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**The Need for a New Political Covenant  
on Human Spaceflight**

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# The Need for a New Political Covenant on Human Spaceflight

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## Abstract

Of all international space activities, human spaceflight is most closely tied to the now obsolete rationales of the Cold War. Even though only two agencies have human programs, the total expenditure exceeds that for all other civil space activities combined. Currently, the political rationale for the Space Station in the U.S. is heavily connected to foreign policy objectives relative to the Russian Federation; and the lifetime of these policies may not be commensurate with the construction and operation of a space station. The long term viability of human exploration of space requires that a new political covenant must be constructed between the technical community and the rest of society as represented by international political institutions. Although U.S. space policy includes a goal to expand human presence beyond low Earth orbit, it has never been fully debated within the U.S. political system. Thus, no ownership of it exists within the general political process.

Legitimate philosophical rationales exist which support an investment in human spaceflight. Although human spaceflight can also be supported in terms of the massive problems facing humanity on the Earth in the next Century, they are of little interest to today's politicians. Nevertheless, thoughtful dialogue with leaders and opinion-makers can result in a political consensus for investment in human spaceflight. However, the space community must face up to the challenge of finding institutional and technical implementations which are much more economical than those we now have. Trust must be engendered between the technical community and the political process rooted in a mutual education and enlightenment on the problems facing each.

## The Political Threat to Human Space Exploration

Permeating all gatherings of space professionals is a concern over shrinking budgets in an era of worldwide economic recession. The end of the Cold War has led to falling priorities for space exploration. Aerospace professionals in the

United States, Russia, and Europe are particularly concerned. In Japan, modest space budgets appear steady and even increasing; and China has recently begun formulating a new program of human spaceflight.

Human spaceflight is particularly expensive, and only the United States and Russia have felt compelled to make that scale of societal investment. In the 1980's Europe, Japan, and Canada decided to invest significant fractions of their space budgets in the International Space Station. Their political ally, the U.S., called for support; but they also perceived that investment in the associated technologies was necessary to stay competitive and influential on the world scene.

After the collapse of the Soviet Union, the political rationale in the U.S. for what is called Space Station Alpha has evolved until now the emphasis in the Clinton Administration is on constructive investment in the fragile Russian economy. Space agencies still tout the technical benefits of research in low Earth orbit, but it is doubtful whether those arguments in isolation would justify the requested level of funding. Space Station Alpha and Mir are currently the only tangible commitments to the future of human spaceflight, and proponents of human exploration are not confident in the robustness of their political support.

Space activities at some level undoubtedly have a long term future. National security considerations still justify a military space program, if only for intelligence gathering and communication. Certain commercial space sectors are healthy, particularly telecommunications and global positioning systems. Commercialized remote sensing is doing less well. Space science is being squeezed, but some investment will continue into the foreseeable future.

The prospects for human spaceflight are less certain. On one hand, some futurists predict diminishing resources on Earth will have to be supplemented by resources from space such as energy-producing facilities or strategic materials mined from planets or asteroids. So far, predictions of doom have had little effect on either politicians or investors. Other futurists believe

that space exploration is simply part of life's ultimate purpose. Humans will expand into the solar system because they can, and that expansion is necessary for ultimate survival of the species.

In this paper, I do not want to examine the validity or effectiveness of these rationales; others have done so at great length. I agree that space development of any significant scale cannot occur until economic incentives dominate, but for at least next two decades we must deal with political rationales. (In fact, the situation will never change as long as space agencies and aerospace companies remain "comfortable" with government doles and refuse to focus on making space accessible to private investment.) Therefore, I want to consider the nature of the implicit social contract between the political processes and the space community.

### **Politics at the Birth of the Space Age**

A remarkable event occurred in October 1957. The people who were involved with it knew that it would be remarkable, but they had no idea just how significant it would become.

In 1950, the RAND Corporation submitted a secret report to the U.S. Government pointing out possible legal problems to be faced with the launching of proposed reconnaissance satellites<sup>1</sup>. The Soviet Union could have legal grounds for protesting violation of sovereignty when a satellite passed into its "air space" during an orbit. When the scientific community submitted plans for the International Geophysical Year (IGY) which included the first launches of artificial Earth satellites, one by the United States and one by the Soviet Union, the initiative was perceived to provide a solution to the secret debate in foreign policy.

The participation of the Soviet Union in this benign scientific activity would set an international legal precedent that permission was not required to place a satellite in an orbit passing over another country. The Eisenhower Administration chose the struggling Vanguard program to be the U.S. representative because the implementing agency (Naval Research Laboratory) had less of a military association than did the Army Ballistic Missile Command with its Jupiter rocket. The possibility that the Soviet satellite might be launched first was a secondary consideration and even slightly desirable, given the legal concerns.

No one anticipated the political firestorm that erupted following Sputnik. The U.S. media characterized the event as proof of a terrifying techni-

cal capability which had arisen undetected in the secret lair of the Soviet bear. While development of nuclear weapons by the Soviets could be rationalized by the U.S. public as theft of technology by a pervasive spy network, a preemptive technical triumph could not be so easily dismissed.

The political benefits of space spectacles were not lost on Nikita Khrushchev. Over the next five years, he pressured the Soviet Chief Designer, Korolev, to produce ever greater public relations victories by pushing to the limits the basic capabilities of his rockets. Korolev would have preferred to increase capability for space exploration and development in a more rational manner.<sup>1</sup>

In the United States, the initial Sputnik shock led to the National Space Act and the formation of NASA. John Kennedy campaigned on the mythical missile gap and subsequently initiated the Cold War arms race after election. The launch of Yuri Gagarin into orbit, superimposed on the Bay of Pigs debacle in Cuba, led to Kennedy's announcement of the Moon Race. Within four years human space exploration had gone from pure fantasy to hard reality. The sky was no longer the limit for the dreamers of cosmic voyages.

### **Astronauts: An Endangered Species**

As the race to the Moon proceeded in the decade of the 1960's, political urgency subsided and the NASA budget declined. Many questioned whether there was a race at all. As the first Moon landing approached, President Nixon asked for a strategy for future space exploration. The Space Task Group, assembled by NASA and led by the Vice-President, presented a cornucopia of large crewed space stations and bases on the Moon and Mars<sup>2</sup>. The President rejected these visions entirely, given budgetary pressures from the Vietnam War and from social programs. Elimination of the human space program was contemplated.

A series of political considerations led to the Space Shuttle program. President Nixon was concerned about votes in California, home of major aerospace industry, in the 1972 election. NASA struck a deal with the Department of Defense to support the Shuttle if NASA modified it to meet some military requirements. Finally, NASA produced economic models which predicted major reductions in launch costs with a reusable, frequently launched system.

Parsimonious funding of the Shuttle program and unforeseen technical problems led to delays of the first flight. One significant consequence was the loss of the Skylab, the U.S. space station, which fell into the atmosphere over Australia. The Space Shuttle also turned out to be an expensive vehicle to operate with launch frequencies more than a factor of 5 less than promised.

### **Renewed Acknowledgement of Human Space Exploration**

The Reagan-Bush decade began with a theme for reduced Government spending, but in the end the space program prospered. The Space Shuttle was strongly supported and the Space Station program was initiated. A significant development of this decade was the explicit inclusion of a strategic vision for human space exploration into U.S. space policy for the first time. After the Challenger explosion, the NASA Administrator charged astronaut Sally Ride to look into strategic directions for the space program<sup>3</sup>. Drawing on the work of the National Commission on Space (chaired by Tom Paine)<sup>4</sup>, Administrator Fletcher established a long-range goal to expand human presence beyond the Earth into the solar system. This goal was incorporated into national space policy by President Reagan in February, 1988.

President Bush raised the stakes in July, 1989, with his declaration of a permanent human presence on the Moon and human journeys to Mars following completion of the Space Station<sup>5</sup>. His program was originally called the Human Exploration Initiative and later changed to the Space Exploration Initiative (SEI) for political reasons. NASA produced a technical response in November, 1989, entitled "Report of the 90-Day Study on Human Exploration of the Moon and Mars"<sup>6</sup>. The report was widely criticized, mostly for its purported high cost and lack of innovation. Vice-President Quayle subsequently initiated commissions to recommend reforms in NASA (Augustine Commission)<sup>7</sup> and to look for more innovative approaches to the SEI (Stafford Commission)<sup>8</sup>.

Support for the SEI was weak at the highest management levels of NASA; and Congress attacked the program savagely, ultimately scouring the NASA budget to eliminate any traces of human exploration of the planets. By 1993, the SEI was dead and its organizations disbanded.

### **Space Exploration is not Politically Correct**

The Space Exploration Initiative was one victim of political wars between the Executive and the Legislative Branches of the U.S. Government, but its demise was aided by indifference and political ineptness in NASA in the charged political environment. An analysis of the decline and fall of the SEI is beyond the scope of this paper, but I do want to comment on the role of Congressional staff in the process.

The NASA Administrator elevated the Office of Exploration in 1990 to the level of Associate Administrator following a recommendation of the Augustine Commission. The post was abolished by the subsequent NASA Administrator in 1993, after Congress adamantly refused to allocate funds. Staffers reportedly pored over the FY93 NASA budget in detail to remove all items associated with Moon/Mars exploration and in the process eliminated some unrelated items whose names evoked the wrong context.

After the elimination of the Office of Exploration in NASA Headquarters, the Director of the Johnson Space Center (JSC) changed the name of the Exploration Program Office (which had supported the Associate Administrator) to the Planetary Projects Office and moved most of the personnel inside the pre-existing New Initiatives Office to remove the impression that SEI work was continuing. Substantially without funds, the office continued to consider strategies for adapting plans for human exploration to the new fiscal and political realities. The existence of the effort was so sensitive that a photo opportunity at JSC for a Russian lunar rover team, sponsored by the Planetary Society, was canceled at the last minute to avoid any publicity that might be connected to SEI.

A year later, a JSC employee, who had once been a manager in the Exploration Program Office, was making a presentation to Congressional staffers about some aspect of Space Station Alpha as part of the consideration of the FY95 budget. After the presentation, a staffer asked whether an element described in the presentation was on the Space Station to promote SEI. The NASA employee assured the staffer (truthfully) that it was not the case; the element served another purpose.

When I heard this story, I was struck most strongly by the defensiveness of NASA employee, who was quick to deny any association of his project with Exploration. The unspoken assumption in the exchange was that Exploration

was politically incorrect. My rather simple thesis is that this implicit assumption must be reversed throughout political processes in (at least) the spacefaring nations. The community of space activists must create a common system of belief in society that human exploration and space development is a natural and inevitable part of the future. The question of "whether" must be converted to a question of "how" leading to a question of "when".

Many employees of NASA and other Government agencies resent having technical projects reviewed by Congress at high levels of detail (micromanagement), and they resent the power of the unelected staff in that process. I do not wish to debate whether it is appropriate that Congressional staffers have such power; the point is that they do. Other governments have equivalent processes where technical decisions are reviewed by bureaucrats who may not have the professional training or, often, adequate background data for informed decisions. Any political strategy for promoting human space exploration must accommodate this reality.

### **The Political Context of Space Activities in the United States**

U.S. society has undergone fundamental changes in the last two decades, and a new equilibrium has yet to be defined. Societal adjustments in terms of racial demographics and relations began in the 1950's but accelerated in the 1970's. Major companies have reduced their work forces dramatically in the last decade. Lifetime employment associated with corporations like IBM or even the military can no longer be assumed. Legislation to protect the environment is beginning to come into conflict with basic U.S. values on property rights and freedom of choice. The growth of a massive debt has gradually eroded all flexibility in administering the federal budget, creating enormous pressures on policymakers and legislators to curtail programs and services. Political gridlock has led to growing cynicism and disrespect in the electorate while crippling the ability of the U.S. to exercise decisive leadership on the world stage. The nascent information revolution promises to bring even more changes although no one understands just what they might be.

In the midst of this societal foment, NASA looks much as it did 20 years ago, thereby becoming increasingly irrelevant in the political envi-

ronment of Washington. Much of Congress views NASA as a "jobs" program, and the current Administration primarily looks to NASA for a technology engine to increase national economic competitiveness. (However, the National Laboratories, deprived of military funding, are new competitors on the political scene for this role.) Strong support from the President preserved Space Station Alpha in the recent Congressional budget battles because the Administration wanted it as an element of Russian foreign policy. Vice-President Gore is very interested in global change research and believes NASA can provide important tools for that objective. Meanwhile, working level NASA employees see themselves as agents for exploration of space in the name of Humankind and puzzle over lack of support for such a noble endeavor.

NASA is a 30-year-old bureaucracy with entrenched interests, resistant to change which could eliminate jobs or alter organizational structure. (In this, it is no different than any other organization.) It routinely seeks advice from the "community", which consists of an aerospace industry dependent on NASA funds and scientists dependent on NASA funds. NASA appoints the committees and defines their charters, making the advisory process incestuous. As a result, NASA has insulated itself to a large degree from societal change. In short, the customer has changed but NASA has not.

Administrator Goldin arrived as a revolutionary. He faced an Agency that had been told it could not go to the Moon and Mars, that was under siege both at home and abroad for an expensive and seemingly unproductive Space Station program, and that had suffered devastating publicity for flaws in expensive, highly touted programs. He also arrived having had very little experience with NASA, unfamiliar with its strengths, weaknesses, and complexities. His tenure thus far has been characterized by turbulence, creating dismay among those who applauded change and horror among those who resist it.

At the end of the summer of 1994, a window of relative calm is opening in the Agency, following robust support of the Space Station in the 1995 budget and a spectacularly successful repair of the Hubble Space Telescope. A survey of the landscape reveals new leadership in the field centers, new organizations and new processes in NASA Headquarters, a new hard line on mission costs, a tightly constrained budget, and a new emphasis

on interaction of the Agency with society through education processes and through incorporation of societal diversity. Administrator Goldin has impressed on the Agency, as never before, the new boundary conditions under which it will operate in the future. Only time will tell whether new, emerging structures will suffice to meet the expectations of society as well as the expectations of NASA's employees and supporters.

Let's consider the latter.

The discussion thus far in this section has been couched in the metaphor of the marketplace. The emphasis has been on the expectations of society for products in return for its investment. What is often lost in such considerations is the fact that the landing of humans on the Moon and the robotic exploration of the solar system has excited the spirits of exceptionally creative, intelligent, and talented young people. Apollo astronaut Harrison Schmitt emphasizes that the Apollo technical and scientific team often worked 16-hour days because it was a labor of love. And he emphasizes that the program would not have succeeded without that effort. Unbeknownst to the politicians, the experience of space exploration imbued a generation with a faith that space will be the future home for humanity. That belief and excitement lives on today in NASA employees (particularly younger ones) and in others who are lucky enough to participate in the space program. If the leadership of NASA decides that the structure and objectives of the Agency should be purely "market driven", then the inspirational quality which has been a hallmark of the space program will disappear.

I have encountered more than one scientist, formerly involved in space science, embittered by the experience of having research terminated in budget cuts during the Apollo era. These people feel betrayed by NASA when the relatively small amounts of money spent on the scientific community were sacrificed to grandiose projects at aerospace companies. It is easy to dismiss such feelings as naiveté about the marketplace, but I interpret this frustration as further evidence that involvement with space exploration and science engenders a sense of higher mission in many people. Surveys at NASA centers reveal that employees confer more loyalty to the mission of the organization than to the organization itself.

This sense of mission has much in common with religious belief. Believers are not converted by purely logical arguments. Space enthusiasts can produce "justifications" for space development, but these points are usually developed

within a system of belief rather than by deductive reasoning from universally accepted premises. However, I do not mean to say that no pragmatic reasons exist for going into space.

To emphasize the importance of shared vision within the space community, I deliberately choose the word *covenant* with its religious connotation to describe a desired common understanding of the long term societal role of space exploration and development. During the race to put a human on the Moon, many people - both within and outside the space program - believed a covenant existed. Leaders of the technical effort, such as Werner von Braun and Sergei Korolev, were working toward a future for humanity in space. Vision is particularly manifest in the life work of Krafft Ehrlicke. Politicians did not share these dreams.

In my opinion, any investments in the technology of human space exploration will always be vulnerable to the derisive snigger of the bureaucrat until society as a whole accepts the ultimate potential of space development. Of course, then we in the space community incur an obligation to fulfill that expectation without asking for extraordinary allocations of resources.

### Difficulty Selling Human Space Exploration

In an earlier paper<sup>9</sup>, I described the dilemma facing the technical manager proposing a lunar base. How does one answer the question, "Why go to the Moon?"

An initial reaction is to list the benefits of going to the Moon. Tangible benefits are always preferable but, in an undefined program, are likely to be educated guesses. At one time, educated guesses might have been adequate; but the Space Station lesson is that political adversaries will remember unfulfilled promises. Avoid overselling - or hype, as it is often called. And program success is not always an adequate defense. The Hubble Space Telescope program has been criticized for bragging on its discoveries in the press.<sup>10</sup>

Alternatively, one can cite intangible benefits as justification. Although these are not as compelling, they do have the advantage of being less vulnerable to future refutation. Presentations supporting the SEI promised to improve quality of life through advances in technology, to inspire youth to enter technical fields, to spur competitiveness, to instill national pride, and to bring nations together for peaceful cooperation. This list reflects a hasty market analysis of "national

needs", circa 1990. While I do believe that these benefits are real and could flow from a well-conceived program of human exploration, I am not convinced that they would necessarily follow from just any randomly selected program of lunar bases and Mars missions.

A somewhat more sophisticated strategy avoids promises altogether and instead describes what would be done on the Moon or on Mars. The audience can evaluate the worth of the activities in its own terms of reference. Duke<sup>11</sup>, in an AIAA paper entitled, "Why Explore the Moon?", states that the Moon is "a stepping stone in the expansion of humanity beyond the Earth", "opens new opportunities for scientific advancement not available on Earth", and will provide the first significant resources from space. Implicit is the premise that space development and space exploration are desirable and even inevitable manifestations of the human condition.

The inevitability of human expansion beyond the Earth is a theme which is usually supported by historical analogy and/or anthropological arguments. A good example is found in the AIAA paper, "Why Explore the Universe?", by Robert McC. Adams<sup>12</sup>. The anthropological imperative is explored at length in the book *Interstellar Migrations and the Human Experience* by Ben Finney and Eric Jones<sup>13</sup>. While the premise that *homo sapiens* will go where able to go is persuasive, it is not very useful in arguments for funds in the current fiscal year. What is inevitable in evolutionary terms can be postponed on evolutionary time scales.

A politician's interest in reelection draws him/her to deliverable, tangible benefits from a lunar base (or other human space initiatives). Yet, promises from an undefined program are highly uncertain. Conversely, successful philosophical arguments require time to take root in the national mind-set and become part of the zeitgeist. Program managers cannot expect support for funding until their objectives become politically acceptable.

### Creating the Covenant

President Bush presented a philosophical statement for human exploration of the Moon and Mars. NASA, in its subsequent reply, concretized the proposal by specifying what would be done, how it would be done, when it would be done, and how much it would cost. While political agreement might have been reached on a philosophical

level about human activity beyond low Earth orbit, the confrontational relationship between the President and the Congress doomed the enterprise in the form in which NASA presented it. Some of us argued that the SEI should be treated as a strategic planning envelope within which to plan the future of the space program, but the urge to make it a set of programs layered on top of the Space Shuttle and the Space Station proved irresistible to a culture based on project management.

I propose working to reestablish the general goals for human exploration of the solar system as outlined in the July, 1989, speech. Although this task is complicated in the U.S. by the recent political history of the concept, independent initiatives in Europe and in Japan are moving in this direction.

At the beginning of June, 1994, the European Space Agency hosted an International Lunar Workshop in Beatenberg, Switzerland. Invitees from around the world considered a proposed four-phase program of lunar exploration and development<sup>14</sup>. A phase of robotic exploration and scientific investigation would be followed by establishment of permanent robotic scientific facilities. The third phase would focus on the first exploitation of the lunar resources, leading to installation of the first human outpost in the next phase. Although the first lander and orbiter missions would begin at the turn of the century, no timetable is offered for the duration of the phases and no specification is made of the mission content.

What is being requested from the European political process is agreement to a strategic approach for space exploration and development. Tacit acknowledgement is made that the objectives will be addressed as technical resources become available and that new phases will be entered as the state of technology advances and becomes affordable. The Beatenberg Declaration, issued at the end of the workshop, generally supported the program but mentioned ultimate human presence only obliquely, as that issue was contentious.

Also in 1994, the Japanese Lunar and Planetary Society drew up a program of long term lunar exploration and development, which was considered at a well attended conference in September in Tokyo. The conference was not only noteworthy for its theme of Return to the Moon but also because it was jointly sponsored by ISAS and NASDA. In the past the two Japanese space agencies have maintained carefully distinct agendas. I am less familiar with the details of the Japanese

plans, but published NASDA studies<sup>15</sup> have emphasized human presence and commercial development on the Moon more strongly than have European proposals.

While the genesis of these initiatives was influenced by the short-lived SEI in the U.S., the development of each proposal has been independent of the other and has been independent of U.S. leadership. At a conference sponsored by the American Institute of Aeronautics and Astronautics in May, 1994, the Director General of NASDA and a senior representative of ESA answered separate questions on lunar exploration from the audience at a panel discussion. Both representatives stressed the need to complete the Space Station Alpha but then added that lunar exploration was the objective for humans in the 21st Century. These independent affirmations of a lunar focus in the future validates the general vision of the Space Exploration Initiative and should eventually help the acceptance of long range goals in the U.S. political process.

In the U.S., formulation of space policy requires input both from the Executive and the Legislative Branches, but they play different roles. The Executive asserts; the Legislative permits; NASA must produce while complying. The President, through his advisory system, formulates policy and proposes initiatives in conjunction with the annual budget submission. NASA has input to that process, but outside groups or other departments of the Executive may strongly influence the result. Congress shapes the final product through its control of budget authorization and appropriation. NASA testifies in hearings on the budget, but Congressional representatives are also sensitive to inputs from their constituents.

NASA is forbidden by law to lobby Congress to influence policy, but the Agency is chartered to educate the public (constituents). Where education ends and advocacy begins is a matter of opinion. NASA sends information to individuals or organizations who then are free to use it to support the space program to Congress. In particular, scientific societies and even individual scientists have become increasingly sophisticated about contacting Congressional representatives and the members of key committees.

Since direct participation in space-related endeavors historically has been limited to a small community of technologists and scientists, the only political constituency actively supporting the

space program during budget deliberations are industry lobbyists and space activist organizations. Even within that small group, tension exists among advocates for science missions and for human missions. A quirk in the U.S. government structure places the NASA budget in competition with funding for war veterans and other social programs, special interest groups whose numbers overwhelm space activists.

While lobbying and political activism are part of today's realities, they are ultimately tactical solutions, targeted for the current year's debate. To ensure long term stability in the goals of the space program, we must make long term investments in such things as the education of young people. To infuse a generation with an expectation of space achievements requires a deeper commitment than supporting a NASA Spacemobile to carry exhibits and presentations to individual classrooms. The issue of space themes in K-12 education now has the attention of the NASA Administrator; and, as Chief Scientist France Cordova said in a recent speech, we must get information from space activities into the textbooks promptly. True progress in this area can be made only if it has high level management attention.

Next, the space program must cease to become the exclusive purview of a few scientists and astronauts. The general public, including Congresspersons and their children, must have some reasonable expectation of experiencing space exploration directly. Commercial ventures designed to give the public access to in-space operations should be encouraged, as long as they do not compromise the safety or scientific integrity of other space activities. NASA programs themselves must be restructured to enlarge the community of participants.

In an earlier paper, I laid out a program for direct student involvement in design and operation of a lunar-based telescope<sup>16</sup>. Beginning with a university design competition, continuing with construction, and operation of Earth-based systems with ever-increasing degrees of autonomy and remoteness, and culminating in a lunar system whose operation is indistinguishable from Earth-based prototypes, the program would be a collaborative effort of industry and academia supported by NASA. In parallel with the engineering and development, educators would utilize prototype and engineering test facilities to certify students at increasing levels of expertise



and scientific achievement, leading to a license to propose research on the lunar facility.

A program designed from the ground up to serve educational needs would be a major departure from current mission structures. However, paradigms are changing. The Announcement of Opportunity (AO) from NASA's Solar System Exploration Program for Discovery Missions requires the Principal Investigator (PI) to immediately place processed data in public archives and then to compete with other scientists in a separate AO for data analysis. Traditionally, the PI has had exclusive intellectual rights to the data for one year, and the archiving requirement was not often enforced strictly.

Finally, space agencies around the world should encourage broad dialogue on the potential role of space science and exploration to enhance the quality of life physically, intellectually, and spiritually in the 21st Century. It is important to involve in this dialogue opinion makers from disciplines outside the space program - the humanities, the arts, philosophy, religion, ecology, the media, the physical sciences, and public policy. If our system of belief in a space future is valid, then this dialogue can only enlighten us and encourage others to experience the vision. A broad societal consensus on the benefits of investing in space is the best insurance against extinction of spacefarers.

I assert most people believe in the proposition that space will be a future domain of humanity. My suggestion is to utilize this common belief as the basis for a consensus (external to the space program) on the long-range goals of human exploration. The International Astronautical Federation is taking steps in its 1994 Congress to consider the structure of the societal dialogue at the international level. However, every space agency which has concern for its future must discuss the message of space development in its own society. We should heed the Chinese proverb that says:

To plan for a year, plant a crop; to plan for a decade, plant a tree; to plan for a century, educate the people; from the crop you will reap tenfold, from the tree a hundred-fold, from educating the people a thousand-fold.

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