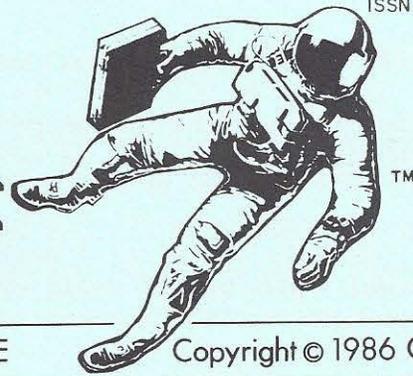


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Space Commission, Challenger Commission Release Reports

Within weeks of each other, two Presidential commissions presented their respective reports to the White House. One, the report of the National Commission on Space, proposed an ambitious American space program that would place the United States in the forefront of an international effort to take humanity out into the solar system. The other, the Report by the Presidential Commission on the Shuttle Challenger Accident, chastised the current American space program--specifically the National Aeronautics and Space Administration (NASA)--for its failures in the design, construction, and operation of the U.S. Space Shuttle and recommended a re-examination of the way NASA accomplishes its goals.

This is an ironic juxtaposition--the reports seem contradictory. One sets up NASA as the hope of mankind, capable of great achievements, while the other seems to paint the space agency as an operation barely capable of tying its shoes without incident. Which is closest to the real picture? How are these reports being received by those who are currently charged with planning the government's efforts in space?

The Report of the National Commission on Space:

"The year is 1935. Pan American Airways is inaugurating trans-Pacific service, with additional flying boats on order to open trans-Atlantic service in 1939. The last Pony Express rider turns over his mail pouch to a young biplane pilot while newsreel cameras grind. Almost nobody expects to fly the Atlantic--that's for young daredevils like Lindbergh--but half a million people per year cross in ocean liners. Washington's chief concern is the Federal Deficit: \$30 billion in revenues versus \$50 billion in outlays (1985 dollars)."

So begins the final report of the National Commission on Space (NCOS). The NCOS was charged by the President in March of 1985 with developing an overall, long-term strategy for the United States' civilian space program. The Commission, headed by former NASA administrator Thomas Paine, included in its membership such notables as Neil Armstrong, Gerard O'Neill, General Charles Yeager, Ambassador Jeane Kirkpatrick, and other representatives of government, science, and industry.

In its report, the NCOS proposed a vast, integrated program that, carried out over the next 20 years, would result in a major human presence in space by the year 2035. Projects recommended include low cost transport to orbit, interorbit vehicles, space stations in various locations throughout the inner solar system, and bases on the Moon and Mars (see Figure 1, page 3).

The NCOS anticipates a role for the private sector in these plans, stating that "wherever possible the private sector be given the task of providing specified services or products in space, and be free to determine the most cost-effective ways

to satisfy those requirements, consistent with evolving Federal regulations."

However, as the preceding statement implies, the majority of the activities discussed in the report would be carried out by NASA and the government.

The overall cost of this program is estimated at \$700 billion between 1995 and 2020, with only about one-fourth of this amount contributed by the private sector. The annual NASA budget would be almost quadrupled (in constant 1986 dollars) from the current \$9 billion to about \$40 billion by the end of that time.

If government funds form the largest contribution to this program, where does the money come from? How does the NCOS imagine that, in the current battle to balance the budget, the United States would be willing to part with these sums? In answer, the NCOS states that the increases in real terms are not that large, and could easily be absorbed by economic growth if one assumes a rather conservative projected annual growth rate for the U.S. Gross National Product (GNP) of 2.4% over the next twenty years. A NCOS chart (Figure 2, next page) illustrates the relationship between the proposed NASA budget and the GNP. It shows that the NASA budget, as a percentage of GNP, actually remains almost constant. It also shows that this percentage would remain below one-half of the percentage spent on space during the peak Apollo years.

"With the lessons of history in mind, and with a vision of humanity moving outward from Earth, the Commission recommends a new direction for our civilian space program that we believe will advance the broader goals of 21st-century America: To lead the exploration and development of the space frontier, advancing science, technology, and enterprise, and building institutions and systems that make accessible vast new resources and support human settlements beyond Earth orbit, from the highlands of the Moon to the plains of Mars."

So ends the report, on a note of challenge and boundless optimism. It was released to the public on May 22.

In Washington at least, judging from appearances, the NCOS report went over like a circus clown at a wake. The report was originally to have been presented at the White House in the middle of April. In fact, after being postponed twice, it was presented at the NASA offices in Washington on the Friday before Memorial Day, which, in terms of publicity, is the equivalent of sneaking it out under the cover of darkness. In spite of this, there was some reaction.

NASA, predictably, was enthusiastic. NASA administrator James Fletcher hailed the report as an exciting and challenging blueprint for the future (as will be seen, his response to the Rogers Commission report was somewhat cooler).

Certain voices in the space science community, also predictably, piped up to attack the NCOS report for its emphasis on manned space systems. Scientists such as James A. Van Allen and Carl Sagan, resentful of NASA's obsession with the Shuttle and the Space Station, see the NCOS plan as more of the same.

After the initial reactions, the NCOS report seemed to fade completely into the woodwork. The battle over funds for another Space Shuttle orbiter has not yet been settled, and the American space program is still in the disarray discussed here last month. Perhaps the NCOS report's timing was not the best--it was followed, two weeks later, by the report of the commission investigating the worst disaster ever to strike the United States in its twenty-five years of human travel in space.

(TEXT CONTINUED ON PAGE 4)

LOW COST ACCESS TO THE INNER SOLAR SYSTEM

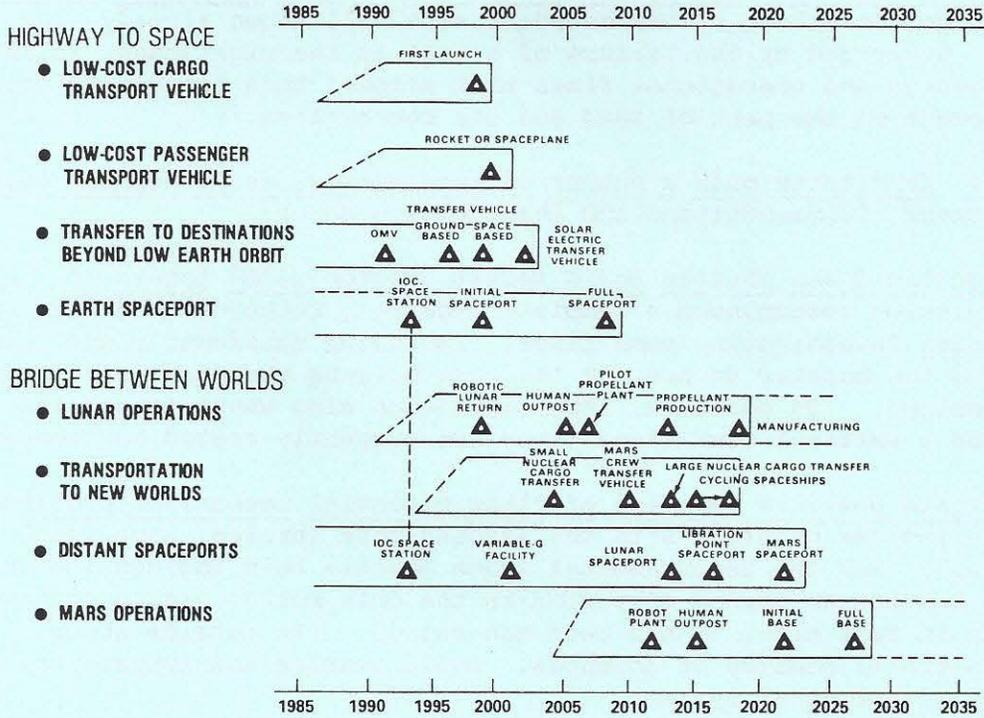


FIGURE 1

COST OF PROPOSED US SPACE PROGRAM

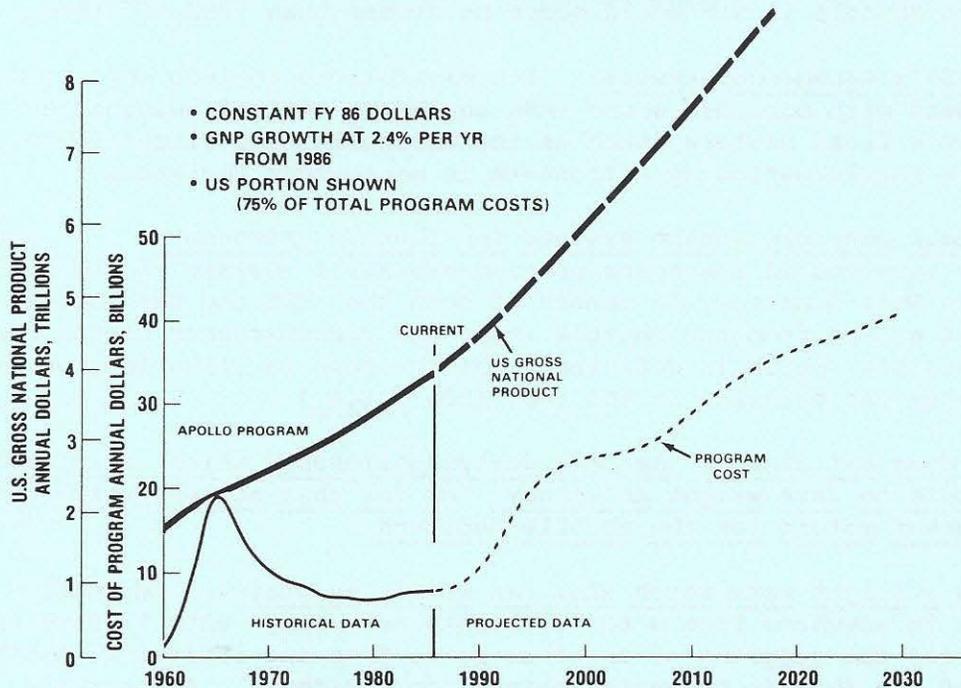


FIGURE 2

The Presidential Commission on the Shuttle Challenger Accident:

Soon after the destruction of the Challenger on January 28, a Presidential commission was formed to investigate the accident and recommend changes to prevent its recurrence. Headed by former Secretary of State William Rogers, the commission became known as the Rogers Commission. On June 9, this commission presented a 250-page report to the President.

As far as the disaster's causes go, there were no real surprises in the report. Its conclusions on the nature of the accident were well known already--the Shuttle Challenger was destroyed by the failure of a seal in the right-hand solid rocket booster. The design and operational flaws that allowed this failure to occur were due to mismanagement on the part of NASA and its contractors.

The Rogers Commission made a number of recommendations to correct the situation. Some of these recommendations and their consequences:

- Redesign the Space Shuttle Solid Rocket Booster (SRB) joints to make them safer. The commission recommended a complete redesign, rather than just a "make do" fix (NASA has been investigating some fixes, including stiffener rings which could be wrapped around the booster to prevent the case bulging that may have contributed to the seal problem). In addition, the commission also wants to see the new SRB designs tested on a vertical test stand (they are currently tested horizontally).

- Investigate possible redesign of other potential mechanical problems in the Shuttle. These include problems with the landing gear (brakes, nose-wheel steering systems and tires), and the temperamental Space Shuttle Main Engines (SSMEs), which are an accident waiting to happen (the SSME is the only rocket engine to have failed catastrophically in test after it had been man-rated). An outside group, put together by the National Academy of Sciences, would oversee and approve the redesign process for the SRB and other systems.

These mechanical fixes would delay launch of the next Shuttle flight far beyond the currently planned date of July, 1987. In particular, if vertical SRB testing is required, the next Shuttle launch could occur no sooner than 1988--if then.

- Rework NASA's management system. Recommendations include more centralization of management with more decisions made in NASA's central headquarters rather than at the agency's field centers (such as the Marshall Space Flight Center). Also recommended: more participation by astronauts in management decisions.

- Investigate possible escape systems for Shuttle astronauts. A surprising number of people involved in the space program are still unaware of the options in this area. Even Neil Armstrong (a member of both the NCOS and the Rogers commission) implied that escape from the Shuttle under the circumstances of the Challenger disaster was impossible, which is definitely not the case (a workable proposal for a Shuttle abort system was detailed in the Feb. 1986 C.S.R.)

The report does not discuss the NASA design philosophy which eliminated proposed escape systems to save weight and money, or for that matter, which originally selected solid rocket motors for the Shuttle boosters.

- Establish a flight rate which NASA can safely maintain. Currently, sources tell us that this is anywhere from 9 to 12 flights per year, with 12 stretching it. Overworked crews and the juggling of critical parts from one orbiter to another were characteristic of the Shuttle operation before the accident. Another new orbiter may not improve these processing bottlenecks.

It has not really come out what a large effect a lower launch rate will have on

NASA's plans. Take, for example, NASA's current pride and joy, the Space Station project. Although numbers vary, some NASA sources say that the Space Station could require up to 24 Shuttle flights to assemble, and up to 14 flights per year to service. If the flight rate is less than 12 per year, this could get interesting, considering the clamoring for Shuttle space currently going on in the military, commercial, and scientific community.

- Avoid reliance on a single launch system (the Shuttle) in the future. NASA's policy of elimination of other launch systems was the agency's worst blunder, and instrumental in putting the U.S. in its present launch vehicle drought. This policy has not received nearly the publicity that the O-rings have, although it is of much more importance to the space program.

Unlike the National Commission on Space report, the Rogers Commission report made a big splash. The first reactions came from inside the Rogers Commission itself. Commission member Richard Feynman, a Nobel prize-winning physicist, nearly took his name off of the final report after Rogers asked him to remove a section Feynman had written that Rogers deemed too emotional. Among other things, Feynman stated that NASA "exaggerated the reliability of the Space Shuttle to the point of fantasy." (The section authored by Feynman will appear in a later appendix to the report). Another, anonymous commission member also felt that the final report "pretty much got watered down."

The Congress received the Rogers Commission report and expressed great indignation at NASA's failings. Senators and congressmen began the great battle for network news time. A number of issues were raised:

Commission chairman Rogers was grilled on the aforementioned "watering down" of the NCOS report, and criticized for not naming more individuals responsible for NASA's errors (in the report, only Marshall booster project chief Lawrence Mulloy, was singled out by name for his role in approving the questionable SRBs for flight).

Morton Thiokol, the builder of the SRBs, was also raked across the coals for its part in approving the Challenger's SRBs for flight--an action which involved overruling its own engineers in order to please NASA. NASA's choice of Thiokol for SRB production has come under suspicion, and a NASA bias toward the company is suspected. Congressmen are urging NASA to establish a second source for manufacturing the solid boosters. Four companies are eager to compete, claiming that they could cut booster costs up to \$10 million per flight (one of these, mentioned in last month's issue, is Aerojet, which is proposing a joint-free SRB).

James Fletcher got nailed down for what was seen as a bad attitude. The NASA administrator, who had reacted so enthusiastically to the NCOS report, responded to the Rogers Commission report with considerably less concern than was deemed appropriate. Here was NASA under attack, its capability to carry out its charter in question. Talk of criminal negligence was even being raised. How did Fletcher respond? He pledged to examine the report with "an open mind."

"[The report's] conclusions...are not unexpected and certainly not entirely undeserved," said Fletcher. "We will certainly study all the recommendations. I see no reason why nearly all of them can't be followed."

This noncommittal response from the head of an agency that should have been bending over backwards to prove its willingness to mend its ways did not go over well in Washington. Fletcher was hauled to Ye Woodshed by the Great Communicator. President Reagan intends to order NASA to carry out the Rogers Commission recommendations, and if the agency doesn't, he will expect to hear a damn good reason why. This makes a delay of the next Shuttle flight until at least 1988 a near-certainty, and it is likely that this is only the beginning of NASA's troubles in Washington.

So, the Rogers Commission report is raising some dust. Unfortunately, it seems like the National Commission on Space report is starting to gather some. Yes, perhaps its timing was bad, coming so soon after the Challenger disaster.

Still, there are those space enthusiasts who say that this is precisely the time when a bold new plan is needed, when a new goal is necessary to quicken a space program seemingly lost in self-doubt. The members of the NCOS themselves seem to be part of this group--they dedicated their report to the seven Challenger astronauts. Some of these enthusiasts feel that NASA's current trial by fire is essential to the creation of a new, leaner, more effective space agency that could carry out the vision of the NCOS.

A more cynical, and probably more accurate view, is that the NCOS report marks a path for mankind to move out into space, and the Rogers Commission report shows that a government space program is not the way to follow it.

But, mistaken or not (and despite the viewpoint that NASA is the solution rather than part of the problem), it is the confident, optimistic, stick-to-it attitude of people like these, inside NASA and elsewhere, that is the heart and soul of the American space effort. If, or when, NASA fails them for good, they will move on to keep trying somewhere else. Without such stubborn dreamers no space endeavor, public or private, would ever get off the ground. May their tribe increase.

* * *

The report of the National Commission on Space, titled Pioneering the Space Frontier, has been published by Bantam Books and should be on sale at most bookstores. Paperbound, with color illustrations, it costs \$14.95.

The Report by the Presidential Commission on the Shuttle Challenger Accident is available for \$18.00 per copy from the Government Printing Office, 710 N. Capitol St., Washington DC 20401. The order number is 040-000-00496-3.

* * *

And Another One Bites the Dust...

For those still keeping count, the third stage of Ariane V18, an Ariane 2 launch vehicle, failed in flight on May 30. Wiped out in the accident were an \$82 million Intelsat 5 satellite, another huge chunk of the satellite insurance industry, and a slight smug expression that had become a fixture on certain European faces after three different American launch vehicles bought the farm.

Until next time,

Tom Brosz

The Commercial Space Report (C.S.R.) is published monthly, and endeavors to report and analyze developments in the field of private initiatives in space transportation and exploitation.

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