



Ground and Operations Support Systems



As the launch environment changes, entrepreneurial development increases and ISS commercial resupply companies emerge, there is a tremendous opportunity for the State of Florida to expand Ground Support Operations (GSO) to serve multiple launch operators near point of launch, to reverse the more expensive proposition for each launch company to develop the capability in house, and to provide increased services which encourage commercial development.

The Market Horizon

GSO activities are generally defined, during the conduct of space-related mission operations, as everything not directly associated with launch operations. GSO includes a lengthy assembly, checkout and integration but can also include the design, development, construction, operation and maintenance of those hardware and software elements associated with processing launch vehicles and their payloads (including crew and crew personal equipment).

GSO activities have often been accomplished at some distance from the launch site and the attendant hardware has been shipped to the site just prior to the actual launch. This concept is referred to as “Ship and Shoot”. There is striking evidence that for most complex boosters and payloads the concept is flawed. For example, no Shuttle orbiter was ever launched within one year of its initial arrival at the Kennedy Space Center.

Booster and payloads are often shipped from the prime manufacturer to the launch center where they undergo assembly, checkout and integration activities preceding launch. Often, the contractors have a permanent delegation in residence at the launch site who can provide the technical expertise to effect any required failure analysis, part replacement and/or repair and retest needed to ensure the flight elements are ready on a timely basis for flight. By contrast “Ship and Shoot” requires every failed element to be returned to the vendor for troubleshooting and repair for all but the simplest of problems.

As the launch tempo increases, there is an increased opportunity for launch operators to want to take advantage of Florida-based GSO-related assets. With the advent of more “start up”/entrepreneurial launch operators, they are almost certain to decide buying some GSO services “by the yard” is considerably less expensive than developing an in-house capability. The Orion OEM went even further and decided final assembly and checkout of the crew and service modules (typically done in a contractor facility) was best accomplished adjacent to the launch site in a building leased from NASA (but designated as a contractor “plant”).

The next generation heavy-lift booster and its associated payload carrier(s) are expected to make use of very large-scale composite structures. This represents an extraordinary opportunity for the state to acquire (and perhaps operate) fiber placement machines and autoclaves that can support multiple hardware items. There may also be an opportunity for a shared depot and repair center wherein multiple launch and payload contractors could buy storage, machine shop operations, test capability, support laboratory functions, etc. from a single entity.

Florida’s Edge

- A 50+ year history of successful payload processing and launch operations for hundreds of flights
- Hundreds of millions of dollars in infrastructure support for payload processing operations
- Unique payload processing buildings including:
 - The Space Station Processing Facility (SSPF)
 - The Multi Purpose Payload Processing Facility (MPPF)
 - The payload spin test facility
 - The Space Life Sciences Laboratory (SLSL)
 - A privately owned and operated company dedicated to payload processing
- A fleet of payload carrier vehicles
- Specially constructed roadways and bridges (including rail operations) that connect the ground operations sites to the launch pads
- The ability to fuel/defuel payloads with hazardous liquids (hypergolic fuels)
- A knowledgeable workforce consisting of thousands of payload specialists
- One of the world’s largest fully automated x-ray installations



In the Vehicle Assembly Building’s High Bay 4, the Ares I-X “super stack 1” is to be lifted into High Bay 3 and attached to the forward motor segment. Super stack 1 comprises the frustum, forward skirt, forward skirt extension, interstages 1 and 2 and the fifth segment simulator. Ares I-X is the test vehicle for the Ares I, which is part of the Constellation Program to return men to the moon and beyond. Image credit: NASA/Jack Pfaller

M A R K E T H O R I Z O N



In Sight and Achievable

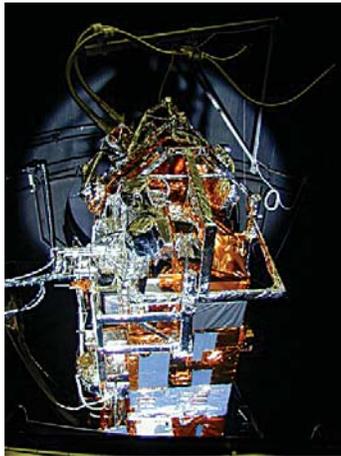
- GSO for suborbital rockets and payloads for commercial and academic research investigations
- GSO for Commercial resupply service providers

Tactical Development Strategies

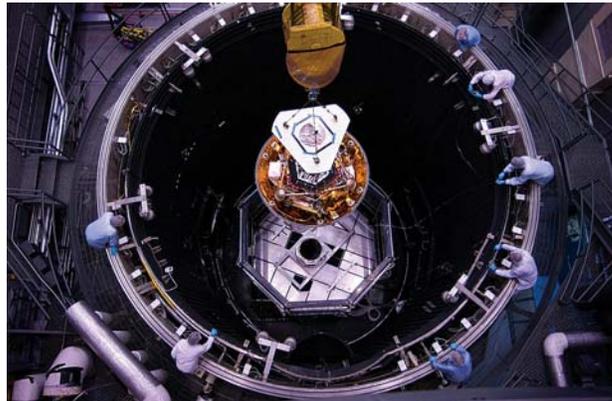
- Market the advantages of GSO in proximity to the launch sites and other government and privately owned infrastructure
- Publicize the availability of a well-qualified, available and affordable workforce for the operation and maintenance of GSO assets
- Use Space Florida's unique(Special District) financial capabilities to develop multi-use infrastructure resources that enable GSO
- Expand the definition of the Commercial Launch Zone (CLZ) to afford the benefits of the zone to GSO
- Ensure that the monies appropriated for the Commercial Space Infrastructure Act can be applied to GSO related assets



Sitting on top of the mobile launcher platform, space shuttle Discovery arrives on top of Launch Pad 39A at NASA's Kennedy Space Center in Florida. Image credit NASA



The Large Space Simulator (LSS) provides close simulation of in-orbit environmental conditions thereby ensuring optimization of the design and verification of spacecraft and payloads. Its exceptional test volume makes it an excellent tool for testing large payloads. Image credit: ESA



NASA's Phoenix Mars Lander was lowered into a thermal vacuum chamber at Lockheed Martin Space Systems, Denver, in December 2006. The spacecraft was folded in its aeroshell and underwent environmental testing that simulated the extreme conditions the spacecraft will see during its nine-and-a-half-month cruise to Mars. Image Credit: NASA/JPL/JA/Lockheed Martin

Space Florida was created to strengthen Florida's position as the global leader in aerospace research, investment, exploration and commerce. As Florida's aerospace development organization, Space Florida is dedicated to attracting and expanding the next generation of space industry businesses. Created by the State of Florida as a special district in May 2006, Space Florida serves space-related functions in all three aerospace sectors: civil, military and commercial. Florida's attributes include its superlative workforce, proven infrastructure and unparalleled record of achievement.

