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 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 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."

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 ▶

Gamma

Exit Ariane-5: explosion devastated Cluster scientists.

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

▶ flexibility that ESA has to achieve this would be to delay future missions, while trying to avoid a detrimental knock-on effect.

What are the realistic options for an affordable, scaled-down version of Cluster? One possibility would be to fly a single satellite with simpler scientific instruments. One back-up satellite already exists and could be prepared quickly and reasonably cheaply by the German contractor, Dornier.

A second possibility would be to launch the back-up satellite along with one or more smaller, simpler and cheaper satellites. But this would require much more time, as the design of any new satellite would need to be extensively tested.

In either case, ESA will be looking at the possibility of putting any replacement satellite or satellites into orbit with other ISTP spacecraft, in an attempt to reproduce the three-dimensional resolving power characteristic of Cluster's four-satellite set-up, which scientists are keen to protect.

In both cases, the reduced weight of the mission would allow a cheaper launcher — such as Ariane-4 — to be used. In both cases, however, even if ESA was able to find sufficient money to provide the replacement satellites, national space agencies would have to agree to pay once again for the instruments, despite extreme tightness of their own funds. **Alison Abbott**

NIH resists bill to promote research into Parkinson's

Washington. Support is growing in the US Congress for a bill that would dramatically increase spending on research into Parkinson's disease by the National Institutes of Health (NIH) — despite the opposition of leading NIH officials who dislike congressional mandates.

The bill, named after Morris K. Udall, a popular former congressman, has 42 Senate co-sponsors and 176 supporters in the House of Representatives, ranging from conservative Republicans to liberal Democrats — a "dream" list, according to one Senate aide. Between 1 and 1.5 million Americans are believed to suffer from Parkinson's disease. One estimate puts the cost of their care at $25 billion a year. The bill authorizes more than $100 million a year for Parkinson's research over five years, compared to $28 million at present.

Advocates describe the present sum, much of which is channelled through the National Institute of Neurological Disorders and Stroke (NINDS), as paltry compared to that allocated to diseases such as Alzheimer's and AIDS. They have now convinced many politicians of their case. Even conservative opponents of fetal tissue transplants — which NIH Parkinson's money now supports — have signed on as co-sponsors, even though the bill does not contain a ban on NIH funding of such research.

One such senator, Rick Santorum (Republican, Pennsylvania), has "some reservations" about the bill because of this, says his spokesman, Tony Fratto. "But we felt that [Parkinson's disease] is so important that we need to give the bill as much support as possible." Other senators, such as Dan Coats (Republican, Indiana), who vocally oppose congressional "earmarking" of NIH funds, are making an exception and supporting the Parkinson's bill.

Zach Hall, the director of NINDS, declines to comment on the bill, but says his institute is "very actively concerned" with Parkinson's.

Harold Varmus, the director of NIH, questioned in March by the Senate Committee on Labor and Human Resources, said he opposed the bill. He argued that the longed-for advances in Parkinson's research would come about not by quadrupling funds directed at Parkinson's but from "work that is generic to all nerve cells".

But Paul Wellstone (Democrat, Minnesota), both of whose parents had the disease, challenged Varmus, saying that many people struggling with the illness "are not at all persuaded" that generic research is enough. Citing "no increase at all" in funding for Parkinson's by NIH since 1989, Wellstone said: "I don't see that much of a commitment."

Varmus replied that he feared the NIH could not "responsibly fund" ten Parkinson's research centres, as required by the bill. "We don't believe that science would be furthered by such a large expenditure of money for so many centers," he said. He also called on the committee — which is responsible for drafting a separate bill that authorizes the NIH — to preserve "an atmosphere as free as possible from restrictions" requiring the NIH to spend money on certain diseases. The Udall bill was introduced in 1995. Its House author is Henry Waxman (Democrat, California), and its Senate author is Mark Hatfield (Republican, Oregon).

The bill's advocates hope that the Senate Committee on Labor and Human Resources will soon amend a bill reauthorizing the NIH to include the Udall bill. But chairwoman Nancy Kassebaum (Republican, Kansas), opposes additions to the NIH bill, and its House counterpart is unlikely to see legislative action this year, according to aides. **Meredith Wadman**

Chinese rocket site 'blind to safety'

Hong Kong. An internal memorandum from the international satellite company Intelsat, criticizing a "blindness towards safety" at China's rocket launch site and describing it as "pathetically short of world standards", has added to the aerospace industry's growing concerns about the viability of China's commercial satellite launch capabilities.

The memorandum, which was obtained by the Washington-based publication *Science and Government Report*, reports what it claims to have been "callous disregard for human life" and states that "under no circumstances" can Intelsat use the site again. It is written by a manager who witnessed the explosion on 14 February during attempted lift-off on the first flight of a Long March 3B rocket of Intelsat's 708 satellite from the space site at Xichang in Sichuan province.

Although China's Great Wall Industry Corporation, which runs the launch facility, reported four deaths, Israeli film footage smuggled out afterwards showed soldiers clearing bodies and wreckage over a large area. The film-maker estimated that a hundred people had been killed. In another disaster in January 1995, six people were officially reported killed at the inland military site, which is in a mountainous region populated by farmers.

The Intelsat memo says observers were prevented from leaving the viewing area for nine hours after the explosion. "In retrospect, this gave the Chinese enough time to clear out any dead people from the gate and village areas, which were not evacuated to our knowledge," the memo says.

Great Wall declines to comment on either its launch schedule or the site's safety. Since the disaster, however, two planned Intelsat launches, one by the US-based company Echostar and a fourth by Asia Satellite Communications (AsiaSat), based in Hong Kong, have been moved to Russia's Proton and France's Ariane rockets.

February's failure contrasts sharply with that of Ariane (see page 241), in which the rocket was blown up from the ground within a few seconds of launch. The Long March 3B was allowed to fly for 20 seconds and to turn until it was heading back to Earth, even though television footage clearly showed it turning off-course before it had even cleared the launch tower. Some observers speculate that either the Chinese held off to avoid damaging the launch tower or that their rocket was not carrying explosives capable of destroying the vehicle in case of difficulties. **Elisabeth Tacey**