

Massachusetts Institute of Technology  
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Luminary Project Memo No. 19

TO: Distribution  
FROM: R. A. Larson *RHL*  
DATE: January 26, 1971  
SUBJECT: Hardware dependent constants used in the Luminary program

Action requested by: 23A, 23B, 23C, 23T

Date requested by: February 2, 1971

The attached list contains selected hardware dependent constants which are being used in the Luminary Program. The "Old" values are those used in Luminary; the "New" ones are taken from the Spacecraft Operational Data Book (SODB). We have been requested by the MSC to review these values in light of performance degradation or limitations of capability to determine if any of the fixed memory constants should be changed.

Distribution:

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# LUMINARY

constant LUM

500B

## Mass Properties

Maximum descent weight:  
Maximum ascent weight:  
Minimum descent weight:  
Minimum ascent weight:  
Minimum CSW weight:

### OLD

16,700 KG  
5050 KG  
6062 KG  
2200 KG  
4704 KG →

### NEW

16697 KG  
4943.3 KG  
7484.8 KG  
2200.0 KG  
4096.0 KG

## RCS jets

Thrust 2 jet:  
Thrust 4 jet:

200 lb  
400 lb

{ same

## Descent engine

Thrust:  
Mass flow rate:  
Exhaust velocity:

9817.6 lb  
14.8 KG/sec  
2952.08 m/sec

9790 lb  
14.681 KG/sec  
2987 m/sec

Throttle scaling:  
Throttle lag:

2.8173 lb/b.t.  
0.08 sec

same  
same

10% DPS engine thrust:

1050 lb

1376 lb (13%)

## Ascent engine

Thrust:  
Mass flow rate:  
Exhaust velocity:  
Impulse velocity acquired in  
a 1-second maneuver for a  
unit mass vehicle:  
Minimum impulse:  
Slope of minimum impulse curves

3500 lb  
6.133 KG/sec  
3030 m/sec  
140.12 KG-m/cs  
31.133 KG-m/cs  
1.5569 KG-m/cs<sup>2</sup>

3476.8 lb  
6.083 KG/sec  
3043.42 m/sec  
140.12 KG-m/cs  
69.24 KG-m/cs<sup>2</sup>  
2.094 KG-m/cs<sup>2</sup>

Turn on delay:

90 sec

100 seconds

## OPTICS

8m occultation cone  
1/2 angle:

60 deg

same

## Landing Radar

Lower limit IR data:  
Maximum re-positioning delay:

50 ft  
11 seconds

{ same

PETER WEISSMAN

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