

# Ground Processing and Launch Facilities

- Historical examples
  - Early Launch Facilities
  - Saturn I
  - Saturn V
  - Russian
- Modern examples
  - Shuttle
  - Delta IV Heavy
  - DC-XA



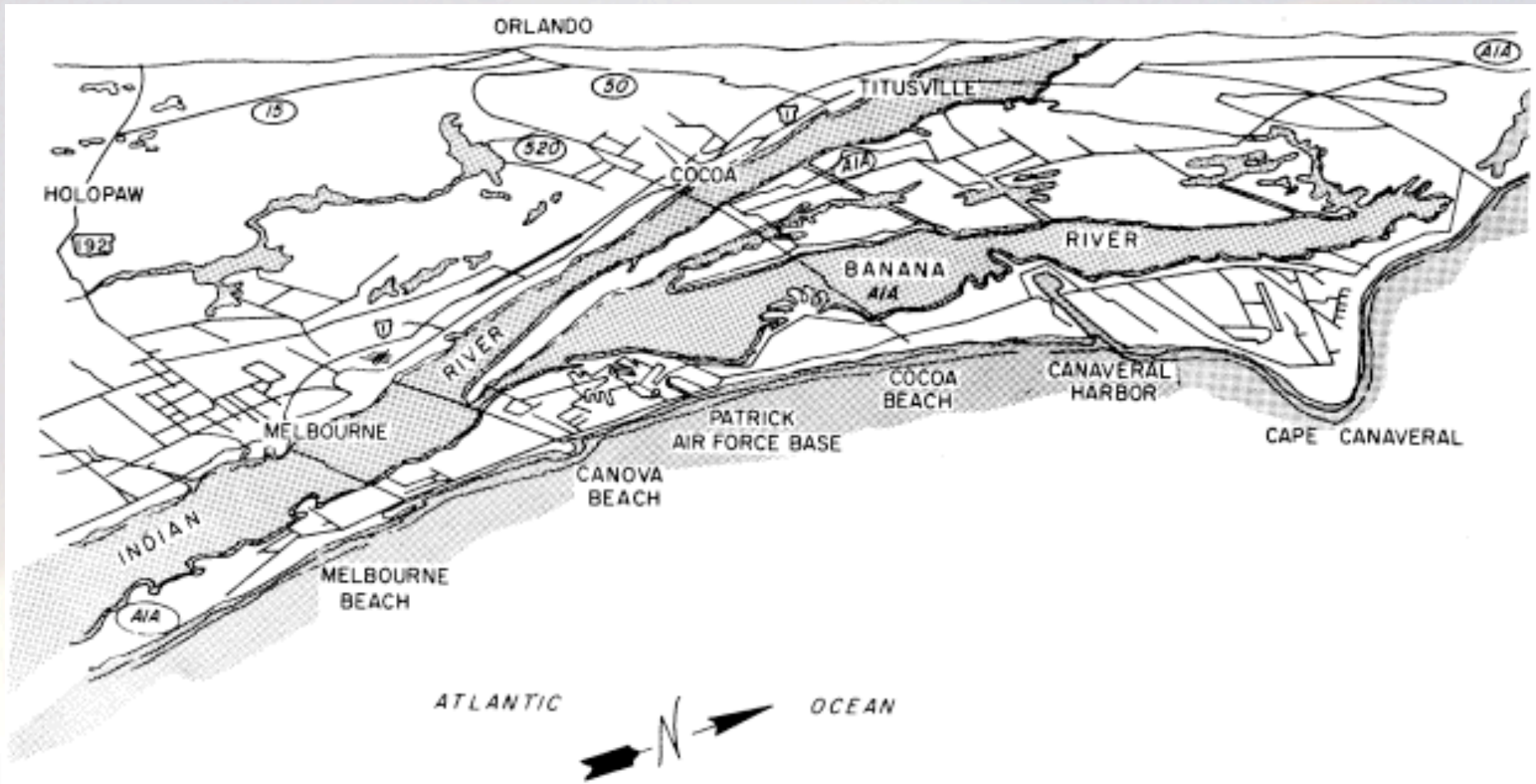
# Cape Canaveral circa 1950



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# Map of Cape Canaveral



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# “ICBM Row”



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# LC-5 – Mercury-Redstone



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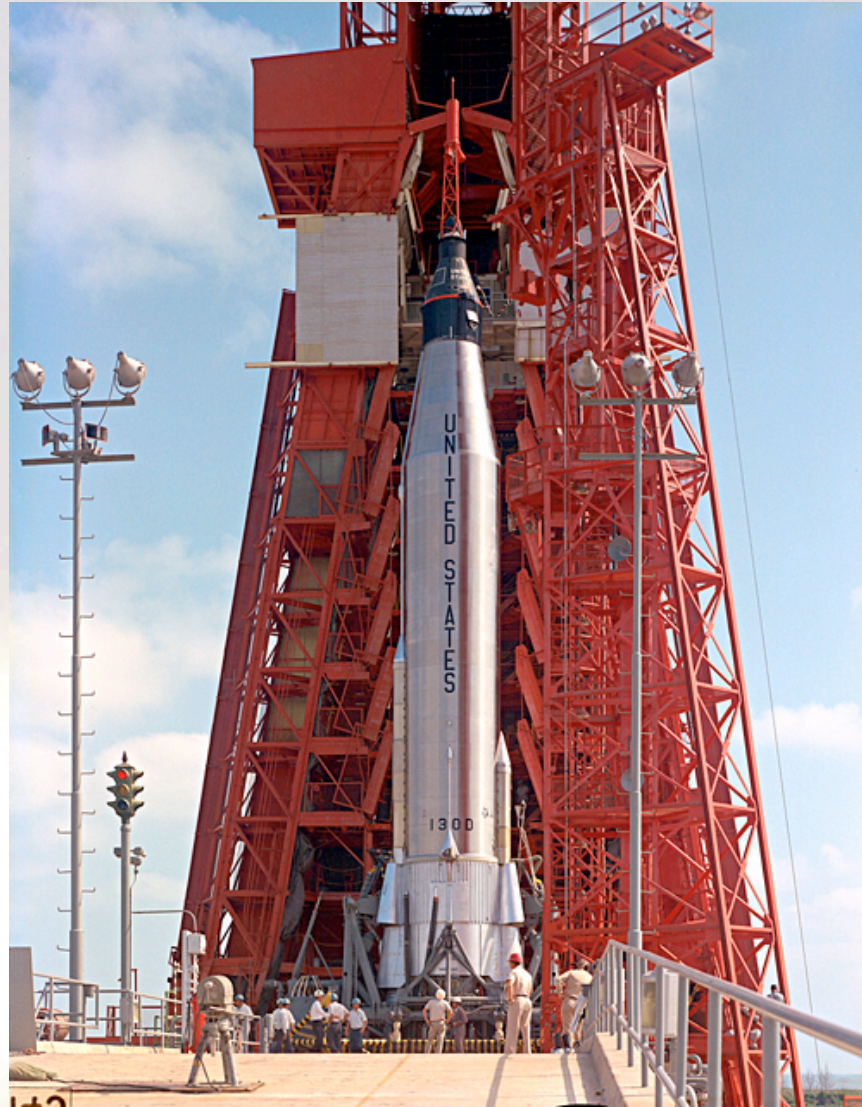


# LC-5 Emergency Crew Escape System



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# Atlas Support Gantry



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# LC-14 – Mercury-Atlas



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# Titan II Access Tower Operation



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# LC-34 Schematic



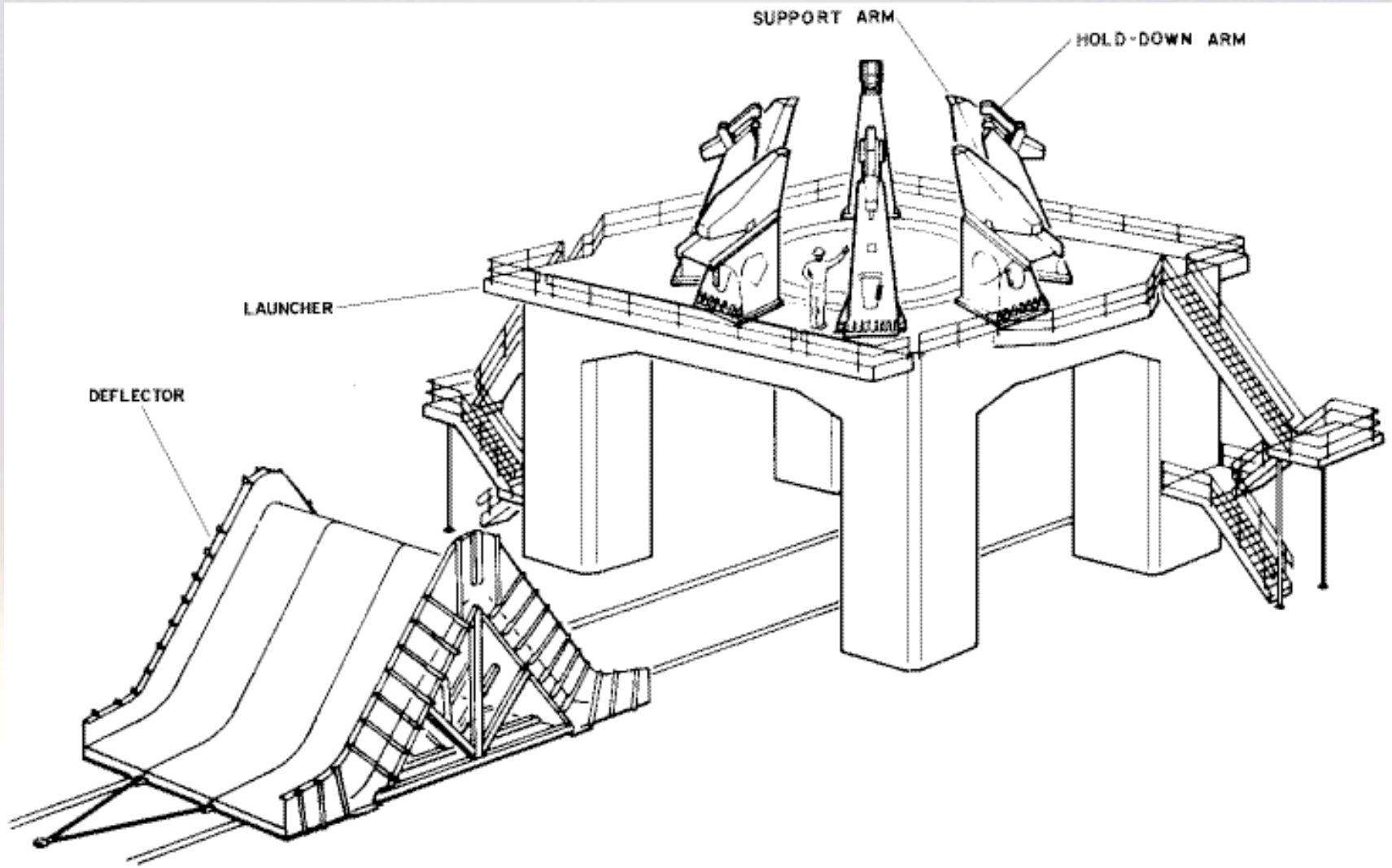
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# Saturn I Launch Pedestal



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# LC-34 Launch Pedestal Under Construction



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# LC-34 Flame Deflector



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# LC-34 Blockhouse

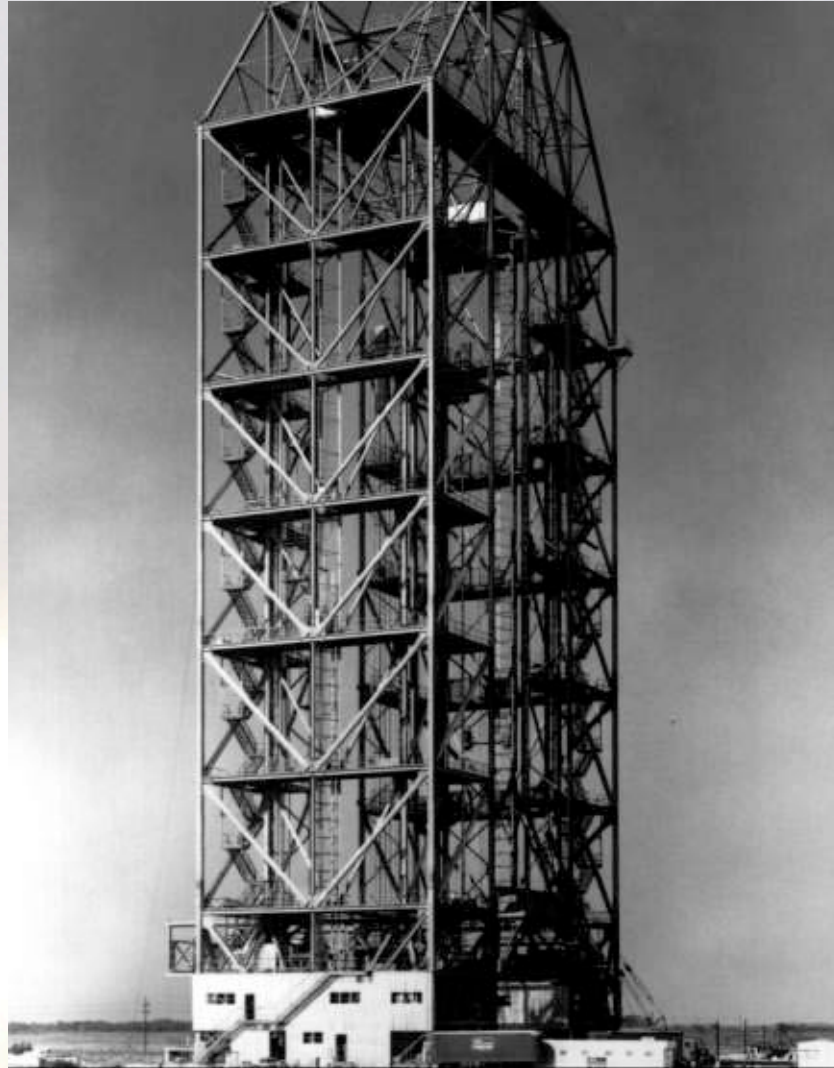


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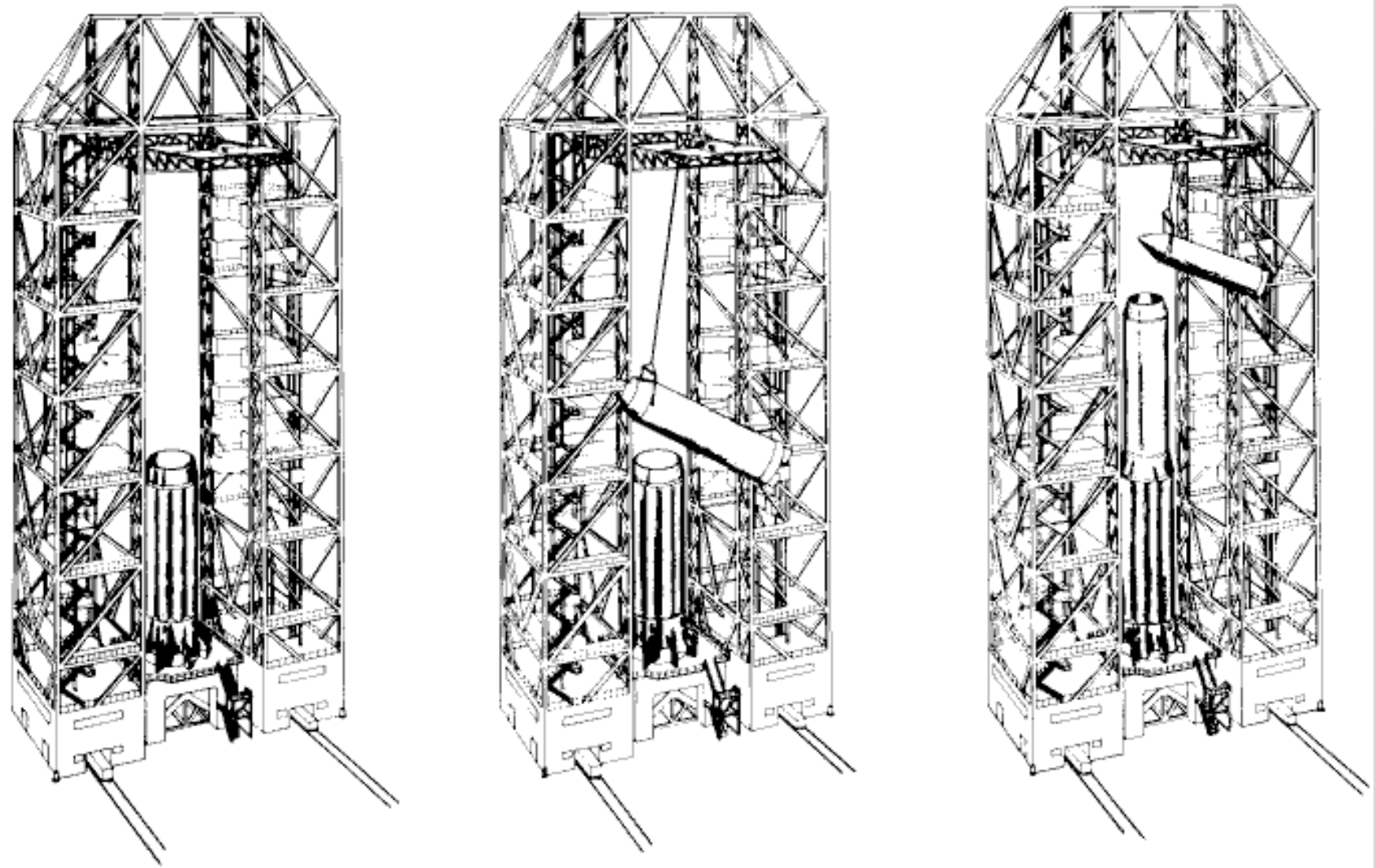
# LC-34 Service Structure



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# Saturn I Erection Process



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# Aerial View of LC-34



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# Aerial View of LC-34



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# Aerial View of LC-34



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# S-I Stage Rotation



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# S-I Stage Rotation



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# Assembly of Saturn I

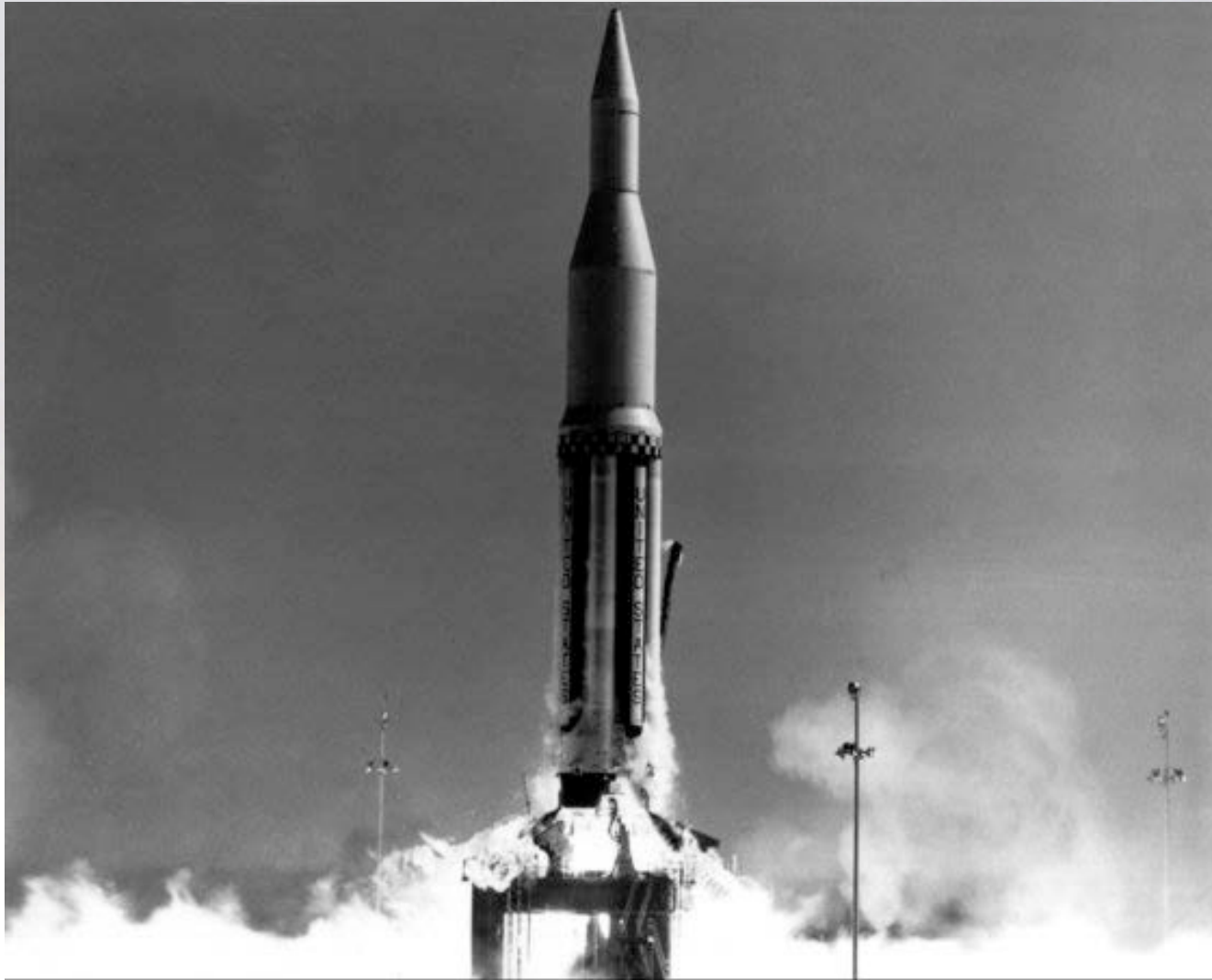


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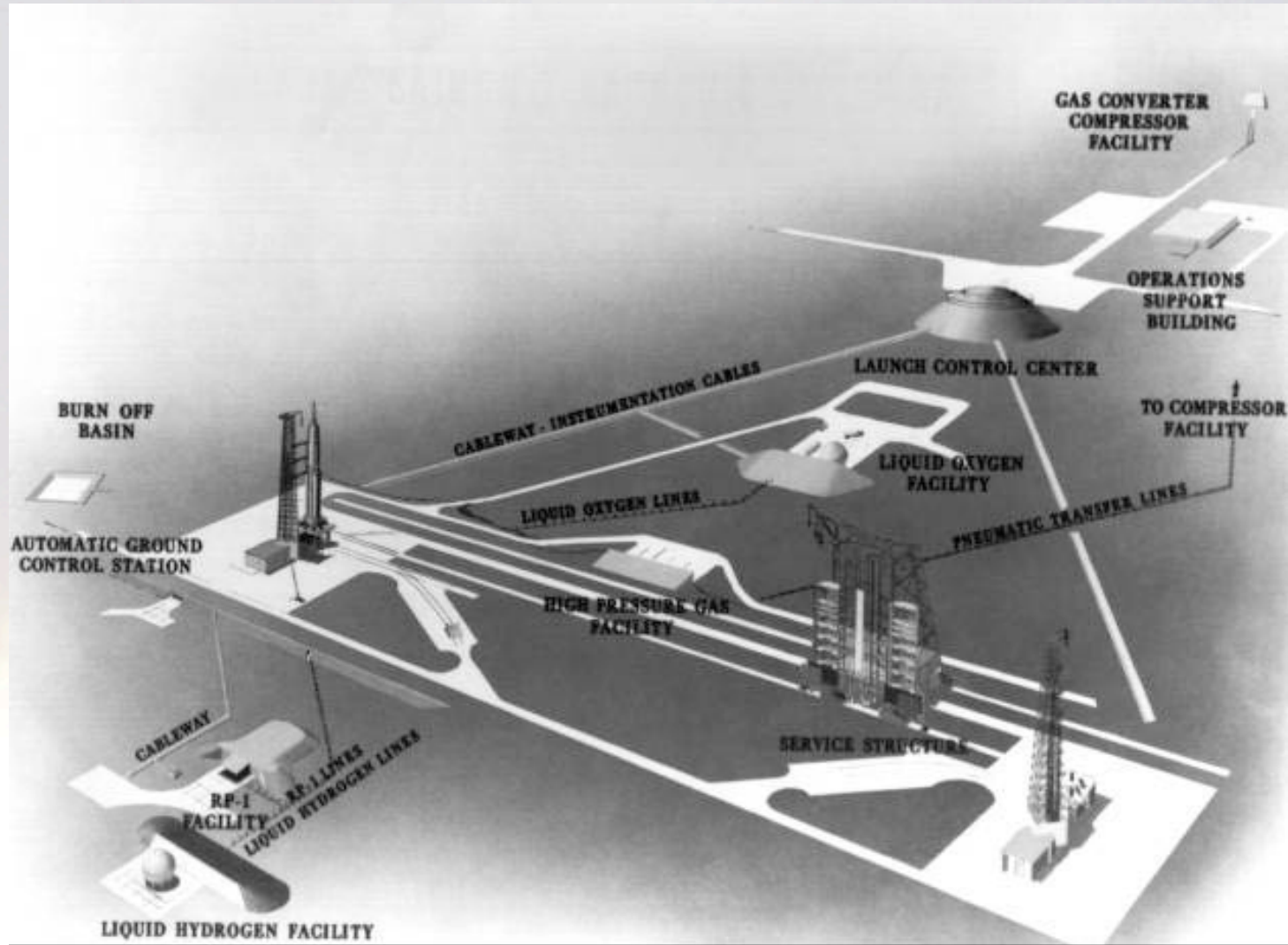
# SA-201 Launch



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# LC-37 Concept



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# LC-37 Under Construction (1963)



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# LC-37 Construction Photo

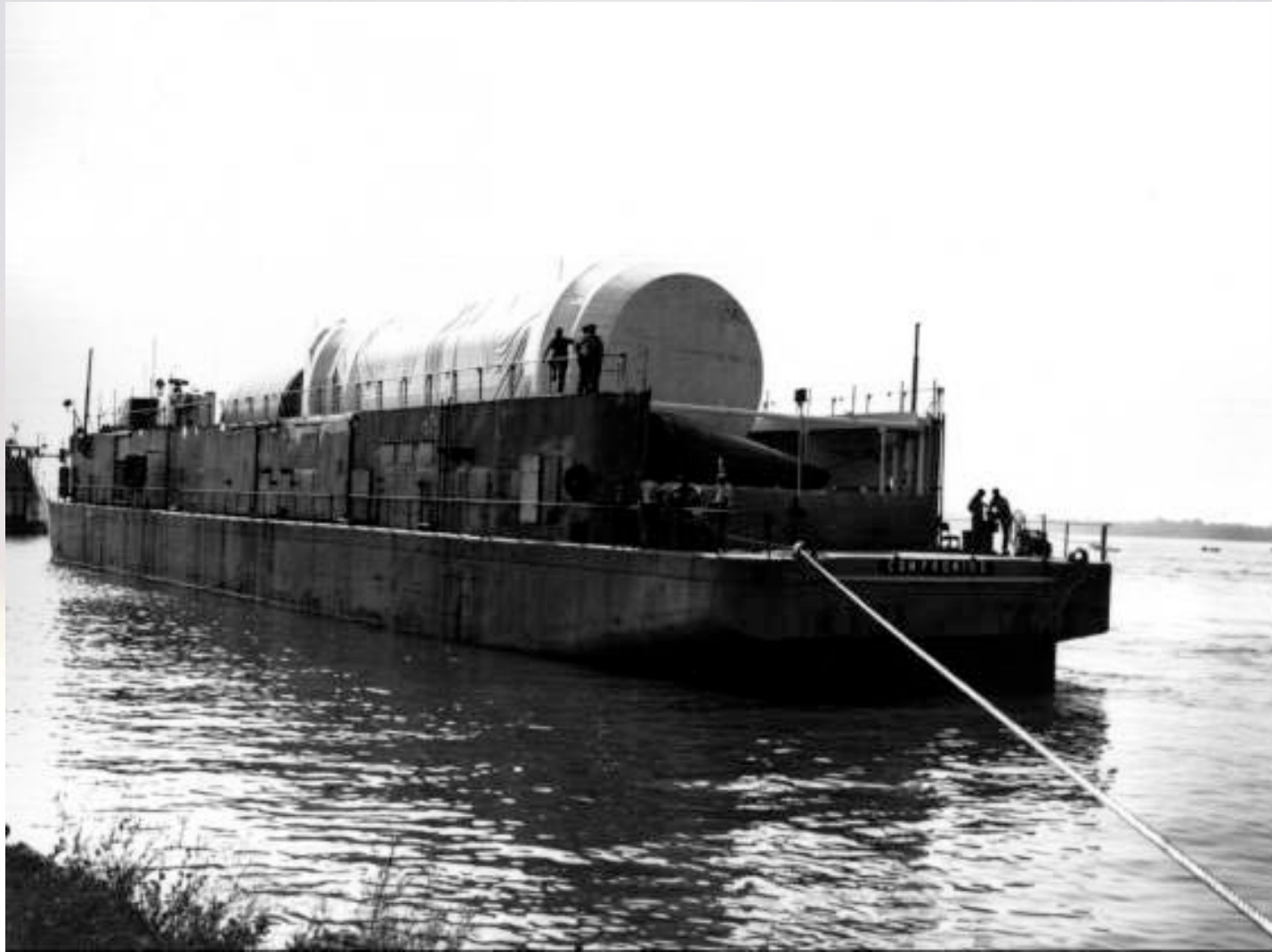


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# Barge Transport of Launch Vehicle Stages



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# Aerial Transport of Stages

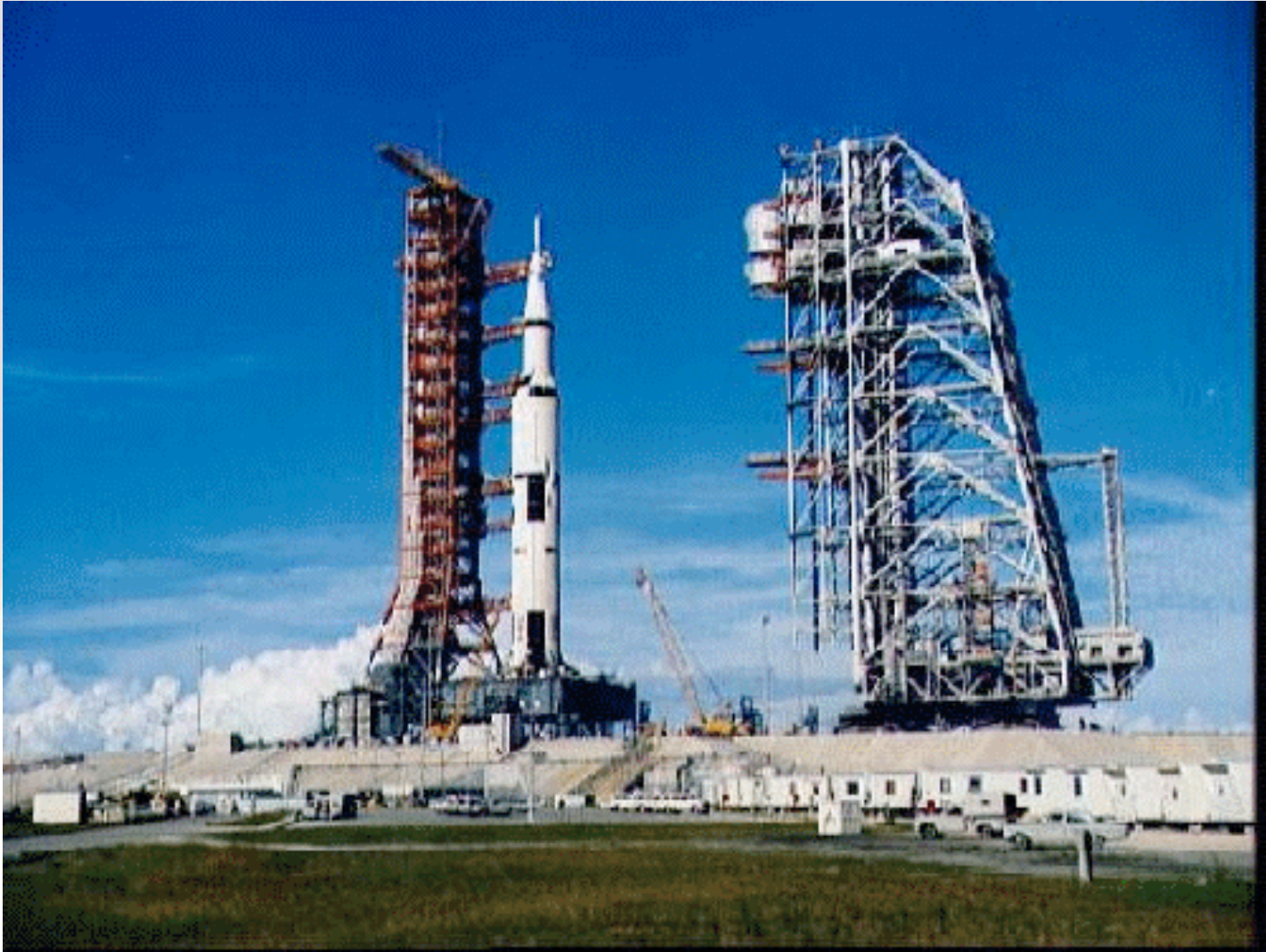


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# Saturn V Launch Facility

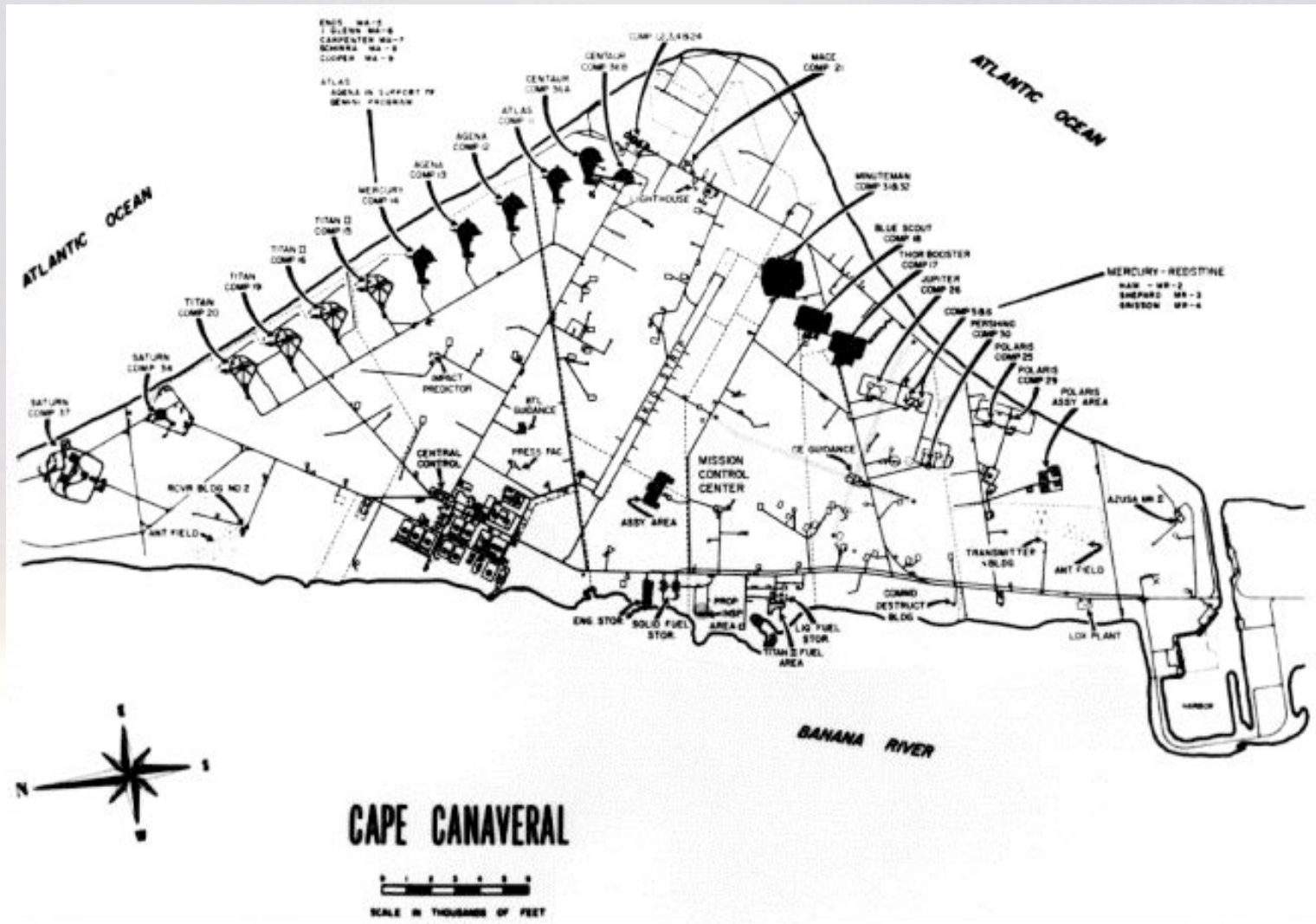


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# Cape Canaveral Siting Map



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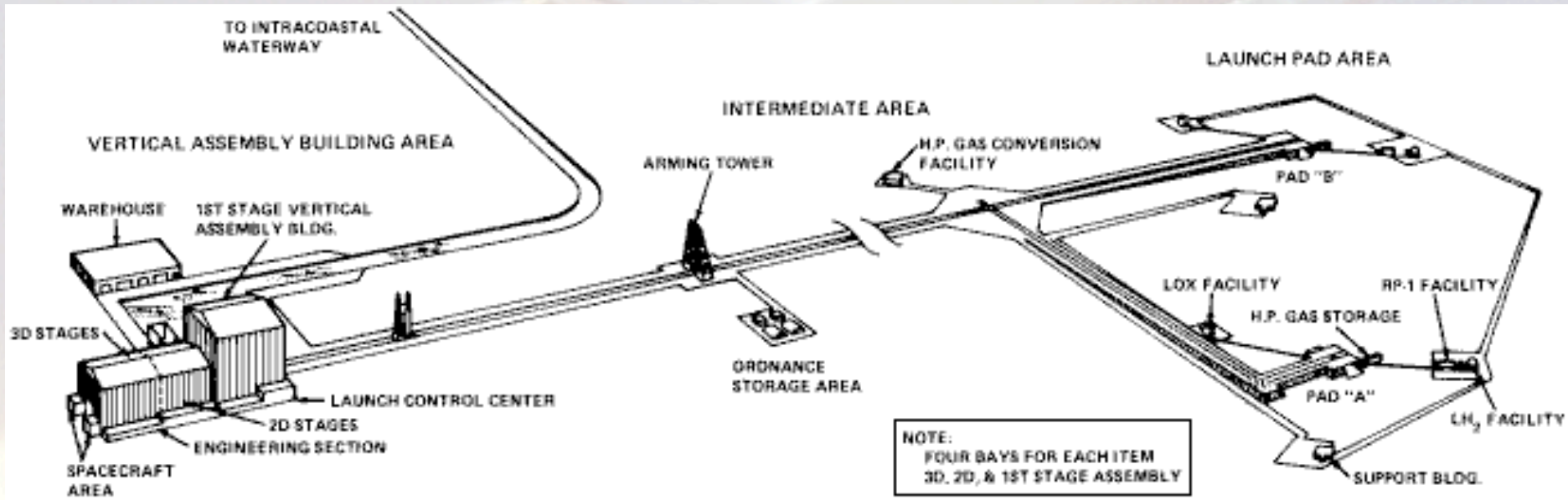
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# Launch Sites Considered for Apollo

- Cape Canaveral
- Offshore from Cape Canaveral
- Mayaguana Island in the Bahamas
- Cumberland Island, Georgia
- A mainland site near Brownsville, Texas
- White Sands Missile Range in New Mexico
- Christmas Island in the mid-Pacific south of Hawaii
- South Point on the island of Hawaii

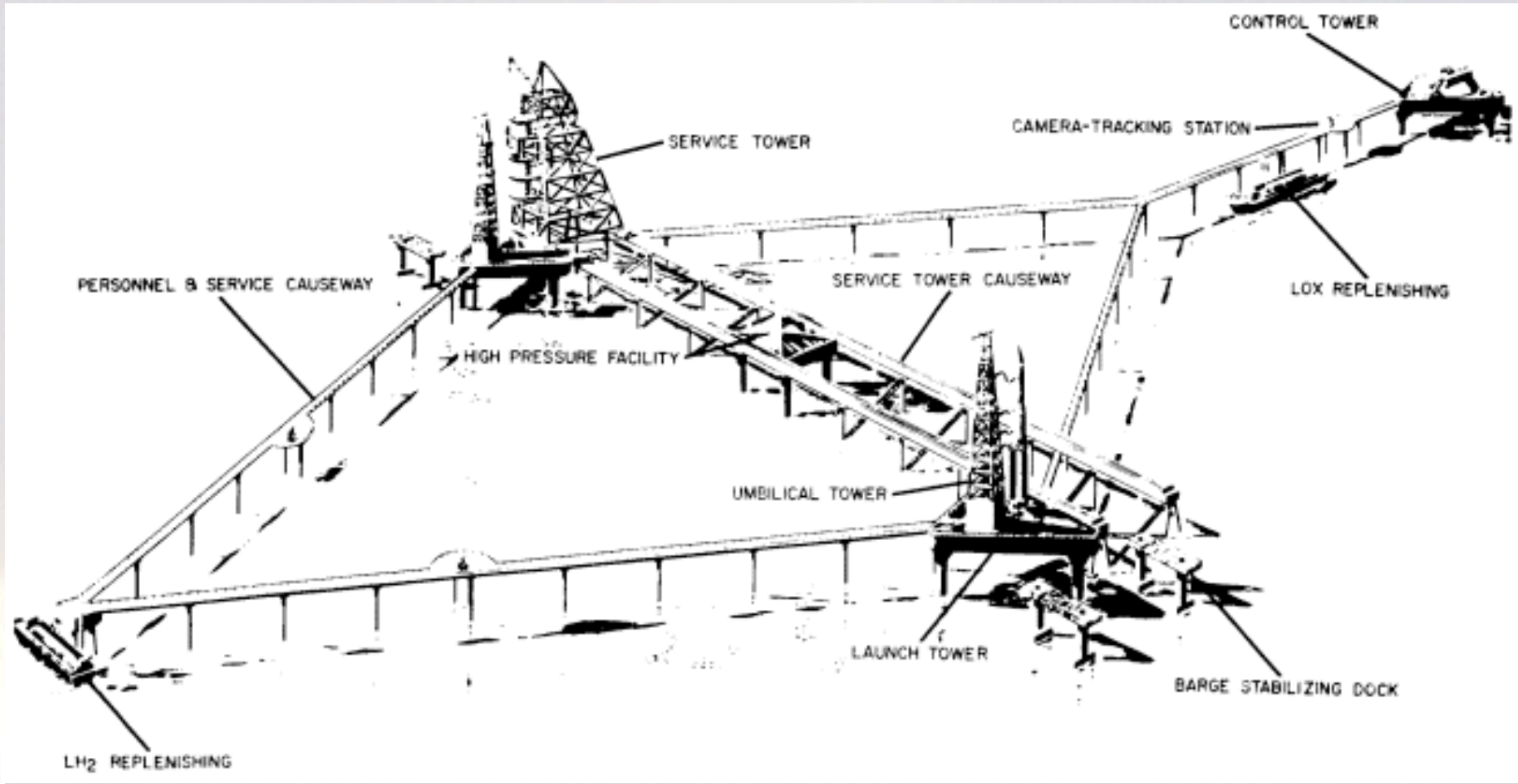


# Early Mobile Launch Complex Concept





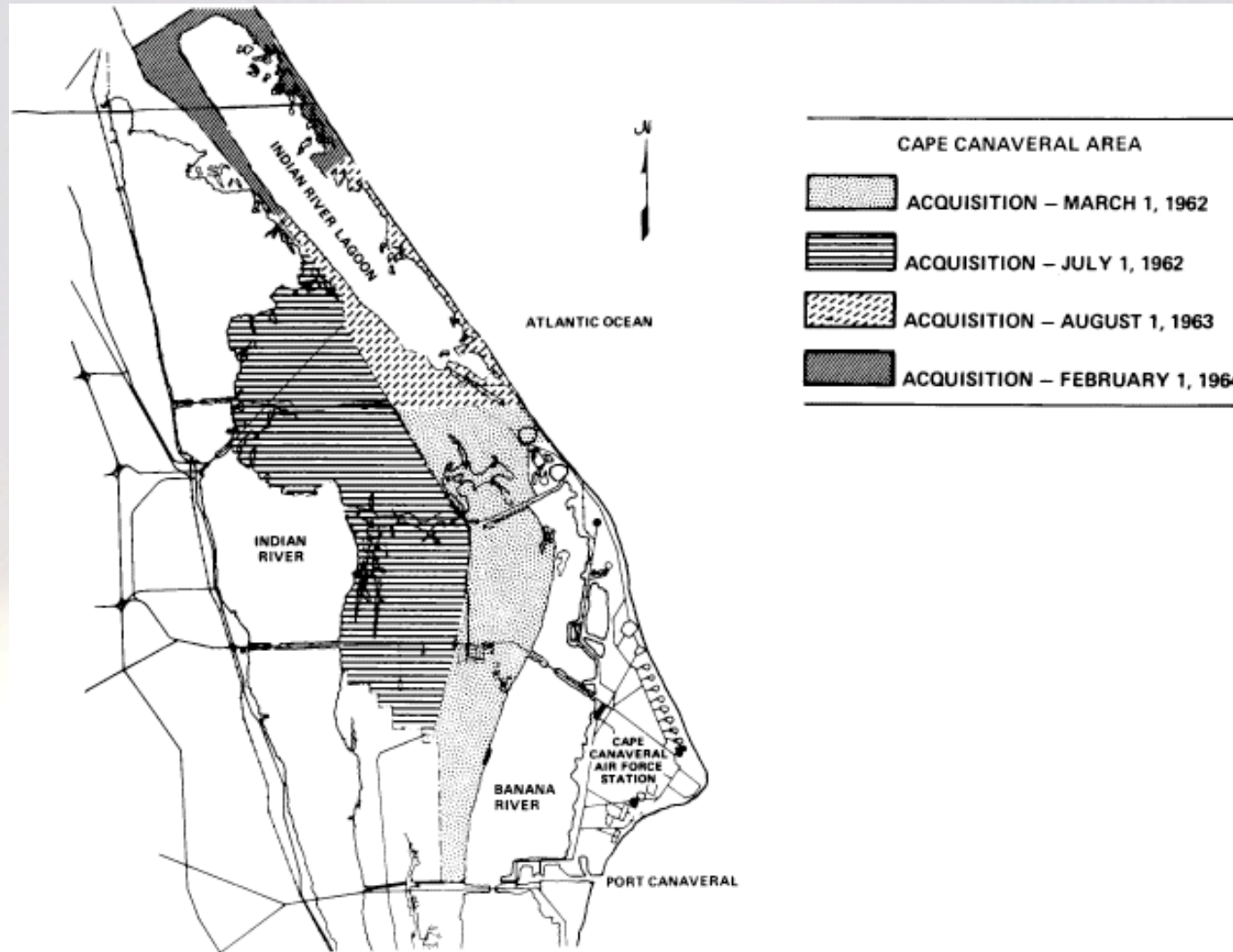
# Concept of an Off-Shore Launch Facility



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# Merritt Island Launch Area (MILA)





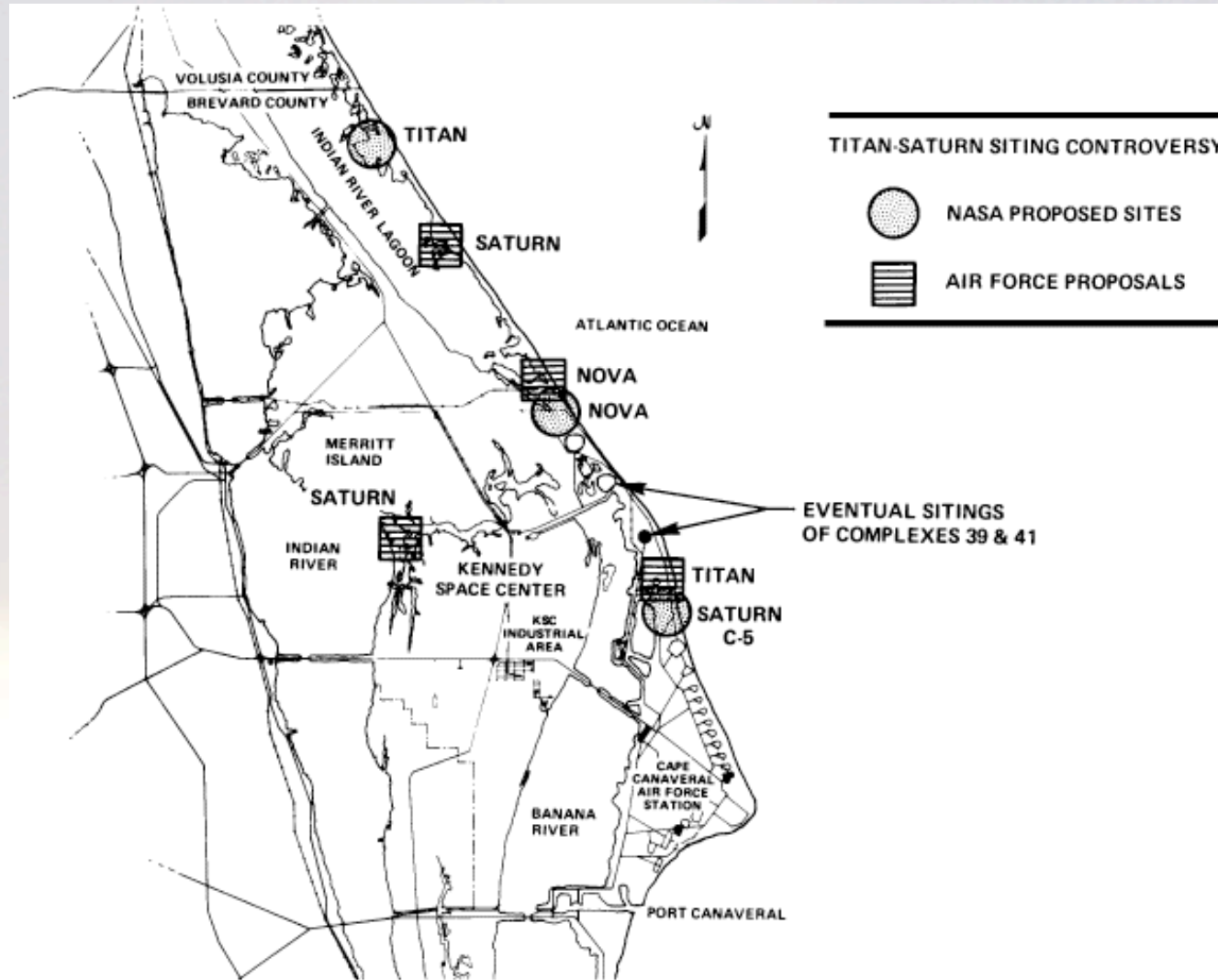
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## Ground Processing and Launch Facilities

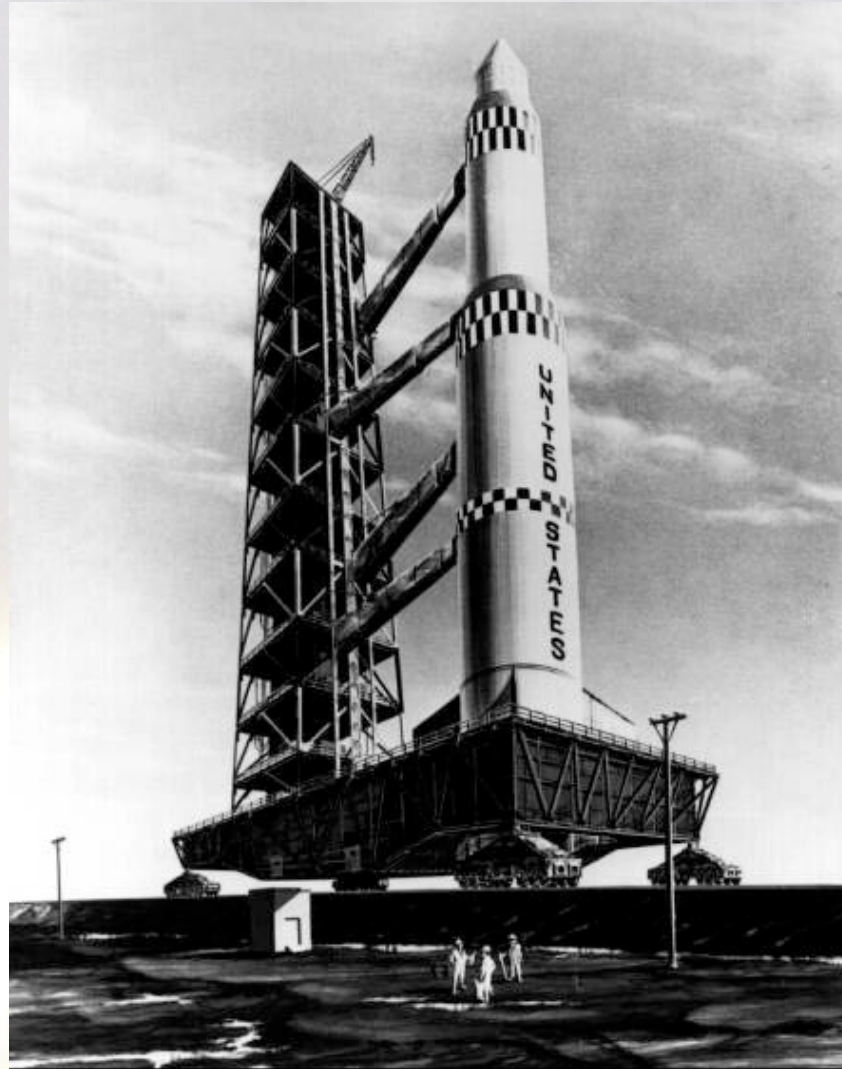
### ENAE 791 - Launch and Entry Vehicle Design



# Competition for MILA Launch Sites



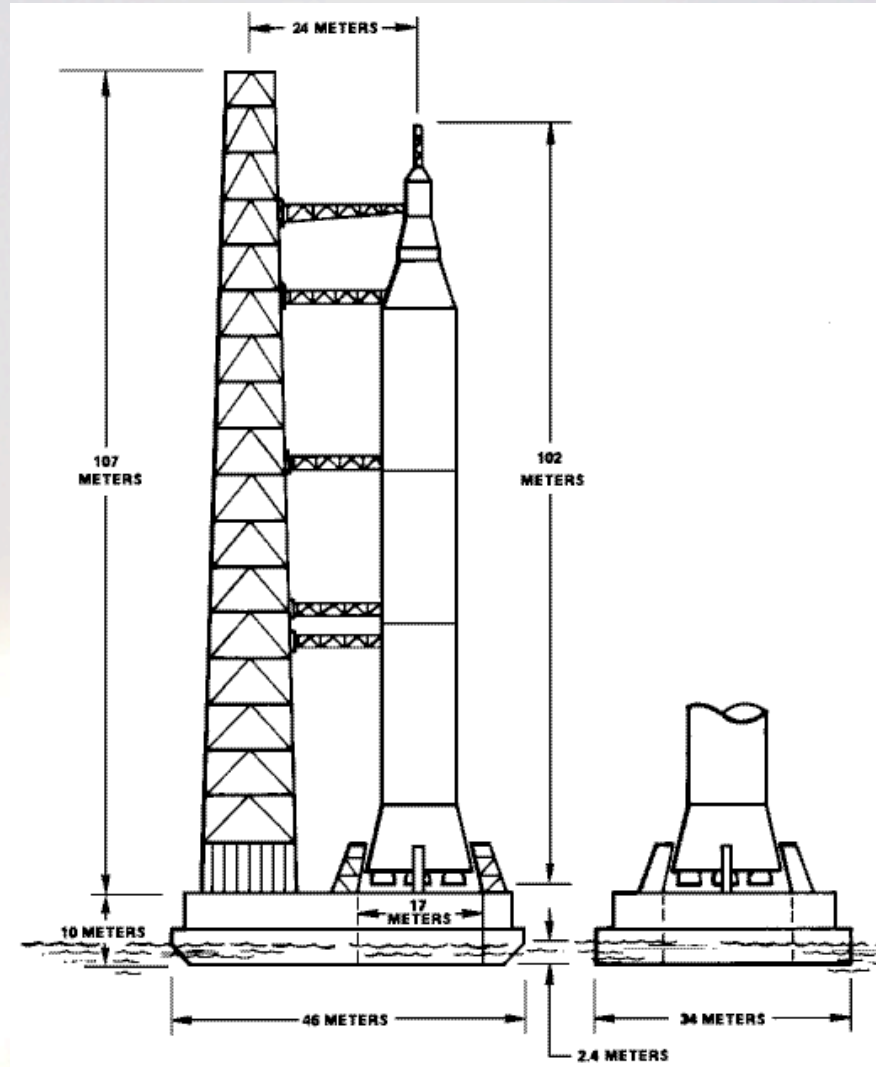
# Rail-Based Nova Launch Concept



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# Barge-Based Saturn V Launch Concept

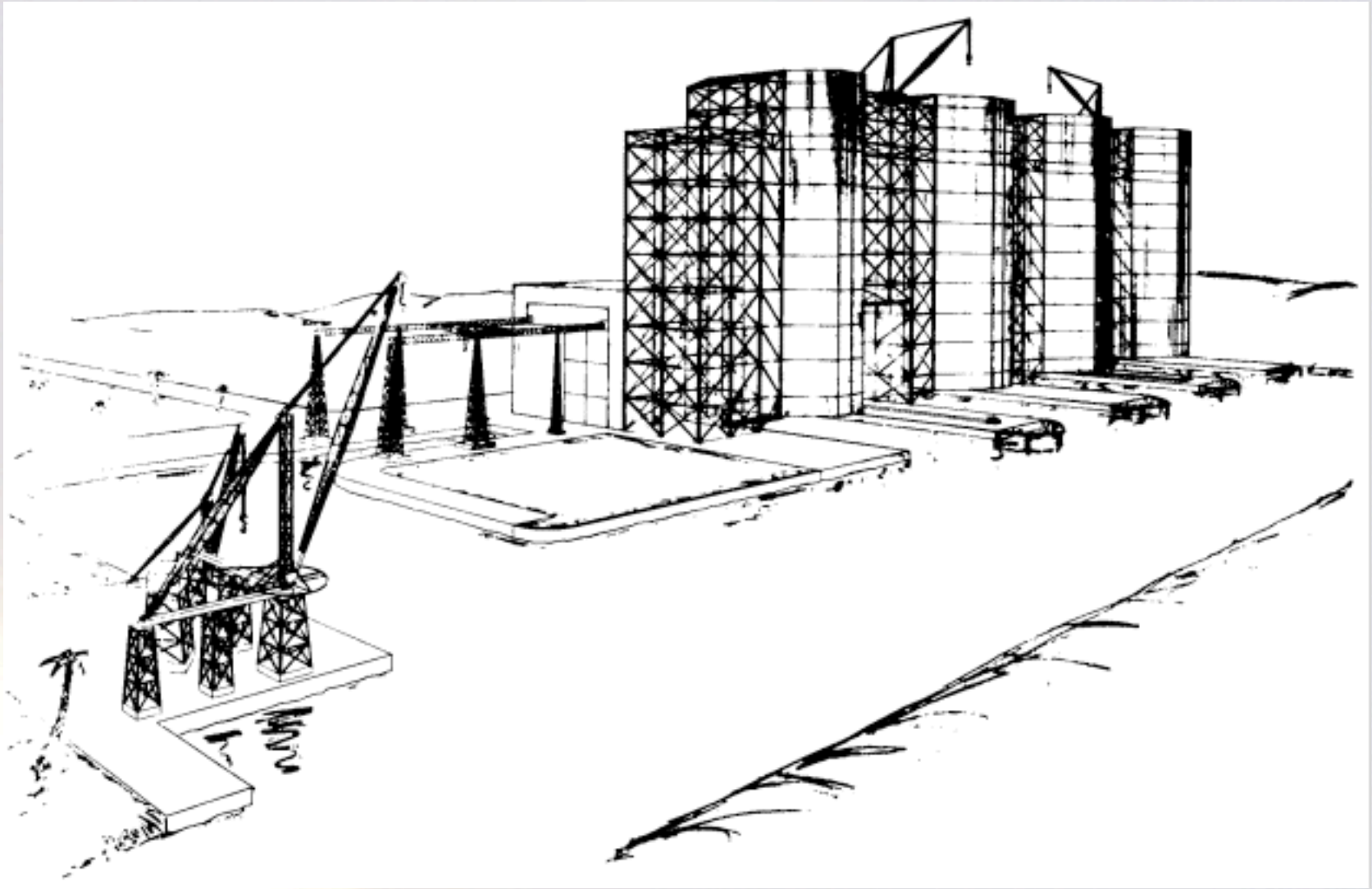


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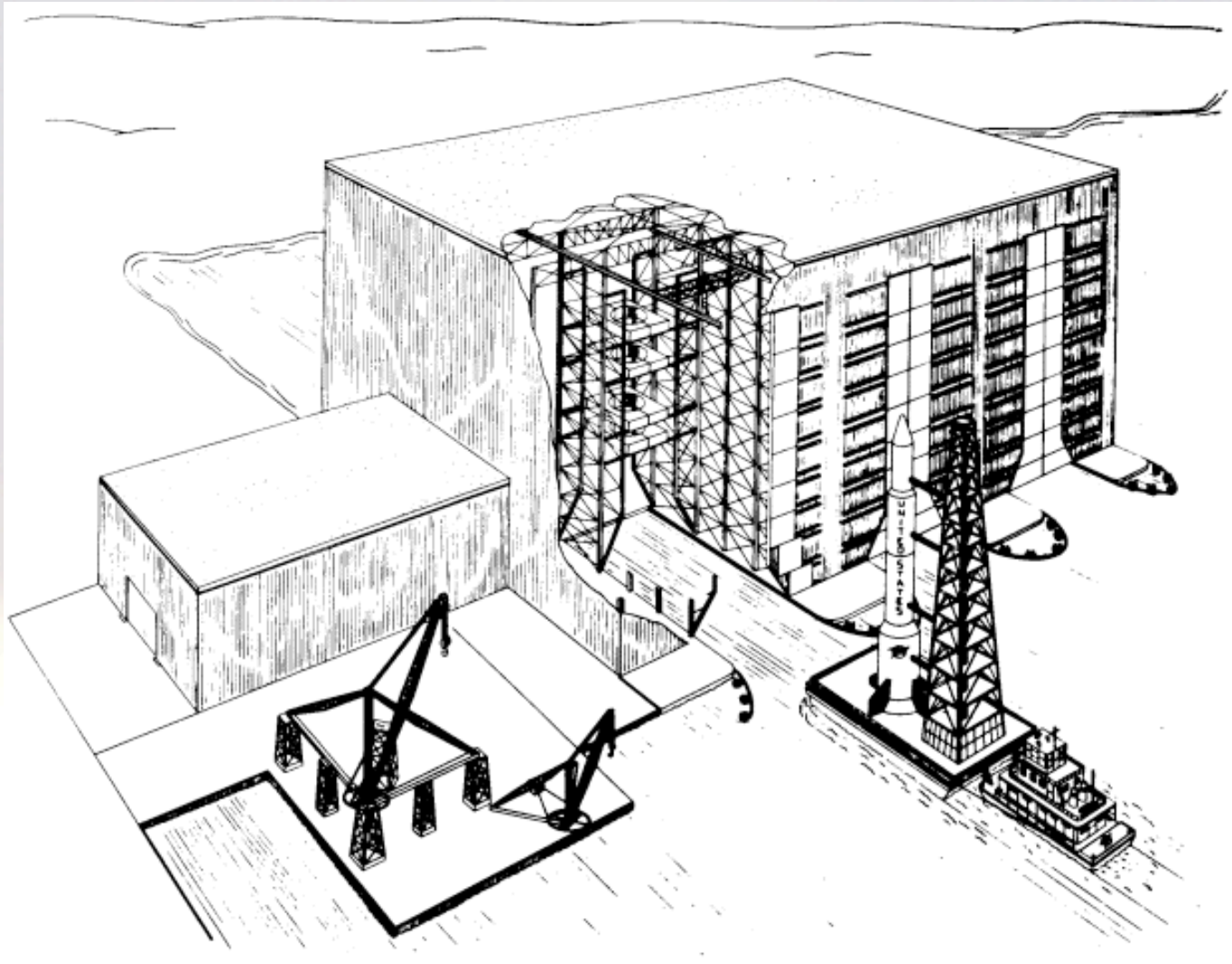
# Barge-Based Vertical Assembly Building



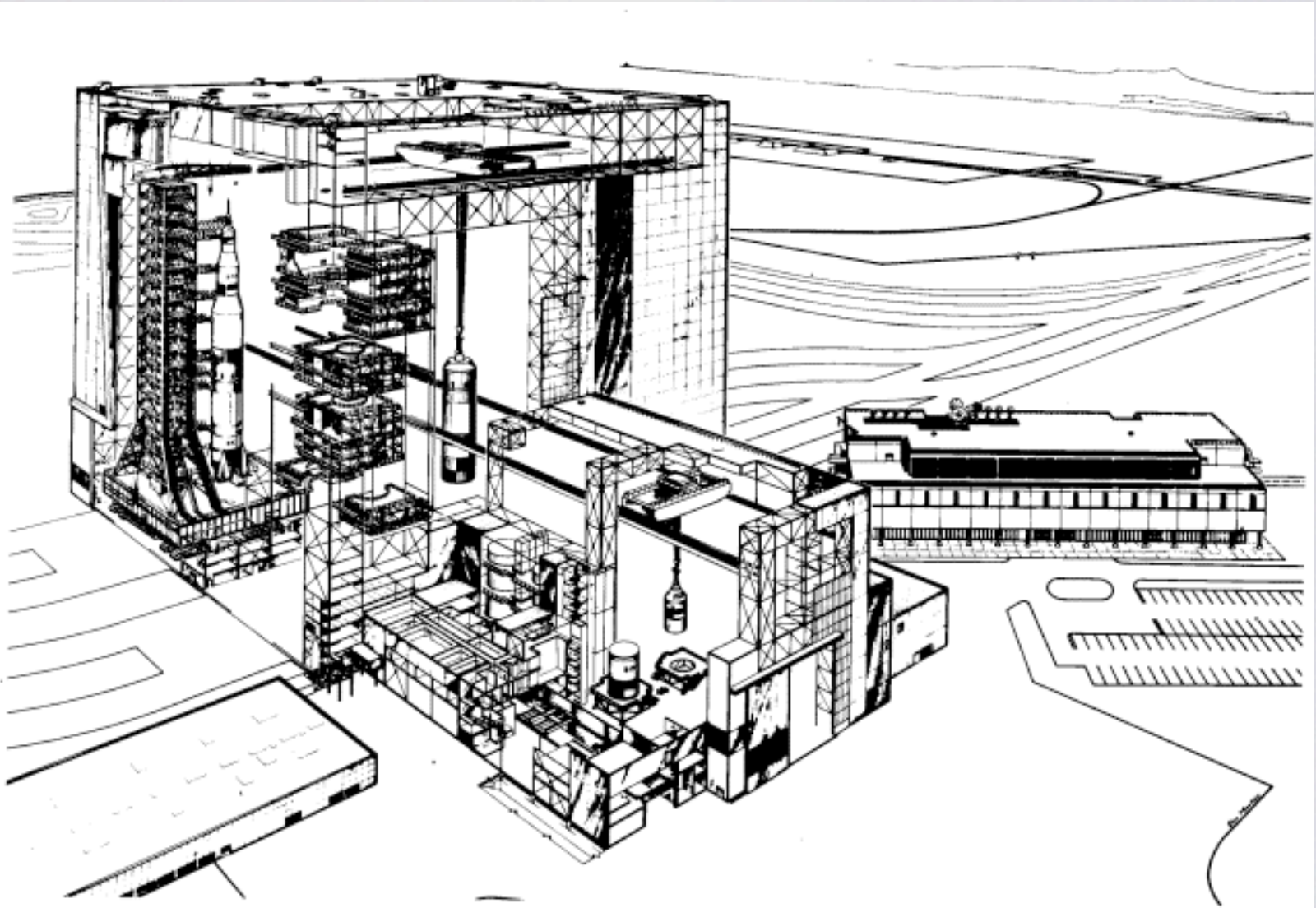
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# Barge-Based VAB (Enclosed)



# Interior Concept of VAB



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# Early Construction of VAB



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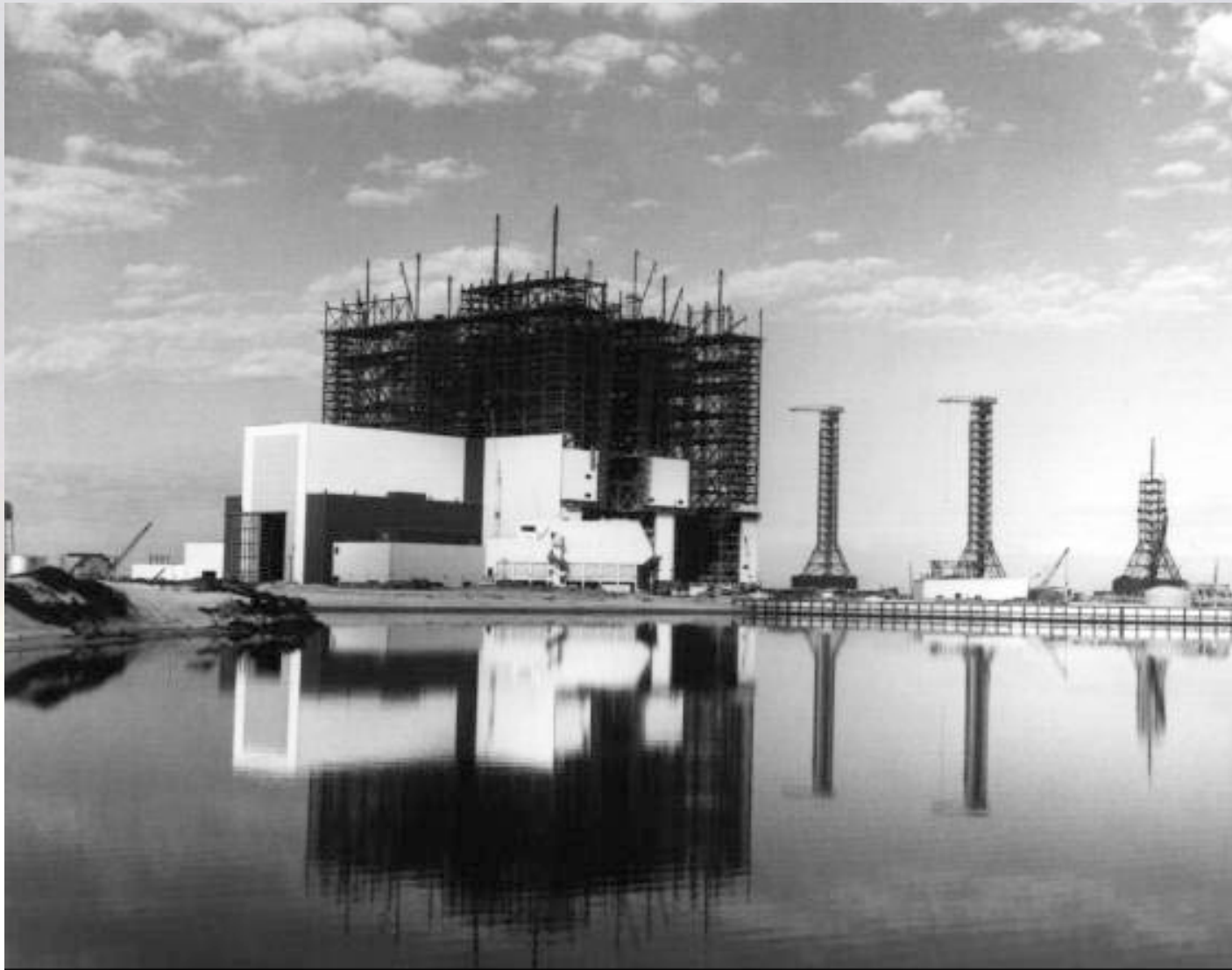
# VAB and LCC Under Construction



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# VAB from Turning Basin



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# Interior of Launch Control Center



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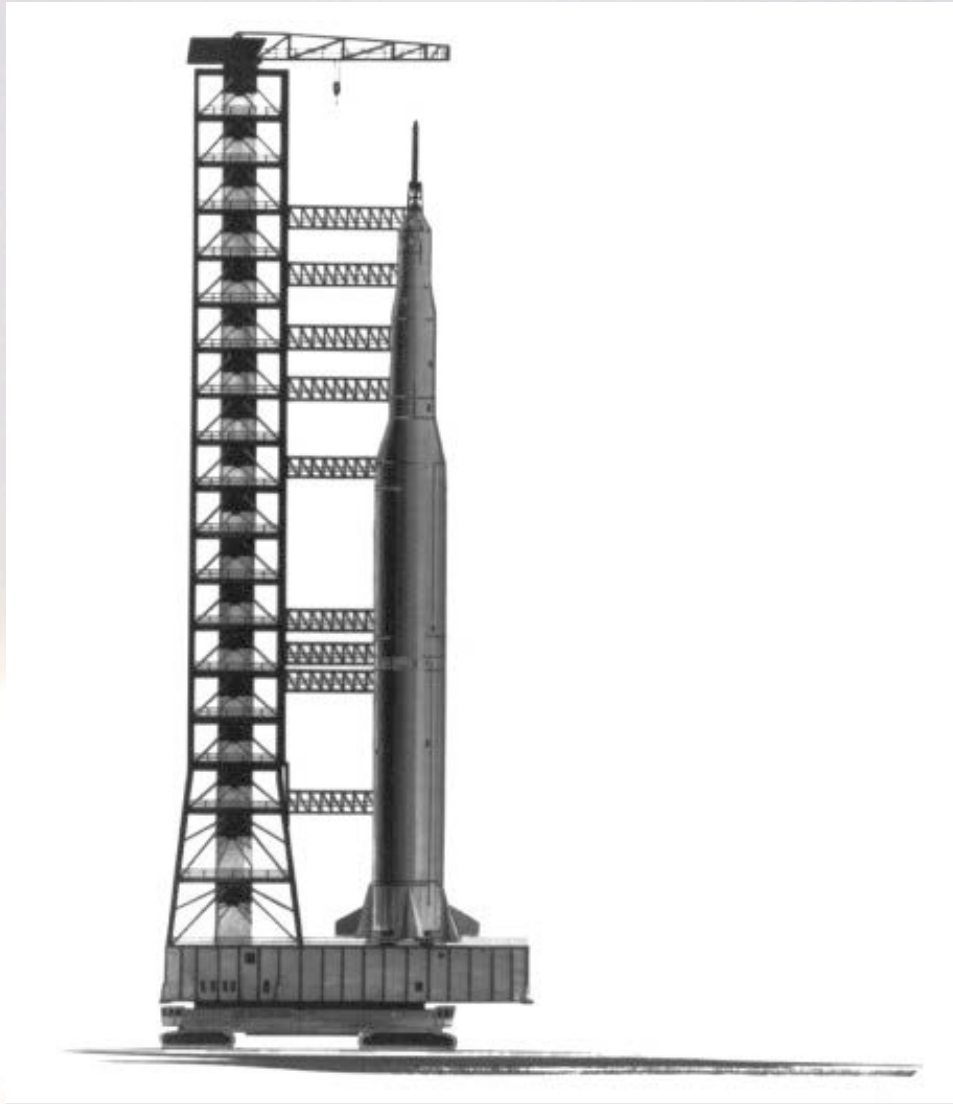
# Interior of Launch Control Center



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# Early Concept of Mobile Launch Platform

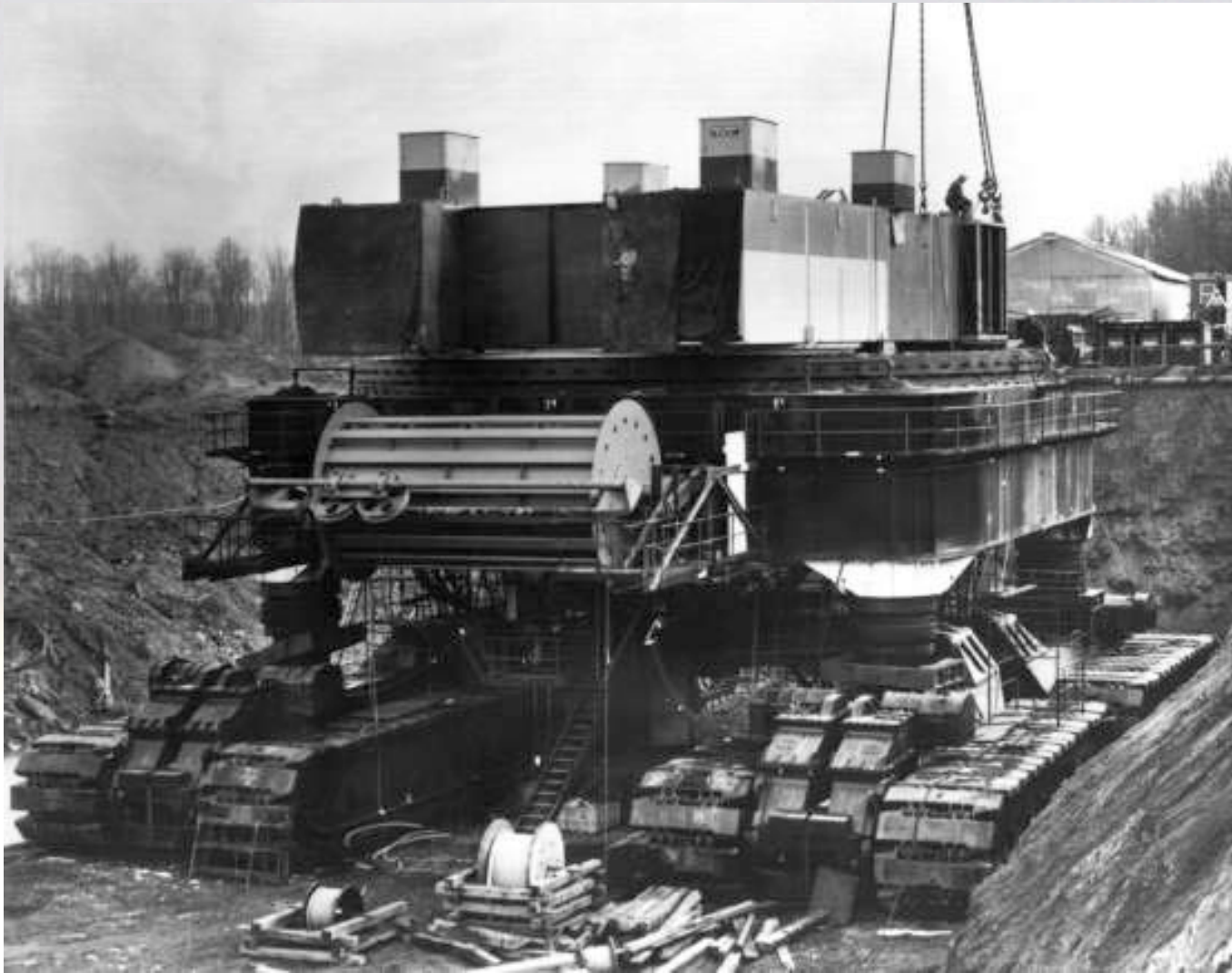


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# West Virginia Strip-Mine Coal Shovel



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# Crawler-Transporter

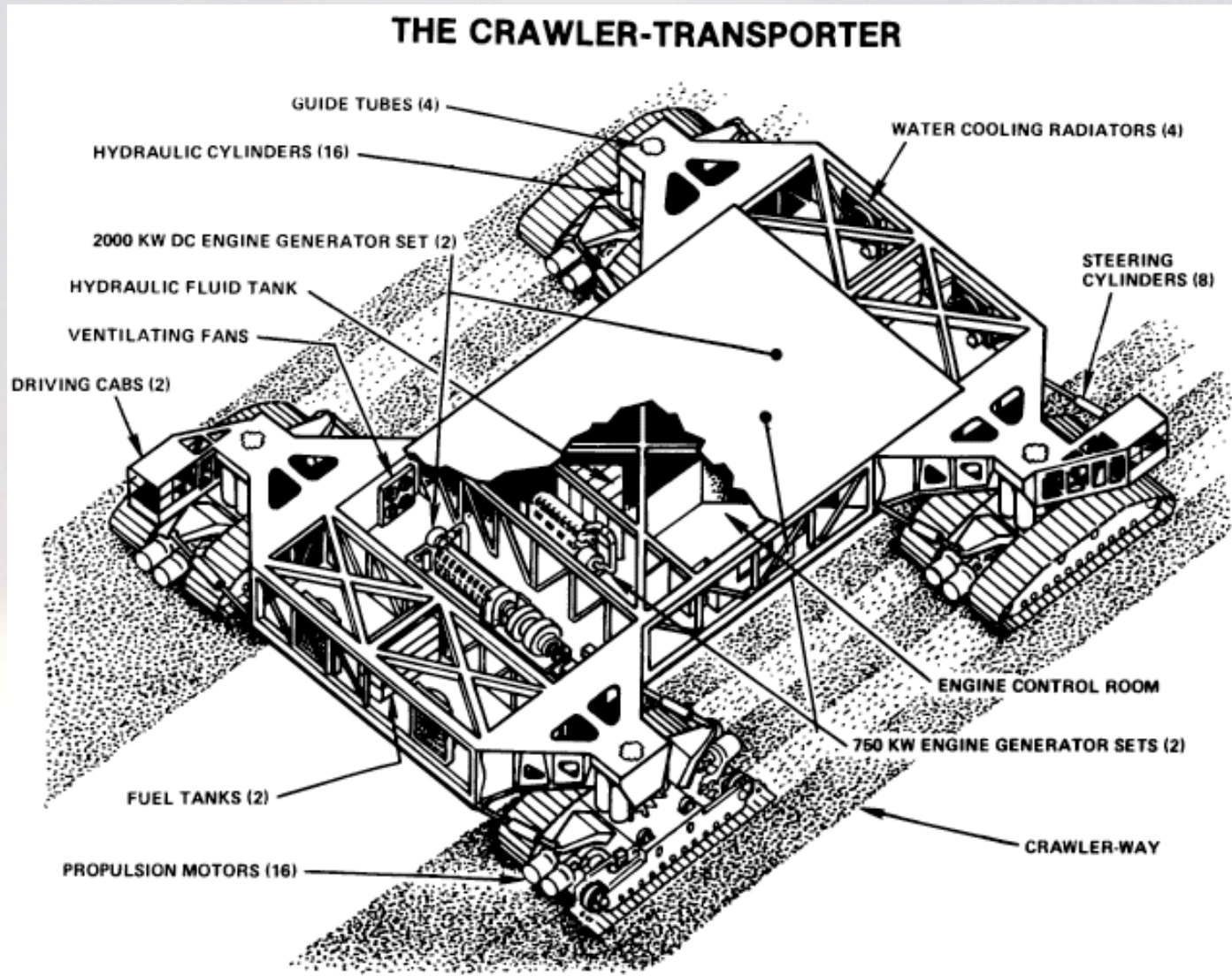


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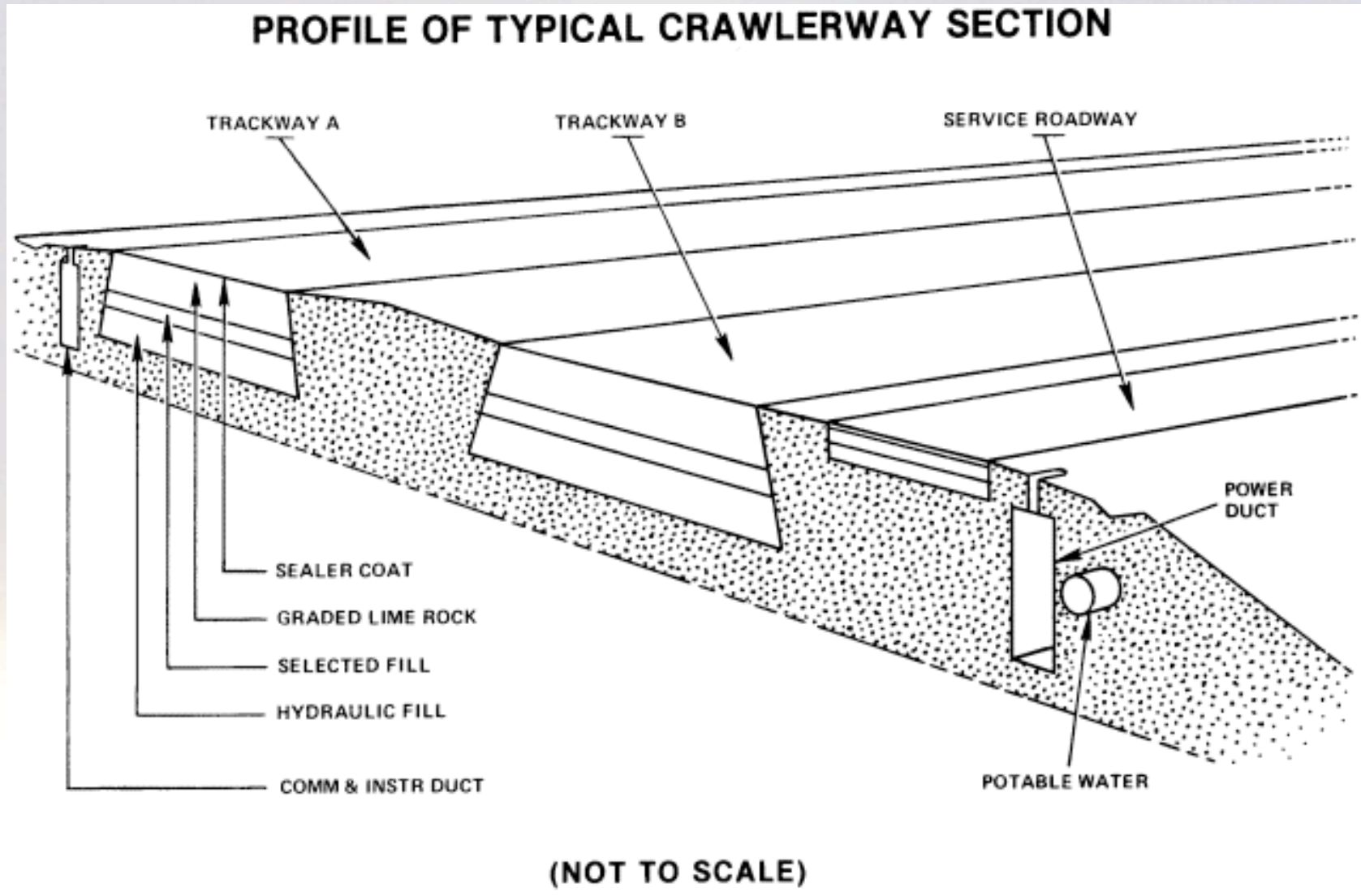


# Cutaway of Crawler-Transporter





# Complex 39 Crawlerway



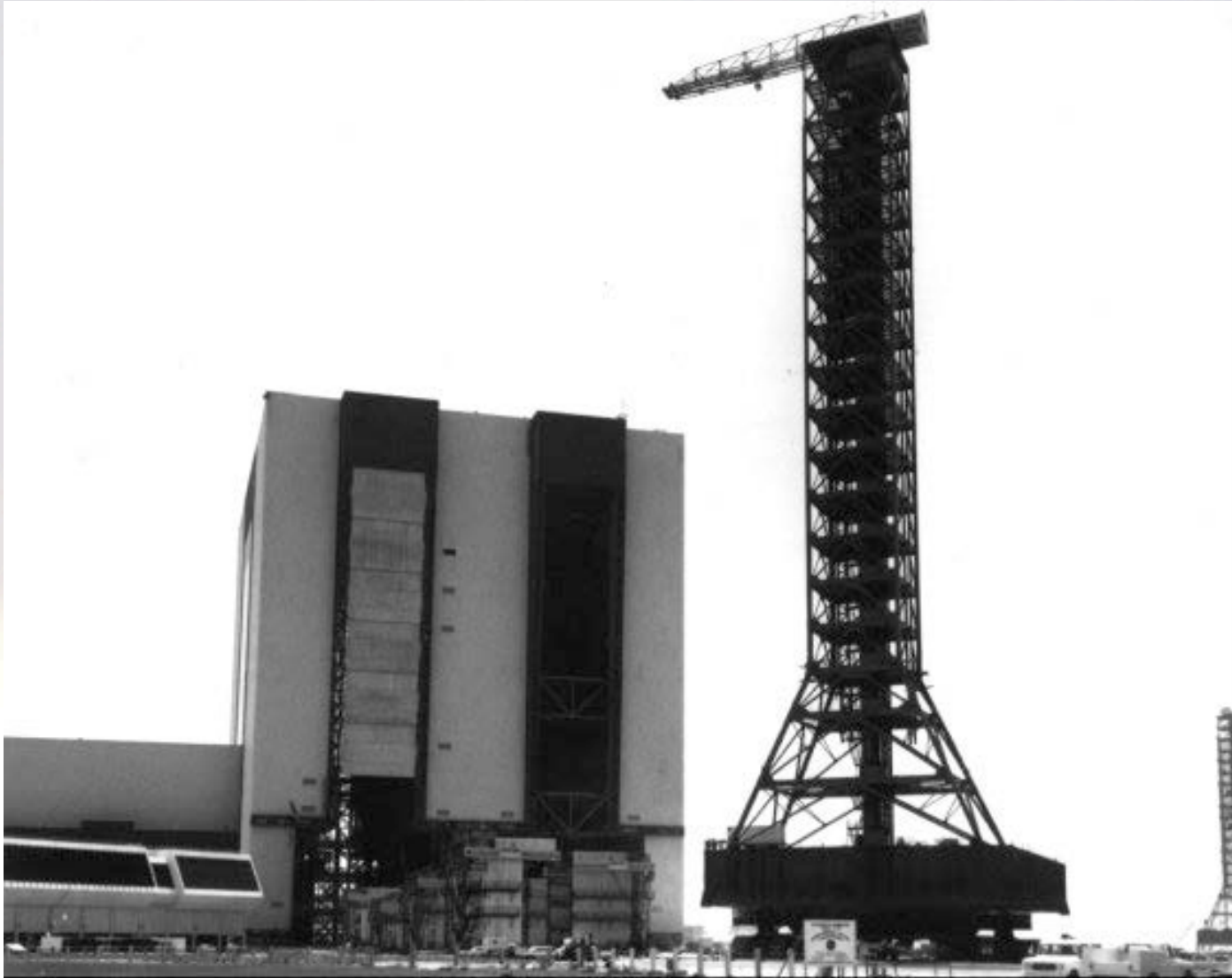
# Saturn V Mobile Launch Platforms



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# MLP Transport Tests

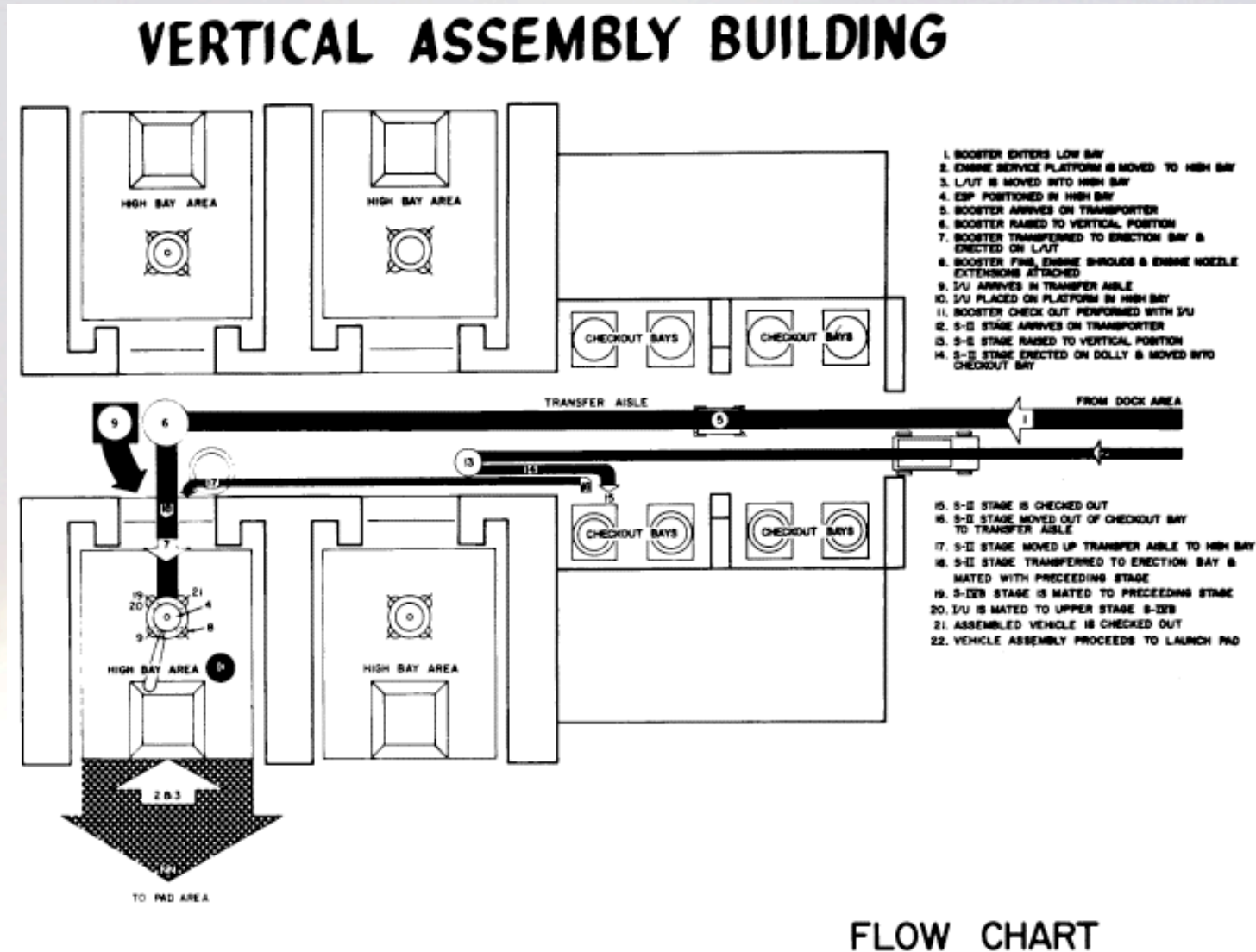


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# Interior of VAB



**FLOW CHART**



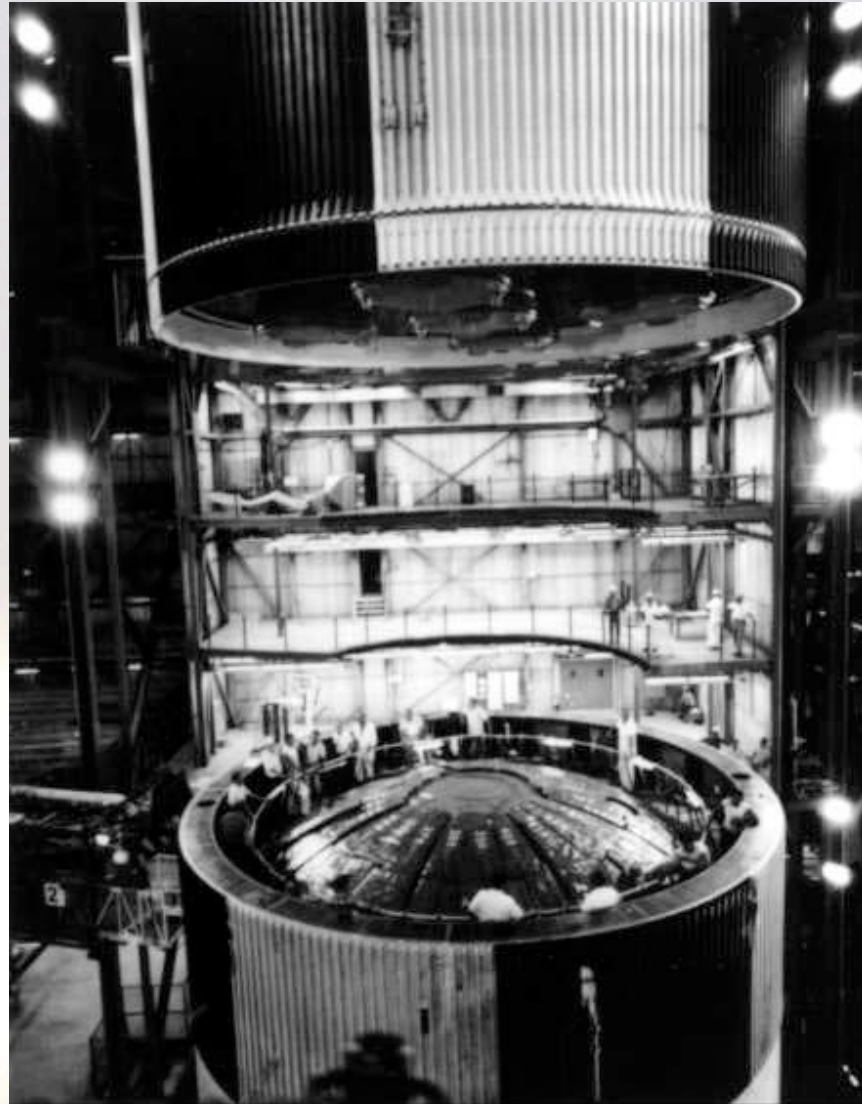
# S-IC Stage in VAB Transfer Aisle



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# S-IC – S-II Stacking

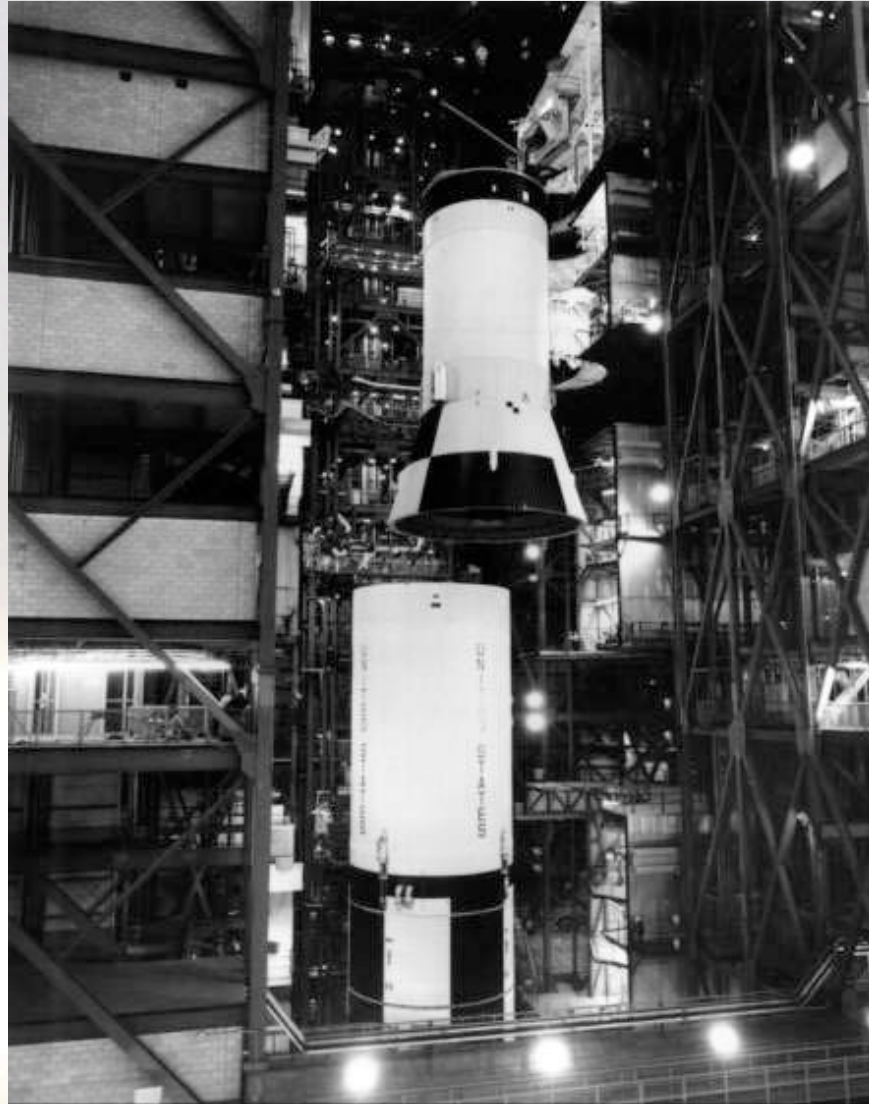


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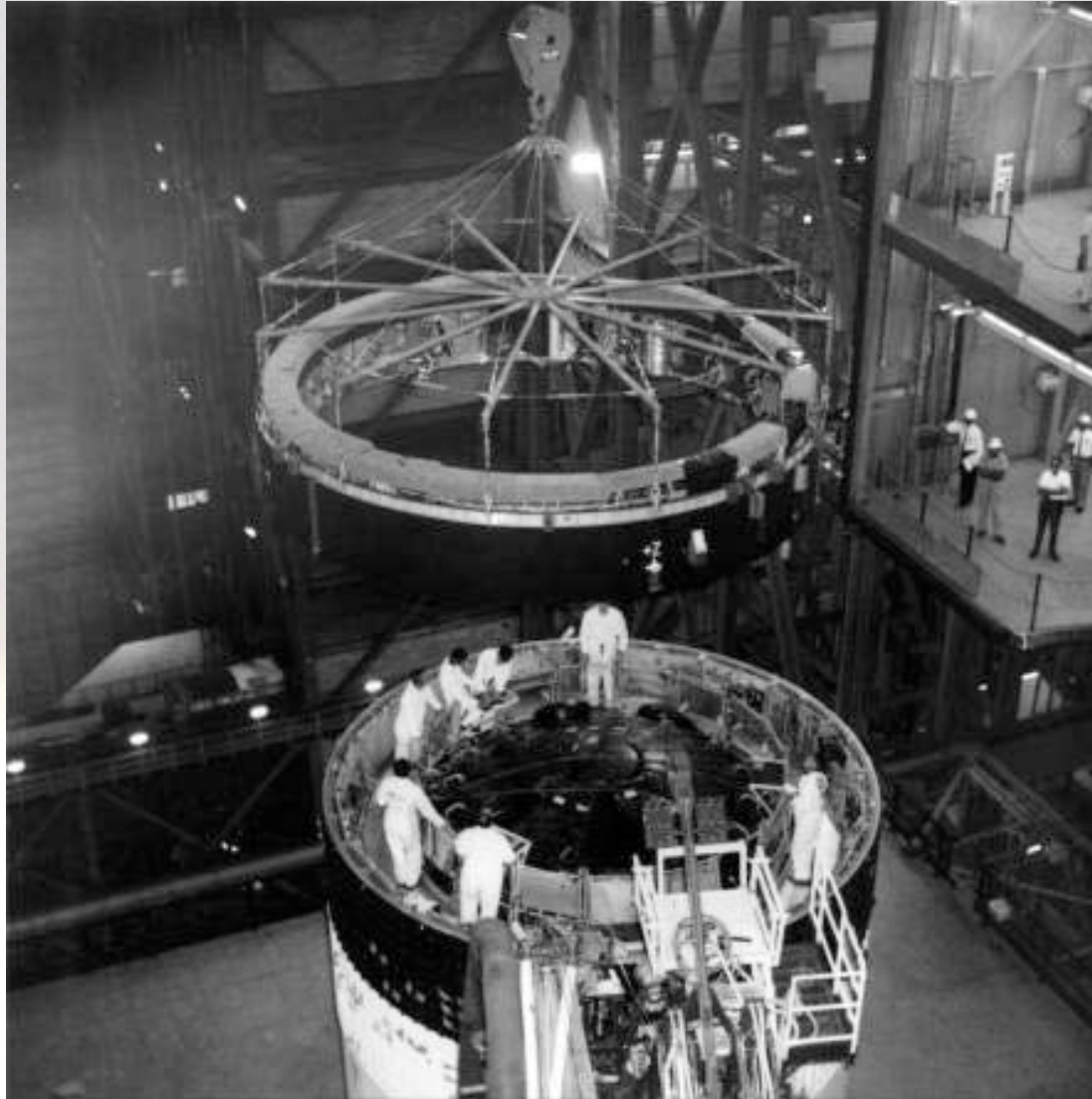
# S-II – S-IVB Stacking



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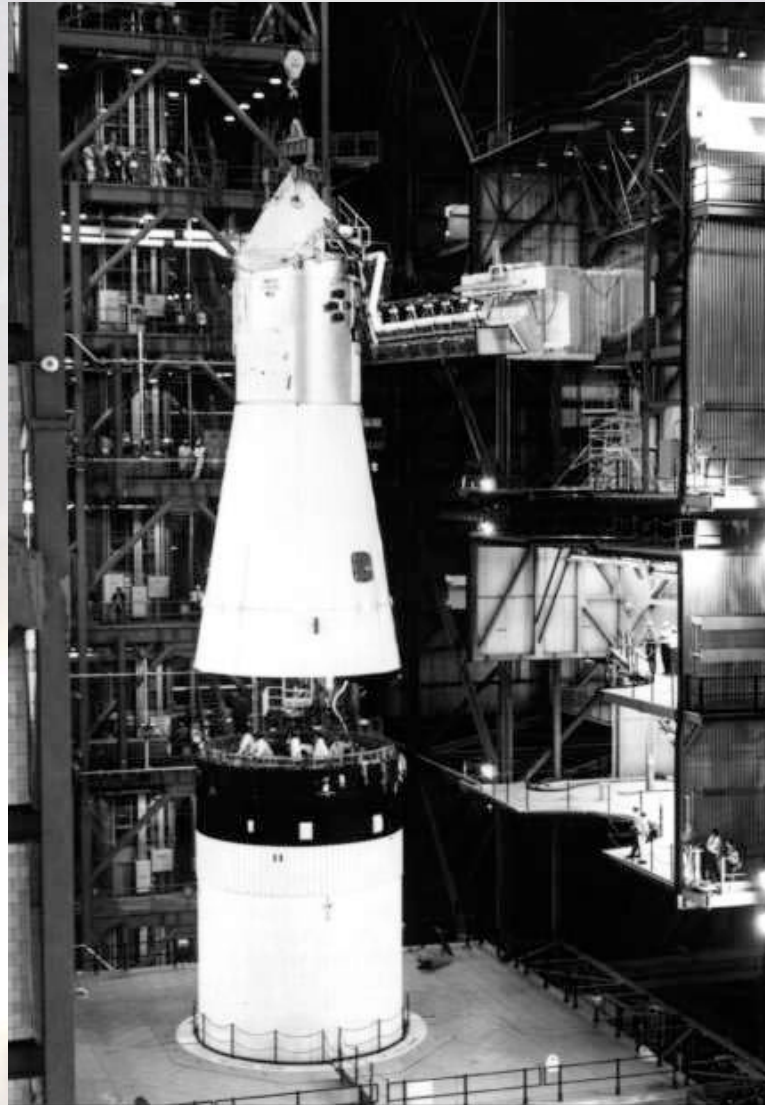
# S-IVB – Instrument Unit Stacking



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# IU – Apollo Spacecraft Stacking



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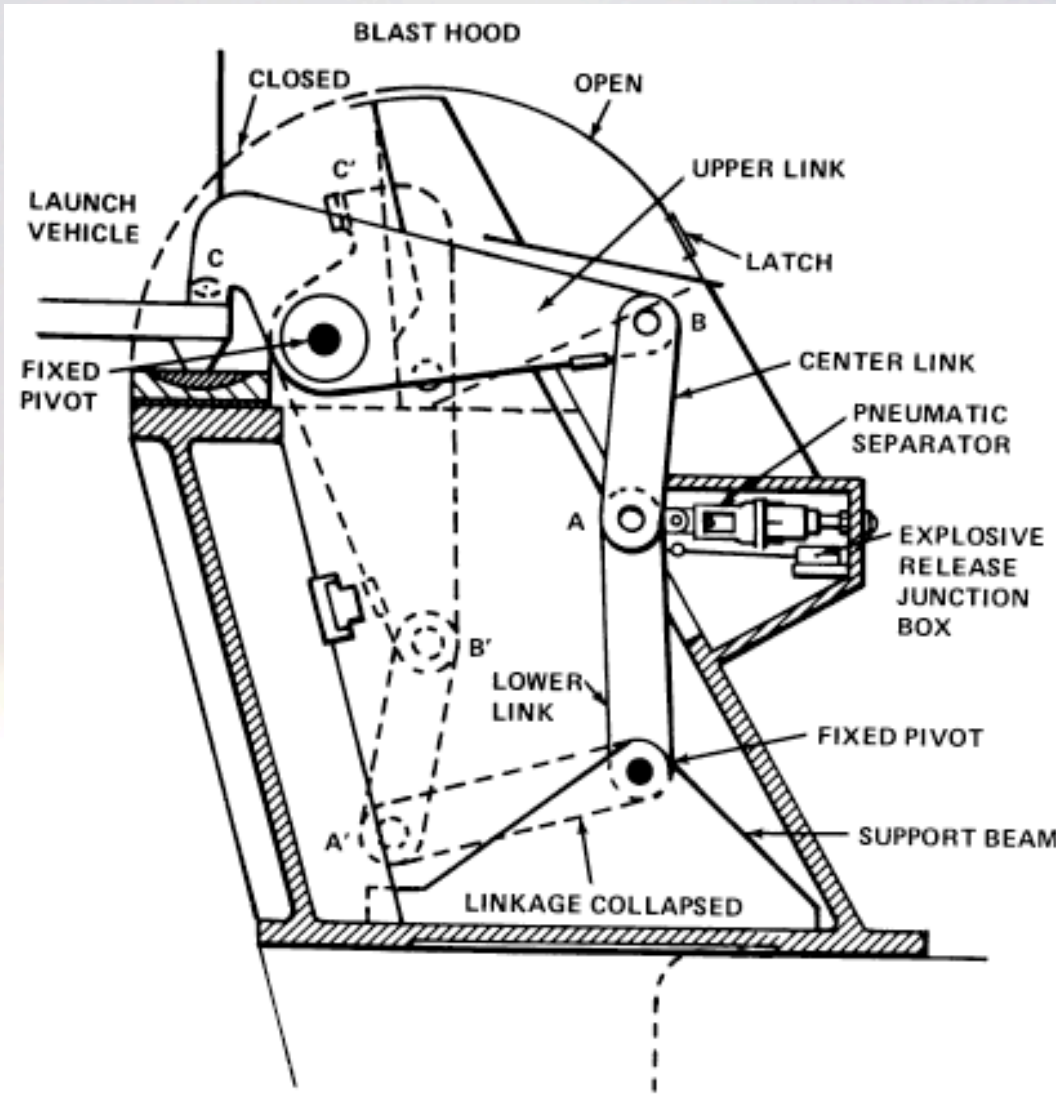
# Apollo–Saturn V Completed Stack in VAB



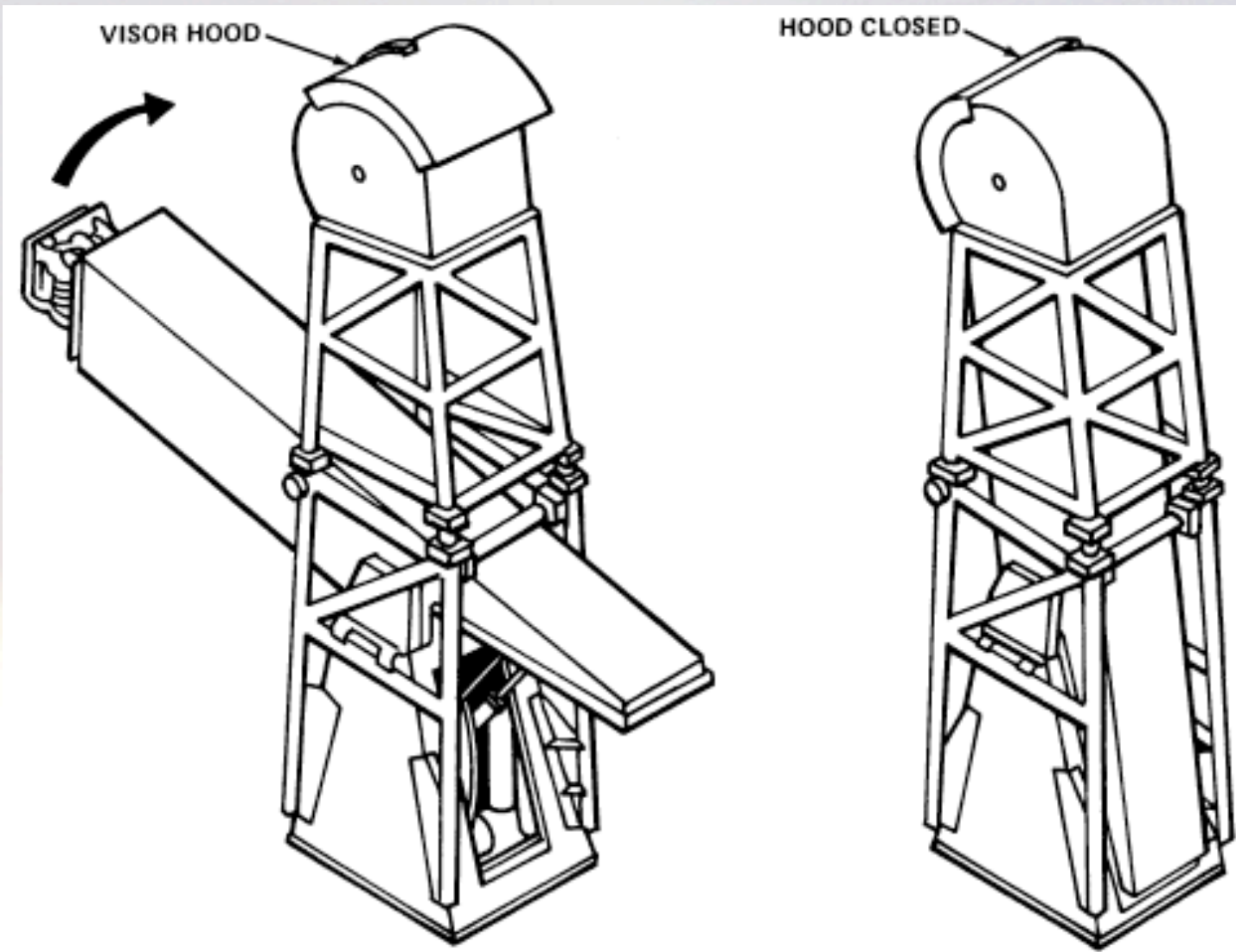
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# Saturn V Hold-Down Restraints



# S-1C T-0 Disconnects





# Building the LC-39 Launch Pads



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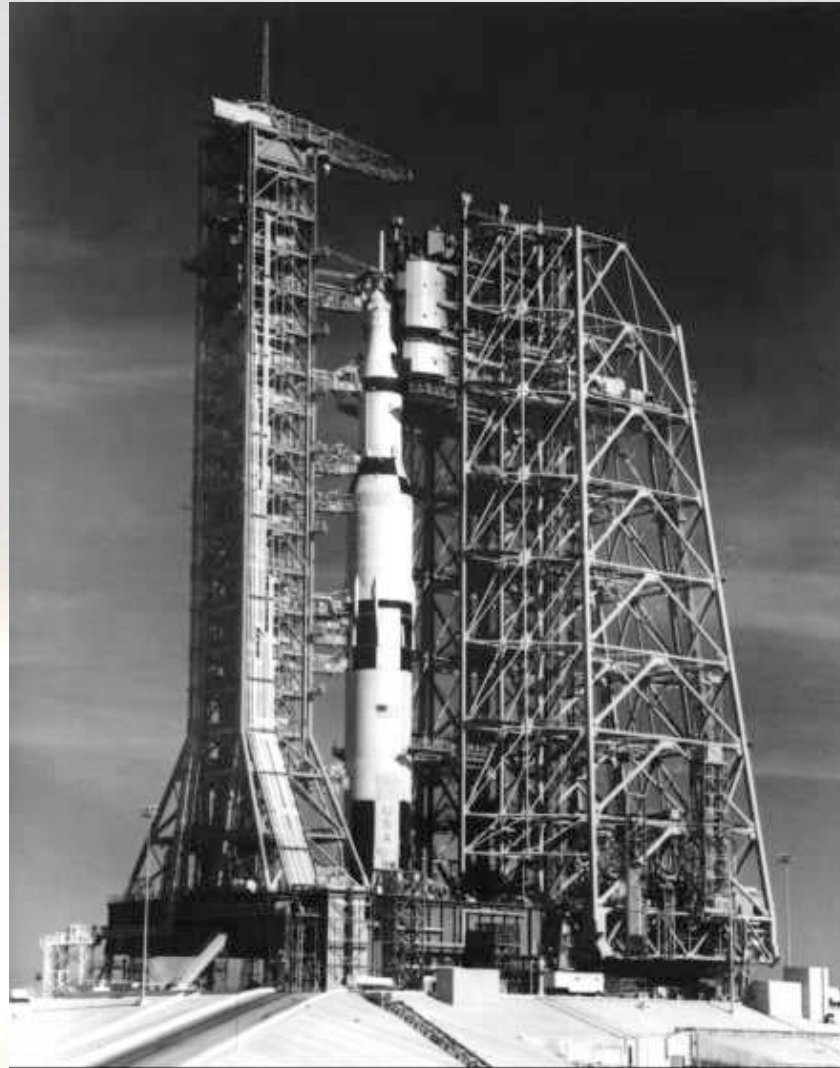
# LC-39 Crawlerway and Stacks



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# SA-501 at LC-39A



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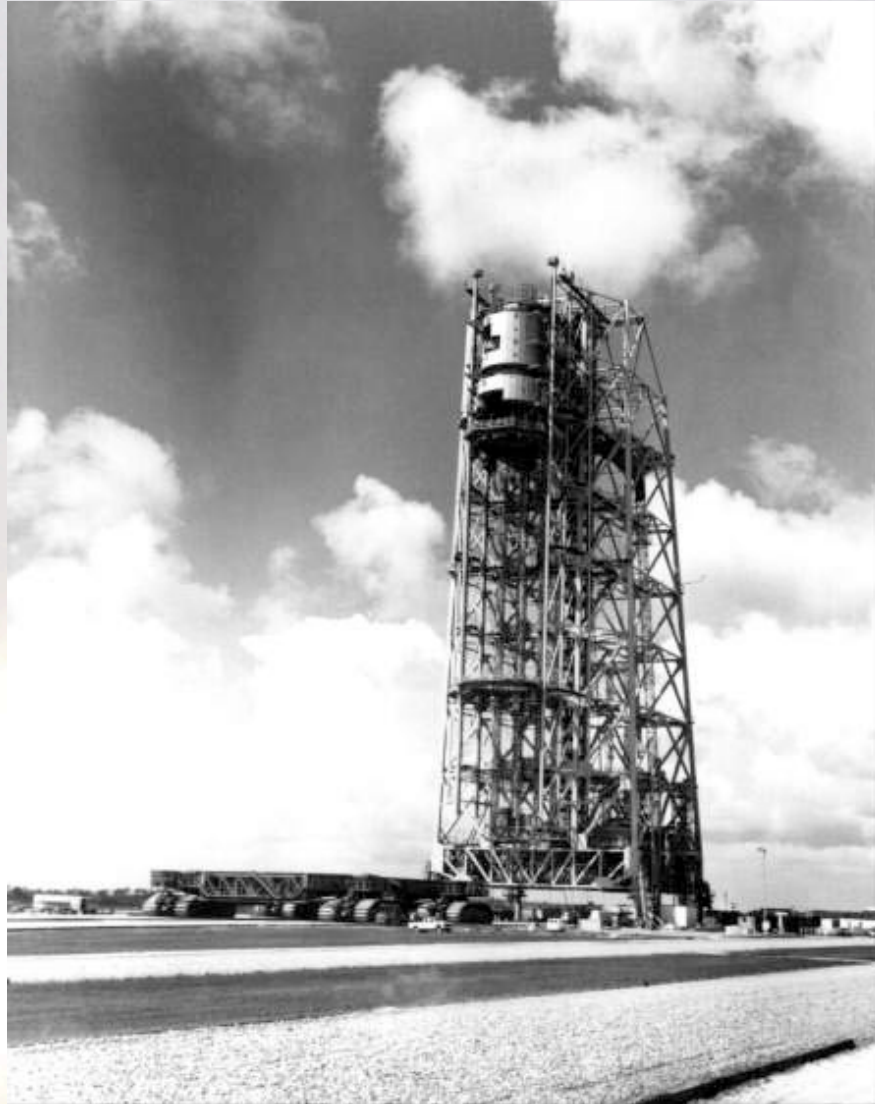
# LC-39 Mobile Service Structure



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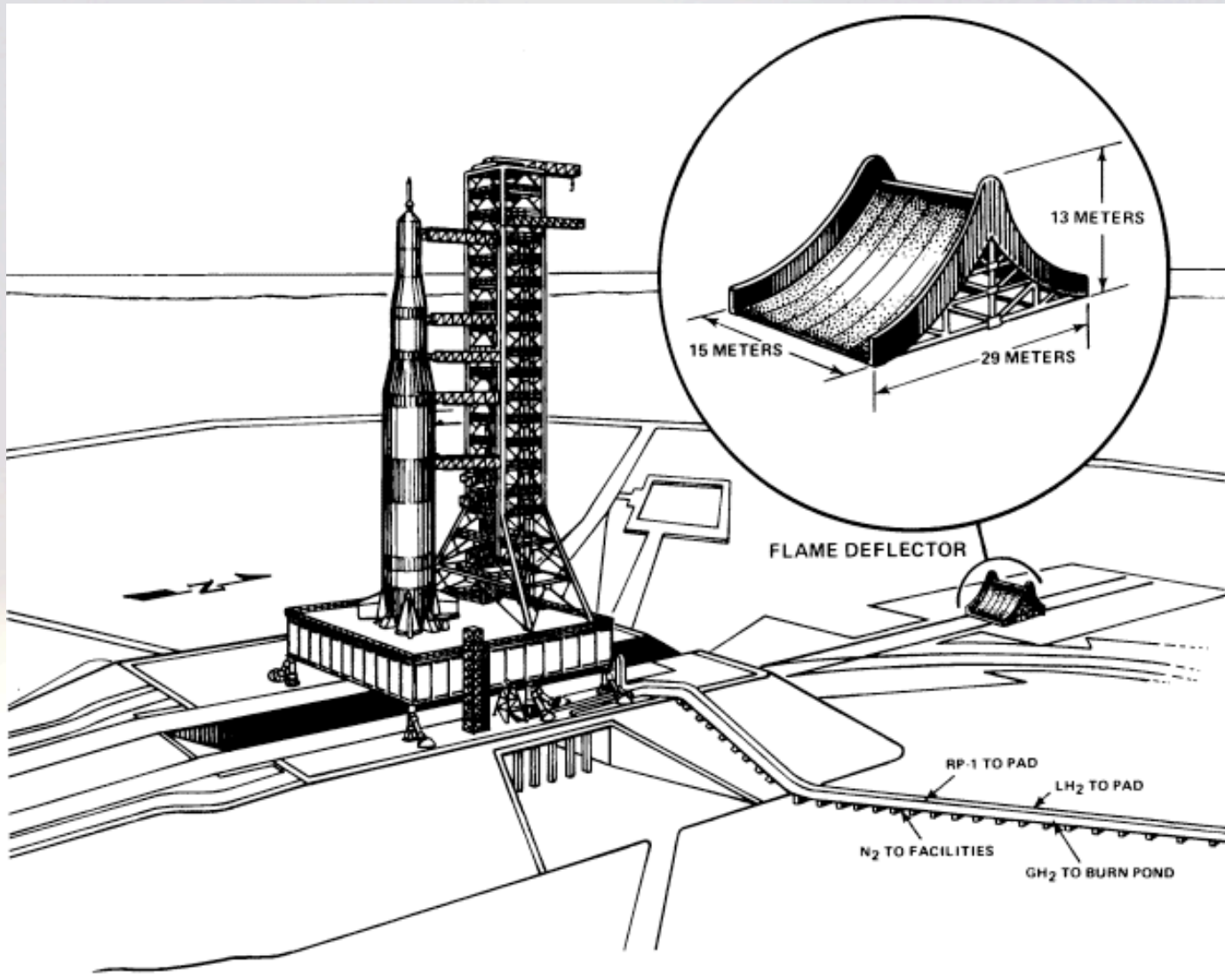
# LC-39 Mobile Service Structure



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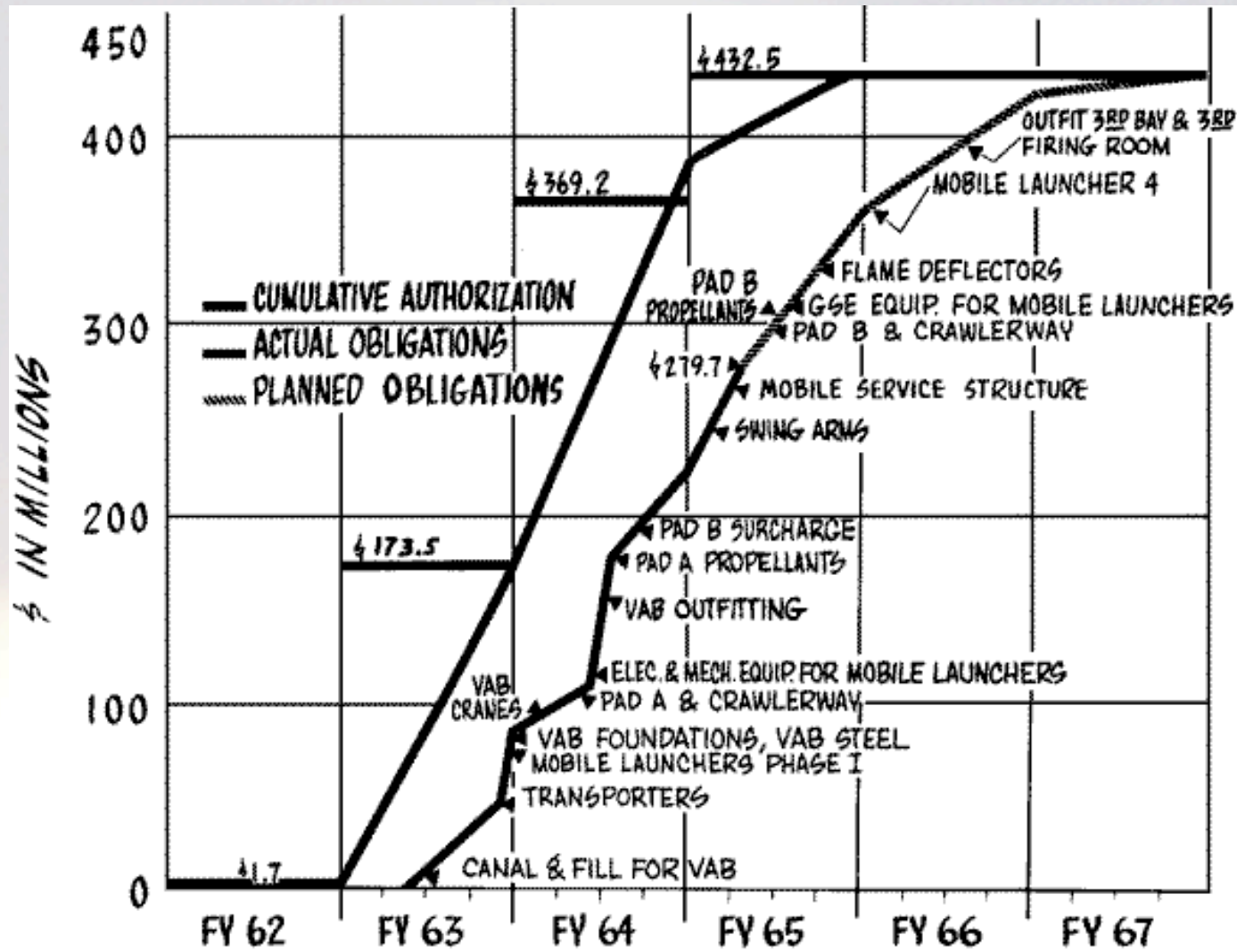
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# Complex 39 Launch Mounts

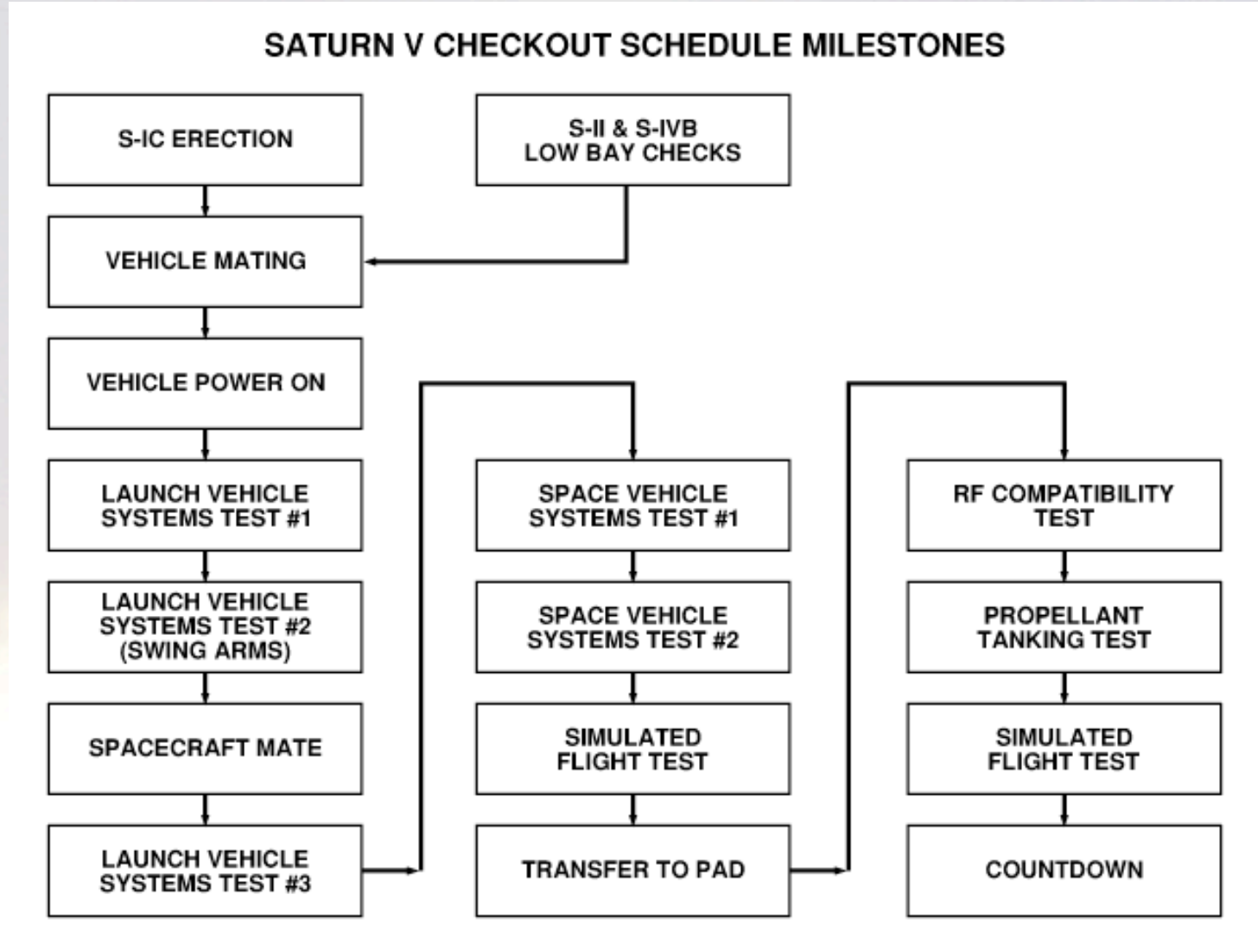




# Expenditures for LC-39



# Saturn V Vehicle Checkout Flow



# Soyuz Launch Vehicle Moving to Pad

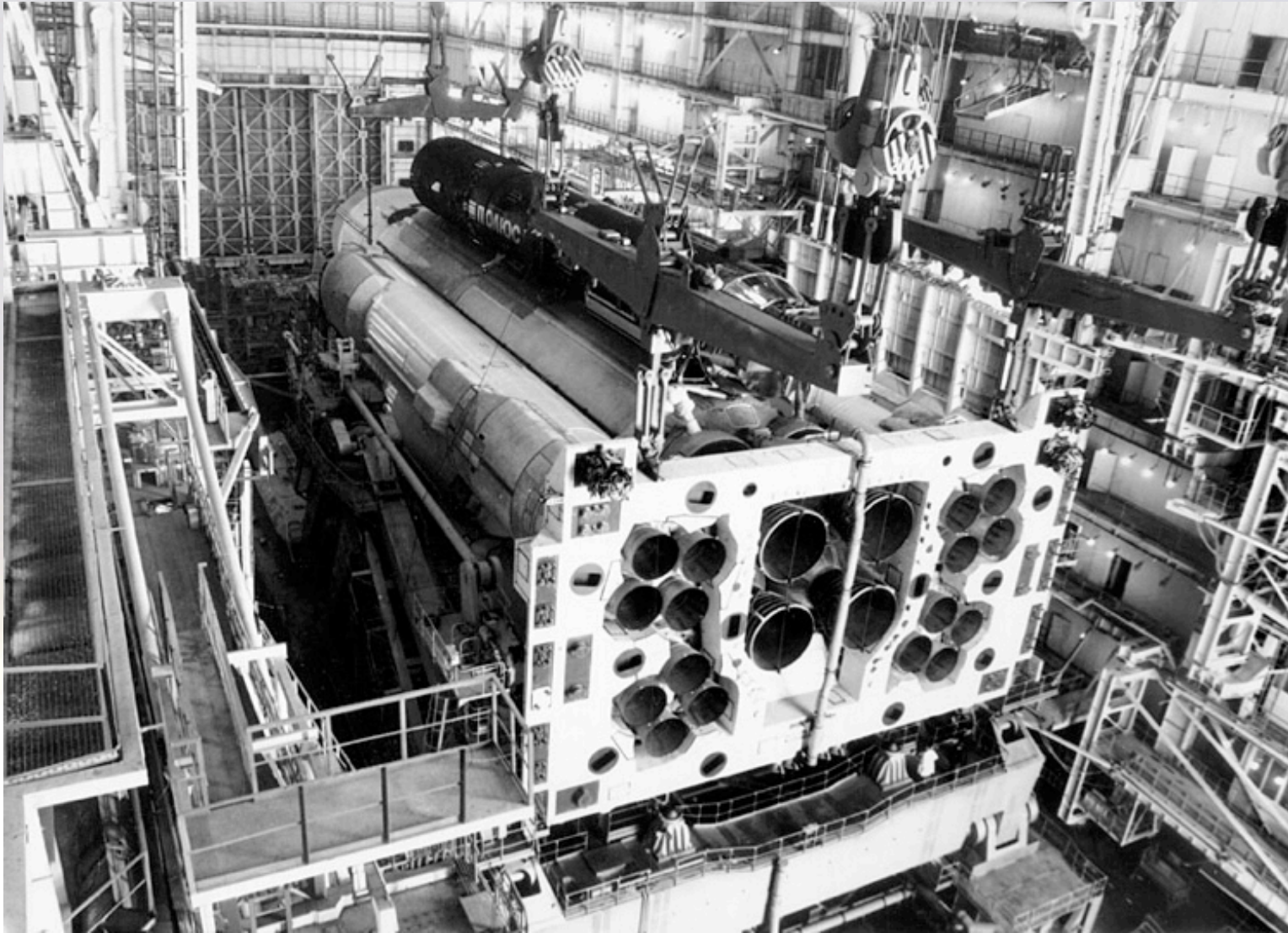




# Soyuz Launch Site



# Energia in Horizontal Integration





# Energia Transported to Pad





# Energia at Pad

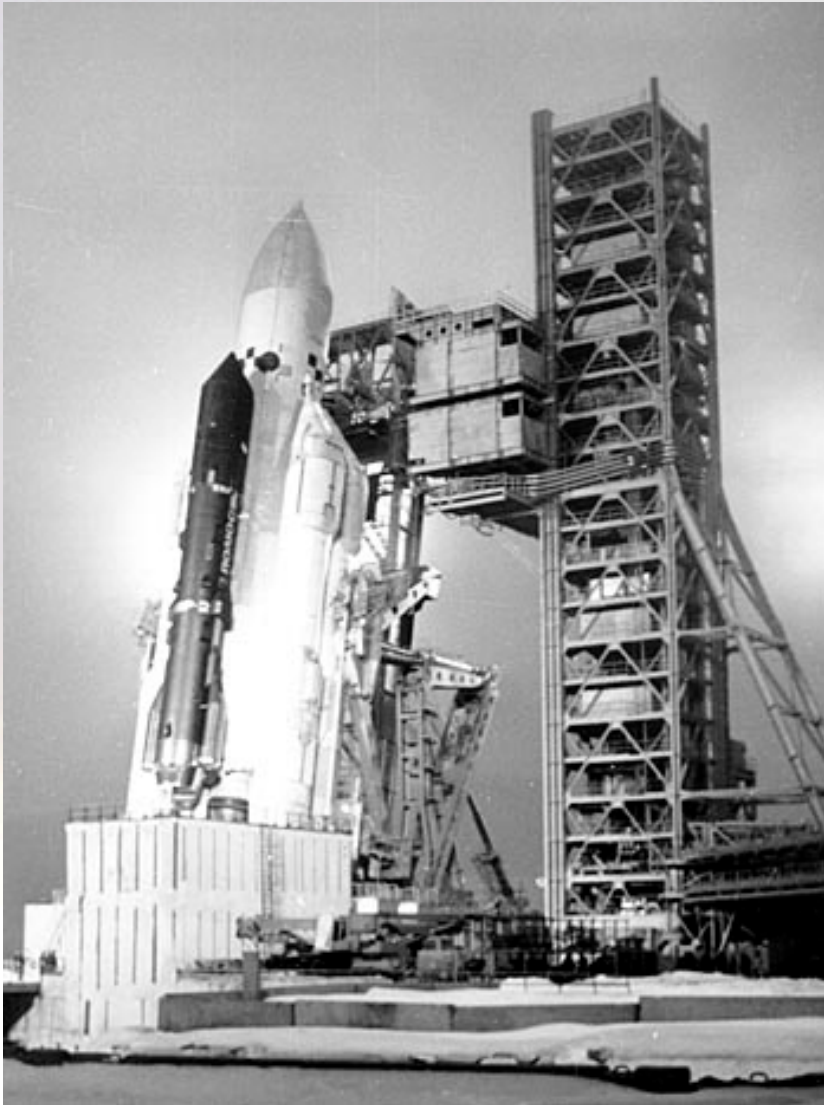


# Energia Erection



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# Energia on Pad





# Shuttle Landing Facility



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# Transport to Orbiter Processing Facility





# Payload Bay Inspection in OPF





# SSME Removal/Installation



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# Transfer to Vehicle Assembly Building



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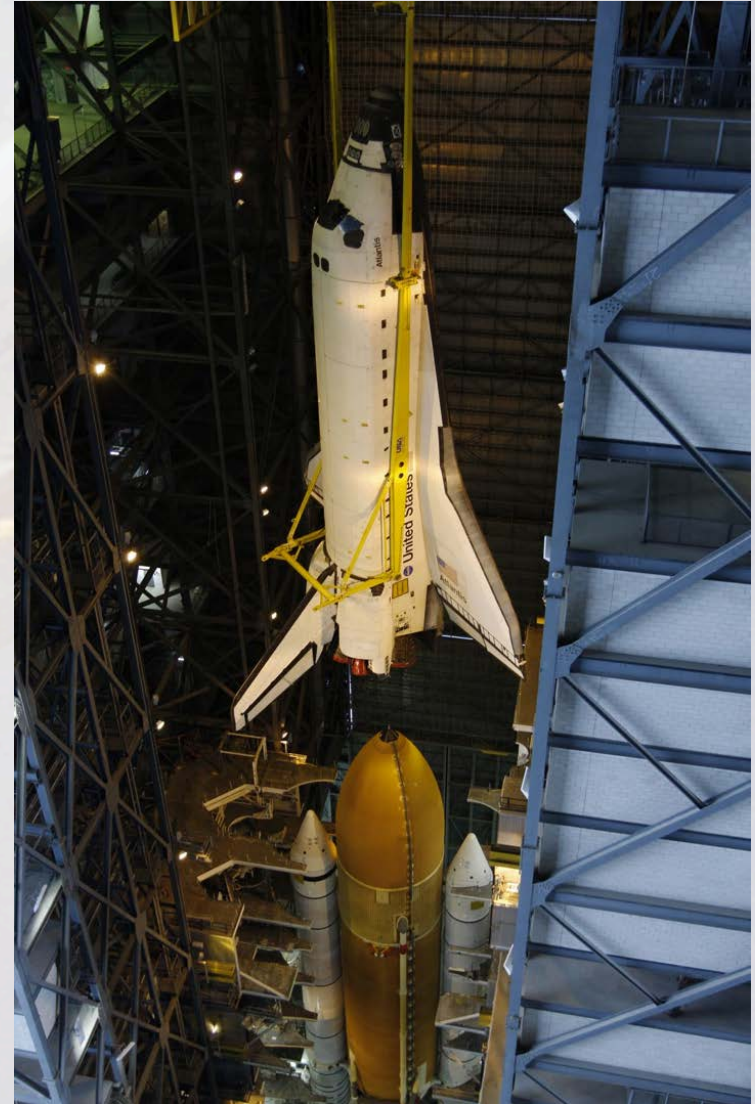


# Attaching Hoisting Fixtures





# Attaching Orbiter to Shuttle Stack





# Shuttle Rollout



# Delta IV Heavy Horizontal Integration



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# Delta IVH Horizontal Integration Facility



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# Delta IV Heavy Transporter



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# Delta IV Heavy at LC34 Blockhouse



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# Delta IV Heavy Arrives at LC-34



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# Delta IV Heavy Module Interconnects



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# Delta IV Heavy at Pad



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# Delta IV Heavy Rotation



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# Delta IV Heavy Rotation



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# Delta IV Heavy at Pad



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# DC-XA on Launch Pad

