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CF-105 RE-PLANNING

The basic reason for re-planning the CF-105
Program is,

- (a) to attempt to give the R.C.A.F. an aircraft which is up to date with the state of the art at all times,
- and,
- (b) to more realistically plan the first 11 aircraft on the basis of our present status and knowledge, for instance, it is now considered that the Iroquois could not go into the 6th aircraft, and it is also considered unlikely that we would get four Mark 1 aircraft flying by the end of next year.

MARK 1

The proposed program shows 11 Mark 1 aircraft, all with J.75 engines, 3 of which have their first flight in 1957. (It is anticipated that if there should be slippage on the first aircraft, it should still be possible to get 3 aircraft flying in 1957, instead of 4 as on Program 3.)

I have shown 2 aircraft only in the first half of 1958, since this is the period when new radar noses have to be provided to house the Astra-1 developmental systems and other portions of the Integrated Electronics.

In the latter half of 1958 I have shown 1 aircraft per month, a total of 11 aircraft by December of 1958. Program 3 shows 11 aircraft by March 1959, i.e., 3 months later.

The new program gives us 2 more J.75 powered aircraft, which should accelerate the early part of our development program.

MARK 2

The Mark 2, which is a genuine Mach 2 aircraft, is shown starting at the 12th aircraft, in March of 1959.

All Mark 2's have Iroquois (improved) engines, which means that they will have to be optimized for combat at Mach 2 instead of Mach 1.5. The basic differences between the new Mark 2 aircraft and Program 3 Mark 2's are the installation of an improved Iroquois engine, re-designed nozzles for optimization at Mach 2, certain changes to the leading edges of the wing to reduce drag at high supersonic speeds, changes in the air conditioning system, and possibly some changes in the aircraft fuel system, to cope with the high speed conditions, and to be able to control the C.G. for a wider speed range.

The build-up on the Mark 2 aircraft has not been based on production capacity, but rather on restricting the developmental aircraft to forty total, since the R.C.A.F. would probably not be willing to accept more aircraft than this prior to clearance for Squadron operation.

The date at which the Mark 2 can be cleared to the Squadrons is based on the timing of the Astra-1, the armament pack, etc., and in considering these phases, it appeared that it would not be possible to achieve this point until June, 1960, which is one month ahead of the date assumed in Program 3.

From June of 1960 the production rate on the Mark 2 has been kept at four aircraft per month, and 79 Mark 2 aircraft have been shown, based on the following :- nine aircraft would probably be retained by the Company or the R.C.A.F. for continuing tests and Mark 3 development, which, coupled with the 11 Mark 1's, would give 20 test aircraft for the full development program. Seventy Mark 2 aircraft then would be available to equip 4 Squadrons. It is not considered practical to give the Air Force any less than 4 Squadrons.

MARK 3

The number of Mark 2 aircraft which should be built is also influenced by the time at which the Mark 3, which is a Mach 2.5 aircraft, could be phased in. This aircraft

would differ from the Mark 2 by the following.

It would have a super-improved Iroquois engine with variable intake and exit geometry, 2/3T Structure would be used extensively (it is not considered that this would entail major re-design of the structure), escape would be improved either by fitting of a capsule or an ejector seat with skip-flow generator, further modification of the wing leading edge may be required, with possible changes to the dimensions of the notch, the Astra-2 Fire Control System would be installed, which would be comparable at least with the Super MX.1179 system, which, we understand, is later going in a medium range interceptor for the U.S.A.F.

All the systems will have to be completely vetted and changed where necessary to make them compatible with operation at Mach 2.5. This could be a major task, especially on the air conditioning system.

Introduction of the Mark 3 is shown running parallel with the phasing out of the Mark 2, and this concept is one that we have not tried on a production basis previously, since we have tended to complete one Mark and switch over at a given aircraft to the next Mark. However, to keep continuity in our program, and also to phase in the Mark 3 as soon as possible in order to be competitive with U.S. projects, I have shown a 5 per month continuous build, gradually changing over from Mark 2 to Mark 3. This will obviously have to be checked with Manufacturing.

The proposed program shows 25 aircraft total by the end of 1959, instead of 19 on our present Program 3, and 69 by the end of 1960, instead of 60 on Program 3.

I believe that this provides a sound development program for the CF-105, and basically, it does not appreciably change the funds required through March of 1960.

CF-100 MARK 6

The R.C.A.F. require a missile aircraft in the

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time scale between June of 1958 and the end of 1959, when they receive their first missile firing CF-105.

Their requirement is based on an attempt to meet the threat during this time scale, and also to set up a logistics system for missiles, in readiness for the CF-105 program, and to train their Air and Ground Crews on the use of missiles.

The new CF-105 program does not take care of this gap, since the 17th aircraft, which is equipped with a Fire Control System and missiles, is only accelerated by 2 months on the new program, still leaving a gap of 16 months with no missile firing aircraft.

The abandonment of the Mark 6 program will leave our Air Force without a missile carrying aircraft during this time, and could induce them to purchase a foreign missile firing aircraft, and if they were approached with the object of deleting the Mark 6 program and continuing with the Mark 5 for the last 70 aircraft, they may be led to this decision.

However, as we stand at present, I believe there is little hope of us really giving them a Mark 6 operational type aircraft for assessment until the end of 1958, which is only 9 months ahead of the time at which they receive a CF-105 with missiles, and the cost of the complete Mark 6 program is approximately 70,000,000 dollars.

Obviously, somebody has to decide whether it is worth 70,000,000 dollars to bridge the 8-to-12 months gap between the presently ordered rocket firing Mark 5's and the CF-105's delivered for the missile assessment program.

The difference between giving the Air Force 70 Mark 5's and 70 Mark 6's to fire missiles is approximately 37,000,000 dollars, which would just about balance our over-expenditures on the CF-105 program.

An alternative suggestion is to delete the after-burner and tail re-design, etc., associated with re-heat on

the Mark 6, and provide them with Mark 5 aircraft with a missile capability. The actual saving in a program of this kind would only be in the order of 6½ million dollars, but we would stand a far better chance of delivering the Mark 6 aircraft with at least the provisions for Sparrow and Sparrow type Fire Control System on time, even if there should be a delay in the weapon portion of the program.

A further alternative would of course be to carry out a program approaching the CF-105 Interim Program, or CF-105A, which would provide the Air Force with J.75 engined CF-105A's capable of carrying Sparrow missiles externally, or rockets, by October of 1958, and Iroquois-CF-105A's by December 1958. There would have to be a considerable increase in the funds available for the CF-105 to achieve this.

RECOMMENDATIONS

- (a) We should re-examine the CF-100 Mark 6 Program to determine whether we can provide the R.C.A.F. with a basic Mark 5 with Sparrow firing capability, and check the saving in cost by doing this.
- (b) We should re-examine the CF-105 over-all program in line with the proposed new program of Mark 1, 2, and 3, and go through an exercise to determine whether it is possible, by means of short-cuts, minimum tooling for Mark 1, etc., to achieve this program within the funds provided.

If this produces no tangible savings, we will obviously have to approach the Government for more funds for the CF-105, with a clear-cut story, based on the new program.

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