

*Commonwealth Aircraft Corporation Pty. Ltd.*

Port Melbourne 24th April, 1942.

Memo from AIRCRAFT SUPERINTENDENT.

To THE MANAGER.

I submit, herewith, some notes for your consideration on the future possibilities of the Interceptor.

These have been compiled after detailed discussions embracing both Engineering and Factory opinions.

These viewpoints have been co-ordinated to fit in with production continuity in the Aircraft Factory, this being a problem which will very soon have to be settled.

It is considered that Proposition III is not only the best, but also the most practical.

In general, it is hoped that the technical problems to be faced in the installation of the Wright engines, and the components to be designed, tooled up, and made, will apply to the Improved Fighter only.

To fit the Wright engine to the existing machine would mean undertaking much of the Design and Shop developmental work twice over.

HAF/KFW

24th April, 1942.

FUTURE PROGRAMME POLICY TO MAINTAIN CONTINUITY IN THE AIRCRAFT FACTORY.

The progress made with development and production of the CA-12 Contract for 105 Interceptors is greater than was anticipated, necessitating an early decision as to the subsequent programme.

This memorandum is intended to record the alternative possibilities and to analyse their relative merits and practicability, and to outline the effect on the Bomber.

The situation has been examined on the basis of three alternative propositions, all of which assume the completion of the current CA-12 Contract for 105 Interceptors (S3C4G Engines) by October 1942.

In exploring the various propositions the following changes to the existing Interceptor Design have been considered.

- (a) Installation of Wright Engine in present structure, with a minimum of change.
- (b) A Re-designed and Improved Fighter entailing substantial changes (mainly to sheet metal components), providing an aircraft as effective as any other Fighter operating during 1943.
- (c) Installation of Turbo Superchargers during 1943 to either of the above types, or to the present design.

PROPOSITION I.

- (a) Production of a further 75 Interceptors identical with the present type, simultaneously with -
- (b) Production of 100 Interceptors with Wright Engines.

As we will have a capacity of 40-50 Aircraft per month by the time the current contract is completed, it will be essential to have a mixture of P.& W. and Wright types to absorb this capacity, since the Wright Engine Schedule is only 25 per month commencing in September.

The modification incorporating the Wright Engine installation would be made with a minimum of change. Engineering and Shop development could be completed to meet the Engine supply in October.

- (c) Development of Improved Fighter for Flight of the prototype in December, and quantity production by February 1943.
- (d) Development of the Bomber including manufacture of the first 5 machines, would be delayed to July 1943. \*

PROPOSITION II.

- (a) Production of a further 100-150 Interceptors with P.& W. Engines identical with present type.
- (b) Development of the Bomber to achieve production of 12 per month by March 1943. \*
- (c) Development of the Improved Fighter, including manufacture of the first five machines, would be delayed to June 1943.

PROPOSITION III.

- (a) Production of a further 100 Interceptors identical with the present type.
- (b) Development of the new Improved Fighter with Wright "Cyclone" Engines with provision for Turbo Supercharger, which could be fitted when available.  
The first aircraft would be flown in October and quantity production by December 1942.
- (c) Development of the Bomber, including production of the first five aircraft, would be postponed to May 1943. \*

\* Subject to Section (b) on Page 5.

In examining these propositions it is necessary to have in mind the various factors which inevitably govern a decision. These factors are outlined under the two headings of Engineering and Production.

ENGINEERING.

It is felt that the Interceptor as it exists at present must be regarded only as an intermediate step to a fighter aircraft of a quality necessary for active service in 1943.

It is also considered that the present Interceptor, with a Wright Twin "Cyclone" Engine, does not come up to the 1943 standard unless some refinement in design is incorporated, including a Turbo Supercharger, to justify the use of an engine in the 1700 H.P. class.

As a comparison, the existing Interceptor with a 1200 H.P. Engine, but equipped with a Turbo Supercharger, is at altitude better in speed, climb, and range than the same aircraft fitted with the 1700 H.P. Engine, but without the Turbo Supercharger.

There are also technical and production problems entailed in the fitting of the "Cyclone" Engine which have not yet been solved, and the solution to this installation could, therefore, better be done with the development of the proposed high class fighter aircraft.

It should be borne in mind that the present Interceptor design was started in the Engineering Department exactly 13 weeks ago, and it is only 9 weeks since the first drawings were released to the Factory. In this time, apart from the design of a new aircraft, the Engineering Department has developed fighter radio equipment, including a throat microphone and motor generator power supply, complete oxygen equipment, high altitude fuel pumps, and an optical reflector sight for the front gun, apart from other minor items of equipment necessary for combat work.

All this equipment will be satisfactory for use in an improved Fighter design, and based on the excellent progress achieved with the present Interceptor it is anticipated that the new Fighter could be designed and ready for flight in five months time, which would be in time to meet the predicted deliveries of Wright Twin "Cyclone" Engines.

On our present knowledge of the subject it is considered that the following should serve as a basis for a new design of Fighter:-

ENGINE INSTALLATION: - 1700 H.P. Twin "Cyclone" Engine with 4-bladed wooden propellers. The Engine installation will be designed for the incorporation of Turbo Supercharging, if these units are available during 1943.

- ARMAMENT: - 2 20-mm. belt fed Cannons, with total of 400 rounds, and 4 Machine Guns (4,000 rounds) installed in a new design wing, which would incorporate a laminar flow aerofoil section.
- PERFORMANCE: - Cruising speed.  
(Max. Cont. Power Rating) 385 m.p.h. at 30,000-ft.
- Maximum Speed. 396 m.p.h. at 30,000 ft.  
(Power can probably be maintained to )  
(35,000-ft. with Maximum Speed 420 m.p.h.)
- Range. (Normal Tanks)  
2/3 power at 15,000 ft. 700 miles (300 m.p.h.)  
450 H.P. at 15,000 ft. 1,500 miles.
- Range. (Overload Tank)  
2/3 power at 30,000 ft. 1,000 miles. (340 m.p.h.)  
Econ. Power 30,000 ft. 1,800 miles.

- DETAILED DESIGN: - The aircraft will be designed in accordance with the latest principles of which we have knowledge. This includes laminar flow aerofoil, high speed nose cowl with efficient duct design, elimination of leakage losses, and a retractable tail wheel installation.

It is felt that only by the adoption of an up-to-date design on this basis could we justify the request for a further supply of high-powered engines from the U.S.A. during 1943, and the provision of exhaust Turbo Superchargers can only be justified in such a design of aircraft.

The fact that allocation of Wright engines has been obtained (with difficulty) expressly for our Fighter, suggest that they are put immediately to the best possible use, namely, the production of a type of aircraft as good as any the Japs may produce in 1943.

PRODUCTION.

(a) Development and Tooling:

The Factory has limited resources for developmental work, by which is meant provision of temporary tooling, manufacture of the initial batch of new type aircraft, and the development of production technique and methods.

These resources are capable of handling only one type of aircraft at a time.

Our Production Tooling capacity is approximately 10,000 hours per week, which is sufficient, with the assistance of Temporary Tooling, to provide for the manufacture of the various Interceptor types outlined in the alternative propositions.

The Bomber Tooling is an immense undertaking. To complete it in a reasonable time would involve a considerable increase in our capacity together with the locating of outside capacity far in excess of what is at present available.

The following tables give the estimated Tooling hours for the various types of aircraft considered, and the time to complete the programmes using the whole of our present tooling facilities.

Interceptor (Current Type)	150,000 hrs.	15 weeks.	-	} 55
Interceptor (Wright Engine Type)	75,000 hrs.	8	"	
Fighter (New Design)	200,000 hrs.	20	"	
Bomber	800,000 hrs.	80	"	

(b) Production Capacity:

The Factory has a capacity of 40-50 Fighters a month, or alternatively 12-15 Bombers a month, but cannot handle both programmes simultaneously.

These rates are based on the following:-

Production Capacity of Factory = 300,000 hours per month.

Interceptor 6,000 - 7,000 hours per aircraft.

Bomber 20,000 - 25,000 " " "

To achieve these figures it is assumed that production developmental work is finalised and that full tooling is available.

This Production is possible by concentrating our resources and facilities on one type at a time. Any increase in the numbers of components and types makes the control of production less efficient, and greatly increases the ratio of setting up time to production effort in all departments.

BOMBER PRODUCTION.

It has been stressed in this memorandum that the Factory has inadequate capacity to tool the Bomber in a reasonable time, but has sufficient capacity to handle Fighters at a reasonable rate. Using all our resources for the Bomber a maximum of 15 machines per month might be attained and the question arises if this rate is acceptable for Combat aircraft, in 1943.

In view of these factors it is suggested that a scheme for sub-contracting the Bomber almost completely might be investigated.

This would involve -

- (a) The development and manufacture of the first batch of major components at C.A.C. to prove Engineering and Production methods.
- (b) The establishment at these Works of a self-contained department to control Engineering, Tooling, Planning, Production Control and Supply of Material and Components to the Contractors involved.
- (c) The finding and education of suitable Contractors.
- (d) The provision of assembly space to handle Bombers in quantity.

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