On the Space Station and Prerequisites for the Human Exploration Program

On March 19, 1993, Space Studies Board Chair Louis J. Lanzerotti sent the following letter, accompanying the report cited, to NASA Administrator Daniel Goldin.

It is my pleasure to present to you, on behalf of the Space Studies Board and its Committee on Human Exploration, copies of our new report, *Scientific Prerequisites for the Human Exploration of Space*. This report surveys and elaborates the key research that must be carried out before a program of human exploration can be undertaken. This research is necessary to establish whether long-duration human spaceflight is possible, and if it is, what technical approaches are most likely to be successful and productive.

Substantial preparatory work for Moon and Mars missions can be conducted by robotic probes, but I would like to take this opportunity to elaborate on the special roles of the life sciences and of a piloted space station. NASA has recently announced the intention of conducting a sweeping review of the Space Station Freedom program. Recognizing that the decision to expand human presence into the solar system "must be based on nontechnical factors,"[1] the Board has steadfastly maintained that "a properly equipped and configured space station is pivotal"[2] to essential preliminary research. The enclosed report states[3] that

> The Space Studies Board strongly affirms the position that a suitably equipped space-based laboratory is required to study the physiological consequences of long-term spaceflight.

The Board has summarized the major characteristics of such a space station on several occasions, extracting these from the fundamental guidance provided in the Goldberg report of its Committee on Space Biology and Medicine.[4]

At the same time that the space station design is being reevaluated, it is apparent that the new administration may be reexamining the position of human space exploration within national priorities. Human return to the Moon or exploration of Mars may not be pursued on an aggressive timetable in our current environment of constrained resources-indeed, the Augustine Committee recommended that the Mission From Planet Earth be undertaken on a "go-as-you-

pay" basis.[5] However, the Board has noted that "many of the fundamental problems in life sciences research involve a long period of time for their pursuit and solution."[6] The enclosed report asserts,[7] nonetheless, that

> the difficulties currently being experienced by the space station project do not negate the essential need for such a facility to perform the enabling research on human adaptation to the microgravity environment necessary for a Moon/Mars program.

The current redesign efforts should be based on a realistic assessment of the depth and pace of America's commitment to human exploration of the inner solar system. The body of the Board's work in space biology, together with the efforts of other advisory groups,[8] provides comprehensive guidance on the capabilities needed to pave the way for this enterprise. If the goal of human exploration is superseded as the premise for the nation's space station program, planning and implementation of orbital research infrastructure should be adjusted to meet the requirements of the new objectives efficiently and cost-consciously. We must recognize, however, that such decisions might significantly delay the nation's option for human expansion into the solar system.

I look forward to the opportunity to meet, at your convenience, with you and your colleagues to discuss our report further.

[1]Committee on Space Policy, *Toward a New Era in Space: Realigning Policies to New Realities*, National Academy Press, Washington, D.C., 1988.

[2]Space Studies Board, letter to NASA Administrator Richard Truly, March 30, 1992.

[3]Committee on Human Exploration of the Space Studies Board, *Scientific Prerequisites for the Human Exploration of Space*, National Academy Press, Washington, D.C., 1993, p. 13.

[4]Committee on Space Biology and Medicine of the Space Science Board, *A Strategy for Space Biology and Medicine for the 1980s and 1990s*, National Academy Press, Washington, D.C., 1987.

[5]*Report of the Advisory Committee on the Future of the U.S. Space Program*, Superintendent of Documents (GPO), Washington, D.C., December 1990.

[6]Space Studies Board, "Space Studies Board Position on Proposed Redesign of Space Station Freedom," March 14, 1991, 7 Ref. 3, p. 13.

[8]Aerospace Medicine Advisory Committee of the NASA Advisory Council, *Strategic Considerations for Support of Humans in Space and Moon/Mars*