

Oberg-Fobos-Nov10- **overnight news not encouraging**

From: James E Oberg Sent: Thursday, November 10, 2011 7:59 AM

1. Overnight [EST] developments in the Russian 'Phobos-Grunt' space probe stuck in parking orbit -- are not encouraging. I'm glad nobody took my 50:50 odds bet on the probe being rescued.

2. The 'easy solutions' I was hoping for -- regaining ability to command the probe to try again to fire its engines and head out towards Mars -- have now failed.

3. It's beginning to look like the probe's guidance computer 'rebooted' incorrectly after the initial problem that prevented the rocket firings Tuesday night [EST] soon after launch.

4. One report is that the 'reboot' returned the computer to the pre-launch servicing mode -- in which it does not listen for radio commands. That would be fatal -- 'all she wrote' for the probe.

5. The rescue attempt is significantly hampered by their limited space communications capability, which is even worse than I first thought. Only a SINGLE ground site, the Baykonur launch center, can perform commanding. Several other sites can receive-only for telemetry signals. Adding some European or US sites doesn't solve the problem.

6. This limits the recovery efforts to TWO -- maybe three -- five-minute intervals every day.

7. And there may not be enough time. Although the satellite has maybe two weeks before it burns up, it may be running out of battery power by tomorrow, or sooner.

8. Reports that the solar panels have been opened have not been verified. An official claim that they have two weeks to restore control SEEMED to suggest they had solved the power problem, but doubts remain.

9. Actually, very LITTLE has been verified by the Russian Space Agency [Roskosmos]. They have retreated behind a Soviet-style 'secrecy curtain' that is traditionally an indicator of panicked despair. Sadly it's an all-too-familiar Russian cultural reaction to bad news -- say nothing and hope that people stop paying attention.

10. The original plan was to perform a two-step rocket firing to push the probe out of parking orbit towards Mars [and its moon, Phobos, the ultimate destination]. The first step raised the orbit several thousand miles, and two hours later the rocket fired again to complete the acceleration.

11. Both firings were to occur over South America, because of the direction into space that the probe had to take. That's a geography-dictated requirement.

12. But Russia has no tracking sites there, and the tracking ships it used to send to the South Atlantic for past maneuvers of this type, were all sold for scrap after the USSR's collapse.

13. Hence the request to South American amateur astronomers to keep an eye out for the rocket firings. This was a smart move -- because it was these skilled observers who reported NO firing or even a single flash [which would have indicated a hardware problem shutting down a properly-commanded firing], which gave the first critical clues about WHY the probe never left the parking orbit.

11. The reason for this two step firing seems to be a traditional 'Russian kludge' approach to hardware in general. The probe had grown too heavy for the original propulsion stage to push it fast enough to get to Mars. So rather than redesign the entire propulsion stage with new, bigger fuel tanks, the Russians just strapped a new set of tanks at the aft end of the rocket. They were fabricated in the form of a fat donut with the hole providing space for the rocket plume when it fired. After exhausting the fuel in the supplemental tanks, the engine stopped and the tanks were to be dropped -- and after circling Earth once, the next burn was to complete the acceleration. It would have worked. Gotta hand it to those designers.

12. It seems the Russian controllers now suspect that an orientation problem during the autopilot-controlled pointing line-up prior to the first burn was detected, triggering a computer relapse to 'safe mode' that never even tried to light the engine.

13. It was this situation that the overnight passes, a few hours ago, failed to undo. Apparently the control computer will not accept ground commands.

14. In such a situation, resuming the mission -- or even commanding a controlled suicide dive safely into the South Pacific, like Mir did ten years ago -- will be impossible.

15. We then face the threat of a fully-fuelled probe falling back to Earth at random in the next two weeks or so.

16. There remain different estimates of how MUCH highly toxic fuel is on board -- I estimated five tons or more, some experts tell me it's TWICE that or more.

17. There's also differences of opinion on whether the hydrazine fuel will freeze solid -- making it much more likely to survive all the way to a ground impact and local-area major contamination event. This depends on the design of the probe's tanks.

18. Outer space is actually quite cold. When a Russian 'Salyut' space station lost power 25 years ago, its water and propellant tanks DID freeze solid. But a daring rescue mission on a Soyuz capsule recovered control, restored power, and rescued the space station. No such chance now -- there's not enough TIME left.

19. As for what to expect today -- nothing, except in a miracle, some official candor.

20. The next command opportunity -- and perhaps, the last -- is late this afternoon EST.

21. I will monitor, with rapidly diminishing hope, and will advise.