

## **RADAR TARGET DISCRIMINATION OF NEARLY IDENTICAL TARGETS USING FREE-FIELD MEASUREMENTS**

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Recent work has demonstrated the feasibility of discriminating several different aircraft targets using measured time-domain data. In that work, the scattered field response of a target measured inside an anechoic chamber is convolved with an E-pulse waveform to produce a signature based on the target natural resonances. By use of this unique signature, the target can be discriminated from others. In general, nearly identical targets are very difficult to discriminate since their natural resonances are close to each other.

This paper will investigate discrimination of nearly identical airplane models. The targets consist of a 1" diameter 12" long cylinder as a fuselage and 0.25" diameter, 4" to 8" long cylinders as wings. The wings are attached at three different angles, 90, 45, and 30 degrees to the axis of the fuselage.

Measurements are made using the MSU free-field transient range, which consists of a 12'x12'x24' anechoic chamber, with wideband horn antennas used both for transmitting and receiving. The horn antennas have been loaded with a distributed resistance to eliminate the strong resonances which often occur near the target natural resonances. Excitation is provided using a 0.5 ns pulse of amplitude 40V, and the received waveform is digitized by a waveform processing oscilloscope.

Initial results appear quite encouraging. Aircraft having only slightly differing wingspans were discriminated.