

upon this memo sent, JCF
 discussed same with F.T.S.
 & as a result of FTS's further talks with RCAF,
 letter never sent)

30 August 1957

Air Vice-Marshal M.M. Hendrick,
 AMTS., R.C.A.F.,
 Department of National Defence,
 OTTAWA, Ontario.

SPARROW II 78
 RECOMMENDATION

Dear Air Vice-Marshal Hendrick :-

In order to assist you in your deliberations on the Arrow armament selection, we thought it would be useful to you to have on file a summary of the thoughts which we attempted to present to you on this subject last Wednesday.

As you know, Avro have not been in a position to participate in the selection of the weapon for the Arrow and we have not carried out sufficient optimisation studies, etc., to be able to advise on the technical side of the weapon selection. We have been in the position of installing, in the most efficient way, the weapon chosen by yourselves, or, in other words, to put it colloquially, we have done as we were told.

It has appeared to us however, standing at the sidelines, so to speak, that since the U.S. Navy abandoned the Sparrow II project, the whole missile program is in an uncertain state, and we believe that the situation is now probably aggravated considerably by the tightness of the funds in the Arrow program. As we see it, there are two roads which the RCAF could follow :-

1. They could choose a weapon being developed in the U.S. which was generally compatible with the overall weapon system, and which gave promise of later being closely optimized to the Arrow weapon system in its time scale. It appears to us that the Raytheon family of missiles, starting with

the Sparrow III and developing to the Sparrow X, which has provision for either high yield TNT or an atomic warhead, gives this continuity of development. We had also understood that the Fire Control System required for the Sparrow X is a logical development of the Astra system.

By choosing this course it appeared to us that the RCAF can take advantage of the developments being carried out in the U.S., with a consequent saving in cost and time, and there would be the further advantages of a similarity of U.S. and Canadian weapon logistics, which would be of an advantage in the joint Continental defence system.

NOTE: We gained the impression that you feel that the Astra I does not have the necessary degree of sophistication necessary to make possible the use of the Sparrow X as part of the Arrow weapon system, and that you feel that the A.1 range is inadequate to permit the use of the missile with the nuclear warhead, and that the missile with the H.E. warhead would give a lower P_k when compared with Sparrow II or III, considering the number of missiles that could be carried.

As we mentioned, very preliminary studies on our part lead us to the conclusion that the use of Sparrow I with the nuclear head is compatible with Astra I and that the P_k of the weapon system equipped with this combination could be expected to be appreciably higher than that obtainable with Sparrow II or III, although it might presumably be lower than could be obtained with an electronic system representing a later state of the art. Further information indicates that the Sparrow X is more completely compatible with the Arrow environment than the Sparrow IID or Sparrow III from which it is derived.

2. The other alternative, and the one which the RCAF have apparently chosen, is to take the Sparrow IID missile, which has been abandoned by the U.S. Navy, and develop it to the point where it would be equivalent, say, to the Sparrow X in time, and it appeared to us that this had two distinct disadvantages, one being the time which it would take to develop

this missile to be carried supersonically in the Arrow, and the extended time it would probably take to develop the weapon to the stage where it is compatible with the overall Arrow weapon system.

We also feel, in the light of figures obtained from Raytheon, that it will cost an enormous amount of money to develop the missile to the ultimate capability, and Canada would be going it alone, so to speak, in the funding of this program.

In view of all this, therefore, it seems to us that the most logical course would be to choose the Sparrow III missile for the Arrow, since it is at present more compatible with the aircraft and promises further developments in the missile without Canada having to pay an enormous development cost.

With regard to the effect of all this on the CF-100 program, we have done a check to ascertain whether it would be possible to fit the Sparrow III to the CF-100 Mk 6 and incorporate the additional C.W. injection installation required, and our layout shows that it can be done, provided we delete the air to air IFF in the nose. There would of course be some delay in the Mark 6 program by doing this, and we estimate that this would probably be around 6 months.

We realize that you are fully aware of all these facts and have other considerations which we are not in a position to fully assess, and there is no doubt that in some of these areas you are in a much better position to assess the ramifications of many of these aspects than we are ourselves. However, in view of the time scale of the Sparrow X, with fleet introduction scheduled for approximately the same time as the scheduled introduction of the Arrow into RCAF squadron use, we recommend that every effort be made to obtain an objective analysis of the weapon system capability with Sparrow X as soon as

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possible. In view of your decision to use the Sparrow IID at this time, you may consider it desirable, should the study show real advantages, to authorize the development of a Sparrow X weapon installation, and to reinstate the Sparrow III/Sparrow X capability of the Astra system.

Yours very truly,

J. C. Floyd,
VICE-PRESIDENT, ENGINEERING

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