

NASA deploys new system to avoid traffic jams at Mars

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Washington: Five active spacecrafts are now orbiting the Red Planet, including one from India, leaving NASA with no option but to beef up traffic monitoring, communication and manoeuvre planning to ensure that Mars orbiters do not collide with one another.

The newly-enhanced collision-avoidance system from the US space agency accurately warns if two orbiters approach each other too closely.

NASA's Mars Atmosphere and Volatile Evolution (MAVEN) and India's Mars Orbiter Mission (Mangalyaan) joined the 2003 Mars Express from ESA (the European Space Agency) and two from NASA -- the 2001 Mars Odyssey and the 2006 Mars Reconnaissance Orbiter (MRO).

Currently, all the five active Mars orbiters use the communication and tracking services of NASA's Deep Space Network.

This brings trajectory information together and engineers can run computer projections of future trajectories out to a few weeks ahead for comparisons.

The newly-enhanced collision-avoidance process also tracks the approximate location of the NASA's Mars Global Surveyor, a 1997 orbiter that is no longer working.

"Previously, collision avoidance was coordinated between the Odyssey and MRO navigation teams. There was a less possibility of an issue," Robert Shotwell, Mars Programme chief engineer at the NASA's Jet Propulsion Laboratory (JPL), said in a statement.

"MAVEN's highly elliptical orbit, crossing the altitudes of other orbits, changes the probability that someone will need to do a collision-avoidance manoeuvre. We track all the orbiters much more closely now."

MAVEN, which reached Mars on September 21, 2014, studies the upper atmosphere.

It flies on an elongated orbit, sometimes farther from Mars than NASA's other orbiters and sometimes closer to Mars, so it crosses altitudes occupied by those orbiters.

For safety, NASA also monitors positions of ESA's and India's orbiters which both fly along elongated orbits.

Traffic management at Mars is much less complex than in the Earth orbit, where more than 1,000 active orbiters plus additional pieces of inactive hardware add to hazards.

As Mars exploration intensifies, precautions are increasing.

The new process was established to manage this growth as new members are added to the Mars orbital community in years to come.

"It is a monitoring function to anticipate when traffic will get heavy," said Joseph Guinn, manager of JPL's mission design and navigation section.

When two spacecrafts are predicted to come too close to one another, "we give people a heads-up in advance so the project teams can start coordinating about whether any manoeuvres are needed," he informed.

The new formal collision-avoidance process for Mars is part of NASA's Multi-Mission Automated Deep-Space Conjunction Assessment Process.

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