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An Empirical Self-Protection Chaff Model

Authors: Robert J. Rohrs; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH SCHOOL OF ENGINEERING

Abstract: The purpose of this study was to develop a computer model to calculate the probability of attaining breaklock in an aircraft-**chaff**-tracking radar encounter, Although some of the assumptions made may seem to oversimplify the model, these were necessary to create the simple, quick running simulation that was desired. This thesis produced a simulation capable of charting the effectiveness of **chaff** used in the self-protective mode. Simulation results can be used to determine which type/design of **chaff**/**chaff** canister will produce a greater probability of breaklock for a given scenario. The radar included in this simulation is a Scan with Compensation tracking radar. Variable parameters include pulse width, beamwidth, pulse repetition frequency, and operation frequency. An 'ideal' MTI filter is incorporated into the model to negate the effect of MTI blind speeds. Results of several simulation runs illustrate the effects of varying **chaff** radar cross section and aircraft velocity on the probability of attaining breaklock, Although aircraft maneuvers are not included in the simulation, conclusions as to how the probability of breaklock is affected can be made by varying the velocity vector.

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