Addressees NOV 0 5 1969

AA/R. R. Gilruth
AB/G. S. Trimble
CA/D. K. Slayton
CB/A. B. Shepard (49)
CF/W. J. North
CF13/D. F. Grimm
CF212/C. Jacobsen
CF212/W. Haufler
CF212/W. Hinton
CF2/J. Bilodeau
CF22/C. C. Thomas
CF22/D. L. Bentley
CF22/R. L. Hahne
CF22/M. C. Gremillion
CF22/W. B. Leverich
CF22/T. H. Kiser
CF24/P. Kramer
CF24/J. Rippey
CF24/A. G. Nolting
CF24/M. C. Contella
CF24/D. W. Lewis
CF24/D. K. Mosel
CF3/C. H. Woodling
CF32/J. J. Van Bockel
CF32/M. F. Griffin
CF33/M. Brown
CF33/C. Nelson
CF34/T. W. Holloway (6)
EA/M. A. Faget
EA2/R. A. Gardiner
EA4/J. Chamberlin
EA8/J. B. Lee
EA8/P. M. Deans
EB/P. Vavra
EE/L. Packham
EE/R. Sawyer
EE13/M. J. Kingsley
EE13/R. G. Irvin
EE3/R. L. Chicoine
EE6/G. B. Gibson
EE6/R. G. Fenner
EE6/J. R. McCown
EP2/W. R. Hammock
EG/R. G. Chilton
EG/D. C. Cheatham
EG13/W. J. Klinar
EG2/K. J. Cox
EG2/E. E. Smith
EG25/T. V. Chambers
EG27/W. R. Warrenburg (2)
EG27/H. E. Smith
EG7/C. T. Hackler
EG7/J. Hanaway
EG8/B. Reina
EG8/A. R. Turley
EG44/C. W. Frasier
EG/MIT/T. Lawton
KA/R. F. Thompson
PA/G. M. Low
PA/O. G. Morris
PD7/R. H. Kohrs
PA/K. A. Kleinknecht
PA/S. H. Simpkinson
PA/J. A. McDivitt
PA2/M. S. Henderson
PB/A. Hobokan
PC/W. H. Gray
PD/O. E. Maynard
PD/R. V. Battey
PD12/C. D. Perrine (5)
PD13/A. Cohen
PD14/R. W. Kubicki
PD6/H. Byington
PD7/W. R. Morrison
PE/D. T. Lockard
HA/J. P. Loftus
TJ/J. H. Sasser
TJ/R. L. Nance
TH3/J. E. Dornbach
CO7/J. Nowakowski
FA/C. C. Kraft, Jr.
FA/S. A. Sjoberg
FA/C. C. Critzos
FA/R. J. Rose
FA4/C. R. Hicks
FC/E. F. Kranz
FC/C. E. Charlesworth
FC/M. Windler
FC/J. W. Roach
FC/G. S. Lunney
FC/G. D. Griffin
FC2/C. S. Harlan
FC2/H. M. Draughon
FC2/J. H. Temple
FC25/C. R. Lewis
FC27/W. E. Platt (3)
FC3/A. D. Aldrich
FC3/N. B. Hutchinson
FC35/B. N. Willoughby (3)
FC35/R. Fruend
FC4/J. E. Hannigan
FC4/4/R. L. Carlton
FC4/J. Wegner (2)
FC4/H. Loden (3)
FC5/J. C. Bostick
FC5/P. C. Shaffer
FC54/J. S. Llewellyn
FC54/C. F. Deiterich
FC54/J. E. I'Anson
FC55/E. L. Pavelka (6)
FC56/C. B. Parker (3)
FC6/C. B. Shelley (4)
FL/J. B. Hammack
FL2/R. L. Brown (2)
FL6/R. W. Blakley
FS/L. C. Dunseith
FS5/J. C. Stokes (11)
FM/J. P. Mayer
FM/C. R. Huss
FM/D. H. Owen
TRW/Houston/W. Hill
FC5/J. G. Renick
FM13/R. P. Parten (11)
FM2/C. A. Graves (3)
FM3/C. T. Hyle
FM4/E. R. Schiesser
FM4/P. T. Pixley
FM4/R. T. Savely (3)
FM4/W. R. Wollenhaupt
FM5/J. D. Yencharis (4)
FM5/R. E. Ernull (5)
FM5/H. D. Beck
FM5/R. D. Duncan
FM6/K. A. Young (6)
FM6/R. W. Becker (3)
FM7/S. P. Mann
FM7/D. A. Nelson
FM7/R. O. Nobles
FM/Branch Chiefs (8)
YA/F. Borman
IBM/Houston/G. Carlow, D70
Boeing Data Management (4), HA-04
BELLCOMM/HQS./R. V. Sperry
BELLCOMM/HQS./MAS/A. Merritt
BELLCOMM/HQS./D. Corey
BELLCOMM/HQS./G. Heffron
GAEC/Bethpage/J. A. Wachtel
GAEC/Bethpage/R. Schindwolf (3)
GAEC/Bethpage/R. Mangulis
GAEC/Bethpage/R. Pratt
GAEC/Bethpage/Consulting Pilot's Office
GAEC/Bethpage/B. O'Neal
GAEC/Houston/G. Kingsley
MIT/IL/R. R. Ragan (25)
MIT/IL/M. W. Johnston, IL 7-279
NR/Downey/M. Vucelic, FB84
NR/Downey/A. Sohler, AE23
NR/Downey/J. E. Roberts, AE23
NR/Downey/B. C. Johnson (4), AB46
NR/Downey/W. H. Markarin, AE23
NR/Downey/J. Jansz, BB48
NR/Downey/M. B. Chase, AB33
NR/Downey/D. W. Patterson, AC50
MITRE/Houston/W. P. Kincy
GSFC/500/F. O. Vonbun
NASA/HQS./MAO/R. B. Sheridan
NASA/HQS./MAOP/R. O. Aller (2)
NASA/HQS./XS/R. Sherrod
NASA/HQS./Colonel T. McMullen, MA
NASA/HQS./Chet Lee, MA
KSC/CFK/R. D. McCafferty
KSC/CFK/P. Baker
KSC/CFK/C. Floyd
KSC/CFK/M. Walters
KSC/CFK/F. Hughes
KSC/CFK/MIT/R. Gilbert
TRW/Redondo Beach/R. Braslau
TRW/Houston/W. J. Klenk
TRW/Houston/R. J. Boudreau
TRW/Houston/C. R. Skillern
TRW/Houston/M. Fox
TRW/Houston/K. L. Baker
TRW/Houston/F. A. Evans

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UNITED STATES GOVERNMENT

Memorandum

NASA Manned Spacecraft Center

TO : See list attached

DATE: October 29, 1969

69-PA-T-139A

FROM : PA/Chief, Apollo Data Priority Coordination

SUBJECT: AGS licks PGNCS for RCS Insertion

Pete Conrad has discovered and, if necessary, intends to do something that Dan Payne and others around here got squared away a year or more ago. Unfortunately, due to the press of more urgent business, we failed to advertise it enough. This note is to make sure you know that the AGS does a better job than the PGNCS of guiding the LM into orbit using the RCS if the APS stops prematurely and can't be restarted. And, it should be used in this unlikely and horrifying event.

It may surprise you to learn that if the APS fails during the last minute of LM ascent, insertion may still be achieved using the RCS. For this specific case, a 4 jet RCS burn about 9 minutes long would be required to pick up the remaining 1,000 fps. (This obviously far exceeds the 85-second constraint currently limiting +X RCS operation, but who will quibble over that?)

The proper procedure for RCS insertion is to switch to AGS AUTO, since AGS will steer the vehicle automatically at RCS thrust acceleration levels while PGNCS will not. Meanwhile, the PGNCS velocity-to-be-gained display may be monitored to verify that AGS is performing adequately. When the PGNCS velocity-to-be-gained is small (i.e., less than 25 fps) control could be switched back to PGNCS and the standard velocity residual trimming procedures could be employed. Use of AGS AUTO relieves the crew of manually maintaining attitude such that the PGNCS display of total velocity-to-be-gained is along the X-axis during a long RCS burn. Also, AGS guidance has cross-range position control assuring insertion into the CSM plane while PGNCS does not.

As I said, Pete found all this out for himself and intends to act according with our blessing if this happens. This is another example of a low-probability contingency procedure cleared away. We'll have to be careful we don't carry this kind of effort too far or we'll be arrested for violation of the law of diminishing returns!

Howard W. Tindall, Jr.

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