MIT/IL SOFTWARE ANOMALY REPORT

MIT REPORT NO. LNY 49
PROGRAM LUMINARY
PROGRAM REVISION 69

1.1 ORIGINATOR: L. BERMAN	1.2 ORGANIZATION: MIT/IL	1.3 DATE: 3/21/69	1.4 ORIGINATOR CONTROL NO.

1.5 DESCRIPTION OF ANOMALY:

See attached sheet.

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1.6 DESCRIPTION OF RUN:

See attached sheet.

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- MIT ANALYSIS -

2.1 CAUSE:

Overflow in computation (see attached sheet.)

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2.2 RECOGNITION:

Failure of vehicle to make expected roll (about $\overline{Z}_8$) toward CSM plane.

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2.3 MISSION EFFECT:

For small Tgo (early aborts), out-of-plane position error will not be eliminated.

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2.4 AVOIDANCE PROCEDURE:

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2.5 RECOVERY PROCEDURE:

Plane correction must be made later.

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2.6 PROGRAM CORRECTION:

See attached sheet.

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2.7 RECOMMENDED DISPOSITION (Fix, Work-around, etc):

Not serious enough to fix in 69, should be fixed for LUMINARY 1A.

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2.8 RECOMMENDED RE-TESTING:

Inspection of a nominal abort sequence.

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2.9 MIT/IL SIGNATURE: Lonne W. Cherry	2.10 DATE: 3/21/69

3.1 NASA DIRECTION:

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3.2 NASA/MSC SIGNATURE:	3.3 ORGANIZATION	3.4 DATE:

4.1 CLOSING ACTION TAKEN:

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4.2 SIGNATURE:	4.3 ORGANIZATION:	4.4 DATE:

MSC Form 1403 (Rev May 68)

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For early aborts, the rate parameters in ascent guidance tend to be large; in fact, both yaw and pitch rate parameters (y rate and p rate) overflow on a typical run (4-4-Bernikowich). For pitch the problem is not serious, since the overflow is caused by a DDV, which means that the result is POS or NEG MAX, which is about 1.5 times the maximum magnitude permitted for p rate anyway, so even if it didn't quite overflow, it would get cut back.

For yaw, however, the overflow is caused by a SL2, so where we should have 1.03, we get .03, i.e., we get small yaw rates, which is equivalent to giving up yaw position control (which is physically the result).

The solution is to replace

219	DDV	DDV	with	SL2	DDV
220		TGO		DDV	SETPD
221	SL2	STEPD			TGO
222		04			04

Same operations in a different order. It is a lot easier than diving in to rescaling the whole mess.