Panel Session - "The Application Of Space Age Technology To Society's Needs"

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THE APPLICATION OF SPACE AGE TECHNOLOGY TO SOCIETY'S NEEDS*

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THE PANEL

Moderator

Dr. Daniel I. Cooper, Manager of Special Projects, McGraw-Hill. Dr. Cooper received his Ph.D. in Nuclear Physics from M.I.T. in 1952. He began his career with the Bell Telephone Labs, directing research on transmission, then shifted to the publishing business joining McGraw-Hill's Nucleonics Magazine in 1954. In 1961 he became Executive Editor of Science and Technology Magazine, and Publisher in 1965. Recently he rejoined McGraw-Hill as Director of Continuing Professional Development.

Panelists (in order of introduction)

Dr. Winston F. Koch, Vice President and Chief Scientist, The Bendix Corporation. Dr. Koch received his Ph.D. from the University of Berlin in 1934, while in the role of exchange student for Wernher von Braun's brother who was studying at the University of Cincinnati. Among other things, he is an accomplished pianist. Shortly after receiving his degree he served as Director of Electronic Research at the Baldwin Piano Company, where he developed the Baldwin electronic organ. In 1942 he joined Bell Labs as Director of Acoustic Research. He has a great feeling for the importance of analogs, and much of his research was based upon his appreciation of the analogy between acoustics and microwaves. His contribution today is to review us on the current capability of the Aerospace Industry, reminding us of the systems we have at work now, and to look toward the analogs we can make in other areas.

William D. Smith, Director, Technical Research and Development, GENESCO. Mr. Smith is a 36 year old native Texan with a B.S. in Physics. His experience has been in the areas of automation, mechanized systems and technical management. He spent four years with the Semiconductor Division of Texas Instruments, where he helped to develop the automatic equipment for in-line packaging. He became Manager of Mechanization for one of GENESCO'S companies in 1965, and assumed his present position with the corporation in 1967. GENESCO is the nation's largest apparel industry, ranking 86th among the top 500 companies in the country. Yet its annual sales of $1.2 billion represents only 2.5% of the $40 billion apparel industry. He has had the experience of being part of the aerospace industry and for the past four years has been engaged with coupling the different levels of technology. He is tending to needs of society such as putting a shirt on the back of a man on the street. His contribution to the panel is his experience in putting today's technology to work in yesterday's industry.

Dean Arthur M. Weimer, Special Assistant to the President, Vice Chairman Aerospace Research Application Center, Indiana University. Dr. Weimer was Dean of the School of Business at IU for almost 25 years. He joined IU in 1937 as Professor of Real Estate and Land Economics, a position he still holds. He is now the Special Assistant to the President of IU for Economic Growth Programs, and the Executive Vice President of the American Association of Collegiate Schools of Business. And finally, the role which furnishes his best vantage point for this panel, he is the Vice President of the IU Aerospace Research Applications Center. From these many positions, he will discuss technology transfer, particularly the view from the university.

Dr. Richard L. Lesher, Assistant Administrator, Office of Technology Utilization, NASA. Dr. Lesher's background is in the field of business and economics. He has a bachelor's degree from the University of Pittsburg, a master's degree from Penn State, and a Ph.D. from Indiana University. He joined NASA as a consultant in June, 1964, and served in several management capacities before being appointed to his present position in June, 1966. Out of that capacity he has written many articles and co-authored a comprehensive and well known report for the Presidential Committee on Technology, Automation and Economic Progress. From this perspective he will discuss the government view of technology utilization.

AUTHOR'S INTRODUCTION

Panel Sessions were a FIRST for this year's Space Congress. Both sessions were well received and it is anticipated that future Congresses will continue to include them in the program.

Miles Ross, General Chairman of the Sixth Space Congress, introduced Session Organizer Frank Vaughn, who introduced Dr. Cooper. The moderator introduced the panelists as they made their opening statements, and he did an outstanding job of lacing the presentations together with smooth transitions. The panelists represented four different vantage points: the aerospace industry, the consumer industry, the university and the government. Following their formal presentations, the panel had a discussion session during which written questions from the audience were answered.

A synopsis is included so the Proceedings are a complete representation of Congress activities. It represents the participants' views in summary form, but is neither a verbatim transcript nor has it been edited by the participants.

*This panel session was sponsored by the Canaveral Section of the AIAA and was organized by Frank W. Vaughn, Vice Chairman, Canaveral Section AIAA.
OPENING STATEMENTS

Introductory Remarks by the Moderator: Dr. Cooper

Dr. Cooper began by stating that we should not take ourselves too seriously, but should hang loose. He feels that many of us are in for transitions in the near future at least as complete as the one which created our industry. From his vantage point as Publisher of Science and Technology Magazine he notes that we tend to underestimate our accomplishments. Even the title of this panel indicates that we don’t realize we are already contributing to society’s needs. Yet, we are.

Applications such as communication and weather satellites and navigation aids are obvious. But another, at least partially due to the strong technological base, is the years of relative peace between major powers. The very real threat of retaliation has made all of us, on both sides, stop and think. Also, the recent crescendo of successes in the manned space program has furnished a strong and good stimulus for the spirit of America, much needed after a year torn by such depressing events as riots and assassinations.

One of the main outputs of this panel should be to convince us that we are important in the overall scheme of things.

Dr. Cooper called us “big jobbers”, in contrast to the neighborhood fix-it man, a “little jobber”. Less than a decade after being charged with going to the moon, a very large job, we are seeing it fulfilled. The question is not one of whether space efforts are important. We all agree they are. Rather it is one of: What else can and should we be doing? There are many directions we might turn, including these examples. Civilian technology is not perfect. Automobile manufacturers have difficulty with automatic chokes while we control fuel flow in outer space. Our cities are in decay, clogged with traffic, unsafe, unhappy and worst of all, uncivilized. Education is in need of repair, as verified by the actions of the systems latest products. Many of these are big problems, geared to the big jobber. A simple solution called “systems engineering” is only offered as a complete solution by a simplistic. The problems are more complicated than that. They are complicated further by their enmeshment with political structures that are in many cases out-moded, but jealously guarded. There is no centralized power for all these problems. Many are entwined with local governments, of which there are some 900,000 units.

These examples should not discourage, but excite. In the past we overcame difficulties associated with solving interdisciplinary problems. Likewise, we should be prepared to meet and eventually to understand and like the sociologist, behavioral psychologist and the politician. Companies are beginning to move in this direction. The Rand Corporation has a $1.2 million contract with NYC to perform a systems analysis of some city departments, and Lockheed has worked on some hospital systems. To point up the timeliness of these problems, note that Harold Finder, formerly Associate Administrator for Organization and Management for NASA, will soon assume his new role as Assistant Secretary of Housing and Urban Development, HUD. He will be in charge of urban research and technology. But his anticipated budget this year is only $25 million, a small amount by the standards we’re used to in the space industry.

Concluding, Dr. Cooper emphasized a need for new channels for funding these new problems. And he reviewed some of the history of the funding appropriated by Congress for the Home Finance Agency, predecessor of HUD. In 1954 only $125,000 was allocated, and it was to be used to liquidate all housing programs not later than April 30, 1954. The budget was zero from 1956 to 1961, before moving into figures like $300,000 to $700,000. This appears now to have been short-sightedness, and the responsibility is partly ours. Just when we were building up, beginning in 1958, this important area lay idle. Then in 1968 a large leap forward produced a budget of $10 million, an attempt at making an improvement in urban technology, and it is moving ahead this year. We should all ponder this, because we must all become involved in social and political mechanisms if we are to form an effective attack on society’s needs.

A General View from the Aerospace Industry: Dr. Koch said that there are many ways an aerospace related corporation, such as Bendix, can apply the experience gained from space efforts to society’s needs. Several trends have been set in motion in industry by the space program that have already contributed to our country’s well being. First, the emphasis on equipment weight has made an impact on fields such as computers, an area in which the United States leads the world. The high degree of reliability that must be achieved in the space program has raised the quality of our production methods, placing our products in high ranking positions on the world market. The complexity that we’ve encountered in bringing together so many disciplines has forced us to develop the systems approach to a high level of competence. These general trends have assisted us as a nation to keep the balance of payments at an acceptable level. For example the electronics trade balance has risen steadily from $650,000 in 1964 to $790,000 in 1968.

The U.S. is forging ahead in seeking applications for new technology. The needs of the consumer, the city and the nation are being tended to. The systems approach, conditions engineers to be alert for applications in other disciplines. The U.S. is far out in front of the world in research and development, with an accompanying lead in technology. This stimulates a steady inward flow of scientists and engineers from other countries, which raises our competence.

Communications is big business in this country. Our long distance calls alone total $5 billion, the annual space budget figure. Overseas calls, excluding Canada and Mexico, total $1/3 billion. Though it now costs $7.50 for a three minute call from NYC to London, Comsat charges only 10c per minute wholesale, so our costs are going to come down. We already receive live TV coverage of events around the world, and we’re trying now to link together a network of computers via satellite. Another effort is to tie all commercial and educational TV networks together. With stronger transmitters on larger satellites we won’t need a $1 million Telstar antenna and expensive ground links to receive signals. One use of the Apollo program we have the Saturn booster with sufficient thrust to orbit these large satellites. There will be a TV transmitting station with enough power that normal home sets will be line of sight receivers using inexpensive antennas.

Many companies are contributing now to this trend toward applications. Among the leaders are TRW, Hughes, Lockheed, RCA and Bendix. The secret
of happiness is freedom. The secret of freedom is courage. And we’ve certainly exhibited our courage in accepting the challenge of such a large project as reaching the moon, both as individuals and as a nation.

A View from a Consumer Industry: Mr. Smith’s remarks are based on his experience gained in seeking to apply new technology to the apparel industry. Apparel includes garments and shoes, not the weaving of textiles, themselves. Basically it is a people packaging industry. Textiles are converted to garments, both functional and fashionable. GENESCO has 164 plants, does 40% of its business retail, owns 1700 stores, and employs 66,000 people. Dr. Cooper, in his introduction of Mr. Smith, told us that GENESCO commands only 2% of a $40 billion industry, yet it is the largest apparel industry and is 86th among the top 500 companies in the country. There are three manufacturing groups: footwear, underwear and outerwear. The 23 operating companies are autonomous, as long as they are profitable.

A recent reorganization made a clean separation of product research from process research. Product research shapes and designs fashions, and product research must develop machines to produce them. So, in this case, it is a separation of art from science. Mr. Smith had a small group in one of the operating companies in Waco, Texas, on the Brazos River (the Lone Ranger used to camp there). They were moved to corporate headquarters in Nashville and charged with a twofold mission. First, to develop a corporate strategy for process development; and second, to set up an organization for implementing this strategy. In an early survey it was determined that of 35,000 laborers, 46% were sitting at sewing machines, so there was a common thread. The objective of this survey was to find opportunities (some call them problems), trends for success and motives for mechanization. Three motives for mechanizing were isolated.

1. Reduce labor
2. Improve utilization of material
3. Improve reaction time

Reaction time is the time transpiring between the time when the designer says a product will sell and the time when it is actually released to the stores. It takes six weeks on the line for a man’s suit. Shoes are the quickest, at five days. Some early decisions have proved to be very significant. First, it was decided that the industry was so far behind technically that it was cheaper to buy the research than to assemble a full research team in Nashville. Next, there was no base to build on. Finally, no generic tools existed. There are nine machines which sew a breast pocket to a large flat piece. A two-fold attack was begun. First a local attack for short term improvements at low cost. It involves infiltration to build confidence in engineers and the technology they bring. Second, a coordination of all companies in the corporation to keep them from developing similar machines. This long term phase also includes developing basic machines, which are so badly needed.

A seamstress is a woman who compensates for all those cutting errors. By prodding and pulling, cramming and fitting, she makes two things which are not alike look alike. Specifications were prepared and bids went out for a general cutting machine. Hughes won, and in a feasibility study uncovered 40 new ways to cut, including RF, high speed punches, and cryogenics. The choice was CO2 laser cutting. Central pattern sizes have long been stored on computers. Using an X-Y plotter approach it only remained to develop an omnidirectional cutter to have the makings of a basic cutting machine. The laser fills the bill.

Mr. Smith concluded assuring us that today’s technology can be employed in his industry. He says it is the only defense against the enemy, the import. The apparel industry must mechanize, or move to Hong Kong! The barrier between the space industry and the apparel industry can be removed by a translator. This translator is an engineer who can listen to an Italian tailor and convert what he says into specifications and needs.

A View from the University: Dean Weimer questioned whether the view from the university today requires a view from the classroom and laboratory, a view from the athletic field or a view from a protest march. The university is a many faceted institution with many problems. An experiment was begun in the Fall of 1962 which resulted in the formation of the Aerospace Applications Center, April 1, 1963. The center has a primary function of building a bridge between the large mass of technical material (primarily NASA’s) and the non-space needs of industry. The beginning was clouded by skepticism and doubt. Some critics felt that it was a big boondoggle. Even the supporting agency NASA had uncertainties as to which direction to proceed. The need was obvious, but the mechanics were not. Dean Weimer expressed gratitude that the early organization was flexible, because they could learn from experience how best to formalize it. Initially, 29 companies supported the Center. The amount of the investments were small, usually $500 or less, but very important because it assured the Center of some active cooperation. Each company was requested to commit one man to serve as an in-company consultant.

The Center began with NASA’s tremendous storehouse of information, which contains about 700,000 pieces of information. These items are abstracted and computerized for more rapid search. The task was to match the information to the needs of each company. One problem was that of protecting the companies’ high priority needs. Profiles were accumulated, though, simplifying the transfer.

They found that larger companies could benefit from the transfer most, because they had more personnel to handle it. Men in small companies usually had too many other responsibilities, and often lacked expertise. Working with local governments was more difficult due to the lack of personnel to receive and use the transfers. The information transfer consists of bits and pieces, not major discoveries which are easily recognized and utilized. The Center has been able to help the local governments primarily in the areas of transportation and crime detection and hopes to do more. Universities and research institutions have also benefited from the services.

Dean Weimer stressed that one of the major benefits from the transfers is the stimulus to thinking, not the small bits of information alone. It works like an idea session, and the real payoff has been in the aroused imaginations of the recipients.

Many things have been learned at the Center. For example, there is no aerospace industry as
such. Instead there are many companies around the country with various ties to aerospace programs. Another thing is that because of social relations within companies, a person must be found in the company who really wants the service, a champion, to make it work. The resistance to change is very strong from those who are comfortable in their jobs or who are ignorant, and this can completely stifle the transfer. All things considered, the Center is a very worthwhile venture.

In conclusion Dean Weimer named companies which have used the Center. These include Ball Brothers, Bendix-Kansas City Division, Borg Warner, Delco Radio Division of General Motors, General Electric Motor and Generator Division, GE Electronics Industry, General Dynamics-Convair Division, ITT Federal Labs, ITT Industrial Labs, Eastman Kodak, Eli Lilly, Monsanto, National Cash Register Company, Owens-Illinois, Westinghouse, Xerox, and some smaller ones like Hoffmans Specialty of Indianapolis and Sarkes Tarzian of Bloomington.

The View from the Bendix Corporation: Dr. Koch gave general capabilities of the aerospace industry in his earlier remarks. Now he presents some specific contributions by his own company. Dr. Koch quoted statistics stating that Bendix is a large diversified company with 75 plants in 23 states employing 65,000 people. Bendix International has an additional 60 affiliated plants in 15 countries. The principal products are in electronics, automotive parts and supply, automated equipment, aerospace systems, aviation products, and oceanics. Total domestic business in 1967 involved sales of $1.6 billion and $1.4 billion in 1968. International sales were almost $500 million. Direct exports of goods produced in domestic plants experienced an average per annum growth of 15.5% over the period of 1960 to 1966, as compared to the overall U.S. average per annum growth of 6.5% for the same period. In exporting 10 times as much as it imports, Bendix is typical of many other aerospace related companies. These figures tend to confirm the earlier contention that the space program is valuable to the national trade balance.

Dr. Koch summarized five Bendix Public Needs Programs that have evolved from space and military efforts. First, an infrared scanner has been developed in Ann Arbor which scans over a large band of infrared. Its uses include ascertaining thermal pollution, a serious problem in our lakes and streams due to power generated by burning both fossil and nuclear fuels. It is used to scan grain fields to detect a need for fertilizer or irrigation or the presence of too many insects. It also examines rock outcroppings, the primary stimulus for NASA's interest, offering applications in tracing natural resources. A second program arose from work on coherent radar. Applications are in optical processing and radar image pictures taken through clouds and overcast. It appears to have a big future in geological surveys for natural resources. Development is underway on acoustical coherent sonar, with applications in fish finding, and mine finding for the military.

The navigational and control groups have furnished NASA with many inertial guidance devices. These principles will be useful in commercial aircraft such as the 747, the DC-10 and others. Bendix has a contract for studies connected with Columbia, the ideal city of the future, to be built outside Washington, D.C. They are doing transportation studies and will construct a building in the city. Finally, the problem of air pollution is being attacked. A solid state fuel injection system was developed and picked up by Volkswagen, who wanted to avoid redesigning their present system to meet U.S. antipollutant standards.

These represent some of the Bendix efforts. Other companies are making similar contributions, and the trend is just beginning.

A View from the Government: Dr. Lesher stressed that applications is not a new area. Many people think the knowledge that has been accumulated for ten years will be applied for the next ten. But utilization of learned information has been going on for years, as evidenced by the six year history of Dean Weimer's Center. He said that we shouldn't refer to an aerospace industry. It is actually the aggregate of all U.S. industry, so it is no surprise that space capabilities are spreading to other jobs, and that the aerospace technology is relevant here on earth.

Six years ago, James E. Webb decided to increase the payoff from space to society. As part of a program to implement this decision, he formed the Office of Technology Utilization in 1962. All contractors for NASA must report innovations to this office for public dissemination. Dr. Lesher referred us to Paper Session 18 for details of the workings of the office, and then proceeded to hit the highlights in his remarks.

His office has disseminated a total of about 3000 innovations, ranging from nuts and bolts to significant advances. All the normal governmental methods are used, plus six regional distribution centers like the one at Indiana University. Technology surveys have been contracted to compile state-of-the-art reports in various areas. All computer software belonging to NASA is being put into an inventory, and is sold for the cost of a copy. The trade press has been used heavily for information distribution because it is a prime source for finding new advances for many American companies. When the program was begun, industry laughed at the government for trying to tell them how to do anything. They finally realized that this office is a channel from advanced industries to backward ones. Congress laughed along with the rest, but many agencies in this and other countries have begun similar offices, and this year Congress increased the allocation from the requested amount.

A standard dissemination approach is to begin with a large mass of information, the answers, and to distribute it widely to seek questions. Dr. Lesher reported an effort to reverse the process. Studies are made seeking questions, which are then matched to the files of NASA capability. The biomedical area was selected for pilot efforts. There is no doubt that engineers will solve many of the problems that have plagued the medical people for years.

Dr. Lesher shifted his attention at this time from hardware advances to management. He said that systems management and large scale systems for information handling are extremely important. As an example, he cited the medical services industry, including doctors, hospitals, pharmacies and others. This year it is a $55 billion industry and will go up by 1975 to around $100 billion. Roughly 40% pays for information handling such as taking data and moving it back and forth between patient, nurse, doctor, lab and hospital record. Appreciable savings can be realized here.
The Aerospace Industries Association recently polled its members to find out which were currently applying space technology and management techniques to new areas. A brochure entitled "Application of Aerospace Technology to Civil Systems" reports the areas of urban affairs, information systems, transportation, materials, medical technology, power generation and environment.

Dr. Lesher concluded by pointing to areas where man is receiving a return now. First a multiplier of one must be applied because 90% of the space budget is spent in U.S. industry creating jobs. Satellites are doing wonderful jobs in communications and navigation. Earth resources surveys have a staggering potential. Spin-off occurs through his office and the regional distribution centers. Aerospace companies are moving onto other problems. People transfers from aerospace to other industries carry the management and technical techniques fastest. Education has been improved. And an effect which is difficult to evaluate, the nation has developed an attitude that nothing is impossible. If we can land a man on the moon then we can do anything. He ended by repeating his thesis that our investment in space will be repaid many times over in the long run.

**QUESTION AND ANSWER SESSION**

**Question:** How can space age technology be applied to water conservation and management?

**Answer:** The infrared scanner explores the dryness of fields and could be applied here. It could also monitor the thermal pollution level.

**Question:** The space program has been a large R&D effort. Often it is not realized that the management of this program is an R&D project in itself. Has this led to any fall-out in industry?

**Answer:** Yes. Companies have observed NASA's methods and have emulated them in managing their own research programs.

**Question:** Does the 10c/minute long distance rate include the cost of putting up the satellite?

**Answer:** Yes, Comsat charges the carriers 10c/minute wholesale on NY to London calls, and this includes all costs.

**Question:** Has the Office of Technology Utilization attempted to spin-off management techniques?

**Answer:** Yes, but it is usually more difficult and slower than transfer of a piece of hardware. People in backward companies and city governments usually don't understand what you're talking about. But aerospace companies are contracting to set up the systems. The best method is by people transfer, but it is slow. The educational process is beginning to catch up.

**Question:** How much has it effected the university curriculum?

**Answer:** No appreciable change of courses, but a good deal of change in course content. For example, the case studies in complex management systems are drawn from this area. There are a few universities teaching courses in technology transfer. If spin-off is a second order effect, then teaching about it must be third order. Many large companies like GE have teams to transfer technology within the company.

**Question:** What happens to the ladies sitting at the sewing machines when they are replaced?

**Answer:** GENESCO has a corporate policy against replacing people through automation. The intent is to raise productivity, not do away with people, so new markets are sought.

**Question:** How many companies responded with bids on the single stack cutter?

**Answer:** Six were invited, only two responded and Hughes won. This points up one of the problems. Many companies claim to be working outside NASA and DOD, but it's hard to find them.

**Question:** Is there an equivalent to Commerce Business Daily which lists jobs like the GENESCO cutter?

**Answer:** Mr. Smith used a shotgun approach. Some information might be available through the Department of Commerce or the Small Business Bureau. Some organizations similar to IMS are in the making.

**Question:** What prompts a backward concern like GENESCO to suddenly change and make an attempt to go modern?

**Answer:** Desperation. Imports are a very real threat and the labor content in the apparel manufacturing must be reduced.

**Question:** How large is the GENESCO Research and Development group? Do you expect to grow? Are other companies following your lead?

**Answer:** The group has 22 people right now and we expect to grow. Three or four companies are following our lead, but the 20 largest account for only 75 of that $40 billion, and only the largest ones can afford it. GENESCO is in the apparel business, not the patent or royalties business. No attempt is being made to control the patents so there will be spin-off to the smaller companies.

**Question:** Are any of the supplier companies large enough to do some of this development, e.g. Singer?

**Answer:** Singer and its Diehl Division, manufacturer of servo motors, are becoming very active. Two or three others are interested.

**Question:** Do you anticipate a time when GENESCO will increase its small R&D budget to the 4% level often seen in the aerospace industry?

**Answer:** R&D is poorly defined. Magazine advertising is often considered market research. The figure is around 2% now, and will rise some, but not to the level of 42.

**Question:** Is the government subsidizing the TU Applications Center?

**Answer:** The Center had support for its first five years. It has some small grant support through NASA now, but it is essentially self-supporting. Fees from 90 companies range from $150 to $12,000 depending upon the usage. The university has also contributed to its support because it recognizes the benefits to the faculty and graduate students.

**Question:** If an engineer is to apply his knowledge to urban problems, what should his education consist of, and how should he proceed to continue his education?
million requests for information through the mail. By the polls, we have tremendous public support. Our Apollo Astronauts have been received in an overwhelming manner all over the world. Undaunted, the NASA centers had 1.5 million visitors in the last six months of last year and received 1.7 million requests for information through the mail. 

Answer: The main service available from the Center along these lines would be to furnish you with some prototypes of successful proposals. 

Question: To what extent has the IU Center become involved, perhaps informally, with helping groups, say cities make application for federal money. 

Answer: The Center has not done this. Some people in the university, particularly those associated with the Indiana University Foundation, have done some of this. It is surprising to those of us so deeply involved with government funding to find that groups like school boards and cities know nothing about how to apply for grants. We all can contribute something here. The OEO has published a Catalog of Federal Assistance Programs, which contains descriptions of all federal programs with money available. It is a valuable reference for people with proposals. HUD will take it over. 

Question: Do you feel that the technical spin-offs justify the expense of the space program? If so, why the increasing resistance to space programs? 

Answer: The underlying assumptions in both of these questions are absolutely wrong! The space program was established by an act of Congress for international competitive reasons, not for spin-off or R&D. The first question should be: Once that decision (to compete) is made, how do you best manage the resources to get the most out of it? That is exactly what we’re trying to do by getting all the economic benefits. To repeat, in the long run space R&D will pay for itself! Throughout history scientists and engineers have been victimized by shortsighted and narrow visioned people. At the Constitutional Convention our country’s early leaders were concerned with catching up with Europe. From this start we have driven on to our present role as technical leader of the world. But we can’t relax. The question about public support stems from that ridiculous Harris Poll. But it drew conclusions from answers to irrelevant questions. Of course we don’t want people to starve, and of course we would all like to pay less taxes. But the question of exploring space versus feeding the poor is analogous to a farmer choosing between seed and paint for his house out of the proceeds of this years crop. The question was framed to our disadvantage, and the press picked up the peak of this iceberg, which led to a further misrepresentation of the facts. Europe is filled with nations which were riding high, with strong technological bases and new developments, which opted at some point in history to turn inward and solve their social problems. Now they’re not on the top. Furthermore, regarding the public support of the space program, NASA centers had 1.5 million visitors in the last six months of last year and received 1.7 million requests for information through the mail. 

Question: What is the hoped for increase in productivity within GENESCO from using space technology? 

Answer: The goal is to double in five years. This means the same labor content can be twice as effective using the technology. 

Question: Please address the point of direct utilization of space technology, other than satellite launchings for communications, such as rapid transport in the future, zero-g manufacturing, any wild, long range predictions? 

Answer: Many of the sessions in this Congress are addressing such questions. And they’re not really wild. The areas spelled out in the question are very promising. 

Question: How do you propose to sell the services of the space age technologist to the backward or unsophisticated segment of our industries, and convince these people the expense is worth it? 

Answer: A brief answer will suffice since this has been touched on before. It’s a matter of getting people involved. The market system, with the profit motive will make it happen. The single biggest failure of the Russian program has been their lack of economic benefits, due to their lack of market systems with the profit motive stimulant. 

Question: The NASA reliability and quality assurance have been major factors in the space successes. What is the industry-educational community attitude toward government regulation of product quality sold to the public, in a manner similar to that for products sold to the government? 

Answer: The high level of reliability and quality assurance is not needed in most products. And there is the planned obsolescence which many companies force on us. 

Question: With full access to contractor’s information, have you ever come across any discovery that has taken strokes off your golf score? 

Answer: Having such a full respect for the market system, especially the profit motive, you can be sure that if that ever shows up I won’t give it away, I’ll sell it. 

Question: Many of society’s most pressing problems are political and sociological in nature. How do we use technology to get over the hurdles? 

Answer: Technology won’t help directly. Urban problems are rooted in social problems related to building codes and labor unions. Dean Weimer said that as one trained in the social sciences he used to have a kind of fear of technically trained people. Now he finds the same thing in us in reverse. Social problems, like technical ones, are solvable and yield to hard work. 

Question: How do we sell the public on using our capabilities on such problems as those of a local school board? 

Answer: You must attack the right problems. And you must create a market, with an incentive that boils down to the profit motive. For example, don’t try to change the calendar, it’s too deeply rooted in our agricultural base. A systems approach on a building is usually only economical, with incentives for savings, when several school districts combine on a building program to share costs of development.