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NAVAL AIRCRAFT PRODUCTION

10 March 1948

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10 March 1948

CAPTAIN WORTHINGTON: The speaker this afternoon, Rear Admiral Oster, is Assistant Chief of Materials and Services in the Bureau of Aeronautics. He graduated from the U. S. Naval Academy in 1917. In World War I, he served on the USS Kansas. After the war he transferred to the Construction Corps and took postgraduate work at Massachusetts Institute of Technology, where he received his Masters Degree in Naval Architecture. He has had several tours of duty at the Naval Aircraft Factory, Philadelphia, Pennsylvania. These duties ranged from shop superintendent to chief engineer. He had several tours of duty in the Bureau of Aeronautics. His World War II assignments afloat included Materiel Officer on the Staff, Commander Aircraft Battle Force, Pacific Fleet; Commander Carriers, Pacific Fleet and Commander Aircraft, Pacific Fleet.

I take great pleasure in welcoming Rear Admiral Henry R. Oster.

ADMIRAL OSTER: Gentlemen, last week I had the pleasure of listening to a very interesting talk by Brigadier General Shepard of the Air Force. He stated the major production problems which had confronted him during the past year, and outlined the steps which were being taken to eliminate them, or, at least, to make them less serious. He mentioned the coordination existing between the Air Force and the Navy and some of the difficulties which we were mutually solving, such as cross-procurement delays.

It is almost needless to say that naval aviation has been faced with the same production problems although some of them are to a different degree. One of them is in regard to the concentration of work in plants. The Air Force has most of its production work in three airframe companies, while our production airframe contracts are fairly well-spread through seven plants. However, that is not a criticism, since we must not overlook that concentration may have many advantages as well as disadvantages, especially in peacetime. It allows better administration; better control of the work; the reduction of peaks and valleys in the production of the manufacturer's plant; and lower costs.

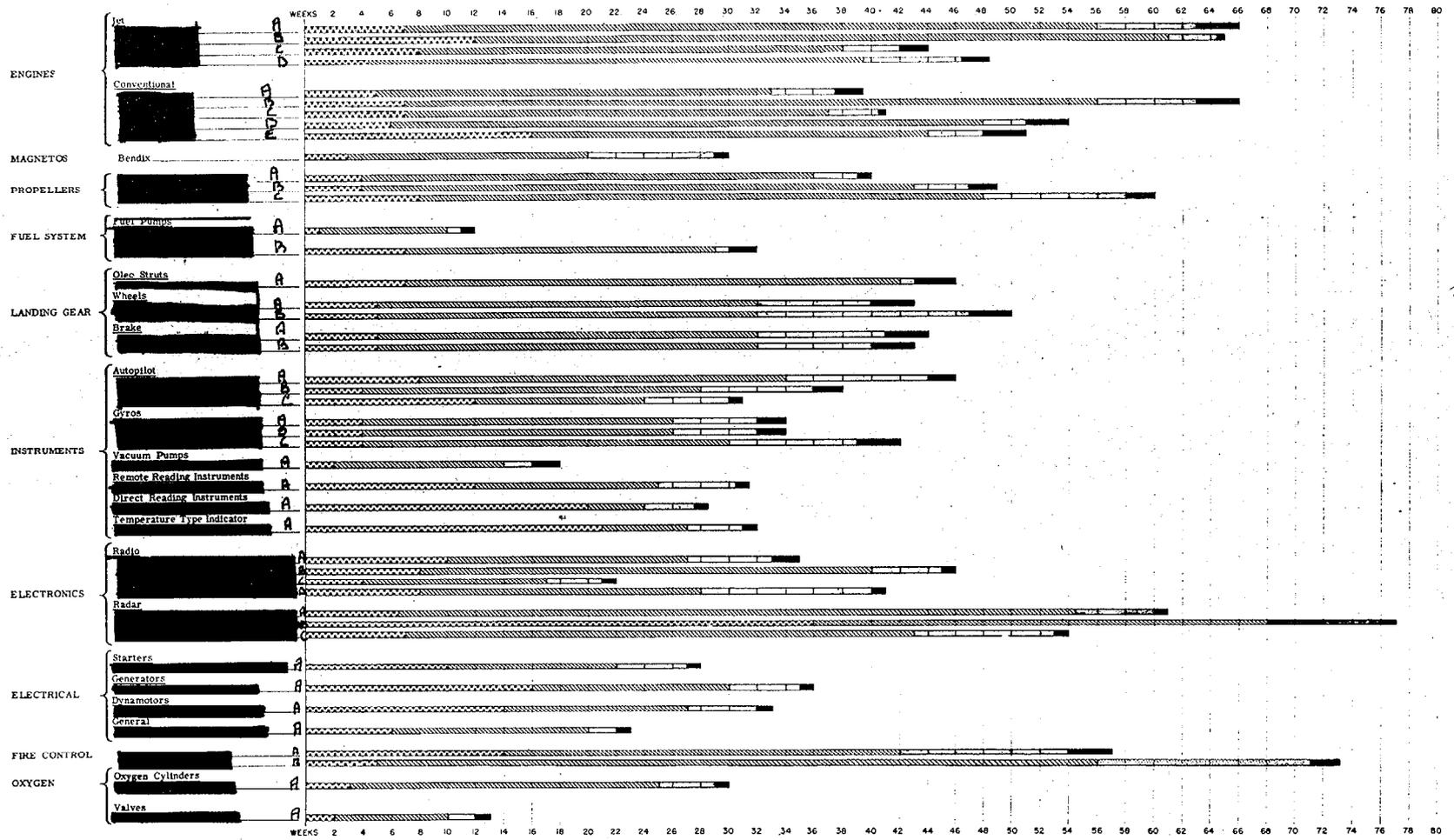
The disadvantages, I think, are apparent, in that other companies are meanwhile likely to go out of existence, and in case of war, they would not be ready. That is one of them.

A second way in which we differed was that, in general, we did not attempt as extensive improvements and, thus, had fewer delays due to that. Again, this was not an unmixed blessing to the Navy because in some instances, of course, we got less modern planes.

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COMPONENT MANUFACTURING FLOW TIME

CHART I



Actual Mfrs names have been deleted
 Companies designated as "A" "B" "C" etc.,
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There are two main elements, the cost element and the time element. I want to touch on both of those from the points of view of peacetime and wartime. The cost element is so high compared to the airframe that the components are vital. General Shepard stated that the fire control system of the B-50 cost more than the frame structure. For the average Naval airplane the component costs are lower, due partly to smaller equipments and partly to the lesser amount of GFE which we furnish. However, on the P2V-2, which is our latest type of patrol airplane, one component alone, the electronic submarine detecting equipment, cost over \$135,000, nearly a third of the total airframe cost.

Now, the cost element from the point of view of peacetime: The total cost of airplanes is the major controlling factor in aviation preparedness. While the services draw up their original requirements in numbers of airplanes by types and even by models, the Bureau of the Budget recommends and the Congress authorizes on a dollar basis which must fit into the overall national budget. (I might add that this may result in a number of airplanes which have no relationship whatsoever to our operating requirements.) As a result, the total number of airplanes obtainable is the average cost divided into the total sum authorized. If the average cost could be halved, we could obtain twice as many airplanes. Theoretically, that would mean more factories, more facilities, and more men employed, and would give us a higher jumping-off spot for wartime production. Such a radical reduction is, of course, impossible, but any reductions in the price of the airplane would be very helpful. Inasmuch as the components cost such a big part of the airplane, there is a fertile field for attention.

There is very little to be said about cost in wartime. The cost element is of little significance. In fact there are practically no money limitations.

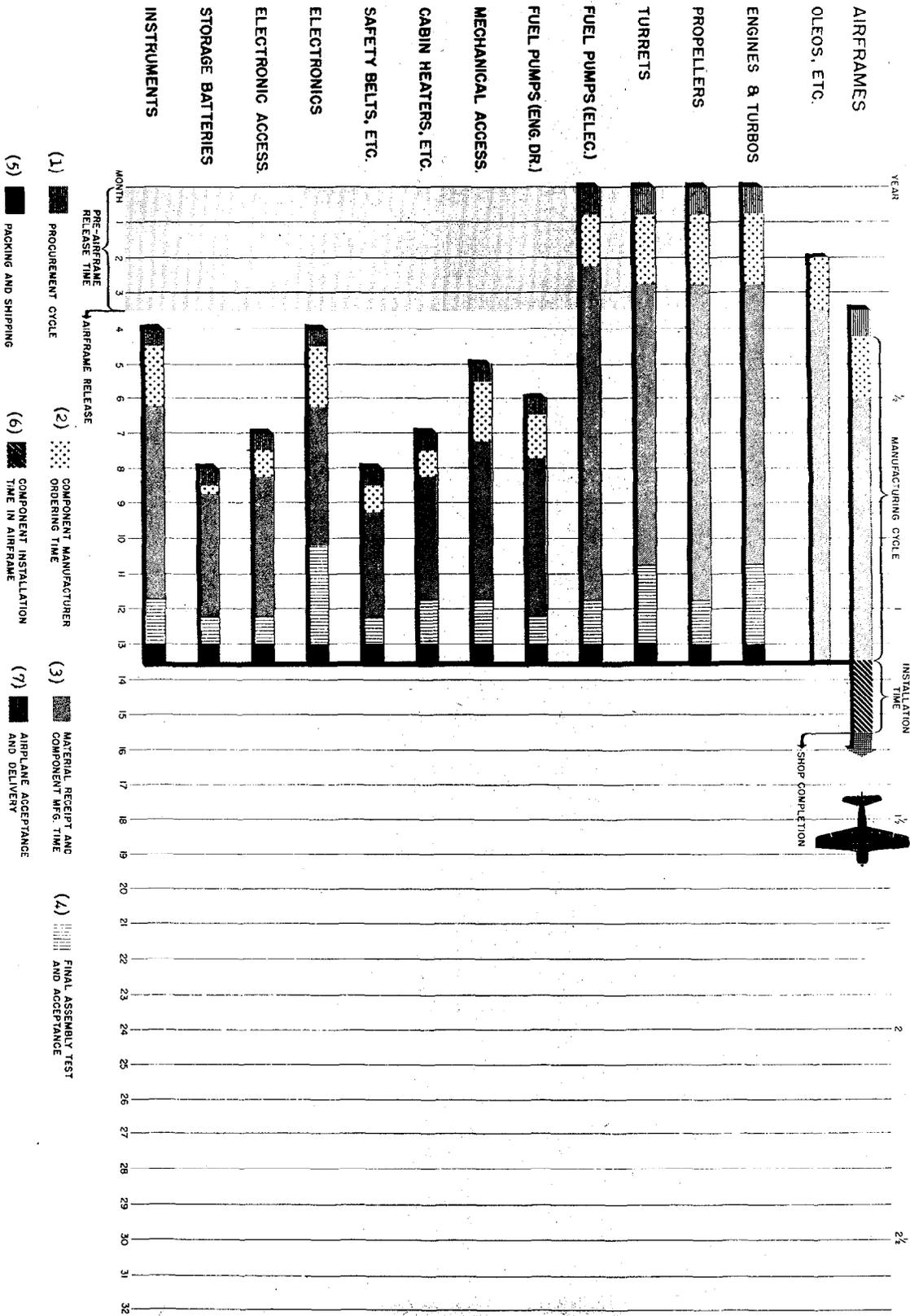
But coming to the second part of that item, the time element, the time element for obtaining much of the equipment is greater than that of the airframe. This will be shown by some charts to make it clearer.

Chart No. 2 is one which was initially prepared almost three years ago as a first step to plan the placement of contracts in connection with wartime production. Production had, at that time, the following advantages: (1) established types, (2) unwillingness to disturb production for minor equipment changes, and (3) the availability of priority-fixing directives to break bottlenecks. Moreover, at the time this was prepared, the country was in full swing in production of everything, and components probably were not nearly so limiting as now or as they would be for a few years at the start of the next war. Also, designs at that time were considerably less complicated than at present. Even so, with many models the data were not realistic, and airplanes were not being obtained within the time limit of fifteen months shown. It was an aim rather than a fact.

PROCUREMENT & MANUFACTURING—MASTER PLAN 1945

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CHART II



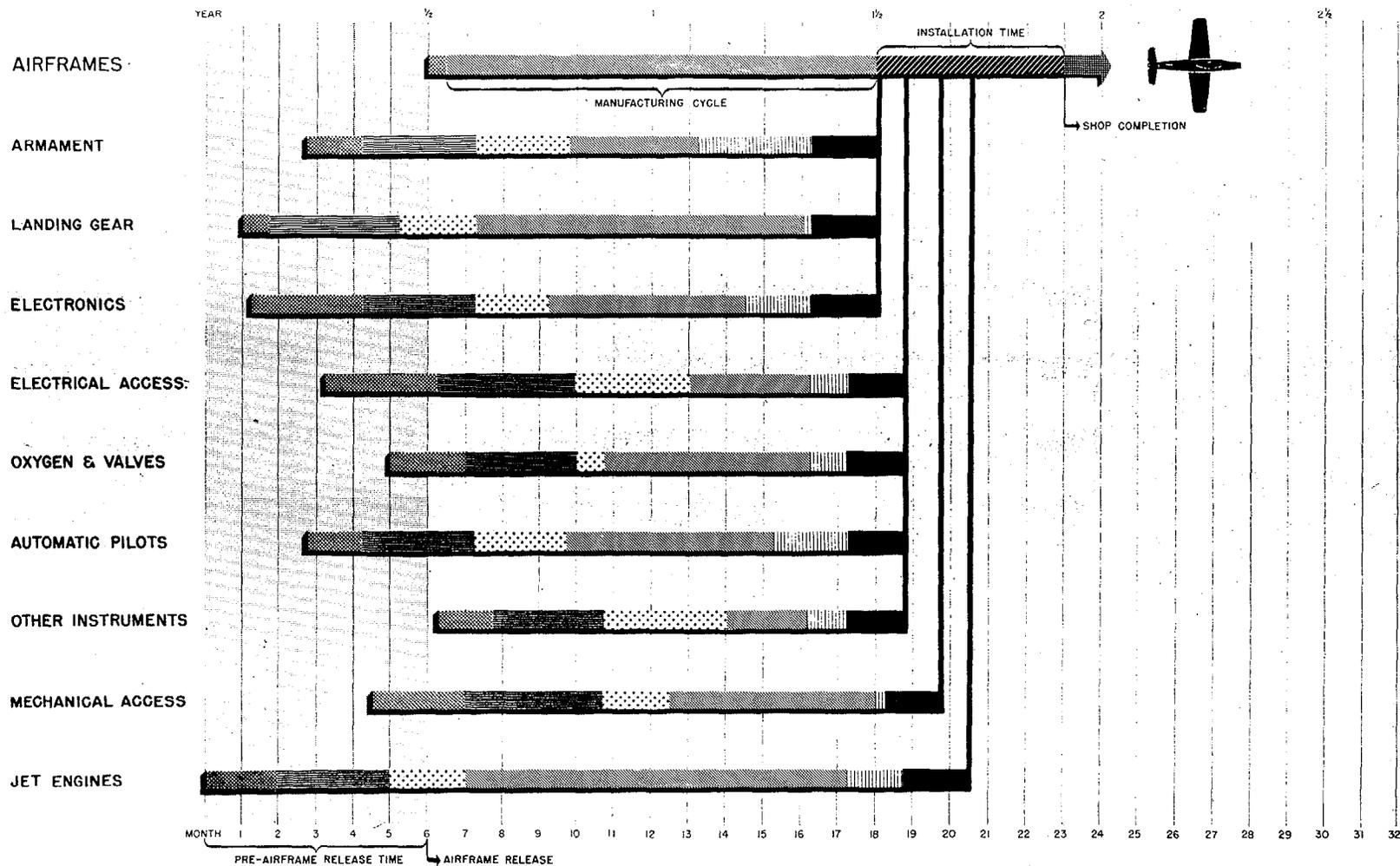
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PROCUREMENT & MANUFACTURING—MASTER PLAN 1948

CHART IV

LIGHT TYPE—FIGHTER JET ENGINE PLANE



- (1-a) [Pattern] BID REQUEST-PROCUREMENT TIME
- (1-b) [Pattern] CONTRACT PROCESSING-PROCUREMENT TIME
- (2) [Pattern] COMPONENT MANUFACTURER ORDERING TIME
- (3) [Pattern] MATERIAL RECEIPT AND COMPONENT MFG. TIME
- (4) [Pattern] FINAL ASSEMBLY TEST AND ACCEPTANCE
- (5) [Pattern] PACKING AND SHIPPING
- (6) [Pattern] COMPONENT INSTALLATION TIME IN AIRFRAME
- (7) [Pattern] AIRPLANE ACCEPTANCE AND DELIVERY

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I will read the component groups as they now stand on our latest charts Nos. 4 and 5. The airframe itself is again at the top, then armament, landing gear, electronics, electrical accessories, oxygen and valves, automatic pilots, other instruments, mechanical accessories, and jet engines. The full-time Bureau of Aeronautics Procurement is split into two phases, the bid request time in (1-a) and (1-b) is the contract processing procurement time.

To repeat then, (2) is the component manufacturer ordering time; (3), the material receipt and component manufacturing time; (4), the requirement for final assembly test and acceptance of the component; then (5), the time for packing and shipping; the vertical line at the end shows the date it must be complete in order to arrive at the assembly point of the airframe without delaying the airplane. You will note Chart No. 4 is for the light type fighter jet planes. Chart No. 5 is on the heavier type plane. A glance shows that within a year after the authorization of the airframe, some equipment must be made and be on hand in the assembly shops of the airframe manufacturer in order not to delay the airplane. Certain of the others can come in later, but armament, landing gear, and electronics must be there beforehand.

Between Chart No. 2 of 1945 and Charts Nos. 4 and 5 made last fall, there was another study made by the Bureau of Aeronautics. We thought then that we could get an airplane done in about fifteen to eighteen months. As a result of our studies, preliminary charts were made up and sent to a great many manufacturers for their checkup and verification. This was to show what they could do on airplanes presently under procurement. The results which came back were disappointing. Their lead times required on components were considerably longer than we had hoped would be needed in the postwar period. Their manufacturing times of the airplane was about the same, namely, a twelve-month period and also their assembly times, but the components were shown to be more critical than even we had thought.

Now, Chart No. 4 covers the smaller aircraft and is generally for jet-powered fighter planes. Chart No. 5, shows the heavier aircraft which generally still have reciprocating engines. It is notable that it is the heavy bomber types which have the longer requirements for time from the conception of a component until a production airplane can be delivered. These show for the light type airplanes certain components should be ordered six months before the airframe (the shaded area). We should get our procurement on some of them a full six months in advance; others not so soon, but there are about half of that group that must be ordered about six months before the airplane is authorized if you are to meet the scheduled completion date. Allowing for twelve months for the manufacture of the airplane and six months for installation of equipment, test, and delivery, a total of about twenty-four months is required, which is the best we expect to do on our smaller type, combat airplanes.

Obviously, during this period here (indicating) we have an opportunity of getting some later equipment, and that is why we are attempting to do it in this manner. This means that before the funds are authorized for the airplanes, we are estimating what models and how many we will be able to buy and are proceeding with component procurement months ahead of time, depending upon the lead-time requirement for each article. This looks simple on the chart--we just get these articles six months ahead--but when dealing with thousands of articles it really is difficult.

I might explain at this point that these charts are average conditions. Our replies from the many manufacturers showed great variations among the manufacturers and among the different models. Two companies, for example, on a fighter job, would come in with fairly great variations in the amount of time they estimate it would take them to get the electronics equipment. That is a field for us to explore to try to get the longest-time manufacturers down to the shortest ones.

To follow this system of ours necessitates obligating funds for this component material in a fiscal year prior to that for the airplane. For example, last month we initiated the procurement of about 20 million dollars worth of such items, starting with those requiring the longest lead and manufacturing time. That is only a start--20 million dollars this year. We expect to spend many, many more times that next year in extending this procedure for procurement of components. We hope to get the Bureau of the Budget approval on that very soon.

Longer range procurement planning, which, it is believed, will soon be authorized, will allow manufacturers to have advance knowledge of their probably production and thus permit them to take similar action in regard to contractor-furnished equipment. We hope at this stage, someplace in here (indicating), to be able to tell the contractor that he is very probably going to get a contract on the first of July--say on the first of February, or January, tell him he is likely or has good possibilities of getting a contract the first of July for such and such a number and type of planes. That will allow him to do a great deal of planning in his own plant, to make up his selection of subcontractors, contact them, and cut down what you can see is an appreciable period in our government-furnished equipment, namely, the paper-work time, including the contracting.

Now, for wartime this time factor is, of course, of more importance. It is in the industrial mobilization that the full impact of the components is felt. It is the most intricate and difficult field to analyze and plan, and it is in a state of continuous, and for aircraft, rapid change. By comparison the planning for the airframe is simple. It was on equipments that the aircraft planning for the late war fell down the worst. Manufacturing facilities and personnel were lacking for such items as oleo struts, leak-proof tanks, fractional horse-power motors, just to name a few of these things.

Another example is where an immense capacity exists, such as in the General Electric Company, with its dozens of plants, but where there are so many agencies wanting so many thousands of different products. The problem is to determine beforehand an allocation on some basis to each one--whether that is by product, by plant, by square foot of floor area, by man-hours--but on some basis of allocation to each one, so that upon mobilization there would be a semblance of system and balance in procurement, a lack of confusion on the part of the agency and the manufacturer, and the assurance that orders would be put in promptly but without a swamping overload resulting, that is, with proper priorities. That would be another difficult one to solve, as an example, I say, of hundreds of others. In both of these instances, without proper planning the disorder would work itself out within a few years just as it did during the late war. But will we have time for that?

Procedures to cope with this situation are just now starting. It might be interesting for you in your course here at the College to put some thought of how you would proceed to solve some of these problems involved in the industrial mobilization of the most important part of the airplane production, namely, the components. Needless to say, we would be delighted to hear of any short cuts which you might evolve.

The foregoing part of this talk has been confined to a presentation of a few facts and some generalized discussion. In addition, it might be interesting to tell you the results of a recent study by the Air Force and the Navy on the causes of delayed production at the present time. They are twelve in number and are grouped under four categories. Some have already been mentioned.

Group I. These are delays largely outside of service control:

(1) Personnel turnover in the aircraft industry. With the shrinkage of the industry and the uncertainty of jobs, many people have been leaving.

(2) Relaxation of effort on the part of labor. That is general. We won't get any improvement there until there is less competition for labor in all fields.

(3) Material shortages, such as steel and aluminum, (a) induced by strikes; (b) resulting from competitive commercial requirements (many manufacturers are finding it more lucrative to supply civilian consumer demand); (c) resulting from loss of priority control. We have no means now of forcing people to sell goods to the services.

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Some of the most obvious devices to improve conditions are listed as follows. To a great extent they summarize what has been said before and I am merely repeating them for emphasis:

1. Require components approved for use in production type aircraft be fully developed, tested, and established in production as a routine matter prior to approval for such use.

2. Accumulate in stock piles the long-lead-time components.

3. By expediting effort in improved planning of the production, accelerate the manufacturing process--meaning in our case, for the Navy and its manufacturers to attempt to become more efficient.

4. Retard the airplane manufacturing schedule to coincide with practical limitations as to availability of components, accepting initially a one-time general lapse of schedules. Wait until the component is on hand before you even issue the order for the airplane.

5. Initiate the development of procurement action on components far enough in advance of contracting for the airframes so as to permit meeting airframe manufacturing schedules with regular production of the components.

The present general approach to the problem in our activity is to obtain long-range procurement programs for major airplane production; to endeavor to forecast the implications of the long-range planning program as to requirement for components; to screen specifications for those components and changes in specifications so that only relatively urgent military necessity is permitted to hazard airplane deliveries on account of equipment supply difficulties; and, generally, to advise prospective contractors for components so far as possible in advance of procurement. We are endeavoring to change the budgeting and procurement planning system to obtain appropriations and permit the release of funds--we are doing this, as I said, to a limited extent now, this means do it generally for all of our contracts--for equipment purchasing sufficiently prior to the availability of funds for airplanes selected as to enable component ordering at an adequate lead time in advance of airframe assembly schedule requirements.

The results of our studies are being promulgated within the service to those who can help us most. These studies are being followed, furthermore, by those persons in such activities as the Bureau of the Budget, with whom we have closest dealings in connection with fiscal matters--and I may say, sympathetic dealings. They have restrictions, too, which they cannot avoid, but their dealings with us are on a very helpful plane. Present indications are that we may anticipate success in a number of those steps. At least that is what we are aiming for. Thank you.

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equipment list. However, we have such items as this: We may have 10 types of planes using 43-60 Pratt and Whitney engines. Should Douglass purchase 250 from Pratt and Whitney, Consolidated buy 250 and Boeing 250, for example, or should we consolidate the purchases for all these companies and put in a single procurement request for 750 engines?

Obviously, under the latter procedure Pratt and Whitney is better able to take our large order, we are better able to control it, get a better price, and get better delivery dates. That is just one example. Another one--on the matter of security, there are certain items which are made in security plants that we wish to control. We wish to have these in closed shops and closed inspection, and not put them out to the airframe manufacturer for him to advertise for bids all over the globe.

We had as recently as a week ago a meeting attended by all of our division heads to analyze these lists in an attempt to get more material under contractor-furnished equipment.

During the war we found we had to pull many of the items back out of contractor-furnished equipment into government-furnished equipment because we had the ability to put priorities on from a central place, Wright Field or Navy Department, to get the articles produced when the single manufacturer could not get them through. These articles were blocked up in a large list for which the Air Force, and the Navy could fight for allocations against the allocations to ships, ordnance, and everybody else. The ideal condition would be to have it all contractor furnished.

QUESTION: Yes, sir, I appreciate some of the very great difficulties of it.

ADMIRAL OSTER: There are two sides to the question.

QUESTION: I feel sometimes we in the Government like to be buyers. We like to go out and place our contracts and have our inspectors. It seems it could be handled by the Government's controlling which company is going to get them. Wright doesn't care where you get them.

ADMIRAL OSTER: The orders would come, in that particular case, in small quantities. They wouldn't be grouped. We look at the whole engine picture for a whole year or two ahead. The Air Force does the same thing. Then we place a single order and obtain many advantages thereby.

QUESTION: I was assuming that it was already decided that that is the engine you want in all these planes you are going to buy. You must make that judgment. I am not suggesting for a moment that you permit the airplane manufacturer to buy his from companies of his own choosing. You mentioned the matter of secrecy.

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