

Is NASA an expensive failure?

Thomas Gold

The debacle of the US space programme is the consequence of the insecure, publicity-seeking policies of the National Aeronautics and Space Administration.

THE succession of NASA failures cannot be ignored. The enormous expense of shuttle launches has removed NASA from competitiveness in the international market for the launch of utilitarian satellites such as those for studying the weather, for international communications systems, or for surface mapping of the globe. At the start of the shuttle programme, NASA announced that the huge investment would be quickly repaid, because it would make space launches enormously cheaper than disposable boosters could ever make it. Now, 20 years on, the opposite is true: the cost per pound launched into a near-Earth orbit is many times greater than that of the unmanned, disposable boosters which have meanwhile been developed in several other countries. Further, disasters and near-disasters make clear that the shuttle is not a secure launch system.

Beyond that, we have witnessed a succession of failures of gigantic proportions. The Hubble space telescope, a \$2 billion enterprise, had a design fault so gross that it could have been detected before launch at relatively small extra expense with quite simple, high-precision measuring instruments. Whether the recent repair mission will turn out to be successful remains to be seen. But its cost (between \$630 million and \$1.2 billion) must temper enthusiasm for a repair that, at best, cannot bring the instrument to the originally expected performance. The number of independent, serious faults that had to be fixed does not make for a good prognosis.

The Galileo mission to explore Jupiter and its satellites, costing more than \$1 billion, may still yield some results, but a mechanical failure in unfurling the spacecraft's antenna will prevent it from signalling all its results back to Earth.

Now, after a costly series of failed shuttle launches, another major project costing nearly \$1 billion, the Mars Orbiter, has been inexplicably lost. Similarly, an Earth-mapping satellite, a continuation of the Landsat series, is now floating uselessly in some unknown Earth orbit. Is this succession of failures to be expected from a programme that has been properly planned, in view of the enormous cost?

The problems of planning space research programmes were discussed with great care and in detail in the early 1970s. Committees of external advisers, some set up by NASA and some by the Office of Science and Technology in the White House, made numerous detailed recom-

mendations which in general favoured a cautious, step-by-step approach to provide a learning period before any major expenditures. The advice of these committees was largely against the design of the shuttle but in favour of improving expendable, unmanned boosters. NASA was advised to practice sending small spacecraft with gradually advancing complexity of instrumentation to the planets, and initially a much smaller space telescope into orbit. Having gained experience from these, larger missions could be undertaken later.

NASA was invariably strongly opposed to such a policy. Its aim, so it seemed to me in the 1970s, from the perspective both of the White House space science panel and the Lunar and Planetary Missions Board of NASA, was to gain approval for the largest project in each field that could possibly be proposed. For a launch vehicle, nothing short of a huge manned shuttle would do, even if the launch would often be for only a small utility satellite. The experience with the Apollo mission to the Moon had given NASA confidence in mega-projects. Such projects, once approved, would be hard to cancel, whereas a succession of mini-projects could always be cut back. I suppose the reasoning was that huge projects would provide the financial stability which this giant, post-Apollo organization now required. The conflict with the external advisory groups was severe. Eventually, both the Nixon White House and the NASA administration disbanded them.

Within the NASA organization, external research funding was given preferentially to a few groups "with whom it could work", meaning those that went along with its policies. This policy was apparently introduced at the top level. For example, a memo (unearthed under the Freedom of Information Act) from George Low, deputy administrator, to James Fletcher, administrator, discusses one proposal: "... incidentally it is a good one. . . I had no objection to his testimony before Congress, but he should realize that being funded by the government and by NASA is a privilege and that it would make little sense for us to fund him as long as his views are what they now are. . .". The memo has a handwritten comment in the margin, apparently by Fletcher, stating "great work".

Many other academic research groups took the view that they would not be able

to change the NASA policies, so they might as well do the best they could by going along with them. NASA tended to represent this attitude in Congress as an endorsement of its plans.

Many of the best scientists and engineers left NASA in the 1970s, some, I have no doubt, because of their disagreement with these policies. Proposals for future missions were selected according to their ability to attract large funds from Congress, and their scientific or utilitarian value was only a distant second criterion. NASA spent large sums for propaganda for its proposals, and is still doing so. It inevitably has enormous support from science-fiction buffs and space enthusiasts, and that support spills over into Congress. NASA nurtured that support with the suggestion that all the current manned space endeavours are the necessary prelude to manned exploration of the planets, commencing with Mars. But a Mars expedition, based on the only propulsion technique now available, chemical rockets, would require a 2-year round trip, which would be extremely hazardous and expensive. If a new and much faster means of propulsion were to be devised, there would be plenty of time then for the preliminary work. Manned space-flight exercises now will do nothing to advance the time when a manned Mars flight becomes a real possibility. I am sure NASA is aware of this, but it prefers to lead the public to believe that a great new era of manned planetary flight is beginning, and that it is laying the groundwork.

Is it possible that this institutional corruption has become so pervasive that NASA can no longer hold together a body of scientists and engineers of the calibre required for their ambitious plans? Are we seeing now a debacle that stems from a mental attitude, rather than from a statistical fluctuation in the rate of accidental failures? If this is so, how must we then view the next gargantuan NASA plan of a permanent space station? This plan involves the immediate commitment of billions of dollars, as well as an open-ended commitment to further support. Of course, it also requires the long-term commitment, once the station is built, of keeping it manned, supplied, functional and safe — if that were possible. □

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