

ESA seeks to pick up the pieces from Cluster mission's fiery fate

Munich. The European Space Agency (ESA) is to decide within a few weeks whether partially to replace its space science mission Cluster, a group of four satellites planned to explore the 'solar wind' which was lost when the launcher, Ariane-5, exploded during its maiden flight last week.

But even if a scaled-down repeat mission is approved, there is no guarantee that Cluster's unique three-dimensional imaging capability will survive. Nor is there any guarantee that national space agencies will finance new payloads.

Cluster was one half of ESA's ECU-850-million (US\$1.05-billion) solar-terrestrial physics programme, the first of ESA's four 'cornerstone' missions of its Horizon 2000 space science programme. The other half of the mission is SOHO, which was successfully launched a few months ago, and will image the Sun's disk, corona and wind at different wavelengths.

Cluster was planned to study the charged particle, electrical and magnetic field environment of the Earth in its responses to solar activity, as monitored by SOHO. Its four identical satellites would have provided the first high-resolution, three-dimensional

analysis of this environment. SOHO-Cluster is also part of a wider global programme of solar-terrestrial physics, the Interagency Solar Terrestrial Programme (ISTP). This is a series of coordinated missions that include NASA's Wind, Japan's Geotail and Russia's soon-to-be-launched Interbol.

Roger Bonnet, head of ESA's space

reliable option at the time, with the technical capability of lifting the five-tonne weight of the four-satellite mission. "I would take the same decision again," he says.

Scientists are aware of the relatively high failure rate of all launchers; that of Ariane-4, for example, is one in twelve. But this did not help ease the pain felt by Cluster investigators last week, who watched years of their working lives disintegrate 40 seconds after launch. "I realized it could happen," says André Balogh, of Imperial College, London. "But I had given no structured thought to what would happen in the eventuality."

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In fact, ESA has been quick to move on behalf of the bereft scientists, and a plan of action is likely to be agreed in the coming weeks. ESA feels a great responsibility to the scientists who lost so much, says Bonnet, pointing to their "total despair, depression and tears" immediately after the explosion.

Bonnet has already commissioned from Cluster scientists an inventory of their remaining hardware, software, manpower and facilities, in order to assess how far the original scientific objectives of Cluster might be salvaged. ESA's science advisory group and its science programme committee (SPC), which is made up of representatives of its member states, will meet next week to explore how to proceed.

There is general agreement in the space science community that the Cluster mission cannot be fully replaced because of a shortage of money in the space science budget. But there are also very strong feelings that something of the mission should be saved. "Given the scale of the loss, ESA should feel obliged to compensate [the scientific community] in some way," says Berend Wilken, an investigator from Germany's Max Planck Institute for Aeronomics, reflecting the general mood of the 900 or so scientists involved in Cluster.

Sympathy abounds both within and around ESA. "It is hard to imagine how we could get the whole mission back," says David Southwood, chairman of the SPC. "But we will trawl for clever ideas of what we can do with what is available." Bonnet points out that the ESA space science programme "is intended to serve all space science communities and solar terrestrial scientists must be left with something".

But he also emphasized that no other mission within the space science programme will be sacrificed to make room for a Cluster replacement. The only financial ►

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Exit Ariane-5: explosion devastated Cluster scientists.

science directorate, defends the decision made by ESA in 1986 to accept an offer of a free flight on Ariane-5's first qualification launch, not only because this saved hundreds of millions of ECUs, but also because the launcher was thought to be the most

NASA tightens criteria for new launchers

Washington. The US National Aeronautics and Space Administration (NASA), which has a backlog of scientific satellites awaiting launch because of a string of recent rocket failures (see *Nature* 376, 717; 1995), is to increase its supervision of untested launch vehicles, and will require them to institute new quality control measures. The requirements will be included in a request for proposals for small launch vehicles scheduled to go out to industry this summer.

Problems with the new Pegasus XL launch vehicle built by Orbital Sciences Corporation of Fairfax, Virginia, have been particularly vexing to NASA. Four of the agency's small science satellites have been on hold because of the rocket's failure in its first two outings. Now that the Pegasus is back in service (with a success in March), all four are scheduled for launch this year. Another small launcher built by Lockheed Martin Corporation, which also failed on its first try, is scheduled to carry NASA's Lunar Prospector in 1997.

Frustrated by the delays, Daniel Goldin, the administrator of NASA, announced last year that no NASA spacecraft would ride on a first-time launcher in the future. That

policy will still hold for unique or expensive missions where the risk of failure is high. But some lower-risk payloads may still end up on maiden flights, says Karen Poniatowski of the agency's launch vehicles office.

The new NASA policy divides launchers into three categories: those with no proven flights, those with some experience (1 to 14 flights), and mature launch systems. Launchers in all three categories would have to submit to an ISO 9000 review — an international quality review standard — before a launch contract could be awarded.

Launchers in the first two categories would be subject to several additional reporting requirements, including a NASA audit with "relatively small on-site requirements", says Poniatowski.

So far, says Poniatowski, the launch industry seems willing to accept the new NASA policy. Although there may be some increase in costs associated with the additional requirements, the improved quality control should result in savings, she says. The intention of the new policy is to let the launch industry continue to audit itself, while boosting NASA's confidence in a successful launch. Tony Reichhardt