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Paper Session I-B - Contracts vs. Commercialization - The Need for Privatization by NASA: A Perspective on ISS Plans for Commercialization Through Privatization

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Contracts vs. Commercialization
The need for privatization by NASA

International Space Station potential for Commercialization through Privatization

A perspective

One of NASA’s stated goals is to get back to the basics and re-establish its role of research, development and exploration of space and get out of the job of low earth orbit general space operations and communications. Having a privately and commercially operated Space Shuttle and Space Station is one way to accomplish this goal.

NASA has made commercialization and privatization activities a part of the 1998 strategic plan. The following is a brief out take on the 1998 plan.

Parts of the NASA strategic plan for Human Exploration and Development of Space (HEDS) roadmap calls for:

1998 - 2002 Establish a Presence
Deliver world class programs and cutting edge technology through a revolutionized NASA.

- **Invest** in advanced concepts that may produce breakthroughs in human exploration and commercial development of space.
- **Enable** the commercial development of space and share HEDS knowledge, technologies, and assets that promise to enhance the quality of life on Earth.
- **Transfer** knowledge and technologies, and promote partnerships to improve health and enhance the quality of life.

2003 - 2009 Expand our Horizons
Ensure continued U.S. leadership in space and aeronautics.

- **Enable** the commercial development of space and share HEDS knowledge, technologies, and assets that promise to enhance the quality of life on Earth.
- **To that end**
- **Facilitate** the use of space for commercial products and services resulting in the participation of at least 200 private firms by the year 2002, and a 100% increase in the level of Industry committed resources by 2005 (Space Station utilization).

- **Achieve** early cost savings in space communications and lay a foundation to permit the privatization and or commercialization of NASA’s space communication operations by no later that 2005.

- **Develop** a plan for privatizing Shuttle operations and implement by 2002. Establish the feasibility of commercialization of the Space Shuttle and some ISS operations by no later that 2005.

2010-2023 Develop the Frontiers. Expand human activity and space based commerce in the frontiers of air and space.
Conduct human missions to planetary and other bodies in our solar system. 
Promote the commercial development of space and share HEDS knowledge technologies and assets that promise to enhance the quality of life on Earth. 
Demonstrate new systems and capabilities to enable U.S. Industry to develop new profitable space industries.

The Johnson Space Center Implementation Plan for 1997-98 has the following included in the section on HEDS:

- Develop partnerships with internationals, Industry (U.S.) and academia to identify and promote the commercial use of space.
- Develop and implement privatization and commercialization of the Space Shuttle, International Space Station and Space Operations.

The specific plan for NASA to implement commercial use of International Space Station is still being discussed, but one thing is clear, the rules of the road for commercial use of tax payer provided facilities for private gainful profit are about to change.

The Office of Space Flight (OSF) at NASA headquarters has established a Commercialization Board and the International Space Station Program Office (ISSPO) has a commercialization working group to implement and review commercial issues. The International Space Station Program Office is planning for an unprecedented level of corporate and Industry participation at or near the time of assemble complete by late 2003. Currently we are developing a long term list of opportunities. The key aspects of this effort will be to involve non-aerospace industries and a broad cross-section of the general economic and social community to ingrain space commerce as a natural extension of life on Earth.

Part of the goals of the OSF are to (1) Enhance the capability and performance of the ISS, (2) Reduce the cost of the ISS to the taxpayer, (3) Stimulate the U.S. space based economy.

Dan Goldin NASA Administrator has stated that “Commercialization is essential if we are ever to open the space frontier for the American public,” he went on to say “It will make for a stronger, better civil space program and will cost the taxpayer less money.”

The strategic direction is set and a roadmap is drawn. How does the plan evolve?

THE HISTORY

Historically the U.S. Government has acted to facilitate the expansion of the national infrastructure from the railroad that was built to tie the country together coast to coast in the 1800’s, to the Interstate highway act of the1950s, to the information super highways of today. The role of Government is very clear. Commercial use of space got a jump start with the COMSAT program and continues today. The U.S. is investing in another large infrastructure, the International Space Station.

All of these activities were to foster business activity at a time after their development. Businesses and new towns grew up along and around railroads and highways and we soon found out how to grow the available bandwidth of the Comsat and put it commercial use. And just like those first railroads, first interstate highways and early Comsats the Space Station is not an ideal commercial facility. Over time it’s architecture will evolve beyond current technical needs to new technological as well as commercial requirements.
THE OPPORTUNITIES

When the NASA needs to buy something it writes a purchase order or a contract for products or services. When it comes to the operations and utilization contract for the International Space Station Program, like the Space Shuttle program it is seen as a prize for the aerospace Industry. With the right opportunities both could be quite a prize for space based business as well.

Privatization and commercialization of NASA’s Space Shuttle and Space Station operations and utilization are more than just a hope as indicated in the NASA strategic plan. One of the questions is how will the contract language be worded to allow this to happen and what type of alliance will evolve from the activity?

Privatization of space in the next decade will mean less control by the Government and more commercial access. For instance access to facilities with a profit potential in the area which previously was only available to a select few Governments or large private companies.

The International Space Station when assembled in 2003 must be operated, and supported in the most effective and efficient manor possible. Dictated in part by the mission, goals and objectives of the increment payload mix. Some of the efficiencies can come from requirements and also how they are met. The potential for commercialization is very good if the right market driven opportunities are matched with an economic model that balances the risk, the investment, and the return on that investment.

Everything about the International Space Station is expensive because of the size and scope, and complexity of the project. NASA has cut as many cost as possible but the fact is it cost a lot to own and operate a space station.

Privatization of highly technical and traditional NASA activities has some tremendous opportunity for the Government to drive space commerce forward and will shape the infrastructure for doing space related business. Some risk is involved also.

The Department of Defense is committed to protecting our national interest and we as a Nation are committed to maintaining our leadership in space. One of our newest areas of national interest is commercial space. The competition will increase soon.

THE RULES HAVE TO CHANGE

The rules of the road will come from the answers to some general questions. Here are a few examples. (Most of these were submitted by Industry and the entire list is in the appendices).

• What is the policy on non-traditional (internal racks/external attachments) used for commercial business?

• What is NASA’s Policy regarding NASA purchase of privately provided ISS on-orbit services? (e.g., power generation)

• What are the legal issues with flying a commercial payload to ISS on the Shuttle?

• What are the ISS on-orbit operations price for payloads?
What are cost/price associated with resources such as astronaut time, power, thermal, use of facilities, data and communications?

How will the on-orbit resource cost metering be done? (power, etc.)

Is it an option or good idea to lease or auction the use of Station facilities and sites?

What will be the tax issues with regard to profit from outer space commerce?

How will the commercial partners deal with the International Partners regarding competition, pricing, space availability? International Partner Governments do subsidized commercial sales and work closer with Industry.

This list is general and is by no means inclusive. Point of fact, it must be expanded at every opportunity in order to help further the creation of a new business oriented environment. The answers to these and other important question’s will shape the way NASA and Industry associate in the future.

THE CONTRACT

In the Federal Acquisitions Regulations (FAR) the work contract means “a mutually binding legal relationship obligating the seller to furnish the supplies or services (including construction) and the buyer to pay for them. It includes all types of commitments that obligates the Government to an expenditure.

From the NASA FAR supplement subpart 16.2
Some of the contract types are:

- Fixed price contracts
- Firm Fixed price contracts
- Fixed-price incentive with firm targets
- Fixed-price incentive contracts
- Fixed-price contracts with prospective price redetermination
- Fixed-ceiling-price contracts with retroactive price redetermination
- Cost Contracts
- Cost-sharing
- Cost-plus
- Cost-plus-award-fee
- Cost-plus-fixed-fee
- Cost-plus-incentive-fee

And many more variations.

Privatization or commercialization can have many meanings when Government assets are involved. Debate these meanings and try to fit the definitions to any one space program. Coming to a consensus is difficult to say the least.

A new breed of Government partner-contractor has to evolve based on a new type of relationship: a kind of partnership where more than costs are shared, risks are shared and the for profits are based on market driven price. Risk of new ventures in new places will stretch both the Government and NASA’s procurement capabilities.

THE NEW PARTNERSHIPS OF THE FUTURE

A new type of Government/business agreement might be titled a Cost Minus, Operations and Utilization Contract with Commercial Opportunity and Incentive For the International Space Station. (Using the International Space Station as an example)

The title dictates a linkage between the International Space Station Operations and Utilization contract and the eventual privatization and commercialization of the International Space Station. Again, this is an
atypical contractual arrangement but one both Industry and NASA should consider. This contract would be a key element in the architecture and overall execution plan and also shape NASA’s future role and responsibility in low earth orbit.

NASA would follow traditional procurement procedures to allow potential respondents to participate and ultimately contract with NASA. The agreement would be both an operations and utilization contract and a commercial partnership. An atypical contract that makes a difference in the way commerce is done in space would have to also help accomplish the national agenda for research and science.

The contract would include language to allow commercial use of some allocated opportunity and the potential commercial development and use of the facility such as the ISS. I believe that today, sufficient flexibility exist to do this within the structure of Government procurement regulations.

Initially, NASA can put out an Announcement of Opportunity in the Commerce Business Daily per NASA FAR supplement 1872. The Announcement could request input on commercial potential in the broadest sense. This would allow Industry to express to NASA which aspects of the ISS they see as potentially commercial. Also the follow-on discussions and pre-proposal meetings could allow a meaningful exchange of ideas on mechanisms. One of the benefits NASA sees in a broad business participation and input as to the kinds of arrangements that will be interesting enough for Industry to pursue.

Some of these proposals would lead to agreements with the new “Commercial Contractor/Partner.”

The future ISS operation and utilization contract should include transition planning to move to a more privatized operation which in turn could support commercial operations and use in the future. A staged approach is desirable because of the unique aspects of the International Space Station, the new contract, and future markets.

The basic architecture of the contract would be a beginning cost to the Government based on the requirements and announced commercial use and opportunities. A key aspect of the request for proposals would be the conveying of any existing commercial income potential agreements to the commercial contractor/partner at the time the contract begins. This commercial activity along with other opportunities to enhance the ISS capability and capacity would be the key to long term operations cost reduction for NASA. A percentage of the commercial income would offset the general cost to operate the ISS on orbit. This is the minus part if the agreement. A “tax” would only apply to the commercially derived income/profit. The profit potential would not be limited to a traditional fixed or award fee contract but would be tied to commercial opportunities. The incentive would be the broad scope of flexibility and commercial control.

Also there may be a need for some legislative changes for “tax free” status to incentivize Industry to participate.

As an example; a commercial partner would have the right to fly a privately developed and launched free flyer like a power station near the station and to sell power to other commercial users. This may be a cost effective augmentation at some point in the future. Another example is the enhancement of the communications capability of the ISS which could be sold to earth based constellation operators or ISS based commercial facility users (racks). The additional cost to fly the payload or new facility is covered by the user and some of the profit paid as a “tax” to offset the ISS “overhead”.

How profitable can a new ISS operations and utilization Government contract be? The value will be upwards of $13 billion over ten years. One thing is clear. The company, corporation, or consortium that gets a head start in large scale space operations will be a leader of space parks for some time to come. Most commercial activity now centers around communications, launch services, remote sensing, and materials manufacturing. It is understood that the commercial partner would in turn enter into other agreements as a broker for services and seek the broader participation of smaller aerospace and non-typical companies. Maybe the next space station will be built by corporate America for all kinds of business including those hundreds of ideas we read about everyday. The future large scale on-orbit commercial space operator has to start learning by doing, now. Developing markets will take as much time as learning how to manage the enterprise.

Currently NASA finds interest in our contract opportunities from large and small companies, but is the SS really something that Wall street would like to invest in? Studies are underway by both NASA and the Industry to determine just that.

NASA’s broadly based and general in nature requirements for operations should allow some flexibility in how the potential contractor could do the job. Assets and responsibilities may need to be transferred to the private sector. The ISS Program Office and the Office of Space Flight know that the outcome of the current Shuttle Operations contract evolution towards privatization will affect ISS contracted operation. Also the current Space Operations contract which is being awarded sometime this year has privatization potential included in its language.

While a Cost-Minus arrangement is one option other similar more creative contract variances could be applied to allow monetary returns from commercialism to flow back to NASA which could help offset the operations and utilization cost so the taxpayer does not foot the entire bill for the NASA.

OTHER OPPORTUNITIES

Everyone has read the studies and news reports about potential commercial use of space from communications, remote sensing, to sending nuclear waste to the sun, burial in space and many other ideas. Some good ideas and some unusual ones. Space is a new frontier for businesses to operate and creative ideas abound on what to do to make money in space. Some ideas will work and others will not. These ideas always raise more question and ultimately who is going to pay the cost and be responsible.

The first partnerships may have to be those non-typical arrangements that fall outside the arena of Federal Acquisition Regulations as “NASA Space Act Agreements”.

The process of matching the creative entrepreneurial ideas with the existing structure of the ISS leads some interesting discussions. Given that the ISS almost completely designed and developed, and the utilization and operation is already planned for years into the future based on the payloads, when can new commercial activities occur? Most planning seems to have begun based on the number of ideas that NASA receives. At the present time some of the current payloads can be classified commercial because of there origins with NASA’s Commercial Space Centers. Others are technology testbeds being developed privately and flown as experiments with possible dual use in the private and Government sectors. All have significant Government or international partner involvement.

ISS opportunities exist in the areas of energy, communications and remote sensing. The ISS has more users for its power, more information needs that bandwidth and more earth observing opportunities than new
sensors. This is usually the case for any new venture and one would expect it was the case with Mars Pathfinder and Lunar Prospector.

The ISS as planned, has a limited resources capacity. Only so much power, thermal, space, crew time, data downlink, is available. Almost immediately additional capacity will be needed for bono-fide commercial use of the station. In the interim, creative solutions driven by need will play a part in overcoming roadblocks to commercial supported improvements. The ISS is not being built and was never planned to be a space business park, but if that is what it is to become then some technical as well as cultural changes must to occur.

OTHERS HAVE PRIVITAIIZED

The Department of Energy has made enormous strides in the direction of privatization and have developed some lessons learned that will benefit all agencies. Department of Defense agencies see the possibilities and advantages of privatized operations where possible and civil space can take those steps. Case studies indicate the benefits can allow agencies to maintain control of core disciplines and at the same time acquire services that will facilitate commercial use and reduce overall cost of operations.

CONCLUSION

To suggest that the U.S. is to remain the leader in commercial use of space requires NASA to partner with multinational U.S. companies that do business in the global economy. NASA will, enable, facilitate, promote, and invest in the commercial space marketplace and the Space Station will be one of the facilities.

NASA can now allow the activity needed to stimulate developing low earth orbit businesses. NASA can allow market driven ideas a place in space to try out new products and services. The transition from NASA only to a NASA and Industry partnership will mean a contract for commercialization. Eventually privately owned and operated will happen when the markets are mature for the right products and services. Space based commercial communications will evolved to a 100 Billion a year business in the next five years. The ISS will evolve commercially also.

If you want to think in terms of real potential just use the Olympics sponsor model and by the year 2013 the “Space Station Disney” or “Reebok, or “NIKE”, or any other name in the stock exchange and work backwards. That is where we are today. New models of contracts and agreements today is how we get there.

This year will be challenging for NASA with a major event of First Element Launch of the new ISS occurring.

The bright new star in the sky will be an International one. It will not be illuminated by flashing multicolored neon telling us where to eat, but it will be a new place to do business in the not to distant future. A new facility to support basic research and commerce at the same time and help make a better life on earth.
Appendix

The rules of the road will come from the answers to some general questions such as:
(Most of these were submitted by Industry and the entire list is in the documentation)

- What is the overall policy on using taxpayer financed property (the ISS) for commercial profit?

- *What is the policy on non-traditional (internal racks/external attachments) used for commercial business?

- *What is NASA’s Policy regarding NASA purchase of privately provided ISS on-orbit services? (e.g., power generation)

- How does Industry deal with the issue of competition from NASA? (private vs. Potentially “free” NASA provided facilities)

- *What are the legal issues with flying a commercial payload to ISS on the Shuttle?

- What are the options to fly non-manned cargo to ISS? (ELV, Other launcher vs. the Shuttle)

- What will be the manifesting issues and priorities with regards to Shuttle payload space available?

- What are the launch costs/price per pound for Shuttle missions carrying commercial payloads to ISS?

- *What are the ISS on-orbit operations price for payloads?

- *What are cost/price associated with resources such as astronaut time, power, thermal, use of facilities, data and communications?

- *How will the on-orbit resource cost metering be done? (power, etc.)

- How will NASA protect proprietary rights regarding new information and technologies being generated in space by use of the ISS?

- How will security for data and experiment samples be assured for a commercial partner?

- *Is it an option or good idea to lease or auction of Station facilities and sites?

- What will be the integration time to get on Shuttle/Station? (led time to fly)

- What is the approval cycle/loop and schedule to fly on the ISS?

- What will be the safety documentation and review process?

- What are the return to earth and de-integration options and schedule?

- What are the third party liability and termination for convenience by either party policy?

- Who will be the POC with authority for commercial deal making and execution?
• *What will be the tax issues with regards to profit from outer space commerce?

• Which regulatory agencies will be involved with commercial ISS operations and utilization?

*How will the commercial partners deal with the international partners regarding competition, pricing, space available?