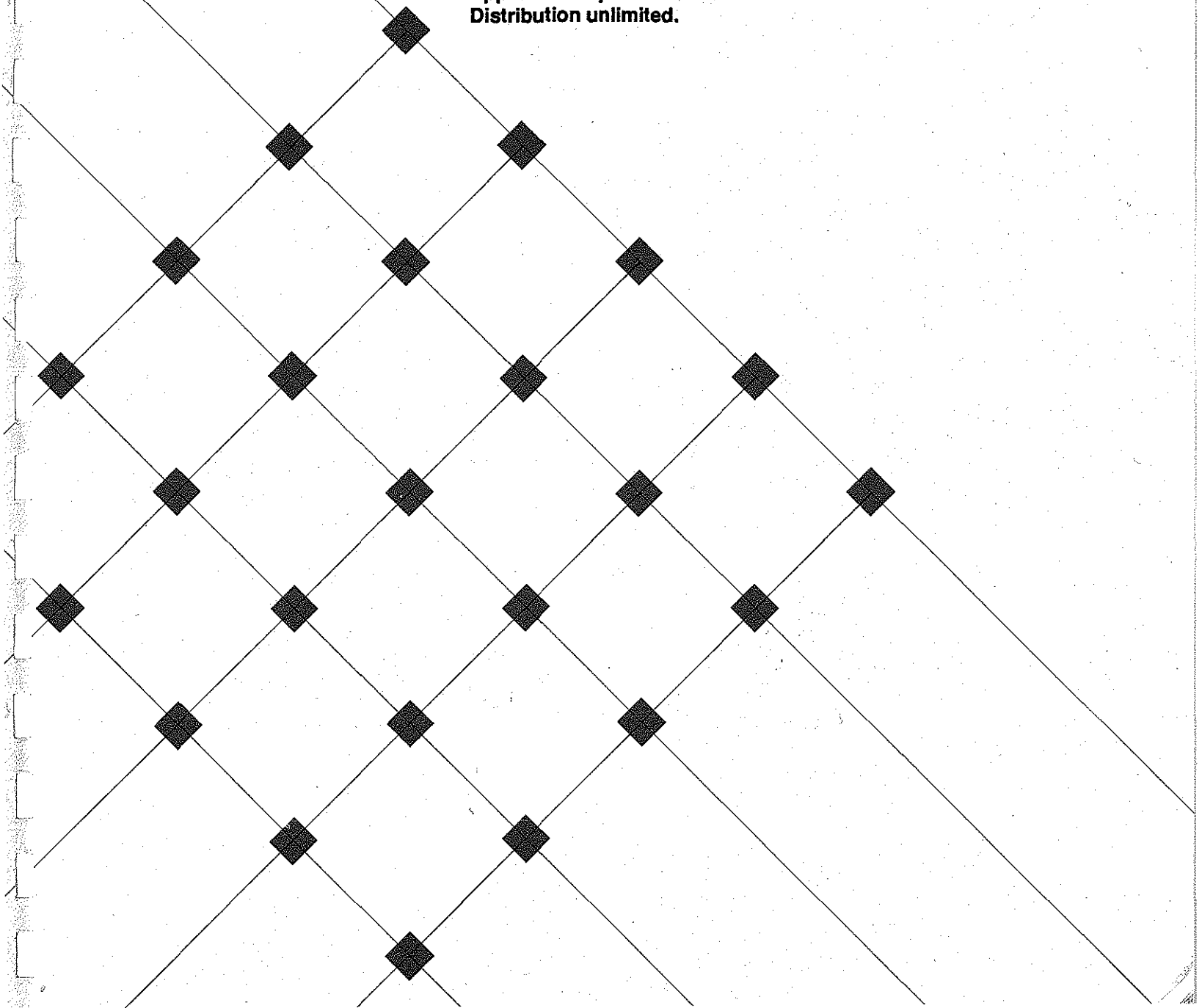
Technical Report
CMU/SEI-86-TR-1
Carnegie-Mellon University
Software Engineering Institute

Toward a Reform of the Defense Department Software Acquisition Policy

by
Pamela Samuelson
Principal Investigator

April 1986



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July 21, 1986

Mr. Norman J. Latker
Director, Federal Technology Management Policy
Office of Productivity, Technology and Innovation
U.S. Department of Commerce
14th and Constitution, N.W.
Washington, D C 20230

Dear Mr. Latker:

At long last, the Software Licensing Project's "Toward a Reform of the Defense Department Software Acquisition Policy" report is available for public dissemination. This report, a copy of which is enclosed, is the culmination of approximately eighteen months of intensive study into Defense Department procurement policy with respect to software and data rights. It is the product of a research effort which included interviews with individuals from industry and government alike who must on a regular basis work within the environment created by the DoD acquisition regulations. It reports a wide range of problems that both industry and the Department have been experiencing as to software procurements.

The report makes a number of suggestions for changes to the DoD procurement policy that may alleviate some of the difficulties our research uncovered. We hope that the report will provide government and industry with some new information and ideas that will assist in the resolution of the conflicts over software and data rights acquisition issues. Our hope in forwarding this copy to you is that you will be a part of this process.

If you have any questions or comments regarding this report, please don't hesitate to call me at my office at the University of Pittsburgh School of Law, 412: 648-1389. Thank you for your assistance.

Sincerely,

Pamela Samuelson
Consultant

PS:kll

Enclosure

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Preface

Problem

The Software Licensing Project (SLP) team of the Software Engineering Institute (SEI) was created to study legal issues related to the government's acquisition policy with respect to software and data rights. In conducting its research, a primary focus of the SLP has been the government's problems in structuring licensing arrangements for maintaining and enhancing software, that is, in obtaining sufficient rights in and documentation about software to be able to perform in-house maintenance and enhancement, or to achieve competition for maintenance contracts. To understand the context within which maintenance and enhancement problems have arisen, the project undertook a broad investigation of the government's software acquisition policy. In the course of this investigation, we were made aware of a wide range of software licensing problems being experienced by the government. This report reflects this broad investigation of the DoD's software acquisition policy.

Approach

To initiate our investigation a series of interviews were conducted with Department of Defense (DoD) personnel and other persons recommended by them. The Software Licensing Project investigators interviewed about 120 persons. About 75% of our interviews were with DoD personnel from the Services. More of our interviews were with Air Force than Army or Navy personnel, but we spoke with as many people from the other services as we could. We spoke to contract officers, their supervisors, some contract policy makers, Automatic Data Processing personnel, developers of advanced systems, maintainers of systems, and lawyers who have handled software data rights disputes. More than twenty of our interviewees were from outside the government (See Appendix C.) Some were consultants to the government, and some were people from industry. All "outsiders" interviewed were persons recommended by DoD personnel. The SEI researchers also reviewed prior DoD reports on software and technical data rights policy as well as cases, statutes, treatises, and regulations pertinent to the issues.

Scope of Report

This report does not purport to be a complete account of all problems the Defense Department is experiencing vis-a-vis software acquisitions and data rights. What the report does purport to be is an organized catalog of software acquisition problems reported by those Defense Department personnel whom we interviewed, along with some assessment of their seriousness. Virtually all of the DoD people we interviewed believed the Department to have some software licensing problems. The majority of those interviewed -- including a majority of the DoD people -- believed the government to have many serious software acquisition problems, and strongly urged changes in acquisition policy to remedy the problems.

Executive Summary

Background

From a technological standpoint, software has been a tremendous boon to U.S. defense capabilities. Although many technological possibilities have yet to be realized, it is not so much in terms of its uses and capabilities that the Department of Defense currently finds software troublesome, but rather with respect to more mundane issues such as how to acquire and maintain software developed by private firms. The DoD seems not to have understood software as a technology well enough yet to fashion a set of rules relating to its acquisition and maintenance that makes sense in terms of the technology and the economics of the industry.

DoD sometimes finds, for example, that it is tempting to treat software like it treats hardware. Software is, of course, often an integral part of an effective hardware system (e.g., the guidance system for a missile.) It is, in fact, a substitute for hardware parts that could be built to implement the same system (because the system can be implemented in software, bulk is reduced and a wider range of capabilities may be attained). Software and hardware are both, in some sense, end products; this fact makes it seem as though they ought to be treated the same.

It may also be tempting to treat software as technical data (such as blueprints, written instructions relating to manufacture and maintenance, and the like). Both are in essence recorded information. Whatever can be written on paper can be transcribed into a machine-readable form. These and other factors make the similarities between software and technical data seem strong enough to suggest that a similar acquisition and maintenance policy should be employed with both.

DoD first acquired software under its technical data policy. After a period of frustration, it became apparent that it was inappropriate to acquire software as if it were technical data. (The cost of acquiring government-wide rights -- which is what the technical data rights policy provides -- to software that was needed at only one government installation was impeding the acquisition of such software.) So software (at least in machine-readable form) eventually became differentiated from technical data in the regulations, although software and technical data policy continue to be somewhat intertwined. Thus while rights which attach to proprietary software are different from those that attach to technical data, the same standard data rights clause is nonetheless used to acquire rights in both.

The question is whether software has yet been adequately differentiated from technical data and differentiated in the right ways. Has software as a technology been adequately understood by DoD and have the legal rules and practices developed by DoD to acquire and maintain this technology been molded to conform to an appropriate understanding of the technology? DoD's rules and practices regarding software must make sense not only in terms of the technology but also in terms of the government's needs to use the technology and in terms of the economics of

rights" in the software in one provision and only "governmental purpose" rights in another provision. This ambiguity has caused considerable confusion among DoD personnel. A clarification of DoD's intent as to the scope of its rights when contractors retain copyrights is needed.

1.1.2 The Failure to Include a Right to Make Derivative Works Within the Definition of Unlimited Rights

The current definition of unlimited rights speaks only of rights to "use," "duplicate," and "disclose" software developed at public expense. Derivative works rights are particularly important because maintenance, enhancement, reuse, translation, rehosting and retargeting of software are all dependent on having a derivative works right. Considering the importance of such a right to DoD, it would seem prudent to include such right explicitly in the definition of "unlimited rights."

1.1.3 What It Might and Might Not Mean to Have Unlimited Rights in Non-Deliverables

Under the DoD standard data rights clause, the government appears to claim unlimited rights in items developed under a government contract but not required to be delivered to the government. Numerous problems of this sort have arisen in software contracts. The DoD would be well advised to revamp its acquisition regulations to eliminate such confusion, either by eliminating its claim of unlimited rights in non-deliverables or by making a deferred ordering clause standard.

1.1.4 The Apparent Conflict between the Special Works Clause and Section 105 of the Copyright Law

DoD policy calls for use of the "special works" clause when the government wants to own and control software developed at public expense. The "special works" clause purports to give the government a direct copyright interest in such software as if it was a "work made for hire." Unfortunately, Section 105 of the copyright law prohibits direct acquisitions of copyrights by the government. A copyright obtained in this manner might, therefore, be found invalid if challenged in a court of law.

1.2 Ambiguities or Problems in the Regulations That May Harm Industry's Interests

There are also some ambiguities and apparent inconsistencies in the DoD acquisition regulations which seem to work to the disadvantage of industry. Two examples are discussed.

1.2.1 Possible Unlimited Rights in Proprietary Software When Separate Licensing Agreements Are Not Made

The DoD acquisition regulations provide that when DoD acquires software developed wholly at private expense one of two types of restricted rights will apply. One set is applicable to commercial software and one set to other than commercial software (and to commercial software whose owner elects not to have it treated as commercial software.) As to the commercial software, there is a standard set of terms and restrictions on the government's use. As to the other software, it is contemplated that other terms and restrictions can be negotiated by the parties, subject only to the requirement that the government must always have the four minimum rights set forth in the clause. The language of this part of the clause also seems to contemplate that a license agreement containing other restrictions will be negotiated and made a part of the government contract.

1) How to acquire rights in or access to CAD/CAM programs used in the development of software for the DoD; 2) Acquiring rights to local area network usage of software; 3) Acquiring rights in semiconductor chip designs; 4) Acquiring trademark rights in software; and 5) The effect of "shrink wrap" licenses accompanying software delivered with restrictive notices.

Chapter 1 also offers some suggestions on how DoD might revise its software acquisition regulations to avoid some of the pitfalls discussed in the chapter, and makes recommendations as to how the data rights clause might be restructured so as to achieve greater simplicity and clarity.

Chapter 2: Software Maintenance and Enhancements

This chapter discusses a range of licensing problems that DoD personnel identified as software maintenance and enhancement problems. One of the reasons why maintenance and enhancement problems may be so difficult to solve is that they are not one but many problems.

The chapter begins with a discussion of the set of problems that the RFP for the Software Engineering Institute initially identified as difficulties DoD was having in getting sufficient rights in and documentation about software to enable the software to be competitively maintained or enhanced, or sometimes to be maintained in-house.

The report concludes that obtaining rights in the government to modify software is not a current software licensing problem of the Defense Department. The DoD procurement regulations require that in all software acquisition contracts for proprietary software the government must at minimum get the right to modify the software. This regulatory authority is important since copyright law might otherwise prohibit the modification of software without the permission of the copyright owner to make a "derivative work." The DoD regulations appear to be sufficient to secure for the DoD the right to modify software it acquires.

Getting adequate software documentation seems to be the major software maintenance and enhancement problem experienced by the Defense Department. The reasons for this problem include: 1) lack of farsightedness in acquiring sufficient documentation, 2) lack of diligence in supervising delivery of documentation, 3) lack of adequate inspection as to attachment of restrictive notices, 4) poor quality of some documentation delivered, and 5) unwillingness of some companies to provide certain documentation to the government.

Without adequate documentation, maintenance and enhancement of software will be at least more difficult, and perhaps impossible.

Under the DoD procurement regulations, the government obtains the right to modify software, but does not automatically acquire the right to sublicense its modification right to others. If the government has unlimited rights in software, obtaining competition in software maintenance and enhancement contracts may not be difficult. If, however, the government has only restricted rights as to software and limited rights as to documentation, it will probably have to do any maintenance and enhancement work itself, or through the firm that originally developed the software. This firm

need greater training in the area of software procurement so as to achieve a better understanding of the technology they are charged with acquiring. Personnel practices need to be improved to retain those personnel who have acquired some training and experience. Improved communication mechanisms between those acquiring a system and those who will use the system need to be developed and implemented. Chapter 3 discusses ways in which such changes might be accomplished.

Chapter 4: Reusability and Other Software Derivative Works Problems

This chapter considers a host of problems that arise when "derivative works" are created from an original piece of software. Particular attention is given to concerns of DoD personnel about software reusability.

The term *software reuse* has several meanings. A common factor to each of these meanings, be it a project which reuses a particular module of code or one which reuses the logic, structure and/or design of a program, is that it may be an instance of the creation of a derivative work which may involve the complex regulations of the copyright law.

The copyright law gives to the holder of a copyright certain exclusive rights in the subject matter of the copyright. Included among these exclusive rights is the right to make derivative works based on the original copyrighted item. For the government to make, or have made for it, software which is in some way derived from a program in which another party holds a copyright, without having first obtained the permission of the copyright holder, raises the possibility that the government will be found to have infringed the copyright. As a result, the government may be prohibited from making use of the newly developed software.

The potential impact of the derivative works right for software is broader even than its effect on software reuse projects. Virtually any effort which in some way alters software and causes it to act in a way different from its original function may be found to be the creation of a derivative work should the copyright holder challenge the government's actions in court. Thus, even basic maintenance and enhancement efforts, as well as rehosting, and retargeting, to the extent that the changes may be said to improve the software, might be found to be derivative works -- the creation of which infringes the rights of the copyright holder. Such projects also raise questions as to ownership rights in the newly created product.

This chapter discusses these issues at some length, noting that the legal issues which arise in the context of the derivative works right of the copyright law are as significant as the technological, sociological and cataloguing problems which must be confronted when dealing with software reusability. These are issues which the DoD should consider in preparing to undertake such projects.

A mark cannot be both a trade mark and a certification mark; it must be one or the other. It is important to know which type of mark you have since different rights attach depending on whether it is a trade mark or certification mark. If one tries to enforce rights one does not in fact have in the mark, or otherwise misuses one's rights in the mark, one runs the risk of losing that mark.

A trademark can only be owned by persons who manufacture or distribute goods bearing that particular mark. By contrast, the owner of a certification mark is prohibited from being either a manufacturer or distributor of goods for which certification is sought. Unlike a trademark, a certification mark does not signify the source of goods; it signifies only that certain goods have met a certain standard. To obtain rights in a certification mark, one must register the mark with a federal agency, and develop certain standards that others must meet to be certified to use the mark.

Since the DoD intends to use its rights in the word "Ada" to establish certain standards which must be met before an item can be certified as an "Ada" compiler or whatever, it appears that "Ada" is a certification mark rather than a trade mark. If this assumption is correct, then it is important that the government not take ownership in software using this mark. It must also police use of the mark by non-certified parties. It must make sure that the mark is not used for other than certification purposes. And it must not deny certification to qualified parties. Failure to follow these guidelines could result in loss of a certification mark. It also must develop standards for everything it wishes to be able to certify (not just compliers).

Chapter 7: A Hypothetical Illustration of Software Licensing Problems under the Existing Regulations

This chapter uses a hypothetical software environment system developed at DoD expense to illustrate some of the problems discussed in previous chapters. It may be easier to comprehend the seriousness of and interrelationship of these several problems by examining them through a hypothetical example.

For instance, this chapter points out serious problems that may arise due to the conflict between the unlimited rights provision and copyright retention clause of the DoD acquisition regulations, questions as to ownership rights in modified software which has been derived from software in which a contractor holds a copyright, the need for an adequate definition of the term "governmental purpose," and issues related to government ownership of copyright, patents, trademarks, warranties, and export controls. Although this chapter represents a hypothetical example, the problems it illustrates are very real. Given the number of ambitious software engineering projects which the DoD has been funding in recent years, it would be wise to solve the problems this Chapter discusses before they erupt into litigation.

cannot reside in hardware since reverse engineering of the hardware would readily reveal any such "secrets.") Because software tends to be protected through both copyright and trade secret law, there is good reason to be concerned about the injunctive potential, although in some situations the government might be able to avoid the issuance of an injunction.

An additional basis for concern about injunctive relief has been expressed because of a series of recent federal court decisions which have suggested that injunctive relief may be available to prevent the government from releasing material in which it claims unlimited rights but which is claimed as a trade secret by its producer. This danger was thought by several DoD lawyers to be particularly acute in disputes with subcontractors because until recently there has been no formal procedure under the Contracts Dispute Act for handling controversies about data rights as between a subcontractor and the government. Some thought that the Contract Disputes Act should be amended to eliminate this risk. One provision of the 1985 DoD Authorization Act may partially address this problem.

Chapter 10: CAD/CAM Programs

This chapter poses a series of questions that have been troubling DoD personnel about computer aided design and computer aided manufacturing (CAD/CAM) programs.

CAD/CAM programs are being increasingly used in both the design and manufacture phase of DoD funded projects. Because of the potential commercial value of CAD/CAM programs, and the widespread industry concern about the government's ability to safeguard valuable commercial information, some contractors are reluctant to provide DoD the CAD/CAM programs used to design and manufacture items developed under DoD projects. Without access to the tool used to develop a product, the maintenance and enhancement of that item may be more difficult, and perhaps impractical.

One potential solution to this dilemma is that DoD may be able to contract for obtaining access to the CAD/CAM program (although perhaps not a copy of it) on an "as needed" basis for necessary maintenance and enhancements. This would provide the DoD with information needed for modifications while at the same time protecting the contractor's interests in commercially exploiting its valuable program. For such an arrangement to be satisfactory, however, the government would need to have assurances that it would have continual, irrevocable access to the original program used to develop and/or manufacture the item acquired.

It may be beneficial to the government for the responsibility for maintaining the CAD/CAM program to remain with the contractor. Although with an access arrangement the government would lose an element of control by not having physical possession of the program, it might gain in terms of ease of retrieval and not having to trouble itself with configuration management for the system.

A major problem with making arrangements for DoD to get access to CAD/CAM programs is that

works protected under the copyright or patent law. Since there are many government projects which will likely make use of specially designed chips, it would seem advisable for the DoD to consider adopting a policy that takes note of the chip law.

Chapter 13: Approach to Solving DoD's Software Licensing Problems

This chapter offers some suggestions about an approach that DoD might consider undertaking to resolve the software licensing problems raised in this report.

There is no easy way to solve all of DoD's software licensing problems. There are too many different types of problems, stemming from too many different causes. There is also too much money at stake for any "quick fix" solution to work. The situation is made more difficult by the strained relationship which currently exists between industry and government with regard to software/data rights issues.

That does not mean, however, that none of DoD's software licensing problems can be resolved quickly or easily; nor does it mean that most of of its problems are unsolvable. Removing the ambiguities and inconsistencies from the existing procurement regulations, for example, would require some relatively minor alterations to those regulations. Although some of DoD's software licensing problems may be more resistant to solution than others, there may well be ways of approaching even the major problems that would be more constructive than other approaches which might be taken.

The crucial point is that not all of DoD's software licensing problems can, or should be treated in the same way. There are certain problems which DoD has more control over than it does others. In allocating resources, we suggest that DoD place a greater emphasis on those problems which are more readily within its control, and, therefore, could be more easily resolved. There are also some software licensing problems that are by their nature more amenable to change than others. Again, in allocating the time and resources of DoD personnel to addressing software licensing problems, we advise that DoD attempt to focus its limited resources on those problems which are most likely to be impacted by such an effort.

The reality of today is that many firms on the "cutting edge" of software technology can survive without doing business with the government. The DoD needs the latest technology in order to maintain a strong defense and military capability. Thus, it seems clear that in many cases, DoD needs industry more than industry needs DoD. Given this situation, it seems incumbent upon DoD to make some effort to improve the strained lines of communication between it and private industry.

Our conclusion is that industry people is willing to meet with DoD in an effort to resolve differences which exist. It is clearly within the power and control of DoD to pursue such communications, and would likely be one of the most beneficial steps DoD could take toward resolving many of its software licensing problems.

1. Problems Arising from the DoD Data Rights Regulations

There is considerable support within DoD, especially among its non-lawyers, for a major overhaul of the regulations with respect to data rights affecting software procurements. Industry also tended to favor a major overhaul. Many of the DoD procurement people (and some of its lawyers) would like to see the regulations adopt a simpler, more reasonable approach to software licensing, one more like that used in private sector software transactions. Some of the DoD personnel to whom we spoke regarded the basic approach of the DoD data rights regulations as sound, although they also tended to think that there were some problems with some details of the regulations as applied to software.

We believe that there are some serious problems with specific details of the present regulations as they bear on software licensing, some of which have erupted in specific instances. The first several sections of this chapter discuss specific aspects of the DoD procurement regulations as they bear on software licensing problems raised by DoD personnel. At a minimum, some revisions in the regulations to avoid these problems would seem wise.

To us, the DoD software procurement regulations resemble one of those old 1950's model computers that tend to go "down" a lot because of burned out vacuum tubes and other equipment failures. If the question is can it be fixed up yet again, the answer is probably yes. If the question is instead whether it is time to get a new computer, the answer is probably also yes. The current regulations are overly complicated, ambiguous and inconsistent in a number of ways, not only in terms of commercial practices but also in terms of the precepts of intellectual property law. Revising the format of the regulations could not only simplify, clarify and update procurement practices, but also serve to improve relations with industry. The final subsection of this chapter discusses the reasons we regard the proposed FAR data rights regulations as better serving the DoD's interests than the current DoD FAR SUPP and its proposed revisions do.

Finally, it should be noted that while this chapter and several subsequent chapters place particular emphasis on the copyright law as a means by which contractors can protect certain interests in software they have developed, they do so because this reflects the approach used in the DoD procurement regulations. In industry, trade secret protection, not copyright, is often the preferred mode for protecting one's intellectual property rights in software and technical documentation. The DoD procurement regulations, however, do not recognize the existence of trade secret protection for software or technical data ([8] pp 430-31). The regulations instead create a kind of contractual intellectual property right in them. The government contractually recognizes certain proprietary rights in privately developed software. The DoD regulations do, however, specifically incorporate copyright law in some respects, and also seem to contemplate that copyright law may govern as to some things.

poses (see section 1.3.1). DoD personnel need to understand the limitation the copyright retention provision may impose on the government's rights.

The current regulations should be revised to clarify the government's intention as to the copyright retention provision. Perhaps the government needs to give itself an unlimited license in copyrighted material funded by it, or perhaps the unlimited rights policy should be modified to make it clear the government will only claim rights for governmental purposes. The government needs to make a choice, and then to clearly communicate the direction it has chosen.

1.1.2 The Failure to Include a Right to Make Derivative Works within the Definition of Unlimited Rights

The current DoD FAR SUPP definition of unlimited rights, both in the policy and contract clause provisions of the procurement regulations, neglects to make explicit whether the government will have the right to prepare derivative works when it has unlimited rights in software ([61] secs. 27.401 and 52.227-7013(a)). The current definition speaks only of rights to "use," "duplicate," and "disclose" such software. Derivative works rights are particularly important as to software because maintenance, enhancement, reuse, translation, rehosting, and retargeting are all dependent on having a derivative works right. (See also Chapter 4). It is, of course, possible that a court might construe the existing clause to include a derivative works right notwithstanding the failure to mention this important right in the definition, but it would seem prudent to make explicit the government's claim as to derivatives if indeed this is as significant a need as some believe, especially since it is so easy to do. That the proposed Federal Acquisition Regulations explicitly define unlimited rights to include a derivative works right weakens DoD's argument of implicit inclusion.

1.1.3 What it Might and Might Not Mean to Have Unlimited Rights in Non-deliverables

The government claims unlimited rights in all technical data and software developed under a government contract and at public expense ([61] sec. 52.227-7013(b)(1)). Often a government contract will call for delivery of only certain specified items of technical data or software. Sometimes the government may get wind of some valuable intellectual property developed under the contract (and in which the government, therefore, claims unlimited rights) whose delivery has not been required by the contract, but which the government would very much like to have. The contractor may even offer to "sell" this valuable thing to the government. Such an offer is likely to be rebuffed by government lawyers who may insist that "it's already ours."

Although the regulations do seem to give the government unlimited rights in all data and software generated under a government contract, and Professor Nash in his book, *Patents and Technical Data* ([8]) speaks of the government having an "inchoate" right to such things (pp. 450-51) it is difficult to know what it means to claim unlimited rights in something which you don't have and which the person who has it is under no enforceable obligation to give to you.

1.1.4 The Apparent Conflict between the Special Works Clause and Section 105 of the Copyright Law

The policy provisions of the DoD FAR SUPP advise procurement personnel to use the "special works" clause ([61] sec. 52.227-7020) when the government wants to exercise ownership and control over software developed at public expense ([61] secs. 27.402 and 27.405). Unfortunately, Section 105 of the Copyright Act of 1976 [59] (selected portions of the Copyright law can be founded in Appendix A) expressly prohibits the federal government from owning copyrights directly. It does, however, allow the government to take copyrights by assignment, bequest, and the like. Trying to take the copyright in software as if it is a "work made for hire" (as the special works clause purports to do) does not seem to be a taking by assignment or bequest. (See Chapter 5.)

Section 105 of the copyright law may, therefore, have the effect of nullifying the "special works" clause ([61] sec. 27.405) and the implementing clause ([61] sec. 52.227-7020) insofar as they purport to give the government a direct copyright interest in works prepared for it by private contractors. DoD does not by regulation have the power to nullify statutes, so if there's a conflict, it is the DoD regulation that must yield. (We have been informed that the DoD's special works clause has been used in many development contracts for software. This raises the specter that any software in which the government claims direct copyright interest through the special works clause will be held to be in the public domain).

If DoD wants to own copyrights in certain software, it may want to consider adopting an approach similar to that which NASA or the newly proposed FAR regulations have taken, which allows the government to require the contractor to obtain a copyright in the software developed at government expense and assign it back to the government. (See Chapter 5.)

1.2 Ambiguities or Problems in the Regulations That May Harm Industry's Interests

Just as there are several provisions of the current DoD regulations that seem to offer the government lesser rights than it might have expected it had, there are several provisions that suggest that even when software and its associated documentation have been developed wholly at private expense, unwary contractors may find the government claiming unlimited rights in these materials rather than the more restrictive rights the contractor might have expected. Two instances of this type of problem are discussed in this section.

1.2.1 Getting Unlimited Rights in Privately Developed Software Seemingly Subject to Restricted Rights as to Which a Separate License Agreement Has Not Been Incorporated Into the Contract

The DoD standard data rights clause ([61] sec. 52-227.7013(b)(3)) distinguishes between two types of restricted rights, those applicable to commercial software and those applicable to other software. As to the former, there is a standard set of restrictions on the government's use. As to

nological innovations will be unavailable to DoD. For this reason, it would be wise to revamp the DoD procurement regulations so as to avoid such "booby traps."

1.2.2 Getting Unlimited Rights in Software Documentation as to Other Than Commercial Software

Software documentation is often included in manuals. It may also be characterized as instructional material necessary to maintain a system. Manuals and instructional material necessary to maintain a system, which are required to be delivered under a government contract, are materials in which the government, through the standard data rights clause ([61] sec. 52.227-7013(b)(1)(vii)) claims unlimited rights even if it has been developed at private expense. Since virtually all software documentation may be construed to be within the clause, potentially all software documentation may be subject to unlimited rights claims. Since software documentation tends to be particularly sensitive commercial information, this creates a prospect for considerable loss if a company provides documentation to DoD.

If the documentation pertains to commercial software, it might arguably be exempted from the broad reach of the unlimited rights provision because the commercial software restricted rights provision ([61] sec. 52.227-7013(b)(3)(ii)) indicates that not only the machine-readable code but any related software documentation that has been developed at private expense and is not in the public domain will be subject to restricted rights. If the documentation pertains to non-commercial software, there is no comparable basis for claiming an exemption under the other restricted rights provision, ([61] sec. 52.227-7013(b)(3)(i)). Some DoD people think this means that the government will have unlimited rights to other than commercial software documentation, even though it was developed at private expense and is not in the public domain.

Like the previously described example, this "booby trap" requires a highly technical reading of a very complicated and long (nine page) clause. Like the other example, the incongruity is not obviously flagged so that a diligent industry person who read the clause would understand what he or she was giving up. Like the other incongruity, it is most likely the result of imprecise drafting rather than being an intentional statement of clearly articulated policy. It would make no sense to interpret the clause as subjecting the machine-readable code to the restricted rights provision and yet to treat the documentation (which would likely contain all the most sensitive, commercially valuable information) as if the government had unlimited rights in it and could show it to whomever it wished. Again, even if the government chose to litigate the issue and won, it would stand to lose credibility because of the perceived unfairness of such a position.

It should also be noted that the DoD procurement regulations do not clearly distinguish commercial software from other than commercial software. According to the regulations, software is commercial if it is "used regularly for other than government purposes and is sold, licensed or leased in significant quantities to the general public at established market or catalog prices" ([61] sec. 27.401). It seems that as much as 55% non-government sales and use might be required in order for software to qualify for treatment as commercial software ([8] pp 501). The precise dividing line, however, is unclear. It should also be noted that software which is developed for the

The way intellectual property law tends to define "ownership" and "property rights" is not so much in terms of what a particular person can do with a particular thing, but in terms of what right he or she has to exclude other people from doing things with that property. (Patent law, for example, gives the patentee the right to exclude others from making, using, or selling the patented invention for seventeen years ([65], sec. 154). The government's "unlimited rights" definition seems to go to what the government can do with software and its documentation and what it can authorize others to do, and does not grant any rights to the government to exclude others from it. For this reason, intellectual property law would likely treat "unlimited rights" as a broad license, not as an ownership interest (e.g., Regents of the University of Colorado v. K.D.I. Precision Products, Inc., [43], discussing the difference between "unlimited" and "exclusive" rights).

1.3.2 Governmental Purpose

If all "unlimited rights" truly means is a license to use "for governmental purposes," it is important to understand what the latter term means. Unfortunately, the DoD FAR SUPP does not define the term at all. Does it mean:

a) for use by all federal governmental agencies, or only by DoD, or only by the particular service that obtained the rights? If the former, does that mean NASA can get it for nothing just for the asking?

b) for use by state or local governments if the DoD thinks it a good idea to share the software?

c) for use by foreign governments to whom the U.S. government wants to give it?

d) for use in the defense community as a whole (including all private firms who contract with DoD) if DoD thinks it is a good idea to share the thing?

e) for use by defense contractors in foreign countries to whom the government might want to give the software?

f) for use to enable the government to get something at a low cost or for free? (See Chapter 7).

g) for use in competitive reprocurements or maintenance contracts?

Because of Congress' recent intense concern about competitive reprocurements, the last of these questions may seem to be of the greatest topical interest, but all of these questions are of considerable importance. Prior case law would seem to take a narrow view of the term's meaning ([8] pp 425-426).

1.3.3 Privately Developed Software

Because so much of DoD's policy on the allocation of rights turns on whether software was developed at private or public expense, it would be highly desirable to define this term in the regulations, and to make its definition part of one of the standard clauses required to be placed in all development contracts. In this, we concur with the earlier conclusion of the OSD Technical Data Rights Study [11]. That Study's definition ("developed without direct payment by the government which requires the performance of the developmental effort") is a step in the right direction,

mediate arrangements between the "floor" and "ceiling" may be appropriate, depending on governmental needs. If that is the intent, there are simpler ways to say this than the current DoD regulations do.

1.3.5 Distinguishing Types of Documentation

The definitions to the procurement regulations do not differentiate at all among the various types of software documentation. Some documentation contains sensitive information, and hence, is jealously guarded by the developer. For example, documentation which reveals internal design information, algorithms, and proprietary information of a program may need to be distinguished from training and user manuals. Industry may be willing to accept a broader rights package as to the latter types of documentation. However, unless a more restrictive rights package is available as to the former, the company may choose not to do business with DoD, or may sell only "old" technology to DoD. DoD's policy should reflect these concerns by distinguishing forms of documentation in such a way that differential rights treatment can be effected.

1.4 Issues Not Addressed in the DoD Regulations

1.4.1 CAD/CAM Programs

An issue frequently raised by DoD procurement personnel in our interviews was how to fit computer-aided design/computer-aided manufacturing (CAD/CAM) programs into the regulatory structure for DoD procurements. A separate chapter (Chapter 10) discusses the CAD/CAM issues at greater length. The primary reason CAD/CAM programs seem difficult to fit into the DoD FAR SUPP structure is that the structure assumes that the government will obtain a physical copy of any proprietary software which it chooses to acquire. If the government gets a physical copy, it will get at least the four minimum rights in the software that are set forth in the regulations.

Purveyors of CAD/CAM programs have sometimes been willing only to license certain access to their CAD/CAM programs, and not to allow the government to get a copy of the program itself and not to get the standard set of minimum rights to the software. A second important facet of the CAD/CAM dilemma is that manufacturers of major systems for the government who use CAD/CAM programs may be much less willing to deliver large volumes of technical data about the system, arguing instead that the government's needs can be met by controlled access to the manufacturer's CAD/CAM program. This may make the government more dependent on firms using CAD/CAM programs when seeking competitive reprocurements. The present regulations do not provide guidance about how to deal with this situation.

1.4.2 Local Area Networks

It is becoming more common for units within the Defense Department to establish local area networks which share software. The DoD procurement regulations do not provide guidance about making acquisitions of software intended for use in network environments. NASA regulations do

1.4.7 Software Warranties

A number of people raised the issue of what if any warranties the government can or should get in software. Those persons pointed out that there are provisions in the DoD FAR SUPP ([61] specifically sections 27.410-5 and 52.246-7001) regarding warranties for technical data. Because software is a developing art, it may be difficult to obtain warranties for it, but numerous people have indicated a desire for a policy about software warranties. Whether, in the absence of any contractual provision concerning warranties, the government may claim implied warranties (e.g., of merchantability or fitness for a particular purpose) have attached to delivered software is addressed in Chapter 11). If getting more explicit standard warranties for software is desired, some regulatory guidance might be helpful to procurement personnel.

1.4.8 "Shrink Wrap" Licenses

Much of the commercial software presently available in the market comes with what purports to be a "licensing agreement" either inside the box or just under the plastic wrapping (commonly known as "shrink wrap" licenses). Typically these forms provide that by opening the box or the plastic wrapping, one will be presumed (by the software vendor, if not by the law) to have consented to a series of restrictions on use of the software, as well as to have accepted that one is not really the owner of a copy of the software, but only a licensee of the manufacturer, and to have agreed to respect the manufacturer's trade secrets and other proprietary rights in the software, and to have consented to a variety of other matters (e.g., what state law will apply in a dispute). When the government buys this kind of software, the question is whether these licenses bind the government. This question was raised time and again in our interviews with DoD personnel.

One view within DoD is that the procurement regulations (and in particular the standard data rights clause) would be given legal effect, even if not explicitly incorporated into the contract. Others thought that perhaps the shrink wrap licenses might be viewed as modifying (and controlling) the standard clause, or that the absence of the basic data rights clause in the purchase arrangement might mean it would not govern. Because a raft of questions about shrink wraps often come up, it is worth going into them in somewhat more detail, as the next subsection does.

1.5 Shrink Wrap and Other Standard Licenses

The first three subsections deal with a set of questions which were posed to us about shrink wrap licenses. The last several subsections deal with questions which DoD might want to ask.

1.5.1 Authority to Bind

By far the most commonly asked question about these licenses was who was supposed to open the package to validate them (or who is to sign in the case of other standard licensing arrangements). It was widely thought that unless the contract officer broke open the package or

1.5.4 Are These "Licenses" Enforceable?

A question which should be asked is whether these shrink wrap licenses have any legal effect whatever. Although the States of Louisiana and Illinois have passed laws recognizing their validity, there are many who regard these "shrink wrap" licenses as unenforceable as a matter of contract law, imposing, as they attempt to do, restrictions on the purchaser's rights after the contract has been made, and relying, as they do, on opening a package or box as indicative of consent when it may easily be indicative of disregard.

Others question the legality of certain provisions of shrink wrap licenses under the copyright law because the licenses purport to control uses that can be made of the software. Copyright law does not give copyright owners any rights to control use. These "licenses" also purport to deprive purchasers of rights they would be entitled to as "owners" of a copy of software, such as the right to resell the copy and the right to make a "backup" copy.

1.5.5 NASA's Special Data Rights Clause

To give clear guidance to NASA personnel who are responsible for procuring commercial software, NASA has adopted a regulation to clarify that the government's data rights under the original sales contract will not be superceded by delivery documents containing inconsistent data rights provisions ([64] sec. 1827.473-4(b)(2) and 1852.227-79). In essence, what that clause says is "notwithstanding anything that might be construed to the contrary, the government always gets the following minimum rights and government procurement regulations govern if there are any other seemingly inconsistent terms." In effect, this clears up all the problems described in the first three subsections above.

1.5.6 "Published" Commercial Software

One other part of the same NASA regulation which DoD might want to consider adopting is that which "lifts" the restriction on the government's right to disclose copyrighted software that has been "published" (widely distributed with a copyright notice) within the meaning of the copyright law. If copyrighted material has been "published," the ideas and information it contains are considered to be in the public domain, which should mean that restrictions on disclosure should cease. Whether the government can simply disregard such a restriction, or whether the data rights clause contractually binds the government to respect the limitations that others in the world are free to ignore is a close question (see Aronson v. Quick Point Pencil Co. [20] suggesting that the government would be bound.)

Because copyright law does not give the copyright owner any rights to control "uses" of his or her work (except public performances and displays), it may be that both DoD and NASA could adopt a regulation for "published" software which would lift restrictions as to what computers or facilities could use the software.

1.6.2 "License Rights"

Apart from the repudiation of the fixed expirations, the other major recommendation of the OSD Technical Data Rights Study was to add a third option to the arsenal of potential ways to get rights to technical data. Although the OSD study [11] did not address software issues, in speaking with members of the Study Group, it was clear that they intended the "license rights" option to be applicable to software as well. The proposed DoD data rights regulations issued in the late summer of 1985 would create a new "license rights" option, although the intent of this provision seems to be somewhat different than what had been intended by the OSD Study Group, which in turn was different from what industry had in mind when it began promoting the idea of "licensing". It may be helpful to lay out what we have been able to discern as to the thrust of the OSD study proposal, of the industry proposal, and of the proposed regulations, and to comment on each in turn.

What we take to be the aim of the OSD study recommendation is to enable the government to impose a requirement upon its contractors that they license competitors to make use of proprietary data in competitive reprocurement (or in the case of software, maintenance/enhancement) situations. Because industry strongly objects to the government simply handing proprietary data and software over to any low bidder that comes along, and has been arguing forcefully for a "licensing" approach alternative, adoption of a proposal of this sort may be an important step in improvement in relations with industry. Implemented in an optimal way, the OSD Study Proposal might even save DoD a lot of money. It is worth noting, however, that industry's intent in promoting the licensing concept seems to be twofold: first, to maximize the amount of control a contractor may have over the competitor or potential competitor as to its use of the proprietary software (industry wants a direct relationship, not just granting power to the government to sublicense whomever it pleases) and second, to begin to move the government closer to the standards that prevail in the commercial arena (See e.g., [12]). By contrast, the intent of the recently proposed DoD regulation for "license rights" seems to be to give the government the option to negotiate expirations for restrictions on software or technical data. The regulation proposal thus would shift substantially the thrust of the "license rights" proposal as originally conceived by the OSD Study Group.

The major reservation we have about the OSD Study Proposal and the proposed regulation is that the "license rights" option may not be explained well enough for contract officers and other people who will look to the regulations for guidance to understand the intent and implement it as it was intended to be implemented.

To be more specific, one of the problems with both the OSD proposal and the proposed regulation is in the name it gives the option. The OSD Study, for example, states: "Current policy provides only two recognized ways to acquire technical data rights: Limited and unlimited. The policy should be expanded to include licensing" ([11] at 20). The ordinary person reading this would tend to think that "licensing" must be something different from "limited" or "unlimited" rights, when in fact, both limited and unlimited rights seem to be particular types of licensing arrangements. (If you own something, you own something. If you let someone else use that thing, you license its use, regardless of whether you give the person a broad or a narrow license.)

accurate (discussed in Section 1.3.1), and that term means only a license to use for governmental purposes and to sublicense for the same, then there would be no difference between the OSD Study "license rights" option and "unlimited rights."

Furthermore, the OSD Study draft reprocurement license clause was long, complex, and unclear. (For instance, it often referred to "direct license rights" which it did not define. Is this a direct license between the contractor and the government, or a license between two contractors?) The OSD draft license rights clause also seems to be written as though it is unrelated to the standard data rights clause although in fact it would modify it. The aim of the draft clause seems to be only to address the spare parts reprocurement issue, although the need for licenses to get competition may be broader than that (e.g., software maintenance). Software is not mentioned at all, and the draft license rights clause would not be readily adaptable to software.

Industry would seem to have a decided preference that if another firm has to be licensed to use the first firm's trade secrets, the two firms make arrangements directly so that in the event of an abuse, the first firm can proceed directly against the second firm rather than have to try to push the government to do something. Industry also doesn't like the government to dictate or supervise terms of licenses. The OSD draft clause accepts the industry preference for contractor-to-contractor licenses. It is worth noting (as unfortunately the OSD study does not) that there are serious dangers of overreaching (exclusionary conduct in antitrust parlance) by the original contractor in any arrangement which would involve licensing of competitors as to valuable technologies. If the government does not want to end up paying through licensing essentially the same amount as if there had been a sole source, some government supervision of the terms and conditions of the license would seem to be necessary in direct competitor situations.

The license rights option, as reflected in the proposed DoD regulations, is a far cry from the license rights proposal that industry has been promoting. It is far from clear that the new DoD option will be acceptable to industry which can always opt to stick with limited or restricted rights for valuable technologies.

1.6.3 Predetermination (to be Renamed as Prenotification) of Rights

The OSD Study favored use of a predetermination of rights clause in all development contracts although the Study thought it should be called a "prenotification" clause instead of a predetermination clause. The clause, in essence, requires the parties to identify all software and technical data that will be delivered under the contract with restrictions on the government's use of it. Many of the DoD personnel to whom we spoke supported use of this clause. Some regarded it as essential. While the aim of the clause -- to clarify data rights as much as possible at the outset -- is laudable, many people in the field regard the clause as unrealistic and unworkable, especially as to software. How can one say what rights the government will get in software from third tier subcontractors when the software may not yet exist, or if it does, the prime may not yet have identified who will deliver it, let alone with what rights? One person likened the predetermination process to asking Lewis and Clark to prepare a set of "triptiks" for their exploration of the Oregon Territory before they'd set out on their journey.

of restricted rights for software and yet another set of restrictions ("limited rights") for technical data. It is also difficult to comprehend why the regulations subject software documentation (which is classified as "technical data") to different restrictions than machine-readable code (i.e., "software"). This doesn't seem to make sense given that in the commercial market these things are treated as subject to the same restrictions. Why one would treat documentation for commercial software differently than other software documentation is also mysterious.

Even if there is good justification for treating technical data other than software documentation differently than software, it doesn't make sense to have two so similar and yet not identical sets of restricted rights for software. What DoD seems to need to do is set a "floor" of minimum rights it must always get in software (perhaps to be named "minimum rights") and then let the parties negotiate other rights and restrictions (perhaps to be stamped "negotiated rights - see Contract No. _____") as they see fit. The proposal found at the end of this section attempts to develop a set of minimum rights for software and technical data (lumped together under the definition of intellectual property). Simplifying these provisions would also eliminate the "booby traps" that the current regulations set for the unwary business, as well as eliminating the "booby traps" that might close on the government.

1.7.2 Not Getting as Many Rights as DoD Needs

It is understandable that in reaction to the spare parts competition problems which were due in part to the government having gotten inadequate rights to certain technical data and which have come under intense Congressional scrutiny, DoD would make efforts to adopt policies aimed at assuring that such problems would not occur in the future. The seemingly obvious ways to accomplish this are either: (a) to acquire unlimited rights in all technical data and software (either initially or through fixed expirations on restrictions) or (b) to get the option to allow the government to acquire at a later time unlimited rights to technical data or software for a price negotiated at the time the contract was made. Both would seem to achieve the objective sought (being free of restrictions on use and disclosure), but at a very high cost. Industry has been outraged by efforts of these sorts and has apparently expressed their outrage by pricing their technology at stratospheric levels. Perhaps such approaches were overreactions to the problem. Not having asked for enough for awhile, now perhaps the government was asking for more than it needed, and the problem deepened rather than being resolved.

What was true when the procurement scandals "broke" -- and what probably remains true today -- is that there are instances in which the government is not getting as much data rights as it needs. The two areas as to which we have reason to think present data rights policies may be insufficient pertain to use and disclosure of technical data to third parties for spare parts reprocurement purposes, and use and disclosure of software and documentation to third parties for maintenance or enhancement purposes. Perhaps specific provisions could be written to accomplish these objectives. As the discussion of "license rights" above indicates, some efforts are in the process of being made to do this, at least as to technical data. A more limited reaction is one which industry may be willing to try to live with.

have no reasonable expectation of receiving a continuing stream of income from the product, and that, as a result, the government isn't getting the best technology. Some government people might think, "a private firm has incentive to deliver the best software to us (even though we have unlimited rights) because it's OK with us if they take the thing to the commercial market."

There are a couple of problems with this theory. One is that since the government claims an unlimited right to disclose the software developed at public expense to any one for any purpose, the government always has the power to pull the rug out from under the commercial market (for in today's market, it is the valuable secrets embodied in the software that seem to determine its commercial value). This means the firm can never be sure there will be a commercial market there to tap. Secondly, the government sometimes wants to "give away" valuable software in which it has unlimited rights to other private defense firms to enable those firms to perform better work on government projects. The problem is that the software's developer may see these other defense firms as its primary commercial market. This too can undermine the potential incentives that government people tend to think the private firm has retained.

It is worth pointing out that Congress has enacted a law to encourage small firms to develop and deliver to the government the highest quality, most innovative products, namely the Small Business Innovation Development Act [68] which gives participating small firms the right to retain ownership rights in patents developed at public expense, with a license back to the government to use the patent for governmental purposes. Previously the government could have taken ownership of patents developed at public expense. It is not surprising that software firms hail the SBIDA as the "enlightened" and "modern" policy that the government should follow as to software.

As far as we are concerned, the government is welcome to retain its broad unlimited rights policy. It just shouldn't be surprised if this policy results in its getting less high quality products. Whether it should retain this policy or narrow it to a governmental purpose policy depends on what its goals are. If the primary goal is to get the best available technology and improve incentives, it should adopt the SBIDA approach. If its primary goal is to get as much data rights as it possibly can in hopes that will save money down the line, it should stick with unlimited rights.

It might be wise for the government to consider voluntarily giving up its broad unlimited rights policy for software and explicitly adopting a policy more in line with the SBIR policy as to patents, or adopting a policy under which the government would take less than unlimited rights when mixed funding was used for software development. This might be a step toward improving relations with industry without giving up what the government truly needs. The government may still wish to retain the power to obtain ownership rights in intellectual property when achievement of certain well defined goals would seem to require broader control than simply a license to use for governmental purposes. But it might be easier for industry to accept the government's need to sublicense for reprocurement and maintenance purposes if the government was willing to trim back somewhat its unlimited rights policy.

(3) Other Licenses Possible: When the government needs to have more than minimum rights in certain intellectual property, the government and contractor can enter into other licensing arrangements, but in no event can the government enter into a licensing agreement for intellectual property which gives the government less than minimum rights.

Rights of the Contractor

(1) Ownership: The contractor shall be considered the owner of all intellectual property developed at public expense under this contract, except as to contracts in which the special works clause is used, subject only to granting the government an unlimited rights license to the intellectual property.

(2) Copyright: The contractor may obtain and retain a copyright on all intellectual property delivered to the government under this contract except when the special works clause is used. The contractor's obtaining of a copyright shall not limit the government's rights under its unlimited rights, minimum rights, or any other license.

(3) Restrictive Markings: The contractor may attach appropriate restrictive legends to its intellectual property, as set forth below in section (d).

Rights of Subcontractors

(1) Getting Same Data Rights From Subcontractor: Whenever intellectual property is to be obtained from a subcontractor under this contract, the parties shall use this same clause in the subcontract, without alteration. No other clause shall be used to diminish or enlarge the government's or contractor's rights in the subcontractor's intellectual property required for the government.

(2) Direct Delivery to the Government: Subcontractors under this contract may deliver technical data in which the government will have less than unlimited rights directly to the government rather than through the prime contractor.

(3) No Leverage: The contractor and higher-tier subcontractors shall not use their power to award subcontracts as economic leverage to acquire rights in intellectual property from their subcontractors for themselves.

(4) Right to Attach Restrictive Markings: Subcontractors under this contract shall have the same rights to attach restrictive markings to their intellectual property as the contractor does to intellectual property.

Restrictive Legends

(1) No Marking If Unlimited Rights: Intellectual property in which the government has unlimited rights shall be delivered with no restrictive markings. Unmarked items delivered under this contract will be presumed to be items in which the government has unlimited rights.

(3) Computer Software: "Computer software" means all firmware, software, data bases, and documentation for the same.

(4) Technical Data: "Technical data" means [same as the current definition but excluding computer software documentation].

(5) Minimum Rights: "Minimum rights" means:

(a) as to technical data, the right to use, copy, and disclose the material within the government; and

(b) as to computer software, the right to

(i) use it at the facility for which it was acquired or to which it is transferred;

(ii) the right to use it with a back-up computer if the computer for which it was acquired becomes inoperative;

(iii) make back-up copies for safekeeping, and for modification purposes;

(iv) modify it, or combine it with other software (modification will not alter restrictions on the software).

[end of clause]

Additionally, DoD might want to develop standard licensing clauses giving the government the right to sublicense use of proprietary intellectual property for competitive reprocurement or competitive software maintenance purposes, subject to appropriate restrictions on any third party use of this property. In Chapter 2 we offer some suggestions about how the potential for competition in software maintenance situations could be maximized.

Another thing that might be desirable to consider is the development of one standard data rights clause for all intellectual property, including patents and chips, which would define the minimum rights in each respective type of subject matter in the definition of "minimum rights." It does not seem desirable to have a wholly different policy (and structure for that policy) for patents and for other types of intellectual property. Integration at least ought to be considered, and hopefully attempted.

If the alternative draft clause set forth above was adopted by DoD, it would remove some of industry's complaints about it, but that might only serve to sharpen the areas of disagreement. Industry would like for DoD to give up claiming "unlimited rights" in software and technical data developed at public expense, and to adopt a policy of only taking what the current regulations call "license rights" in these things, that is, a license to use intellectual property for governmental purposes and to sublicense for the same purposes. Industry regards this SBIR-type approach as the "modern" and "enlightened" solution to data rights acquisitions. Only modest changes to the draft clause above would be necessary to incorporate this industry preference in the standard data rights clause. An intermediate position would be to have the government take unlimited rights in things completely funded by the government, and only a governmental purpose license

1.8.1 The Proposed DoD FAR SUPP May Be Inconsistent with the Proposed FAR

The proposed DoD FAR SUPP doesn't even define terms the same as the proposed FAR. For example, the FAR definition of "unlimited rights" is more precise and comprehensive than that found in the proposed DoD FAR SUPP. Other terms common to both are defined somewhat differently for no apparent reason. Such inconsistencies are likely to result in confusion and misinterpretation.

In substance, the DoD FAR SUPP provisions are quite different from the FAR provisions. In particular, the DoD FAR SUPP fails to claim the full set of minimum rights the FAR proposal says that government is supposed to acquire in restricted rights software. The failure of the DoD FAR SUPP to claim the fifth minimum right that the FAR would allow, namely the right to sublicense support contractors, may seriously impede the ability of DoD to obtain competition for maintenance and enhancement of its software.

1.8.2 The Proposed FAR Policy is Preferable to the DoD Policy

The proposed FAR policy is more comprehensible than the DoD Policy.
It is:

- more concise
- more straightforward
- more consistent with commercial practice
- more consistent with intellectual property law

The proposed FAR policy avoids the anomolies and inconsistencies inherent in DoD Policy. For example:

- The FAR avoids the conflict between the DoD FAR SUPP "special works" clause and Section 105 of the Copyright Act.
- The FAR, in contrast to the DoD FAR SUPP, avoids the conflict between the unlimited rights clause and the retention of copyright clause.
- The FAR avoids the confusion caused by the two sets of restricted rights found in the DoD FAR SUPP.
- The FAR avoids the problems caused under the DoD FAR SUPP by treating software and documentation differently.
- The FAR avoids the problems caused by the DoD FAR SUPP practice attaching two different meanings to the term "license rights."
- The FAR avoids the potentially harsh result which could occur from failure to negotiate a separate licensing agreement as to restricted rights software under the DoD FAR SUPP.

The proposed FAR provides a more precise definition of "unlimited rights," including within this definition the right to make derivative works. This right is important if DoD is to be able to maintain, enhance and reuse software. The more limited definition of the DoD FAR SUPP, in contrast to the FAR, may be seen as a rejection of this right by the DoD. This could have extremely serious repercussions for DoD.

2. Problems Arising from the Need to Maintain and Enhance Software

Apart from the set of software acquisition problems arising from the DoD procurement regulations discussed in Chapter 1, the next most complex and difficult set of software acquisition problems that were identified by DoD personnel in the course of our investigation related to the maintenance and enhancement of software. Software often requires some modification to correct "bugs" or other deficiencies which may not be discovered until after the software has been acquired, and perhaps even after it has been embedded in a larger system. In addition, the user may want to have software modified so as to add some new capability or function beyond that which the product was originally intended to perform, or to upgrade the software when new technological developments are achieved. (Problems relating to these sorts of modifications will hereinafter be referred to as "maintenance/enhancement" problems.)

The adaptability of software over time is one of the great advantages of software as compared with hardware, but adaptability is not an unmixed blessing. Along with adaptability comes a complex set of licensing problems that have frustrated DoD personnel as they have sought to acquire excellent adaptable software at the lowest cost. One set of these problems arises from the debate within DoD over whether it is wise or cost-effective to compete the maintenance or enhancement of software to third party contractors, or even to do maintenance/enhancement work in-house.

The first four sections of this chapter discuss the licensing aspects of this controversy and recommend some strategies for how DoD might compete software maintenance if it chooses to do so. The chapter also discusses some of the disadvantages of competing software maintenance. The remaining two sections of the chapter discuss a variety of other problems identified by DoD personnel as software maintenance/enhancement problems. One of the reasons software maintenance/enhancement problems may seem intractable is that they are not one but many problems. There is no quick fix that will solve all of them at once.

2.1 Getting Sufficient Rights in or Documentation about Software to Enable DoD to Do "Organic" or Competitive Maintenance or Enhancement for Software

The initial statement of work for the Software Licensing Project (as reflected in the SEI RFP) indicated that DoD had been having trouble acquiring sufficient rights in software and software documentation to enable it to maintain or enhance software, either in-house (commonly referred to as "organic maintenance") or by private firms through competitive bidding. DoD sought assistance in solution of these problems.

(e) companies being unwilling to give their source code to the government at any price or under any conditions.

There was general agreement among DoD persons to whom we spoke that steps needed to be taken to remedy this situation. Some were hopeful that solutions could be devised that would create greater incentives for industry to voluntarily cooperate with DoD in its efforts to get better documentation for maintenance purposes. Some worry that punitive approaches would enhance already strong disincentives to cooperate with the government in this respect.

2.1.3 Getting Sufficient Rights in Software and Documentation to Get Competition as to Software Maintenance and Enhancements

Whether the government can get competition in software maintenance and enhancement contracts seems largely to turn on whether the government has ownership of or unlimited rights in software and its associated documentation, or whether the government has only restricted rights as to the software and limited rights as to the documentation. If the government has ownership or unlimited rights, getting competition in software maintenance/enhancement contracts is said to be easy. If instead the government has only restricted and limited rights, it seems that getting competition is very difficult. Defense Department personnel generally report little success in getting "proprietary" software competitively maintained.

As the DoD regulations are presently written, while DoD virtually always has rights to modify the software, the regulations do not provide DoD with the rights necessary to sublicense the modification right to others. Such a right must be specifically negotiated. That means that getting competition as to maintenance and enhancement of restricted rights software will only be feasible if the software's owner will agree, which he need not. If he will not agree, DoD will either have to do the modifications itself or hire the original firm to do the maintenance on a sole source basis. Because many software companies may wish to have sole source maintenance contracts with DoD, their incentives to agree to competitive maintenance are minimal. The critical point is that the only time there may be any opportunity to get such agreements to allow competitive maintenance is during the original competition when the development contract is let.

2.2 Maintenance Needs for Things Used in Performance of Government Contracts: Software Tools and CAD/CAM Programs

Documentation may not be the only thing which may be needed in order to maintain or enhance software and the systems of which they may be a part. Access to software tools or CAD/CAM programs which a firm may have employed in developing the system may also be needed. Industry is likely to be even more sensitive when the government expresses its interest in obtaining such tools or CAD/CAM systems for maintenance and enhancement purposes than it would be about the government obtaining software documentation, especially if the government seeks to obtain such things for competitive maintenance purposes.

These programs may be essential to do maintenance and enhancement work for the system. Chapter 10 discusses the CAD/CAM problem at somewhat greater length, but because the government's need for CAD/CAM programs largely centers on maintenance needs, it seemed necessary to flag the issue in the maintenance section as well.

As with the software tool problem, the CAD/CAM problem is one about which the industry is extremely sensitive, and one for which, as a consequence, it may be difficult to find a compromise solution that will be acceptable to both the government and industry.

2.3 Structural Problems with Getting Delivery of Adequately Supportable Systems

2.3.1 Different Interests of Buyers and Maintainers within the Government

There appear to be some structural problems internal to the Defense Department that may make adequate planning for software maintenance and enhancement difficult to achieve. Major weapons or communication systems acquired by DoD may include complex software components. These systems may also require significant and complex software systems to support the major systems. If the command which purchases the system is not the command which will use, maintain, or enhance the system, it may not be aware of the extent of software documentation that will be needed to use, enhance, or maintain the software, and it may not be as sensitive to the need for supportability software as the using or maintaining command might need it to be. Although there are some structural mechanisms within DoD that are intended to provide opportunities for communications about such matters, they do not seem to be working as successfully as DoD may wish. This is seen by many to be a contributing cause toward the software maintenance and enhancement problems DoD has encountered down the line.

2.3.2 Sole Source Maintenance as a Habit

From procurement personnel's point of view, if a company has built a complex piece of software for DoD, and it's a good piece of software, that company will know that software better and will be able to maintain it better than any other company, even if the other company gets the source code. That software engineering is still in fairly primitive stages as an engineering discipline makes reliance on the original developer to do maintenance work seem the most expedient route to take. The developing company will have a better idea of how to avoid the problems that enhancing software so often creates for another part of code. Theoretically, the developing firm will be able to do the job faster, more reliably, and more cheaply than a competitor. And if it's a good piece of code, then the developing company may be thought to deserve to reap some more rewards for it. Besides, procurement personnel may be wont to think, we already know these guys and they do a good job for us. Quality and quickness count for something; money isn't everything. So why not deal with that company instead of having to go through a long drawn out competition process?

(c) DoD should assess the relative costs of acquiring different levels of rights and of sole source, internal, or competitive maintenance over time so that cost-effective choices can be made upfront. DoD should recognize that sometimes sole source maintenance will be cheaper than acquiring all the rights and data needed to do the maintenance in-house.

(d) DoD should insist that its procurement personnel involve both the using command and the maintaining command in the supportability planning, perhaps even getting engineers from these latter commands to sign off on the system.

(e) DoD should train contracting personnel about software life cycle needs, about data rights, and about software documentation as regards supportability needs. (See Chapter 3.)

(f) DoD should consider entering into escrow arrangements whereby documentation may be placed in the hands of a third party, such that upon the happening of certain contingencies, the documentation will be released to the government for maintenance purposes. This would assure that until the happening of this contingency, the industry's valuable software documentation will be protected from disclosure, while at the same time assuring that the government can get access to it under specified conditions.

2.4.2 Getting Sufficient Rights to Enable Competition for Maintenance

(a) DoD should recognize that it may be difficult or impossible to compete maintenance and enhancement of software held as a trade secret by its owner. DoD needs to assess, to the extent it can, what the long term maintenance needs and costs are likely to be, taking into account what cost savings may be achievable by competition. It may not be worthwhile to buy rights to compete maintenance.

(b) DoD's best chance to get competition as to software maintenance will be when it is initially negotiating the system's development contract.

(c) If DoD decides to try to compete the maintenance, it must recognize that it will need to get upfront:

(i) the ability to sublicense its software modification right or a commitment by the contractor to license another company to modify the software;

(ii) the ability to sublicense the documentation about the software, or a commitment by the contractor to license the other company to have access to the documentation;

(iii) very detailed documentation; and possibly

(iv) rights in the software tools, or a commitment from the developing firm to license a competitor's access to the tools.

(d) It may be desirable for DoD to develop a standard competitive reprocurement or maintenance license provision and clause for the DoD FAR SUPP in order to alert contract officers to the need for and the appropriate manner of obtaining rights for these purposes.

less generous to industry than the other provision. Others were utterly baffled by this inconsistency.

Restrictions Attaching to Modified Portions

Several lawyers -- some from government, some from industry -- raised the question of how DoD would treat those portions of the software that were modified. Who would "own" the rights in them? What, if any, restrictions might they be subject to? The DoD regulations are not clear about this (except perhaps as to modifications of unlimited rights software, for which DoD FAR SUPP sec. 27.404-1(a)(4) says the government will have unlimited rights to changes in things in which they already have unlimited rights.) In the absence of clear guidance from the regulations, most of those who have thought about the question have assumed that the government would have unlimited rights in all modifications, whether done by the government or a private firm. Because of the problems arising from the copyright retention provisions of the DoD FAR SUPP and because of certain provisions of the copyright law, which may have a bearing on rights in these circumstances, it is not clear that this assumption is entirely correct (see subsection 2.1.2 and Chapter 4).

Duty Not to Prepare Similar Software

The DoD regulations provide that when software has been delivered at private expense and acquired by the government with restricted rights, the associated documentation will not be used to prepare similar software ([61] sec. 27.404-1(e)). Some have thought this may have some limiting effect on the government's rights to modify software.

Reverse Engineering

If the government has not obtained sufficient documentation in software to enable it to modify the software easily and if either there is not time to get the original contractor to modify it, or the contractor wants an unreasonable sum for the modification, government personnel may try to reverse engineer the software to figure out what needs to be fixed.

Reverse engineering will very likely involve making a copy of the program for reverse engineering purposes. An interesting question is whether the making of such a copy is authorized under the restricted rights provisions of the standard data rights clause. Those provisions seem to limit the right to copy software to archival or back up purposes ([61], sec. 52.227-7013(a) and (b)(3)). Of course, the government might argue that since it is often necessary to make a copy of the software in order to be able to figure out how to modify it, it is impliedly within its modification rights. Software firms, of course, might read the provision more literally, and argue that modifying the code is all the government has bought rights to under the data rights clause.

2.6 Other Software Maintenance/Enhancement Licensing Problems

2.6.1 Effect on Warranties When Software Is Modified

Much of the software available commercially, and much of the software developed for DoD, is unwarranted software, that is, software delivered under contracts which disclaim liability for defects. One DoD lawyer complained to us that often the nearest thing to a warranty the government can negotiate for as to software is a promise from the contractor to take a look at the software and try to fix it if problems later arise. Increasingly, however, the government has been able to negotiate warranties for software systems, and perceives itself to need warranties. As reluctant as firms may be to warrant software, their willingness to negotiate warranties may depend on whether they will get the contract to do all the maintenance/enhancement work or whether the government plans to do the maintenance itself or compete the maintenance. Because enhancements to software will sometimes adversely affect the functioning of the unmodified portions of the code, software producers have legitimate concerns about what might be done to any software they have warranted, but which they are precluded from maintaining. In making licensing arrangements, the government may have to trade getting a warranty in software for getting maintenance competition. Indeed, a contractor will generally include a clause providing that modifications to the software will void the warranty.

2.6.2 Configuration Management

The Air Force, in particular, reports having some difficulty in managing the large volume of information about software and all its many versions that may be necessary to have in order to do maintenance/enhancement work organically or to contract out for such services. This seems to be due, in part, to resource constraints (personnel, expertise, and equipment) and in part, to having "old" information. Delays caused by bureaucratic procedures that must be followed to accomplish a change in the configuration are reportedly also a serious problem. Sometimes, Air Force personnel said, the Air Force takes delivery of software documentation at an early stage, following which some substantial modifications of the software are be made by the developer, about which the government may not have or get full documentation. In some cases, we were told, this was a problem of not having arranged for delivery of later developed material, and in some cases, of not following up on getting delivery of the needed material. Several of the Air Force people with whom we spoke about this matter favored the idea of having the developer do configuration management for Air Force software on the theory that it would be done better by industry than by the government.

2.6.3 Insertion of Proprietary Modules into Unlimited Rights Software

We were told that firms that do software enhancement work on software in which DoD has unlimited rights have on occasion delivered back to the government software into which the companies have inserted proprietary modules.

3. The Need for Better Training about Software, Data Rights, and Intellectual Property Law

Chapter 1 has elucidated the many complexities that the Defense Department's standard data rights policy entails, as well as the necessary and complex interaction of intellectual property law and the data rights regulations. Chapter 2 has observed that software development contracts involve acquiring not only rights in software, but acquiring a substantial volume of documentation that may be needed to maintain or enhance the software. To do this job well, DoD's procurement personnel need to have considerable expertise about software as a technology, about software life cycles, about the supportability needs of software systems, and about the complex data rights provisions. Although our investigation taught us that DoD has many dedicated and intelligent procurement officers, it also taught us that, by and large, DoD's procurement personnel felt that they would greatly benefit by more training about software and about data rights. Many DoD lawyers who have been working in the patent and technical data rights areas could also benefit from broadening their intellectual property expertise to include copyright, trade secret, and chip protection.

3.1 Procurement Personnel Need Training

SLP investigators interviewed many individuals whose job included acquiring software for the government. Those with whom we spoke typically exhibited a dedication and loyalty to their position; they seemed to sincerely want to do a good job. Our conclusion is that DoD already possesses the most important resource needed for a good procurement process --- good people. The DoD could, however, benefit from better development of that resource.

3.1.1 Acquiring Software, Technical Documentation and Data Rights Is a Complicated Process

The process of procuring a system is extremely complex and, at times, confusing. The contracting people must have a grasp of and be able to deal effectively with both complicated procurement regulations and sophisticated technology. The procurement personnel must concern themselves not only with the actual physical procurement of items such as software, but also must obtain sufficient technical data as well as rights in the data and the software in order to allow maintenance and enhancement of the system, and of the software on which the system is likely to be dependent. Adequate assessment of one's needs with regard to documentation and data rights requires at least a basic understanding of the technology to be acquired, including some knowledge of software life cycles.

To further complicate matters, the negotiations regarding the software, technical data and rights thereto will often occur prior to or simultaneously with the actual development of the software, and the data which explains the software. A particular piece of software will often be a small, but vital

If contracting personnel lack an understanding about the technology they are purchasing, they may ask for much more in the way of technical documentation, data rights and software tools than is actually needed to maintain and/or enhance the system. The same is true if they do not understand the life cycle of the software they are acquiring, or what information, rights, and tools will be needed in order to maintain and enhance the system properly throughout its life cycle. As a result, RFPs are said to be vaguely worded about maintenance, and contracting people may ask for more than would be necessary to support the system.

Industry people with whom we have spoken have indicated to us that if DoD contracting personnel were better able to articulate why they need certain documentation, rights or tools in order to support a system, they (industry) would be more willing to provide that which has been requested. As stated in the "Report of the Rights in Data Technical Working Group (RTDWG) Volume II: Supporting Data [13] (a report prepared under the auspices of the Institute for Defense Analysis for the Office of the Under Secretary of Defense for Research and Engineering, and released January 23, 1984), the government needs to

> . . . identify what this equipment is going to do, what the system is going to be, and what its life cycle is going to be and that will give the contractor a warmer feeling that the Government has really done its homework instead of just going out on a fishing trip for all of the data rights, because they really don't know what they want. Report at 211-212.

As long as DoD contracting personnel are unable to specify their needs as to technical documentation, data rights and software tools, it seems likely that industry people will regard DoD's expansive but vague claims of need as an indication that the government has simply not done its "homework" and does not really know what it wants, and will regard such claims with suspicion.

A report prepared by the OSD Technical Data Rights Study Group [11] released June 22, 1984, specifically noted the need for additional training of DoD procurement personnel in the area of technical data rights. This report, prepared by a study group panel which included representatives of the Air Force, Army and Navy, noted that "[c]urrently, training is minimal and there is no requirement to attend mandatory training in the data rights area. Consequently, personnel are not generally conversant with policies, procedures and clauses regarding application of rights in technical data." See "Who Should Own Data Rights: Government or Industry? Seeking a Balance" at 42. The OSD Study Group went on to recommend that OSD "coordinate the development of a comprehensive training program in the area of technical data rights" for DoD contracting personnel. Another OSD report, entitled "DoD Acquisition Improvement - The Challenges Ahead: Perspectives of the Assistant Secretary of Defense for Acquisition and Logistics" (WadeReport, released November 5, 1985) noted this same concern and suggested even more far-reaching changes with respect to the DoD acquisition and logistics work force ([4] at 6-16).

3.2.2 Initial Training Received by Procurement Personnel Does Not Prepare Them to Deal with Software/Data Rights Acquisitions

Currently, it appears that procurement personnel receive no initial training as to the technology involved in software, technical documentation, and data rights which they are charged with acquiring; nor do they receive any training which would enable them to understand life cycle concerns which are so important in this area. Consequently, the software/data rights area is an area of weakness with regard to DoD procurement practices.

The contracting personnel with whom we have spoken identified this deficiency as a major flaw in their preparation for the role in which they function. Indeed, the people we spoke with indicated that, with the exception of a few initial courses covering areas such as basic contract law and procurement management, almost all of the preparation they have received for the work they do has been in the form of on the job training.

3.2.3 Supervision and on the Job Training of Contracting Personnel Has Been Weak in Recent Years Due to a Shortage of Experienced Personnel in This Area

Procurement personnel normally work their way up through the ranks. (Division Chiefs were at one time Contract Officers, Contract Officers began as Contract Negotiators, and so on.) Supervisory personnel thus understand the job of those they supervise, and have the knowledge necessary to assist them. Thus, on the job training plays an important role in the development of the procurement officer's skills. There has, however, reportedly been a decline in the number of experienced procurement personnel on the job for the DoD. In one command, we were told, fifty-five per cent of the procurement people were inexperienced. The more inexperienced the staff, the less efficient will be the on-the-job training.

3.3 Ongoing Training of Procurement Personnel

3.3.1 Current Status of Ongoing Training

Our research found that procurement personnel typically do receive some form of ongoing training, a kind of continuing education or in-service training. This ongoing training, generally provided on a monthly basis, has, however, tended to focus on what one contracting person referred to as current "hot issues." For example, the emphasis of sessions during our interview period had been on the Competition in Contracting Act, particularly what it means to procurement personnel. Software and data rights issues, we were told, have tended to be overlooked in such training.

various locations where procurement personnel work. Some version of the training might also be included in the initial training received by new procurement personnel.

The training should include, as a minimum, some coverage of:

a. How to deal with software/data rights acquisitions in an RFP, including some focus on adequate specification of what is being requested.

b. What software is, and how technical documentation, data rights and software tools apply to it.

c. Why life cycle concerns are important to software acquisition.

d. Why maintenance and enhancement concerns are important to the system/software being acquired.

e. How technical documentation, data rights, software tools, and life cycle concerns affect the ability to maintain and enhance system software.

f. How to understand and apply the procurement regulations relating to software/data rights acquisitions.

g. What flexibility and discretion is afforded contracting personnel under the relevant regulations.

2. Provide for greater standardization in RFP's. Such standardization should include a focus on:

a. A clearer specification of what is being requested.

b. Incorporating some mechanism whereby maintenance/enhancement concerns will be recognized and dealt with at the RFP stage of a procurement.

3. Develop a feedback mechanism whereby procurement personnel will be made aware of maintenance/enhancement problems which arise as a result of inadequate system support.

4. Reusability and Other Derivative Works Problems Involving Software

There has been considerable interest in recent years within the Department of Defense about promoting "reusability" of software. For a variety of reasons, discussed briefly below, software reuse is an attractive idea. However, DoD personnel seem troubled by a range of problems with attempting to implement reusability projects. Among the more serious of these problems is how DoD might make appropriate licensing arrangements with private firms so as to promote reuse of software. It is not yet clear that software reuse will be able to live up to the promise that some of its promoters have held out for it.

It is, of course, important to understand that software "reuse" is a term that refers to a wide variety of things, including large software programs composed largely of modules of standard code that can be combined to produce specific application programs, programs that are built upon and incorporate all or part of pre-existing programs, programs that were developed in conjunction with one government project that are furnished on a "GFI" (government furnished information) basis to subsequent contractors for use in subsequent projects, and even reuse of software designs or algorithms when writing new application software. There is a lively controversy within DoD over which model of reuse is the "best" or "most appropriate" model from a technical standpoint. We do not have the technical expertise to assess the merits of the claims made for or against the various models of reuse. Although different models of reuse may present different technological challenges, each has a common legal denominator. Each may be an instance of a "derivative works" right problem under the copyright law.

Copyright law gives the owner of a copyrighted piece of software the exclusive right to control the preparation of "derivative works" from the original work. Copyright law defines "derivative work" in a broad fashion; it is a work based upon another work. [59] sec. 101. Although there is as yet little case law to flesh out the meaning of the derivative works right in the software context, it is conceivable -- perhaps even likely -- that all models of software reuse discussed above may create derivative works problems unless the reuser is the same person as the owner of the original copyrighted software.

Unfortunately, it is not just software reuse that seems to raise derivative works problems for the government. Modification and enhancement of software also are instances of creating derivative works. Translating code from one computer language to another, revising code so that it can be executed on different hardware or so that it can generate code to be executed on different kinds of hardware, and perhaps even all forms of computer-generated works may be within the meaning of the "derivative works" right under the copyright law.

DoD's acquisition regulations are not currently structured so as to facilitate licensing arrangements that will promote reuse of software or harmoniously deal with other forms of the derivative works problems. DoD lawyers seem inexperienced with software technology and with the in-

developed by company A in a contract for another radar system to be developed by company B. Doing so will constrain choices about other elements of the radar system, such as what computer and operating system company B can use. These constraints, in turn, may limit other choices. Company B may well think that these constraints will inhibit its development of a superior system. Moreover, unless the two radar systems are intended to serve precisely the same function in precisely the same way, reusability requirements can lead to trouble. It is common knowledge that many adjustments in software (to add a new capability, to modify a function, even to fix a bug) can create unforeseen problems with the unmodified portions of the software, some of which may show up immediately, some of which may show up down the line. Documentation about the software obtained from A and given to B may either be inadequate or incomprehensible to B, which may further increase the risk of unintended ill effects when making the necessary modifications for the second radar system. Reuse may also mean using "old" technology instead of new and better technology. Perhaps even more significant than these problems with reusability is the practical problem of giving company B a handy scapegoat whenever there are problems with the second radar system: it will always be said to be the fault of the GFIed software.

Yet the Navy seems willing to accept these risks and has taken to evaluating bids for certain new systems based on the percentage of software reuse the bidders are willing to commit to making, and are requiring use of certain software on a GFI basis in subsequent projects.

Creating structural incentives for the contractors to reuse either their own or other software would seem to be a promising short term strategy for the Defense Department. It might also be beneficial to do follow up studies of Navy reuse projects. Perhaps the Navy approach will be proven more viable than Air Force personnel seem currently to believe.

4.1.2 Ownership Issues and the Derivative Works Problem with Reuse

There seemed to be considerable consensus among DoD personnel to whom we spoke that unless the government owned or had unlimited rights in software to be reused, reuse would be difficult to impossible to achieve. Although company A in the radar example above might be willing to license company B's use of its proprietary software, the government can not count on company A's cooperation, because company A may prefer to have the follow-on contract. Even if company A was willing to license reuse, it could be expected to charge B a rather hefty sum for the privilege of reuse, which might mean that the ultimate cost savings to the government from reuse would be minimal to nonexistent. And even if company A gets the follow-on contract and reuses its own software, that may only reduce the time required for development, not necessarily the cost (at least not by much since company A might be a low bidder only by comparison with the bids of others who would have to develop the software from scratch). As with competitive maintenance, reusability of software is made more difficult when proprietary software is involved.

Even if the government has paid for the development of the software intended for reuse and expects to get unlimited rights in the software, there may be a problem with actually getting unlimited rights; if the development firm decides to take a copyright in the software, the govern-

new program is created through its use.) A firm that developed a "perfect" program of this sort would, in essence, put itself out of business after its first sale to the government, for if the government had unlimited rights, the government could give the reusable code away to anyone and everyone if it so chose. Even a follow-on contract for maintenance might be of limited interest to the developer of reusable modules.

If, however, the firm could be sure it could have a substantial commercial market for the reuse program without fear of government "giveaways," or if the firm could collect a royalty upon reuse of its components, then theoretically it would have a strong incentive to create an excellent set of modules so that its modules would be used instead of those of another firm. (Of course, it is important to remember that in the real world there is a big difference between creating incentives for excellence and the actual creation of an excellent product.)

4.1.4 Problems Associated with Configuration Management or Libraries for Reusable Software

Several DoD personnel with whom we spoke about reusability of software expressed doubts about the feasibility of efficient and cost-effective software reusability, given the substantial costs associated with managing the large volume of data needed to keep track of all the software components the government might want to reuse. This challenge is by no means peculiar to the DoD. Reuse of software requires an elaborate library or cataloguing system, whereby both the government and subsequent software developers can be made aware of and have access to software which can be reused. While the development of such an accessing system does present some challenge, it may not be insurmountable. [1]

4.2 Other Derivative Work Problems

Software is now considered to be copyrightable subject matter. Although not all software is copyrighted, much of it is. Many firms that claim copyright protection for their software also claim trade secret protection for the same software. Copyright owners have the exclusive right to prepare, or authorize preparation of, derivative works. [59] sec. 106 (2). The derivative works right can give rise to a number of different types of problems in addition to those already discussed in Section 4.1, each of which is discussed below.

4.2.1 Maintenance and Enhancement of Software

Because another chapter has been devoted to this topic, this section will do no more than reiterate that when the government maintains or enhances software, in each instance it may be creating a derivative work which, unless authorized, might infringe any copyright held in the software by a private firm (except for the fixing of a "bug" that had rendered the software inoperable, which would be privileged under section 117 of the copyright law.) Because of the broad definition accorded the concept of a derivative work, it is conceivable that even maintenance efforts might fall with its scope.

4.2.4 Reuse of Software Designs

The government may sometimes want to reuse the design of a piece of copyrighted software in another software project. The question is whether the government needs to worry about copyright interests in such a case. Recent copyright precedents have suggested that reuse of software designs may infringe the copyright (e.g., Whelan Associates, Inc. v. Jaslow Dental Labs, Inc. [50]) finding infringement of dental laboratory software copyright based on structural similarities between programs). There are some copyright scholars who would argue that reuse of software designs involves reuse of ideas, methods, processes, and discoveries of the software which do not infringe the copyright law under 17 U.S.C. sec. 102(b) [59] but as yet the issue is unsettled. It again creates a potential for liability against the government if care is not taken in licensing arrangements with respect to the original software.

4.2.5 Government Rights in Contractor-Prepared Derivative Programs

A problem discussed at some length in Chapter 7 is what rights the government should have in subsequently developed derivative software made from software prepared for and funded by the government. The government will sometimes want to claim rights in these derivatives, even though there may be no contractual obligation requiring the contractor to give the government a copy. Copyright law would not seem to give the government rights in the derivative software unless the government had an ownership interest in the original copyright.

4.2.6 Programs Produced Through Use of Other Programs

As noted above, there would seem to be copyright problems if modules of proprietary software were "reused" by combining them together to create a new piece of application software because a derivative work would seem to have been created. In such a case, portions of identical code would be included in the new work. A copyright owner in the baseline program would, therefore, seem under the copyright law to be the owner of intellectual property rights in the new application software. Arguments might be made that this should not be an infringing derivative work since it is the very purpose of the base program to produce application software, however the question is a close one, and if it matters to DoD what the answer is, making appropriate contractual arrangements to allocate ownership would seem wise.

An even closer and potentially more troublesome question is whether the owners of copyrights in software tools (or other types of software capable of being used to create new software) have any claim to rights in programs produced through use of their proprietary programs. The definition of derivative work under the copyright law is sufficiently vague that it is conceivable that a court might find software generated through use of other software to be a derivative work. In such an instance, the code would not be identical, but the second piece of code would be "derived" from the first.

It is conceivable that a contractor might attempt, pursuant to a software license, to claim rights in software developed by the government through use of the contractor's software. We have heard

5. Government Ownership of Copyrights

When DoD wants to take a direct ownership interest in a work prepared for it by a private contractor, the DoD FAR SUPP directs that the "special works" clause found at DoD FAR SUPP ([61] sec. 52.227-7020) be used in the development contract ([61] sec. 27.405). The clause in effect claims a direct copyright for the government under the copyright "work made for hire" doctrine. We understand that this "special works" clause has been used in a number of DoD software development contracts. Indeed, it appears that a deviation would be required to attempt take a copyright interest in any other manner.

There are two problems with use of the special works clause for this purpose, one, that software is not one of the categories of specially commissioned works that qualifies for "work made for hire" rules, and second, that the copyright law specifically prohibits the government from taking direct ownership rights in copyrighted works ([59] sec. 105). The legislative history of this section reflects that Congress considered the issue of copyright ownership of works prepared for the government by contractors and decided that while agencies could decide that contractors could be permitted to retain copyrights, the government could not get direct copyright ownership in works prepared for it. ([6] at 59.)

Copyright law permits the government to own copyrights only by assignment, bequest, and the like. Taking a copyright as if the work was "made for hire" is not the same as taking a copyright by assignment or bequest. What the DoD "special works" clause will be effective in doing is precluding the contractor from claiming any ownership rights in the software. If the Defense Department wishes to obtain a copyright interest in software, it would be well-advised to adopt a strategy similar to that adopted by NASA and that proposed under the new FAR.

5.1 Assignment of Copyrights: The NASA and FAR Approaches

NASA lawyers with whom we spoke questioned the validity of the DoD approach to taking copyrights, and offered their strategy as an alternative possibility. The NASA strategy attempts to take advantage of the explicit exception contained within Section 105 which allows the government to hold a copyright transferred to it by assignment. When NASA wants a copyright interest in software, it inserts a special works clause in the development contract which requires the contractor to obtain a copyright registration for the work (such as software) and then to assign the copyright to NASA ([64] secs. 1827.473-3 and 1852.227-77).

The recently proposed FAR has a somewhat more complicated approach to the "special works" problem than does the NASA policy. Under the allocation of rights provision of the FAR special works clause, the government claims four things: (1) unlimited rights in all data (which includes software and technical data) delivered under the contract and in all data first produced in performance of the contract (2) the right to limit the contractor's exercise of claims to copyright data first

from Congress, these two reasons can be turned around and used to construct a rationale for a software exception to the general rule against copyright ownership.

5.3.1 The Double Subsidy Argument

One concern evident in the legislative history of Section 105 was that the public would, in effect, be paying a double subsidy for the work if the government were permitted to obtain copyright protection in works produced at public expense --- first in the form of tax dollars spent to develop the work, and then in the form of the higher prices which would be generated by the commercial advantage of copyright protection.

This rationale for the Section 105 prohibition does not explain why Congress decided to treat government ownership of copyrights and patents differently. The same double subsidy concerns would seem to exist for patentable works produced at public expense. In either case, the public is paying twice if forced to 1) support the development of the work with tax dollars, and 2) then pay a higher price for access to the work due to the commercial advantage generated by a particular form of intellectual property protection. Perhaps, therefore, the double subsidy argument does not seem to have been Congress' primary concern.

One can turn the double subsidy concern around by pointing out that there may sometimes be a strong need for the government to have a copyright to accomplish its objectives for software produced at public expense. It may sometimes need the power to control uses that other firms, including the contractor that originally produced the software, may make of the software, and may, in particular, need to be able to control the preparation of derivative works. To insure that the government will not have to pay again for the privilege of exercising such control, allowing the government to own the intellectual property interest may be important. If private industry is to be permitted always to retain ownership interests in software developed at public expense, the result will likely be greater expenditure of funds by the government and by the public at large -- that is, a greater subsidization by the public -- a result which runs counter to the policies underlying Section 105 of the Copyright Act. The government could use such an argument in an effort to bring about legislative reform of the Copyright Act so as to provide a software exception from the Section 105 prohibition.

5.3.2 The Free Flow of Information Argument

The other major reason for the prohibition against government ownership of copyrights explains why there is a differential treatment as to patents and copyrights. The legislative history of Section 105 and its predecessor Section 8 of the previous Copyright Act speak of an intent to place "all works of the United States Government, published or unpublished, in the public domain," and of the need to have works "freely available" ([6] pp 58). Indeed, the most cited case dealing with the prohibition against copyright for government works (Public Affairs Associates, Inc. v. Rickover [42]) looked primarily to such free flow of information concerns in determining the scope of this prohibition. As the court stated in Rickover ([42] pp 268) the prohibition against the U.S. Government securing copyright protection for works developed at public expense "is designed to

6. Problems Arising from the Government Trademark Rights as Regards Software

In recent years the Defense Department has been acquiring, maintaining, and enforcing trademark rights in words used in connection with software (among them, in "Ada"). We have not had an opportunity to see the government's trademark registration certificate or to thoroughly investigate the trademark questions discussed below. However, because "Ada" and other similar trademarks seem to be important to the government and because interviews with DoD personnel seemed to reveal some misconceptions about trademark issues (and about the perils of not being careful about use of trademarks) it seemed that these concerns needed to be raised. They seem deserving of further study.

6.1 What Kind of Mark Does the Government Own?

A question which we put to several government people who seemed knowledgeable about the "Ada" trademark was what kind of a mark it is: a trademark or a certification mark? There are important differences between the two, and some important limitations on rights depending on what kind of mark it is. The government people to whom the we spoke seemed not to know what kind of mark "Ada" was.

6.1.1 What a Trademark Is

A trademark is a word, picture, or symbol which a manufacturer or seller of goods adopts and affixes to his products in order to identify that manufacturer or seller's goods and distinguish them from others' goods ([63] sec. 1127). ("Kellogg's," for instance, is a trademark for cereal products, which the mark's owner stamps on the box to allow consumers to discern that this box of cereal was made by Kellogg, and not by another cereal manufacturer.) Trademark law is aimed at protecting consumers from being confused, not at protecting the valuable property right the owner of the mark may have or thinks he has in the mark. To serve a trademark function, a word or other symbol cannot be a functional part of the product, and it has to signify to consumers from whom the goods come, not what kind of goods they are.

6.1.2 What a Certification Mark Is

Trademarks can only be owned by persons who manufacture or distribute goods bearing that particular mark. By contrast, the owner of a certification mark is prohibited from being either a manufacturer or distributor of goods for which certification is sought. Unlike a trademark, a certification mark does not signify the source of goods; it signifies only that certain goods have met a certain standard. A certification mark, then, is a mark used upon or in connection with the products of one or more persons other than the owner of the certification mark which certifies one or more of the following: regional or other origin, material, mode of manufacture, quality, accuracy, or other characteristics of the products ([63] sec. 1127.)

6.2 Who Owns the Ada Trademarks?

"Ada" is most often advertised as "a registered trademark of the U.S. government" or as "a registered trademark of the U.S. Department of Defense." (The AJPO Guidelines the government has issued for use of the Ada trademark are of the latter type.) When we asked DoD people about the potential problem of the government owning programs that might be within the range of its certification, thereby endangering any certification mark it might have, the response was that it is really the Ada Joint Program Office (AJPO) that owns the Ada mark.

However, the government itself widely touts the Ada mark as being owned by the government or DoD. Because of this, it is conceivable that a court would find an overlap of ownership. Furthermore, because a court would be unlikely to enforce a certification mark owned by one division (or even a subsidiary) of a company that certified the products of another, it is not clear that even if AJPO is found to be the legal owner, it is separate enough from another unit of DoD for the certification mark to stand. At any rate, it would seem prudent, if this is to be DoD's defense, to start touting Ada as being owned by the AJPO, or to make sure DoD never takes ownership in any Ada software as a protective measure.

6.3 What is the Scope of the Mark in "Ada"?

Just because the government might properly own a certification mark in Ada as to compilers, that doesn't necessarily mean it owns rights in Ada across the board, or even as to anything relating to software. The point is not an obvious one, and may run counter to what common sense might suggest, but the way trademark theory runs, when someone acquires rights in a mark, he only has the right to use that mark in connection with sale of the particular goods publicly distributed with use of the mark. Someone else is free to use the same mark in connection with the sale of another kind of goods. The reason is that consumers won't be confused if they see the same mark on different kinds of goods. (If you see the word "Tiffany's" on a can of tobacco, you won't think the famous jeweler made it.)

6.3.1 Is "Ada" Generic?

The Guidelines written by the AJPO about use of the trademark Ada state (at sec. 1(b)):

> It is fundamented [sic] important that the Ada trademark [sic] not become a generic name for a class of programming languages; and that it be well understood that the Ada trademark refers to one programming language, created by DoD, whose purity is maintained through a rigorous language control mechanism.

Unfortunately, there may not be anything the government can do to prevent Ada from being found to be a generic term for the computer programming language as to which it is commonly used. The trademark law tests genericness based on what the ordinary person would think the term referred to, not what the owner of the mark thinks. The primary significance of "Ada" would seem to be as a particular language, rather than as signifying DoD as the source of some product. If it is, the term would seem to be generic to that extent.

should not encourage others to respect their rights in "Ada," but it is to say one should be careful to understand the limits the law of trademarks places on an owner's rights.

6.4 Conclusion

We would caution DoD to be careful about its use and its authorization of other's use of the term "Ada" for other than certification purposes. Recall that this is one of the grounds for cancellation of a mark.

What DoD is attempting to do in promoting Ada as a standard programming language and in developing high standards for certifying programs written in and for that language are laudable aims. We would hope these aims are realized and only wish to caution about the care that must be employed in using trademark law to achieve them. We would not want to see the Department's own lack of experience with trademarks become the basis for undermining the achievement of these worthy goals.

7. A Hypothetical Illustration of Software Licensing Problems under the Existing Regulations

The Defense Department has recently undertaken the funding of some ambitious software engineering projects. It therefore seems worthwhile to examine a set of licensing problems and questions that are likely to arise in connection with such projects. Many of the problems which will be discussed in this chapter have been discussed in previous chapters in a more abstract way. This chapter presents a hypothetical situation which may provide a useful illustration of how these abstract problems might evidence themselves in a concrete instance.

Although the discussion below is hypothetical, it is important to understand that any ambitious software project of the sort presented here could raise similar problems. To solve these problems now, before they erupt into litigation, would seem desirable.

7.1 The Hypothetical Situation

For purposes of this illustration, assume that the DoD has made a major funding commitment with a contractor (Contractor A) for the development of an extremely sophisticated software system (We'll call it Z System). The primary objectives of the Z System contract are as follows:

(1) the development of a standard set of software development tools that the government could use for the purpose of generating code for military purposes;

(2) dissemination of this standard tool set to the defense contractor community for the purpose of use in military projects;

(3) excellence in the tool set so that the industry would want to use the tool set rather than having to be required to use it;

(4) creation of many derivative works, most obviously "rehosts" (rewriting the Z System so that it will operate on different host machines) and "retargets" (altering the Z System so that it will produce code that will run on different machines), all of which would be widely available to the government and to industry;

(5) creation of commercial spinoffs by those who might rehost or retarget (which hopefully would give those firms some incentive to create a good product for the government); and

(6) control over exports of the standard tool set.

To get this project underway, the DoD might let a contract to Contractor A to develop the Z System to run on one particular "host" computer and to produce code which would run on another particular "target" machine. It might well be understood that the first version of the Z System would serve as a model for future developments of rehosts and retargets, and that the original would not itself be as widely used to generate code as the derivatives because it, for example, might have been written to run on a mainframe, whereas most of the uses would be for microcomputers. Assume also that a large sum of money, somewhere in the range of $20 million, has been paid to Contractor A for the Z System product, a version of which has been delivered.

7.3.1 Retargeting or Rehosting

Suppose that DoD announced the availability of the Z System for rehost and retarget purposes if a firm could meet certain minimal conditions (e.g., having a certain kind of computer). The DoD might hope to get rehosts and retargets of the Z System to be made at minimal or no additional cost to the government. If the Z System had considerable commercial potential, the DoD might hope that this would serve as an incentive for firms to do rehosts or retargets for the government at minimal cost. The DoD would realize that incentives would be enhanced if the firms were able to retain exclusive commercial rights to their version of the Z System.

Suppose that a computer company (Contractor B) offered to create a version of the Z System for Contractor B machines at no charge to the government on condition that Contractor B would retain all commercial rights to their version of Z. (Contractor B might think that commercial sales of its computers would be enhanced by being able to offer its version of the Z System along with the machine. Sales of Contractor B's machines to DoD might, of course, also be enhanced.) Contractor B might ask the DoD for assurances that Contractor B could do this without any liability to A. The question is whether DoD can give Contractor B this reassurance on the theory that it is a legitimate governmental purpose to get a free retarget, and therefore within the government's rights vis-a-vis Contractor A. What happens if Contractor A expresses objection to this kind of deal, as seems likely, arguing that its copyright in the Z System gives Contractor A the right to control all commercial distributions of the derivative works of its copyrighted work, the Z System?

Preparing derivative works is one of the exclusive rights of the copyright owner ([59] sec. 106(2)). The copyright statute defines "derivative work" as follows ([59] sec. 101):

> a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which a work may be recast, transformed, or adapted. A work consisting of editorial revisions, annotations, elaborations or other modifications which, as a whole, represent an original work of authorship, is a "derivative work."

Both a rehosting and retargeting of the Z System would seem to fit this definition.

Common sense might suggest that if Contractor B created a retarget for the government and the creation of the retarget was within the scope of the government's license, Contractor B could take a copyright in the retarget (assuming that the government would once again use the standard data rights clause in its contractual arrangement with Contractor B). However, under the copyright statute, it is not clear that Contractor B is entitled to a copyright, or that its copyright would entitle Contractor B to make commercial distribution of the derivative work. This is because Contractor A's permission to the government to authorize the making of derivative works seems, in this hypothetical, to be limited to governmental purposes. Contractor A might claim that the terms of the government's deal and Contractor B's commercial intent exceed the scope of this license. It is a general rule of copyright law that if one exceeds the scope of license permission, an infringement of the copyright has occurred (e.g., Gilliam v. American Broad-

customers, which rights the government cannot abrogate simply because it wants to. Contractor A might well argue that it is not a legitimate governmental purpose to authorize commercial distributions of its work, in part because such distributions are not directly in fulfillment of any governmental mission and in part because it undercuts Contractor A's market for the Z System (a market which, according to our hypothetical, the government agreed to leave to Contractor A). Contractor A might admit that widespread dissemination of the Z System derivatives was expected, but might argue that it would be glad to license commercial marketing of those derivatives but that it never intended to leave itself with no commercial market. Contractor A might point out that the government knows that there is a very limited commercial market for the original Z System which runs on a particular mainframe and prepares code for another computer. Contractor A might also argue that the government is under a duty of good faith not to destroy or undermine the commercial market for its Z System.

How a court of law would decide these matters is somewhat hard to predict. It is not, however, a clear winner for the government, or for those whom the government might wish to authorize to make rehosts, retargets and enhancements.

7.3.4 What Rights the Government Has to Contractor A's Derivative Products

Now suppose that Contractor A made a deal with Contractor C to prepare a version of the Z System which would operate on a specific microprocessor. An important question which DoD should then ask is: What if any rights the government would have in derivative works prepared by Contractor A for others? If the government had a copyright in the Z System, or if the government had unlimited rights in it and unlimited rights meant having ownership or an ownership interest, then it would seem the government would have some rights as regards these other versions of the Z System. If the government had unlimited rights (rather than a license for governmental purposes) in the Z System, the government might have an argument that it has inchoate rights in the enhancements, even though it has no right to possession. (See Chapter 1 for a discussion of the problem of unlimited rights in non-deliverables.) Since it would appear that under this hypothetical the government may only have a license for governmental purposes, unless the government made contractual arrangements with Contractor A to obtain rights in all derivative products prepared by Contractor A, the answer would seem to be that it would have no rights to these derivative products.

7.3.5 Rights to Exclude and Rights to Use

To say that if the government had the copyright for the Z System, it would have some "rights" as against Contractor A when Contractor A prepared enhanced versions of the Z System for entities other than DoD is not to say that the government would own a copyright in the enhanced Z System or would even have a right to use copy, or disclose the enhanced Z System (unless, of course, by contract the government had obtained such rights).

As Chapter 1 has shown, intellectual property law tends to define ownership rights in terms of having power to exclude others from using the thing which is claimed as property. A copyright

System code (or any improved version of it) to defense industry because the government thought it best for the industry to have a good set of standard tools would seem to be stretching "governmental purpose" further than the government's right would clearly extend.

7.5 Taking a Copyright in a Derivative of the Z System as a Way to Avoid Problems

Returning to the hypothetical Z-2 contract, assume that DoD seeks to avoid the problems it had with Contractor A by putting a "special works" clause in the RFP for the Z System-2, by which the DoD hoped to take a direct copyright interest in Z-2. For reasons explained in Chapter 5, the efficacy of the present special works clause to obtain ownership rights for the government is questionable because of the copyright law's preclusion of direct government ownership of copyrights. A special works clause more like NASA's might, however, be effective in getting a lawful copyright assignment to DoD. Unfortunately, a deviation may be required for DoD to use a clause other than the special works clause to achieve this purpose.

The idea of taking the copyright is a good one because, if executed properly, a copyright will give the government rights to control the making and distribution of derivative works. Had the government owned the copyright in the Z System, Contractor A's version of the Z System for Contractor C would be a derivative work in which the government would have rights; then it would be Contractor A's copyright in the derivative work that would be in jeopardy if Contractor A had not obtained authorization from the government to prepare derivatives.

Owning a copyright is a good idea, but it has its costs, not the least of which is enforcing the copyright. Unless the government grants to rehost or retarget companies exclusive licenses to the government's copyrighted works, the government will have to be made a party to any lawsuit between the rehost/retarget firm and one of its customers over actions by the customer in contravention of the rehost/retarget firm's rights under the copyright license. (See 3 Nimmer on Copyright sec. 12.02 [9].) Also, being the owner may make the government a warrantor of the software unless adequate disclaimers have been made.

Some DoD people might think that they would be able to free themselves from obligations to Contractor A once they had gotten the Z System rehosted and took a copyright in Z-2 or Z-3. Such an assumption would be questionable. Contractor A would still be the owner of a copyright in the Z System of which the rehost would be a derivative work. The government's power to have derivatives made probably only extends to having them done for government purposes. Because the government's power will be limited by the terms of its license with Contractor A it does not become free of that constraint simply by getting more rights to a later version. An analogy may help. If you get the permission of someone who has translated a book from French to German to use his German translation to do a translation into English, that doesn't mean that you don't need the French author's permission as well. Copyright permissions must have a clean trail back to the source. If you don't get it, it's like a little tooth decay under a filling. The tooth goes on rotting instead of being cured.

7.9 Controlling Export of the Z System by a Contractor

Another potential problem regarding ambitious software projects has to do with controlling exports of it. The DoD might be very upset to find out that a Contractor A had licensed to export a system, such as the Z System, developed for DoD to a foreign firm.

The problem seems to be that there are presently two independent approaches for getting an export license, one handled by the Commerce Department under the Export Administration Act ([62] sec 2401 et seq.) and one handled by the State Department under the Arms Export Control Act ([56] sec 2751 et seq.). We have been told that the former agency tends to be somewhat more generous in granting licenses, being more concerned about balance of trade than security matters (although acquiring such a license is still a rather complicated, onerous process). The latter agency tends to be even more cautious about granting licenses, and maintains a list of arms-related items which cannot be exported. Even with caution, however, mistakes can be made.

Apart from the export regulations, it would not seem that the government would have the power -- absent a contractual commitment not to export without permission -- to prevent a contractor's export of a system, such as Z System, developed for DoD because the standard data rights clause is silent about rights to control exports. Had the government taken a copyright in the system, it might have a power to prevent exports because exports are a kind of distribution and copyright law would give the government the right to exclude Contractor A from distributing the code unless of course the government had granted a broad license to distribute the code to the contractor.

7.10 Conclusion

As this chapter has illustrated, software contracts raise a host of difficult problems which current regulations do not adequately address. To avoid these problems through better planning would be preferable to experiencing them again and again.

8. Subcontractor Flowdown Problems

A reason "subcontractor flowdown" seems to have been so often raised by DoD personnel as a software licensing problem is that much software intended for governmental use is developed at the subcontractor level. One of the DoD persons whom we interviewed estimated that two-thirds of the mission critical computer resources (MCCR) software prepared for DoD was developed by subcontractors. Since data rights and other important aspects of the government's rights as regards software will depend at least in part on the arrangements made between the prime and its subcontractors, it is not surprising that problems have arisen when the arrangement negotiated between the government and the prime differed from the arrangement between the prime and its subcontractor (or even between a first tier subcontractor and a second tier subcontractor). Although other kinds of problems are possible, government lawyers tend to be concerned by situations in which the prime makes an agreement with the subcontractor to obtain lesser rights than the government believes it needs and had bargained for from the prime. The examples we were given of "subcontractor flowdown" software licensing problems were of this sort.

What all subcontractor flowdown problems have in common is the question of whether the government will be able to enforce its contractual rights in the software as against the subcontractor, or will be able only to sue (or gain concessions from) the prime for its failure to deliver what the government bargained for. Because such situations can include second and third tier subcontractors, and so on, the questions raised can become quite complex and difficult to sort through. One project might include several subcontractors; it might also include various items and components, each with varying restrictions on the government's right to use.

Although some of DoD's lawyers strongly believe that the government will always be able to get the rights it bargained for and insist that there are no subcontractor flowdown problems, others have expressed a belief that the subcontractor may not be held to an arrangement made by the government to which the subcontractor has not consented. In the real world, the government may tell prime contractors that their failure to get the rights they are bound to deliver to the government is their (the prime's) problem which they have to solve (hopefully by getting the rights the government wants), but primes may realize that their failure to get the level of rights the government wants is, in reality, the government's problem.

For reasons discussed below, this author thinks that the government may sometimes be able to get the expected level of rights from the subcontractor despite inclusion of a contrary clause, and sometimes not. The matter seems largely to turn on whether inclusion of a clause is mandatory or discretionary.

would seem entitled to the benefit of the minimum rights guaranteed under the standard data rights clause. Contract officers, acting outside of their authority, cannot bind the government [47].

8.1.3 Partial Contradiction

Suppose instead that a software producer was required to deliver three pieces of software to a prime for the government and was willing to let two of the pieces of software be modified, but not the third. Suppose further that the subcontractor realized that the standard data rights clause was incorporated by reference in the subcontract and expected and intended for that clause to apply as to the two pieces of software, but negotiated with the prime for a special clause precluding modification of the third. A court applying general contract law would probably try to interpret the seemingly conflicting clauses in a way that would reconcile the conflict (e.g., City of Columbia, Mo. v. Paul N. Howard Co. [27]). One way to reconcile the conflict would be to say that the standard clause applies to the first two and the "no modification" clause to the third. General contract law might also tend to favor subsequent and more specific expressions of the parties' intent when construing conflicting clauses (e.g., Matter of Antuna [36]). This too might seem to favor giving effect to the "no modification" clause.

On the other hand, when one is talking about a mandatory clause, that is, a clause that is required by regulation and that is itself a regulation, a strong argument can be made that it should apply notwithstanding the arguments that favor the subcontractor. Government contract law, after all, is somewhat different from general contract law.

8.1.4 Subcontract Clause Resolving an Ambiguity in the Mandatory Clause

Suppose that a subcontractor agrees to develop a piece of software at public expense. Assume that he realizes that there is an ambiguity in the standard data rights clause as to the extent of the government's rights in such software -- unlimited rights or a license for governmental purposes (See Chapter 1) -- and decides that in the subcontract, he is going to resolve the ambiguity by putting a clause in the contract giving himself the copyright, giving to the prime a license to use the software for governmental purposes and permission to sublicense the government for the same, and defining "governmental purposes" to exclude "giveaways" to industry.

The subcontractor's argument for enforcement of his rights as against the government is much stronger here than in the previous hypotheticals. Although an agency is ordinarily entitled to interpret its own regulations, courts will not always accept later developed interpretations of regulations that would defeat the reasonable expectations of those who have produced and delivered a product in reliance on a particular, reasonable interpretation of the regulations. A potential subcontractor might need to be able to assess the extent of his commercial market for the software to decide whether and on what terms to bid. If resolving the ambiguity will aid in his planning and will encourage him to bid, why not allow the subcontractor his supplement? After all, the government had ample opportunity to define its rights and its terms in advance of the subcontract, and failed to do so.

9. Limitations on Governmental Action: Injunctions and Related Problems

Most software intended for commercial distribution is held as a trade secret by the producer. Although the government has statutory authority to infringe patents and copyrights ([53] sec. 1498) it does not have similar authorization to appropriate trade secrets against the owner's wishes. Indeed, there is a criminal statute ([69] sec. 1905) that penalizes any federal employee who discloses confidential information claimed as a company's trade secret without authorization. Some DoD lawyers are worried about the risk in litigation with a software producer over trade secret software of an injunction issuing against governmental use of the software.

This is a risk that the government has not previously had to confront as to systems acquired from contractors because hardware, if protected by a form of intellectual property law, would generally be protected only by patents, which the government could infringe. Trade secrets generally cannot reside in hardware since reverse engineering of the hardware would readily reveal any such "secrets." Because software is now often protected by copyright and trade secret law, a new situation has arisen. As the discussion below indicates, there is good reason to be concerned about this potential, although there are some situations (described below) in which the government might be able to avoid the issuance of an injunction.

An additional basis for concern about injunctive relief has been expressed because of a series of recent federal court decisions which have suggested that injunctive relief may be available to prevent the government from releasing material in which it claims unlimited rights but which is claimed as a trade secret by its producer. This danger was thought by several DoD lawyers to be particularly acute in disputes with subcontractors because until recently there has been no formal procedure under the Contracts Dispute Act for handling controversies about data rights as between a subcontractor and the government. Some thought that the Contract Disputes Act should be amended to eliminate this risk. One provision of the 1985 DoD Authorization Act may partially address this problem.

9.1 Limitations of 28 U.S.C. sec. 1498

If the government uses or manufactures a patented invention or copies or distributes a copyrighted work without the owner's permission, section 1498 of Title 28 of the U.S. Code says that the exclusive remedy of the patentee or copyright owner is an action for damages in the Claims Court . This statute effectively prevents injunctive relief from being entered against the government for patent or copyright infringements (e.g., Pitcairn v. United States [41]). One of the reasons that this shield from injunctions is available as to copyrights and patents, but not trade secrets, is that if one infringes a patent or copyright, the patent or copyright will survive the infringement, whereas an appropriation of the trade secret can utterly destroy the trade secret, as for example, when the government distributes trade secret information about a spare part for competitive reprocurement purposes. An injunction is the only thing that can prevent the loss of the trade secret. Because of this, it seems unlikely Congress would amend this statute to grant the government broad discretion to appropriate trade secrets.

On the other hand, DoD FAR SUPP sec. 27.404-1(d) [61] does say that "[p]atented or copyrighted computer software will not be subject to any agreement prohibiting the government from infringing a patent or copyright." The likely response to this by a software producer who claims simultaneous copyright and trade secret protection in software is: "If you can infringe my copyright without violating any of my trade secret rights, that's OK; I'll take my claim for damages to Claims Court; but if you threaten my trade secret in any way, I will sue you for injunctive relief."

9.1.3 The "Essence of the Claim" Test

This hypothetical response of the hypothetical software producer suggests a refinement of the theory discussed in the previous subsection which might produce a shield against injunctions in some instances: If the "essence" of the claim against the government is not on a trade secret, but relates to an infringement of the copyright, section 1498 may shield the government from injunctive relief despite the claim of simultaneous copyright/trade secret protection. For example, if some Air Force officer had made a second copy of some software to give to one of his co-workers, the "essence" of the owner's claim would seem to be damages for copying, based on an infringement of the copyright, which would allow the government to invoke section 1498. If instead the government decided to give out a company's trade secret source code to the defense contractor community, the essence of the owner's claim would be on the trade secret, and thus injunctive relief might be awarded.

9.1.4 NASA's Approach to Simultaneous Protection

If a firm sells NASA rights to software and the program is delivered with a copyright notice and without any legend saying it is unpublished, NASA considers the software to be published copyrighted material [64]. If the software is a published copyrighted work, then the ideas it contains are in the public domain and can no longer be claimed as trade secrets. NASA also considers mass-marketed software as published software. This treatment of software by NASA is an important way to claim the benefits of section 1498 by eliminating possible trade secret claims and forcing copyright infringement claims where injunctions are not permitted. However, this procedure does not eliminate the threat of injunctions if the company delivers the software with a notice that it is unpublished. DoD might want to consider adopting regulations similar to NASA's in this respect.

9.1.5 National Security Grounds for Avoiding Injunctive Relief

Several of the government lawyers to whom we spoke about this issue believed that the government would never be enjoined from any use, duplication, or disclosure of software because even if section 1498 did not preclude an injunction, national security considerations could be cited to persuade a court to decline issuing an injunction, even though it might have power to do so. It is indeed hard to imagine a court ordering the F-16 fleet grounded because some software producer has a dispute over his rights in software aboard these planes, but national security considerations may not always win the day, especially where the software is being used by the government in much the same way as a commercial customer might use it (e.g., word processing).

[47] where the Supreme Court ruled that the United States is not bound by any agreements entered into by its officers which are not permitted by law.) It is possible that an injunction might issue against the particular lab director's continued use of the software in a way that violated the agreement. That, of course, would not preclude moving the employee to a different location and having the software used by a new lab director who would not be bound by the agreement.

9.2 Limitations of the Contract Disputes and Tucker Acts in Disputes Over Proprietary Rights

At one time, the government could argue that any dispute over the extent of its data rights as to any piece of technical data or software deliverable under a contract was a dispute under the contract that could be shunted into the Contract Disputes Act or Tucker Act frameworks. This would preclude the issuance of injunctive relief (e.g., International Engineering Co. v. Richardson [32]). Since the Supreme Court decision in (Chrysler v. Brown [26]), discussed briefly below, a new avenue has opened up for litigating data rights claims against the government, one which seems to permit injunctions to issue. Contractors concerned about the government's impending release of proprietary data may look to this promising new avenue. Government lawyers are rightly concerned about this development.

9.2.1 The Relevant Cases

It was the Supreme Court's decision in Chrysler v. Brown [26] that opened up this new door to injunctive relief against the government in cases involving proprietary data. Chrysler had sued under the Administrative Procedure Act for an injunction to prevent the Defense Logistics Agency from releasing data about Chrysler's affirmative action plan to persons making a request for it under the Freedom of Information Act. The Supreme Court held that DLA's decision to release the data was "agency action" reviewable under the APA by a person who had suffered a legal wrong or had been adversely affected thereby ([54] sec. 702). The APA does not preclude injunctive relief against the government.

Three years later, in Megapulse v. Lewis, [37] a contractor who opposed the government's release of its technical data for competitive reprocurement purposes sued for injunctive relief under Section 702 of the APA in reliance on Chrysler. The contractor claimed that the government had only limited rights in the data; the government claimed unlimited rights in it. The lower court refused to issue an injunction because of the earlier International Engineering decision. Megapulse argued to the Court of Appeals that Chrysler v. Brown had effectively overruled that earlier case, and that an APA action was now available when an agency decided to release proprietary data. The Court of Appeals agreed with Megapulse and ruled that injunctive relief was possible. The court stated that not all decisions by a contract officer would be reviewable under the APA. Actions against the government that were in essence "contract" claims would still have to be pursued under the Tucker Act, but the court did not accept the government's argument that a suit over proprietary data rights was essentially a contract claim. It was the government, not the contractor, who was relying on the contract. Although the Court of Appeals did not order

> If a claim pertaining to the validity of the asserted [proprietary] restriction is submitted in writing to a contracting officer by a contractor or subcontractor at any tier, such claim shall be considered a claim within the meaning of the Contract Disputes Act of 1978...

There are several limitations of this provision which merit attention. For one thing, it appears that this provision will apply only as to solicitations issued by DoD after October 19, 1985, and thus will not affect many current contracts. Secondly, when one looks at the whole of section 2321 (of which this provision is a part) it is clear that by its terms it applies only to technical data, and not to software. Thirdly, a reading of the whole of section 2321 raises a question of the reach of subsection (e). That is, it would appear that the section envisions a formal challenge procedure as to restrictive legends on technical data when contract officers and contractors (quite notably, it adds subcontractors) are in disagreement when the material is delivered. The subsection says if a contractor or subcontractor submits a claim as to the validity of the restriction within this formal challenge mechanism, that claim will be under the Contracts Dispute Act. That subsection does not say that all claims concerning the validity of restrictions on data delivered under contract are by their nature, contract claims that must be handled exclusively under the Contracts Dispute Act. If instead of following the formal challenge procedure under section 2321, the government simply decided to lift the restriction for competitive reprocurement (or other) purposes, subsection (e) might not provide protection. Thus, while this provision may help the government construct an additional defense against injunctions in some instances, it does not appear to provide a complete and certain shield against injunctions in all software rights disputes.

Similarly, the proposed subpart 27.4 of the FAR [66] provides at sec. 52.227-24(i) that a contract officer may deal directly with a subcontractor at any tier over issues related to restrictive markings. This provision states explicitly, however, that it neither creates nor implies privity of contract between the government and the subcontractor. This provision would not appear to help, and may even work against any efforts by the government to bring such a dispute within the ambit of the Contract Disputes Act. It thus appears that unless the Megapulse and Williams International decisions are overruled, DoD will still have to worry about injunctions issuing in software disputes.

10. Problems Associated with CAD/CAM Programs

CAD/CAM (computer aided design/computer aided manufacturing) programs are likely to produce some of the most complex and hotly contested software licensing questions for DoD over the next few years. The current acquisition regulations are not set up to facilitate acquisition of these important tools. This Chapter discusses the set of concerns DoD personnel raised about CAD/CAM programs in the course of our interviews.

10.1 What CAD/CAM Programs Are and Why They Are Important

The CAD aspect of a CAD/CAM program is, as the name implies, a tool which aids in the design of a product. The CAD provides an electronic display, a blue print if you will, on which to make design additions and alterations. This display is complete with measurements and specifications relevant to the design process. The CAM aspect of a CAD/CAM allows one to carry this process a step further. With the CAM, one can transmit the design, through telephone lines for example, to be received at another location. More importantly, the CAM is capable of causing equipment at the remote location to "tool up" and begin producing the item which has been designed and transmitted. Hence, this is the manufacturing aspect of a CAD/CAM program. A CAD/CAM program can be used in the design and manufacture of components, or the whole of a product. Further, CAD programs are being used increasingly often in the development of software. A CAD/CAM program can thus be a powerful tool in the development and growth of new technologies.

There are various CAD/CAM programs currently available, and these programs are not necessarily derivative of one another. In order to access and modify a product or component designed with the aid of a CAD/CAM program, be it for maintenance or enhancement purposes, we understand that one must use the very same CAD/CAM program that was originally used in the design and manufacture of that component or product. It seems that contractors on many DoD projects are making use of CAD/CAM programs. Our understanding is that different CAD/CAM programs are being used in those projects. Whether or how much they may be derivative of one another is not clear.

CAD/CAM programs have significant commercial value to the contractors who have developed these programs. This technology, which is still in an early state of development, promises to have a major impact on the high technology field as it is further developed and commercially exploited. In all likelihood, CAD/CAM programs will be among the most commercially lucrative of technological innovations of the near future. Increased use of such programs in the design and manufacture of new technology seems certain. In other words, CAD/CAM programs are valuable commercial items that can be expected to be widely used in large scale manufacturing of new technologies.

Due to the commercial value of CAD/CAM programs, most contractors would prefer not to provide such programs - that is, certainly not the source code and the technical documentation

10.4 Treatment of Electronic Access under the Regulations

Electronic access to CAD/CAM is in some ways inferior to, or at least different than, physical possession of the program and/or technical data. Most obviously, access to technical data via a CRT provides only a temporary image of the data--electronic pulses on a screen. This raises various difficult questions. How would such access be handled under the procurement regulations: as software or as technical data? The CAD/CAM program would clearly be software, but without delivery it cannot be classified as software by the government for the government would not, in this situation, have physically received the actual software. An electronic image does not, on the other hand, seem to fit the definition of technical data, but a printout of the image and/or information would seem to fit the definition of technical data ([61] sec. 227.401, regarding the definition of technical data: "The data may be graphic or pictorial delineations in media such as ... computer printouts").

If the government only gets access to CAD/CAM, what is it getting? Should electronic access be treated as software or as technical data? How should printouts of the electronic image be treated? How would the applicable procurement regulations be applied? Are the FAR and FAR SUPP flexible enough to deal with a new situation such as software which is part of the manufacturing process? The answers to these questions do not spring readily from the existing regulations and DoD policy in this area.

What some contractors are reportedly offering in the way of access to a CAD/CAM appears to be a limited license for maintenance purposes; it is clearly less than restricted rights. Do the regulations permit the government to enter into this kind of arrangement? It is not clear what rights the government would be required to obtain in CAD/CAM under the procurement regulations, nor is it clear what data rights attach to the electronic image or to the printout of CRT images.

An arrangement of this sort might have an adverse impact on any plans DoD has with regard to competitive reprocurement. Government personnel are concerned about whether the government would have the right to show another contractor the printout for purposes of spare parts procurement or maintenance/enhancement of the product designed with the aid of the CAD/CAM program. Some have also wondered about the effect of the Maintenance Clause (Section 1-202) of the DoD Authorization Act which seems to require that DoD acquire sufficient rights to maintain software: would electronic access to the CAD/CAM program meet the mandate of this legislation?

Each of these questions would require further study before policy recommendations regarding CAD/CAM programs would be possible. Until some policy regarding CAD/CAM programs is developed, it seems likely that government personnel will be in a quandary as to how to react when confronted with a data rights question involving a CAD/CAM.

11. Problems Arising from Software's Hybrid Nature: of Warranties and Other Matters

Software in its machine-readable form has some characteristics of hardware and some characteristics of technical data. This hybrid character of software has led to some confusion within the Department of Defense about the manner in which software should be acquired and maintained after acquisition: should it be treated like hardware, or like technical data, or differently from both? The hybrid character of software also has a bearing on other questions, such as whether implied warranties may attach to it.

11.1 The Hybrid Character of Software

11.1.1 Hardware and Software

Software is like hardware in that it causes machines to do things. Software is in fact merely a replacement for hardware components that could otherwise perform the same function. Software is embedded in hardware and part of an overall hardware system. Like hardware, software can often serve as a tool for creating other items. Like hardware, software needs maintenance work from time to time to operate properly.

Software is unlike hardware, however, in a great many ways. Software is, for example, easy and cheap to replicate as compared with hardware. Once the first copy has been produced, software can be almost endlessly replicated at almost no cost regardless of how complex the code is. One of the consequences of this is that the government tends to think that additional copies of software ought to be deliverable at a very low cost, whereas industry, which is concerned about recouping its research and development costs and about "piracy" of its product which the firm may be helpless to prevent, and which regards the sale of software as the sale of a production facility (as if one bought a General Motors factory when one bought a truck produced by GM), regards additional sales at higher price levels to be necessary to make the software business viable. A second consequence of this low-cost replicability is that the software industry, for the most part, tends to make its products available only on a highly restrictive licensing basis, rather than selling copies outright.

Another important difference between software and hardware is that software may be wholly subject to a lengthy lawful monopoly (i.e., a copyright) as well as being held as a trade secret, whereas hardware may be subject to a much shorter monopoly (i.e., a patent) and most often cannot be held as a trade secret since it generally can be reverse engineered. Moreover, quite often hardware is either not patented at all or only subject to partial patent protection. A high standard of inventiveness is required for patent, while copyright requires only the most minimal originality. Hardware, unlike software, cannot be copyrighted at all. The bottom line of all of this is that it will be <u>much</u> harder to get competition as to software reprocurements and maintenance than as to hardware because of the stronger intellectual property protection afforded to the whole

11.1.3 The Implications of Software's Hybrid Nature

We wish that we could provide clear guidance as to the acquisition and maintenance implications of the differences between software and hardware and between software and technical data. Many persons in DoD whom we interviewed were deeply puzzled about this subject and regarded solving this puzzle as crucial to making better decisions about DoD's software acquisition policies. The discussion of the two previous subsections reflects the factors that fueled the puzzlement of those to whom we spoke. It does seem that software is sufficiently different from hardware and technical data that software cannot be acquired or managed as if it was hardware, or as if it was simply technical data.

11.2 Implied Warranties for Software

Although there are a great many questions which the hybrid nature of software raises, we will only dwell on one that was frequently raised in the interviews we had with DoD personnel: whether, in the absence of any contractual provision as to warranties, there might be any implied warranties -- of merchantability or of fitness for a particular purpose -- that might attach to software delivered to the government. The reason this is a "hybrid nature" question is that the answer to the question seems to turn largely on whether software is more properly characterized as a "good" or as a "service". Implied warranties do not attach to services; they may apply to goods.

Hardware -- computers, airplanes and hammers -- is clearly "goods". Technical data is clearly not "goods," but may be reflective of a service. Preparing software is a service. Maintaining software is a service. But how is software to be characterized when produced?

Although there is no definitive answer to this question, the modern trend seems to be to treat software as a "good" (e.g., Carl Beasly Ford, Inc. v. Burroughs Corp. [23], and [2]). This makes sense given that software performs machine-like functions just as hardware does. The fact that software manufacturers so often disclaim all implied warranties might indicate their acceptance of a strong likelihood that software products will be treated as "goods" for warranty purposes.

A second hurdle that must be overcome to impose implied warranty liability on a software manufacturer is establishing that the transaction is of a sort that qualifies. Outright sales of goods are clearly transactions that will give rise to implied warranty responsibilities; leases and licenses are less clearly covered. Since much software is currently licensed rather than sold, this might seem to cut against the argument for implying warranty protection. However, it is becoming more common to apply U.C.C. [71] principles to lease and licensing transactions (e.g., Chatlos Systems, Inc. v. National Cash Register Corp. [24] and Westmont Tractor Co. v. Viking Exploration, Inc., [49]). So this too may be a surmountable obstacle.

Thirdly, there is a question of whether implied warranties may attach to software sold to the government. Sales to the government are governed by federal contract law, not state contract law, such as the Uniform Commercial Code [71]. It appears that when there are no specific

12. Problems Arising from New Chip Protection Law

Congress recently passed the Semiconductor Chip Protection Act of 1984 [67] which created a new form of intellectual property law to protect semiconductor chip designs. This law resembles patent law in certain ways and copyright law in certain ways. It also contains some new and unique features which are found in neither copyright nor patent law. The federal procurement regulations have not yet been amended to take this new law into account. Because much software that the government buys is delivered on semiconductors and because chips are so intimately related to computer systems acquisitions of which software is a part, several DoD persons were concerned about how this new law should be treated under the FAR or DoD FAR SUPP.

Because ignorance of what the law provides and having no policy about the law means that the DoD may be more likely to get into trouble over the issue, it would seem worthwhile to understand the law and make a policy about it.

12.1 An Overview of the Semiconductor Chip Protection Act

Under the chip protection law [67], persons who create "original" mask works for semiconductor chips have been given the exclusive right to control the creation of chips embodying that design, as well as the importation and distribution of chips embodying that design. (The standard of originality is said in the legislative history to be of the same minimal sort as is true in copyright.) To obtain ten years of protection for this design, the mask work's owner must apply to the Copyright Office for a certificate of registration within two years of the first commercial exploitation of the chip design. Chips embodying a protected design may (but need not) display a symbol of this protection (an "M" and the name of the owner). The same set of remedies have been provided to mask work owners as to copyright owners. A right to reverse engineer chip designs is specifically provided in the Chip Protection Act.

The legislative history of the chip protection law makes clear that any programs that are embedded on a ROM do not fall within the scope of this law. Such programs may, of course, be protected under the copyright law, and/or possibly be maintained as a trade secret. The chip protection law governs only as to the design of the circuitry, not the information stored on it. That is, it is the non-program aspects which are protected under the chip law.

12.2 Circumstances In Which It Might Matter to DoD What the Chip Law Provides

infringing chips. The only time the government could get into trouble by purchasing equipment with infringing chips for use by government employees would be if the government had induced or knowingly caused its contractor to violate one of the exclusive rights of the mask work owner.

(b) Purchase for Redistribution

If the government buys "pirate" chips or equipment containing "pirate" chips and the government intends to distribute these items to another entity (such as to GFE it or to make a foreign military sale) and the government did not know that infringing chips were used, it will incur no liability until it learns that infringing chips were used. After receiving notice, the government would have to pay the mask work owner a reasonable royalty on any chips it distributed (i.e., sold, leased, licensed, exchanged, etc.) thereafter. What a reasonable royalty is may be decided by the parties or in litigation. A failure to negotiate about the reasonable royalty will subject the formerly innocent user to the full range of remedies available against outright infringers.

Because there may well be occasions in which the government will want to distribute chips or equipment with chips in it, perhaps the government should revise DoD FAR SUPP to require the contractor to warrant that no infringing chips were used and to indemnify the government for any liability.

It is probably worth emphasizing as a separate matter that a copyright in a piece of software is not affected in any way by the chip law.

12.2.5 Manufacture of Chips

Before the government started to manufacture chips which contained a protected chip design, authorization from the owner of the chip mask would be needed. Manufacture without such authorization would be an infringement of the proprietary rights of the owner of the mask.

12.2.6 Possibility of an Injunction

If the government violated the rights of the chip mask owner through manufacture of a chip without authorization or in some other way, and the owner of the mask sued, 28 U.S.C. Sec. 1498 [53] would not protect the government against the issuance of an injunction to stop the use of the mask. Sec. 1498 only eliminates the possibility of an injunction against the government for patent or copyright infringement (see Chapter 9) and has not been extended to apply to infringements of a chip mask.

13. A Proposed Approach to Solving DoD's Software Licensing Problems

Having raised so many software licensing problems in the course of this report, we feel some responsibility to suggest at least an approach that DoD might employ to solving the myriad problems it has with the acquisition and maintenance of software. Unfortunately, there is no quick and easy way to solve all of DoD's software licensing problems. There are too many different types of problems, stemming from too many different causes. There is also too much money at stake for any "quick fix" solution to work. The situation is made more difficult by the strained relationship which currently exists between industry and government with regard to software/data rights issues.

That does not mean, however, that none of DoD's software licensing problems can be resolved quickly or easily; nor does it mean that most of of its problems are unsolvable. Removing the inconsistencies from the existing procurement regulations described in Chapter 1 would, for example, require no more than some minor alterations to those regulations. Improved personnel policies and training programs could alleviate other difficulties DoD is experiencing. And, although some other of DoD's software licensing problems may be more resistant to solution than others, there may well be ways of approaching even the major problems that would be more constructive than other approaches which might be taken.

The crucial point is that not all of DoD's software licensing problems can, or should be treated in the same way. There are certain problems which DoD has more control over than it does others. In allocating resources, we would suggest that DoD place a greater emphasis on those problems which are more readily within its control, and, therefore, could be more easily resolved. There are also some software licensing problems that are by their nature more amenable to change than others. Again, in allocating the time and resources of DoD personnel to addressing software licensing problems, we would advise that DoD attempt to focus its limited resources on those problems which are most likely to be impacted by such an effort.

13.1 What DoD Has Most Control Over

13.1.1 How DoD Treats Its Personnel

How DoD trains, works, and rewards its contracting personnel is an important factor bearing on its software licensing problems and also a factor over which DoD has considerable control. As Chapter 3 has indicated, the DoD contracting personnel to whom we spoke feel they could benefit from additional training about software, its life cycle management, and data rights. Probably the biggest "return" per dollar spent on solutions could be obtained by improving initial training about these matters, and by having periodic update training.

Once on the job and trained, procurement personnel should also have manageable workloads,

exist many problems in this area. Those same individuals tend to point an accusing finger at the other side as the culprit responsible for these problems. Industry people say, "the government is asking for too much, and they are not willing to pay for it." The government people say, "we need those software tools, or data, or rights to meet our needs", or "the regulations, or this policy, or that clause requires us to get all of that whether we need it or not, so you have to give it to us." Unfortunately, industry has become somewhat distrustful about what government people say, and the government people sometimes feel the same way about industry people.

The reality of today is that many firms on the "cutting edge" of software technology can survive without doing business with the government. The DoD needs the latest technology in order to maintain a strong defense and military capability. Thus, it seems clear that in many cases, DoD needs industry more than industry needs DoD. Given this situation, it seems incumbent upon DoD to make some effort to open up and improve the strained lines of communication between it and private industry.

Many of the industry people we spoke with indicated that they would welcome the opportunity to sit down and discuss software/data rights procurement issues with DoD people in an effort to resolve their differences. Indeed, some of these individuals told us that in their view the most useful role the SEI could play would be to provide a forum wherein industry and government people could meet to discuss software/data rights issues in an objective, rational manner. These people, however, also expressed a lack of optimism over the prospect that such productive communication would in fact occur, citing incidents such as DoD's sudden withdrawal from the Rights in Data Technical Working Group (RTDWG) [13] (a study which DoD had itself initiated), and the imposition of the Air Force's "Orr Clause".

Our conclusion is that industry people are willing to meet with DoD in an effort to resolve differences which exist. It is clearly within the power and control of DoD to pursue such communications, and would likely be one of the most beneficial steps DoD could take toward resolving many of its software licensing problems.

13.2 What DoD Has Some Control Over

13.2.1 DoD's Own Acquisition Regulations

The DoD also has considerable control over its own procurement regulations in the areas of software and data rights (the DoD FAR Supplement). This control is tempered somewhat by the limitations imposed by the FAR and relevant legislation, as well as by the process required of DoD to adopt new regulations, and the opportunity of industry to contest newly proposed regulations before they become effective. Nonetheless, there is much DoD could do toward adopting regulations which are more simplified, uniform, and clear.

Through revision of its own acquisition regulations, the DoD could, for example, resolve issues such as government ownership of copyright by adopting an assignment approach, and concerns

13.3 What DoD Has Less Direct Control Over

As has been discussed throughout this report, there are some areas over which DoD has little direct control, and little likelihood of making a direct impact regardless of the amount of resources expended. The areas in which it seems less likely that DoD would be successful in bringing about direct changes include:

(1) Getting competition in maintenance of proprietary software (see Chapter 2).

(2) Obtaining software tools in which a private firm holds a proprietary right (see Chapter 2).

(3) Obtaining CAD/CAM programs from private firms (see Chapter 10.)

The rights the government has been asking for in this regard are too valuable to industry to be given up easily. A more productive approach might be to develop a mechanism whereby DoD could more easily enter escrowing and long term maintenance agreements providing for controlled access to such items. Indeed, such an approach might actually be beneficial to the DoD in that under such an arrangement DoD would not only have access to needed documentation, code, tools and the like, but would also avoid having to trouble itself with storage, cataloguing and internal access concerns.

Further, through such a method, DoD could have greater access to improvements in the technology and/or means of maintaining and enhancing that technology, and, significantly, would not be endangering any implied warranties which might otherwise be jeopardized if DoD maintained or modified software organically or through competitive reprocurement. If DoD persists in asserting that it must have ever greater rights in software, software tools, CAD/CAMs, and software documentation, it may find it has "shot itself in the foot". Industry response is likely to be to withdraw from doing business with DoD or to only sell DoD "old" technology.

Finally, it should be noted that the challenge of trying to find an appropriate way to acquire and maintain software is not one unique to the DoD. The unique nature of software -- part "writing," part" machine" -- has caused substantial confusion about its proper treatment in many areas of the law. Properly conceptualizing software and fashioning a set of legal rules to deal with it is extremely difficult; it requires a deep understanding of the economics of the software industry and of the realities of the development of software technology.

One of the things that makes this already difficult task yet more difficult is that the economic and technological aspects of the software industry are not static, but rather are rapidly evolving. Software development has long been a very labor-intensive activity; it is now becoming a more capital intensive industry, especially with the development of powerful software development tools and environments. There would be some advantage to DoD in encouraging this shift to a more capital intensive production process, especially in terms of improvement of development productivity. To encourage this shift, DoD must, however, abandon the quasi-technical data orientation of its current software acquisition policy.

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APPENDIX A

Selected Sections of the Copyright Law

Section 101 - Definitions

As used in this title, the following terms and their variant forms mean the following:

An "anonymous work" is a work done on the copies or phonorecords of which no natural person is identified as author.

"Audiovisual works" are works that consist of a series of related images which are intrinsically intended to be shown by the use of machines or devices such as projectors, viewers, or electronic equipment, together with accompanying sound, if any , regardless of the nature of the material objects, such as films or tapes, in which the works are embodied.

The "best edition" of a work is the edition, published in the United States at any time before the date of deposit, that the Library of Congress determines to be most suitable for its purposes.

A person's "children" are that person's immediate offspring, whether legitimate or not, and any children legally adopted by that person.

A "collective work" is a work, such as a periodical issue, anthology, or encyclopedia, in which a number of contributions, constituting separate and independent works in themselves, are assembled into a collective whole.

A "compilation" is a work formed by the collection and assembling of reexisting materials or of data that are selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship. The term "compilation" includes collective works.

A "computer program" is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.

"Copies" are material objects, other than phonorecords, in which a work is fixed by any method now known or later developed, and from which the work can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. The term "copies" includes the material object, other than a phonorecord, in which the work is first fixed.

"Copyright owner", with respect to any one of the exclusive rights comprised in a copyright, refers to the owner of that particular right.

"Pictorial, graphic, and sculptural works" include two-dimensional and three-dimensional works of fine, graphic, and applied art, photographs, prints and art reproductions, maps, globes, charts, technical drawings, diagrams, and models. Such works shall include works of artistic craftsmanship insofar as their form but not their mechanical or utilitarian aspects are concerned; the design of a useful article, as defined in this section, shall be considered a pictorial, graphic, or sculptural work only if, and only to the extent that, such design incorporates pictorial, graphic, or sculptural features that can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article.

A "pseudonymous work" is a work on the copies or phonorecords of which the author is identified under a fictitious name.

"Publication" is the distribution of copies or phonorecords of a work to the public by sale or other transfer of ownership, or by rental, leasing, or lending. The offering to distribute copies or phonorecords to a group of persons for purposes of further distribution, public performance, or public disply, constitutes publication. A public performance or display of a work does not of itself constitute publications.

To perform or display a work "publicly" means:

(1) to perform or display it at a place open to the public or at any place where a substantial number of persons outside of a normal circle of a family and its social acquaintances is gathered; or

(2) to transmit or otherwise communicate a performance or display of the work to a place specified by clause (1) or to the public, by means of any device or process, whether the members of the public capable of receiving the performance or display receive it in the same place or in separate places and at the same time or at different times.

"Sound recordings" are works that result from the fixation of a series of musical, spoken, or other sounds, but not including the sounds accompanying a motion picture or other audiovisual work, regardless of the nature of the material objects, such as disks, tapes, or other phonorecords, in which they are embodied.

"State" includes the District of Columbia and the Commonwealth of Puerto Rico, and any territories to which this title is made applicable by an Act of Congress.

A "transfer of copyright ownership" is an assignment, mortgage, exclusive license, or any other conveyance, alienation, or hypothecation of a copyright or of any of the exclusive rights comprised in a copyright, whether or not it is limited in time or place of effect, but not including a nonexclusive license.

A "transmission program" is a body of material that, as an aggregate, has been produced for the sole purpose of transmission to the public in sequence and as a unit.

To "transmit" a performance or display is to communicate it by any device or process whereby images or sounds are received beyond the place from which they are sent.

idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work.

Section 103 - Subject Matter of Copyright: Compilations and Derivative Works

(a) The subject matter of copyright as specified by section 102 includes compilations and derivative works, but protection for a work employing preexisting material in which copyright subsists does not extend to any part of the work in which such material has been used unlawfully.

(b) The copyright in a compilation or derivative work extends only to the material contributed by the author of such work, as distinguished from the preexisting material employed in the work, and does not imply any exclusive right in the preexisting material. The copyright in such work is independent of, and does not affect or enlarge the scope, duration, ownership, or subsistence of, any copyright protection in the preexisting material.

Section 104 - Subject Matter of Copyright: National Origin

(a) Unpublished Works. The works specified by sections 102 and 103, while unpublished, are subject to protection under this title without regard to the nationality or domicile of the author.

(b) Published Works. The works specified by section 102 and 103, when published, are subject to protection under this title if -

(1) on the date of first publication, one or more of the authors is a national or domiciliary of the United States, or is a national, domiciliary, or sovereign authority of a foreign nation that is a party to a copyright treaty to which the United States is also a party, or is a stateless person, wherever the person may be domiciled, or

(2) the work is first published in the United States or in a foreign nation that, on the date of first publication, is a party to the Universal Copyright Convention; or

(3) the work is first published by the United Nations or any of its specialized agencies, or by the Organization of American States; or

(4) the work comes within the scope of a Presidential proclamation. Whenever the President finds that a particular foreign nation extends, to works by authors who are nationals or domiciliaries of the United States or to works that are first published in the United States, copyright protection on substantially the same basis as that on which the foreign nation extends protection to works of its own nationals and domiciliaries and works first published in that nation, the President may by proclamation extend protection under this title to works of which one or more of the authors is, on the date of first publication, a national, domiciliary, or sovereign authority of that nation, or which was first published in that nation. The President may revise, suspend, or revoke any such proclamation or impose any conditions or limitations on protection under a proclamation.

(4) the effect of the use upon the potential market for or value of the copyrighted work.

Section 108 - Limitations on Exclusive Rights: Reproduction by Libraries and Archives

(a) Notwithstanding the provisions of section 106, it is not an infringement of copyright for a library or archives, or any of its employees acting within the scope of their employment, to reproduce no more than one copy or phonorecord of a work, or to distribute such copy or phonorecord, under the conditions specified by this section, if -

(1) the reproduction or distribution is made without any purpose of direct or indirect commercial advantage;

(2) the collections of the library or archives are (i) open to the public, or (ii) available not only to researches affiliated with the library or archives or with the institution of which it is a part, but also to other persons doing research in a specialized field; and

(3) the reproduction or distribution of the work includes a notice of copyright.

(b) The rights or reproduction and distribution under this section apply to a copy or phonorecord of an unpublished work duplicated in .....

Section 117 - Limitations on Exclusive Rights: Computer Programs

Notwithstanding the provisions of section 106, it is not an infringement for the owner of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program provided that:

(1) that such a new copy or adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner, or

(2) that such new copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.

Any exact copies prepared in accordance with the provisions of this section may be leased, sold, or otherwise transferred, along with the copy from which such copies were prepared, only as part of the lease, sale, or other transfer of all rights in the program. Adaptations so prepared may be transferred only with the authorization of the copyright owner.

Section 118 - Scope of Exclusive Rights: Use of Certain Works in Connection with Noncommercial Broadcasting

under a copyright, has not previously been transferred voluntarily by that individual author, no action by any governmental body or other official or organization purporting to seize, expropriate, transfer, or exercise rights of ownership with respect to the copyright, or any of the exclusive rights under a copyright, shall be given effect under this title except as provided under Title 11 [relating to bankruptcy].

APPENDIX B

DoD Procurement Regulations

27.403 Acquisition of Rights in Technical Data.

27.403-1 Background.

(a) Government's Interest in Technical Data. The Government has extensive needs for many kinds of technical data. Its needs may well exceed those of private commercial customers. For defense purposes, millions of separate equipment and supply items, ranging from standard to unique types, must be acquired, operated, and maintained, often at points remote from the source of supply. Functions requiring varied kinds of technical data include training of personnel, overhaul and repair, cataloging, standardization, inspection and quality control, packaging, and logistics operations. Technical data resulting from research and development contracts must be obtained, organized and disseminated to many different users. Finally, the Government must make technical data widely available in the form of contract specifications in order to obtain competition among its suppliers, and thus further economy in Government procurement.

(b) Contractor's Interest in Technical Data. Commercial organizations have a valid economic interest in technical data pertaining to items, components, or processes which they have developed at their own expense. Such technical data is often closely held because its disclosure to competitors could jeopardize the competitive advantage it was developed to provide. Public disclosure of such technical data can cause serious economic hardship to the originating company.

(c) The Balancing of Interests.

(1) It is apparent that there is no necessary correlation between the Government's need for technical data and its contractors' economic interest therein. However, in balancing the Government's requirements for technical data against the contractor's interest in protecting his technical data, it should be recognized that there may be a considerable identity of interest. This is particularly true in the case of innovative contractors who can best be encouraged to develop at private expense items of military usefulness where their rights in such items are scrupulously protected.

(2) It is equally important that the Government foster successful contractual relationships and encourage a ready flow of data essential to Government needs by confining its acquisitions of technical data to cases of actual need. Certainly the Government must not be barred from bargaining and contracting to obtain such technical data as it needs, even though that technical data may normally not be disclosed in commercial practice. Moreover, when the Government pays for research and development work which produces new knowledge, products, or processes, it has an obligation to foster technological progress through wide dissemination of the new and useful information derived from such work and where practicable to provide competitive opportunities for supplying the new products and utilizing the new processes.

(6) Technical data which is in the public domain or has been or is normally released cr disclosed by the contractor or subcontractor without restriction on further disclosure. "In the public domain" means available to the public without copyright or other restriction of any kind.

(c) Limited Rights Technical Data.

(1) Except as provided in paragraph () above, unpublished technical data pertaining to items, components or processes developed at private expense will be acquired with limited rights, provided that the data is identified as limited rights data in accordance with subparagraph (b)(2) of the clause at 52.227-7013, Rights in Technical Data and Computer Software. Unpublished, as applied to technical data and computer software documentation, means that which has not been released to the public nor been furnished to others without restriction on further use or disclosure.

(2) It should be clearly understood that the above statement of policy is a recital of rights to be acquired in technical data. Neither the foregoing statement of technical data rights policy, nor its implementing subparagraphs (b)(l) and (2) of the clause at 52.227-7013, Rights in Technical Data and Computer Software, establishes technical data requirements for a particular contract. It should also be noted that technical data pertaining to items, components or processes developed at private expense may be called for, required, or otherwise furnished under subparagraphs (b)(l), (3), (4), (5), and (6) above and, as such, it will be acquired with unlimited rights. Contract clauses and the schedule establish the form and type of technical data to be furnished; the categories into which such technical data fall, determine the rights to be obtained by the Government to use or publish such technical data.

(d) Predetermination of Rights in Technical Data.

(l)(i) When the Government needs technical data with unlimited rights, any data which the offeror intends to deliver with limited rights pursuant to paragraph (c) above should be identified prior to contract award, if feasible, and an agreement with respect thereto shall be incorporated in the contract. This procedure is called predetermination of rights in technical data.

(ii) The procedure may be initiated by the contracting officer or an offeror during the negotiation of a negotiated contract. In order to be productive, the procedure should apply only to that technical data for which rights may practicably be identified. Although the agreement may also cover technical data to be delivered with unlimited rights, in no case shall the procedure be used to require the contractor to furnish, with unlimited rights, technical data which he is entitled to furnish with limited rights under the policy in paragraph (c) above. The contracting officer shall consult his counsel as fully as possible in determining whether to use the procedure and in connection with the various steps of the procedure.

(2) Any agreements reached shall be incorporated in the Schedule of the contract directly or by reference and shall describe specifically the technical data which may be furnished with limited rights pursuant to paragraph (c) above. The contracting officer may, however, review the technical data asserted to be limited rights data to determine whether to invoke the procedures of paragraph (f) below to negotiate to purchase unlimited rights in any of the technical data, or adopt some alternative such as to--

(2) The analysis and findings referred to in subparagraph (b)(l) above shall specifically identify each item, component or process and the particular technical data therefor which is to be purchased.

(3) When all technical data is to be acquired under any contract with unlimited rights in accordance with the findings of paragraph (f)

(1) above, the clause at 52.227-7015, Rights in Technical Data -- Specific Acquisition, shall be used.

(4)(i) In addition to the acquisition of unlimited rights in technical data as authorized in paragraph (f) (1) above, there will be situations when it is in the best interest of the Government to acquire from subcontractors repair parts or components by direct sale to the Government.

(ii) The clause at 52.227-7017, Rights in Technical Data -- Major System and Subsystem Contractor, may be used in contracts for major systems or major subsystems involving estimated program expenditures in excess of $50 million of RDT&E funds or in excess of $200 million of production funds. When this clause is used, any compensation the contractor requires for the right the subcontractor will have to use his limited rights, technical data shall be included in the price of the prime contract. Also, the Government shall have the right to purchase such items direct from manufacturing subcontractors without the payment, either directly of any fee or royalty to the prime contractor, or as part of the purchase price, for use of the prime contractor's technical data.

(iii) For the purpose of applying the foregoing policy, the following definitions shall be utilized: A major system is a composite of equipment, skills, and techniques capable of performing and/or supporting an operational role which required or will require research, development, test and evaluation investment or design, development, test and evaluation investment estimated in excess of $50 million or total production investment estimated in excess of $200 million. A major subsystem is a major functional part of a major system (as defined above) which is essential to operational completeness. Examples are: airframe, propulsion, armament, guidance, and communication. A major system or major subsystem contractor includes an associate contractor defined as a prime contractor to the Government for developing and/or producing subsystems, equipment, or components meeting specifications prepared by a contractor performing one or more of the functions of systems engineering for a major system (as defined above).

(g) Notice of Certain Limited Rights.

(1) Whether or not the procedure of paragraph (d) above for predetermination of rights in technical data is used, if continuing information is desired under a contract about a contractor's intention to use in the performance of the contract any item, component, or process for which technical data would be subject to limited rights in accordance with the policy of paragraph (c) above, the contractor may be required to advise the contracting officer of this fact promptly (see subparagraph 27.412(a)(2) and Alternate I to the clause at 52.227-7013, Rights in Technical Data and Computer Software). If possible, the schedule should indicate the specific areas pertaining to which limited rights data is of concern and the notice requirement should be restricted to those areas of concern.

The Government shall include such identifying markings on all reproductions thereof, unless the Government cancels such markings pursuant to subparagraphs (c)(2), (d)(3), or (d)(4) below.

(2) The contractor has the responsibility to assure that no restrictive markings are placed on technical data except in accordance with the "Rights in Technical Data and Computer Software" clause at 52.227-7013. Copyright notices as specified in Title 17 United States Code, Sections 401 and 402, are not considered "restrictive markings".

When the clause at 52.227-7013, "Rights in Technical Data and Computer Software", is required by 27.412(a), the clause at 52.227-7018, "Restrictive Markings on Technical Data", shall also be included in the contract. The contractor's procedures required by this clause shall be reviewed periodically by the Contract Administration Office. In addition to the rights afforded to the Government by the clause at 52.227-7018, "Restrictive Markings on Technical Data", the following actions are available to insure proper marking of technical data:

(i) The procedures in paragraph (d), "Removal of Unauthorized Markings", of the clause at 52.227-7013, may be invoked if the contractor fails to follow procedures required by the clause at 52.227-7013, Rights In Technical Data and Computer Software, or fails to correct deficiencies within a specified time.

(ii) Failure to follow proper marking procedures may also be deemed to render technical data nonconforming and subject to FAR Section 46.102 and to withholding of payments under the "Technical Data--Withholding of Payments" clause.

(iii) When a pre-award survey is requested by the purchasing office, the quality assurance review shall include as an item of special inquiry an examination of the prospective contractor's procedures for complying with the "Restrictive Markings on Technical Data" clause.

(iv) The contractor's procedures for complying with the "Restrictive Markings on Technical Data" clause shall be reviewed when holding post-award conferences pursuant to FAR Subpart 42.

(d) Unmarked or Improperly Marked Technical Data.

(1) The Government shall have the right to require the contractor to furnish clear and convincing evidence of the propriety of any restrictive markings used by the contractor on data furnished to the Government under contract.

(2) Technical data received without a restrictive legend shall be deemed to have been furnished with unlimited rights. However, within six months after delivery of such data the contractor may request permission to place restrictive markings on such data at his own expense and the Government may so permit if the contractor--

(1) Computer software resulting directly from or generated as part of the performance of experimental, developmental, or research work specified as an element of performance in a Government contract or subcontract;

(2) Computer software required to be originated or developed under a Government contract, or generated as a necessary part of performing a contract;

(3) Computer data bases, prepared under a Government contract, consisting of--

(i) information supplied by the Government--

(ii) information in which the Government has unlimited rights, or--

(iii) information which is in the public domain;

(4) Computer software prepared or required to be delivered under this or any other Government contract or subcontract and constituting corrections or changes to Government-furnished software; or

(5) Computer software which is in the public domain or has been or is normally furnished by the contractor or subcontractor without restriction.

(b) When the Government has unlimited rights in computer software in the possession of a contractor, no payment will be made for rights of use of such software in performance of Government contracts or for the later delivery to the Government of such computer software, provided however, that the contractor shall be entitled to compensation for converting the software into the prescribed form for reproduction and delivery to the Government.

(c) It is Department of Defense policy to acquire only such rights to use, duplicate, and disclose computer software developed at private expense as are necessary to meet Government needs. Such rights should be designed to allow the Government flexibility while, at the same time, adequately preserving the rights of the contractor. Computer software developed at private expense may be purchased or leased. Restrictions may be negotiated with respect to the right of the Government to use, duplicate, or disclose computer programs or computer data bases developed at private expense. As a minimum, however, the Government shall have the rights provided in the definition of restricted rights in Section 27.401.

(d) Patented or copyrighted computer software will not be subject to any agreement prohibiting the Government from infringing a patent or copyright. Title 28, United States Code, Section 1498 provides that the Government is liable only for reasonable compensation for use of a patented invention or for infringement of copyright. However, see Section 27.711.

(e) When computer software is developed at private expense and acquired with

a necessary part of performing a contract, only that portion of the resulting product in which the original product is recognizable will be deemed to be computer software developed at private expense to which restricted rights may attach.

(5) The scope of the restrictions on or, conversely, the scope of the use which the Government is permitted to make of such software shall be taken into account in determining the reasonableness of the contract price for the computer software.

(c) Computer Software Subject to Restricted Rights.

(1) Because of the widely-varying restrictions which are likely to be encountered in the purchase or lease of computer software developed at private expense, a standard recital setting forth specific restrictions and rights suitable for all cases is not feasible. If the standard set of restrictions and rights set forth in paragraph 27.404-l(f) for commercial computer software is not appropriate, personnel are urged to consult counsel in any case in which the proposed contractor requests the Government to accept other restrictions on the use of such software.

(2) To apprise user personnel of the restrictions on use, duplication or disclosure agreed to by the Government with respect to such software sold or leased to the Government, the contractor is required to place the following legend on such software:

RESTRICTED RIGHTS LEGEND

Use, duplication or disclosure is subject to

restrictions stated in Contract No. .....

with.....(Name of Contractor).

For commercial computer software and documentation, the contract number may be omitted and replaced by "paragraph (b)(3)(B) of the Rights in Technical Data and Computer Software clause at 52.227-7013", and the contractor's address added. The Government shall include the same restrictive markings on all its reproductions of the computer software unless the Government cancels such markings pursuant to the procedures in Paragraph 27.403-3(d).

(3) A statement setting forth the restrictions imposed on the Government to use, duplicate, and disclose computer software subject to restricted rights is required to be prominently displayed in human- readable form in the computer software documentation. The reference to the Rights in Technical Data and Computer Software clause in the Restricted Rights Legend on commercial computer software and documentation satisfies this requirement.

(4) Except as provided in paragraph (b) above, computer programs, computer data bases, and computer software documentation delivered to the Government pursuant to a contract requirement must be identified with the number of the prime contract and the name of the contractor.

(5) All markings, (notice, legends, identifications, etc.) concerning restrictions on the

52.227-7013 Rights in Technical Data and Computer Software. As prescribed at 27.412(a)(1), insert the following clause:

RIGHTS IN TECHNICAL DATA AND COMPUTER SOFTWARE (MAY 1981)

(a) Definitions. "Commercial Computer Software", as used in this clause, means computer software which is used regularly for other that government purposes and is sold, licensed or leased in significant quantities to the general public at established market or catalog prices.

"Computer", as used in this clause, means a data processing device capable of accepting data, performing prescribed operations on a device that operates on discrete data by performing arithmetic and logic processes on the data, or a device that operates on analog data by performing physical processes on the data.

"Computer Data Base", as used in this clause, means a collection of data in a form capable of being processed and operated on by a computer.

"Computer Program", as used in this clause, means a series of instructions or statements in a form acceptable to a computer, designed to cause the computer to execute an operation or operations. Computer programs include operating systems, assemblers, compilers, interpreters, data management systems, utility programs, sort-merge programs, and ADPE maintenance/diagnostic programs, as well as applications programs such as payroll, inventory control, and engineering analysis programs. Computer programs may be either machine-dependent or machine-independent, and may be general-purpose in nature or designed to satisfy the requirements of a particular user.

"Computer Software", as used in this clause, means computer programs and computer data bases.

"Computer Software Documentation", as used in this clause, means technical data, including computer listings and printouts, in human- readable form which (1) documents the design or details of computer software, (2) explains the capabilities of the software, or (3) provides operating instructions for using the software to obtain desired results from a computer.

"Limited Rights" as used in this clause, means rights to use, duplicate, or disclose technical data, in whole or in part, by or for the Government, with the express limitation that such technical data shall not, without the written permission of the party furnishing such technical data be (1) released or disclosed in whole or in part outside the Government, (2) used in whole or in part by the Government for manufacture, or in the case of computer software documentation, for preparing the same or similar computer software, or (3) used by a party other than the Government, except for:

(1) Emergency repair or overhaul work only, by or for the Government, where the item or process concerned is not otherwise reasonably available to enable timely performance of

(1) Unlimited Rights. The Government shall have unlimited rights in:

(i) technical data and computer software resulting directly from performance of experimental, developmental or research work which was specified as an element of performance in this or any other Government contract or subcontract;

(ii) computer software required to be originated or developed under a Government contract, or generated as a necessary part of performing a contract;

(iii) computer data bases, prepared under a Government contract, consisting of information supplied by the Government, information in which the Government has unlimited rights, or information which is in the public domain;

(iv) technical data necessary to enable manufacture of end-items, components, and modifications, or to enable the performance of processes, when the end-items, components, modifications or processes have been, or are being, developed under this or any other Government contract or subcontract in which experimental, developmental or research work is, or was specified as an element of contract performance, except technical data pertaining to items, components, processes, or computer software developed at private expense (but see subdivision (b)(2)(ii) below);

(v) technical data or computer software prepared or required to be delivered under this or any other Government contract or subcontract and constituting corrections or changes to Government- furnished data or computer software;

(vi) technical data pertaining to end-items; components or processes, prepared or required to be delivered under this or any other Government contract or subcontract, for the purpose of identifying sources, size, configuration, mating and attachment characteristics, functional characteristics and performance requirements ("form, fit and function" data, e.g., specification control drawings, catalog sheets, envelope drawings, etc.);

(vii) manuals or instructional materials prepared or required to be delivered under this contract or any subcontract hereunder for installation, operation, maintenance or training purposes;

(viii) technical data or computer software which is in the public domain, or has been or is normally released or disclosed by the Contractor or subcontractor without restriction on further disclosure; and

(ix) technical data or computer software listed or described in an agreement incorporated into the schedule of this contract which the parties have predetermined, on the basis of subparagraphs (i) through (viii) above, and agreed will be furnished with unlimited rights.

(2) Limited Rights. The Government shall have limited rights in:.

(2) release to a foreign government, as the interest of the United States may require, only for information or evaluation within such government or for emergency repair or overhaul work by or for such government under the conditions of (1) above. This legend, together with the indications of the portions of this data which are subject to such limitations shall be included on any reproduction hereof which includes any part of the portions subject to such limitations.

(3) Restricted Rights.

(i) The Government shall have restricted rights in computer software, listed or described in a license or agreement made a part of this contract, which the parties have agreed will be furnished with restricted rights, Provided, however, notwithstanding any contrary provision in any such license or agreement, the Government shall have the rights included in the definition of "restricted rights" in paragraph (a) above. Such restricted rights are of no effect unless the computer software is marked by the Contractor with the following legend:.

RESTRICTED RIGHTS LEGEND

Use, duplication or disclosure is subject to

restrictions stated In Contract No.

with (Name of Contractor)

and the related computer software documentation includes a prominent statement of the restrictions applicable to the computer software. The Contractor may not place any legend on computer software indicating restrictions on the Government's rights in such software unless the restrictions are set forth in a license or agreement made a part of this contract prior to the delivery date of the software. Failure of the Contractor to apply a restricted rights legend to such computer software shall relieve the Government of liability with respect to such unmarked software.

(ii) Notwithstanding subdivision (i) above, commercial computer software and related documentation developed at private expense and not in public domain may, if the Contractor so elects, be marked with the following Legend:

RESTRICTED RIGHTS LEGEND

Use, duplication, or disclosure of the

Government is subject to restrictions

as set forth in subdivision (b

(3)(ii) of)

the Rights in Technical Data and Computer

Software clause at 52.227-7013.

(Name of Contractor and Address)

When acquired by the Government, commercial computer software and related documentation so legended shall be subject to the following:

others do so for Government purposes. With respect to technical data and computer software in which the Government has unlimited rights, the license shall be of the same scope as the rights set forth in the definition of "unlimited rights"\in paragraph (a) above. With respect to technical data in which the Government has limited rights, the scope of the license is limited to the rights set forth in the definition of "limited rights" in paragraph (a) above. With respect to computer software which the parties have agreed in accordance with subparagraph (b)(3) above will be furnished with restricted rights, the scope of the license is limited to such rights.

(2) Unless written approval of the Contracting 0fficer is obtained, the Contractor shall not include in technical data or computer software prepared for or acquired by the Government under this contract any works of authorship in which copyright is not owned by the Contractor without acquiring for the Government any rights necessary to perfect a copyright license of the scope specified in subparagraph (c)(l).

(3) As between the Contractor and the Government, the Contractor shall be considered the "person for whom the work was prepared for the purpose of determining authorship under Section 201(b) of Title 17, United States Code.

(4) Technical data delivered under this contract which carries a copyright notice shall also include the following statement which shall be placed thereon by the Contractor, or should the Contractor fail, by the Government:.

> This material may be reproduced by or for the U.S. Government pursuant to the copyright license under the clause at 52.227-7013 (date).

(d) Removal of Unauthorized Markings. Notwithstanding any provision of this contract concerning inspection and acceptance, the Government may correct, cancel, or ignore any marking not authorized by the terms of this contract on any technical data or computer software furnished hereunder if:

(1) the Contractor fails to respond within sixty (60) days to a written inquiry by the Government concerning the propriety of the markings, or

(2) the Contractor's response fails to substantiate, within sixty (60) days after written notice, the propriety of limited rights markings by clear and convincing evidence, or of restricted rights markings by identification of the restrictions set forth in the contract.

In either case, the Government shall give written notice to the Contractor of the action taken.

(e) Relation to Patents. Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Government under any patent.

(f) Limitation on Charges for Data and Computer Software. The Contractor recognizes that the Government or a foreign government with funds derived through the Military Assistance Program or otherwise through the United States Government may contract for

(i) standard commercial items which are manufactured by more than one source of supply; or

(ii) items, components or processes for which such notice was given pursuant to predetermination of rights in technical data in connection with this contract.

(3) Contracting Officer approval is not necessary under this clause for the Contractor to use the item, component or process in the performance of the contract.

ALTERNATE II (MAY 1981) As prescribed at 27.412(a)(3), add the following paragraph to the basic clause:

( ) Publication for sale. If, prior to publication for sale by the Government and within the period designated in the contract or task order, but in no event later than 24 months after delivery of such data, the Contractor publishes for sale any data

(1) designated in the contract as being subject to this paragraph and

(2) delivered under this contract, and promptly notifies the Contracting Officer of these publications, the Government shall not publish such data for sale or authorize others to do so. This limitation on the Government's right to publish for sale any such data so published by the Contractor shall continue as long as the data is protected as a published work under the copyright law of the United States and is reasonably available to the public for purchase. Any such publication shall include a notice identifying this contract and recognizing the license rights of the Government under subparagraph (c)(l) of this clause. As to all such data not so published by the Contractor, this paragraph shall be of no force or effect.

APPENDIX C

Interviewees

Background/Profession

EMPLOYER		Management Admin.	Technical	Contracting Personnel	Lawyers	TOTAL
	ARMY	01	01		04	06
	NAVY	11	06	02	08	27
	AIR FORCE	09	14	15	09	47
	OSD	01			03	04
	DLA		03			03
	STARS		04			04
	TOTAL DoD	22	28	17	24	91
	NASA				02	02
	Industry Private Practice	04	03		11	18
	Academic Research		04		02	06
	TOTAL	26	35	17	39	117

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2b. DECLASSIFICATION/DOWNGRADING SCHEDULE: N/A	
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6a. NAME OF PERFORMING ORGANIZATION: Software Engineering Inst. / 6b. OFFICE SYMBOL (If applicable): SEI	7a. NAME OF MONITORING ORGANIZATION: SEI Joint Program Office ESD/ALSI
6c. ADDRESS (City, State and ZIP Code): Carnegie-Mellon University, Pittsburgh, PA 15213	7b. ADDRESS (City, State and ZIP Code): Hanscom Air Force Base, Hanscom, MA 01731
8a. NAME OF FUNDING/SPONSORING ORGANIZATION: SEI Joint Program Office / 8b. OFFICE SYMBOL (If applicable): ESD/ALSI	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER: F19628-85-0003
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16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB. GR.	

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

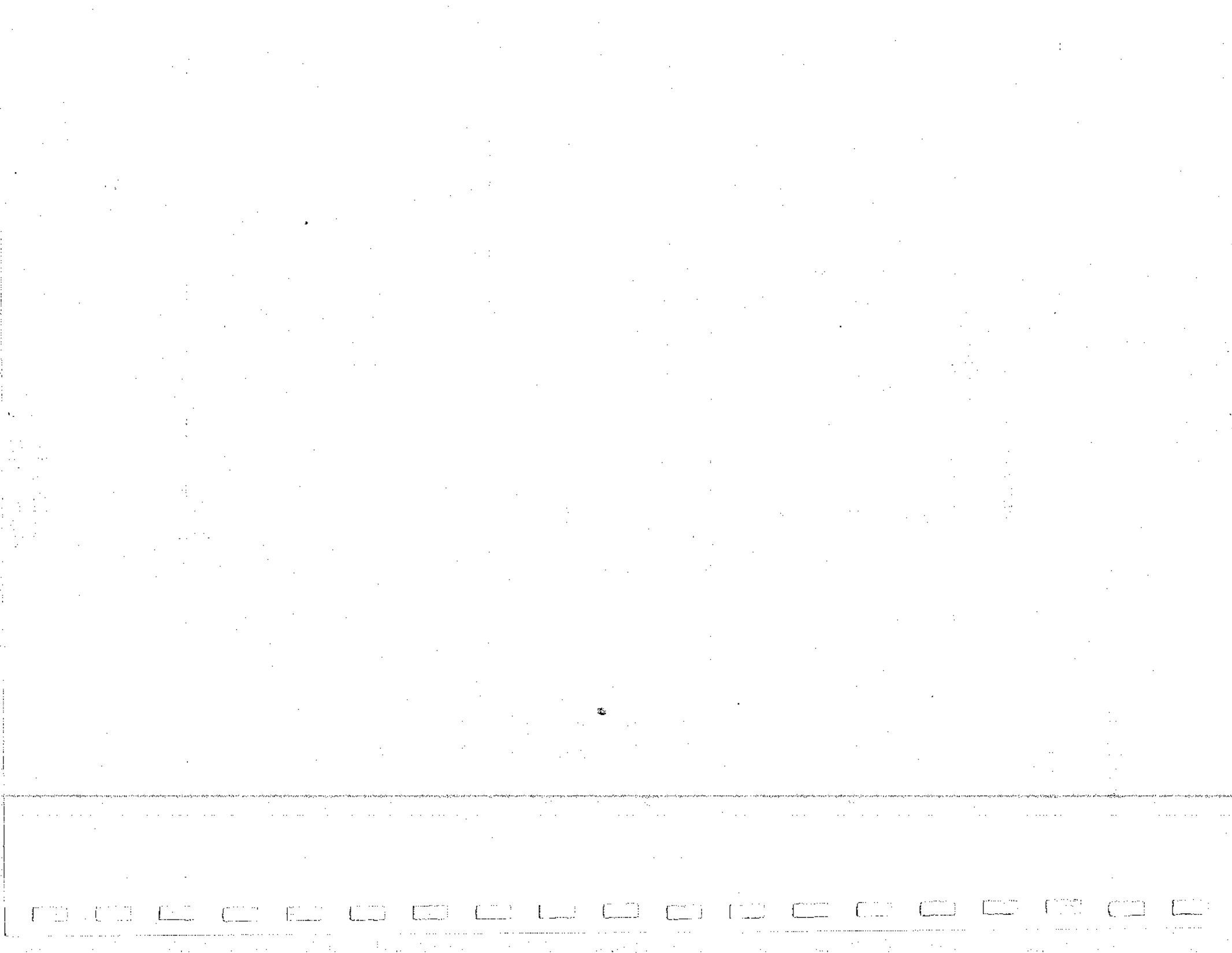
This report of the Software Licensing Project of the SEI catalogues and discusses various problems with respect to DoD software procurement policy, and offers suggestions as to ways in which the DoD could improve its software acquisition and licensing methodologies. The report focuses on the software/data rights provisions of the DoD procurement regulations (DoD FAR SUPP Subpart 27.4) as they relate to the Federal Acquisition Regulations, legislation regarding federal contracting practices, intellectual property law (i.e., copyright law patent law, state trade secret law, trademark laws, etc.) and general commercial practice of the software industry. Particular attention has been given to legal issues related to maintenance and enhancement (software supportability) concerns, reusability and other software modification issues, subcontractor situations and the possibility of an injunction issuing against the government in certain situations. Issues related to significant DoD projects, such as the development of the Ada language system, are also examined. This report urges a reform of DoD policy with respect to the acquisition of software, technical data and documentation, software development tools, CAD/CAM programs and the like.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS ☐	Unclassified

22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE NUMBER (Include Area Code)	22c. OFFICE SYMBOL

DD FORM 1473, 83 APR — EDITION OF 1 JAN 73 IS OBSOLETE.

SECURITY CLASSIFICATION OF THIS PAGE



property or services with respect to which the vendor may be liable to the Contractor for charges for the use of technical data or computer software on account of such a contract. The Contractor further recognizes that it is the policy of the Government not to pay in connection with its contracts, or to allow to be paid in connection with contracts made with funds derived through the Military Assistance Program or otherwise through the United States Government, charges for data or computer software which the Government has a right to use and disclose to others, which is in the public domain, or which the Government has been given without restrictions upon its use and disclosure to others. This policy does not apply to reasonable reproduction, handling, mailing, and similar administrative costs incident to the furnishing of such data or computer software. In recognition of this policy, the Contractor agrees to participate in and make appropriate arrangements for the exclusion of such charges from such contracts, or for the refund of amounts received by the Contractor with respect to any such charges not so excluded.

(g) Acquisition of Data and Computer Software from Subcontractors.

(1) Whenever any technical data or computer software is to be obtained from a subcontractor under this contract, the Contractor shall use this same clause in the subcontract, without alteration, and no other clause shall be used to enlarge or diminish the Government's or the Contractor's rights in that subcontractor data or computer software which is required for the Government.

(2) Technical data required to be delivered by a subcontractor shall normally be delivered to the next-higher tier contractor. However, when there is a requirement in the prime contract for data which may be submitted with limited rights pursuant to subparagraph (b)(2) above, a subcontractor may fulfill such requirement by submitting such data directly to the Government rather than through the prime Contractor.

(3) The Contractor and higher-tier subcontractors will not use their power to award subcontracts as economic leverage to acquire rights in technical data or computer software from their subcontractors for themselves.

(End of clause)

ALTERNATE I (MAY I981) As prescribed at 27.412(a)(2), add the following paragraph to the basic clause:

Notice of Certain Limited Rights.

(h)(l) Unless the Schedule provides otherwise, and subject to (2) below, the Contractor will promptly notify the Contracting 0fficer in writing of the intended use by the Contractor or a subcontractor in performance of this contract of any item, component or process for which technical data would fall within subparagraph (b)(2) above.

(2) Such notification is not required with respect to:

(A) Title to and ownership of the software and documentation shall remain with the Contractor.

(B) User of the software and documentation shall be limited to the facility for which it is acquired.

(C) The Government shall not provide or otherwise make available the software or documentation, or any portion thereof, in any form, to any third party without the prior written approval of the Contractor.

Third parties do not include prime contractors, subcontractors and agents of the Government who have the Government's permission to use the licensed software and documentation at the facility, and who have agreed to use the licensed software and documentation only in accordance with these restrictions. This provision does not limit the right of the Government to use software, documentation, or information therein, which the Government may already have or obtains without restrictions.

(D) The Government shall have the right to use the computer software and documentation with the computer for which it is acquired at any other facility to which that computer may be transferred; to use the computer software and documentation with a backup computer when the primary computer is inoperative; to copy computer programs for safekeeping (archives) or backup purposes; and to modify the software and documentation or combine it with other software, Provided, that the unmodified portions shall remain subject to these restrictions.

(E) If the Contractor, within sixty (60) days after a written request, fails to substantiate by clear and convincing evidence that computer software and documentation marked with the above Restricted Rights Legend are commercial items and were developed at private expense, or if the Contractor fails to refute evidence which is asserted by the Government as a basis that the software is in the public domain, the Government may cancel or ignore any restrictive markings on such computer software and documentation and may use them with unlimited rights. Such written requests shall be addressed to the Contractor as identified in the Restricted Rights Legend.

(4) No legend shall be marked on, nor shall any limitation or restriction on rights of use be asserted as to, any data or computer software which the Contractor has previously delivered to the Government without restriction. The limited or restricted rights provided for by this paragraph shall not impair the right of the Government to use similar or identical data or computer software acquired from other sources.

(c) Copyright.

(1) In addition to the rights granted under the provisions of paragraph (b) above, the Contractor hereby grants to the Government a nonexclusive, paid-up license throughout the world, of the scope set forth below, under any copyright owned by the Contractor, in any work of authorship prepared for or acquired by the Government under this contract, to reproduce the work in copies or phonorecords, to distribute copies or phonorecords to the public, to perform or display the work publicly, and to prepare derivative works thereof, and to have

(i) technical data, listed or described in an agreement incorporated into the Schedule of this contract, which the parties have agreed will be furnished with limited rights; and

(ii) unpublished technical data pertaining to items, components or processes developed at private expense, and unpublished computer software documentation related to computer software that is acquired with restricted rights, other than such data as may be included in the data referred to in subdivisions (b)(l)(i), (v), (vi), (vii), and (viii) above. The word unpublished, as applied to technical data and computer software documentation, means that which has not been released to the public nor been furnished to others without restriction on further use or disclosure. For the purpose of this definition, delivery of limited rights technical data to or for the Government under a contract does not, in itself, constitute release to the public.

Limited rights shall be effective provided that only the portion or portions of each piece of data to which limited rights are to be asserted pursuant to subdivisions (2)(i) and (ii) above are identified (for example, by circling, underscoring, or a note), and that the piece of data is marked with the legend below in which is inserted:

A. the number of the prime contract under which the technical data is to be delivered,

B. the name of the Contractor and any subcontractor by whom the technical data was generated, and

C. an explanation of the method used to identify limited rights data.

LIMITED RIGHTS LEGEND

Contract No. ----------

Contractor:

Explanation of Limited Rights Data Identification Method Used

Those portions of this technical data indicated as limited rights data shall not, without the written permission of the above Contractor, be either

(A) used, released or disclosed in whole or in part outside the Government,

(B) used in whole or in part by the Government for manufacture or, in the case of computer software documentation, for preparing the same or similar computer software, or

(C) used by a party other than the Government, except for:

(1) emergency repair or overhaul work only, by or for the Government, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work, Provided, that the release or disclosure hereof outside the Government shall be made subject to a prohibition against further use, release or disclosure; or

the work; Provided, that the release or disclosure thereof outside the Government shall be made subject to a prohibition against further use, release or disclosure; or

(2) Release to a foreign government, as the interest of the United States may require, only for information or evaluation within such government or for emergency repair or overhaul work by or for such government under the conditions of (1) above.

"Restricted Rights", as used in this clause, means rights that apply only to computer software, and include, as a minimum, the right to--

(1) Use computer software with the computer for which or with which it was acquired, including use at any Government installation to which the computer may be transferred by the Government;

(2) Use computer software with a backup computer if the computer for which or with which it was acquired is inoperative;

(3) Copy computer programs for safekeeping (archives) or backup purposes; and

(4) Modify computer software, or combine it with other software, subject to the provision that those portions of the derivative software incorporating restricted rights software are subject to the same restricted rights.

In addition, restricted rights include any other specific rights not inconsistent with the minimum rights in (1)-(4) above that are listed or described in this contract or described in a license or agreement made a part of this contract.

"Technical Data", as used in this clause, means recorded information, regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental or engineering work, or be usable or used to define a design or process or to procure, produce, support, maintain, or operate materiel. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specifications or related performance or design type documents, or computer printouts. Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications and related information, and computer software documentation. Technical data does not include computer software or financial, administrative, cost and pricing, and management data or other information incidental to contract administration.

Unlimited Rights', as used in this clause, means rights to use, duplicate, or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to have or permit others to do so.

(b) Government Rights.

use, duplication, or disclosure of computer software required or authorized by the terms of the contract under which delivery is made are required to be in human-readable form that can be readily and visually perceived and, in addition may be in machine-readable form as appropriate and feasible under the circumstances. Such markings shall be affixed by the contractor to the computer software prior to delivery of the software to the Government.

(6) The human-readable markings may be applied to card decks, magnetic tape reels, or disc packs. This may be, in the case of a card deck, on a notice card even though the cards of the deck do not contain printed material; in the case of a card deck packaged in a container intended as a permanent receptacle for the cards, on the container; in the case of a tape, on the tape reel or on the surface of the leader and trailer of the tape; and in the case of a disc pack, on the hub of the disc.

(d) Unmarked or Improperly Marked Computer Software.

(1) No restrictive markings shall be placed upon computer software unless restrictions are set forth in the contract prior to delivery of the software. Copyright notices as specified in Title 17, United States Code, Sections 401 and 402 are not considered "restrictive markings". The Government may require the contractor to identify the contractual provision setting forth such restrictions before accepting computer software with restrictive markings. If computer software is received with restrictive markings, and there is a question whether it is authorized by the contract to be furnished with restricted rights, it shall be used subject to the asserted restrictions pending written inquiry to the contractor. If no response to an inquiry has been received within 60 days, or if the response fails to identify the restrictions set forth in the contract, the cognizant Government personnel shall cancel or ignore the markings, notify the contractor accordingly in writing, and thereafter use the software with unlimited rights.

(2) Computer software received without a restrictive legend shall be deemed to have been furnished with unlimited rights. However, the contractor may request permission to place restrictive markings on such software at his own expense, and the Government may so permit, if the contractor establishes that the markings are authorized by the contract and demonstrates that the omission was inadvertent. Failure of the contractor to mark such computer software prior to delivery to the Government shall relieve the Government of liability for any use, duplication or disclosure of such computer software.

(3) If computer software authorized by the contract to be furnished with restrictions is received with restrictive markings not in the form prescribed by the contract, the software should be used in accordance with the restrictions provided for in the contract and the contractor shall be required by written notice to correct the markings to conform with those specified in the contract. If the contractor fails to correct the markings within 60 days after notice, Government personnel may correct the markings, and so notify the contractor.

restricted rights, the associated computer software documentation will be acquired with limited rights to the extent provided in the definition of limited rights in Section 27.401, and will not be used for preparing the same or similar computer software.

(f) Commercial computer software and related documentation developed at private expense may be leased, or a license to use may be purchased, by the Government subject to the restrictions in subdivision (b)(3)(i) of the clause at 52.227-7013, Rights in Technical Data and Computer Software.

27.404-2 Procedures.

(a) Deviations. All requests for deviations from this Section 27.404 shall be submitted to the DAR Council in accordance with the procedures in FAR Section 1.404.

(b) General.

(1) except as provided at 52.227-7031, Data Requirements, any computer program or computer data base to be purchased under a contract shall be listed on the Contract Data Requirements List (DD Form 1423). Also, if a contract requires the conversion of data to machine-readable form, the editing or revision of existing programs, or the preparation of computer software documentation, the products of this work, if required to be delivered, shall be included on the DD Form 1423.

(2) The clause at 52.227-7013, Rights in Technical Data and Computer Software, shall be included in every contract under which computer software may be originated, developed, or delivered. That clause establishes the circumstances under which the Government secures unlimited rights in both technical data and computer software, limited rights in technical data, and restricted rights in computer software. In negotiated contracts where the clause at 52.227-7013, Rights in Technical Data and Computer Software, is required, the provision at 52.227-7019, Identification of Restricted Rights Computer Software, shall be included in the solicitation.

(3) Contracts under which computer software developed at private expense is procured cr leased shall explicitly set forth the rights necessary to meet Government needs and restrictions applicable to the Government as to use, duplication and disclosure of the software. Thus, for example, such software may be needed, or the owner of such software will only sell or lease it, for specific or limited purposes such as for internal agency use, or for use in a specific activity, installation or service location. In any event, the contract must clearly define any restrictions on the right of the Government to use such computer software, but such restrictions will be acceptable only if they will permit the Government to fulfill the need for which such software is being procured. The recital of restrictions may be complete within itself or it may reference the contractor's license or other agreement setting forth restrictions. If referencing is employed, a copy of the license or agreement must be attached to the contract. The minimum rights are provided in the Rights in Technical Data and Computer Software clause at 52.227-7013, and need not be included in the recital.

(4) When computer software developed at private expense is modified or enhanced as

(i) demonstrates that the omission of the restrictive marking was inadvertent,

(ii) establishes pursuant to subparagraph (d)(I) above that the use of the markings is authorized, and

(iii) relieves the Government of any liability with respect to such technical data (see Paragraph 27.403-3(a)).

(3) If technical data which the contractor is not authorized by the contract to furnish with limited rights is received with restrictive markings, the technical data shall be used with limited rights pending written inquiry to the contractor. If no response to an inquiry has been received within 60 days, or if the response fails to substantiate by clear and convincing evidence that the markings were authorized, the cognizant Government personnel shall cancel or ignore such markings, notify the contractor accordingly in writing, and thereafter may use such technical data with unlimited rights.

(V) If technical data which the contractor is authorized by the contract to furnish with limited rights is received with restrictive markings not in the form prescribed by the contract, the technical data shall be used with limited rights, and the contractor shall be required by written notice to correct the markings to conform with those specified in the contract. If the contractor fails to so correct the markings within 60 days after notice, Government personnel may correct or cancel the markings, so notify the contractor in writing, and thereafter use the technical data accordingly.

(e) Technical Data Furnished on a Restricted Basis in Support of a Proposal. When the contracting officer contemplates awarding a contract on a solicited or unsolicited proposal which was offered on a restricted basis (see FAR Section 5.413 and FAR Section 15.509), he shall ascertain whether to acquire rights to use all or part of the technical data furnished with the proposal. If such rights are desired, the contracting officer shall negotiate with the offeror in accordance with the policies set forth in this Section 27.403. If the offeror agrees to furnish the technical data under the contract, the appropriate clause at 52.227-7013, Rights in Technical Data and Computer Software, shall be inserted in the contract, and the contract shall identify the technical data to be covered by the clause as provided by Section 27.410.

(f) Delivery of Technical Data to Foreign Governments. As provided in the definition of limited rights in Section 27.401, limited rights include the right of the Government to deliver the technical data to foreign governments as the national interest of the United States may require, subject to the same limitations which the Government accepts for itself. When the Government proposes to make technical data subject to limited rights available for use by a foreign government, it will, to the maximum extent practicable, give reasonable notice thereof to the contractor or subcontractor who generated the technical data and whose name appears thereon. 27.404 Acquisition of Rights in Computer Software.

27.404-1 Policy.

(a) The Government shall have unlimited rights in:

(2) No such advice shall be required as to items, components, or processes for which notice was previously given pursuant to the predetermination procedure in the same contract, or with respect to standard commercial items which are manufactured by more than one source of supply. No contracting officer approval under this clause is necessary for the contractor to use any item, component, or process, identified pursuant to this requirement, in the performance of the contract.

(3) If the contracting officer agrees that under the policy stated in paragraph (c) above such technical data would be subject to limited rights, he may then determine whether to invoke the procedure of paragraph (f) above, to negotiate for the purchase of unlimited rights in such data or to adopt other suitable alternatives. The contract shall be amended to reflect any changes required by these procedures.

27.403-3 Procedures.

(a) Deviations. Extension of the six-month period of subparagraph 27.403-3(d)(2) below shall be processed under the authority of FAR Section 1.403. 0ther deviations to Section 27.403 and from the clauses prescribed for use herein shall be processed in accordance with the procedures in FAR Section 1-404.

(b) Establishing the Government's Rights to Use Technical Data.

All technical data specified in a contract or subcontract for delivery thereunder shall be acquired subject to the rights established in the appropriate Rights in Technical Data clauses. Except as provided in FAR Section 48.105 and in FAR Subpart 36.6 no other clauses, directives, standards, specifications or other implementation shall be included, directly or by reference, to enlarge or diminish such rights. The Government's acceptance of technical data subject to limited rights does not impair any rights in such data to which the Government is otherwise entitled or impair the Government's right to use similar or identical data acquired from other sources.

(c) Marking of Technical Data.

(1) Technical data delivered to the Government pursuant to any contract requirement shall be marked with the number of the prime contract, except as provided, in Subparagraph 27.434-2(c)(2), and the name of the contractor and any subcontractor who generated the technical data. Each piece of technical data submitted with limited rights shall also be marked with--

(i) the authorized restrictive legend,

(ii) an indication (for example, by circling, underscoring, or a note) of that portion of the piece of technical data to which the legend is applicable, and

(iii) an explanation of the indication used to identify limited rights data.

(i) delete or modify the requirement for the technical data in which the Government would need unlimited rights if it were ordered, or

(ii) modify the specifications so as not to require or permit the use of the item, component or process covered by the limited rights data; or

(iii) include a contractual option to acquire unlimited rights. (3) When the predetermination of rights in technical data procedure is to be used, include the provision at 52.227-7014, Predetermination of Rights in Technical Data, in the Request for Proposals.

(4) If completion of predetermination proves impracticable before award or if contractual requirements relating to design or technical data items are changed during the course of a contract, an appropriate provision shall be included in the contract, requiring the contractor to complete the identification of limited rights with respect to that technical data listed in the solicitation for which predetermination was proposed, or to identify limited rights technical data relating to the changed requirements.

(e) Subcontracts. It is the policy of the Department of Defense that prime contractors and higher-tier subcontractors shall not use their power to award subcontracts as economic leverage to acquire rights in the technical data of their subcontractors for themselves. Accordingly, a subcontractor who would have the right pursuant to paragraph (c) above to furnish technical data with limited rights, may furnish such limited rights data directly to the Government rather than through the prime contractor.

(f) Specific Acquisition of Unlimited Rights in Technical Data.

(1) Notwithstanding paragraph (c) above or any other provision of this subsection the Government may acquire unlimited rights in any limited rights technical data by means of negotiation with an individual contractor or subcontractor, or as a part of a competition among several contractors or subcontractors. Such individual negotiation or competition may be conducted either by the Government, or upon Government request by the prime contractor or higher-tier subcontractor. Such unlimited rights in technical data shall be stated in the contract schedule as a separate item and shall be separately priced. Unlimited rights in technical data shall not be acquired under this paragraph unless it is determined after a finding upon a documented record that component, or process to which the technical data pertains;

(ii) there is no suitable item, component or process of alternate design or availability;

(iii) the item or component can be manufactured or the process performed through the use of such technical data by other competent manufacturers, without the need for additional technical data which cannot be purchased reasonably or is not readily obtained by other economic means; and

(iv) anticipated net savings in reprocurements will exceed the acquisition cost of the technical data and rights therein.

(3) At the same time, acquiring, maintaining, storing, retrieving, and distributing technical data in the vast quantities generated by modern technology is costly and burdensome for the Government. For this reason alone, it would be necessary to control closely the extent and nature of technical data procurement. Such control is also necessary to insure Government respect for its contractors' economic interest in technical data relating to their privately developed items. The policies and procedures of this subsection are framed in the light of these considerations.

27.403-2 Policy.

(a) General.

(1) It is the policy of the Department of Defense to acquire only such technical data rights as are essential to meet Government needs.

(2) In deciding whether to acquire technical data for future acquisitions so that all such acquisitions can be made on a competitive basis tc the maximum practicable extent, the provisions of this section shall govern.

(b) Unlimited Rights Technical Data. Technical data in the following categories shall be acquired with unlimited rights.

(1) Technical data resulting directly from performance of experimental, developmental, or research work which was specified as an element of performance in a Government contract or subcontract;

(2) Technical data necessary to enable others to manufacture end-items, components and modifications, or to enable them tc perform processes, when the end-items, components, modifications or processes have been, or are being, developed under Government contracts or subcontracts in which experimental, developmental or research work was specified as an element of contract performance, except technical data pertaining to items, components or processes developed at private expense;

(3) Technical data prepared or required to be delivered under any Government contract or subcontract and constituting corrections or changes to Government-furnished data.

(4) Technical data pertaining to end-items, components or processes, prepared or required to be delivered under any Government contract or subcontract, for the purpose of identifying sources, size, configuration, mating and attachment characteristics, functional characteristics and performance requirements ("form, fit and function" data, e.g., specification control drawings, catalog sheets, envelope drawings, etc.);

(5) Manuals or instructional materials prepared or required to be delivered under a Government contract or subcontract for installation, operation, maintenance or training purposes; and

(a) The exclusive rights provided by section 106 shall, with respect to the works specified by subsection (b) and the activities specified by subsection (d), be subject to the conditions and limitations prescribed by this section.

(b) Not later than thirty days after the Copyright Royalty Tribunal has been constituted in accordance with section 802, the Chairman of the Tribunal shall cause notice to be published in the Federal Register of the initiation of proceedings for the purpose of determining reasonable terms and rates of royalty payments for the activities specified in subsection (d) with respect to published nondramatic musical works and published pictorial, graphic, and sculptural works ...

CHAPTER 2. - COPYRIGHT OWNERSHIP AND TRANSFER

Section 201 - Ownership of Copyright

(a) Initial Ownership. Copyright in a work protected under this title vests initially in the author or authors of the work. The authors of a joint work are co-owners of copyright in the work.

(b) Works Made for Hire. In the case of a work made for hire, the employer or other person for whom the work was prepared is considered the author for purposes of this title and, unless the parties have expressly agreed otherwise in a written instrument signed by them, owns all of the rights comprised in the copyright.

(c) Contributions to Collective Works. Copyright in each separate contribution to a collective work is distinct from copyright in the collective work as a whole, and vests initially in the author of the contribution. In the absence of an express transfer of the copyright or of any rights under it, the owner of copyright in the collective work is presumed to have acquired only the privilee of reproducing and distributing the contribution as part of that particular collective work, any revision of that collective work, and any later collective work in the same series.

(d) Transfer of ownership.

(1) The ownership of a copyright may be transferred in whole or in part by any means of conveyance or by operation of law, and may be bequeathed by will or pass as personal property by the applicable laws of intestate succession.

(2) Any of the exclusive rights comprised in a copyright, including any subdivision of any of the rights specified by section 106, may be transferred as provided by clause (1) and owned separately. The owner of any particular exclusive right is entitled, to the extent of that right, to all of the protection and remedies accorded to the copyright owner by this title.

(e) Involuntary Transfer.

When an individual author's ownership of a copyright, or of any of the exclusive rights

Section 105 - Subject Matter of Copyright: United States Government Works

Copyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise.

Section 106 - Exclusive Rights in Copyrighted Works

Subject to section 107 through 118, the owner of copyright under this title has the exclusive rights to do and to authorize any of the following:

(1) to reproduce the copyrighted work in copies or phonorecords;

(2) to prepare derivative works based upon the copyrighted work;

(3) to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or

(4) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and motion pictures and other audiovisual works, to perform the copyrighted work publicly; and

(5) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and pictorial, graphic, or sculptural works, including the individual images of a motion picture or other audiovisual work, to display the copyrighted work publicly.

Section 107 - Limitations on Exclusive Rights: Fair Use

Notwithstanding the provisions of section 106, the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include -

(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;

(2) the nature of the copyrighted work;

(3) the amount nd substantiality of the portion used in relation to the copyrighted work as a whole; and

The "United States", when used in a geographical sense, comprises the several States, the District of Columbia and the Commonwealth of Puerto Rico, and the organized territories under the jurisdiction of the United States Government.

A "useful article" is an article having an instrinsic utilitarian function that is not merely to portray the appearance of the article or to convey information. An article that is normally a part of a useful article is considered a "useful article".

The author's "widow" or "widower" is the author's surviving spouse under the law of the author's domicile at the time of his or her death, whether or not the spouse has later remarried.

A "work of the United States Government" is a work prepared by an officer or employee of the United States Government as part of that person's official duties.

A "work made for hire" is:

(1) a work prepared by an employee within the scope of his or her employment; or

(2) a work specially ordered or commissioned for use as a contribution to a collective work, as a part of a motion picture or other audiovisual work, as a translation, as a supplementary work, as a compilation, as an instructional text, as a test, as answer material for a test, or as an atlas, if the parties expressly agree in a written instrument signed by them that the work shall be considered a work made for hire. For the purposes of the foregoing senter, a "supplementary work" is a work prepared for publication as a secondary adjunct to a work by another author for the purpose of introducing, concluding, illustrating, explaining, revising, commenting upon, or assisting in the use of the other work, such as forewords, afterwords, pictorial illustrating, maps, charts, tables, editorial notes, musical arrangements, answer material for tests, bibliographies, appendixes, and indexes, and an "instructional text" is a literary, pictorial, or graphic work prepared for publication and with the purpose of use in systematic instructional activities.

Section 102 - Subject Matter of Copyright: In General

(a) Copyright protection subsists, in accordance with this title, in original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communication, either directly or with the aid of a machine or device. Works of authorship include the following categories:

(1) literary works;
(2) musical works, including any accompanying words;
(3) dramatic works, including any accompanying music;
(4) pantomimes and choreographic works;
(5) pictorial, graphic, and sculptural works;
(6) motion pictures and other audiovisual works; and
(7) sound recordings.

(b) In no case does copyright protection for an original work of authorship extend to any

A work is "created" when it is fixed in a copy or phonorecord for the first time; where a work is prepared over a period of time, the portion of it that has been fixed at any particular time constitutes the work as of that time, and where the work has been prepared in different versions, each version constitutes a separate work.

A "derivative work" is a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which a work may be recast, transformed, or adapted. A work consisting of editorial revisions, annotations, elaborations, or other modifications which, as a whole, represent an original work of authorship, is a "derivative work".

A "device", "machine", or "process" is one now known or later developed.

To "display" a work means to show a copy of it, either directly or by means of a film, slide, television image, or any other device or process or, in the case of a motion picture or other audiovisual work, to show individual images nonsequentially.

A work is "fixed" in a tangible medium of expression when its embodiment in a copy or phonorecord, by or under the authority of the author, is sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration. A work consisting of sounds, images, or both, that are being transmitted, is "fixed" for purposes of this title if a fixation of the work is being made simultaneously with its transmission.

The terms "including" and "such as" are illustrative and not limitative.

A "joint work" is a work prepared by two or more authors with the intention that their contributions be merged into inseparable or interdependent parts of a unitary whole.

"Literary works" are works, other than audiovisual works, expressed in words, numbers, or other verbals or numerical symbols or indicia, regardless of the nature of the material objects, such as books, periodicals, manuscripts, phonorecords, film, tapes, disks, or cards, in which they are embodied.

"Motion pictures" are audiovisual works consisting of a series of related images which, when shown in succession, impart an impression of motion, together with accompanying sounds, if any.

To "perform" a work means to recite, render, play, dance, or act it, either directly or by means of any device or process or, in the case of a motion picture or other audiovisual work, to show its images in any sequence or to make the sounds accompanying it audible.

"Phonorecords" are material objects in which sounds, other than those accompanying a motion picture or other audiovisual work, are fixed by any method now known or later developed, and from which the sounds can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. The term "phonerecords" includes the material object in which the sounds are first fixed.

[53] 28 U.S.C. Sec 1498.

[54] Administrative Procedure Act.
5 U.S.C. Sec. 702.

[55] Air Force Acquisition Circular 85-16.
Reprinted in CCH Government Contracts Reports Vol. 9 at para. 94,176. I985.

[56] Arms Export Control Act.
22 U.S.C. Sec. 2751 et seq.

[57] Competition In Contracting Act of 1984, Pub. L. 98-369 10 U.S.C. Sec. 2301.

[58] Contract Disputes Act of 1978.
41 U.S.C. Secs. 601-613. .

[59] Copyright Act of 1976 (17 U.S.C. sec 101 et. seq.).

[60] Copyright Act of 1909.
reprinted in CCH Copyright Law Reports Para. 15,501.

[61] Department of Defense Federal Acquisition Regulation Supplement Parts 52 and 27.
48 CFR Parts 252 and 227.

[62] Export Administration Act.
50 U.S.C. App. Sec. 2401 et seq.

[63] Federal Trademark Act of 1946, as Amended (The Lanham Act).
15 U.S.C. Secs. 1051-1127.

[64] NASA FAR Supplement Directive Subpart 18-27.4.
I985.
48 CFR Part 1827.

[65] The Patent Act of 1952 (35 U.S.C. 101 et seq.).

[66] Federal Acquisition Regulations Parts 27, 44 and 52.
48 CFR Parts 27 and 52. I985.

[67] Semiconductor Chip Protection Act of 1984.
17 U.S.C. 901-914. 1984.

[68] Small Business Innovation Development Act of 1982, Pub.L. 97-219.
15 U.S.C. 631. I982.

[69] Trade Secrets Act.
18 U.S.C. Sec. 1905.

[70] Tucker Act 28 U.S.C. Sec. 1491.

[71] Uniform Commercial Code, Ninth Edition.
The American Law Institute National Conference of Commissioners on Uniform State Laws.

[14] Restatement of Torts, Sec. 757.
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[15] Pamela Samuelson.
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[16] Diane S. Savage and Julie Bannerman.
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[17] John O. Tresansky.
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[18] Appeals of Reeves Soundcraft Corp.
2 U.C.C. 210 (1964).

[19] Apple Computer, Inc. v. Franklin Computer Corp.
714 F.2d 1240 (3d Cir. 1983).

[20] Aronson v. Quick Point Pencil Company.
440 U.S. 257. l979.

[21] B.K. Instrument, Inc. v. United States.
715 F.2d 713 (2d Cir. 1983).

[22] Caha v. United States.
152 U.S. 221 (1894).

[23] Carl Beasly Ford, Inc. v. Burroughs Corp.
361 F. Supp. 325 (E.D. Pa. 1973) aff'd 493 F.2d 1400 (3rd Cir. 1974).

[24] Chatlos Systems, Inc. v. National Cash Register Corp.
479 F. Supp. 738 (D.N.J. 1979) aff'd in part, 635 F.2d 1081 (3rd Cir. 1980).

[25] Chevron Chemical Company v. Costle .
641 F.2d 104 (3rd Cir. 1981).

[26] Chrysler v. Brown.
441 U.S. 281 (1979).

[27] City of Columbia, Mo. v. Paul N. Howard Company.
707 F.2d 338 (8th Cir. 1983).

[28] United States v. Conrad Publishing Company.
589 F.2d 949 (8th Cir. 1978).

[29] G.L. Christian & Associates v. United States.
160 Ct.Cl. 1, 312 F.2d 418, rehearing, 160 Ct.Cl. 58, 320 F.2d 345 cert. denied, 375 U.S. 954 (l963).

[30] Gilliam v. American Broadcasting Company.
538 F.2d 14 (2d Cir. l976).

[31] Hubco Data Products Corporation v. Management Assistance, Inc.
219 U.S.P.Q. 450 (D.C. Idaho l983).

[32] In Re Florida Citrus Company.
160 U.S.P.Q. 495 (TMTAP 1968).

Because of the DoD's position as a world leader in supporting the development and use of software technology, DoD has had the misfortune of confronting a great many software problems before they have rippled through other parts of the national economy. Unquestionably, this creates some difficulties for DoD, and places the DoD in the position of dealing with challenges that are often without precedent, a difficult task indeed. On the other hand, this situation gives the DoD a unique opportunity to influence the direction of the software industry in the future. By addressing the many challenges placed on its doorstep by the software industry, the DoD can claim a strategic position on the leading edge of the development of software technology.

regarding trademark rights in words such as Ada by properly registering the mark and complying with the requirements as discussed in Chapter 6. Further, it would be relatively easy for the DoD to address any issues related to the need for a derivative works right by making some adjustments to its definition of "unlimited rights".

As has been noted throughout this report, the DoD acquisition regulations are in need of some revision so as to make them more consistent with the realities of modern commercial practice as well as the precepts of intellectual property law. A clearer, more succinct delineation of the various rights packages available, and of the situations to which they apply, would be a substantial improvement. The regulations could be shaped so as to allow the DoD to more easily enter escrowing and long term maintenance agreements where necessary and appropriate in order to secure documentation, tools, CAD/CAM programs and the like which would otherwise remain unavailable to the DoD. In general, the software/data rights regulations could be revised so as to better reflect the economic realities of the software industry as well as a better appreciation of software technology. It is time to stop treating software and its documentation similar to the way DoD treats technical data. The economics of the software industry are simply too different from the economics of the technical data situation for the legal rules to be the same. The policy reflected in the newly proposed FAR Subpart 27.4 [66] would provide DoD a good starting point toward devising such a regulatory policy statement. A further advantage of addressing DoD's software licensing problems through regulations is that such changes could be made without resort to legislative or litigation activities.

13.2.2 DoD Policies With Respect to RFPs and Procurement Practices

DoD could also do much to improve its own internal policies as to the preparation of RFPs, and other aspects of DoD procurement practices. The Department could take steps toward greater standardization, and increased emphasis on maintenance/enhancement issues at an early stage of the procurement process (as was discussed in Chapters 2 and 3). Moreover, this is an area in which DoD has substantial control since it would not be limited by the notice and comment requirements which would accompany the adoption of new regulations.

13.2.3 Legislative Reforms and Court Action

The DoD could use its powerful lobbying abilities to seek legislative changes if it thought this necessary to improve its position in the software/data rights procurement area. Areas of focus might include the changes to the Contract Disputes Act to shunt all data rights disputes into this framework so that injunctive relief would be unavailable to contractors in software disputes (see Chapter 9) or the Copyright Act to get software exempted from the Section 105 preclusion against direct government ownership of copyrights (see Chapter 5). Similarly, the government could target certain areas for emphasis by its legal staff. Test cases could be sought in an effort to put forward legal theories which DoD feels are important. Resources could be focused in these areas in an effort to maximize the chances that DoD would prevail as to these legal theories.

accessible and knowledgeable supervisors, and they should be paid reasonably. In other words, they should be accorded working conditions that are not seriously disproportionate to those of their counterparts in private industry. Good procurement regulations don't help unless you have experienced, well-trained, and dedicated people performing the acquisition work. Good people can work around problems with the procurement regulations. If, on the other hand, DoD continues to lose its best people to industry due to low employee morale, inadequate job preparation, undesirable working conditions, low pay and so on, then it will probably also continue to fare badly in its dealings with industry in the area of software/data rights procurement.

13.1.2 Encouraging Employees to Specialize in the Software/Data Rights Area

As has been illustrated throughout this report, the acquisition of software, data rights and other computer related technology is one of the more complex and specialized areas with which DoD personnel become involved (see Chapter 3). Consequently, it would be beneficial to DoD to have some personnel who are sufficiently specialized in this area that they would be adept with the intricacies and subtle nuances of software technology. It is also difficult, if not impossible, for a legal generalist to acquire sufficient knowledge of intellectual property and software/data rights issues to be able to perform well in negotiations or legal conflicts with industry people, many of whom are specialized in those particular areas. In particular, DoD would probably benefit significantly if it encouraged more of its attorneys to specialize in the intellectual property area, with some of these focusing their efforts on software/data rights issues.

13.1.3 Internal Communications

The DoD might also do well to devote more of its resources to finding strategies which would improve internal communications within DoD, and within and among the services and defense related industries. Better feedback mechanisms, whereby individuals are informed not only of problems which arise in the course of software/data rights acquisition, but also of approaches which seem to work well, are needed. In addition, communication as to what software/data rights resources are already available within the Department would be useful. Our research uncovered situations in which the same software or data rights had been purchased on more than one occasion because of the lack of any mechanism whereby the availability of the software or data rights could have been communicated to others within the Department. Some form of library or cataloguing system might even be advisable as a means of encouraging that DoD take advantage of the reusability of certain software, and of communicating that DoD already possesses certain data rights and there is no reason, therefore, to purchase them again. These are matters which it is certainly well within the control of DoD to address.

13.1.4 DoD - Industry Communications

In the course of preparing this report, we spoke with many individuals, from both government and industry, who play some role in the software/data rights procurement process. We noted that representatives of both industry and government are quick to acknowledge that there currently

12.2.1 Government Funded Development of Mask Works/Chip Designs

We have not spoken with anyone in the Defense Department who is directly involved in government funding of chip designs. We are aware of the VHSICs program and we have reason to believe that some government funding of chip designs is ongoing. Because of this, some formal DoD policy on ownership and the extent of rights in chip designs would seem to be appropriate.

12.2.2 How DoD Might Obtain Ownership of the Mask Work

Like the copyright law, there is a provision in the chip law that mask works created by the United States government can not be protected under the chip law. Again like the copyright law, the chip law provides that the United States government is not precluded from receiving or holding exclusive rights to mask works by assignment, bequest or the like. Because of the similarity in the wording of the copyright and chip law provisions, it would seem to make sense for the government to require, if it wanted to own the chip design, the developing firm to get a mask work certificate and to assign it to the government rather than to try to use an approach similar to that reflected in the DoD special works clause. (See Chapter 5.)

12.2.3 How DoD Might Obtain Other Rights to the Mask Work

If the government wants to allow the chip designer whose work it might be funding to retain ownership of the mask work and wants to obtain unlimited rights or other license rights to use, disclose or duplicate the chip design, the DoD FAR SUPP would have to be amended. The standard data rights clause presently in place refers only to technical data and software. The government may also want to give itself the right to distribute the protected chips, if the definition of unlimited rights is not certain to include it.

Chip designs are not typically held as trade secrets once the chip has been sold into the marketplace because "publication" of the chip prevents the design from being held as a trade secret. This makes the proprietary rights provisions of the standard data rights clause inappropriate for use in a contract involving acquiring rights in chip designs. Technical data about the process of manufacturing the chips however, might still present the same acquisition concerns as are associated with other technical data.

12.2.4 Government Purchase of Infringing Chips

(a) Purchase for Government Use Only

Persons (including the government) who buy "pirate" chips or who buy equipment which contains "pirate" chips for their own use will not be liable under the chip law to the person who owns the mask right in the chips. This means that in the ordinary case where the government might buy equipment for its use (and its use alone) the government will not be liable to the chip manufacturer if one of its contractors has used "pirate" chips in performance of a contract to develop the equipment. It is irrelevant whether or not the government knows that the contractor was using

federal laws which contradict the provisions of the U.C.C., courts have increasingly applied U.C.C. principles as a statement of the modern law of contracts to be used in federal contract cases as well (United States v. Conrad Publishing Co. [28]). Implied warranty liability under U.C.C. principles has been imposed in prior government contract cases (see e.g., Appeals of Reeves Soundcraft Corp. [18] in which the Armed Services Board of Contract Appeals upheld the government's right to refuse to accept a delivery of magnetic tape claiming the tape did not meet the standards set by the parties to the contract. An implied warranty was found, applying principles of the U.C.C. and the Uniform Sales Act as guides to federal law in the area of implied warranties). It would surely not seem reasonable that the government be accorded less warranty protection than any other commercial customers of a seller. Under the U.C.C., implied warranties of merchantability automatically arise in every transaction involving a merchant-seller ([71] sec. 2-314) (unless appropriately disclaimed) and an implied warranty of fitness for a particular purpose will be enforceable if the seller has reason to know of the buyer's particular purpose for the software and that the buyer is relying on the seller's expertise in choosing or designing the correct software (see [71] sec. 2-315). Therefore, if the software doesn't perform correctly and there is not an explicit disclaimer of implied warranty protection, there would seem to be some basis for a government claim of implied warranties as to software delivered to it, although in many cases there may be a disclaimer.

And finally, software can be reused. The reuse of software further complicates the warranty situation in that the reused modules will often be subject to separate and distinct warranty provisions in themselves. The effect of the reuse on the warranty which applies to the module, and the effect of the reuse on the ultimate product are difficult questions which add to the lack of clarity as to this issue.

of a piece of software (e.g., control over making derivative work) as compared with the whole of a piece of hardware. This means that it is even easier to get into a "sole source" arrangement as to software than as to hardware. Because the government is becoming ever more dependent on software, this has to be a serious concern.

Moreover, because software engineering is still in early stages of development, it is generally more difficult to specify how software (as compared with hardware) should be developed for particular functions and to estimate the costs and development schedule for it. Software is also virtually "invisible" as compared with hardware, which means that it is more difficult to detect if someone delivers very similar or nearly identical software on a second development contract. And "invisibility" means that it may be more difficult, as a general matter, to detect defects in software or to know how to fix them once the defect is known. Again, because software engineering is a developing art, software is likely to contain a lot of undetected defects that will need to be corrected while in the user's possession. Unlike hardware, software is readily changeable; new capabilities can be added without substantial additional plant or material costs. All it takes is labor. All of this tends to make software maintenance and enhancement a much bigger part of software life cycle planning than is the case with hardware.

11.1.2 Software and Technical Data

Software and technical data are similar in being recorded information. They are also alike in that both are often held as trade secrets and licensed under restrictive conditions, rather than being sold in the marketplace. Loss of the secrets may undermine or destroy the firm's commercial advantage. Both are also capable of being claimed as unpublished copyright material. Both involve modest production costs in themselves once the technology they embody has been developed. Both are difficult to price with any precision. Because the material costs are low (i.e., what it costs to do a drawing on paper, what it costs to make a second copy of software), the government often thinks the price ought to be low. Because it is the valuable technology that they embody that the firm wants to protect and exploit, industry tends to price them high. With both, sometimes crucial information necessary for maintenance or enhancement of the item to which they pertain may not be readily apparent from examination of the paper or disk; rather it may be stored away in the memory of some engineer who designed it. Ongoing service contracts are sometimes necessary to be able to gain access to that expertise.

Where software differs from technical data is in being an "end item" in itself. Software is a product that will perform machine functions, whereas technical data is merely information about a product. As an end item, software will more likely be a product with a commercial market whereas technical data will often not be sold or licensed to anyone but the government. When altered, software will perform differently, as compared with technical data which will simply reflect a new configuration. Software also requires an environment of equipment and other software to be effective.

10.5 Ability of DoD Personnel to Make Use of Electronic Access Material

Another difficult question is whether the government can effectively make use of on-screen technical data for maintenance/enhancement purposes. Some to whom we have spoken have doubted that government personnel have the "know-how" to make appropriate use of CAD/CAM programs and technical data they may contain. CAD/CAM programs tend not to be very "user-friendly." Not being able to find material they need, or even realizing it is accessible via the electronic access to the CAD/CAM creates a real-world problem for government personnel. A contract with the CAD/CAM purveyor to supply training or "know how" on an as needed basis might answer some of these problems.

We understand that the Air Force has begun to encourage the delivery of technical data via electronic media. At least some Air Force policy makers seem to feel that electronically accessible technical data is preferable to data delivered in more traditional paper form. Electronic data allows for easier storage, and over time, as electronic media are increasingly used for such data, it will hopefully become easier for personnel to use.

10.6 Conclusion

CAD/CAM programs are a valuable technology that DoD should encourage, even if industry may only be willing to provide access to the CAD/CAM, not a physical copy. As long as the government has assurances that its access to the original CAD/CAM program will not be cut off, electronic access to CAD/CAM may actually provide some benefits over physical delivery of technical data. At any rate, the government should think through its policy in this area and determine what type of arrangement, consistent with regulatory requirements, will protect its interests in access to CAD/CAM.

and often not even the executable code -- to the government. Contractors seem to be concerned that providing the CAD/CAM to the government might endanger the commercial value of the program. Our information is that some of these contractors may, however, be willing to supply the government with an access code through which the government will be able to gain remote access to the firm's CAD/CAM system for a particular component or product on an "as needed" basis. Further, our information is that these contractors may even be willing to allow the government to make a printout of a particular component design that may appear on the terminal screen.

Such an access arrangement would, however, raise some important questions and concerns. The primary question is whether such limited electronic access to CAD/CAM programs used in the development of products the government is using would be sufficient to meet the maintenance and enhancement needs of the government for that product.

10.2 Access to the Original CAD/CAM Program Needed

Because of the substantial commercial value of such programs, contractors are constantly changing --- improving and refining --- the CAD/CAM programs which they have developed, so as to make those programs even more valuable. The life cycle of components used by DoD is very often as long as 20 years. Clearly, software industry people cannot be expected to keep their CAD/CAM programs the same for the life cycle of components. Indeed, our understanding is that some CAD/CAM programs are changed almost daily.

An arrangement allowing access to a CAD/CAM program for maintenance/enhancement would present some clear dangers for the government. Under such an arrangement, it would be the contractor which controlled the program, and it would be the contractor which would be in a position to determine whether the program would be changed. For the CAD/CAM program to be adequate for the government's maintenance and enhancement needs, the government would need an explicit agreement that the original CAD/CAM program would remain available to it.

10.3 The Need for Irrevocable Access

Another critical consideration regarding access arrangements for DoD would be: what assurance will the government have that its access to the CAD/CAM would not be cut off? For example, what happens if the government has a dispute with the vendor and, in retaliation, the vendor changes the access code to the CAD/CAM, thereby cutting off the government's access to the program. The control of access to the CAD/CAM program remains with the vendor in this type of accessing arrangement. The government would, at the least, want to get a contractual agreement from the vendor that access to the CAD/CAM, whether through change of the access code or otherwise, could not be terminated. Escrowing the CAD/CAM program with a neutral third-party might be another way to protect the government's interests.

an injunction to issue, it directed the lower court to "grant such non-monetary relief as it finds appropriate." The Megapulse decision has many government lawyers worried.

The Megapulse decision has been cited approvingly in other cases including B.K. Instrument, Inc. v. United States, [21]; Williams International Corp. v. Lehman ([51]; and Spectrum Leasing Corp. v. United States [45]. Between these cases the Supreme Court decided another case which some DoD lawyers have thought to be somewhat helpful to the government's argument that Megapulse should be overruled. That case is Monsanto Corp. v. Ruckelshaus [44]. Monsanto complained of the EPA's decision (under an authorizing statute) to release valuable information about Monsanto's pesticides to Monsanto's competitors. Monsanto argued that this was a taking of property without just compensation in violation of the Fifth Amendment to the Constitution. As to one of the three time periods involved, the Supreme Court found that there may have been a "taking" of the trade secret through a decision to release the data, which would require just compensation to be awarded to Monsanto. However, the Supreme Court held that equitable relief was not available to enjoin the taking of the trade secret for a public use which was duly authorized by law; a Tucker Act claim of monetary damages would be the only remedy available.

The Williams International case discusses the implications of Monsanto on the viability of Megapulse. Williams International involved a subcontractor who was complaining of the Navy's decision to remove restrictive legends on its drawings submitted to the prime contractor who in turn submitted them to the Navy. In Williams International, the government relied on Monsanto for the proposition that injunctive relief was unavailable in any case where the government "took" a trade secret. The government argued that Megapulse had implicitly been overruled by the Supreme Court in Monsanto.. The court in Williams International disagreed. Although deciding in favor of the government on the merits of the controversy, the court found that Megapulse had not been overruled by Monsanto. A difference the court found significant between the Megapulse and Monsanto situations was that in Monsanto there had been specific legislative authorization for the agency's release of data such as Monsanto's. Congress therefore had intended to exercise its eminent domain powers if necessary to achieve the release, whereas there was no similar authorization as to the subcontractor's data in Williams International.

9.2.2 Application to Subcontractors and Primes

Another reason the court in Williams International decided that an injunction could issue against the government in a data rights dispute of that sort was that the subcontractors were unable to directly bring suit against the government under the Tucker Act or make use of the Contract Disputes Act because there was no privity of contract between them and the Navy. The applicable regulations do not provide a mechanism by which subcontractors can use the internal appeals process for contract disputes with primes. [66] 44.203(c) and 52.233-1, Disputes.)

The DoD Authorization Act of 1985 [52] may provide some additional buffer against injunctive relief in at least some future disputes between the government and subcontractors over proprietary rights in material delivered under contract. Section 1216 of that Act, now embodied in [57] sec. 2321(e) states:

9.1.6 Taking Trade Secret Software by Eminent Domain

Trade secrets have been held to be property which is protected by the Fifth Amendment of the Constitution. This Amendment prohibits the government from taking private property without due process of law or without just compensation (Ruckelshaus v. Monsanto [44]). It appears unlikely that the Defense Department can exercise the power of eminent domain to take trade secrets without some explicit authorization from Congress (see e.g., United States v. North American Co. [39], indicating the need for Congressional authorization to effect a valid taking under the government's eminent domain powers).

Section 1498 impliedly authorizes the DoD to take patents and copyrights for public use (Leesona Corp. v. U.S. [35]). The court in that case declared that when the government infringes a patent, it has "taken" a patent license under an eminent domain theory based on the implied power of Section 1498.

It is not clear that this same analysis could be applied to a taking of software which is protected as a trade secret. There does not appear to be any law that, either expressly or impliedly, would grant the government broad power to take trade secrets whenever the DoD feels it is necessary. Although regulations which are promulgated by the heads of departments have the force and effect of law (Caha v. United States [22]) it seems doubtful that DoD could grant itself the power to "take" trade secrets. From the present interpretation of the law, this power probably requires some type of legislative authority from Congress.

9.1.7 Liability of Government Employees for Unauthorized Disclosures of Trade Secrets

If a government employee discloses trade secret or confidential information of a private firm without authorization, that employee may be prosecuted by the government under the criminal provision of the Trade Secrets Act [69]. The Trade Secrets Act does not create a private right of action which would allow the private firm to sue the government to enjoin any disclosure in violation of the statute (Chrysler v. Brown [26]) but the statute has been construed to provide a standard by which to judge the legality of proposed agency disclosures. One court has construed it to create a federal law right of non-disclosure (Chevron Chemical Co. v. Costle [25]).

9.1.8 Injunctions Against Particular Government Employees

Another important question is whether a government employee might be enjoined against use of certain software in the course of his employment, even if the government itself could not be enjoined. An example was given of a lab director who was asked to sign a restrictive license agreement with a software company. This license agreement was not made part of the contract which was signed by the contracting officer and did not contain the minimum rights required in software contracts. If the lab director had violated the agreement, the company could not sue the government because the lab director, who was not a contracting officer, had no authority to bind the government to such an agreement (see e.g., Utah Power & Light Co. v. United States

9.1.1 Forcing an Election of Copyright

Software is copyrightable subject matter (Apple Computer, Inc. v. Franklin Computer Corp. [19]). Because software is copyrightable and because copyright protection attaches to original works of authorship from the time of their creation ([59] sec. 302(a)), some government lawyers have thought that the government would be able to use section 1498 as a shield against an injunction in any software dispute.

It is an intriguing theory, but there are some problems with it. There does not seem to be a precedent that would support the theory that an infringer can force the owner of an unpublished work to opt into the copyright system and forego trade secret protection just so that the infringer can avoid an injunction. Indeed, the Supreme Court decision in Kewanee Oil Co. v. Bicron Corp. [34] indicates that a company has the right to choose whether to rely on trade secret protection instead of seeking a patent. Presumably, the Court would hold similarly as to copyrights.

The theory would also seem to prove too much. If right, it would mean the government could release any or all technical data it possessed, regardless of its restrictive legends, because virtually all of the things that qualify as "technical data" would also qualify as "original works of authorship" under the copyright law. It would not be just as to software that this theory would apply. There would be, then, no company trade secret which the government could not give away. It is unlikely that courts would be willing to permit this construction of the reach of section 1498.

9.1.2 Simultaneous Copyright and Trade Secret Protection in Software

The present standard data rights clause permits developers of software for the government to retain copyrights in the software ([61] sec. 52.227-7013(c)(1)). For reasons discussed in Chapter 1, there may be an incentive for a software producer to claim a copyright in the software because this action may have the effect of cutting back on the extent of the government's rights, giving them a license to the software for governmental purposes rather than giving them unlimited rights. Some privately developed software may also be delivered to the government with copyright notices.

Some government lawyers have argued that whenever software is delivered with any indication of an intent to claim copyright protection, that means that section 1498 can be invoked to avoid an injunction. This theory is more plausible than the previously discussed theory, but it too seems to rely on an election of protection theory that may not hold water. That is, the theory boils down to the idea that if someone claims a copyright in something, he cannot claim it as a trade secret at the same time. However, simultaneous copyright and trade secret protection has been finding acceptance in the courts (see e.g., Warrington Assoc. v. Real Time Engineering Systems, Inc. [48]) in which the court held that even if computer software is mass marketed, as long as there is an agreement not to disclose by the purchaser, trade secrecy as well as copyright protection can be maintained.) And many software producers rely on both. The DoD standard data rights clause does not, either explicitly or implicitly, seem to require any election.

8.2 Discretionary or Special Clauses

There are many clauses in government contracts that are not mandatory. Some are standard discretionary clauses, such as the special works clause [61] sec. 52.227-7020). Some are specially drafted for particular contracts, for example, clauses defining the scope of warranty rights in software. If a prime contractor has promised the government to obtain certain rights under a discretionary clause (e.g., to obtain a copyright for the government or to obtain strong warranties), and the prime is either unable or neglects to get a commitment for such right from a subcontractor, it seems unlikely that the government could enforce against the subcontractor the rights it had expected the prime to get for it. We were told of a number of examples of this kind of problem. We were given to understand that these situations tended to be resolved through negotiation, the prime typically conceding its neglect and offering some penance, but without the subcontractor giving in further. This was perceived by DoD lawyers to be a serious problem, particularly as to software licensing. The difficulty for a contract officer in finding time to closely supervise data rights provisions in subcontracts was often cited as a contributing cause of this problem. Closer supervision of the terms of subcontracts would, however, seem to be the best way to resolve this set of problems.

8.1 Mandatory Clause

8.1.1 Subcontract Silence

The strongest argument for awarding the government an entitlement to the same rights in subcontractor-produced software (or technical data) as it had arranged for with the prime is when the subcontract is silent as to the issue and the issue pertains to something addressed in a clause that is mandatory in government software acquisition contracts, for example, the standard data rights clause. The same policy considerations that prompted the court in G.L. Christian & Associates v. United States [29] to read a mandatory "termination at the convenience of the government" clause into a government contract would seem to apply as to subcontract arrangements. Subcontractors will surely know that the software they are developing is being developed for the government. They would probably be held to have constructive notice that DoD regulations require inclusion of the standard data rights clause in software development contracts unless a deviation is granted ([61] sec. 27.404-2(b)(2)) and that the standard clause requires primes to flow government requirements down ([61] sec. 52.227-7013(g)(1)). Regulations such as these have the force and effect of law (Caha v. United States [22]). From a policy standpoint, the effectiveness of the regulations in creating a system in which the government will know what rights it has in everything it buys would be seriously undermined if subcontractors were allowed to avoid mandatory clause flowdowns without making a special showing of need for a deviation. The regulations define, in many respects, what minimum rights the government must have. Unless a deviation is obtained, the government would seem to have the right to expect that this set of minimum requirements would be met.

8.1.2 Contradictory Clauses

Suppose the prime is unable to persuade a subcontractor to allow the government to modify the software and agrees to inclusion of a clause that precludes modification. Regardless of whether the standard data rights clause is included or excluded, would the government have the right to modify the software? The issue is important because commercial licensing arrangements typically do not allow the licensee to make modifications or enhancements. Subcontractors for software may be quite insistent that the software not be modified, especially if the software is to be warranted.

As Chapter 2 above indicated, some contract officers seem to believe the government would not have the right to modify software if the prime had negotiated the right away. Other government lawyers to whom we spoke believed that the government would still have the right to modify the software notwithstanding the contrary agreement. One lawyer cited Technical Development Corp. v. United States [46] in support of this theory. Certainly, the policy considerations which support the Christian doctrine and its application in subcontractor contexts would seem to be useful to the government when confronted with a clause in contradiction to the government's standard set of rights. A deviation is always available if a special case can be made for limiting the government's rights in particular instances. In the absence of a deviation, the government

In other words, the DoD may never be free from obligations to Contractor A so long as its copyrighted Z System is the basis for the derivative programs.

7.6 What about Patents?

On the assumption that software is not patentable and that software algorithms are not patentable, let's suppose that the Z System contract says nothing about allocation of patent rights. Although there are certainly cases which say that software and algorithms are not patentable and other cases which say that transformation of matter from one physical state to another is required for patenting a process that may be implemented in software, it is fair to say that patent law as regards software is in a state of flux. One important recent case upheld a brokerage firm's patent of a data processing process implemented in software (Paine, Webber, Jackson and Curtis v. Merrill, Lynch, Pierce, Fenner and Smith, [40]). This case could presage a wave of non-manufacturing process patents for software. The government should simply be aware of this because although patent ownership by a private firm on software in which the government had a copyright would not necessarily hurt the government in terms of its own use of the software, it may hinder the government's right to license commercial distributions of the copyrighted software by other firms whom the government might license to use the software. Commercial distributions might require getting permission from the patentee as well as from the government.

7.7 What about Trademarks?

As indicated in Chapter 6, the government is more frequently taking ownership (or at least staking out rights to) to trademarks in software development contracts. Assume a DoD RFP for some system such as Z system or Z System-2 claims government ownership of a trademark for the system. There is nothing wrong with the government trying to get and enforce trademark rights so long as it is careful about what it is doing. As Chapter 6 points out, trademarks can be very tricky; certification marks in particular are subject to cancellation if one begins owning what is being certified. Because of this, guidance through a standard regulation about taking trademark rights would seem to be advisable.

7.8 What about Warranties?

Now suppose a DoD RFP is issued for a software system such as a Z System-2 which disclaims any warranties for the Z System code that will be "GFI"ed to the winning bidder. (Some government people seem to think it unnecessary to disclaim warranties, arguing that everyone knows that the government never warrants anything.) The Z-2 Contract, we'll assume, is is otherwise silent about warranties. As Chapter 11 explains, there is some chance that implied warranties of merchantability or fitness for a particular purpose may attach to software; and taking the copyright may entail taking some responsibility for warranties. Because of this, the government should be careful about making sure that in any distribution of the Z System code (or a derivative) to any commercial customer of the winning bidder, the government's liability for warranties in that code (as well as in the original Z System) be adequately disclaimed.

would give the government the right to prevent Contractor A from preparing, copying, or distributing unauthorized derivative works (such as an enhanced Z System). The copyright might also give the government the right to challenge any copyright Contractor A might claim in an enhanced Z System (recall that copyright protection is not afforded to unauthorized derivative works). But negative power is not the same as positive power. That is, the power to prevent Contractor A from making or selling an unauthorized enhancement would not entail a corresponding power on the part of the government to employ the enhancement for itself (i.e., to use, disclose, copy, or do anything else with it).

7.3.6 DoD's Rights to Control Contractor A's Arrangements with Other Government Agencies

In this hypothetical, it has been assumed that DoD obtained a license to copy and use the Z System for governmental purposes. This license would not seem to be restricted to the DoD, but would seem to cover all federal agencies. It is an interesting question whether Contractor A has the right to sell the Z System to another governmental agency, given that the DoD's license would seem to mean that all governmental agencies are already entitled to use it without charge.

Suppose, for example, Contractor A sells rights to the Z System to a NASA facility, at some specified charge, and even agrees to do some enhancements for NASA. The DoD might wonder whether Contractor A has a right to do this and whether DoD will be able to get unlimited (or at least license) rights to any enhancements that NASA might fund.

As to the former question, it would be somewhat dependent on the terms of the original contract, but assuming that there is no clause explicitly precluding sales to other governmental agencies, it is hard to see on what basis DoD could argue that Contractor A has no rights to sell to NASA as part of its commercial market if NASA wants to buy. As to the latter question, DoD would seem to have no greater rights to obtain from Contractor A the derivative works it prepared for another government agency than as to derivative works prepared for private companies. Perhaps, however, the DoD could obtain the enhancements directly from NASA in such a circumstance.

7.4 Giving Out the Z System to Industry for Other Than Rehost/Retarget Purposes

If DoD has only been releasing the Z System to software defense industry firms for the purposes of having rehosts or retargets made for the government to enable the government to fulfill its governmental missions, this would seem to be within the scope of a "governmental purpose" license. But suppose the DoD decided instead to give out the Z System to the software defense industry for use by the firms to produce code for the government. Would that be a valid governmental purpose within the government's license or would this be an encroachment on the commercial market rights of Contractor A under its copyright? It is a close question. If the sole use that could be made of the Z System by industry was in performance of government contracts, that would seem to be within the scope of the government's license. Simply to distribute the Z

casting Co. [30]). Also, copyright protection in a derivative work will not attach to the extent that it unlawfully incorporates another author's copyrighted material ([59] sec. 103(a)). If the government (instead of Contractor A) owned the Z System copyright, it could authorize Contractor B to copyright Contractor B's derivative work. Not owning the copyright, the government can't grant to Contractor B a larger license than the government's arrangement with Contractor A permits. Because of this, it would not be clear that Contractor B could copyright the retarget and distribute it commercially. As a matter of copyright law, Contractor A would seem to have a legal right to control commercial distributions of the Contractor B version of the Z System, although as subsection 7.3.5 within indicates, Contractor A may not itself have any rights to use or sell Contractor B's version of the Z System.

7.3.2 Giving Away Z System Code for Commercial Distribution

Now suppose that DoD is also in the process of letting a second contract for some enhancements to the Z System (Z System-2). (Suppose also that Contractor A will not be a contender for this contract.) As a result of the problems DoD may have had with Contractor A over the original Z System, assume that DoD's contract personnel for Z-2 try very hard to structure their contractual arrangements with the new contractor so as to avoid those problems. One way to attempt this might be to try to get government ownership of the Z-2. (The problems with this approach be discussed below in Section 7.5) Suppose also that part of the RFP authorizes the winner of the Z-2 contract to distribute the machine-readable version of Contractor A's Z System to all of its commercial customers. (The RFP might forbid the winner from selling Contractor A's version of the Z System code but might purport to allow it to distribute the Z System code to commercial customers free from the obligation to get Contractor A's permission and free from any obligation to pay royalties to Contractor A.) To the extent that the Z-2 would be a derivative work of the Z System, the RFP might also give permission to the winning offer or to sell or license the derivative Z System to its commercial customers free from any obligations toward Contractor A.

The interesting question is, of course, whether the government has the legal right to authorize commercial distributions of the Z System code or to authorize commercial distributions of a derivative work of the Z System program without Contractor A's (i.e., the original copyright owner's) permission. This, of course, leads back to the question of what the scope of the government's rights are under the standard data rights clause.

7.3.3 Balancing The Government's and Contractor A's Interests

The government might argue that it does have the legal right to do these things because it is an appropriate governmental purpose to have rehosts, retargets, and/or enhancements of the Z System made at the least cost to the government, and for those rehosts, etc. to be widely available, and Contractor A always knew that widespread dissemination of derivative works was intended.

Contractor A's response might well be that under the copyright law, it has rights over distributions of its product to commercial customers and over distributions of derivative products to commercial

The question the government needs to know is: What is the extent of the government's rights in the Z System.

7.2 Government Takes Unlimited Rights, or Does it?

In most software development contracts, DoD will have used the standard data rights clause ([61] sec. 52.227-7013). Assuming this was done in the contract with Contractor A for the Z System, the government's normal expectation would be that since public funding would subsidize the development costs, the government would have unlimited rights.

Now suppose for purposes of this hypothetical, that to the surprise and dismay of the DoD, the Z System software and documentation is delivered to DoD with Contractor A's copyright notice affixed to it. None of the DoD procurement personnel who let the Z system contract may have noticed the part of the standard data rights clause that permits contractors to retain copyright interests in all works delivered to the government (except those delivered as "special works.")

The reader should recall that the effect of the contractor's copyrighting a work paid for by the government seems to be that the government will get a license to copy and use the work for governmental purposes. Because the clause was ambiguous and was drafted by DoD, a court would likely find the copyright retention clause to limit the extent of the government's rights. That this might perturb the expectations of DoD's procurement personnel who thought that the government would have unlimited rights is unfortunate, but not contractor A's problem.

If DoD decided to attempt to purchase the copyright from Contractor A, Contractor A would most likely realize that the government was in a poor bargaining position and would take advantage of the situation by offering to sell the copyright for what the DoD would consider to be an outrageous sum.

7.3 Rehosts, Retargets, and Enhancements of the Z System

It is important to understand how the cutback from unlimited rights to governmental purpose rights might limit the government's power to achieve its objectives for Z system. The clearest example of a likely source of friction would arise in the creation of derivative software. We have assumed that the government always intended to authorize rehosts and retargets to be made of the Z System and that Contractor A would not be the sole source for all these derivative works. Contractor A, in this hypothetical, would likely not contest the government's right to distribute the Z System for the purpose of having rehosts and retargets prepared for it.

But what Contractor A may wish to contest is the right of the government to make certain kinds of deals to get rehosts and retargets made for them. Further, Contractor A may well claim rights in derivative works of the Z System done by other firms. If firms developing the derivatives attempt either to distribute the Z System or derivative works of the Z System for commercial purposes, Contractor A might challenge their rights to do so. The government itself might be concerned about what, if any, rights it might have in rehosts or retargets done by Contractor A for entities other than the DoD. These problems are explored in detail below.

Ada is less likely to be found generic as to computer programs (or compilers). To the extent that the DoD wants to assert trademark-type rights to "Ada" in conjunction with computer programs, it may (if careful) be able to maintain some control over the term.

6.3.2 The Scope of the Government's Rights in "Ada" as to Compilers

Assuming that DoD owns a valid certification mark in Ada as to compilers that meet its rigorous set of prescribed standards, DoD not only can authorize those who meet the standards to advertise their products as "certified as Ada compilers," it must police the market to insure that others are not marketing uncertified products as if they were certified. But this duty can be overzealously enforced. Owning a certification mark in Ada does not necessarily mean the government has a right to prevent anyone who has produced a compiler that is capable of compiling Ada source code into machine code from making reference to "Ada" in promotional materials for the program. DoD would have a right to control who can promote their products as "certified as an Ada compiler." However, this does not mean that DoD can stop someone from saying "this program compiles Ada." There is such a thing as a fair use defense to trademark infringement actions. Under 15 U.S.C. sec. 1115(b)(4) [63] persons are entitled to use words that other people claim as marks if they do so in good faith and in order to accurately describe their product. The latter comment above would appear to fall within the fair use defense.

6.3.3 The Scope of the Government's Rights in "Ada" as to Other Programs

From perusing the AJPO Guidelines for the use of Ada, it appears that DoD is claiming rights to control use of the term "Ada" in conjunction with programs other than compilers. However, these guidelines only set forth standards that must be met by compilers. If the government wishes to certify other kinds of programs, it would need to have and publish standards for those other things. And, of course, the government's mark as to other programs would also be subject to a fair use defense.

6.3.4 The Scope of the Government's Rights as to References to "Ada" in Publications

Many trademark owners whose marks are endangered because of widespread usage of the term in a generic way (Xerox, Kleenex, and plexiglass come to mind) have undertaken a policy to protect the source significance of the mark by highlighting its trademark significance. This may include, in the mark owner's own promotional materials, use of a "TM" or "(R)" or "brand" placed next to the endangered mark; it may also include the mark owner's request (or even demand) to others who might make reference to the mark, that they acknowledge the mark as a trademark in some way (e.g., use of "TM" next to the word). A trademark owner does not, however, have a legally enforceable right to insist on reference to the mark as a mark in connection with written materials (other than advertisements). The only thing that invades a trademark owner's rights is use of the mark by a competitor or near competitor in a way that would confuse consumers. Reference to a mark in a book or article does not fall into that category. That isn't to say that DoD

To obtain rights to a certification mark, one must register the mark with a federal agency and set forth the criteria an applicant must satisfy to be certified to use the mark. The certification mark owner is obligated to apply the standards in a non-discriminatory fashion to those who seek certification. A certification mark is subject to cancellation or to a challenge to its validity in infringement litigation if:

> (1) the owner of it has not controlled or is unable legitimately to control use of the mark,
>
> (2) has started reproducing or marketing any goods to which the certification mark is applied,
>
> (3) has permitted use of the certification mark for other than certification purposes, or
>
> (4) has discriminatorily refused to certify or continue to certify the product of any person who meets the standards which the mark certifies ([63] sec. 1064(e)).

A certification mark will also be subject to cancellation if it is (or has become) a generic or common descriptive name for a kind of product ([63] sec. 1064(c)). Even having an "incontestable" mark will not preclude cancellations on these grounds ([63] sec 1065).

The important -- if obvious -- point here is that either one has a trademark or one has a certification mark. One cannot have both, at least not as to the same or similar kind of goods ([7] sec. 19:32). While "Good Housekeeping" is a trademark as to a magazine and a certification mark as to various household goods, there is a large gap between these two things. Where the gap is narrower or non-existent, certification marks may be invalid if similar to a preexisting trade mark already owned by the applicant. (See In Re Florida Citrus Company [32]). And if one has a certification mark, one cannot at the same time be the producer or distributor of goods of the same kind.

6.1.3 What is "Ada"?

The government has established rigorous standards that must be met before a compiler can be certified as an "Ada compiler." It seems reasonable, therefore, to assume that the kind of mark government must have in "Ada" is a certification mark for use in connection with compiler programs. If this assumption is correct, then, in accordance with the principles set forth in the previous subsection, it is clear that the government, in order to maintain the certification mark, must not take ownership rights in any software using the mark. It must police use of the mark by non-certified parties. It must make sure that the mark is not used for other than certification purposes. And it must not deny certification to qualified parties. If "Ada" is intended to be a certification mark for things other than compiler programs, the government should make sure its registration for "Ada" is broad enough to cover these other things and the government must develop standards and guidelines for other such "Ada" products.

achieve in a democracy that depends upon accurate public knowledge the broadest publicity for matters of government." The concerns expressed in the Rickover case relate to censorship and freedom of information. These concerns provide a justification for prohibiting government acquisition of copyright protection for works developed at public expense, and are also consistent with the differential treatment accorded patentability of inventions developed at public expense (in which case concerns over free flow of information and the potential for censorship would not be as pronounced).

Software would seem to fit more appropriately within the rationale for allowing exclusive rights protection in the area of inventions than for precluding such rights for the government in the area of copyrightable subject matter. Software would not seem to raise the same kinds of "free flow of information" and "right of the public to know" concerns which underlie the differential treatment accorded "works of the United States Government" of a traditional copyrightable sort as opposed to works which involve patentable subject matter.

Software is a tool for performing a job; it is a commercial item, not a communicative one (at least not in the censorship/free flow of information sense of that term). The commercial realities of the software industry make it highly desirable for the government be able to protect its interests in this area. The issue is not one of censorship, but one of rational use of public funds. The public benefit from a "free flow" of the "information" contained in software seems less strong than in the case of books and articles. Given that the public is likely to pay more---in the form of higher expenditure of tax dollars---for this dubious privilege, the rationale for treating software the same as other copyrighted works seems weak.

The policies of the Section 105 prohibition against copyright protection for "works of the United States Government" simply do not fit in the case of software developed at public expense, and actually seem to be undermined by such an application of this provision.

5.4 Conclusion

There do seem to be some circumstances in which government ownership of rights in software would be desirable. Strict application of the copyright law does not provide adequate intellectual property protection for software developed at public expense. A protection scheme more akin to that provided under the patent laws may be needed to adequately protect the government's legitimate interests in software developed at government expense. At the very least, an exception from the Section 105 prohibition against copyright could be argued for on these grounds.

produced in performance of the contract, (3) the right to obtain an assignment of copyright in such data, and (4) the right to limit the release and use of certain data by the contractor (See [66] Sec. 52.227-17(b)()(1)).

One of the two key features of the FAR special works clause is the explicit agreement it demands from the contractor not to assert a claim of copyright in any data first produced under the contract without the written permission of the contract officer ([66] sec. 52.227.17(c)). The second key feature is the power given to the contract officer to direct the contractor to claim copyright in such data and assign the copyright to the government or its designated assignee. (Id.) A further interesting feature of the FAR clause is the limitations it puts on the contractor's own use of data first produced under the government contract. The contractor under the special works clause agrees not to use the data for purposes other than performance of the contract and not to release, reproduce, distribute, or publish the data without the written permission of the contract officer.

If ownership and control of certain software is what the Defense Department thinks it needs, the Department would be well-advised to pursue a strategy similar to that reflected in the new FAR.

5.2 The Implications of Owning a Copyright

There are two differences in the nature of the copyright protection afforded to those who take copyrights by assignment and those who own copyrights directly. A copyright obtained through assignment can be taken back by the author after a period of 35 years ([59] sec. 203(a)(3)). This provision was meant to protect improvident artists who might have signed away their rights "for a song" before the value of their product had been recognized. Thus, the government might obtain less than the full-term of copyright protection (generally, 75 years) which would be available if it could take a copyright directly. Still, a more limited form of intellectual property protection is certainly preferable to a form of protection which may be unenforceable; and, at any rate, 35 years is generally a more than sufficient length of protection due to the typically rapid obsolescence of software.

Secondly, to make an assignment of a copyright effective against a third party, it must be recorded in the Copyright Office. Without recording, the assignment to the government might have to yield to a subsequent assignment to a purchaser in good faith ([59] sec. 205(e)). In addition, proper recordation of the transfer of copyright is a prerequisite to the ability to bring an infringement action ([59] sec. 205(d)). It would thus be important for the government to take this step and see that the assignment is recorded with the Copyright Office.

5.3 A Need for Legislative Reform?

It is interesting to note that the U.S. Government is permitted to take patent rights directly, but not copyrights. Congress appears to have two principal reasons for prohibiting copyright protection for "works of the United States Government." If the Defense Department regards being able to take direct copyright interests in software as sufficiently important to seek special dispensation

of two instances of such claims in the commercial marketplace: one in which the producer of a compiler claimed rights to royalties in compiled code, the other in which the producer of an operating system claimed rights to prevent sales of programs developed through use of the operating system to entities other than the operating system's owner. It may be this idea will catch on more widely over time. DoD might want to consider putting a provision in the procurement regulations to the effect that the government shall own rights in the software produced through use of other software, just to be on the safe side.

Fortunately, the government, through the standard data rights clause, always has modification rights in any software acquired under the DoD FAR SUPP. But as pointed out in Chapter 2 above, the government does not, as a matter of course, have the right to sublicense its modification rights to others. To sublicense the modification right in copyrighted trade secret software without the software owner's permission creates the risk of injunctive relief being entered against the government. (See Chapter 9.)

Who owns what rights in modified or enhanced software can be an extremely complicated question because of a copyright rule that limits or negates copyright protection for any derivative work made without the copyright owner's full authorization. [59] sec. 103 (a). Because the present procurement regulations seem to give the government authority to prepare derivative works of copyrighted software developed at public expense only for government purposes, the rights of the firm that made the modifications to make use of the modifications, even on its own copy of the same software, may be limited by the copyright rule. (See Chapters 1 and 7.)

4.2.2 Duty Not to Create Similar Derivative Software of Privately Funded Software

The government clearly has the right to modify the software in which it has obtained rights, to maintain it and to add a new capability needed to make the software better able to do the thing it was acquired to do. It is, however, a different question whether the government has the right to create another piece of derivative software, such as the translation of a program originally written in JOVIAL to one written in Ada, without the permission of the owner of a copyright in the original software. Indeed, the DoD FAR SUPP contains a policy statement indicating that proprietary software documentation will not be used to create other similar software. [61] sec. 27.404-1(e).

4.2.3 Authority to Create Derivative Software if Publicly Funded

If the government has funded the development of software, it usually expects to have unlimited rights in the software. If the government has unlimited rights in software, an argument can be made that it has the right to create or authorize creation of derivative software. However, strictly speaking, the definition of unlimited rights refers to "use," "copy," and "disclose" as the rights the government has, which could give rise to an argument that creating a derivative work is not within the scope of unlimited rights. The copyright statute could be cited to support this strict construction because of its separation of "copying" and "creating of derivative works" [59] sec. 106. Some clarification of the government's right to create derivative works in the definition of "unlimited rights" might be wise.

Also, as Chapter 1 has indicated, the government's payment of the development costs of software does not necessarily mean that it has truly "unlimited" rights in the software. The developer of such software has the right under the present regulations to take a copyright in it, with a license back to the government to use it for governmental purposes. This would seem to mean that the government's authority to authorize others to prepare derivative works is thereby limited. As Chapter 7 indicates, this may mean that the original contractor would probably be able to prevent any contractor who prepared a derivative work for the government from marketing the derivative work commercially.

ment may be reduced to having a governmental purpose license in it (See Chapter 1). The government's ability to authorize other firms to reuse this software, for purposes other than the governmental project (i.e., for any potential commercial spinoffs) may be seriously jeopardized by the restrictions of the governmental purpose license (See Chapter 7). The government will also have the same problems getting adequate documentation from company A to give to company B for software reuse purposes as it does in getting the documentation for maintenance/enhancement purposes (See Chapter 2).

In addition to the idea of reusing specific software from one project to another (as in the radar example), there is growing interest in broader scale reusability projects, such as creating programs consisting of thousands of modules of code, different combinations of which can be formed to produce different software. Some programs of this sort have already been developed. Some are proprietary. Some have been prepared by government engineers and programmers.

It is clear that if the baseline program is proprietary, then modules of it will also be proprietary. Use of such a proprietary base program to create application software consisting of some of the base program's modules would seem to create a proprietary derivative work. Certainly if the base program is copyrighted, it would seem that the user would need the copyright owner's permission to create such derivative works. This permission might be limited or withheld. For example, the owner of the base program might limit use to creation of certain kinds of application software, or may make the right to this sort of reuse contingent upon payment of additional royalties (besides whatever fee one paid to obtain access to the base program). If one wished to use two or more proprietary base programs owned by different companies to create new software with modules from each, one might need each company's explicit permission. Some companies might object to incorporation of modules from another system. It is difficult to imagine how to deal with all the many conflicting proprietary claims and the many claims for additional royalties every time each standard module is used. (Think of how many pieces of software have the same basic I/O routine). This set of complexities has led many in the government to doubt the advisability of making use of proprietary reuse programs of this sort.

4.1.3 Incentive Problems with Broad Rights to Reuse in the Government

These concerns about reusability of proprietary software has led many to insist that the government must own the software or have unlimited rights to make software reuse feasible at all.

Some in DoD, though, worry about the quality of large scale reuse programs developed either internally at DoD or by private companies for the government. Although DoD does, in fact, develop a lot of software in-house, that is not its main mission or the thing that it does best. The quality of software produced by the government may not be as high as that produced by a top-notch software development firm. And private firms may lack incentives to develop outstanding reusability programs for the government, that is, programs in which the government would have unlimited rights and for which the government would have to pay no further royalty, no matter how much reuse was made of its modules. (This, of course, is precisely what many government people want: to buy one excellent program and not have to pay again each time a

tricacies of the copyright law as it affects the many different types of derivative works of software with which DoD must deal. To understand how the derivative works right may limit the government's rights as to software, this Chapter will first discuss reuse and then the other forms of derivative works with which DoD must be concerned.

4.1 Reusability of Software - The Pros and the Cons

Reuse of software is an attractive idea. For one thing, if software was reused, there would likely be more standardization of software and software components, which would seem a promising step toward solving some of the current problems with supportability and maintainability of software raised in Chapter 2. Greater consistency and reliability in software would also seem to be potential benefits of reusability. Reusability also holds out some promise of saving considerable amounts of money, or at least of allowing DoD to get more or better software for the same money. It was widely believed by DoD personnel to whom we spoke that DoD was paying time and time again for development of the same software or software components. It was widely believed that software costs would be reduced if software, or at least certain common functions in software, were able to be routinely reused. Also, reuse would seem to promise reduced software development time. If one can use this standard input-output routine and that filter and this standard whatever, and put one's programming effort into providing the "glue" with which to put the standard components together, or into making certain necessary enhancements to some components, surely that should reduce the time it takes to develop software. Perhaps this would also free up software engineers to tackle more difficult software development problems.

Given these (and other) prospective advantages of reusability of software, it is no wonder that DoD personnel are seriously interested in promoting reusability and no wonder that DoD has invested considerable sums in reusability projects. Yet, some initial experiences in reusability have revealed a considerable number of problems with the concept, some of which pertain to the feasibility of making appropriate licensing arrangements if software is reused.

4.1.1 The Debate over "GFI" Software

Among the many current "reuse" issues being debated within DoD is whether it is appropriate to provide software developed by one contractor to a second contractor on a "government furnished information" (GFI) basis (which would require the second firm to use the first firm's software). It is our understanding that the Navy and the Air Force have different views on this issue. The Navy is more favorably disposed to this practice than is the Air Force. Air Force people to whom we spoke regarded the problems likely to arise if this kind of software reuse was attempted to be so many and so serious as to outweigh the potential benefits. Without attempting to take a stand on the merits of either position or to promote this model of reuse over others, it seems worthwhile to detail the controversy to illustrate the more general problem of how to make appropriate arrangements for reuse.

Here is the Air Force's argument: suppose one decides to require reuse of radar software

3.3.2 Thoughts of Procurement Personnel Regarding Ongoing Training Needs

Procurement personnel with whom we spoke generally felt that some form of training in the areas of software and data rights would be very useful for them. Most expressed the view that some background in these areas would give them a greater feeling of confidence in their ability to effectively negotiate for and purchase such products. Further, the people with whom we have spoken have often expressed the view that such training should include some coverage of the regulations (FAR and DoD FAR SUPP) which cover software and data rights procurement issues. Many of the individuals who must work with and within these regulations find them to be confusing, and therefore feel that some explanation of their function and purpose would be helpful.

While those we have spoken with have expressed differing views on the structure a course on software and data rights issues should take, most have felt that a two day seminar format would be most appropriate. A common complaint about training attempts in other areas was that too often there has been too much material crammed into a few short hours of time, with the result that the participants took little useful information away from the course. Many felt a two or three day format was the optimal blend --- allowing enough time for some in depth coverage of a subject, but not so long that people lost interest. Most of the people with whom we spoke were concerned that if an effort was undertaken to provide training as to software and data rights, the course should be relatively substantive in nature, not, as one contracting person we spoke with put it, "a summary of the fact that we have problems."

Other suggestions included that the course be developed and implemented by an outside consultant so as to provide a more objective view of some of the controversial issues which arise when discussing software and data rights issues. It was also suggested that such a course could then be presented at various bases.

3.4 The Need for More Specialization and Broader Expertise by DoD Lawyers

DoD has some very fine and experienced patent and technical data rights lawyers. These are the people who tend to advise DoD about software intellectual property matters. Unfortunately, sometimes these lawyers do not have as much expertise in the areas of copyright, trade secret, trademark, and chip protection laws, all of which are now necessary to provide comprehensive legal guidance in software acquisition matters. Copyright law differs from patent law in a number of important respects. (The government, for example, can own patents but not copyrights directly.) DoD should encourage more specialization on software intellectual property matters as well as a broadened approach to understanding software legal protection by its lawyers.

3.5 Recommendations

1. Develop and implement a training program regarding software and data rights acquisition for procurement personnel, as previously recommended by the OSD Study Group. Such training might be done in a two to three day seminar format which could be presented periodically at

3.1.3 Need for a Feedback Mechanism

Upon the fielding of a system, responsibility for that system passes from one command to another. As a result, the people who must deal with maintenance and enhancement problems which arise due to inadequate acquisition of documentation and/or data rights are different than the people who originally procured the system and supporting material. In other words, the people who failed to get adequate documentation and rights do not have to deal with the subsequent problems which their lack of foresight have occasioned. Moreover, it appears that no mechanism exists whereby the procurement personnel are made aware of the problems occasioned by their failure to acquire certain documentation and/or rights. Without such feedback, it seems unlikely that the procurement people will have the incentive, or for that matter the knowledge, necessary to cause them to confront this problem.

3.1.4 Industry Can Be Expected to Exploit DoD Weaknesses

It can also be expected that industry will exploit the weaknesses in DoD procurement practices. If DoD contracting personnel do not understand the product they are purchasing, and make broad vague requests for rights and documentation in RFP's, then it seems likely that industry will sell the government those rights and that documentation which industry is willing to part with, whether the government really needs it or not. In a sense, that is simply good business. If the government tells you it wants to buy your product and is willing to meet your price, why not sell it to them. If the government later finds it really didn't need the product, or that it was not as valuable to the government as it originally thought, it is really the government's own fault for not having done its "homework."

3.2 Preparation of Procurement Personnel for Their Role in System Acquisition

3.2.1 Background from Which Procurement Personnel Come to the Job

Our research indicates that procurement personnel come from a variety of academic and professional backgrounds, often unrelated to the type of work they will be doing as a contracting representative for the government. Very few have any background in technically oriented fields, such as engineering, which would aid them in understanding the technology involved in the systems they are charged with acquiring. An almost universal response of those with whom we spoke, a group which included procurement personnel, engineers, and attorneys, was that some understanding of the technology involved in the system --- especially with regard to software, technical documentation, life cycle concerns, and data rights --- would be very helpful to the procurement personnel in the performance of their mission. It was as widely acknowledged that such knowledge is, at this time, lacking.

component to be embedded within a sophisticated system. In procuring the larger, more complex system, the procurement personnel must deal with many smaller components, any one of which, while it may seem but a minor element in the overall picture, may effectively cripple the system if the technical data and rights that have been acquired prove to be insufficient to implement, maintain and/or enhance the component or product.

Moreover, this procurement process often takes place in the context of strong pressure on contracting personnel to "field" the system as fast as possible, and within tight budget constraints. The procurement person knows that his or her performance will be judged on the basis of how quickly, and often how cheaply, the system goes from inception to fielding, not on how well the system is supported by needed documentation and data rights. As one contracting individual informed us, "If there's a delay in the fielding of a system I am responsible for procuring and I say it's because I'm negotiating over data rights or technical documentation which will be needed for maintenance and enhancement, I'm going to be gone in a hurry."

3.1.2 Procurement Personnel Do Not Generally Understand Software As a Technology or Data Rights

Procurement personnel with whom we spoke often indicated to us that they felt that their understanding of software as a technology was insufficient to allow them to make procurements in an optimal way. Moreover, many of these individuals informed us that their lack of understanding of the technology that they must acquire inhibits their ability to apply the software/data rights procurement regulations. In talking with these individuals, we noted that they sometimes had difficulty responding to questions which required some understanding of software technology.

Further, virtually all of the contracting people we talked with informed us that they do not have sufficient knowledge of software and data rights to enable them to value one package of rights as opposed to another. That is, procurement personnel seem not to understand how the range of potential limitations on software or data rights may affect the value of the product being acquired. A lack of valuation ability may place the government at a disadvantage in any negotiation involving limited or restricted rights packages. It is difficult to effectively negotiate a price for a particular package of rights if one cannot gauge the value of that package as opposed to another. It seems like trying to buy a plane when one does not know what a plane actually does. Without such knowledge, it is impossible to determine the value of the product.

Similarly, because the procurement people seem not to fully understand the technology which they are purchasing, they may not fully understand the application of the procurement regulations regarding software and data rights to the acquisition of that technology. They also may not realize the extend of discretion afforded them under those regulations. They may not realize that the regulations allow them to structure licensing agreements which could, in effect, serve as middle ground alternatives to the traditional extreme categories of unlimited and limited or restricted rights. Again, it is difficult to negotiate effectively when one does not understand the range of freedom one is permitted to exercise in those negotiations.

2.6.4 Use of Unusual Computer Languages or Equipment to Get into Sole Source Maintenance Arrangements

We heard of several examples of contractors using nonstandard programming languages and equipment to prepare software for delivery to the government. DoD personnel to whom we spoke seemed to believe that a primary motivation for this was in order to facilitate being in a sole source maintenance position.

2.6.5 Indemnification if Third Party Software Maintainer Abuses Rights

Many government lawyers were very concerned about whether the government would be liable if a firm to whom the government provided proprietary software and its associated documentation for the limited purpose of doing maintenance or enhancement work abused the right to have this material, for example, using it to prepare a competitive product. Some persons in the Defense Department believed it appropriate for the government to assume responsibility for this. Others were adamant that the government should not be liable.

2.5.2 Questions Under Copyright Law

Reverse Engineering

Apart from the DoD regulations, might DoD be able to rely on the copyright law to obtain rights to reverse engineer software? The answer, at least currently, would seem to be it doesn't look so good. A recent software copyright infringement case held that making a copy (including making a core dump of the code into printed I's and O's of a program for reverse engineering purposes) was an infringement of the copyright, notwithstanding that the parties charged with infringement had lawfully obtained a copy of the software (Hubco Data Products Corp. v. Management Assistance, Inc. [31]). While there are some copyright scholars who would argue that reverse engineering ought to be permissible in software cases as a matter of copyright law, this precedent stands for the contrary proposition. Any prudent user of software ought to be aware of the legal risks he or she is taking if any copy of the software is made in the process of reverse engineering the software.

Ownership Rights In Modifications

The unclarity of the DoD regulations about ownership rights and restrictions as to software modifications may mean that if the original software is claimed to be protected under copyright law (even as an unpublished work), it is copyright law that will fill in the gaps. The general principle of copyright law is to assign ownership rights to whoever is the "author" of an "original work." Creation of a derivative work may involve original authorship. (Even an edited work will involve the editor's judgment about what to include and what to leave out. Even the translation of a book from one language to another involves selecting this adjective instead of its synonym for incorporation into the translation.) Modifications of software are derivative works that may qualify for some copyright protection.

However, unless one has the permission of a copyright owner from whose work one's own work derives to make such a derivative work, one infringes the copyright. If the original author has given a second author only limited permission to make the derivative work (e.g., only for a particular purpose) the latter's ownership rights may be curtailed to that extent. As Chapter 4 explains, copyright protection will not be afforded to any unauthorized derivative work to the extent it incorporates the original work's expression. It will also not be given to a derivative work authorized for a limited purpose and then used beyond the original purpose ([59] sec. 103(a)). (See also Chapter 7 for an elaboration on this point.)

It is probably also worth mentioning that the government would not likely be free from obligations to the owner of proprietary software simply because at some point the government's enhancements would be substantial enough to make the proprietary software unrecognizable.

To the extent that the government has a firm other than the copyright owner do maintenance or enhancement work for it, the government ought to recognize that the maintenance/enhancement firm may claim rights to the enhancements (It may even deliver the enhanced version with its copyright notice) but the viability of these rights claims would be limited by the scope of authorization DoD has from the original contractor.

(e) To be able to maximize the possibility of gaining agreement for competitive maintenance of proprietary software, DoD should be prepared to make arrangements :

(i) either to name who will be the third party maintainer or define what process will be used to qualify a potential third party maintainer; and

(ii) to promise the developer of the software to put the competitive maintainer under a specific set of restrictions (such as those under which the government operates as to that software).

The government might also want to consider naming the original software developer as a third party beneficiary of the agreement between the government and the third party maintainer as to restrictions on rights so that if there is abuse, the developer can sue the maintainer directly.

2.5 Other Legal Issues Relating to Modifications

Although the government clearly has the right to modify software developed at private expense, a number of legal questions have been raised about modifications, some of which derive from the DoD regulations and some from copyright law.

2.5.1 Questions under the DoD FAR SUPP

Unlimited Rights and Derivative Works Rights

An important question that affects its rights to modify and enhance software developed at public expense -- a question to which the DoD regulations give no answer -- is whether the Defense Department has the right to prepare derivative software. The definition of unlimited rights makes no mention of a derivative works right. It should if DoD wants to be sure it has one.

Effect of Modification on Pre-existing Restrictions

If DoD modifies proprietary software in which it has only restricted rights, how does the modification affect the restrictions? The standard data rights clause ([61] sec. 52.227-7013) seems to answer the question somewhat differently, depending on what kind of restricted rights software one is talking about. It provides as to commercial software (or rather to software that a firm has elected to have treated as commercial software) that "unmodified portions [of the restricted rights commercial software] shall remain subject to these restrictions." (See subsection (b)(3)(ii).) Other than commercial software is governed by subsection (b)(3)(i) which refers the reader back to the definition of restricted rights in subsection (a), which in its subsection (4) provides that "those portions of the derivative software incorporating restricted rights software are subject to the same restricted rights."

It may be that the intent of the drafters of this clause was for these two provisions to mean the same thing. If that is so, it is a shame that precisely the same wording wasn't used in both places, for that would remove the potential for ambiguity. If they were intended to mean different things, it is not clear why this would be so. Several lawyers to whom we spoke thought that these provisions were not substantively the same and believed the commercial software provision to be

Over time, the original developer may become more and more confident of its position as the sole source for maintenance of software, and may increase the price for its services accordingly. It may be difficult for the government to break away from sole source maintenances no matter what the cost. It should be noted that commercial buyers tend to have similar difficulties in this respect.

2.3.3 Lack of Experience and Training as Contributors to the Problems

If one adds to this set of already described structural disincentives to adequate planning for software maintenance and supportability, the fact that procurement personnel are often not well trained about software, system lifecycles, or data rights, one can see that the structural problems internal to the Defense Department may be significant contributors to software maintenance problems. It takes considerable sophistication and experience with major systems and what it takes to support them to plan ahead for system supportability. Adequate planning may be made additionally difficult because at the time a development contract may be let, the software for the system may not yet be in existence, but only in the preliminary planning stages, and supportability of the software system may not be easily plannable until after the system is more fully developed.

2.3.4 How Internal Structural Problems Work to the Advantage of Industry

It is perhaps an obvious point that the structural problems internal to the Defense Department create opportunities in software maintenance and supportability contexts for industry to charge very large sums of money for work or rights that could have been purchased more cheaply had they been bargained for at the early phases of the contractual arrangement. It is often in the industry's interest to take advantage of these opportunities when they arise.

2.4 Recommendations about How to Plan Better for Maintenance and Enhancement of Software

Although further work could surely be done about the government's software maintenance licensing problems discussed thus far, it is possible to identify some ways in which DoD might improve its approach to solving this class of maintenance/enhancement problems. New regulations won't help much. The best solution to this class of problems is improved planning for maintenance and enhancement of software at the time the contract is made.

2.4.1 Getting Adequate Documentation to Enable Maintenance or Enhancements

(a) DoD would do well to develop a better, more standardized set of specifications about what software documentation must be delivered to DoD and with what rights.

(b) DoD should decide upfront what arrangements the government wants or needs to make about who should do the maintenance or enhancement work. For reasons other than merely cost, the government may need to do the maintenance in-house. How much rights and how much data the government needs from a contractor will in large measure depend on this decision.

2.2.1 Software Tools

Software tools are a set of programs that may be used to produce other programs. Software tools commonly include editors, compilers, and debuggers, among other things. The application software produced by the tools could be anything from the guidance system of a missile to an inventory control program. Much of the expensive software the government buys is software which is expected to be modified over time. For example, satellite monitoring systems must be revised whenever a new satellite is launched. In order to modify application software in an optimal way --and in some cases, in order to modify it at all -- it may be desirable or necessary to have access to the tools that were used to create the program in the first place. Even if the government's contract officers have the foresight to try to bargain to obtain rights in software tools, the company may be extremely reluctant to grant anyone -- let alone the government (which is widely perceived by industry to be unable to protect commercial secrets) -- to have a copy of the software tools, or even to have access to the tools. A software producer's tools may be perceived to be the major factor in the company's competitive edge in the industry. Parting with them may be a highly charged subject. Indeed, for the government to be able to make any deal to get proprietary software tools is thought a remarkable event.

One potential approach to solving this problem might be for non-governmental third parties to enter into licensing arrangements with the software tool producer (assuming that the company would license anyone) on more restrictive terms than government procurement practices would allow. The government could then allow this third party licensee to do the maintenance/enhancement work. This may not be a solution in all instances, however.

There seems to be a strong preference, if not a clear policy, for DoD to do "organic" maintenance/enhancement work for all weapons system software and weapon related software. We were also frequently told that many companies would not license proprietary software tools to anyone.

Those software tools which companies are likely to be willing to make available to the government with unlimited rights are the older, less valuable technologies. If DoD's priority is to get the best technology, using old tools doesn't seem to be desirable. If DoD's priority is to be able to do all maintenance and enhancement organically or competitively, then having rights to old tools is better than having rights in none.

2.2.2 CAD/CAM Programs

Increasingly, industries are using computer aided design/computer aided manufacturing (CAD/CAM) programs to design and manufacture systems. Most of the examples we heard concerning systems designed for the government with CAD/CAM programs were from the aerospace industry. Because aircraft tend to be rather expensive systems and systems which require more than a modest amount of maintenance and enhancement, both as to software and hardware components, there is growing concern within the Defense Department about getting access to and rights in the CAD/CAM programs used to design the systems in the first place.

2.1.1 Getting Rights to Modify

Obtaining rights for the government to modify software is not a current software licensing problem of the Defense Department. While many other buyers or licensees of software are experiencing difficulty in negotiating with software firms about whether or not they can modify software, this does not seem to be DoD's problem. The DoD procurement regulations require that in all software acquisition contracts the government must get the right to modify the software ([61] sec. 52.227-7013(b)(3)). Government lawyers, on the whole, tend to think that this means that even when a contract between the government and a software contractor is silent about modification rights, the standard data rights clause will be construed by a court to be incorporated into the contract under the Christian doctrine. (See [29]) in which the court read a "termination for the convenience of the government" clause into a military housing contract.) On the other hand, some DoD contract officers seemed to believe that if prime contractors had negotiated away the government's right to modify software in dealing with a subcontractor, the government would be bound by the prime's action. This may not in fact be so for reasons discussed, at Chapter 8.

If, instead of relying on the DoD standard data rights clause, the government was relying on the copyright law as a basis for obtaining rights to modify software, the government's rights would be on more shaky grounds. Copyright law regards any modification of copyrighted software as the creation of a "derivative work" which one needs permission of the copyright owner to do ([59] sec. 106(2)). Although owners of copies of software have a limited right to modify software under Section 117 of the copyright law, the right is so limited as to be virtually nonexistent (1) because only "owners" of copies (and seemingly not licensees) have such rights, and (2) because modifications are only permitted to the extent they are created as an "essential step in the utilization of a computer program in conjunction with a machine." One court has interpreted this to mean that modifications are only permitted if the program won't execute as is (Midway Mfg. Co. v. Strohon [38]). Because copyright law currently offers such limited rights to modify software, it is a good thing for DoD that it has made modification rights part of the package of minimum rights that it always gets in software.

2.1.2 Getting Adequate Documentation to Make Modifications

Getting adequate software documentation seems to be the major software maintenance/enhancement problem experienced by the Defense Department. Many of the "horror stories" we heard were instances of one of the following sorts:

(a) not being farsighted enough to ask for delivery of all the documentation needed to enhance or maintain a system (by far the most common and most significant problem);

(b) not being sufficiently diligent in supervising the delivery of documentation to insure that everything that should have been delivered was, in fact, delivered;

(c) not supervising the attachment of restrictive notices to software to ensure they were only attached to software wholly developed at private expense;

(d) not being able to comprehend the documentation delivered because of its complexity or turgidity; or

1.8.3 The Proposed FAR Policy is More Compatible with CICA and the 1985 DoD Authorization Act Than Is the DoD Policy

The CICA and the DoD Authorization Act indicate that Congress intended there to be a uniform system of federal procurement policy. The proposed DoD FAR SUPP runs counter, in many instances, to the policy which other federal agencies will follow under the FAR.

Congress intended that federal procurement regulations achieve a balance as to the interests of contractors and the government. The proposed FAR more reasonably balances the interests of the parties involved than does the DoD FAR SUPP. It, for example, creates the potential for the government to take less than unlimited rights when both public and private funds are used to develop software. The proposed DoD FAR SUPP would not permit this. In fact, the proposed DoD policy, while in most respects the same as the existing policy, would shift substantially the rights balance in favor of the government because the definition of "developed at private expense" would make it nearly impossible for any software to qualify. This would significantly reduce incentives to do business with the government.

1.9 Conclusion

An even better solution to DoD's software data rights problems than revising the standard data rights clauses as suggested in Section 1.7 would be for DoD to adopt the same basic "data rights" policy as soon will govern all other federal agency acquisitions. More specifically, DoD should adopt the proposed Subpart 27.4 of the Federal Acquisition Regulations (FAR) rather than the proposed Subpart 27.4 of the DoD FAR Supplement (DoD FAR SUPP).

Even if DoD chooses not to adopt the FAR data rights provisions, it should recognize that the current software acquisition policy is seriously flawed in a number of respects. It is highly ambiguous about certain rights provisions concerning matters which need to be clear. It conflicts with intellectual property law in some instances. It creates needless disincentives to do business with DoD in the software acquisition area. It is not tailored to take into account the kind of technology software is. The present policy is too closely tied to the technical data rights policy and fails to recognize that the economics of software development are significantly different from the economics of technical data. If DoD wishes to acquire rights in the best software technology, it must adopt a software data rights policy that is no more divergent from standard commercial practices than is essential to fulfill its mission.

in things funded only in part with government money. The 1985 DoD Authorization Act (creating 10 U.S.C., sec. 2320(a) [52]) suggests this may be compatible with Congressional thinking.

A second variation on the draft standard data rights clause above, which we would have DoD consider would be one that would have the government bend to industry's demands for getting only a governmental purpose license as to intellectual property developed at public expense instead of "unlimited rights" and would require industry to bend by giving DoD the right to sublicense for competitive reprocurement or maintenance purposes (subject to appropriate restrictions on the third party) as part of its "minimum rights." Again, only modest changes in the draft above would seem to be required to accomplish this. If getting competition for reprocurement and maintenance purposes is a high priority of DoD, it may be worthwhile to consider whether the government can live with being able to use and sublicense use of intellectual property for governmental purposes. If it can, maybe this wouldn't be a bad deal to make.

1.8 Recently Proposed Revisions to the DoD Procurement Regulations

Until recently, there has been no substantive "data rights" policy under the FAR. Because DoD has long needed to have a standard policy for acquiring rights in software and technical data, DoD developed its own elaborate policy, which is currently embodied in the DoD FAR SUPP ([61], Subpart 27.4).

The Competition in Contracting Act (CICA) [57], passed last year, required development of a substantive data rights policy for all federal agency acquisitions. Both CICA and the 1985 DoD Authorization Act reflect Congress' intent that there be a uniform data rights policy for all federal agencies. The newly proposed Subpart 27.4 of the FAR is the substantive data rights policy that was developed to respond to this Congressional mandate.

Shortly after issuance of the newly proposed FAR data rights provisions, DoD issued a set of proposed revisions to the DoD FAR SUPP. Although said to "supplement" the FAR, the proposed DoD regulations, if adopted, will entirely supplant the FAR.

Supplantation of the FAR is inconsistent with the Congressional mandate for a uniform policy for federal acquisitions. Because of this and because the proposed FAR contains a superior data rights policy, one which is more straightforward and concise, more consistent with commercial practice, and more compatible with other Congressional directives in the CICA and the 1985 DoD Authorization Act, DoD should give serious consideration to adopting the FAR proposal rather than the DoD FAR SUPP proposal. If a few additional provisions are necessary to enable the Defense Department to carry out its special mission, DoD should, of course, be able to supplement the FAR to accomplish these objectives. Complete supplantation of the FAR is, however, neither necessary nor desirable.

(2) Minimum Rights Legend: Intellectual property in which the government has only minimum rights must be delivered with a restrictive marking of the following type:

Minimum Rights

Property of: (contractor or subcontractor's name)

(3) Restrictive Legend for Other Licenses: Intellectual property delivered to the government under other kinds of licensing arrangements must be delivered with the following restrictive marking:

Negotiated Rights

Property of: (contractor or subcontractor)

Contract No:_____

(4) Substantiating Restrictive Legends: The government may challenge restrictive legends attached to intellectual property delivered or intended to be delivered under this contract on the ground that public funds were used to develop the intellectual property. Within 60 days after a written request for substantiation of a restrictive legend, the contractor or subcontractor shall provide clear and convincing evidence that the intellectual property was developed wholly at private expense. If the contract officer finds that the intellectual property was not developed wholly at private expense, the government may ignore or cancel the restrictive legends.

(5) Right to Appeal Cancellations of Restrictive Legends: If the contract officer finds that intellectual property delivered under this contract with restrictive rights has not been developed wholly at private expense, the contractor or subcontractor shall have the right to appeal any decision of the government to cancel or ignore the restrictive marking in accordance with the provisions of the Contracts Dispute Act.

(6) Contractor Challenges to Subcontractor Restrictive Legends: When a subcontractor delivers to the contractor any intellectual property for eventual delivery to the government under this contract, and the intellectual property is marked with a restrictive legend which the contractor believes to be inappropriate, the contractor shall notify the contract officer of the inappropriate legend so that the contract officer may challenge it.

Definitions

[NOTE: Only the definitions to be changed are mentioned here. Additional definitions of such terms as "developed at public expense" and "government purpose" are not offered here, although they too should be added.]

The following terms used in this clause have the following meanings:

(1) Unlimited Rights: "Unlimited rights" means the right to use, copy, disclose, distribute, perform, display, and prepare derivative works of intellectual property, in whole or in part, in any manner and for any purpose whatsoever, and to have and permit others to do so.

(2) Intellectual Property: "Intellectual property" refers to technical data and computer software.

1.7.4 Proposed Alternative Data Rights Clauses

There are many ways a standard data rights clause for DoD might be structured and written. Among the problems with the existing standard data rights clause is its great length (nine pages) and its turgidity. It is a clause which has been much amended, as first this situation, then that, is taken into account. The amendments have, unfortunately, not always been simple, straightforward, unambiguous and comprehensible. Perhaps it is time for a fresh start. Over time a new clause may also become encrusted, but at least for a while, it may be an improvement.

Even without altering the substance of the data rights clause, DoD might be able to get some "mileage" from a revision of the standard data rights clause that would make the clause more readable and less ambiguous. One of industry's standard complaints about the clause is its jesuitical complexity, a complaint which could be eliminated by such a revision.

The draft alternative data rights clause found below does not retain all of the substantive provisions of the existing data rights clause. It drops, for example, the claim to unlimited rights in non-deliverables produced at government expense on the ground that this provision serves only to frustrate the government when it believes it has rights it cannot enforce. On the other hand, it gives the government back its unlimited rights in copyrighted material produced at government expense. And it defines unlimited rights in a broader manner so as to allow creation of derivative works, among other things. This draft is offered simply as an item for consideration, as something to think about if DoD decides that a revision of the standard data rights clause might be desirable.

Following the draft clause is a short discussion of two other possible alternative draft clauses, one of which industry people might greet as reflecting a more "enlightened" policy, and one of which we suggest might be a workable compromise of the government's and of industry's concerns.

1.7.5 An Alternative Standard Data Rights Clause

Rights of the Government

(1) Unlimited Rights Licenses: The government shall have unlimited rights in:

(i) all intellectual property to be delivered under this contract which was developed at public expense;

(ii) all intellectual property to be delivered under this contract which is in the public domain or otherwise distributed without restriction;

(iii) all intellectual property to be delivered under this contract which incorporates intellectual property in which the government already has unlimited rights; and

(iv) all intellectual property delivered under this contract which is not properly marked as to the restrictions pertaining to it.

(2) Minimum Rights Licenses: The government shall have a minimum rights license in all intellectual property delivered under this contract which has been developed at private expense. Written permission of the owner of such intellectual property will be required before the government may make other uses or disclosures of this intellectual property.

1.7.3 Getting More Rights Than DoD Needs

Government procurement people frequently say (and there is even a DoD regulation to back it up) that it is the policy of the Defense Department to acquire only so much rights as the government needs ([61] sec. 27.403-2(a)). The truth is that DoD routinely acquires more rights than it needs. Its practice reveals that its priorities often lie elsewhere.

Perhaps the clearest illustration of overacquisition of rights is the government's standard policy of acquiring unlimited rights in software and data produced at government expense, even as to what is non-deliverable under the government contract. The government doesn't always need to have unlimited rights in these items although perhaps sometimes it does. Another illustration is its insistence on treating many things clearly not in the public domain and not developed at public expense (such as manuals) as subject to unlimited rights. Still another illustration is its policy of treating something as having been developed at government expense if so much as $1 (or for that matter, a dime) of government money has been spent in its development, which of course will mean that the government will get unlimited rights in it. Again, it isn't the case that the government always needs all those additional rights, especially since if that $1 of government money had not been spent on "fine-tuning" the product, the government would have contented itself with restricted rights to the proprietary software. The vigilant search by government lawyers for some technical defect in compliance with the DoD FAR SUPP to enable the government to get unlimited rights in something which both parties reasonably expected to be subject to restrictions (the price itself also reflecting the expectation of restrictions) would be viewed by industry as yet another instance of the government searching for more rights than perhaps it truly needs (and has paid for).

From our interviews with DoD personnel, it appears that getting unlimited rights in publicly funded software and technical data is, for many people, a fixed star in the firmament of the DoD procurement universe. Industry seems to have adjusted to it, although this is one of its least favorite government policies.

There is a certain elemental appeal to the policy. People generally tend to think that if they pay money to have something made for them, they "own" it and should be able to do with it as they please. Government people frequently express this kind of sentiment toward the spending of government money, and seem not to understand why private firms might object to the policy. The private firms, of course, tend to think that the government is trying to get something for nothing.

The truth is that private firms understand this principle of getting all the rights and benefits when one pays for something very well when it comes to their rights as against those of their employees. Within a firm, ownership of intellectual property and profits resulting from the value of the intellectual property do not go to the creative employee, but to the shareholders of the firm. (But then, that is the essence of the free enterprise system which the Department was created to defend.)

Yet government people do understand -- even if they don't much like it -- that private firms seem to lack incentives to develop and deliver their best products to the government when the firms

1.7 Rethinking and Simplifying DoD's Data Rights

As DoD well knows, industry people have a lot of complaints about the DoD procurement regulations, especially as they affect software data rights. "Revise Part 27.4 of the DoD FAR SUPP," they are wont to say. Just how, they do not usually say, or if they do, they tend to pull out a huge laundry list of grouses and do not differentiate among them at all.

We take as "givens" much of what industry doesn't like about government procurement practices (e.g., the auditing of the books, the limits on profits, the record keeping requirements) and much of what the government has insisted it needs (more rights than industry commonly gives to its commercial customers, especially as to reprocurements and maintenance.)

On the other hand, perhaps a revision of the procurement regulations as to data rights would be a good idea. A lot of DoD people, particularly those who are actually doing procurements, favor the idea.

Doing so might be a step toward improvement of relations with industry. And if the government can clarify what its priorities are in the data rights area, perhaps it can strike a balance with industry to get a little more of what it truly needs to achieve competition in reprocurements, maintenance, and enhancements, by giving up a little of what it already has, but does not truly need, perhaps trimming back somewhat on its unlimited rights policy. At the same time perhaps the government can simplify the regulations and make them more comprehensible which would be a benefit both to the government and industry.

1.7.1 Comprehensibility as a Goal of the Regulations

One of the priorities DoD should have for its data rights regulations is having regulations which are as simple, straightforward and clear as possible. The current DoD data rights regulations fall short of this goal.

Procurement regulations - especially as to data rights - need to be readily understood and applied by people of ordinary intelligence who aren't lawyers and who often have to work under extreme pressure and have many things to worry about besides data rights. Given this, one can perhaps see the value of at least attempting a more simple, straightforward approach. When a contracting officer is being rushed to field a system, and when future promotions will ride on how quickly he is able to field that system, he is likely to avoid becoming enmeshed in complicated data rights issues which he will likely not understand all that well to begin with and which, if he pursues their depths, will surely slow the procurement process down. If the system is fielded with inadequate data rights for, say, organic maintenance/enhancement purposes, well, that will be someone else's problem anyway. A more streamlined, understandable regulatory structure might help the contracting officers to overcome their reluctance to address data rights issues.

One good example of how the regulations unnecessarily complicate data rights matters is the provisions for two kinds of restricted rights for software and yet another set of restrictions ("limited rights") for technical data (See section 1.3.4). It is difficult to understand why there are two kinds

Here is a second problem with the proposal. The ordinary person might tend to wonder whether "license rights" were more or less than other things. The ordinary person would say, "Well, 'license rights' surely has to be less than unlimited rights, but is it more or less than limited (or in the case of software, restricted) rights?" Now on the one hand, it would seem that if the government, in getting "license rights," was getting the right to show the valuable data or software of one company to another company for reprocurement purposes, it would seem like the government was getting more than limited or restricted rights because limited and restricted rights allow only use and disclosure within the government (except in emergencies).

On the other hand, from talking with the OSD study's members and from reviewing the OSD Study's discussion of "direct licensing," the ordinary person might well think that this proposal was intended to enable the government to get the benefit of data or software which it might not possess, but which a third party might have gained licensed access to. In other words, this might be a way for the government to get the benefit of certain data or software without getting any rights or less than minimum rights to them. So this would tend to make someone think it was less than limited or restricted rights. If this was intended, then the regulations would have to make this very clear.

Furthermore, if all one wanted was a middle ground between "unlimited" and "limited" rights, it isn't clear that a special "license rights" provision is necessary. The present "limited rights" and "restricted rights" provisions already allow for a middle ground. With the original contractor's written permission, it has always been possible to give out to another contractor limited rights technical data or restricted rights software. There is no prohibition against getting that written permission in the original contract.

What DoD seems really to need is not a middle ground, but a contractual commitment from the original contractor to agree to one of three things: (1) to license the government to sublicense a second firm for reprocurement or maintenance purposes, (2) to enter into a license agreement with a second firm to allow it to use the data or software for reprocurement or maintenance purposes, or (3) to allow restrictions on the government's use and disclosure to expire after a period of time so that competitive maintenance or reprocurement can occur. If the commitment to allow third party access for maintenance or reprocurements is what is truly needed, any such regulation should say so very clearly. Neither the OSD Study Proposal nor the recently issued proposed DoD regulation on license rights provides this clear guidance.

Yet another problem with both the OSD Study Proposal and the proposed DoD regulations concerning "license rights" is that there is already one set of "license rights" in the DoD FAR SUPP ([61] sec. 52.227-7025). It is downright confusing to have two entirely different "license rights" clauses in the same set of regulations (one applicable to SBIR and one applicable to reprocurements). The OSD Study would not have revised the existing definition of "license right" (although the current definition only gives the government the right to sublicense "for governmental purposes." This, unfortunately, begs the question whether competitive reprocurements are within the meaning of that phrase). The proposed DoD regulations give license rights two different meanings which only exacerbates the problem. If the narrow interpretation of "unlimited rights" is

1.6 Issues Arising from the OSD Technical Data Rights Study

1.6.1 Fixed Expirations for Restrictions

In September 1983, the Secretary of the Air Force, Vernon Orr, issued a directive [55] (since modified) requiring that a clause be inserted in all future Air Force development contracts to provide that all restrictions on technical data and software delivered to the government under contract would expire no later than five years after delivery (referred to below as "the Orr clause"). NASA had been using a similar clause for some years. This idea interested one of the committees of the House of Representatives which asked OSD to study the idea. The OSD Technical Data Rights Study was organized. Its report, issued in June of 1984 [11], rejected the Orr clause approach, at least as to technical data. The 1985 DoD Authorization Act gave the Secretary of Defense authority to issue regulations permitting fixed expiration periods of up to seven years. (See [52] sec. 2320(c).) The DAR Council studied the OSD Study Proposal and the Authorization Act and issued proposed changes to the DoD FAR SUPP for public comment. Those proposed regulations would have permitted but not mandated fixed expiration periods.

From the standpoint of traditional intellectual property theory, fixed expirations for restrictive legends make sense. If the technical data or software being delivered is not inventive enough to be patented, why should the government create what is in essence perpetual protection for the thing when if it was patented, it would be in the public domain after 17 years? If copyright law would not protect the information, ideas, processes, procedures, and other valuable things contained in technical data, drawings and software, why should the government's data rights policy treat them as protectable property? Intellectual property law does not accept the idea that information and ideas are capable of being "owned" by anyone. Even traditional trade secret law does not protect any "property" right in the valuable secret per se, but only protects the confidential relationship that may have been formed when one person disclosed something valuable in confidence to another, or protects against industrial espionage or other tortious conduct by one who wants to obtain the secret [14]. Trade secret law also recognizes that over time old technology may become less valuable, or valueless, which makes fixed expirations seem reasonable. It is also in keeping with the modern law of trade secrets to grant injunctive relief only for the period of time it would take to discover the secret oneself (and if that time is past, no injunction may issue) and to grant monetary relief for a similarly limited period.

From the standpoint of how industry regards its secrets, the fixed expiration approach poses some difficulties. Fixed expiration periods are sometimes used by industry, but generally in the context of negotiations focused on a particular item of software to be acquired. The inflexible approach of the original Orr directive has now been rethought and DoD seems to have kept the option but allowed greater flexibility about it in the acquisition process. It may be possible to provide for a specification during the planning stage or system acquisition as to whether an expiration period would be desirable, and if so, how long the period should be.

signed the agreement, the government could not be bound by the terms of the license because only the contract officer has the power to bind the government. Yet companies widely insisted on getting the actual user either to sign or to break open the package. Those who believed that such acts by users would not bind the government also believed that if users opened the package or signed, they would expose themselves to personal liability and potentially to injunctive relief (even if acting in a governmental capacity), which was thought to be undesirable and perhaps inconsistent with the regulatory mandate. It would be very helpful to the people who have to use these regulations for procuring software to be able to get clear guidance from the regulations about this troublesome issue.

1.5.2 What Effect on Government's Rights

What effect the failure of the contract officer to open the package or sign the agreement would have on the extent of the government's rights thereafter was also a subject of some debate. Would it be unlimited rights because of the failure to follow proper procedures and to make the restrictions a part of the government contract? Or restricted rights normally applicable to commercial software? Since these licenses typically restrict the government's ability to modify the software, they contain less than the four minimum rights the procurement regulations say the government must have. How that affects the government's rights also mystified some, although others pointed out that ([61], sec. 27.404-1(c)) states that "[a]s a minimum, however, the Government shall have the rights provided in the definition of restricted rights in Section 27.401," and that the Christian Associates case [29] suggests that clauses that are mandatory in government contracts will be read into a contract even if not found there. (That case involved a contract silent on a clause, not one contradicting the clause.) (See Chapter 8 for more discussion of this problem.)

1.5.3 Other Terms in Violation of Federal Procurement Regulations

Many of the other standard terms of these licenses are in conflict with federal procurement law. For example, they typically set forth such things as what state law will govern disputes, and where lawsuits are to be brought, as well as providing for instant termination of the license in the event of any violation of the terms of the license, and a return of the software to the vendor. The government could be expected to argue that none of these would bind the government even if the contract officer broke open the package or signed the license agreement. Since the contract officer is not authorized to agree to things which are in violation of the procurement regulations, the argument would conclude that the government would not be bound by these conditions. That may well be so, but what would be helpful to the people in the field is to have a regulation that explicitly addresses this problem.

make provisions to accommodate this technological development ([64], sec. 18-27.473-2(e)). The DoD should think about doing so as well.

1.4.3 "Time Bombs," "Worms," and "Triggers"

Some software being sold commercially contains "time bombs," software devices that at a prescribed time either stop the software from working or stop it from working accurately. Other software contains "worms," software devices that, upon a certain condition being met, cause destruction to that software, other software, or stored data. Still other software contains "triggers," software devices which prevent software from running on any but a specifically identified C.P.U. Because of the possibility that a software firm might install "time bombs" or "worms" or "triggers" in software acquired by the government, perhaps the regulations ought at least to require notice to the government if software is to be delivered with "time bombs" or other such devices.

1.4.4 The New Chip Law

The only forms of intellectual property law to which the DoD FAR SUPP makes reference are patent and copyright law. In fall of 1984, Congress created a new form of intellectual property law to protect designs of semiconductor chips. Because much of the software that DoD buys is delivered on chips, the new chip law seems at least somewhat related to DoD's software licensing practices, and hence within the broad scope of this report. Chapter 12 discusses the features of the chip law as they may affect the Defense Department.

1.4.5 Trademarks

Another form of intellectual property law to which the DoD FAR SUPP makes no reference is trademark law. Because it is becoming more common for the government to take trademark rights as to software under development (especially in connection with the government's promotion of Ada as a standard language for military applications), some standard clauses for obtaining trademark rights in software products produced for the government by private firms should be available. Because of some nonobvious wrinkles in the trademark law which could trip up the government's efforts to maintain trademark rights, explained at some length in Chapter 6, it is important to have a policy which will get it right the first time.

1.4.6 Government Rights in Derivative Works

As Chapter 4 explains at greater length, there are a number of "derivative works" issues not currently addressed by the current regulations which are of some considerable importance in software acquisitions. Two of the issues are: (a) what if any rights the government has in contractor-prepared derivative works of software in which the government claims unlimited rights (see also Chapter 7) and, (b) what if any rights the government has in modifications it makes to restricted rights software prepared either by it, or for it by private firms.

although it still does not address the critical issue of what it means for software or technical data to be "developed" (i.e., what are the critical events, especially as to software -- When the algorithm is developed? When the source code is written? When the code is first compiled? When it is debugged? etc).

The proposed revisions to the DoD FAR SUPP data rights provisions issued in the late summer of 1985 undertook to define "developed" and "developed at private expense" more precisely. Unfortunately, the definition proposed is so stringent that virtually no software would qualify as privately developed software (because of the testing requirement and because of the requirement that all development be completed before any government contract for the software is in existence). The proposed definition (like another similar attempt a few years ago) has proved too controversial to be adopted ([8] pp 443-445). It does seem time to try to develop a definition that both industry and government can live with. The term is too important not to be defined.

1.3.4 Two Types of Restricted Rights

The policy provisions of the DoD FAR SUPP ([61] sec. 27.401) contain only one definition of restricted rights applicable to software. The implementing data rights clause found at ([61] sec. 52.227-7013) sets forth, in subsections (b)(3)(i) and (ii), two different sets of restricted rights, one applicable to commercial software (at the vendor's election) and one applicable to other software.

One of the problems with this approach is that while the two sets of rights resemble each other in some respects, they are not the same, and to the extent they are different, it is not apparent what principled basis exists for the differentiation. (One, for example, focuses on the computer for which software was acquired, whereas the other focuses on the facility. Also, the two sets of rights do not seem to treat modifications the same.) It appears that the differences may be the result of imprecise drafting. If these differences are intentional, then they should be explained.

Another problem is that there isn't an easy way to refer to the two kinds of restricted rights. That is, it would, at a minimum, be helpful to be able to refer to "commercial software restricted rights" and "trade secret software restricted rights." It is also hard to comprehend why documentation concerning commercial software should be allowed to get restricted rights treatment, but not documentation for other software. Subjecting other than commercial software documentation to the broader "limited rights" policy (giving the government the right to use, disclose and duplicate the documentation throughout the government) has an added disadvantage for the government in that it deters many software firms from doing business with DoD or from selling rights to their most valuable technologies. Moreover, none of the contract officers to whom we spoke could tell us the difference between these two sets of restricted rights or could tell us how to apply them. Industry people also seemed somewhat confused by these two sets of rights. This creates needless confusion.

What seems to be the general intent of this segment of the regulations is to set a "floor" of minimum rights which the government must always have (as well as setting a standard "ceiling" of unlimited rights when government funding has been used) and then to indicate that inter-

government with an intention that it also be sold in the commercial marketplace will not likely qualify for treatment as commercial software since at the time of development there will be no sales outside of the government. Our understanding is that because of the ambiguities of language in the regulations, most contractors do not exercise the option of having software treated as commercial.

1.3 The Need for More Precise Definitions

1.3.1 What Unlimited Rights Means Vis-a-Vis Ownership

There does not seem to be a consensus among DoD personnel about what "unlimited rights" means vis-a-vis ownership. We discovered at least four interpretations DoD personnel had as to this issue.

(a) Some think it is the equivalent of ownership.

As one person has said, "if it looks like a duck and quacks like a duck, it is a duck."

(b) Some think it means the government co-owns the subject matter, the government owning it in the governmental sphere, the contractor owning it in the commercial sphere.

The recoupment provision was thought by some to support this interpretation.

(c) Some think it means the thing is in the public domain.

Certainly, with trade secret data, what the government seems to have is the capability to put the thing in the public domain.

(d) Some think it means that the the contractor owns the thing and that the government has a license back to use the thing for governmental purposes.

Section 1.1.1 suggests that this last interpretation may be the more appropriate one. Yet there is a big difference between "unlimited rights" as defined by section 27.401 ("to use, duplicate or disclose ... in any manner and for any purpose whatsoever, and to ... permit others to do so") and "license rights" as defined by that same section (which limits the right to use, duplicate or disclose to "governmental purposes"), so something different must have originally been meant by unlimited rights.

Why does it make a difference what it means? Because DoD people (and industry people as well) sometimes think of "unlimited rights" as an ownership interest which means they may act on this belief, which means they can get into trouble if it isn't true. For example, in negotiating a software development contract as to which keeping control over derivative software may be important, the government may use the standard data rights clause and expect to get unlimited rights. The government might have thought it wouldn't need a copyright since it would have unlimited rights or it might think unlimited rights was ownership. But if the contractor copyrights the software, the government may not have unlimited rights; and even if it has unlimited rights as to uncopyrighted software, it isn't clear this includes rights to make derivative software. (See Chapter 7.) What unlimited rights really means vis-a-vis ownership matters.

the latter, it is clearly contemplated that other restrictions can be negotiated by the parties, subject only to the requirement that the government always has the four minimum rights set forth in the clause. (A different restrictive legend is to be attached to the software depending on which arrangement the contractor has elected to take.) The language of the standard clause contemplates that a separate license agreement containing other restrictions is to be negotiated and made a part of the government contract.

The issue arises: what happens if a separate license agreement has not been negotiated, or if a license agreement has been negotiated but not explicitly made part of the government contract? Reportedly, many firms have provided their proprietary software to DoD, and have not negotiated separate licensing agreements, let alone made such agreements part of the government contracts. These software firms apparently assume that the government will have no more than the four minimum rights.

The government might make the argument that unless there is a separate agreement and it is made a part of the government contract, the government has unlimited rights in the software. The following language of the clause could be used to support this interpretation: "The contractor may not place any legend on computer software indicating restrictions on the Government's rights in such software unless the restrictions are set forth in a license or agreement made a part of this contract prior to the delivery date of the software." On the other hand, industry might argue that the government should be held to the four minimum rights where no separate license was negotiated or made part of the contract, so long as the software was developed wholly at private expense.

If the government did decide to litigate on a claim of unlimited rights in software where no separate agreement was made part of the contract, we think it unlikely that a court would uphold the government's interpretation of this clause. If a software firm provided the government with its proprietary software on the understanding and in the expectation that no more than the four minimum rights would have attached, it would seem likely that the court would protect the party's reasonable expectations. Modern contract law has moved away from hyper-technical approaches to contract formation and tends to enforce reasonable expectations of the parties. This is a case, however, in which even if the government won, it could lose in the long run since the mere pressing of the claim might further impair already strained relations between industry and government.

Some industry people who knew about this little "booby trap" in the regulations were nervous about it, but thought that DoD's contracting personnel would be "reasonable" and not spring the trap. Even where the likelihood of harm may be perceived to be slight, however, a software contractor may be unwilling to take even the risk presented by the DoD procurement regulations when the firm's most valuable technology would be at stake. This disincentive to do business with the DoD is even more pronounced where a small contractor is involved since the valuable technology at issue is likely to be the very "lifeblood" of the company, that is, the competitive edge which allows the company to survive in the marketplace. In such cases, even a slight risk is likely to dissuade such a company from doing business with the DoD, with the result that useful tech-

The issue could arise in a number of different contexts. For example, suppose a series of DoD contracts was awarded to a small business over a several year period for development of software. Assume the contractor developed an excellent algorithm that was not a deliverable item under the contract, and offered to sell it to the government for an additional sum. To further cloud the issue, suppose there had been a short hiatus in government funding of the research, and that it was during this hiatus that the algorithm was developed at the contractor's expense. The government might very well insist that the contractor deliver the algorithm on the ground that it already belonged to the government. The contractor would likely disagree, creating an impasse. The end result would likely be that the government would have to meet the contractor's price, or go without the algorithm.

There would be some equitable pull to the government's argument that after giving this small business funding, it is owed something of value in return. The contractor's position that the years of government funding had not supported development of this product might appear dubious to some, and thus could weaken the contractor's equitable argument. Yet there would also seem to be some equity in the contractor's stance. He could argue that he had been willing to deliver what was deliverable under the contract, and it wasn't his fault that the government hadn't called for delivery of the algorithm and hadn't put in a deferred ordering clause as the current regulations allow. Moreover, since the government would not have had a contractual basis for complaint against the contractor had he not developed this valuable algorithm, it might seem to some as though the government was trying to get something for nothing.

Other interesting questions deriving from the problem of what it means to have unlimited rights in non-deliverables include: whether the government has any rights if the contractor later sells the valuable non-deliverable to someone else; whether the government can rightfully claim unlimited rights in a derivative work which incorporates the non-deliverable and which was (but for the non-deliverable) clearly developed at private expense; and what if any obligation the contractor has to inform the government of any other use of the non-deliverable. If a contractor has reason to believe that the government would claim unlimited rights in a derivative of non-deliverable software if that item is later delivered under a subsequent acquisition arrangement, the contractor is not likely to be willing to deliver it.

This problem seems to be an instance of confusion over the meaning of "unlimited rights" vis-a-vis ownership (see Section 1.3) as well as another instance of the government's having higher expectations about its rights than "unlimited rights" seems able to deliver. The advantage to DoD in leaving this ambiguity in place is that it may sometimes be helpful in negotiating with software developers about non-deliverable software or algorithms. The disadvantage to DoD in leaving this ambiguity in place is that without an option or deferred ordering clause, it raises expectations that the government may have no lawful right to have satisfied, and may create opportunities for distrust and bitterness, which are in neither the government's nor industry's long term best interest. So, it would be wise for the government to consider making the deferred ordering clause standard, or drop its unlimited rights claims to non-deliverable software or data.

1.1 Ambiguities or Problems in the Data Rights Regulations That May Harm the Government's Interests

There are several provisions in the current DoD FAR SUPP that are widely perceived to be troublesome for the government in achieving some of the goals it may have for software systems. Four instances of this are discussed in this section. (Selected portions of the DoD FAR SUPP can be found in Appendix B.)

1.1.1 The Apparent Conflict Between the Unlimited Rights Provision and the Retention of Copyright Provision

It is standard government policy to obtain unlimited rights in any software developed at public expense under a government contract or subcontract ([61] sec. 27.404-1). "Unlimited rights" is defined to mean "the right to use, duplicate, or disclose ... computer software in whole or in part, in any manner and for any purpose whatsoever, and to have or permit others to do so" ([61] sec. 27.401).

Another subsection of the standard policy regulation allows contractors to retain copyrights in all software (or, for that matter, technical data) first developed or generated in performance of a government contract even if funded by the government ([61] sec. 27.402(c)). The only exception to this is when the government uses its "special works" clause, which purports to give copyright ownership to the government. Where a contractor owns the copyright, the government is supposed to get a license back to copy and use the copyrighted material for governmental purposes ([61] sec. 52.227-7013) for the implementing data rights clause; see also [8] (pp 487-488) for a discussion of this ambiguity). This latter provision is not well understood by DoD's own procurement personnel.

It is possible to envision a scenario where the government might expect it would have unlimited rights in software developed under a software development contract only to find that the contractor delivered the software with a copyright notice on it, and that the government's rights would have been cut back because of the contractor's invocation of the copyright protection. Chapter 7 gives a more extended hypothetical discussion of how this might conflict with the government's sense of its interests.

In any litigation between the government and a contractor over the meaning of these two seemingly conflicting clauses, it seems likely that a court would construe the clauses so as to give effect to the copyright limitation. The law generally construes any ambiguity in a contract against the party -- here the government -- that has drafted it. What that means is that unlimited rights doesn't always mean unlimited rights.

In fact, it may never mean unlimited rights. Virtually all of the technical data and software delivered to the government is copyrightable subject matter. Unpublished copyrighted subject matter needn't be designated with a copyright notice to be protected under that law. Because of this, it may be that unlimited rights never means anything but a license for governmental pur-

the DoD acquisition regulations do not provide any guidance about such issues. Access appears to be less than the set of minimum restricted rights that the standard data rights policy contemplates as mandatory for software acquisitions. DoD needs to develop a better regulatory policy to enable it to benefit fully from this relatively new and powerful technology.

Chapter 11: Software's Hybrid Nature

This chapter briefly explores how software differs from hardware and from technical data. One of the many ramifications of the hybrid nature of software -- partly a "writing," partly a "machine part" -- has to do with whether DoD may be able to claim warranties in software delivered to it under contracts silent as to the issue of warranties.

Implied warranties -- as of merchantability or fitness for a particular purpose -- do not attach to services; they may attach to "goods." If more akin to hardware, software would appear to be within the meaning of "goods." If characterized as being more like technical data, software would appear to be more in the nature of a service. Thus, the characterization of software can have significant implications with respect to the question of whether or not implied warranties will attach. We conclude that implied warranties may attach to software delivered to DoD, even though government contracts, strictly speaking, are not governed by the Uniform Commercial Code from whence such implied warranties as merchantability and fitness for a particular purpose originally came.

Chapter 12: Semiconductor Chip Protection

This chapter describes the new form of intellectual property law that Congress created in 1984 which gives a set of exclusive rights to owners of chip circuitry designs. The new chip protection law resembles patent and copyright law in some ways, but it is unique in some respects. It also reports on how the new law may affect DoD's software acquisitions.

The DoD acquisition regulations make no reference to the new chip law. There is no existing mechanism, for example, by which DoD can take rights in the chip designs developed for it. The chip law, like the copyright law, contains a provision prohibiting the government from directly obtaining protection under that law. Thus, to obtain protection in a chip developed by the government or by a contractor for the government, it appears that the DoD would have to employ an assignment approach such as that discussed in Chapter 5 dealing with government ownership of copyright.

An important way in which protection under the chip law differs from protection under the copyright law is that section 1498 of title 28 U.S.C. shields the government from an injunction in cases where the government is found to have infringed a copyright or a patent; no such protection is available to the government for infringement of a chip mask. Thus, the holder of protection under the chip law might be able to obtain an injunction against the government prohibiting further use of an infringing chip, whereas such relief would not be available against the government as to

Chapter 8: Subcontractor Flowdown Problems

This chapter raises a set of concerns voiced by DoD personnel about the extent of the government's rights when prime contractors fail to obtain from a subcontractor the full set of rights that the government had bargained for from the prime. The chapter suggests that the government may be able to enforce rights under mandatory clauses as against the subcontractors, but not those deriving from discretionary or specially written clauses.

Certain clauses, such as the standard data rights clause, are required to be used in DoD software acquisition contracts unless a deviation has been obtained from the DAR Council. If a prime neglects to insert the standard data rights clause in a subcontract with a software developer or negotiates with the subcontractor for less rights than the mandatory clause requires that the government have, it would seem that the government could enforce the standard data rights clause against the subcontractor. The clause is a government regulation and is required by regulation to be inserted in all DoD software contracts unless a deviation has been obtained. Subcontractors would likely be held to have constructive notice of this.

There are many clauses used in government contracts that are not mandatory. The "special works" clause is an example of a standard discretionary clause. Other clauses are specially drafted for particular contracts (e.g., clauses defining the scope of warranty rights in software). If a prime contractor has promised the government to obtain certain rights under a discretionary clause, and the prime either is unable or neglects to secure a commitment for such rights from a subcontractor, it seems unlikely that the government could enforce against the subcontractor the rights it had expected the prime to get for it.

Chapter 9: Limitations on Governmental Action

This chapter discusses the risk of injunctive relief being entered against the government in disputes over rights in software held as a trade secret by its owner. The chapter identifies a number of situations in which the government might be able to successfully avoid injunctive remedies, but notes that certain recent legal precedents have created a serious risk of injunctive relief in software disputes, from which DoD may not be shielded by various statutes on which it has customarily relied to avoid injunctions.

Most software intended for commercial distribution is held as a trade secret by the developer. Although the government has statutory authority to infringe patents and copyrights, it does not have similar authorization to appropriate trade secrets against the owner's wishes. Indeed, there is a criminal statute that penalizes any federal employee who discloses confidential information claimed as a company's trade secret without authorization. Some DoD lawyers expressed concern about an injunction issuing against governmental use of the software. This they felt might occur in the context of litigation between a software producer and the government over trade secret software. This is a risk that the government has not previously had to confront as to its equipment because hardware, if protected by a form of intellectual property law, would generally be protected only by patents, which the government could infringe. (Trade secrets generally

Chapter 5: Government Ownership of Copyrights

DoD is running a risk when it employs its "special works" clause to attempt to take a direct copyright interest in software. This chapter proposes adoption of a less risky strategy for obtaining ownership rights in software.

When DoD wants to take a direct ownership interest in a work prepared for it by a private contractor, the DoD FAR SUPP directs that the "special works" clause be used in the development contract. The clause in effect claims a direct copyright for the government under the copyright "work made for hire" doctrine. We understand that this "special works" clause has been used in a number of DoD software development contracts. Indeed, it appears that a deviation would be required to attempt take a copyright interest in any other manner.

The problem with use of the special works clause for this purpose is that the copyright law specifically prohibits the government from taking direct ownership rights in copyrighted works. The legislative history of this section reflects that Congress considered the issue of copyright ownership of works prepared for the government by contractors and decided that while agencies could decide that a contractor might be permitted to retain a copyright, the government could not get direct copyright ownership in works prepared for it.

Copyright law permits the government to own copyrights only by assignment, bequest, and the like. Taking a copyright as if the work was "made for hire" is not the same as taking a copyright by assignment or bequest. What the "special works" clause will be effective in doing is precluding the contractor from claiming any ownership rights in the software. A copyright obtained directly in the DoD pursuant to this clause may very well be found invalid if challenged in court.

If the Defense Department wishes to obtain a copyright interest in software, we recommend that they adopt an assignment approach similar to that adopted by NASA and that proposed under the new FAR whereby the contractor takes the copyright and then assigns it to the government. Alternatively, the government might consider working for a legislative change which would permit the government to directly obtain a copyright in software developed for it under government contract.

Chapter 6: Problems Arising from the Government's Trademark Rights with Regard to Software

The Department of Defense is increasingly claiming trademark rights in software and related technology. Acquiring and maintaining trademark rights is a specialized legal matter. There seems to be little expertise within DoD as to the scope and proper use of the government's trademark rights in words (such as "Ada") used in connection with software. DoD personnel seemed to be unclear as to the type of mark "Ada" is (i.e., a certification mark or a trade mark), who owns the mark (i.e., the U.S. government, DoD or the Ada Joint Program Office), and even as to what rights attach to a trade mark or certification mark.

may have incentives not to give up its "sole source" position as to maintenance and enhancements, unless provision has been made for this during the original competition for the development contract. The chapter recommends a variety of mechanisms DoD might use to better plan for competitive maintenance of software when this is desired. Escrowing of software documentation is discussed as a possible mechanism to ensure that DoD will have access to the documentation under specified conditions, while at the same time ensuring that the proprietary rights of the developer are respected.

In addition to acquiring written documentation and rights to modify, adequate maintenance and enhancement of software will often require access to the "tools" which were used in the development of the software. Software tools and CAD/CAM programs are increasingly being used to develop software. Because of the commercial value of such tools, contractors are reluctant to license the government to acquire rights in software tools or in some cases even access to them because of objections to the government's standard data rights policies. If DoD wishes to obtain rights in or access to the highest quality software tools and CAD/CAM programs that industry has to offer, it may need to adjust its data rights policy. For example, it might make arrangements whereby an intermediary firm could acquire the material on the government's behalf, subject to more restrictions than the government's standard policy permits.

Other issues discussed in Chapter 2 that relate to software modifications include the effect of modification by the government on pre-existing restrictions, whether restrictions will attach to modified portions, the significance of the regulatory duty not to prepare similar software, the ramifications of reverse engineering of software, deciding about ownership rights in modifications, and the effect on warranties when software is modified.

Chapter 3: The Need for Better Training about Software, Data Rights, And Intellectual Property Law

This chapter examines the need for additional training of DoD contracting personnel with regard to both software technology and the government's data rights policy.

Although DoD is fortunate to have many dedicated, competent individuals among its procurement personnel, these individuals reported that they feel inadequately trained for the role they have to perform in complex software acquisition contracts. Much of the software that the contracting personnel must acquire is "state of the art" technology. Communication between procurement personnel and users seems to be infrequent, which makes maintenance and supportability planning more difficult. Often procurement personnel have no training in software technology, software life cycles, or software support systems. Further, the procurement regulatory structure within which the negotiation process must proceed -- especially as to data rights -- is quite complex. Finally, the turnover rate among procurement personnel is high, which only aggravates the situation.

Given the difficult environment within which contracting personnel must operate, it is not surprising that there have been problems related to the acquisition of software. Contracting personnel

The question is what happens if the government acquires software which the contractor has decided to have treated under the regulations as other than commercial and a separate license agreement has not been negotiated or made part of the contract? DoD personnel seem to have differing opinions about this. Some believe that the failure to negotiate a separate agreement will result in the government acquiring unlimited rights in the proprietary software, even though but for the oversight, the government would settle for having restricted rights. Others feel that only the four minimum rights would attach. This is a source of considerable concern to those in industry who recognize the possibility that the government might claim broader rights.

1.2.2 Unlimited Rights in Software Documentation as to Other Than Commercial Software.
The DoD acquisition regulations seem also to permit the government to claim unlimited rights in documentation for privately developed software insofar as it can be characterized as instructional material necessary to maintenance of a system. While the restricted rights provision pertaining to commercial software seems to shield commercial software documentation from the broad reach of this provision, there is no comparable basis for claiming an exemption from unlimited rights treatment for the documentation to software treated as other than commercial software. Many industry people are quite nervous about delivering software documentation to the government for fear they will lose all proprietary rights in the documentation.

1.3 The Need for More Precise Definitions

During interviews with DoD personnel, we found confusion concerning certain definitions used in the DoD acquisition regulations. Some of this confusion is the result of ambiguity and imprecise wording. In other instances, crucial concepts are simply not defined. Some of the more significant problems include:

1. The lack of an adequate definition for the term *unlimited rights*. There is considerable uncertainty within the DoD as to whether unlimited rights is more akin to an ownership interest or a license right. We conclude that unlimited rights gives the government a kind of license right.
2. The lack of any definition for the term *governmental purpose*. The DoD acquisition regulations provide for, in certain instances, a license for governmental purposes, but fail to provide guidance as to what the scope of such license might be.
3. The term *privately developed software* needs to be defined. The scope of this term is a highly controversial issue, and input from industry on this matter would seem advisable. To neglect to define the term, however, only ensures conflict between industry and government as to its meaning.
4. The existence of two types of *restricted rights* in the acquisition regulations does not seem to serve any purpose sufficient to justify the confusion it creates.

1.4 Issues Not Addressed in the DoD Regulations

There are several issues relevant to the procurement of software which are not addressed by the existing DoD acquisition regulations. Since DoD's personnel need guidance about how these issues should be dealt with, provision should be made for them in the regulations. Among the most critical areas not adequately dealt with by the present DoD acquisition regulations are:

the software industry. The policy also needs to be clear and comprehensible to persons of average intelligence. The current software acquisition practices of the DOD fall short of these goals.

To be fair, it should be said that to develop the new conceptual apparatus that is necessary to treat software appropriately is a difficult task. The temptation is to use the nearest analogue as long as one can, until the problems with reliance on the analogue become more pronounced than the problems associated with developing a new concept. The time has come for the Department of Defense to renounce the quasi-technical data orientation of its acquisition practices toward software and to adopt a new policy that is clear and coherent, that is no more divergent from commercial practices than is necessary for the achievement of the Defense Department's mission, that is appropriate in terms of the Defense Department's need to use the technology, and that is appropriate in terms of intellectual property rights associated with software.

Report Structure

This report reflects the concerns of DoD's own people. Perhaps the most valuable contribution this report can make is in its structuring and giving expression to concerns of those in the Defense Department who have to live with the software licensing problems described in this report. With one or two exceptions, all of the problems discussed in this report are problems identified by DoD personnel.

The general structure of this report reflects the principal investigator's judgment about the relative importance of the various categories of software licensing problems discussed in the individual chapters. Within each chapter the order of discussion of the problems, in general, is reflective of their relative importance vis-a-vis each other. The less worrisome the problems, the later, in general, they are discussed in the report. Below is a summary of the content of each chapter.

Chapter 1: DoD's Procurement Regulations

This chapter addresses a rather wide variety of software licensing problems that DoD personnel have raised about the existing procurement regulations governing software acquisitions. It focuses most particularly on the standard data rights clause.

1.1 Ambiguities Disadvantaging the Government

There are some ambiguities and inconsistencies in the DoD procurement regulations which seem to work to the disadvantage of the government. Four examples are discussed in this chapter.

1.1.1 The Apparent Conflict between the Unlimited Rights Provision and the Retention of Copyright Provision

The DoD standard data rights clause, in general, allows contractors to retain a copyright in software developed at public expense. The clause seems to give the government "unlimited

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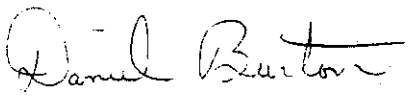
The ideas and findings in this report should not be construed as an official DoD position. It is published in the interest of scientific and technical information exchange.

Review and Approval

This report has been reviewed and is approved for publication.

FOR THE COMMANDER



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