Synopsis:
- What’s coming up in the next few years at the Cape.
- A look at recent events, new launch vehicles on the horizon, and upcoming plans for Cape Canaveral AFS and Kennedy Space Center.
THE FUTURE SCENE
AT
CAPE CANAVERAL
SPACEPORT

Or:
“How I Learned to Stop Worrying
and Love Clear Plastic Fins”

Patrick McCarthy
NAR 20148
NARCON 2017
OVERVIEW

- A Very Quick Cape History
  - Changing Times
    - Satellite Boom
    - Dispense with the Excess
- Your Grandfather’s Cape
- Not Your Grandfather’s Cape
- Launch Complex Shuffling
- Rockets & Spacecraft Galore
A VERY QUICK CAPE SPAC EPORT HISTORY

- Active since 1950
- Over 3,400 launches supported
A VERY QUICK HISTORY (CONT'D)

- Diverse launch vehicle mix
- Every U.S crewed flight flew from the Cape Spaceport
CHANGING TIMES

- Space Industry is Transitioning
  - Limited government budgets lead to a shift toward commercial
  - Government reliance on the private sector will significantly increase
  - Global Space Industry Revenues from Commercial Sources already far exceed Government
COMING SOON TO A SKY NEAR YOU!

- Massive satellite constellations promising global coverage for comm & imaging
- Providing Internet service for everyone everywhere:
  - OneWeb: 2,620 satellites!
  - SpaceX network: 4,425 satellites!!
- Fleets of Imaging satellites:
  - Planet
  - Terra Bella
  - WorldView Legion
GOVERNMENT EXCESS FACILITIES TRANSFER

- “Surplus” government facilities changing hands

CX-39A to SpaceX

SLC-13 to SpaceX

SLC-46 to Space Florida

SLF to Space Florida

SLC-36 & 11 to Blue Origin
YOUR GRANDFATHER’S CAPE

- Launch Complexes purpose-built
- Every program had their own CX - sometimes multiple CX
- Government programs, Government-run
NOT YOUR GRANDFATHER’S CAPE

- Existing/Operational Launch Complex / Manufacturing Facility
- New/Proposed Launch Complex

- LC-39B (NASA SLS)
- LC-39 A (SpaceX F9/FH)
- LC-48?
- LC-41 (ULA Atlas V / Vulcan)
- LC-40 (SpaceX F9)
- LC-37 (ULA Delta IV)
- LC-36/11 (Blue Origin)
- LC-46 (Space Florida)
MAKE ROOM FOR NEW LAUNCH PADS

LC-49

AECOM concept

Shiloh

AECOM concept

Pat Rawlings / SAIC for NASA
SPACE FLORIDA NOW RUNNING THE SLF

- Commercial tenant development
- Next-gen spacecraft and UAS advanced aerospace systems
- Development, testing, and manufacturing opportunities
RECENT ACTIVITIES AT THE SLF

Super Guppy delivery of Orion pressure vessel

Antonov Delivery of ULA Atlas V Payload

Visit from Vintage B-17 by CAF

Mockup Orbiter refurbishment by LVX Systems

Genovation GXE Vehicle Testing
ORBITER PROCESSING FACILITIES? NO MORE!!

OPF-1 & 2

OPF-3

to USAF Boeing X-37B

to Boeing Starliner
ROCKETS & SPACECRAFT GALORE

- Horizontal Launch Vehicles
- NASA Space Launch System / Orion
- United Launch Alliance – Atlas V / Delta IV / Vulcan
- Space Exploration Technologies - Falcon
- Boeing Starliner CST-100
- Sierra Nevada Dream Chaser
- Orbital ATK Minotaur
- Blue Origin New Glenn
- Small Launch Vehicles
THINGS WITH WINGS (HLV)

- Pegasus
- Generation Orbit
- Stratolaunch
- Virgin Galactic
- XCOR
- Starfighters
- 4Frontiers
SPACE LAUNCH SYSTEM

- CX-39B
- Launch every two years?
ORION – EXPLORATION CREW VEHICLE

- 7 astronaut capacity
- “Mission to Mars” component
- Interim Cryogenic Upper Stage
- ESA Service Module
ORION - ASCENT ABORT AA-2

- High altitude flight test of Launch Abort System i.e., “Little Joe III”
- Launch from SLC-46

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- ATB Ignition
- Begin Reorientation
- Reorient Complete
- LAS/CM Separate from ATB
- ATB Impact
- LAS, CM Impact
- Initiate Abort

NASA concepts
UNITED LAUNCH ALLIANCE

- Atlas V / Delta IV
- Launch from SLC-41 & 37
UNITED LAUNCH ALLIANCE

- Vulcan
- Launch from SLC-41
SPACEX FALCON 9

- Launch from CX-39A and SLC-40
- Re-usable boosters: flyback to Autonomous Spaceport Drone Ship or Landing Complex 1
SPACEX FALCON HEAVY

- Launch from CX-39A
- Boosters (X3) fly back to Landing Complex 1
SPACEX DRAGON

- Commercial Crew and Cargo contracts
- Looking at propulsive landing vice parachutes
BOEING STARLINER CST-100

- Commercial Crew and Cargo contracts
SIERRA NEVADA DREAM CHASER
BLUE ORIGIN – NEW GLENN ORBITAL BOOSTER

Launch Site/Static Test SLC-36 & 11

750K sq ft manufacturing facility
BIG BOOSTERS COMPARED

- Orbital launchers
- Vulcan & New Glenn:
  - 1st stage BE-4 LOX/CH₄
  - 2nd stage LOX/LH₂
- Falcon Heavy:
  - LOX/RP-1
LAUNCH VEHICLE SIZE SPECTRUM
SMALL LVS – ROCKETLAB ELECTRON
OTHER INTERESTING THINGS ON THE WAY

Moon Express

Bigelow Space Station

Orbital ATK NGL
QUESTIONS?