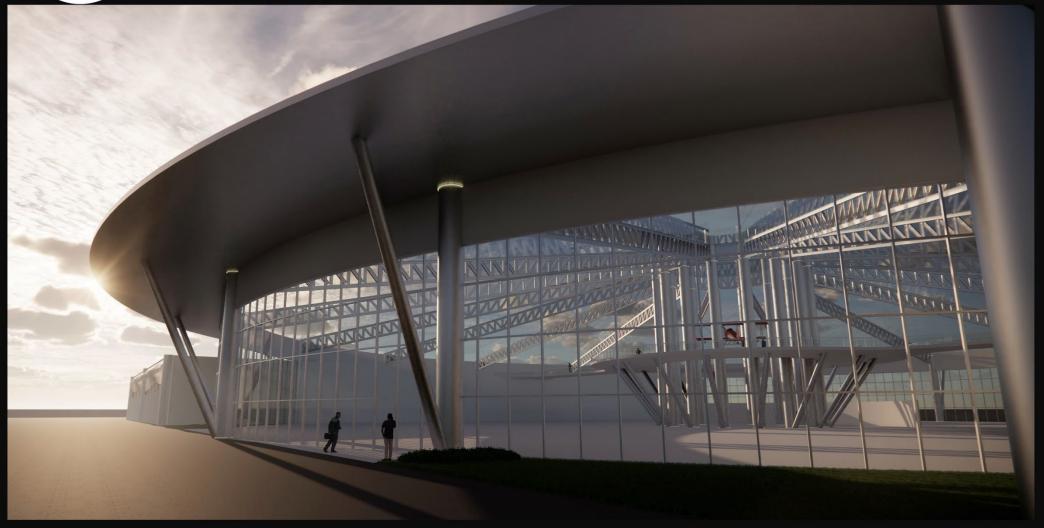
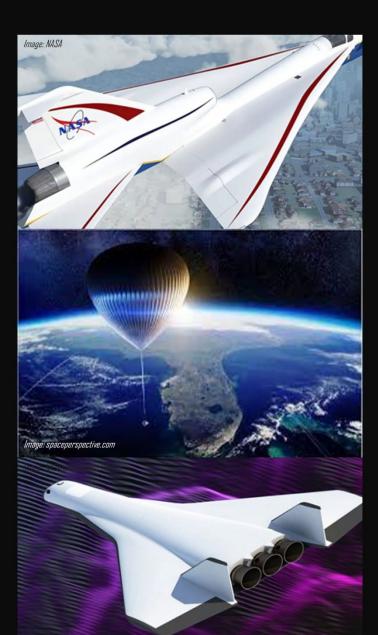
EXPLORATION SPACEPORT





EXPLORATION SPACEPORT | REVISED FINAL MASTER PLAN
December 2023

In Association with:

Prepared by:









TABLE OF CONTENTS

1.	Proje	ct Overview	3
	1.1	Phases & Tasks	3
	1.2	Planning Process	3
	1.3	Exploration Spaceport at Space Coast Regional Airport Campus	5
2.	Visio	ning Statement & Project Goals andObjectives	7
	2.1	Vision Statement	7
	2.2	Guiding Principles	
	2.3	Project Goals and Objectives	8
3.	Explo	oration Spaceport Basis of Planning (Existing Conditions)	11
	3.1	Space Coast Regional Airport & Exploration Spaceport Property Boundary	11
	3.2	Space Coast Regional Airport & Exploration Spaceport Inventory of Facilities	12
	3.3	Site Circulation & Security	13
	3.4	Zoning	14
	3.5	Utilities	15
	3.6	Stormwater System	18
	3.7	Wetlands – Development, Mitigation, Goals, Objectives, and Procedures	19
	3.8	TCAA Spaceport Key Stakeholders Interviews	21
4.	Spac	e Transportation Market Analysis Survey	25
	4.1	Market Demand	25
	4.2	Support Markets	33
	4.3	Supply Markets of Spacepoprts	38
	4.4	Engine Test Stand Capacity- Exploration Spaceport	47
	4.5	Aerospace Key Performance Indicators	49
	4.6	Exploration Spaceport SWOT (Strengths, Weaknesses, Opportunities, and Threats)nalysis	50
	4.7	Point-To-Point Spaceport Spacecraft Guidelines Research	51
5.	Explo	oration Spaceport Land Development Planning	55
	5.1	Overall Plan-Developable Areas with Runway Access (RWY)	56
	5.2	Developable Areas with Runway Access (RWY)Adjacent to Engine Test Stand Areas	57
	5.3	Developable Areas with Runway Access (RWY)Proposed New Terminal Area and Main Development Area	
	5.4	Developable Areas with Runway Access (RWY)Runway 927 Area	59
	5.5	Overall Plan-Developable Areas NonRunway Access	60
	5.6	Developable Areas–Non-Runway Access–Engine Test Stand Areas	
	5.7	Developable Areas–Non-Runway Access–Flexible Office Complex Area	
	5.8	Developable Areas-Non-Runway Access-Flexible Office Complex Area Near Proposed Terr	minal
		/ Main Development Area	
	5.9	Overall Land Acquisition Areas	64

	5.10	Hybrid Developable Areas-Northern Campus Access Area-with Current Road Configuration	on6
6.	Explo	oration Spaceport Area Development Planning	67
	6.1	Main Developable Area with Runway Access	
	6.2	Flexible Office Complex Area	
	6.3	Multi-Use Facilities and Engine Test Stand Areas	7
	6.4	Space Coast Space Coast Innovation Park Development Phases 1, 2Fast, and 3West	
	6.5	9-27 Runway Developable Area	7
	6.6	Northern Developable Area–Short-Term	7
	6.7	Northern Developable Area–End-State	8
	6.8	Orlando Utilities Company (OUC) Dock Proposed Connection	8
7.	Explo	oration Spaceport Implementation Plan-PlanningHorizon	83
	7.1	Implementation Plan-Phase 1-0 to 5 Years	8
	7.2	Implementation Plan-Phase 2-6 to 10 Years	8
	7.3	Implementation Plan-Phase 3- 11 to 20 Years	8
8.	Roug	h Order of Magnitutde (ROM) Cost Estimate	89
	8.1	Assumptions & Clarifications Regarding ROMEstimates	8
	8.2	Project Categorizations	
	8.3	ROM Totals	8
	8.4	Short-Term (0 to 5 Years) Projects ROM Estimates	9
	8.5	Mid-Term (6 to 10 Years) Projects ROM Estimates	9
	8.6	Long-Term (1120 Years) Projects ROM Estimates	9
	8.7	High-Level Projects Schedule for Design and Constrution –Short-Term Projects Only	9
9.	High-	Level Return on Investment (ROI) Anaysis	9
10.	Next	Steps	97
11.	Appe	ndix	99
	11.1	Commercial Space Transportation License	9



FIGURES & TABLES

Figure 1-Planning Process	
Figure 2 – TCAA Regional Context Map.	
Figure 3 – TCAA TIX Airport Diagram	
Figure 4 – Visioning and Guiding Principles	
Figure 5 – Space Coast Regional Airport & Exploration Spaceport Property Boundary	
Figure 6 - Space Coast Regional Airport & Exploration Spaceport Inventory of Existing Facilities - Aviation and Spaceport	ort . 12
Figure 7 – Space Coast Regional Airport & Exploration Spaceport – Site Circulation & Security Map	13
Figure 8 – Space Coast Regional Airport & Exploration Spaceport – Zoning Map	14
Figure 9 - Space Coast Regional Airport & Exploration Spaceport - Utilities Map - Water Mains and Hydrants	15
Figure 10 - Space Coast Regional Airport & Exploration Spaceport - Utilities Map - Sewer	16
Figure 11-Space Coast Regional Airport & Exploration Spaceport - Utilities Map - Existing Infrastructure	17
Figure 12 - Space Coast Regional Airport & Exploration Spaceport - Stormwater Map	18
Figure 13 – Space Coast Regional Airport & Exploration Spaceport Inventory of Existing Facilities – Wetlands Map	
Figure 14 – Florida Spaceport Improvement Program 2018 Project Handbook – Inter-agency relationships *	
Figure 15 – Spaceport Key Performance Indicators	
Figure 16 –Exploration Spaceport SWOT Analysis	
Figure 17 – Land Development – Overall Plan with all Development Types	
Figure 18 – Land Development – Potential Development Areas with Runway Access (RWY) (Blue)	
Figure 19 – Land Development –400,000 GSF Facility and Engine Test Stand Areas	
Figure 20 – Land Development – Main Development Area with Runway Access	
Figure 21 – Land Development – East / West Runway Area with Runway Access	
Figure 22 – Land Development – Potential Development Areas – No Runway Access (Yellow)	
Figure 23 – Land Development – Engine Test Stand Area within Property Boundary	
Figure 24 – Land Development – Englie Test Stand Area within Troperty Boundary. Figure 24 – Land Development – Office Complex Area Near TCAA Main Office	
Figure 25 – Land Development – Small Area near Main Development Area	
Figure 26 – Land Development – Small Alea near Mail Development Alea Figure 26 – Land Development – Land Acquisition Strategy – Areas 1-5	
Figure 27 – Land Development – Land Acquisition Strategy – Area 6	
Figure 28 – Land Development – Developable Area Near North Entrance	
Figure 29 – Area Development – Overall Plan with All Proposed Development	
Figure 30 – Area Development – Main Developable Area	
Figure 31-Rendering: Spaceport Terminal Exterior	
Figure 32 – Rendering: Spaceport Terminal Exterior	
Figure 33 – Rendering: Spaceport Terminal Interior Ground Floor	
Figure 34 – Rendering: Spaceport Terminal Interior Second Floor	
Figure 35 – Rendering Spaceport Terminal Interior Exhibit	
Figure 36 – Rendering Northeast of Buildings F, G, and H.	
Figure 37 – Rendering North by Northwest of Buildings F and G	
Figure 38 – Area Development – Office Complex – with Mission Critical Center, SCIF, and Flexible Office Space	
Figure 39 – Area Development – 400K GSF Building and Office Complex Adjacent to Engine Test Stand	
Figure 40 – Area Development – Space Coast Innovation Park Proposed Development by Phase	
Figure 41-Area Development - Potential Development North of 9-27 (East / West) Runway Area	78
Figure 42 – Area Development – Proposed Development Near Northern Campus Entrance – Existing Road	79
Figure 43 – Area Development – Proposed Development Near Northern Campus Entrance – Road Redesign	
Figure 44 – Area Development – Orlando Utilities Company (OUC) Dock Connection Plan	81
Figure 45 – Implementation Planning – End-State	83
Figure 46 – Implementation Planning – 0 to 5 Year Plan	85
Figure 47 – Implementation Planning – 6 to 10 Year Plan	
Figure 48 – Implementation Planning – 11 to 20 Year Plan	
Figure 49 – Short-Term Projects Design and Construction Schedule	

Table 1—Goal#land Related Objectives	8
Table 2 – Goal #2 and Related Objectives	8
Table 3 – Goal # 3 and Related Objectives	8
Table 4 – Goal # 4 and Related Objectives	9
Table 5 – Goal # 5 and Related Objectives	9
Table 6 – Goal # 6 and Related Objectives	9
Table 7 – Goal # 7 and Related Objectives	10
Table 8 – Goal #8 and Related Objectives	10
Table 9 - Existing Inventory of Buildings and Tenants	12
Table 10 - Wetlands Watersheds – As of June 2023	19
Table 11 - Spaceport Spacecraft - Super Sonic	51
Table 12 - Spaceport Spacecraft - Hyper Sonic	. 52
Table 13 - Spaceport Spacecraft - Low Earth Orbit	. 53
Table 14 - Spaceport Spacecraft – Definitions and Resources	. 54
Table 15 - Land Development Acreage	. 55
Table 16 - Proposed Buildings Summary Square Footage	67
Fable 17 - Implementation Planning Horizon Summary	. 84
Fable 18 - Implementation Plan 0-5 Years Summary	. 85
Table 19 - Implementation Plan 6 to 10 Years Summary	. 86
Table 20 - Implementation Plan 11 to 20 Years Summary	87
Table 21–Industry Standard Cost Estimate Classification Matrix	. 89
Table 22 – ROMTotals	. 89
Table 23 – Short-Term Projects ROMEstimates	. 90
Table 24 – Mid-Term Projects ROMEstimates	91
Table 25 – Long-Term Projects ROMEstimates	
Table 26 – High-Level ROI Analysis	. 95



PROJECT OVERVIEW

The Titusville/Cocoa Airport Authority (TCAA) owns and operates a distinctive three-airport system - the Space Coast Regional Airport (TIX), Arthur Dunn Airpark (X21), and Merritt Island Airport (COI). In an effort to address business drivers and anticipated future development at their larger airport, TCAA contracted with Ricondo and Jacobs to perform Master Planning services at the Space Coast Regional Airport & Exploration Spaceport (TIX). Ricondo is preparing the overall Airport Master Plan, while Jacobs is compiling this Exploration Spaceport Master Plan.

The Exploration Spaceport Master Plan presents a set of recommendations to accommodate and optimize commercial space activity at the Spaceport in congruence with the Airport Master Plan for the Space Coast Regional Airport.

The Master Planning process explores various land development and area development scenarios to respond to the commercial space market demands and recommends a plan that considers the highest and best use of the spaceport's land and facility resources.

TCAA wishes to further develop the framework necessary to transform the Exploration Spaceport site over the next 20-years to meet the TCAA goals and objectives to support commercial space activity.

Phases & Tasks 1.1

As a subconsultant to Ricondo, Jacobs has been assigned the Exploration Spaceport Master Plan that is the basis of this report. Ricondo is preparing a separate Aviation Master Plan for the airport side of the Space Coast Regional Airport. Together, Jacobs and Ricondo will create TCAA a seamless set of reports to explore the future end-state of both 'sides' of this property. Both teams are working together to ensure that aviation information is accounted for in any proposed concepts in the Exploration Spaceport Master Plan, most notably codes, height restrictions, runway exclusion areas, site safety, FAA requirements, and site for overall site ingress/egress and secure runway

For this report, Jacobs has prepared the following sections to convey the scope of work requirements:

- Visioning for Project Goals & Objectives
- Basis of Planning Existing Conditions for all scope requirements
- Space Transportation Market Analysis Survey (and Emerging Technologies)
- Draft Master Plan Information for:
- Draft Land Development Plan
- Draft Area Development Plan
- Draft Implementation Plan for the following planning horizon:
- Short-Term (0-5 years) Building Layout and Phasing

- Medium-Term (6-10 years) Building Layout (no phasing)
- Long-Term (11-20 years) Building Layout (no phasing)

Conceptual high-level project schedules for design and construction and Rough-Order-of-Magnitude Cost Estimating will be provided within the Final Master Plan report after TCAA and Space Florida Draft report review and comments.

1.2 **Planning Process**

The Jacobs team uses an initial industry standard planning approach to Master Plan projects, with the end-state tailored for TCAA at the Exploration Spaceport. Our process helps to facilitate 'seeking' opportunities, challenges, and data required to fulfill each Master Plan. This process leads to a defensible, useable, and appropriate Master Plan for TCAA.

Goal Setting

Goal Setting sets the direction of any project, is key for the alignment of the planning framework, and serves as a driving force in alternatives development and evaluation.

The gathering of existing conditions data and discussions with TCAA and Exploration Spaceport functional user groups (Key stakeholders) helps the planning team to understand the following:

- Current and future site operations and program requirements.
- Assess adequacy of available space for proposed facilities and infrastructure to meet current and future needs.
- Capture opportunities for expansion of technologies at the overall site. for example the Engine Test Stand mentioned in the project scope of
- Identify and map site constraints and opportunities.
- Understand functional relationships.
- Identify and map site opportunities for Land Development (overall acres for development and Area Development (overall facilities and associated available square footages).

Basis of Planning (Existing Conditions)

The basis of planning is a summary of what is being planned in the context of the site being developed. This includes all functional elements, identification of buildable areas, non-buildable areas, and identification of development opportunities. The basis of planning integrates current and future planned elements and their desired functional relationships. For more information refer to Section 3 Exploration Spaceport Basis of Planning (Existing Conditions)

Land Development Planning

Land Development Planning concepts are based on the planning needs gathered at the initial onset of the project, along with project goals and objectives and key stakeholder interviews that create a balanced approached to identifying opportunities and constraints for site development at Exploration Spaceport. This process also includes considerations for potential land acquisitions surrounding the site. Land development analysis identifies needs, planning parameters, site development suitability, and then is used to evaluate available acreage for development and expansion. For more information refer to Section 5 Exploration Spaceport Land Development Planning

Area Development Planning

Facility concepts based on the existing conditions information and the identified Land Development Planning serves as the basis of determining potential facilities development that present TCAA with leasable square footage at the Spaceport. The culmination of the Area Development Planning process creates a holistic view of how many facility types can be developed at Exploration Spaceport and then what that would cost – through a rough-order-of-magnitude (ROM) cost estimate and a high-level Return-On-Investment analysis to be provided in the Final Master Plan document. For more information refer to Section 6 Exploration Spaceport – Area Development Planning

Implementation Planning – Planning Horizon

The Implementation Plan allows TCAA to establish a planning horizon as the initial step in developing a roadmap for executing the proposed growth and development identified in the Master Plan. Planning horizons are useful timelines that balance and address immediate needs from mid- and longer-term end-states and identify when funds will be required to implement specific actions. The planning horizon for this study includes short-term (0-5 years), mid-term (6-10 years), and long-term (11-20 years). To meet the goals and objectives of long-term, end-state Exploration Spaceport helps TCAA to monitor and strategically implement all proposed projects in a time-sensitive manner.

Short-term (0-5 years) planning horizons for immediate action or focus required by TCAA to design and execute facilities to fulfill project goals and objectives. Results are needed in the 0–5-year timeframe. Actions may be urgent to fill a capability gap.

Mid-term (6-10 years) actions are needed soon, but there may be more flexibility to fully develop / validate programming requirements and develop a 10-15% concept design and cost estimates that can be used in a design build or traditional bid-build request for proposal. Advanced planning with requirements is more fully articulated and can render a more precise return on investment.

Long term (11-20 years) actions may be more notional or aspirational in nature, may change over time, may be based on short- and mid-term goals, may be influenced by technology or functional changes, or may change because of emerging or new business opportunities.

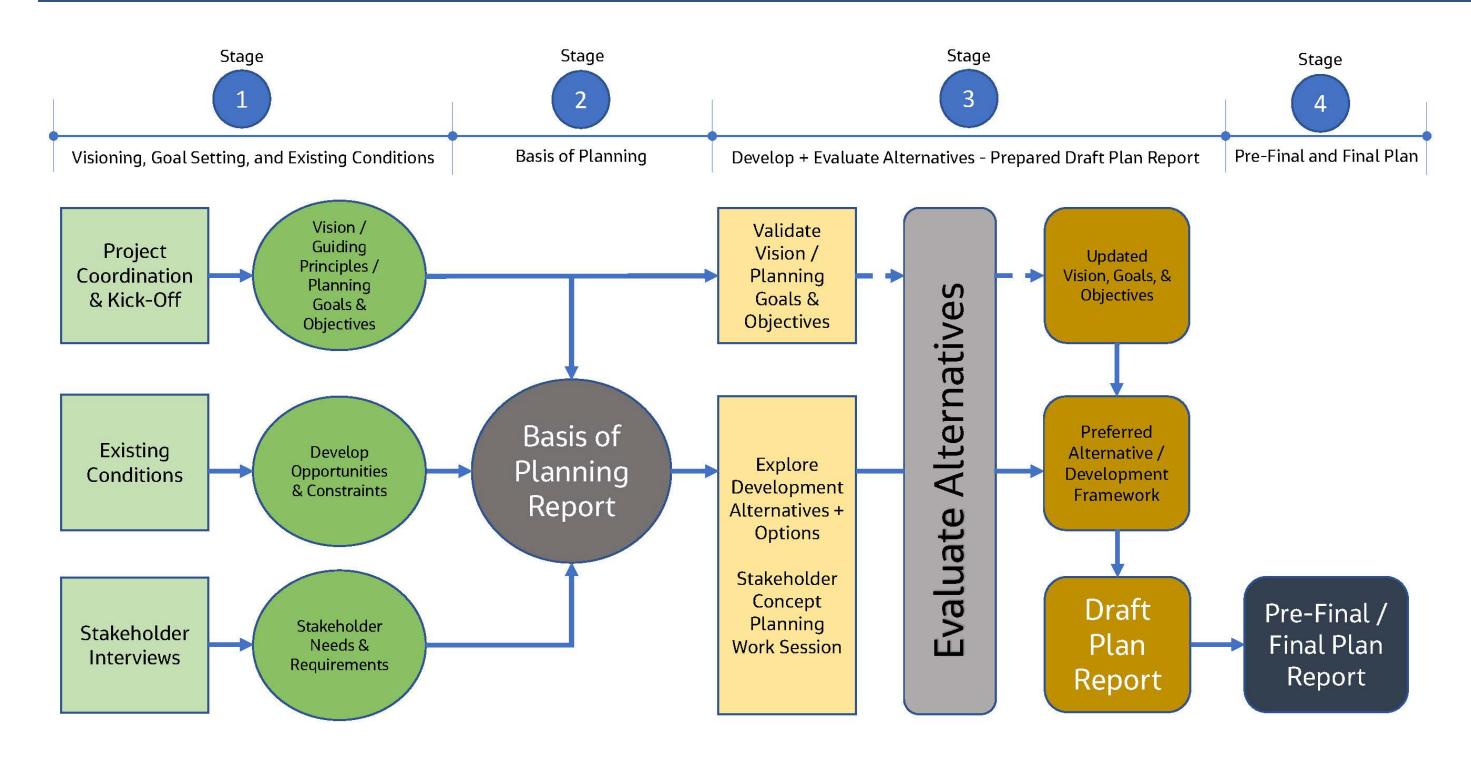


Figure 1-Planning Process

Exploration Spaceport at Space Coast Regional 1.3 Airport Campus

For regional context, the Titusville/Cocoa Airport Authority (TCAA) oversees three airports within the Central Florida Region:

- (1) Space Coast Regional Airport (TIX)
- (2) Arthur Dunn Airpark (X21)
- (3) Merritt Island Airport (COI)

The Space Coast Regional Airport and Exploration Spaceport are also within close proximity (32 miles) to a major Central Florida international airport.

(4) Orlando International Airport (MCO)

The premium location of Exploration Spaceport offers TCAA a unique advantage in attracting business and potential tenants in a thriving aerospace community due to its proximity to Port Canaveral, Kennedy Space Center, Cocoa Beach, Orlando tourist attractions and convenient access to I-95, State Road 528 (Beachline Expressway), U.S. Highway 1, and rail lines.

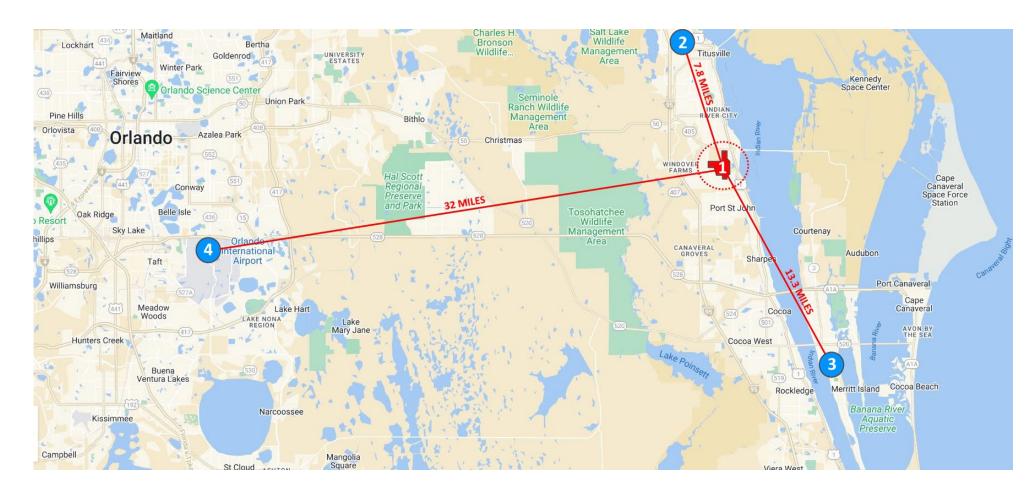


Figure 2 – TCAA Regional Context Map

As the focus of this report, the Space Coast Reginal Airport and Exploration Spaceport are located at 51 Bristow Way in Titusville, Florida. This site is flanked by residential neighborhoods, Titusville corporations and businesses, and the main access roads to the Kennedy Space Center and the Space Coast.

The graphic to the right depicts the general location of the Space Coast Regional Airport & Exploration Spaceport. Existing tenants are listed below:

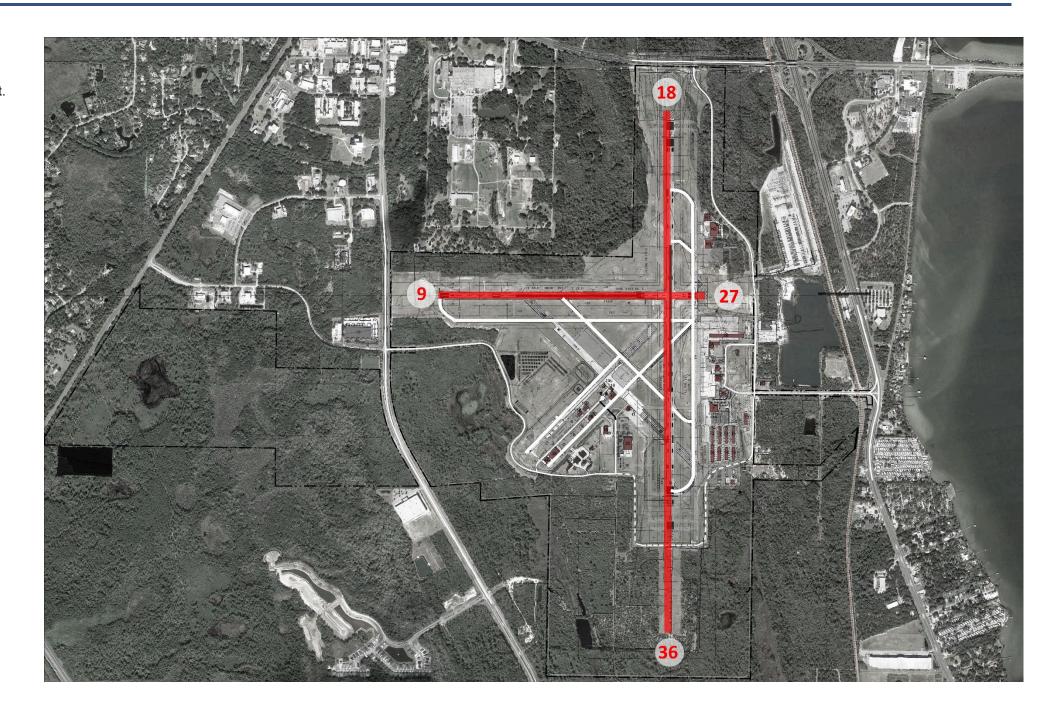


Figure 3 – TCAATIX Airport Diagram



VISIONING STATEMENT & PROJECT GOALS AND OBJECTIVES

Vision Statement 2.1

A vision statement provides the "big picture" directive to guide the physical development on the site for a minimum of eleven-years. To fulfil the vision, supporting goals and objectives provide measurable indices for strategic growth. Alignment with these goals and objectives helps to ensure a desired end-state that captures the essence of the vision. Determining whether future projects can achieve the objectives provides a means of evaluating whether they will be contributing to or detracting from the vision. When aligned with the goals and objectives, physical, real property assets will contribute to an unparalleled customer experience and optimized aerospace testing, research and development, flexible office space, and assembly facilities.

As part of the project scope, the Master Plan team came together through a series of interviews and work sessions with TCAA and key stakeholders to answer the question: What is the Exploration Spaceport Master Plan focused on achieving? The preliminary answer to this guestion emerged as the following Vision Statement:

"The Exploration Spaceport Master Plan will provide unique opportunities for diverse aerospace business growth and unparalleled customer experiences, land development that creates a fiscally sustainable TCAA business model, business partnerships within the Central Florida region, and a destination for national and international aerospace research. testing, assembly, and potential future launches."

2.2 **Guiding Principles**

Guiding principles are related to site development planning parameters that influence and align development decisions under all circumstances. They highlight crucial values, articulate a long-term intent, and encourage decision alignment when requirements change or are unknown. To further define ways to achieve the goals and objectives, the following guiding principles are provided as an analysis and understanding to measure future projects and decision-making efforts.

- Consider TCAA's current and potential tenants (clients) when designing areas for future development.
- Ensure the highest and best use of facilities from a wholistic business perspective to achieve operational excellence.
- Harness the regional aerospace adjacencies to the Kennedy Space Center (KSC-NASA), Patrick Space Force Base, and the Orlando Utilities Company (OUC) dock, as well as Central Florida attractions and infrastructure.
- Provide reliable and adaptable facilities and utilities to support sustainable and resilient site development and future capacities.

VISION

The Exploration Spaceport Master Plan will provide unique opportunities for diverse aerospace business growth and unparalleled customer experiences, land development that creates a fiscally sustainable TCAA business model, business partnerships within the Central Florida region, and a destination for national and international aerospace research, testing, assembly, and potential launches.

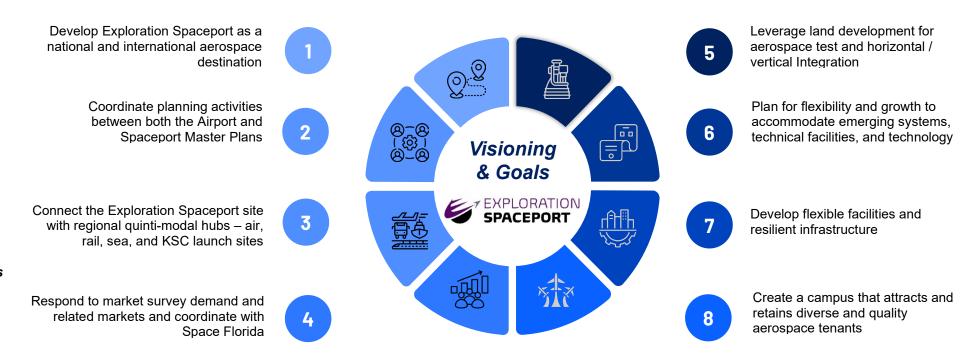


Figure 4 – Visioning and Guiding Principles

Project Goals and Objectives 2.3

To fulfill the overall goals for this project, supporting objectives provide measurable indices upon which to achieve a desired end-state. Determining whether future projects can achieve the objectives provides a means of evaluating whether they will be contributing to or detracting from the goal.

Together, through a series of questions and discussion, key TCAA and project stakeholders developed the following goals and objectives for this project:

Goal #1: Create a Spaceport that becomes a national and international destination			
Objective 1	Prioritize facilities for aerospace technology to attract aerospace industry leader tenants.		
Objective 2	Operate the TCAA Exploration Spaceport within the FAA Spaceport guidelines and requirements to become part of the larger, national network of established Spaceports.		
Objective 3	Market Exploration Spaceport as an international destination that harnesses American aerospace ingenuity and connections to aerospace companies (harnessing the Central Florida region attractions, Space Coast, and Space Force presence).		
Objective 4	Become good stewards of the environment and local economy to drive business development into the region and the State.		
Objective 5	Create land development opportunities for a 'build it and they will come' perspective to attract aerospace related activities and tenants.		

Table 1-Goal #1 and Related Objectives

Goal #2: Identify parcels and development opportunities for Key stakeholders (current and future tenants)			
Objective 1	Link all Spaceport sites, parcels, and facility opportunities with TCAA portfolio-wide tenant and business growth knowledge and the Airport Master Plan to create a comprehensive Spaceport Master Plan.		
Objective 2	Utilize this comprehensive Spaceport and Airport Master Plan to obtain financial sustainability for forecasting and funding growth projects.		
Objective 3	Supplement the Shuttle Landing Facility (SLF) activities at KSC and Patrick Space Force Base launch areas with potential tenant space and technology needs.		
Objective 4	Attract new tenants, grow TCAA business, and expand the Airport presence within the region by utilizing a 'quick response' to site and facility leasing inquiries and availability.		
Objective 5	Work with the Space Coast Innovation Park Development Group to introduce planning ideas into the Master Plan for the Space Coast Innovation Park Phases 1, 2, 3 east, and 3 west parcels.		
Objective 7	Identify and plan future parcels that can accommodate 100,000 square foot facilities – as possible.		

Table 2 - Goal #2 and Related Objectives

Goal #3: Identify and Plan for an Engine Test **Stand within the Space Coast Regional Exploration Spaceport** Identify a parcel within the Exploration Objective 1 Spaceport that can accommodate a potential Engine Test Stand (Common Use Test Stand). Objective 2 Analyze and adhere to local zoning ordinances, noise contours, and Quantitative Distance Arcs (QD Arcs), especially for proposing an Engine Test Stand immediately adjacent to residential areas or the runway protection areas. Objective 3 Determine the maximum size and engine thrust that can be accommodated within a 1250-foot radius. Objective 4 Integrate the Engine Test Stand facility and blast zones into the overall safety and security plan of the Airport runway system. Objective 5 Locate the facility in an area that can accommodate manufacturing / processing / assembly facility to be occupied by one large tenant or by multi-tenants without International Traffic in Arms Regulations (ITAR) restrictions. Objective 6 Ensure safe setbacks for storage of combustibles fuels and materials are considered for the facility, as well as planning for a separate delivery accessway for those material types.

Identify a second Engine Test Stand area for

Table 3 – Goal #3 and Related Objectives

expansion if available.

Objective 7



Goal #4: Create a connection to Exploration Spaceport from the OUC Seaport Dock, rail line, KSC & Space Force Station launch areas, and major roadways

Objective 1	Create opportunities for Spaceport shipping, receiving, and access to and from a multi-modal perspective (air, road, rail, and sea).
Objective 2	Harness the direct, adjacent access and relationship to the KSC and Space Force Station launch areas for business development and attracting potential aerospace tenants.
Objective 3	Allow for land development that helps TCAA to market to aerospace tenants the opportunity for a spacecraft water retrieval with a barge and boat pier combination adjacent to the Spaceport (OUC dock and/or Port Canaveral).
Objective 5	Create a plan that allows TCAA to market the opportunity for international deliveries through Port Canaveral, regional rail lines, the Orlando International Airport, and through major adjacent roadways.

Table 4 – Goal #4 and Related Objectives

Goal #5: Prepare a market survey of the Space Coast Region to identify opportunities for business growth at the Spaceport and its relationship with the Central Florida Region and the City of Titusville		
Objective 1	Gather and review sub-markets information for competitive position analysis.	
Objective 2	Gather and review space transportation support markets information.	
Objective 3	Gather and review other / competitor spaceport markets information.	
Objective 4	Identify Key Performance Indicators (KPIs).	
Objective 5	Gather and review Spaceport budget and proposed project information (for Final Report only): Operating Costs and Proposed Projects – Provided by TCAA Maintenance Plan Costs and Proposed Projects – Provided by TCAA	
Objective 6	Perform initial SWOT Analysis.	
Objective 7	Discuss and develop potential tenant information - revenue opportunities – not including Return on Investment (ROI) analysis (Final Report only).	

Table 5 – Goal #5 and Related Objectives

Goal #6: Identify a parcel for a future Airport / Spaceport Terminal			
Objective 1	Create a facility that has maximum exposure to airfield infrastructure.		
Objective 2	Locate the facility in an area that is prime for development.		
Objective 3	Identify the largest flexible area that can accommodate a Hangar and terminal with maximum tarmac area.		
Objective 4	Locate the facility near a secured access point.		
Objective 5	Create a space that can accommodate Airport travel or Spaceport point-to-point travel.		

Table 6 – Goal #6 and Related Objectives

Goal #7: Create an area for an income producing TCAA managed 'flexible office' space			
Objective 1	Plan for a large office building that can serve as flexible office space for many types of potential tenants (without ITAR restrictions).		
Objective 2	Plan for a Sensitive Compartmented Information Facility (SCIF) space.		
Objective 3	Plan for a mission control center.		
Objective 4	Create an area with a pedestrian campus feel.		
Objective 5	Centrally locate this facility type within a more 'public' area/zone of the site.		
Objective 6	Locate the facility type for easy access to and from Airport roads and provide ample parking.		

Table 7 – Goal #7 and Related Objectives

Goal #8: Coordinate and produce information to communicate future / proposed plans with Space Florida and the (local) community		
Objective 1	Coordinate with TCAA, Space Florida, and the planning team throughout the life of the project.	
Objective 2	Interview Space Florida for Master Plan input and approval.	
Objective 3	Produce information that can be easily used for a community Town Hall and community educational outreach.	
Objective 4	Create a plan that is community friendly, sustainable, and resilient.	
Objective 5	Link Spaceport information with the larger Florida system of airports and spaceports.	

Table 8 – Goal #8 and Related Objectives



3. **EXPLORATION SPACEPORT BASIS OF PLANNING (EXISTING CONDITIONS)**

This section contains various pertinent existing conditions found at the Space Coast Regional Airport & Exploration Spaceport. These existing conditions serve as the basis of planning for our later sections containing land development and area development planning. The basis of planning allows the consulting team to fully understand the various existing aspects of site infrastructure and facility uses in order to plan effectively for site development. Outlining existing conditions aids in discovering planning parameters and site development opportunities and constraints.

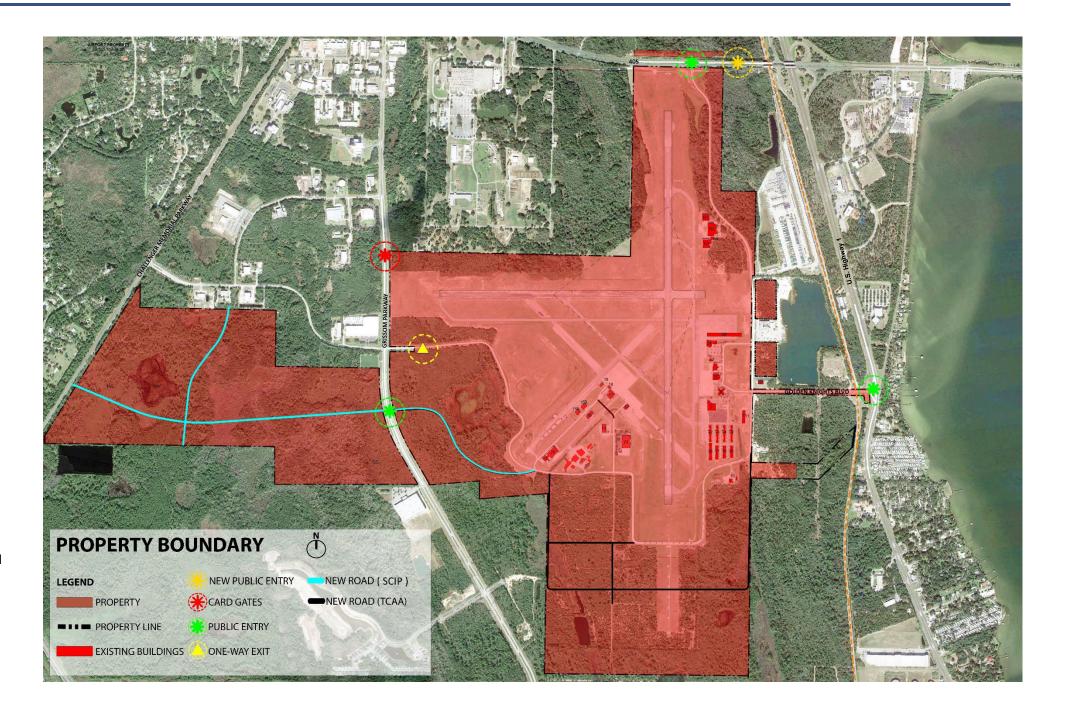
Also included in this section is the information gathered at the key stakeholder interviews that enables the planning team to understand the existing and proposed space requirements for a list of TCAA potential aerospace tenants and real estate development partners.

Space Coast Regional Airport & Exploration 3.1 **Spaceport Property Boundary**

The TCAA Space Coast Regional Airport and Exploration Spaceport property boundaries cover a large amount of land between multiple major roads: Challenger Memorial Parkway that leads directly to I-95, S.R. 405, Grissom Parkway, Golden Knights Boulevard, and U.S. Highway 1.

A large easement exists between the lower half of the runway area and a parcel of land that TCAA does not own that terminates at the railroad tracks and access to U.S. Highway 1.

The site is flanked by parcels of land that TCAA does not currently own, as well as residential development.



Space Coast Regional Airport & Exploration 3.2 Spaceport Inventory of Facilities

The Space Coast Regional Airport & Exploration Spaceport contains multiple facilities for both TCAA functional departments/activities and tenants within the aviation and aerospace markets. The following graphic shows the existing facilities and designated tenants located throughout the site.

	Building Table	
Building ID	<u>Tenant</u>	Square Foot
2A	Space Perspective, Inc.	2,580
2B	Space Perspective, Inc.	52,300
2C	Space Perspective, Inc.	15,000
2D	Space Perspective, Inc.	7,250
3	Air Traffic Control Tower	300
F	Aircraft Rescue and Firefighting	9,750
T2 - T5	T-Hangars	44,700
Т6	Sheltair Space Coast, LLC (T-Hangars)	17,500
T7 - T9	T-Hangars	12,300
T11	T-Hangars	11,500
6	Titusville-Cocoa Airport Authority, US Aviation Training Solutions Inc., and Various Other Tenants	10,350
7	US Aviation Training Solutions Inc.	22,500
10	Airport Maintenance	6,000
13	Global Aviation Management	10,000
14	MAG Aerospace	6,500
15A	Sheltair Space Coast, LLC	7,350
15B	Sheltair Space Coast, LLC	5,600
16	Comp Air Aviation	8,500
17	Space Coast Executive Jet Center	13,000
18	Vacant	2,300
19	Spaceport Avionics Services, Inc.	3,150
23	Professional Aircraft Accessories (Goldstein Management)	61,000
26	MAG Aerospace	27,900
N1	Valiant Air Command, Inc. – Air America (Vietnam Building)	15,000
N2	Valiant Air Command, Inc. – Air America (Warbird Museum)	36,800
N3	Valiant Air Command, Inc. – Air America (Restoration Hangar)	22,000
N4	Valiant Air Command, Inc. – Air America	2,400
		433,530

Table 9 - Existing Inventory of Buildings and Tenants

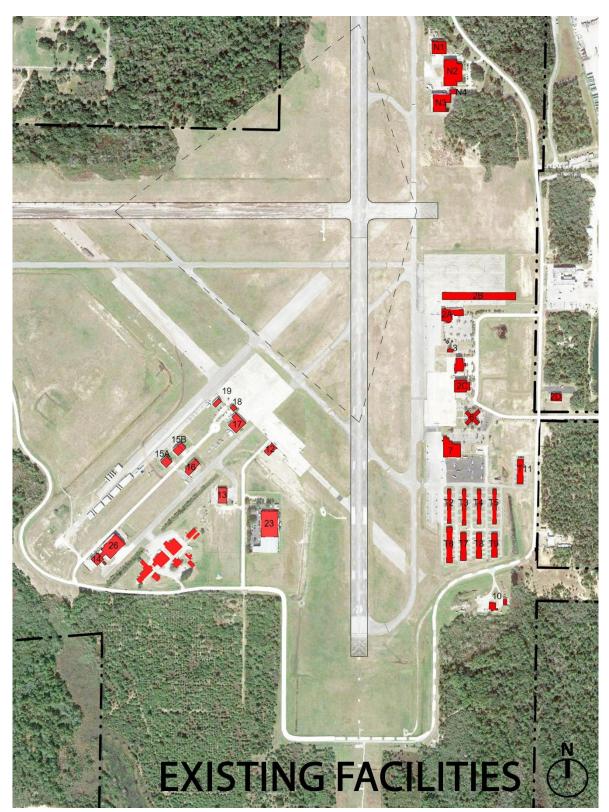


Figure 6 – Space Coast Regional Airport & Exploration Spacepolytoentory of Existing Facilities – Aviation and Spaceport

Site Circulation & Security 3.3

The Space Coast Regional Airport and Exploration Spaceport Campus Site & Security Circulation Map demonstrates that the overall site has a large amount of curvilinear circulation and multiple access points that work 'for today' for current tenants who have a more open concept to campus access but may not work 'for tomorrow' for potential tenants requiring more security control points.

Also, vehicular circulation (both employee and visitor personally owned vehicles (POV), campus fleet, and delivery vehicles/trucks will need to be expanded to include the proposed land and area development plans later in this document.

The map shown on this page indicates existing roads and entry points, as well as proposed roads. The proposed roads provide for more taxi-way adjacent development. The public entries work well in areas for tenants choosing a more open feel to the campus, as well as access points to the Space Coast Space Coast Innovation Park development.

Entry Points

North Entry: Columbia Boulevard (State Road 405): The North entry would remain relatively the same except with some additional landscaping and signage. This entry is open to the public. There are a few acres available east of the entry that could be strategically developed, and this area is contiguous to several additional linear acres. This area is also adjacent to the potential NE acquisition parcel.

East Entry: U.S. Highway 1: The east entry also would stay relativity the same except for new landscaping and signage. Depending on what property could be acquired, there are again some strategic acres adjacent to the entry that would benefit the Airport and Spaceport.

West Entries: Grissom Parkway: Currently there are three planned entries off of Grissom Parkway. The more northern entry point (red asterisk) off of Grissom Parkway could provide a new secured access point to potential developable property with runway access. The center entry point (yellow triangle) off of Grissom Parkway would be the beginning / terminus of the ultimate Perimeter Road. The Master Plan proposes to make this road an exit only (one-way). The southern entry point (green asterisk) off of Grissom Parkway would be the public entry that leads to all tenant spaces and the western entry to the Spaceport.

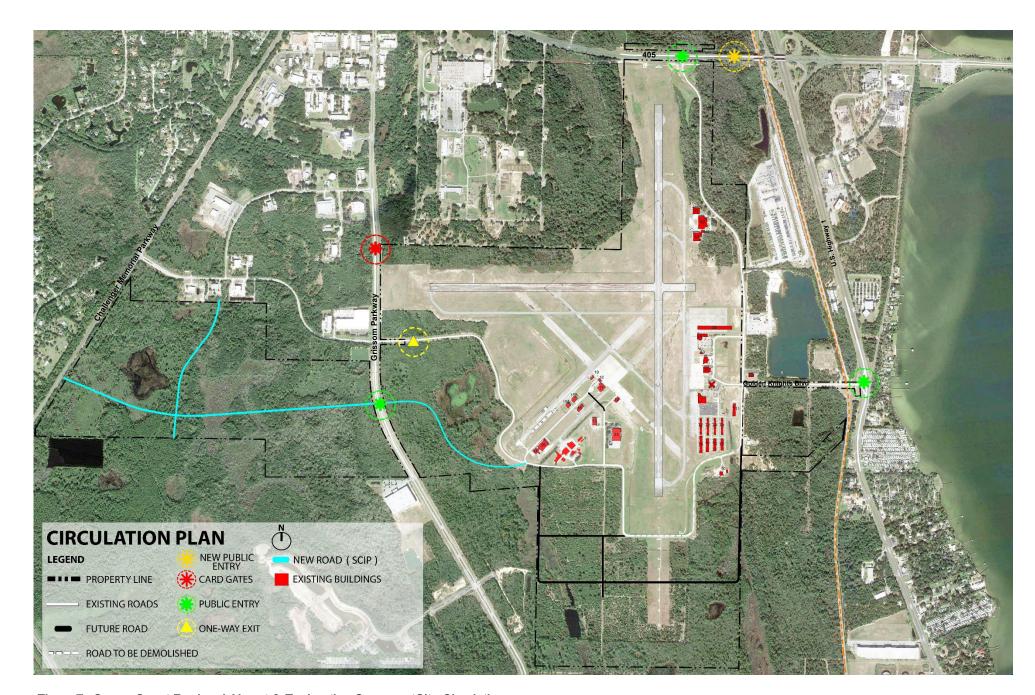


Figure 7-Space Coast Regional Airport & Exploration SpaceportSite Circulation & Security Map



3.4 Zoning

The Airport and Spaceport campus (inside the existing property boundary) includes multiple zoning types for the following:

Public / Semi-public – 'P' areas account for almost the entirety of the existing Airport campus.

Planned Industrial Park – 'PID' areas for Space Coast Space Coast Innovation Park development, as well as some of the areas proposed as land acquisition shown later in this document.

Commercial High Intensity (Light Industrial Services and Warehousing) – 'M-1' areas are immediately adjacent to the proposed Engine Test Stand area and can support this type of development if TCAA acquires this type of parcel.

Concerns

Open Space / Recreation – 'OR' areas throughout pose an issue / constraint for development within the Space Coast Space Coast Innovation Park 3-West area. This is a unique zone within the overall land development plan and is related to the adjacent residential housing zone.

Planned Unit Development – "PUDZ" areas adjacent to Space Coast Space Coast Innovation Park 3-West and close to Grissom Parkway pose a development issue for the Engine Test Stand. Although these areas are outside (considerably) the blast zone, moving forward with test stand development will be a controversial trade off during the proposed Town Hall meeting.

Low Density Residential – 'R-1B' areas pose an issue / constraint for full development of Space Coast Space Coast Innovation Park 3-West, as well as secured circulation and access to this area. 'R-1B' and 'OR' combined limit the development in this area for aerospace purposes and may render this large parcel more of an office / administrative type of development area.

Community Commercial – 'CC' areas may cause constraints for TCAA land acquisitions in this area, and the location of this zoning immediately adjacent to the proposed Engine Test Stand.

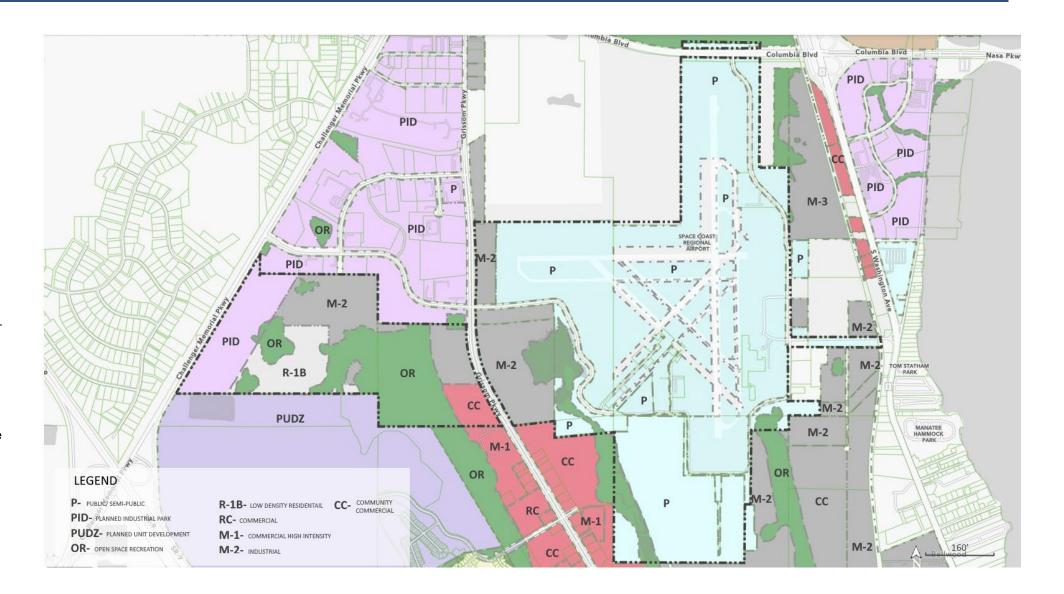


Figure 8 – Space Coast Regional Airport & Exploration SpaceportZoningMap

3.5 **Utilities**

The following graphics depict the existing conditions for various uses throughout the Airport and Exploration Spaceport. The images include water mains and hydrants, sewer, and various infrastructure. At present, this information is basic and high level and does not indicate the sizing of piping / conduits, as well as capacity. All future design projects must ensure that there will be no proposed development conflicts with any existing utilities.

After the Master Plan document, TCAA will need to conduct a more in-depth study of the various utilities for each of the proposed facility projects. Also, for any development north of the 18-36 runway and adjacent to north of the 9/27 runway will need to be examined for utilities access under or near the runways or along the property line(s).

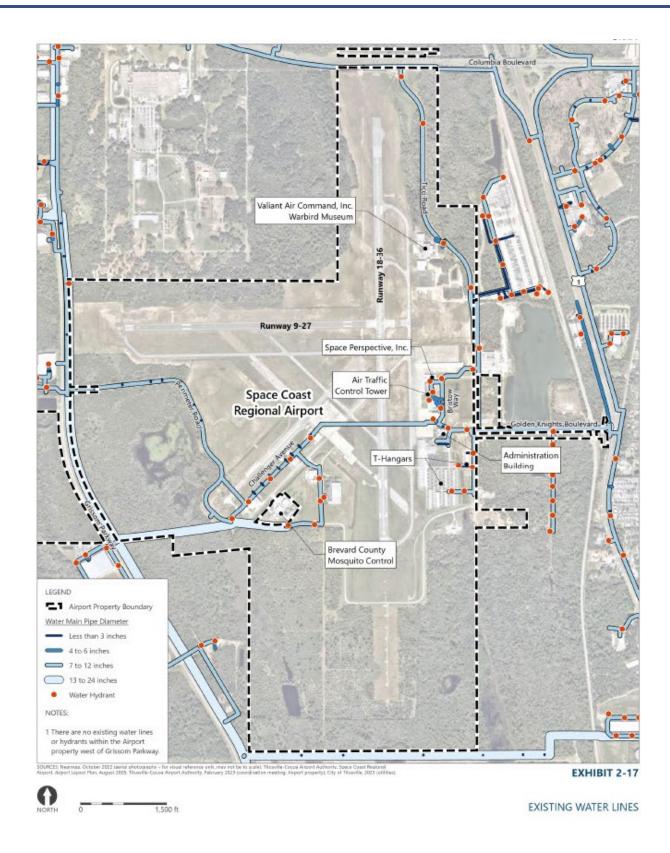


Figure 9 - Space Coast Regional Airport & Exploration Spaceport Utilities Map-Water Mains and Hydrants

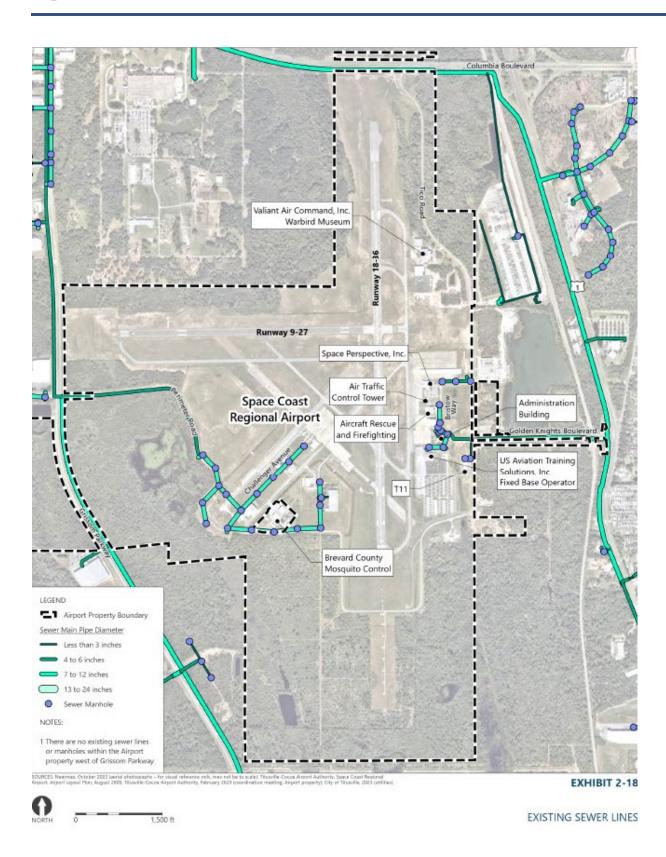


Figure 10-Space Coast Regional Airport & Exploration SpaceportUtilities Map-Sewer

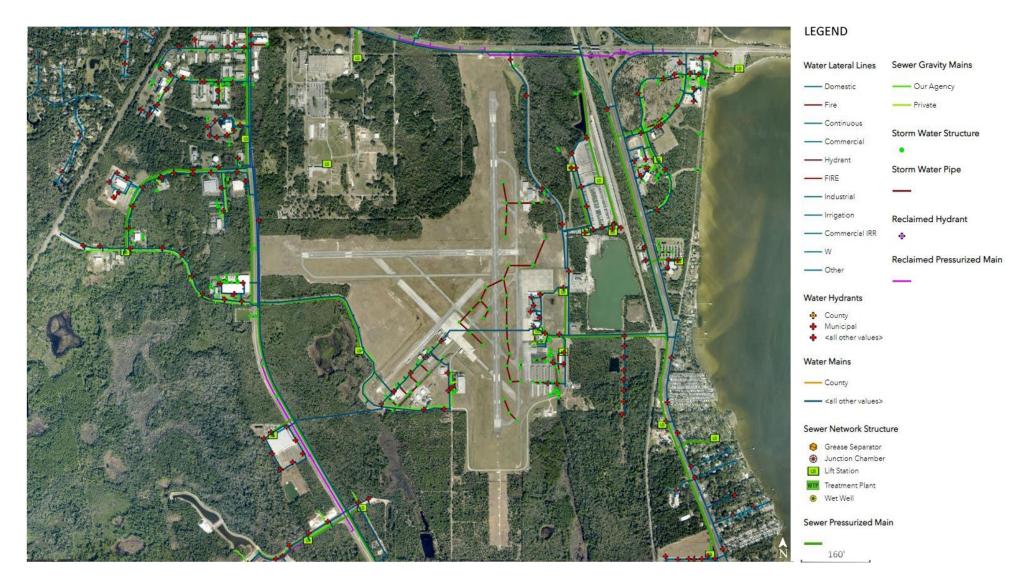


Figure 11-Space Coast Regional Airport & Exploration SpaceportUtilities Map— Existing Infrastructure

Stormwater System 3.6

The following graphic depicts the existing conditions for the stormwater system throughout the campus. At present, this information is basic and high level and does not indicate the sizing or capacity.

After the Master Plan document, TCAA will need to conduct a more detailed stormwater master plan to analyze the impact for each of the proposed facility



Figure 12-Space Coast Regional Airport & Exploration SpaceportStormwater

3.7 Wetlands - Development, Mitigation, Goals, **Objectives, and Procedures**

The Environmental Assessment (EA) document from September 2019 for this Airport and proposed Spaceport set the stage for the anticipated transformation of the airport into an Airport / Spaceport. It was the basis for the Launch Site Operator license from the FAA that occurred on May 5, 2020 (refer to Section 10 Appendix). Also, the EA presented the Airport Layout Plan (ALP) for the proposed Spaceport and was approved in September 2019. This document uses that document and layout as a basis for design and development. This Spaceport Master Plan builds on the past requirements, revised ALP and existing conditions that will carry the plan into the future. All the habitat conditions, wildlife, noise conditions and wetland identifications and requirements apply and again are the basis for this document. All the requirements, permitting, regulations, and licenses from the EA document also apply to any development in this report going forward.

The past EA refers to Regions of Influence (ROI) within the developable area of the airport boundaries; this document builds on that idea and introduces a more refined intent for the Spaceport planning and layout. One of the most important areas to be addressed is the wetlands and floodplain areas as the Spaceport plan is implemented. The EA describes the types and procedures that will need to be addressed as part of the implementation of the new Spaceport Master Plan. Several changes and revisions have been incorporated into this new layout that will need to be validated and presented to the Agency Having Jurisdiction (AHJ).

Any new alterations that are presented as a part of the new Spaceport Master Plan must revisit the EA and confirm that in fact there will be no adjusted requirements. The new layout and design will need to be analyzed as to its adverse effect on the altered plan or if no adverse effect is projected.

The following is an updated description and narrative of the wetlands mitigation process, status of existing credits, types of wetlands and procedures that will need to be evaluated with every new revision to the Plan:

Mitigation for unavoidable impacts to jurisdictional features (wetlands and surface waters) for the proposed project is required under both the federal Clean Water Act (CWA) Section 404 and the State of Florida Environmental Resource Permitting (ERP) regulatory programs. Proposed mitigation strategies are intended to fully offset the loss of functions that these jurisdictional features provide to the environment. The functional values for the jurisdictional features are assessed for pre- and post-project conditions using agency-approved tools to quantify the values being lost from the impacts or gained through proposed mitigation strategies. The demonstration of full compensatory mitigation for proposed project impacts is a requirement for both federal and state permits to be issued.

Compensatory mitigation for proposed project impacts to jurisdictional features can take the form of one or a combination of strategies. These strategies include purchasing credits through an approved mitigation bank or performing mitigative actions through restoration, enhancement, creation, or preservation of on-site or off-site resources. The preference of both Federal and State regulatory agencies is that the mitigative strategy compensates for the

functions being lost to the type of feature being impacted (forested wetland, herbaceous wetland, stream). These agencies also prefer that mitigation occurs in proximity to the impacts (same watershed, on-site) and transpires at the time of impact.

Mitigation Strategies

Mitigation Credits - purchased through an approved mitigation bank within the service area of the project. The purchase of mitigation credits provides the applicant with a streamlined approach for meeting mitigation needs. The applicant purchases enough of the specific type (federal and/or state) of credit, for the specific resource being impacted (forested wetland, herbaceous wetland) with no further obligations. The Space Coast Regional Airport is located primarily within the St. Johns River (Canaveral Marshes to Wekiva) Watershed (Basin 18) with a portion being located within the Northern Indian River Lagoon Watershed (Basin 21). A summary of mitigation credits available at the various mitigation banks operating within these watersheds is provided in the table below.

Watershed / Bank	Credit Types	Available Credits	
		Forested	Herbaceous
St. Johns River (Canaveral Marshes to Wekiva (Basin 18)			
Colbert Cameron	Federal & State	83 State & 2	257 Federal
East Central	Federal & State	Sold Out	Sold Out
Tosohatchee	NA	NA	NA
Northern Indian River Lagoon (Basin 21)			
Green Wing	Federal & State	15	59
Neo Verde	State	17	0

Table 10- Wetlands Watersheds-As of June 2023

Restoration and Enhancement – the re–establishment of aquatic resource characteristics and functions at a site where they have ceased to exist or exist in a substantially degraded state. Restoration of wetlands is a common on-site mitigation strategy. Activities may include invasive species removal, removal of drainage ditches to restore hydrology, prescribed burns, and / or native species plantings. The restoration strategy requires an agency-approved mitigation plan and legal instrument to ensure the action in perpetuity.

Creation – the establishment of an aquatic resource where one did not formerly exist. This mitigation strategy is typically less preferable than

restoration/enhancement as the risk of success is greater. Like restoration/enhancement, this mitigation strategy requires an agency-approved mitigation plan and legal instrument to ensure the action is in perpetuity.

Preservation – the conservation or dedication of ecologically important existing aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms to prevent their destruction or degradation in the future. Preservation is often used in conjunction with other mitigation strategies. This strategy is typically limited to a percentage of the compensatory mitigation total (20%) as it does not meet the "no net loss" mandate for the mitigation of wetland impacts.

The development of mitigative strategies includes specific objectives that serve to ensure that there is a full and successful offset of ecological functions of aguatic resources being lost through impact. Typical objectives include the following: The qualification of ecological functions lost at the project site and gained at the mitigation site(s):

- The replacement of lost functions by identification of potential onsite and in-kind mitigation opportunities prior to seeking offsite and/or outof-kind opportunities.
- The development of mitigative strategies that are easily implementable and sustainable.
- The establishment of a monitoring program that includes specific success criteria, ensuring that mitigation strategies are effective.
- The establishment of legal instruments to provide permanent protection of mitigative activities.

Any new development from this point forward will need to be validated with the new ALP, jurisdictional requirements, and amounts of disturbances for all wetlands, floodplains, and environmental requirements.

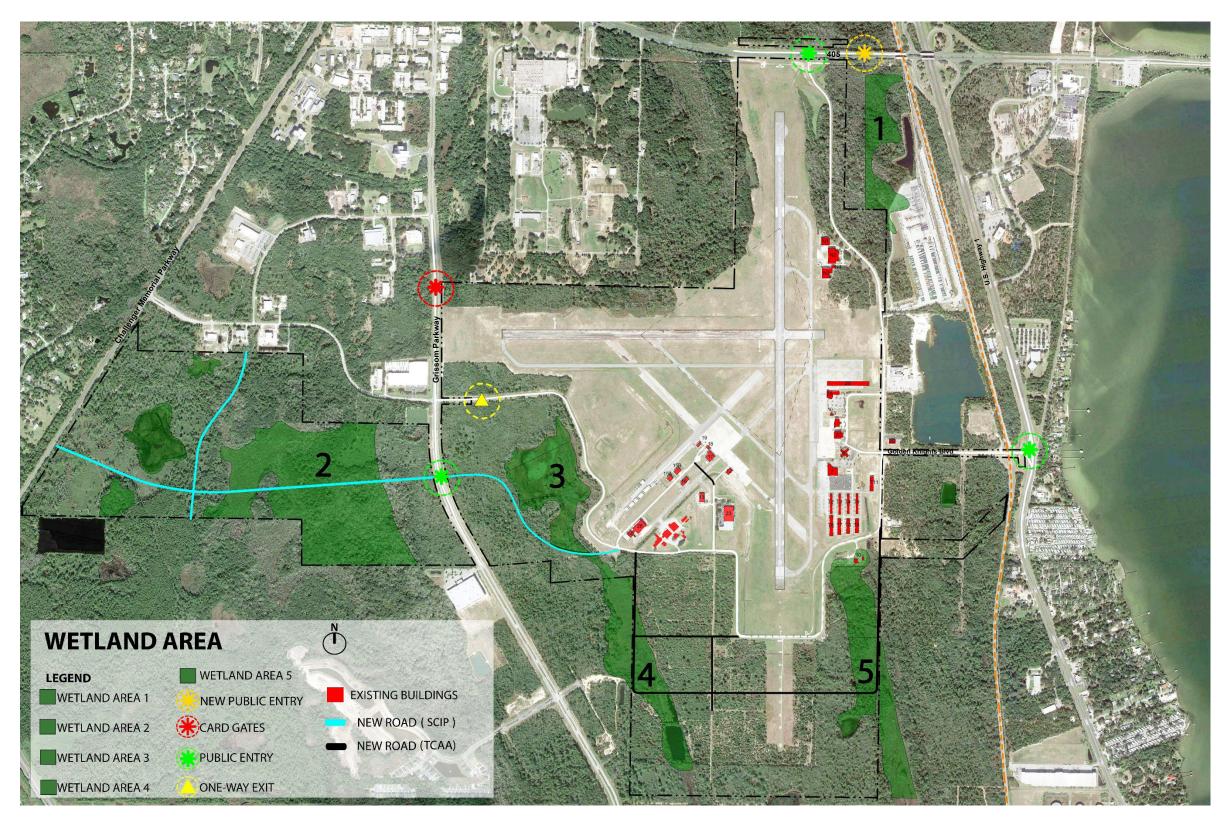


Figure 13–Space Coast Regional Airport & Exploration Spaceport Inventory of Existing Facilities – Wetlands Map

3.8 TCAA Spaceport Key Stakeholders Interviews

During the data gathering process for the Basis of Planning (existing conditions), the planning team created a Master Plan communication email to alert all current and proposed tenants of the Exploration Spaceport Master Plan and the pending Key Stakeholder interview process. An interview survey was prepared for each interview and of the complete list of Key stakeholders the following groups / tenants participated:

- 1. Space Perspective
- Confidential Aerospace Company
- 321 Launch
- 4. Space Coast Space Coast Innovation Park Development

The following sections include high-level data gathered from Key Stakeholder Interviews.

Space Perspective

Overall

- Infrastructure space needs design, infrastructure, and operational support at TCAA.
- The ability to receive large objects to and from the Spaceport.
- Area for integration.
- A launch / loading area with an explosive perimeter.
- For testing, provide sufficient space for a capsule and anything related to an energetic event.
- Provide safe space for 800 kg of hydrogen and gas.
- When using hydrogen at lift/launch, consider the overall plan (utilities, space, and logistics).
- Provide a wide variety of uses for testing areas with various scenarios for components and launching.
- Provide areas for pressure release testing there are not many places outside of the Kennedy Space Center that provide an area to do this type of testing.
- Provide infrastructure for launching operations throughout the site prior to a tenant needing it (proactive and not reactive).
- Team with tenants and not just serve as a landlord (turnkey facilities).
- Create a flexible site for growth / expansion / just-in-time services for technology growth.
- Perform and maintain an Environmental Assessment for technology expansions and requirements.
- Provide very high-speed internet to all buildings. (infrastructure and utilities) – they work with their information on the cloud (mostly / majority), so speed is imperative. Speed is also imperative during launching. This type of infrastructure needs to be present at the site for the overall aeronautical needs in general.
- Hotels and other infrastructure in the vicinity are a consideration for planning for their customers in the future. Discussions going on about higher end hotels and restaurants (more options). Occupancies with hotels (Kevin D. discussions) – during launches (manned or not)

- occupancies are up 100%. Area could support another higher end
- Their staff increases and could be here for about two weeks out of the month. Long-term stay apartments within the area are also a consideration. They are getting interns this summer too and they have to consider where they would put them. They tend to surge in staff. 25-30 people surge for staff. Investor tours, board meetings, etc. impact housing strategy.

Day-to-Day Activities

- Objects manufactured in Melbourne are trucked to TIX for integration within the hangar.
- Proposing building and testing multiple capsules and associated technology a few times per month.
- Potentially starting to fly and launch from the Spaceport several times per month.
- The capsule needs proof testing.
- Address low power lines at OUC Dock and the distance between the Dock, through KSC, and into TCAA Spaceport.
- So far, Space Perspective is the only entity wishing to go through KSC from the OUC Dock.
- Create a process for this that other tenants will be able to utilize after Space Perspective has worked it out.
- Provide a multi-modal site with access between air, road, rail, and sea.
- If consolidated within one area, possible 'end-state' would include acquiring an additional 100,000 square feet plus temporary facility for high-altitude balloon assembly, 30,000 square-foot composite manufacturing from Melbourne (they lease this) - could move to Titusville (air-conditioned industrial space with high ceilings). (25' tall doors and higher facility). (approximately 20' tall capsule).
- Recovery via ocean. Continuing trend (others like Blue Origin too). Port Canaveral is at capacity and expensive.
- Key infrastructure includes other studies such as maritime study for the area. A Hangar type facility will be of use.

Public Access

- They give tours to customers, investors routine for them. Especially over time as their technology and 'end product' evolves and is ready for launch. Melbourne activities are not part of the tour so collocating items helps with that too.
- Consider entrance to areas from major highways first impression especially important to them and potential clients/customers. For SP and their customers, as well as customers of contractors and overall airport. Looks older municipal like. SP's mission control building looks great for their customers who fly in and access their building, but bigger picture is what is at stake.
- FBO tour for them to get support for hangars for jets as the gateway to KSC.

Discuss proposed functions and uses for your company at the Titusville Airport / Spaceport site. What functions will remain, and which functions will be expanded in the future?

- Adding balloon launch to the AST Launch Site Operator (Spaceport) License. (presents idea of actual launches from airport/spaceport) current license is horizontal take off / launch - need for amendment to include balloon launch. FAA slow process and SP is working on this.
- Large building infrastructure available for the growth of tenant companies – we had to go to Melbourne for expansion.
- Development and use of the Indian River Power Plant dock. (OUC Dock for MS Voyager).

What constraints (easements, parking, land acquisition, setbacks (explosives or sound), etc.) exist at the overall Titusville Airport / Spaceport site that could prohibit your company's growth or development - or participation - at Spaceport?

 High and wide load access in and out of the Spaceport due to power lines, similar to Port Canaveral, the Indian River Power Plant dock, and to a lesser extent KSC. (clearance and routes to and from dock and spaceport) (discuss turning radii)

Does your company have any specific Site Security requirements? Does your company require ITAR security requirements?

- Not ITAR for facilities or site items they are the exception and not the rule for this.
- They do control access with badges, but not subject to ITAR (for foreign nationals and other aspects).

Does your company's existing or proposed facility require rocket and/or engine testing?

- Use of the fueling area for a wide variety of testing, capsules to rocket engines. (either districting conversation and/or common use test stand) (this designates that the common use test stand may need to actually be an engine test stand) (any hazardous materials associated with steering capsule? Associated with anything else? Fueling necessary for any aspect?). Their current license has hazardous materials use requiring specific radius – look at their license for explosives etc. Specific area outlined for this – look at their lease – this cannot be encroached upon. Develop this area for functional use and preserving it as resource for Spaceport. FAA has already made a determination for this area for explosive radius. Major need for this preservation. Multi-
- Needs access and some moderate infrastructure.



Facilities programmatic requirements

Employee Type	Current Headcount	5-year projection
Full time employees	+/- 100	500
Part-time employees		
Seasonal / Temporary/surge	25-30	

Confidential Aerospace Company

Overall

- Proposed: (existing mostly in DC with home base in Florida) launch and land reusable rocket. Footprint like larger aerospace company although smaller than what exists out within vicinity.
- ITAR controlled. Confidentiality and Sensitivity. Physical security. Depending on mission payload.
- Commercial company likes development opportunities at Titusville. Payloads delivered and stored, while companies prepare their payload and then return.

Public Access

- No because of ITAR physical security so this needs physical separation.
- Consider air shows and coordination with TCAA.

Site

- Operational complex, not a touring or customer presentation facility.
- Constraints power line locations for transport could do just horizontal, but payload processing and some vertical is preferred.
- Need setbacks for visual privacy too linked to air shows and others on site.
- Storage requirements the Fleet requires conditioned space, possible containers - so possibly consider what can fit within their acreage and their building footprint – mostly maximizing the building space on a parcel that is appropriate.
- Hazardous materials 1.1 ordinance possible engine test stand for liquid oxygen, liquid hydrogen, and liquid methane.
- Deliveries, shipping and receiving mostly by truck / semi, not using rail at the moment, and they are intrigued by the concept of the OUC Dock connection – considering private assessment of possibly using this and / or being able to use this.
- Fleet parking needs 200 fleet and POVs, with varying other types of smaller vehicles – including electric vehicle charging areas.
- Height restrictions none, but for aviation requirements within area at least 60' high (plus) to do integration – goes through FAA airspace analysis with 50-60 feet possible under current requirements.

Does your company have any specific Site Security requirements? Does your company require ITAR security requirements?

- ITAR background security requirements.
- Right of way to get items from their facilities to the Cape, with vertical and horizontal cargo – oversized load so consider / analyze turning radii.

Does your company's existing or proposed facility require rocket and/or engine testing?

- Preferred to have their own facility out in testing area if separate from their main facility. To have their own equipment stored in a designated facility. Then a scheduling issue.
- Purpose for space. Looking at thrust 1250' minimum. Could range up
- Business rules can be in conflict with using a common-use test stand. No common interfaces for rockets today.

Facilities programmatic requirements:

Employee Type	Current Headcount	5-year projection
Full time employees	1	350 full time (2 shifts with 100 people at a time) - 150-250 parking spaces Rocket side / payload side.
Part-time employees		12
Seasonal/Temporary		50

Roughly, how much overall square footage (SF) do you have right now for your company, or need for need for your company?

- Currently in Cocoa Beach.
- Future would need 200,000 GSF building with payload door for mature program.
- Possible 5-acres.
- Possibly 1-4 buildings to divide tasks to add up to 200,000 GSF.
- 156,000 square feet exists elsewhere.

321 Launch

Overall

- Building clean room, storage, and office space building (they have 4 acres greenfield (lease agreement signed) ready to build in 90% design package and working with developer. Within 3-6 months) Done by 4th quarter 2024. Small launch and satellite community. Multi-user site. Nonhazardous materials. LLC to get the buildings built with others maintaining the building. Time sharing for clients to come and use the building when they need. Also selling services. SW side of airport (Center Lane and Perimeter Road). Currently in Merritt Island. Works across at least 10 federal sites. Work with small aerospace businesses. 26,000 GSF. 2 stories – get generic site plan of the 4 acres. Some area on site. High-bay space for clean room with air locks on either end. Future expansion on site with possible outdoor storage. Finally, assembly and integration space.
- Public access touring and escorting will be a yes related to ITAR restrictions. Badge access to building.

Site

- Identified preferred location on site plan within the 'main development
- Possible opportunity for hazardous materials.
- Constraints 1200' radius setback if opportunity for hazardous
- Possible fueling cell within a heavy industrial area if a district like this gets defined on the Master Plan.
- Deliveries, shipping, and receiving they have shipping and receiving built into their proposed building – mostly box trucks and vans – they have accommodated for the turning radii within their plan.

Does your company have any specific Site Security requirements? Does your company require ITAR security requirements?

Commercial market is target – no special ITAR at first. They have site and building security though. They are considering putting up a fence around their parcel. Not envisioning fencing in a district.

Does your company's existing or proposed facility require rocket and/or engine testing?

 Potential client for this for testing, fueling area, and possible hazardous materials - potential.

Facilities programmatic requirements:

Employee Type	Current Headcount	5-year projection
Full time employees	They are moving to this site when built – headcount is determined by their desired square footage and how many people can office in that space.	
Part-time employees		
Seasonal / Temporary		

Space Coast Innovation Park (SCIP) Development

Overall

- We are a ground lease tenant who is developing 450 acres on the West side of the Airport for commercial uses.
- They are developers in general and not necessarily aerospace only. Lots of large parcels with and without conceptual designs. Mentioned mix-use and industrial with some hotels too. They have not done a formal market study for their parcels and ideas.
- We lease office space in the previous administration building and are entitling our first Phase of the aforementioned development – 3 offices at present. Ramping up when they go through construction. So, 3 people to 4 people in the office, along with construction folks in a construction trailer.
- They hire design-build contractors and then manage design professionals for each project.
- Part of the admin building just 3 offices. 355 Golden Knights Blvd. In there with other developers like TIX developers.
- Public Access We need connectivity to the East side for our users, access to rail, and ideally cargo. Port access also.
- Access to the intermodal facility, Port, bury utilities along the perimeter roadway, expand perimeter roadway all around to support payload transport.

Site

- 1.1 million square feet of industrial warehouse, likely with aerospace users that will need to transport goods to KSC.
- Constraints:
- They need multimodal transportation options.
- Roadway improvement.

- Create connections between air / sea / train.
- Overhead utilities heights address them.
- Address different zoning criteria look at Spaceport wide zoning different zoning designations throughout.
- Height restrictions up to 50 feet buildings within their conceptual plans are based on aerospace and environmental studies that assert this number.

Does your company have any specific Site Security requirements? Does your company require ITAR security requirements?

 No, but tenants likely will need this consideration and planning requirements.

Does your company's existing or proposed facility require rocket and/or engine testing?

- No, but tenants likely will need this consideration and planning requirements.
- Possible drone activity but needs to tie back with FAA studies TCAA to supply.

Facilities programmatic requirements

- Roughly, how much overall square footage (SF) do you have right now for your company, or need for need for your company?
- They are building 1.1 million square feet in Phase 1 and Phase 2.
- Likely 2 million square feet in Phase 3.



Page Intentionally Left Blank

Total Market Size in

2040 = USD 1,010

billion

10%



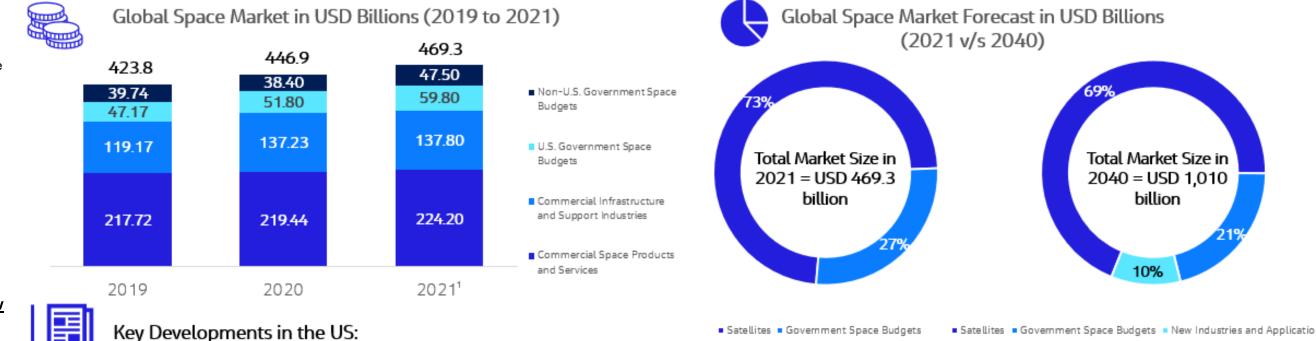
SPACE TRANSPORTATION **MARKET ANALYSIS SURVEY**

As part of the scope of work, the planning team performed a Space Transportation Market Analysis Survey to explore information for this Master Plan report on the following items:

- Gather and Review Sub-Markets Information for Competitive-Position Analysis.
- Gather and Review Space Transportation Support Markets Information.
- Gather and Review Other/Competitor **Spaceport Markets** Information.
- Identify Key Performance Indicators.
- Value Added Include Spaceport Spacecraft Point-to-Point Guidelines.

Market Demand 4.1

Market Demand - Overview of Global Space Economy



- Rise in research, innovation, and commercialization of the space industry from government to private industries is expected to boost the growth of the space sector in the US over the next 10 years
- Developments in space technology such as additive manufacturing for producing 3D-printed rockets, reusable rockets, and reduction in the cost of satellites is expected to drive the growth of the space economy over the next 10 years
- Florida is the second largest state in the US in terms of the number of aerospace establishments and has over 151,460 employees working in the aerospace sector

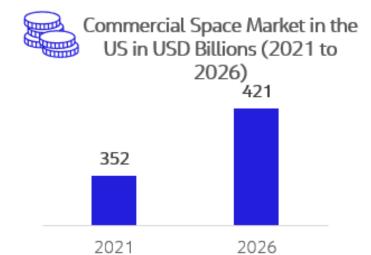
@Jacobs 2023

Sources:

https://thespacereport.org/?taxonomy=topic&term=economy-interactive-tables-and-charts



Market Demand – Commercial





Overview of the Space Market in the **US for Commercial Sector**

- The global commercial space sector is expected to generate a revenue of USD 1 trillion by 2040
- The satellite launches are expected to account for ~70% of the total revenue in 2040
- Commercial space industry is expected to witness growth due to needs such as enhanced GPS/GIS, geospatial intelligence, enhanced satellite **coverage, and facilitate safe launch** for Space Tourism, Microgravity, R&D



Key Developments in Florida:

- Since 2007, the total economic impact of the state's aerospace finance and development authority reached USD 5.9 billion in 2022
- Over the next 5 years, the total economic impact is expected to reach over USD 5.3 billion (an average annual impact of USD 1.1 billion)
- Space Florida, the state agency that promotes the space industry in Florida, announced in 2022 that it is expected to build a "human spaceflight service center" near Kennedy Space Center to boost the commercial **space sector** in the region
 - The **facility** is expected to **employ 200 people** by 2025



Key Developments in the US:

- In 2021, the **private sector funding** in the space sector was pegged at **USD 10 billion**, a **ten-fold** increase over the last 10 years
- The global Research & Development (R&D) funding share of the US government decreased from 70% to 50% over the last 10 years, increasing in participation by the private sector
- As of February 2023, SpaceX has launched more than 3,271 mass-produced small Starlink satellites in low Earth orbit (LEO)

Estimated Market Growth:



Note: Low High

Based on Analyst's interpretation

©Jacobs 2023

Sources:

hhttps://www.floridatoday.com/story/tech/science/space/2022/03/06/private-astronaut-training-facility-could-come-to-brevard/6800673001/

https://www.spaceflorida.gov/news/space-florida-5-9-billion-economic-impact-on-floridas-economy/

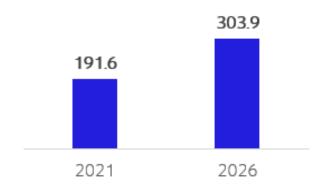
https://business.uoregon.edu/files/media/commercial-space-industry-report.pdf

https://www.space.com/spacex-starlink-satellites.html



Market Demand – Space Tourism





Overview of the Space Market in the US for Tourism Sector

The key companies operating in space travel and tourism in the US are SpaceX, Blue Origin, and Virgin Galactic



Key Developments in Florida:

- Florida is expected to be at the forefront of the space tourism sector in the US over the next 5 to 10 years
 - In July 2022, the Space Coast Office of Tourism, the agency responsible for the marketing of tourism operations in Brevard County, Florida, announced its plans to spend USD 9.78 million for developing marketing campaigns
 - In-state: the campaigns will be run in Miami/Fort Lauderdale, Orlando, Tampa/St. Petersburg, and West Palm Beach in Florida
 - Out-of-state markets will be run in Atlanta, Boston, Charlotte, North Carolina Chicago, New York, Philadelphia, and Washington D.C.
 - Space Perspective, a human spaceflight company which operates from Exploration Spaceport and Kennedy Space Center, has planned to use balloons to lift passengers to the edge of space in a pressurized gondola from Brevard and Duvall counties



Key Developments in the US:

- In July 2021, Virgin Galactic and Blue Origin launched suborbital tourism programs from their spaceports in New Mexico and Texas, respectively
- **Orbital Assembly Corporation** is a space construction company that is expected to **launch two space** stations with tourist accommodations:
 - The Voyager Station is scheduled to open in 2027 and will accommodate an expected 400 tourists
 - The smaller capacity Pioneer Station is expected to open in three years, housing 28 tourists

Estimated Market Growth:

Note: Low High

Based on Analyst's interpretation

@Jacobs 2023

Sources:

https://researchfdi.com/resources/articles/space-tourism-and-the-space-economy/#:~:text=The%20fwture%20space%20Tourism&text=Voyager%20Station%20is%20scheduled%20to,at%20a%20much%20smaller%20capacity.

https://airandspace.si.edu/stories/editorial/space-tourism-then-and-now

https://reporter.rit.edu/tech/rise-space-tourism

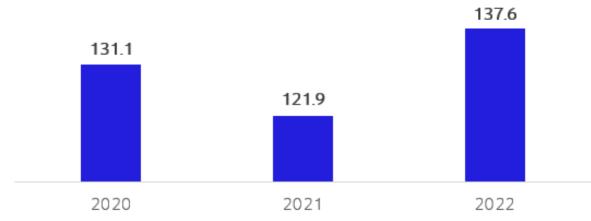
https://www.space.com/space-perspective-stratosphere-balloon-tourism-flights.html



Market Demand – Tourism Industry in Florida



Tourism Market in Florida by the Number of Visitors in Millions (2020 to 2022)





Key Points in the U.S.:

- Tourism in Florida contributed **USD 101.9 billion** to the **economy of Florida** which led to **1.7 million direct and indirect jobs** in the state in 2022
- Florida generates **USD 3.27 in state tax revenue** for **every USD 1** it invests in the tourism sector
- Florida is one of the few states in the US where the tourism revenue generated has returned to pre-pandemic levels
- The growing trend of space travel is expected to lead to more international travelers visiting Florida

©Jacobs 2023

Sources:

 $https://www.visitflorida.com/about-us/\#: \sim : text = Florida's \%20 tourism \%20 industry \%20 was \%20 responsible, a \%205.0 \%25 \%20 increase \%20 over \%202019.$



Market Demand - Impact of Space Tourism on Tourism **Industry in Florida**



Tourism Market Demand in Florida

- Florida has a reputation for a leader in tourism for over the last 50 years and has been witnessing a record number of visitors post-COVID-19
- For instance, in the summer of 2022 the following statistics took place at some of the key tourist attractions in Florida:
 - Port Canaveral-based cruise lines sailed at 100% occupancy
 - Brevard Zoo had a record-breaking attendance
 - Kennedy Space Center Visitor Complex opened a new exhibit
- Over the next 5 years, the demand for tourism in Florida will be accelerated due to growing leisure travel, diminished COVID concerns, and rising corporate and group travels



Tourism Market Hotel Sup in Florida

- The growing demand for space themed attractions and the existence of a large number of spaceports, such as KSC, is expected to boost the hotel demand in the region
- The rising demand for space tourism will lead to a supply pressure on hotels, restaurants, and local shops to fulfill the demand
- In 2022, the surge in demand for tourism resulted in a staffing crisis in Florida 🕻
 - In July 2022, the hotel industry across the US had a vacancy of more than 130,000 jobs
- Hotel owners are hiring at higher salaries and providing more incentives to retain the staff, this is subsequently leading to higher hotel rates for tourists



Key Challenges

- Increasing Fuel Costs can affect the tourism market as the prices of services in industries such as cruise lines and space travel can be affected negatively, as well as inflation rates in general
- Natural calamities such as hurricanes can disrupt the tourism market in Florida which will lead to a loss of potential revenue



Key Recent Highlight - Artemis 1 Moon Mission

- In August 2022, the beachside hotels in Florida were sold out for months prior to the Artemis 1 moon mission as the tourists wished to witness and celebrate the launch of the Orion spacecraft
- The state witnessed a footfall of over 100,000 tourists to Florida during the launch of the 322-foot rocket on 16 November 2022

@Jacobs 2023

Sources:

https://www.space.com/nasa-artemis-1-launch-florida-space-coast-tourists

https://www.wesh.com/article/orlando-hotels-staffing-shortage/40580776

https://www.hospitalitynet.org/opinion/4114306.html

https://www.nasa.gov/specials/artemis-i



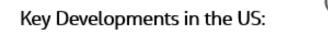
Market Demand - Defense



Overview of the Space Market in the US for Defense Sector

- The spaceport market will see opportunities in the defense sector primarily due to an uptick in cyberspace investments, and an increase in satellite launches for communication, navigation, meteorology, and intelligence related to defense
- The key companies in the defense space market in the US are SpaceX, Lockheed Martin, Boeing, Northrop Grumman, Leidos, Virgin Galactic Holdings, and Rocket Lab USA





- In January 2023, SpaceX launched a next-generation GPS satellite into orbit for the US military's use
 - The GPS3 satellite is expected to improve the quality of communications of smartphone applications and other systems
- The market witnessed multiple launch opportunities in 2023
- For instance, **Lockheed Martin** is expected to **launch 4 GPS satellites**; the company will further **launch** 22 more satellites after the initial 10 which have strong protection against hackers and foreign militaries







Key Developments in Florida:

- Florida is witnessing defense launch activity in areas such as Volusia and Brevard Counties
- Volusia County has attracted investments from Brazilian company Ocellott, Onicx Group and Aries Capital (that have partnered with TVEDC) to bring speculative manufacturing facilities to Edgewater, etc.
- The Cape Canaveral Space Force Station in Florida is one of the eight Space Force stations
- In February 2023, Blue Origin, the private space company founded by billionaire Jeff Bezos, awarded its first interplanetary NASA contract which will see the launch of its New Glenn heavy-lift rocket in late 2024 from the Cape Canaveral Space Force Station in Florida, as well as continued work on Project Kuiper
- In August 2022, Lockheed Martin launched its sixth missile warning satellite (the last of the US Space Force's Space Based Infrared System (SBIRS) program) from the Cape Canaveral Space Force Station in Florida

Note: Low High

Based on Analyst's interpretation

@Jacobs 2023

Sources:

https://www.forbes.com/sites/qai/2023/01/25/spacex-deploys-gps-3-satellites-for-space-force-in-its-latest-launch/?sh=13f26eef34cf

https://www.thedefensepost.com/2022/08/05/lockheed-missile-warning-satellite/

https://businessfacilities.com/2023/02/launching-to-success-aerospace-defense-locations/

https://www.reuters.com/business/aerospace-defense/blue-origin-awarded-its-first-nasa-interplanetary-launch-contract-mars-mission-2023-02-10/



Market Demand - Education, Healthcare, and Science



Overview of the Space Market in the US for Education, Healthcare, and Science Sectors

- Spaceports are experiencing a demand in applications and university research for the weather forecasts, healthcare, climate change, agriculture, healthcare, oceanography, and defense
- For instance, NASA is using advanced radar technology which is an observatory system for 5 advanced satellite missions that provide a 3D view of how the earth's systems are operating and are impacted by climate change



Sub-sector - Climate Change

- Climate TRACE, an organization that combines science and satellite technology with artificial intelligence (AI) to study global emissions, has harnessed 300 satellites to analyze 60 terabytes of data
- GHGSat currently has several satellites in orbit and monitors greenhouse gases in high resolution. It, too, is capable of identifying emissions from individual facilities
- NASA's Carbon Monitoring System brings together satellite remote sensing. scientific knowledge and modelling to help national and local partners with climate monitoring and mitigation efforts. For example, it has helped the U.S. Environmental Protection Agency with methane emissions data



Sub-sector - Agriculture

The data collected by NASA's Earth Surface Mineral Dust Source Investigation in July 2022 has led to scientists identifying more than 50 'super-emitters' in central Asia, the Middle East and the southwestern US in the fossil fuel, waste or agricultural sectors



Estimated Market Growth:

Sub-sector - Healthcare

The rise in the acceptance of telemedicine is expected to spur the volume of satellite launches as it can enable healthcare companies to remotely monitor patients in more isolated locations



Note: Low High

Based on Analyst's interpretation

Estimated Market Growth:

©Jacobs 2023

Sources:

https://climatetrace.org/about

https://www.automotiveworld.com/articles/fcc-spacex-satellite-ruling-advances-autonomous-vehicle-development/

https://www.space.com/ghgsat-carbon-dioxide-detecting-satellite-to-launch



Market Demand – Community



Overview of Space Market in the US for Community Sector

- Spaceports launch satellites that provide numerous benefits to the community such as the following
 - Navigation services for ambulances or firefighters, first responders, as well as the organization of power grids and other essential infrastructure
 - Management and synchronization of financial transactions of all types



Sub-sector – Civil Services

- Spaceports are expected to witness an increase in demand due to the advent of autonomous vehicles over the next 10 years
- In June 2022, SpaceX was provided the regulatory approval to use its Starlink satellite internet constellation on vehicles in motion; this will accelerate the development of autonomous vehicles



Sub-sector – Energy Networks

- Satellites are being deployed in energy networks to improve their efficiency and reduce their environmental impact
- Satellites provide geographic information systems (GIS) for infrastructure mapping and locating energy networks
- Oncor, the largest utility company in Texas, uses the vegetation management database from X2N
- Washington state fire officials detect lightning strikes in real-time through GOES satellites



Sub-sector - Banks

- U.S. Financial Institutions use geospatial data
- Agriculture-banks are using satellite monitoring solutions to assess loan risk by considering the forecasted weather, imagery, and data
- For instance, companies such as EOS Data Analytics (based out of the US) use Alpowered satellite imagery analytics to support loan risk assessment with accurate data on farms' productivity and harvesting capacity



Estimated Market Growth:



Note: Low High

Based on Analyst's interpretation

©Jacobs 2023

Sources:

https://x2n.com/blog/how-utility-companies-are-using-satellite-technology/

Support Markets 4.2

Support Markets - R&D

Trend	Description	Examples
Increase in R&D spending	 The traditional aerospace and defense companies are more dependent on government funding for its R&D operations Each of these companies was estimated to have invested close to USD 1 billion per year on R&D over the last 3 years 	 For instance, Lockheed Martin invested USD 1.5 billion on R&D in 2021 and USD 1.3 billion on R&D in 2020
Rising funding from the private sector	 The share of private sector funding in space R&D has to have increased over the past 10 years In 2022, the cumulative government funding in space programs increased to USD 103 billion, an increase of 9% over the previous year During the period from 2017 to 2021, the private sector funding in global R&D in the space sector has a Compound Annual Growth Rate (CAGR) of 22% As of 2021, government funding for space R&D companies accounts for 66.6% of the total space R&D funding and funding from the private sector accounts for ~33.3% of the total space R&D funding 	 The US government spent USD 61.97 billion on space programs in 2022, an increase from USD 54.59 billion spend in 2021 China invested USD 12 billion on space programs in 2022, an increase from USD 10.29 billion spent in 2021

©Jacobs 2023

Sources:

https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/the-potential-of-microgravity-how-companies-across-sectors-can-venture-into-space

https://www.euroconsult-ec.com/press-release/new-record-in-government-space-defense-spendings-driven-by-investments-in-space-security-and-early-warning/

https://www.euroconsult-ec.com/press-release/new-record-in-government-space-defense-spendings-driven-by-investments-in-space-security-and-early-warning/



Support Market – R&D Continued

Trend	Description	Examples
Space technology funding		 The investment highlights across the globe in 2022 are below: Iceye, based in Finland, and Synspective, based in Japan, secured rounds of USD 100 million or larger Pixxel, a global Earth observation company based in India, raised USD 25 million
	 For instance, Lockheed Martin has started Lockheed Martin Ventures as its corporate venture arm which has invested in space support services companies such as Terran Orbital, Xona Space Systems, and Slingshot Aerospace in 2022 Stellar Ventures, a new space-focused venture capital firm founded by Patterson and Celeste Ford, the founder of engineering firm Stellar Solutions, invested in Xona Space Systems and Skyloom in 2022; the company plans to invest in 5-10 more companies in 2023 	European startups such as OroraTech, Aerospacelab, LiveEO, and Satellite Vu received funding as well in 20222
		©Jacobs 2023

©Jacobs 2023

Sources:

https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/the-potential-of-microgravity-how-companies-across-sectors-can-venture-into-space

Support Market - Supply Chain

Upstream

Space Manufacturing

Space manufacturing includes **primary** and secondary contractors that undertake the sourcing, manufacturing, and assembling of satellites



Space Launch Operations

These stakeholders undertake the satellite launch services







Downstream

Space Applications

The end-use industries of space launch services include tourism, education, healthcare, defense, consumer, technology, agriculture, commercial, and more

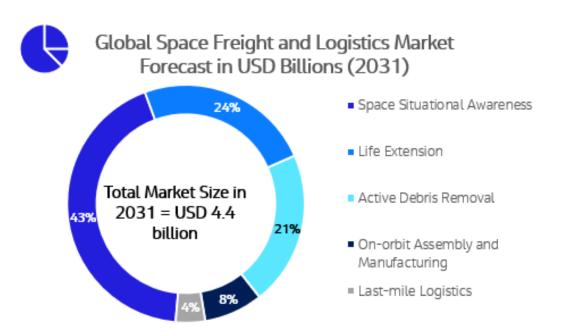




Ancillary services are provided at various intervals of the value chain. These services include R&D services, satellite operation services, transponder leasing companies, insurance companies, logistics services, and other administrative services

©Jacobs 2023

Support Market – Freight and Logistics



- Factors such as the increasing number of satellites in LEO (low-earth-orbit), rise in miniaturization of electronics, and growing affordability of space operations has led to a rise in demand for space logistics
- The key companies in the US space logistics market are Atomos Space, Deutsche Post DHL Group, D-Orbit, Impulse Space., Launcher, Momentus Space, Northrop Grumman, and Yusen Logistics
- The investments in the space freight and logistics sector is increasing as the venture capitalists aim to be early investors in a booming market
- For instance, in February 2023, Momentus Space, an in-space infrastructure and logistics company, gained an investment of USD 10 million from an undisclosed institutional investor, which would be used to make their space logistics solutions more robust

©Jacobs 2023

Sources:

https://www.businesswire.com/news/home/20230222006141/en/Momentus-Announces-10-Million-Investment



Support Market – Freight and Logistics Continued

Space Logistics Sub-sector	Description	Anticipated Market Growth
Space Situational Awareness (SSA)	 SSA is expected to remain the largest market in the space logistics sector over the next 10 years The rising demand for space sensing activities such as Radio Frequency (RF) mapping, weather monitoring, remote sensing, etc. 	
Life Extension	 Sub-sector is a matured market The capability to increase the lifespan of satellites by 5 years and increase their overall efficiency is driving the sub-sector 	
Active Debris Removal	 As of 2022, there are ~6,800 functioning satellites, 8,800 tons of space debris objects, and 32,000 tons of debris objects, and more than 128 million fragments less than 5 cm in size that cannot be monitored by SSA assets Thus, the increase for logistics services to avoid the collision of satellites and ensure hassle-free functioning is rapidly growing 	
On-orbit assembly and manufacturing	 Sub-sector is in nascent stage The market is focused on increasing the technology readiness in the industry 	
Last-mile logistics	The demand is generated from commercial constellations in LEO	

Note: Low | | | High Based on Analyst's interpretation

©Jacobs 2023

Sources:

https://www.businesswire.com/news/home/20230222006141/en/Momentus-Announces-10-Million-Investment

Supply Markets of Spacepoprts 4.3

Supply Markets – US Spaceports and Launch / Re-entry Sites

Map Legend

FAA- Licensed Vertical Launch Site

FAA- Licensed Horizontal Launch Site

Exclusive Use Site (Non-FAA Licensed)

FAA-Licensed Reentry site

FAA- Licensed Horizontal and Vertical Launch Site

U.S. Federal Site



@Jacobs 2023



Supply Markets –Continential US (CONUS) Spaceports

Spaceport	Operator	Location	Capabilities	Pads/Runways
Huntsville International Air and Space Port	Huntsville Madison County Airport Authority	Huntsville, Alabama	 Air Traffic Control Tower (ATC) Aircraft Rescue and Fire Fighting (ARFF) ARFF Fix-Base Operator (FBO) providing Jet-A and related FBO services 	 18L/36R 10,001' x 150' asphalt runway (current horizontal landing orbital reentry site) 18R/36L 12,600' x 150' asphalt runway
Mojave Air & Space Port	Mojave Air & Space Port	Mojave, California	 Air Traffic Control (NFCT-VFR, FAA/DoD-STARS, ADS-B) ARFF, & Security, Aviation Fuel Class D/G, Restricted Airspace Access (R2508/2515) MOA access Supersonic Corridors (Black Mountain, PIRA, & High Altitude) 	 Runway 12/30-12,500' x 200' Runway 08/26-7,049' x 100' Runway 04/22-4,745' x 60'
Vandenberg Space Force Base	United States Space Force	Vandenberg Air Force Base, California	 8 Space Launch Complexes Two vertical, orbital launch pads Two satellite processing facilities 	One Runway (North VAFB): 15,000 by 200 feet, concrete
Colorado Air & Space Port	Adams County	Watkins, Colorado	 Air Traffic Control (Serco CT-VFR, 3-ILS all wx approaches, GPS, ADS-B) ARFF, & Security, Aviation Fuel Class D/G MOA access Supersonic Corridors (Kansas State Corridor) 	Two asphalt runways (8000 feet each)

@Jacobs 2023

Sources:

https://www.faa.gov/space/spaceports_by_state#ak_psc

Supply Markets –Continential US (CONUS) Spaceports

Spaceport	Operator	Location	Capabilities	Pads/Runways
Cape Canaveral Space Force Station	45th Space Wing	Cape Canaveral • Launch pads Runway Space Force • Launch azimuths Station, Florida • Orbital inclinations and telemetry • Satellite processing		Runway:13/31-10,000' x 200'
Kennedy Space Center	National Aeronautics and Space Administration (NASA)	Kennedy Space Center, Florida	 Launch & landing capabilities & technologies Available vacant land Vehicle, payload, spacecraft & small satellite processing, integration and testing Plant research & production 	Runway: 15/33-15,001' x 300'
Space Florida Launch Complex 46	Space Florida	FCQG+FV Cape Canaveral, Florida	 Multi-user pad capable of supporting up to 10-foot diameter vehicles Mobile Access Structure (MAS) Payload lift capabilities for low Earth orbit (LEO) in excess of 4,900 pounds 	One vertical launch pad One Runway
Space Florida Launch and Landing Facility	Space Florida	J874+Q9 Wilson, Florida	 Air traffic control tower Capable of supporting all types and sizes of aircraft and spacecraft vehicles Suborbital flight training and research, weightless flights, and aviation and aerodynamic flight testing 	15,000-foot runway

@Jacobs 2023

Sources:

https://www.faa.gov/space/spaceports_by_state#ak_psc

https://www.spaceflorida.gov/facilities/llf/

https://www.spaceflorida.gov/about/executive-staff/

Supply Markets – Continential US (CONUS) Spaceports

Spaceport	Operator	Location	Capabilities	Pads/Runways	
Cecil Air and Space Port	Jacksonville Aviation Authority	13365 Simpson Way, Jacksonville, Florida	Horizontal Launch Multi-user mission control center	4 runways with primary runway being12,503 feet long	
Spaceport Camden	Camden County	Camden County, Georgia	 Capable of supporting responsive, flexible, and low-cost access to space for small-class vertical orbital and suborbital launch systems Support year-round operations of up to twelve launches per year with launch azimuths ranging between 83-115° from the launch point 	12,000-foot runway and hangar	
Spaceport America	New Mexico Spaceflight Authority	234 Aleman Rd. Truth or Consequences, New Mexico	 Radar, meteorology, telemetry and optics support through White Sands Missile Range Utilities: water, electric, high speed fiber- optic cable 	 12,000' x 200' concrete runway One 200-sq ft general-purpose launch pad Two 10-m diameter general-purpose pads 	
Launch Site One West Texas	Blue Origin	853QF62P+MV Van Horn, Texas	 Suborbital rocket launch facility Rocket engine test facility 	-	
Boca Chica	SpaceX Launch Site	52448-54298 Boca Chica Blvd Brownsville, Texas	Vertical launch area (VLA) Launch and landing control center	Currently Suborbital PAD A and PAD B are included	

©Jacobs 2023

Sources:

https://www.faa.gov/space/spaceports_by_state#ak_psc

https://cecilspaceport.com/post/frequently-asked-questions#:~:text=Q.-,How%20long%20is%20the%20primary%20runway%3F,any%20production%20aircraft%20flying%20today.

https://issuu.com/th1946/docs/spaceport_camden_-_mission_possible

https://www.linkedin.com/in/billmeadows/

https://www.faa.gov/space/stakeholder_engagement/spacex_starship/operations

https://www.linkedin.com/in/shyamal-patel-83a79729/

Supply Markets – Continential US (CONUS) Spaceports

Spaceport	Operator	Location	Capabilities	Pads/Runways
Houston Spaceport	Houston Airport System	510 Ellington Field, Houston, Texas	 Air Traffic Control Towers (ATCT) dedicated mission-control facilities for commercial spaceport operations Launch corridor to existing Offshore Warning Areas W-147C and W-147D over the Gulf of Mexico 	Runway 17R/35L 9,001' x 150' Runway 4/22 8,001' x 150'
Midland International Air & Spaceport	Midland International Airport	9506 La Force Blvd., Midland, Texas	 Production and launch operations Open areas for flight and energetic testing Also supports the testing and qualification of space and pressure suits, payloads, subsystems and components, as well as flight crew training operations 	Four Runways Runway 4/22 spans 4,605 feet Runway 10/28 spans 8,302 feet Runway 16L/34R spans 4,247 feet Runway 16R/34L spans 9,501 feet landings
Mid-Atlantic Regional Spaceport Wallops Flight Facility	Virginia Commercial Space Flight Authority	7414 Atlantic Rd., Wallops Island, Virginia	 A multi-pad launch complex Airfield for Unmanned Autonomous Systems (UAS) that supports primarily unmanned platforms but can also accommodate conventional manned platforms Payload Processing Facility Launch vehicle and Integration and Control Facility (ICF) 	Currently includes Pad OA, Pad OB and newly constructed Pad OC, located on NASA's Wallops Research Range

©Jacobs 2023

Sources:

https://www.faa.gov/space/spaceports_by_state#ak_psc

https://www.midlandtxedc.com/media/userfiles/subsite_15/files/industry/spaceport/Air%20%20Space%20Port%20and%20Spaceport%20Business%20Park%20Brochure_10x10_4_6_2015_Single%20page%20with%20crop%20marks.pdf

https://www.midlandtxedc.com/spaceport-business-park/



Supply Markets -Outside Continential US (OCONUS) Spaceports

Spaceport	Operator	Location	Capabilities	Pads/Runways
Pacific Spaceport Complex Alaska	Alaska Aerospace Corporation	Kodiak Island, Alaska	 Two command and control mission ops systems Fixed and transportable Range Safety and Tracking Systems (RSTS) Indoor launch vehicle processing and storage Payload Processing Facility (PPF) cleanrooms and hypergol fueling Capability for liquid, solid, hybrid, and stratospheric balloons Suborbital and orbital launch scenarios Large launch azimuth: 110 - 220 degrees (59 - 110 inclination) Off-axis tracking locations at spaceport and downrange Rapid and Agile Space Launch (RASL) Innovation Center 	6 pads total: • 4 orbital-class pads, • 2 suborbital pads

©Jacobs 2023



Supply Markets -Outside Continential US (OCONUS) Spaceports

Spaceport	Operator	Location	Capabilities
Reagan Test Site	US Army	2,300 miles west southwest of Hawaii on Kwajalein Atoll in the Marshall Islands	Unique instrumentation systems such as high-fidelity metric signature radars and optical sensors; support for research, development, testing, and evaluation of technology for long- range missile testing; missile defense; and space domain awareness
Koonibba Test Range	Southern Launch	40km north-west of Ceduna on the West Coast of the Eyre Peninsula, South Australia	 More than 10,000 km² of range area 145km downrange Overland payload recovery Support from the logistics hub of Ceduna
Woomera Range Complex	Royal Australian Air Force, a division of the Australian Defence Force	North-west pastoral region of South Australia	 Woomera Prohibited Area, the large land mass weapons range used for the testing of war materiel Woomera Restricted Airspace, the restricted airspace above the Woomera Prohibited Area Camp Rapier, the secure garrison support and specialized training compound within the Woomera Prohibited Area Nurrungar Test Area, the small specialized testing area just outside the Woomera Prohibited Area

©Jacobs 2023

Supply Markets -Outside Continential US (OCONUS) Spaceports

Spaceport	Operator	Location	Capabilities
Integrated Test Range	Defense Research & Development Organization	Balasore, Odisha, India	 Various high performance Range Instrumentation Systems such as Electro Optical Tracking System (EOTS), Radar System, Telemetry System and Central Computer System are deployed and configured in real time to provide necessary data (precise location and health parameters) of airborne targets through entire course of flight
Thumba Equatorial Rocket Launching Station	Indian Space Research Organisation (ISRO)	GVV7+497, VSSC Housing Colony, Thumba, Thiruvananthapuram, Kerala	 Infrastructural provisions for propellant testing, rocket designing, rocket motor casting, integration, payload assembly, testing as well as evaluation Ground infrastructures like a telemeter receiving station, test stands for testing solid and liquid propellants, components and payloads which are required to administer vibration tests
Satish Dhawan Space Centre	Indian Space Research Organisation (ISRO)	SHAR, Sriharikota Range PO - 524 124. Nellore District, Andhra Pradesh	Facilities for solid propellant processing, static testing of solid motors, launch vehicle integration and launch operations, range operations comprising telemetry, tracking and command network and mission control center
Barreira do Inferno Launch Center	Brazilian Space Agency, Brazilian Airforce	RN-063, km 11 - Ponta Negra, Natal - RN, Brazil	 Provision of tracking support for launches from the Alcântara Launch Center and Guiana Space Centre

@Jacobs 2023

Page Intentionally Left Blank



Engine Test Stand Capacity - Exploration Spaceport

Preliminary Capacity Calculations

- The maximum Quantity Distance Arcs (QD Arcs) explosive distances allowable at Exploration Spacport is 1250' radius – based on available land for this purpose.
- Because QD Arcs policies and guidance do not deal with specific details as to the size and height of the proposed engine test structure, the focus becomes more on how much of a separation TCAA will need between the explosives/testing and any occupied building and public roads.
- Assumption the structure itself will be located within the center of the
- o A test stand structure may be designed in a variety of ways depending
 - The test article type / size / orientation / propellant type
 - Desired run time
 - Need for altitude simulation
 - Desired life and durability
- When determining a location or possible use for a test stand, the physical structure (and associated test article) should be located away from public roads, public structures, and runways. Height limits of the stand will also be governed by Airport regulations.
 - The location of the proposed test stand area is not overlapping with the existing runway but does overlap with the Runway Protection Zone. (Refer to Section 6.3 Multi-Use Facilities and Engine Test **Stand Areas** for more information.)
 - Limited by runtime*, the maximum Net Explosive Weights (NEW) or explosive equivalent – and potential propellants that can be used at this proposed 1250' radius area are as follows:

NEW (lbs)	LOX/RP – 1 (lbs)	LOX/LH (lbs)	LOX/Methane (lbs)	PAD (ft)
30,000	300,000	214,000	214,000**	1,250

Note: PAD = Public Area Distance, NEW = Net Explosive Weight

*Caution when citing LOX/Methane quantities allowable in this test stand. Presently, there are no well-established standards for QD Arcs requirements for LOX/Methane use in a test stand. Other aerospace companies are currently following QD Arcs requirements for LH when using Methane, but research to determine appropriate guidance is ongoing.

** the 1250' QD radius limits the amount of propellant TCAA can store, thereby posing a limit on runtimes that may vary by engine.

Previous Project Example - Vertical Engine Test Stand

- Photo: NASA White Sands Test Facility (WSTF) similar to the type of stand within a 1250' radius.
- Designed by Jacobs Technology Group for NASA. The stand is capable of handling engines with thrust up to 180,000 lb/f (similar to SpaceX's Merlin 1D that powers their Falcon 9 rocket).
- This approach would enable vertical firings which may be needed for some test customers. *
- Another option might be a horizontal firing position which can have a simpler approach with affixing an engine down to some anchors in the concrete. *
- Note: propellent run tanks and other infrastructure required for this test stand do not appear within the image.
- * Test customers may want a variety of test stand designs based on their needs.





<u>Previous Project Example of a Horizontal Test Position</u>



Photo Credit: Blue Origin

Previous Project Example of a Horizontal Test Position



Photo Credit: Relativity Space Test at Stennis Space Center, MS

Aerospace Key Performance Indicators 4.5

This section contains Spaceport Key Performance Indicators (KPIs) gathered from the Florida Spaceport Improvement Program 2018 Project Handbook (prepared by Space Florida and the Florida Department of Transportation (FDOT)). These KPIs are part of the overall funding stream requirements for any proposed project at a Spaceport.

Improve Aerospace Transportation Facilities – improving facilities and proposing facilities for Spaceport / Aerospace future development.

Encourage Cooperation and Integration between Airports and Spaceports – similar to the overall Master Plan process between TCAA, Ricondo (Airport Master Plan), and Jacobs (Spaceport Master Plan).

Facilitate and Promote Inter-Agency Efforts to Improve Space Transportation Capacity and Efficiencies – aligning a Spaceport to the larger state-wide initiative for Spaceport Development.

Improve Spaceport Infrastructure - vehicle manufacturing, testing, research and development, and launch capabilities.

Spaceport Coordination for Funding and Projects - the project request and approvement process between all Spaceport / Aerospace partnerships for project and funding requests.

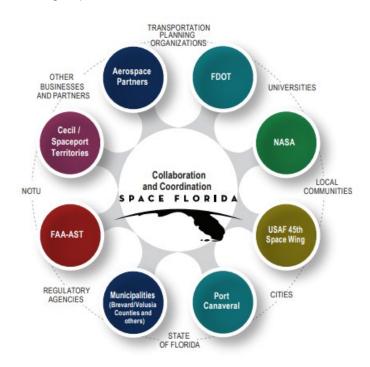


Figure 14-Florida Spaceport Improvement Program 2018 Project Handboek Inter-agency relationships*

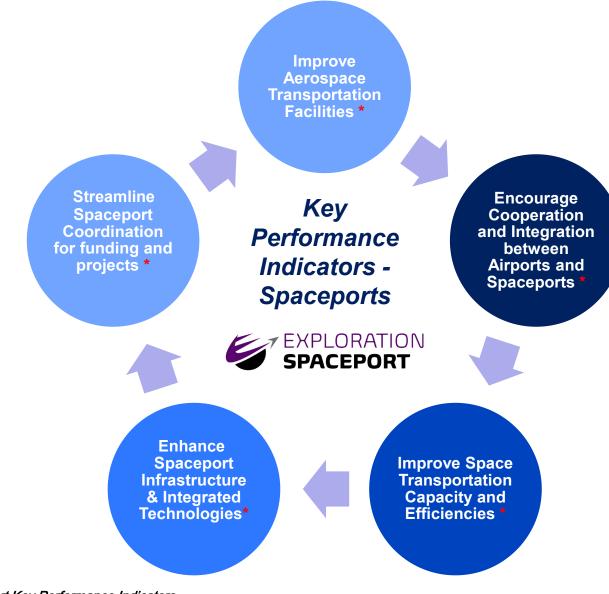


Figure 15-Spaceport Key Performance Indicators

Florida Spaceport Improvement Program 2018 Project Handbook – Space Florida and FDOT – to secure project funding



Exploration Spaceport SWOT (Strengths, 4.6 Weaknesses, Opportunities, and Threats) Analysis

SWOT is a guick brainstorming tool to help develop ideas for a plan. Identification of outside opportunities and threats are important to understanding internal strengths and weaknesses because they can reveal hidden challenges or obstacles in achieving the vision, goals, and objectives. Elements such as facilities, location, land, operational capabilities, safety and emergency response, security, capability gaps, horizontal infrastructure, growth objectives, community connections and partnerships, circulation, standoff distances, horizontal infrastructure concerns, and more led to emerging themes through the identification of this SWOT. An assessment of today, where the Space Coast Regional Exploration Spaceport needs to be in the future, and how to align business drivers with functional requirements helps to create an integrated plan. This plan helps TCAA to achieve a strategic, and intentional, end-state that is critical in developing a planning framework for the course of actions. The figure to the right summarizes SWOT input for TCAA.

To establish a context for planning, TCAA stakeholders provided input on the following topics:

- What are core competencies found at TIX?
- What are the desired attributes for long-term end state for TIX?
- What are the unique aspects of TIX?
- What is working well?
- What opportunities exist for growth and improvement?

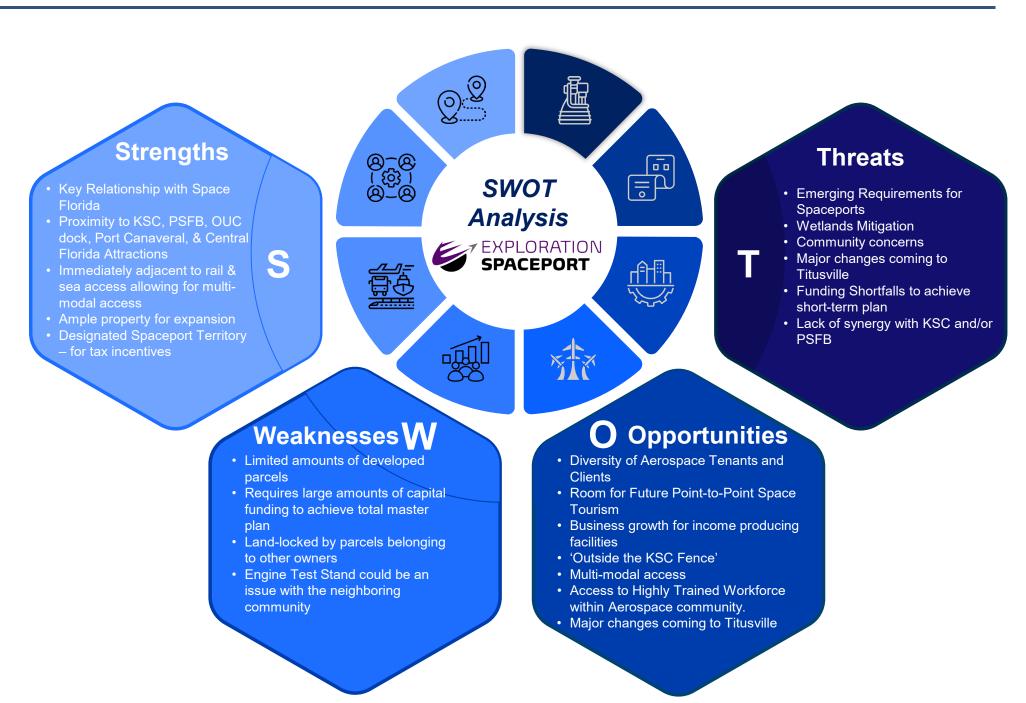


Figure 16-Exploration Spaceport SWOT Analysis

Point-To-Point Spaceport Spacecraft Guidelines 4.7 Research

As a valued-added bonus to the Market Survey scope of work requirements, the planning team has researched and compiled the classifications, sizing, and basic overall requirements for Spacecraft that could serve as 'point-to-point' carriers in a Spaceport future.

CLASSIFCATION	COMPANY	VEHICLE DESCRIPTION	SPECS	LAUNCH/LANDING TYPE	RUNWAY LENGTH	ENGINE/FUEL TYPE	COMMENTS	STATUS	IMAGES
	BOOM SUPERSONIC	XB-1	68 ft (21 m) long, has a 17 ft (5.2 m) wingspan and a 13,500 lb (6,100 kg) maximum take-off weight. Powered by three non-after-burning J85-15 engines with variable geometry inlets and exhaust, the prototype should be able to sustain Mach 2.2 with more than 1,000 nmi (1,900 km) of range. For thermal control, the environmental control system uses the fuel as a heat sink to absorb cabin heat.	Not disclosed	Not disclosed	General Electric J85- afterburning turbojet engine that uses jet fuel	The Boom XB-1 "Baby Boom" is a one-third-scale trijet supersonic demonstrator	ACTIVE	400
	LOCKHEED MARTIN	F-35 LIGHTNING II	Span 35 ft, length 51.4 ft, height 14.4 ft. Weight: Max T-O 70,000 lb. Power Plant: F- 35A: one Pratt & Whitney F135-PW-100, 40,000 lb thrust. Performance: Speed Mach 1.6 with full internal weapons load, range 1,380 miles.	The aircraft has three main variants: the conventional takeoff and landing (CTOL) F-35A, the short take-off and vertical-landing (STOVL) F-35B, and the carrier-based (CV/CATOBAR) F-35C.	8000 foot long runway or 2.5km long - Minimum 7000' TODA	Jet Fuel-The single-engine aircraft is powered by the Pratt & Whitney F135 low-bypass augmented turbofan with rated thrust of 43,000 lbf (191 kN).	The Lockheed Martin F-35 Lightning II is an American family of single-seat, single-engine, all-weather stealth multirole combat aircraft that is intended to perform both air superiority and strike missions.	ACTIVE	
SUPERSONIC	BOEING	F/A-18E/F SUPER HORNET	45' WINGSPAN, 61' LENGTH, 16' HEIGHT, 6.58M TAILPLANE SPAN, 3.60M DISTANCE BETWEEN FIN TIPS	assisted takeoff from an aircraft carrier deck - horizontal launch and landing	Takeoff (runway): 5,200 feet (1,585 meters), flaps HALF Takeoff (carrier): < 1,000 feet (300 meters), flaps HALF Landing (runway): 5,150 feet (1,570 meters), flaps FULL Landing (carrier): < 1,000 feet (300 meters), flaps FULL	General Electric F414 - twin-engine, carrier- capable, multirole fighter aircraft variants - Additional fuel can be carried in up to five external fuel tanks and the aircraft can be configured as an airborne tanker by adding an external air-to-air refueling system.	Boeing F/A-18E and F/A-18F Super Hornet are twin-engine, carrier-capable, multirole fighter aircraft variants	ACTIVE	
	BOEING	EA-18G GROWLER	60.2' LENGTH, 16' HEIGHT, 45' WINGSPAN, 33100LBS EMPTY WEIGHT	horizontal aircraft catapult launch	Take Off Distance: 823 metre - 2,700.10 feet Landing Distance: 640 metre - 2,099.71 feet	General Electric F414- afterburning turbofan engine in the 22,000-pound thrust class produced by GE Aviation.	carrier-based electronic warfare aircraft, a specialized version of the two-seat F/A- 18F Super Hornet	ACTIVE	The state of the s
	LOCKHEED MARTIN	F-104 STARFIGHTER	55' LENGTH , 22' WINGSPAN, 14' HEIGHT, 196 SQ FT WING AREA, 14K LBS EMPTY WEIGHT,	horizontal launch and landing	4000' at 25000lbs	General Electric J79 -axial-flow turbojet engine built for use in a variety of fighter and bomber aircraft and a supersonic cruise missile.	American single-engine, supersonic air superiority fighter which was extensively deployed as a fighter-bomber during the Cold War	RETIRED FROM MILITARY SERVICE ONLY	F6-786 U.S.AR FORCE

Table 11 Spaceport Spacecraft - Super Sonic



CLASSIFCATION	COMPANY	VEHICLE DESCRIPTION	SPECS	LAUNCH/LANDING TYPE	RUNWAY LENGTH	ENGINE/FUEL TYPE	COMMENTS	STATUS	IMAGES
	SIERRA SPACE	DREAM CHASER	Gross mass of 9,000 kg, a length of 9 m, a span of 7 m (4.5 m with folded wings) and a height of 2 m. Up to 5,500 kg of payload can be transported to the ISS	horizontal launch and landing	It is a lifting body with winglets that can land on any runway in the world measuring at least 10,000 feet in length	propane and liquid oxygen as fuel type	reusable lifting-body spaceplane	ACTIVE	
HYPERSONIC	BOEING	Х-37В	30' LENGTH, 15' WINGSPAN, 10' HEIGHT, LAUNCH WEIGHT OF 11000 LBS	boosted into space via a launch vehicle - re-enters Earth's atmosphere and lands as a spaceplane. The X-37 lands automatically upon returning from orbit		Aerojet AR2-3 engine using storable propellants, providing thrust of 6,600 poundsforce	reusable robotic spacecraft	ACTIVE	
	STRATOLAUNCH	TALON-A	28' LENGTH, 11.3' WINGSPAN, LAUNCH MASS OF 6000LB	under its own power, via a	The aircraft requires 12,000 ft (3,700 m) of runway to lift-off. Rocket separation was originally planned at 35,000 ft (11,000 m). A payload of 550,000 lb (250 t) can be flown	Propellant: LOX / Kerosene	a reusable, rocket-powered, hypersonic flight vehicle	ACTIVE	STRATOUNICH

Note: Hypersonic spacecraft require runway lengths that exceed those at TIX

Note: As the spacecraft fleet evolves the runway length will continue to be evaluated in subsequent spaceport master plans to ensure that the fleet using, or reasonably expected to use, the Exploration Spaceport can be accommodated. The approved Airport Layout Plan (ALP) for TIX depicts an extension of Runway 18-36 of 681' to the south, for a total length of 8,000' that will accommodate the majority of spacecraft in use today. The Spaceport Master Plan, while not specifically studying runway length, aligns with ALP's recommendation to provide an 8,000'runway to accommodate existing and future spacecraft likely to use the Exploration Spaceport over the 20-year planning horizon.

Table 12- Spaceport Spacecraft - Hyper Sonic

CLASSIFCATION	COMPANY	VEHICLE DESCRIPTION	SPECS	LAUNCH/LANDING TYPE	RUNWAY LENGTH	ENGINE/FUEL TYPE	COMMENTS	STATUS	IMAGES
	SPACEX		HEIGHT OF 8.1M(26.7') - 4M (13') DIAMETER - CAPSULE VOLUME 9.3M^3(328'^3) - TRUNK VOLUME OF 37M^3(1300'^3) - 6000KG(13228LBS) - LAUNCH PAYLOAD MASS 3000 KG(6614LBS)	Vertical launch (Falcon 9); returns to Earth in a parachute-assisted splashdown	Launch Pad	SuperDraco is a hypergolic propellant rocket engine that uses a storable propellant mixture of monomethylhydrazine fuel and dinitrogen tetroxide oxidizer.		ACTIVE	a contract of the contract of
	LOCKHEED MARTIN	ORION	11' LENGTH, 17' DIAMETER	Although compatible with other launch vehicles, Orion is primarily intended to launch atop a Space Launch System (SLS) rocket, with a tower launch escape system. returns to Earth in a parachute-assisted splashdown	Launch Pad	It's equipped with a total of 33 engines: one main OMS engine (OMS-E), eight auxiliary engines, and 24 reaction control thrusters. The OMS-E is a reused space shuttle engine that performs most of Orion's large translational and trajectory correction burns. monomethyl hydrazine fuel	a partially reusable crewed spacecraft	ACTIVE	
	DAWN AEROSPACE	MK-II AURORA	4.8M LENGTH, TAKE-OFF WEIGHT OF 350KG AND EMPTY WEIGHT OF 75KG	horizontal launch	Not disclosed	Rocket Engine Oxidizer - 90% Hydrogen Peroxide Fuel - Kerosene Cooling - Regenartivtely cooled Design Thrust - 3700 N (sea level) Max Thrust - 4300 N (vacuum) ISP - 236 s (sea) to 287 s (vacuum) Ignition - caralyst (fully restartable) Engine cycle - liquid bipropellant, electric pump-fed, throttleable	uncrewed reusable suborbital spaceplane	ACTIVE	1000 P
LOW-EARTH ORBIT (LEO)	VIRGIN GALACTIC (THE SPACESHIP COMPANY)	SPACESHIP TWO	12' CREW CABIN LENGTH, 7.7' DIAMETER, 27' WINGSPAN, 59' LENGTH, 15' HEIGHT	launches from under the wing of a carrier aircraft (White Knight Two)	Not disclosed	RocketMotorTwo engines-hydroxyl- terminated polybutadiene (HTPB) as fuel and nitrous oxide (N20) as oxidizer	Mother aircraft: White Knight Two, SUB ORBITAL an air-launched suborbital spaceplane type designed for space tourism	ACTIVE	200
	VIRGIN GALACTIC	VSS UNITY	18.3M LENGTH, 8.3M WIDTH, 2.3M CABIN DIAMTER	launches from under the wing of a carrier aircraft (White Knight Two)	Not disclosed	hybrid rocket engine	a SpaceShipTwo-class suborbital rocket- powered crewed spaceplane	ACTIVE	digital and the second
	BLUE-ORIGIN	NEW SHEPHARD	60' HEIGHT, 12.1' DIAMETER	VTVL	Launch Site One pad	The BE-3 (Blue Engine 3) propels the rocket to space and restarts for a controlled pinpoint landing on the pad. The uniquely throttleable engine slows the booster down to just 8 km/h (5 mph) for landing new liquid hydrogenfueled rocket engine		ACTIVE	
	SPACEX	STARSHIP	HEIGHT: 394', DIAMETER: 29.5', PAYLOAD CAPACITY: 100-150	VTVL	60' X 60' Launch Pad	Raptor Engine-reusable methane-oxygen staged@combustion engine. Powered by six engines, three Raptor engines, and three Raptor Vacuum (RVac) engines, which are designed for use in the vacuum of space	super heavy-lift space vehicle	ACTIVE	

Table 13- Spaceport Spacecraft - Low Earth Orbit

DEFINITIONS	HYPERSONIC	Specifically five times faster than the speed of sound. Therefore, all hypersonic speeds are also supersonic		
	SUPERSONIC	Faster than the speed of sound, while hypersonic means, but something supersonic is not necessarily hypersonic		
	LOW ORBIT	An orbit around Earth with a period of 128 minutes or less and an eccentricity less than 0.25		
	RLV	Reusable Launch Vehicle		
SOURCES	https://portcolorado.com/air-space-port-master-plan-advisory-committee/			
	https://www.spacex.com/			
	https://www.dawnaerospace.com/			
	https://www.nasa.gov/exploration/systems/orion/index.html			
	https://www.faa.gov/about/initiatives/airshow/media/military/Navy_F-35C_Maneuvers_Package.pdf			
	https://static1.squarespace.com/static/5e82736a5e6bb91e8af13ea7/t/642ca7372f7f0742c4b01201/1680647993871/DA+Mk-II+Flyer+20230401.pdf			
	https://www.lockheedmartin.com/en-us/products/orion.html			
	https://www.sierraspace.com/			
	https://www.digitalcombatsimulator.com/upload/iblock/d82/yy7ijgxinh6jmuc10r3naas3qrh23xj3/DCS-FA-18C Early Access Guide EN.pdf			
	https://coloradoairandspaceport.com/sites/default/files/2022-CASP-Spaceport-Master-Plan.pdf			

Table 14- Spaceport Spacecraft – Definitions and Resources

5. **EXPLORATION SPACEPORT LAND DEVELOPMENT PLANNING**

The land use approach used to begin this Master Plan helped to identify the overall acres included within the entire Airport / Spaceport property boundary. To then compute how many acres were available for development, the Airport runways and taxiway areas and the existing tenants' areas were subtracted from the totals, leaving an identifiable amount of developable area. Developable areas were divided into separate types of space based on taxiway access, non-taxiway access, main areas (that included existing facilities), and areas for secure access and an engine test stand. The developable areas are broken into the following color-coded districts for a total of **2,083 available** acres (including acquisition parcels).

Land Development Acres				
Name	Acres			
Runway Access (RWY) Area 1	72			
Runway Access (RWY) Area 2	22			
Runway Access (RWY) Area 3	13			
Runway Access (RWY) Area 4	19			
Runway Access (RWY) Area 5	51			
Runway Access (RWY) Area 6	23			
Runway Access (RWY) Area 7	3			
Runway Access (RWY) Area 8	4			
TOTAL	207			
Non Runway Access (NRWY) Area 1	28			
Non Runway Access (NRWY) Area 2	6			
Non Runway Access (NRWY) Area 3	11			
Non Runway Access (NRWY) Area 3A	6			
Non Runway Access (NRWY) Area 4	82			
Non Runway Access (NRWY) Area 5	35			
Non Runway Access (NRWY) Area 6	6			
Non Runway Access (NRWY) Area 7	11			
TOTAL	184			
Space Coast Innovation Park (SCIP) Phase 1	47			
Space Coast Innovation Park (SCIP) Phase 2	48			
Space Coast Innovation Park (SCIP) Phase 3	352			
TOTAL	447			
Land Acquisition (LA) Area 1	21			
Land Acquisition (LA) Area 2	10			
Land Acquisition (LA) Area 3	56			
Land Acquisition (LA) Area 4	71			
Land Acquisition (LA) Area 5	98			
Land Acquisition (LA) Area 6 (OUC Parcels)	326			
TOTAL	582			
Airfield	662			
Overall Land Development Acres	2,083			

COMPOSITE AREA CARD GATES DEVELOPABLE AREA ONE-WAY EXIT NEW ROAD DEVELOPABLE AREA RWA PUBLIC ENTRY **AQUISITION AREA** INNOVATION PARK NEW PUBLIC ENTRY **EXISTING BUILDINGS** WETLAND AREA TEST STAND SAFETY RADIUS

Figure 17-Land Development-Overall Planwith all Development Types



Overall Plan - Developable Areas with Runway 5.1 Access (RWY)

Runway Access (adjacency to taxiways and then runways) properties within the Space Coast Regional Airport (TIX) / Exploration Spaceport have a high premium for present and future tenants, making it the most valuable property for development. The following concepts highlight this land development type:

- First priority for leasing and development will be given to companies / tenants that need runway access for their businesses.
- Slope constraints determine heights of actual buildings adjacent to the taxiway/runway.
- Runway 9-27 (east / west): 250' from CL + 1:7 slope
- Runway 18-36 (north / south): 500' from CL + 1:7 slope
- RWY Area1: a strategic section of Spaceport to develop a TCAA requested new Spaceport terminal.
- RWY Area 2: space for potential development of small hangars / offices / manufacturing facilities with a secured entry – to be determined at a later date in the implementation plan.
- RWY Area 3: possible space for small hangars / offices with nonsecured taxiway frontage.
- RWY Areas 4, 7, and 8: opportunities to infill this area with new construction of smaller office / maintenance / hangar type of facilities (alongside existing facilities).
- RWA Area 5: a strategic location for a manufacturing / assembly / office complex to include:
 - o New "supersonic" area (from the existing Environmental Assessment Report September 2019).
 - Fueling area.
 - Large warehouse/high bay processing facility.
 - Proximity to a proposed Engine Test Stand.
- RWY Area 6 can also become a site to accommodate a new single / muti-tenant development.

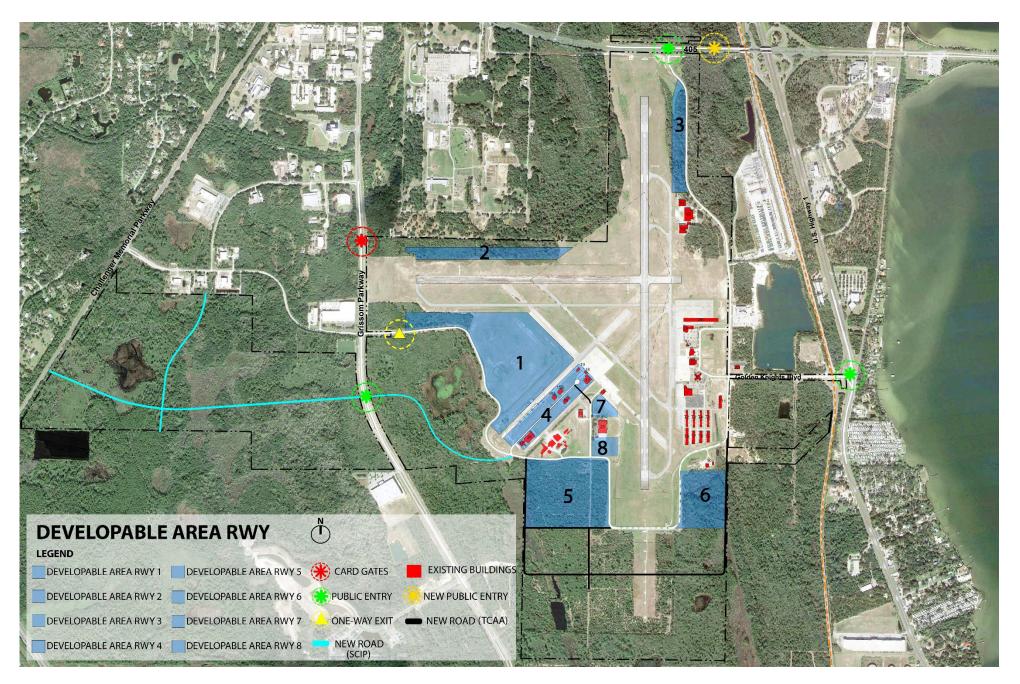


Figure 18-Land Development-Potential Development Areas with Runway Acess (RWY) (Blue)



Developable Areas with Runway Access (RWY) -5.2 Adjacent to Engine Test Stand Areas

The following concepts highlight this land development type adjacent to a proposed engine test stand:

- RWY Area 5 (blue): introduces the concept of a new manufacturing / assembly / office complex to include:
 - o New "super-sonic" area (from the existing Environmental Assessment Report September 2019).
 - Fueling area.
 - Large warehouse/high bay processing facility.
 - Proximity to a proposed engine test stand.
- RWY Area 6 (blue) can also accommodate a new single / muti-tenant development with taxiway access. This area also has Wetland Area 5 (green) crossing through it that will require wetlands mitigation analysis in all design phases (after this Master Plan).

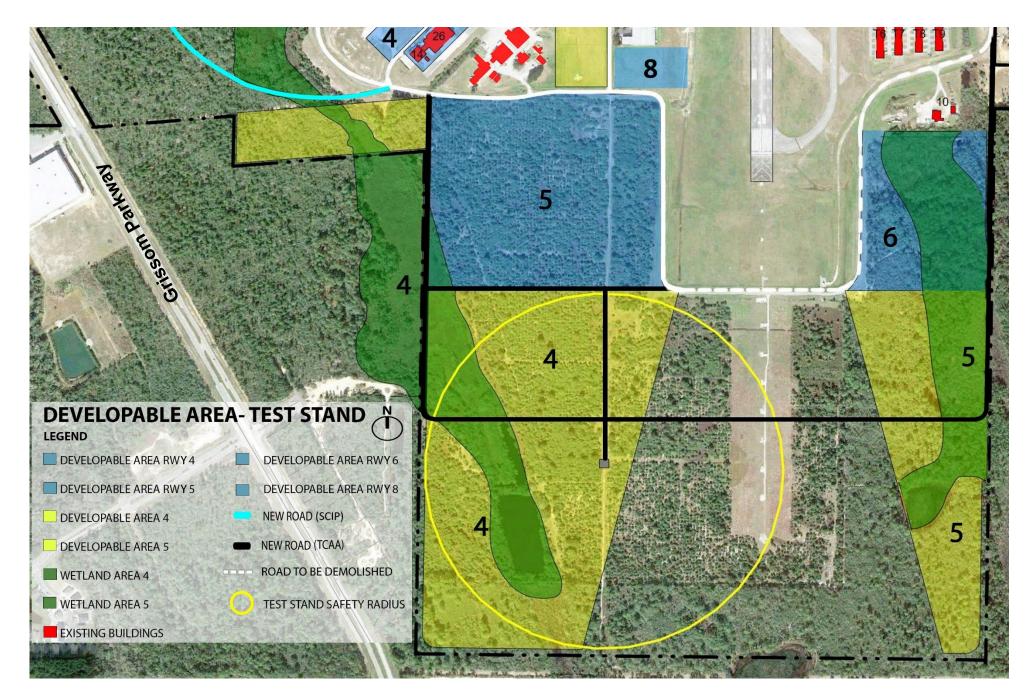


Figure 19-Land Development-400,000 GSF Facility and Engire Test StandAreas



Developable Areas with Runway Access (RWY) -5.3 **Proposed New Terminal Area and Main Development** Area

The following concepts highlight this main development land type to the southwest of both Runway 9-27 (east / west) and Runway 18-36 (north / south):

- RWY Area1: an opportunity for a new Spaceport terminal.
- RWY Areas 4, 7, and 8: opportunities to infill this area with new construction of smaller office/maintenance/hangar type of facilities (alongside existing facilities).
- Taxiway access for key existing and future tenants whose businesses require access to taxiways and then the main runways.
- This area requires a smaller amount of wetlands mitigation analysis in all design phases (after this Master Plan).

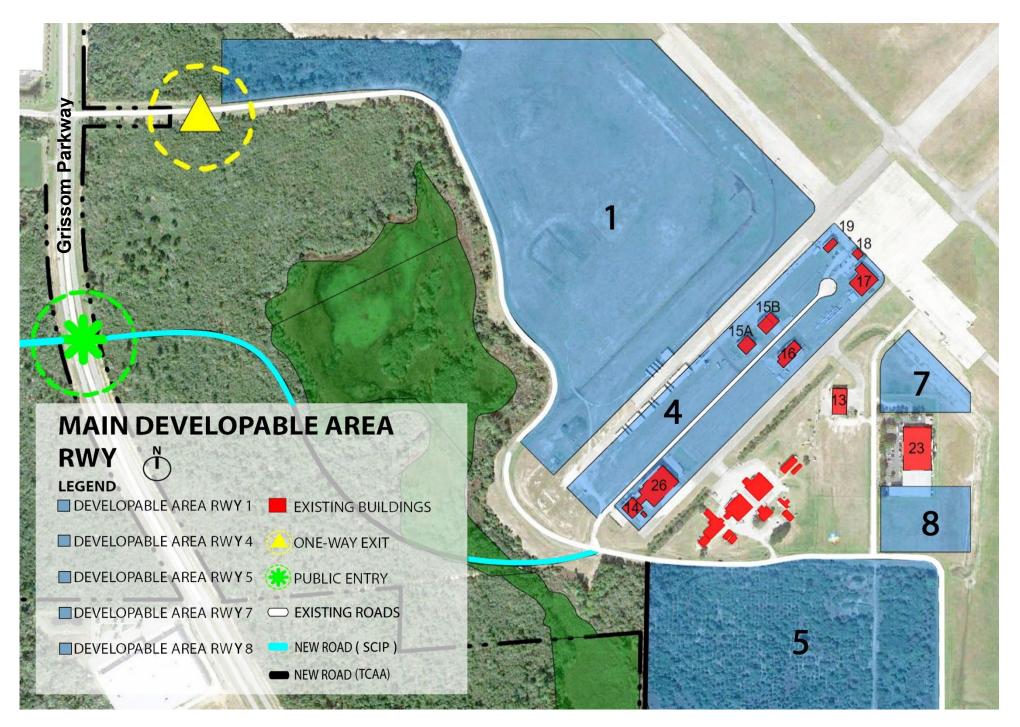


Figure 20 - Land Development-Main Development Area with Runway Access



Developable Areas with Runway Access (RWY) -5.4 Runway 9-27 Area

The following concept highlights this land development to the north of Runway 9-27 (east / west) and west of Runway 18-36 (north / south):

- This parcel creates a unique, secured entry for potential tenants, with the possibility of hangars / offices facilities with direct taxiway access.
- Any proposed facilities in this area require a maximum height restriction for offices / hangars of approximately 21 feet.
- A one-way in and out roadway system can be developed for this area creating a secure ingress / egress for employees and visitors.
- This area can be a secluded development with low traffic and noise for potential tenants.
- Requirements for development here include 250' from center line of runway plus 1:7 slope to determine max building height.
- New utilities and roadways will need to be constructed in this area (neither exists here at present).



Figure 21-Land Development-East / West RunwayArea with Runway Access

5.5 Overall Plan - Developable Areas Non-Runway **Access**

The yellow areas shown on this map are all available for development, but do not have direct or major access to taxiways or runways. These parcels are still valuable because of their adjacency to properties with runway access.

The following concepts highlight this land development type:

- Non-RWY Area 1: this area has a large developable parcel for the use of additional hangar / manufacturing / office facilities. With the acquisition of land to the east of this parcel, TCAA would be able to redesign / reconfigure the north entrance.
- Non-RWY Area 2: a unique plot with one entry on the main road bordering the western portion of the site. This main road access makes this site suitable for rentable offices or store front businesses.
- Non-RWY Area 3: a large site that can be developed as a public access, pedestrian-friendly complex because of its proximity to existing Airport administration buildings. Tenants who require less secure access to their facilities would find this land development type suitable for their business models.
- Non-RWY Area 4: this area is designated as a secure area for the development of an engine test stand and associated facilities.
- Non-RWY Area 5: this area can accommodate a variety of aerospace facility types.

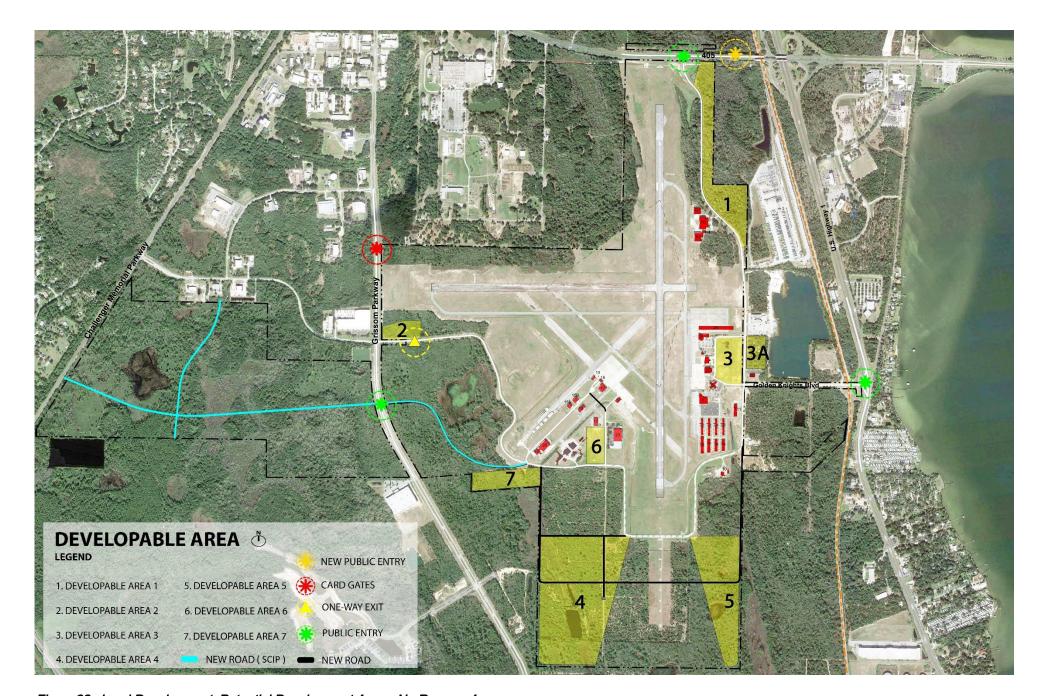


Figure 22 - Land Development-Potential Development Areas-No Runway Access (Yellow)



Developable Areas - Non-Runway Access - Engine 5.6 **Test Stand Areas**

The following concepts highlight this land development type for a proposed engine test stand:

- Non-RWY Area 4 (yellow): this area can accommodate a proposed engine tests stand with a blast distance radius of 1,250', as well as a small test stand facility. This area also has Wetland Area 4 (green) crossing through it that will require wetlands mitigation analysis in all design phases (after this Master Plan).
- Non-RWY Area 5 (yellow): the area could accommodate a to-bedetermined development for a variety of purposes. This area also has Wetland Area 5 (green) crossing through it that will require wetlands mitigation analysis in all design phases (after this Master Plan).

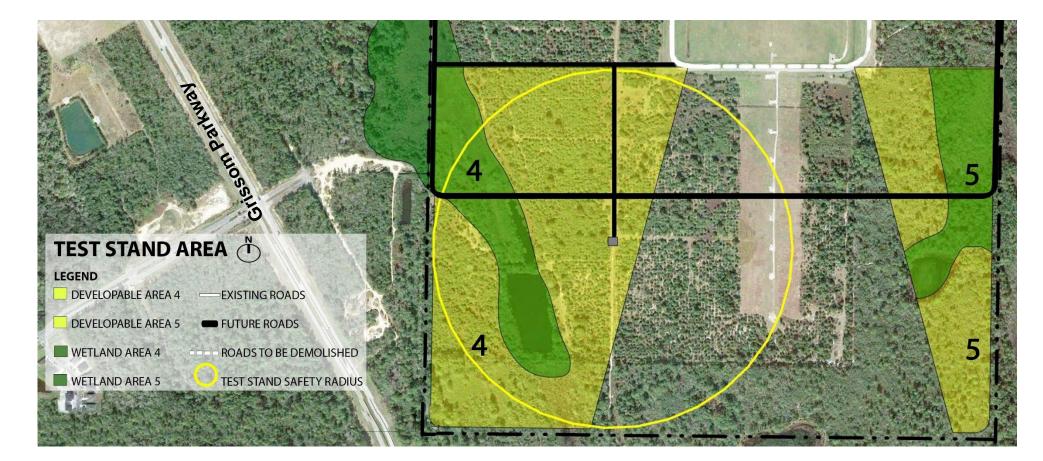


Figure 23 – Land Development–Engine Test Stand Area within Property Boundary



5.7 **Developable Areas – Non-Runway Access – Flexible Office Complex Area**

The following concepts highlight this land development type for a flexible office space complex:

- Non-RWY Area 3: a large site that can be developed as a public access, pedestrian-friendly complex because of its proximity to existing Airport administration buildings. Tenants who require less restricted access to their facilities would find this land development type suitable for their business models. This area type could also include the following:
 - SCIF ready space. 0
 - Mission Critical / Command Center space.
 - Community support spaces.
- This area contains 10.3 acres of land directly east or across the street from Building F (ARFF facility).
- This area can be considered as prime development land since it is located on the corner of the north and east main entryway roads and has direct access to the main Airport function buildings, such as the terminal building, fire station, and other tenant spaces.
- This plot could lend itself to the development of the main Airport building expansion and other structures that may be crucial for administrative airport functions.
- This area can be developable space for rent or internal Airport use.
- This area does not have direct runway access, but its value can be seen in the development of crucial infrastructure because of its location and size.

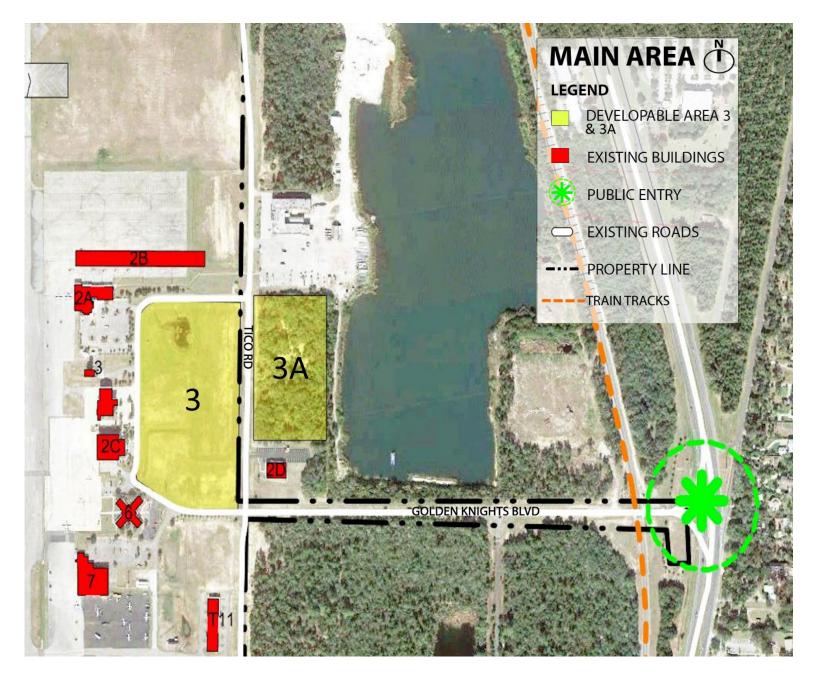


Figure 24 - Land Development-Office Complex Area Near TCAA Main Office



Developable Areas – Non-Runway Access – Flexible 5.8 Office Complex Area Near Proposed Terminal / Main **Development Area**

The following concepts highlight this land development type for a unique, secure office space complex:

- Non-RWY Area 2: this area has approximately 5.8 acres and is a unique parcel that is strategically located near the proposed RWA Area 1 new Spaceport Terminal and runway, yet it still has its own public
- This area would utilize a 'one-way' egress that comes in contact with this parcel and originates at the proposed Spaceport Terminal building.
- The parcel could be utilized for distribution, delivery/inspection, or office space for the Spaceport Terminal.
- Runway slope constraints will apply to this parcel.

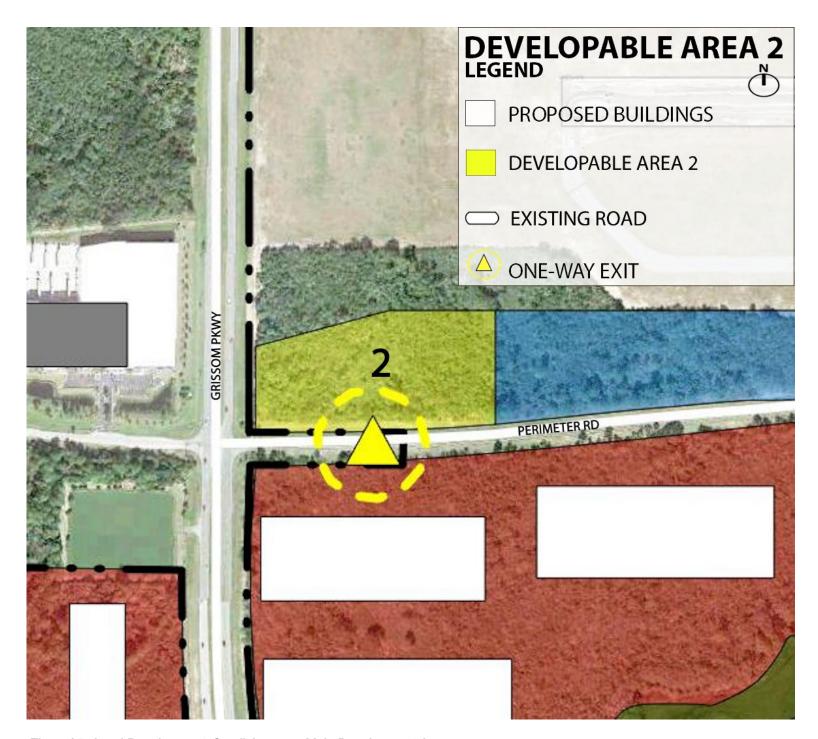


Figure 25-Land Development-Small Area nealMain Development Area



5.9 **Overall Land Acquisition Areas**

To execute the proposed land development strategy (and area development in the next section), it is highly recommended to acquire as much property as possible around the current Airport boundary.

The Space Coast Regional Airport and Exploration Spaceport is unique with respect to its adjacency to a major regional rail network that is connected to several launch complexes, a port, and a nearby dock. Refer to **Section 6.8** Orlando Utilities Company (OUC) Dock Proposed Connection.

There are several acres on the southeast side of the Airport that are prime for multi-modal connections.

- There are additional acres in the northeast adjacent to the rail, but not
- There are also additional acres to the southwest that are not adjacent to the rail line or taxiways.
- All three areas should be considered for acquisition.

The demand for Space companies, research and development, and community outreach will continue to grow as the Spaceport matures and becomes part of a larger Spaceport network both nationally and internationally.

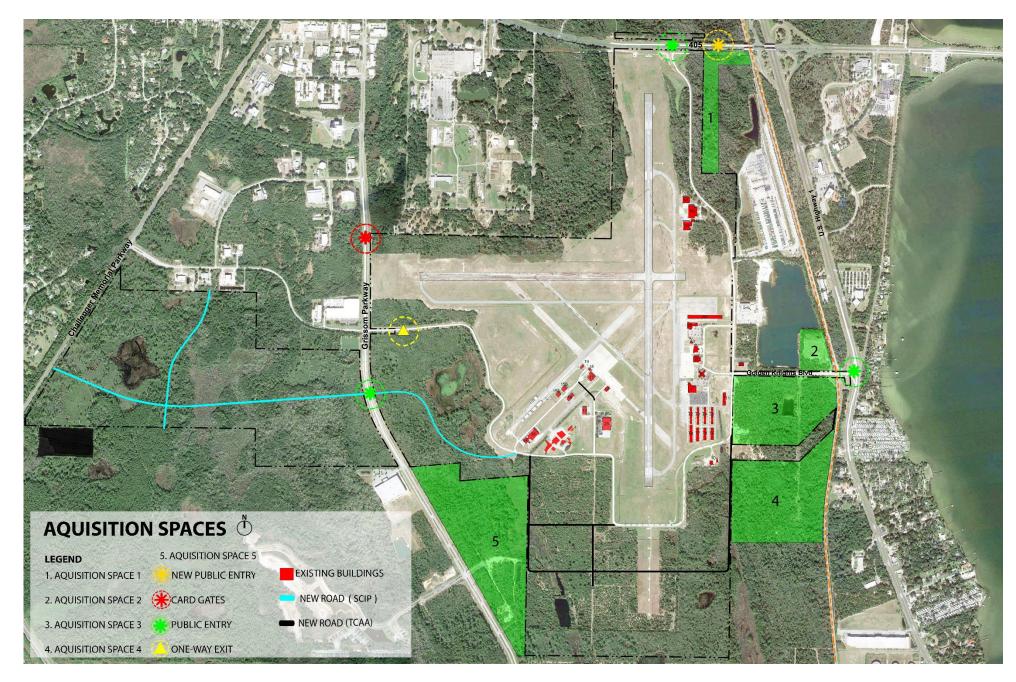


Figure 26 - Land Development-Land Acquisition Strategy - Areas 15

Land Acquisition Area 6 is a critical acquisition for linking the OUC Dock, creating an easement from the dock through the existing OUC property and into the currently held parcels by FPL and OUC to the south of 18-36 runway. Although this scenario is realistic, it must be communicated and coordinated with several stakeholders. If achieved, the Dock and rail access will become one of the most valuable assets of the Spaceport.



Figure 27-Land Development-Land Acquisition Strategy-Area 6

Hybrid Developable Areas - Northern Campus 5.10 Access Area – with Current Road Configuration

The northern developable area consists of three main portions of land:

- 1. RWY Area 3 (blue) (13.6 Acres) on the western portion of the target area that is valuable because of its runway access.
- 2. Moving right, the existing main entry road separates RWY Area 3 from Non-RWY Area 1 (yellow) (28.2 Acres).
- 3. Directly west of both these developable areas is a proposed Land Acquisition Area 1 (21 Acres).
 - o Land Acquisition Area 1 is bordered entirely on the east by the north / south train track line that could be an important way of moving goods in and out of the Spaceport.
 - o Further analysis of this area and the reasoning for acquisition can be found in Section 6.6 Northern Developable Area - Short-Term and Section 6.7 Northern Developable Area – End-State.

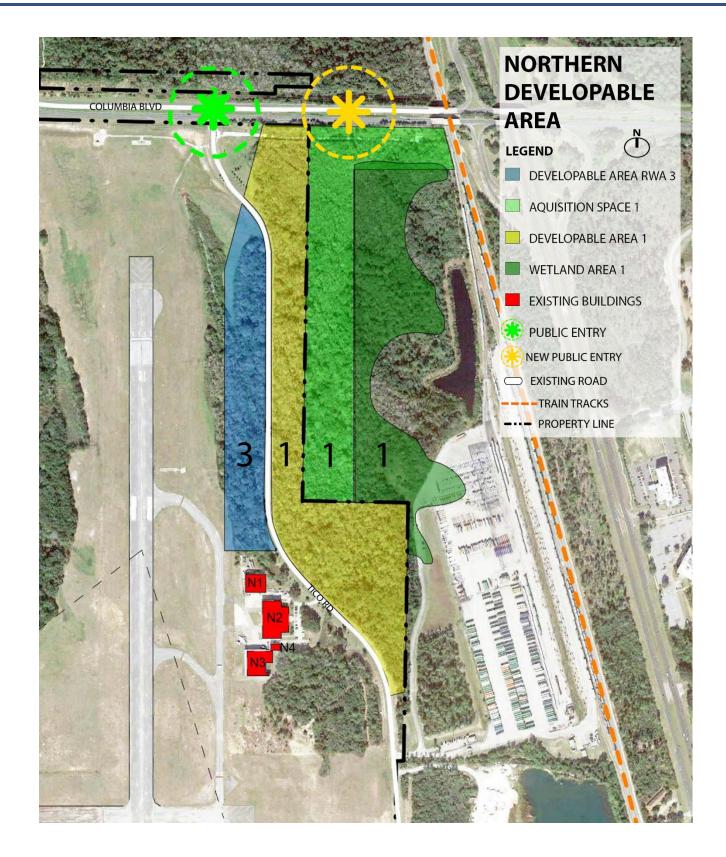


Figure 28 – Land Development–Developable AreaNear North Entrance

6. **EXPLORATION SPACEPORT AREA DEVELOPMENT PLANNING**

To further expand upon the land development concept, this section contains an area development approach used to explore the potential square footage of developable space for TCAA to lease to existing and future tenants. Area development includes schematic layouts of potential facilities, as well as highlevel functions of tenants.

Area development plans build upon the available 2,083-acres of land (divided up into six areas: Airport proper, Airport infill, Spaceport, engine test stands, Space Coast Space Coast Innovation Park, and future land acquisitions) and explore the possibility of 1,905,133 rentable square feet of office. manufacturing, processing, assembly, and hangar space.

- Each area plan includes a conceptual development plan based on market analysis, Spaceport requirements, and local needs and demand of both tenants and the community.
- Each area plan will delineate the conceptual facilities, their square footage, and adjacencies within the overall Spaceport.
- These area development plans are conceptual in nature and will definitely vary based on changing market conditions and specific tenant requirements.
- The table to the right shows the summary of proposed spaces/facilities and the overall growth strategy.
- Return on Investment Strategies and Analysis will be included in the Final Document, as well as a Rough-Order-of-Magnitude (ROM) cost estimate will be included in the Final Document, along with a high-level Return on Investment (ROI) analysis.

As the spacecraft fleet evolves the runway length will continue to be evaluated in subsequent spaceport master plans to ensure that the fleet using, or reasonably expected to use, the Exploration Spaceport can be accommodated. The approved Airport Layout Plan (ALP) for TIX depicts an extension of Runway 18-36 of 681' to the south, for a total length of 8,000' that will accommodate the majority of spacecraft in use today. The Spaceport Master Plan, while not specifically studying runway length, aligns with ALP's recommendation to provide an 8,000' runway to accommodate existing and future spacecraft likely to use the Exploration Spaceport over the 20-year planning horizon.

Proposed Buildings					
Letter	Name	Building SF			
Α	Spaceport Main Terminal	249,720			
В	Mixed Use (Office, Retail, Restaurant)	41,571			
С	Mixed Use (Office, Retail, Restaurant)	64,000			
D	Hangar / Office Space	128,000			
E	Hangar / Office Space	128,000			
F	Office Building (with SCIF)	69,000			
G	Office Building	69,000			
Н	Office Building	69,000			
J	Manufacturing / Processing Building	104,000			
K	Small Hangar / Office / Warehouse	12,000			
L	Small Hangar / Office / Warehouse	12,000			
M	Medium Hangar / Office / Warehouse	30,000			
N	Small Hangar / Office / Warehouse	10,000			
0	Small Hangar / Office / Warehouse	10,000			
Р	Small Hangar / Office / Warehouse	20,642			
Q	Medium Hangar / Office / Warehouse	30,000			
R	Medium Hangar / Office / Warehouse	25,000			
S	Large Warehouse / Storage	73,000			
Т	Medium Warehouse / Storage	29,000			
U	Highbay 400K SF Multi-Use Facility (Processing and/or Assembly)	400,000			
V	Manufacturing and Assembly Building	165,000			
W	Manufacturing and Assembly Building	165,000			
X	Replacement Air Traffic Control Tower	1,000			
Z	Engine Test Stand	200			
	Total Square Feet	1,905,133			

Table 16- Proposed Buildings Summary Square Footage

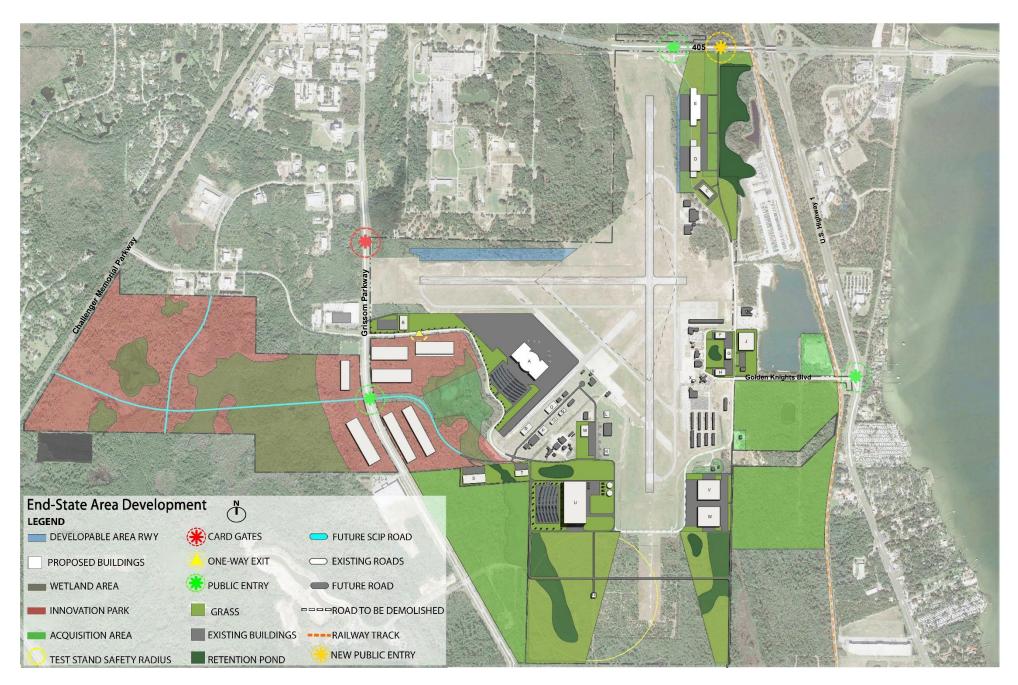


Figure 29-Area Development-Overall Plan withAll Proposed Development



Main Developable Area with Runway Access 6.1

This area was developed for a Spaceport Terminal area (Buildings A) and a parking lot; expanded development for smaller multi-use / runway access facilities (Buildings L, K, M. N, O, P, Q, R) and manufacturing / assembly / office facilities (Buildings S, T, and U). A smaller area off of Grissom Parkway has been identified for a stand-alone multi-use facility (Building B).

Buildings A:

- Building A is the proposed Spaceport Main Terminal Area (SPMT) and associated Space Port Main Terminal Parking (SPMT Parking).
- The SPMT is a one story, approximately 249,720 square-foot building designed to facilitate the entire process of launching exploratory space vehicles for individual companies and facilitates boarding and onboarding of spacecraft. The square footage includes both the Terminal and two hangars.
- The SPMT Parking accommodates over 1,000 parking spaces.

Building B:

- A small facility off of Grissom Parkway that is immediately adjacent to a one-way access point to the airport that allows for a secured entrance / exit from the runway systems.
- The two-story building can accommodate 41,571 square feet of office / retail / restaurant functions.

Buildings L, K, M, N, O, P, Q, R:

- All proposed buildings in this area would be similar to existing facilities and would be smaller, ranging from approximately 12,000 to 30,000
- These facilities could be utilized for a variety of purposes for either the Airport or Spaceport because of its proximity to the runway.

Building S and T:

- These smaller facilities assist in connecting the Space Coast Space Coast Innovation Park development with the main development area of the Spaceport.
- These facilities can be used for assembly or office space.

Building U:

• This 400,000 square-foot manufacturing / assembly / office complex can include a building, fueling area, high-bay space, and immediate adjacency to a proposed engine test stand.



Figure 30 – Area Development–Main Developable Area

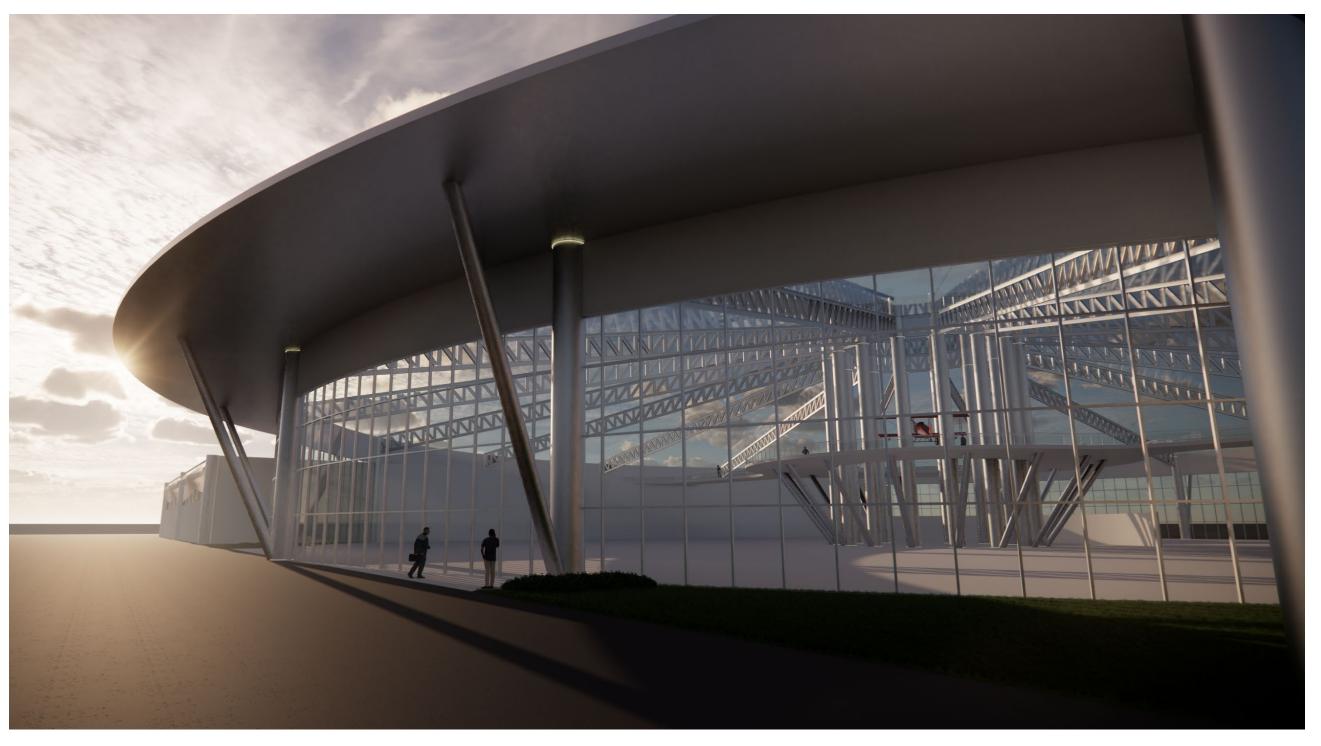


Figure 31-Rendering Spaceport Terminal Exterior

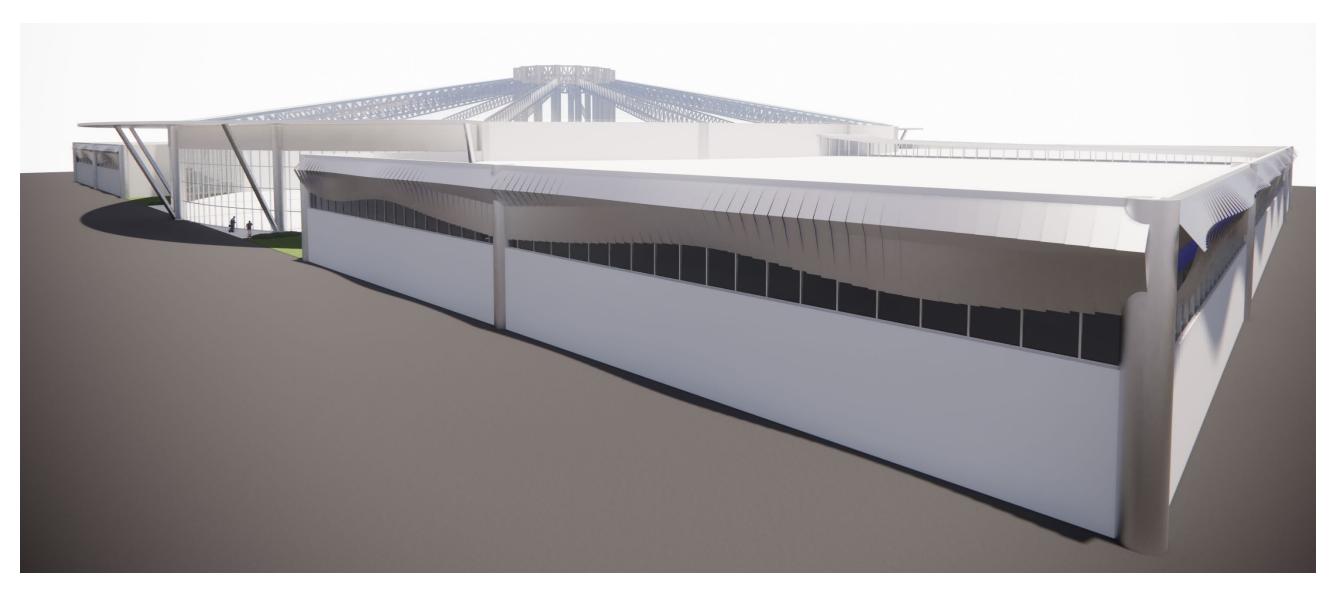


Figure 32-Rendering Spaceport Terminal Exterior

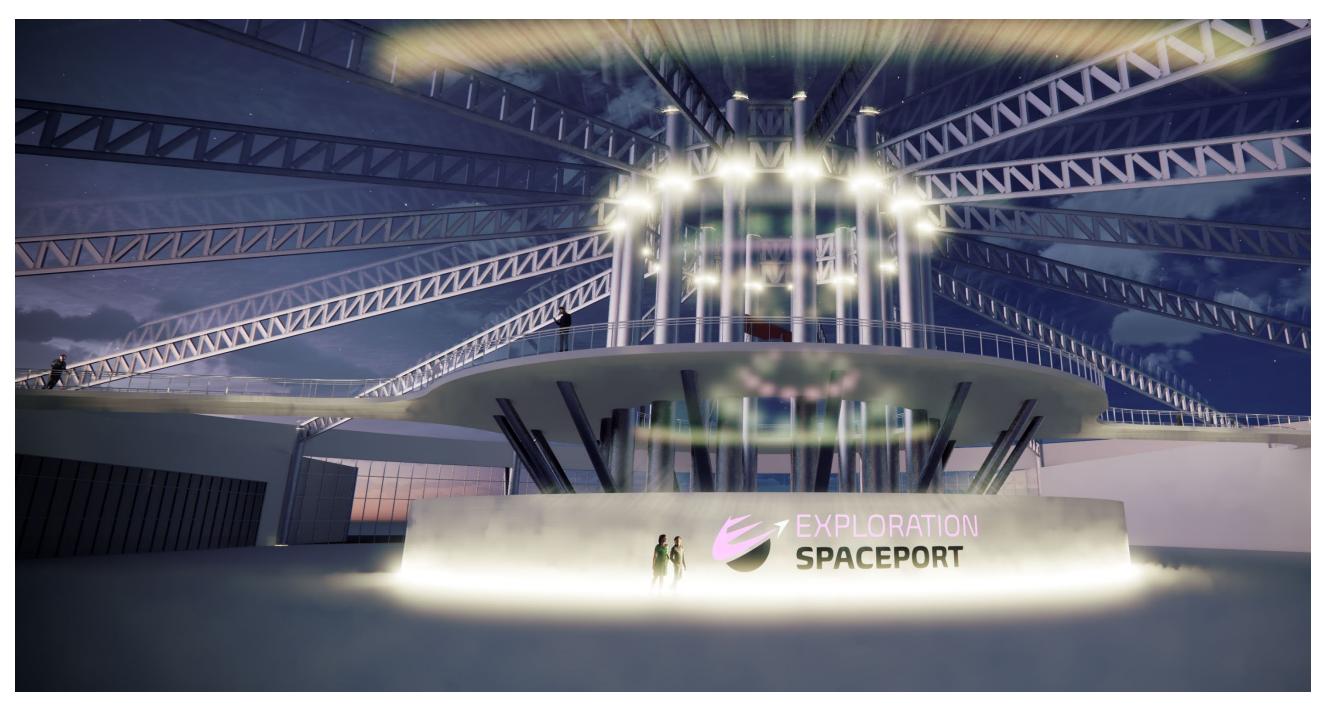


Figure 33-Rendering Spaceport Terminal Interior Ground Floor



Figure 34 – Rendering Spaceport Terminal Interior Second Floor

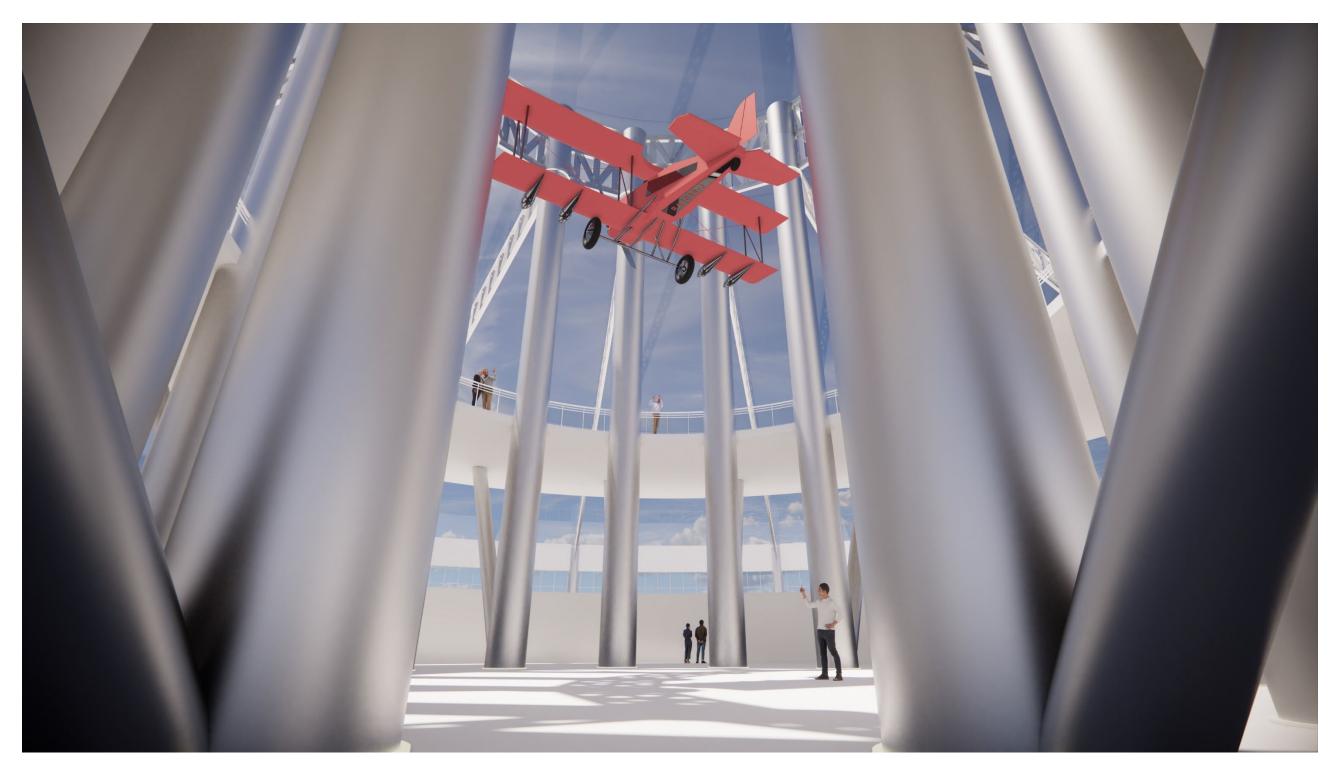


Figure 35 – Rendering Spaceport Terminal Interior Exhibit

Flexible Office Complex Area 6.2

The Non-RWY Area 3 – Office Complex Area - is a 10.3-acre plot that can be developed with three (3) facilities - Buildings F, G, and H to serve as leasable office space for TCAA. Building J could serve as a land lease for an aerospace company seeking processing and manufacturing space.

- The structures are bordered by hardscape that will provide for parking and aid in vehicular circulation.
- Enclosed by the hardscape is a stormwater retention pond that is bordered by green space for future development for various outdoor activities, such as outdoor seating, or viewing landings and take-offs.
- Across the street and to the east is proposed Building J a 104,000 square-foot warehouse with a 39,000 square-foot parking lot to the
- All parking ratios must be verified as the final square footage is identified and approved.



Figure 36-RenderingNortheast of BuildingsF, G, and H



Figure 37-RenderingNorth by Northwest of BuildingsF and G



Figure 38-Area Development-Office Complex-with Mission Critical Center, SCIF, and Flexible Office Space



Multi-Use Facilities and Engine Test Stand Areas 6.3

RWY Area 5 is a 50.8-acre site for Building U and RWY Area 6 is a 22.7-acre site for Buildings V and W. The overall area contains a new roadway concept to link the east and west sides that respects the runway protection area.

Building U:

- RWY Area 5 has been developed in response to the request for a 400,000 square-foot covered building (Building U), the need for associated parking, and a need for liquid and gaseous storage for jet fuel and other chemicals associated with fueling and maintenance of spacecraft.
- The site area holds a 110,000 square-foot retention pond in the northern region closest to the Brevard County Mosquito Control.
- The left or western side of the site holds a 334,000 square-foot parking lot that can hold 1,000 vehicles.
- The middle of the area holds Building U, and the eastern portion of the area holds fuel tanks and components needed to facilitate the fueling process such as pumps, piping, and other outdoor fixtures.

Buildings V and W:

- RWY Area 6 has been developed to hold two buildings for a future Aerospace company and general parking – 200,000 square feet each (Buildings V and W).
- This area also has Wetland Area 5 (green) crossing through it that will require wetlands mitigation analysis in all design phases (after this Master Plan).
 - o The area contains a 108-foot wide by 444-foot long (48,000 square feet) sliver of wetlands mitigation/retention pond.
 - On the western portion of the site sits another 91,000 square-foot portion of the retention pond bordered at the north and south by hardscape leading from both buildings to the runways.
 - o This hardscape will act as a driveway for vehicles stored in both buildings to get to and from the runway.

Building Z:

- The proposed test stand structure could be either an open test stand for an engine (for example); an enclosed structure for indoor testing of some type of non-engine aerospace article; or possibly an enclosed structure for some type of vacuum testing (pressure testing) for a nonengine aerospace article.
- The main directive the analysis in the master plan is to demonstrate that the available land area could accommodate a maximum blast radius for an engine of 1,250 feet, if TCAA were to construct an outdoor, non-enclosed engine test stand.
- Refer to Section 4.4 Engine Test Stand Capacity Exploration **Spaceport** for more information on maximum blast calculations.
- Noise abatement is not part of this analysis, nor the noise contours for engine testing at the spaceport and surrounding areas.



Figure 39-Area Development-400K GSF Building and Office Completion to Engine Test Stand



6.4 **Space Coast Space Coast Innovation Park Development Phases 1, 2, 3-East, and 3-West**

Information for the Space Coast Space Coast Innovation Park development phases was provided to the consulting team for inclusion in this Master Plan. This information is high-level and does not include additional details A separate developer / design team is developing these areas for TCAA.

Phases 1 and 2

- Phases 1 and 2 are located to the east of Grissom Parkway.
- Phase 1 is a 47-acre plot that sits directly on the corner of Grissom Parkway and Perimeter Road.
- The future development of this area contains three (3) large warehouse / manufacturing or industrial structures ranging between 100,000-200,000 square feet each.
- Directly south of Phase 1 is a future road that provides another access point to the Spaceport from Grissom Parkway.
- This road is the northern border of Phase 2 is a 47-acre plot proposed to hold two (2) warehouse buildings similar in size and scope to Phase
- Phases 1 and 2 are also separated in the eastern portion by 19 acres of wetland zones.

Phase 3 East and 3 West

- Phase 3-East has two (2) proposed buildings on the eastern side (along Grissom Parkway) to be developed for similar uses to Phases 1 and 2 (shown in the graphic to the right).
- Phase 3-East does not contain any wetlands areas.
- Phase 3-West contains the larger share of acreage (350 acres), is undeveloped, and does not contain any proposed building plans as of
- Phase 3-West continues 128-acres of wetland zones, along with multiple zoning uses that may not be suitable for development.



Figure 40 - Area Development - Space Coast Space Coast Innovation Park Proposed Development by Phase

9-27 Runway Developable Area 6.5

This region can be developed as hangar or office space with direct runway access. For this study, this area of the Airport property will only be shown as 'developable' within this report and not shown with proposed building images like other areas within this section.

For future use, this area of development would be limited to a 21-foot construction height restriction because of its distance from the main runway (250' + 1:7 slope).

This area could possibly house four (4) buildings that are 125,000 square feet each (21 feet high) and three (3) 66,000 square-foot parking lots. This location off of Grissom Parkway could contain a secured entrance and a cul-de-sac to the end of the proposed access road.

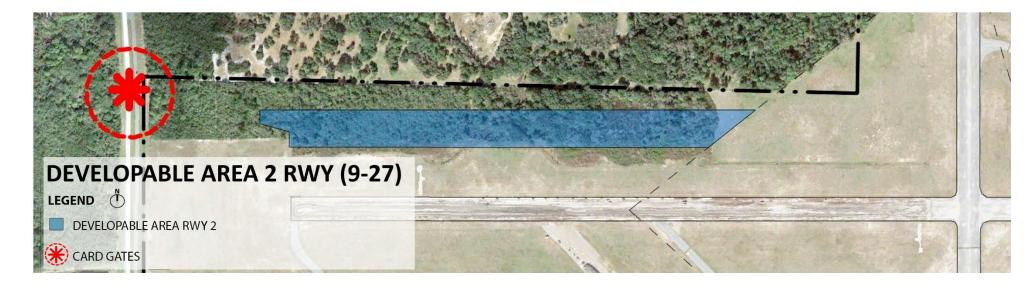


Figure 41-Area Development-Potential DevelopmentNorth of 9-27 (East / West) Runway Area



Northern Developable Area - Short-Term 6.6

This option shows a proposal for the 28-acre non-RWY Area 1, known as the Northern Developable Area in this section.

Building C and Surrounding Areas

- This layout provides for a new 64,000 square-foot facility (Building C) that could be used for mixed-use (office, restaurant, and / or retail).
- The building is surrounded by hardscape that can serve as parking and vehicular circulation on the perimeter of the facility (the southwestern end of the developable area).
- This new development ties directly into the existing entry road.
- The rest of the property could be further developed for outdoor activity or additional buildings to the south.

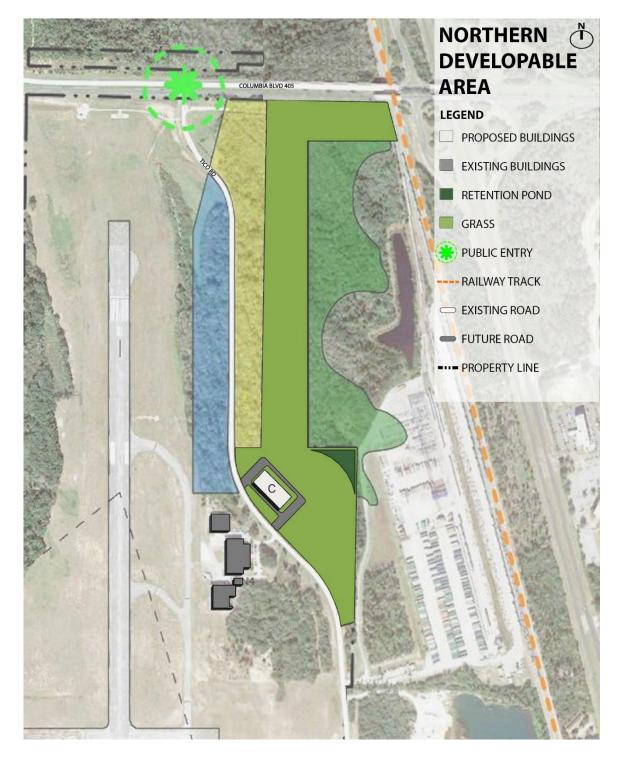


Figure 42 - Area Development-Proposed DevelopmentNear Northern Campus Entrance - Existing Road

6.7 Northern Developable Area - End-State

This end-state concept shows a now acquired property (Land Acquisition Area 1 (21 acres), Non-Runway Area 1, and Runway Access Area 3, known as the Northern Developable Area End—State in this section. Land Acquisition Area 1 appears to be an easement for access to rail lines to the east. The wetland mitigation area and retention pond exist and are part of the railway property to the east. This redesign allows for the existing entry road to the Airport to move east directly beside the western portion of wetland zone providing a smoother curved road and opening the western portion to development.

Building C and Surrounding Areas

- This layout provides for a new 64,000 square-foot facility (Building C) that could be used for mixed-use (office, restaurant, and / or retail).
- The building is surrounded by hardscape that can serve as parking and vehicular circulation on the perimeter of the facility (the southwestern end of the developable area).
- This new development ties directly into the existing entry road.
- The rest of the property could be further developed for outdoor activity or additional buildings to the south.

Buildings D and E

- Buildings D and E are both new 125,00 square-foot office / hangar / manufacturing / assembly facilities that have direct runway access, as well as outdoor aircraft entry and parking zones to the west of the site and a new vehicular parking hardscape area to the east of these new
- Both buildings D and E have high-bay hangar space within the middle of the buildings, and both include two, two-story office spaces on either side of the high-bay hangar space.

Note: the apron edge to the adjacent taxiway respects the 85.5-foot setback requirement.

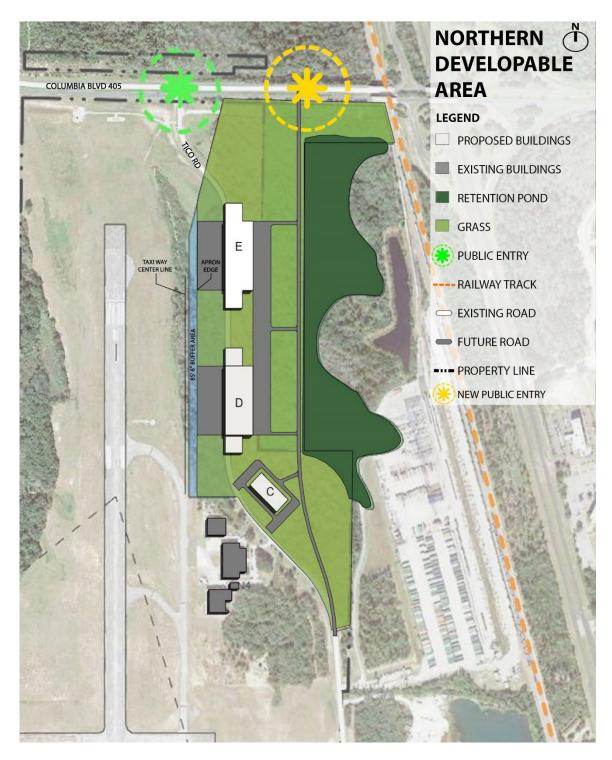


Figure 43 – Area Development–Proposed DevelopmentNear Northern Campus Entrance - Road Redesign

Orlando Utilities Company (OUC) Dock Proposed 6.8 Connection

The OUC Dock is a critical asset that is currently being looked at for supplemental purposes to the Spaceport. Several tenants have expressed interest in using the dock to moor a barge that could be used to retrieve spacecraft after splashdown. If the Spaceport can come to an agreement with the Orlando Utilities Commission (OUC), then the negotiations would include 'cross access' easements, railroad crossings, and a potential future access road to return a flatbed semi-truck to the Spaceport property. Although this scenario is realistic, it must be communicated and coordinated with several stakeholders. If achieved, the Dock access will become one of the most valuable assets of the Spaceport. If the proposed acquisition of the East property could also occur, then it may be possible to have a rail spur extend from the existing rail line, which would again be able to complement the dock and port access. The barge could also be used to not only retrieve, but also to deliver to Kennedy Space Center, Cape Canaveral Space Force Station or to Port Canaveral. If the concept of global Point to Point is applied, this Exploration Spaceport becomes a highly desirable location and destination as the market study predicted.

Also shown in this concept is the Land Acquisition Area 6 (OUC parcels) to the south of Runway 18-36. This land acquisition can solidify TCAA's direct link between the dock to the Spaceport. Also along this area is an easement owned by Brightline.



Figure 44 – Area Development-Orlando Utilities Company (OC) Dock Connection

7. EXPLORATION SPACEPORT IMPLEMENTATION PLAN – PLANNING HORIZON

The following graphics, narrative, and charts depict the consulting team's proposal for implementing the Exploration Spaceport Master Plan. Although this approach is conceptual, input from interested stakeholders, including community leaders, elected officials, funding partners, end-users, and the general public, will facilitate the Plan's actual implementation. Comprised of three phases, the planning horizon totals 20 years: 0 to 5 year, 6 to 10 year, and 11 to 20 year time periods. The graphic to the rights illustrates the end-state of the Master Plan with complete build out of all available land. It is important to note that any property acquired subsequent to the finalization of this Master Plan, as well as the western portion of Space Coast Space Coast Innovation Park (Phase 3 West), are not included in this graphic.

The phasing chart provided on the next page contains the potential projects included in each specific phase and the anticipated impact on the finances and demographics of the Spaceport and the surrounding community.

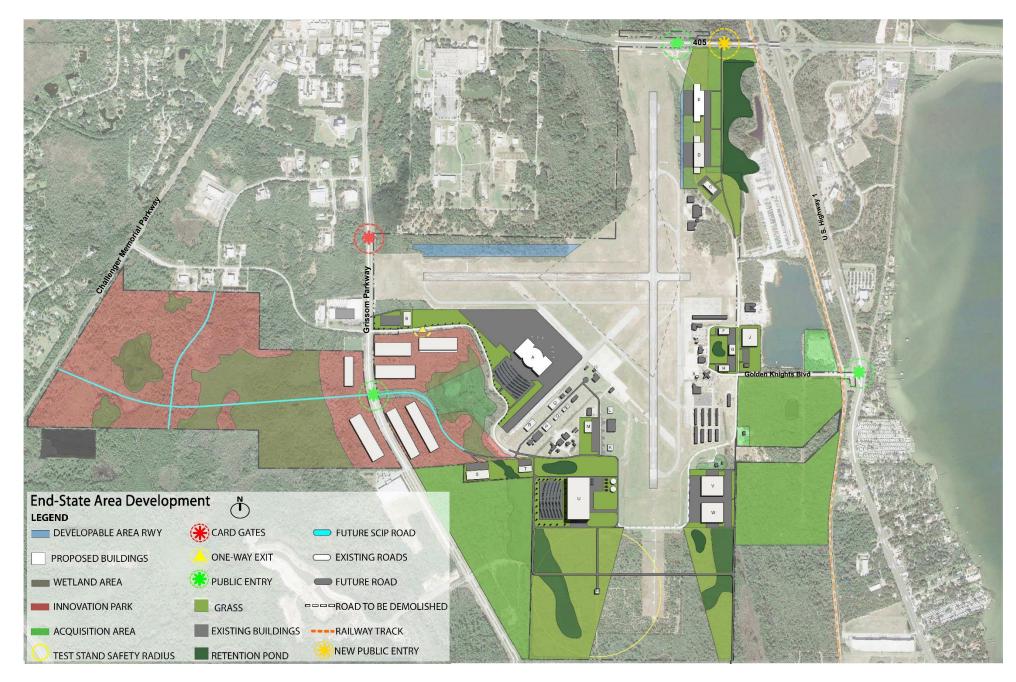


Figure 45 – Implementation Planning–End-State



Planning Horizon in Years	Exploration Spaceport Master Plan Implementation Plan - Proposed Projects	Order of Priority	Affects Visitors & Titusville	Income Producing Tenants	Perform ROI Analysis
	Developer Driven: Space Coast Innovation Park Development - Phase 1+ 2 + 3 EAST and TCAA Development (capital improvement project): Challenger Avenue Development	1	X	X	X
	TCAA Development: 3 Flexible Office Buildings with Potential SCIF, Mission Critical Center - Proposed Buildings F, G, and H and Associated Road Redesign Surrounding Taxiways	2		X	X
	TCAA Development: Construct Replacement Air Traffic Control Tower - Proposed Building X	3		X	X
	Tenant Development and TCAA Site Development: Proposed Buildings V and W	4	X		
0-5 YEARS	Tenant Development and TCAA Site Development: 400,000 Square Foot Processing Facility - Proposed Building U	5		X	X
	Tenant Development and TCAA Site Development: Proposed Manufacturing and Processing Building J	6	X	X	
	Tenant Development and TCAA Site Development: Main Area Development Phase 1 - Proposed Buildings R and M	7		X	X
	OUC Dock Connection - Negotiations, Agreements, and Easements	Ongoing	X	X	
	Wetland Mitigation and Land Acquisition Parcels 3 and 6	Ongoing	X		
	Tenant Development and TCAA Site Development: Engine Test Stand Area and Small Facility - Proposed Building Z			X	X
	Tenant Development and TCAA Site Development: Proposed Warehouse / Storage Buildings S and T			X	X
	Tenant Development and TCAA Site Development: Main Area Development Phase 2 - Smaller Facilities - Proposed Buildings K, L, N, O, P, and Q	Projects 1-7		X	X
	Developer Driven: Space Coast Innovation Park Development - Phase 3 West and TCAA Development: Challenger Road (By Others)	without order of priority	X	X	X
6-10 YEARS	Tenant Development and TCAA Site Development: Spaceport Terminal - Proposed Building A		X	X	X
	Tenant Development and TCAA Site Development: Mixed Use (Office, Retail, and Restaurant) Facility - Proposed Building C		X	X	X
	Tenant Development and TCAA Site Development: Mixed Use (Office, Retail, and Restaurant) Facility - Proposed Building B		X	X	X
	Land Development Areas 1, 4, and 5		X		
	TCAA and Tenant Development: Full Multi-Modal Access (with Road, Rail and Sea (OUC Dock and Port Canaveral))	Ongoing	X	X	
	TCAA Development: Main Entrance (North Entrance) Area Development - Road Alignment (after Land Acquisition Area 1 completed in 6-10 years)	1	X		X
11-20 YEARS	Tenant Development and TCAA Site Development: Proposed Buildings D and E	2	X		X
11-20 TEARS	Tenant Development and TCAA Site Development: North of 9-27 (East / West) Runway Area	Ongoing		X	X
	TCAA Development: Runway 36 Extension		X	X	

Table 17- Implementation Planning Horizon Summary



7.1 Implementation Plan – Phase 1 – 0 to 5 Years

Planning Horizon in Years	Exploration Spaceport Master Plan Implementation Plan - Proposed Projects								
	Developer Driven: Space Coast Innovation Park Development - Phase 1+ 2 + 3 EAST and TCAA Development (capital improvement project): Challenger Avenue Development	1							
	TCAA Development: 3 Flexible Office Buildings with Potential SCIF, Mission Critical Center - Proposed Buildings F, G, and H and Associated Road Redesign Surrounding Taxiways								
	TCAA Development: Construct Replacement Air Traffic Control Tower - Proposed Building X								
	Tenant Development and TCAA Site Development: Proposed Buildings V and W	4							
0-5 YEARS	Tenant Development and TCAA Site Development: 400,000 Square Foot Processing Facility - Proposed Building U								
	Tenant Development and TCAA Site Development: Proposed Manufacturing and Processing Building J								
	Tenant Development and TCAA Site Development: Main Area Development Phase 1 - Proposed Buildings R and M	7							
	OUC Dock Connection - Negotiations, Agreements, and Easements	Ongoing							
	Wetland Mitigation and Land Acquisition Parcels 3 and 6	Ongoing							

Table 18- Implementation Plan 05 Years Summary

Implementation Planning Horizon Phase 1:0 to 5 years -The initial phase of the planning horizon focuses on the immediate short term. TCAA has numerous requests for leasable space, and their need for development of rentable properties is critical. This phase secures the boundary of the Spaceport, creates leasable space for current requests, and begins to identify next-phase projects and environmental concerns. For Phase 1, the following seven priorities have been identified.

Priority 1: The development of Space Coast Space Coast Innovation Park (SCIP) continues with the construction of several facilities within Space Coast Innovation Park (SCIP) Phases 1, 2, and 3-East. These facilities are mostly within the "public" area of the Master Plan, but the buildings within Space Coast Innovation Park SCIP Phases 1 and 2 could be within a secured boundary if so desired by the end-user.

<u>Priority 2:</u> TCAA has proposed constructing a facility to accommodate flexible office space (Buildings F, G, and H) within the more public zones of the Airport and Spaceport. This proposed office complex could satisfy the request for leasable office space to either smaller aerospace companies that require a small area to larger tenants that need an entire building. In addition to flexible office space, these buildings could also contain a mission control critical center and a Sensitive Compartmented Information Facility (SCIF). To provide a campus-like environment, the retention pond could serve as an amenity by being situated next to walking trails, decks, and a gazebo. The overall development would enhance the current pedestrian circulation within this area of the Spaceport.

Priority 3: Construct a new Air Traffic Control Tower (Building X).

Priority 4: TCAA is actively negotiating with a sizeable, confidential aerospace company that is interested in constructing offices and a manufacturing area within the Spaceport that proposed engine test stand. (Buildings V and W).

Priority 5: As part of the initial environmental assessment (EA) completed for the Spaceport, a 400,000 square-foot processing facility (Building U) was identified in addition to associated facilities for storage and other purposes.

This Master Plan advances that concept but relocates the facility to an area with runway access and adjacency to a proposed engine test stand located in the southern portion of the Airport property. This acreage will accommodate all of the parking, fueling, and storage included in the EA. Provisions should be made for demolition of existing facilities, new roadways and utilities, and any required wetlands mitigation.

Priority 6: TCAA is engaged in negotiations with an aerospace company that is interested in office space, as well as areas for manufacturing and processing, which is closer to the more pubic areas of Spaceport (Building J).

Priority 7: As with all proposed phases, infill development of the main area of the Airport is encouraged (RWA Areas 4, 7, and 8).

This phase proposed buildings R and M. An overall Master Plan for utilities will need to validate capacities and facility arrangement for infill projects to continue in this area.

Ongoing: The OUC Dock could play an important role in the success of the Spaceport (refer to **Section 6.8 OUC Dock Proposed Connection** for more information). Because the Dock could become an asset that could support numerous Spaceport tenants, negotiations should begin timely. .It is worth noting, however, that there is an ongoing study being conducted by various state agencies.

Ongoing: Throughout the overall implementation process, TCAA should remain mindful of next steps. Wetlands mitigation and land acquisition of parcels 3 and 6 must be considered immediately in the short-term of the Master

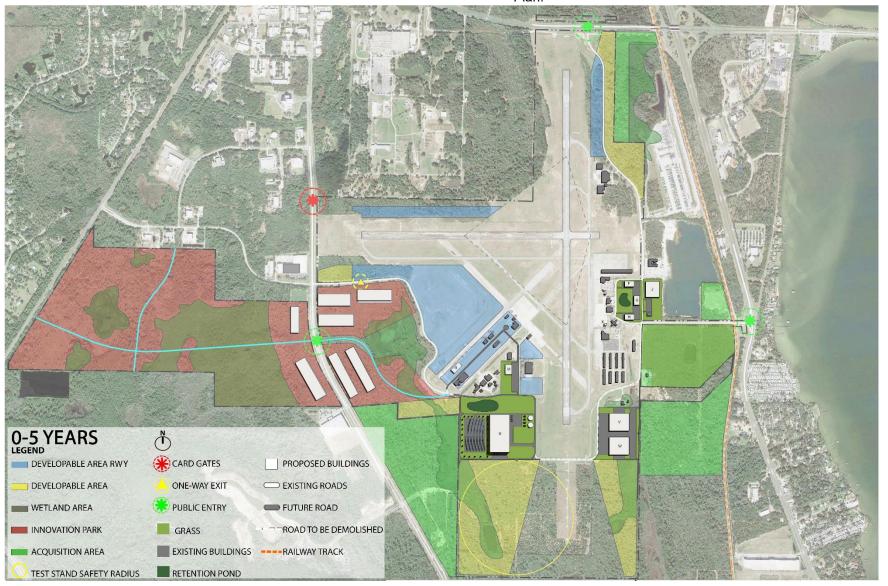


Figure 46 – Implementation Planning – 0 to 5 Year Plan



7.2 Implementation Plan – Phase 2 – 6 to 10 Years

Planning Horizon in Years	Exploration Spaceport Master Plan Implementation Plan - Proposed Projects
	Tenant Development and TCAA Site Development: Engine Test Stand Area and Small Facility - Proposed Building Z
	Tenant Development and TCAA Site Development: Proposed Warehouse / Storage Buildings S and T
	Tenant Development and TCAA Site Development: Main Area Development Phase 2 - Smaller Facilities - Proposed Buildings K, L, N, O, P, and Q
	Developer Driven: Space Coast Innovation Park Development - Phase 3 West and TCAA Development: Challenger Road (By Others)
6-10 YEARS	Tenant Development and TCAA Site Development: Spaceport Terminal - Proposed Building A
	Tenant Development and TCAA Site Development: Mixed Use (Office, Retail, and Restaurant) Facility - Proposed Building C
	Tenant Development and TCAA Site Development: Mixed Use (Office, Retail, and Restaurant) Facility - Proposed Building B
	Land Development Areas 1, 4, and 5
	TCAA and Tenant Development: Full Multi-Modal Access (with Road, Rail and Sea (OUC Dock and Port Canaveral))

Table 19- Implementation Plan & 10 Years Summary

Implementation Planning Horizon Phase 2 – 6 to 10 years - focuses on the continued development of facilities at the Spaceport but introduces the need to expand the Spaceport boundary through land acquisition. The following projects, while not in order of priority, represent the desired achievements during Phase 2. (Facilities completed in Phase 1 – 0 to 5 years – are shown in grey.)

Non-Prioritized Project 1: An important income-producing facility for Exploration Spaceport is a proposed engine test stand (Building Z). Because of the residential uses surrounding this area, such a facility could become controversial due to the noise that would be produced. In order for this type of project to come to fruition, the community would need to demonstrate its support. In addition, a variety of state agencies have requested additional research and studies on the effects, if any, of engine test stands. Despite this potential controversy, an engine test stand would produce increased opportunities for revenue generation for the Spaceport and could aid in attracting national and international Aerospace companies to the region.

Non-Prioritized Project 2: Proposed Buildings S and T seek to fulfill the Spaceport's need for warehousing and storage facilities.

Non-Prioritized Project 3: As with all three proposed phases of the planning horizon, infill development within the main area of the Airport (RWA Areas 4, 7, and 8) is encouraged and supported. This phase proposes buildings K, L, N, O, P, and Q, but an overall utilities Master Plan will be required in order to validate capacities and layout options for infill projects to potentially occur in this area.

Non-Prioritized Project 4: The final phase of the Space Coast Space Coast Innovation Park development – Phase 3-West – should be advancing through the planning stages. By this point, there should clear indicators that are driving market demands for space, size, and proximity to the Spaceport. Zoning and wetlands mitigation will need to be addressed in this area, which will potentially have unrestricted access and several roadway ingress and egress points. A challenge for this project is the continued development of Challenger Avenue.

Non-Prioritized Project 5: The Spaceport Main Terminal Area (SPMT) (Building A) will be a state-of-the-art terminal that will accommodate Point-to-Point travel from around the globe and will bolster both space tourism and hypersonic/supersonic business and leisure travel.

Non-Prioritized Project 6: The introduction of a mixed-use facility (Building C) at the north entrance is expected to provide for offices, possible retail space, and a dining option for employees and visitors.

Non-Prioritized Project 7: A second potential mixed-use facility (Building ???) at the west entrance will also incorporate offices, retail space, and a dining option for employees and visitors.

Ongoing: Addressing the need for expanding the boundary of Exploration Spaceport to achieve the desired end-state of the Master Plan will continue. Acquiring parcels 1, 4, and 5 will serve as a catalyst for achieving total connectivity of the Spaceport.

Ongoing: Joining the entire Spaceport to the surrounding region will require a multi-modal approach that includes roads, rail, sea, and air transportation. . The roadway aspect enables semi-tractor trailer trucks to operate on the Florida Interstate system for both delivery and retrieval of cargo, and the ability to easily access Port Canaveral and the OUC Dock will provide an economic benefit to the Spaceport. The rail could be connected to Kennedy Space Center and the Cape Canaveral Space Force Station. A Spaceport with on-site, functional rail access and a spur for the delivery and collection of goods will complete the multi-modal connectivity to the region and the world.

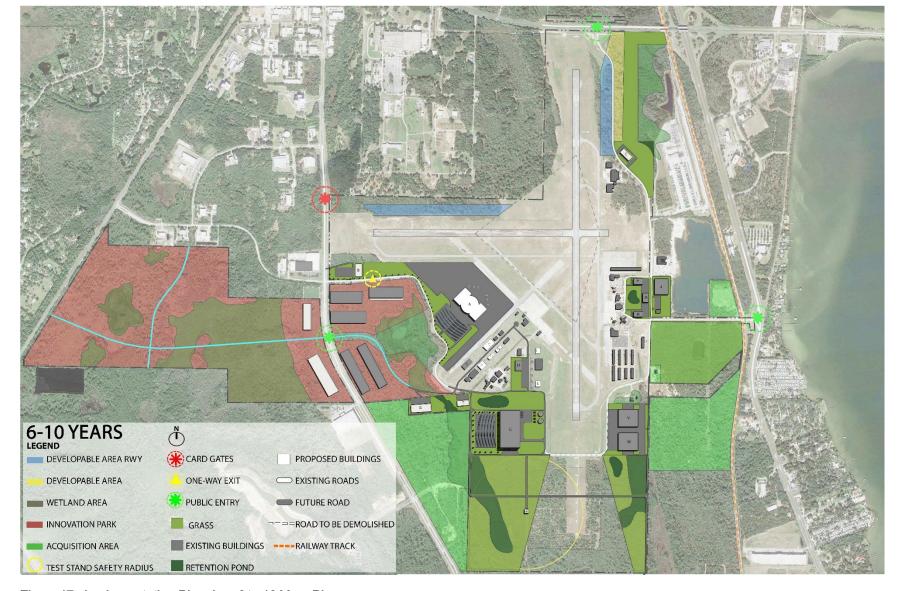


Figure 47 – Implementation Planning – 6 to 10 Year Plan



7.3 Implementation Plan – Phase 3 – 11 to 20 Years

Planning Horizon in Years	Exploration Spaceport Master Plan Implementation Plan - Proposed Projects							
	TCAA Development: Main Entrance (North Entrance) Area Development - Road Alignment (after Land Acquisition Area 1 completed in 6-10 years)							
11-20 YEARS	Tenant Development and TCAA Site Development: Proposed Buildings D and E	2						
11-20 TEARS	Tenant Development and TCAA Site Development: North of 9-27 (East / West) Runway Area							
	TCAA Development: Runway 36 Extension							

Table 20 - Implementation Plan 1 to 20 Years Summary

Implementation Planning Horizon Phase 3 – 11 to 20 years focuses on the achievement of the total end-state of the Spaceport with property acquisition in Land Acquisition Area 1 during Phase 2, 6- to 10-year planning period. Two priorities have been selected for this phase; facilities completed in Phase 1,0 to 5 years, and Phase 2, 6 to 10 years, are illustrated in grey.

<u>Priority 1:</u> If TCAA is successful in acquiring property within Land Acquisition Area 1, then the full end-state plan can be accomplished and should address the redesign of the primary entrance, as well as the possibility of incorporating rail access along Tico Road. This area of development could include hangars or other aeronautical uses with runway access. This priority achieves the maximum amount of proposed leasable facilities for TCAA income generation.

Priority 2: Proposed buildings D and E address the continuing need for hangars and office space at the Airport and Spaceport.

Ongoing: This priority demonstrates merely conceptual development to the north of Runway 9-27 (east / west). Because utilities do not extend to this area, significant site preparation would be required in order to be developed. As such, the consulting team has designated this area as a developable option because, despite the required site preparation, this area remains ideal for hangars or other aeronautical uses with direct runway access.

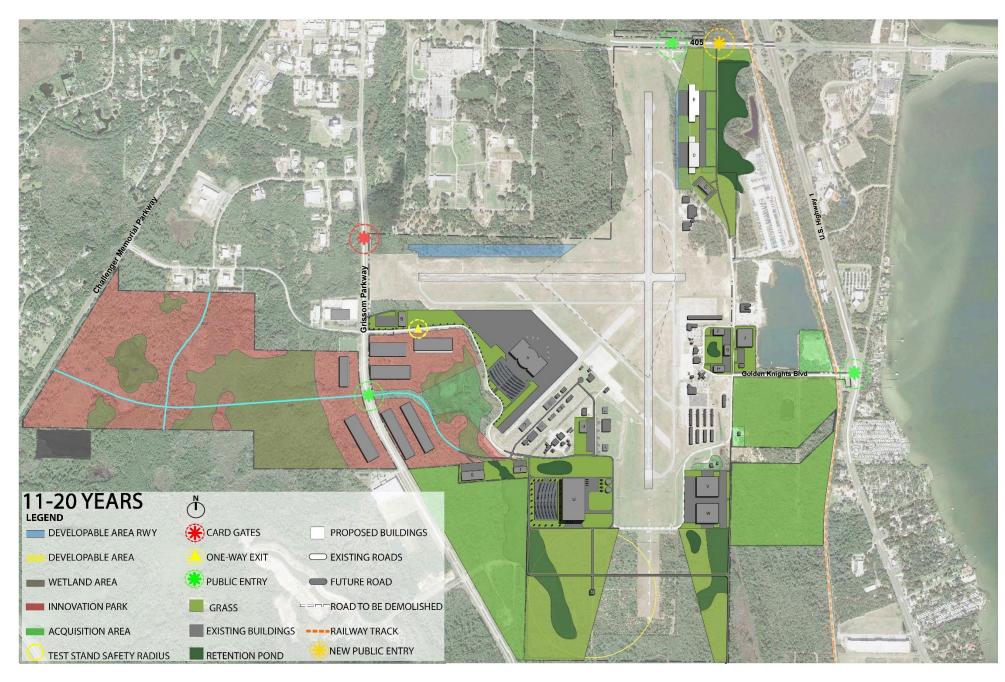


Figure 48 – Implementation Planning – 1 to 20 Year Plan



ROUGH ORDER OF MAGNITUTDE (ROM) COST ESTIMATE

The consulting team performed a Rough Order of Magnitude (ROM) cost estimate for all of the proposed projects. This information will provide TCAA with the approximate cost associated with each project. Appropriate costs-persquare footages were applied to the different facility types, and each ROM cost utilized industry-standard Construction 'Division' costs, such as:

- Division 1: General Requirements
- Division 2: Demolition Excavation and Miscellaneous Utilities
- Division 3: Concrete
- Division 4: Masonry
- Division 5: Steel
- Division 6: Carpentry
- Division 7: Thermal Exterior Skin
- Division 8: Doors
- Division 9: Finishes
- Division 10: Miscellaneous Specialties
- Division 11: Equipment
- Division 12: Millwork, Appliances, Blinds
- Division 14: Elevators, Escalators, Cranes
- Division 15: Mechanical
- Division 16: Electrical, Communications, Security

The ROM also recognizes costs for general conditions, permits, insurance bonds, contingency, and contractor fees.

Also incorporated within this section is a high-level project schedule for design and construction for the short-term (0 to 5 years) projects only.

8.1 **Assumptions & Clarifications Regarding ROM Estimates**

The following assumptions and clarifications are included in these ROM estimates:

- All work will be performed during regular business hours (no overtime).
- The estimate is considered to be a ROM budget.
- The following elements are NOT included in the ROM:
- Egress to the site construction.
- o Contractor, or municipal costs and fees.
- Tap or development fees.
- Soft costs. 0
- Removal of hazardous materials.
- Wetlands mitigation or other environmental expenses.
- The bid factor / uncertainty at a rate of 5% to 10% may be required but is not set forth in the estimate.
- It is assumed that 4 to 5 contractors will produce proposals for all work
- The estimate is in 2023 third quarter dollars.

- R.S. Mens Costworks 2023 third guarter adjusted for area and project size was used.
- All estimates are AACE Class 5 estimate of Low (-20% to -50%) to High (+30% to +100%).

Table 21-Industry Standard Cost Estimate Classification Matrix

Estimate Class	Project % Complete	Purpose of Estimating Estimate Method		Expected Accuracy Range
Class 5	0% to 2%	Feasibility	Estimator Judgment	Low: -20% to -50% High: +30% to +100%
Class 4	1% to 15%	Concept	Parametric	Low: -15% to -30% High: +20% to +50%
Class 3	10% to 40%	Budget Authorization	Semi-detailed	Low: -10% to -20% High: +10% to +30%
Class 2	30% to 75%	Control	Mostly Detailed	Low: -5% to -15% High: +5% to +20%
Class 1	65% to 100%	Check Estimate	Detailed	Low: -3% to -10% High: +3% to +15%

8.2 **Project Categorizations**

All projects included in this Master Plan were divided into two categories: (1) Project Priority; and (2) Development Assignments, i.e., funding sources.

Project Priorities

Project priorities are time- specific and are categorized as follows:

- Short-Term 0 to 5 Years(ROM costs include escalation for this project type only).
- Mid-Term 6 to 10 Years.
- Long-Term 11 to 20 Years.

Potential Revenue Opportunities - Development Assignments

Development assignments pertain to potential funding partners, who will ultimately own any vertical improvements, as well as items that will be included in TCAA's lease allowances.(An analysis of rates and high-level return on investment information can be found in Section 9.)

Developer Driven – the Space Coast Space Coast Innovation Park development team spearheads these projects – all associated square footages. uses, and costs are not included in this Master Plan and / or ROM.

TCAA Development – the majority of these projects will be funded by TCAA through matching grants from their funding partners, which include Space Florida, the Florida Department of Transportation (FDOT), and the Federal Aviation Administration (FAA) . TCAA will maintain ownership of the land and the vertical improvements and will operate as a landlord for tenants interested in leasing space. These projects represent full risk for TCAA.

Tenant Development and TCAA Site Development – prospective tenants will fund the majority of these projects, including all costs associated with construction of facilities, while TCAA will provide funding for site preparation. Tenants will take ownership of the vertical improvements, and TCAA will lease the full acreage of the parcel to the tenant. These projects represent partial risk for TCAA.

ROM Totals 8.3

The following totals represent the end-state for the Exploration Spaceport Master Plan. The majority of buildings and facilities are assumed to be designated for Spaceport utilization and business development.

Table 22 - ROM Totals

ROM Cost Totals											
Total Square Footage	1,905,133										
Total TCAA Development - New Buildings and Pad Preparation (Buildings F, G, and H)	\$207,218,665										
TCAA Site Development - Pad Preparation for all Tenant Development	\$29,627,104										
Total Tenant Development - End-State	\$1,670,278,046										
Total Site Work - End-State	\$310,555,666										

Site Work is included in these ROM estimates as an overall lump sum and is calculated based on an average of \$163 per square foot. Allocations of this line item must be determined as projects are proposed.

Short-Term (0 to 5 Years) Projects ROM Estimates 8.4

Table 23 – Short-Term Projects ROM Estimates

			TCAA	Exploration Spaceport Master Pl	an Rough C	order of Mag	nitude (ROM) Costs End	-State		
						Esca	ılated	Not Es	calated	Cost Per Square Foot	Oite Week Octo
	Planning Horizon	Project Priority	Building Designation	Building Description	Building Gross Square Footage	Building Pad Preparation Costs	Building Construction Costs	Building Pad Preparation Costs	Building Construction Costs		Site Work Costs - Average \$163 per Square Foot
		1	By Others	Developer Driven: Developer Driven: Space Coast Innovation Park Development - Phase 1+ 2 + 3 EAST and TCAA Development (capital improvement project): Challenger Avenue Development							
			F with SCIF	TCAA Development: 3 Flexible Office Buildings with Potential SCIF, Mission Critical Center - Proposed Buildings F, G, and H and Associated Road Redesign Surrounding Taxiways	69,000	\$612,174	\$86,648,676			\$1,256	\$11,254,935
pep		2	G		69,000	\$612,174	\$59,366,733			\$860	\$11,254,935
n Included	0 to 5 Years		н		69,000	\$612,174	\$59,366,733			\$860	\$11,254,935
scalation	Implementation	3	x	TCAA Development: Construct Replacement Air Traffic Control Tower - Proposed Building X	1,000						
sca			V	Tenant Development and TCAA Site Development:	165,000	\$2,622,189	\$123,584,120			\$749	\$26,913,975
Ш		4	w	Proposed Buildings V and W Manufacturing and Assembly Buildings	165,000	\$2,622,189	\$123,584,120			\$749	\$26,913,975
		5	U	Tenant Development and TCAA Site Development: Proposed Building U - High Bay Multi-Use Processing	400,000	\$6,512,197	\$632,570,477			\$1,581	\$65,246,000
		6	J	Tenant Development and TCAA Site Development: Proposed Manufacturing and Processing Building J	104,000	\$2,397,126	\$83,148,881			\$800	\$16,963,960
		_	М	Tenant Development and TCAA Site Development:	30,000	\$399,507	\$23,209,200			\$774	\$4,893,450
		7	R	Proposed Building M - Medium Hangar / Office / Warehouse Proposed Building R - Medium Hangar / Office / Warehouse	25,000	\$341,765	\$19,855,039			\$794	\$4,077,875

Mid-Term (6 to 10 Years) Projects ROM Estimates 8.5

Table 24 – Mid-Term Projects ROM Estimates

			TCAA	Exploration Spaceport Master Pl	an Rough C	order of Mag	nitude (ROM) Costs End	-State						
						Esca	alated	Not Es	calated		O' W 1 O 1				
	Planning Horizon	Project Priority	Building Designation	Building Description	Building Gross Square Footage	Building Pad Preparation Costs	Building Construction Costs	Building Pad Preparation Costs	Building Construction Costs	Cost Per Square Foot	Site Work Costs - Average \$163 per Square Foot				
			Z	Tenant Development and TCAA Site Development: Engine Test Stand Area and Small Facility - Proposed Building Z	200				\$3,939,824						
			s	Tenant Development and TCAA Site Development: Proposed Building S - Large Warehouse / Storage Building Proposed Building T - Medium Warehouse / Storage Building	73,000			\$955,400	\$46,402,464	\$636	\$11,907,395				
			Т		29,000			\$955,400	\$18,444,000	\$636	\$4,730,335				
			К		12,000			\$207,529	\$8,254,395	\$688	\$1,957,380				
þ			L	Tenant Development and TCAA Site Development: Proposed Building K - Small Hangar / Office / Warehouse Proposed Building L - Small Hangar / Office / Warehouse Proposed Building N - Small Hangar / Office / Warehouse Proposed Building O - Small Hangar / Office / Warehouse Proposed Building P - Small Hangar / Office / Warehouse Proposed Building Q - Medium Hangar / Office / Warehouse	12,000			\$207,529	\$8,254,395	\$688	\$1,957,380				
clude			N		10,000			\$207,529	\$6,878,662	\$688	\$1,631,150				
lot In	6 to 10 Years	No	0		10,000			\$207,529	\$6,878,662	\$688	\$1,631,150				
tion P	Implementation	Priority	Р	Proposed Building Q - Medium Hangai / Office / Warehouse	20,642			\$207,529	\$14,198,935	\$688	\$3,367,020				
Escalation Not Included			Q		30,000			\$399,507	\$18,602,801	\$620	\$4,893,450				
"								By Others	Developer Driven: Infrastructure and Capital Planning - Innovation Park Development: Phase 3 West and TCAA Development: Challenger Road (By Others)						
			Α	Tenant Development and TCAA Site Development: Spaceport Terminal - Proposed Building A	249,720			\$4,036,013	\$289,613,025	\$1,160	\$40,733,078				
			С	Tenant Development and TCAA Site Development: Mixed Use (Office, Retail, and Restaurant) Facility - Proposed Building C	64,000			\$799,044	\$45,701,420	\$714	\$10,439,360				
			В	Tenant Development and TCAA Site Development: Mixed Use (Office, Retail, and Restaurant) Facility - Proposed Building B	41,571			\$504,589	\$29,681,694	\$714	\$6,776,489				

Long-Term (11-20 Years) Projects ROM Estimates 8.6

Table 25 – Long-Term Projects ROM Estimates

	TCAA Exploration Spaceport Master Plan Rough Order of Magnitude (ROM) Costs End-State														
							Esca	Escalated Not Escalated							
		Planning Horizon	Project Priority	Filliding Description		Building Gross Square Footage	Building Pad Preparation Costs	Building Construction Costs	Building Pad Preparation Costs	Building Construction Costs	Cost Per Square Foot	Site Work Costs - Average \$163 per Square Foot			
ation	ot ıded	11to 20 Years	No	Unassigned	TCAA Development: Main Entrance (North Entrance) Area Development - Road Alignment (after Land Acquisition Area 1 completed in 6-10 years)										
cala	No	Implementation	Priority	D	Tenant Development and TCAA Site Development: Proposed Building D - Hanger / Office Building	128,000			\$3,022,266	\$83,737,964	\$654	\$20,878,720			
Es	Es L			E	Proposed Building E - Hangar / Office Building Proposed Building E - Hangar / Office Building	128,000			\$3,022,266	\$83,737,964	\$654	\$20,878,720			

High-Level Projects Schedule for Design and 8.7 **Construction – Short-Term Projects Only**

The following high-level project schedule for design and construction in the short-term (0 to 5 years) has been presented for TCAA's use. This schedule demonstrates that the short-term 0 to 5-year projects may be at capacity for development (with an assumption of unlimited funding) within Exploration Spaceport.

Larger projects require an 18-month time period for design and a 2-year time frame for construction. Depending on various external factors, smaller projects could be completed in less time.

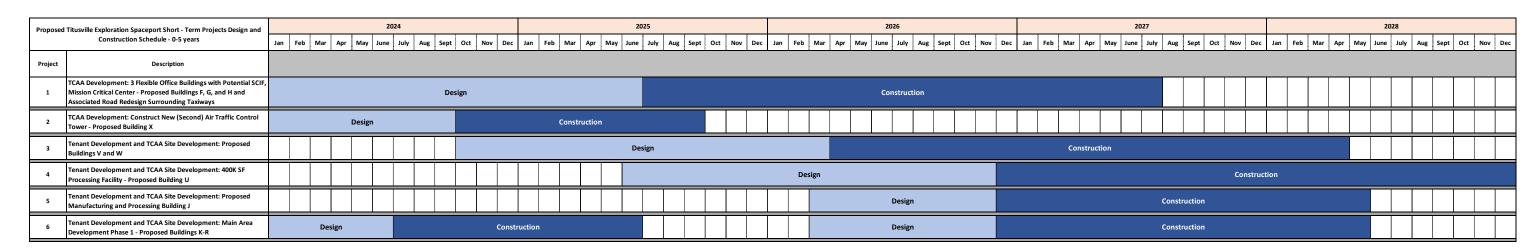


Figure 49 – Short-Term Projects Design and Construction Schedule



9. **HIGH-LEVEL RETURN ON INVESTMENT (ROI) ANAYSIS**

Based on the proposed program of development, a high-level Return on Investment (ROI) analysis was conducted, which considered estimated costs and potential revenue associated with real estate development and leasing. Notably, this restricts the analysis to certain financial returns and excludes other potential benefits that may be relevant to the decision-making process, such as job creation, tax revenue, tourism, etc. For each proposed asset, one of two strategies was assumed: (1) ground lease, or (2) develop and lease.

The ground lease strategy assumes that TCAA leases graded parcels to an end user and that the end user is responsible for the construction and operation of any buildings on that parcel. In this scenario, TCAA's costs are limited to site preparation in advance and annual operating expenses (OPEX) that are primarily administrative costs. In return, TCAA collects annual ground lease payments, which are based on the size of the parcel in square feet.

The develop-and-lease scenario assumes that TCAA prepares the parcel for development and constructs and operates the vertical improvements on the site. In this situation, TCAA's costs include site preparation, construction (hard and soft costs), and annual OPEX. In return, TCAA collects annual lease payments based on the size of the building in square feet.

The Net Operating Income (NOI) analysis uses lease rate assumptions provided by TCAA¹ and an 85% occupancy assumption; however, an independent market analysis was not conducted at this stage, and the consulting team cannot verify that there will be demand for the properties at these lease rates. For each asset, the upfront costs of site preparation and construction were calculated, and the NOI of lease revenue-minus-OPEX was calculated on an annual basis for 10 years. Following the 10-year period, a terminal value for each asset was estimated².

The 10-year NOI plus terminal value was compared to the site preparation and development costs to calculate the ROI, which is expressed as a ratio of 10year revenue to costs.

The table below highlights the estimated ROI for each asset and for the program overall (excluding the terminal building). The majority of the ground lease properties have a positive ROI, ranging from 1.3 to 5.5 times the cost of development. This is attributable to the relatively lower cost/lower risk approach of ground leasing but relies on the ability of TCAA to secure tenants for those parcels. Conversely, the develop-and-lease properties have an ROI of less than 1, meaning that the overall 10-year revenue from the property is lower than the cost of development. This is driven by high construction costs compared to modest lease revenue for the completed buildings.

The engine test stand and replacement air traffic control tower were not included in the ROI analysis, nor was the Spaceport Terminal. The Terminal will require more in-depth analysis at a later time to determine use and potential revenues. The ROI also does not include a cash-flow profile, acquiring land in Acquisition Area 1, job creation, economic output, tax revenue, tourism and other benefits, or market analysis.

Table 26 – High-Level ROI Analysis

	TCAA Exploration Spaceport Master Plan High-Level Return on Investment (ROI) Analysis													
Building Letter	Proposed Project Type	Strategy 1=Ground Lease 2=Develop	ROI	Planning Horizon	Priority	Ground Lease Revenue	GLA Lease Revenue	Total Rev	Opex	NOI	NOIx10	Terminal Value	10-Year Revenue	DevCost
Р	Small Hangar / Office / Warehouse	1	5.7			\$71,450	\$0	\$71,450	\$7,145	\$64,305	\$643,053	\$535,878	\$1,178,931	\$207,529
K	Small Hangar / Office / Warehouse	1	5.5	1		\$69,696	\$0	\$69,696	\$6,970	\$62,726	\$627,264	\$522,720	\$1,149,984	\$207,529
С	Mixed Use (Office, Retail, Restaurant)	1	5.0	6-10 Years		\$243,936	\$0	\$243,936	\$24,394	\$219,542	\$2,195,424	\$1,829,520	\$4,024,944	\$799,044
Q	Medium Hangar / Office / Warehouse	1	4.3			\$103,842	\$0	\$103,842	\$10,384	\$93,458	\$934,580	\$778,817	\$1,713,397	\$399,507
L	Small Hangar / Office / Warehouse	1	4.2			\$52,272	\$0	\$52,272	\$5,227	\$47,045	\$470,448	\$392,040	\$862,488	\$207,529
M	Medium Hangar / Office / Warehouse	1	4.2	0-5 Years	7	\$102,786	\$0	\$102,786	\$10,279	\$92,507	\$925,074	\$770,895	\$1,695,969	\$399,507
R	Medium Hangar / Office / Warehouse	1	4.2	0-5 lears	,	\$86,535	\$0	\$86,535	\$8,654	\$77,882	\$778,817	\$649,014	\$1,427,831	\$341,765
В	Mixed Use (Office, Retail, Restaurant)	1	3.4			\$104,544	\$0	\$104,544	\$10,454	\$94,090	\$940,896	\$784,080	\$1,724,976	\$504,589
N	Small Hangar / Office / Warehouse	1	2.8	6-10 Years		\$34,614	\$0	\$34,614	\$3,461	\$31,153	\$311,527	\$259,606	\$571,132	\$207,529
0	Small Hangar / Office / Warehouse	1	2.8	0-10 lears		\$34,614	\$0	\$34,614	\$3,461	\$31,153	\$311,527	\$259,606	\$571,132	\$207,529
S	Large Warehouse / Storage	1	2.4			\$137,171	\$0	\$137,171	\$13,717	\$123,454	\$1,234,542	\$1,028,785	\$2,263,326	\$955,400
D	Hangar / Office Space	1	2.3	11-20 Years		\$418,176	\$0	\$418,176	\$41,818	\$376,358	\$3,763,584	\$3,136,320	\$6,899,904	\$3,022,266
Е	Hangar / Office Space	1	2.3	11-20 16415		\$418,176	\$0	\$418,176	\$41,818	\$376,358	\$3,763,584	\$3,136,320	\$6,899,904	\$3,022,266
U	Highbay 400K SF Multi-Use Facility (Processing and/or Assembly)	1	2.3	- 0-5 Years	5	\$888,624	\$0	\$888,624	\$88,862	\$799,762	\$7,997,616	\$6,664,680	\$14,662,296	\$6,512,197
٧	Manufacturing and Assembly Building	1	1.3	0-5 fears	4	\$200,376	\$0	\$200,376	\$20,038	\$180,338	\$1,803,384	\$1,502,820	\$3,306,204	\$2,622,189
W	Manufacturing and Assembly Building	1	1.3		4	\$200,376	\$0	\$200,376	\$20,038	\$180,338	\$1,803,384	\$1,502,820	\$3,306,204	\$2,622,189
Т	Medium Warehouse / Storage	1	0.9	6-10 Years		\$54,493	\$0	\$54,493	\$5,449	\$49,043	\$490,434	\$408,695	\$899,130	\$955,400
J	Manufacturing / Processing Building	1	0.6		6	\$93,227	\$0	\$93,227	\$9,323	\$83,904	\$839,041	\$699,201	\$1,538,242	\$2,397,126
G	Office Building	2	0.5] 0 E Voors		\$0	\$1,246,313	\$1,246,313	\$124,631	\$1,121,681	\$11,216,813	\$16,024,018	\$27,240,830	\$59,978,907
Н	Office Building	2	0.5	0-5 Years	2	\$0	\$1,246,313	\$1,246,313	\$124,631	\$1,121,681	\$11,216,813	\$16,024,018	\$27,240,830	\$59,978,907
F	Office Building (with SCIF)	2	0.3			\$0	\$1,246,313	\$1,246,313	\$124,631	\$1,121,681	\$11,216,813	\$16,024,018	\$27,240,830	\$87,260,850
						\$3,173,762	\$3,738,939	\$6,912,701	\$691,270	\$6,221,428	\$62,214,301	\$71,875,273	\$134,089,569	\$230,247,344
Α	Spaceport Main Terminal	0	\$0	6-10 Years		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$293,649,038

0-5 Years Priority Projects 1 (Innovation Park) and 3 (Air Traffic Control Tower) are not included.

Assumed lease rate for ground lease parcels is \$0.40 per square foot; for buildings, it is \$25.00 per square foot. Buildings are assumed to have a leasable area that is 85% of gross square footage.

² Terminal values were calculated based on NOI divided by capitalization rates of 12% for ground lease assets and 7% for buildings.



NEXT STEPS

The following items should be addressed in the short- to mid-term in order to start fulfilling the proposed Implementation Plan.

- Upon completion of Space Coast Regional Airport Master Plan (slated for the end of 2024), review information and any major changes that would impact this Exploration Spaceport Master Plan - make any necessary updates.
- Within the next year or two, TCAA should consider creating a Task Order to update this Master Plan – master plans are living documents and require updating on a regular basis.
- Continue coordination and potential acquisition of land parcels identified in this Master Plan, especially parcels at the North entrance to the Airport and the OUC barge dock and related properties.
- Continue coordination with any potential infrastructure updates or expansions with this Master Plan.
- Consider contracting Jacobs for architectural, engineering, real estate return on investment analysis, market survey updates, or construction management for any proposed projects that are approved for design and construction, especially the short-term.
- Continue coordination between Space Coast Innovation Park and Exploration Spaceport development.
- Perform detailed wetlands mitigation analysis and environmental assessments for all proposed projects.
- Perform Airport / Spaceport tax map analysis for all proposed projects.



11. APPENDIX

11.1 **Commercial Space Transportation License**

License Order No. LSO 20-019A

OFFICE OF COMMERCIAL SPACE TRANSPORTATION

LICENSE ORDER REGARDING OPERATION OF A LAUNCH SITE

AUTHORIZED BY LICENSE NO. LSO 20-019

ISSUED TO

Titusville-Cocoa Airport Authority

- 1. Authority: This Order is issued to Titusville-Cocoa Airport Authority (TCAA) under 51 U.S.C. Subtitle V, chapter 509, and 14 C.F.R. Ch. III.
- 2. Purpose: This Order grants License No. LSO 20-019, issued on May 5, 2020, by the Federal Aviation Administration's Office of Commercial Space Transportation (FAA/AST), authorizing TCAA to operate certain portions of Space Coast Regional Airport (TIX), as a launch site at Titusville, Florida and prescribes, as conditions to License No. LSO 20-019, certain additional requirements applicable to the authorization.
- 3. Authorization: TCAA is authorized to operate a launch site at TIX, an airport that is certificated for commercial service under 14 C.F.R. part 139 and federally obligated under 49 USC section 47107, et.seq. and section 13(g) of the Surplus Property Act of 1944, as amended, 49 U.S.C. section 47152:
 - (a) for U.S. Government or FAA-licensed or permitted launches (see note below); and
 - (b) as required by 14 C.F.R. § 420.51, in accordance with the representations in TCAA's license application, and any subsequent amendments approved by AST as of the date of this Order, and any modifications to the license issued by the FAA under 14 C.F.R. § 420.47.



License Order No. LSO 20-019A

OFFICE OF COMMERCIAL SPACE TRANSPORTATION

LICENSE ORDER REGARDING OPERATION OF A LAUNCH SITE

AUTHORIZED BY LICENSE NO. LSO 20-019

ISSUED TO

Titusville-Cocoa Airport Authority

- 1. Authority: This Order is issued to Titusville-Cocoa Airport Authority (TCAA) under 51 U.S.C. Subtitle V, chapter 509, and 14 C.F.R. Ch. III.
- 2. Purpose: This Order grants License No. LSO 20-019, issued on May 5, 2020, by the Federal Aviation Administration's Office of Commercial Space Transportation (FAA/AST), authorizing TCAA to operate certain portions of Space Coast Regional Airport (TIX), as a launch site at Titusville, Florida and prescribes, as conditions to License No. LSO 20-019, certain additional requirements applicable to the authorization.
- 3. Authorization: TCAA is authorized to operate a launch site at TIX, an airport that is certificated for commercial service under 14 C.F.R. part 139 and federally obligated under 49 USC section 47107, et.seq. and section 13(g) of the Surplus Property Act of 1944, as amended, 49 U.S.C. section 47152:
 - (a) for U.S. Government or FAA-licensed or permitted launches (see note below); and
 - (b) as required by 14 C.F.R. § 420.51, in accordance with the representations in TCAA's license application, and any subsequent amendments approved by AST as of the date of this Order, and any modifications to the license issued by the FAA under 14 C.F.R. § 420.47.



License Order No. LSO 20-019

4. License Term: The term of License No. LSO 20-019 authorizing TCAA to operate a launch site at TIX is five (5) years from May 5, 2020, the effective date of its license.

OFFICE OF COMMERCIAL SPACE TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

Lirio Liu, Executive Director Office of Operational Safety

Issued: May 5, 2020 Effective: May 5, 2020

Note: License No. LSO 20-019 authorizes TCAA to operate a launch site; it does not authorize FAA-licensed or permitted launches, which require separate authorizations from the FAA.