

# Canaveral National Spaceport: Business as Unusual - Premier Customer Service *A Revolutionary Path to Space*


Prepared for the Spaceport Florida Authority by



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**Disclaimer:**

The information, assertions, or opinions contained in this report are those of the study group that wrote it and do not necessarily reflect the opinion of the Spaceport Florida Authority (SFA).

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## Executive Summary

### Motivation

The focus of this study was to consider what the eastern launch complex should be in the future. The objective of the study was to define what is required to create a world-class spaceport. That is to say not merely *a* world-class spaceport, but *the* world-class spaceport. This goal is not a new one; in fact, it has been attempted on multiple occasions in the past. However, previously the challenge largely was one of responding to the needs of government programs.

The situation is different now:

- Commercial programs have become more significant to all the sectors.
- Programs are more diverse.
- Utilization of space has grown in importance in the military, civil, and commercial sectors and could grow enormously in the near future.
- Technology is changing both the requirements a spaceport must meet and the ways of meeting them.
- And most importantly, there is serious and successful competition to the traditional preeminence of “the Cape”, both within the U.S. and worldwide.

While the hardware, facilities, and real estate were the easiest aspects to define it became obvious from the very beginning the primary importance was the organizational structure and policies that are needed to create and operate the spaceport. Furthermore, it also became obvious that legislation would be required to create the required organization. That in turn led to the need to define roles and responsibilities for the various players, including the new organization itself.

### Make It So

Space access is at a crossroad. The United States is no longer the dominant business player of space access. This is not only a political black eye; it is also an economic loss. However, visionary leadership and innovative policies can make the difference. Embracing the concept that “change” equals persistence, instead of “fixing” the Eastern Range, we can make it different at its core philosophy and focus. It is envisioned that the ultimate goal is to be *the* premier spaceport we call the Canaveral National Spaceport.

But, can Canaveral National Spaceport, the next leap from the Cape Canaveral Spaceport, meet this challenge? Certainly!

It’s time for a new vision!

Although the Cape Canaveral Spaceport Vision and Mission are progressive and a step in the right direction, the right stuff is actually the Canaveral National Spaceport Vision and Mission. The key here is customer service focus:

**Vision:** Be the World Business Leader for Access to Space

**Mission:** Provide Premier Customer Service in fulfilling the National Will as a treasured national resource – committed to assuring United States leadership in space science, commerce, and defense.

Implementation of such a difference is challenging. Keen leadership can enthusiastically embrace this challenge with new policies and legislation making Canaveral National Spaceport be reality, making it so.

### Policy

A concept for establishing a system of national spaceports, each managed by a chartered national spaceport authority, is proposed with the intent to fulfill attributes to be a premier marketplace for customers and fulfill demanding public expectations, that is, a “National Will”.

The policy issues associated with the operation of any spaceport are complex and those for the Canaveral National Spaceport even more so due to the multiple State, Federal, and private organizations involved. Most spaceports – including Kourou - are built around one customer, or at least one type; Canaveral National Spaceport has to handle all types. These issues are growing more complex every day, as Federal agencies assert their rights to control commercial space launch activities and private firms come up with ever more innovative technical and managerial approaches.

The answer to this growing challenge is to create new policies and legislation that bring to life an organization that will not merely streamline the current structure but constitute a new one dedicated to *spaceport activities*. While no such spaceport policies have been created to date, there is considerable legal and policy precedent for similar actions in other industries. This will require appropriate legislation.

### Organization

Canaveral National Spaceport, managed by a Canaveral National Spaceport Authority, would fulfill roles and responsibilities as recommended in previous studies. This organization would be a regulator of “fair play” and a facilitator for spaceport customers, launch site operators, launch vehicle owners, payload owners, and assorted vendors. As a national spaceport, six attributes are to be fulfilled:

1. Facilitate the environment for one or more launch site operators to function safely, diversely, and competitively.
2. Promote ongoing fair play, that is, assuring the one or more launch site operators each have reasonably equitable opportunities to offer competitive scheduling and fees to launch vehicle owners. Also assuring the launch site operators to not place excessive risk, to safety or to operational business resources, upon each other or to the public.
3. Enable free market opportunities for multiple propellant suppliers, data communication-command-control, and other such site vendors to do business with launch vehicle and payload customers.
4. Accommodate all modes of space transportation not just launch. For re-usable launch vehicles, re-entry or return operations will be just as important as launch.

5. Secure the needs of national defense as required. Such defense needs may include launch on call, secrecy, restricted access, and national resource protection.
6. Fulfill a National Will to compete in a global/universal marketplace.

Customer service is the product to be provided by this new organization. Safety, legislation, economics, technology, and leadership are the key ingredients to enable and keep this organization responsive to the National Will. A national commitment, inspired by presidential leadership, will be essential to organize a treasured national resource – The Canaveral National Spaceport.

### **The Requirements Process: A Revolutionary Path to Customer Service**

The call for leadership is also a call for a difference in philosophy. It's all about attitude! The Range of today has made some progress in simplifying the convoluted system requirement process that has evolved over the years of its existence. However, a commercial attitude of, "What can we do for you the customer?", has yet to permeate the spaceport. Until and unless it does, the requirement process will remain focused inwardly on the Range rather than outwardly on the customer.

The spaceport of today is at a strategic inflection point, a point in time that must see a difference or watch effectiveness diminish. Interestingly enough, the space industry may be at a similar strategic inflection point with the many commissions, reports, and studies currently under review. The results of these efforts we show significant differences across the space community. That makes the mission of the spaceport adapting to customers all the more relevant as those customers struggle to understand the new rules of engagement.

The current Range exists primarily unto itself much like occupants of a castle. It's not that today's Range has a bad attitude rather it has to be customer centered instead of Range centered.

The biggest single hurdle to improving access to space for the commercial sector is the current government philosophy of providing the private sector with launch opportunities, services, and property only on an "excess capacity" basis. Because of this restriction, commercial requirements cannot be a part of the long term planning of the Range. Until this is different, customer service is only a dream.

Instead of waiting for customers, Canaveral National Spaceport will be openly courting them. Involved even in the design process to ensure compatibility, Canaveral National Spaceport will work to attract and satisfy customers even to the point of pre-qualifying new designs as capable of being launched from the Florida spaceport. How launch service providers and other customers acquire the right to use property on the spaceport must also be different if the free market model is to have a chance.

## Technical Capabilities

Technical services/functions will be one of the fundamentally different elements of the Canaveral National Spaceport. The vision for the future spaceport is one that commercializes, to the greatest extent possible, spaceport functions that have traditionally been performed by the government owned and controlled range. Using a free market model (i.e. the freedom to acquire needed technical support from the private sector) rather than the current government-proviso model will promote technical innovation and maximize customer support.

Government subsidization needs to be minimized and commercial enterprise roles and functions must emerge for the birth of the Canaveral National Spaceport to take place. One key infrastructure element the spaceport will provide is the integrated scheduling of launch and return operations. This will require technology modernization in the areas of dynamic scheduling and automation techniques. The spaceport authority will be responsible for those services and functions that are in the interest of public safety and that promote fair play at the spaceport. Both technology and regulatory innovations to include automated/standardized safety procedures and decision support tools will be required.

The spaceport authority will also provide weather advisories for launch, landing, and ground operations; emergency services; and physical security as required for safety of the public. In addition to encouraging community infrastructure in the areas of transportation (e.g. roadways, railways, airways, and seaways) and utilities, the spaceport will ensure these same services are provided within the “gates” of the spaceport.

The fact that the vision of the Canaveral National Spaceport includes the ability of the spaceport to accommodate multiple launch site operators has significant impact on the technical capabilities/services infrastructure: only those generic to all, and are the responsibility of the spaceport, will be provided by the spaceport authority. Thus, many services and functions will need to be acquired by the launch site operator, launch provider or satellite owner from commercial entities. For example: specific launch vehicle and spacecraft data systems/networks will not be the responsibility of the spaceport; and storage facilities or hangars will be owned by the operators, or leased from commercial providers.

The freedom to acquire these technical services from vendors will promote economic growth, free-market competition, and technical innovation and, most importantly, maximize customer service.

## Economic

For the last decade, U.S. private industry and the Department of Defense (DoD) have been reinventing the way they do business. In an effort to help U.S. manufacturers compete in the international market, and at the same time keep U.S. military ranges/testing facilities busy, Congress created the commercial charge policy to make U.S. private industry's use of DoD facilities more cost effective.

The Government must make Public Law 103-160, the Defense Authorization Act, Section 846, Title 10 of the U.S. Code, Section 2681, "Use of Test and Evaluation Installations by

Commercial Entities” different to allow the spaceport to compete with private industry for business. Key areas for economic differences to be made are:

1. Conduct in-depth pricing comparison of major competitors.
2. According to the results of interviews with potential and existing customers, the spaceport needs to develop a customer-sensitive pricing strategy and value proposition. Implement a profit motive and negotiate prices with customers based on their need for spaceport services.
3. Communicate positively the value of services to customers and employees. Let the customers and employees know what they are getting for their money.
4. Track plan progress against customer retention goals. Track pricing data and implement an earned value reporting system.
5. Proactively communicate with current and prospective customers. Communicate pricing information openly and before the customer has to request it. Develop new methods to speed up paying for services and receiving payment of services rendered.
6. Assign senior executives to build personal relationships with customer CEOs and presidents.

### Summary

Canaveral National Spaceport will follow the free market model; will be a spaceport not a range; and will be *the* spaceport that provides premier customer service. With this focus, a set of visionary legislation, economic models, organization, and infusion of technology will leapfrog the Eastern Range to be the Canaveral National Spaceport.

The biggest single hurdle to improving access to space for the commercial sector is the current government philosophy of providing the private sector with launch opportunities, services, and property only on an “excess capacity” basis. Because of this restriction, commercial requirements cannot be a part of the long term planning of the Range. Until this is made different, customer service is only a dream.

Customer service at the spaceport will be the focus. The spaceport will actively seek customers rather than relying on the customer coming to the spaceport. The spaceport of tomorrow will work to attract and satisfy customers; pre-qualify new designs as capable of being launched from the Canaveral National Spaceport; and conduct the space access business as a business.

### Issues

- Will the Air Force actually operate and maintain any launch complexes or will all such services be provided as “overhead” on launch service-style contracts? This issue will alter how the Air Force perceives the spaceport authority.
- What is the proper role of the Spaceport Florida Authority?
- How will the spaceport interface with national organizations?
- The DoD Major Range and Test Facility Base (MRTFB) operates under a set of rules that specifically designed to ensure that the elements of the MRTFB charge one another in a standard, fair, and predictable manner. If a separate authority is created, will these rules still apply?

- How will the other states react to the creation of the Canaveral National Spaceport Authority?

### Topics for Further Study

- Research and document high level federal organization relationships and recommend modifications
- Examine how the spaceport authority should relate to national structures
- Perform trade study on approaches to spaceport technical capabilities
- Define a specific roadmap for implementation of recommendations in the legislative and economic areas

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## List of Acronyms

ADPE	Automated Data Processing Equipment
AFMC	Air Force Materiel Command
AFSC	Air Force Space Command
ATC	Air Traffic Control
ATF	Alcohol, Tobacco, Firearms
CAS	Contract Administration Services
CCAFS	Cape Canaveral Air Force Station
CCS	Cape Canaveral Spaceport
CEO	Chief Executive Officer
CNS	Canaveral National Spaceport
CSLA	Commercial Space Launch Act
CSOSA	Commercial Space Operations Support Agreement
DBA	Direct Budget Authority
DOD	Department of Defense
DOL	Department of Labor
DOT	Department of Transportation
DTRA	Defense Threat Reduction Agency
EELV	Evolved Expendable Launch Vehicle
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FIA	Future Imagery Architecture
FY	Fiscal Year
G & A	General and Administrative
GOCO	Government Owned/Commercially Operated
GPS	Global Positioning System
GSE	Government Support Equipment
HVAC	Heating, Ventilation and Air Conditioning
IWG	Interagency Working Group
JOCAS	Job Order Cost Accounting System
JON	Job Order Numbers
KSC	Kennedy Space Center
MOA	Memorandum of Agreement
MPLM	Multi-Purpose Logistics Module
MRTFB	Major Range & Test Facility Base
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NPRM	Notice of Proposed Rulemaking
O & M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PI	Program Introduction Document
R & D	Research and Development

RBA	Reimbursable Budget Authority
RDT & E	Research, Development, Testing and Evaluation
RLV	Reusable Launch Vehicle
SCA	Safety Control Authority
SFA	Spaceport Florida Authority
SLC	Space Launch Complex
SC	Statement of Capability
SSPF	Space Station Processing Facility
T & E	Testing and Evaluation
TBD	To Be Determined
TVA	Tennessee Valley Authority
US	United States
USAF	United States Air Force
USG	United States Government
45 SW	45 <sup>th</sup> Space Wing
45 SW/XP	45 <sup>th</sup> Space Wing Plans Organization
45 SW/XP (JX)	45 <sup>th</sup> Space Wing Plans Organization/Joint Programs and Customer Service Office

# 1. Introduction

## 1.1 Turning Point or Point of No Return

Is space access of today at a turning point? Many think so. United States dominance in the space access business is waning. Our Eastern Launch Complex is no longer launching more satellites than any other launch facility. The lead has shifted to foreign soil and is getting competition locally as well. This is not only a political black eye; it is also an economic loss. Congressman Dave Weldon (FI-15) in statement to the Aerospace and Aeronautics Subcommittee on March 22, 1999 stated:

*“...Foreign (launch) facilities are cheaper and generally more customer friendly according to studies on this issue. Our ranges will lose more and more business to these competitors if we do not act to make our ranges the best in the world.”*

Clearly, the competition is not only from outside the United States, but also from inside the country where other commercial launch sites will flex their wings. Executives from nine commercial U.S. launch sites recently met to ensure *inland* “entrepreneurial space facilities have a voice in national policy”. Issues of common interest included:

- Flight safety standards
- FAA regulations
- Commercial space legislation
- and unfair advantages if national launch ranges are turned over to private or other non-governmental entities

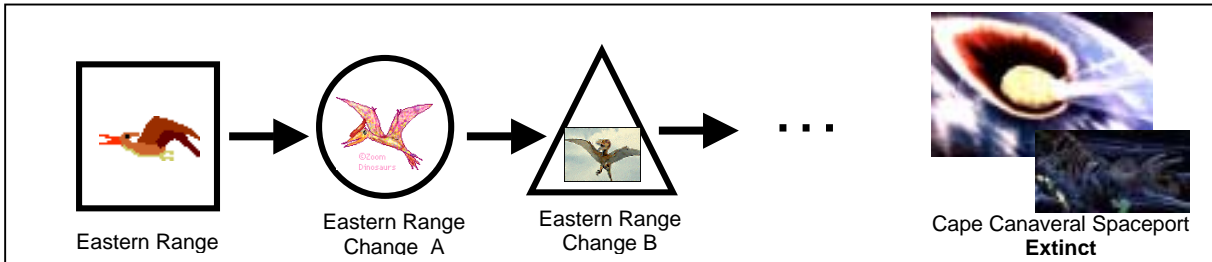
Can Canaveral National Spaceport (CNS), the next-leap from the Cape Canaveral Spaceport, meet this challenge? Certainly! However, unlike the challenges of the past that the Eastern Range “changed/fixed” with technology, people and programs, this is one involving core differences in philosophy and culture. It’s also a challenge that needs immediate attention.

It’s time for a new vision!

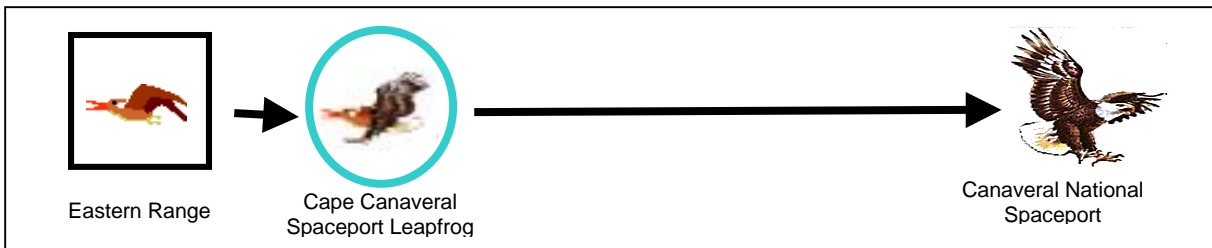
## 1.2 Extinction or Distinction

Change equals persistence. This has been seen over the years in efforts created to “fix” the Range. However, these “fixes” simply maintain the status quo. To illustrate, if we view the current Eastern Range as a “pterodactyl” and “change/fix” it, it will simply become an evolved Eastern Range, see Figure 1-1 . Eastern Range - Change A will be made up of the same “stuff” as the pterodactyl, the Eastern Range. It looks “changed” or “fixed” but it is the same in essence, the Eastern Range. This cycle continues because there is no difference in its essence. History records the pterodactyl’s fate.

However, in the interim, Cape Canaveral Spaceport has taken a step in the direction of making a difference. Though not a leapfrog step, it is significant. Taking a leapfrog step will take space access from our existing “pterodactyl” to be the majestic “eagle”, the future Canaveral National Spaceport, Figure 1-2 . Making a difference, being essentially distinct, the Canaveral National Spaceport will be *the* business solution for access to space.



**Figure 1-1 Change equals persistence not difference.**



**Figure 1-2 Being different.**

How are these different and how will this be accomplished?

These two scenarios are different to the very core of their respective philosophies and cultures. Visionary policy, economics, and innovation are the extraordinary differences that make the two distinct. These attributes will make space access be the majestic “eagle”, Canaveral National Spaceport, a treasured national resource.

Canaveral National Spaceport’s capabilities; who will provide them; and how they will be provided will make a difference not be a change.

These leapfrog steps, outlined in the remainder of this document, will ensure Canaveral National Spaceport’s distinction not extinction.

**1.3 A Step in the Right Direction**

The Cape Canaveral Spaceport has begun to embrace the new vision of space access. Cape Canaveral Spaceport has developed a Vision and Mission that provide a first step for making the needed difference, Figure 1-3 .

**Current Cape Canaveral Spaceport Vision:**  
To Be the World's Premier Launch Site and Spaceport Technology Center  
**Current Cape Canaveral Spaceport Mission:**  
To enable safe, world-class launch processing, payload processing, test, launch,  
technology development and support services

**Figure 1-3 Current Vision - A Step in the Right Direction**

Spaceport Florida Authority, a state agency incubates and aids finance commercial space ventures and space education initiatives, is helping forge a partnership at the Cape Canaveral Spaceport. The partnership being forged in Florida is being closely monitored, influenced and assisted by policymakers and staff in Washington, D.C. A high-level review of the nation's spaceports is nearing completion and will include recommendations to the President on any changes in policy, law or budgets that may be needed to help assure that U.S. military, civilian and private companies have unimpeded access to space.

The Cape Canaveral Master Plan is partly through its development. It embraces the beginning tenants for the future Canaveral National Spaceport:

*“Ultimately, the Cape Canaveral Spaceport should be the premier, most economically viable launch complex within a global spaceport network... The Spaceport must be the leader in a global launch network, guiding international space projects that include research, commerce and exploration.”*

**1.4 The Right Stuff**

Following in these footsteps the future Canaveral National Spaceport will stay on track to the right stuff. Customer service will be Canaveral National Spaceport's ultimate focus, ensuring its place as *the* space access business solution. Canaveral National Spaceport's Vision and Mission are shown in Figure 1-4.

**Canaveral National Spaceport Vision:**  
Be the World Business Leader for Access to Space  
**Canaveral National Spaceport Mission:**  
Provide premier Customer Service, fulfilling the National Will as a treasured national resource  
- committed to assuring United States leadership in space science, commerce, and defense.

**Figure 1-4 The Right Stuff**

These Vision and Mission Statements make a distinction in Canaveral National Spaceport's emphasis. They put the customer at the focus and make this a business endeavor. Canaveral National Spaceport will follow the free market model; will be a spaceport not a range; and will be *the* spaceport that provides premier customer service. With this focus, a set of visionary legislation, economic models, organization, and infusion of technology will leapfrog the Eastern Range to be the Canaveral National Spaceport.

The distinctive philosophy outlined above can be seen by an illustration of legislation, economics, organization, and technology legs focusing customer service at the pinnacle, as shown in Figure 1-5.



**Figure 1-5 Canaveral National Spaceport Focus - The Right Stuff**

The right stuff:

**Legislation** must be enacted that will allow commercial customers access to spaceport facilities, services, and technology.

**Economics** of the spaceport must be such that it can compete with other launch facilities, foreign and domestic, for new business.

**Technology** must stay in cutting-edge, reaching and maintaining world-class standards to attract new customers.

**Organization** must be formed that will allow the necessary processes to be implemented making the Canaveral National Spaceport efficient and service focused.

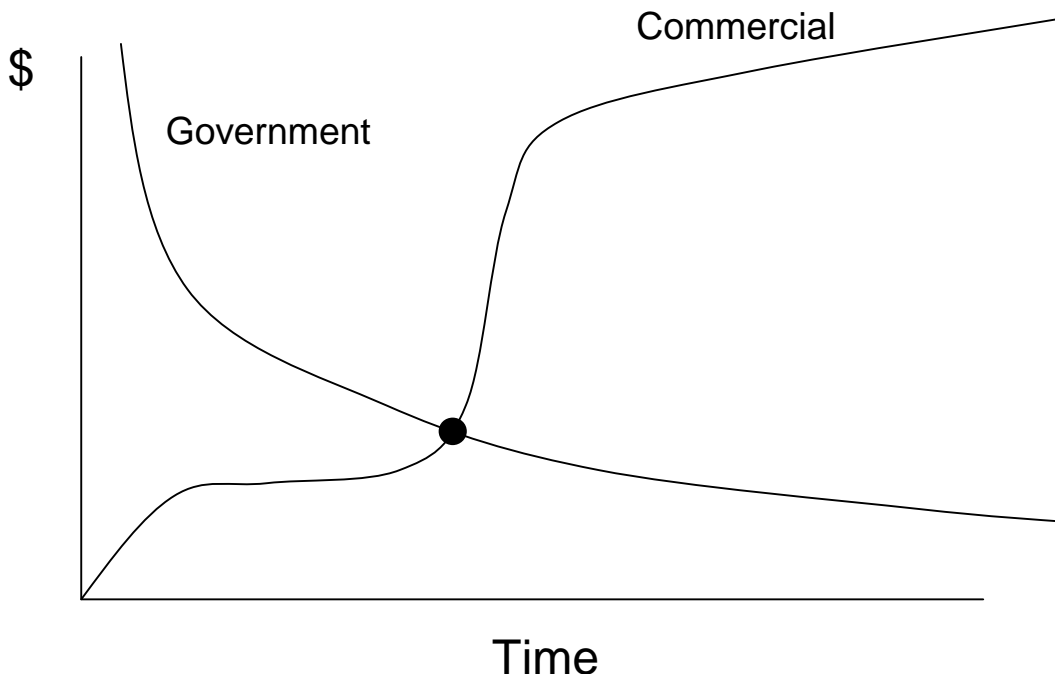
**Customer Service** then has the foundation to remain at the pinnacle of everything the spaceport undertakes in this business endeavor.

The implementation of such a difference is challenging. However, keen leadership focused on the proper vision can enthusiastically embrace this challenge, making it be reality.

### 1.5 Charting the Course

The remainder of this document will reference each of the legs of Figure 1-5 in four major sections. Each section's recommendations support the future Vision and Mission outlined above. In other words, they chart the course for the Canaveral National Spaceport.

Additionally, a roadmap is necessary to make the Canaveral National Spaceport be a reality. The development of this roadmap will take a significant effort. However, the fundamentals of this roadmap can be understood now in light of this study. Figure 1-6 displays, in a very general way, the need for a decline of government investment and the increase in commercial profitability. To be in the business of business, government investment and control must diminish and commercial enterprise must increase. Each section will also show an applicable layer for that section's input on the roadmap.



**Figure 1-6 Canaveral National Spaceport Roadmap**

A set of visionary legislation, economic models, organization, and infusion of technology will leapfrog the Eastern Range to be the Canaveral National Spaceport.

## **2. Legal/Policy**

### **2.1 Introduction - Defining the National Will**

A “National Will” must be perceived to appropriately balance and fulfill the demands for commerce, defense, and science. The demand for chartering national spaceports would then be to accommodate flexibility to support the Government’s response to changing world situations. The National Will must be a commitment by the nation to be the leader in this global marketplace. This Will must be inspired by national leadership, and be widely accepted by the electorate, as considerable inertia against realignment of existing institutions, legislation, and attitudes must be overcome. A National Strategy must be created, implementing current and revised recommendations, as the plan to make the “National Will” a reality.

### **2.2 Fulfilling the National Strategy**

A “National Strategy” will be required as the plan to make the “National Will” a reality. A National Strategy must be created implementing sound recommendations that can be fulfilled within approximately 8 years. One may ask, “Why should a plan be designed for fulfillment in approximately 8 years?” There are several reasons. First, significant effort will be required to realign the existing institutions, legislation, and attitudes. Second, a presidential administration, seeking to receive historical credit for such an accomplishment, would want the job done before the presumed completion of two successful terms in office. Third, precedence for greater space challenges over this time span were established by the successful effort to rally the nation with President Kennedy’s challenge to getting a man to the moon and back within the 1960’s.

A February 2000 White House Interagency Working Group (IWG) report, “The Future Management and Use of the U.S. Space Launch Bases and Ranges”, identified six near-term recommendations establishing meaningful milestones for an ambitious National Strategy:

- IWG Recommendation 1: “Propose alternative management structures to provide greater user voice and improve operational flexibility.”  
A national spaceport, managed by a national spaceport authority, would be organized to allow for various launch site operators to co-exist at a national spaceport and to each develop their own concept of operations. The emphasis would be on minimizing the spaceport authority’s role in operational systems matters, thereby leaving flexibility primarily in the hands of the spaceport customers.
- IWG Recommendation 2: “Pursue improved efficiencies in range operations.”  
With the transition from segregating launch site and range operations to a seamless spaceport operation, and the de-emphasis of the spaceport authority meddling with customer operations, pursuit should focus on:

1) improved efficiencies of “fair play” when siting adjacent launch site operations; 2) conducting concurrent and increased daily volume operations amongst the spaceport customers; and 3) assuring public safety is not compromised under radically accelerated operational volume.

- IWG Recommendation 3: “Encourage, permit, and maximize use of non-federal funding sources.”  
Funding sources must predominately come from competitive spaceport customers (launch site operators, launch vehicle owners, payload owners, and commodity and service vendors) operating in the global marketplace. This will not include other funds necessary to assure safety, to promote “fair play”, and to strategically stimulate business in the interest of the National Will.
- IWG Recommendation 4: “Explore options for replacing ‘excess capacity’ constraint in law.”  
New legislation, such as overhaul of the Commercial Space Launch Act, is required to change from the passive “excess capacity” paradigm of the past to the pro-active “Treasured National Resource” paradigm required for competitiveness and flexibility. Such legislation will be required to establish mechanisms for chartering national spaceports managed by national spaceport authorities.
- IWG Recommendation 5: “Develop common range safety requirements and ensure FAA resources for safety.”  
A national spaceport system, managed by national spaceport authorities, would operate under standardized safety criteria established by the FAA. Global aerospace traffic control issues would necessitate FAA participation in international cooperation to assure safety aboard launch vehicles and payloads as well as assure public safety.
- IWG Recommendation 6: “Develop Air Force-NASA plan for next-generation range technology development.”  
The emphasis of the NASA Kennedy Space Center would need to transition from being an extended geographical launch site location to a center of spaceport technology development expertise, a payload owner and experimental launch vehicle developer promoting the scientific aspect of the National Will. Working together with the Air Force to support development of superior technology to meet the defense aspects of the National Will, the NASA Kennedy Space Center would become the premier center for technological expertise. While Canaveral National Spaceport, along with other chartered national spaceports, would strive to become the premier gateway to space.

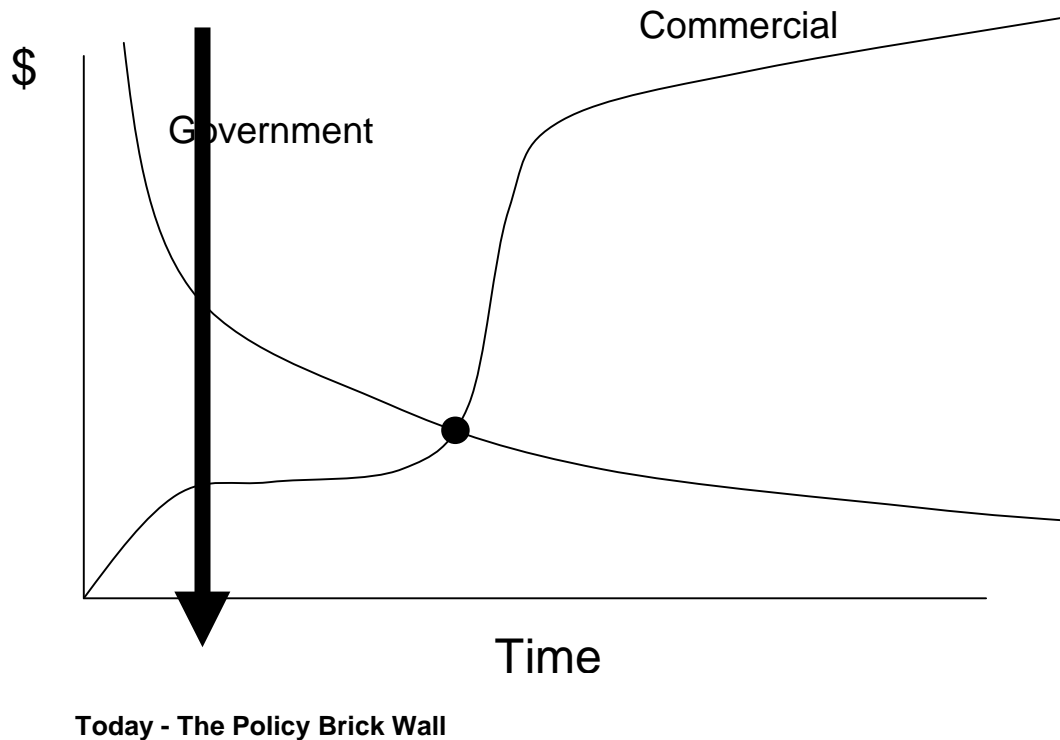
## **2.3 The Focus**

The “Customer Service” Focus diagram. Figure 1-5, depicts how Legislation, Economics, Technology, and Organization combine to enable the required service be provided to customers. This is particularly true from a national perspective, as is Canaveral National Spaceport. Each of the four elements interacts, but they are all shaped by policy:

- Legislation is essentially formalized high-level policy. The original Commercial Space Launch Act (CSLA), its revisions, and derived policies reflect the organizations, economics, technology, politics and customers of their times. All have changed, and so new legislation is required.
- Organization is both derived from policy and responds to it. The CSLA defined certain polices based upon existing organizations. The organizations then changed their form and created detailed policies based upon the CSLA; this process continues.
- Technology drives policy in many ways, as is seen by the latest revision to the CSLA, which recognizes the need to support not only launch but also re-entry operations.
- Economics impact policy in a number of ways: both due to the real world of the commercial marketplace and the available funding that can be supplied by governments. The original CSLA was driven primarily by economic considerations.

### **2.3.1 Where Are We Headed Anyway?**

Federal Government investment in the spaceport has been decreasing and is expected to further drop in the future as both the Air Force and NASA become “ticket buyers” rather than “airline operators.” A key concept is that private investment is expected to substitute for government funding. At the same time, international competition has become quite fierce and new technologies offer both immense challenges and breathtaking opportunities. But the current organizational structure, formed by obsolete economics, 1950’s vintage technologies, and constrained by the associated legislation and resultant policies, cannot enable the future vision to be achieved. It stands as a brick wall, an obstacle to the future. Referring to the roadmap chart, we can see that we are at a crucial policy juncture, Figure 2-1.



**Figure 2-1 Policy Overlay**

#### **2.4 Complex and Becoming More So Every Day : The Policy Situation**

The spaceport policy situation is highly complex and involves not only Air Force and NASA regulations and policies but also those of virtually every other government agency.

Appendix B provides a list of most of the agencies that have some degree of control over the spaceport. This represents a bewildering array of agencies, each with their own charter, regulations, and directives as well as Executive, Congressional, and Judicial direction that affect their operations. Furthermore, the situation is becoming more complex, not simpler. As additional commercial programs come forth, new private firms enter the mix and older customers come out from under the umbrella of military and civil space operations. Also, Appendix B does not include state, private, local, or professional organizations or educational institutions that can impact, assist, or otherwise affect the spaceport.

All of these players have something in common. Individually, none of them are funded or chartered in any way to operate a true spaceport. None are even charged with the responsibility of determining the requirements for a general-purpose spaceport.

Every agency is restricted in what it can do, not only by its own policies and regulations, but also by those of the other agencies. Let us assume the Air Force acts in accordance with the law and agrees to support commercial space activity. Let's further assume other federal agencies [Federal Aviation Administration (FAA), Department of Labor (DOL), Federal Communications Commission (FCC), Alcohol, Tobacco, and Firearms (ATF), Environmental Protection Administration (EPA), etc.] impose their own requirements on those same commercial firms. The Air Force is in no position to intercede. The Air Force can only require compliance, and at best, accommodate.

While many Federal agencies hold sway over some aspect of spaceport activities, none are chartered, funded, or truly interested in creating and operating a spaceport. The Air Force has the closest thing to a defined mission in the area, but it has been following an approach with an increasingly narrow focus that essentially gets the Service out of the spaceport business. Of even greater importance, is the Air Force cannot grant relief from the limitations that are imposed on it (such as the undefined restrictions on competition with commercial sources) nor those imposed by other agencies (such as the ATF requirement for inspections of privately owned ordnance stored on the base).

The net result is there is no single organization that is truly dedicated to planning, designing, and operating a spaceport. The result is that current customer requirements are not being met, and there is no true planning effort to define the spaceport of the future.

There are numerous challenges with assigning one of the current Federal or State organizations as the operator of the spaceport. While legal and regulatory problems exist, the challenge of establishing an appropriate organizational culture is even more daunting. An example is the effort underway to reassign safety responsibilities. This was undertaken simply because operating a range safety organization was outside the culture established in Air Force Space Command.

Another challenge is there are so many Federal agencies that potentially have control over activities at the spaceport that a large number of legal revisions would be required to specifically give one agency control over all issues or to exclude some agencies and to retain others. Aside from that, every existing Federal organization carries with it its own inappropriate regulations and attitudes.

#### **2.4.1 And the Answer Is: Straightforward Solution to Complex Challenge**

The ultimate answer to the need for a true spaceport organization is to create one. There is considerable successful precedent for this concept.

The Tennessee Valley Authority (TVA) is a U.S. government agency established in 1933 to control floods, improve navigation, improve the living standards of farmers, and produce electrical power along the Tennessee River and its tributaries. In 1933 the U.S. Congress passed a bill establishing the TVA, thus consolidating all the activities of the various government agencies in the area and placing them under the control of a single one. The TVA is an example of a specific federally chartered authority created to handle a specific need. Although controversial in a number of respects, the TVA has on multiple occasions been found Constitutionally legal by the U.S. Supreme Court. One of the most serious issues that had to be resolved has been that of competition with private power companies, but this has been resolved effectively if perhaps not to everyone's complete satisfaction. Although the creation of the TVA required a large initial investment, the authority has been paying back the debt to the government through profits from the sale of electricity, in addition to being self-supporting.

An airport is frequently cited as a model for an approach to the organization of a spaceport. While in reality there are few actual one-to-one analogies between airports and spaceports, most airports are not nationally chartered; one useful example is the Metropolitan Washington Airports Authority. The authority operates and maintains both the Dulles and Ronald Reagan National Airports that support Washington D.C. Unlike most airport authorities, both an Act of Congress and an act of the Virginia Assembly chartered the Metropolitan Washington Airports Authority. Prior to 1985, the FAA operated both of the airports, so it is an example of federal property being transferred to a separate, self-supporting authority for the purpose of providing a service needed by both the Federal Government and private industry. The TVA and Metropolitan Washington Airports Authority provide the basic outline for establishing a model of what is required.

Like the TVA and the Metropolitan Washington Airports Authority, the spaceport authority should have the eventual goal of being self-supporting through funding received from the spaceport's users. However, initially, this will not be possible given the relatively low flight rate. The spaceport will have to primarily operate using Federal funds. In reality, this is no different than current practice. At present the Air Force and NASA provide the vast majority of funding required to operate and upgrade Cape Canaveral Air Force Station, the Eastern Range, and the Kennedy Space Center. This funding must continue to be provided at approximately its present level. However, as technology enables both lower launch costs and more-efficient operations a greater burden of the cost can be transferred to spaceport users.

## **2.5 Legislation Not Negation**

A Canaveral National Spaceport Authority should be created by both an Act of the U.S. Congress and the Florida Legislature. The main provisions of this legislation should be:

- The Federal Government would hold a lease on the real property issued to the Authority. The Authority would have the right to issue sub-leases to private firms for construction and operation of privately operated facilities and to license the shared use of spaceport facilities.
- Spaceport customers would have the right to, where feasible, acquire services from competing private firms. This would not be feasible for most range services nor for services such as fire protection and base level security but should be feasible for most other spaceport services.
- Individual private companies, including launch service providers and launch site operators, would operate launch and processing facilities. The possible exception would be those services provided for small, experimental, and educational payloads, which might be best supported directly by the Authority.
- Safety responsibilities would remain with the Federal Government. Shared responsibility is a possibility.
- The new Authority would have the resources and the right to issue its own specifications and standards and perform its own engineering and procurement activities.
- The Authority would have the right to function as the Federal Government within its own boundaries. Rather than having the private firms (that will provide the nation's space lift capability) deal individually with a multitude of bureaucracies (none of which have any real expertise in space launch) these firms should have to deal with only one specialized agency: the spaceport authority itself.

## **2.6 Who's Who: Roles and Responsibilities**

A February 2000 White House Interagency Working Group (IWG) report, "The Future Management and Use of the U.S. Space Launch Bases and Ranges", identifies five current and planned divisions of responsibilities: base ownership; supporting infrastructure; space launch operations, facilities, and systems; range facilities and systems; and safety responsibility and systems.

- Base Ownership: Per the IWG report, currently "the USG (United States Government) owns real estate and manages real property processes, but commercial launch operators are responsible for environmental documentation and compliance on sites they use". It is recommended that the USG continue base ownership, however in a new way in which national spaceports would be chartered, owned, and managed in the

national interest. Canaveral National Spaceport, managed by a Canaveral National Spaceport Authority, would be tasked to fulfill the attributes for diverse and competitive multiple commercial launch site operators to function safely, fairly, and with recognition of diverse classes of customers (launch site operators, launch vehicle owners, payload owners, vendors, researchers, military, etc.) Such a national spaceport authority would be tasked to fulfill a “National Will” assuring national interests for commerce, science, and defense are capable of being pursued and achieved.

- **Supporting Infrastructure:** Currently the “USG owns, operates, and maintains roads and utility systems for the entire base.” It is recommended this continue with vigilant cognizance to not compete with potential vendor customers unless it is determined to be in the interest of stimulating greater free market opportunities by launch site operator customers.
- **Space Launch Operations, Facilities, and Systems:** The IWG report states that the “USG owns, operates, and maintains payload processing facilities and the active launch complexes used to support USG missions; commercial launch operators operate and maintain facilities they use exclusively.” It is proposed that such resources be primarily furnished by spaceport customers, that is, by the one or more launch site operators. The national spaceport authority should furnish facilities only as deemed necessary to induce competitiveness in the marketplace. Facilities and systems for space launch operations and range, being primarily as furnished by the customers, should be respected seamlessly by the national spaceport authority as integrated “spaceport” operations.
- **Range Facilities and Systems:** Currently considered separately from space launch facilities and systems, IWG notes “USG owns, operates, and maintains; commercial launch operators pay ‘direct costs’ for use in support of commercial missions.” Likewise, as for space launch operations, primarily the spaceport customers will determine needs and be responsible for all equipment to perform operations. Spaceport facilities and systems should be primarily provided by launch site operators or potential vendors unless it is determined to be in the interest of stimulating greater free market opportunities by launch vehicle and payload owners.
- **Safety Responsibilities and Operations:** As the IWG report states, “USG has safety responsibilities and conducts safety operations”. The national spaceport authority should continue these safety operations and assure compliance with FAA and all other relevant safety requirements (Public Law 60, environmental standards, atmospheric turbulence limitations, cross over hazards from adjacent operations, workloads). Unlike spaceport assets acquired by customers for commercial endeavors, the spaceport authority may need to acquire such safety assets to assure its responsibilities are properly fulfilled. As the spaceport matures, with

numerous launches and other potentially hazardous ground and flight operations occurring daily, daily risk management criteria may need to be defined to fulfill without compromise overall risk management policy.

## 2.7 Attributes

Attribute	Current Status	Vision
1. Facilitate a positive environment for launch site operators to function safely, diversely, and competitively	Local, Command level, Service and National Policies place commercial operators in secondary status at best. Commercial firms are beset by numerous requirements and restrictions imposed by multiple agencies.	A truly independent authority, that can address in total the requirements of all customers and serve as a shield against inappropriate and odious regulations.
2. Promote clear policies, designed for fair play, equitable treatment, fair pricing, and resolution of issues	Confusing, ill-defined and seemingly arbitrary regulations lead to a impression of massive inertia and a self-serving bureaucracy	Clearly defined policies structured toward customer needs.
3. Equitable free market opportunities for both customers and suppliers	Draconian and seemingly arbitrary rules designed to require compliance in some cases and forbid lower cost approaches in others. No one-stop shop allowed, but flexibility also limited.	Enable customers to select the optimum mix of convenience versus cost for their situations. A one stop shop for those who wish it and “ala cart” services for those who do not.
4. Accommodate all modes of space transportation.	Government program oriented. Competition with other sites is not a factor	A Big Picture view of what is required for the present and future in order to provide service and be competitive
5. Secure the needs of national defense as required	Individual program oriented. Wait until it comes in the door.	Both respond to anticipated future needs. Avoid fixing short-term perception problems with long term plans.
6. Fulfill National will to be the leading space faring nation	Meet only firm requirements only while abiding by numerous restrictions	To Boldly Go.....

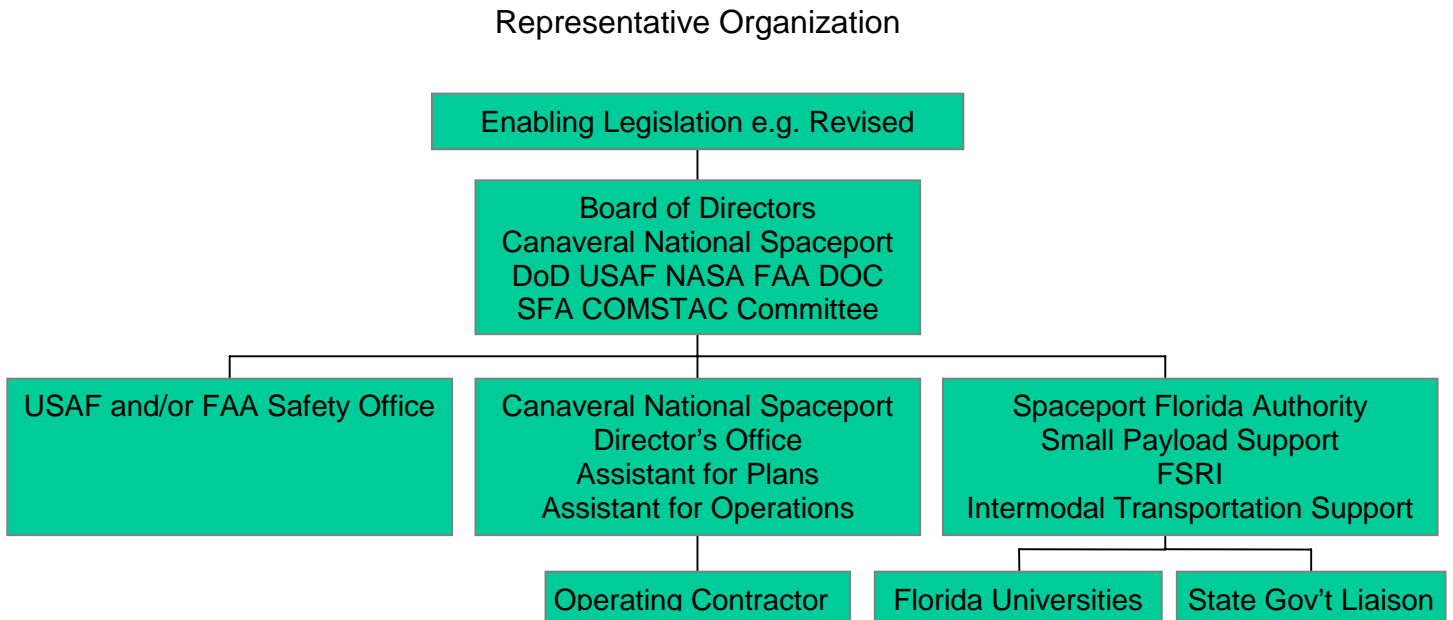
### 3. Organization

#### 3.1 Introduction

Essential organizational advances are required to remain a viable spaceport. Before an organization can be defined, the attributes must first be identified. Organizational roles and responsibilities can then be recognized and assigned appropriately. The true needs of spaceport customers must be assessed to meet near-term and long-term commercial, defense, and science demands. Historical precedence, in support of other modes of transportation, facilitates assessment of various organizational models. With this assessment, a recommendation can then be substantiated to best organize Canaveral National Spaceport as a treasured national resource.

#### 3.2 A New Look

A Board of Directors whose membership should include the USAF, the U.S. Navy, NASA, the FAA, and the State of Florida should govern the Authority. Other possible membership could include a representative of the DoD Test Facilities and Installations office as well as private industry. Figure 3-1 outlines a representative organization, from a policy perspective, to be legislated.



**Figure 3-1 Representative Organization to be Legislated**

### 3.3 Who's Who on the Board?

The creation of the Canaveral National Spaceport Authority will imply some significant differences in roles and responsibilities as well as creating new ones:

- *The Canaveral National Spaceport Authority.* Serve as the manager of the spaceport and associated launch/test range. Provide municipal-style services, including overall planning and scheduling to all valid spaceport users. Ensure that required laws and regulations are properly defined and followed. Serve as the interface for all spaceport customers to the Federal, State, and local governments.
- *The United States Air Force.* Serve as the primary Department of Defense interface to the spaceport authority. Exercise the appropriate degree of insight and control over USAF launch missions. Provide technology development capabilities. In conjunction with the Federal Aviation Administration, ensure that public safety is maintained.
- *The National Aeronautics and Space Administration.* Serve as lead for technology development efforts. Exercise the appropriate degree of oversight and control over NASA missions (and other Civil missions as defined in appropriate Memorandums of Agreements (MOAs)).
- *Federal Aviation Administration.* Serve as Department of Transportation (DOT) lead for interface to the spaceport. Exercise mandated DOT authority for commercial space launches. Work with the Air Force to provide the required federal oversight and control for safety purposes.
- *The Spaceport Florida Authority.* Serve as the Florida State interface to the spaceport authority. Ensure that other state agencies factor spaceport requirements into their plans, such as for inter-modal transport planning. Coordinate with other states on cooperative ventures.
- *All Governmental Agencies.* Promote the Canaveral National Spaceport to ensure its capabilities are adequate to meet national and state needs.

### 3.4 Spaceport Customer Recommendations: Current, Potential, and Beyond

At the 38<sup>th</sup> Space Congress held in Cocoa Beach, Florida, May 2001, current and potential spaceport customers exchanged concerns regarding the viability of the U.S. to be competitive in the global space launch marketplace.

The lack of a National Will was expressed as the root cause for U.S. deficiencies in legislation and competitiveness in the marketplace. One potential upstart launch vehicle owner expressed that the U.S. government is doing everything possible to keep us from being competitive; specifically the CSLA in its current form must be overhauled completely.

Another major roadblock concerned the need for seeking export licenses. Export licenses apparently are required even from U.S. launch vehicle owners launching U.S. payloads from the U.S. because insurance coverage is primarily available from foreign companies. Therefore, another class of spaceport customer to be recognized must include domestic insurance companies and financiers.

Current launch vehicle providers, on cost reimbursable government contracts, would see new competition at such national spaceports as counter-productive to keeping the market secured by just a few competitors for follow-on contracts. Competitiveness between spaceports, between various launch site operators at a spaceport, and between launch vehicle owners using a launch site operator would be a new marketplace for payload owners to seek much greater opportunity to lower costs. Current paradigms have been limited to enhancing launch vehicle technology to lower payload costs and have not seen the improvements necessary to significantly lower cost. Therefore, the focus should be on improving the spaceport efficiency.

While the demand for new launch vehicles is currently low, the demand for cost efficient and reliable launch site operations exists, but this cannot currently be satisfied in the U.S. The viability of military “U.S. Space Forces” to do their job is impacted by the limited choices for launch vehicle and launch site operators.

### **3.5 Historical Precedence from Other Modes of Transportation**

The organizational precedence for the establishment of national spaceports and the chartering of national spaceport authorities is provided by the wisdom of the founding fathers of the United States Constitution. A “Commerce Clause” within Article I of the Constitution provides congressional power to “regulate commerce with foreign nations and among the several states”.

In the 19<sup>th</sup> century, laws based on the Constitution assured “fair play” of railroads and other modes of conveyance and communication that extend across state borders. In the early 20<sup>th</sup> century, commerce laws expanded an interstate commerce commission’s ability to optimize utilization of treasured rail and water transportation.

In aviation, regulations to promote “fair play” and safety were initially issued by clubs in the United States and France. These club rules, replaced by municipal laws, were then followed by State and eventually Federal laws. These rules and laws pertained to control of pilot and aircraft qualifications, collision avoidance, and minimizing disturbance of the peace. The government became a transportation operator for the purposes of defense and a payload customer for the purposes of conveying the mail. The Federal government became a provider of airways and navigational aids across the country, however most airports remained private or local government property. The government continues to maintain “fair play” in access to airways.

Commerce laws have provided for the establishment of agencies such as the Interstate Commerce Commission. Therefore, the role of the Federal government to establish national spaceports; to charter national spaceport authorities; to regulate and assure safety; and to promote “fair play” is already well founded in existing precedence.

### **3.6 Assess Organizational Models**

State port authorities have been created as an organization to support the operation of seaports and airports. Traditionally chartered by “local” government, the objective of a port authority is to fulfill the “local” needs for marketing, finance, transportation throughput, and “local” return on the investment. Port authority organizational goals are to stimulate competitive “local” industries with minimal government involvement, provide efficient gate keeping for “fair play”, provide dependable infrastructure, streamline licensing, and provide realistic and fair fee structures.

In the case for national spaceport authorities, the United States Government, as the “local” government in a global space launch marketplace, seeks fulfillment of its National Will and return on the investment. The organizational model is to promote “fair play”, look after the interest of the National Will, assure public safety, and minimize bureaucratic hurdles and noncompetitive involvement. As seaport and airport authorities have successfully fulfilled these roles, a system of national spaceport authorities can likewise fulfill a similar role for managing spaceport operations in the national interest.

### **3.7 Organizational Attributes**

A primary role for this spaceport organization must be to facilitate the environment for one or more launch site operators to function safely, diversely, competitively. The organization should allow launch site operators to develop their own concept of operations. Each launch site operator should be accommodated to provide for as many launches per day as can be safely supported. This is in contrast to the current role of the government organization to define requirements for and contract launch site operators as required. Currently, if any “excess capacity” remains, independent launch site operators may then do business as permitted with the government striving to assure launch site operators conduct safe operations but not aggressively pursuing diversity and competitiveness amongst launch site operators.

A second role for the spaceport organization should be to promote fair play, that is, assuring the one or more launch site operators each have reasonably equitable opportunities to offer competitive scheduling and fees to launch vehicle owners. That is each of the one or more launch site operators may do business with one or more vehicle owners. The organization should promote opportunity for maximized throughput to enable various payload customers diverse and competitive launch opportunities. Customers may opt to discard the one pad-one vehicle type concept of today and configure as they see fit for launching multiple

vehicle types. With an organization allowing for payload customer access to multiple types of launch vehicles through multiple launch site operators co-existing at the spaceport, the spaceport's position in the marketplace will be strengthened with maximum throughput, capacity, flexibility, and responsiveness. In regards to promoting fair play, the spaceport organization should assure that the various launch site operators do not place excessive risk, to safety or to operational business resources, upon each other or to the public. In the current situation, by government defined validated requirements, each launch site is limited to support only one type of launch vehicle scheduling opportunities are limited by centralized control boards and government furnished range capability.

Another role for the spaceport organization should be to enable free market opportunities for multiple propellant suppliers, data communication-command-control, and other such site vendors to do business with launch vehicle and payload customers. Without compromising safety, the organization should strive to promote potential vendors to have access to spaceport launch site operator, launch vehicle owner, and payload customers. Every effort should be made to incorporate new technology, such as allowing competing wireless technologies to co-exist in reliable and secure modes. The vendors themselves, from the perspective of the spaceport organization, should be considered a class of spaceport customers as well, utilizing real estate, airwaves, and other spaceport resources. Presently, minimal effort is made to accommodate on-site business beyond winners of government contracts and spaceport technology is deployed as approved by centralized boards.

The spaceport organization must accommodate all modes of space transportation, not just launch. For re-usable launch vehicles, re-entry or return operations will be just as important as launch. Furthermore, operations such as refueling, servicing, and cargo handling may be critical for some spaceport customers. Innovative modes of transportation should be facilitated, such as: horizontal and vertical launches and landings, magnetic rail launches, sail landings, light and ion propulsion, air launches, and sea launches. The organization must accommodate free-thinking to support innovative customers in need of high risk flight test endeavors, being allowed to try, fail, learn, and try again without endangering the public or other customers. Current spaceport operational support focuses primarily on "day of launch" services (that is for vertical launches), with second thought to all other modes of the operation.

It is vital that the spaceport organization secures the needs of national defense as required. Such defense needs may include launch on call, secrecy, restricted access, and national resource protection. The organization must be cognizant and responsive to higher U.S. Government authority to appropriately execute National policies regarding commerce, science, and defense. The current organization places appropriate emphasis on the needs of national defense; however it has no deliberate design to support commerce and science while maintaining the support for defense.

Finally, the spaceport organization must have and be able to fulfill a National Will to compete in a global/universal marketplace. It must be intelligent to foresee the changing needs of a competitive marketplace, the changing needs of customers, and the changing and multi-faceted National Will and be technically competent to aggressively support those needs as they arise. It must be willing and premier to aggressively seek and retain business.

Attribute	Current Status	Vision
1. Facilitate the environment	The Government defines the required launch site operators and contractually develops the concept of operations. "Excess capacity" independent launch site operators may then do business only as permitted by the Government.	Each launch site operator should be accommodated to provide for as many launches per day as can be safely supported. As many launch site operators as possible.
2. Promote ongoing fair play	Scheduling opportunities are limited by centralized control boards and by limited Government-furnished range capability. Each launch site is limited to support only one type of launch vehicle.	Various launch site operators may each do business with one or more vehicle owners promote opportunity for maximized throughput Customers may opt to discard the one pad
3. Enable free market	Little effort is made to tolerate business beyond winners of government contracts. Technology exists as approved by centralized planning boards.	Without compromising safety, strive to promote potential vendors to have access to spaceport launch site operator, launch vehicle owner, and payload customers.
4. Accommodate all modes of space transportation	Vertical launches are the primary operation supported. Range assets are designed to support day of launch operations.	Innovative modes of transportation should be facilitated. The organization must accommodate free-thinking to support innovative customers.
5. Secure the needs of National defense	National defense needs are primarily supported.	Be cognizant and responsive to higher U.S. Government authority to appropriately execute National policies regarding commerce, science, and defense.
6. Fulfill a National Will	The "National Will" is not defined and competitive efforts are lacking.	Foresee the changing needs of a competitive marketplace, of customers, and the multi-faceted National Will, be technically competent to aggressively support those needs as they arise.

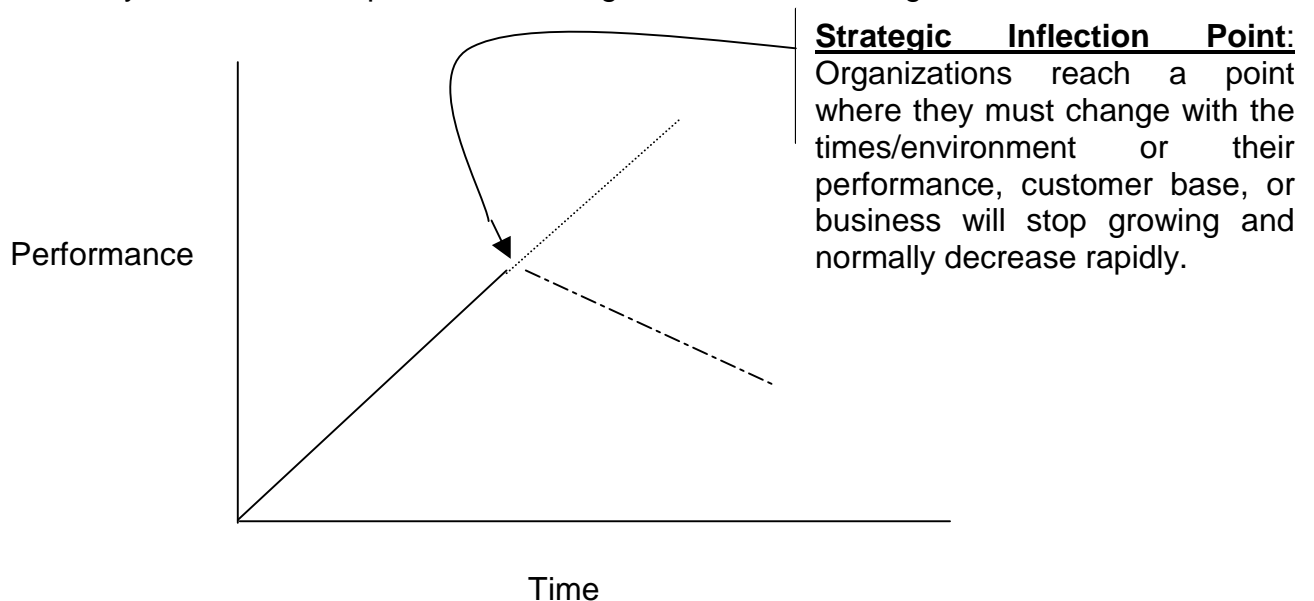
## 4. Requirements Process: A Revolutionary Path to Premier Customer Service

### 4.1 Introduction

How efficiently, effectively, and economically the Florida spaceport can meet commercial and government customer requirements may determine the likelihood that the spaceport can survive. One of the most significant keys for survival is for the spaceport to become passionate about customer service. Such a passion would represent a difference from the technology focus of the past. The engine for this difference must be a new philosophy; the fuel must be passionate customer service; and the cargo will be all who have a vested interest in the success of Florida spaceport.

When a passion for customer service permeates every aspect of the spaceport that is when customer expectations will be met and exceeded and the spaceport will flourish. What this will require is a drastic move away from a launch base that provides, plans, and procures only for existing launch and payload customers. Such a move would result in a spaceport more generally able to focus on attracting, planning, and providing for new customers as well serving its existing ones.

But more than just differences in focus, many believe the Range needs a difference in its very essence. A JD Powers & Associates study determined that every organization reaches a point in its existence where it must be different. The study referred to that point as a Strategic Inflection Point, Figure 4-1.



**Figure 4-1 Strategic Inflection Point**

Today's Range, despite its proud history of unmatched technical performance, may have reached a strategic inflection point. One of the major questions at this strategic point is: "Will the spaceport become a commercial market place or remain a government institution?" Both are customers of today and the future. A commercial marketplace can serve government needs, but a government-controlled spaceport will never move fast enough to keep pace with the forces of the free enterprise system. More importantly, a spaceport controlled by the government will not have incentive to become passionate about the service it provides customers.

A move to a free enterprise model for the spaceport of tomorrow has long been called for by the private sector and is now gaining widespread favor within Government circles. The United States Space Commission in January of 2001 noted in the Rumsfeld report that the US needed to:

*"Develop a strategy for relying more on commercial launch facilities, towards the goal of largely privatizing the national launch infrastructure."*

The Office of Science and Technology Policy study on "Future Management and Use of the US Space Launch Bases and Ranges" completed by the White House Inter-Agency Working Group found:

*"U.S. commercial space launches enhance national security by lowering costs and improving reliability..."*

Even if the spaceport has reached this critical juncture it's not too late to make differences. The JD Powers study also determined the three things necessary for an organization to evolve towards a customer focused organization:

- Drive performance beyond "quality" to customer satisfaction
  - Not just doing things right but doing the right thing
- Realize not all customers have the same set of expectations
  - Don't standardize your customers
- Be prepared to face internal challenges
  - Many of the obstacles to making a difference are ourselves

If the move can be made toward a free-enterprise spaceport, where the government owns and operates only those services that are required for public safety, are commercially not economically viable, and is imbued with a passionate customer service philosophy, then there's reason for optimism. The following sections highlight areas for improvement and a rationale for difference.

#### **4.2 The Castle Complex-----Mission Focus: Organization**

The current Range's prestigious reputation was built by ensuring the necessary technologies, people, and programs were in place to support specific programs and not on customer service. Some attention has been given to customer service, but typically, the customers were expected to adjust to life at the Range. The result, as seen in Phase I of this study, is a difficult place for a customer to do business. On the other hand, if a customer can find the way through the labyrinth of Range requirements and processes, it can get their needs met. It's almost as if the Range exists philosophically in a castle and if you can get its attention it will respond. This is not a criticism of the current Range's attitude. Rather, it is an observation that in essence the current Range structures is self-centered rather than customer centered.

Recent initiatives like the establishment of the JX "front door" might be a harbinger of progress. What is needed is for the Range to continue to move out of its castle and to tear down the walls philosophically. When the customer is king, the requirements processes will be simplified, the responses more accommodating, and the required timelines significantly shorter. Then the castle complex will no longer be a valid analogy for the Range. While there are real costs involved in changing this focus, they will be offset by an increased customer base.

#### **4.3 Access not Excess-----Mission Focus: Legislation**

The biggest single philosophical issue threatening the spaceport of tomorrow is the current government philosophy of providing the private sector with launch opportunities, launch services, and launch property on an "excess capacity" basis. This means that commercial firms, especially those without government contracts, have little or no access to Range facilities, land, and services. When excess capacity is available, it exists only because the government deems it available. At any time, that capacity can be withdrawn. Therefore, commercial requirements cannot be a part of the long term planning on the current Range. Clearly, this is not a business practice conducive to the growth of new customers at the spaceport.

Legislation has been proposed in Congress to remedy this disparity. This legislation recognizes the importance of the commercial customer and calls for "equal access" to launch opportunities, services, and lands. If enacted, this would place the spaceport in a position to begin planning for, and meeting, commercial customer needs. Among other things, Range upgrades when they are being planned would be driven by customer requirements.

#### **4.4 Beyond the Front Door-----Mission Focus: Organization**

Clearly, the establishment of the JX single point for customer service is a move in the right direction because it promises to focus on customer service. As one can see however, from the Phase I systems requirements flow chart this front door leads to a very involved and confusing process of processes. Each of these

processes has its own single point of contact, its own requirements, costs and its own time, required to navigate. The front door analogy paints a picture of the Range waiting for customers to knock on the door with their requirements, which is self-centered rather than customer centered.

Instead of a front door, the spaceport of the future should be knocking down barriers and rolling out the red carpet rather than waiting for customers. Instead of providing a path for customers to find their way through the range to launch, the spaceport of tomorrow needs to be finding potential customers. While some functions like range safety try to get involved early in the design process, the Range itself is not fully committed to establishing an early presence with the customer. This interface would enable potential customers to make design decisions facilitating launching from the spaceport. For example, if the spaceport of tomorrow requires GPS capability on all launch vehicle flight termination systems, it makes sense to ensure potential customers are aware of this as they are making design decisions rather than when they show up wanting to launch. This early interaction is the only solution to the chicken or egg question of whether, and when, the range or launch vehicle designs should change to take advantage of new technologies. A web based customer service center can help get the word out early to potential customers.

This early interface may also include the pre-qualification of launch systems, and payloads rather than waiting for them to apply to launch from the spaceport. Although this accelerated process may look more expensive on the surface, it's bound to result in more and happier customers. This should reduce the timelines of the current spaceport processes significantly.

#### **4.5 Neither a Lender nor a Licensor be-----Mission Focus: Economics**

In the philosophically different world of the spaceport of tomorrow, where the customer is king, the way customers are granted the right to use spaceport facilities should be made different. Particularly onerous to current customers is the present practice of licensing facilities for use by a commercial entity. Such an arrangement fails to provide customers the necessary assurance of exclusive use and availability. Long-term leases should be the normal way to allocate spaceport resources.

Flexibility to accommodate customer requests in leasing facilities must reside local to the Cape and must be able to be processed expeditiously. Phase I of this study found that such requests require Air Staff approval and can require up to three years to process. Commercial customers shouldn't be expected to adhere to any aesthetic building standards more stringent than local building and safety codes.

#### **4.6 Environmental Clean Up and Liability-----Mission Focus Legislation, Economics**

Currently launch providers bear the costs, and liability of environmental cleanup in any new work, or environmental mishap, that disturbs contaminated land. Putting such a burden on a commercial customer is counter-productive to attracting new business and may preclude private use of such land. In the spaceport of tomorrow the United States Government should, through the Super Fund Cleanup Bill or some other mechanism, retain the great majority of the financial and legal liability to restore the contaminated lands. Furthermore, in anticipation of customer requirements, the government should begin cleanup efforts to restore desirable launch, and processing areas to the extent practical back to an environmentally sound condition.

#### **4.7 Spaceport Pricing and Services-----Mission Focus: Economics**

The current pricing/cost system on the Range puts the majority of the financial risk on the spaceport customer and little on spaceport service provider. Additionally, little or no insight is provided the customer as to the accuracy of charges placed against their programs. Range service providers, without prior authorization/verification of exact amount, can claim charges for services rendered and withdraw monies deposited by the customers in Job Order Numbers (JON). Because of the complexity of the JON system and the difficulty involved in tracking individual charges, mischarges are difficult to prevent, detect, and resolve. For smaller companies, this additional accounting burden may be a barrier to operating on the spaceport.

In order to attract customers, the spaceport of the future should provide a web-based catalog of fixed priced costs for its services. Work to develop such a catalog is already underway and should be prioritized. Only spaceport services necessary for public safety should be "required" of the commercial customer. Those services that the spaceport can provide efficiently and economically will be in demand by the customers. Those services that do not attract customers will wither.

The exception to this free enterprise model should be the spaceport instrumentation, telemetry, and tracking systems. In order to attract customers to the spaceport the government should build, own, and operate (through commercial vendors) these systems similarly to FAA and airport safety/communications equipment. Built smartly, these will indeed prove to be cost effective. However, even if government subsidies are required, this is the right area for that to happen. Such a subsidy, while clearly in the best interests of the Government maintaining "assured access to space" for national interests, may well prove to be controversial to other purely commercial spaceports unless the government can offer them subsidies as well.

#### **4.8 Ground Safety Oversight -----Mission Focus: Organization, Legislation**

Currently government safety oversight at the Range falls into two basic areas – ground safety and flight safety. While everyone would agree that protecting the American population from an errant incoming rocket is a Government function (a.k.a. FAA), few believe that extensive Government safety oversight of ground operations is required. Ground operations at research facilities and industrial sites are under the jurisdiction of OSHA. The contractors performing these activities understand the OSHA requirements and OSHA is the “punishing” body if its laws are not followed. The spaceport government safety organization can not financially penalize non-conformance and yet operations cannot commence without their okay.

As an example of the inconsistencies, there is little government safety oversight at the industrial sites that produce the highly explosive propellants used by boosters and spacecraft. There is little government oversight of the transportation of these propellants to the spaceport. But, once these propellants enter the gates of the spaceport a horde of government safety professionals descends upon them and scrutinizes every move they make, every facility they occupy, and every process that involves them.

The government’s first attempt to ease out of the ground safety game comes with the EELV launch infrastructure. Both Boeing and Lockheed-Martin have “Safety Control Authority (SCA)” for their respective infrastructures. However, both probably would say that the government’s “insight” into their operations is still intrusive and excessive.

Bottom line is that the ground safety oversight at the spaceport is excessive – both greater than other research/industrial sites and other Air Force installations. This excessiveness can cause greater cost, decreased launch rates, and loss of potential business.

## 4.9 Attributes

Attribute	As Is	Will Be	Should Be	Vision
1. Spaceport Focus	Technology, process focused	Growing interest in commercial sector	Passionate about customer service	Technology, Economics, Legislation
2. Spaceport Control	Government controlled	Some commercial processes but still self-centered	Free enterprise model, Government provides TT&C ala airports. Commercial vendors supply the rest	Economics, Legislation
3. Spaceport Services	Plans, procures only for current customers. Commercial customers restricted to "excess" capacity	Legislation pending to address disparity Other commercial spaceports could be expected to claim disadvantage	Commercial access to services, launch opportunities, and launch property	Legislation, Economics
4. Spaceport Customer Support	Labyrinth of processes, unwieldy, processes of processes	Creation of JX "Front Door" a beginning	Beyond the Front Door. Early interface with potential customers. Pre qual of launch vehicles	Customer Service
5. Spaceport Licensing	Licensing preferred. No changes apparent by Spaceport. No guarantee to customer of exclusive use or availability	No changes apparent	Long-term leases should be the normal way. Flexibility built to accommodate customer needs	Legislation
6. Spaceport Environmental Cleanup and Liability	Launch providers bear cost and liability of required cleanups	No changes apparent	Government should retain responsibility and liability for cleanup	Legislation
7. Spaceport Pricing & Services	JON system puts majority of financial risk on customers	Some efforts towards fixed price, web based system. No apparent change to JON system	Web based, fixed price services by commercial vendors	Economics
8. Spaceport Ground Safety Oversight	Much more oversight than industry or other R&D centers	EELV contractors given Safety Control Authority, but Government oversight still significant	Rely on OSHA regulations, laws, and certifications	Legislation

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## 5. Spaceport Technical Capability

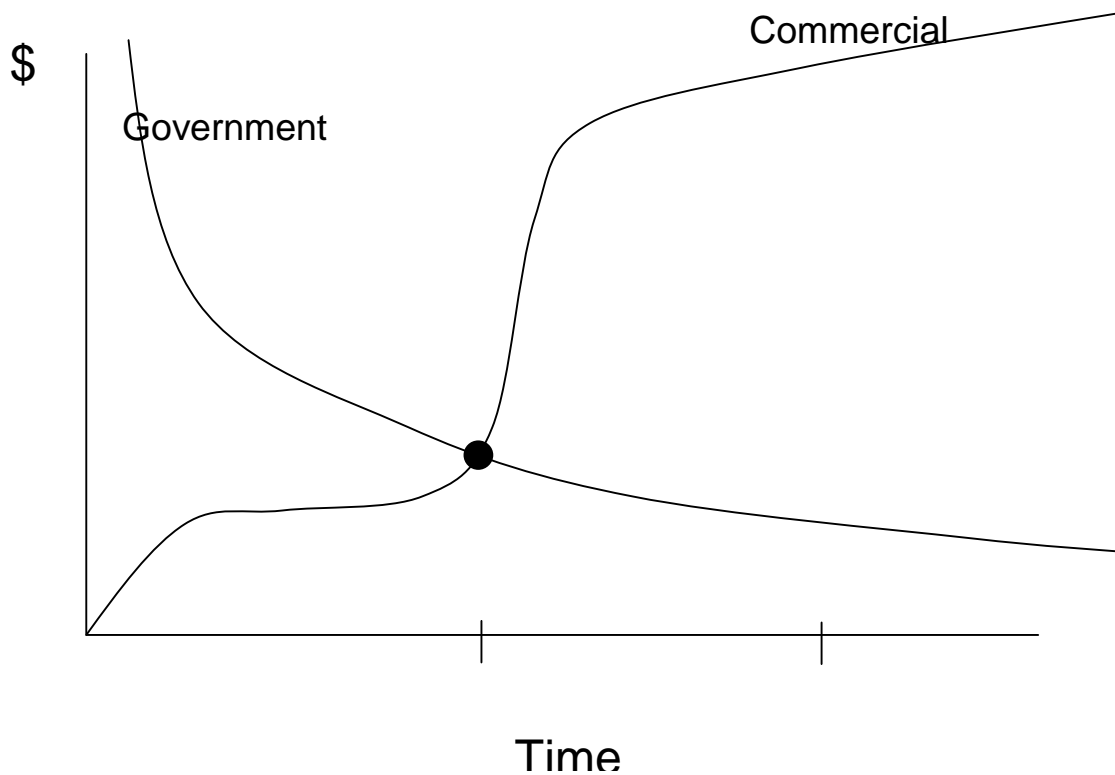
### 5.1 Introduction

Spaceport technical capabilities and support processes will require leapfrog evolution from the existing pterodactyl-like approach at the Eastern Range to transform into the majestic eagle, Canaveral National Spaceport. Technology enhancements/innovation will be fundamental to the birth of Canaveral National Spaceport. The leapfrog evolution to Canaveral National Spaceport is one that commercializes spaceport functions that have traditionally been performed by the government owned range. This free market model (i.e. the freedom to acquire needed technical support from the private sector) promotes economic growth, competition, and technical innovation and, ultimately, better/more cost-effective Customer Service.

The nature of required technical support services, who will provide them and how they will be paid for is the subject of this section; however, successful leapfrog evolution will require a path opened by visionary policy, customer-oriented organization, market-driven economics, and technology innovation.

The Canaveral National Spaceport will require some of the same, and some new technologies, to meet the evolving demands of future launch vehicles and payloads. The vision of Canaveral National Spaceport, from a technical capability viewpoint, is that the spaceport will accommodate multiple launch site operators. Using this approach, many services and functions will be negotiated by the launch provider and payload owner for such services and functions. Certain safety and regulatory requirements (see [Policy section](#)) must be met by any contracted service/function provider or government capability. The vision calls for a demarcation in the responsibility of infrastructure; the spaceport will provide those required for safety by national regulatory bodies and any interfaces to community infrastructure (e.g. power companies).

Figure 5-1 depicts the inflection point in government subsidization of spaceport technical capabilities. This point corresponds to the level of funding that is necessary to provide those “safety - related”, generic services that are analogous to the FAA provided systems for the National Airspace System (NAS). Some examples of FAA funded equipment include the TRACON and en-route tracking systems for NAS. Similarly, tracking for safety and flight management decision support will be their responsibility.



**Figure 5-1 Technical Services – Who Pays?**

## **5.2 Spaceport Infrastructure: Uncle Sam Wants You... To Have**

Spaceport infrastructure/technical services are an area that is almost completely provided by the government currently. The evolution of Canaveral National Spaceport will minimize government-subsidization and maximize the commercial enterprise roles and functions. This section outlines the responsibilities of the government within the Canaveral National Spaceport vision relative to major spaceport infrastructure elements. Additionally, a distinction is made between government (FAA) and quasi-government (spaceport authority) responsibilities.

### **5.2.1 Operations Scheduling**

A key infrastructure element the government and quasi-government will provide is the scheduling of launch and return operations. In conjunction with the flight-planning aspects of this activity is the scheduling of shared-use facilities, instrumentation, and services.

Scheduling launch and return operations is a flight planning function that requires safety analysis and potentially third party conflict resolution. These analyses/resolutions are currently conducted by the government, and will remain so in the future; however; the government in this case is the FAA rather than the Air Force. The spaceport authority will conduct scheduling of shared-use facilities, instrumentation, and services.

In order for these planning activities to be done in the most cost-effective and equitable manner, *technology innovations in the areas of automation and dynamic scheduling* must be integrated into both the FAA and spaceport authority activities.

### 5.2.2 Traffic and Flight Management

Traffic and Flight Management will be a key focus even as the government becomes less involved, . The following are tasks the government (read FAA) will provide:

- Vehicle-related launch, flight, landing and ground operations monitor and control
- Ascent/Reentry flight safety monitor and control
- Regulating associated hazardous ground operations
- Coordinating Flight Plans - Arrivals and departures will need to be coordinated with the following offices:
  - National airspace traffic management office
  - Seaway management (potentially)
  - Spaceport fire/rescue/medical
  - Spaceport crew/controllers
  - Contingency landing site personnel



**Figure 5-2 Future Flight Traffic**

### 5.2.3 Technical Services/Functions

The government/quasi-government will be responsible for particular services and functions that are in the interest of public safety; that promote fair play at the spaceport; and that are marketable to and generically required by the Canaveral National Spaceport customers.

#### 5.2.3.1 Meteorological Support

The spaceport authority will provide weather advisories for launch, landing, and ground operations. Launch site operators, launch providers, and payload companies will have access to this information and data at a competitive and standard rate.

#### 5.2.3.2 Tracking/Communication

The FAA will be responsible for the tracking/communication services that are required to satisfy mandatory safety and flight management activities. *GPS-based position tracking* is being advocated as the future “norm” for the aviation industry. Likewise, the Canaveral National Spaceport needs to embrace this technology.

#### 5.2.3.3 Emergency Services

These may be provided by the local community; however, the spaceport authority will have the responsibility to provide emergency services to all customers for a standard fee. Emergency services will be provided as necessary under the safety and regulatory requirements. These will be the minimum required. Launch providers and satellite owners/deployers will acquire any additional emergency services from commercial entities.

#### 5.2.3.4 Security

The spaceport authority will provide physical security. *Again, automation is the key to a cost-effective solution in this area.*

Additionally, a minimum level of communication security for proprietary/classified data will be available. These services will be individually procured except for spaceport owned resources.

### 5.2.4 Spaceport Infrastructure

The spaceport authority will provide access to power, roadways, railways, airways, and seaways within the Canaveral National Spaceport “gates”.

## 5.3 Customer Infrastructure Services/Functions: An Acquired Taste

Acquired infrastructure services/functions include those that the launch site operator, launch provider or satellite owner/deployer will contract from commercial entities. Commercial acquisition of the following services allows quick customization to customer requirements in a competitive and innovative market.

### 5.3.1 Data /Instrumentation

Launch vehicle and spacecraft tracking (that not required by FAA) and data networking can be acquired from commercial companies.

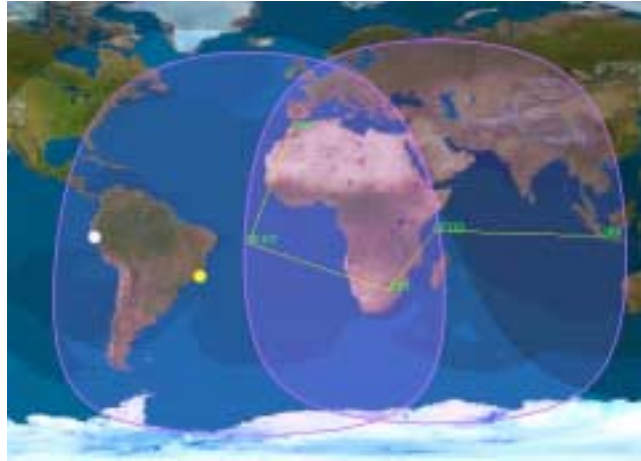
### 5.3.2 Timing

Customers will provide their own timing, or it may be provided as a spaceport infrastructure service (all other commercial spaceports give users the option).

### 5.3.3 Communication

Ground/flight vehicle inter-communications systems management and control will be acquired, Figure 5-3.

The launch provider or satellite owner will have several competitive options such as commercially available ground systems and/or time lease of orbiting tracking assets such as a TDRSS type system.



**Figure 5-3 Communication Connectivity**

### 5.3.4 Maintenance

Storage facilities or hangars (for RLVs) will be acquired, owned, or leased from commercial providers located either at the Canaveral National Spaceport as launch site operators or separately from the spaceport. The spaceport will encourage, via local petitioning, community infrastructure in the areas of transportation (i.e. roadways, railways, airways, and seaways) to ensure access to the spaceport launch or return complexes.

### 5.4 Mixed Bag

Within the launch vehicle and payload processing area, the Canaveral National Spaceport will have a mixed model of responsibility and cost allocation. In the area of mandatory responsibility, the following services, as regulated by the FAA, are within the purview of the spaceport authority:

- Propellant storage and handling
- High pressure gases
- Toxic liquid spill handling/control

These services will have publicized fee schedules, similar to those provided by airport authorities for similar services.

Facilities and services associated with launch vehicle and payload assembly will be a mixed model as outlined in the following sections.

## 5.4.1 Launch Vehicle Assembly Area

### 5.4.1.1 Introduction

The type of launch vehicle assembly area that is required will be highly dependent on the type of launch vehicle it is. Traditional launchers (or some derivation thereof) will require assembly areas similar to what is currently used. The methods for performing this task, however, may be different. (e.g. modular/self-contained components from the factory. )

Additionally, the launch vehicle may be reusable and require different capabilities and techniques. For instance, one reusable launch vehicle (RLV) may be fully contained except for refueling, checkout, and turnaround functions, a space plane if you will. Or, the RLV could be a two-stage vehicle or one that requires launch assist mechanisms. In these cases, vehicle assembly will take on different characteristics. An example, placing a launcher on the back of a catapult or rocket sled. The future holds a variety of requirements that we cannot accommodate under the current technical capabilities at the spaceport.

### 5.4.1.2 Canaveral National Spaceport Vision

Adhering to the free market model, the Canaveral National Spaceport vision for the launch vehicle assembly area is that for multiple flight customers (analogous to an airline), the launch vehicle organization will provide the assembly area and associated services at Canaveral National Spaceport via a contract with a local firm. They may even contract the A&E for the facilities through the spaceport authority, and furnish the services themselves.

Still mindful of the free market model, it is envisioned that a Launch Site Operator (note: this may initially be the spaceport authority itself) will have a generic launch vehicle assembly area that may be leased by less frequent users. This concept is analogous to what goes on at airports today. For example, there are 83 airlines that fly in/out of Orlando International Airport. Only a few of those have “dedicated” terminals. The rest simply pay a fee (a standard/negotiated fee) to the Airport Authority.

## 5.4.2 Payload and Cargo Processing

### 5.4.2.1 Introduction

The facilities associated with payload/cargo processing may be categorized the following way:

- *Offline Processing for High Volume/High Deployments.* This spaceport customer category is typically characterized by high volume, standard payloads, typically for commercial ventures, and would most likely be processed through a commercial payload facility (e.g. Astrotech).

- *Offline Processing for Upper Stage Elements.* For those missions that require an upper stage to reach orbit.
- *Offline Processing for Space Logistics.* (e.g. the MPLM (Multi-Purpose Logistics Module) and its processing through the Space Station Processing Facility (SSPF).
- *Offline Processing for Low Volume, Customized Payload Deployments.* This spaceport customer category is typically characterized by custom, unique payloads that are usually for scientific and military missions. (e.g. the Hubble Space Telescope as processed through the Vertical Payload Facility)
- *Offline Processing for Personnel/Passenger Accommodations.* State-of-the-art operations involving crewed payloads. System throughput performance factors are major business parameters.

#### 5.4.2.2 Canaveral National Spaceport Vision

The facilities for spacecraft processing will be acquired by the launch vehicle organization, the satellite owner/deployer, or a combination of both. These facilities will most likely be leased from a Launch Site Operator, the spaceport authority, or a commercial processing facility (e.g. Astrotech). High volume customers may contract with the spaceport authority to build their own facilities.

## 5.5 Attributes

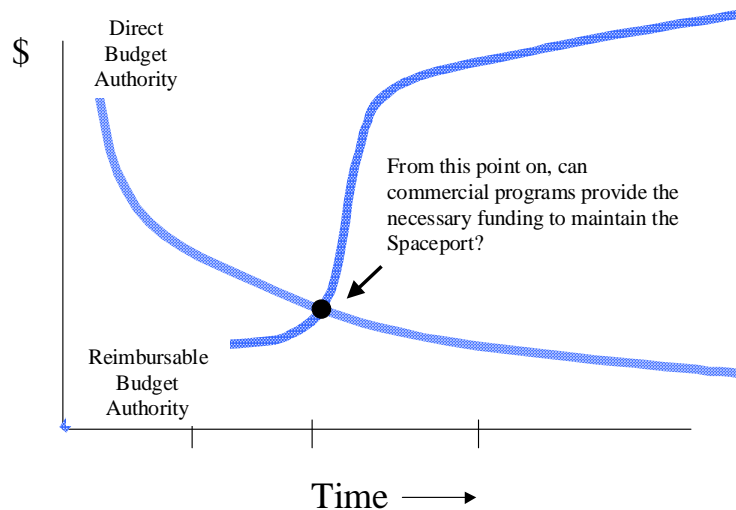
The following table summarizes the major drivers to reach the Canaveral National Spaceport vision in the area of spaceport technical capabilities. It only addresses those areas that have specific innovation actions that need to be taken. Refer to the previous subsections for discussion on other technical capability areas.

<b>Attribute</b>	<b>Current Status</b>	<b>Vision</b>
1. Operations Scheduling – Spaceport facilities and services	Air Force controlled – multiple “hoops” – limited equality	Spaceport authority – highly equitable. Requires implementation of automated, dynamic scheduling capability.
2. Operations Scheduling – Flow control/flight planning	Air Force controlled – mission success and safety analysis intermingled and very costly	FAA – analyze only where required by regulation. Requires standard procedures/tools.
3. Meteorological Support	Air Force provided – hidden cost	Spaceport authority will provide standard weather advisories as part of fixed fee structure. Requires maximum use of World Met Office will be employed
4. Tracking/ Communication	Air Force provided – hidden cost	FAA will provide instrumentation and communication infrastructure only for that tracking/communication that is required for safety/flow control. Requires innovation: GPS-based position tracking
5. Security	Air Force provided – hidden cost and manpower intensive.	Spaceport authority provided. Requires automation to be cost effective
6. “Other” Capabilities Data/Instrumentation Timing Communications Maintenance Facilities Launch Vehicle Processing Payload Processing	Air Force provided/controlled/billed	Customer acquired

## 6. Financial & Cost Structure

### 6.0 Introduction

The Appendix A of this report gives the history/current status of the factors that influence costs. Because of this history and because there was no evidence of active marketing of the spaceport pricing/cost, a short write-up on the pricing and marketing starts this section (subheadings 6.1 through 6.1.4.6). This “active” marketing of the spaceport is necessary if the goal depicted on the following chart is to be met, Figure 6-1.



**Figure 6-1 Spaceport Funding: Direct to Reimbursable Budget Authority**

### 6.1 Proposed Actions/Differences

The following differences are recommended for Canaveral National Spaceport:

According to a paper titled The Major Range and Test Facility Base (MRTFB) and the Commercial Charge Policy submitted by Janette M. Moyer, Institute for Defense Analyses for the Director, Test, Systems Engineering and Evaluation Office of the Under Secretary of Defense (Acquisition and Technology), in 1994 Congress initiated the commercial charge policy legislation that would decrease the cost of doing business at the MRTFB (CCAFS) for commercial entities. Public Law 103-160, the Defense Authorization Act, Section 846, amended Title 10 of the U.S. Code to add Section 2681, "Use of test and evaluation installations by commercial entities." This policy was viewed as a means to sustain the test and evaluation facilities with increased workload and reimbursements, and help U.S. private industry at the same time. In that law, Congress stated that "The Secretary of Defense may enter into contracts with commercial entities that desire to conduct commercial test and evaluation activities at the Major Range and Test Facility Installation."

New rules and guidelines for commercial users of the MRTFB were established under this law. It would encourage U.S. commercial use of U.S. test and evaluation installations by making the charges for range services to commercial users more favorable. The law allows the Secretary of Defense to enter in to contracts with a commercial entity to use the MRTFB (CCAFS) and to reimburse the DoD for all direct costs that are associated with the tests being conducted by the commercial entity. In addition, the contract could include a provision that requires the commercial entity to reimburse DoD for indirect costs related to the use of the MRTFB (CCAFS) that the Secretary of Defense deems appropriate.

The public law governing the commercial charge policy states: "A contract entered into under subsection (a) shall contain a provision that the Secretary of Defense may terminate, prohibit or suspend immediately any commercial test or evaluation activity under the contract if the Secretary of Defense certifies in writing that the test and evaluation activity is or would be detrimental to the public health and safety, to property (either public or private), or to any national security interest or foreign policy interest of the United States."

In a change to the charge policy in DoD Directive 3200.11. On November 7, 1994, the Deputy Secretary of Defense amended the previous uniform funding policy for commercial users and non-DoD government users of the MRTFB. Concurrently, the Under Secretary of Defense (Acquisition and Technology) sent a memorandum to the Secretaries of the Military Departments and the Assistant Secretary of Defense for C3I, outlining the guidance for implementation of the policy with the following stipulations:

- The MRTFB (CCAFS) installations cannot compete with private industry for business. See Appendix A for exact quote from DoDD 3200.11
- Commercial customers must be charged direct costs and, in addition, may be charged indirect costs. The amount of indirect costs to be charged will be determined by the commander of the MRTFB (CCAFS) activity.
- MRTFB (CCAFS) installations will not receive additional institutional funding as a result of this policy difference.
- Facilities cannot be retained primarily for the use of non-DoD users.
- Commercial tests are not to interfere with DoD tests.
- Private industry users must be U.S. commercial entities.
- The reduced charges to U.S. private industry is extended to all non-DoD government users, including state and local governments.

To implement the congressional direction for reducing the cost to commercial users at the MRTFB (CCAFS), the Test and Evaluation (T&E) Executive Agent Board of Directors, in conjunction with the Director for Test, Systems Engineering and Evaluation, developed implementation guidance. In November 1994, the guidance was approved by the Under Secretary of Defense (Acquisition and Technology) and the Deputy Secretary of Defense.

The Government needs Public Law 103-160, the Defense Authorization Act, Section 846, Title 10 of the U.S. Code, Section 2681, "Use of test and evaluation installations by commercial entities" to be different to allow the spaceport to compete with private industry for business.

1. Conduct in-depth pricing comparison of major competitors.
2. According to the results of interviews with potential and existing customers, the spaceport needs to develop a customer-sensitive pricing strategy and value proposition. Implement a profit motive and negotiate prices with customers based on their need for spaceport services.
3. Communicate positively the value of services to customers and employees. Let the customers and employees know what they are getting for their money.
4. Track plan progress against customer retention goals. Track pricing data and implement an earned value reporting system.
5. Proactively communicate with current and prospective customers. Communicate pricing information openly and before the customer has to request it. Develop new methods to speed up the paying for services and receiving payment of services rendered.
6. Assign senior executives to build personal relationships with customer CEOs and presidents.

### 6.3 Attributes

The following attribute chart summarizes where the spaceport is in relation to finance and costing (pricing).

Attribute	Current	Vision	Focus
1. Public Law 103-160, the Defense Authorization Act, Section 846, amended Title 10 of the U.S. Code to add Section 2681, Use of test & evaluation installations by commercial entities.	Implementation guidance on the congressional direction for reducing the cost to commercial users, was approved in November 1994 by the Under Secretary of Defense (Acquisition and Technology) & the Deputy Secretary of Defense	To implement these commercial programs, the 45SW/XP is developing a document described as the Range Catalog of Costs. Two major factors contribute to the new capability of the 45 <sup>th</sup> Space Wing to develop a catalogue of range costs.	Conduct in-depth pricing comparison of major competitors to determine best pricing strategies.
2. The MRTFB (CCAFS) installations cannot compete with private industry for business.	<u>Department of Defense Directive 3200.11 (DoDD 3200.11), Major Range &amp; Test Facility Base</u> , declared the MRTFB to be a "national asset which is operated & maintained primarily for the Department of Defense test & evaluation support missions, but also to be made available for all users having a valid requirement for its capabilities."	Paragraph 3.1.3 of DoDD 3200.11, states that "MRTFB commanders are to ensure that they are not competing with US private industry in providing services to commercial users or non-DoD Government users."	The Government needs Public Law 103-160, the Defense Authorization Act, Section 846, Title 10 of the U.S. Code, Section 2681, "Use of test and evaluation installations by commercial entities" to be different to allow the spaceport to compete with private industry for business.
3. Commercial customers must be charged direct costs and, in addition, may be charged indirect costs.	The Service Secretaries & the Assistant Secretary of Defense, C3I for the Joint Interoperability Test Center delegated, in many cases, to the local MRTFB installation level the authority to determine the appropriateness of the amount of the indirect costs included in a contract.	Spaceport activities use the Job Order Cost Accounting System (JOCAS) to identify all costs of services provided to customers and bills for the allowable (reimbursable costs) through the billing process.	According to the results of interviews with potential and existing customers, the spaceport needs to implement a profit motive and negotiate prices with customers based on their need for spaceport services
4. Facilities cannot be retained primarily for the use of non-DoD users. Commercial tests are not to interfere with DoD tests. Private industry users must be U.S. commercial entities and the reduced charges to U.S. private industry is extended to all non-DoD Gov't users.	Paragraph 3.1.3 of DoDD 3200.11 states that "The use of MRTFB facilities by private organizations & commercial enterprises shall not increase the cost to the Department to operate the MRTFBs & shall not be factored into the decision-making process for sizing and maintaining the T&E infrastructure."	The 45 SW Policy for Commercial Launch/Range Customers on Sources of Base Support, Dated 14 June 2000 is based on regulation and congressional law. It directly applies to companies and other non-federal entities seeking to obtain/procure base support from the 45 <sup>th</sup> Space Wing in support of their activities at CCAFS.	Seek legislative action that will allow the spaceport to compete with private industry for business.

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## 7. Summary

Canaveral National Spaceport will follow the free market model; will be a spaceport not a range; and will be *the* spaceport that provides premier customer service. With this focus, a set of visionary legislation, economic models, organization, and infusion of technology will leapfrog the Eastern Range to be the Canaveral National Spaceport.

The creation of a dedicated spaceport authority is a simple concept and one that has considerable precedent. It is in keeping both with the history of federal Government involvement in industrial and transportation development and at the same time fits the current preference to avoid subsidization and adding more government bureaucracies. Implementation will be challenging but equally straightforward.

The first step is to implement this concept is to design the necessary organization on paper. The possibilities for a Government Owned/Commercially Operated (GOCO) organization versus other options would be investigated as well, probably by examining the organizational structures of comparable organizations. For example, the TVA, the Washington Airports Authority, and the Savannah River Plant (a DOE GOCO organization) would be studied to determine pros and cons of various structures.

The next step is to create proposed legislative documents, one for the U.S. Congress and one for the Florida Legislature.

Next, the concept of the spaceport would be “advertised” through the usual means; articles in newspapers and trade publications and meetings with appropriate agency and legislative leaders. A panel session of the next Space Congress would address the concept from various perspectives. The House and Senate Science and Technology and Armed Services Committees would be encouraged to study the concept and report on it. The concept would be tied to the Rumsfeld Commission recommendations, which have been well received by both Congress and the Bush Administration.

Once the concept was advanced, the organizational study would be brought forth, and would have the huge advantage of providing a starting structure, that very likely would be accepted as at least the initial definition.

The final step would be the actual development of legislation, probably as a part of a revised Commercial Space Launch Act. This would, of necessity, address National priorities as well as Canaveral National Spaceport.

While progress has been made in moving the spaceport towards the free enterprise model characterized by a passion for customer service much is left to be done. The following chart summarizes the key attributes addressed in the

chapter, where the spaceport of today is, where it's moving, and where it needs to go in order to flourish.

The biggest single hurdle to improving access to space for the commercial sector is the current government philosophy of providing the private sector with launch opportunities, services, and property only on an "excess capacity" basis. Because of this restriction, commercial requirements cannot be a part of the long term planning of the Range. Until this is made different, customer service is only a dream.

## **8. Conclusion**

### **8.1 Issues**

The concept described in this report is a viable concept that offers the potential to greatly improve the focus, organization, attractiveness to customers, and ultimately the capabilities of Canaveral National Spaceport. However, many details still must be worked out and key questions remain. These include:

Will the Air Force actually operate and maintain any launch complexes or will all such services be provided as "overhead" on launch service-style contracts? This issue will alter how the Air Force perceives the spaceport authority. What is the proper role of the Spaceport Florida Authority? In the past, SFA has found itself filling in areas where NASA and the Air Force chose not to support, such as the creation of a small ELV capability at SLC-46. A properly managed spaceport authority will handle such requirements as part of its mission, so presumably such special programs will not be required. Obviously, SFA will be the primary manager of State of Florida investments, but the question remains as to what those investments will be and what philosophy will be followed in making them.

How will the spaceport interface with national organizations? While the use of a Board of Directors will ensure the spaceport's ability to operate effectively in either the current or any future Federal organizational structure – it will only be necessary to add or subtract members from the Board – is there a better way for the spaceport to relate to a new national space structure, such as might be associated with a new DoD agency, a U.S Space Force or even a new Federal Department of Space? Large customers, such as Boeing, have stated to us that spaceport policies are a national problem, and fixing the situation at the Cape will only address part of their concerns.

The DoD Major Range and Test Facility Base (MRTFB) operates under a set of rules that specifically designed to ensure that the elements of the MRTFB charge one another in a standard, fair, and predictable manner. If a separate authority is created, will these rules still apply?

How will the other states react to the creation of the Canaveral National Spaceport Authority? While the Authority will not require an increase in the Federal investment in Cape Canaveral - and in fact intrinsic in its creation is the goal of substantially reducing such Federal subsidy - the National Coalition of Spaceport States and others seeking their own spaceports (most notably, California) may react negatively to such Federal endorsement and enabling of what they may regard as Florida's capabilities.

How will procurement of new range capabilities be accomplished? For the Canaveral National Spaceport Authority to have its own engineering and procurement capabilities would represent a significant expansion of its capabilities over simply an operating authority. On the other hand, the comparatively short history of range upgrade procurements managed by a separate SPO is not a happy one. The Air Force and NASA possess significant R&D capabilities, valuable expertise, and systems procurement skills; whether these can be used by an independent spaceport remains a question; if they cannot, this raises other issues.

## **8.2 Topics For Further Study**

These questions and other related issues result in the identification of the following study concepts:

- Study Topic On High Level Federal Organization Relationships
- Examine how the authority should relate to national structures. Options to be studied include the spaceport as an operating arm of an existing or new Federal Agency. Possibilities would include the current arrangement with the U.S. Air Force, Department of Transportation, the Department of Commerce, a new DoD Assistant Secretariat of Space, NASA, and a new U.S. Space Force. The study method will be to examine the plans and operating approaches of the various agencies to determine if they are compatible with the operation of a spaceport.

### Study Topic on Approaches to Spaceport Capability

- Examine how the spaceport should achieve its capabilities. While a contractor operation controlled by a relatively small spaceport authority staff is the baseline approach, other approaches could be:
- A Government Owned Contractor Operated (GOCO) arrangement, with Government "Owner" being part of an existing or new government agency.
- A Government organization with organic capabilities, similar to the Federal Air Traffic system.
- A separate spaceport authority with organic capabilities, similar to the Washington Airports Authority. The study method will be to study existing examples of the options, such as DOE's GOCO Savannah River Plant, the Washington Airports Authority, and the Tennessee Valley Authority.

## Appendix A - Financial & Cost Structure Background

### Introduction

Before anything is said, please note that this section of the report looked at the commercial aspects of the spaceport. Consequently, it contains an obvious bias from the commercial perspective. However, draft copies of the report were reviewed and commented on by both spaceport officials and commercial users. Their comments were insightful, are greatly appreciated, and were incorporated wherever possible.

For the last decade, U.S. private industry and the Department of Defense (DoD) have been reinventing the way they do business. In an effort to help U.S. manufacturers compete in the international market, and at the same time keep U.S. military ranges/testing facilities busy, congress created the commercial charge policy to make U.S. private industry's use of DoD's facilities more cost effective.

The Major Range and Test Facility Base (MRTFB) is comprised of 21 testing ranges around the United States, the Bahaman Islands, Puerto Rico, and the Kwajalein Islands. It consists of a broad base of activities managed and operated under uniform guidelines to provide support to the Department of Defense (DoD) and its components responsible for developing or operating materiel and systems.

Department of Defense Directive 3200.11 (DoDD 3200.11), Major Range and Test Facility Base, declared the MRTFB to be a "national asset which is operated and maintained primarily for the Department of Defense test and evaluation support missions, but also to be made available for all users having a valid requirement for its capabilities." The Cape Canaveral Spaceport is one of the 21 ranges that comprise the MRTFB. Therefore, any further reference to MRTFB includes Cape Canaveral Spaceport.

### History

DoDD 3200.11 sets the guidelines and regulations for the MRTFB and initiated a uniform funding policy. This policy was designed to assure the most effective development and testing of materiel and to provide for inter-service compatibility, efficiency, and equity without influencing technical testing decisions or inhibiting legitimate and valid testing.

Until 1994, the uniform funding policy directed that DoD users, including defense contractors working on active DoD contracts, be charged direct costs only, excluding military labor costs and ancillary variable indirect costs. Other indirect costs, such as general and administrative and any generic capital costs to keep

the facility's "doors open," are to be funded by the Services or responsible defense agency. Non-DoD government users were charged direct costs plus military labor, and a proportional share of indirect costs, including those costs needed to operate the installation on a normal day-to-day basis. Commercial/Foreign Military Sales users were charged all of the above plus depreciation, return on investment, asset use charge, and other charges as may be specified under the terms of an international agreement.

In 1994, Congress initiated the commercial charge policy legislation that would decrease the cost of doing business at the MRTFB (Spaceport) for commercial entities. Public Law 103-160, the Defense Authorization Act, Section 846, amended Title 10 of the U.S. Code to add Section 2681, "Use of test and evaluation installations by commercial entities." This policy was viewed as a means to sustain the facilities with increased workload, reimbursements, and help U.S. private industry at the same time. In that law, Congress stated that "The Secretary of Defense may enter into contracts with commercial entities that desire to conduct commercial test and evaluation activities at the Major Range and Test Facility Installation."

New rules and guidelines for commercial users of the MRTFB were established under this law. It would encourage U.S. commercial use of U.S. installations by making the charges for range services to commercial users more favorable. The law allows the Secretary of Defense to enter into contracts with a commercial entity to use the MRTFB and to reimburse the DoD for all direct costs that are associated with the tests being conducted by the commercial entity. In addition, the contract could include a provision that requires the commercial entity to reimburse DoD for indirect costs related to the use of the MRTFB that the Secretary of Defense deems appropriate.

The public law governing the commercial charge policy states, "A contract entered into under subsection (a) shall contain a provision that the Secretary of Defense may terminate, prohibit or suspend immediately any commercial test or evaluation activity under the contract if the Secretary of Defense certifies in writing that the test and evaluation activity is or would be detrimental to the public health and safety, to property (either public or private), or to any national security interest or foreign policy interest of the United States."

The Secretary of Defense granted his authority to enter into commercial testing contracts, per Section 2681 of Title 10, U.S. Code, to the Service Secretaries and the Assistant Secretary of Defense, C3I for the Joint Interoperability Test Center. Further delegation to the local MRTFB installation level, consistent with Service and departmental contracting policy, is strongly encouraged. The authority to determine the appropriateness of the amount of the indirect costs included in the contract provision has been, in many cases, delegated to the MRTFB (Spaceport) installation commanders.

The new provisions of the commercial charge policy as promulgated were a change to the charge policy in DoD Directive 3200.11. On November 7, 1994, the Deputy Secretary of Defense amended the previous uniform funding policy for commercial users and non-DoD government users of the MRTFB. Concurrently, the Under Secretary of Defense (Acquisition and Technology) sent a memorandum to the Secretaries of the Military Departments and the Assistant Secretary of Defense for C3I, outlining the guidance for implementation of the policy with the following stipulations:

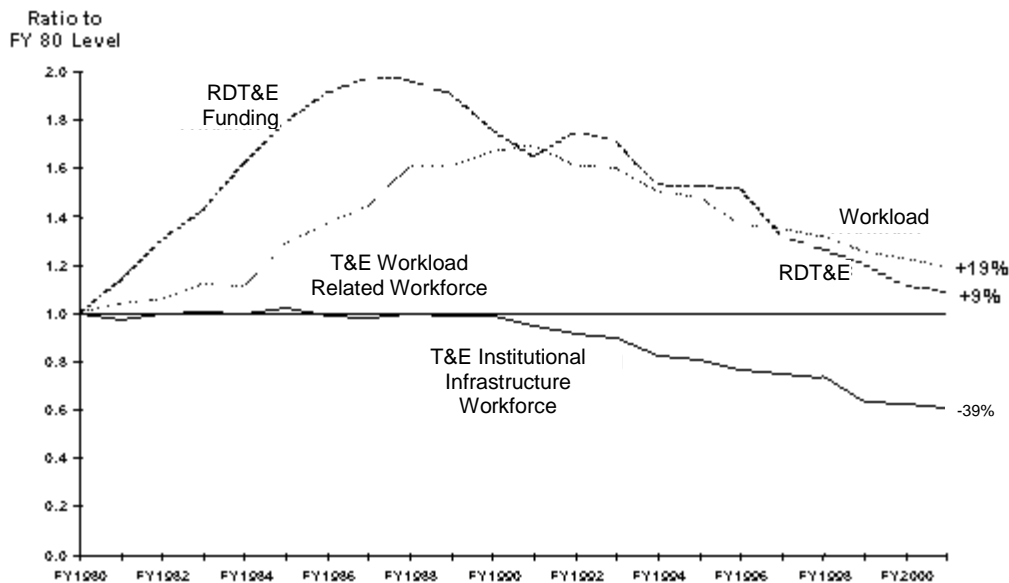
1. The MRTFB installations cannot compete with private industry for business. (Paragraph 3.1.3 of DoDD 3200.11 states that “MRTFB commanders are to ensure that they are not competing with US private industry in providing services to commercial users or non-DoD Government users.”)
2. Commercial customers must be charged direct costs and, in addition, may be charged indirect costs. The amount of indirect costs to be charged will be determined by the commander of the MRTFB activity.
3. MRTFB installations will not receive additional institutional funding as a result of this policy change. (Again, Paragraph 3.1.3 of DoDD 3200.11 states that “The use of MRTFB facilities by private organizations and commercial enterprises shall not increase the cost to the Department to operate the MRTFBs and shall not be factored into the decision-making process for sizing and maintaining the T&E infrastructure.”).
4. Facilities cannot be retained primarily for the use of non-DoD users.
5. Commercial tests are not to interfere with DoD tests.
6. Private industry users must be U.S. commercial entities.
7. The reduced charges to U.S. private industry is extended to all non-DoD government users, including state and local governments.

The DoD implemented a commercial charge policy to the fullest extent possible in an effort to keep the ranges open and capable of meeting users needs without competing with private industry and without maintaining facilities primarily for commercial use. The following chart, taken from a report titled VISION 21 a Report to the President and Congress, dated April 30, 1996 was billed as the plan for the 21<sup>st</sup> century for DoD laboratories and Test-and Evaluation (T&E) facilities. The data is from all T&E centers, but the trends fit the spaceport. It shows why the DoD must find commercial users for the spaceport.

Notice that the chart shows that the T&E center infrastructure workforce is declining faster than the drivers of T&E support; i.e., RDT&E funding and the workload-related workforce. It also shows a normalized comparison of the trends since FY 1980 in RDT&E funding, MRTFB workload, and T&E infrastructure workforce. The T&E infrastructure workforce started its decline from a lower base, in that it did not share in the buildup of the 1980s. Further, the T&E center infrastructure, measured in terms of funding and personnel, accounts for less than 2% of the DoD infrastructure. It shows that although the Defense budget

had significant increases in the 1980s the T&E infrastructure, as measured by the size of the workforce, had little growth and by the end of FY 2001 it is programmed to be 39% below its FY 1980 level, in constant dollars. On the other hand RDT&E funding and T&E workload are programmed to be significantly above the FY 1980 level, even in real terms.

Put another way, by the end of FY 2001, the spaceport's workload is projected to be 19% higher than it was in the base year of 1980, but the spaceport's infrastructure workforce (which must support the workload) is projected to be 39% lower than the base year of 1980.



Trends in Major MRTFB Center Infrastructure

The lack of appreciable growth in Test and Evaluation during the 1980's has left a critical need for revitalization of the Test and Evaluation infrastructure. Most MRTFB facilities were built in the early years of the cold war. The trends shown above are evident, even here, more than two thirds of the spaceport infrastructure is over forty years old. Assuming the spaceport followed the above chart, during the last thirty years, the DoD's investment rate for the spaceport facilities has been less than one third of the rate of investment in private industry and only about one sixth of the investment rate for high technology industries. The facilities need to be revitalized to:

- Address new space systems technologies
- Replace outdated technology and single service approaches with state-of-the-art instrumentation and facilities that satisfy joint needs;

- Replace the inefficient, labor intensive Test and Evaluation capability with modern, cost effective instrumentation and facilities to meet the needs of the twenty-first century.

## **Funding Sources**

The spaceport currently receives funding in two ways.

1. Through Direct Budget Authority (DBA) to the spaceport activities for the FY.
2. Through Reimbursable Budget Authority (RBA) equal to anticipated reimbursements. The spaceport's anticipated reimbursements are based on reimbursable orders expected to be received for a FY. RBA is available only to the extent that reimbursable orders are received.

DBA funding is used to fund spaceport operating costs not directly identifiable or allocable to a user's program. The spaceport DBA is used to pay the following institutional costs:

1. Indirect and overhead costs not reimbursable by users.
2. Improvement, modernization, certain non-reimbursable maintenance, and repair costs.
3. DoD mission requirements.

RBA funding allows domestic DoD and commercial customers, including state and local governments, to be charged direct costs, including military personnel labor costs and those indirect costs determined appropriate by the spaceport.

A customer requiring support from a spaceport activity initially request services in either a Program Introduction (PI). The PI includes enough information to allow the spaceport activity to evaluate its ability to provide the required support, provide reimbursable cost estimates, and prepare performance schedules.

The spaceport activity responds to the PI with a Statement of Capability (SC). The SC describes the spaceport activity's ability to provide the requested support, a preliminary schedule, a "rough order of magnitude" cost estimate by Fiscal Year (FY), and whether the effort will be accomplished at a fixed price or on an actual cost basis.

1. For fixed price reimbursements, the spaceport bills the customer for the total amount of the order at completion of launch. If the effort covers more than the current year, the customer is billed for the current year portion only. The spaceport bears the cost risk of using fixed price reimbursements. This means the financial manager for the customer knows the program budget cost for the year, but the financial manager of the spaceport may have a budget variance at the end of the year.
2. For actual cost incurred customers, charges are for the direct costs actually incurred per the cost accounting system and are billed monthly. Full funding is required for the FY effort, except during periods of Continuing Resolution Authority when incremental funding is permitted. Billings against actual cost incurred orders are accomplished monthly.

Spaceport activities use the Job Order Cost Accounting System (JOCAS) to identify all costs of services provided to customers and bills for the allowable (reimbursable costs) through the billing process. JOCAS accumulates, records, edits, and reports applicable cost data related to projects, tasks, work units, and evaluation efforts. It identifies the total cost of work performed to a product or activity and provides the total cost of individual segments of overall missions. Within JOCAS costs are collected and classified as direct, indirect, or overhead. Spaceport activities use the JOCAS to identify all reimbursable costs provided to customers and to collect payment through the reimbursement billing process.

Not all users can be charged for aborts and cancellations, only DoD customers. (Note: NASA is considered a DoD customer). The liability does not usually exceed the direct costs incurred except for special purpose facilities scheduled in advance for a specific period. In these cases, the liability includes lost reimbursements unless the spaceport is able to schedule a substitute workload.

### **Allowable Costs**

There are basically three types of allowable costs against funds associated with activity at the spaceport:

Direct costs are reimbursable expenses that can be reasonably, economically, and consistently identified to a customer (user) program, project or final cost objective at the time the expense was incurred. Direct costs may originate from contractor support or work performed in-house. Direct costs include but are not limited to the following:

1. Labor (civilian and military) (Note: Military labor costs are reported, but not billed to DoD customers).
2. Material, supplies, and utilities.
3. Spaceport facility configuration and deconfiguration differences required by the user.

4. Equipment (including installation, repair, maintenance due to usage, and removal).
5. Miscellaneous contractual services, including spaceport O&M contractual support.
6. Civil engineering work requirements.
7. O&M and depot level repairable costs of test support aircraft and ground support equipment. This will include a pro-rata share of depot maintenance based on standard flying hour rates.
8. Resources damaged, consumed, or maintained for a user.
9. Printing, photographs, and reproduction.
10. Proficiency training for a specific user or program.
11. Travel and per diem.
12. Transportation of supplies and equipment.
13. Test planning for a specific test (amount less than \$5,000 may be waived) by test center Commanders.
14. Total contractor costs when the sole purpose of the contractor is to support users of the activities.
15. Contract administration services (CAS) (reimbursed only by non-DoD users).
16. Facility O&M dedicated to a specific user.
17. Real property leases dedicated to a customer's program.
18. Automated data processing equipment (ADPE) support.
19. Pre-SC direct cost.
20. Any other products/services provided on a product/service standard rate basis.

Indirect costs are expenses incurred that cannot be identified specifically to a single program, project, or final cost objective. They do not produce the primary customer product or service and are one management level above where direct costs are incurred. Indirect costs not related to changes in workload activity levels are not reimbursable. These costs are funded through the spaceport activity's DBA. Ancillary variable indirect costs are expenses directly attributable to a customer's project and which vary according to customer workload changes. These costs must be identified and negotiated by the spaceport and user prior to starting spaceport support.

General and administrative (G&A) overhead costs are not totally attributable to a specific mission, program, or project, but support the facility as a whole. These costs are allocated to all functions/outputs. Sample G&A cost include:

1. Management
2. Normal base maintenance
3. Communication
4. Other equipment required for the normal base operation
5. Other costs not usually identifiable to a particular program

The 45 SW Policy for Commercial Launch/Range Customers on Sources of Base Support, Dated 14 June 2000 is based on regulation and congressional law. It directly applies to companies and other nonfederal entities seeking to obtain/procure base support from the 45<sup>th</sup> Space Wing (45 SW) in support of their activities at Cape Canaveral Air Force Station (CCAFS) under the terms of a Commercial Space Operations Support Agreement (CSOSA) or equivalent document. The purpose of this policy is to clarify for launch/range customers those instances where the 45 SW is a “required” or “available” source of base support as well as the types of base support that must be acquired from commercial sources (i.e., “commercially available”).

### **Factors that Influence Costs**

Because of its history, the Spaceport/Government has been accustomed to dealing with the “cost” of “required” services, but the commercial world, the most prevalent term is “price”. To help define the types of pricing, the following is reprinted from an Internet document titled Issues Affecting Price, prepared by Business Resource Software, Inc. 2013 Wells Branch Pkwy #305, Austin, Texas 78728. The term spaceport has been occasionally inserted to add emphasis.

The concept of a “price” is a worldwide concept. In fact, there are many ways to express the concept of 'price'. Some of the terms are; assessment, bill, charge, cost, dues, duty, expense, fare, fee, honorarium, interest, levy, premium, rate, retainer, salary, wage, tariff, tax, tithe, toll and tuition. No matter what you choose to call the 'price' you will charge for your product or service there are a number of factors to consider when determining how much you should charge.

### **Types of Pricing**

There are many ways to present the 'price' for a service to the commercial customer. Some of the better-known textbook methods are:

1. Cost plus a percentage of the cost.
2. Breakeven, that is, whatever it costs to produce the product or provide the service. (Usually non-profit organizations, but not necessarily)
3. Target profit (e.g.: make a 20% profit before tax. This implies that you understand all of your operating costs very well.)
4. Perceived value (priced to the consumer's expectation)
5. Competitive related (price using competitive price as a base)
6. Sealed bid (usually construction projects)
7. Two part pricing (fixed fee plus variable usage rate e.g.: telephone service)
8. Bundled pricing that combines multiple products and/or services under one price.
9. Discounts for cash payment (when cash flow is important)
10. Quantity discounts (when volume is important)
11. Trade-in price (when there is some residual value for a trade-in item)

12. Update price for an improvement to an existing product (this allows you to benefit from current customer base)
13. Discounted price to a reseller (to expand volume through channels of distribution)
14. Seasonal discount (to even out volume which allows a consistent production process)
15. Sales price (to promote demand, with volume hopefully offsetting reduced price)
16. Psychological pricing (e.g.: to create an impression of a lower price, \$199.95 versus \$200)
17. Geographical/sales site location (e.g.: varying prices for fuel in different geographical locations)
18. Price plus shipping (catalog/mail order type of sales)

### **Pricing Objectives**

The objectives that the spaceport sets will have a significant impact on the decisions related to its setting of prices. Some textbook examples of objectives and their influence on pricing decisions are:

1. Does this offering require a short term or a long-term commitment? IE: Is it a "pet rock" sort of offering or is it something you can build a business around?
2. Does the spaceport need to maximize cash flow? If so, are they willing to set prices high to get the greatest return from each customer at the cost of limiting market share? If not, are they willing to significantly under-price the competition to generate some cash but destroy future market potential by lowering price expectations?
3. Is it the spaceport's intent to capture maximum market share? If so, are they prepared to take a loss on the sales of your current offering to build a customer base that will purchase a follow on (potentially much more lucrative) offering in the future?
4. Does the spaceport want to price at some point relative to competition (higher, lower or equal) with intent of creating an image relative to (different than) the competition?
5. Does the spaceport have excess inventory? If so, is break even or even a loss on each sale of an offering more cost effective than having the offering sitting in inventory due to storage costs or time sensitive materials?
6. Is it important to attract attention to the product/service? Will the spaceport establish recognition and if so is this more important in the short term than concern for whether any profit is realized?
7. Does the spaceport want to price to attract distributors? If so, are they willing to accept significantly lower profit margins to establish relationships with one or more distributors who will likely carry future offerings once a relationship has been established?

8. Does the spaceport want to price to set entry barriers? If so, they must decide whether a low price (that still breaks even or makes a profit) will discourage the entry of new competitors.
9. Does the spaceport want to price to hurt competition? If so, are they willing (or able) to lower prices enough to insure that they will increase your market share?
10. Are certain price levels necessary to retain customer base? This may be a factor if it is their intent to remain in the market over a long period of time with numerous offerings. In this case, it may be prudent to maintain low prices, which will encourage relationships with distributors and repeat purchases from your customer base.
11. Does the spaceport want to establish an image of high value, thus high price? If so, do they have the resources to have your offering considered the "top of the line" in quality, reliability and durability and thus a justifiably high price?
12. Does the spaceport want to establish an image of high value but a low price? If so, do they have the resources to have their offering considered the "top of the line" in quality, reliability and durability and still priced at a comparable or lower price than the competition?
13. Does the spaceport want to maximize profit? Are immediate profit margins more important to them than building a customer base and creating an image (enterprise, product, or service) that will sustain them in the long run?

Objectives 1, 3, 4, 5, 6, 9, 10, and 12 should be addressed by the spaceport before publishing a cost (pricing) catalog. Conducting a trade study of these objectives may entice the Government to reconsider its current approach.

### **Competition**

If a spaceport is a market leader in the industry, their prices can influence the global pricing within the industry. Market leaders have often created a "pricing standard" against which other competitor's prices are compared. If the spaceport has the ability to price lower than the competition, it may be able to capture a greater market share that can benefit them over time as new programs become operational.

A decision to compete with a lower price should not be made lightly. If a competitor perceives that the spaceport's low pricing has the potential of reducing their market share or impacting their influence in the industry, they may respond with an even lower price. Then, instead of increasing their market share, they could be faced with no opportunity to increase their market share at all (It is always of value to know the capabilities and tendencies of your competitors).

A different form of competition is the 'alternative solution'. The customer's first alternative, if the price is too high, is a decision that they really don't need the

Spaceport's offering or any of their direct competitor's offerings. There may also be a variety of ways for the customer to solve their problem. For example, if the spaceport is offering a launch service, they are really in the business of transportation. So, the prospective customer has the option of their service versus horizontal launch from a runway, sea launch, air launch, or back to the first alternative of staying at home. The availability of numerous alternative solutions will usually limit pricing flexibility.

### **The Market**

Understanding the characteristics of the marketplace is an essential factor in establishing a price for spaceport services. They should first try to identify the general type of market they will be selling to.

Type of market

1. Commodity (many buyers/competitors, non-unique products)
2. Uncontrolled (many buyers/competitors, unique products)
3. Controlled (many buyers, few competitors, unique products)
4. Vertical-low (limited # of buyers, many competitors)
5. Vertical-high (limited # of buyers, few competitors)

### **Customer Characteristics**

The spaceport should document as many details as possible about the 'typical' customer in the launch market. Examples of the kind of detail they should look for are:

1. Customer's perception of spaceport services (positive perception = higher price)
2. Customer's awareness of spaceport services (lack of awareness raises promotion costs)
3. Whether service is for a captive audience (limited launch sites, minimizes marketing costs)
4. The criticality of the offering to the customer (more critical = higher price)
5. The ability of the customer to pay (greater ability = higher price)
6. Demand due to seasonal considerations (snow shovels priced lower in the summer)
7. Demand due to geographic considerations (snow shovels in Tahiti are unlikely to sell no matter how low the price)
8. Market trends or changing customer interests

### **The Service**

There are many characteristics of a service; that will influence the price:

1. Does the service provide tangible versus intangible benefits and/or differences? Services with immediate and tangible benefits will usually support higher prices.

2. The uniqueness of the services versus the competition. Uniqueness usually supports a higher price if the service has credibility.
3. Whether the service is one of several in a service line. Pricing must be consistent with the rest of the line.
4. Whether the service is a complement to another service. Sales to existing customers usually reduce marketing costs thus giving greater pricing flexibility.

### **Enterprise**

A variety of factors within the spaceport will influence the pricing decision. Some examples are:

1. The cost to produce the service is clearly the first factor in setting the price.
2. The potential for learning curve benefits. That is, will sales volume and time result in lower costs thus creating the potential for lower prices?
3. The ability to meet demand. If the spaceport has a limited capacity, they should price high enough to insure that they don't create more demand than they can satisfy.
4. The cost to deliver, including shipping, warehousing and installing.
5. The cost to promote, including press releases, press tours, ads, literature, demos, etc.
6. The financial resources, giving the spaceport the ability to sustain a start-up period of losses.
7. The quality and speed of the spaceport service delivery.

### **The Environment**

In addition to characteristics of the spaceport's competitors, their customers and enterprise, there are more general, 'environmental' factors that can influence the pricing.

1. At what point in market life cycle of the spaceport service are they selling?
2. What are the availability, quality, and cost of channels of distribution?
3. What is the status of the economy (inflation, deflation, varying interest rates)?
4. What is the potential for government intervention? Is the spaceport verging on a monopoly? Is their service important to national stability?
5. Are market characteristics such that a lower price will generate a higher demand? (Elasticity of demand)

### **Other**

There are many other factors that can influence pricing, that are difficult to place in any of the above categories. Some of these are:

The method of payment the spaceport wants to extend to the customer. (Cash, invoice for 30 day payment, credit card, time payments, no payments until ...)

1. The cost for the customer to switch to the spaceport service from their current solution. Does a high switching cost imply that the spaceport needs to price low to offset the switching costs or should they price high because the customer has already committed to a high dollar solution?
2. What image is most appropriate for the spaceport service to achieve maximum market penetration? (often higher prices imply higher quality and vice versa)
3. Is the spaceport able to define price thresholds, upper & lower, where the customer will consider the price unreasonable?
4. Is it reasonable to segment the market for different prices? (first-time buyer vs. existing customer.)
5. Are there special conditions at the time of purchase?
6. How reliably can the spaceport project sales volumes? Reliable volume forecasts typically allow for better pricing determination.

### **Summary**

During the last decade, the spaceport has experienced numerous budget reductions. The result of which has forced the spaceport to restructure and to look for alternative funding sources. The most widely discussed option is to open the spaceport to commercial launches to increase the size of the total obligation authorization. To implement these commercial programs, the 45SW/XP is developing a document described as the Range Catalog of Costs. Two major factors contribute to the new capability of the 45<sup>th</sup> Space Wing to develop a catalogue of range costs.

1. The range is evolving the structure of the various contracts.
2. The JOCAS accounting system.

The wing commander chartered a team to accomplish this task within 2 years. The catalog will enable customers to enter a web-based system to obtain cost (price) information for all range services. The 45 SW/XP has developed and published a policy for use by space launch providers seeking to launch from the spaceport. This policy explains what to expect. However, commercial customers interviewed demonstrated concern for the current efforts and stated the government will not be able to effectively commercialize the spaceport because:

1. They do not have the will.
2. There is no cost accountability or profit motive.
3. The senior leadership is judged purely on their management of Direct Budget Authority (DBA) programs. Reimbursable Budget Authority (RBA) programs (Commercial programs) are not on their report card.

Interviews with commercial customers revealed that they feel there are three major obstacles to the commercialization of the spaceport by the government.

1. Basic philosophy of the accounting system. There is no economy driver in the government system, i.e. there is no profit motive. The example was given that within the government, at the beginning of the year an organization receives a bucket of money. The objective is to take that amount of money in the bucket to zero at the end of the year. You don't want to over-run or under-run, both of which are bad. This basically makes it a time expenditure. This problem is compounded by the fact that Direct Budget Authority (DBA) programs fund the spaceport. Reimbursable Budget Authority (RBA) money cannot be used. Commercial programs are RBA. Therefore, once the Total Obligation Authority is reached, money cannot flow. This results in delays in which the commercial program will have no control. This drives up the cost and increases uncertainty.
2. A customer has no idea of what they get for their money. There is no cost insight. It is a closed system. In addition, any capital improvements made are a sunk cost. Capital improvements become Government property and there are no tax write-offs to offset this expenditure. During an interview the comment was made that "the patient is going to die" This comment was in reference to the current state of confusion as to the fate of the spaceport and what is perceived as "all talk and no action" by the government. Companies are not only concerned about their ability to compete, but also about the ability of the American space industry to lead the world into space.
3. Small companies trying to gain a foothold on the spaceport are having a difficult time because of proposed changes in spaceport assets, uncertainty in having to pay multiple times for the same service no insight into what they are paying for, and leases being too short with no assurances they will be renewed. All of these factors increase the cost (price) of launching from the spaceport.

## **Appendix B Policy**

### Government Agencies Involved with the Cape Canaveral Spaceport

NASA, including not only the Kennedy Space Center but initiatives and programs of the Marshall Spaceflight Center and the Johnson Space Center;

The U.S. Air Force, including Air Force Space Command and Air Force Materiel Command;

The United States Navy's Naval Ordnance Test Unit;

The DoD Major Range and Test Facility Base, managed by the DoD Test Facilities and Installations office;

The White House Office of Science and Technology Policy and the National Space Council;

The Defense Threat Reduction Agency (DTRA);

The Department of Transportation, specifically various Federal Aviation Administration aircraft-related divisions, the FAA's Office of Commercial Space Transportation and the U.S. Coast Guard;

The Federal Communications Commission;

The Department of Commerce; including the department's Bureau of Export Administration and the National Oceanic and Atmospheric Administration;

The Environmental Protection Agency (EPA);

The Department of the Interior's National Park Service, and The Fish and Wildlife Service.

The Department of the Treasury's Bureau of Alcohol, Tax, and Firearms.

The Department of Labor, including the DOL's Occupational Health and Safety Administration.

The National Transportation Safety Board

## **Appendix C Rumsfeld Report Summary**

### **Implications for the Cape Canaveral Spaceport of the Recommendations of the Commission to Assess United States National Security Space Management and Organization**

1. The report of the Commission to Assess United States National Security Space Management and Organization makes a number of highly significant recommendations relative to the organization of and goals for U.S. national security space-related efforts. The recommendations of the Commission carry significant weight and are in the process of being implemented. Aside from the straightforward recommendations, the implications of the positions advocated by the commission are huge, and have considerable bearing on the future organization and management of the Cape Canaveral Spaceport, especially in the policy area.
2. Our study recommends that a new organization be created for the express purpose of operating a spaceport at Cape Canaveral. Furthermore, it recommends that the spaceport have certain characteristics. Our vision of the future Cape Canaveral Spaceport is fully in accord with the Commission's findings and recommendations.
3. First, at its most basic level, the Commission recommends significant organizational changes that are geared toward recognizing the importance and potential of space to the U.S., stating "the U.S. Government – is not yet arranged or focused to meet the national security space needs of the 21<sup>st</sup> century." We espouse this same viewpoint relative to the Cape Canaveral Spaceport. Currently under the control of the U.S. Government, the spaceport is not arranged or focused to meet the space needs of the 21<sup>st</sup> century. The Commission recommends a radical, but nonetheless measured approach designed to create an organization that ultimately can meet the need of today and the future. We propose an identical approach.
4. The Commission's vision is of a revised Department of Defense and intelligence community relationship together with a reorganized U.S. Air Force for the near future, and ultimately a Department of Space, possibly with a new military service focused on space exclusively, a "space force." Our vision for the spaceport is similar in many respects. We see a new organization, quasi-governmental in nature, and which would contain many elements of the current structure, but be more focused on running a spaceport, a true "spaceport authority." Our longer-term concept is for the spaceport authority to become fully commercial in nature. Thus, both we and the commission recommend radical transformations in organizations, but in a measured, staged, manner.
5. There are no elements of our recommended approach that are at variance with the Commission's recommendations. However, certain of the Commission's recommendations and observations relate directly to our

recommended approach the Cape Canaveral Spaceport. Specifically, these are:

- a. The Commission recommends “Develop a strategy for relying more on commercial launch facilities toward the goal of largely privatizing the national launch infrastructure.” The creation of a Canaveral National Spaceport Authority as a quasi-governmental agency, with the goal of eventually establishing a commercial-like, self-supporting entity is fully in accord with this concept and is an essential element in privatization.
- b. The commission states “Investment in Science and Technology Resources is essential.” Our recommendations recognize that special provisions must be made to encourage, foster, and support R&D activities, especially the smaller payloads that do not usually have all required resources. The spaceport authority would be charged with the responsibility for providing processing and launch facilities for small R&D missions that currently are not necessarily any agency’s responsibility.
- c. The commission asserts that “Commercial space activity will become increasingly important to the global economy.” Restricted by law, mission statements, attitudes and raids on funding, the current spaceport management structure does not address either the requirements or the potential of commercial space efforts. A new dedicated spaceport organization will be able to do so.
- d. The Commission recommends that the U.S. Government take action to “create and sustain within the government a trained cadre of space and civilian space professionals.” While on the surface, creating an authority to take over the operation of the Cape Canaveral Spaceport from the Air Force and NASA may seem counter to this concept, in reality it is fully in accord. Unlike the actual use of space, the skills required to operate a spaceport are highly specialized and do not have wide applicability elsewhere. The military and civil agencies need to follow the lead of the commercial user and focus on the use of space rather than the mechanics of the support mission. A dedicated spaceport authority that still enables the USAF, NASA, and the FAA to have a degree of control is more in keeping with the true needs of professionalism.

In summary, the Rumsfeld Commission report recommends a dramatic new direction for U.S. space policy, one that will emphasize the use of space. To achieve this end, the Commission recommends major changes in organization, and, even more significantly, in attitudes. The creation of a Canaveral National Spaceport Authority will be an essential element of realizing the vision of the Commission.