



PANEL LEGEND

APOLLO 13 - O2 TANK 2 LOSS OF PRESSURE

EECOM - SY LIEBERGOT

20	19	3	5	9
Page from Apollo 13 Flight Mission Rules document detailing CSM EECOM "GO" criteria.	Telemetry data was converted into a digitally formatted dynamic display that was optically mixed with static (background) data from a file of slides with fixed labels that produced a composite image suitable for viewing by a TV camera and was transmitted over a discreet TV Channel to a monitor. Was also able to display normal television.	TV MONITOR	TV MONITOR	VOICE COMMUNICATION POSITION Used to establish a "loop" or voice connection by mission personnel for intra NASA facilities communications. "Yellow" = Loop monitor ON "Flashing White" = this position using loop "Steady White" = other position using loop
4	7	8	21	
VOICE COMMUNICATION POSITION Spare position that was originally assigned to the position called TELCOM that was shared with EECOM at this console. The TELCOM position was removed from this console after Apollo 10 and a new position - INCO was created at another location in the MOCR.	SUMMARY MESSAGE ENABLE KEYBOARD (SMEK) Enables a program to compile telemetry data into a format suitable for transmission as a teletype message.	MANUAL SELECT KEYBOARD (MSK) Used to select a Digital/TV format number page, for display on a monitor A "Hard Copy" of a screen image could be made.	DISPLAY REQUEST KEYBOARD (DRK) Semi automatic MSK for rapidly accessing selected Digital/TV formats.	SYSTEM STATUS/ STATUS REPORT
6	18	14	12	13

Just prior to a scheduled shift change, Flight Controller (EECOM) Sy Liebergot requested a procedural "stir" of the cryogenic tanks in the Service Module. A short while after the applicable switches were activated in the Command Module by Command Module Pilot Jack Swigert, a short circuit occurred between wires or in the fans of O2 Tank 2 as a result of undetected pre-launch damage. This led to a fire and a rapid rise in pressure that eventually caused the tank dome to fail, explosively releasing the O2 into the Service Module bay. This resulted in the bay door covering that sector of the Service Module to be blown off hitting the nearby High Gain antenna causing a temporary loss of telemetry.

This graphic represents the situation displayed to Sy Liebergot when the telemetry resumed.

The first indication observed by Sy Liebergot was on the left screen - CSM EPS HIGH DENSITY, where Fuel Cell 1, N2 Pressure indicated 0.17 psi - effectively "0". However, as the related Fuel Cell O2 and H2 pressures were normal, this was correctly assumed to be due to a sensor malfunction. Fuel Cell 1 O2 flow also showed a drop in flow rate to 0.193 lbs/hr. Post mission, this was correlated to the "shocked" closure of the O2 Reactant Valve that permits O2 to flow to the Fuel Cell, but direct indication of this occurring, required both O2 and H2 Reactant Valves to be closed - an unprecedented occurrence during translunar coast. Closure of the Reactant Valve also affected Fuel Cell 3, but this was not yet evident. Fuel Cells 1 and 3 continued power generation for approximately three minutes with the O2 remaining in the supply lines downstream of the O2 Reactant Valve.

On the CSM ECS-CRYO TAB page on the right screen, O2 tank 2 pressure indicates 19 psi (off-scale low), quantity indicates 47% (indication had failed earlier in the mission) and temperature indicates 84 degrees (off-scale high).

The number of confusing telemetry indications were more indicative of a telemetry failure than a cascading multiple system failure. However, the failure of the O2 tank and the consequential failure of the Fuel Cells led to a mission termination due to loss of electrical power.

NOTE: Apart from the data on the screens preserved by Sy Liebergot at the time, there is no extant information that completely describes the order and labelling of the lights and push buttons on the panels. This graphic has been created from the limited documentation prior to and subsequent to Apollo 13. Therefore, other than the data displayed on the monitors, the depiction of the console is an estimated representation at the time indicated.

