

Massachusetts Institute of Technology
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LUMINARY Memo #47

TO: Distribution
FROM: George W. Cherry
DATE: October 29, 1968
SUBJECT: DPS and APS Engine Data

I have received the following engine data from Harry Byington via Thomas Price. This data is supposed to represent the best available. We should use it in Section 5, Section 6, LUMINARY, environment programs, engineering simulators, etc.

DPS Engine Data

Reference: Telephone call from Thomas Price, Jr. on 10/25/68.

SNA-8-D-027

LED-540-54

The thrust and I_{SP} figures below are based on 100 % thrust equals 10,500 pounds during fixed throttle point operation.

The thrust increases linearly from 92.5% to 94.5% during 370 seconds of FTP operation.

The I_{SP} drops linearly from 303 to 299 during 370 seconds of FTP operation.

Thus the average I_{SP} is 301 and the average thrust is 93.5%.

$$F_{DPS} = 0.935 \times 10,500 = 9817.5 \text{ lbs}$$

$$\dot{m}_{DPS} = F_{DPS} / I_{SP}(DPS) = 32.616 \text{ lbs/sec}$$

$$v_e(DPS) = g I_{SP}(DPS) = 32.174 \times 301 = 9684.4 \text{ ft/sec}$$

APS Engine Data

$$F_{\text{APS}} = 3500 \text{ lbs}$$

$$\dot{m}_{\text{APS}} = 11.32 \text{ lbs/sec}$$

$$I_{\text{SP}}(\text{APS}) = 309 \text{ seconds}$$

$$v_e(\text{APS}) = g I_{\text{SP}} = 9941.8 \text{ ft/sec}$$

This data on APS was based on the average of test results at White Sands.

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H. Byington MSC