

THINKING ABOUT SPACE FUTURES, THEN, NOW AND TOMORROW

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"We are all in the gutter. But some of us are looking at the stars." Oscar Wilde

What I intend to do during this essay is to remind you very briefly of the kinds of images--or visions--which have influenced some of humanity's space programs so far, and to consider some official as well as unofficial visions of the future of space exploration presently held. My purpose in this essay is merely to inspire your own visioning by reminding you of past and present visions held by others elsewhere.

1. NASA vision.

Mark Byrnes recently wrote a book, titled Politics and Space: Image making by NASA, which clearly explains the various types of images and visions which NASA has used to gain public support for its activities.

The following are some quotations from his book:

"NASA in its early years was seen as the 'embodiment of Yankee ingenuity and derring-do, the pride of the US and the envy of the world' as a 'superhuman agency.'" (1)

"NASA used three images--nationalism, romanticism, and pragmatism--to build support over its history.

"Nationalism has appealed to Americans' patriotism and love of country. Nationalist statements have emphasized that the space program should be supported because it is good for America as a nation. NASA...bolsters American national pride, national prestige, national strength (both military and economic) and peaceful international relations. Nationalism was NASA's primary image during the late 1950s and into the 1960s [during the initial days of Cold War competition with the Soviet Union]. (3)

"The prevailing international situation seems to have been the most important influence on the use of nationalism, which has been quite compelling under the right international conditions. Americans have traditionally responded when called to assist their country, especially when they have perceived a threat to the nation. Thus nationalism was a powerful image in the years just after Sputnik..., but it was not quite as effective in the 1980s, when NASA used the image to argue for the space station. By that time, the Cold War was fading and most Americans were much less scared of the Soviet Union than they were in the 1950s and 1960s." (174)

"Romanticism has played to the emotional aspect of the human character. It has highlighted the excitement and adventure inherent in NASA's activities and described how space exploration fulfills some basic human yearnings. Romanticism has noted that space activity allows humans to continue to explore, requires the efforts of heroic people, provides a variety of emotional rewards, and helps satisfy human curiosity. NASA employed romanticism often during the middle to late 1960s. (3)

"NASA used romanticism most heavily during two periods: the Apollo era and the post-Challenger years. In both cases, events had clearly demonstrated to the actors in NASA's political environment that the agency was involved in risky work. NASA responded with romanticism which admitted the risk and justified it on a variety of grounds." "It may be that romanticism, because it plays to the audiences' spirit and sense of adventure, has been more effective when the agency's political environment is more supportive and more flexible. " "In addition, while romanticism has sometimes been a powerful image, it probably has had a greater chance of falling flat than the other images." (175)

"Pragmatism has emphasized that the space program produces practical benefits for all citizens, thus appealing to individuals' material self-interest. This image has asserted that activity in space pays down-to-earth dividends. According to pragmatism, the space program stimulates technological advances, generates new products and techniques, delivers economic returns, enhances scientific knowledge, offers educational opportunities, and provides a space transportation system. NASA stressed pragmatism throughout the 1970s and well into the 1980s (3).

"Political difficulties seem to have encouraged NASA to use pragmatism, as it did after its political environment soured around 1970. Even under an unfavorable environment, an agency may win some measure of support if it can convince people that they have something material to gain through the agency's activities. Pragmatism did not bring NASA great political gains in the 1970s, but it did stabilize the agency's environment and thus may have prevented further erosion of support." (175)

"NASA has used all of its images to varying degrees throughout its existence, but it has emphasized certain images at certain times. This book argues that NASA, seeking to maximize its political support, has altered its use of images as the agency's political environment has changed." (3)

"Observers have often regarded NASA as quite skillful at managing its public image. For example, two reporters wrote in 1986 that NASA had a 'longtime reputation as one of the slickest self-promoters in Washington.' Not everyone has agreed with that assessment, however. One critic expressed amazement that NASA failed to maintain public interest in the Apollo program. 'The inability of NASA to keep a few trips to the moon as interesting to an TV audience as years of soap

operas and situation comedies represents a staggering triumph of ineptitude.'" (175)

2. Visions of the future of US space programs in the 1980s.

(The following is largely based on William E. Burrows, Exploring Space: Voyages in the Solar System and Beyond, 1990, Chapter 14)

In 1980, "a blue ribbon panel [was] established to devise a rational sequence of goals for planetary exploration and define the missions to carry them out. This resulted in the creation of the Solar System Exploration Committee...which worked under the auspices of the NASA Advisory Council. It delivered its detailed two-part report, Planetary Exploration Through Year 2000, in 1983 and 1986.

The SSEC study was followed by the creation of the National Commission on Space, headed by NASA administrator Thomas O. Paine, and including astronaut Neil Armstrong, the well-known test pilot Chuck Yeager, "and Kathryn Sullivan (the first American woman to walk in space)". The Commission held extensive public meetings throughout the United States and produced a beautiful and appealing report titled Pioneering the Space Frontier. An exciting vision of our next fifty years in space.

In 1987, the astronaut Sally Ride authored another inspiring report, titled Leadership and America's Future in Space, and a year later, the Space Science Board's National Research Council issued a seven-volume report, Space Science in the Twenty-First Century: Imperatives for the Decades 1995 to 2015. This latter was the product of "task groups specializing in earth sciences, planetary and lunar exploration, solar and space physics, astronomy and astrophysics, fundamental physical and chemistry, and life sciences."

There were other visionary reports during this same period. While each differed significantly, they all called for impressive programs in space science and solar system exploration over the 21st Century, either by the United States alone, or in cooperation with various other national space programs. Both the Paine and Ride reports called for human settlements on Mars by the end of the 21st Century.

With the end of the Cold War and the collapse of the American economy and national will in the 1990s, all the wonderful visions and plans have more or less come to an end, though bits and pieces might remain in the problematic International Space Station and various unmanned probes of Mars, Venus or other elements of the solar system.

But even the continued existence of NASA, in anything like its past form, is highly uncertain. There have been significant reductions and reorganizations already through the mid 1990s. It is still possible that the once-proud institution will be dismantled, major portions of it privatized or liquidated, with any residual governmental function being very difficult to anticipate or define at this time.

3. What NASA vision for the 1990s?

A NASA official, Jack Mansfield, speaking to an ISU assembly during the 1995 Stockholm Summer Session, said that the current options for NASA are either to "build on the past" or to "reach for the future."

Building on the past meant for NASA to continue doing what it currently is doing until it can do no more. It is, he said, "a frontier to a vast wasteland. There are no funds to go beyond. There is no ambition to go beyond. We betray the dream."

"Reaching for the future [would] let the near term program be defined not by extrapolation, but by a vision of the New Millennium" which would have "international industry [which] knows how to create jobs and make money in space with satellites" take over all satellite programs (including the next generation of Reusable Launch Vehicles after the US Shuttle) and let "governments [only] support a space program of science and exploration." (From distributed outlined notes "Near and Mid/Term Perspectives for US Space Program")

More recently, NASA Administrator Daniel Goldin has proposed that NASA's future missions should seek to answer questions which "loosely correspond to the agency's five existing strategic enterprises--space sciences, mission to planet Earth, human exploration and development of space, aeronautics and space technology enterprise--and public relations...." (Anne Eisele, "Questions raised to plan for future," Space News, November 4-10, 1996, p. 3)

All five are fine, laudable questions. However the one relating to "public relations" is the most relevant to our concerns here:

"How do we effectively communicate consistent information regarding the relevancy, results, and excitement of NASA's missions? How can we involve the other nations of the world in our journeys of discovery, combining that which makes us strong and preserving that which makes each of us unique, to improve the productivity of the space program?" (18)

That certainly is a typical American way of expressing its mission and the relation of the American program to that of other nations. But, sadly, it is no vision, and was not meant to be one.

Indeed, there is no clear and unequivocal statement of NASA's vision of the future of space exploration. Does manned space exploration have a major role, or is it mainly up to robots and artificial intelligence for the foreseeable future? Does NASA plan basically to go it alone, or will there be substantially increased and equitable transnational cooperation? Indeed, how thoroughly is the US committed even to the international space station, a project that has (often with good reason) plenty of detractors within the agency, and without? Will only practical, immediately applied, and Earth-focused missions be encouraged (as seems to be the case), or, to the contrary, will these be left to the private sector (as they arguably should if "commercialization" is to mean anything real), and NASA only do the essential, but otherwise unfunded work of basic space science? If so, what, precisely, will that entail?

But what about other countries? Even if the future of American space activities--much less the character of American space visions--is highly problematic, what is the situation elsewhere?

4. Japanese vision.

The Special Committee on Long-Term Vision, Space Activities Commission, issued a Report on Japan's Space Long-Term Vision in July 1994, titled Toward Creation of Space Age in the New Century.

The vision contained in this document is indicated in five items which are titled the "Significance of Space Development":

- "1. Expansion of frontier of new scientific knowledge and the creation of new cultures by exploring the unknown universe;
2. Expansion of the sphere of human activities and prolonging the existence of mankind.
3. Creation of new technologies and industries through the development of advanced space technologies.
4. Improving international understanding and trust, and achieving more stable and developed international societies.
5. Stimulating the imagination and curiosity of the next generation to support the advancement of human society."

The contrast between this vision and that of any American era is stark: "The creation of new cultures"? "Prolonging the existence of mankind"? "Improving international understanding and trust"? "Stimulating the imagination and curiosity of the next generation"?

Nationalism and pragmatism? Not a shred. Romanticism? Certainly so, but certainly not the heroic rugged explorer of American myths.

A September 1994 Japanese-language publication by the Japanese space agency, NASDA, is titled "To the Moon and the Planets". It contains beautiful evocative photographs and artists' renderings of what it calls "The New Frontier of the 21st Century." Of special interest are seven pages of pictures (and few words) which show NASDA-labeled rovers, telescopes, reusable "Cargo Express" vehicles, and an elaborate settlement all on the Moon. This is followed by three pages about Mars, the last of which depicts a permanent human settlement on the Red Planet.

Since that time, Japan seems to have become even more committed to establishing a permanent settlement on the Moon, with unmanned exploration anticipated through 2005, the construction of unmanned systems on the surface through 2016, and manned systems constructed by 2023 and occupied from 2024 beyond. (Paul Kallender, "New technologies key to building permanent manned moon station," Space News, October 21-27, 1996, p. 3; "Towards the moon and solar system," Spacecraft, October 1996, pp. 331-333; "Moon looms large in Japan's plans," Science 1 November 1996, p. 712f).

Unlike the United States, the USSR, and to some extent Europe, space and the military have never been combined in Japan. Japan was not part of the Cold War Space Race. Its motivations have always (at least formally) been peaceful,

humanistic, and scientific. In a way, I consider this to be a more "normal" development of space science and policies. In contrast, the way in which space science and policies developed in the US and USSR--as an ideologically-driven Cold War crash program--is highly artificial and abnormal, I believe.

With the end of the Cold War, and the civic malaise and public "poverty" which has followed, it seems highly likely to me that compelling visions for space exploration for the foreseeable future will be more like those of Japan expressed here, than those of the US during the Cold War period.

5. European visions

In their book, International cooperation in space: The example of the European Space Agency, Roger Bonnet and Vittorio Manno explain the origins of the European space program this way:

"In the aftermath of the Second World War and of the early success of the Soviet and American space programs, it became clear to a few European scientists that an international space research organization was needed in Europe."

"The alternatives would have been for European nations to compete individually or to participate in an organization under the auspices of NATO. Because of the military character of NATO and the desire expressed by several European scientists to keep open the possibility of dialogue with their Soviet colleagues, this option was rejected, making it explicit that the future European Space Research Organization would have exclusively peaceful objectives."

"The lack of a European military space program at a level comparable with that of the Soviets or of the Americans made it difficult for the European aerospace industry to reach critical levels of technological know-how and launching capability. A civilian space program offered a possible remedy to this state of affairs." (3)

After many years of growth and success, the future of ESA and its many programs now seems to be in serious doubt. Some days, the future looks promising and bright, while other days it looks gloomy indeed. The response to this uncertainty has, so far, not been the formation of an inspiring vision for space exploration, whether romantic or nationalistic, but commercial pragmatism in the extreme.

Space 2020

For example, in October 1995, ESA published Space 2020, a Round Table Synthesis Report (SP-1192). In spite of using a well-respected futures visioning technique--alternative scenario analysis--a more cautious and indeed, "down to earth", document can scarcely be imagined.

The introduction explained the procedures this way:

"In the first phase of the Space 2020 study, two important scenarios were selected as reference models for the time horizon chosen: the 'Greater Europe Scenario' and the 'Little Europe Scenario'. The Greater Europe Scenario held that, around the end of the decade, the

European Union would in principle have monetary union, convergence of economic policies, an integrated defence system, and a common foreign policy. The Little Europe Scenario, on the other hand, held that no real progress towards European integration was expected up to the end of the decade, particularly as far as monetary union and the convergence of foreign and defence policies were concerned. Regardless of which of these two scenarios proves to reflect more accurately the situation prevailing by the year 2020, it is expected that the major challenges for the European space sector are likely to stem from the mounting needs for commercial services in the most dynamic regions of the world." (5)

In the conclusions, the report states that

"The initial objective of the 'Space 2020 Round Table' was primarily the identification of a strategic road map for Europe with respect to the future perspectives of the space sector. This road map...has been outlined for several medium-term expectations.... The long-term perspectives have not received sufficient attention from the Round Table, because identifying a strategy for the medium-term future was considered more pressing than the long-term scenarios themselves." (33)

Even so, concerning the longer term, the report did conclude:

"There is a general agreement that the role of public authorities in the economy will be reduced and that a free market will be the dominant feature of the economic organisation up to 2020 and beyond.

The long-term trend seems to be a move away from large expensive space missions in favour of a greater number of cheaper missions based on using small spacecraft. ... The trend towards small and cheap space missions will also take place in Europe because of the competitive pressure from the rest of the world which is developing the required technologies for other applications." (35)

This is, sadly, the form futures forecasting and visioning often takes when people inexperienced in the process first give it a try. Futures novices normally project into the future their hopes and fears about the present, and then proceed to plan for them. If the present seems bright, then so does the future. If the present appears to be dark and gloomy, then so is the future. In neither case is there a sufficiently serious effort made either to forecast genuinely alternative future possibilities, nor, more importantly, to envision and work towards the creation of a preferred future, regardless of what future currently seems to be the "most likely."

If it were the case that the participants at the Round Table preferred a small-scale, commercially-driven future for space, then they should say so, and celebrate that vision, making it compelling and exciting for the rest of us. But the feeling emerging from the report is one of remorse over the loss of past possibilities rather than eagerness in facing a brave new world of competition and commercialization.

6. Project Space Vision

A group of younger space scientists, led by Par Edin of Sweden, conducted a world wide survey of attitudes towards the future of space science and exploration via the World Wide Web in 1995.

"When asked to prioritize possible motivations for future space activities from a list of commonly suggested options, the three overall most supported reasons for space activities were:

- To achieve scientific progress;
- To provide immediate services and direct benefits to humanity on Earth;
- To explore the universe and eventually expand humanity outside the Earth."

The group concluded their report with three recommendations to ESA for a global space policy for the next fifty years which were titled "Keeping the dream alive," "Opening the door to the future," and "Reaching for the universe."

Concerning the latter, the group advised ESA: "As you formulate a policy for future space activities, consider that there are at least two distinctly different ways of thinking about space. One is the spectacular 'Let's Conquer Space!' mentally inspired by Von Braun which took humanity to the Moon and still permeates much of our planning in US and Europe. The other is the alternative vision of thinkers like Tsilokovsky that emphasizes that 'Space is part of humanity's natural home.'

"In spite of its initial success, it seems difficult to see how the first approach can take us much further than where we are now. The second way of thinking, on the other hand, may offer a route towards a sustainable, growing space effort which can answer the needs and desires of humanity. You may find that this vision can be applied more successfully when considering the future for our generation."
(All quotes are from Project Space Vision Executive Summary)

7. ISU Vision 2020

One of the two design projects for the 1995 Stockholm Summer Session of ISU was titled "Vision 2020." The authors of the project report took a view similar to that of Project Space Vision:

"A major product of Vision 2020 is our philosophy for space endeavors. This philosophy is captured briefly in the vision statement of this project.

"From our point of view, space should be part of the effort to serve humanity. As a geographic place, space to us is another environment in which to seek resources, to manufacture goods, to enhance human knowledge about the universe, and to seek ways to improve the human condition."

The vision statement of the 2020 project was:

"We envision worldwide benefits thorough space activities and their applications; benefits which are based on the ideals of common good for humanity and shared global consciousness."

From this vision statement "four major themes emerged:"

Quality of Life
Expansion
Access to Space
Global Cooperation.

Quality of life was further broken down into Earth Preservation and Progress, Information Opportunities, and Science & Technology.

Expansion into space described a series of incremental steps from Earth, into low Earth orbit, to the Moon, and to Mars and beyond, not unlike those envisioned very early on by NASA and other space agencies, and re-articulated in the various vision documents of the 1980s.

The concerns of Access to Space capture a different aspect of the main vision, that can be well expressed by two statements that were heard frequently during the design project. One was that space flight should no longer be the privilege of a highly trained professional elite: "Until everyone can go into space, no one should go." The second statement was that space flight must become as safe, reliable, and cheap as commercial air transportation is now.

Global Cooperation reflected the awareness that from now on major space ventures are and should be beyond the capability of any single nation. But more than that, it expressed the clear recognition that cooperative space efforts are themselves progressive steps towards peaceful global cooperation in all other spheres.

8. Other sources for current space visions.

There are numerous visions of space science, exploration, and settlement in the literature of various space support organizations, and found in such journals and magazines as Space Policy, The Planetary Report, Ad Astra, Spaceflight, The Journal of the British Interplanetary Society, and many more. The May/June 1996 issue of Ad Astra, for example, is entirely devoted to "An agenda for the future." The editorial pages of Space News usually contain one or more brief essays calling for new or renewed and often visionary commitments to space activities.

Especially noteworthy is the establishment of the "X Prize" ("enabling human ingenuity and adventure in space"), largely the inspiration of our own Peter Diamandis. Following the example of the prize which challenged Charles Lindbergh to fly from New York to Paris in 1927, The "X Prize" is intended to be "a multi-million dollar international space prize which will shape the future of commercial space travel for private citizens." (From the invitation for the May 18, 1996 public announcement of the X Prize in St. Louis, Missouri. See also Ad Astra, May/June 1995)

Three beautiful, inspiring, if still largely "conventional" documents have also recently been published containing statements of the hopes and dreams of most of the major space visionaries of our time. See Valerie Neal, ed., Where next, Columbus? The future of space exploration. New York: Oxford University Press, 1994; Frederick I. Ordway III and Randy Liebermann, eds., Blueprint for space. Science fiction to science fact. Washington: Smithsonian Institution Press 1992; Carl Sagan; and Pale Blue Dot. A vision of the human future in space. New York: Random House, 1994.

See also Roger Handbert, The future of the space industry. Private enterprise and public policy. Westport, Connecticut: Greenwood Publishing, 1996; Harvey Meyerson and Danelle Simonelli, Launchpad for the 21st Century: Yearbook of the International Space Year. San Diego: Univelt for the American Astronautical Society, 1995; Stanley Schmidt and Robert Zubrin, eds., Islands in the sky. Bold new ideas for colonizing space. New York: John Wiley & Sons, 1996; G. Harry Stine, Halfway to anywhere: Achieving America's destiny in space. New York: M. Evans, and Company, 1996; and Robert Zubrin, The case for Mars: The plan to settle the Red Planet and why we must. New York: The Free Press, 1996.

9. Three new perspectives.

But I will end my brief survey today by calling attention to three other visions. One is by Bruce Cordell, and is called "Forecasting the next major thrust into space." The second is by Oliver W. Markley and is titled, "The future of 'SpaceShip Earth:' A context for thinking about space commercialization." The third is derived from the various space-oriented symposia held by the Tenri Yamato Culture Congress of the Japanese religious organization, Tenrikyo.

Cordell:

I find the one by Bruce Cordell interesting because it ties a vision of the future of space exploration to a theory and method of cycles which seems to make the timing of "the next major thrust into space" both predictable and largely inevitable.

Using a theory of 56-year long cycles recently developed by Theodore Modis of Geneva, Switzerland (Predictions, 1992), Cordell concludes that "[t]his result allows us to forecast that the decade from 2015 to 2025 will be the analog of the 1960s; i.e., it will involve major activities in technology, engineering, and human exploration. There is every reason to believe that the focus will be on large-scale human operations in space and that they will be spectacular." (56)

However, Cordell warns, "Twenty-first century space planners should be reminded that the Modis Cycle falls as rapidly as it ascends, and that Modis peaks tend to be times of major wars. Thus if independence from Earth is not achieved by space settlers of the 2020s, large-scale human operations in space may be curtailed until the next Modis peak arrives in 2081!" "And without the proper use of space technologies and resources, it's likely humanity will have been engulfed or significantly altered by environmental, cosmic, or even computer-related events" by 2081, Cordell believes. "Even so, societal events

are not predetermined by these ubiquitous waves as long as we actively include them in our planning." (57)

Markley:

The piece by Markley is worthy of your consideration, I believe, because it is the work of a professional futurist--a professor in the Department of The Study of the Future, at the University of Houston, Clear Lake, Texas, who has been active in space futures for many years.

In keeping with the perspective of many futurists, Markley believes that the world is about to enter a "Fourth Wave" of human transformation. The Second Wave, Industrial Era, is over, and we are moving quickly through a Third Wave Information Era. However, primarily because of human overpopulation and ecological overload, we are also racing towards a bifurcation point which will lead either to "Overshoot and Collapse" (the most likely alternative) or "Global Consciousness" (Markley's preferred and possible alternative). (1f)

The alternative of Global Consciousness might be made possible through the development of what Markley calls explicate and implicate technologies. Explicate technologies involve physical space, examples important for the future transformation being nanotechnology and genetic engineering. Because they operate at the molecular level, these technologies "may help lighten impacts on the ecosystems of the planet" caused by our present massive, energy-intensive, and polluting industrial technologies. (3)

Implicate technologies involve non-physical space, and might also be called "Noetic Technologies" because they deal with "mind, consciousness, and transcendental ways of knowing." According to Markley, they "may provide a reliable tool set for tapping the wisdom and guidance humanity needs in order to navigate to a 'safe landing' from the unsustainable growth trajectory" of the present.

"As to how future generations of people on Spaceship Earth could motivate themselves to make the changes necessary to voluntarily stabilize ecological load," Markley says we should "imagine a 'New Overview Effect' brought by a combination of 'space tourism' (in both 'outer' and 'inner' space) and the widespread availability of appropriate theory, tools and training to:

1. discover the vast potential that lies within, especially the transphysical implicate domain, hypothesized as being causally prior to the explicate universe of physical space;
2. engage in mental time/space travel...; and
3. ...participate in physical inter-stellar travel and galactic commerce with a cultural posture more peaceful and partnership-oriented than war-like and exploitative." (5)

Markley concludes by saying that "my primary motivation is this: a profound sense of urgency.... May this statement prove to be a successful self-denying prophecy--i.e., a contingent forecast which, by showing the handwriting on the wall, leads humanity to avoid irreparably damaging the essential life support systems of Spaceship Earth--choosing instead to co-create an inspiring destiny involving a sustainable, humane planetary society and a new era in space." (5)

Tenrikyo.

Finally, the vision of Tenrikyo I take to be indicative of the rise of serious space activities by non-governmental and non-commercial organizations. In this instance, by a well-established Japanese religious community which has had a long-standing interest in space exploration and settlement.

I am not certain why or when Tenrikyo first became interested in space exploration, but I do know that Ben Finney and I have attended various meetings over the past ten years which Tenrikyo has held in Japan on space-oriented themes. For example, in December 1986, the American Astronaut Russell Schweickart and myself gave public lectures as part of a "Pre-session" titled, "Toward the Cosmic Age." [Both lectures, and twenty-four others on related themes, are found in Tadakazu Yamada, ed., Cosmos-Life-Religion: Beyond Humanism. Tenri, Japan: Tenri University Press, 1988]. The symposium was held in Tenri City, Osaka, and Tokyo.

In July 1989, Russell Schweickart, Russian Cosmonauts Oleg Makarov and Georgi Ivanov, and others participated at a seminar in Osaka on "Earth, Space and Human Beings." In June 1990, Ben Finney and Astronaut Charles Conrad were among the participants in a symposium in Tenri City on "Inner Cosmos and Outer Space: Searching for a New Cosmology."

The leading spirit behind these activities is Akio Inoue who is the Director of the Tenri Yamato Culture Congress. Among many other space-related activities, Mr. Inoue translated into Japanese parts of the diary kept by Cosmonaut Valentin V. Lebedev during his 201-day flight aboard Salyut 7 in 1982. Inoue was especially interested in Lebedev's accounts of his dreams in space, and in the forward to the excerpts, Mr. Inoue urged readers to look beyond the physical and technological aspects of space flight and to focus more on its spiritual and religious dimensions and implications.

Similarly, in an English-language prospectus for a "Japan International Space Culture Congress," Inoue wrote:

"In further pursuing space development, we need now to consider ever more intensely such basic questions as the relation between man and space, between the universe and the evolution of life forms, as well as why man exists in the universe at all. Such profound questions must be asked along with those concerned with the material sides of scientific and technological development." "In Japan, for example, space research tends to over-emphasize the technological aspects, and to neglect such important social and psychological questions as the changes in human consciousness and society that space development is sure to bring about. These questions need to be as eagerly pursued as are those solely concerned with the technology of space exploration." (4)

Whether Tenrikyo or some other religious or spiritual group is the first to move into space for reasons that are not primarily militaristic, political, or economic, all three of the final visions I have cited here stress that when all is said and done, and the current Cold War-driven motivations and motivators are finally dead and gone, then space research and exploration may finally be

driven by the far more noble human needs of knowing, understanding, transformation, and spiritual growth.

However, I believe it is also important to add that even the militaristic, political, or economic motivations for space activities throughout the 21st Century are not likely to be monopolized by the countries and interests which dominated during the 20th Century. For example, while one headline in Space News [October 30-November 5, 1995, p. 3], reads, "ESA may have to cut one of its science missions" (because of the "European governments' decision to reduce their financial support for space science"), another headline reads "Asian nations dish out space money." The spending estimates for 1994 vs 2000 for Japan, China, South Korea, Australia, Taiwan, Thailand, Indonesia, Malaysia, Philippines and Singapore are listed, and most of the projections are upwards. We have already discussed Japan, but China, particularly, seems to intend to play an especially prominent role in the future of space flight and exploration. (Peter de Selding, "Chinese set ambitious plans, Space News, October 14-20, 1996, p. 1, 19; Peter de Selding, "China makes space top priority," Ibid., p. 6)

Given the culture and cosmologies of those nations, in comparison to Europe and North America, can it be doubted that new visions of space will soon emerge as well?

10. A final warning.

However, I want to leave you with a warning. Without vision, all space programs will perish. Vision is crucial, and primary. And yet there is currently no clear, inspiring, and compelling vision anywhere.

Nonetheless, vision alone is not enough. While without vision, nothing worth achieving will be attempted, it is also essential that you understand and utilize the political environment in order to make your dreams come true. Many of the visions I cited above, especially for NASA, foundered entirely on the rocks of domestic American politics. They were visions devoid of political finesse.

Our own John Logsdon has written, "Visions of space travel would have remained just visions, had they not become linked to individuals and organizations that controlled the resources necessary to turn vision into reality." "Thus the story of the space era is not only a study of creative minds and human aspirations, but also a story of the partnership between politics and dreams." (Logsdon, "The challenge of space: Linking aspirations and political will," p. 147)

But in addition to vision and politics, it is also important to know some facts, as this final example makes clear.

"On July 20 [1989, President of the United States], George Bush had unveiled his plan to build the manned space station that Ronald Reagan had approved and use it as a prelude to the program of returning astronauts to the Moon and eventually sending them on to Mars. The president had chosen the 20th anniversary of the Apollo 11 landing to make the announcement. On August 11 the vice president [of the United States, Dan Quayle, who was also the chairman of the National Space

Council] was interviewed on the Cable News Network as a follow-up to Bush's new space initiative. One question had to do with whether Quayle believed that it was feasible to send people to Mars. 'Mars is essentially in the same orbit (as Earth),' the vice president answered. 'Mars is somewhat the same distance from the Sun, which is very important. We have seen pictures where there are canals, we believe, and water. If there is water, that means there is oxygen. If oxygen,' Quayle added, straight-faced, 'that means we can breathe.' And where earthlings could breathe, he indicated, they could function quite nicely indeed." (From William Burrows, Exploring Space, p, 409)

With beliefs like these, who needs visions? And with friends like that, who needs enemies? Is it any wonder the American public, at least, has lost faith in its space leaders even if it clearly has not lost interest in space?

So where are the compelling visions which will drive future space exploration and research? It seems to me highly unlikely that we can (or should) soon return to the visions, or the sources of the visions, which drove the old Cold War Space Race between the US and the then-Soviet Union. Of course, it is not impossible that such sources might re-emerge in the early 21st Century, if not between those old rivals, then perhaps between China and India, or China and Japan, or (who knows?) Japan and a reunified Korea--or, to throw back even further in world politics, between France, Germany and the UK. Such superpower rivalries are clearly possible again in the future, but I consider them less likely, and certainly entirely undesirable.

Indeed, what will be, or should be, the role of the military of any country in continuing or revitalizing a vision for space? It is my conclusion that one of the reasons the American public is so confused about and unfocused in its vision for the future of space efforts is that these efforts are so tightly tangled up with the future of the US military per se: its enormous (I would say commanding) role in the entire US economy (from being the primary US manpower policy to being the primary US industrial policy), and the unease with which many Americans accept or even acknowledge the continued presence and dominance of a military/corporate welfare state in the US.

For one example of many, the Honolulu Advertiser, November 1, 1995, reported the following:

"In 1993, executives of Martin Marietta Corp. apologized for a string of disasters that ended up costing taxpayers \$2.3 billion. But now, those same executives would get an \$11 million bonus--backdated to 1993--under a plan approved by the Clinton administration."

"The \$11 million is part of a controversial \$31 million Pentagon payment to officials of the national's largest defense contractor. Under the plan, taxpayers would finance a third of the \$92 million bonus package the executives gave themselves for staging the merger of Martin Marietta and Lockheed earlier this year."

Many Americans may think of "NASA" only when they think of "space." But others may think of the US military and of the huge aerospace industry dependent upon it. And when they think of that, they may recall \$6000 screwdrivers and \$20,000 toilet seats; real or imagined waste, inefficiency and

cost overruns, endlessly covered by beleaguered taxpayers; and planned or attempted superspy military misadventures which seem wholly out of place in the new world order.

And yet the reality is that the military is and will be present, if not dominant, in space, and that many ardent space enthusiasts are willing, if not eager, that this continue to be so (Jennifer Heronema, "A. F. space chief calls war in space inevitable," Space News, August 12-18, 1996, p. 4; Jennifer Heronema, "Space finds home in military's future," Space News, September 16-22, 1996, p. 4, 35).

If not, what can take the place of such nationalistic/military driven visions? Commercialization of space? Space tourism? (Leonard David, "Entrepreneurs crusing toward space tourism," Space News, August 12-18, 1996, p. 5) So far that seems not to have drawn a tittle of popular response, and scarcely enough action from private entrepreneurs to drive any substantial space vision whatsoever. Indeed, it appears that many of the potential leaders in space commercialization and tourism (as is true of business generally) want to have it both ways--freed from governmental regulation, but heavily dependent on public financial support. Perhaps the X Prize is the spark which will kindle the private flames.

Until then, we seem to be left to the tender mercies of "romantic" visions, whether secular or sacred; philosophical or profane; culture-bound or transcultural.

One example of the dilemma here was recently exemplified in the pages of Space News.

In the October 14-10, 1996 issue, under the headline "Aim for exploration, not exploitation," Linda Billings issued a clear clarion call for space programs which are "about evolution, revelation, and inspiration." She was specifically reacting to earlier items in Space News: "A. F. Space Chief Calls War in Space Inevitable," and "A Call to Space Warriors." She also felt that the wildly popular film, "Independence Day", feed into this terrifying self-fulfilling prophecy of violence and conquest in space. "Earth might never be rid of people who explore to seize and exploit," Billings wrote. "But we can choose to reward not the exploiters but those who explore to discover and learn."

Then, in the November 4-10, 1996 issue, Space News published a letter from James F. Glass, titled, "Space Bunk" which opened by stating "Seldom has Space News published a more complete or pure sample of balderdash as it has in Linda Billing's silly piece...." "Space will be conquered (sorry for the politically-incorrect term) by those with guts, a love of freedom, and desire to succeed economically. New-age philosophers and social engineers need not apply....," Glass concluded.

Perhaps Cordell is correct, and it is all a matter of cycles. We are in a period now where no amount of effort is going to produce the vision necessary to propel humanity into space. But keep the faith, baby, Cordell's message implies: sometime between 2015-2025, nothing but very bad luck will prevent us from launching forth. So standby and be prepared.

So is it, as T. S. Eliot wrote some time ago, that "Only a fool, fixed in his folly, believes that he can turn the wheel on which he turns"? Or can we find or create compelling visions for space now?

"Dreams are maps," Jon Lomberg recently wrote.

"Humanity's dreams of Mars have helped us find our way there as surely as the calculations of scientists and engineers. If people on Mars someday recover this disk, and rediscover these dreams, their own visions of the planet will certainly be affected by these pieces of the pre-history of Mars, perhaps inspiring these future Martians to dream new dreams which we cannot imagine." (Jon Lomberg in Andy Salmon and Darren Brunham, "Before the science there was the dream," Spaceflight, Vol. 38, October 1996, p. 335)

Alas, that will not be so. These words were written about the contents of a CD Rom which was aboard the ill-fated Russian Mars '96 craft which exploded shortly after liftoff. But the sentiments are nonetheless true. Without dreams, we perish--though sometimes we perish with our dreams.

We all indeed are lying in the gutter. But some of us are looking at the stars.

If we at ISU are not among the leading dreamers, who will be, and why should ISU exist at all? The Credo of the Founders of ISU requires that of each of us: "Together, we shall aspire to the Stars with wisdom, vision and effort."

Dream! And work so as to make your dreams come true.

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