BOX 171.

2. F AIRCRAFT MATERIAL: December, 1942 - September, 1944.

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DESCRIPTIVE BROCHURE

P-59A JET PROPULSION AIRPLANE

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A. DESCRIPTION OF THE P-59A AIRPLANE:

The P-59A airplane is a single seat, high altitude, fighter airplane manufactured by the Bell Aircraft Company of Buffalo, New York, and powered with two Type I-16 jet propulsion engines built by General Electric Company of West Lynn, Massachusetts. This engine is an Americanized version of the British Whittle jet propulsion engine. This airplane weighs approximately 10,500 lbs. and is armed with either four 20 mm cannons or four caliber .50 machine guns. The speed and service ceiling of the airplane compare favorably with the best of our conventional fighters. Photographs of this airplane are shown in Exhibit "A", "B", and "C", and a perspective drawing of a Type I-16 jet propulsion engine is contained in Exhibit "D".

B. THEORY OF OPERATION OF JET PROPULSION ENGINE:

The thrust or propulsion force produced by the Type I-16 jet propulsion engine is the reaction from a stream or jet of exhaust gases ejected at high velocity through a nozzle at the rear of the engine. This reaction is, in principle, the same as the force experienced while holding the nozzle of a garden hose in operation.

The Type I-16 jet propulsion engine operates as follows: A centrifugal air compressor takes in air from the front of the engine and compresses it to approximately four times atmospheric pressure. The air is then discharged from the compressor into ten combustion chambers where fuel is added and burned hereby heating the air.

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A greater quantity of air is supplied than is necessary to completely burn the fuel. The heated gases then pass out of the combustion chambers and through a turbine wheel which is mounted on the same shaft as the compressor. The turbine therefore drives the compressor and provides the power necessary to compress the air. There is, however, more energy in the hot gases leaving the combustion chamber than is necessary to compress the cold air, and the hot gases emerge from the turbine into a tail cone at higher than atmospheric pressure. From there, the hot gases expand further through a nozzle on the end of the tail pipe and pass out into the atmosphere at high velocity.

C. PRESENT STATUS OF THE P-59A PROGRAM:

Sixteen airplanes have been produced, and the 64th engine is now in assembly. The first flight was made 1 October 1942. Flight tests have been in progress at the Materiel Command Flight Test Base at Muroc, California since that date. Approximately 261 hours of flying and 1713 hours of engine operation, both in the air and on the test stand, had been accomplished by 1 January 1944. During this time numerous minor difficulties have been eliminated both from the airplane and from the engines.

The Army Air Forces now has on order 100 production P-59A airplanes, the first of which should be delivered in March 1944, and 550 production Type I-16 jet propulsion engines, 200 of which will be delivered to the Bureau of Aeronautics, U. S. N.

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D. PRESENT STATUS OF OVERALL JET PROPULSION PROGRAM:

The Army Air Forces now has on order eight other types of jet propulsion engines, including two internal combustion gas turbines for use with propellers, and four other experimental aircraft that will employ the various types of jet propulsion engines under development. One of these airplanes, the Lockheed XP-80, has flown successfully, and from preliminary flight test gives indication of being our highest speed fighter airplane. The engine employed was manufactured in England by the De Havilland Company. It is similar to the Type I-16 in principle, but is larger, and differs in construction details.

E. ADVANTAGES OF JET PROPULSION ENGINES:

The primary advantage of the jet propulsion engine lies in the fact that it avoids one factor which, to the best of present knowledge, limits the maximum speed to be attained by an airplane. The factor is the propeller. Aerodynamists in general believe that 500 M.P.H. is somewhere near the maximum speed to be attained with a propeller, whereas 570 or more M.P.H. can probably be achieved with jet propulsion. Other advantages are apparent in its simplicity of construction and installation, its light weight, reliability, and lack of vibration, and with further development, durability, ease of maintenance, long service life, less rigid fuel specifications and reduced cost of quantity production.

F. DISADVANTAGES OF JET PROPULSION ENGINES:

The chief disadvantage of the jet propulsion engine is the low

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propulsive efficiency at low aircraft speeds. This reflects in high fuel consumption at low aircraft speeds. The fuel consumption of a jet propelled airplane is, at present, approximately 25% higher at 450 M.P.H. than the fuel consumption of an airplane propelled by a conventional engine, and at 200 M.P.H. is approximately six times as great.

Another disadvantage closely allied with the first is the low take-off thrust of the jet propulsion engine. This may best be understood by drawing a parallel comparison with the motor car. The controllable propeller used on current airplanes acts very much as the gear shift in an automobile; it gives a high starting thrust as a motor car engine does in low gear. Starting a jet propulsion airplane is somewhat like starting a motor car in high gear.

G. FUTURE POSSIBILITIES OF JET PROPELLED AIRPLANES:

The dominating factor in the future of the jet propelled airplane will be the requirement for higher airplane speeds. It becomes a problem of military necessity and of the economic question "What price shall we pay for speed?"

Some improvements in fuel consumption will be achieved and it is probable that within the near future the fuel consumption of the jet propulsion engine will be no greater, and possibly less than the fuel consumption of a conventional engine and propeller at speeds above 450 M.P.H. Certain compromises will be made in future designs to attain high take-off thrusts and lower fuel consumptions in the cruising range. The general characteristics, however, will remain; that is, lower propulsion efficiency at low aircraft speeds and improved

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efficiency at high aircraft speeds.

Perhaps the most significant fact to emerge from the jet propulsion engine development is the entrance of the internal combustion turbine into the field of aircraft propulsion. The development of the jet propulsion engine and the internal combustion turbine has been one and the same. The internal combustion turbine can, however, be designed to drive a propeller and two such turbines are under development at this time. It appears possible, therefore, that the next ten years may see the turbine, either as a jet propulsion engine or driving a propeller, replacing reciprocating engines in aircraft in much the same manner as the steam turbine replaced the reciprocating steam engine in ocean liners in the first quarter of this century.

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This document contains information affecting the national defense of the United States within the meaning of the Espionage Act, U. S. C 50:31 and 32. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

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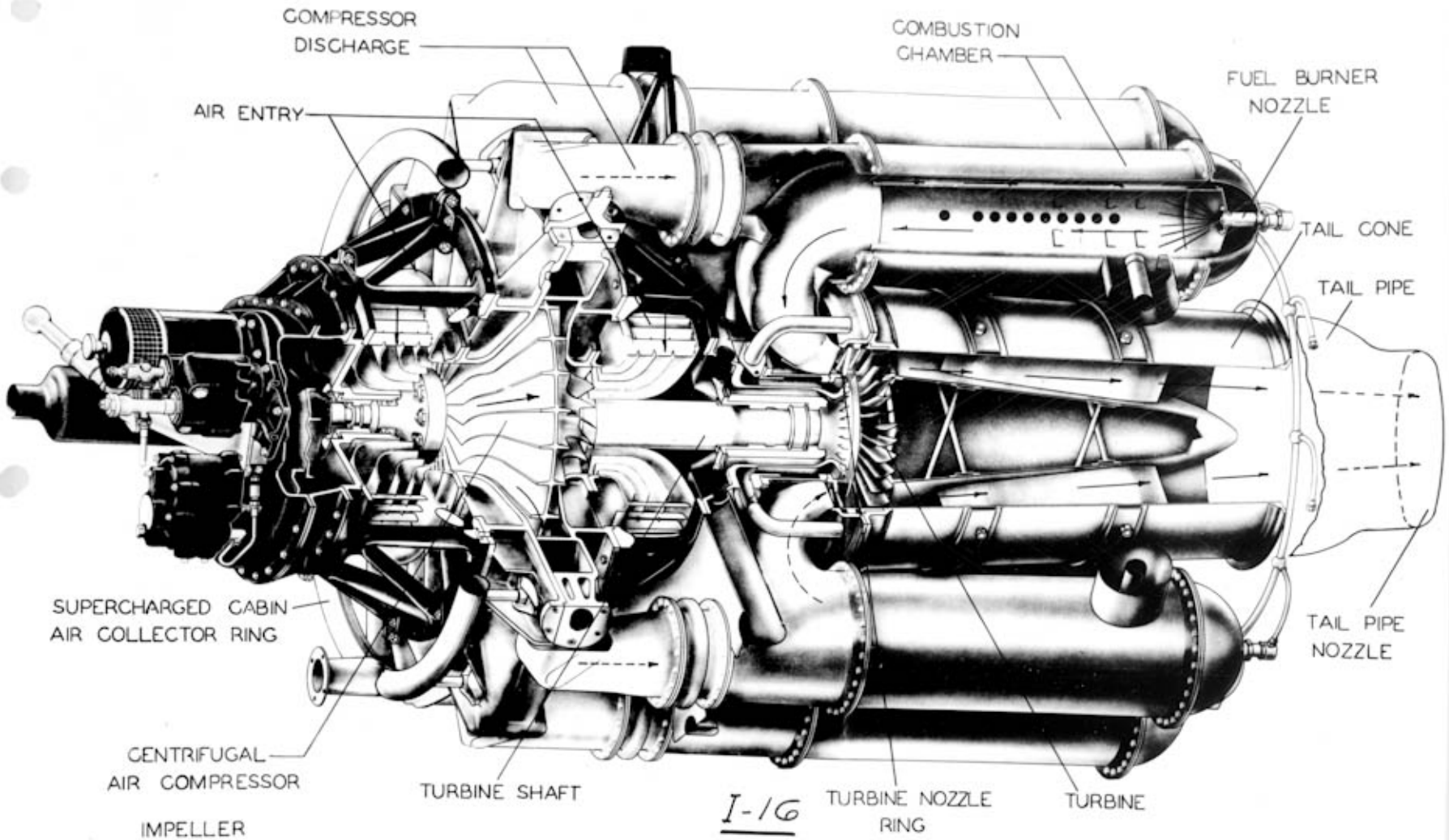
EXHIBIT "D"



I-16

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(F)

File

THE WHITE HOUSE
WASHINGTON

September 22, 1944.

MEMORANDUM FOR

J. FRANKLIN CARTER:

In regard to the report on parachute releases, the President suggests you take this matter up with Admiral Brown.

Grace G. Tully
Grace G. Tully
Private Secretary

Regraded Unclassified

August 23, 1944

File

SINGLE-POINT RELEASE PARACHUTE HARNESS

It is reported that procurement of the single-point, quick-release parachute harness equipment for the air services and airborne troops is being given insufficient attention.

It is further reported that since March of this year (when the Army Air Forces Materiel Command at Wright Field ordered the shift to the much safer quick release) only 6,000 sets have been procured.

It will be recalled that nation-wide publicity regarding the hazardous character of the triple-point release parachute harness in use by U.S. airmen was responsible for the shift to the single-point release universally used by all other Air Forces of the world.

A brief survey of the history of the use of the quick-release harnesses shows that by 1935 every nation having military aircraft was using the quick-release with the exception of the United States. The British Navy adopted it for the Fleet Air Arm in 1936. The Japanese use it exclusively, having purchased several units from the Irwin Air Chute Company in 1932, after which they proceeded to copy it and manufacture it in Japan. The German factory of the Irwin Company was seized in 1936 by the Nazis, who proceeded to manufacture hundreds of thousands of

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quick-release harnesses. The Russian Air Force uses it exclusively, manufacturing it in the Soviet Union in their own factories.

It is stated that the lethargic attitude of the Material Command at Wright Field toward the problem of shifting over to quick-release harnesses is largely due to the fact that responsible Officers feel that they have been "pushed into" the adoption of the quick-release.

This feeling is undoubtedly due to the fact that the publicity given the unprogressive attitude of the Army Air Forces and the Bureau of Aeronautics, U.S. Navy, in the matter of adoption of quick-release harnesses was particularly pointed as contained in the newspaper column by Drew Pearson.

The facts, however, regarding attempts of responsible military personnel to secure effective action in this matter pointedly indict high-ranking Officers of the Navy and, in particular, Rear Admiral Julius A. Furer, Coördinator of Research and Development.

The general public had no knowledge of the parachute controversy until the early weeks of March of this year, when the first article by Drew Pearson appeared. However, more than six months prior to that time the matter was officially called to Admiral Furer's attention by Officers of the Emergency Rescue Equipment Section, who had available incontrovertible

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evidence as to the dangerous character of the old triple-point release as well as data on the experience of the Royal Air Force and the 8th U.S. Air Force with the single-point release. Their recommendation that a strong letter be sent to Army Air Forces and the Bureau of Aeronautics went unheeded.

Captain Louis B. Olson, U.S. Coast Guard, assigned as Officer in charge of the Emergency Rescue Equipment Section and directly responsible for its operation to Admiral Furer, finally conferred with the Admiral on or about November 19, 1943, at which time the Admiral signed a modified letter, extremely mild in tone, recommending that consideration be given to the adoption of this equipment by the Bureau of Aeronautics.

In spite of the evidence which Admiral Furer had before him at that time in the form of a Memorandum from Brigadier General Longfellow of the 8th Air Force under date of June 1, 1943, consisting of four typewritten pages of incontrovertible argument for the quick-release (copy attached), he did not take any steps to bring this matter forcefully to the attention of the Materiel Command of the Army Air Forces.

Analysis of current conditions surrounding the procurement of this equipment strongly indicates that the present attitude is largely due to the failure of Admiral Furer to accept responsibility under Memorandum No. 58 of the Joint Chiefs of Staff.

Forceful action on this particular matter of the parachute

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release was required under the provisions of the Directive covering Emergency Rescue Equipment, the responsibility for which had been placed with Admiral Furer by the Secretary of the Navy. His failure to carry out the responsibility under this Joint Chiefs of Staff Directive was the primary cause of the Navy's failure to take immediate action to procure this vital equipment. This stand further encouraged the lethargic attitude on the part of the Army Air Forces. Finally, continued inaction resulted in scathing publicity. This publicity, in turn, so infuriated Officer personnel in the Army Air Forces that no adequate attention is being given to the procurement of this important equipment.

Had proper investigation been made by Admiral Furer or had the facts available through the responsible Officers of the Emergency Rescue Equipment Section been examined, it would have been found that the history of the test given by the Army Air Forces and the Navy to quick-release equipment showed woeful and irresponsible action on the part of many of the Officers concerned.

In one case, for example, the Irwin Air Chute Company negotiated with Lieutenant General Lee of the Army Air Forces to equip the first battalions of airborne troops with quick-release harnesses.

Exhaustive trials at the Paratroop School at Fort Benning were held early in 1941 and 2,500 quick-release

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chutes were ordered. After delivery of 700 had been made a Major "Tug" Wilson made a dummy test at the Fort Benning Field, utilizing the quick-release harness, and in conducting the test turned the dummy on its face on the floor of the plane in such a manner as to deliberately turn the quick-release mechanism and then dropped the dummy out to fall free of the harness in full view of the Officers and men. This test so prejudiced persons on the ground that the balance of the order was canceled and no further action was taken to provide quick-release equipment.

Action taken by the Materiel Command at Wright Field since March of this year to procure quick-release equipment has resulted in the "farming out" of 250,000 units of the quick-release mechanism to companies such as the Oneida Silver Company of Oneida, New York, the Highway Steel Company of Highland Park, Illinois, and L. A. Darling and Company of Ronson, Michigan. It is asserted that it has taken these Companies two and one half months to three months to tool-up for the job. To date no deliveries of quick-release units have been made by them.

It is reported that the Materiel Command did, after the publicity last Spring, proceed to draft a standard specification for the quick-release harness and turned the procurement of this equipment over to Captain Bashlu, a Reserve Officer, as Contracting Officer. It is stated that

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he had been in the Service about seven or eight months and his previous experience had been solely with the May Company, a large department store in Cleveland, Ohio.

It is reported that no high level assistance was afforded to any Officers concerned in this matter nor was any assistance requested from any other branches of the Army such as the Ordnance Department or the Army Service Forces, which would have been able, it is believed, to arrange contracts with competent, large manufacturers for the production of hundreds of thousands of quick-release units.

Further, it is reported that procurement by the Army Air Forces of the quick-release equipment has been hedged around by the most minute considerations of price. A tabulation of the price of a triple-release parachute against the quick-release equipment shows that the quick-release costs about 5 to 6 per cent more.

Type	Cost
Standard parachute with triple-point release harness.....	$84.50
Standard parachute with quick-release harness.....	89.50
Standard triple-point release harness...	20.00
Single-point, quick-release harness.....	24.00

It is estimated that approximately 1,500,000 parachutes are in use by the Army Air Forces alone. The modification

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of these parachutes to the quick-release type would require that number of quick-release harnesses and release boxes. Best information indicates that on September 15, fourteen thousand, or less than 1 per cent, will have been manufactured.

The Bureau of Aeronautics of the Navy has not yet procured any quick-release harnesses as they are still experimenting with and "redesigning" releases. It is, however, in the water where the survivor has the most urgent need for extricating himself immediately from his parachute harness. In spite of this obvious urgency the Bureau of Aeronautics apparently still finds it necessary to "experiment."

In view of the inevitable growing intensity of air combat over water in all Theatres and, in particular, in and around the islands of the Japanese Empire, as well as in the China-Burma-India Theatre, the most expeditious procurement of quick-release parachute equipment should be made. Since a year has practically been wasted, the necessity for streamlined action with a sure-fire follow-through cannot be too strongly stressed.

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Pres "F"

WAR DEPARTMENT
THE CHIEF OF STAFF
WASHINGTON

September 13, 1944

MEMORANDUM FOR THE PRESIDENT:

Mr. John Franklin Carter has forwarded to my office a secret report on what the Army is doing with respect to the adoption of a single point parachute harness release. In sending the document he has stated that he does so pursuant to instructions from the President's office.

Mr. Carter states that the Army Air Forces, being prejudiced against the single point parachute release, have not aggressively pressed the program of conversion from the old to the new type release. General Arnold tells me that the conversion of the entire manufacture of parachute releases to the single point type is going forward as rapidly as production will permit. Deliveries have been behind estimated schedules but this results from over-optimism on the part of the Air Forces when making out the production schedules.

I am asking General Arnold to return Mr. Carter's report with his comments.

G. C. Marshall
Chief of Staff.

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THE WHITE HOUSE
WASHINGTON

File

9-22-44

MEMORANDUM FOR ADMIRAL WILSON BROWN

Dear Wilson:

This is to be included in your other J. Franklin Carter documents.

Pa
E.M.W.

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9 February 1944

MEMORANDUM FOR THE PRESIDENT:

I don't believe General Arnold gave you the figures for planes delivered overseas in January. They are interesting.

	883	Heavy Bombers
	581	Medium and Light Bombers
	1524	Fighters and Fighter Bombers
	150	Reconnaissance
	106	Transports
	37	Utilities and others
	230	Gliders
Total	3511	

The foregoing represented 64 1/2% of January ~~and~~ or 71% of December, total factory deliveries to the Army Air Forces. In combat planes the shipments represent 90% of January deliveries from the factory, or 97% of December deliveries. The Ferry service involved in this transaction is considerable.

(Sgd) G. C. MARSHALL

Chief of Staff.

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COPY FOR WHITE HOUSE

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F

October 14, 1943

MEMORANDUM FOR THE PRESIDENT:

Subject: Decrease in German Fighter Production.

The damage to fighter factories at Regensburg and Wiener Neustadt has been reflected in German fighter production for the months of August and September, as shown in the following figures.

July	810
August	635
September	500

This production will further decrease as a result of the attacks on the Focke-Wulf factory at Marienburg which occurred on October 9th. Every building in that factory was badly damaged. (See attached photos).

A comparison of German and Allied fighter strength as of today is as follows:

Opposed to Germans	(Army Air Forces	2451	
	(Royal Air Force	5561	
			8012
Total	Germany		2350

H. H. ARNOLD
General, U.S. Army
Commanding General, Army Air Forces

Incl:
Photos

See File A1

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In reply address not the signer of this letter but Bureau of Aeronautics, Navy Department, Washington, D. C.

Refer to No.

NAVY DEPARTMENT
BUREAU OF AERONAUTICS
WASHINGTON

CONFIDENTIAL

28 December 1942

M E M O R A N D U M

For: Captain McCrea.

SUBJECT: Diesel-powered Plants for Aircraft.

1. The Germans had Diesel engines in some transports and some flying boats prior to the war and are still using them in those types. Air Vice Marshal McNeece-Foster reports that there appears to be a tendency for Germans to switch to Diesel engines for really high altitude flying, with respect to which my people say as follows:

> "As far as is known of German developments, the Diesel is not now contemplated for any combat aircraft other than a single, high altitude, reconnaissance aircraft, the DO27 with Jumo 207 engines, exhaust turbo-supercharged. The 207 is not a new engine. Probable reasons for the use of a Diesel in this airplane are: the airplane is not intended as a combatant aircraft, low exhaust temperatures help the metals problem in the turbine, ignition is simplified, and there must be an excess of this type engine in Germany."

2. The Navy has five Diesel engine development contracts underway, of which two are in the single cylinder stage, two are full scale engines under construction, and one has been flown in an airplane. Due to the tremendously improved performance of gasoline engines both as to power, weight and fuel consumption, none of the Diesel projects appears particularly promising. Low theoretical fuel consumption, the major advantage of the Diesel, is being so closely approached by the gasoline engine that the disadvantages of the Diesel have much greater weight.

3. Air Marshal Evill is in England. McNeece-Foster will cable for latest information on Diesels.

J. S. McCain

J. S. McCain

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A1

THE WHITE HOUSE

WASHINGTON

CONFIDENTIAL

December 26, 1942.

MEMORANDUM FOR

THE CHIEF OF THE BUREAU OF AERONAUTICS.

The President has recently expressed an interest in diesel-powered plants for aircraft.

Would you be good enough to let me have a short memorandum on this matter? Specifically the President asked that Air Marshal Evill be contacted to find out whether or not the British are aware of German progress in this direction.

Very respectfully,

John L. McCrea,
Captain, U.S.Navy,
Naval Aide to the President.

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