

## US Commercial Space Act of 1998 and Its Implications for the International Space Station

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### Abstract

The US Congress declared that the use of free market principles in operating, servicing, allocating the use of, and adding capabilities to the International Space Station, and the resulting fullest possible engagement of commercial providers and participation of commercial users, would reduce Space Station operational costs for all partners and the Government's share of the United States burden to fund operations. NASA is being pushed towards privatization and commercialization of the International Space Station. It is quite necessary for other partners in the International Space Station projects as the international cooperation scheme to examine the legal and practical feasibility within the framework of space laws.

1. Since 1988 Agreement among US, ESA countries, Japan and

Canada on International Space Station Project reached and later Russia joined, there have been several difficulties to implement this international cooperation scheme among member countries. Even though the schedule of the project has been delayed, there is virtually no serious discussion of canceling the program among the countries concerned. Despite on-going schedule and budget issues, everyone now agrees that the International Space Station (ISS) will exist and go on.

The Congress and the Administration are now shifting their attention to the issue of ISS operation and its utilization, like how to ensure that the ISS is affordable to operate and that it is used as effectively and efficiently as possible.

A continuing element of this discussion are the mechanisms by which NASA can increase the role of private industry, in operating and maintaining the ISS, in supporting ISS users, in building new capabilities and upgrades to the ISS systems and in using the ISS for commercially-relevant and economically-useful activities.

Industrial exploitation of near-Earth space is a fundamental objective of the US investment in the ISS. Several studies forecast potential economic benefits from space-based microgravity R&D and production facilities. Shuttle-based R&D activities have offered positive results, but limited flight opportunities preclude systematic investigation or exploitation. NASA has reaffirmed its commitment to commercial utilization of ISS. R&D breakthrough provide the American taxpayer with a return of investment. Private sector users paying a fair share of ISS operations costs will enable NASA reallocate funds to new missions or challenges. In other words

NASA wants and needs a strong Space Station user community.

NASA has two interrelated challenges of convincing industry that space-based research activities can play an important scientific or technical role in their businesses and of convincing industry to pay for ISS resources. Industry must be able to define a positive cost-benefit calculus, in the context of alternative uses of capital. Most companies have well-defined R&D programs and ISS experiments must be attractive enough to displace other activities. In order to articulate a compelling reason for ISS projects, users require knowledge of what the ISS environment offers ability to relate that environment to specific corporate technology objectives and opportunity to exploit the results for competitive or financial advantage.

Industry R&D investments typically move through three phases; exploratory research in which promising hunches are pursued, applied or demo where successful hunches are tested in a prototype or testing

environment and production phase in which successful applied or demo products move into full scale development leading to production.

Elasticity of demand for ISS infrastructure cannot be projected with precision, but educated guesses at overall trends can be considered. All classes of activity will be inelastic across most price ranges. Type of activity will determine user valuation or demand curve. Price at which NASA maximizes revenue and price at which NASA achieves utilization objectives may not be the same.

The current ISS operations regime is not aligned with commercial experience. The costs of space may accurately reflect today's capabilities, but industry's response will be to ignore ISS if terms of access are too heavy. A market-responsive pricing mechanism and manifesting process must be developed if NASA wants the private sector to use the Station. An effective, sustained, commercially oriented outreach effort is necessary to develop industry awareness,

interest and utilization of the ISS facility.

## 2. Commercial Space Act of 1998

The Commercial Space Act of 1988(P.L.105-303) originally proposed in the House of Representatives as H.R.1702, was signed by the President on 28 October 1998. The Congress declares that a priority goal of constructing the International Space Station is the economic development of Earth orbital space. It also further declares that free and competitive markets create the most efficient conditions for promoting economic development, and should therefore govern the economic development of Earth orbital space.

The Congress further declares that the use of free market principles in operating, servicing, allocating the use of, and adding capabilities to the Space Station, and the resulting fullest possible engagement of commercial providers and participation of commercial users, will reduce Space Station operational costs for all partners and the Federal

Government's share of the US burden to fund operation.

Major provisions related to ISS of the Commercial Space Act of 1998 direct NASA to deliver a series of studies to the Congress.

1) Opportunities for commercial providers to play a role in ISS operation, use, servicing and augmentation. 2) A market study that examines and evaluates potential industry interest in providing commercial goods and services and interest in using ISS. 3) A report on the number of proposals NASA received during 1997 and 1998 regarding commercial operation, utilization, servicing or augmentation of the ISS, and NASA's actions on those proposals. 4) A report on the potential for, and issues associated with, full privatization of the Space Shuttle.

The Act expands federal policy and legislation for commercial launch services. It includes provisions for re-entry vehicles and operations, permits continuation of NASA's launch voucher program and requires the Federal government to procure

space transportation services from US commercial providers.

As responding to the Commercial Space Act of 1998, NASA management began to consider many of the issues embedded in the Act and developed a new Commercial Development Plan for the International Space Station. NASA also commissioned a study to consider alternatives for reducing its cost of human space access. These responses and actions indicate that NASA is being pushed towards privatization and commercialization of the ISS.

### 3. Commercial Development Plan

The short-term objectives of the Plan begin the transition to private investment and offset a share of the public cost for operating the space shuttle and space station. The long-term objectives are to establish the foundation for a marketplace and stimulate a national economy for space products and services in low-Earth orbit, where both supply and demand are dominated the private sector.

The Plan determines cost and feasibility of a Commercial Lab project that would provide one STS flight per year during ISS assembly for utilization activities.

It identifies Pathfinder business opportunities (activities which could be operated/sustained on a commercial basis) that can begin the transition phase.

- Commerce Lab

The objective of the Commerce Lab is to ensure that there is a User Community ready to exploit ISS facilities, as they become available.

Commercial microgravity activities remain subcritical, because there have been more than 150 commercial flight experiments since 1985 and over half of the total were biotech/pharmaceutical experiments

- Identified Pilot Businesses

NASA identified nine businesses;

+ New commercial business opportunities

Consumer goods in space

Brand name sponsorship

Educational products

Payload accommodation  
auction

New product development  
(proprietary proposal)

On-orbit research facility  
(proprietary proposal)

+ Operations

Imagery

+ New capability development

Communications

Ground operations facility  
(proprietary proposal)

4. The NGO Utilization Manager has been proposed to address necessary improvements in ISS utilization processes. Objectives of the NGO utilization manager are to create a new, user-friendly organization that would facilitate and expand ISS utilization. The NGO is considered to serve as the interface between users and operators, in order to maximize the range of productive users, as well as minimize the cost and schedule associated with

conducting user operations in low-Earth orbit and to be established in the year of 2000 for target.

NASA, with Congressional urging, is moving quickly to privatize the International Space Station, in order to be consistent with NASA's objective to be ready to move to the next project and with Congressional desire to have ISS prove its worth. Even though NASA does not have an official fixed schedule or commitment, it is clear that transfer of Utilization functions will come first and reliance of private sector for system augmentation will come next. USA-like organization to assume operations responsibility will probably be deferred until after assembly complete.

5. NASA's efforts to encourage industrial development of space are likely to have mixed results with positives and negatives.

In positives: Efforts to transfer day-to-day

operations and utilization management activities to contractors will reduce costs and improve service. Private sector augmentation of limited ISS resources can probably be done more efficiently and more quickly than if performed under traditional NASA procurement. Efforts to introduce market-based pricing into NASA utilization will provide hard targets for space entrepreneurs in terms of prices users will pay for access to low Earth orbit.

In negatives: It is doubtful that, even with the most efficient commercial management, ISS and STS will ever make sense as fully commercial ventures (that is, with users paying full costs). The commercial user community in the US is still either ignorant of, or ambivalent towards, the utility of space research given the current cost, schedule and operating constraints.

6. As the Commercial Space Act of 1998 was passed in the Congress and signed by the president, US efforts to actively shift from a government-dominated space economy to a private-sector led space economy continue to accelerate. NASA's efforts in manned spaceflight and microgravity would be seen in the context of this larger trend. However, there are still a wide gap of the trend of commercialization and privatization between US and other areas, Europe and Japan. Europe is still not proceeding as quickly in the middle of politics and issues associated with industry consolidation. Japan is making some progress in satellite applications, but manned space and infrastructure activities are still government-led.