

SPACEPORT AMERICA: NEW MEXICO'S BOLD GAMBLE

by

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ABSTRACT

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Many sites are currently vying for Federal Aviation Administration (FAA) approval for their spaceports. One of these, Spaceport America, is scheduled to commence operations before the end of 2010. The New Mexico Economic Development Department (NMEDD) has already shown how an innovative and aggressive business strategy can attract marketable commercial space industries to the facility. An agreeable location, strong state government support and established corporate connections give it the potential to become a major hub of commercial space-based activity. Perhaps the greatest threat to the spaceport is the lack of guaranteed financing. New Mexico has shown willingness to provide some government funds but federal assistance can ensure that Spaceport America becomes one of the world's premier inland commercial launch facilities.

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CHAPTER I BACKGROUND

A New Era

The United States (US) is experiencing a period of space infrastructure development similar to that experienced by the country during the initial years of the air transportation system. Unlike that early period, however, cities or states wishing to embark on the building of a new spaceport must first convince the federal government that they have accounted for all safety hazards. Due to liability, political and environmental issues, permissions for space launch were initially reserved only for National Aeronautics and Space Administration (NASA) sites. However, the Federal Aviation Administration (FAA) has since reconsidered this policy (FAA/AST, 1998).

Expansion of Space-flight Infrastructure

Because of the demand for commercial space launch services, the FAA approved (1996) three commercial spaceports that were located on or near existing government launch sites. These included Spaceport Florida at Cape Canaveral Air Force Station, California Spaceport at Vandenberg Air Force Base and the Virginia Space Flight Center at Wallops Island. Several other sites have since competed for the ability to operate commercial space launch facilities. One of the first to achieve an FAA license was the Mojave Airport (FAA/AST, 2005). A company on the airfield, Burt Rutan's Scaled Composites, wanted to be able to launch a sub-orbital reusable launch vehicle (SRLV) to win the Ansari-X Prize competition. The requirements to win this prize were to demonstrate the manufacture and launch of a spacecraft capable of carrying three people to 100 kilometers twice within two weeks (Ansari-X Prize, 2006). Rutan's SpaceShipOne

won the X-Prize in 2004, but by then it was clear that the Mojave site was not exactly the type of facility Scaled Composites wanted. One reason for this was that the state of California did not initially cooperate with licensing or funding. Another problem with the Mojave Airport is that it is located close to busy commercial aviation airspace. Eventually, company executives found a different site that they believed was more suited to their future plans for space tourism: the area near White Sands Missile Range, New Mexico (The Space Review, 2006).

Why New Mexico?

Beginning with rocket testing by Robert Goddard, New Mexico was involved with many space and nuclear research programs: the Manhattan Project, space tracking technology initiatives, missile development programs and numerous launches of small spacecraft. The appeal of the high desert and sparsely populated areas south of Albuquerque has also attracted many fledgling aerospace companies to New Mexico. Perhaps most importantly, the successful record of the White Sands Missile Range has long demonstrated the potential for a commercial spaceport within the state boundaries (New Mexico State University, n.d.).

Location

Spaceport America will be located in the town of Upham, southern Sierra County, New Mexico, at 33 degrees North latitude, 106.5 degrees West longitude (FAA/AST, 1998). This town is located approximately 45 miles north of Las Cruces and 30 miles east of Truth or Consequences (Spaceport America, 2007). The spaceport will be approximately 27 square miles in size but will be surrounded by approximately 30,000 acres of safety buffer zone, most managed by the New Mexico State Land Office

(NMSLO) and Bureau of Land Management (BLM). It is conveniently located along Interstate-25 and near the White Sands Missile Range (New Mexico State University, n.d.). Figure 1 depicts the location of Spaceport America within the State of New Mexico.



Figure 1. Location of Spaceport America. *Note.* From spaceportamerica.com.

Benefits of the site include: approximately 340 days of sunshine per year, allowing for space operations with a limited number of weather cancellations; low population density, reducing liability during launch and ground recovery; high elevation (4,700 feet above mean sea level), reducing fuel costs compared to launches from sites near sea level; and dry air, which will reduce corrosion on launch vehicles (Spaceport America, 2007). Another potential benefit is the possibility of using existing White Sands

tracking facilities as a cost savings measure during early years of spaceport operation (FAA/AST, 1998).

Early History

Goddard's research and the significant operations conducted during the last six decades at White Sands provided the foundation for a commercial space venture for the state of New Mexico. In the early 1990s, the Southwest Space Task Force formed with the expressed purpose of bringing the space industry to the state (Spaceport America, 2007). The New Mexico Office of Space Commercialization (NMOSC) was tasked with creating a plan for the spaceport and conducting environmental impact studies (FAA/AST, 1998). The initial name for the facility was Southwest Regional Spaceport (SRS). The goal of the venture was to operate a spaceport for "horizontal and vertical launches of suborbital reusable launch vehicles that would launch from SRS and return to SRS or adjacent lands" (FAA SRS Fact Sheet, 2006, p.1 ¶ 1). Despite early planning efforts, it wasn't until the administration of current Governor Bill Richardson that the idea was fully accepted by state officials (Spaceport America, 2007).

While the spaceport was still only a concept, it was clear that a major customer base would be required to achieve the financial backing and stability for future construction and operation. Richardson appointed Rick Homans as Cabinet Secretary of Economic Development for the state of New Mexico. Since 2003, he has worked with the space industry to attract customers to the spaceport. By 2004, he had achieved a success with a contract for New Mexico to host the X-Prize Cup. Additional effort was placed in developing a customer base of expendable launch vehicle (ELV) and reusable launch vehicle (RLV) companies (Spaceport America, 2007).

The much-publicized activities of Scaled Composites (in its quest to win the Ansari-X Prize) provided further opportunity for Homans. Sir Richard Branson's Virgin Galactic was already in negotiations with Rutan to achieve exclusive rights to the winning product of the X-Prize for a space tourism venture. Fortunately for the state of New Mexico, these talks provided Homans with an opportunity to propose the SRS site as an alternative to the Mojave Airport (Spaceport America, 2007). By December 2005, Virgin Galactic agreed to make SRS its world headquarters. In the process, the company became the first leaseholder at the new spaceport (New Mexico Business Weekly, 2005). By January 2006, the New Mexico legislature and governor enacted laws to create the self-titled "world's first purpose built commercial spaceport." In July 2006, SRS was renamed Spaceport America (Spaceport America, 2007).

CHAPTER II

DEVELOPMENT

Management

The New Mexico Economic Development Department (NMEDD) is currently responsible for the development of Spaceport America. A component of NMEDD, the Spaceport Authority, manages the affairs of the spaceport. This board consists of prominent business, political and industrial leaders such as Rick Homans (Chairman), Diane Denish, Toots Green, Jerry Hanks, Richard Holdridge, William Loomis, Casey Luna, Jim Manatt and Benjamin Woods (Spaceport America, 2007).

Specific accomplishments of NMEDD and the Spaceport Authority already include: procurement of the state share of funding (i.e. \$125 million); several agreements with local ranchers for land use; a land-lease agreement with the NMSLO; a Memorandum of Agreement (MOA) with White Sands Missile Range; a MOA with Virgin Galactic for a 20 year lease; approval of an official cost estimate for the spaceport construction; and formation of relationships with the National Park Service and BLM to preserve and protect the environment while maximizing economic opportunities. One county tax referendum on the spaceport, supported by NMEDD and held in early April 2007, was also approved. This was considered to be one of the major hurdles in continuing pursuit of public financing and should generate \$6.5 million per year for 20 years (Spaceport America, 2007).

Funding and Investors

Early estimates indicated that nearly \$225 million would be required for the production of Spaceport America. While eventually revised to \$198 million, the figure

will still require the use of federal, state and local money (Silver City Sun-News, 2007). By January 2007, the New Mexico State legislature had already approved over \$100 million for facility construction and an additional \$25 million for roads and infrastructure (New Mexico Business Weekly, 2007). Some state funding is contingent on the signing of a “cornerstone agreement.” To secure this, Homans proposed Spaceport America’s first contract, between New Mexico and Virgin Galactic. Signed in December 2005, the agreement requires a 20-year lease, costing at least \$1 million per year for the first five years (New Mexico Business Weekly, 2005). There are reports that approximately 70% of the funding must come from the state, with an additional 25% from the county governments near the spaceport. Federal funds, tentatively budgeted at 5%, are not assured (Haussamen Blog, 2007).

Construction and Contractors

In June 2006, the state of New Mexico signed a contract with DMJM Aviation/AECOM (based in Tampa, Florida) to provide engineering and architectural services for the spaceport. New Mexico based companies Dekker Perich Sabatini and Molzen-Corbin & Associates will provide design consultations (Spaceport America, 2007). Initial construction is scheduled to begin in early 2008 (New Mexico Business Weekly, 2007).

Construction will be achieved in two phases. In the first phase, called the “programming” stage, roads and utilities required for spaceport operations will be built. The second phase includes development of the remaining spaceport infrastructure. The commercial launch facility will require construction of launch pads, an aircraft runway

and payload processing facilities (FAA/AST, 1998). Control facilities and a cryogenic fuel plant will eventually be added (New Mexico State University, n.d.).

In both phases, the construction team will seek to utilize materials that promote environmental and economic benefit. A visitor center will be built near the site to encourage tourism and public interest (Spaceport America, 2007). While the planned opening date of the spaceport is 2010, some hope that the first space tourism flights will occur in 2009 (New Mexico Business Weekly, 2006).

CHAPTER III
OPPORTUNITIES
Customers

Virgin Galactic

As demonstrated by the flights of SpaceShipOne in pursuit of the Ansari X-Prize, Virgin Galactic's business model shows great promise. With several days of personalized training, customers of the company will be treated to a first-class vacation. The proposed flight profile of SpaceShipTwo allows for launch from Spaceport America, a sightseeing tour of the sub-orbital environment and scenic views of the southwestern US. Upon return to Spaceport America, the customers will participate in a "winging" ceremony as they are officially designated as astronauts (Virgin Galactic, 2006).

Branson's reputation for supporting various types of "adventure tourism" should provide worldwide interest for this new venture. In addition, the associated notoriety of being one of the first people in space will undoubtedly provide many new avenues for development in all areas of tourism. By early 2006, 100 people had already pre-paid the \$200,000 fee for a guaranteed flight and others had signed up to take later flights (Virgin Galactic, 2006).

Rocket Racing League

The RRL is a NASCAR-style sports organization that plans to race rocket powered aircraft. Rocket Racing (Inc.) hopes to eventually organize Earth-orbital races. While this vision is probably many years from being realized, Spaceport America figures heavily in its success. Still in the development and testing phase, the X-Racer will be a "stock-car-like" prototype for early race competitors. Initial race formats will take place

in a one mile by two mile by half-mile three-dimensional track. As technology improves, the race arena will be expanded to create a more competitive environment (Rocket Racing League, n.d.).

Cargo Services

By September 2005, the state had arranged for one corporation, UP Aerospace, to have rights to the first launch at Spaceport America. This launch was attempted in September 2006, although it was ultimately unsuccessful. Another launch is schedule for Spring 2007. Starchaser Industries of the United Kingdom has also agreed to take up residence when the facility is completed (Spaceport America, 2007). In the interim, other companies (e.g. Beyond Earth Enterprises Corp.) are beginning to move to the high desert in order to position themselves as worthy competitors for the prized launch real estate (New Mexico Business Weekly, 2007).

Spaceport America could eventually serve as the launch site for companies providing valuable commercial services for NASA. Transformational Space Corporation (t/Space) is attempting to develop technologies for International Space Station (ISS) crew and cargo re-supply. Should the company be successful, the economic potential could be just as substantial as that for tourism (Futron, 2005).

X-Prize Cup

The X-Prize Cup was developed to provide the public with an opportunity to witness space technology in action. Included in this goal was the belief that incentive prizes (e.g. Ansari X-Prize) would spur development of such technology (X-Prize Cup, n.d.). The first X-Prize Cup was held in Las Cruces in October 2005, providing spectators with an opportunity to witness the flight of the RRL's EZ-Rocket, a Starchaser rocket

engine firing and Armadillo Aerospace's test of a lunar landing vehicle (Spaceport America, 2007). In 2006, the event included competitions for further cash prizes in the Lunar Lander Challenge, Vertical Rocket Challenge and Space Elevator Games. One highlight of the 2007 Cup is the proposed demonstration of the RRL's X-Racer (X-Prize Cup, n.d.).

Job Creation

Economic projections for the success of Spaceport America indicate that the facility may be more than just a good location for space-related businesses. Since the southern part of New Mexico has long been one of the poorer regions of the state, any major infrastructure development will provide major economic benefit. Even the construction phase of the spaceport could provide over 2,500 new jobs and over half a billion dollars in economic activity (Futron, 2005). Another potential benefit of spaceport construction in the Upham area will be development of an improved aerospace and aviation industry within the state of New Mexico, which currently ranks 36th in the country in aviation employment (New Mexico State University, n.d.). Tourism may add another 3,000 jobs (Futron, 2005).

Effect on Local Economy

While some areas of the state of New Mexico already have a tourist base, the entire state should benefit from the introduction of the spaceport. Along with potential tourist interest in the facility itself, the annual X-Prize Cup and the activities of the RRL will also increase tourism (Spaceport America, 2007). New Mexico officials predict over half a billion dollars in increased economic activity from space tourism and visitor spending (Futron, 2005).

CHAPTER IV

THREATS

Federal Approval

Achieving a license for a spaceport is considered a major government action. To receive approval, the new spaceport must demonstrate satisfactory compliance with an environmental review under the auspices of the National Environmental Policy Act (NEPA) of 1969. The FAA Office of Commercial Space Transportation (FAA/AST) must prepare an Environmental Impact Statement (EIS), which serves as the basis for later federal issuance of a launch site operator license. This license lasts for five years (FAA SRS Fact Sheet, 2006). In Spaceport America's efforts to achieve full status, NMEDD must be licensed by the FAA/AST to offer the facility to launch operators. Each launch operator, in turn, must receive licensing approval (FAA/AST, 2006).

Certification of Spaceport America was initially expected in 2007 but delays in approval of the EIS have already pushed the date back to the first quarter of 2008. While launches of ELVs have already occurred, spaceport construction and RLV/SRLV operations await completion of the certification process (Spaceport America, 2007). Interestingly, SpaceShipOne and SpaceShipTwo achieve their entire flight profiles as air-launched vehicles and do not actually require a launch operator license. They do, however, require a suitable runway (FAA/AST, 2005).

Opposition from Residents

As demonstrated in the extremely close nature of the Dona Ana county tax referendum (i.e. margin of 270 votes), funding from local governments may delay or cancel development or operations of Spaceport America. Two other counties, Sierra and

Otero, must pass similar referendums. While one spaceport-supporting group, People for Aerospace, has spent thousands of dollars attempting to pass tax legislation, opposition groups, such as the South Valley Alliance, have likewise attempted to block the use of public funds. Even if all referendums pass, local governments are already discussing the use of benchmarks to ensure the taxes can be discontinued if the spaceport is never completed (Silver City Sun-News, 2007).

Cost Overruns

The potential for cost over-runs during construction of Spaceport America is significant. While the state of New Mexico has already committed over \$100 million, many residents and politicians have already expressed concerns that there are still too many uncertainties in the area of finances. Federal backing is expected, but not yet guaranteed (Haussamen Blog, 2007). One area that may provide some optimism, however, is the overall cost estimate for the spaceport. By eliminating one of the proposed runways, the developers have been able to reduce the total estimated cost of the spaceport by more than \$25 million. The Spaceport Authority and NMEDD have shown the ability to revise plans in order to achieve a measure of cost savings (Silver City Sun-News, 2007).

Schedule Slips

Since the announcement of the Virgin Galactic partnership with Spaceport America in 2005, development milestones have not been entirely accurate. A review of historical predictions by Secretary Homans may leave the reader with a less than optimistic feeling about the ultimate success of the spaceport. Initial construction and operating dates have constantly changed, although the target date for construction is

generally considered to be 2008, with initial space operations in 2010. Licensing, Memorandum of Agreements and public funding have all taken longer than expected. Future slow-downs can be expected if local referendums fail or there are delays in the Record of Decision (ROD) on the EIS or FAA license (Spaceport America, 2007).

CHAPTER V

CONCLUSIONS

Summary

Development plans have proceeded relatively smoothly with little more than a decade of effort. Secretary Homan's vision and leadership have spurred New Mexico lawmakers to approve over \$100 million. This, coupled with the efforts of grass-roots support organizations, has also led at least one county to approve tax increases to provide public funds. With the "cornerstone agreement" New Mexico has with Virgin Galactic, the NMEDD has indicated that it is serious about attracting space related business to the new spaceport.

The opportunities that seem to indicate success for Spaceport America include a favorable location, strong support within the New Mexico state government and high customer interest. Demand for space-tourism and launch services are certainly high, with several companies already making plans to utilize the spaceport. Virgin Galactic's so-called "adventure tourism" model should inspire at least a few new people to visit New Mexico.

The threats that seem to indicate failure for Spaceport America include the uncertainty about funding sources and delays in achieving development milestones. Support for federal funding should be gained as soon as feasible. And, while the list of accomplishments of NMEDD and the Spaceport Authority is impressive, the realization of the spaceport will only occur if schedules are met and all funding can be procured.

The author believes that Spaceport America will be a success because the potential benefits to all parties (i.e. New Mexico residents, customers and space-business

entities) outweigh the negatives. As long as licensing requirements are met and the initial construction phase begins as planned, the possibility for a vibrant and functioning spaceport is well within the grasp of its operators.

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APPENDIX A
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