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LUMINARY Memo #84

To: Distribution
From: D. Eyles
Date: 21 May 1969
Subject: Ignition Algorithm Convergence

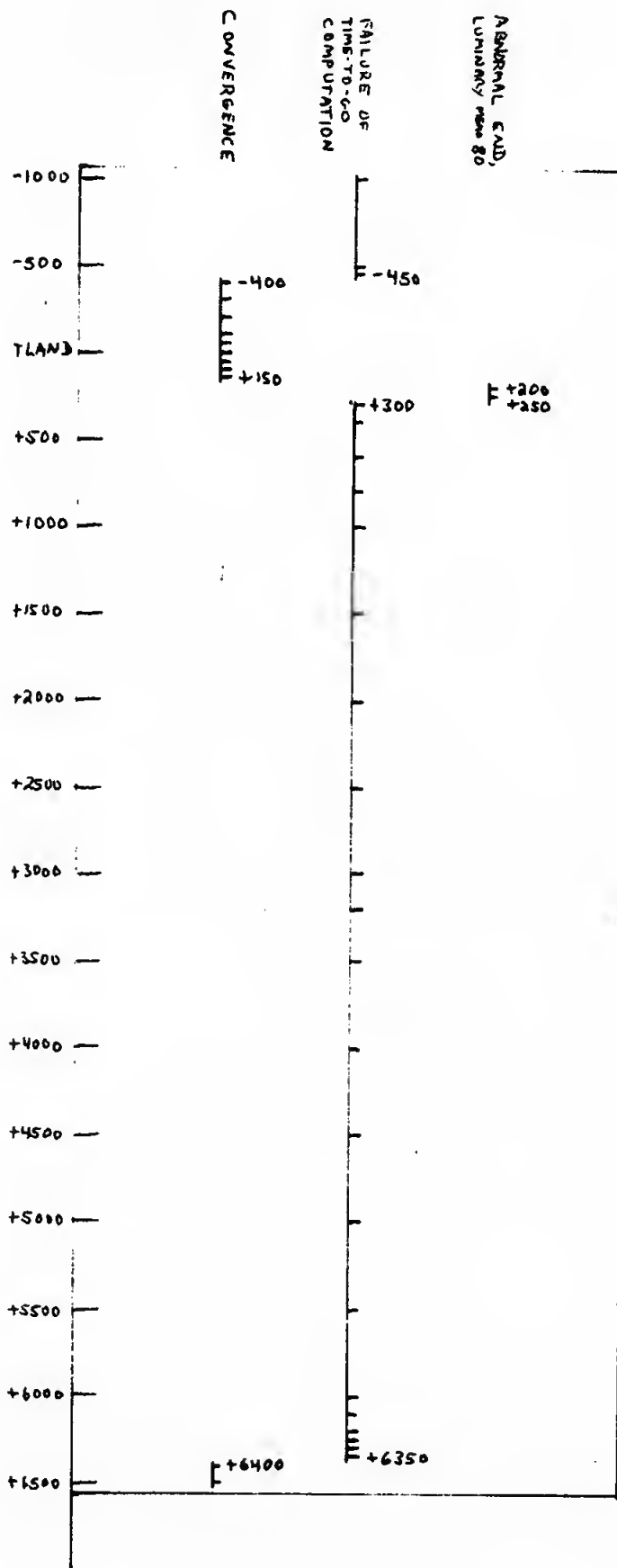
This memo presents the results of a fairly unexciting series of tests of the landing ignition algorithm of Luminary 1A. The parameter varied in these runs was TLAND, the number which determines the first guess of ignition time and place. The aim was to locate points on the descent orbit at which convergence on a wrong solution or other bad behavior can occur. None were found.

Nominal TLAND is 357659.87 but this is rounded and TLAND +100, for instance, is 357760. Where there was an effort to determine closely at what TLAND ignition algorithm behavior changes, a granularity of 50 seconds was considered sufficient: thus for example the time at which the algorithm starts converging, on the minus side, is somewhere between -450 and -400.

First there is a chart showing behavior around one descent orbit. Second, a table summarizes the runs. "First computed TGO" is included because these values indicate that on the minus side the limiting factor is the scaling of that variable in the AGC: units of 2^{17} centiseconds for a maximum of 1310.64 seconds.

The results given here assume the targetting selected for Mission G.

IGNITION ALGORITHM CONVERGENCE AROUND ONE DESCENT ORBIT



| Modification of TLAND | Computed TIG | First Computed TGO | What Happens |
|-----------------------|--------------|--------------------|--|
| 1000 | | | Time-To-Go computation fails to converge |
| -500 | | | " |
| -450 | | | " |
| -400 | 356969.49 | -1230.27 | Converges in 3 passes |
| -300 | 356969.50 | -1064.69 | " |
| -200 | 356969.49 | -904.67 | " |
| -100 | 356969.47 | -744.02 | " |
| -50 | 356969.48 | -661.60 | " |
| 0 | | | Converges on first pass |
| +50 | 356969.47 | -487.35 | Converges in 3 passes |
| +100 | 356969.47 | -392.18 | " |
| +150 | 356969.46 | -287.62 | " |
| +200 | | -166.75 | Abnormal end, see LUMINARY Memo 80 |
| +250 | | -9.21 | " |
| +300 | | | Time-To-Go computation fails to converge |
| +400 | | | " |
| +600 | | | " |
| 300 | | | " |
| +1000 | | | " |
| +1500 | | | " |
| +2000 | | | " |
| +2500 | | | " |
| +3000 | | | " |
| +3200 | | | " |
| +3500 | | | " |
| +4000 | | | " |
| +4500 | | | " |
| +5000 | | | " |
| +5500 | | | " |
| +6000 | | | " |
| +6100 | | | " |
| +6200 | | | " |
| +6250 | | | " |
| +6300 | | | " |
| 3350 | | | " |
| +6400 | 363796.76 | -1277.00 | Converges on TIG for next orbit |
| +6500 | 363796.74 | -1108.83 | " |