National Aeronautics and
Space Administration

2012-2031

Kennedy Space Center
Future Development Concept

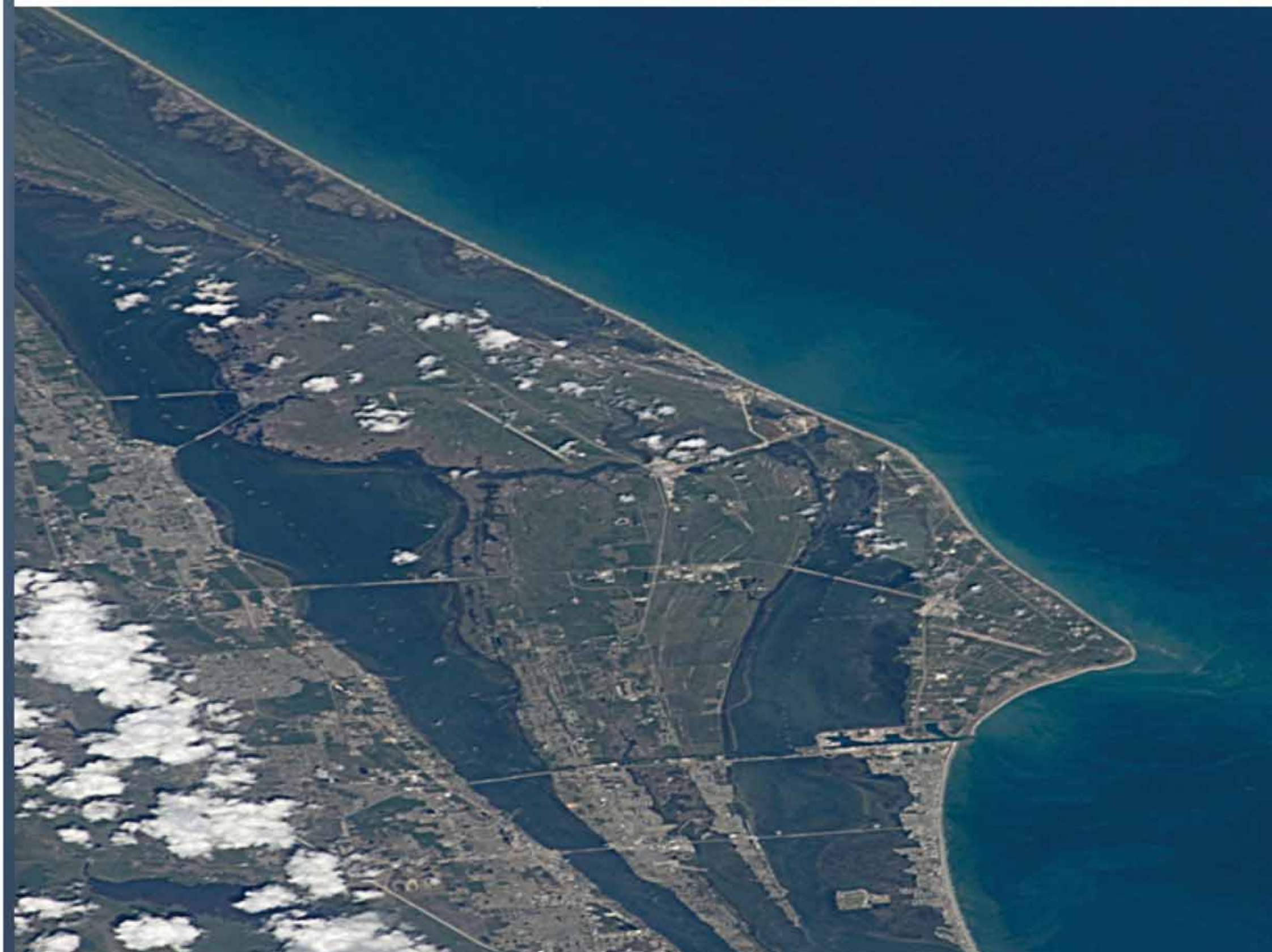
"A new way of doing business for a new generation of explorers"

“History is a relentless master. It has no present, only the past rushing into the future. To try to hold fast is to be swept aside.”

~ John F. Kennedy

Table of Contents

1.0 INTRODUCTION AND OVERVIEW



NASA is at a critical crossroad in its transition to a re-focused Mission that relies on redefining the agency's relationship with industry and leveraging the potential of partnerships. Amid the challenges of an aging and unsustainable asset base, and a highly constrained federal budget, NASA must adopt and implement strategies that preserve the institutional infrastructure needed to support its purpose and programs.

Decisions made now will have long-lasting consequences for the nation's space industrial base, and NASA's ultimate progress in meeting our nation's space objectives. Nowhere across the agency's entire institutional base are these decisions more pressing, or impactful, than at John F. Kennedy Space Center (KSC).

KSC constitutes 67 percent of the agency's land holdings, and nearly 20 percent of NASA's $30 billion (current replacement value) in facilities infrastructure. Yet these statistics alone do not reflect KSC's true value as an irreplaceable national asset.

KSC is the planet's premier launch complex for sending humans and payloads to space. In the years ahead, it will transform from a Government and program-focused, single-user launch complex to a more capability-centric and cost-effective multi-user spaceport. KSC's new mission will be to enable both government and commercial space providers with facilities, experienced workforce and the knowledge necessary to support existing mission sets and new space programs.

KSC has prepared and proposes this Future Development Concept (FDC) to guide its transformation, and provide the foundation for a new Center Master Plan incorporating forward-looking business and operations models based on key guiding principles.

Success requires NASA and KSC to adopt a new way of doing business for a new generation of explorers.

NASA Center and Agency Master Planning

1.1 PURPOSE AND SCOPE

This FDC supports the new agency-wide master planning process identified in NASA's institutional requirements report to the Congress, pursuant to Section 1102 of the NASA Authorization Act of 2010. It has been prepared in accordance with the process and guidance contained in the draft revision of NASA's Master Planning Procedural Requirements (NPR 8800.1A).

The FDC presents an overall concept for changes to KSC's infrastructure, land uses, customer base of space transportation providers and users, and business model. It describes a proposed future state for KSC, and will serve as the blueprint for a new Center Master Plan establishing specific goals and implementation steps over a 20-year planning horizon extending from 2012-2031.

The FDC responds to KSC's new mission, goals, and objectives, and to the significant institutional infrastructure challenges confronting NASA leadership. It seeks to ensure broad alignment with the 2011 NASA Strategic Plan, Agency Facilities Strategy, recent changes in NASA human spaceflight strategies, and the NASA Strategic Sustainability Performance Plan.

In addition, the FDC addresses and considers:

- Both traditional and non-traditional approaches to the recapitalization, re-development, and future expansion of spaceport capabilities
- Partnerships with industry, the State of Florida, and other public and private entities
- Optimal utilization of physical assets and intellectual capital
- Environmental stewardship, sustainability, and the risks associated with future climate change
- Changes to operations and management structure for optimal performance as a multi-user spaceport

1.2 BACKGROUND

KSC's last major revision to its Center Master Plan was performed in 2002, with an update to define Area Development Plans in 2008. The 2002 plan was a forward-looking, 75 year, unconstrained plan for land uses and facilities to support an evolution of KSC and neighboring Cape Canaveral Air Force Station into a more unified spaceport community supporting a robust growth in flight rates. It did not, however, provide a clear implementation approach, or anticipate the dramatic changes and challenging circumstances that exist today.

The planning environment of 2011 demands a revised baseline. The space transportation industry, both its technology and its economy, is evolving globally. The Space Shuttle has completed its final mission and program retirement is in full implementation. NASA's budget has declined from earlier agency planning guidance and NASA anticipates continuing funding challenges in the years ahead. Approximately half of KSC's skilled workforce has been being laid off with the end of the Shuttle Program. Resources to sustain and renew capabilities and facilities are severely constrained.

In the context of Government-wide initiatives, NASA is implementing policies to reduce its facilities infrastructure footprint, consolidate for greater efficiency and sustainability, reduce operations and maintenance costs, and meet energy and water conservation goals.

1.3 FUTURE DEVELOPMENT CONCEPT GUIDING PRINCIPLES

In formulating this proposed concept for KSC's future development, the planning team has been guided by the following core principles:

- Align with NASA's Mission and strategic goals
- Respond to KSC's challenges and objectives
- Support implementation of the agency's facilities strategy
- Ensure responsible stewardship of the natural environment
- Consider the needs and interests of all stakeholders

1.4 CONCEPT FORMULATION PROCESS

The FDC is an initial and integral product in the preparation and technical documentation of a revised Center Master Plan. KSC initiated FDC formulation after a January 2011 consultation with the NASA Director of Technical Capabilities and Real Property and other management staff of the Mission Support Directorate.

KSC's Center Planning and Development Office integrated extensive research and planning efforts already underway at KSC (e.g. 21st Century ground processing architecture studies, infrastructure recapitalization planning, partnership development activities, technical interchanges with prospective future tenants/users, environmental analyses). A Center-wide planning team was formed and KSC named a Master Plan Steering Group comprised of senior management and chaired by the KSC Deputy Director.

This FDC is the result of an iterative process analyzing existing conditions, forecasting future needs, and reconciling the gaps between the KSC present state and desired future state, with a realistic assessment of resources, alternative approaches, and external influences,

1.5 STAKEHOLDER ENGAGEMENT AND INPUT

As outlined in the agency's process, KSC broadly engaged all appropriate stakeholders in the concept formulation. In particular, the participation and involvement of NASA programmatic and institutional leaders has been assured along with that of several key State of Florida and local/regional organizations, and co-located/adjacent federal partners (Department of Interior, Department of Defense, and Federal Aviation Administration). KSC also broadly and proactively engaged industry stakeholders to identify needs for both traditional government missions and new or emerging commercial space markets supported with privately-owned and operated assets.

Direct input and participation from 30 senior leaders in four major stakeholder groups provided key insights, perspectives, and vision. Additional stakeholder engagement occurred through analysis and one-on-one discussions with partner organizations regarding their future plans (e.g. 45th Space Wing's revised General Plan for Cape Canaveral Air Force Station, Canaveral National Seashore's recently drafted Management Plan, and the State of Florida's statewide spaceports master plan).

Extensive stakeholder engagement and vetting of KSC plans for facilities no longer required for the Space Shuttle Program has been assured through internal program and institutional reviews at KSC and NASA Headquarters. KSC has also worked to ensure broad and transparent awareness and participation by industry and other interested parties of KSC facility planning and decision processes. Multiple interim reviews have been held with mission and institutional leadership. KSC has also supported NASA Headquarters in responding to Congressional stakeholder interest in KSC's planning for the future.

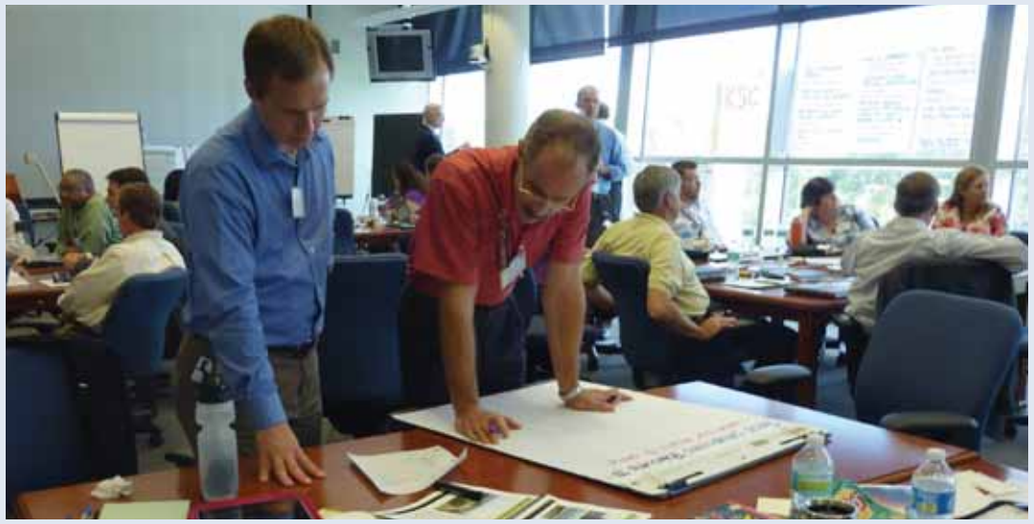
1.6 KSC VISION FOR THE 21ST CENTURY

Our vision is that KSC will be the world's preeminent launch complex for government and commercial space access. KSC will support NASA, and ultimately, our nation's competitiveness, by investing in next-generation technologies and encouraging innovation. KSC will foster partnerships, intergovernmental, commercial, academic, and international, to expand our ability to support both public and private space initiatives.

STAKEHOLDERS PARTICIPATING IN LEADERSHIP INTERVIEWS

NASA / HQ	NASA / KSC	Commercial / Industry	Other Agencies
Bill Gerstenmaier – Space Operations Associate Administrator	Mike Benik – Director, Center Operations	John Elbon – Boeing, VP & PM, Commercial Crew Programs Space Exploration	Frank DiBello – President, Space Florida
Ramon "Ray" Lugo III – Glenn Research Center Director	Mike Bolger – Director, Information Technology & Communications Services	Jeff Greason – President, XCOR Aerospace	Tom Duncan – FDOT
Maria Collura – Commercial Crew Program Director	Col. (Ret.) Robert "Bob" Cabana – Director, KSC	Tom Harmer – Pizzuti Developer for Exploration Park	Layne L. Hamilton – MINWR Project Manager
Kim Toufectis – Agency Master Planner	Scott Colloredo – 21st Century Launch Complex Architecture	Col. (Ret.) Scott Henderson – Director of Mission Assurance & Integration, Space X	John Juilianna – SJRWMD
Dr. Woodrow Whitlow Jr. – Mission Support Associate Administrator	Scott Kerr – Director, Ground Processing	Rick Hoskins – ATK, Dir. Advanced Launch Systems	Myrna Palfrey-Perez – Canaveral National Seashore, Park Superintendent
	Janet Petro – Deputy Director, KSC	William "Bill" Moore – Chief Operating Officer KSC Visitor Center, Delaware North	Mark Ryan – City Manager, City of Titusville
	Pat Simpkins – Director, Engineering & Technology	Mark Sirangelo – Executive VP & Chairman, Sierra Nevada Space Systems Board	Howard Tipton – County Manager, Brevard County
	Mike Wetmore – Director, Safety and Mission Assurance	Dr. George Sowers – ULA, VP Business Development & Advanced Programs	Al Wassel – Federal Aviation Administration
			Brigadier General Burke E. "Ed" Wilson – CCAFS Commanding Officer, Commander 45th Space Wing

Participated in Leadership Interviews



Joe Madden and Charrette Consultant

Pat Simpkins, Joe Dowdy & Charrette Consultant

1.7 KSC STRATEGIC GOALS AND OBJECTIVES

KSC's future depends on our ability to move from government processing and acquisition to an environment supporting diverse Government and commercial entities with full life-cycle support.

To achieve this, KSC will move from program-specific infrastructure to a launch and payload processing complex that will support multiple users with varying requirements. KSC will enable commercial partners to use Launch Complex 39 by providing high-quality, economical processing and launch capabilities. Through partnerships with industry, academia, and other Government entities, KSC will promote the use of our available facilities and highly skilled workforce, attracting new businesses to the spaceport.

NASA relies on KSC to make advancements and innovations in next-generation technologies to make NASA, other Government, and commercial space activities more capable and affordable. Technology areas include in situ resource utilization and surface systems, space launch and suborbital technologies, life sciences and habitation systems, ISS multidiscipline research, environmental remediation and ecosystem sciences, and advanced ground launch and processing systems.

KSC must transform its organization, workforce, facilities, and services to a multi-user model while reducing costs. It must realign its workforce and provide technical capabilities at an equitable price. KSC will plan infrastructure improvements that reduce operating costs.

Another key goal upon which our success relies is the education of our workforce, present and future, and the inspiration of America's youth to value science, technology, engineering and math (STEM) as the means to achieve great dreams.

NASA Strategic Goals: 2011 Through 2021 and Beyond

1:	Extend and sustain human activities across the solar system
2:	Expand scientific understanding of the Earth and the universe in which we live
3:	Create the innovative new space technologies for our exploration, science, and economic future
4:	Advance aeronautics research for societal benefit
5:	Enable program and institutional capabilities to conduct NASA's aeronautics and space activites
6:	Share NASA with the public, educators, and students to provide opportunities to participate in our Mission, foster innovation, and contribute to a strong national economy

2011 NASA Strategic Plan

KSC's Planning Guidance aligns with the NASA Strategic Plan and is highlighted by the following Center goals and objectives:

Goal 1: Ensure mission success by enabling Government and commercial access to space

- Assure successful Government access to space
- Enable development of routine commercial access to space

Goal 2: Develop, operate, and sustain a robust launch and payload processing complex for all providers

- Convert the KSC launch and payload processing complex into a multi-user capability
- Establish plans, processes, and agreements to support multi-user activity

Goal 3: Conduct research and develop technology (R&T) representative of KSC expertise to enable NASA mission success

- Advance KSC's R&T into relevant uses for KSC, NASA, and the Nation
- Conduct R&T development to enhance NASA capabilities to explore
- Perform R&T to enhance surface and launch systems for any destination

Goal 4: Provide a flexible, cost-effective institution to enable success

- Align civil service and contractor workforce with NASA and KSC goals and plans
- Continue the transformation of institutional facilities and infrastructure to support future needs
- Continue the transformation of technical capabilities/services required to support future NASA and multi-use programs
- Establish a model sustainability program

Goal 5: Inspire, engage, and educate through enriching programs, internships, and partnerships

- Assure effective community involvement, partnerships, and STEM awareness
- Increase STEM student opportunities at KSC

1.8 KEY FACILITIES PLANNING STRATEGIES

To align with the agency's strategies, and facilitate KSC's new mission, goals, and objectives, a revised Master Plan for KSC land use and the development of the Center's infrastructure must employ several key planning strategies. These are:

- Sustain uninterrupted capability for near-term launch and landing operations, and associated support
- Restructure land use planning to better manage primary, secondary, and conditional uses, and ensure compatibility of diverse activities
- Re-purpose former Space Shuttle facilities where possible to enable continued support for NASA Mission and foster an emerging commercial space industry while reducing or eliminating Agency facility liability
- Re-capitalize KSC infrastructure to modernize and, where possible, consolidate functions, to improve efficiency and sustainability
- Leverage public-private and public-public partnerships to lessen resource demands for re-capitalization of existing capabilities, reduce ongoing operations and maintenance costs, and enable development of new capabilities to support KSC's multi-user requirements
- Favor re-development and in-fill of areas currently developed and serviced with infrastructure over expansion of horizontal infrastructure and new construction into previously undeveloped land
- Avoid development in areas prone to inundation by storm events, especially those vulnerable to potential impacts of climate change, or critical to preservation of natural ecosystems and wildlife species
- Enable greater on-site production of renewable energy for electric power demand and vehicle propulsion to reduce net impact on greenhouse gases

Interview Highlights: Commercial Launch Support

- Commercial launch support requires a competitive business model
- Bring the entire supply chain to KSC (aerospace, technical, etc.)
- Expand focus to include sub-orbital
- Understand the real market for commercial launch and the pricing structures necessary to be competitive
- Package existing "human talent" and expertise as a consultancy
- Identify customer needs and meet them. Create proactive methods to identify and market potential customers

Interview Highlights: Competitive Analysis

- Commercial customers want reliable services at predictable and affordable prices
- Government restrictions & processes (especially relating to safety and procurement) inhibit commercial competitiveness
- Undefined future architecture for launch requires nimble reaction to construct necessary facilities
- Change management requires change in culture. Move from observers to actors
- Municipal functions of KSC add costs relating to existing infrastructure that inhibits commercial competitiveness

2.0 STRATEGIC FRAMEWORK

"No place else in the world has the combination of experience, geographic advantages, and purpose-built infrastructure that we do at Kennedy Space Center."

- KSC Strategic Position Statement

With the increase of global interest in space activities, and a growing supply of spaceports to meet that demand, KSC must reassess its competitive position, and chart its future role in supporting both government and commercial space initiatives. KSC's unique advantages and opportunities for launching humans and payloads to and from space received a substantial amount of focus during the leadership interviews and the planning charrette. The following strategic position statement was crafted to represent the attributes which make KSC unique on the planet.

2.1 STRATEGIC MARKET POSITION

Kennedy Space Center has a unique and un-duplicable position in the global space launch exploration and recovery marketplace. No place else in the world has the combination of experience, geographic advantages and purpose-built infrastructure that we do at Kennedy Space Center.

Experience	Location	Infrastructure
• Safe and Reliable	• Equatorial Orbit	• Purpose-built
• Proven	• Quinti-modal Access	• 50-Years of Capital Investment
• Human Spaceflight	• Controlled Airspace	• Adaptable
• Uniquely Skilled	• Quality of Life	• Heavy Lift Systems Capable

2.2 TRANSITIONING FROM ONE CUSTOMER TO MANY

KSC's transition to multiple customers and resident programs is strategically critical to a sustainable spaceport infrastructure. New, non-NASA revenue streams will lessen the burden on NASA programs for O&M of launch processing and support assets. Implementing this transition begins with an assessment of KSC's unique strengths, its core competencies, and the need for shifts in both cultural and operational practices to compete effectively as a spaceport of choice for both government and commercial users.

Traditional NASA programs (Launch Services Program, International Space Station, Space Launch System and Multi Purpose Crew Vehicle) will continue to be the core business of KSC, albeit at funding levels that may become increasingly constrained. Commercial launch providers and their customers, along with other government users, will expand the portfolio of KSC activities and provide opportunities for growth and optimal use of KSC assets that would otherwise fall dormant or be underutilized. Cost-saving synergies and spaceport revenue generation will develop by locating manufacturing, engineering, integration, testing and other functions at KSC.

NASA's role over time can be expected to evolve to that of a major "tenant" of the spaceport community at KSC, with its programs owning and operating just that infrastructure required for their missions. Some NASA programs relying on KSC capabilities will purchase only a "ride" provided on a commercially-operated system, and may own little or no spaceport assets as a program. The trend in a constrained budget environment has been for NASA programs to "buy by the yard" and to avoid ownership of the full institutional infrastructure that is KSC. The strategy to diversify KSC's customer base will help spread these institutional costs so that NASA does not have to fund them solely from its appropriated dollars, thus making more of NASA's budget available to conduct research and exploration missions in space.

At the same time, the space industry is highly competitive for both government and commercial markets, and it is attracted to a business environment where it can minimize its cost as well. Commercial providers also want to "buy by the yard" and will price-compare one spaceport's cost for user operations against another's.

An important element of this strategic framework is re-purposing existing facilities that have no identified programmatic requirement now that the Space Shuttle has been retired. KSC has already initiated this activity through active engagement of the U.S. commercial space industry and mechanisms such as Requests For Information and Notice of Availability. For these government assets, priority consideration is given to companies which operate or directly support government (NASA or DoD) or commercial space launch or space user missions. These operations will form the core of the multi-user spaceport KSC seeks to become.

In addition, other operationally-compatible uses and users determined to directly or indirectly support NASA or KSC's Mission will be strategically important to establish a sustainable institutional infrastructure at KSC. This "compatible diversity" will be ensured by clear and consistently-applied criteria for establishing tenancy on KSC as part of the spaceport community.

2.3 CORE BUSINESS FOCUS AND COMPETENCIES: WHAT WE DO

The work performed at KSC should be in line with its core competencies and unique position within the space launch industry consistent with its specialized workforce, facilities, and original purpose.

KSC core competencies are rooted in its history of space flight, the purpose-built infrastructure and its location of the Florida east coast. How KSC applies those capabilities across new business lines is what will enable and attract a broader user base.

KSC Core Competencies
• Acquisition and management of launch services and commercial crew development
• Launch vehicle and spacecraft processing, launching, landing and recovery, operations and sustaining
• Payload and flight science experiement processing, integration and testing
• Designing, developing, operating, and sustaining flight and ground systems, and supporting infrastructure
• Development, test and demonstration of advanced flight systems and transformational technologies
• Developing technology to advance exploration and space systems

Interview Highlights: Vision Ideas

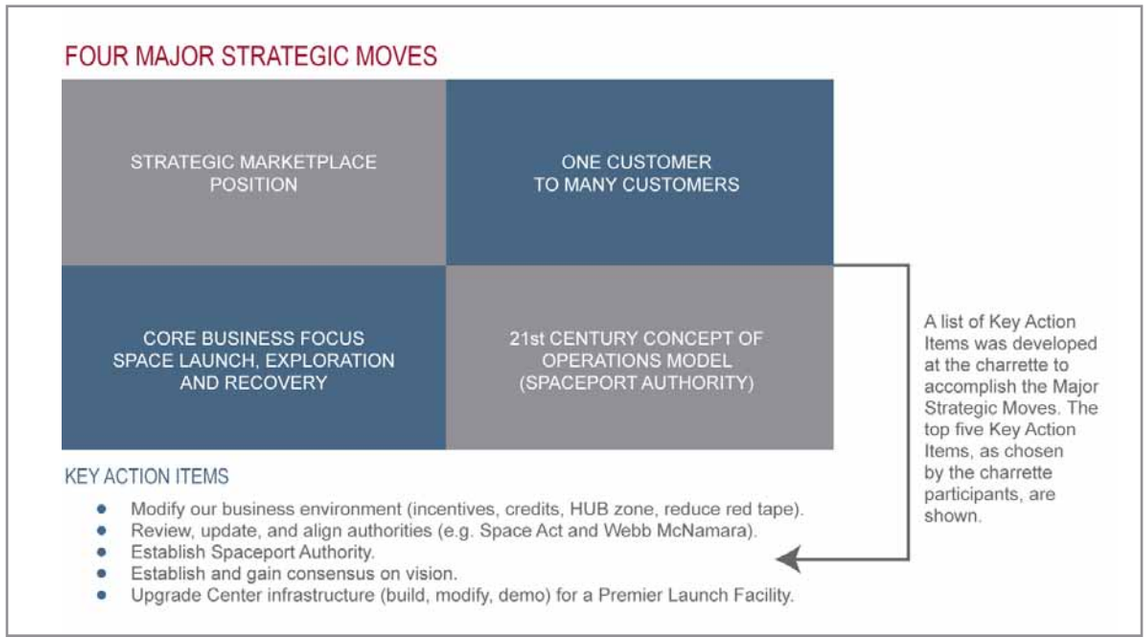
- KSC has a unified spaceport that flies both government and commercial missions
- A "right sized" KSC. Facilities are optimized through disposal (i.e. commercialize), demolition, and modernization, and matched to the future mission / market demand
- Be the world's leader in space supply chain management, encompassing research & development, testing, manufacturing, quality control, ground operations, launch and recovery
- KSC has technology leaders that support a premiere space facility for the 21st Century Use of human capital as a technological resource.

2.4 ADDING NEW VALUE TO ADVANCE NASA'S PURPOSE

Partnerships with commercial entities and other government agencies will be developed to leverage KSC real property assets, help facilitate the shrinking of the NASA infrastructure footprint, and enable the private sector to bring more resources and capabilities to bear in their support for NASA's Mission and purposes.

By providing expert advice and access, KSC will foster commercial and entrepreneurial activity for developing and demonstrating commercial space transportation capabilities, which stimulates employment growth in engineering, analysis, design and research. KSC will continue to build on these valuable partnerships to support and promote commercial development as promising new markets arise.

The Space Act gives NASA broad authority to carry out its mission through the use of Reimbursable, Non-reimbursable, and Funded Agreements. KSC will use the Space Act and other authorities to build a community of government and commercial spaceport tenants and users, to provide access to the launch and processing areas, and to leverage the underutilized capacity of the Center's existing infrastructure.



NASA and Space Florida have just signed a government-to-government, long-term facility use agreement that will allow this former Space Shuttle processing hangar to be re-tooled and re-purposed for use by a commercial space service provider at KSC.

The NASA Juno spacecraft sits atop an Atlas V rocket at Complex 41, located on KSC. Space Florida facilitated private financing to build a new launch complex infrastructure supporting the U.S. Air Force's EELV Program

A Strategic Federal-State Partnership with Florida

The relationship between NASA and the State of Florida has grown ever stronger over more than 50 years of human spaceflight and space exploration. The very establishment of the launch operations complex on Merritt Island in 1961 required the State's dedication of more than 55,000 acres of submerged and other land for NASA's use in the nation's space program.

Since that time, Florida's engagement with the space program has grown, and dramatically so over the past two decades. Florida has become a key strategic partner with both NASA and the U.S. Air Force, facilitating the recapitalization of major launch complexes and support facilities to enable their continuing support for both government and commercial space transportation systems.

In 1989 Florida's Legislature established a special district entity, now known as Space Florida, to lead aerospace economic development within the State. Recently Florida's Department of Transportation has incorporated space transportation infrastructure into its strategic intermodal master planning, similar to its planning and public investments related to airports, seaports, rail systems, and highway networks.

Space Florida has several existing land and facility use agreements at KSC to enable the development of space-related research and technology activities, support use of the International Space Station and KSC's shuttle runway, and facilitate the commercial space industry. It is licensed by the FAA as a site operator of launch facilities at Cape Canaveral Air Force Station.

Florida has partnered with NASA in virtually every aspect of the agency's Mission and will play an increasingly vital role in execution of this FDC. For that reason, Florida has engaged in this planning effort as a major contributor of resources and ideas, both as a development partner and a principal stakeholder.

3.0 SPACE TRANSPORTATION DEMAND DRIVERS

KSC's future concept as a multi-user spaceport requires support for diverse space transportation systems, operated by both government and private entities. What drives the space transportation demand is the full spectrum of current and emerging user markets for human spaceflight, space resource applications in earth orbit, exploration and eventual resource development beyond earth orbit, national security needs, and sponsored research/STEM activities.

Only one space transportation system, NASA's developing heavy lift Space Launch System, is required by its size and architecture to use a KSC launch site during the 2012-2031 planning horizon. All others, both existing and expected to be available, can be supported by other launch sites and support infrastructure outside KSC's institutional base. Even the Atlas V system, a candidate booster for commercial human spaceflight and workhorse for lifting national defense payloads, is functionally integrated with the Cape Canaveral Air Force Station (CCAFS) base infrastructure even though it is on KSC's land.

The FDC therefore relies on a transformation of KSC's business model and concept of operations to achieve its vision for hosting and enabling space access for all.

3.1 SPACE TRANSPORTATION USER-DEMAND FORECASTS

The global space industry is evolving rapidly to meet the needs of expanding national markets, and compete for both existing and emerging commercial markets.

The user demand that supports the 2012-2031 flight operations analysis contained in this FDC is predominantly in markets that have yet to be firmly established. These include the government and commercial demand for exploration beyond earth orbit, government and commercial demand for transport of humans into earth orbit, and the emerging suborbital market for commercial human spaceflight, research, and STEM activities.

National security, civil, and commercial demand for space lift to deploy orbital spacecraft or NASA robotic/science missions will remain relatively flat. At best, a fairly steady pace of launches per year will be required. These needs can be largely if not entirely met by existing space launch capabilities on CCAFS, other U.S. sites, and overseas spaceports that have captured the major share of available commercial satellite business.

The actual market demand for human spaceflight, both orbital and suborbital, or for other potentially large markets such as research and STEM experiments, depend on a much lower price point for space access than ever before achieved. However, systems are currently in development to provide suborbital access for humans at $200,000 or less per flight, and for experiments ranging as low as a few thousand dollars per flight. Commercial orbital flight to ISS was introduced by the Russian Soyuz system at an initial cost of approximately $25 million, and the cost per seat for U.S. astronauts now exceeds $50 million.

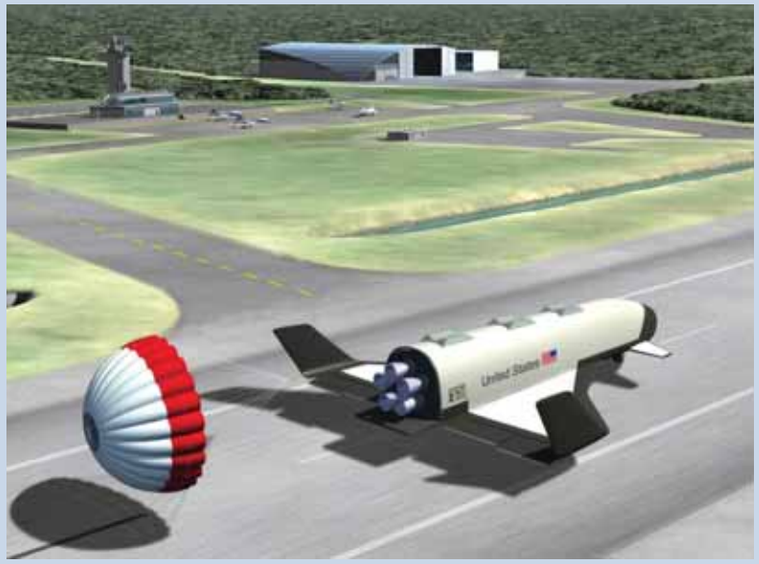
3.2 ANTICIPATED AND POTENTIAL SPACEFLIGHT SYSTEMS 2012-2031

The principal space transportation systems which will or potentially could operate from KSC sites during the 2012-2031 timeframe include:

NASA's SLS heavy lift booster, initially offering a 70 metric ton lift capability and coupled with the Orion multipurpose crew vehicle, is in development to make its first test launch in late 2017 and first crewed flight in 2021 from Pad 39B at KSC. Initially reliant on legacy Shuttle hardware such as the Solid Rocket Boosters and Shuttle Main Engines, a competition for booster elements is planned early in the program development to establish the vehicle's future configuration. System development and flight rate will depend on NASA budget resources assigned to it.

Both existing systems in the USAF Evolved Expendable Launch Vehicle Program (EELV) could adapt to fly from KSC's Complex 39 in addition to Complex 41 and the Cape's Complex 37. Current and growth versions are planned at least through 2030, when the USAF has targeted a replacement system for the EELVs. That future system could emerge during this time frame as a development program to demonstrate and field a fly-back first stage booster that would be fully reusable and reduce mission launch costs. The existing EELVs and enhanced versions could support a wide range of user missions, including support for commercial human spaceflight, NASA and commercial exploration missions, and "game changing" markets that could emerge, such as incorporating propellant depots into exploration architecture or developing space-based solar power.

The new and evolving family of Falcon launch vehicles privately developed and operated by SpaceX also is targeted to address the user needs described above, and is already contracted for NASA cargo delivery to ISS. In addition, other launch vehicles commercially-developed and operated using technology derived from legacy programs may emerge. These could include ATK's proposed Liberty rocket.



Reusable Fly-Back Booster

Re-usable Booster System

OPPOSITE PAGE: View of NASA's planned Space Launch System (SLS) on Pad 39B. In background, a commercial reusable launch vehicle is taking off on a suborbital flight. NASA art by Pat Rawlings.

Atlas V

Delta IV

Falcon 9

ATK Liberty

2012 - 2031 Planning Envelope Forecasts
Average Annual Launch/Landing Flight Operations
Departing from or Arriving at KSC

Flight Rate	Exploration Beyond LEO Gov. and Commercial (Heavy Lift for HSF, Cargo, Spacecraft)	Orbital Commercial Human Spaceflight (VL/V or H Landing)	Orbital Commercial Cargo and Spacecraft (VL/V or H Landing)	Horizontal Launch and Landing for Orbital Missions	Horizontal Launch &/or Landing for Suborbital Missions (HSF, Research, STEM)	Vertical Launch &/or Landing for Suborbital Missions (HSF, Research, STEM)
High	2 - 3	8 - 16	14 - 21	12 - 16	1200 - 1500	1200 - 1500
Assumed	<1 - 1	4 - 8	7 - 14	6 - 12	600 - 750	600 - 750
Low	<1	1 - 2	<7	1 - 2	60 - 90	60 - 90

Virgin Galactic White Knight

Suborbital reusable launch vehicles are currently in development but not yet flying. Both Virgin Galactic's aircraft-launched Spaceship 2 and the XCOR Aerospace Lynx, rocket-powered for an airplane-like horizontal launch and landing, are in development at Mojave, California. Either or both could fly from KSC in the next few years if they become operational. Other providers also have vehicle systems planned to compete in this market.

Similar in development status and targeted market are the vertical-launch, vertical landing systems, two of which are already flying early versions. Masten Space Systems and Armadillo Aerospace have demonstrated such vehicles. Masten is expected to soon initiate flights at Complex 36 on CCAFS.

Other space transportation systems that will potentially emerge in the next 5-10 years include horizontally-launched systems in which a very large aircraft serves as the first stage. These have been proposed for both orbital mission payloads, and eventually, for growth into the orbital human spaceflight market. Configurations involve a variety of carrier aircraft and air launch systems to deploy the upper stage and payload.

Finally, a diversity of new technology vehicles may need sites for test flights and vehicle development. KSC can readily support such programs on a non-interference basis with operational flight systems. In addition, non-spaceflight, specialized aviation uses will be supported at KSC's former SLF to help develop and mature commercial spaceflight. Non-space applications, such as Unmanned Aircraft Systems (UAS), can help advance future aviation as well as spaceflight.

3.3 AVERAGE ANNUAL FLIGHT RATE FORECASTS 2012-2031

To provide a planning basis for future space transportation infrastructure needs during the next 20-year horizon, assumptions regarding anticipated spaceflight systems and architectures to be served by KSC have been coupled with analysis of available data and industry trends to forecast average annual space flight operations requiring KSC land sites and launch/landing facilities.

These forecasts provide a planning envelope in three scenarios for each of the six major categories constructed to accommodate anticipated mission demand. The summary of these forecasts are shown on page 12. The "assumed" scenario illustrates an average annual flight operations rate for each group of missions that is reasonable given the current state of NASA program objectives, industry development, potential market demand, and KSC "capture" potential.

However, since spaceport infrastructure, operations, and business models must be scalable and adaptable to actual flight rates experienced, the matrix illustrates both low and high alternatives to the "assumed" rates for each group.

The key assumptions used in formulating these forecasts are summarized here for each group:

EXPLORATION BEYOND LOW EARTH ORBIT (LEO)

The assumed rate for NASA's newly base-lined Space Launch System (SLS) averages less than 1 flight per year, with the first SLS test flight currently scheduled for late calendar year 2017, and the first crewed flight in 2021. Total for the system and its growth version is forecasted to be 7-10 flights through 2031. In addition, 7-10 flights of one or more commercially-developed systems are assumed in support of government or commercial missions beyond LEO.

The low scenario for this group recognizes the risk of SLS development stretching out for budget or technical reasons, or a future restructuring of space lift strategies or priorities, and few, if any, commercially-provided heavy lift launches for exploration beyond LEO.

The high scenario allows for greater than anticipated government mission demand and accompanying resources, and/or the growth of market demand, both government and commercial, for a commercially-operated heavy lift vehicle to support exploration missions.

Synergies with DoD and FAA

KSC has had a strategic and synergistic relationship with adjoining CCAFS since the very beginning of the nation's space program. Smaller and more geographically constrained than KSC, CCAFS has none-the-less developed, in collaboration with NASA and other entities such as Space Florida, a far more diverse base of launch capabilities. It hosts and supports military, civil, and commercial users and offers an existing model of a multi-user space launch complex on federal property using a federal range.

This FDC identifies ways in which KSC launch and support capabilities can augment and expand flight activity at the Florida range to optimize the best attributes and mission needs of both installations. KSC can offer a solution to CCAFS needs for improving efficiency in its launch hazard zone by accommodating relocation of CCAFS administrative and support functions.

This FDC also identifies opportunities for KSC capabilities to support emerging and future research, development, and operational activities important to national security missions.

A more recent but equally important federal relationship has emerged with the FAA Office of Commercial Space, which plans to establish a Commercial Spaceflight Technical Center at KSC. Working with the FAA and industry partners, KSC hopes to serve as a key national test bed for maturing the technologies and procedures to fully integrate space transportation into the national airspace system and as an integral part of the U.S. economy. The FAA will have increasing regulatory involvement in commercial activities hosted at KSC, and is a federal stakeholder with significant interest in the use of KSC assets enabling commercial space.

ORBITAL COMMERCIAL HUMAN SPACEFLIGHT

The assumed flight operations (launches and landings) of 4-8 per year on average over the next 20 years includes at least two system providers meeting the currently projected need for NASA astronaut crew transport to ISS, coupled with a modest demand for non-NASA flights. This level of activity includes potential for landing of a winged or capsule system back at KSC.

The low scenario represents an expected minimum flight rate for orbital commercial human spaceflight to ISS or for other LEO missions regardless of the NASA ISS crew transport needs. The high scenario represents growth in both government and commercial LEO demand.

ORBITAL COMMERCIAL CARGO AND SPACECRAFT

The assumed 7-14 flight operations per year include both vertical launch/vertical landing and vertical launch/horizontal landing vehicle systems. The systems are designed to deliver crew and cargo to the ISS, other LEO points, deploy satellites or other spacecraft, and enable other mission needs for government and commercial customers. Landings may involve reentering vehicles following the mission, or potentially, fly-back first stage boosters.

A lower flight rate would be expected if KSC is less successful in market capture, and/or with less or longer-term innovation from conventional vertical, expendable systems. The high scenario represents higher market demand for KSC sites, and nearer-term innovations toward partial or full system reusability.

Boeing proposed Crew Space Transportation (CST-100) capsule

SpaceX Dragon

Blue Origin New Shepard

Sierra Nevada Dream Chaser

HORIZONTAL LAUNCH AND LANDING FOR ORBITAL MISSIONS

All three scenarios envision the emergence of one or more horizontally-launched systems that employ very large aircraft. They may be transient to KSC or be based here. Mission requirements and demand are generated by both government and commercial users. Forecasted average annual flight operations are based on when such systems begin operating in the planning period, number of systems operating, and mission demand.

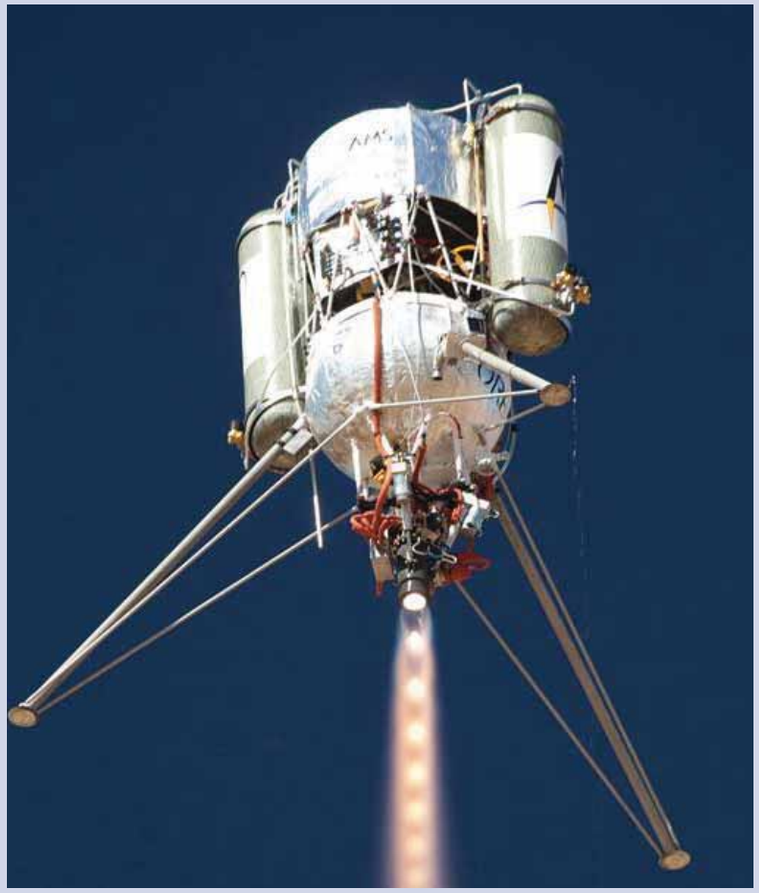
HORIZONTAL LAUNCH AND/OR LANDING FOR SUBORBITAL MISSIONS

All three scenarios envision the near-term emergence of the reusable launch vehicle (RLV) systems in current development to service suborbital demand for human spaceflight, research, and STEM activities. The assumed rate is based on at least one tenant operator at KSC providing a nominal three flights per day, with 200 operation days per year. The low scenario is based on one provider performing "sortie" flight campaigns from KSC for 10 flight days with an average of 3 flights per day. The high scenario envisions more than one tenant operator, or more frequent transient use coupled with one or more tenant operators, and the possible emergence of early point-to-point development flights.

XCOR Lynx

VERTICAL LAUNCH AND/OR LANDING FOR SUBORBITAL MISSIONS

Similarly, vertical takeoff, vertical landing reusable launch vehicle (RLV) systems are already operating to service the suborbital demand. The assumed rate is based on at least one tenant operator at KSC providing a nominal three flights per day, with 200 operation days per year. The low scenario is based on one provider performing "sortie" flight campaigns from KSC for 10 flight days with an average of 3 flights per day. The high scenario envisions more than one tenant operator, or more frequent transient use coupled with one or more tenant operators.



Masten Xombie

4.0 SPACEPORT BUSINESS MODEL

KSC's business model concept for the future embraces two key objectives considered critical to the long term viability of the Center as a multi-user spaceport.

The first is evolving away from the traditional KSC business model of spaceport facilities infrastructure being fully dependent on NASA resources for capitalization, re-capitalization as those facilities become obsolete or inefficient, and for the sustaining operations and maintenance. The new model allows for non-traditional sources of funding facilities initial costs, their eventual replacement, and their O&M. The goal is for the spaceport to be increasingly self-sustaining.

In the future model, NASA's programs become more like major tenants and customers, with a lower burden for common spaceport infrastructure and services as a broader customer base grows to contribute. Non-federal entities, public and private, operate capabilities and services that NASA may use as needed instead of own. Federal ownership of the land that comprises KSC is retained, along with jurisdiction for land use planning, controls, and the integrated activities of the spaceport. However, the ownership and operation of space launch and support facilities, and even spaceport infrastructure and services, become a blend of NASA, other U.S. government, non-federal public entities, and private industry. NASA programs and other users of KSC's facilities and services become an integrated community of providers, suppliers, and customers, owning and operating only what they need to carry out their business.

The second key objective is to transition existing constructed assets in the most effective way to facilitate KSC's diversification. This "right sizing" of KSC's current $6 billion of assets will respond to the Agency's facilities strategy for a future infrastructure that is "similar in capability" but smaller in footprint. It also reduces the future burden to be shared by other non-NASA users. KSC's Master Plan will lay out an implementation approach to reduce it's footprint by a combination of demolition, consolidation, and divestiture. This process is already underway, as represented by the recent out-grant of OPF 3 and associated facilities to Space Florida.

To succeed in balancing the needs of all spaceport users, and create an operating environment that responds to both commercial and government needs for affordable and responsive access to space, KSC must ultimately evolve from Agency field center to self-governing spaceport. That evolution can take place over time and in conjunction with the relative balance between NASA and non-NASA customers. The flexibility inherent in an independent authority to operate in a more business-like fashion than a government agency makes it the most attractive end-state for a multi-user spaceport seeking to offer modern and affordable support capabilities to its customer.

This supports the one common theme reflected across all groups of stakeholders; the need for KSC to operate more like an airport, with a greater flexibility to adapt to the new business environment confronting both government and industry.

OPPOSITE PAGE: Artist's concept of the initial phase of Exploration Park under construction by Space Florida in cooperation with NASA. A Delta IV rises from Complex 39 in the background. NASA art by Pat Rawlings.

Divesting Without Diminishing

KSC's future is built upon a core concept that reconciles NASA's need to reduce its fixed asset footprint while preserving capability to perform the agency Mission, including the enabling of a strong U.S. space industry. This concept divests Agency assets at KSC without diminishing the launch complex's capability to serve as a national asset supporting both government and commercial space transportation needs.

KSC can meet and potentially exceed the current Agency target for a 10% reduction of existing KSC CRV by 2015 using this approach coupled with planned demolition. KSC will develop specific goals for the 2012-2031 timeframe in its Master Plan, along with an implementation approach.

Candidate assets and strategies for achieving CRV reductions are highlighted in later sections of this FDC addressing horizontal infrastructure and future spaceport facilities. *(Sections 9 and 10)*

The concept of divesting without diminishing produces a win for NASA, and a win for the nation's effort to sustain U.S. leadership in civil and commercial space programs amid global competition and constrained agency resources.

KSC believes this concept can be accomplished through the transference of asset ownership (actual title change to existing improvements), replacement of existing NASA-owned assets with assets owned by others, or by effective transfer of ownership liabilities by contractual terms negotiated with public and private entities.

Key mechanisms to be further studied and developed as a part of KSC's new Master Plan will be:

- **Public Benefit Conveyance to the State of Florida or appropriate special districts established by the State of Florida (e.g. Space Florida) for the purpose of operating conveyed improvements as elements of a spaceport, airport, or seaport.**

- **Out-granting long-term use of existing fixed assets and the underlying land on contractual terms that effectively transfer all obligations and liabilities of ownership to a public partner, such as the State of Florida or a Florida special district.** *The right-to-use agreement includes the partner's assumption of operational and third party liabilities, all O&M costs, any future requirement for repair or replacement for any reason, and an obligation to demolish improvements at the conclusion of such use.*

- **Providing to a commercial or non-profit entity the use of government-furnished property (land, structures, and/or equipment), in conjunction with granting a "right of commerce" to perform a spaceport service or function in exchange for assuming all obligations and liabilities of ownership, as described above.** *This approach would be similar in principle to the granting of the concession agreement that has enabled the private-sector's operation of and investment in the KSC Public Visitor Program without dependence on appropriated funds.*

5.0 SPACEPORT CONCEPT OF OPERATIONS

The KSC of tomorrow will be expected to reliably support a multitude of space launch systems. An evolving shift in KSC spaceport operations will be required to integrate diverse activities carried out by both government and commercial providers.

Commercial space providers will be incentivized to locate supply chain functions on or near the spaceport for economies of scale. Some may strive for the greatest possible degree of self-sufficiency, occupying dedicated facilities they lease or construct, providing their own support services, vehicle processing, and out-sourcing only what they must.

Other users may seek to obtain processing and support capabilities available from commercial or government sources on the spaceport, potentially from KSC itself.

Even government programs, including NASA's, may operate in different degrees of self-sufficiency, and with variable tolerance or desire to share facilities, or support capabilities, with others.

In this future environment of co-located government and commercial activities, KSC will function as a spaceport operator, and the overall integrator of activities to ensure operational compatibility, and the safety/security of the entire spaceport community as well as the visiting and neighboring public. KSC, as the spaceport operator, will have to de-conflict individual user concepts of operations in an integrated operations environment.

The KSC Master Plan will identify the core set of capabilities, services, and related infrastructure requirements, necessary for KSC or any successor entity (e.g. spaceport authority) to effectively perform this role in a manner that will both ensure high confidence of reliable service to both NASA mission customers and other users.

Commercial space providers will require less restrictive access for their operations, vendors, and customers, which may include foreign nationals as well as private citizens. The current complex and multi-layered regulatory environment will discourage if not prevent commercial industry utilization of KSC.

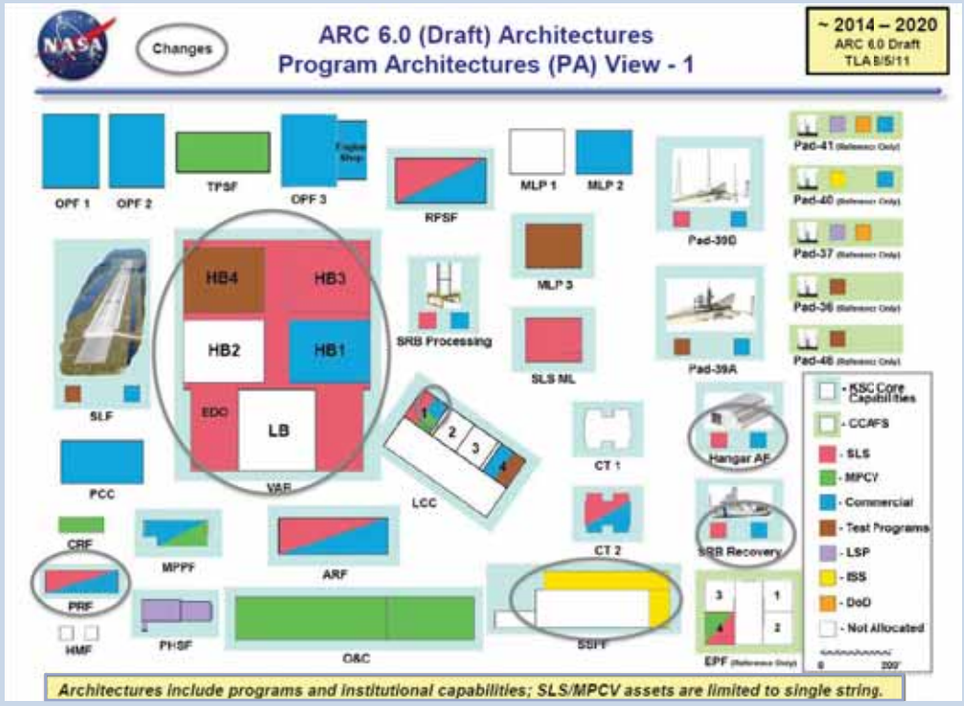
Models KSC will evaluate for applicable practices that can help it address these issues include operations at seaports, airports, and other spaceports.

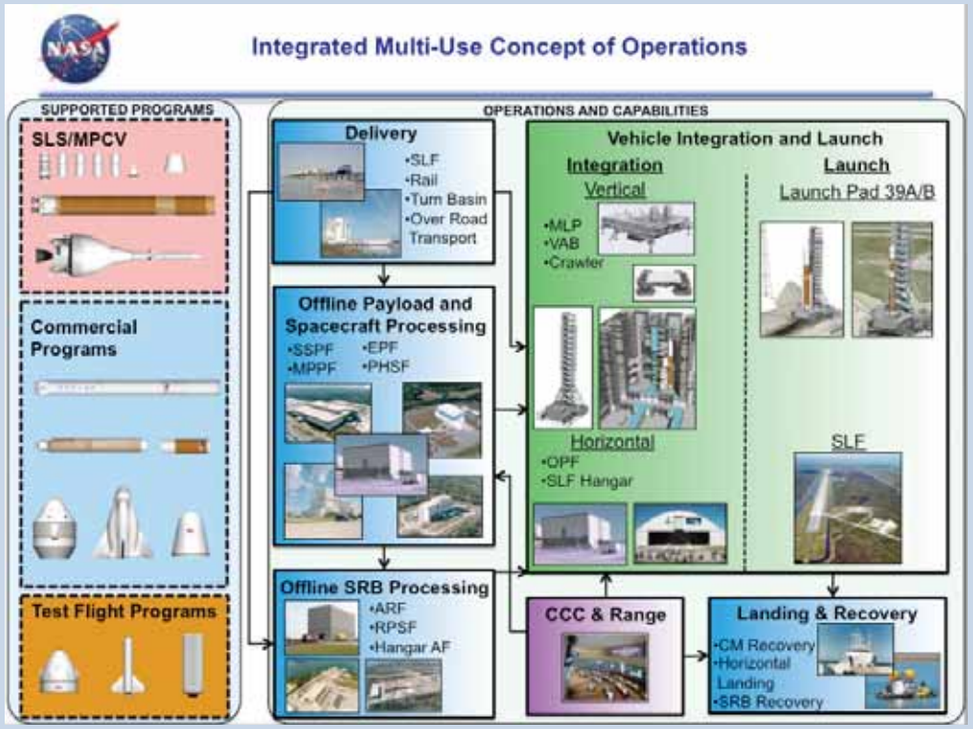
5.1 21st CENTURY GROUND PROCESSING ARCHITECTURE

The 21st Century Ground Processing Program has been established at KSC to integrate the needs of NASA human spaceflight programs along with other potential users of existing KSC launch and processing facilities.

A preliminary and evolving architecture for this integration has been developed based on identified and notional user requirements. This has also included a high-level analysis of processing flows through KSC facilities.

Recent, but still evolving, concepts for both facilities utilization and concept of operations are depicted in the following two charts. Development of the KSC Master Plan will incorporate future iterations, and allow for the necessary scalability to higher or lower than "assumed" flight rates, and to adapt to fewer or greater KSC-hosted systems, and their associated support and customer needs.



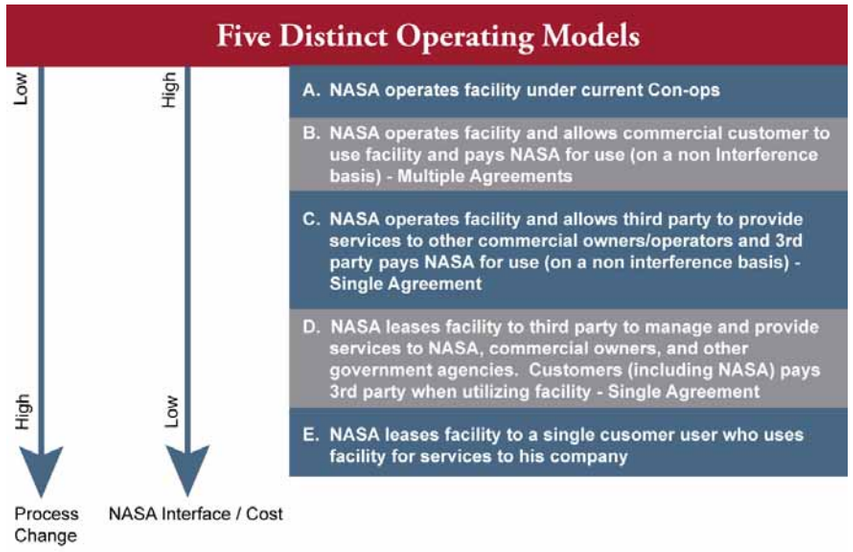


OPPOSITE PAGE: Looking south from Complex 39-B, this rendering shows a variety of space transportation systems in operation. NASA art by Pat Rawlings.

Initially, KSC plans to incorporate into its Master Plan the concept of "Commercial Operating Zones" which will act as enabling areas of the Center that streamline processes, improve accessibility, and establish, to the degree feasible, a safety and regulatory framework no more stringent than would be experienced in a non-federal environment. Other alternative Land Use overlay zones are described in Section 8.

5.2 POTENTIAL OPERATING MODELS FOR EXISTING NASA FACILITIES

KSC is evaluating a number of different approaches to operating facilities that the Agency may retain, such as those used for payload processing. Some potential operating models under consideration are illustrated below. These and others will be refined during the development of the Master Plan and ongoing assessments.



5.3 AIR SPACE AND THE EASTERN RANGE

Along with determining the concept of operations for our horizontal infrastructure, the Center must also ensure that our vertical assets are preserved as well. KSC does not manage its airspace or the Eastern Range. Controlled airspace at KSC and CCAFS, along with the Eastern Range, is managed by the 45th Space Wing. With the end of the Shuttle Program, KSC's restricted airspace is coming under scrutiny by the FAA and airlines that want to utilize the airspace for commercial aviation to reduce flight times and fuel costs.

Future suborbital and orbital space flight vehicles will utilize the existing restricted airspace for flight vehicle test, validation and operations. Maintaining airspace use for space transportation purposes is crucial to KSC's future viability as a multi-user spaceport.

Future launch providers will require increasing flight rates to serve the commercial space market. These increased rates may require multiple flights/launches per day.

Future range policy and architecture studies are in progress with participation by NASA, the FAA, and the 45th SW. These will help to define a future state that can be incorporated into the revised KSC Master Plan.

Evolution of a Multi-User Spaceport

The KSC spaceport will evolve over time to best meet the needs of both NASA and other spaceport users. How much adaptation is ultimately required will depend on how successful KSC is in attracting non-NASA providers. NASA-KSC will continue to own all of the land and as the diversity of users grow on the federal property, different authorities will allow for more flexibility at the spaceport. There is no specific timeframe to this evolution, instead it will be user base driven.

NASA-Dedicated Program

Since its inception, Kennedy Space Center has operated as field center for NASA. Under this structure it has certain authorities delegated to it from NASA HQ. As a NASA field Center, KSC operates under NASA appropriated funds. Any facility and/or Center specific revitalization and upgrades must be submitted to the Agency during the annual PPBE cycle. KSC essentially competes with other NASA field centers in other states to receive funding. Any profits made at KSC through agreements (except EUL) are returned to the U.S. Treasury. All assets that reside on KSC CRV rolls are considered "agency" assets. Under this model, KSC can enter into individual tenant agreements for facilitates and services.

Increased Commercial Presence via KSC/Tenant Agreements

In this model, NASA is still the landowner and majority operator at KSC. KSC has begun to install Commercial Operating Zones (COZ) over defined areas of the Center. These zones allow for maximum commercial flexibility. There is an increasing diversity of fund sources at the Center supporting the spaceport infrastructure. These fund sources come from NASA, other Federal agencies, state and commercial sources. COZ's would allow for flexible (non-federal) wage and safety requirements.

Commercial Spaceport co-located on KSC property

In this model the federal property is composed of NASA, other federal, state and commercial actors. NASA still owns all of the land – but the Agency only owns facilities and infrastructure that support it's programs or capabilities. Most of the federal appropriated NASA funds are used in support of NASA mission and programmatic functions. A Spaceport Authority now exists that operates the Commercial Operating Zones. This Authority could be a dedicated NASA Spaceport funding line (separate appropriation), or a state or other federal entity. Both the Authority and NASA presence would be located within the current 140,000 acre footprint. The advantage of the Spaceport Authority would be its ability to raise capital, retain earnings and issue bonds.

Evolution of a Multi-User Spaceport

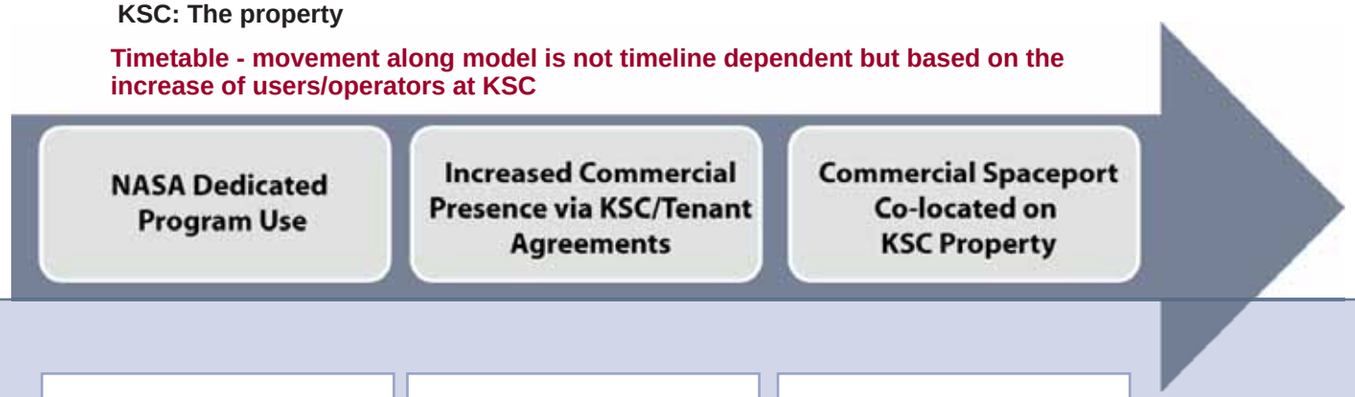
Assumptions:

Spaceport: Dedicated Authority to operate a spaceport on KSC property (ex: NASA –Dedicated funding line, State or other Fed)

NASA/KSC: NASA Programs and civil servants on KSC Property

KSC: The property

Timetable - movement along model is not timeline dependent but based on the increase of users/operators at KSC



NASA:

NASA owns/operates all assets/land

NASA appropriated funding used for all O&M

Government & NASA program focused

NASA/KSC proposes real property agreements, NASA HQ reviews/approves

Non-NASA operators:

Individual agreements for individual facilities/services

NASA:

Owns all land

Funding used for O&M of NASA managed assets

NASA/KSC meets needs of all users equitably

Less infrastructure charges to KSC

Commercial Operating Zones:

Federal, State, & Private asset ownership

Defined/dedicated areas where assets are managed by commercial entities to allow maximum commercial flexibility

Entity pays portion of infrastructure charges.

NASA:

Owns all land

Funds O&M and infrastructure for program/capability specific tasks and facilities (Hi-bay, Pad, etc)

Spaceport: Independently chartered Authority operates Commercial Zones

Increasingly self-sustaining

Ability to raise capital/bond for development/improvements

Provide market based pricing

Requirements more commercial friendly (OSHA, EPA)

6.0 SUSTAINABILITY AND CLIMATE CHANGE

John F. Kennedy Space Center

Lagoon water level rise assessment

Current conditions:

Atlantic Ocean

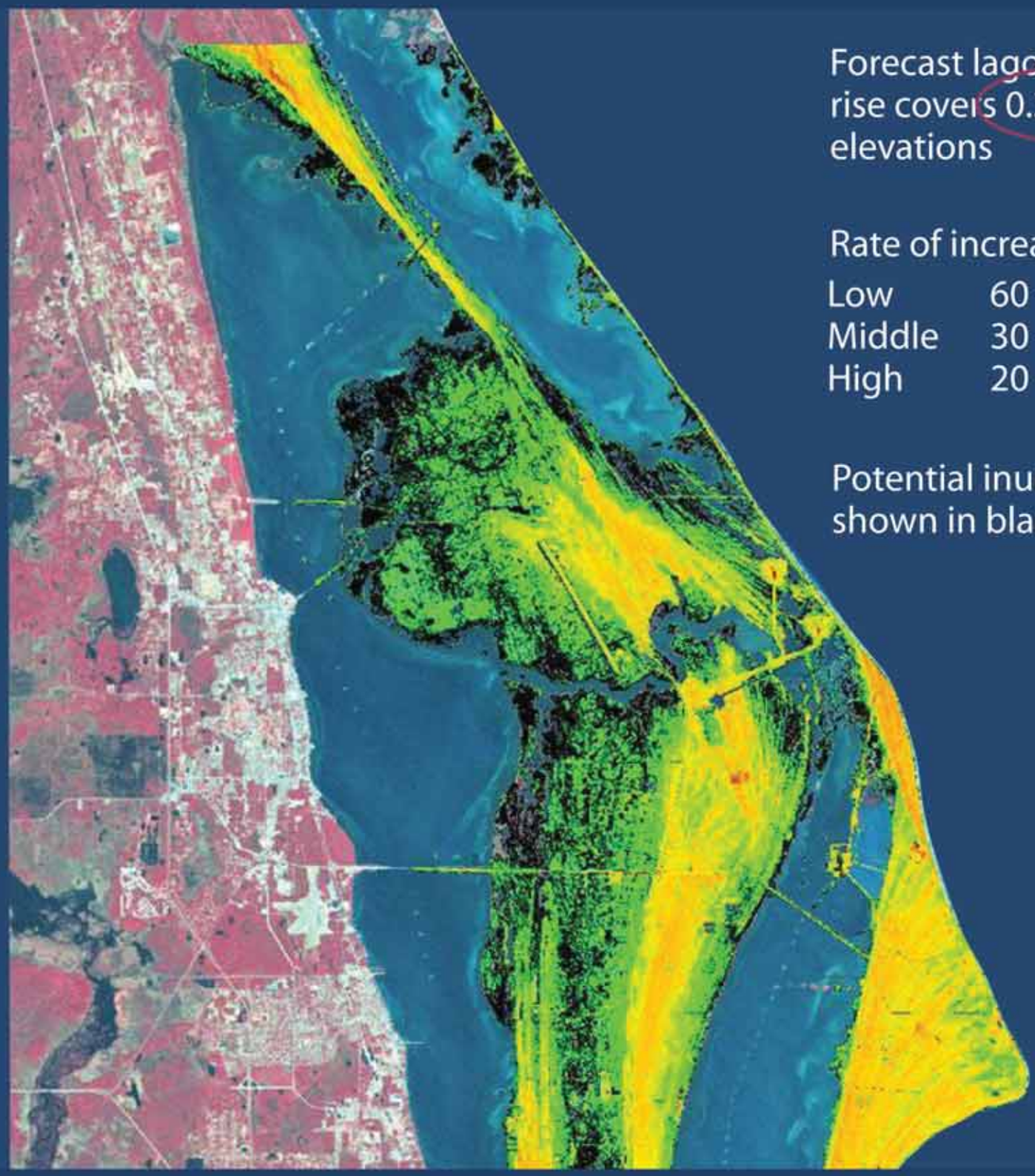
mean sea level
-0.26 m NAVD88

Fall high water level
-0.12 m NAVD88

Indian River Lagoon

mean water elevation
-0.21 m NAVD88

Fall high water level
-0.01 m NAVD88



Forecast lagoon level rise covers 0.3 to 0.4 m elevations

Rate of increase:

Low	60 - 140 yrs
Middle	30 - 45 yrs
High	20 - 35 yrs

Potential inundation shown in black

KSC is committed to future development that is both "leaner and greener." The FDC and new KSC Master Plan place high priority on increasing the efficiency of KSC land use, reducing our consumption of non-renewable resources, and lessening the carbon footprint of our spaceport. While the nature and degree of impact from human activity on the planet's climate remains uncertain, it is important to assess and plan for the potential risks associated with global climate change.

The World Commission on Environment and Development in 1987 defined sustainability: "Meet the needs of the present without compromising the ability of future generations to meet their own needs." In that regard, KSC will continue to steward its assets and land, and to work with partners to advance technologies that enable "greener" space launch and landing operations.

6.1 KSC GOALS FOR ENERGY AND WATER CONSERVATION

KSC is on track to meet established federal goals.

Under the Energy Independence and Security Act of 2007, federal agencies are to conduct annual comprehensive evaluations for 25% of its facilities. KSC has exceeded the 25% annual goal and has evaluated 2.64 Million SF, more than 35% of its total infrastructure. Current executive orders require that 15% of KSC's infrastructure meet the "guiding principles" for sustainable design by 2015. As part of its Master Plan, KSC will adopt development standards to ensure the spaceport serves as a model for sustainability.

6.2 ON-SITE GENERATION OF RENEWABLE ENERGY

In 2009 KSC entered into a public-private partnership with Florida Power and Light to construct a 10 megawatt solar farm on KSC property. The deal also provided KSC its own 1 MW solar facility which is now generating 1% of Center needs from renewable power. The Project won GSA's 2009 Achievement Award for innovative practices and initiatives.

To continue towards the goals outlined in the Energy Policy Act of 2005, the FDC envisions KSC expanding it renewable portfolio to include: wind, bio-fuels, hydrogen production, solar and sponsoring additional renewable energy production.

Overall, the FDC envisions achieving an increasing share of KSC's energy needs from on-site production. KSC is working with both public and private partners to attract a clean energy R&D cluster to Exploration Park. KSC anticipates further use of in-kind consideration in connection with energy projects if such authority is restored to NASA. In addition, KSC and its partners are exploring potential demonstration projects that can utilize KSC land and capabilities to develop clean energy for both electrical power, and for alternative fuels to power vehicles. Specific goals will be developed for the 2012-2031 timeframe in KSC's Master Plan.

6.3 RESPONDING TO CLIMATE CHANGE FORECASTS

The KSC Climate Adaptation Science Investigators (CASI) Phase 1 Study project utilized initial climate change hazards forecast data that was provided by the Goddard Institute for Space Studies (GISS). Downscaled climate projections for the rest of the century suggest increasing mean temperatures, rising sea levels, alterations in rainfall patterns with similar annual totals, increasing days of heat stress, and rising CO_2 concentrations.

An example of the GISS hazards data for forecast temperatures at KSC is shown in the table below. Rising sea level has been identified as the single largest hazard to continued KSC/CCAFS operations and regional land management activities.

Road Category (in miles)	Sea Level Rise Scenario 1 (0.2 m)	Sea Level Rise Scenario 2 (0.4 m)	Sea Level Rise Scenario 3 (1.2 m)
Primary	0.1	0.6	34.1
Secondary	0.9	3.1	46.1
Tertiary	2.7	10.8	159.4
TOTAL	3.7	14.4	239.6

Summary of GIS model predictions for road inundation at KSC based on the three sea level rise (SLR) scenarios selected by IHA.

The KSC Master Plan will manage both vertical and horizontal infrastructure needs based on assumptions based in the 0.4 meter sea level rise scenario defined in the phase 1 study. This scenario and it's forecasted accelerated timeframe of 20-35 years will meet the scope and period of the Master Plan update.

Propellants North Facility LEED Platinum

FPL 10 MW Solar Power Site

7.0 CONSIDERATIONS INFLUENCING SITE DEVELOPMENT

KSC was purpose-built on the eastern coast of Florida in the 1960s to facilitate the nation's space launch capability for conducting the Apollo-Saturn lunar landing program and future exploration to follow.

The selected site on Merritt Island was largely undeveloped and dominated by low-lying salt marshes and palmetto scrub lands, with limited existing infrastructure and development associated with small agricultural and fishing communities. Extensive site modifications were constructed by the U.S. Army Corps of Engineers to enable the spaceport's launch complex and support facilities.

The geographic advantages, and compelling national need, justified the public investments which have grown to $6 billion in replacement value over five decades. Still, about 95% of KSC's land area remains largely as it was when acquired, and relatively undisturbed from its natural condition.

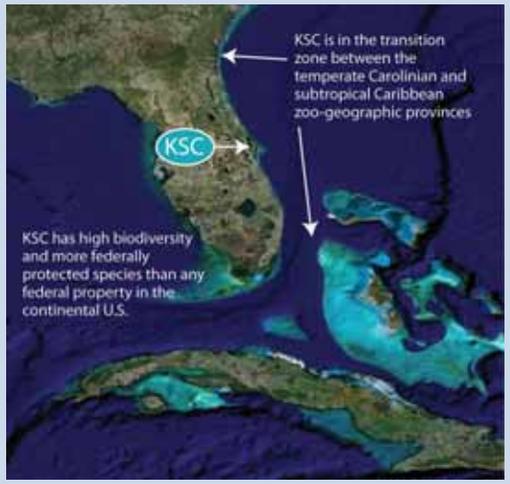
Working with partner agencies in the U.S. Department of Interior, KSC has enabled these undeveloped portions of its land to be managed for wildlife habitat conservation, and to enable, as a conditional and non-interfering use, public access for recreational purposes to pristine coastal beaches, inland waterways, and nature trails.

Today, and continuing into the future of KSC, there are several key characteristics of the natural and built environment that greatly influence site selection and development potential for activities associated with space launch, exploration, and recovery activities.

7.1 NATURAL ENVIRONMENT

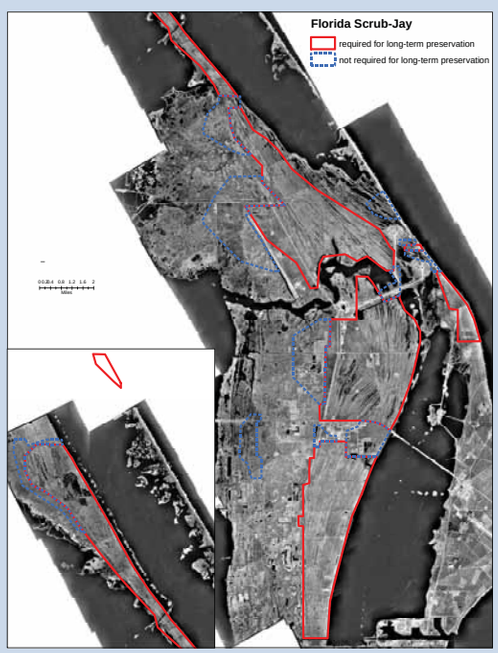
KSC and the associated Merritt Island National Wildlife Refuge (MINWR), Cape Canaveral Air Force Station, and Canaveral National Seashore (CNS) are co-located on the Cape Canaveral Barrier Island complex of east central Florida. These unique federal properties are in the transition zone between the temperate Carolinian and sub-tropical Caribbean zoogeographic provinces. Approximately 7500 acres of KSC are actively used to support space mission operations; the remaining lands are managed by the United States Fish & Wildlife Service (USFWS) as the MINWR and by the National Park Service (NPS) as the CNS. This unique relationship between space flight and protection of natural resources is carefully orchestrated to ensure that both objectives are achieved with minimal conflict.

Florida Scrub-jay



Carolinian and Subtropical Caribbean

Gopher Tortoise



Florida Scrub Jay Compensation Areas

WETLANDS, WILDLIFE HABITAT AND SPECIES PROTECTION

Seventeen federally listed wildlife species have been documented on KSC/MINWR, more than on any other national wildlife refuge in the continental U.S. KSC provides habitat for 330 bird species; nearly 90 species nest on KSC, many of which are year-round residents.

The Indian River Lagoon was designated as an "estuary of national significance" in 1990 by the Environmental Protection Agency. It has 400 species of fishes, 260 species of mollusks, and 479 species of shrimps and crabs.

Of particular species management concern are the Florida scrub jay, the Caribbean manatee, gopher tortoise, and indigo snake. Development of sites and activities that destroy habitat associated with these species, or impede the management of habitat through controlled burns, must be carefully assessed for impacts. Costs of development can include significant mitigation required for destruction or impacts to wetland areas, or upland scrub deemed critical to species management or preservation.

Wetlands Map

OPPOSITE PAGE: Launch Pad 39-A under construction in 1964 is pictured in this view looking westward towards the VAB.

Burn Management - Scrub Jay Habitat Creation

Controlled Burn

MANAGEMENT PLANS AND PRACTICES OF CO-LOCATED AGENCIES

The designation of MINWR and CNS, in 1963 and 1975, respectively, on approximately 132,000 acres that had not been required for NASA's operational infrastructure provides an operational buffer, assuring the safety and security of neighboring activities on the Center, and for the surrounding communities.

The USFWS and NPS exercise management control over agricultural, recreational, and environmental programs within their respective land management boundaries. NASA remains the landowner and retains jurisdiction to remove lands from the MINWR or operate within the CNS as needed to support the space program. NASA, working in partnership with the USFWS and NPS, has demonstrated that through careful land planning and management, use conflicts can generally be resolved to meet the objectives of all stakeholders. NASA includes CNS, MINWR and CCAFS in the Master Plan and site planning/review process.

The new General Plans for both the CNS and CCAFS have been carefully reviewed during preparation of the FDC, along with the established plans of USFWS for MINWR.

KSC TOPOGRAPHY, DRAINAGE, AND SOILS

Much of KSC remains low-lying, poorly drained, and vulnerable to inundation by periodic storm events, such as tropical cyclones or heavy seasonal rainfall. These are also the areas most at risk to be affected by global climate change in future decades.

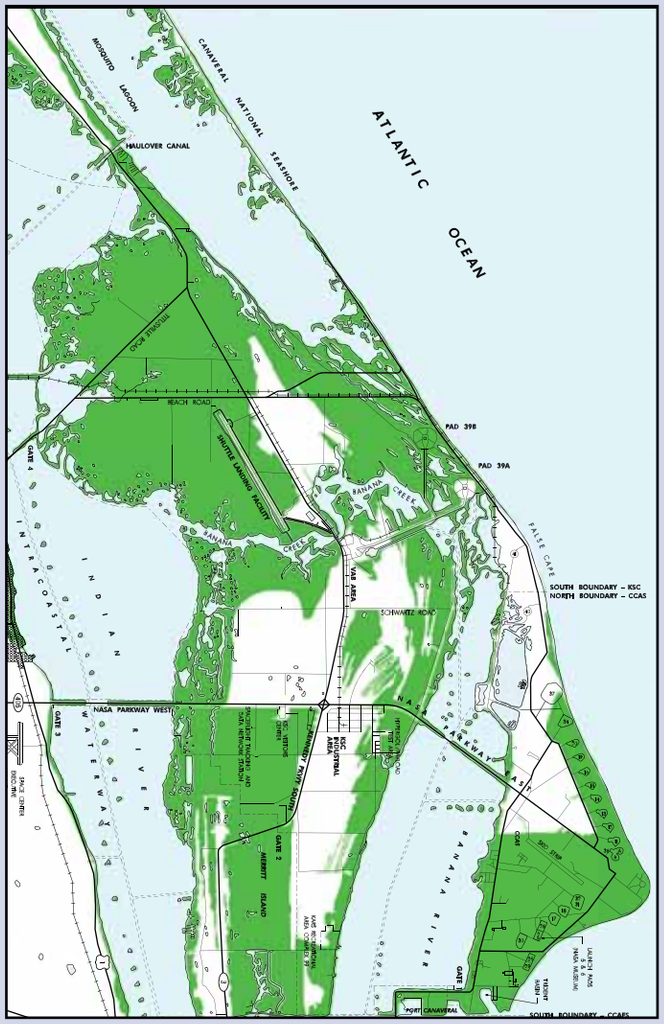
A "best practice" KSC for site development, whether for facilities or infrastructure like primary roads, is to assure construction is at or above an elevation of 10-feet above mean sea level. Development of sites which do not naturally offer this condition must incur the cost of fill and drainage improvements, which make them economically less attractive. This site consideration is a significant one for the FDC.

EXISTING AND FUTURE ENVIRONMENTAL REMEDIATION

KSC has numerous sites known to have been environmentally contaminated by past practices. These sites are now being monitored, and remediated as funds allow. Development in or near these sites is more complicated, or even infeasible, compared to other sites. NASA performs environmental baseline studies to document existing conditions and identify any past contamination prior to allowing any new uses or users to develop or re-develop KSC property and facility sites, with new users accepting liability for their future activities.

Monitoring Wells

Line-of-site considerations occur when telemetry and other data acquisition require an unimpeded "line of site" between collection devices and the object being tracked, normally a space flight vehicle on the launch pad or in flight. These are managed through height restrictions and siting processes.



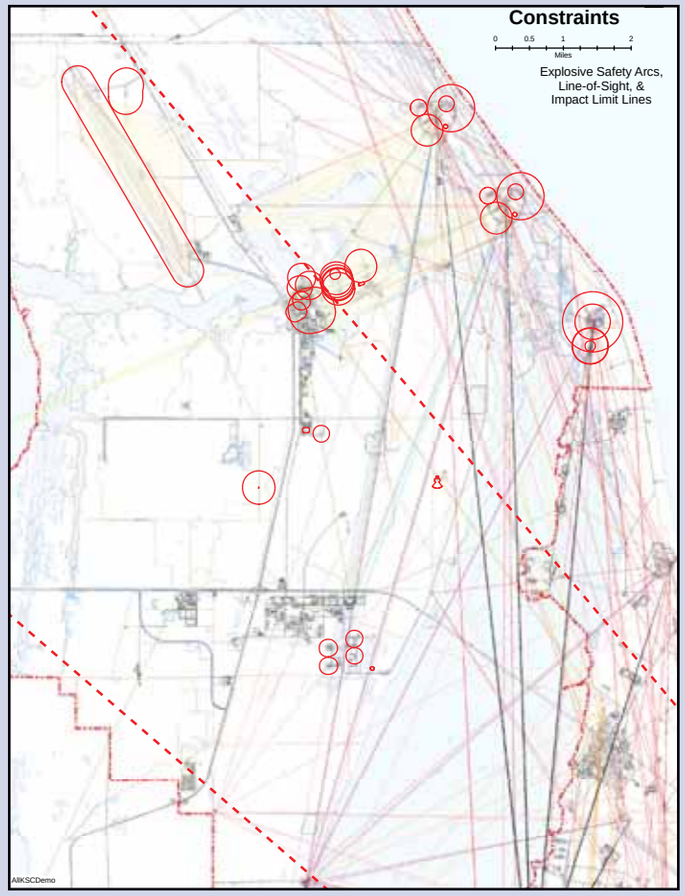
Category 3 Hurricane Flooding

7.2 BUILT ENVIRONMENT

In addition to the site development considerations and limitations imposed by KSC's natural environment, the built environment has several key characteristics unique to a spaceport that influence the selection and development of a site. These built environment considerations include lines of site, vehicle impact limit lines, and Quantity Distance (QD) arcs.

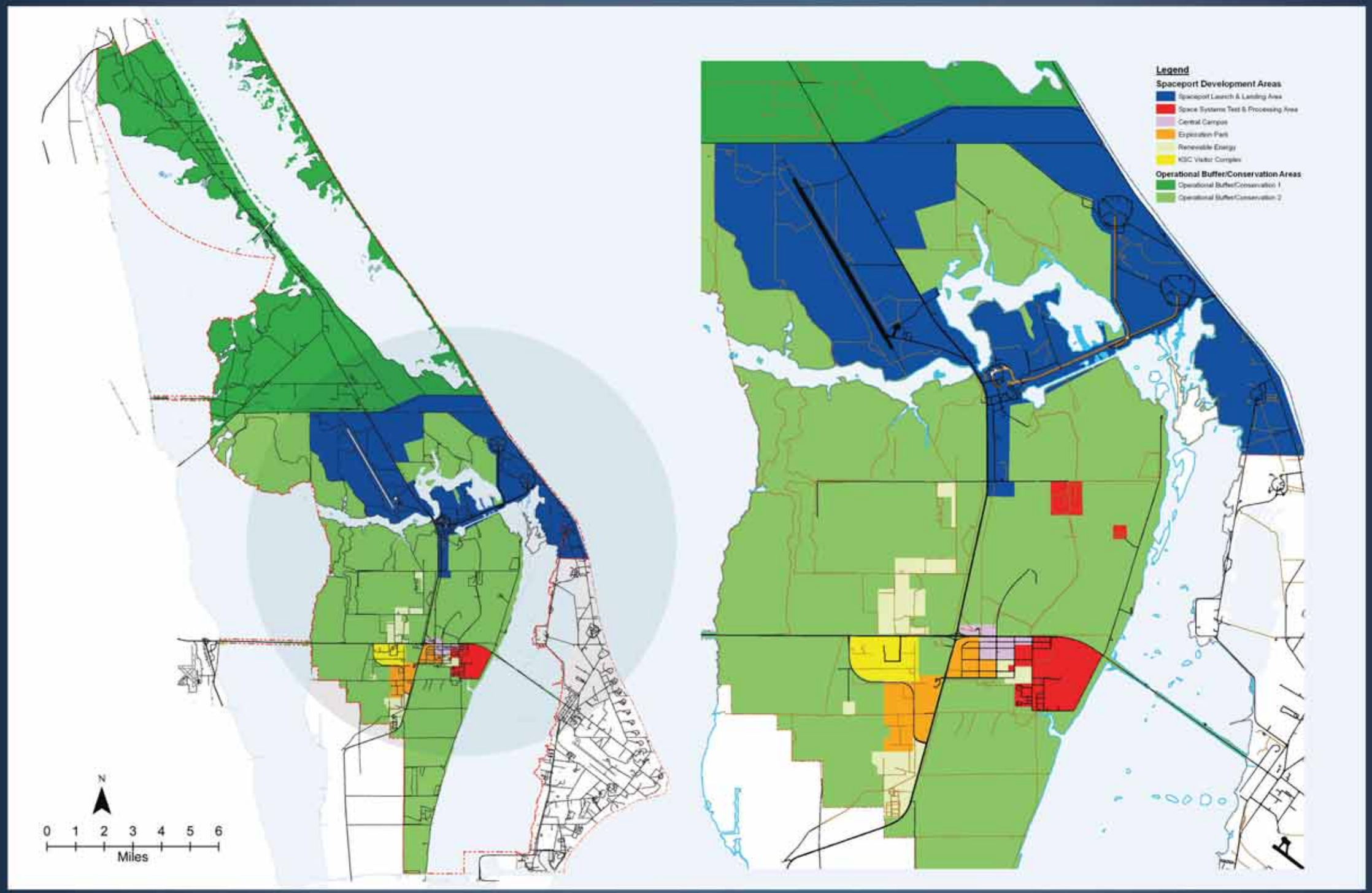
QD Arcs and launch/landing hazard impact limit lines are built environment constraints on development. These safety zones are dependent upon the explosive nature of an activity, or the potential for debris and hazardous materials to impact the ground in the event of a launch or recovery mishap. They serve a multiple purpose of protecting both the built environment and human life from the hazardous processing and launch related activities that are conducted at the Center

While it appears that they encompass the whole Center, in actuality, they represent only a fraction of the developable area. QD circles are concentrated in the spaceport's launch and landing operations area, and the space systems test and processing area. By utilizing thoughtful land management practices and the segregating of like activities in specific geographical areas around the Center, KSC is committed to providing land and space for future partner development.



Built Environment Constraints

8.0 FUTURE SPACEPORT LAND USE CONCEPT



In preparing this FDC, the planners have balanced the needs of both NASA and KSC to achieve future mission goals and objectives while preparing for the evolving requirements of additional stakeholders. In this process, KSC has developed an entirely revised Spaceport Land Use Concept.

This concept achieves significant progress towards a sustainable spaceport in both an economic and environmental context.

KSC plans to organize the Center's land use into 5 Spaceport Development Areas and two broad, Operational Buffer/Conservation Areas. Each of these areas will have specified primary functional uses, secondary uses, and where appropriate, conditional uses. The Center will also employ overlay zones which will designate portions of the Center's land where less restrictive or more restrictive policies and practices apply to achieve certain goals. These goals include creating a more commercial-enabling environment, improving spaceport accessibility, guarding against incompatible uses, decreasing risk exposure to climate change, and conserving critical wildlife habitat.

8.1 PROPOSED KSC SPACEPORT DEVELOPMENT AREAS

KSC's future spaceport development areas and their functional purposes are:

Spaceport Launch and Landing Operations Area – This is the heart of the spaceport's functionality for hosting government and commercial launch providers. It contains the sites of KSC's permanent flight operations facilities. Primary uses and facilities support both vertical and horizontal launch and landing capabilities; vehicle and spacecraft assembly, integration, processing, and command/control; and spaceport infrastructure and operations. Secondary uses and facilities include airfield, seaport, and railroad operations that include both spaceport support and spaceport-compatible non-space activities. Conditional uses include public visitor and guest/media viewing sites, as well as educational/outreach facilities (e.g. visitor tour facilities).

Space Systems Test and Processing Area – This area contains numerous hazardous and industrial activities associated with the testing and processing of space systems and system components. Primary uses and facilities support both government and commercial capabilities for payload assembly, integration, and processing; the development and testing of launch vehicle or spacecraft equipment at the component or system level; and post-flight servicing and refurbishment activities; and spaceport infrastructure and operations. Secondary uses and facilities include associated and compatible manufacturing, logistics, or technical support functions.

Central Campus – This area serves as the spaceport's administrative hub, and contains the modernized and consolidated facilities housing KSC's institutional and resident program management, KSC labs, and administrative facilities owned and occupied by partners such as the USAF and FAA. Primary uses and facilities include offices, labs, training capabilities, technical support, and spaceport infrastructure and operations.

Exploration Park (West and East) – Exploration Park functions as a research and technology campus supporting innovation clusters in commercial space applications, life sciences, clean energy research and development, space systems development and manufacturing, robotics, IT and cyber-security. The west site of Exploration Park is adjacent to but outside the KSC controlled access property. The eastern planned area is located within the secure KSC perimeter and will be built on already disturbed land. Primary uses and facilities include mixed-use and single purpose buildings for offices, labs, resident academic activities by multiple universities, light manufacturing, technical services and test/processing capabilities. Exploration Park hosts privately-financed, built, and operated facilities on leased federal property. These facilities will be built, maintained, and re-capitalized as needed without cost to NASA. Secondary uses for Exploration Park West would include energy research and demonstration projects, and more industrial activities requiring setbacks and buffers to adjoining uses.

KSC Visitor Complex – This complex remains the principal public outreach and education site that KSC has developed since the late 1960s to "tell the NASA story" to millions of American and international visitors. It is fully self-sustaining through non-appropriated revenues generated by the visitors and a portion of these revenues are used to operate, maintain, expand, and renew the visitor experience at KSC. The character and scope of this experience will develop lockstep with KSC as it becomes a multi-user spaceport hosting commercial providers offering commercial human spaceflight opportunities. Public visitation, NASA outreach, and science, technology, engineering and mathematics (STEM) activities are the primary uses for this land area.

Renewable Energy Research and Production Sites – These dispersed sites are comprised of fallow agricultural land and other underutilized property. They are designated for renewable energy research and production as their primary use to help facilitate KSC's goal for achieving increased on-site generation of its power from renewable sources. Commercial agricultural uses are no longer desirable on KSC, and high intensity development of these areas is not supported by existing infrastructure or compatible with adjacent land uses.

Operational Buffer and Conservation – These two non-contiguous areas represent the great majority of KSC's land. Most of this land represents never developed property, or sites which have reverted to a natural environment over the years. A majority of the land is submerged, vulnerable to inundation by rising water whether the result of storm event or climate change, or high-value uplands habitat for species of critical concern, such as the Florida scrub jay. Therefore, the primary purpose and uses for both of the areas is to serve as operational safety and security buffer for space launch and landing activities, and to conserve KSC's natural environment. Secondary uses throughout these portions of the Center include spaceport infrastructure and operations of low impact, small footprint facilities that may be required for support of space launch or landing operations. The northern area, designated Buffer and Conservation Area 1, is open for public access and recreational uses as a conditional use, subject to the operational activities associated with KSC's mission.

8.2 ALTERNATIVE SPACEPORT LAND USE OVERLAY ZONES

While the organization of Spaceport Development Areas described above provides an effective planning tool for clustering functions and ensuring broad compatibility of uses, it does not describe or enable key operational characteristics that must be achieved for a successful multi-user facility.

Key common themes emerged from KSC's analysis of stakeholder interviews, commercial industry and government needs, and the four alternative future concept maps

developed during the two-day planning charrette. These themes are captured in the new proposed KSC planning practice to establish operational overlay zones for the following:

ACCESS CONTROL ZONES – To address the strong consensus that less restrictive access to KSC property and infrastructure is a prerequisite to attracting and sustaining diversified commercial operations, the Master Plan will develop a tiered approach to KSC property access. In concept, access would range from "unrestricted" allowing 24/7 public access on a normal basis; "controlled" which prevents general public access but enables free movement of spaceport tenants, suppliers, and their customers; and "restricted access" which controls to NASA or U.S. government criteria the accessibility to areas which must be protected for safety or security purposes.

COMMERCIAL OPERATIONS ZONES – This overlay zone is envisioned to be applied on areas of the Center where commercial uses may be the sole or predominant owner/user/operator of facilities and activities. The intent is to address both the accessibility issue, and just as importantly, the regulatory environment. In these zones, the intent is to allow for operations to be carried out as they would on any non-federal site. An example is that OSHA safety compliance is in place in lieu of NASA safety regulations.

HAZARDOUS OPERATIONS ZONES – This overlay zone is envisioned to be applied as needed upon areas where the predominant nature of activities require specialized rules, procedures, or land use/development practices to ensure the compatibility and safe operation of any user's operations to the neighboring and overall spaceport community.

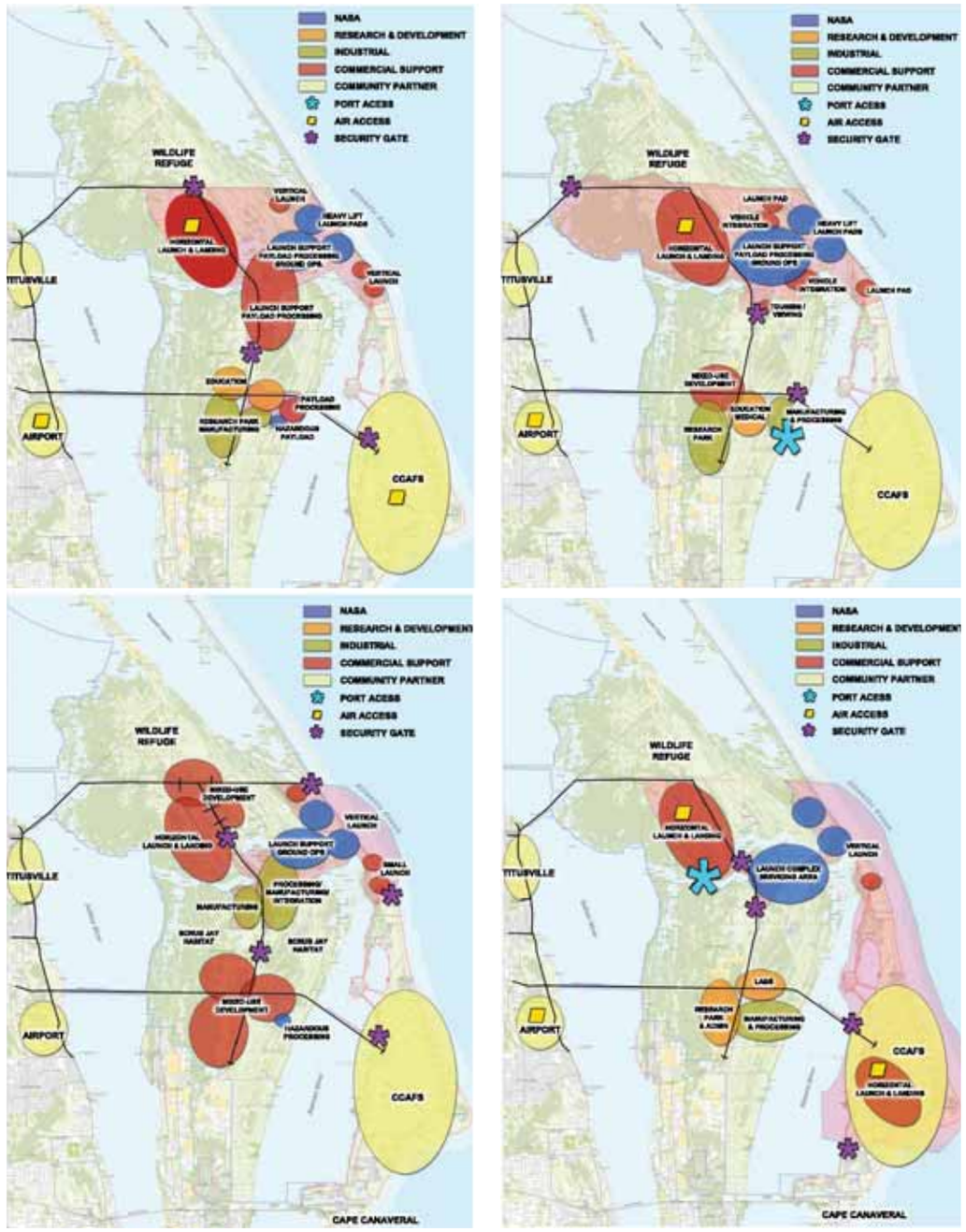
It may be determined during the development of the revised Center Master Plan that additional Land Use Overlay Zones are required to effectively implement this FDC.

In addition, KSC will be developing and implementing a new set of processes and procedures to perform a Planning Administration Function similar to that which might be employed in a municipality, special-district airport or seaport, or other large geography land use hosting multiple users and activities. The Planning Administration Function will be designed to balance the needs of multiple stakeholders, while assuring that future development follows the Master Plan, land use/site development standards, and processes for deviations or waivers.

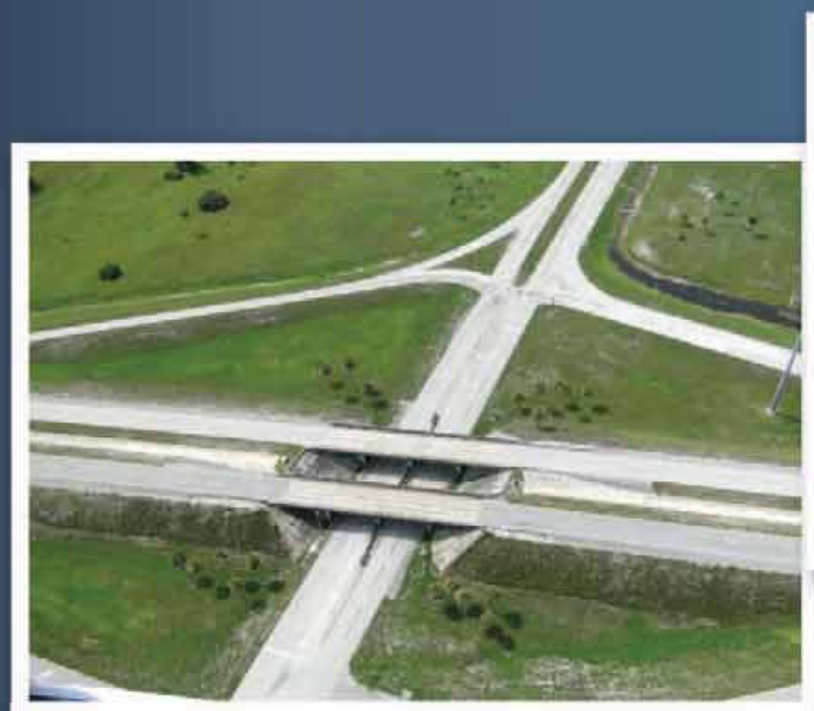
Four notional scenarios for future development of KSC were crafted by teams of stakeholders at the two-day charrette hosted in September. Each team independently described a new relationship between government and commercial operations, identified potential opportunities to optimize KSC's infrastructure and multi-modal transportation resources, and suggested alternative controls for the "gated" portions of the spaceport.

8.3 ALTERNATIVE CONCEPTS DESCRIBING FUTURE GOVERNMENT & COMMERCIAL LAND USES

The concepts below were developed independently by four teams of stakeholder participants during KSC's planning charrette. Each shared a common vision for improved accessibility, reduced NASA footprint, increased leveraging of transportation infrastructure, increased opportunities for commercial operations.



9.0 HORIZONTAL INFRASTRUCTURE



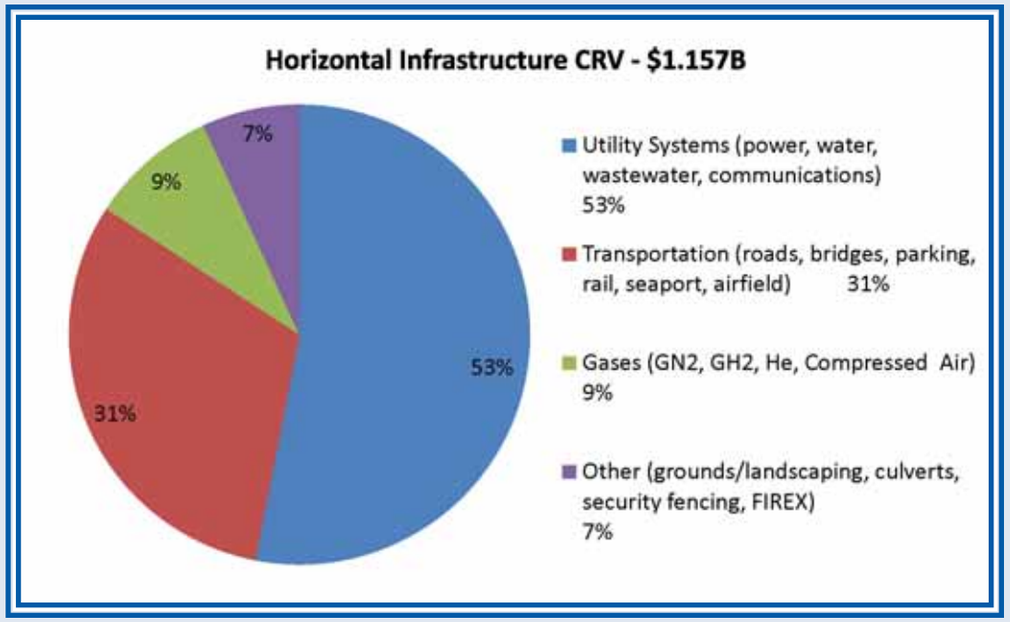
KSC's existing and future horizontal infrastructure enables all other activities required for a multi-user launch complex. Without it, there is no spaceport.

Systems that: distribute electric power and potable water; collect and treat wastewater and storm water; supply critical commodities like gaseous nitrogen; and facilitate the transportation of ground vehicles, rail cars, and ocean-going barges, were all required for the launch complex built here in the 1960s for the U.S. manned lunar program.

Later, when KSC was adapted for the Space Shuttle Program, capability to support both aviation and winged spacecraft was added and became an essential element of the spaceport.

Sustainment, adaptation, and future re-development of KSC's horizontal infrastructure are no less critical to our future mission than it was to the NASA programs of the past. The challenge lies in adapting to the new business model and providing a more affordable and environmentally-friendly infrastructure to meet the needs of future space transportation systems.

The existing KSC horizontal infrastructure represents a CRV of $1.157 billion, just over 20% of KSC's total built environment CRV.



9.1 UTILITY SYSTEMS

Utility systems represent a little over half the value of KSC's total horizontal infrastructure. Of that, the systems to distribute electrical power account for about half of the CRV for all KSC utilities. In 2010, KSC began generating about 1% of its energy needs by a renewable system, a 1 megawatt photovoltaic solar farm provided as part of an innovative partnership with Florida Power & Light, the Center's provider.

The FDC envisions a major expansion of on-site production of renewable energy, including systems to produce electrical power. More than 700 acres of fallow agricultural and other underutilized land has been designated for future use in renewable energy research or production. KSC plans to set an aggressive goal for achieving on-site production of its energy demand from renewable sources by 2030, as it completes it's Master Plan.

Wastewater collection is provided through a Center-wide sewer system, with pumping facilities to a regional wastewater treatment plant on CCAFS. This plant is currently operating at less than half of its designed capacity. Anticipated growth of future demand by activities on both KSC and CCAFS should be accommodated within this capacity. If KSC growth were to require additional treatment capacity, innovative and environmentally-advanced solutions would be pursued on-site.

Potable water is supplied to KSC by the City of Cocoa. More than 67 miles of water pipes deliver the water to all areas of the Center.

Municipalizing KSC's Horizontal Infrastructure

To evolve as a multi-user spaceport, KSC must adopt a municipal-like model of capitalizing and maintaining horizontal infrastructure. In this model, systems that need major repair, replacement, or expansion are capitalized through public or private debt financing repaid over many years and across a broad base through rate structures or special assessments. In addition, both the costs of design/construction and the costs for operations and maintenance are demonstrably less for non-federal entities than for NASA.

The FDC envisions a potential to divest NASA of KSC's government-owned and operated electric power utility and potable water distribution system. Any future expansion or re-capitalization of the spaceport's wastewater collection and treatment system could also be accomplished through a non-government entity. Transferring just the existing power and water distribution system to an investor-owned or public special district entity could reduce CRV by as much as $325 million. NASA could still own a portion or even all of the on-site renewable energy generation targeted by this FDC, thus owning the savings in reduced power costs in a structure similar to the current 1 megawatt solar site owned by KSC but maintained and operated by Florida Power & Light.

KSC will further explore the potential for utility divestiture in the development of its revised Master Plan, and include such strategies, as may prove feasible, in its 20-year plan.

Divesting a portion of the Center's non-space transportation network could also contribute substantial reduction in NASA's existing CRV as well as recurring O&M costs. KSC is exploring the potential for transferring (returning in some cases) primary roadways and public-access waterway bridges to Florida's Department of Transportation (FDOT) for State maintenance. Major replacement projects, such as a new high-span bridge over the Indian River, could be approached through a joint federal-state funding arrangement.

In addition, KSC will study potential options for the divestiture of its railroad, along with the associated railroad bridge over the Indian River, its seaport-linked barge terminal, and its airfield and runway assets. The study will explore how this divestiture of non-space transportation assets might be achieved without compromising their utility and availability for supporting as needed future spaceport operations. Such a divestiture might be accomplished through "public benefit conveyance" of the government's assets to one or more special district entities (e.g. Space Florida and Port Canaveral Authority, or Titusville-Cocoa Airport Authority). The negotiated use rights for underlying federal land would govern the spaceport's priority needs for use, and limitations as appropriate on other non-space transportation uses to ensure compatibility with spaceport operations.

9.2 TRANSPORTATION INFRASTRUCTURE (NON-SPACE)

KSC's non-space transportation infrastructure – its roads, bridges, railroad, seaport, parking lots, and airfield facilities – represent nearly one third of the spaceport's horizontal infrastructure.

Much of this infrastructure dates to the 1960s when the Center was constructed. At one time during the Apollo Program, KSC workforce population reached a high point of approximately 26,000 employees working in multiple shifts. The built infrastructure supported such a labor force, which has now diminished to approximately 7,000 post Shuttle retirement. Infrastructure capacities for the transportation networks are not only adequate for the 20-year planning period, they are significantly underutilized.

9.3 GASES AND OTHER

Other horizontal infrastructure includes the distribution of special-uses gases such as nitrogen through high pressure lines, the use of fencing for securing controlled-access areas, the Center's fire detection and reporting system, storm water drainage and retention systems, landscaping and ground improvements.

9.4 POLICIES AND PRACTICES GUIDING HORIZONTAL INFRASTRUCTURE

To achieve the FDC vision of KSC as an efficient, scalable, and enabling multi-user spaceport, the following policies and practices will guide future horizontal infrastructure:

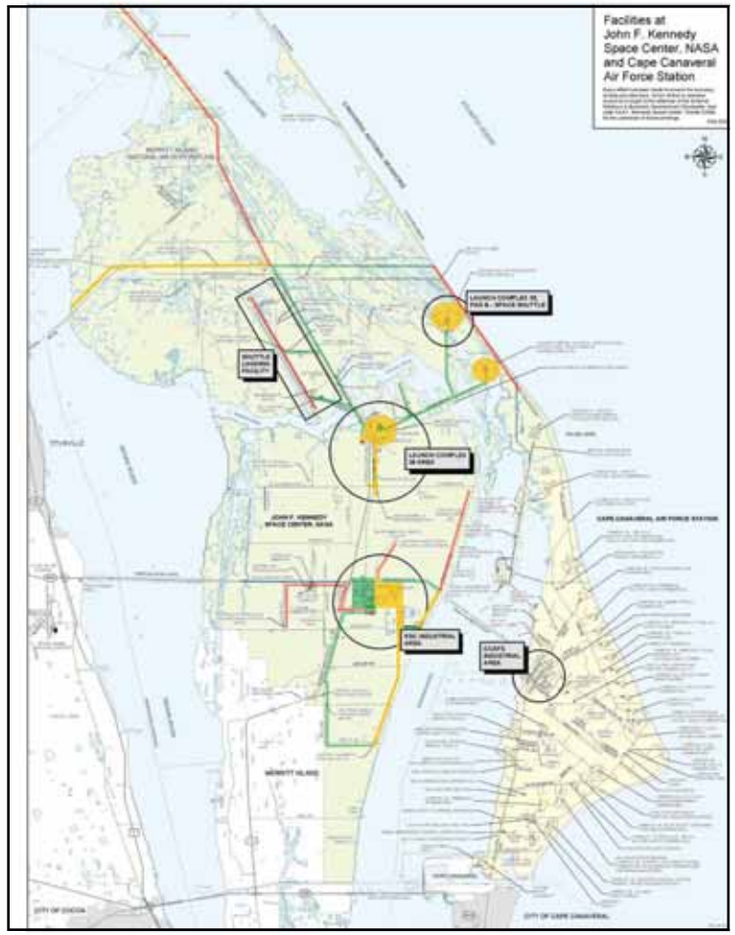
- **KSC will explore how NASA might divest ownership of current horizontal infrastructure, consistent with the needs of government and commercial launch operators for affordable and reliable spaceport services and systems.**
- **KSC will avoid expansion of horizontal infrastructure into inundation-vulnerable areas of the Center, which are designated primarily for operational buffer and conservation, or as sites for potential low-impact/intensity research and production of renewable energy.**
- **Growth of future spaceport capabilities requiring expansions of horizontal infrastructure will be capitalized and maintained, to the maximum extent feasible, by non-NASA entities to avoid NASA ownership and/or liability for the additional CRV and its associated operations/maintenance costs**

KSC High and Medium Voltage Distribution CoF Plan

FY 2014 and Future Projects

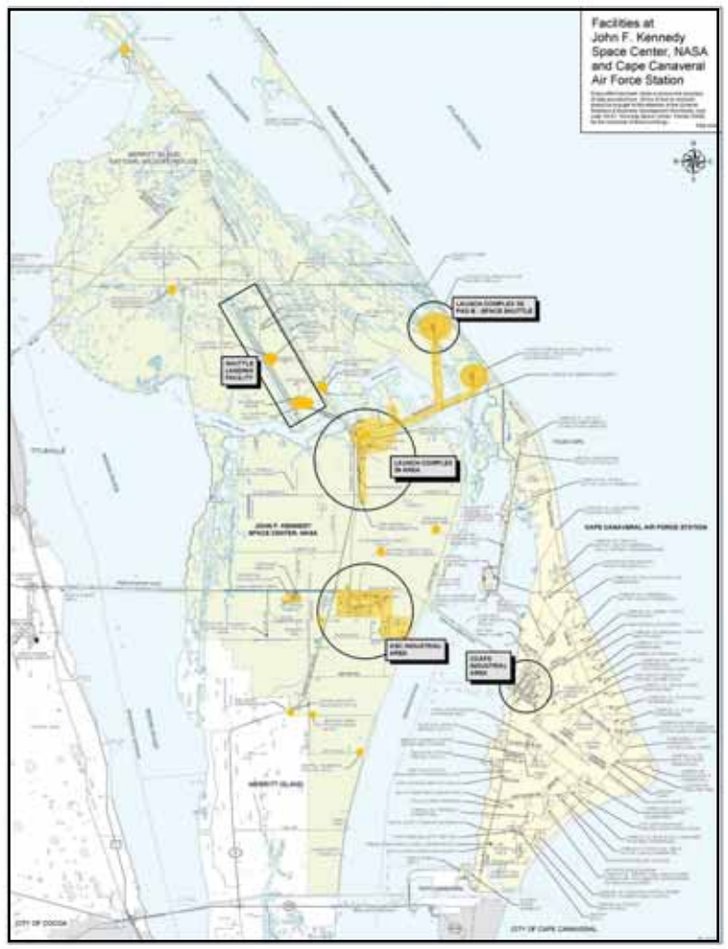
FY 2010 – FY 2013 (In Work)

Complete



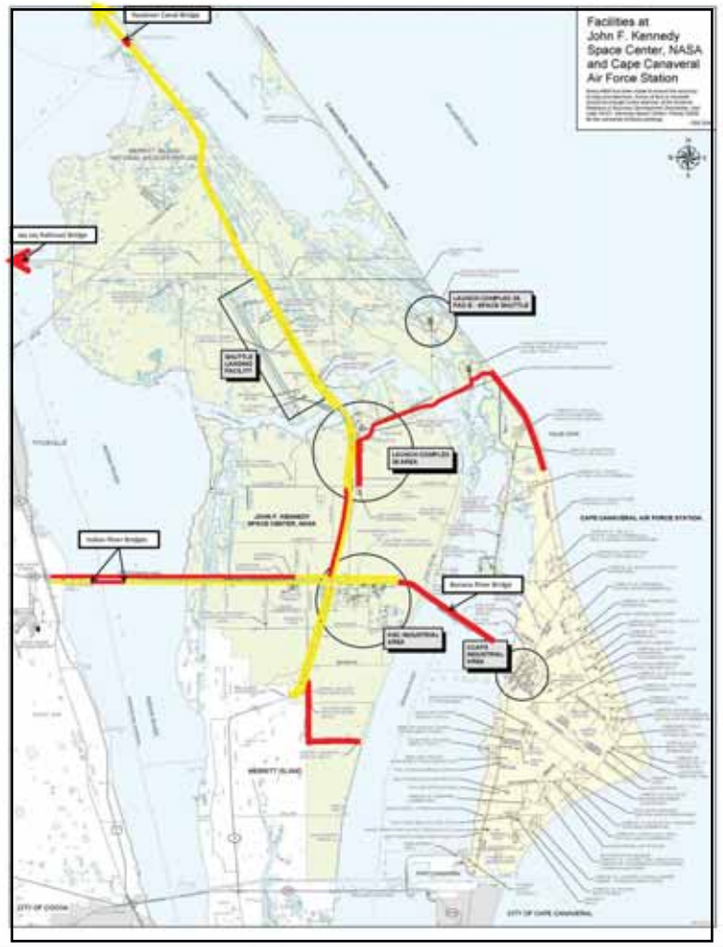
KSC Central Fire Monitoring System CoF Plan

- FY 2014 and Future Projects
- FY 2010 – FY 2013 (In Work)
- Complete



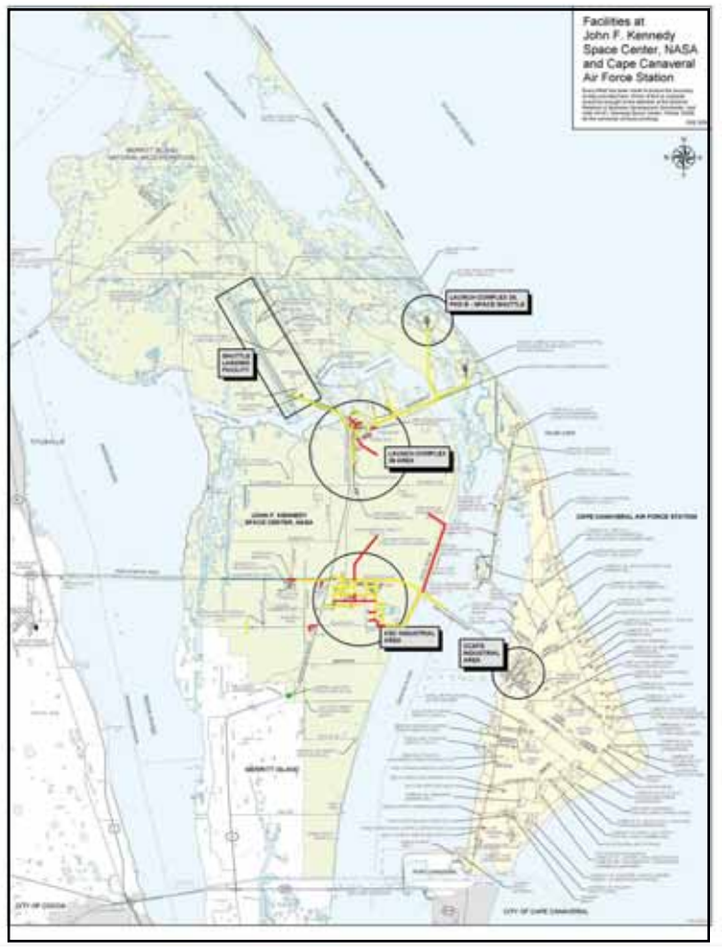
KSC Roadway & Bridge CoF Plan

- FY 2014 and Future Projects
- FY 2010 – FY 2013 (In Work)
- Complete



KSC Water Distribution CoF Plan

- FY 2014 and Future Projects
- FY 2010 – FY 2013 (In Work)
- Complete



"A new way of doing business for a new generation of explorers"

10.0 FUTURE SPACEPORT OPERATIONAL AND SUPPORT FACILITIES

In 1963, President John F. Kennedy visited Cape Canaveral to hear NASA officials describe how his bold and visionary challenge to land Americans on the moon would be facilitated by construction of a spaceport on Merritt Island.

Today, NASA and the launch complex named in honor of President Kennedy are facing a new challenge – preparing the spaceport to again enable Americans to explore beyond the limits of earth orbit.

In the 1960s, NASA's focus was on construction of new facilities that could meet the nation's ambitious goal. Over the decades, its focus shifted to sustainment and adaptation of that infrastructure as changes in Agency programs occurred. In recent years, the focus has again shifted to reflect a maturing of NASA's facility management approach, to seek a more sustainable institutional infrastructure for mission support.

Today, KSC's facility and infrastructure (not including land value) carry a combined CRV of $5.6B. Of that, facilities that support space transportation (launch pads, VAB, LCC, crawler way, SLF, etc) compose $2.5B. Horizontal infrastructure (as described in the previous section) composes $1.1B of the CRV. Of the 692 items on the real property list, the top 50 items represent $4.4B in CRV and range from $18M to $1.2B in value.

Like the rest of NASA's institutional base, the predominant percentage of KSC's constructed assets are facilities built more than 40 years ago. These facilities, and others built more recently that are now dormant at the close of the Space Shuttle Program, must be effectively managed to "right size" KSC for its future Mission.

10.1 21ST CENTURY LAUNCH COMPLEX MODERNIZATION PROGRAM

NASA's FY 2011 budget provided the initial funds to begin a modernization of launch and processing infrastructure at KSC for the new Space Launch System, and to provide for multi user support.

The availability of funds to continue such investments will depend on Congressional appropriations in FY 2012 and subsequent years as NASA plans and develops for an initial launch of the SLS in late 2017.

Clearly, the availability of appropriated funds for needed recapitalization of older and energy-inefficient support facilities will be highly constrained, as will funds to enable the re-tooling of underutilized or idled space transportation assets by other users.

KSC will seek to identify and leverage non-traditional sources of investment to both modernize and re-purpose KSC assets which can still support NASA's Mission, enabling the opportunities to expand KSC's customer base and sustain spaceport capabilities that might otherwise be lost.

10.2 OPPORTUNITIES TO RE-DEVELOP SPACE TRANSPORTATION ASSETS

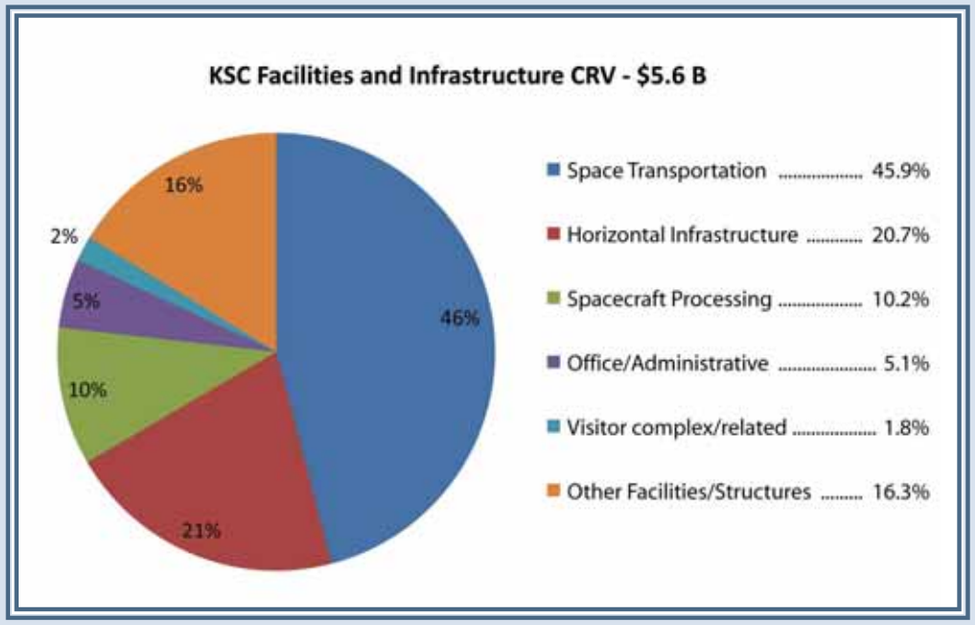
Similar to the opportunities identified for horizontal infrastructure, KSC is already identifying opportunities for potential divestiture of existing space transportation launch or support assets that do not have an identified programmatic need.

The recent use agreement entered into between NASA and Space Florida fully transferred the Agency's ownership liability and obligations, as well as any facility O&M and demolition costs, for OPF 3 and two related facilities, effectively divesting a $59 million CRV liability.

KSC is continuing to identify other opportunities for similar divestiture of space transportation or spacecraft processing assets. Over the coming year as the Master Plan is developed, KSC will work with its programmatic stakeholders and partners to establish an integrated plan for this infrastructure.

In developing the Spaceport Development Areas Map, planners have anticipated the requirements for additional flight, operations, integration and testing facilities. As the resident NASA programs (SLS, Orion, LSP, Commercial Crew) and anticipated commercial providers mature their requirements base, this plan will examine the required operational and support facilities. Each of the following areas and uses will be considered and addressed in the final plan to be finished in late 2012:

- **Launch Complex 39 (A,B)**
- **Shuttle Landing Facility**
- **Launch Complex 41 (AF Use Permit expires in 2021)**
- **Vertical Launch/Vertical Landing complex**
- **Manufacturing, Assembly and Processing Facilities**
- **Research/Development and Test Facilities**
- **Service and Support Facilities**
- **Central Campus**
- **Exploration Park**
- **KSC Visitor Complex**



OPPOSITE PAGE: On November 16th, 1963, President Kennedy and other officials are briefed at Cape Canaveral's Complex 37 blockhouse by George Mueller, NASA's head of manned spaceflight.

11.0 SUMMARY AND NEXT STEPS

KSC has prepared this FDC in cooperation with its stakeholders in NASA, its host state, its neighboring communities and partners, and industry. It lays out a conceptual plan for the transformation of KSC into a new role as a multi-user spaceport enabling both government and commercial providers space access for all.

Upon its approval by Agency leadership, it will guide KSC's new Master Plan development and implementation for the next 20-year planning horizon, from 2012-2031.

Key themes and concepts to be matured and detailed in KSC's Master Plan are:

"A new way of doing business, for a new generation of explorers"

- Defining a new business model that reduces KSC dependence on NASA appropriated funds for sustaining and recapitalizing spaceport infrastructure, while increasing availability to NASA of commercially-owned and operated mission support capabilities
- Transitioning from one customer to many customers, and more airport-like operations
- Evolving from a NASA-governed field installation to a self-governing spaceport focused on space launch, exploration, and recovery

"Leaner and Greener"

- Focusing development and re-development into areas that can accommodate infill to consolidate and cluster compatible functional activities
- Meeting or exceeding Agency goals for energy and water conservation, and for sustainability design standards to lessen KSC's carbon footprint
- Developing on-site production of KSC energy needs from renewable sources
- Avoiding development in areas vulnerable to inundation, requiring intensive site improvements and horizontal infrastructure expansions, or impactful to undisturbed and/or critical habitat for wildlife species

"Divesting without Diminishing"

- Reducing NASA's CRV for existing KSC facilities and infrastructure by divesting, legally or virtually, ownership liability to non-NASA public and private partners and spaceport users
- Identifying opportunities for Agency CRV reductions to meet or exceed current targets
- Sustaining KSC spaceport capabilities to ensure it remains a national asset and a key element of the U.S. space industrial base, optimizing the return on the nation's $6 billion public investment over the past 50 years.

Next Steps

Subsequent to FDC approval, KSC will establish Master Plan teams comprised of both internal and external stakeholder representatives to mature the concepts described herein and develop Master Plan elements to implement them.

These teams will integrate and augment, as needed, on-going current planning studies to:

- Identify the future state and disposition of existing KSC facilities and infrastructure, including who owns and operates what assets, and how NASA will go about divesting capabilities, where appropriate to program/mission requirements, to non-NASA public and private entities
- Establishment of overlay zones to facilitate improved accessibility, enable commercial practices to prevail wherever appropriate, and ensure the safety and security of the spaceport community
- Mature a Planning Administration Function to ensure orderly future development of KSC property in both an economically and environmentally sustainable manner
- Identify opportunities for municipalizing KSC ground infrastructure, where feasible, and develop strategies to enable these concepts through partnerships
- Identify policy, regulatory, and possible legislative/statutory changes needed to support the FDC's implementation

KSC will continue to keep the NASA Mission Support Directorate and NASA programmatic stakeholders advised of progress and issues throughout the development of KSC's revised Master Plan. Completion of the revised Master Plan is targeted for late 2012.

Acknowledgements

This Future Development Concept for the John F. Kennedy Space Center has been guided and approved by:

Robert D. Cabana, Director

Janet E. Petro, Deputy Director and Chair, Master Plan Steering Group

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