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By MLK NLDDE Date 1/3/11

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THE WHITE HOUSE  
WASHINGTON

August 1, 1958



*Air Defense Radars*  
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MEMORANDUM FOR DR. KILLIAN

SUBJECT: Operation of US Ground Radars in the Presence of ECM

General

1. ECM falls roughly into two types. One type corresponds to the case where a single aircraft can mask the existence of many others. This type of ECM appears when a high power jammer is received on the side lobes of the defense radar. If the defense radar had only a single antenna lobe and no side lobes, this type of jamming would be impossible. The second type of jamming is that in which an airplane carrying a jammer renders itself alone invisible. This type of jamming occurs when the radar signal is received on the main lobe of the defense radar.

The importance of the distinction between these two types of jamming follows from the fact that the first type is disastrous to the defense while the second type permits effective defense action.

2. The first type of jamming can be eliminated for practical purposes if the defense radar has sufficiently high power and if its antenna pattern is designed to minimize side lobes.

3. An effective means of defense against ECM according to studies of Project Lincoln involves the use of passive radar receivers which determine the bearing of enemy jamming signals. Using a plurality of such receivers, the location of enemy jammers can be plotted from the intersections of the observed bearings provided appropriate precautions are taken to eliminate ambiguities.

Present Status

1. Existing U.S. ground radars are vulnerable to the ECM since they have no excess power and no auxiliary passive receivers to utilize bearings on enemy jammers.

2. The new A.F. frequency diversity program now under way will provide radars with greater power and with pulse-to-pulse frequency jitter to increase enemy jammer requirements. These radars are designed to operate over approximately a 10% frequency band and several

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types of equipment operating at particular frequencies ranging from 200 megacycles to 3,000 megacycles increase the probability that a clear channel will be available. The installation of the frequency diversity radars will not be completed according to present planning until about 1963.

3. There are no plans as yet to provide passive direction-finding receivers to plot the bearings of enemy jammers.

Recommendations

1. It would be desirable to review the ECM problem to determine whether the measures proposed are appropriate to the probable threat. In particular, the desirability of the addition of passive direction-finding radars to the present system should be investigated.

A handwritten signature in blue ink that reads "W. E. Bradley".

W. E. Bradley

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