Russia's attempts to save Mars probe unsuccessful (Update)

November 10 2011, By VLADIMIR ISACHENKOV and SETH BORENSTEIN , Associated Press

In this Nov.2, 2011 photo distributed by Russian Roscosmos space agency on Wednesday, Nov. 9, 2011, the unmanned Phobos-Grunt probe is seen on the Baikonur Cosmodrome, Kazakhstan. The daring Russian mission to fly an unmanned probe to Phobos, a moon of Mars, and fly samples of its soil back to Earth was derailed on Wednesday, Nov. 9, 2011, right after its launch by equipment failure.(AP photo/ Russian Roscosmoc space agency, HO) EDITORIAL USE ONLY

As Russia's space agency struggled Thursday to fix a probe bound for a moon of Mars that instead got stuck in Earth's orbit, some experts said the chances of saving the $170 million craft looked slim.

Roscosmos spokesman Alexei Kuznetsov said efforts to communicate with the unmanned Phobos-Grunt (Phobos-Ground) spacecraft hadn't

brought any results yet. The probe will come crashing down in a couple of weeks if engineers fail to fix the problem.

The Phobos-Grunt was launched Wednesday and reached preliminary orbit, but its engines never fired to send it off to the Red Planet. Kuznetsov said controllers on Thursday will continue attempts to fix the probe's engines to steer it to its path to one of Mars' two moons, Phobos.

Roscosmos chief Vladimir Popovkin, said the system that keeps the spacecraft pointed in the right direction may have failed. Other space experts suggested that the craft's computer failure was a likely cause.

If a software flaw was the problem, scientists can likely fix it by sending new commands. Some experts think, however, that the failure was rooted in hardware and will be extremely difficult, if not impossible, to fix.

"I think we have lost the Phobos-Grunt," Vladimir Uvarov, a former top space expert at the Russian Defense Ministry, said in an interview published Thursday in the government daily Rossiyskaya Gazeta. "It looks like a serious flaw. The past experience shows that efforts to make the engines work will likely fail."

Complicating the recovery efforts, the space agency only has a few hours a day to reach the probe due to Russia's limited earth-to-space communications network. Kuznetsov said new attempts to contact the craft will be made Thursday evening.

The spacecraft is 13.2 metric tons (14.6 tons), and most of that weight, about 11 metric tons (12 tons), is highly toxic fuel.

Most experts believe the fuel will likely stay liquid if the probe comes down and would harmlessly blow up about 50 miles (80 kilometers)

above ground, but some fear it may freeze, survive the fiery reentry and spill on impact.

Earlier story:

A Russian spacecraft on its way to Mars with 12 tons of toxic fuel is stuck circling the wrong planet: ours. And it could come crashing back to Earth in a couple of weeks if engineers can't coax it back on track.

Space experts were hopeful Wednesday that the space probe's silent engines can be fired to send it off to Mars. If not, it will plummet to Earth. But most U.S. space debris experts think the fuel on board would explode harmlessly in the upper atmosphere and never reach the ground.

The launch mishap was the latest in a series of recent Russian failures that have raised concerns about the condition of the country's space industries.

The unmanned $170 million Phobos-Ground craft successfully got into orbit, propelled off the ground by a Zenit-2 booster rocket just after midnight Moscow time Wednesday (2016 GMT Tuesday) from the Baikonur cosmodrome in Kazakhstan. After separating from its booster, 11 minutes later, it was supposed to fire its engines twice and head to Mars.

Neither engine fired. So the spacecraft couldn't leave Earth's orbit, flying between 129 and 212 miles above Earth. And that orbit is already deteriorating, according to American satellite tracking.

The Federal Space Agency said the probe's orbit and its power sources could allow it to circle the Earth for about two weeks. That jibes with calculations made by NASA.

"From the orbits we're seeing from the U.S. Space Surveillance Network , it's going to be a couple weeks before it comes in," NASA chief debris scientist Nicholas Johnson said Wednesday afternoon. "It's not going to be that immediate."

The craft was aiming to get ground samples from Phobos, one of Mars' two moons, and return them in a daring expedition hailed by eager scientists, who said it may include bits of Mars that may have been trapped on its moon.

Federal Space Agency chief Vladimir Popovkin said the system that keeps the spacecraft pointed in the right direction may have failed. The Russian rescue effort was being hampered by a limited earth-to-space communications network. Even before the problem, flight controllers were forced to ask people in South America to scan the sky to see if the engines on the spacecraft fired.

Amateur astronomers were the first to spot the trouble when they detected the craft was stuck in an Earth orbit.

As time went on Wednesday, experts in the United States became more confident that the Russians could still get the probe going, just a day or two later than planned. There were no sightings of an explosion or partial rocket firings, which are good signs, said James Oberg, a NASA veteran who has written books on the Russian space program and who now works as a space consultant.

"I am growing more confident as we realize that the vehicle is healthy; it didn't blow up," Oberg said late Wednesday afternoon. "They have a chance of doing a Hubble repair, an Apollo 13, snatching victory out of jaws of defeat kind of thing."

The hope is that this is just a software problem that can be fixed and

uploaded to the probe, said Bruce Betts, program director of the Planetary Society in the United States, a group that has a $500,000 experiment on board.

"There's a major problem, but it might be recoverable," Betts said. "The game's not over yet."

The spacecraft is 13.2 metric tons (14.6 tons). Russian data shows that most of that weight - about 11 metric tons (12 tons) - is fuel, NASA's Johnson said.

The key is whether that fuel remains in liquid form or freezes. If it's liquid, it would harmlessly blow up about 50 miles (80 kilometers) above ground, he said.

If the fuel freezes, it poses more of a hazard to Earth because it could survive the fiery reentry and spill on impact. But most U.S. experts, including Johnson, believe it will likely stay liquid.

Yet Oberg said he worries that the fuel - nitrogen tetroxide and hydrazine - would freeze in the cold over a couple weeks. If that happens it "will make it the most toxic falling satellite ever," he emailed. "What was billed as the heaviest interplanetary probe ever may become one of the heaviest space derelicts to ever fall back to Earth out of control."

In 2008, the U.S. government, worried about the hazards of a half-ton of frozen hydrazine in a titanium tank in a dead spy satellite. It shot down the satellite with a Navy missile.

Oberg said if this latest spacecraft falls, it could cause significantly more damage than the Russian Mars-96 spacecraft that crashed in the Andes Mountains and sprinkled some nuclear material.

Far heavier objects - including NASA's Skylab and Russia's Mir space station - have fallen.

If the stuck spacecraft's fuel exploded, only 3 tons of dry material would be left, Johnson said. That's smaller than recent defunct American and German satellites that fell to Earth, causing a brief stir, but no damage as they hit the ocean.

"We've had much larger objects than this come down and not have a problem," said William Ailor of the Aerospace Corp.'s Center for Orbital and Reentry Debris Studies. "Most likely it'll be like the ones we've seen recently. It'll come down in the ocean and we'll never hear about it."

No one has ever been hurt by crashing space objects.

The Phobos-Ground was Russia's first interplanetary mission since the botched 1996 robotic mission to Mars. That probe crashed shortly after the launch due to an engine failure. Moscow-based NPO Lavochkin designed both, as well as two Phobos probes in 1988, which also failed.

The Russian space agency responded to the failures by promising to establish its own quality inspection teams at rocket factories to tighten oversight over production quality.

In contrast with the failures that dogged Soviet and Russian efforts to explore Mars, a succession of NASA's landers and rovers, including Spirit and Opportunity, have successfully studied the Red Planet.

If Phobos-Ground is fixed, it should reach Mars orbit next September and land on Phobos in February 2013. The return vehicle is expected to carry up to 200 grams (7 ounces) of ground samples from Phobos back to Earth in August 2014.

It is arguably the most challenging unmanned interplanetary mission ever. It requires a long series of precise maneuvers for the probe to reach the potato-shaped moon just 20 kilometers (over 12 miles) in diameter, land on its cratered surface, scrape it for samples and fly back.

"If this had worked it would be a fantastic mission," said Cornell University astronomer Steve Squyres, who has worked on several successful and failed U.S. Mars probes. "It is a reminder, if we needed one, that space exploration is hard and Mars missions are tricky."

NASA has its own Mars mission, a mega-rover called Curiosity set to launch Nov. 25 from Cape Canaveral, Fla., and arrive on the surface next summer.

More information: Russian space agency:: http://bit.ly/tVk8TL