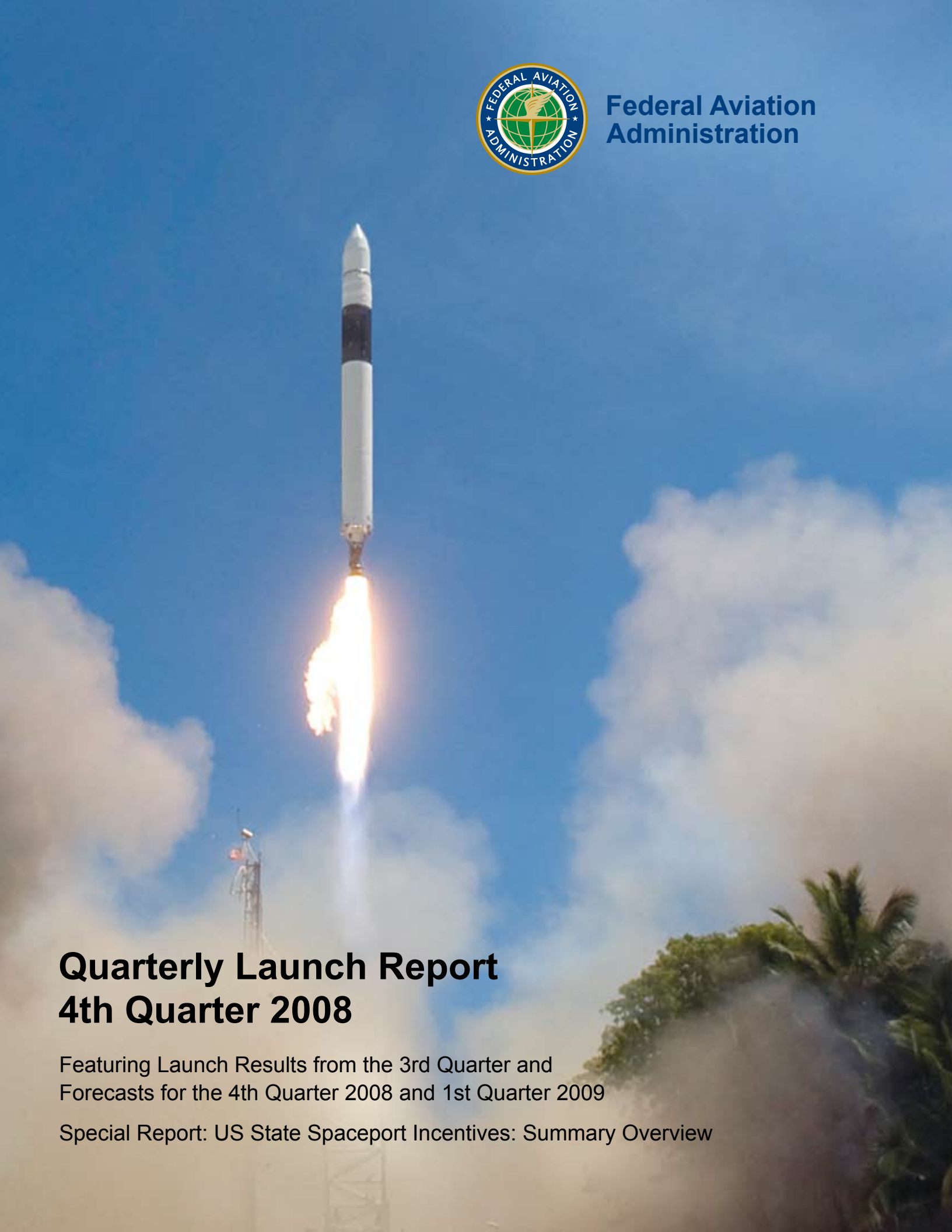


Federal Aviation Administration

Quarterly Launch Report 4th Quarter 2008

Featuring Launch Results from the 3rd Quarter and Forecasts for the 4th Quarter 2008 and 1st Quarter 2009

Special Report: US State Spaceport Incentives: Summary Overview

Introduction

The *Fourth Quarter 2008 Quarterly Launch Report* features launch results from the third quarter of 2008 (July - September 2008) and forecasts for the fourth quarter of 2008 (October - December 2008) and the first quarter of 2009 (January - March 2009). This report contains information on worldwide commercial, civil, and military orbital and commercial suborbital space launch events. Projected launches have been identified from open sources, including industry contacts, company manifests, periodicals, and government sources. Projected launches are subject to change.

This report highlights commercial launch activities, classifying commercial launches as one or both of the following:

- Internationally-competed launch events (i.e., launch opportunities considered available in principle to competitors in the international launch services market);

- Any launches licensed by the Office of Commercial Space Transportation of the Federal Aviation Administration (FAA) under 49 United States Code Subtitle IX, Chapter 701 (formerly the Commercial Space Launch Act).

Contents

Cover photo courtesy of Space Exploration Technologies, Inc. (SpaceX) Copyright © 2008. A SpaceX Falcon 1 lifts off from Omelek Island in the Kwajalein Atoll, 2,500 miles (4,000 kilometers) southwest of Hawaii, on September 28, 2008. The mission, which carried a mass simulator payload to low Earth orbit (LEO), marked the first fully successful launch of the Falcon 1 vehicle.

Third Quarter 2008 Highlights

NASA announces remaining Space Shuttle missions

On July 7, the National Aeronautics and Space Administration (NASA) announced the tentative schedule for the 10 remaining launches of the Space Shuttle. The schedule called for two remaining launches in 2008—the STS-125 Hubble repair mission and the STS-126 ISS mission, both in the fourth quarter—as well as five launches in 2009 and three in 2010.

Virgin Galactic WhiteKnightTwo unveiled

On July 28, the space tourism company Virgin Galactic and vehicle developer Scaled Composites unveiled WhiteKnightTwo (WK2), the carrier aircraft that will loft the SpaceShipTwo (SS2) suborbital spacecraft to its 15,000-meter (49,000-feet) ignition altitude. The WK2 is the largest aircraft ever built exclusively with carbon composites; it has a wingspan of 42 meters (138 feet). Virgin Galactic also announced an agreement to allow airline pilots serving sister company Virgin America to train as WK2 and SS2 pilots.

Third Falcon I launch fails, but fourth succeeds

On August 2, the third launch of the Falcon 1 small launch vehicle developed by Space Exploration Technologies, Inc. (SpaceX) failed about two and a half minutes after launch. The failure occurred near the end of the first-stage burn. On August 6, SpaceX announced that a thrust transient related to engine cutoff timing had caused the failure. Four small payloads—Trailblazer, built by SpaceDev for the Operationally Responsive Space (ORS) Office of the Defense Department, as well as two small NASA secondary payloads and a Malaysian payload adapter—were lost. Subsequently, SpaceX increased the delay between engine cutoff and stage separation, resolving the thrust transient issue. The next launch of the Falcon 1—Flight 4 on September 28—represented the vehicle's first total success.

NASA delays Orion Crew Exploration Vehicle target date

On August 11, NASA announced it was delaying its internal schedule for the first crewed flight of the Orion Crew Exploration Vehicle (CEV) by a year due to technical and financial pressures. Although the official date for the first crewed Orion launch has been March 2015, NASA had pursued plans to operate the CEV as early as September 2013. However, officials delayed the internal target by one year, to September 2014, based on a reevaluation of the effort needed to complete development of the vehicle and its Ares 1 launcher, as well as expected funding. One implication of this postponed target date is a longer than expected gap between the retirement of the Space Shuttle and the availability of a replacement human-rated U.S. launch vehicle.

Third Quarter 2008 Highlights

Iran suborbital launch attempt fails

On August 17, Iran announced it had successfully staged the suborbital launch of a rocket capable of placing a satellite into orbit. According to Iranian media reports, the Ministry of Defense and Armed Forces Logistics launched the communications satellite Omid aboard a Safir rocket, although other reports stated that only a dummy satellite was carried by the vehicle. However, U.S. intelligence analysts, citing satellite data as well as information from a U.S. Navy monitoring vessel in the Persian Gulf, indicated that the launch was in fact unsuccessful. The second stage appears to have broken apart at an altitude above 150 kilometers (90 miles). Some analysts also suggest the reported space launch may have instead been a missile test.

Ares I shock absorbers planned

In late August, NASA announced plans to install high-tech shock absorbers on its Ares 1 rocket—the successor to the Space Shuttle—to dampen thrust oscillations in the booster. The rocket's first stage, like other solid-fueled boosters, is expected to experience thrust oscillations near the end of its burn. Those oscillations could pose a hazard to the Orion CEV and its crew. To compensate for such oscillations, engineers plan to install computer-controlled spring-mounted weights in the base of the first stage. The weights would damp out the vibrations as needed. These shock absorbers are planned to address what some observers have cited as a major concern with the Ares 1 preliminary design.

Suborbital launch vehicle fails

On August 22, a suborbital rocket developed by Alliant Techsystems (ATK) carrying two NASA experiments exploded 27 seconds after liftoff from Mid-Atlantic Regional Spaceport (MARS) at Wallops Island, Virginia. The launch was the first for the two-stage solid-propellant ATK Launch Vehicle (ALV) X-1, which was designed to lead to the development of a larger version for orbital launches of small satellites.

Hurricane temporarily closes Johnson Space Center

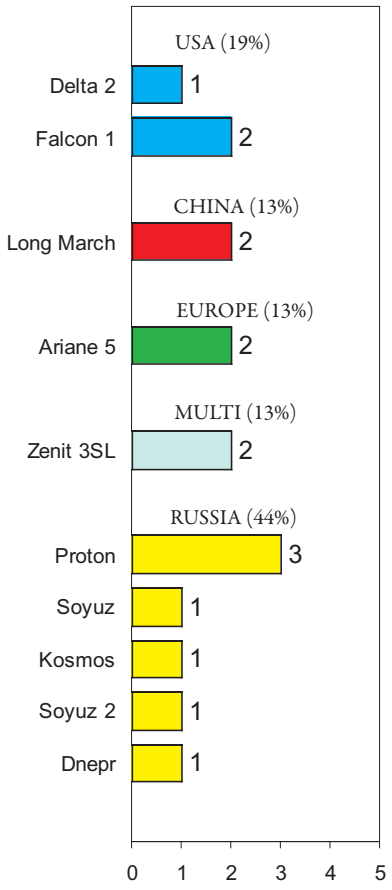
Although Hurricane Ike caused only minor damage to Johnson Space Center (JSC) facilities, the storm's impact on the surrounding Houston area led JSC to close from September 11 to September 21, and resulted in launch delays for the two remaining Space Shuttle missions planned for 2008: STS-125 and STS-126.

China performs first extra vehicular activity

On September 25, China's Long March 2F vehicle successfully lifted off from Jiuquan Satellite Launch Center carrying three "taikonauts" on China's third manned mission, Shenzhou 7. The mission culminated in China's first extra vehicular activity (EVA), a fifteen-minute spacewalk to test a Chinese-developed spacesuit. The crew reentered the atmosphere and landed safely in northern China on September 28.

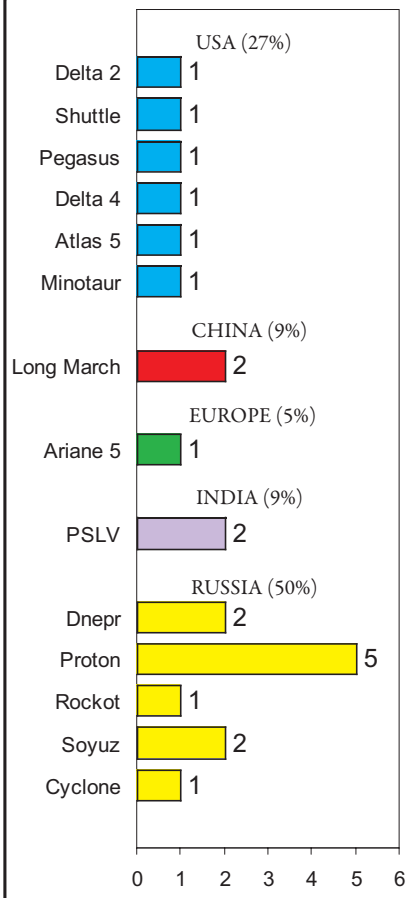
Vehicle Use
(July 2008 – March 2009)

Figure 1: Third Quarter 2008 Total Launch Vehicle Use



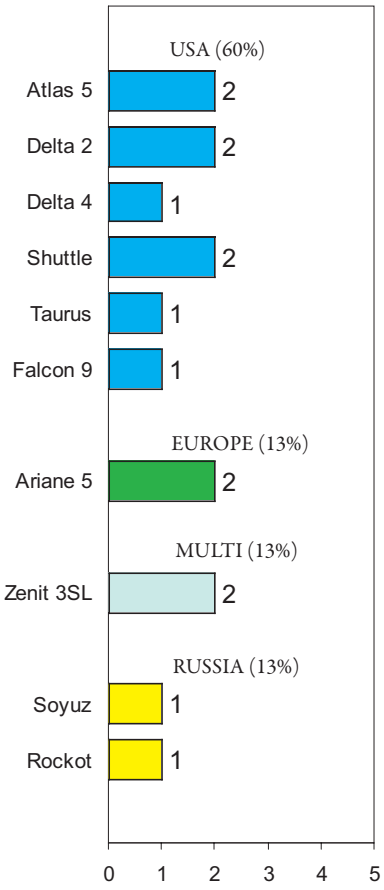
Total = 16

Figure 2: Fourth Quarter 2008 Total Projected Launch Vehicle Use



Total = 22

Figure 3: First Quarter 2009 Total Projected Launch Vehicle Use



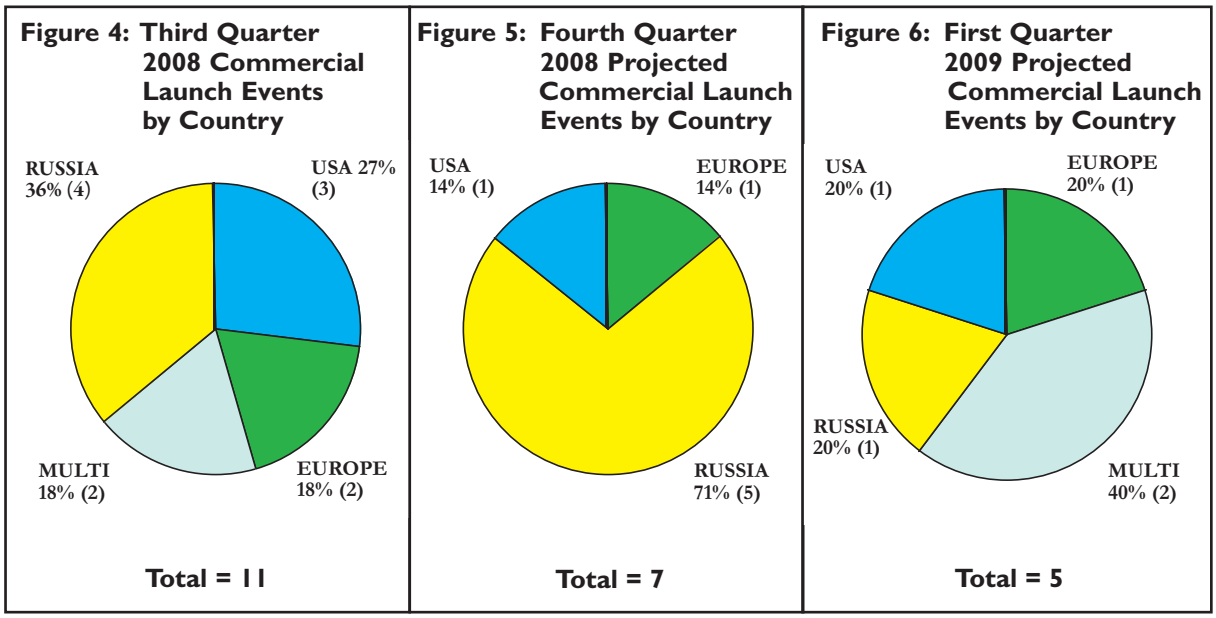
Total = 15

Figures 1-3 show the total number of orbital and commercial suborbital launches of each launch vehicle and the resulting market share that occurred in the third quarter of 2008. They also project this information for the fourth quarter of 2008 and first quarter of 2009. The launches are grouped by the country in which the primary vehicle manufacturer is based. Exceptions to this grouping are launches performed by Sea Launch, which are designated as multinational.

Note: Percentages for these and subsequent figures may not add up to 100 percent due to rounding of individual values.

Commercial Launch Events by Country

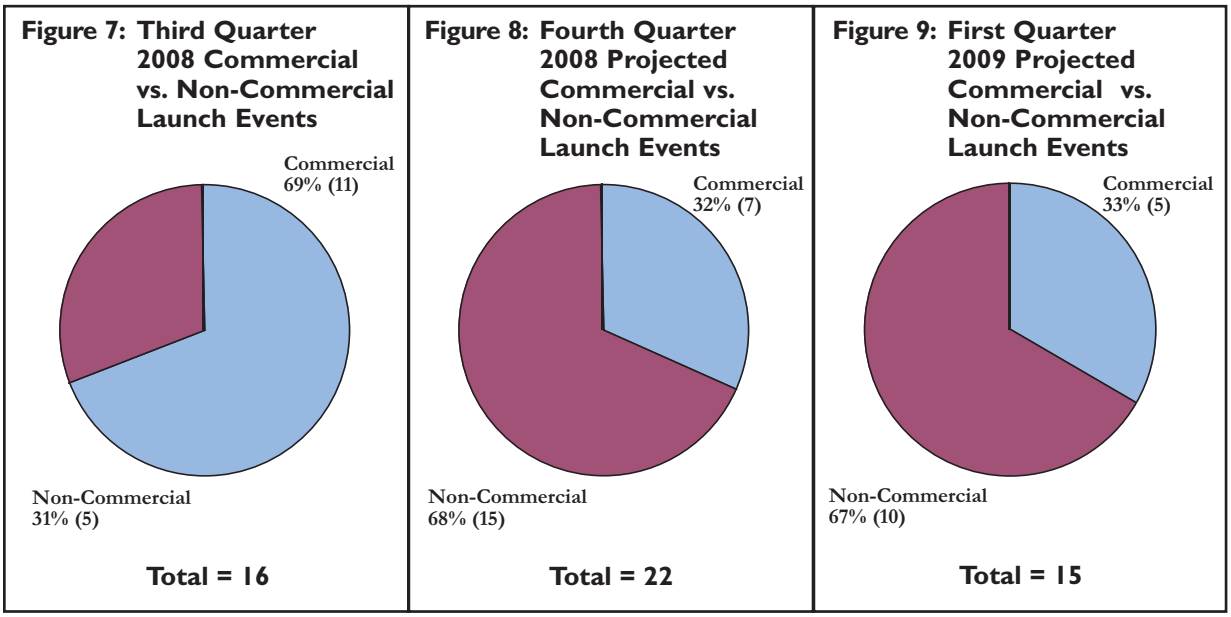
(July 2008 – March 2009)



Figures 4-6 show all commercial orbital and suborbital launch events that occurred in the third quarter of 2008 and that are projected for the fourth quarter of 2008 and first quarter of 2009.

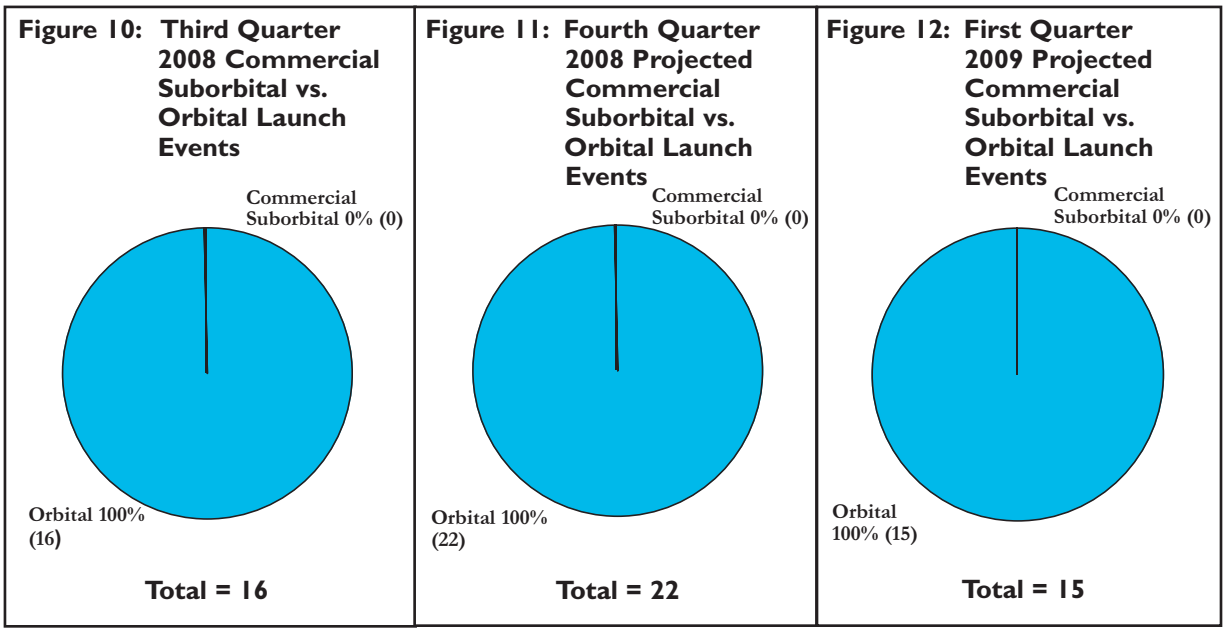
Commercial vs. Non-Commercial Launch Events

(July 2008 – March 2009)



Figures 7-9 show commercial vs. non-commercial orbital and suborbital launch events that occurred in the third quarter of 2008 and that are projected for the fourth quarter of 2008 and first quarter of 2009.

Orbital vs. Commercial Suborbital Launch Events
(July 2008 – March 2009)



Figures 10-12 show orbital vs. FAA-licensed commercial suborbital launch events (or their international equivalents) that occurred in the third quarter of 2008 and that are projected for the fourth quarter of 2008 and first quarter of 2009.

Launch Successes vs. Failures
(July 2008 – September 2008)

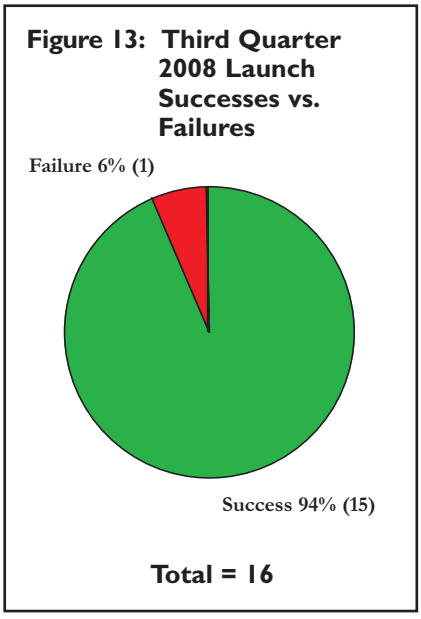
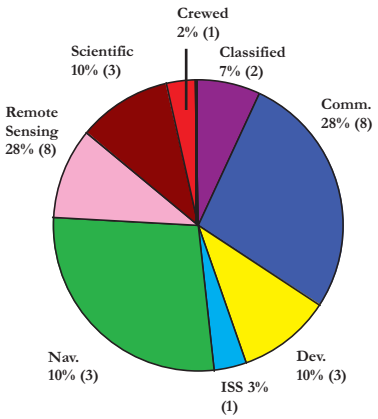


Figure 13 shows orbital and commercial suborbital launch successes vs. failures for the period from July 2008 to September 2008. Partially-successful orbital launch events are those where the launch vehicle fails to deploy its payload to the appropriate orbit, but the payload is able to reach a useable orbit via its own propulsion systems. Cases in which the payload does not reach a useable orbit or would use all of its fuel to do so are considered failures.

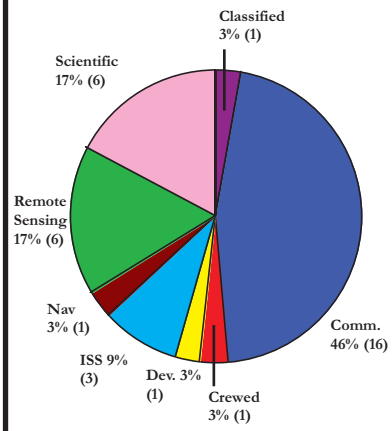
Payload Use (Orbital Launches Only)
(July 2008 – March 2009)

Figure 14: Third Quarter 2008 Payload Use



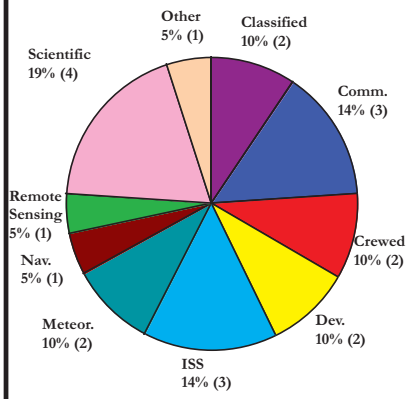
Total = 29

Figure 15: Fourth Quarter 2008 Projected Payload Use



Total = 35

Figure 16: First Quarter 2009 Projected Payload Use

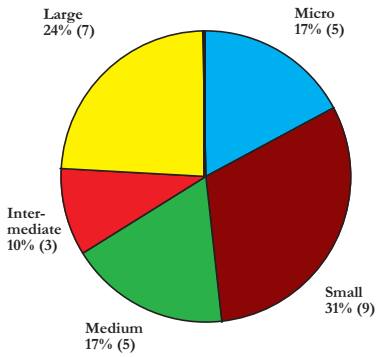


Total = 21

Figures 14-16 show total payload use (commercial and government), actual for the third quarter of 2008 and projected for the fourth quarter of 2008 and first quarter of 2009. The total number of payloads launched may not equal the total number of launches due to multiple manifesting, i.e., the launching of more than one payload by a single launch vehicle.

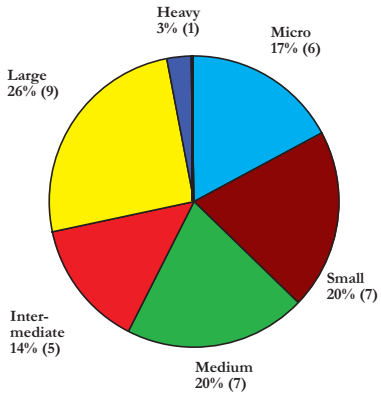
Payload Mass Class (Orbital Launches Only)
(July 2008 – March 2009)

Figure 17: Third Quarter 2008 Payload Mass Mass Class



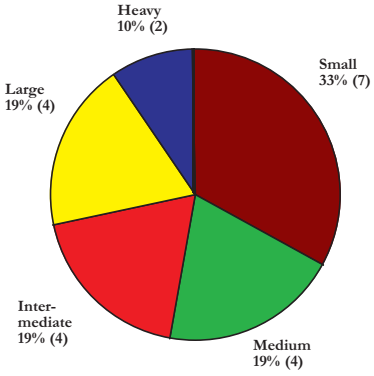
Total = 29

Figure 18: Fourth Quarter 2008 Projected Payload Mass Class



Total = 35

Figure 19: First Quarter 2009 Projected Payload Mass Class

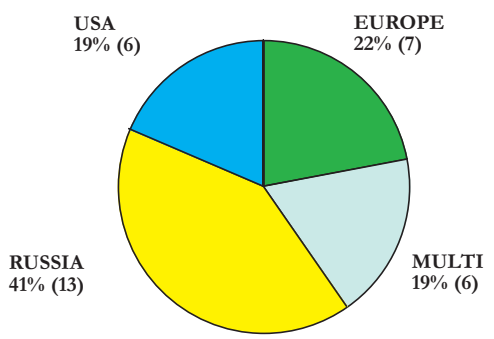


Total = 21

Figures 17-19 show total payloads by mass class (commercial and government), actual for the third quarter of 2008 and projected for the fourth quarter of 2008 and first quarter of 2009. The total number of payloads launched may not equal the total number of launches due to multiple manifesting, i.e., the launching of more than one payload by a single launch vehicle. Payload mass classes are defined as Micro: 0 to 91 kilograms (0 to 200 lbs.); Small: 92 to 907 kilograms (201 to 2,000 lbs.); Medium: 908 to 2,268 kilograms (2,001 to 5,000 lbs.); Intermediate: 2,269 to 4,536 kilograms (5,001 to 10,000 lbs.); Large: 4,537 to 9,072 kilograms (10,001 to 20,000 lbs.); and Heavy: over 9,072 kilograms (20,000 lbs.).

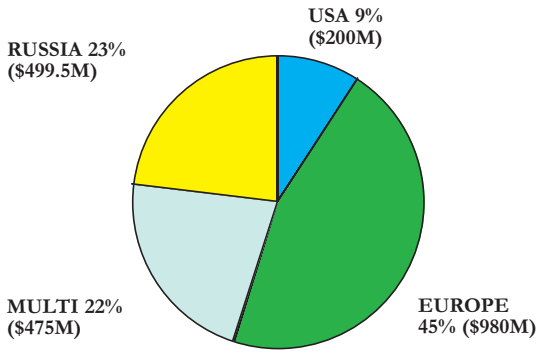
Commercial Launch Trends (Orbital Launches Only)
(October 2007 – September 2008)

Figure 20: Commercial Launch Events, Last 12 Months



Total = 32

Figure 21: Estimated Commercial Launch Revenue, Last 12 Months



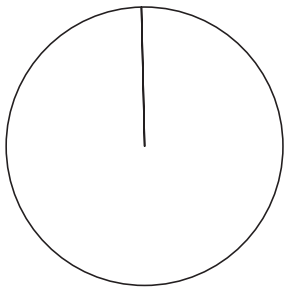
Total = $2154.5M

Figure 20 shows commercial orbital launch events for the period of October 2007 to September 2008 by country.

Figure 21 shows estimated commercial launch revenue for orbital launches for the period of October 2007 to September 2008 by country.

Commercial Launch Trends (Suborbital Launches and Experimental Permits)
(October 2007 – September 2008)

Figure 22: FAA-Licensed Commercial Suborbital Launch Events (or Their International Equivalents), Last 12 Months



Total = 0

Figure 22 shows FAA-licensed commercial suborbital launch events (or their international equivalents) for the period of October 2007 to September 2008 by country.

Figure 23: FAA Experimental Permit Flights, Last 12 Months

Flight Date	Operator	Vehicle	Launch Site
10/20/2007	Armadillo Aerospace	MOD 1	Oklahoma Spaceport, OK
10/27/2007	Armadillo Aerospace	MOD 1	Holloman AFB, NM
10/27/2007	Armadillo Aerospace	MOD 1	Holloman AFB, NM
10/28/2007	Armadillo Aerospace	MOD 1	Holloman AFB, NM
10/28/2007	Armadillo Aerospace	MOD 1	Holloman AFB, NM

Figure 23 shows suborbital flights conducted under FAA experimental permits for the period of October 2007 to September 2008 by country.

Commercial Launch History
(January 2003 – December 2007)

Figure 24: Commercial Launch Events by Country, Last Five Years

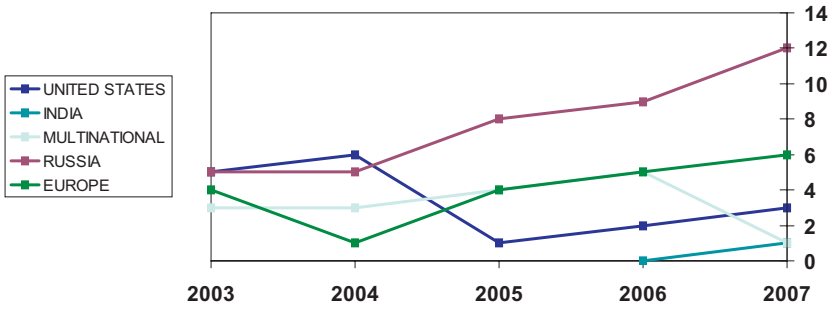


Figure 24 shows commercial launch events by country for the last five full calendar years.

Figure 25: Estimated Commercial Launch Revenue (in $ millions) by Country, Last Five Years

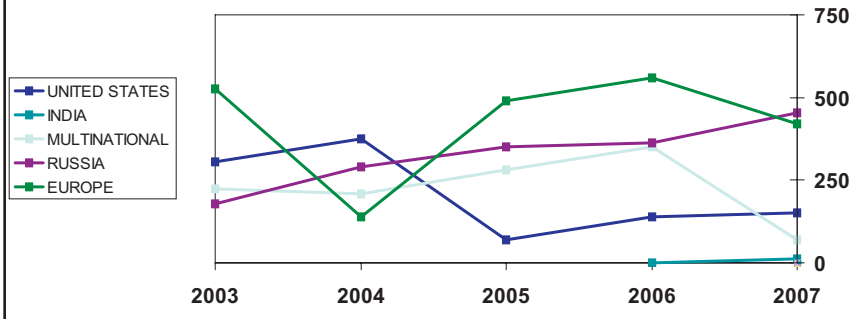


Figure 25 shows estimated commercial launch revenue by country for the last five full calendar years.

US State Spaceport Incentives: Summary Overview

Business Incentives

Every state in the union offers a range of incentives to encourage businesses to locate or increase their activities within that specific state. The vast majority of these incentives are financial, most commonly resulting in a lower tax burden or otherwise reducing the costs of conducting business critical activities. Sometimes these incentives target specific industries or even components of specific industries. Incentives of this kind are generally available at both the state and local level. Any business considering locating in a particular state would likely be eligible for benefits from the state, county, or local municipality. The motivation for most states and localities to offer these types of incentives is to promote job growth and development. Given this, there is often a substantial bias in the types of incentives offered towards industries that pay high salaries and employ large numbers of people.

The critical aspect of incentives is that they are designed to "close the deal" for a particular company considering either a relocation or an initial attempt at doing business. There are, of course, a broad range of factors that influence a company's decision to locate in a certain place. Often, geography and existing infrastructure are the driving forces behind such decisions for space transportation companies. It is when a company is ready to decide between two final locations that incentives have the most potential to affect a company's plans. In very large deals states will often create unique incentives with the company in question playing the states off of each other.

As a large, high technology industry with good pay rates, the space transportation industry is an ideal fit for many states seeking to achieve their development goals. In many cases, this results in the development of unique types of incentives and support networks to close the deal for companies considering doing business in a particular state. It also contributes to a degree of competition between states in the kinds and sizes of incentives that are offered.

Perhaps the biggest example of this kind of activity is the introduction of regulatory incentives in Virginia and Florida.

One of the biggest challenges space transportation operators intent on carrying people face is the current ambiguity regarding how such operations will be regulated on both the federal and the state level. By removing this ambiguity, Virginia and Florida so far (and others likely to follow in the coming year) have effectively created regulatory incentives to lure space transportation companies.

The range of incentives that states offer the space transportation industry is both disparate and substantial. It includes traditional financial incentive packages as well as unique incentives extended to companies considering specific deals. In addition, there several other factors that essentially function as incentives, including spaceports, space authorities, development zones, and unique geography. Each of these factors commonly plays a role in a company's decision to locate in a particular state.

This report lays out the different types of incentives that states employ to try and guarantee that a particular company commits to locating within that state. To that end the report includes an examination of the advent of regulatory incentives within Virginia and Florida, the different types of incentives that states have at their disposal, the incentive-like impact of certain types of infrastructure, and a state-by-state summary of the assets and incentives in place within each featured state.

Regulatory Incentives and Virginia as an Agent of Change

Virginia has recently taken the lead in the area of innovative incentives to lure space transportation companies to the state. In the last two years, the state passed two bills aimed to boost the presence of the industry. The first, the Virginia Space Liability and Immunity Act, enacted in 2007, effectively made Virginia the most progressive state in the country in addressing the challenge that existing tort law posed to emerging human spaceflight transportation companies. The second, the Zero G Zero Tax Act of 2008, will provide an exemption from state income taxes to any space transportation company doing business in Virginia with the intent either to launch payloads from the Mid-Atlantic Regional Spaceport (MARS) or conduct spaceflight training. These two pieces of legislation, coupled with other, more traditional financial incentives, are largely credited with being the driving force behind Orbital Science's decision to locate the launch operations for its new Taurus 2 launch vehicle in Virginia.

These events have not gone unnoticed. Florida's state government, which was keeping a close eye on all of this, was quick to pass a nearly identical version of the Space Liability and Immunity Act and add spaceflight contractors to the list of companies eligible for tax refunds. All of this took other states, and much of the industry, by surprise given the speed with which it was accomplished. As both of these tools appear to be very effective, it's likely that other states will pass similar legislation in the years ahead.

Space Liability and Immunity Act

State	Virginia	Florida
Act Name	Space Liability and Immunity Act Effective Sunsets	Informed Consent for Spaceflight Act
Effective Date	July 1, 2007	October 1, 2008
Sunset	July 1, 2013	No Sunset
Applies to:	All spaceflight entities	Suborbital flights only
Restrictions	Company in question must have been "reviewed by the FAA" during licensing	Company in question must hold an FAA launch license

Effective July 1, 2007, the Virginia Space Liability and Immunity act limits the liability of those providing human spaceflight services in the event of an incident. It is based on the legislation under which the FAA currently operates, creating an informed consent regime for spaceflight participants while stipulating language that participants must review and consent to acknowledging the inherently risky nature of human spaceflight. This legislation is anticipated to be a particularly effective tool in luring human spaceflight companies once they progress from testing to operations. A critical difference between the Florida and Virginia versions of the legislation is that the Virginia law sunsets in 2013 while the Florida statute is permanent.

Zero G Zero Tax Act

The concept of exempting companies from paying taxes on certain types of activities is not a new one; indeed a Zero G Zero Tax bill was introduced at the federal level in 2003, but never passed. Virginia is the first to pass this kind of legislation at the state level to encourage the development of the space transportation industry. The Virginia bill grants an exemption from state income tax for both launch services or

gains achieved from providing resupply services to the ISS. To mirror the advantages that companies could achieve under this bill, Florida added qualified space contractors to an existing list of companies that could qualify for an income tax deduction. The primary qualifying factor for this exemption is an increase in employees at a company's Florida facilities.

Spaceflight Immunity Legislation

Tax Incentive Legislation

State	Virginia	Florida
Act Name	ZeroG/Zero Tax	Qualified Spaceflight Contractor Tax Refund Act
Benefits	State tax exemption on income launch services, simulated launch services for training, or gains resulting from ISS resupply contracts	Allows spaceflight contractors to receive refunds after entering into agreements with the state (refunds based on new jobs and wages paid to employees)
Limitations	Activities must be performed in Virginia or originate from Virginia	Activities must result in a net increase in spaceflight business employment in Florida

Traditional Financial Incentives

Perhaps the most common tools employed by states to encourage space transportation companies to locate within their borders are traditional financial incentives. These incentives can and do take many forms, but the most common are tax rebates or exemptions. Such exemptions are often tied to the specific industry that a particular company is engaged in, how much it pays its employees, and what kind of activity the company intends to conduct in the state. Each of these categories has an entire range of incentives tied to them.

An example of an incentive aimed to support a certain industry would be an aerospace tax credit program, or more commonly a high-technology tax credit program, under which aerospace usually qualifies. The fact that aerospace jobs, like most other high-tech jobs, are generally high-paying is the primary reason that states are interested in encouraging their growth.

The most common incentive packages are ones that reward companies for bringing high-paying jobs (at least relative to the local standard) to the area. Generally these types of incentives have specific metrics tied to pay rates for companies to qualify and they vary state by state.

The last type of common incentive focuses on the kind of activity that the company will conduct within the state. This typically takes the form of a manufacturing incentive to encourage the establishment of large manufacturing facilities, but equally common are R&D tax credits to enable companies to grow locally.

Geographic Incentive Zones

One final type of incentive, which is often realized at the same time as other state incentives, is the exemption or advantage zone. The most common types of these include foreign trade zones, enterprise zones, empowerment zones, redevelopment or renewal zones, and areas designated as rural or low population zones. States establish these zones, any one of which can have a laundry list of unique incentives associated with it, to accomplish various goals within a specific geographic area. Generally these goals are related to raising the standard of living or increasing development in a specific area, increasing the population, generating further employment, or all three. These zones can and often do overlap or be combined with other incentives adding up to substantial bonuses to companies which decide to locate within them.

University/Industry Development Zones

Though also not an incentive *per se*, a major factor that commonly entices companies to locate in particular locations is the presence of state-designated university or industry development zones. These zones are commonly set up to encourage and support the development of specific industries. Incentives are structured to encourage companies and universities to locate in a specific area, generally in close proximity to each other. Such zones carry advantages in themselves, by virtue of having a great deal of capability in the same area, but they also often include their own set of local incentives, which can be added to preexisting state incentives.

Space Authorities

One of the strongest tools available to states to encourage the further development of a local space transportation industry is the space authority. Generally set up and supported through the executive branch of state government, space authorities are staffed by personnel knowledgeable in the field who can serve as advocates for companies already located within or considering a move to a specific state.

In addition to their role as advocates both within the state and nationally for their local industry, space authorities often have unique powers, including bonding authority that allow them to go to great lengths to support projects requiring large infrastructure investments.

Space authorities are commonly only set up in states with strong space transportation heritages, such as California and its California Space Authority (CSA). However, other states with an interest in developing the space transportation industry locally have seen the effectiveness of this model and have set up their own space authorities, such as in Oklahoma with its Oklahoma Space Industry Development Authority (OSIDA).

Spaceports

Though not technically an incentive in the traditional sense, the presence of spaceports, much like space authorities, confers substantial advantages on the states where they are based. The most obvious advantage of spaceports is that they are often extremely expensive infrastructure in and of themselves. Construction of a spaceport from a "green field" facility can run into the billions of dollars. Similarly, the location of some spaceports can be a decisive factor. If a company uses an ELV or a system that drops components during its flight, then a coastal location is a hard requirement. Generally speaking, however, the presence of spaceports can have a substantial impact on companies' decisions to locate.

State Incentive Contacts and Descriptions

In closing, the following section provides state incentive points of contact and a description of those incentives for key states whose incentive systems were found to be comparatively extensive, developed or otherwise noteworthy.

Alabama

Alabama Development Office at:

www.ado.state.al.us

Alabama has long been one of the nation's leaders in the development and manufacture of space transportation technology. With Hunstville's NASA Marshall Space Flight Center, Decatur's manufacturing facility for United Launch Alliance's Delta IV, and the state's legacy of human spaceflight, its little surprise that Alabama is so significant in space transportation. To maintain this edge, the state offers several aggressive incentives to encourage companies to continue to locate in Alabama.

The majority of these incentives include income and property tax exemptions as well as sales and use and business privilege tax exemptions. Alabama has equally aggressive incentives in place at the local level. These can be leveraged in combination with state level incentives to create a comprehensive package.

This is exactly what happened when Boeing decided to establish its Delta IV manufacturing facility in Decatur. In addition to some one-of-a-kind incentives, the combination of state and local incentives totaled some $150 million.

Alaska

Alaska Aerospace Development Corporation (AADC) at:

www.akaerospace.com

Large in land area and small in population, Alaska has taken advantage of its unique location and makeup to host one of the handful of licensed, operational commercial spaceports in the country. The spaceport is the primary asset that attracts aerospace companies to Alaska to do business. Launches from the Kodiak Launch Complex (Alaska's spaceport) have been occurring since 1998.

The unique geographical location of this facility makes it ideal for certain kinds of launches (such as polar), and serves as an incentive in itself. For companies that take advantage of this facility, the Alaska aerospace development corporation (AADC) serves as an advocate to assist companies in taking advantage of all possible benefits.

Other incentives and incentive programs in Alaska focus on encouraging and enabling small businesses. These include SBIR/STTR support, small grants and loans, and equity financing for small companies.

California

California Space Authority

www.Californiaspaceauthority.org

California Business Transportation and Housing Agency (BTU)

www.bth.ca.gov

As the most populous state and the one with the largest economy, examining the incentives that the State of California offers is a very large task. As elsewhere, state incentives can be mixed and matched with local incentives to create an extremely advantageous total incentive package. Also, given the size of California, there are a number of agencies that play different but relevant parts in coordinating industry incentives. In brief, the two primary agencies with responsibility for supporting the space transportation industry are the California Space Authority (CSA) and the Business Transportation and Housing Agency (BTH), but with the emergence of the Mojave Air and Space Port responsibilities become even more scattered.

The BTH provides traditional business incentive packages, while the CSA serves as an industry advocate and a conduit for efforts to support industry. It is also important to note that as a State-backed space authority CSA has bonding authority, which enables it to support large projects.

In addition to the space transportation industry incentives enabled by CSA and BTH, California also offers a number of traditional incentives including: income tax exemptions, development zones, enterprise zones, and property tax exemptions.

Colorado

Colorado Department of Economic Development

www.colorado.gov

Metro Denver Economic Development Corporation

www.metrodenver.org

Colorado has a significant space transportation industry presence with many major companies, including Lockheed Martin and Ball Aerospace, maintaining substantial operations within the state. In addition, the presence of significant space transportation related programs at the University of Colorado as well as the presence of the North American Aerospace Defense Command (NORAD) are substantial factors that affect company decision making in considering Colorado as a place to do business. The state does of course offer a number of business incentives. Though not specifically aimed at the aerospace industry, the state offers a mix of incentives for new and existing businesses, including training assistance, project assistance, sales tax refunds and waivers, tax credits, and state-backed venture capital.

Colorado also features multiple advocates with support available for companies at both the state and local levels. An example of this kind of advocate is the Metro Denver

Economic Development Corporation, which coordinates business relocation and assists in securing incentives in the Metro Denver area. At the state level, the Colorado Department of Economic Development is the primary organization for securing business incentives.

Florida

Space Florida

www.spaceflorida.gov

Florida has one of the most developed networks in the nation for encouraging and enabling space transportation companies to locate within the state. In addition to an ideal location for space access and year-round good weather, the state offers extremely aggressive incentives to encourage space launch activities. These incentives can include a limited tax refund program for space contractors as well as grants and a new exemption from state income tax for work on systems that will end up in space.

An additional asset enjoyed by the State of Florida is the presence of a state-supported non-profit tasked with supporting the industry within the state. This organization, Space Florida, serves both as an advocate and a point of contact for companies considering doing business in Florida. In addition, Space Florida has bonding authority granted to it by the state legislature which, under the right circumstances, allows it to raise funds for infrastructure or other expenditures necessary to enable large projects.

Finally, it is one of the two states (along with Virginia) that offers a regulatory incentive in the form of the Spaceflight Informed Consent Act of 2008. This legislation provides protection from lawsuits against spaceflight operators who conduct activities that carry people so long as any incident was a function of the "inherent risks of spaceflight."

Hawaii

Hawaii Department of Business, Economic Development, & Tourism

hawaii.gov/dbedt

Given its unique geography, the opportunity for the expansion of the space transportation industry in Hawaii is obvious. The aspects of the industry most visible in Hawaii are astronomy and technology development. Although there are limited incentives focused specifically on space transportation, incentives aimed at high technology business generally are some of the most competitive in the nation. They include no general excise tax for locally manufactured goods, including software produced for export; no personal property taxes; no state tax for companies manufacturing capital goods for export; no state

taxes on furniture, equipment, inventory or machinery; no stock transfer tax; and no unincorporated business tax.

In addition to these incentives Hawaii also offers an investment tax credit, which grants a 100% return on cash investments over a front-loaded five-year period.

Maine

Maine Department of Economic Development

maine.gov/portal/business/econ-bus-incentives.html

Though one of the most rural states in the nation, Maine has a substantial list of incentives in place to support high technology companies considering locating within its borders. As space transportation companies clearly fall within the definition of "high technology," they are eligible to take advantage of this. Also, in addition to these incentives, the Maine Technology Institute (MTI), a state sponsored non-profit, offers grants or low interest loans to "high technology" firms that are either starting up or intent upon commercializing new technologies.

Maryland

Maryland Department of Business and Economic Development

www.choosemaryland.org

Maryland enjoys a substantial space transportation presence, including NASA's Goddard Space Flight Center, the Johns Hopkins University Applied Physics Lab, and several major space transportation companies. Given this range of companies, most of Maryland's incentives are aimed at aerospace companies generally rather than focused on space transportation companies. It is also important to note that much of Maryland's interest regarding space transportation companies relates to activity in Virginia at MARS. Given the proximity of the two states, much of Maryland's activities involve encouraging companies intent on operating out of MARS to locate within the State of Maryland.

Also, Maryland offers a range of incentives that can be employed by companies across the entire range of the industry. These incentives include: no gross receipts tax for manufacturers; no sales tax on capital manufacturing machinery and equipment; no sales tax on tangible personal property consumed in manufacturing; no sales tax on equipment or materials used or consumed in R&D; no sales tax on gas, electricity, steam, oil or coal consumed directly or predominantly in a production activity; no state business personal property tax; and no corporate franchise tax, no income tax on foreign dividends (if corporation owns 50 percent or more of subsidiary)

Montana

Montana Department of Revenue

www.MT.gov

Though not generally, thought of as a "space state," Montana has a surprisingly active industry involved in a range of private and federal projects. It also offers several traditional tax-based incentives to business categories including space transportation. These benefits include an investment tax credit, a new/expanded industry tax credit, and a research and development tax credit.

New Mexico

New Mexico Department of Economic Development

www.edd.state.nm.us

With its long-standing history of aerospace technology development and the presence of White Sands Missile Range, New Mexico has a number of obvious location-related assets that make it an ideal location for space transportation companies. In addition to this, New Mexico also features an emerging spaceport, Spaceport America, that offers its own advantages. These two factors have been successful in luring operators to the state in recent years. They were sufficient to lure Virgin Galactic, the Rocket Racing League, UP Aerospace, and Starchaser Industries to the state to set up operations.

In addition to these large scale efforts, New Mexico also offers a number of incentives that are quite similar to those offered by states all over the country. These more traditional incentives come in the form of tax credits for high wage jobs, manufacturer's investment, new markets, rural jobs, technology jobs, and angel investment.

Finally, New Mexico also offers specific incentives to companies which conduct operations at Spaceport America. These are generally focused around making spaceflight activities tax deductible. Such activities include: space related R&D, launching spacecraft, operating spacecraft, recovering spacecraft or payloads, and preparing a spacecraft or payload for launch from Spaceport America.

Ohio

Ohio Department of Development

ohiomeansbusiness.com

Ohio has a number of unique advantages to draw on to encourage space transportation companies to locate within its borders, the two biggest of which are NASA's Glenn Research Center and the Air Force Research Lab (AFRL). Combined with attractive incentive packages, Ohio has a great deal to offer space transportation companies.

Ohio's primary incentives are focused around tax credits and tax exemptions. It offers tax credits for job creation, job retention, research and development, training, manufacturing, and technology investment. It offers exemptions on manufacturing equipment and machinery, research and development, and warehouse machinery and equipment.

Oklahoma

Oklahoma Space Industry Development Authority (OSIDA)

www.okspaceport.ok.us

While it may seem an unlikely favorite among those not familiar with the space transportation industry, Oklahoma has made a substantial name for itself with the creation of the Oklahoma Space Industry Development Authority and the announcement that the former Air Force base in Burns Flat, Oklahoma, would be converted into a spaceport, and that the state would be introducing incentives to encourage space transportation companies to set up business within the state.

The types of incentives that Oklahoma has available include a five-year ad valorem tax exemption, no-cost or low-cost customized employee training, sales tax exemptions, freeport inventory benefits, industrial access road assistance, foreign trade zones, American Indian land tax credits, opportunity zones, an opportunity fund, and both state and local financing programs.

In addition to these incentives, it is critical to note that in 2004, Oklahoma awarded a one-time $10-million tax credit to Rocketplane Limited for the purposes of vehicle development and eventual operations at the Oklahoma Spaceport. While this was only a one-time incentive, it does serve as an example of the dedication of Oklahoma to the further development of aerospace and particularly the new space industry within the state.

Virginia

Virginia Spaceflight Authority

www.marsspaceport.com

Virginia is in a unique position compared to other states within the mid-Atlantic region due to the presence of MARS, co-located with NASA's Wallops Island facility. Though the state has only a small to medium space transportation industry presence, it has recently been quite successful in luring space transportation companies.

Much of this success is due to its introduction of regulatory incentives in addition to financial ones. The Spaceport Liability and Immunity Act of 2007, which provides liability protection for space transportation companies and

their subcontractors in the event of the injury or death of a spaceflight participant, represents a major change in the way states try to differentiate themselves in trying to encourage businesses to locate within their borders.

In addition to this novel approach to incentives, Virginia also offers a wide range of more traditional financial incentives including sales and use tax exemptions, property tax exemptions, small business financing, technology zones, foreign trade zones, development zones, and a state-supported grant program.

Washington

Washington Department of Community, Trade, and economic Development

www.choosewashington.com

The State of Washington has a very active aerospace industry with a thoroughly developed system of incentives in place to support it. While none of these incentives are so narrow as to differentiate the space transportation industry from the aerospace industry generally, the incentives are still in full effect. Of these, the biggest is a decrease in the Business and Occupation (B&O) tax rate that the state charges other businesses. This rate decrease can be leveraged with additional aerospace-related tax credits, such as B&O tax credits for aerospace product development expenditures, preproduction development expenditures, and property and leasehold excise taxes (which applies to new construction as well).

Finally, space transportation companies are also eligible for other tax exemptions including manufacturing equipment and machinery purchases, new job creation, sales and use tax exemption for computers used in offices located within the state, and non production aerospace design and development.

Wisconsin

Wisconsin Department of Commerce

commerce.wi.gov/BD/

Though not focused specifically on space transportation, Wisconsin offers a wide range of incentives geared towards high technology business. Many of these incentives are accessible to space transportation companies that locate within Wisconsin.

Though generally focused on the local level, Wisconsin offers a statewide technology commercialization program and a technology development fund for "high tech" companies within the state.

Wyoming

Wyoming Business Council

www.whywyoming.org

With wide open spaces, no corporate income tax, and no personal income tax, there are a number of basic incentives that might draw a space transportation company to Wyoming on their own. However, the state also offers a wide range of local incentives, many of which are based upon the specific location that a business chooses.

Also, given the relatively small population of Wyoming, the Wyoming Business Council (which, though technically a state agency, is run as a corporation with a corporate structure) can offer a wide range of assistance to businesses within the state going well beyond traditional incentives. This assistance can include support in the areas of business counseling, business permitting, business plan generation, securing of federal contracts, HR consulting, intellectual property, international business, manufacturing, marketing, and product development.

Third Quarter 2008 Orbital and Suborbital Launch Events

Date			Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price	L	M
7/7/2008	√		Ariane 5 ECA	Kourou	*	Protostar 1	Protostar Ltd.	Communications	$140M	S	S
					*	BADR-6	Arabsat	Communications			S
7/15/2008	√	+	Zenit 3SL	Odyssey Launch Platform	*	Echostar XI	Echostar	Communications	$85M	S	S
7/22/2008	√		Kosmos 3M	Plesetsk		SAR Lupe 5	German Ministry of Defense (MoD)	Classified	$12M	S	S
7/26/2008			Soyuz 2 1B	Plesetsk		Kosmos 2441	Russian MoD	Classified	$40M	S	S
8/3/2008	√	+	Falcon 1	Kwajalein Island		Jumpstart	ORS Office	Development	$7M	F	F
						D-sat	Astronautic Technology Malaysia	Scientific			F
						NanoSail-D	U.S. National Aeronautics and Space Administration (NASA)	Scientific			F
						PRESat	NASA	Scientific			F
						Trailblazer	U.S. Air Force (USAF)	Development			F
8/14/2008	√		Ariane 5 ECA	Kourou	*	Superbird 7	Space Communications Corporation	Communications	$140M	S	S
					*	AMC 21	SES Americom	Communications			S
8/19/2008	√		Proton M	Baikonur	*	Inmarsat-4 F3	Inmarsat	Communications	$70M	S	S
8/29/2008	√		Dnepr 1	Baikonur	*	RapidEye 1	RapidEye AG	Remote Sensing	$9.5M	S	S
					*	RapidEye 2	RapidEye AG	Remote Sensing			S
					*	RapidEye 3	RapidEye AG	Remote Sensing			S
					*	RapidEye 4	RapidEye AG	Remote Sensing			S
					*	RapidEye 5	RapidEye AG	Remote Sensing			S
9/6/2008	√	+	Delta 2 7420-10	VAFB	*	GeoEye 1	GeoEye	Remote Sensing	$50M	S	S
9/6/2008			Long March 2C	Xichang		HJ 1A	China National Space Agency (CNSA)	Remote Sensing	$22.5M	S	S
						HJ 1B	CNSA	Remote Sensing			S
9/10/2008			Soyuz	Baikonur		Progress ISS 30P	Roscosmos	ISS	$40M	S	S
9/20/2008	√		Proton M	Baikonur	*	Nimiq 4	Telesat Canada	Communications	$70M	S	S
9/24/2008	√	+	Zenit 3SL	Odyssey Launch Platform	*	Galaxy 19	Intelsat	Communications	$85M	S	S
9/25/2008			Proton (SL-12)	Baikonur		Glonass M R13	Russian MoD	Navigation	$72.5M	S	S
						Glonass M R14	Russian MoD	Navigation			S
						Glonass M R15	Russian MoD	Navigation			S
9/25/2008			Long March 2F	Jiuquan		Shenzhou 7	CNSA	Crewed	$60M	S	S
9/28/2008	√	+	Falcon 1	Kwajalein Island	*	Flight 4	Space Exploration Technologies Inc. (SpaceX)	Development	$7M	S	S

√ Denotes commercial launch, defined as a launch that is internationally competed or FAA-licensed. For multiple manifested launches, certain secondary payloads whose launches were commercially procured may also constitute a commercial launch. Appendix includes suborbital launches only when such launches are commercial.

\+ Denotes FAA-licensed launch.

* Denotes a commercial payload, defined as a spacecraft that serves a commercial function or is operated by a commercial entity.

Notes: All prices are estimates, and vary for every commercial launch. Government mission prices may be higher than commercial prices.

Ariane 5 payloads are usually multiple manifested, but the pairing of satellites scheduled for each launch is sometimes undisclosed for proprietary reasons until shortly before the launch date.

Fourth Quarter 2008 Projected Orbital and Suborbital Launch Events

Date		Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price
10/1/2008	√	Dnepr 1	Dombarovskiy		THEOS	Thai Geo-Informatics and Space Technology Development Agency (GISTDA)	Remote Sensing	$9.5M
10/12/2008		Soyuz	Baikonur		Soyuz ISS 17S	Russian Space Agency (Roscosmos)	ISS	$40M
10/19/2008		Pegasus XL	Kwajalein Island		Interstellar Boundary Explorer	NASA	Scientific	$16M
10/22/2008		PSLV	Satish Dhawan Space Center		Chandrayaan 1	Indian Space Research Organization (ISRO)	Scientific	$20M
10/24/2008	√	+ Delta 2 7420-10	VAFB		Cosmo-Skymed 3	Agenzia Spaziale Italiana (ASI)	Remote Sensing	$50M
10/31/2008	√	Proton M	Baikonur	*	Astra 1M	SES Astra	Communications	$70M
10/2008		Long March 3B	Xichang		VENESAT 1	Venezuelan Ministry of Science and Technology	Communications	$60M
11/14/2008		Shuttle Endeavour	KSC		STS 126	NASA	Crewed	N/A
					MPLM 5	NASA	ISS	
11/16/2008		Delta 4 Heavy	CCAFS		NRO L-26	U.S. National Reconnaissance Office (NRO)	Classified	$155M
11/26/2008		Soyuz	Baikonur		Progress ISS 31P	Roscosmos	ISS	$40M
11/2008	√	Ariane 5 ECA	Kourou	*	Eutelsat W2M	Eutelsat	Communications	$140M
				*	Hot Bird 9	Eutelsat	Communications	

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Fourth Quarter Orbital and Suborbital Launch Events, Continued

Date		Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price
12/13/2008		Atlas 5 421	CCAFS		WGS 2	U.S. Department of Defense (DoD)	Communications	$75M
12/15/2008		Minotaur	Wallops Flight Facility		TacSat 3	USAF	Development	$14.5M
					GeneSat 2	NASA	Scientific	
					PharmaSat 1	NASA	Scientific	
12/20/2008		Cyclone 3	Plesetsk		Coronas Photon	Roscosmos	Scientific	$22.5M
12/25/2008		Proton (SL-12)	Baikonur		Glonass M R16	Russian MoD	Navigation	$72.5M
					Glonass M R17	Russian MoD	Communications	
					Glonass M R18	Russian MoD	Communications	
12/2008		Proton (SL-12)	Baikonur	*	Express AM44	Russian Satellite Communications Company (RSCC)	Communications	$72.5M
				*	Express MD 1	RSCC	Communications	
12/2008	√	Proton M	Baikonur	*	Ciel 2	Ciel Satellite	Communications	$70M
4Q/2008	√	Rockot	Plesetsk		GOCE	European Space Agency (ESA)	Scientific	$13.5M
4Q/2008		Proton M	Baikonur	*	Express AM4	RSCC	Communications	$75M
				*	Express MD 2	RSCC	Communications	
4Q/2008	√	Dnepr 1	Dombarovskiy	*	AprizeStar 3	Aprize Satellite	Communications	$9.5M
				*	AprizeStar 4	Aprize Satellite	Communications	
					DubaiSat-1	Emirates Institution for Advanced Science and Technology	Remote Sensing	
					DEIMOS	Deimos Imaging	Remote Sensing	
					Nanosat 1B	INTA	Communications	
					UK DMC 2	British National Space Centre (BNSC)	Remote Sensing	
4Q/2008		PSLV	Sriharikota		Oceansat 2	ISRO	Remote Sensing	$20M
4Q/2008		Long March 3B	Xichang	*	APStar 6B	APT Satellite	Communications	$60M

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* Denotes a commercial payload, defined as a spacecraft that serves a commercial function or is operated by a commercial entity.

Notes: All prices are estimates, and vary for every commercial launch. Government mission prices may be higher than commercial prices.
Ariane 5 payloads are usually multiple manifested, but the pairing of satellites scheduled for each launch is sometimes undisclosed for proprietary reasons until shortly before the launch date.

First Quarter 2009 Projected Orbital and Suborbital Launch Events

Date		Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price
1/15/2009		Taurus XL	VAFB		Orbiting Carbon Observatory	NASA GSFC	Scientific	$25M
1/2009	√	Zenit 3SL	Kourou		Sicral 1B	Italian MoD	Communications	$85M
2/4/2009		Delta 2 7320	VAFB		NOAA N Prime	U.S. National Oceanic and Atmospheric Administration	Meteorological	$50M
2/10/2009		Soyuz	Baikonur		Progress ISS 32P	Roscosmos	ISS	$40M
2/12/2009		Shuttle Discovery	KSC		STS 119	NASA	Crewed	N/A
					ISS 15A	NASA	ISS	
					MPLM 4	NASA	ISS	
2/26/2009		Atlas 5 501	CCAFS		X-37B OTV	USAF	Development	$75M
3/4/2009		Delta 2 7925-10	CCAFS		Kepler	NASA	Scientific	$50M
3/5/2009	√	+ Delta 4 Medium-Plus (4,2)	CCAFS		GOES O	NOAA	Meteorological	$70M
3/2009	√	Rockot	Plesetsk		Cryosat 2	ESA	Remote Sensing	$13.5M
1Q/2009		Atlas 5 401	CCAFS		Navstar GPS 2F-1	USAF	Navigation	$75M
1Q/2009	√	+ Zenit 3SL	Odyssey Launch Platform	*	Eutelsat W2A	Eutelsat	Communications	$85M
1Q/2009		Shuttle Atlantis	KSC		Hubble Servicing Mission 4	NASA	Other	N/A
					STS 125	NASA	Crewed	
1Q/2009		Ariane 5 ECA	Kourou		Herschel Space Observatory	ESA	Scientific	$140M
					Planck Surveyor	ESA	Scientific	
1Q/2009	√	Ariane 5 ECA	Kourou	*	NSS 9	SES New Skies	Communications	$140M
					SPIRALE 1	Délégation Générale pour l'Armement (DGA)	Classified	
					SPIRALE 2	DGA	Classified	
1Q/2009		Falcon 9	CCAFS		US Government TBA	USA -TBA	Development	TBA

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Notes: All prices are estimates, and vary for every commercial launch. Government mission prices may be higher than commercial prices.

Ariane 5 payloads are usually multiple manifested, but the pairing of satellites scheduled for each launch is sometimes undisclosed for proprietary reasons until shortly before the launch date.