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INTRODUCTION

Let me first thank you, Mr. Chairman, and the Subcommittee for this opportunity to testify on the state of the U.S. space transportation industry and the integral role the Office of Commercial Space Transportation (OCST) has played in fostering the development and maturity of this industry and the safety of its operations.

As you requested, Mr. Chairman, I will particularly address DOT's role in regulating commercial launches, and cite specific contributions to commercial space transportation policy development and coordination.

This is a critical time -- a time of significant opportunity and also of great challenge -- for this relatively young industry.

U.S. launch providers face significantly increased international competition while operating under limits imposed by the technology currently in use. Promising new applications for space -- such as the varied proposals for low earth orbit satellite communications systems and innovative low cost platforms for materials processing in space -- hold out the potential of new markets, but will our launch companies be in a position to capitalize on these opportunities?

Technology moves forward, but will our commercial space entrepreneurs be able to put it to use in meaningful and competitive ways, and will our government adopt policies and support technologies to ensure that U.S. commercial space operators remain in the vanguard of international space activities? These critical concerns are shared by the launch industry and OCST as one of the lead agencies for encouraging and facilitating its commercial operations.

When I became acting director of OCST ten months ago, it did not take me long to identify four elements that are important to the industry:

- 1) A reasonable, efficient regulatory regime,
- 2) Some kind of assurance that the entry of non market economy launch providers will not lead to serious injury to the U.S. launch industry,
- 3) Acquisition of new technology to reduce launch costs and thereby keep the industry competitive internationally, and
- 4) An infrastructure adequate to support commercial launch activities.

REGULATORY REGIME

To understand our present situation in the licensing area, one must be aware of the very high levels of new technology emerging from the small companies:

- . Orbital Sciences Corporation is ably demonstrating the advantages gained in price and efficiency from using a conventional jet aircraft to take the Pegasus vehicle to 40,000 feet and to provide its initial launch velocity.
- . Space Industries, Incorporated and Westinghouse Electric Corporation, under contract to one of NASA's Commercial Centers for Development of Space, are developing the COMmercial Experiment Transporter (COMET) Free Flyer, which will provide a new platform for studying the effects of microgravity and/or processing materials in space, and then

return the module to earth. This COMET system will be launched by a completely new Conestoga vehicle designed by EER Space Systems.

These innovations most assuredly represent great challenge to the entrepreneurs who are developing them. They are also challenging to our licensing staff, who must assure their safety to the public.

Since the Office's creation, OCST has been committed to developing and continually improving an efficient and streamlined regulatory process. Based on DOT's extensive regulatory experience, it has been our view from the beginning that while the regulatory process above all must protect public safety, it can also facilitate industry development, if well designed.

To accomplish this the Office relies on performance criteria--as opposed to design criteria--as the basis for assessing the safety of launch vehicles and their operations. Performance standards are stated in terms of the safety goal to be achieved, rather than giving specific instructions on how to design, build, or operate a system. They are the modern tool of choice in the regulatory arena because they foster the maximum flexibility in technical innovation.

They do come at a cost, however. Performance-based standards place a greater workload burden on the agency that uses them because the agency must be prepared to accept a broad range of possible analytical forms and methodologies by which the applicants demonstrate their safety performance. Assessing safety in this manner can be far more difficult than merely checking to see whether the applicant did what it was told to do in a cookbook solution.

Also, while performance standards are essential to fostering innovation, some companies in the commercial space community are not accustomed to working with them. As a result, particularly with the newer systems, the license applicants must work closely with OCST to assure a full understanding of what must be done to meet public safety requirements.

The framers of the Commercial Space Launch Act recognized that a sound, prudent, regulatory regime is essential to public confidence in, and acceptance of, new and potentially hazardous technology. To that end, OCST is implementing a safety evaluation process for the COMET, representing the first return of an orbiting capsule to a targeted landing zone in the continental United States. Because of the complexity of the COMET system and magnitude of public safety risks, the vehicle safety approval process entailed development of a highly detailed strategic plan to ensure we would address all critical issues. Safety criteria governing the vehicle's return to earth were published in the Federal Register over a year ago.

In keeping with OCST's commitment to streamlining the licensing process, we have been issuing *operators licenses*. An operators license authorizes the conduct of a range of launch activities within prescribed limits, set to meet the launch operator's needs. Recently, with a minimal burden on the launch firms involved, we renewed two of these operators licenses for an additional two-year period. The operators license can substantially reduce the cost for companies having active launch schedules, and based on data provided by industry we estimate savings to industry to date easily exceeded \$200,000, compared to the cost of mission-specific licenses.

Another of our major licensing activities is determination of *maximum probable loss* to establish insurance requirements for each launch. OCST issued the first risk-based insurance requirement in January 1988, and this approach was statutorily mandated by Congress later that year. As a result of these initiatives, the days are gone when companies faced the prospect of purchasing \$500 million in liability insurance, regardless of actual risks involved. We have continued to refine and improve the maximum probable loss determination process so that launch companies are not required to carry more insurance than necessary to protect the public and the government from the financial risks arising out of the conduct of commercial launch operations.

In addition, we are in the process of developing regulations that reflect a more mature licensing regime and a clear articulation of the licensing options available to launch providers and operators of commercial launch site facilities.

Resources - In the licensing area, we have assembled a highly qualified engineering staff that is assisted by a diverse group of contractors, including leading safety experts, that lend their specialized expertise to unique technical issues.

At this moment we are conducting safety assessments involving the COMET program, both the launch (by EER's new Conestoga vehicle) and the re-entry system (the Free Flyer); Orbital Sciences Pegasus vehicle that will be launched for the first time from a commercial jumbo jet; and General Dynamics's first Atlas II-AS commercial launch, with solid rocket motors attached. The volume of work is not only greater than it has ever been; the complexity of the analyses required to assure public safety has also increased manyfold over previous applications, due to increasingly innovative and sophisticated proposals from a maturing industry. Applicants' safety analyses submitted in support of their applications are measured in terms of feet, rather than inches. These applicant's capabilities and operations must be carefully, thoroughly, and thoughtfully assessed to assure that no aspect of the launch activity will, in fact, jeopardize public safety.

The President's FY-94 budget requests three additional staff positions in the licensing division to address this crucial need, so that we can continue to meet these responsibilities.

INTERNATIONAL LAUNCH MARKET

The international commercial launch market consists primarily of launches of large communications satellites into geostationary orbit. This market is limited. Earlier forecasts of up to 15 annually are declining towards 10 to 12 late in the decade.

The major launch systems of the world were developed and underwritten by the United States, European Countries, China and Russia for national strategic and economic purposes. Initially the U.S. industry faced competition only from Arianespace, the European launch consortium. In 1989, China entered the market. And now Russia, which has a large launch capacity, is also seeking commercial launches. The demand for geostationary launches, however, has remained relatively static, falling short of the abundant supply of launchers on the market, and thus creating a difficult competitive environment.

The U.S. commercial launch industry is in the position of competing against foreign launch providers that enjoy substantially greater levels of subsidies and government support, such as Arianespace, or are not operated strictly on market principles, such as the launch industries of China and Russia. Arianespace is supported by the 13 member governments of the European Space Agency. The Chinese and Russian launch enterprises are controlled by the state and are essentially enterprises of the two governments.

The U.S. industry's most immediate concerns relate to competition from launch providers in non-market economies. And it is for this reason that we negotiated a launch services agreement with China before its entry into the market in 1989. It is also one reason why -- together with supporting reform of the Russian economy and its space launch sector in particular -- we are now negotiating a similar agreement with Russia. These agreements are aimed at avoiding significant market disruptions that could result from unrestrained offers of launch prices, terms and conditions that bear little or no relation to costs or to existing market practices in the West.

Under the leadership of the U.S. Trade Representative, the U.S. government is taking steps to ensure that the U.S. industry can compete with foreign launch providers on a level playing field. The launch services agreement with China contains provisions to encourage market-oriented pricing and prevent a

surge in the number of launches that could disrupt the market. As a result of a successful negotiating session earlier this month in Moscow, we are now close to having a similar agreement with the Russians, to permit them to enter the market during their transition to a market economy. We believe that these agreements will work to keep the playing field level for the U.S. industry.

You will hear more on the agreement with Russia in testimony from USTR tomorrow. As the government's primary source of economic and technical expertise on the commercial launch industry, OCST played an important role in those negotiations.

The Office played a comparable role supporting the USTR-led team in the negotiation of the Memorandum of Agreement (MOA) with the People's Republic of China (PRC). DOT chairs the interagency Working Group on Information that provides technical support and analysis to USTR for purposes of determining whether or not the Chinese are in compliance with terms and conditions of the MOA. As we approach the expiration of the MOA at the end of 1994, the Department, through OCST, will have a pivotal role to play in formulating the Administration's approach to continued Chinese participation in the commercial launch market, supplying market analyses, forecasts, and technical expertise, and coordinating with the industry to ensure that their concerns are addressed.

The Department's involvement in the trade arena is an integral part of our responsibility as lead advocate within the federal government for facilitating commercial launches by the U.S. private sector. In other interagency deliberations, we have successfully argued for explicit attention to the needs of the commercial launch industry in a series of national space policy statements.

NEW TECHNOLOGY

Because commercial operations can lead to a reduction in NASA and DOD launch costs, it is to the government's benefit that the industry remain internationally competitive. Today, the U.S. commercial space launch industry sorely needs cost reductions that can come from advanced technology to stay abreast of the new vehicles being developed by our foreign competitors. There are two tracks by which such technology can be acquired: government development of the next generation of launch vehicles, and the infusion of new more cost effective technology at the component level that will bridge the gap until the Air Force and/or NASA have a new vehicle on line. NASA and DoD are both considering a range of conceptual approaches to developing a new generation of launch vehicles.

With respect to the second track, component technology, there are elements in NASA's FY-93 advanced development technology program that would improve technology of the existing expendable launch vehicle fleet. Further, within the President's FY 1994 budget for NASA there is provision for a new technology investment initiative which may include work on advanced launch technologies and expendable launch vehicle improvements. NASA will define these initiatives in June, consistent with the space station redesign activity now underway.

As far as our industry is concerned, component technology research is one of the most important steps the U.S. government can take to help the industry improve its own competitiveness. A new generation vehicle could eventually help U.S. industry, but component technology could have a more immediate impact if it reduces launch costs. The results from both tracks would also benefit the U.S. government as the primary customer of the domestic space transportation industry.

With the assistance of valuable input from our Commercial Space Transportation Advisory Committee (COMSTAC), OCST has been working to assure that both the Air Force and NASA are apprised of the cost, size, and lift requirements for a new vehicle to be

internationally competitive, as well as meet the government's civil and military requirements.

INFRASTRUCTURE

Pursuant to our responsibilities under the CSLA, the office has maintained a strong interest in facilitating enhancements to space launch infrastructure. We work closely with DOD and NASA to improve their responsiveness in providing launch site and range services that meet the needs of commercial customers. Earlier this year we forwarded to Congress a report assessing the existing infrastructure in light of the projected requirements of the U.S. commercial launch industry. It also described long term financing options.

Congress has funded a \$10 million DOD program to provide grants to construct or improve dual-use space launch infrastructure for launches of both U.S. government and commercial payloads. At DOD's request, OCST provided technical assistance and advice on administration of this program, including selection criteria and funding mechanisms.

THE COMMERCIAL SPACE LAUNCH ACT

In many respects, the original Commercial Space Launch Act was a visionary and forward-looking document and periodic amendments have met a number of the major needs of the evolving commercial space transportation industry. But now, nearly a decade after enactment of the CSLA, we find that new proposals from this industry, and emerging technologies leading to new space transportation capabilities, raise public safety concerns that should also be addressed as part of a comprehensive safety regime.

In conducting the reviews required for COMET as part of OCST's licensing process, we have seen one example of how the CSLA needs to be updated. At the time the Act was drafted, commercial remote-controlled reentry vehicles were not yet envisioned. Now that we have experience working with this concept, we recognize that the Act may need to be amended to enable us to address this

new technology more effectively.

The Department is gratified by the recent extension to December 31, 1999, of the so-called *indemnification* provisions of the Act. Implementation of these provisions continues on a case-by-case basis in order to respond to the variations in launch proposals presented for licensing.

CONCLUSION

The U.S. commercial space transportation industry has come a long way since adoption of the Commercial Space Launch Act of 1984 and subsequent actions by the government to foster a robust and competitive domestic commercial launch sector. Beginning with the first launch in 1989, we have had 34 licensed commercial launches, including 16 for foreign or international customers. Our current manifest shows more than 40 firm orders for commercial launches in the future, including five for the remainder of 1993. The commercial space launch industry itself generates \$300 to \$500 million in revenue per year and contributes to our international competitiveness.

New technological advances, such as the Pegasus and the COMET, are just the beginning of the development of more viable space projects in the commercial environment. Advances in single stage to orbit vehicle technology, hybrid fuel vehicles and other developments also have promise.

Despite these bright spots on the industry's horizon, we must remain circumspect in projecting the industry's future. Some unfortunate recent launch failures have raised questions about the reliability of U.S. launches.

The Department and the U.S. government as a whole must remain vigilant and responsive to the changing shape of commercial space markets and technologies if we expect this industry to thrive.

Thank you for this opportunity to share these thoughts with you and I will be happy to answer any questions you may have.

Chuck/Don/Esta/Elaine/Dick/et al
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