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Days ahead crucial for Mars rover

By Paul Rincon

Science reporter, BBC News

Talks to resolve the design of Europe's rover mission to Mars are converging on a "best solution for science", a senior space official has told the BBC.



The robotic rover mission is set to be launched in 2013

The option in question would require an upgrade to the original vision.

But observers fear some European Space Agency (Esa) delegates could still balk at the enormous costs of an enhanced mission.

It will test the resolve of member states to avoid the unthinkable - killing off the flagship project.

Crunch time

Abandoning the ExoMars mission would be a public relations catastrophe for the space agency, raising serious questions over Europe's space capability.

The robotic rover mission is set to be launched to the Red Planet in 2013.

The top-level panel from Esa member states, including the UK, is being asked by agency scientists to approve an upgraded - and much more expensive - design to that originally proposed.

“ The general consensus was positive and recognising the need to have much more science return from the mission ”

Bruno Gardini
Esa ExoMars team member

It would see ExoMars travel with an orbiter to relay data back to Earth.

This would free the mission from reliance on US spacecraft for communications with home, and would allow the rover to wait in orbit for Martian dust storms to subside before landing on the Red Planet.

The option would require the whole package to be launched



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on a bigger, more powerful rocket, meaning the robotic vehicle could also carry additional, or heavier, science instruments to search for life.

ExoMars is one stage in an ambitious European programme of planetary exploration - called Aurora - which is geared eventually to include a mission to return samples of Martian soil to Earth.

Delegates from Esa member states have been meeting this week in Paris to agree a final configuration so that industrial partners can move ahead on the project.

Bruno Gardini, a member of Esa's ExoMars project team, said that "opinion was converging" on the beefed-up mission design.

"We are moving in that direction," he told BBC News.

"The general consensus was positive and recognising the need to have much more science return from the mission. But taking a decision takes a little bit of time and consultation.

"There has of course been discussion on all possible alternatives. But I think at the end, the opinion of the present participants was - I would dare to say - converging because of the scientific return."

Delegates will now meet again on 11 June in an attempt to reach formal agreement on the mission's configuration.

'Marsquakes'

An important meeting to hammer out the financial details of the proposal is scheduled for later this year.

For months, scientific and industrial groups across Europe have been developing a number of concepts in parallel.

The early "baseline option" called for a rover to be launched on a Soyuz-Fregat booster and landed on Mars using bouncing gas bags.

In this original configuration, the 650m-euro rover would have the capacity to carry 8kg of instrumentation, including a drill to burrow beneath the Martian soil.

A Geophysics/Environment Package (GEP) would also be sent with the rover. This fixed station, once placed on the planet's surface, could sense "Marsquakes" and monitor weather.



The Ariane 5 would have the power to launch an upgraded mission

But the bouncing bags would put tight constraints on the volume of space into which the rover must be stowed.

This in turn restricts the maximum mass that can be given over to instruments and makes it impossible to carry a meaningful GEP payload.

Rocket launch

Discontent was also expressed over intentions to use American orbiting spacecraft at Mars to relay commands and data. If the US were to experience a spacecraft failure - as happened last year - ExoMars could be compromised.

Design teams have therefore been considering the enhanced concept that would see the rover launched on a heavy lift Ariane 5 or a Proton rocket.

"We need a decision on the technical content of the work, otherwise it is not efficient anymore," said Bruno Gardini.

David Parker, from the UK delegation on Esa's Programme Board for Human Spaceflight, Microgravity and Exploration, said: "There are future meetings over the coming weeks and months, to try to find the definite way forward on the ExoMars mission."

Of the heavy lift option, he said: "That was Esa's recommendation and was presented to us in real time. Now we have to go back home and reflect and think about it."

Dust storm risks

Some commentators, however, have been worried the extra costs of the beefed-up design - amounting to tens of millions of euros - could force some delegates into turning their backs on the mission.

But to abandon ExoMars now would make a mockery of Esa's planetary exploration programme. It would also knock back a generation of scientists who have pinned their hopes on the Aurora roadmap to deliver a mission to bring back Martian soil and rocks for study in laboratories on Earth.

Late last year, the launch of ExoMars was pushed back from 2011 to December 2013.

With a launch in 2011, ExoMars would have spent two years in a heliocentric orbit before reaching its target.

The mission will now make a direct transfer to Mars, which takes less time to get to the Red Planet.

But it will now arrive in September 2014, during a period of global dust storms.

Without an orbiter, the rover would have to land in the midst

of these storms, a risk Esa says it is unwilling to take.

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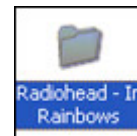
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