

DESIGNING, CONSTRUCTING AND MAINTAINING MODERN PORT FACILITIES

William E. (Bill) Crowe, P.E.

Vice-Chair:

AAPA FACILITIES ENGINEERING COMMITTEE



AAPA FACILITIES ENGINEERING CONFERENCE

Miami, FL: October 24, 2017 to October 27, 2017

- The Emerging Commercial Space Industry
- Drone Usage in Construction and Facilities Management
- LNG Fuel
- Construction Contract Types
- Large Capital Project Highlights
- Designing of Modern Facilities
- Fastlane Grant Funding
- Construction Project Innovation
- Engineering Department Management
- Facilities Maintenance Management



NASA and the Emerging Commercial Space Industry

SpaceX Booster Recovery

Port Canaveral also has played an important role in America's space program, supporting nearby Cape Canaveral launches from the start. In 1961, the capsule of Alan Shepard, first American in space, was retrieved on its return by vessels home-ported at Port Canaveral. In 1965, the Canaveral Lock opened, connecting the Port to the Banana River and designed specifically for passage of large Saturn rockets. During the shuttle program, solid rocket boosters retrieved at sea were returned to the Space Center via Port Canaveral.



August 17, 2016 Return of SpaceX Drone Ship and Booster

THE EMERGING COMMERCIAL SPACE INDUSTRY



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<http://spacecoastlaunches.com/>

Photo courtesy: www.SpaceX.com



UAS OPERATIONS – PORT USAGE

UAS can be useful in many Port Authority operational areas

- Engineering and Construction Projects
 - ✓ Weekly/monthly progress updates
 - ✓ Project inspections
- Marketing
 - ✓ Photos/videos for advertisement to potential cargo and cruise clients
 - ✓ Advertisement of Port sponsored event
- Disaster Preparation and Recovery
 - ✓ Pre and post disaster photos to document damage
 - ✓ Ability to inspect difficult to reach areas quickly in order to resume operations
- Emergency Response
 - ✓ Ability to respond quickly and safely to emergency situation

APPLICATIONS AERIAL DRONE USAGE



Post Hurricane Matthew: Jetty Park Campground



Post Hurricane Matthew: Northside Warehouse Roof Damage

APPLICATIONS AERIAL DRONE USAGE



Oasis of the Seas: Maiden Homeport Arrival 11/5/16



Oasis of the Seas: Maiden Homeport Arrival 11/5/16

UAS OPERATIONS – RULES AND REGULATIONS

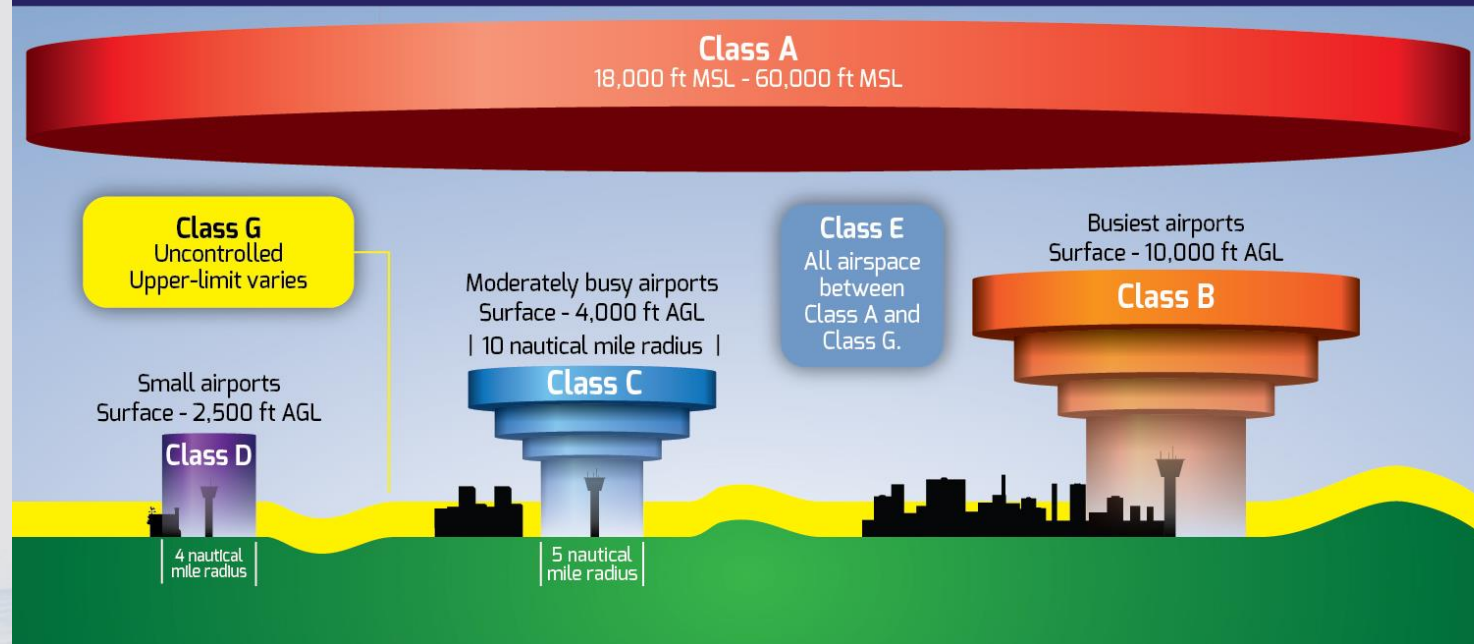
FAA UAS Symposium - March 27-29, 2017 in Reston, VA

14 CFR Part 107: Small Unmanned Aircraft System Rule

- Operator must hold a remote pilot certificate or be under the supervision of someone who does
- Drone must be registered with FAA and weigh less than 55lbs
- Must remain within visual line-of-sight (VLOS)
- No operations over persons (crowd gatherings)
- Operations limited to daylight only or civil twilight (30 minutes before sunrise to 30 minutes after)
- Must yield to all aircrafts
- Must not exceed 400 feet AGL
- May operate within Class G airspace or seek permission for B, C, D, and E

The list above is not meant to be all inclusive and most of the limitations can be waived if the applicant can demonstrate the need.

National Airspace System



sUAS Operation Requirements

Class A ■
Prohibited

Class B/C/D ■ ■ ■
May operate with permission from local Air Traffic Control

Class E/G ■ ■
May operate while following all other regulations

Airspace Classification Data Source:
<https://ftstem.com/lessons/show/521>

UAS ENFORCEMENT

- FAA Enforcement: Administrative Enforcement
 - Education
 - Warning notices
 - Letters of correction
 - Civil penalties
- Local Law Enforcement: Criminal Enforcement
 - Local and State Laws
 - ✓ Privacy
 - ✓ Noise
 - ✓ Reckless endangerment
 - ✓ Trespass
 - ✓ Battery

UAS COUNTERMEASURE RESTRICTIONS

- 18 USC Sec. 32
 - UAS operation countermeasures
 - ✓ Those who damage, destroy, disable, or wreck any aircraft may be held criminally responsible
- 18 USC Sec. 2511
 - UAS communication countermeasures
 - ✓ Those who intentionally intercept system communications including radio may be held criminally responsible
- 18 USC Sec. 3121
 - UAS tracking countermeasures
 - ✓ Those who install or utilize a tracking device without obtaining a court order may be held criminally responsible

FAA FUTURE INITIATIVES

➤ sUAS Legislation

- Working groups to modify current US Code and to complete the following...

➤ H.R. 636, FAA Extension, Safety, and Security Act of 2016

- Sec. 2207 – issue guidance on an emergency exemption process for Certificates of Authorization (COAs) for civil/public operators responding to emergency events
- Sec. 2209 – establish a process for applicants to request UAS operation restrictions near approved critical infrastructure sites (permanent or temporary flight restrictions)
- Sec. 2206 – create a pilot program for hazard mitigation near airports and other critical infrastructures
- Sec. 2202 – establish standards for remote identification

LARGE CAPITAL PROJECT HIGHLIGHTS

VANCOUVER FRASER PORT AUTHORITY P₃

Roberts Bank Terminal 2

- New 2.4M TEU “semi-automated” terminal
- Largest project ever undertaken by the port authority
- 100+ hectares of new land to be built
- 3 berth, 1300m long “deep sea” wharf structure
- 3 new rail yards
- 12 STS cranes, 33 ASCs, 8 RMGs
- Plus all associated infrastructure and equipment
- Total CAPEX - approximately \$3 Billion



Project Contact:
Kevin Karaloff MBA, BAsC
PORT of VANCOUVER
Direct: 604.665.9248

LAKE CHARLES HARBOR & TERMINAL DISTRICT

Cameron LNG Export Facility

- New 14.95 million metric tons per annum (MTPA) export facility
- Operating capacity to receive 2.33 billion cubic feet per day of natural gas
- Three (3) liquefaction trains – each with 4.985 MTPA capacity
- Two marine berths capable of accommodating Q-flex sized LNG ships
- Total CAPEX - approximately \$10 Billion – Private Investment
- Completed in 2018



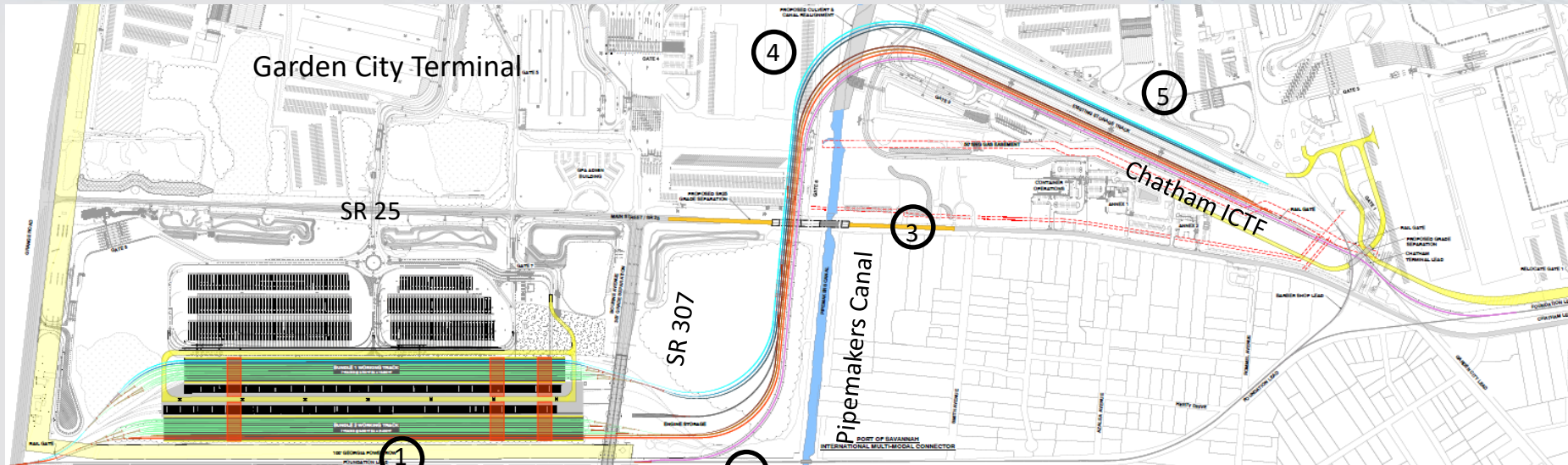
Project Contact:

Donald Brinkman, PE

Lake Charles Harbor & Terminal District

O: 337-493-3526

Port of Savannah Multimodal Connector Project



- \$128 million project
- \$44 million funded thru Federal Grant (FASTLANE)
- Completion at the end of 2020
- Lift capacity increases from 450,000 to 750,000 by 2020 and over 1.0 million by 2024
- 10,000 ft. unit train built completely on terminal

- 1 Mason ICTF track expansion with 8 RMGs
- 2 Multi-rail connection between Mason and Chatham
- 3 SR 25 Overpass
- 4 Rail crossings over Pipemakers Canal
- 5 Chatham ICTF track expansion

ROYAL CARIBBEAN INTERNATIONAL TERMINAL

Miami, FL

- New 6000+ Passenger Terminal
- \$247 million private investment from RCI
- \$15 million in investment from PortMiami
- 1300 L.F. berth for Oasis class vessels
- 1000 car parking garage
- 4,000 jobs and \$500 million in annual economic impact to the area
- Completed in 2018



Source: <http://www.miamiherald.com/news/business/tourism-cruises/article86473617.html>

Project Contact:

Dustin Nason

Royal Caribbean

Director of Worldwide Port Operations

THE FUTURE OF SOUTHPORT

1. Southport Turning Notch Expansion

- Upgrading of approx. 990 LF of an existing bulkhead at existing Berth 30 by adding a toe wall
- Construction of approx. 3,180 LF of new bulkhead
- Construction of approx. 1,600 LF of new Environmentally Friendly Bulkhead (EFB)
- Excavation of approx. 8.16 acre of existing mangrove wetlands & approx. 17.5 acre of existing uplands to Elevation -44 MLLW
- The expanded Turning Notch will provide up to 6 new berths with approx. \$365 million construction cost

2. Southport Crane Rail Infrastructure Improvements

- Approx. 4,100 feet of new 120' gage crane rail at Berths 31 and 32 & approx. 1500 feet of new 100' gage crane rail for the new Berth 30 extension
- 3 new Super-Post Panamax Cranes for Berths 31-32 (\$45 M Crane Cost) & Bid Option: 3 new Super-Post Panamax cranes for Berth 30 (\$45 M Crane Cost).
- Approx.. \$72 million construction cost excluding cranes



DESIGN OF A MODERN CRUISE TERMINAL



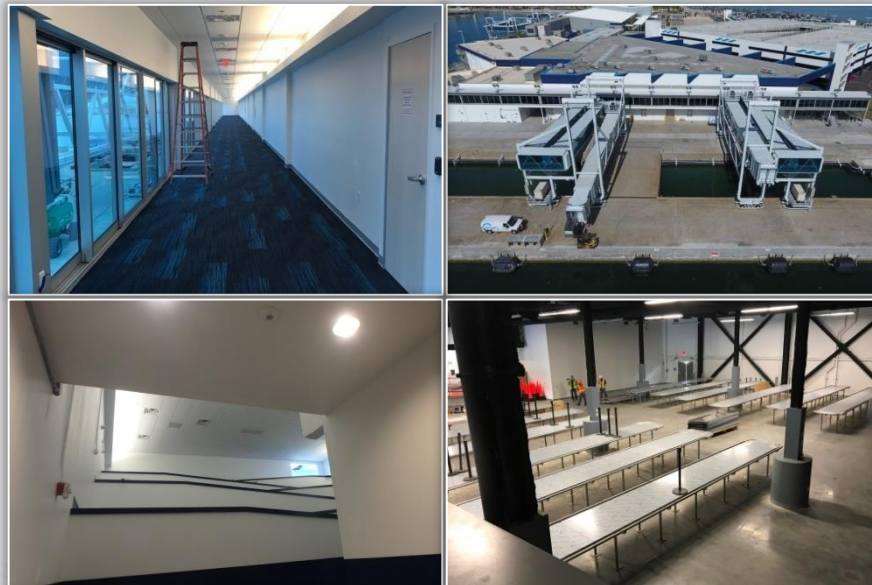
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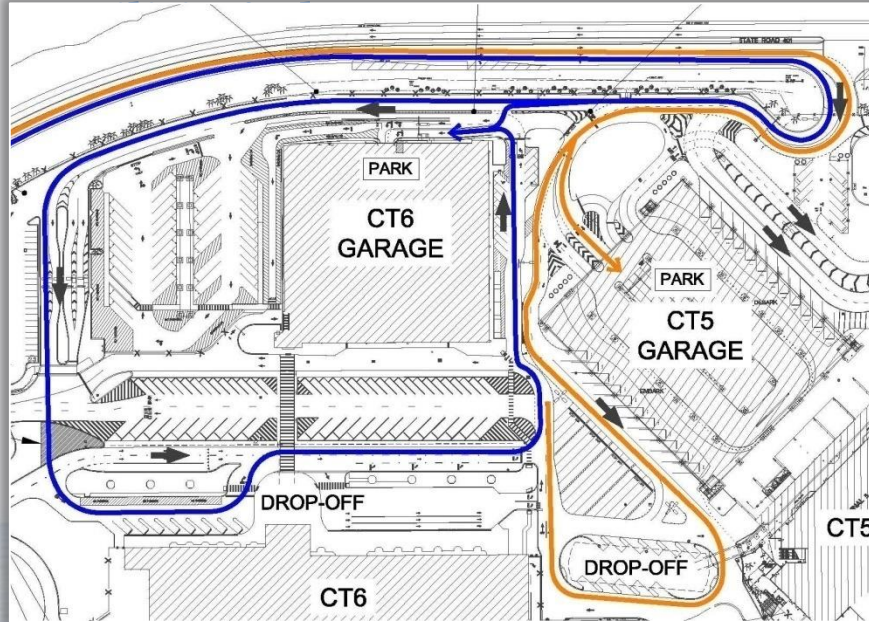
DESIGN OF A CRUISE TERMINAL

- Linear PAX bridge and mobile passenger boarding bridges for increased flexibility for vessel door arrangements compared to legacy fixed gangways
- Seating for roughly 1/3 of the vessel capacity (depending on cruise line)
- Use of two-story ADA-compliant internal and external pedestrian ramps for vertical transport in place of multiple elevators and escalators
- Baggage laydown area for approximately 1.5 to 2.0 bags per person (depending on cruise line)
- Roadways and access for commercial stores, busses, charter busses shuttles, taxis, POV parking and POV drop off

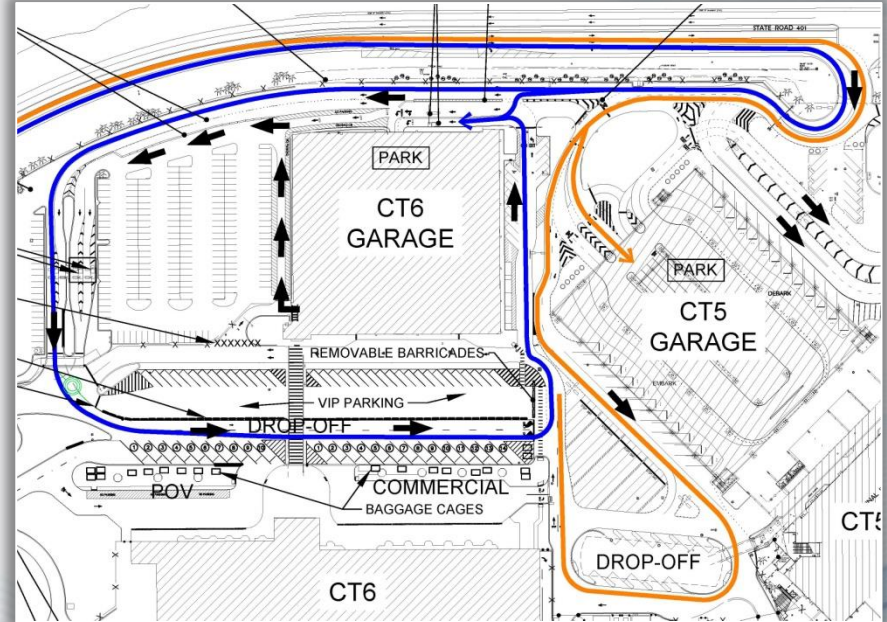


Top Left, CT-10 PAX Bridge; Top Right, Cruise Terminal 5 Mobile Gangways; Bottom Left, Cruise Terminal 5 Pedestrian Ramp; Bottom Right, Cruise Terminal 10 Baggage Laydown Area

CRUISE TERMINAL SECURITY CASE STUDY:



Existing Terminal 6 Drop Off Areas

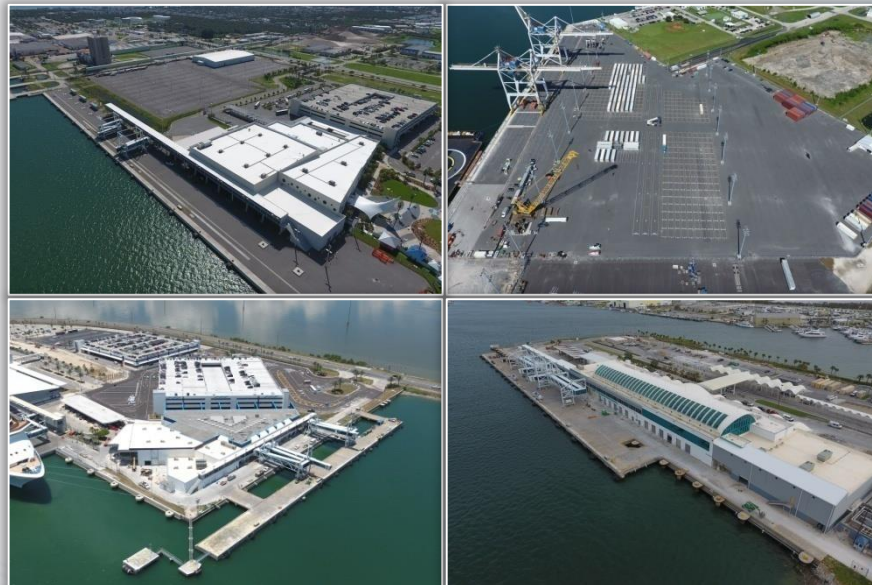


Proposed Terminal 6 Drop Off Areas

COST OF CAPITAL PROJECTS

\$300M in Capital Projects Completed between 2014-2016

- Cruise Terminal #1 - \$110M
Completed December 2014
 $\$50,513,965.89 / 180,000 \text{ SF} = \$280.63 / \text{SF}$
- Marine Terminal (Phase I & II) - \$69.1M
Completed June 2015 / July 2016
Average Cost: $\$648,563.01 / \text{Acre}$
With Stormwater Facilities: $\$890,324.95 / \text{Acre}$
- Cruise Terminal #5 Renovation - \$48.4M
Completed May 2016
 $\$18,495,133.27 / 71,799 \text{ SF} = \$257.60 / \text{SF}$
- Cruise Terminal #10 Renovation - \$35.1M
Completed November 2016
 $\$25,693,355.00 / 125,824 \text{ SF} = \$204.20 / \text{SF}$
- 44' Channel Widening & Deepening - \$42.3M
Completed July 2016
 $\$7.79 / \text{CY}$; $\$7.25 / \text{CY}$; $\$10 / \text{CY}$ with Mob/Demob



Top Left, Cruise Terminal 1; Top Right, Marine Terminal;
Bottom Left, Cruise Terminal 5; Bottom Right, Cruise
Terminal 10

FASTLANE GRANT PROGRAM

- Established in the Fixing America's Surface Transportation (FAST) Act to fund critical freight and highway projects.
- \$4.5 billion for fiscal years (FY) 2016 through 2020,
- In FY16, 212 applications were received totaling nearly \$9.8B
- Ultimately 18 grants in 15 States and D.C. were issued totaling \$800M, part of \$3.6B in projects
- \$850 million for FY 2017 to be awarded by the Secretary of Transportation.
- FY18??



Source: <https://www.transportation.gov/buildamerica/FASTLANEgrants>

CONSTRUCTION INNOVATION



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CONSTRUCTION PROJECT INNOVATION

Case Study: VOPAK Terminal Dock 4/5 Expansion – Houston, TX

- Year Completed: 2011
- Uplands Contractor: L-Con
- Marine Contractor: Orion Marine
- Contract Type: EPC (D/B)
- Contract Value: \$53M US

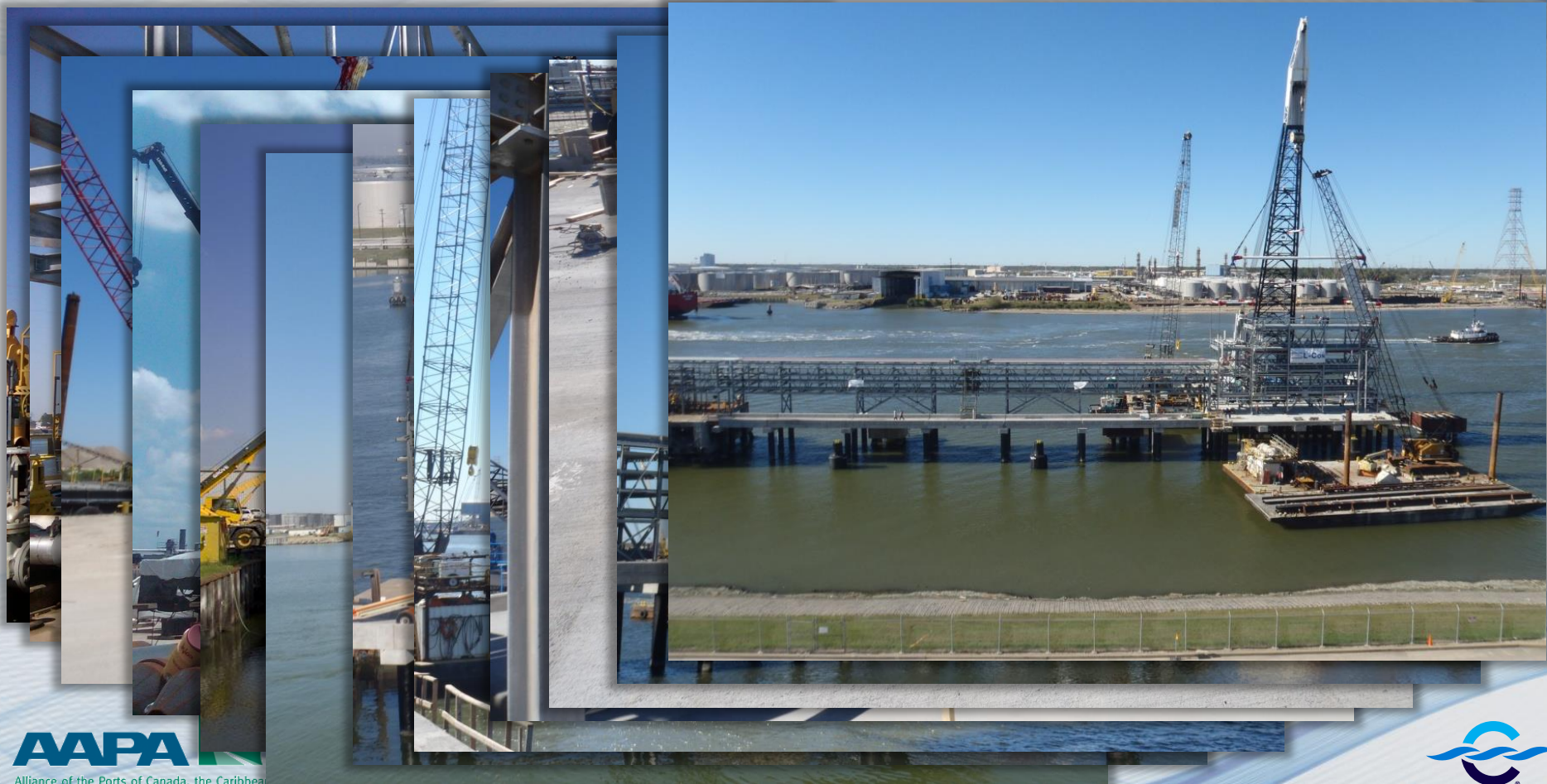


Aero
Photo

727.520.8181
www.aerophoto.com

Vopak Ship Dock 3

Image #100712 6037
Date 07.12.10



LIQUIFIED NATURAL GAS (LNG)



- <http://www.floridiangasstorage.com/>
- Planned Phase I – 1 Billion cubic foot (Bcf) Storage Tank – Indiantown, FL
- <http://pivotallng.com/index.shtml>
- JAX-LNG – 2 million gallon storage tank and liquefaction facility – Jacksonville, FL
- Subsidiary of AGL – Provides LNG to TOTE vessels
- <http://www.crowley.com/>
- LNG Bunkering Facility at JaxPort 2000 CM
- Supplied from Eagle LNG facility in Maxville, FL
- <http://www.crowley.com/>
- Constructing 1 Million Gallon Storage facility in Maxville, FL. Complete late summer 2017.

CONSTRUCTION CONTRACT TYPES



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CONSTRUCTION CONTRACT TYPES

- **Construction Manager at Risk (CMaR):** A project delivery system which entails a commitment by a Construction Manager (CM) to deliver the project within a **Guaranteed Maximum Price (GMP)** which is based on the construction documents and specifications at the time of the GMP plus any reasonably inferred items or tasks.
- **Design-Build (D/B):** A project delivery system used in the construction industry in which the design and construction services are contracted by a single entity known as the design–builder or design–build contractor (typically but not always a General Contractor). The contract value can be based on a **Stipulated Sum (lump sum)** or **GMP**.
- **Design-Bid-Build (D/B/B):** is a project delivery method in which the agency or owner contracts with separate entities for the design and construction of a project. Design–bid–build is the traditional method for project delivery and is typically paid based on a stipulated sum percent complete basis.

FACILITIES MAINTENANCE EFFICIENCY REVIEW

Allidade-MER – July 2016

Overall Findings of Areas for Improvement:

- Since 2011, CPA total square footage has increased 75% and total insured value has increased 120%, while total Facilities Department staffing decreased by 2% over that period of time. Staffing levels within the Facilities Department need to increase by filling current vacancies and adding a handful of new positions.
- Additional supervisory staff needed to support workforce. There should be between eight and twelve workforce personnel per supervisor.
- ...CPA should be able to show full utilization of current Facilities Department resources, and be building a backlog of planned work and capital projects that can be planned and resourced. Administrative staff needed to enter preventative maintenance (PM) tickets track completion.



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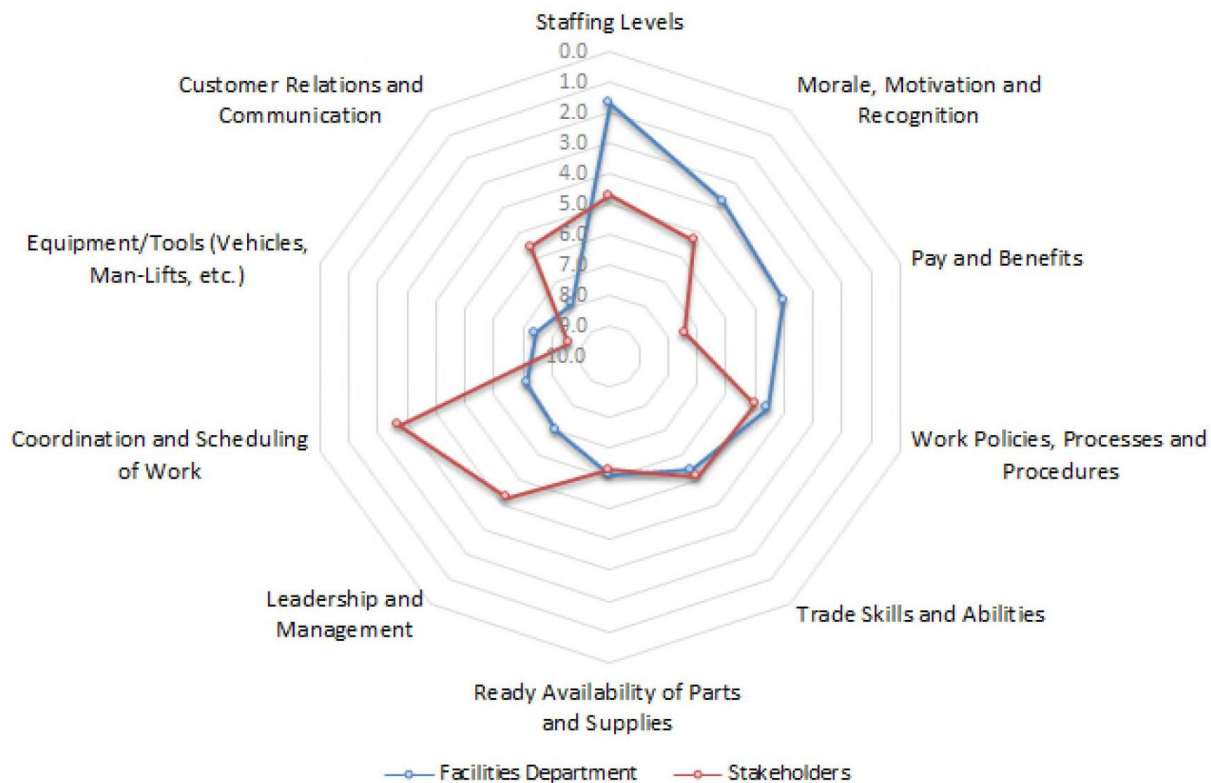
FACILITIES MAINTENANCE EFFICIENCY REVIEW

Allidade-MER – July 2016

Approach to Evaluation:

- Barrier Studies; performed over two weeks, fifteen persons directly participated in barrier studies, with over 30 hours of direct observation.
- Interviews; a total of fifteen interviews were conducted. Eight stakeholders and seven department personnel participated in the interviews.
- Time was spent with 51% total personnel listed on the Facilities Department organization chart.

Thomas J. Moriarty, PE, MBA, CMRP
President, Alidade MER, Inc.
(321) 773-3356, tjmpe@alidade-mer.com



FACILITIES SERVICE CONTRACTS

FY17 Facilities Annual Service Contracts

Company	Description
American Maintenance	Cleaning Services
Brevard County Traffic	Traffic Signal Maintenance
City of Cocoa Beach	Lift Stations Service Contract
Florida Door Control	Automatic Gates Service Contract
Glover Oil	Leaded and unleaded fuel vehicles and generators
Motion Control Services	Pop Up Barriers Maintenance
Ring Power	Generator Maintenance Contract
Schindler	Service Contract Elevators/Escalators
Simplex Grinnell	Fire Alarm Monitoring
Trane	Service for HVAC



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**PORT
CANAVERAL**

ENGINEERING MANAGEMENT



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ENGINEERING MANAGEMENT






Site Development Process





- Establish a well-documented and consistent site plan review process
- Identify and categorize projects (permit applications) by size, commission requirements
- Provide a venue for directed collaboration between Port stake holders (internal and external)
- Prepare and educate the prospective tenants on jurisdictional permits and land use requirements



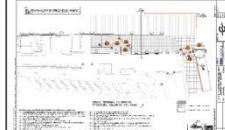
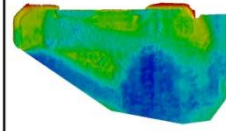
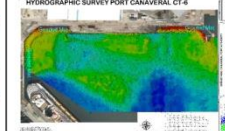


ENGINEERING MANAGEMENT

Capital Project Cut-Sheets

ITEM #	
 Port Canaveral Capital Budget Project Sheet	
PROJECT TITLE: Cove Parking Lot	
<p>PROJECT DESCRIPTION:</p> <p>The design phase started with a kick-off meeting held mid March 2017 with the CPA Real State, IT, Safety and Security and Engineering. The design which is expected to be completed by the third week of April 2017 considers the input of the Cove Merchants Association. The construction will provide a new parking layout with approximately 315 parking spaces, a new storm drain system, lighting and security cameras systems, landscaping and irrigation. Along with these improvements, the construction drawings will include as an alternate job a new security cameras and lighting system for the lot west to the Cove Parking.</p>	
<p>PROJECT PURPOSE:</p> <p>This construction project intends to provide to the customers from the adjacent locations a safe and in compliance parking option.</p>	
PRIORITY: 3	
PROJECT BUDGET: TBD	BUSINESS LINE: Real Estate
	
	
FORM	

ITEM #	
 Port Canaveral Capital Budget Project Sheet	
PROJECT TITLE: Commission Room Renovation	
<p>PROJECT DESCRIPTION:</p> <p>The renovation of the commission room will include the improvements to media room, the lighting, electrical works, a new audio-visual system, a new media room, replacement of the carpet and seating (for code compliance) and minor modifications to the HVAC to accommodate the new layout.</p>	
<p>PROJECT PURPOSE:</p> <p>This project intends to provide better visibility and audio during the commission meetings by improving the seating layout, incorporating new audio visual equipments in strategics locations and replacing the existing lights.</p>	
PRIORITY: 3	
PROJECT BUDGET: \$525,786.36	BUSINESS LINE:
	
	CLICK TO ADD PHOTO
FORM	

ITEM # 1652	
 Port Canaveral Capital Budget Project Sheet	
PROJECT TITLE: Cruise Terminals 6 & 10 Scour Mats	
<p>PROJECT DESCRIPTION:</p> <p>The scope of work for this project includes various sub-aqueous repairs to the existing scour protection mats along the berths at CT 6 & 10. In addition to repairs of the existing scour mats, additional mats will be installed to prevent future erosion along the cruise berths. This erosion is caused largely by the movements of the various cruise ships at the terminals. Soil fill will be placed in needed areas in order to facilitate the installation of the new mats.</p>	
<p>PROJECT PURPOSE:</p> <p>An underwater dive inspection was performed in March 2014 that reveled areas of concerns in regards to erosion along the berth walls. The repair and installation of scour protection mats will provide the needed protection for the berth walls and pier structures in order to maintain safe cruise operations.</p>	
PRIORITY: 4	
PROJECT BUDGET: \$2,000,000	BUSINESS LINE: Cruise
	
	
FORM	

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