in that manner due to reasons other than lack of drawings. Closer examination reveals that of the 7,584 items, 5,501 cost less than $2,500 and thus could not be purchased by formal advertising as so directed by Section III of Armed Services Procurement Regulation (ASPR). Thus, of the 2,000 remaining items purchased by negotiation one third or 650 were purchased by negotiation because of lack of drawings.

The remaining two thirds of these items were purchased through negotiation because of one of a number of exceptions to formal advertising listed in Section III of ASPR.

Why was the technical data insufficient for formal advertising in the above 650 cases?

In 3% of the cases, the drawings were illegible. (An illegible drawing is a drawing that cannot be reproduced to the fourth generation.) In 16% of the cases, the drawings were restricted. (A restricted drawing being a drawing for which the Government has no right to use for formal advertising.) In 20% of the cases, there were no drawings, and in the remaining 61% the drawings were missing, illegible and restricted.

In order for us to obtain better drawings, it is first necessary to discuss how OTAC acquires its drawings.

The great majority of OTAC's drawings are generated by contract. The remaining drawings are obtained from contractors by request from the Government. A large number of the drawings obtained by request are restricted to internal Government use and cannot be used for formal advertising.

Types of contracts under which technical data may be obtained are as follows: research and development contracts, engineering services contracts, VEA and MCEA contracts, and supply contracts.

The Engineering Services contracts and the Research and Development contracts by far generate the largest percent of OTAC's drawings. In fact, the Acquisition of Data regulation of ASPR 9-202.1(c) obligates OTAC to acquire all data necessary to build the end item developed in the performance of the contract (with some exceptions). The end item developed could consist of a mixture of standard military components, commercial components, non-commercial components, and newly developed components. Thus, ASPR requires drawings (not necessarily production drawings) of all the above components.

Supply contracts do not usually call for drawings and ASPR does not make the obtaining of drawings mandatory in such contracts.

On occasion, the seller agrees to furnish a set of production drawings along with the supplies at no additional charge and sometimes the Government feels justified in paying for a set of drawings.

VEA and MCEA are contracts which employ an engineering agency to maintain production drawings up to date and do not generate a large amount of drawings.

Let us now discuss when the Research and Development contracts and Engineering Services contracts are used.

To best do this, it may be well to trace the evolution of a vehicle from infancy to the production line by following the steps below:

1. Concept of a vehicle.
2. Development of the concept.
3. Design (place developed concept on drawings).
4. Make the prototype from the above drawings.
5. Test the prototype.

These five steps are covered by our Research and Development contract. The tangible results of this contract is a prototype which indicates the feasibility of the original concept and a set of drawings.

The set of drawings is either all DTA drawings, all experimental facility drawings, or a combination of both types of drawings.

DTA and experimental facility drawings are not production drawings and are sufficient only to permit construction of replacement parts of the original prototype by the developing contractor and additional prototypes by other contractors if so desired.

Thus, if someone other than the original developer was given DTA or experimental facility drawings, he could use them only to produce another prototype demonstrating the same concept as the original prototype but which would not have interchangeable parts with the original. The lack of interchangeability being based on the fact that the drawings do not give tolerances.

The difference between DTA and experimental facility drawings is the fact that DTA drawings are made on Ordnance paper with

Ordnance specifications while experimental facility drawings are made on facility (contractor) paper with facility specifications. Experimental facility drawings must be provided with the data necessary to convert the facility specifications to Ordnance specifications.

After the prototype is successfully tested another stage of development is entered into as shown by the following steps:

6. Correct design.
7. Redesign for production and make production drawings.
8. Make pilot with the production drawings.
9. Test pilot.
10. Correct design.
11. Release corrected drawings for production.

These steps in the development are covered by our Engineering Services contract. The tangible results of this contract is a pilot susceptible for mass production and a set of production drawings for the pilot.

During the Engineering Services contract, DTA or Experimental Facility drawings generated by the Research and Development contract are utilized to make production drawings. These production drawings are then used to produce a pilot which is utilized to determine the accuracy of the drawings and if the drawings are adequate to use for a production run.

It is pointed out that the contractor who developed the DTA or experimental drawings does not necessarily have to be the contractor who utilizes them for producing the production drawing under the Engineering Services contract. In other words, the same contractor does not necessarily have to get both the Research and Development contract and the Engineering Services contract.

The drawings produced under the Engineering Services contract are Ordnance drawings that comply with the ORDM 4-4 drafting manual and the MIL-D-70327. These government documents insure that the Ordnance drawings produced under the Engineering Services contract are drawings that can be understood and used by any competent manufacturer, or any other government service.

I think we now have enough background to discuss the clauses in our Research and Development contract and Engineering Services contract that relate to the acquisition of drawings.

The Selection of Components clause is provided in both the Research and Development contract and the Engineering Services contract in order to monitor what components are used to make up the end item developed under the contract. As pointed out above, it is possible that the end item developed could be made up of a mixture of standard military components, commercial components, non-commercial components and components newly developed under the contract.

Both of the above contracts define:

Standard military components as being those items listed in Federal Standards, Military Standards, Ordnance Engineering Standards and OTAC Standard Military Component Directory. Any item known to the Contractor to be in the Ordnance Supply System which may not have been formally designated as a "standard" item is, however, to be used in preference to the creation of a new part subject to use approval by the Technical Representative.

Commercial components as being supplies which normally are or have been sold or offered to the public commercially by any supplier. It is intended to cover commodities which are readily procurable through normal trade channels and includes by way of description, but not limitation, "off the shelf" items listed in a manufacturer's stock catalog or items for which there is a specified or established commercial price schedule with an offer to supply same.

Non-commercial component as being a component which was developed at private expense and previously sold or offered for sale, but not commercially, including components which are minor modifications thereof.

The newly developed component is self defining.

Although all four of the above components may be present in the end item, OTAC contracts make it clear that the Government would prefer that the end item be made up exclusively of standard military components.

If the contractor recommends use of a component other than a standard military component on the basis that it performs in a superior manner or that there is no adequate standard military component, he must completely justify such recommendation and obtain approval from OTAC for its use. If OTAC feels the justification is not adequate it will direct the contractor not to use the component.

This monitoring is deemed necessary for a number of reasons. If the contractor was allowed to use all the non-military components

he deemed necessary, there would be a tremendous increase in the number of parts the Government would have to maintain as spares. This multiple stock piling is very expensive.

Further, we possess complete production drawings for all standard military components. If a non-military component is used in lieu of a standard military component, OTAC would have to pay the expense of having new drawings prepared for the non-military component.

One of the most important reasons for the selection of components clause is based on the fact that the contractor is not obligated to provide production drawings for all the non-military components he uses to produce the end item. Thus, in certain situations, if OTAC permits use of a non-military component, OTAC would place itself in a position where it would receive drawings that could not be used for procuring the component at some later date through formal advertising. This situation occurs when the contractor is allowed to use a non-commercial component wherein he can prove proprietary data is necessary in the manufacture of the component. Here the contractor is only obligated to provide a source control drawing depicting the component. This type of drawing is not sufficient for formal advertising as it provides little or no manufacturing data. Thus, the Government would be limited to procuring the component only by negotiation.

Another reason for use of the Selection of Components clause is to limit the use of components newly designed in performance of the contract and which are likely to become repair parts. In the Engineering Services contract the contractor is obligated to provide production drawings depicting the component so theoretically there is no problem as to formal advertising, but the cost of developing the components adds greatly to the end costs of the contract and, therefore, is to be avoided if possible. In Research and Development contracts he gives DTA or Experimental Facility drawings for newly developed components which are not adequate for formal advertising.

In concluding our discussion of the Selection of Components clause a few words should be devoted to discussing the cases wherein a commercial component is used in lieu of a military component and a non-commercial component not involving proprietary data is used in lieu of a military component.

In the first situation the contractor is obligated only to provide envelope drawings which are not as complete as production drawings, but they are still, as seen by the definition of envelope drawings in both the Research and Development and Engineering Services contracts, adequate for formal advertising.

In the case of non-commercial components not involving proprietary data the contractor is obligated to provide production drawings.

Although the contractor is obligated to provide drawings adequate for formal advertising in the case of commercial components, newly developed components, and non-commercial components not involving proprietary data, the Government does not always get them. OTAC Inst. 715-50 specifies that the project engineer is responsible for the technical adequacy of the drawings due to the lack of personnel. It has been near impossible to run adequate checks to see if incoming drawings comply with contract requirements.

For this reason the Engineering Services contract contains a "Drawing Responsibility" clause which extends the contractor's liability for adequate drawings past the delivery and acceptance date of the drawings.

The drawings clauses of both the Research and Development contract and the Engineering Services contract in the main merely point out what type of drawings are required for the four types of components that may make up the end item developed in performance of the contract.

At this point it may ask why, in the Engineering Services contract, we do not require production drawings for all components that make up the end item developed in performance of the contract.

ASPR 9-202.1(c) which relates to the acquisition of data in contracts for experimental, developmental or research work, specifically requires all data necessary to reproduce the end item under the contract but also specifically points out that the data provided for commercial components and non-commercial components in which proprietary data is involved need be something less than production drawings.

Both drawing clauses also specify that all drawings are to be free of restrictions on government usage. Whether the contractor complies with this is checked carefully by OTAC's contract termination group.

Both contracts define a place and time for acceptance of drawings. These paragraphs also include requirements for submission of evidence that unacceptable drawings have been corrected, and certification by the contractor that to the best of his knowledge and belief, the data accurately depicts the items manufactured.

In conclusion, it is felt that the clauses relating to the acquisition of data now present in our Research and Development and Engineering Services contracts are sufficient for the purposes desired ---if the engineering personnel enforce them with vigor.

THE ACQUISITION OF TECHNICAL DATA THROUGH THE ENGINEERING SERVICES CONTRACT AND THE RESEARCH AND DEVELOPMENT CONTRACT

Title 10 USC 2304(a) states in effect that whenever practicable property purchased by the Government shall be obtained through formal advertising rather than negotiation. This is based on evidence that the Government is able to obtain goods at lower prices through formal advertising than through negotiation. Formal advertising is also a means of aiding small business to exist, and thus, keeping business from becoming over-concentrated.

A recent Congressional study has shown that some OTAC items first bought by negotiation have cost from 300-400% more than when the same items were later purchased by means of formal advertising.

If an item can be obtained cheaper through formal advertising, it may be asked why OTAC does not always procure in this fashion? Our ability to use formal advertising is limited due to the lack of adequate production drawings essential for the drafting of a proper Invitation for Bid(IFB).

Title 10 USC 2305 instructs us that "The specifications in an Invitation for Bid must contain the necessary language and attachments, and must be sufficiently descriptive in language and attachments, to permit full and free competition. If the specifications in an Invitation for Bid do not carry the necessary descriptive language and attachments, or if those attachments are not accessible to all competent and reliable bidders the invitation is invalid and no award may be made."

Thus, it is evident that if OTAC's drawings would not permit all competent manufacturers to make the item depicted thereon, the drawings will not be used in an IFB.

In 1960, only 14% of OTAC's major item procurement dollar was spent through formal advertising. In specific dollars, this amounted to 49 million dollars of a total of 354 million.

Also in 1960, only 44% of OTAC's secondary item procurement dollar was spent through formal advertising. In specific dollars, this amounted to 23 million dollars of a total 51 million dollars.

OTAC records reveal that of the 7,584 items purchased by negotiation in 1960 650 were not furnished with adequate engineering support, meaning of course drawings. At first glance, it appears that a large number of items purchased by negotiation were purchased