BELLCOMM, INC.
955 L'ENFANT PLAZA NORTH, S.W. WASHINGTON, D. C. 20024

B70 08001

SUBJECT: Guided Polar Entries
Case 310

DATE: August 3, 1970

FROM: S. B. Watson

MEMORANDUM FOR FILE

A limited study was made to test the Apollo entry guidance for polar entries. Six entries were made using down-range-to-go and cross-range-to-go as parameters. The target was put on the equator and the initial entry point varied to obtain ranges of 1200 NM, 1350 NM, and 1500 NM. The inertial velocity (36210. fps), flight-path-angle (-5.6°) and azimuth (180.°) were held constant. Summary information is presented in the table below.

Down-Range, NM	Initial Cross-Range, NM	Maximum G Level
1500	109	5.4
1350	98	4.6
1200	87	6.6
1500	11	6.1
1350	7	4.7
1200	3	6.2

The entries were guided to within 2 NM of the target without reaching more than 7Gs. The Entry Monitoring System was simulated. The EMS traces, figures 1 and 2, had no onset or offset violations and were not significantly different from similar near equatorial entries.

S. B. Watson

2014-SBW-ksc

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(NASA-CR-113068) GUIDED POLAR ENTRIES
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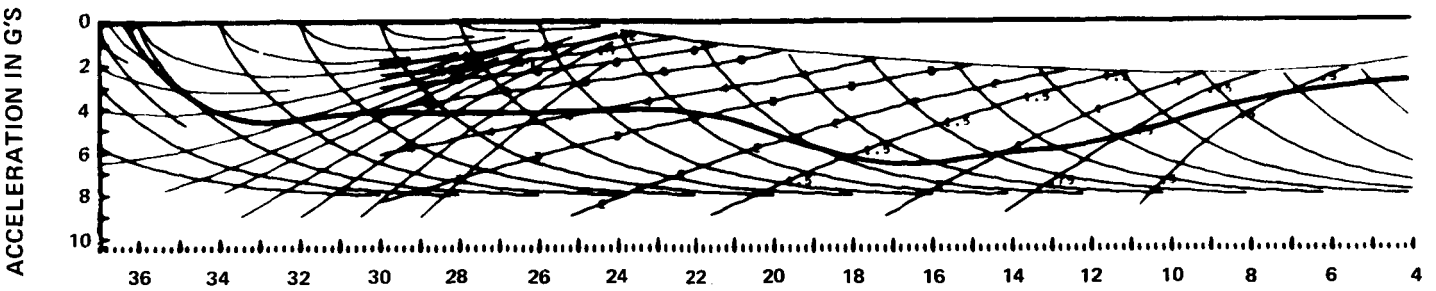
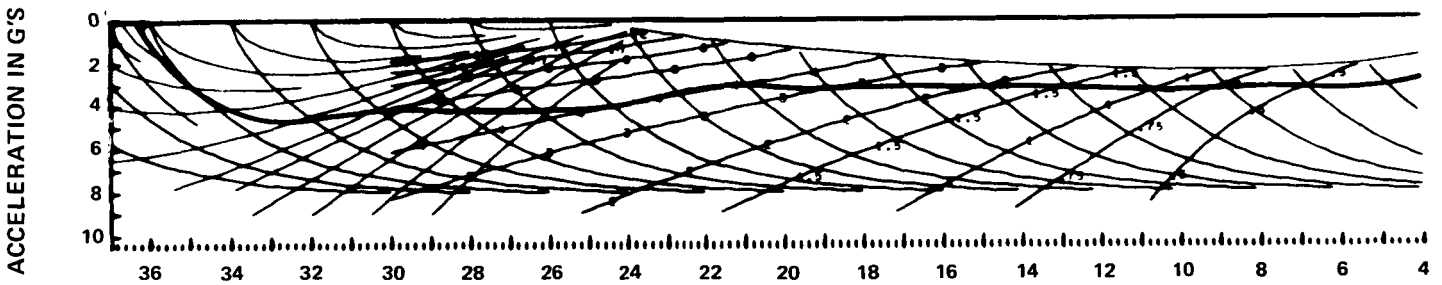
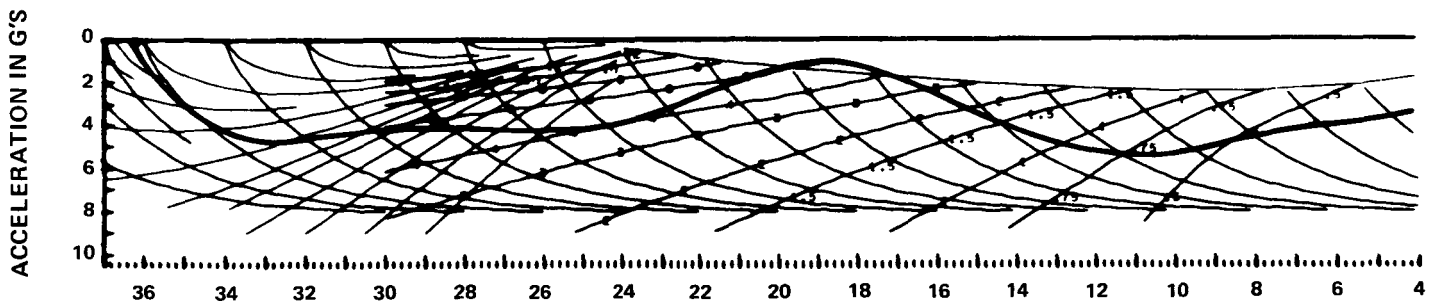


a) INITIAL CROSS-RANGE 87 NM, DOWN-RANGE 1200 NM

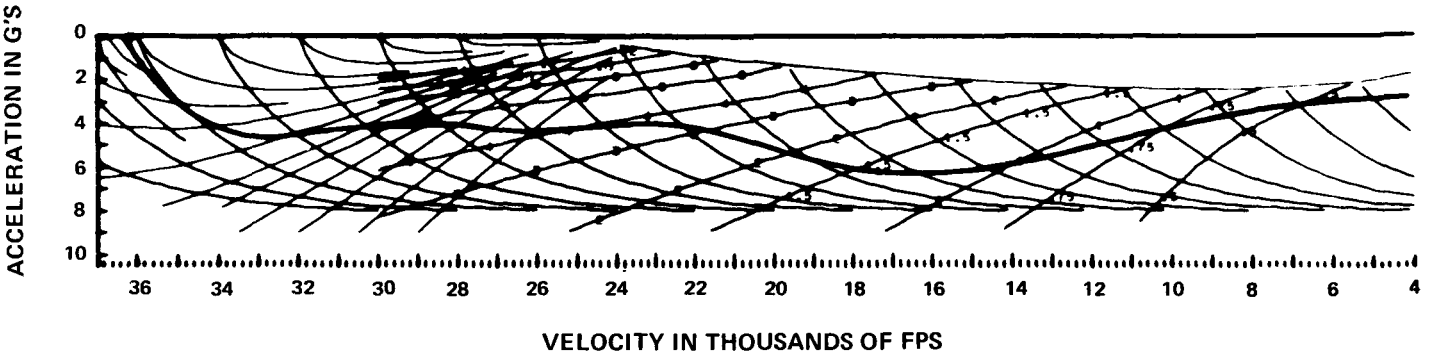


b) INITIAL CROSS-RANGE 98 NM, DOWN-RANGE 1350 NM

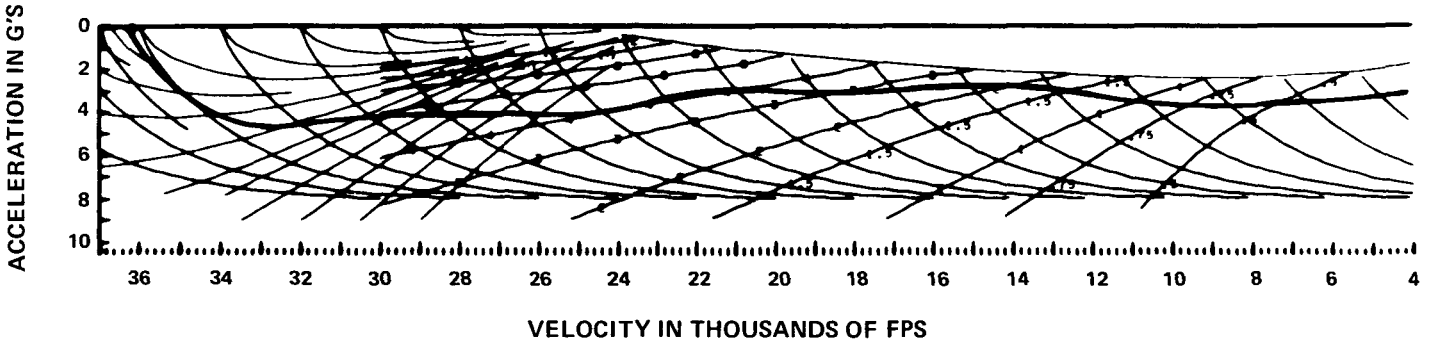


c) INITIAL CROSS-RANGE 109 NM, DOWN-RANGE 1500 NM

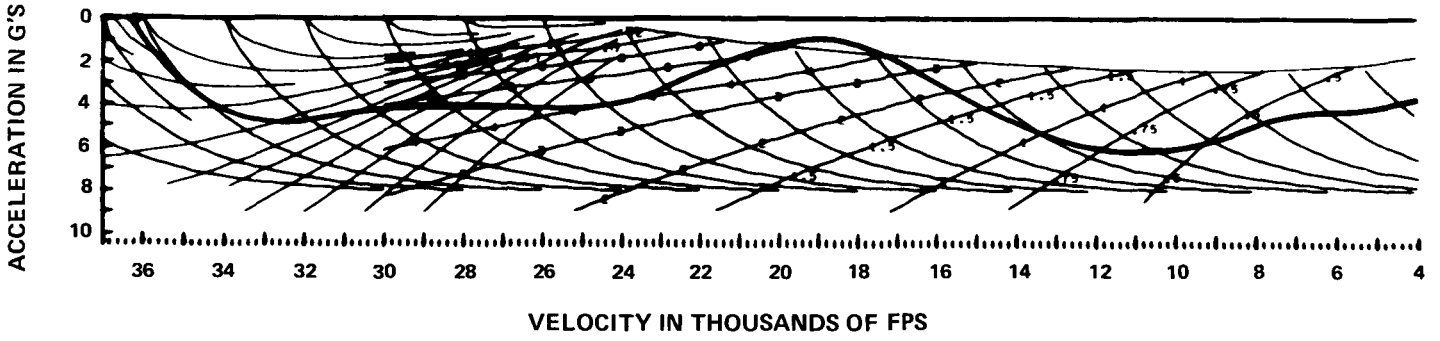
FIGURE 1 - POLAR EMS TRACES WITH LARGE INITIAL CROSS RANGE



a) INITIAL CROSS-RANGE 3NM, DOWN-RANGE 1200 NM



b) INITIAL CROSS-RANGE 7 NM, DOWN-RANGE 1350 NM



c) INITIAL CROSS-RANGE 11 NM, DOWN-RANGE 1500 NM

FIGURE 2 - POLAR EMS TRACES WITH SMALL INITIAL CROSS RANGE

BELLCOMM, INC.

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From: S. B. Watson

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