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F/G 17/9

POLARIZATION DIVERSITY IN MEDIUM-RANGE EXTENDED TARGET MODEL RE--ETC(U)

JAN 78 R L MITCHELL

DAAK40-78-C-0031

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MRI-149-8

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AD-A089 569



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RFSS

(6) POLARIZATION DIVERSITY IN MEDIUM-RANGE EXTENDED
TARGET MODEL REQUIRES SIX RFSS CHANNELS.

TECH NOTE 105-035

(11) 6 JAN 78

(9) Technical note, 1

DAAK40-78C-0031

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**POLARIZATION DIVERSITY IN MEDIUM-RANGE EXTENDED
TARGET MODEL REQUIRES SIX RFSS CHANNELS**

R. L. Mitchell
MRI Report 149-8
6 January 1978

Accession For	
NRLS	DDC
Unprocessed	Unprocessed
JAN. 1978	
Dist	
Availability Codes	
Available for special	
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Without any consideration of target depolarization, three RFSS channels are required to simulate an extended target with the medium-range target model derived by Mott (see MRI Report 132-44). With target depolarization, six RFSS channels are required, two on each polarization component of the three horns making up the triad.

This requirement is easy to demonstrate. Without depolarization, in general, we are first computing sums of the form

$$\sum_1 V_i \text{ and } \sum_1 x_i V_i$$

to simulate the glint and Doppler modulation signals where V_i and x_i are the complex reflection coefficient and angle associated with the i th scatterer (see MRI Report 149-5). With target depolarization, the sums are now of the form

$$\sum_1 P_{11} V_i, \sum_1 P_{12} V_i, \sum_1 x_i P_{11} V_i, \sum_1 x_i P_{12} V_i$$

where P_{11} and P_{12} are the two polarization components associated with the i th scatterer. Since P_{11} and P_{12} are not necessarily proportional, i.e.,

$$P_{12} \neq k P_{11}$$

where k is independent of i , we require a doubling of the number of such sums when target depolarization is included in the models.

For the short-range target model (the one based on the "injection" concept), this doubling of the RFSS channels is not necessary since the signals that would be received by the individual monopulse channels are being simulated directly. The depolarization is automatically accounted for in the simulation process, provided the polarization geometry (missile roll, etc.) is given.