



MARS SOCIETY
Follow the action from the meeting of Mars enthusiasts in Boulder, Colorado.
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S. OGDEN/SPL

NASA draws up blueprint for craft to reach Moon and Mars

BOULDER, COLORADO

NASA last week revealed its plans for the next generation of space vehicles, designed to get humans back to the Moon and, eventually, to Mars.

On 13 August, Christopher Shank, special assistant to NASA administrator Michael Griffin, described the agency's future exploration machinery, which is proposed to replace the shuttle in 2010.

His talk, given at the Mars Society Conference in Boulder, Colorado, precedes a full report scheduled for release this month, called the Exploration Systems Architecture Study. This will lay out how NASA intends to meet President George W. Bush's goal of sending humans back to the Moon by 2020 in preparation for a Mars mission.

"It will be a 'go as you can afford to pay' approach," Shank told the 300 members of the Mars Society, a private group whose mission is to promote human exploration and colonization of the red planet. "Let the long, hard slog begin."

That, he said, means deferring other programmes, such as future research on the International Space Station (ISS) and lunar-base development, until the new space vehicles come online. The first vehicle will be a 25-tonne Crew Exploration Vehicle (CEV), which will ride into space on a modified shuttle booster rocket; this will initially supply and return ISS crews. After 2010, work will begin on a 100-tonne Heavy Lift Vehicle (HLV) that can carry heavier payloads. The HLV will also use a rocket modified from the shuttle's boosters and external fuel tank.

Lockheed Martin and a team at Northrop Grumman-Boeing have contracts to develop the three- to six-person CEVs. Potential designs include

a large Apollo-like capsule or a smaller, slimmer shuttle. NASA will pick the winning design in 2006.

Mars Society members were thrilled to hear about the vehicle plans and they support Griffin in getting started. But they object to the proposed timeline, and the size of the CEV. They want to see a 7-tonne vehicle being used as this could take humans directly to the Moon and back, and so accelerate lunar-base construction. NASA's 25-tonne CEV could carry six people as well as ISS supplies and parts. But to reach the Moon it would need to

rendezvous with another, as yet undeveloped, vehicle in lunar orbit before returning to Earth.

"It's a choice between having a Cadillac ISS programme or a lunar

base," says Robert Zubrin, society president. He argues that continuing to focus on the ISS does little to further the goal of getting to Mars. Shank counters that NASA does not separate the ISS from Moon and Mars missions, as the same components are integral to both.

Zubrin and his fellow enthusiasts applauded the plans for an HLV, which is critical for a martian journey. But some, such as David Schuman, a lawyer at NASA's Goddard Space Flight Center in Greenbelt, Maryland, criticized the decision to delay HLV development until after 2010.

Without solutions to the shuttle's current safety issues, he notes, "we could be left without any heavy-lift capability". That would delay ISS completion, pushing Moon and Mars timelines back another decade. As it is 36 years since the first lunar landing, Zubrin and fellow exploration proponents say that delay is not only unbelievable — it is unacceptable. ■

Kendall Powell

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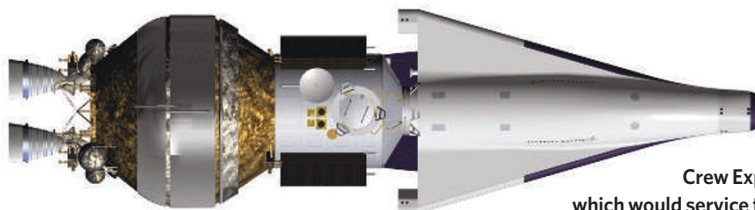
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So far, observers are giving synthetic biologists credit for tackling such issues. But some, such as Paul Rabinow, an anthropologist at the University of California, Berkeley, think that the field needs to take a broader view than it has so far. He is speaking at the San Francisco meeting this week and says he will tell attendees to pay more attention to the danger that synthetic biology could be abused for biowarfare or bioterrorism, something that is harder to control than the risk of accidents.

"The field has been attempting to turn this into a safety issue, but we're living today in a security regime," he told *Nature*. "Dealing with safety is good, but they're fooling themselves if they think that's going to be the end of this question."

Venter agrees, arguing that rather than regulating labs and companies, governments need to use synthetic biology to develop ways to defeat bioterrorist attacks, such as producing drugs and vaccines, or sensors to detect altered organisms in the environment. "If we're not concentrating 100% of our defensive effort on countermeasures, I think we're missing the big picture," he told the NSABB in June. ■

Erika Check



One of the designs for the Crew Exploration Vehicle, which would service the space station.

LOCKHEED MARTIN