THE FUTURE SCENE AT CAPE CANAVERAL SPACEPORT

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.

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NAR 20148
NARCON 2017

THE FUTURE SCENE AT CAPE CANAVERAL SPACEPORT

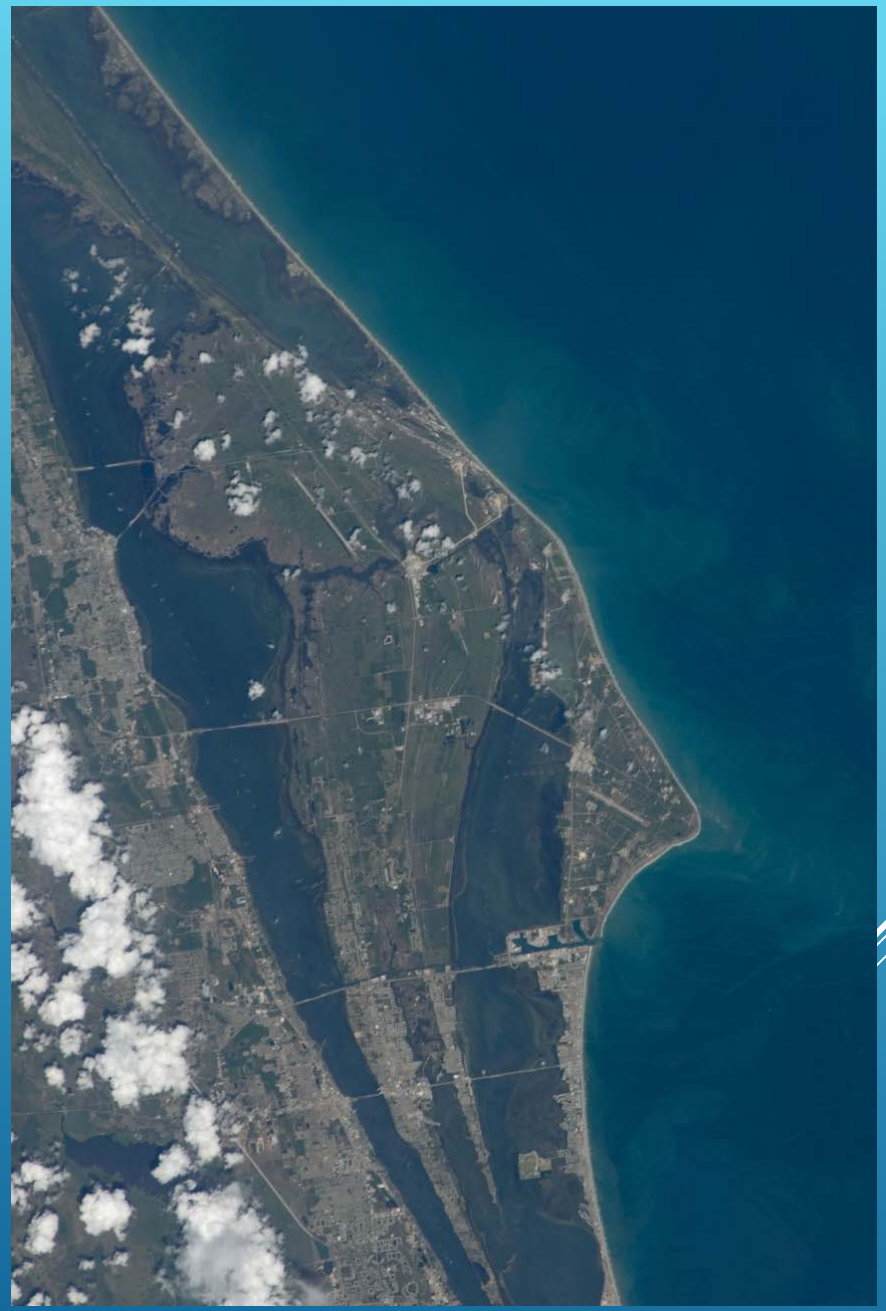
Or:

"How I Learned to Stop Worrying and Love Clear Plastic Fins"

Patrick McCarthy
NAR 20148
NARCON 2017

OVERVIEW

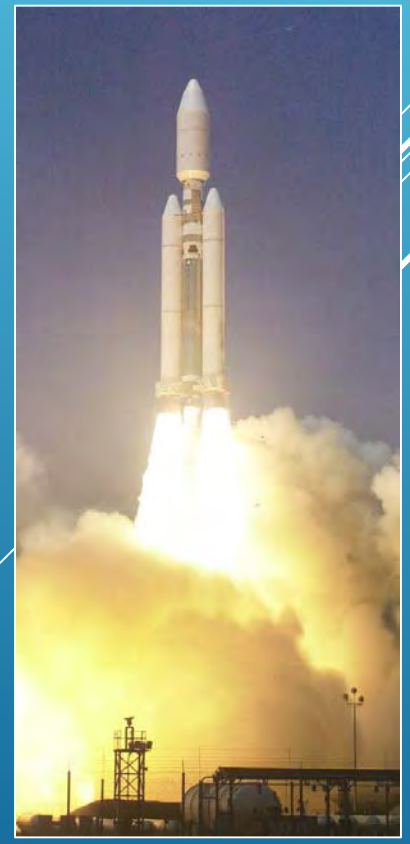
- A Very Quick Cape History
- - Changing Times
  - Satellite Boom
  - Dispense with the Excess
- Your Grandfather's Cape
- Not Your Grandfather's Cape
- Launch Complex Shuffling
- Rockets & Spacecraft Galore



A VERY QUICK CAPE SPACEPORT HISTORY

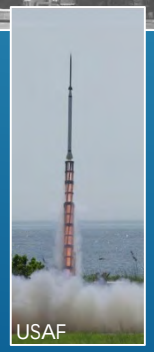
USAF photos

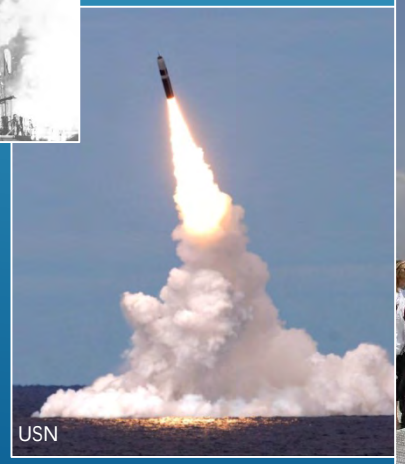
NASA



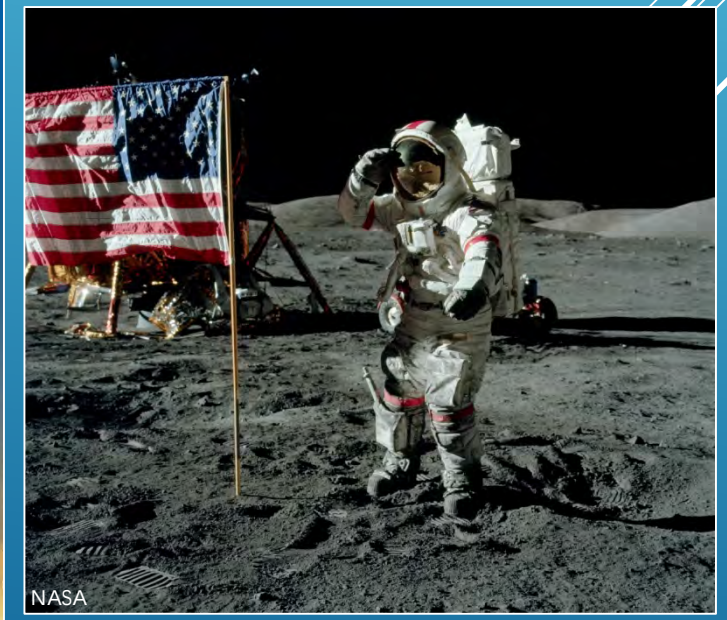
- Active since 1950
- Over 3,400 launches supported

A VERY QUICK HISTORY (CONT'D)





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

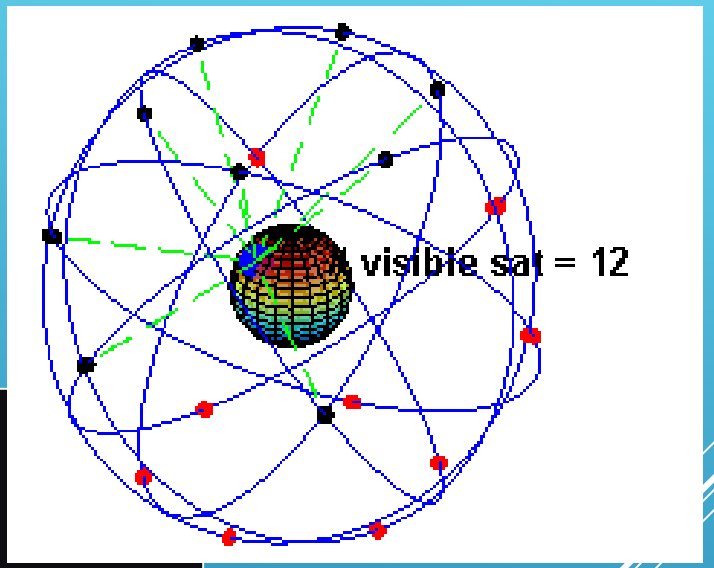


CHANGING TIMES

- 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

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

MAKE ROOM FOR NEW LAUNCH PADS

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

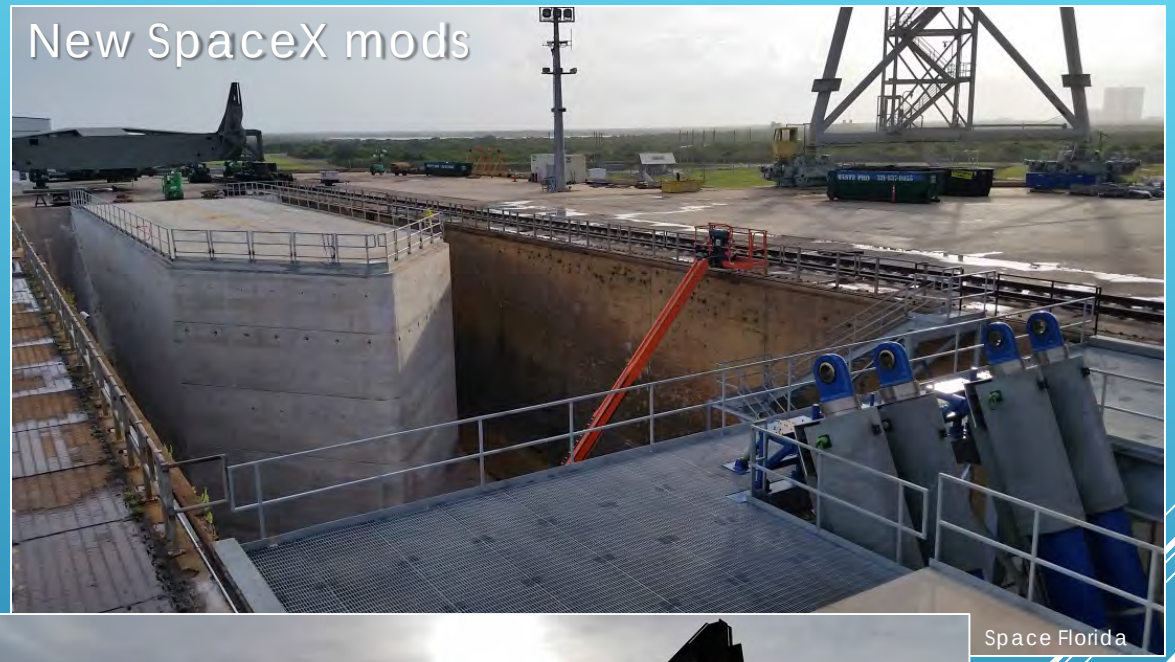
Genovation GXE Vehicle Testing

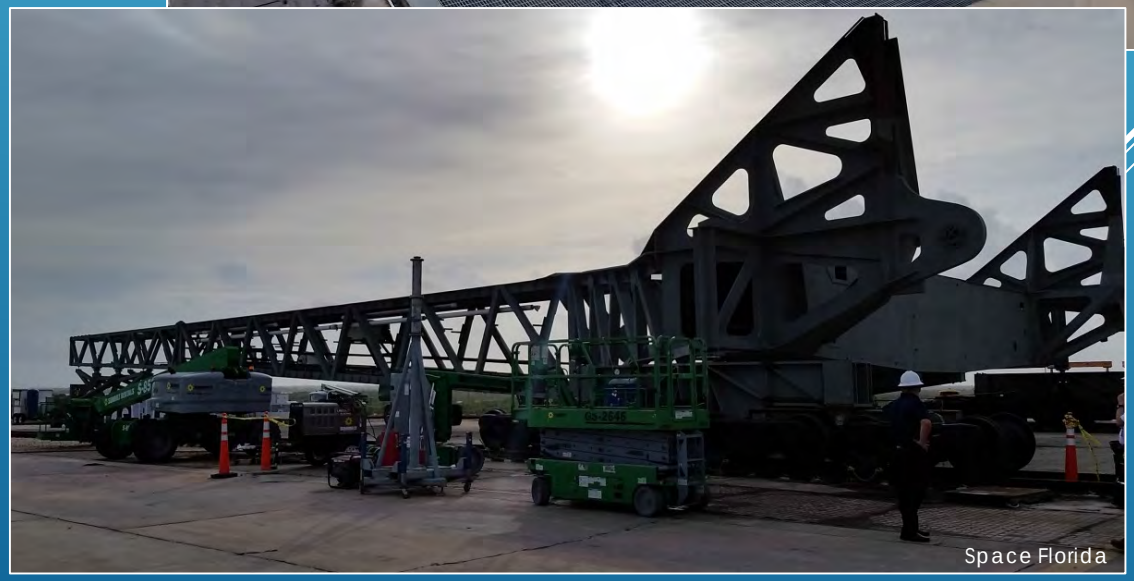
ORBITER PROCESSING FACILITIES? NO MORE !!

to USAF Boeing X-37B

to Boeing Starliner

REPUROPSED LAUNCH COMPLEX 39A





ROCKETS & SPACECRAFT GALORE

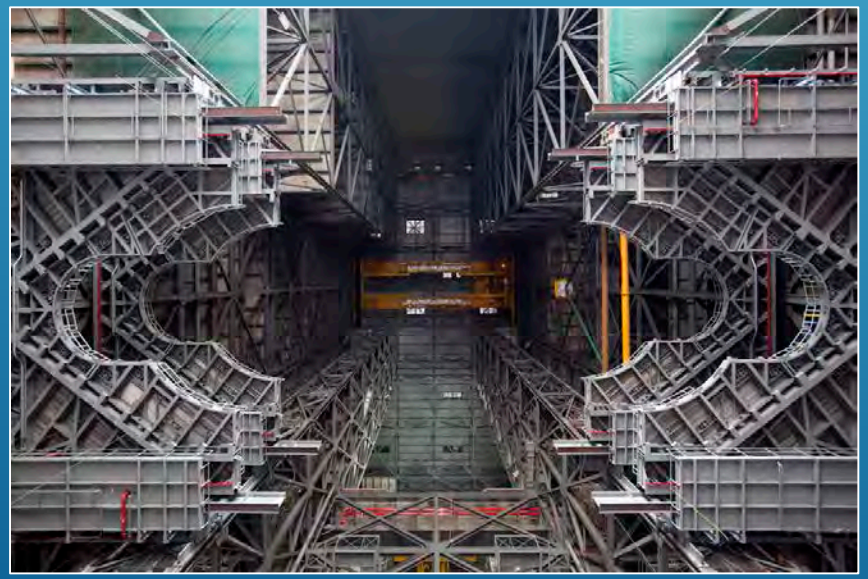
- Horizontal Launch Vehicles
- NASA Space Launch System / *Orion*
- United Launch Alliance – *Atlas V / Delta IV / Vu*lcan
- Space Exploration Technologies - *Falcon*
- Boeing *Starliner* CST-100
- Sierra Nevada *Dream Chas*er
- Orbital ATK *Minotaur*
- Blue Origin *New Glenn*
- Small Launch Vehicles

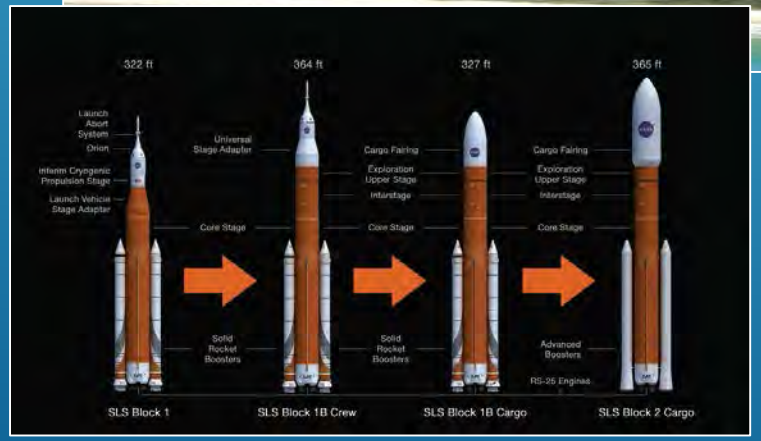
THINGS WITH WINGS (HLV)

Starfighters-
4Frontiers

SPACE LAUNCH SYSTEM

- CX-39B
- Launch every two years?





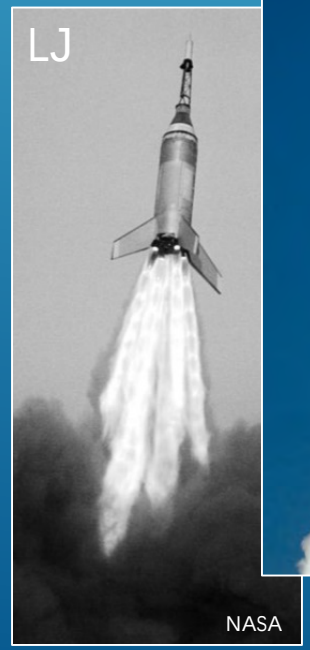
NASA

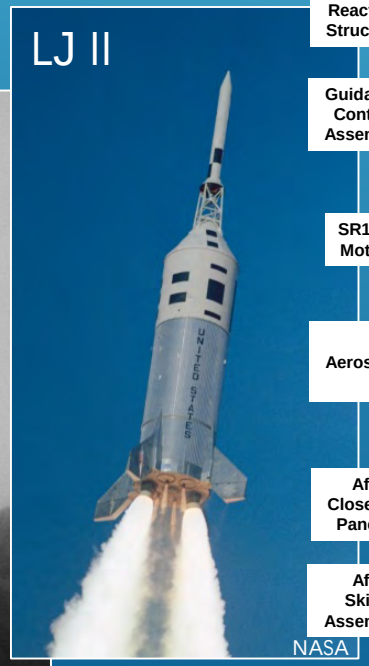
ORION – EXPLORATION CREW VEHICLE

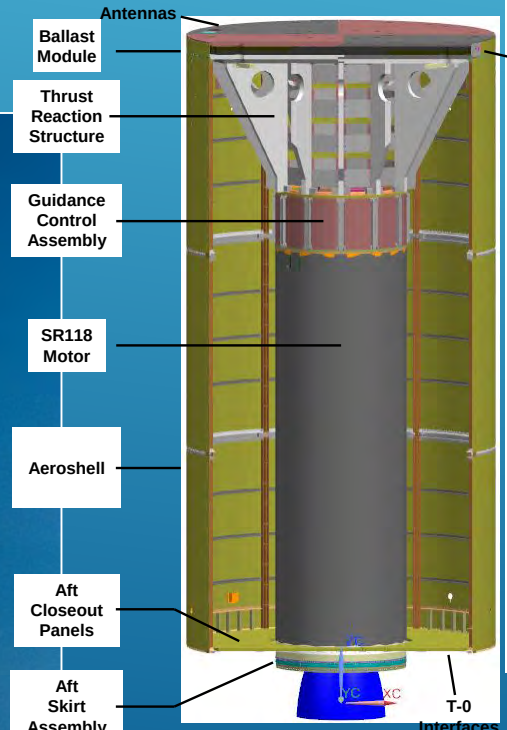
- 7 astronaut capacity
- “Mission to Mars” component
- Interim Cryogenic Upper Stage
- ESA Service Module

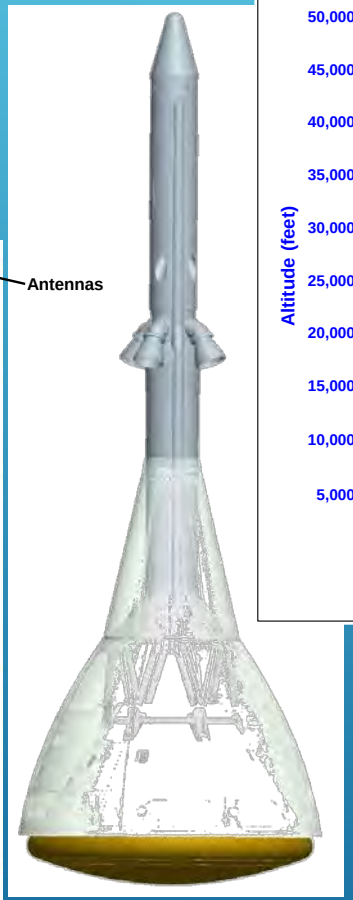
ORION - ASCENT ABORT AA-2

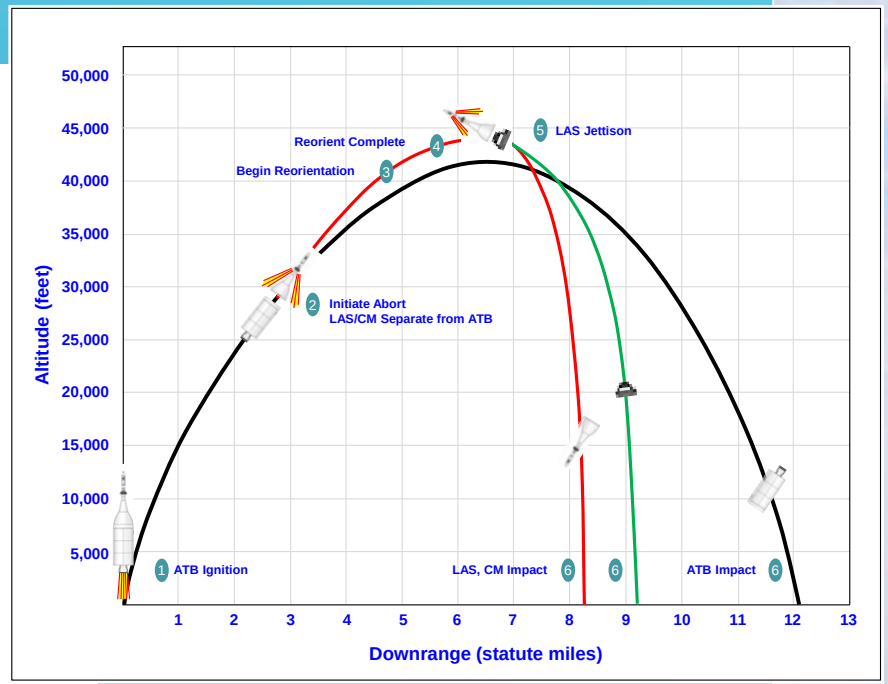
- High altitude flight test of Launch Abort System i.e., “Little Joe III”
- Launch from SLC-46

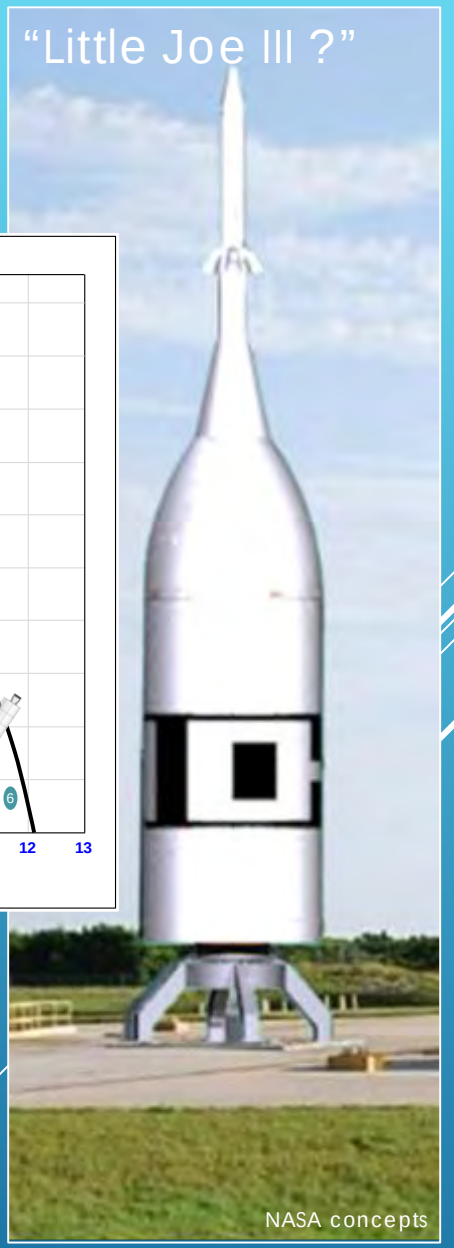










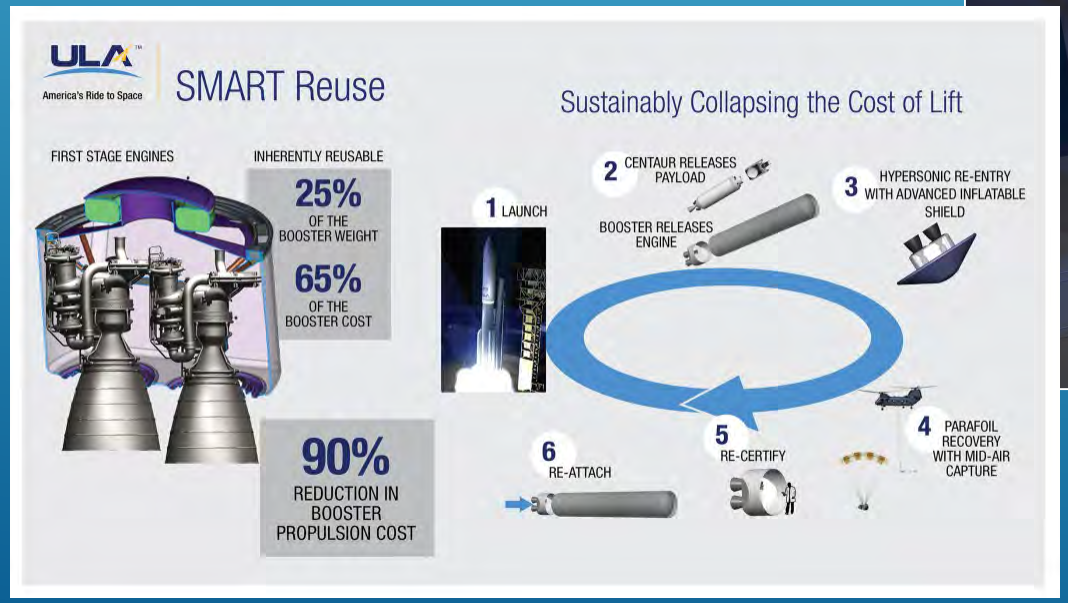


UNITED LAUNCH ALLIANCE

- *Atlas V / Delta IV*
- Launch from SLC-41 & 37

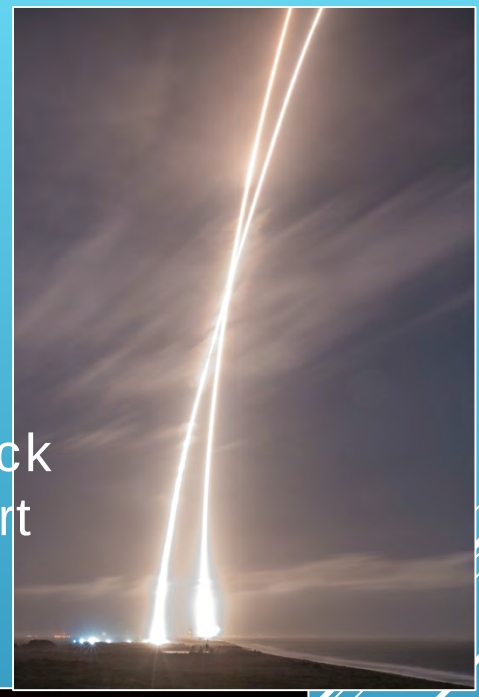
UNITED LAUNCH ALLIANCE

- *Vulcan*
- Launch from SLC-41

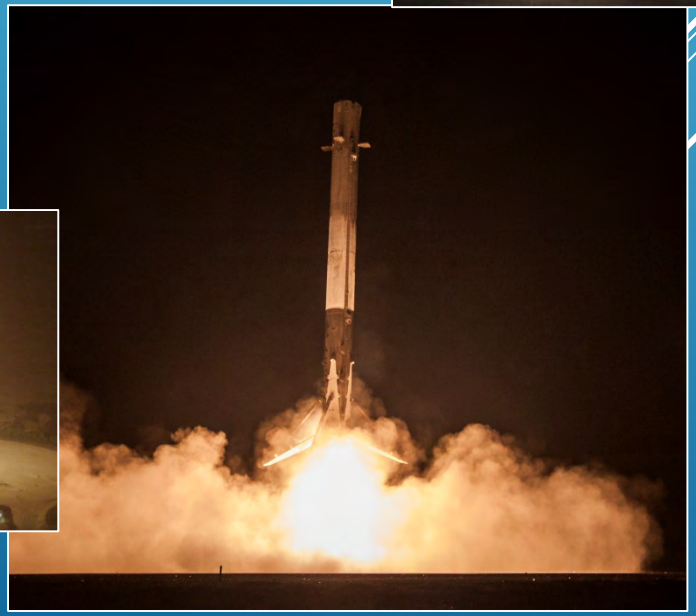


ULA concepts

SPACEX *FALCON 9*



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

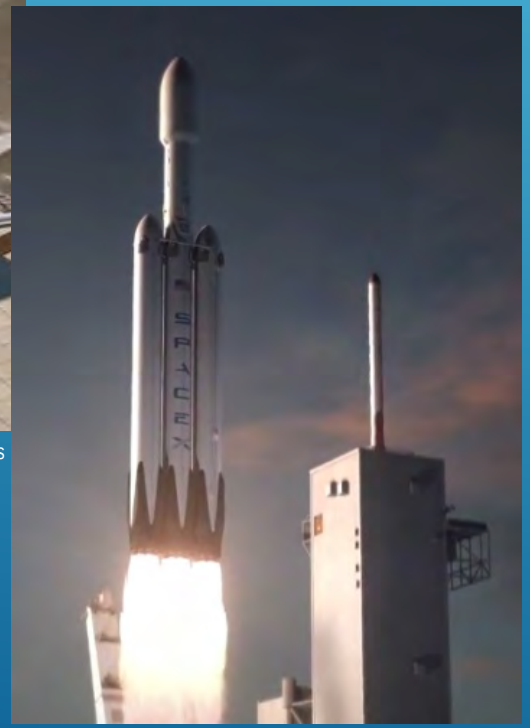


SpaceX

SPACEX *FALCON HEAVY*

SpaceX concepts

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



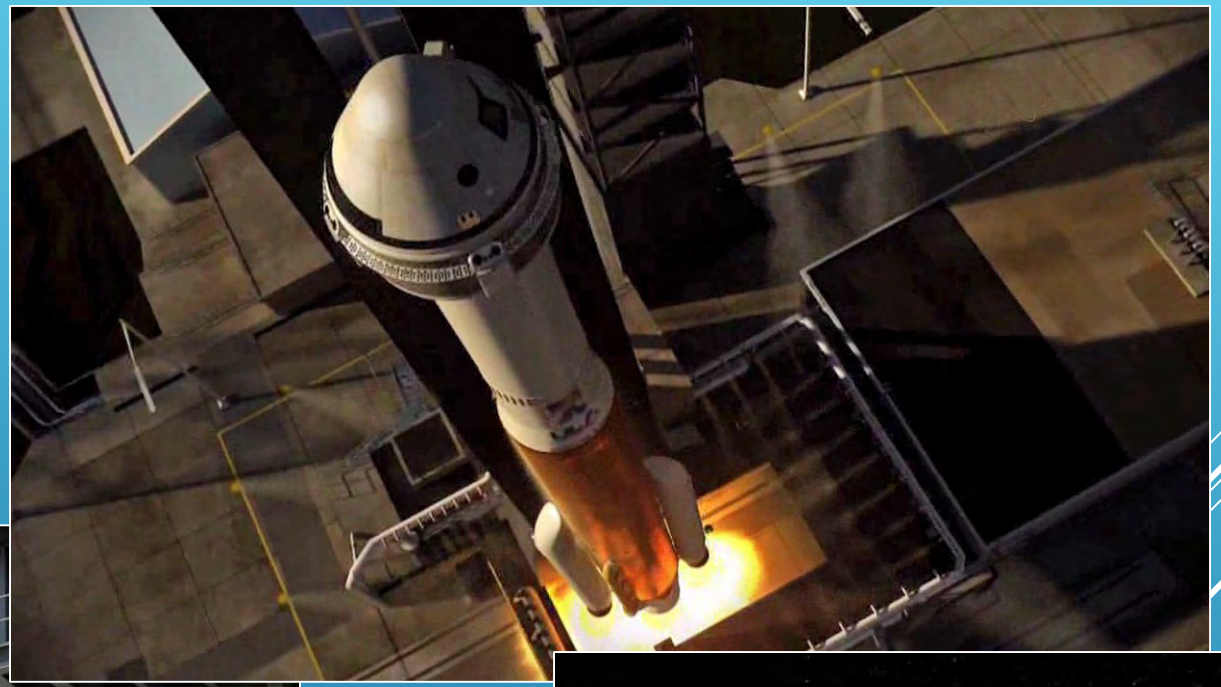
SPACEX *DRAGON*

- Commercial Crew and Cargo contracts
- Looking at propulsive landing vice parachutes

SpaceX concepts

BOEING *STARLINER* CST-100

- Commercial Crew and Cargo contracts

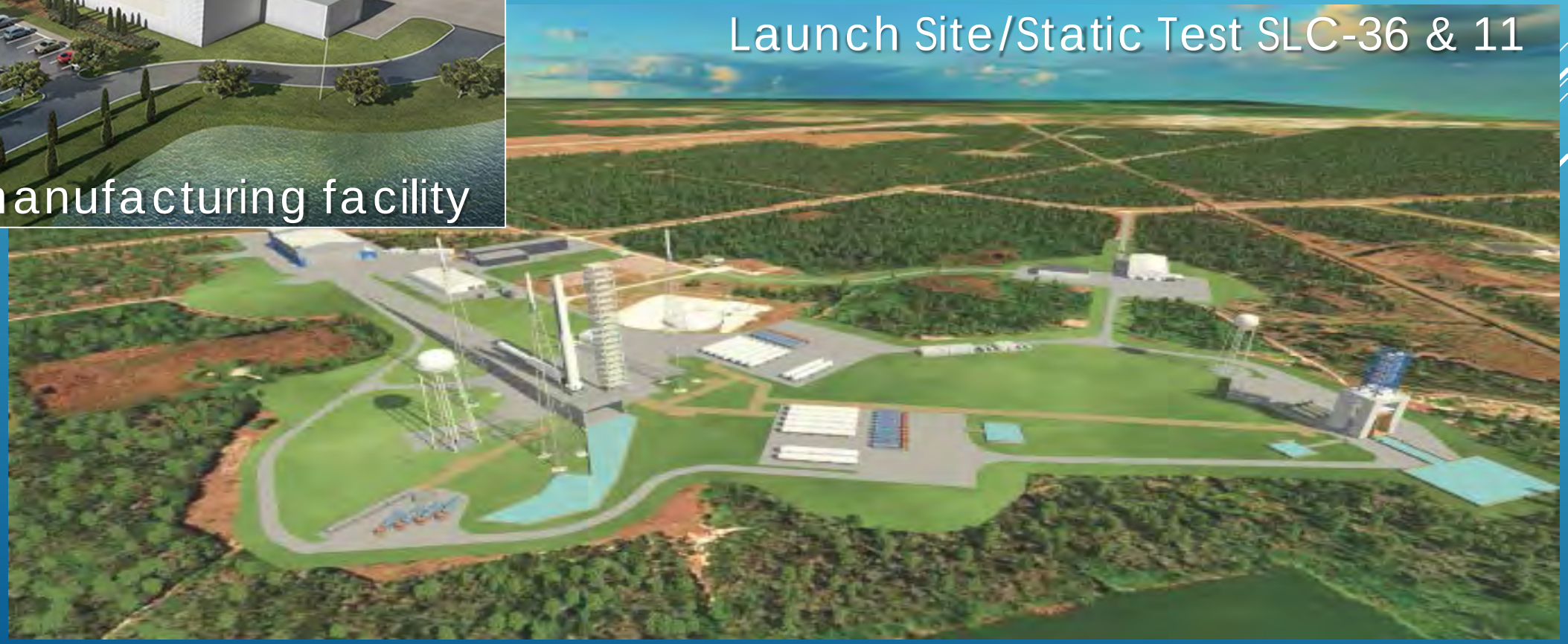


Boeing concepts

SIERRA NEVADA *DREAM CHASER*

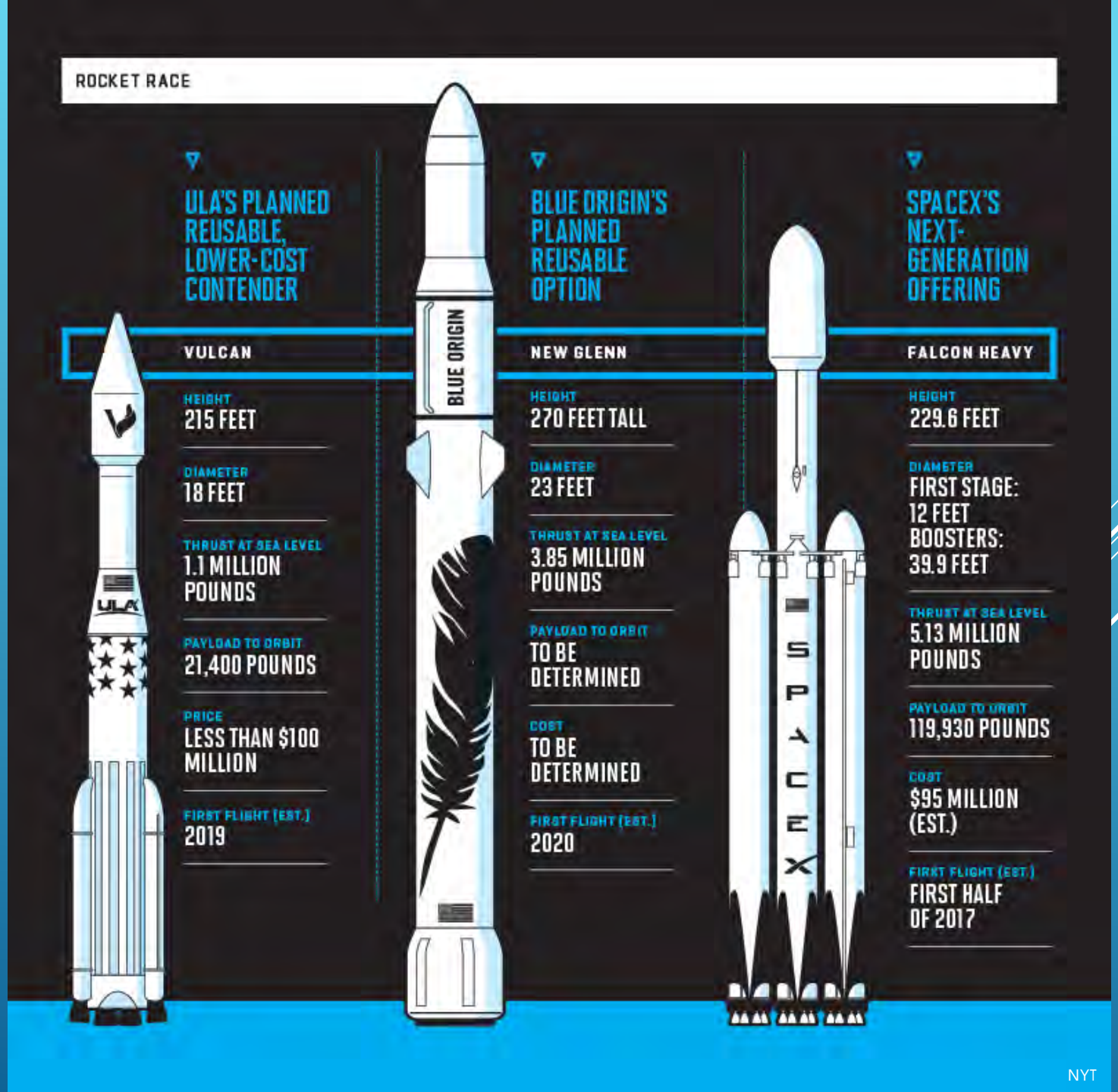
BLUE ORIGIN – *NEW GLENN* ORBITAL BOOSTER

Blue Origin

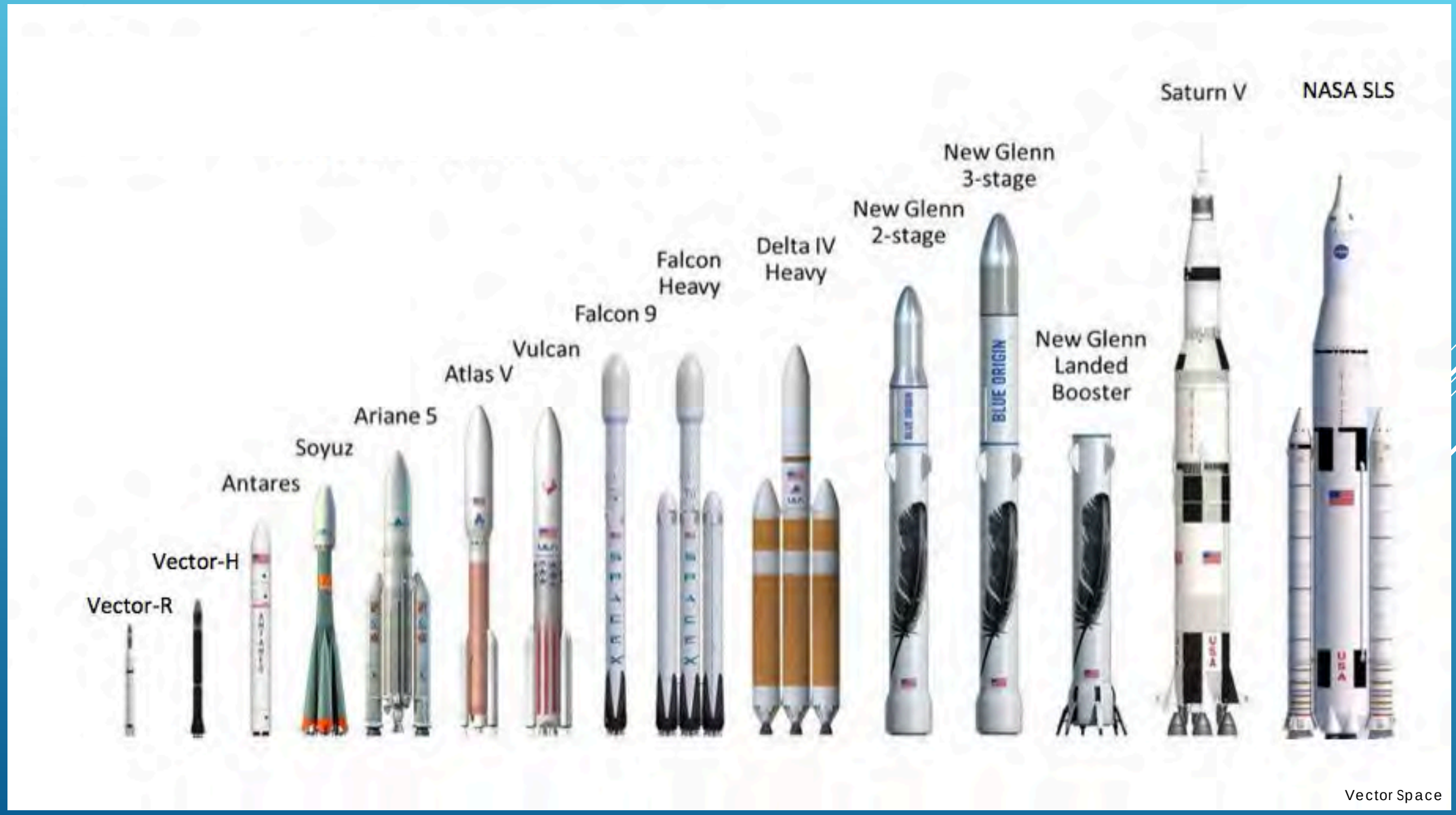


BIG BOOSTERS COMPARED

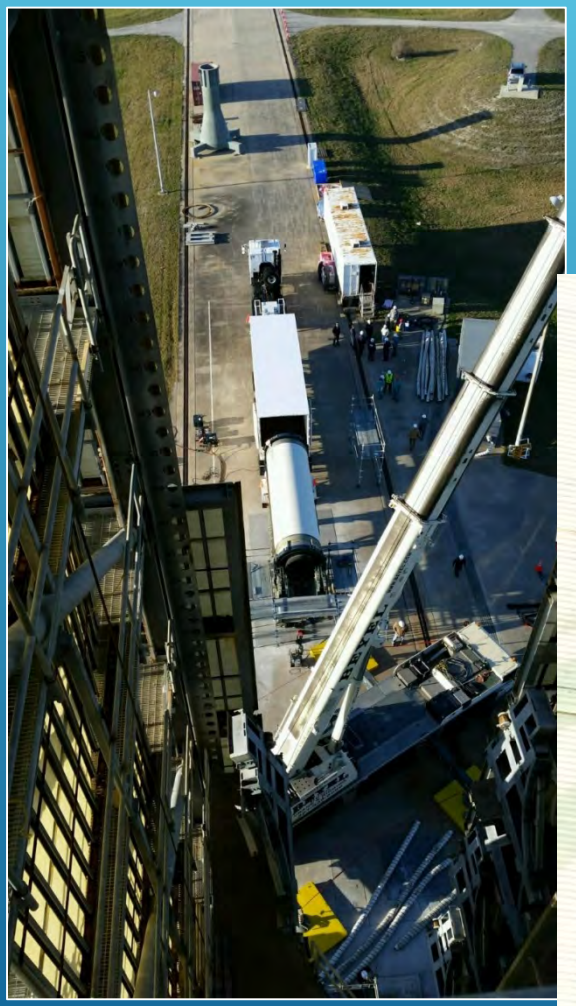
- Orbital launchers
- *Vulcan & New Glenn*:
  - 1st stage BE-4 LOX/CH_4
  - 2nd stage LOX/LH_2
- *Falcon Heavy*:
  - LOX/RP-1



LAUNCH VEHICLE SIZE SPECTRUM



ORBITAL ATK *MINOTAUR-IV*



McCarthy

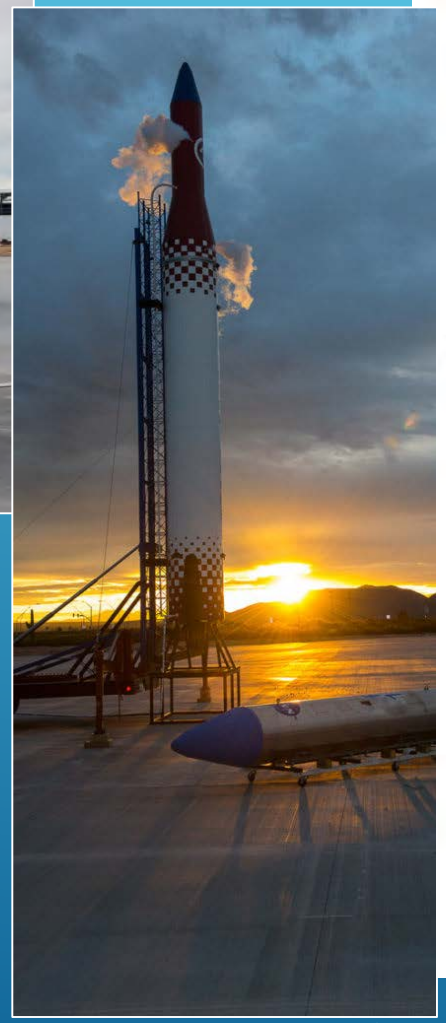
USAF

Orbital ATK

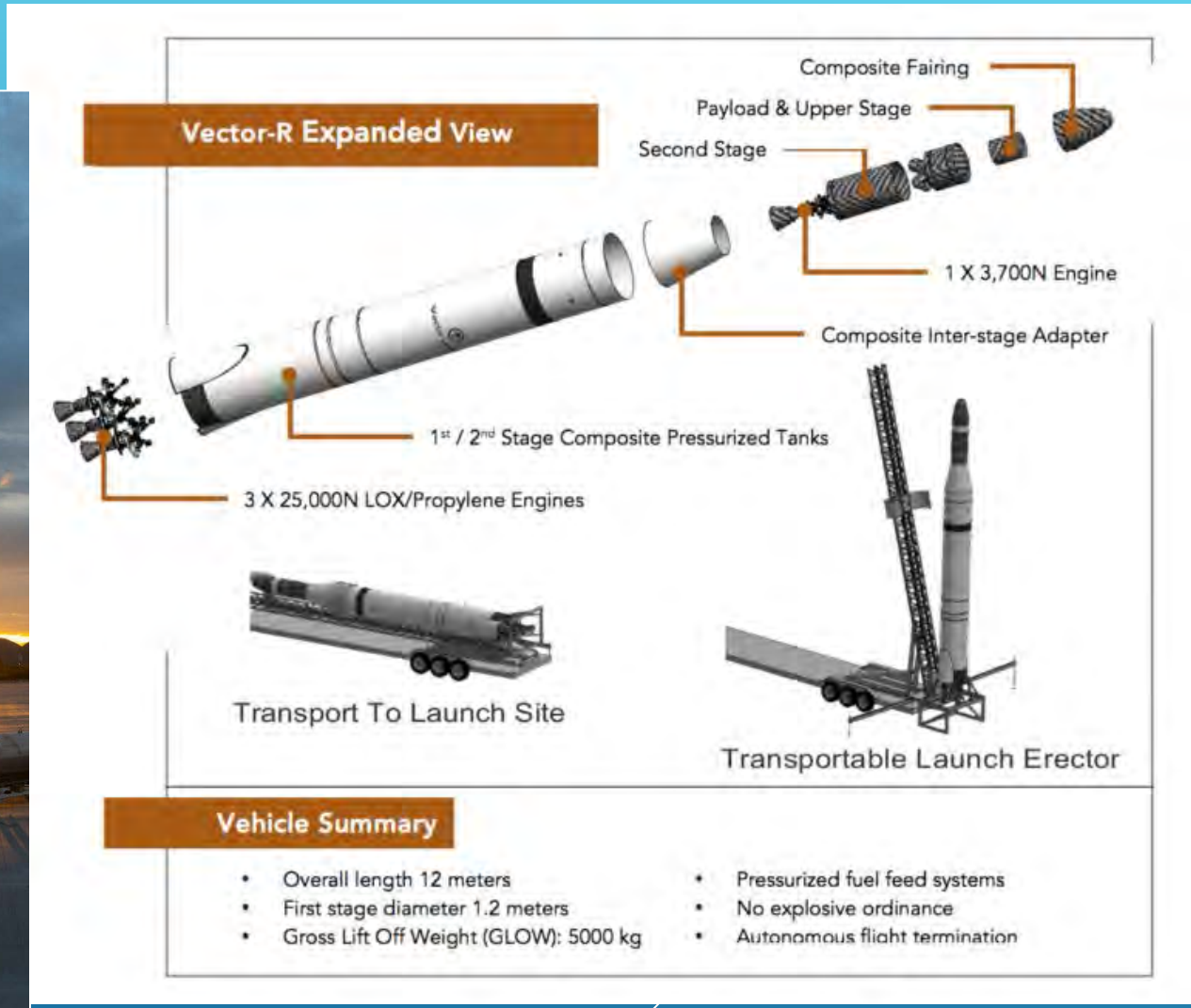
SMALL LVS – ROCKETLAB *ELECTRON*

RocketLab

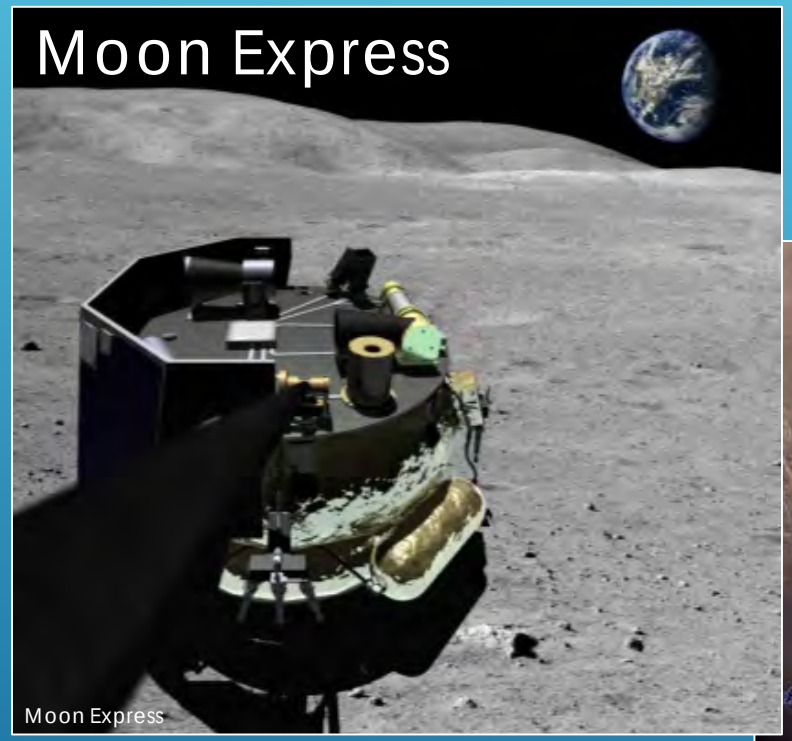
SMALL LVS – VECTOR SPACE



Vector Space



OTHER INTERESTING THINGS ON THE WAY



QUESTIONS?