United States National Space Policy

Safety, Security and Diplomacy Through Science and Technology

Written Statement for the President and his
Council of Advisors on Science and Technology

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Life on this Planet

Life on the planet Earth is currently under siege. Human population is now approaching seven billion lives. Atmospheric carbon dioxide concentration is approaching 400 ppm. The atmospheric combustion of carbon is the fuel that is driving our economic growth. We are sustaining a global human community far beyond the natural carrying capacity of the planet. We are extracting and creating a body of natural wealth, and transforming it into intangible and obsolete assets. As a direct result of these uniquely human activities, numerous species are rapidly being driven into outright extinction, habitat migration and evolutionary adaptation. To state this isn't happening - is to deny science and the reality. Human intellectual aspirations have now exceeded the resources that Earth can sustain.

The Human Condition

It is the nature of the human condition that even confronted with seemingly intractable problems, one still has faith in the knowledge that we since have also evolved into this situation slowly over a period of time, then laws of physics must be such that solutions to our ever present problems actually do exist, and are therefore discoverable. We admit to ourselves that although we do not have all the answers at this time, we will make it an urgent goal to find them, for we have already hypothesized that they, in fact, must exist.

So it is with our current problems of population, our economic growth, energy and the environment, the security of our nation, and health, welfare and education of our citizens. We have reached a crisis of conscience with the modern world - that we cannot continue down the path that we have been taking. We must change direction in order to survive. We don't know exactly where we will end up going, but methods of science have clearly given us tools to identify the hazards that lay before us, and we choose to navigate them. We understand the hazards that we must navigate are those of the planet Earth. Some of those hazards are of are own making, and others have helped make us what we are today.

The Astrophysical Universe

Through the auspices of NOAA and NASA, we have discovered previously unknown truths about our universe and the world in which we live. With that new found knowledge we have begun to understand many of the well known hazards that accompany it, and we have also uncovered a few previously unknown hazards that inhabit it, and surround us.

We are able to come to grips with these dangers, because we have confidence, *dare I say faith*, in our abilities to sift and winnow through the noise, and discover and acknowledge those truths, which reveal themselves by our actions. We now have the abilities to look outward into the universe and examine other worlds for clues to the origin and behavior of our own world, and by doing so, we have gained a greater appreciation and insight into dangers that we face here, and the methods by which we may confront those worst fears.

We have learned to conquer those fears, by confronting our problems, and solving them. By recording our successes and failures we have codified these problem solving methods into a body of work we call science, so that they may be transmitted across borders and down through the generations, greatly increasing the success rate of subsequent solutions. The processes by which we accomplish these tasks mimic the same processes by which life evolves. Now that we have a rough understanding of our human origins, we also have the utmost confidence that evolution will proceed, hindered only by lack of knowledge of ourselves, and the planet on which we reside, in the external universe that has created us. We make the conscious decision to take control of that evolution, so that we may survive.

The Quantum Dynamical World

Through the auspices of the DOE and the NSF we have funded research in quantum and condensed matter physics that has revolutionized our lives; in the way we live; in the way we communicate; how we convert energy, move about, maintain and entertain ourselves. The flow of progress starts from theory, and moves through engineering trade studies, laboratory experiments, device development and fabrication, construction and operation of facilities, and the commercialization of services and technologies that will manufacture the products that we need to organize lives, perform our duties, and maintain our health.

Innovation, Exploration and Discovery

The entrepreneurial spirit that we know can create entirely new industries, enter and compete in evolving marketplaces, invent novel applications and supply new services, depends upon our abilities to think honestly, openly and critically about the real evidence. These abilities are available to anyone and everyone, but from the evidence we know that these critical thinking skills may be developed by enhancing our educational experiences via virtual and real demonstration using 21st century information processing technologies. The abilities to innovate, explore and discover aspects of our natural world is an innate human characteristic, which can be nurtured and enhanced by education and experience. Not everyone is able to extend their abilities into entrepreneurship and to success in the commercial marketplace, however - they should be afforded every opportunity to do so.

Education - Mathematics, Physics, Chemistry and Biology

The vast repository of knowledge that we have at our fingertips is clear, well organized and concise. Commercial search engines and non profit encyclopedias provide nearly instantaneous access to all of human knowledge, and education in the fundamental hard sciences has been reduced to the creative design of educational software architectures, along with guided or mentored instruction, at all age levels of our educational experience. Education itself, both in learning and teaching, has become a lifelong personal endeavor.

Experience - Science, Technology, Engineering and Mathematics

Complementary to the need for teaching, instruction, training, and self education through software solutions, is some actual experience in the real world of hardware and wetware; the biological and geological imperatives of living organisms and their environments, along with the technological tools and techniques, and the operational procedures for the instruments and equipment that allow us to carry out the tasks necessary to our society.

Entrepreneurship - Nanotechnology, Biotechnology and Information Technology

"*What are the critical infrastructures that only government can help provide that are needed to enable creation of new biotechnology, nanotechnology, and information technology products and innovations that will lead to new jobs and greater GDP?*"

The short answer[1] is - advanced light and particle sources, and spectroscopy laboratories. Some believe we are on the verge of much deeper understanding of quantum phenomena, which will open the gates to a floodwater of innovation in materials and exotic physics. The continued funding of materials science and condensed matter physics at specific interest points will allow the nation to direct intellectual resources to its urgent problems.

Agriculture, Construction, Manufacturing and Transportation

The infrastructure of our world is what sustains the bulk of our population, whether they are interested in science or not. The transition from advanced spectroscopy laboratories, to the astronomical instruments and deep space missions of our space programs, through all of the intermediate transitions of education, experience and entrepreneurship within all economic sectors, is the ultimate goal of our national science policy. Without the bulk of the entire efforts of our civilization to support us, there would be no scientific endeavors.

Administration, Communications, Operations and Services

The administration, operations, servicing and supplying of that infrastructure may seem mundane and ordinary, but these are the activities that every one of us participate in every day of our lives. We go about our day to day tasks, seamlessly and efficiently enough to take for granted the extraordinary powers of rationality and reason. We have evolved to a point in space and time, where scientific advances and astronomical discoveries can be communicated in real time to a eager public - now directly participating in that progress.

Recommendations

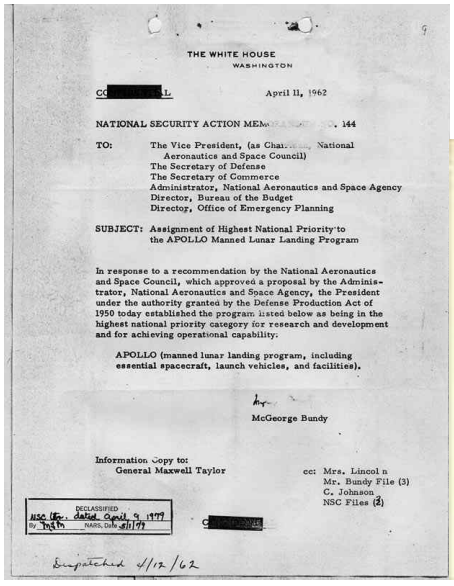
I recommend that you get out there and make speeches with as much thoughtfulness and sophistication as you have put into national space policy, because although the problems we face in the modern world are indeed difficult, they are not insurmountable, even if we don't have all the answers - yet. Our greatest human attribute is the acknowledgement and awareness of the problems of our society and life, which promotes the willingness among the public to make the changes that are necessary to allow us to achieve our goals.

Conclusions

It is not possible to fund a modern, high national priority, manned lunar landing program such as Apollo. Manhattan style projects of any nature, are not executable in our present budget circumstances. We need to put the legacy of Constellation to rest. It may indeed be possible to make a small concession to a space shuttle and space station constituency, by including the existing SSMEs, as primary engines, and a vital component to a national heavy lift launch vehicle architecture, but that engineering exercise only has value if it yields fundamental advances in reusability that will dramatically lower space flight costs. Executive decisions of a president can make or break the solutions to national problems. The recently announced National Space Policy and NASA funding directives adhere to the highest scientific and engineering, diplomatic and national security standards, while still permitting future latitude in executive direction. That future may very soon arrive.

References

1. *Light First*, Research Proposal for the Wisconsin Institute of Discovery
   URL: http://webpages.charter.net/tsiolkovsky/Light_First.pdf



THE WHITE HOUSE
WASHINGTON

April 11, 1962

NATIONAL SECURITY ACTION MEMORANDUM NO. 144

TO: The Vice President, (as Chairman, National Aeronautics and Space Council)
The Secretary of Defense
The Secretary of Commerce
Administrator, National Aeronautics and Space Agency
Director, Bureau of the Budget
Director, Office of Emergency Planning

SUBJECT: Assignment of Highest National Priority to the APOLLO Manned Lunar Landing Program

In response to a recommendation by the National Aeronautics and Space Council, which approved a proposal by the Administrator, National Aeronautics and Space Agency, the President under the authority granted by the Defense Production Act of 1950 today established the program listed below as being in the highest national priority category for research and development and for achieving operational capability.

APOLLO (manned lunar landing program, including essential spacecraft, launch vehicles, and facilities).

McGeorge Bundy

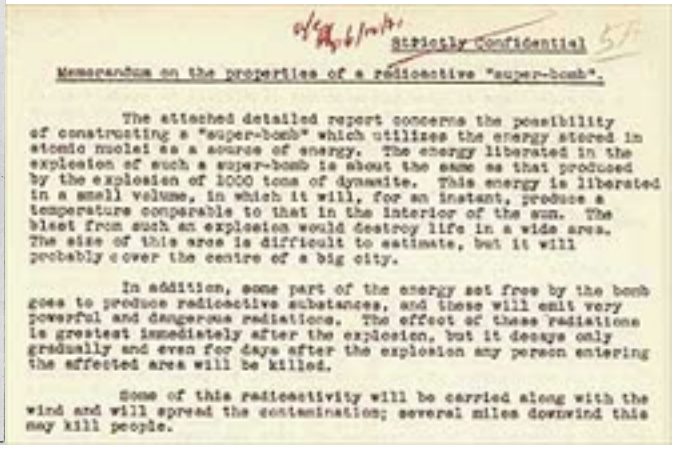
Information Copy to:
General Maxwell Taylor

cc: Mrs. Lincoln
Mr. Bundy File (3)
G. Johnson
NSC Files (2)

DECLASSIFIED
NSC Ltr. dated April 9, 1979
By NARS, Date 5/1/79

Dispatched 4/12/62

National Security Action Memorandum – NSAM 144



Strictly Confidential

Memorandum on the properties of a radioactive "super-bomb".

The attached detailed report concerns the possibility of constructing a "super-bomb" which utilizes the energy stored in atomic nuclei as a source of energy. The energy liberated in the explosion of such a super-bomb is about the same as that produced by the explosion of 1000 tons of dynamite. This energy is liberated in a small volume, in which it will, for an instant, produce a temperature comparable to that in the interior of the sun. The blast from such an explosion would destroy life in a wide area. The size of this area is difficult to estimate, but it will probably cover the centre of a big city.

In addition, some part of the energy set free by the bomb goes to produce radioactive substances, and these will emit very powerful and dangerous radiations. The effect of these radiations is greatest immediately after the explosion, but it decays only gradually and even for days after the explosion any person entering the affected area will be killed.

Some of this radioactivity will be carried along with the wind and will spread the contamination; several miles downwind this may kill people.

Frisch – Peierls Memorandum