SATELLITE 1965--16C THRUSTER OPERATION

An exercise to observe the effect of the thrust of thruster B of Satellite 1965--16C was scheduled for 26 July 1965.

During pass 1928 at 08 56 20Z, thruster B was commanded ON from the Hybla Valley Ground Station. Telemetry data indicates the following:

Immediately after the thruster was turned ON, the thruster pressure increased from zero to 1.7 psi. and then gradually decreased to zero at 08 58 00Z. The temperature of thruster B nozzle, the temperature and pressure of thruster A nozzle and the temperature of the thruster vessel did not change during the entire recorded portion of the pass.

When telemetry data was obtained at Hybla Valley during the next pass (1929), none of the mentioned values had changed. Thruster B was turned OFF at 1039 15 Z and no changes were noted during the rest of the recorded pass.

The orbital period of Satellite 16--B and 16--C and time separation between the two as they crossed the SPASUR fence were observed by SPASUR at Dahlgren just before and immediately after the operation. No significant changes were noted. SPASUR will determine orbital elements and time spacing during the next few days in order to collect additional data for more accurate determinations.

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As of 1500Z 27 July - Dahlgren has not noted any change in the orbits or separation time of 1965 16 B and C.

Satellite 1965 - 16C Thruster Operation Part II

The operations performed on Thruster B of Satellite 1965-16C during passes 1928 and 1929 were previously reported. SPASUR in Dahlgren, Va., did not note any changes in the orbits or in separation time of 1965-16B and C.

Because the pressure always returned to zero, it was assumed that the ON valve did not latch OPEN and more exercises need to be attempted in order to loosen it. On a non-interference basis of data collection from satellite 1965-16D, ON and OFF valve operations were commanded at various times, various duration and repetition rates. SPASUR at Dahlgren was alerted to note any change in orbit when a long period of ON was attempted.

The results are as follows:

Date	Pass No.	Operation
7/26/65	1928	Thruster B turned ON see part 1
	1929	Thruster B turned OFF see part 1
	1937	Thruster B ON - Pressure immediately rose to 3.8 psi - Decreased to zero in 48 seconds.
7/27/65	1938	Thruster B still ON - no pressure
	1942	Turned OFF - no pressure
7/28/65	1951	Thruster B turned ON - pressure up to 3.2 psi Decreased to zero in about 48 seconds.
	1952	"B" turned OFF - no pressure
	1964	"B" turned ON - pressure up to 3.8 psi - decreased to zero in 48 seconds
		"B" turned OFF - turned ON 60 seconds later - pressure to 3.2 psi - decreased to zero in 32 seconds.
		"B" turned OFF - turned ON 30 seconds later - pressure rose to 2.6 psi - decreased to zero in 24 seconds.
		Left "B" ON
7/29/65	1965	"B" ON at arrival - no pressure indication
		Turned "B" OFF and back ON during same command sequence. Pressure rose to 2.6 psi and decreased to zero in 40 sec.
		Turned "B" OFF and ON 30 seconds later. Pressure to 2.3 psi - decreased to zero in 32 seconds.
		Turned B OFF and back to ON 10 times in rapid succession - [illegible]re indication.
		[illegible]in about 20 times - still no pressure.
		[illegible]hen pass ended.

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Date	Pass No.	Operation
7/29/65	1966	"B" Turned ON - Pressure to 2.6 psi back to zero in 32 seconds
		Turned OFF and ON about 20 times - no pressure.
		Turned ON at end of pass - pressure to 1.5 psi - decreased to zero in 24 seconds.
		Left turned ON.
	1970	"B" ON - No command - no pressure
	1971	"B" ON - no command - no pressure
	1978	"B" ON - Tried OFF and ON about 5 times - no pressure
		Left turned OFF.
7/30/65	1979	"B" turned on - Pressure to 1½ psi Decreased to zero in 24 seconds.
		Turned OFF and back ON four (4) times about 30 sec. apart with same results.
		Left turned OFF.
	1980	Turned "B" ON/OFF three (3) times. Highest pressure was 1 psi - leaked back to zero.
		Left turned OFF.
	1983	Turned "B" OFF/ON about 8 times - very slight pressure
		leak to zero.
		Left turned ON.
	1984	Turned "B" OFF/ON about 6 times - Very slight pressure - leaked to zero by end of pass.
		Left turned ON.
	1985	Turned "B" OFF/ON about 6 times - slight pressure - leaked to zero.

During these trials, it was noted that the pressure indicator continuously showed a return to zero and if exercised too often the pressure finally did not rise at all when the valve was turned ON.

At this time, a decision was made to check thruster A valve operation. The results are tabulated as follows:

Date	Pass No.	Operation
7/30/65	1992	Turned ON thruster A at 22:58 - pressure RPI indicated 1.6 psi. When "A" was turned ON Seg. 19-20-21 (Boom RPI's) changed from .6 V to 1.2 V. At 23:00, turned "A" OFF. Pressure leaked from 1.6psi to 1psi and at end of pass was .6 psi.
		"B" was turned ON and OFF several times - no pressure.
		"B" was left ON.

Date	Pass No.	Operation
7/31/65	1993	"A" still OFF; however, pressure still 1/2 psi
		"B" turned OFF and ON - no pressure
		"B" left ON
	1994	No commands
		"A" pressure 1/2 psi - 19-20-21 Seg. still 1.2 V
		"B" left ON
	1997	No commands
		"A" pressure still 1/2 psi - Seg. 19-20-21 back to .6 V
	1998	No commands
		"A" pressure still 1/2 psi
		"B" ON - no pressure
	1999	Same
	2006	"B" turned OFF
		"A" pressure 1/2 psi
8/1/65	2007-2020	Unable to maintain any "B" pressure. "A" pressure 1/2 psi
8/2/65	2021	Same
	2024	Same
	2025	Same
	2026	Same
	2033	Command "A" Thruster ON at 21:44. Pressure went from 1/2 psi to 1 1/2 psi. Boom extension RPI went from .6V to 1.2 V
		Left "A" ON - pressure 1.4 psi
	2034	"A" pressure had reduced to .8 psi. Turned "A" OFF - Pressure stays at .8 psi. Boom ext. RPI's stay at 1.2 V.
8/3/65	2035	"B" exercises negative
		"A" pressure RPI still at .8 psi Boom RPI 19-20-21 back to .6V.
	2038	No commands but "A" pressure increased to 1.1 psi. "B" pressure zero.
	2039	"A" OFF - pressure 1.1 psi
		No commands

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The first ON-OFF operation indicated that the ON valve latched because the indicated pressure remained above .5 psi. Therefore, it was assumed to be working and scheduled to be left ON for one orbit of the satellite. Later, SPASUR noted that no orbital changes had occurred.

Indications of Thruster "A" random pressure changes corraborate previous data where Thruster A RPI indicated pressure changes without valve operation and therefore the valves controlling the pressure in Thruster A are also assumed to be faulty or the .01 ID lines are partially or fully clogged.

On a non-interference basis with 1965-16D, Thruster A has been scheduled to be operated once a week and Thruster B has been scheduled for as often as possible operation in an effort to study valve operation.

When successful, Thruster B will move the satellite in a desired direction and "A" in undesired direction.

Ralph M. Gran

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