

From: James E Oberg Sent: Wednesday, November 09, 2011 8:44 AM
Subject: Russian MARS-PHOBOS probe status -- stuck, but perhaps rescuable....

Jim Oberg advises:

1. The good news from space this morning is that the Russian probe did NOT explode. It actually looks stable and undamaged, with no irreversible losses. IT MIGHT BE SAVED.
2. It is circling the Earth between 200 and 340 kilometers [124 to 211 miles], which is stable for several months. They seem to be in a safe situation, so they have the most precious spaceflight resource -- TIME -- to figure out and implement an alternate command scheme.
3. Today at 12:16 PM EST Moscow Mission Control will try to raise the orbit slightly, to test whether they can get around the apparent software problems that stymied the rocket burns last night [EST], shortly after launch.
4. If this maneuver works -- and we'll know quickly -- it becomes very likely that the probe can indeed be restarted and sent on its way to the martian moon Phobos for its three-year mission to retrieve soil samples.
5. The Russians have had numerous deep space probes get stuck in parking orbit over the past fifty years, They have never rescued a single one of them. But things have changed, their capabilities have improved, probe design has improved, and it now seems entirely possible they will do so this time.
6. The most serious way that time is working AGAINST them is that the parking orbit's plane in space is daily shifting about 7 degrees westwards, which can have an impact on the velocity they will need to attain the desired trans-Mars trajectory. Earth and Mars are also moving in their own orbits so the 'window' for a transit trajectory only lasts to the end of the month.
7. If they fail to regain control, and the satellite becomes a derelict hunk of 'space junk', it then becomes one of the most dangerously toxic objects ever to fall back onto the Earth. That's because it contains at least five tons -- maybe more -- of rocket fuel such as hydrazine, which would likely freeze [or at least 'slush up'] and survive the fires of entry to splash in concentrated form somewhere on the planet, poisoning any nearby living things. Think about the Pentagon's derelict 'USA-193' spy satellite a few years back -- this would be MUCH more dangerous.
8. Apparently there's also a few grams of radioactive cobalt-57 in one of the soil analysis instruments. That doesn't look like any significant contamination threat if/when it falls back to Earth.
9. Even if they rescue this mission -- and I give them better than 50:50 odds of doing so -- that praiseworthy triumph would not dispel the bad omen of the probe's very first steps on a long and difficult journey. You know the old superstition about tripping on your doorstep at the beginning of a long journey -- in that case, you'd better just turn around and go back into the house. But this time there's no choice but to try to continue.
10. Meanwhile, more reports are coming in from Brazil about what the probe looked like in the sky when it failed to ignite its engine. Here's a video: <http://www.youtube.com/wat...>
11. Russian scientists had prudently asked ordinary citizens of South America to keep an eye on the sky at the two specific times of the planned rocket burns, and that was a good idea because now there are eyewitness accounts of the misfire. The probe was far out of range of any Russian tracking site at that time.
12. The crew of the space station also had a chance to spot the second firing, but since the first firing never occurred, the probe wasn't where they expected it to be, and did not see it.
13. The difference in hardware and software makes it clear that this problem should not impact plans to launch a relief crew to the International Space Station November 13 [11:14 PM EST]. Russian space officials in Moscow confirmed this, this morning.
14. The go-for-broke nature of this mission, aiming for the first Russian deep space success in a quarter century, always looked awfully bold, and now looks just plain reckless -- whatever happens next. Whoever is responsible for choosing this approach will have to be sacrificed.

15. It's the Russian way -- find somebody who looks guilty, punish them severely, and encourage the others" in the manner of the cynical old motto, "The beatings will continue until morale improves".

16. Russia cannot retreat from interplanetary missions, or it will irremediably lose its standing as a main player on the space frontier. While it's true their past record at Mars is lamentable, there were no-longer-relevant factors to account for that, and on the other hand their persistence was laudable.

17. What it will take to develop a new generation of skilled space workers remains the unanswered question, and only future flight experience will answer that.

18. But some Russian analysts suggest that the current problems go far beyond superficial issues of hardware fabrication and personnel training inadequacies, and that the 'good old days' of the Space Race 'back in the USSR' were the fruit of a confluence of very special environmental and cultural trends which today no longer exist and can NEVER be restored.

19. Beyond that BIG picture, the current drama is how Russia's space team is working on pulling off a remote-controlled "Russian Apollo-13 rescue" of this currently stalled space mission. There is drama and suspense -- and an exploration mission whose results would, if it works, benefit the entire world.

JimO comment:

<http://forum.nasaspaceflight.com/index.php?topic=15610.435>

Pessimistic? By no means. Nothing irreversibly bad has happened, the full prop load is still available, and short-term 'stay healthy' maneuvers can be performed.

Since the solar panels must be strong enough to perform Mars orbit insertion with the Fregat stage, it seems plausible that they can be deployed even before the Earth departure burn is made. That solves one problem. Going into a higher apogee orbit allowing more dwell time over Russian tracking sites solves another.

The major current problem is to get the spacecraft out of 'safe' mode. But such a mode is DESIGNED to be able to leave when you feel better.

I'll offer better than even odds that they WILL be able to make their interplanetary insertion -- maybe not tomorrow, and maybe not in three days, but within the launch window.

Here's a pessimistic thought -- if they CANNOT regain control of the bird, and it heads for an uncontrolled entry, the hypergolics it carries -- about seven tons of nitrogen tetroxide and hydrazine, which could freeze before ultimately entering -- will make it the most toxic falling satellite EVER. Old USA-193 will pale in comparison, as would Mars-96 and the plutonium it dumped on Bolivia in 1996.