An aerial photograph of the JPL MESA Test Facility. The facility is situated on a hillside with a paved parking lot and several buildings. In the background, there are residential houses and a forested area. The sky is clear and blue.

History of the JPL MESA Test Facility

1959 - 2020

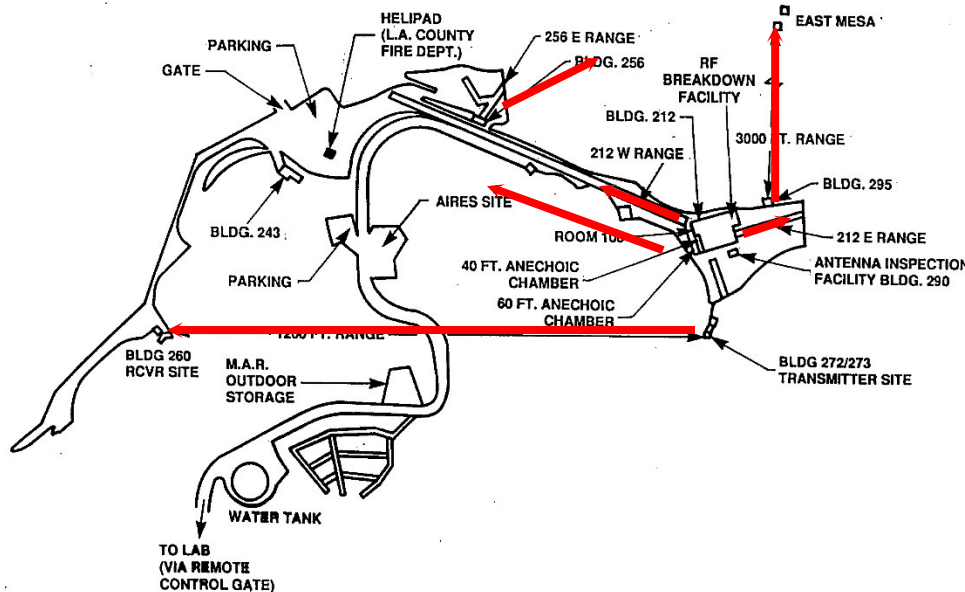
Dr. Joseph D. Vacchione
Jet Propulsion Laboratory,
California Institute of Technology



MESA Facility Description



- Six outdoor far field ranges
 - 3300 ft maximum length
- Indoor chambers (Bldg 212)
 - 20'x20'x40' configured for cylindrical near field scanning
 - 20'x20'x60' chamber – configured for planar and spherical near field scanning
 - X- and Ka-band operation
 - Ante-rooms with 5 & 1 ton cranes for sheltered access
- Vacuum breakdown facility

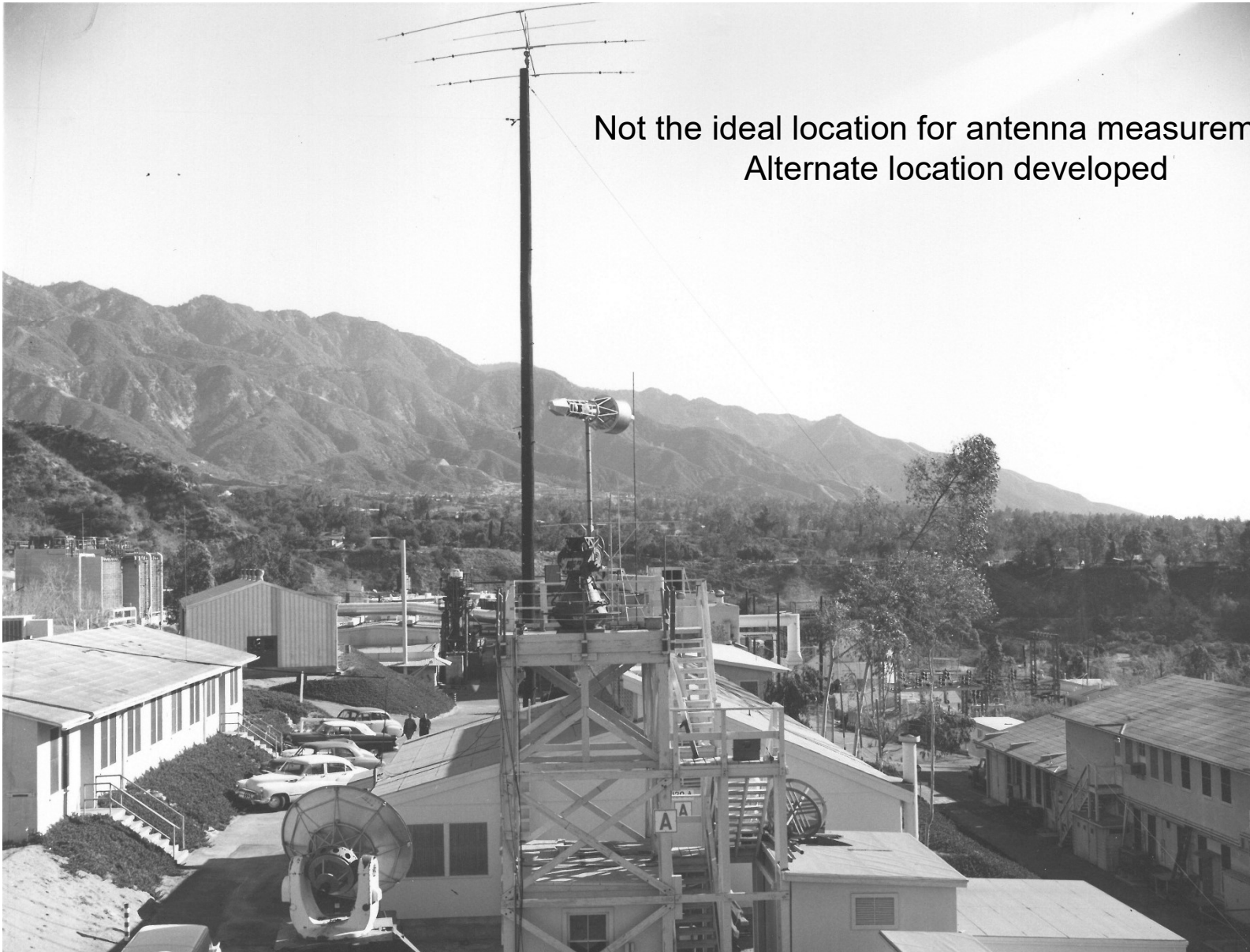




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Ranger 1 Antenna Under Test On Lab Circa 1959

JPL Mesa
Antenna Test
Facility

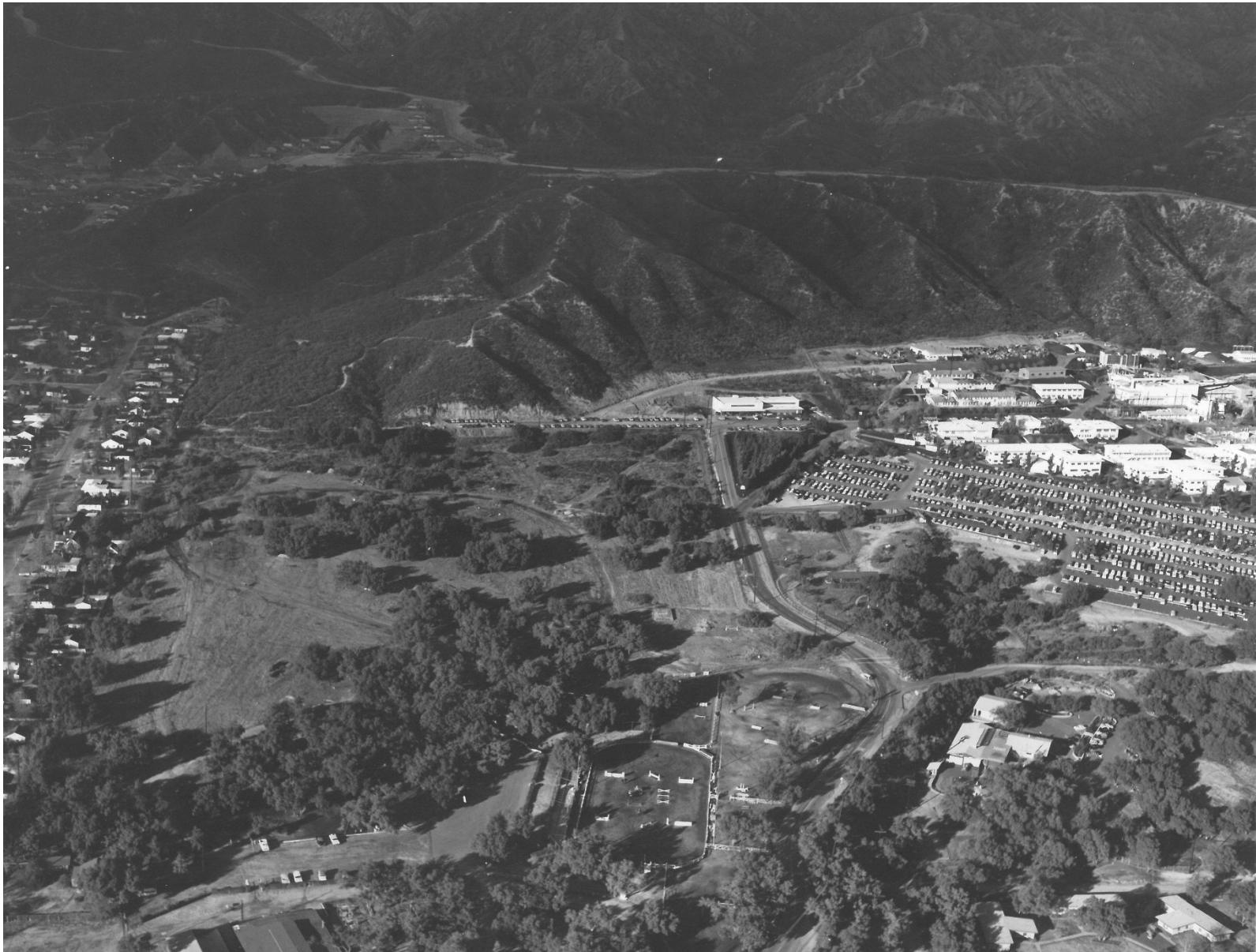




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JPL Circa 1958

JPL Mesa
Antenna Test
Facility





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JPL Circa 1958

JPL Mesa
Antenna Test
Facility





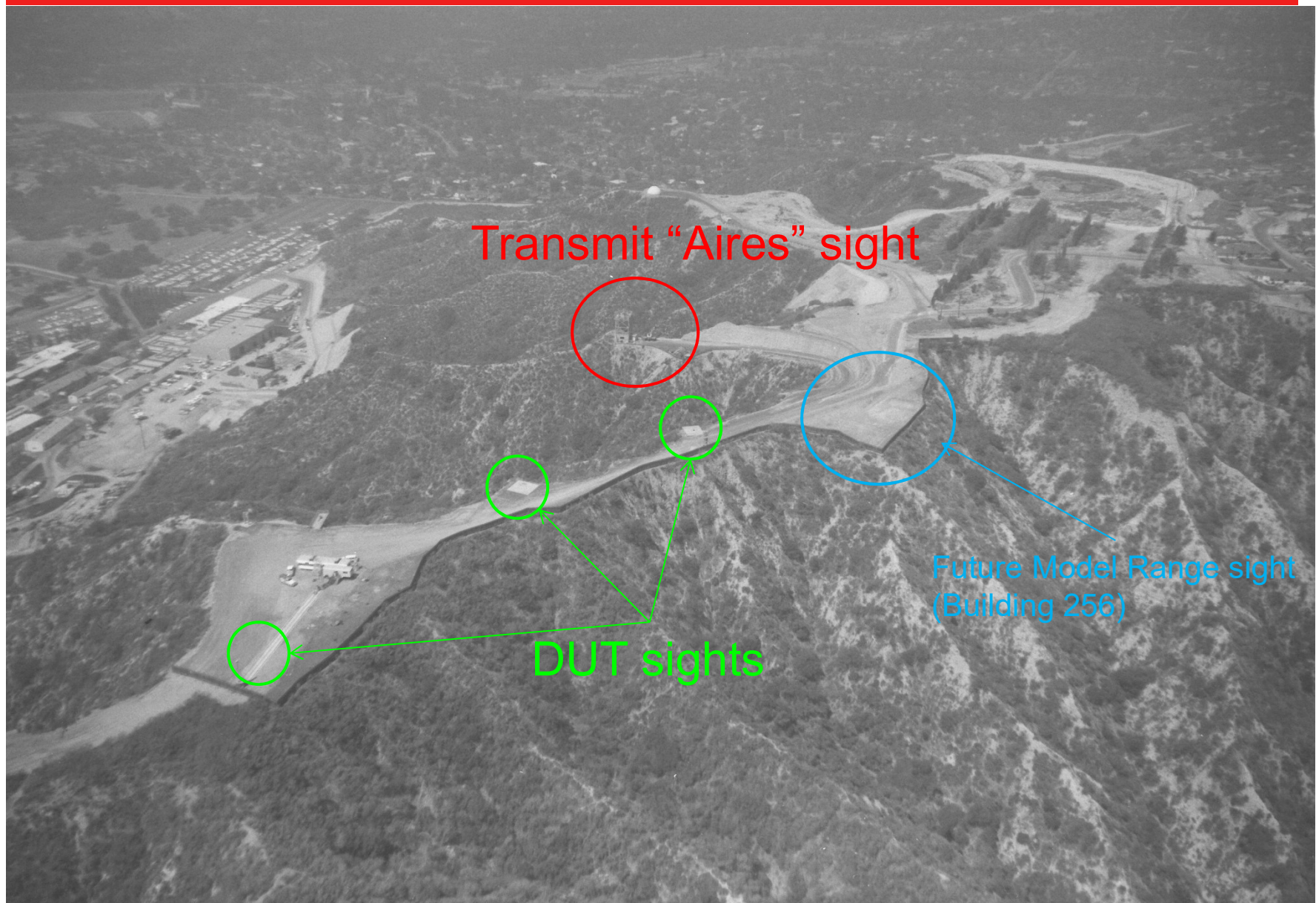
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California Institute of Technology

View of JPL Mesa Circa 1959

JPL Mesa
Antenna Test
Facility



Mesa Circa 1960 Original Antenna Test Operations

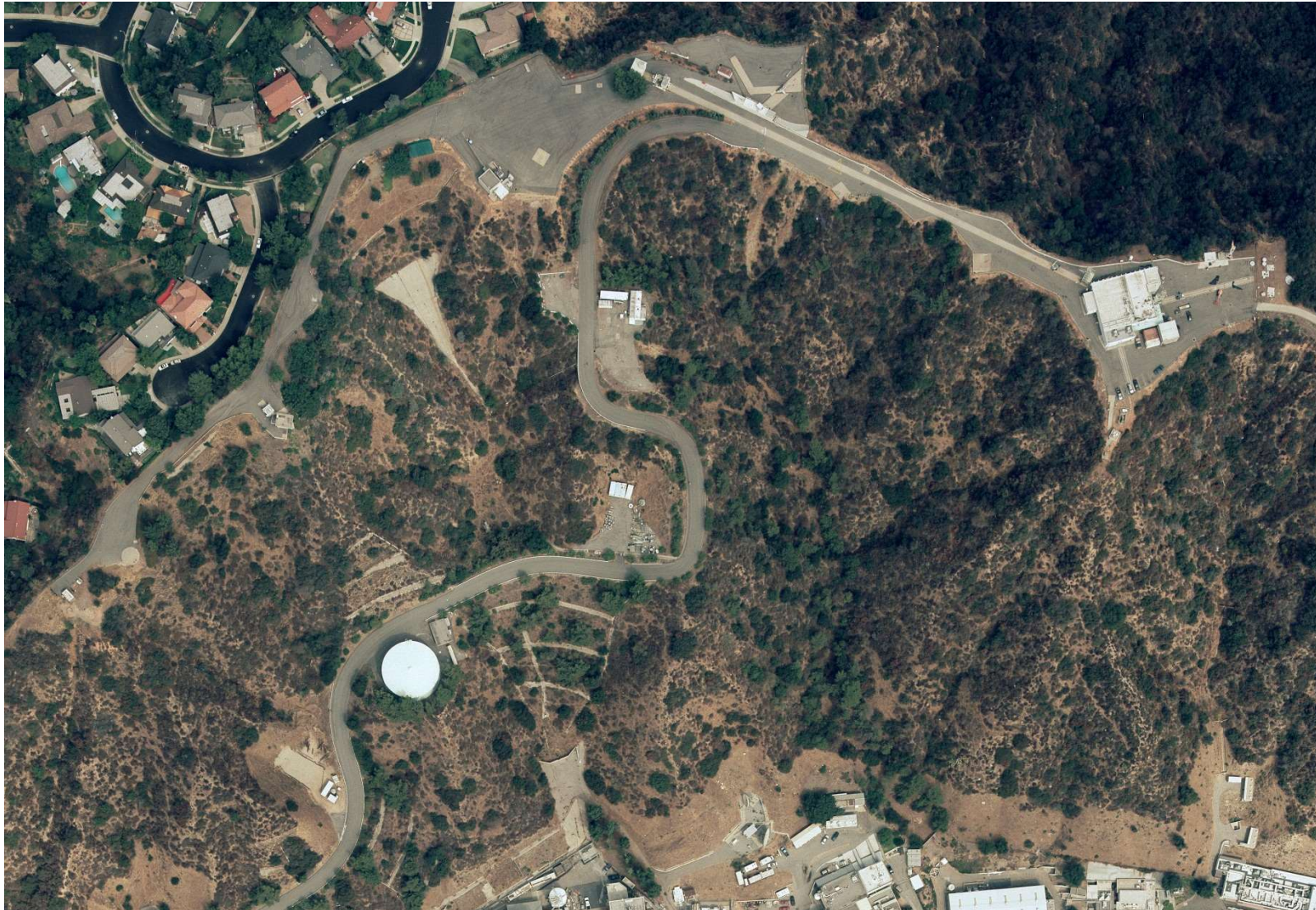




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California Institute of Technology

Mesa Circa 2005

JPL Mesa
Antenna Test
Facility

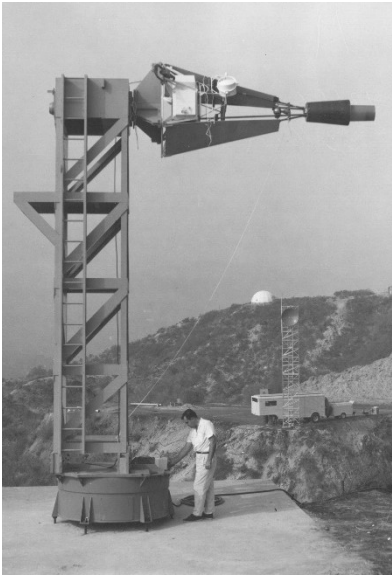


Mesa Circa 1960 Original Antenna Test Operations

JPL Mesa
Antenna Test
Facility



Ranger 2 (Lunar Orbiter)
Launched Nov 1961



Transmit sight &
Test operations trailer





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Aries Sight 1961

JPL Mesa
Antenna Test
Facility

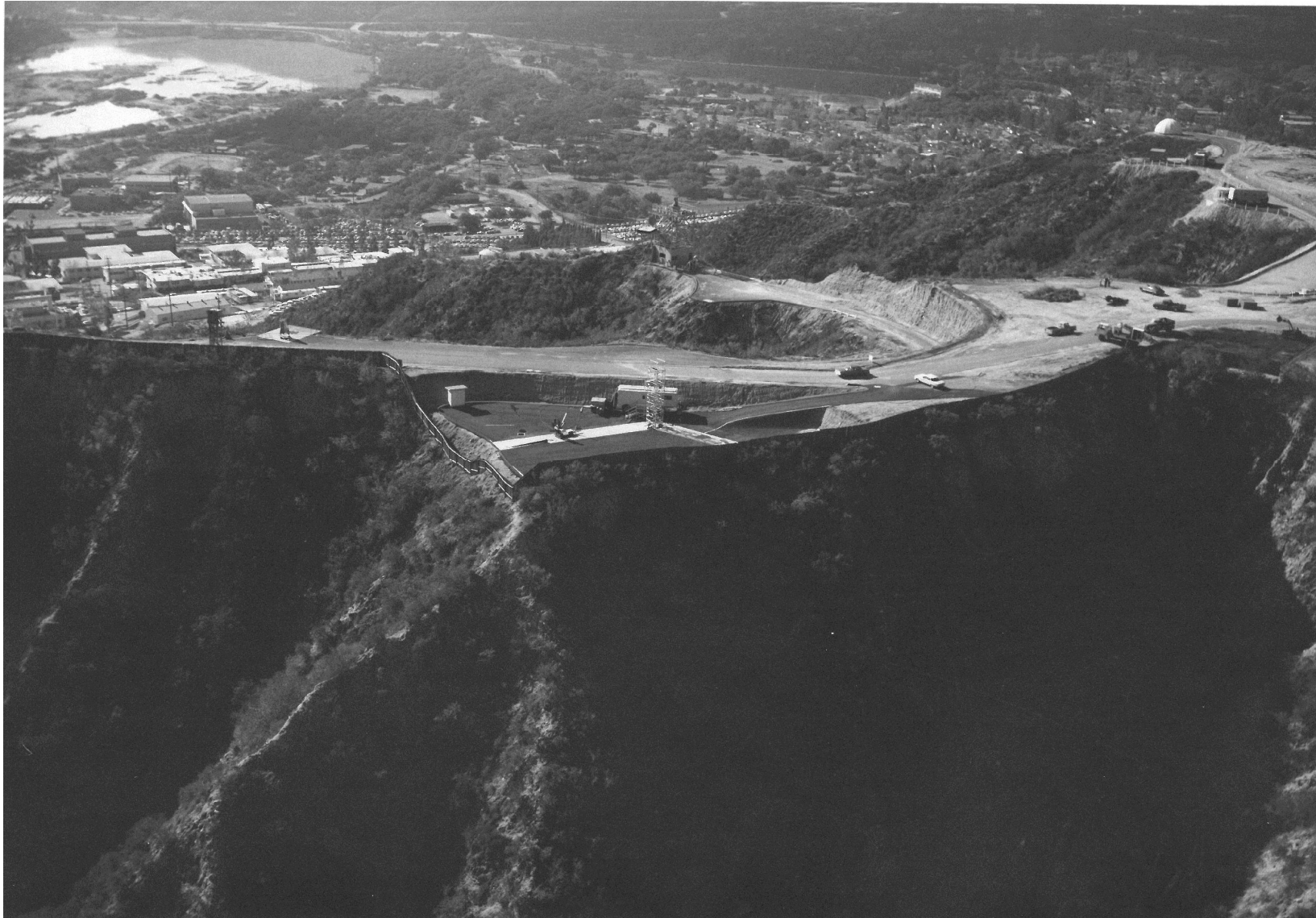




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Model Range 1961

JPL Mesa
Antenna Test
Facility





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California Institute of Technology

JPL Mesa
Antenna Test
Facility



Building 212 Plan Circa 1960



AUSTIN · FIELD & FRY A.I.A. ARCHITECTS & ENGINEERS
WHEELER & GRAY STRUCTURAL ENGINEERS
HOLLADAY & WESTCOTT MECHANICAL & ELECTRICAL ENGINEERS

ANTENNA
BUILDING 212
CALIFORNIA

RANGE
INSTITUTE

JET PROPULSION
OF

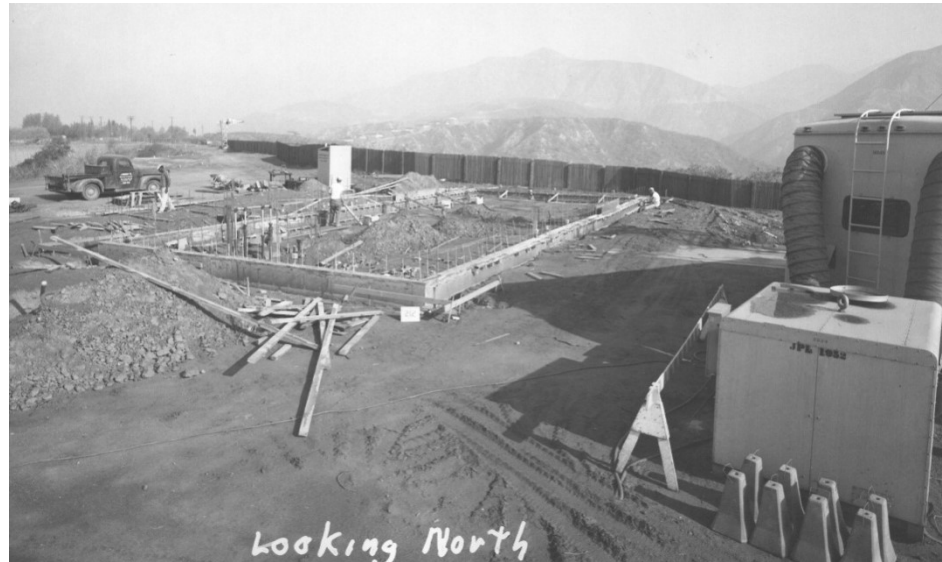
LABORATORY
LABORATORY
TECHNOLOGY



Jet Propulsion Laboratory
California Institute of Technology

Building 212 Circa 1961

JPL Mesa
Antenna Test
Facility





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Ranger 3, 4, 5 Circa 1961

JPL Mesa
Antenna Test
Facility



Ranger 3, 4, 5
Lunar missions
Jan, Apr, Oct 1962





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Ranger 6 & 7 Circa 1963

JPL Mesa
Antenna Test
Facility



Ranger 6 & 7
Lunar missions
Launched
Jan & Jul 1964





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Mariner 3 & 4 1964

JPL Mesa
Antenna Test
Facility



Mariner 3 & 4
Mars Missions
Launched
Nov 1964

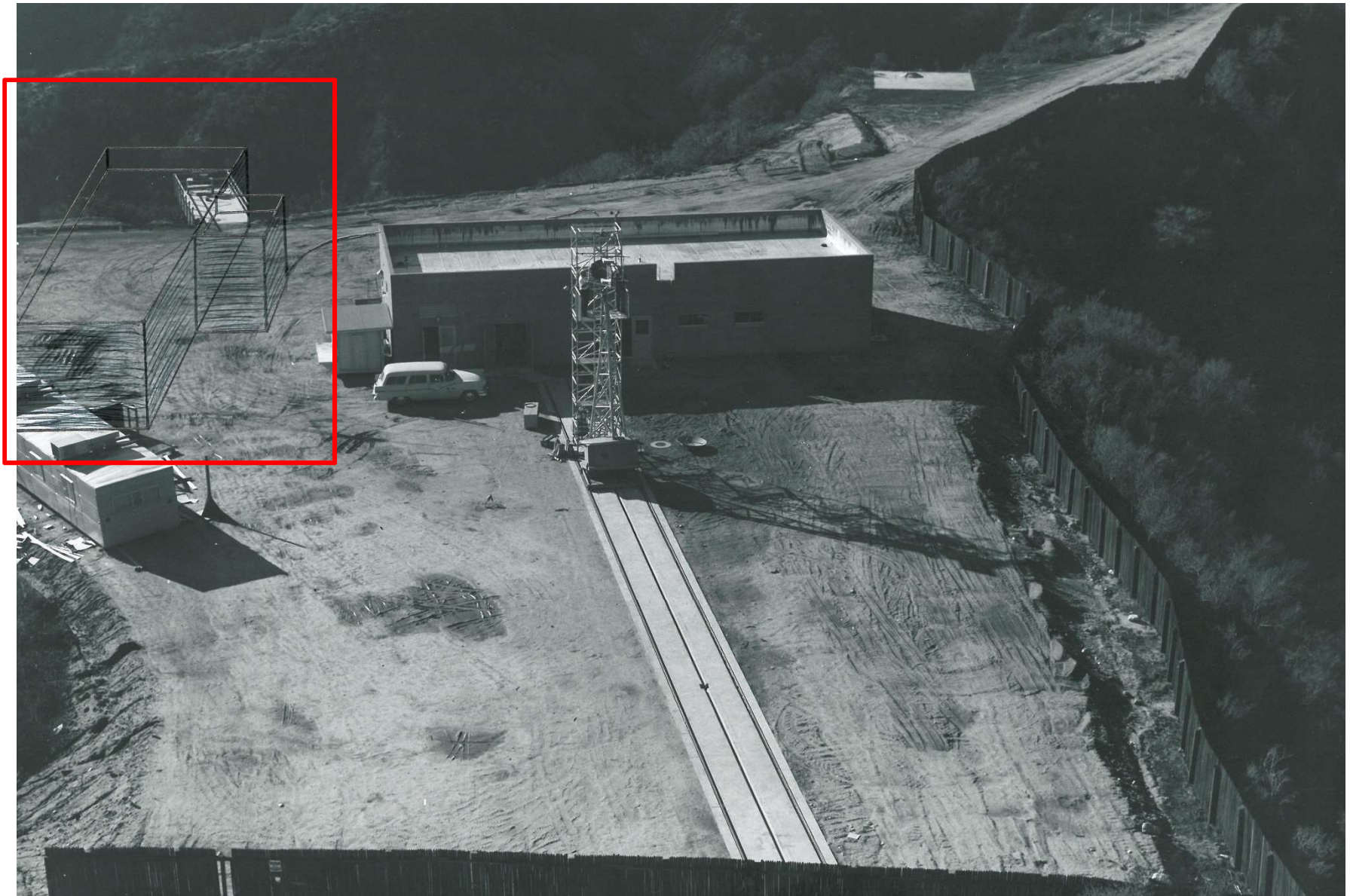




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A few years after Mesa Test facility went into operations Plans were underway to expand

JPL Mesa
Antenna Test
Facility





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Mesa Extension #1 1964

JPL Mesa
Antenna Test
Facility



Foundations
2x subterranean chambers



Upper Level Office Space

60' chamber





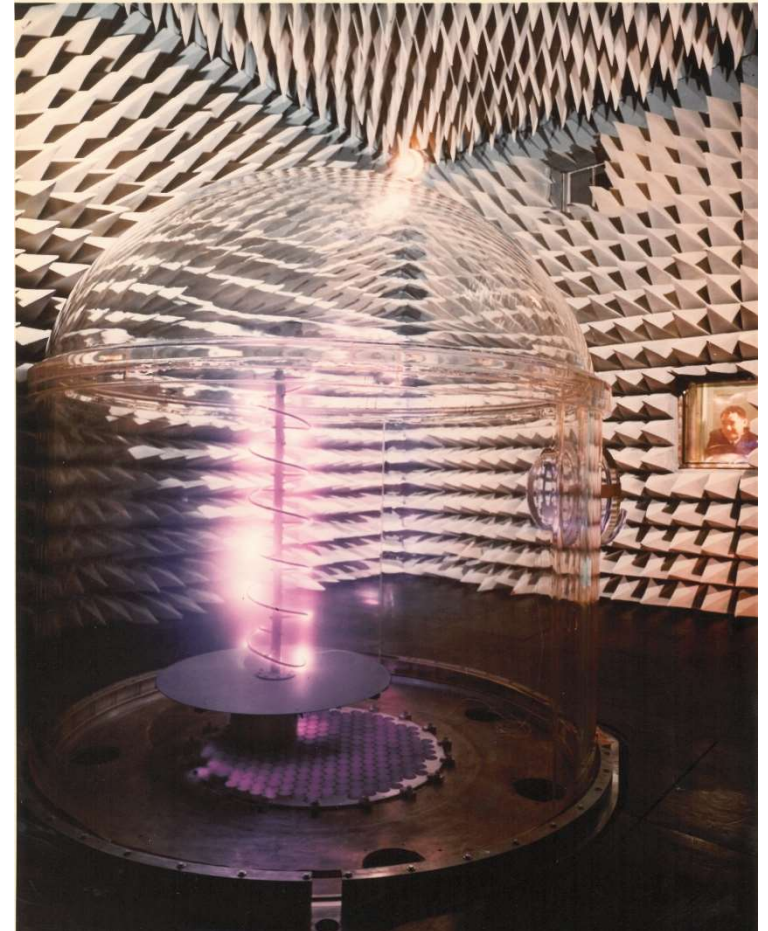
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Model Range Upgrade – Bld 256 1965

JPL Mesa
Antenna Test
Facility



Mesa Extension #2 High Power Vacuum Chamber



Not too long after the Indoor chamber extensions the vacuum bell jar chamber is erected



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Surveyor Circa 1965

JPL Mesa
Antenna Test
Facility



Surveyor's
1 – 7
Lunar Landers
Launched
1966 - 1968



Source Location
possibly at the east
mesa at brown
mountain Or the Aires
Sight



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Mars Mariner circa 1969

JPL Mesa
Antenna Test
Facility



Mars Mariners
8 & 9
Launched: May 1971



Test on the West range



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Testing on 1200 Ft Range

JPL Mesa
Antenna Test
Facility



In addition to flight projects, the DSN used the Mesa to develop its hardware including feeds and the beam-waveguide system





Mesa Circa 1970





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Other Mesa Additions Sometime after 1970

JPL Mesa
Antenna Test
Facility





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Galileo Circa 1983-86

JPL Mesa
Antenna Test
Facility

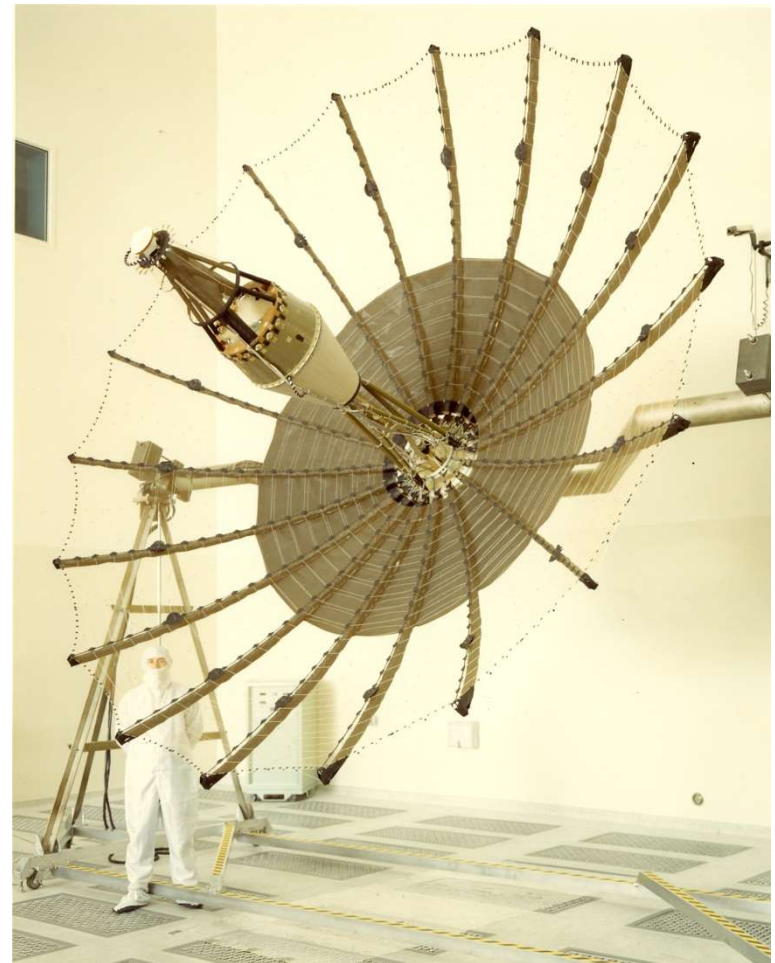


Galileo High Gain Antenna in Mesa 40'
chamber

Measured using a custom developed plane-
polar near-field technique



Galileo
Mission to Jupiter
Launched: Oct 18, 1989





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NASA Scatterometer Antenna Element Circa 1994

JPL Mesa
Antenna Test
Facility



NSCAT
Earth Ocean Winds
Mission
Launched: Aug 1996



NSCAT Antenna Element
measured in Mesa 40' Chamber
using custom developed
Cylindrical Near Field Approach

This Cylindrical NF setup still
heavily used today



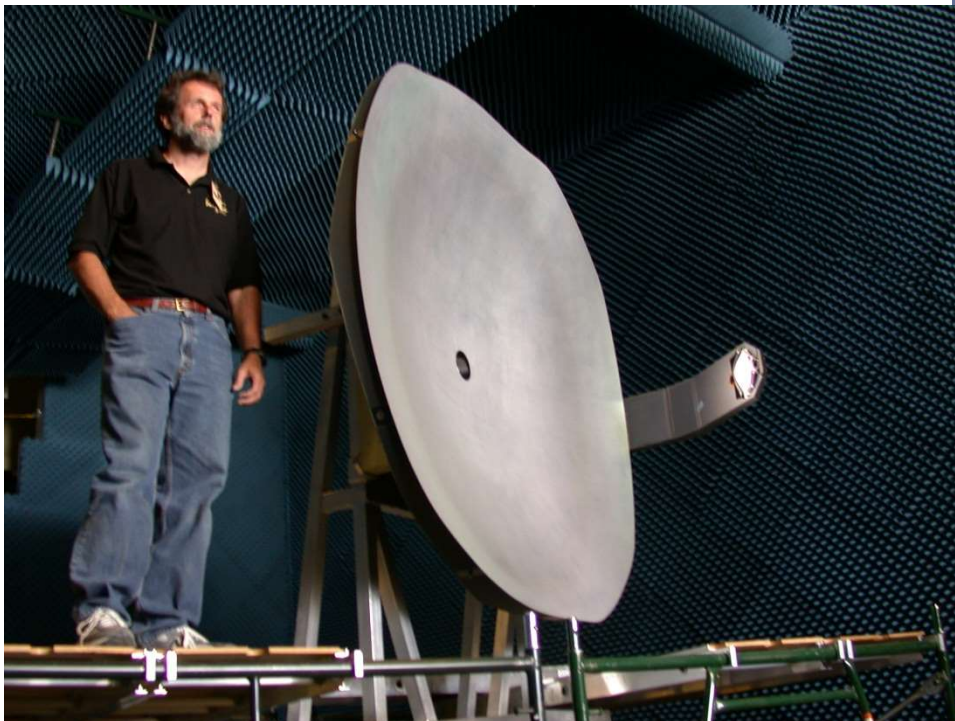
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Cloudsat Antenna Circa 2001

JPL Mesa
Antenna Test
Facility



Cloudsat
Earth Cloud radar
Launched: April 2006



Cloud Sat Antenna Measured on 3000' range (top left) and in the Mesa 40' chamber using the cylindrical NF scanner (bottom left)



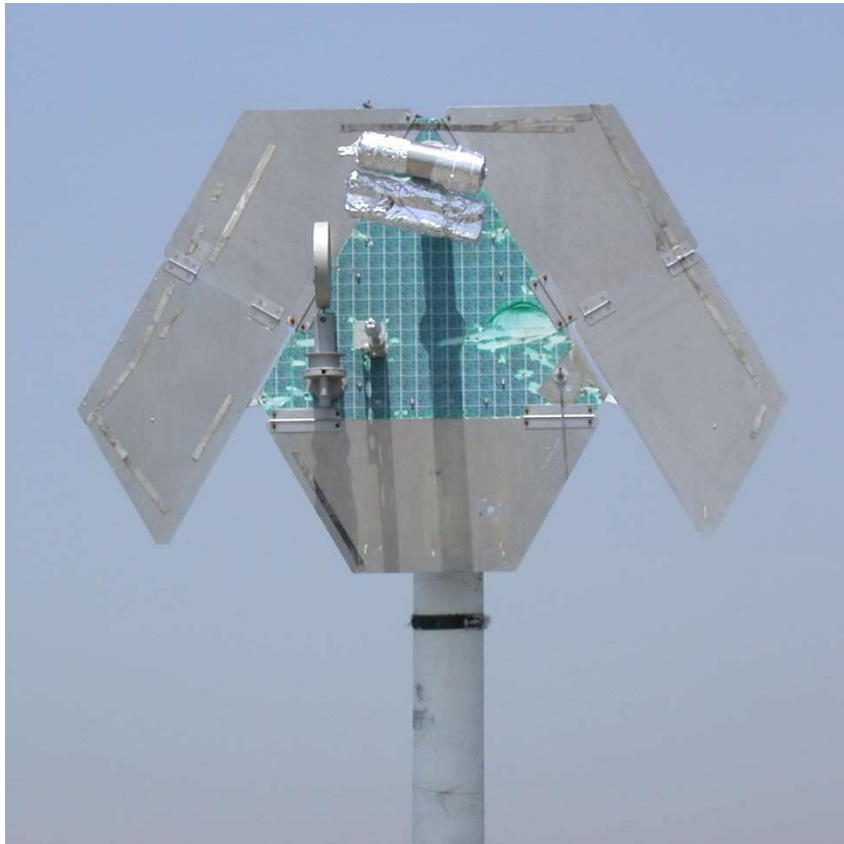
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Mars Exploration Rover Circa 2003

JPL Mesa
Antenna Test
Facility

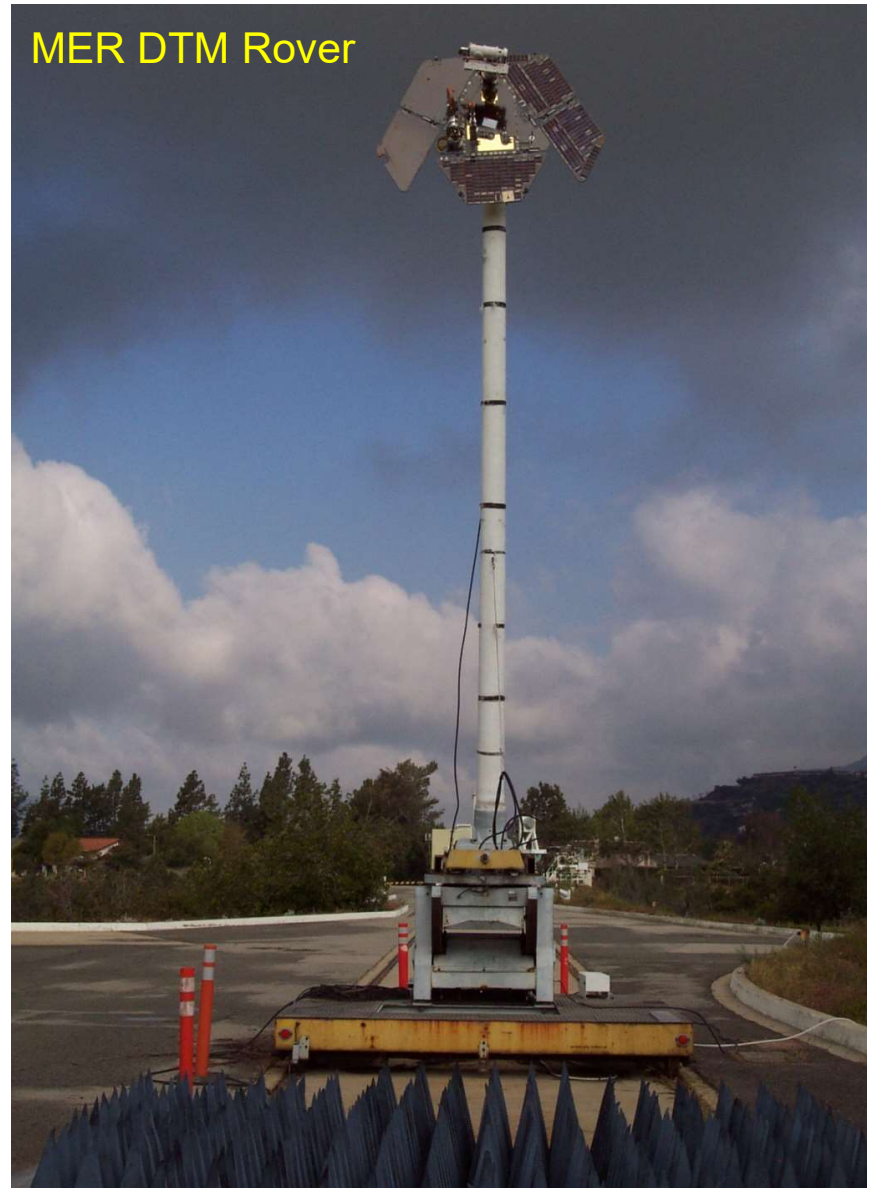


Mars Exploration Rover
Mission to Mars
Launched
Jun & July 2003



MER Rover Mockup

MER DTM Rover

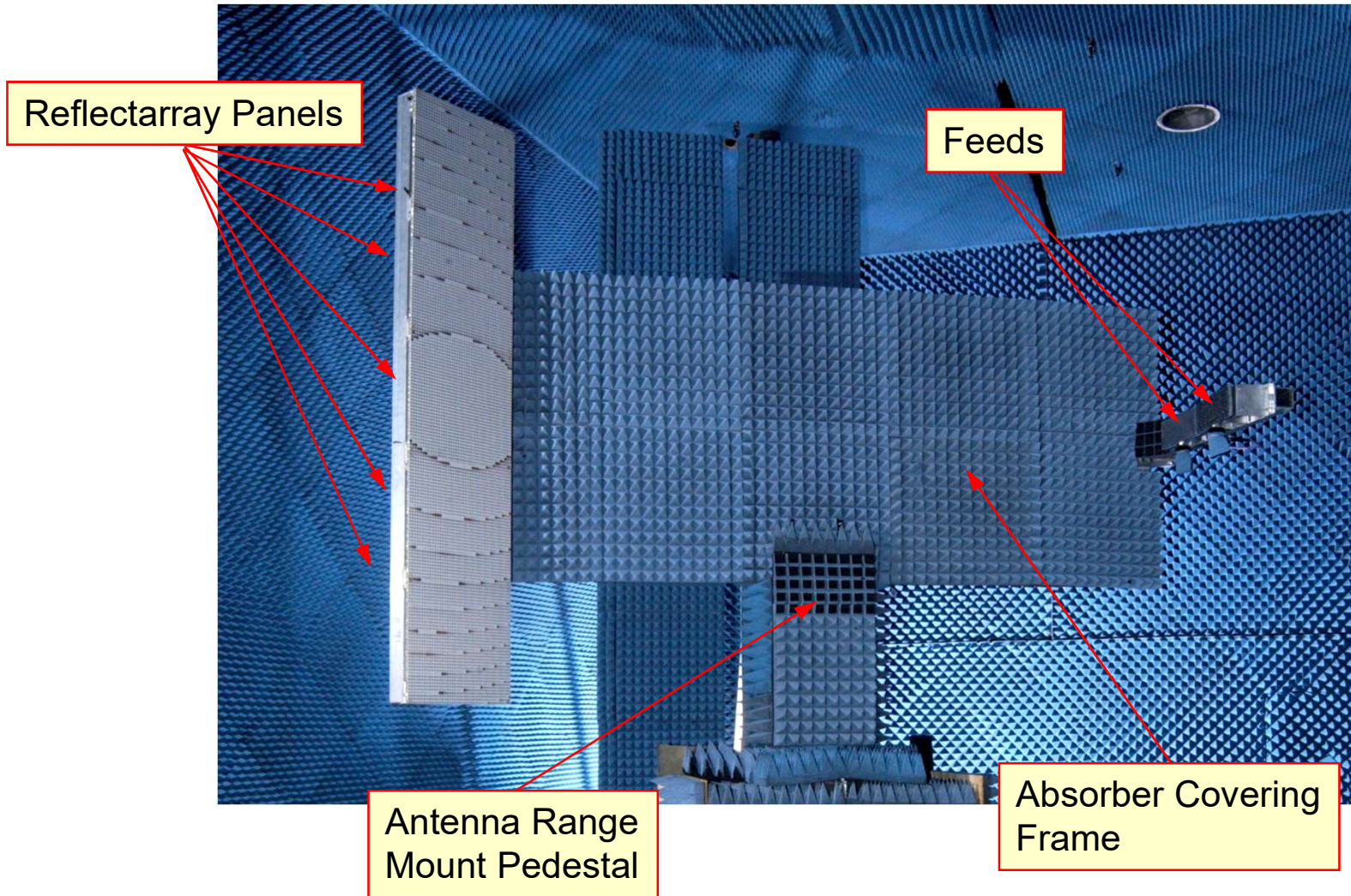




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Wide Swath Ocean Altimeter Breadboard 2005

JPL Mesa
Antenna Test
Facility

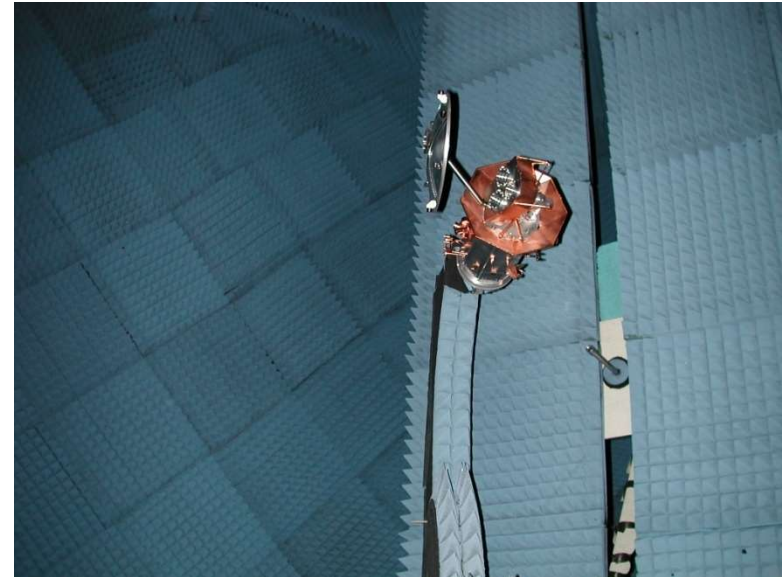
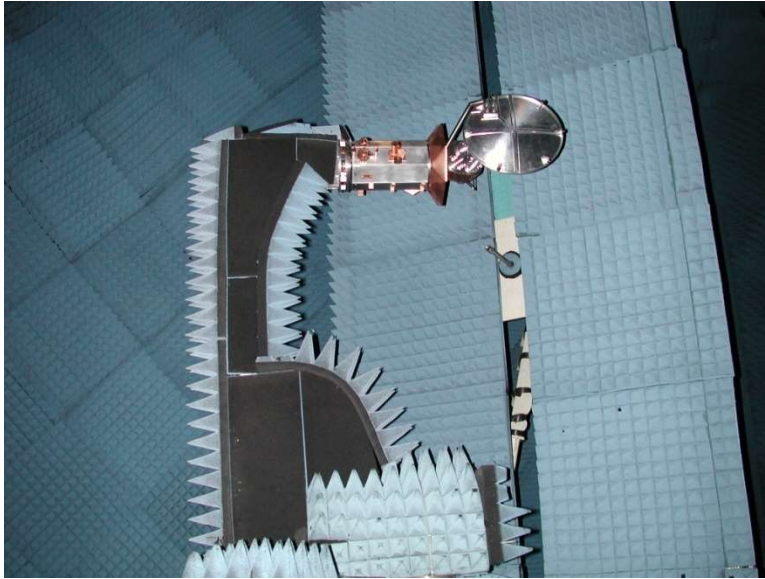




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Aquarius Scale Model 2006

JPL Mesa
Antenna Test
Facility



Aquarius Scale Model Measured in the Mesa
40' chamber using the cylindrical NF scanner

Aquarius
Mission to measure Earth Ocean Salinity
Launched: June 2011



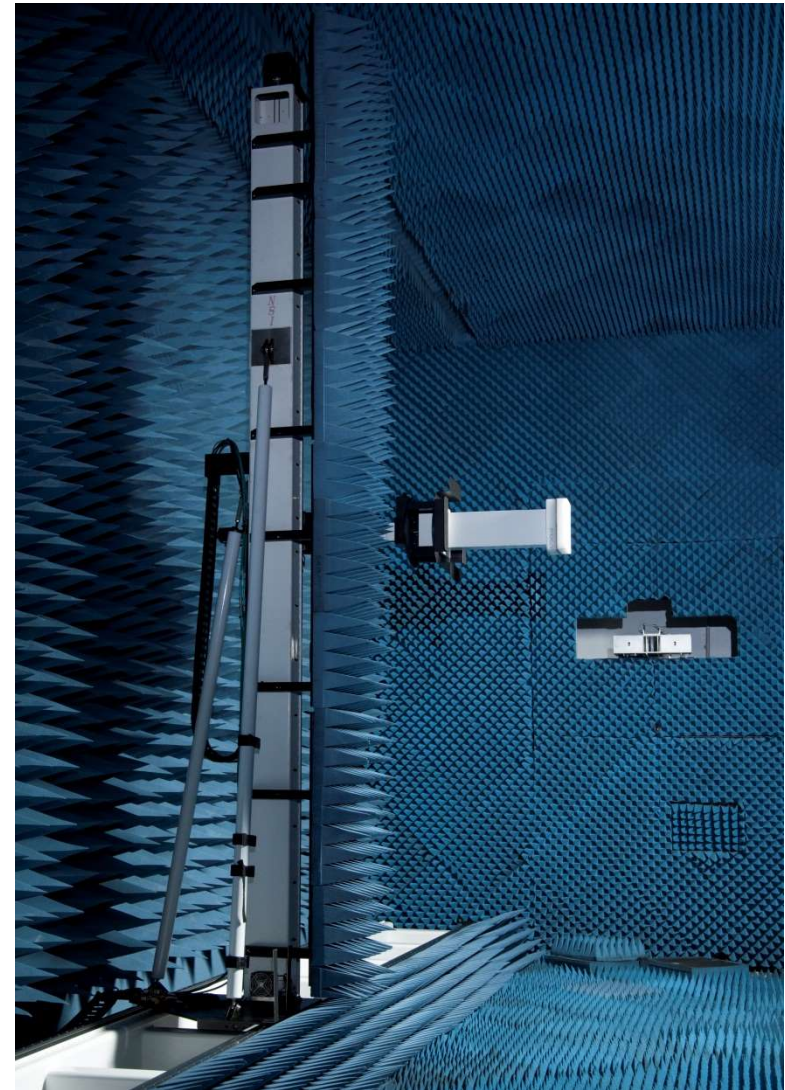
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Planar Near-field Scanner 2008

JPL Mesa
Antenna Test
Facility



Installation of 30'x15' planar near-field scanner
in Mesa 60' range





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Mars Science Laboratory Terminal Descent Sensor Antenna 2008

JPL Mesa
Antenna Test
Facility



MSL TDS Antenna Measured in
the Mesa 40' chamber using the
cylindrical NF scanner

MSL
Mission to Mars
Launched: Nov 2011

Mars Science Laboratory Cruise Stage Mockup 2009



MSL Cruise Stage Mockup measured
on 3000-ft range

MSL
Mission to Mars
Launched: Nov 2011



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Station Fire on East Mesa (2009)

JPL Mesa
Antenna Test
Facility





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Mars Science Laboratory Cruise Stage Mockup 2010

JPL Mesa
Antenna Test
Facility



MSL Cruise Stage Mockup measured in Mesa 60' chamber using a custom spherical near-field scanning approach

MSL
Mission to Mars
Launched: Nov 2011



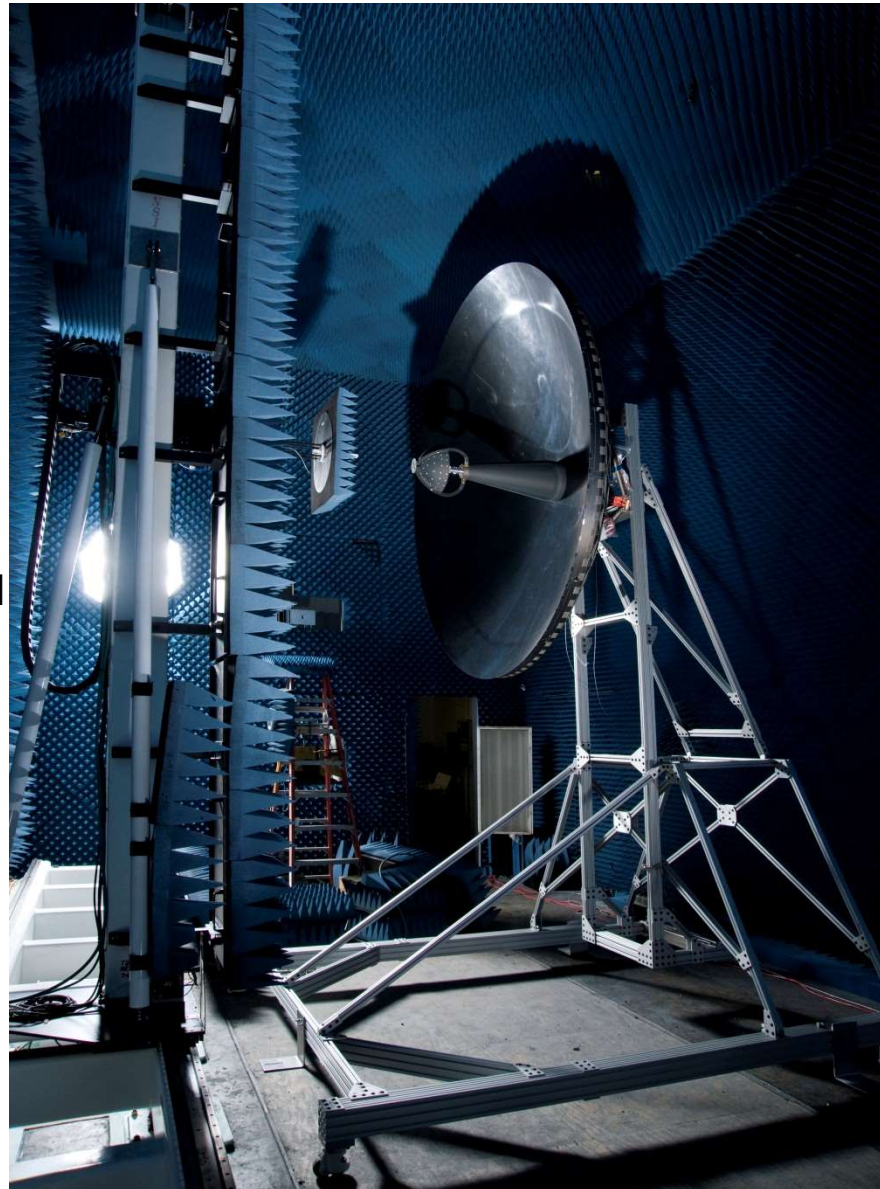
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Juno High Gain Antenna 2010

JPL Mesa
Antenna Test
Facility



Juno
Mission to Jupiter
Launched: Aug 2011



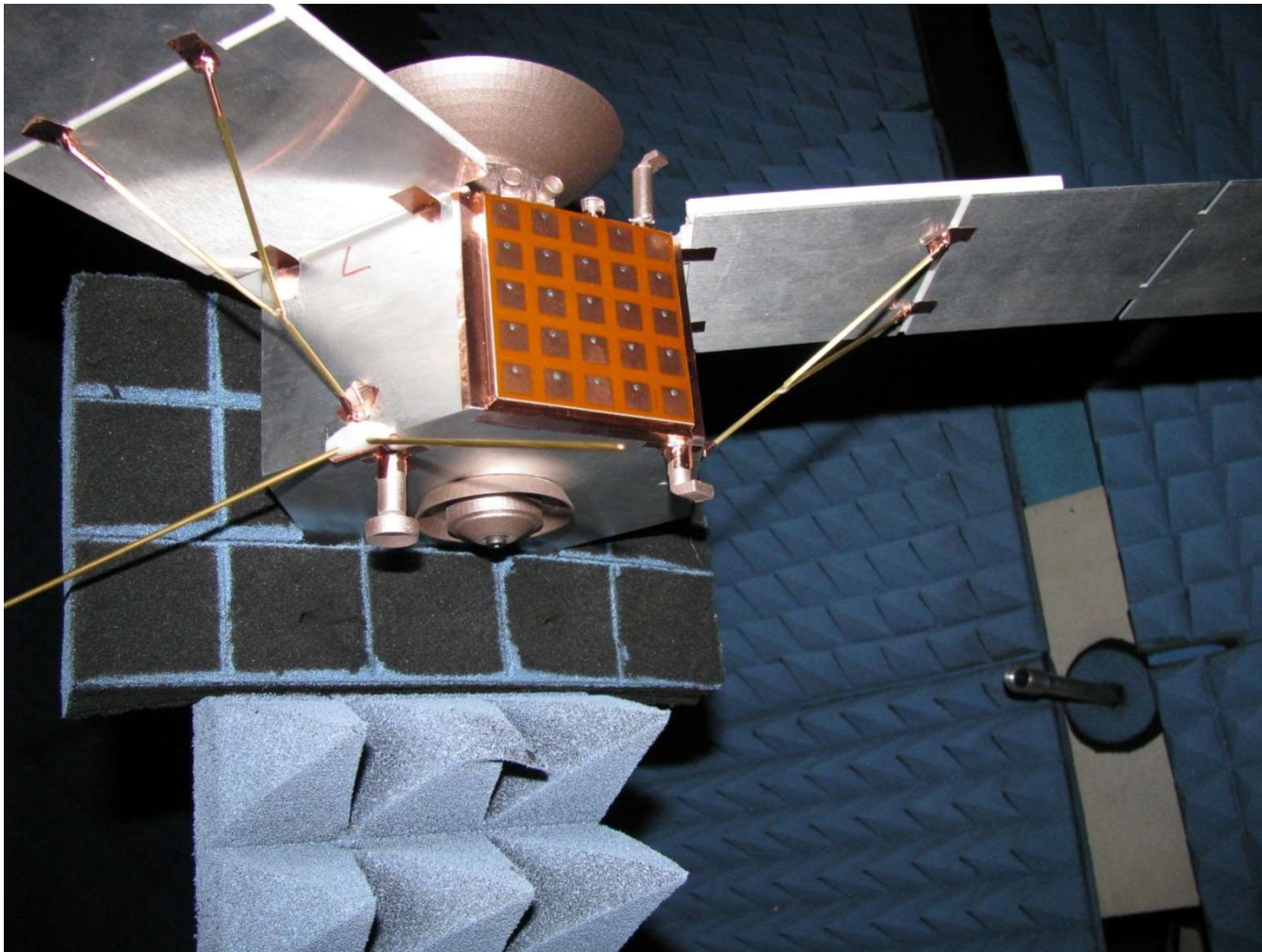
Juno High Gain Antenna
measured in the Mesa 60'
chamber using the 30'x15'
planar near-field scanner



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Juno Scale Model 2010

JPL Mesa
Antenna Test
Facility



Juno Scale Model
Measured in the Mesa 40'
chamber using the
cylindrical NF scanner



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Ocean Surface Topography Mission / Jason 3 Radiometer Antenna 2012

JPL Mesa
Antenna Test
Facility



OSTM / Jason-3 Radiometer Antenna
Measured in the Mesa 40' chamber using the
cylindrical NF scanner

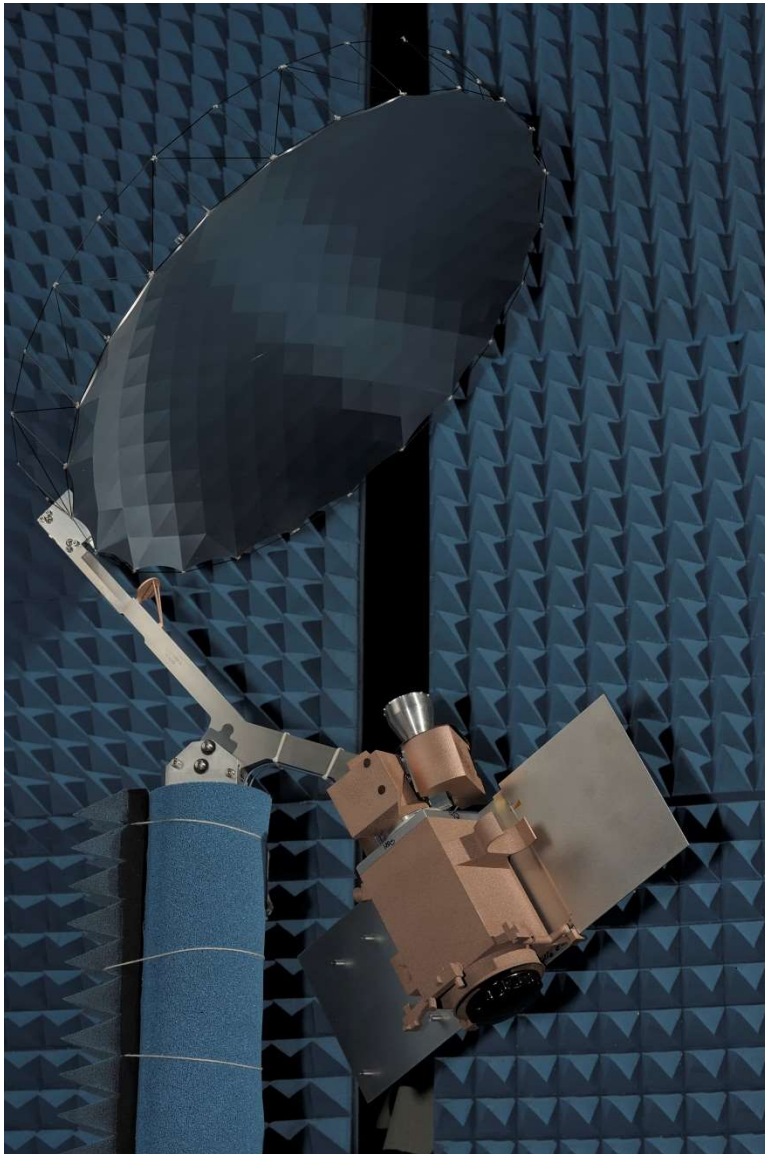
OSTM / Jason-3
Mission to Measure Earth sea-level
Planned Launch:2014



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Soil Moisture Active Passive Scale Model 2012

JPL Mesa
Antenna Test
Facility



SMAP Scale Model Measured in the Mesa 40'
chamber using the cylindrical NF scanner

SMAP
Mission to map Earth's soil moisture
Planned Launch: 2014



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Low-Density Supersonic Decelerator 2014

JPL Mesa
Antenna Test
Facility



LDSD Parachute test on Mesa East Range





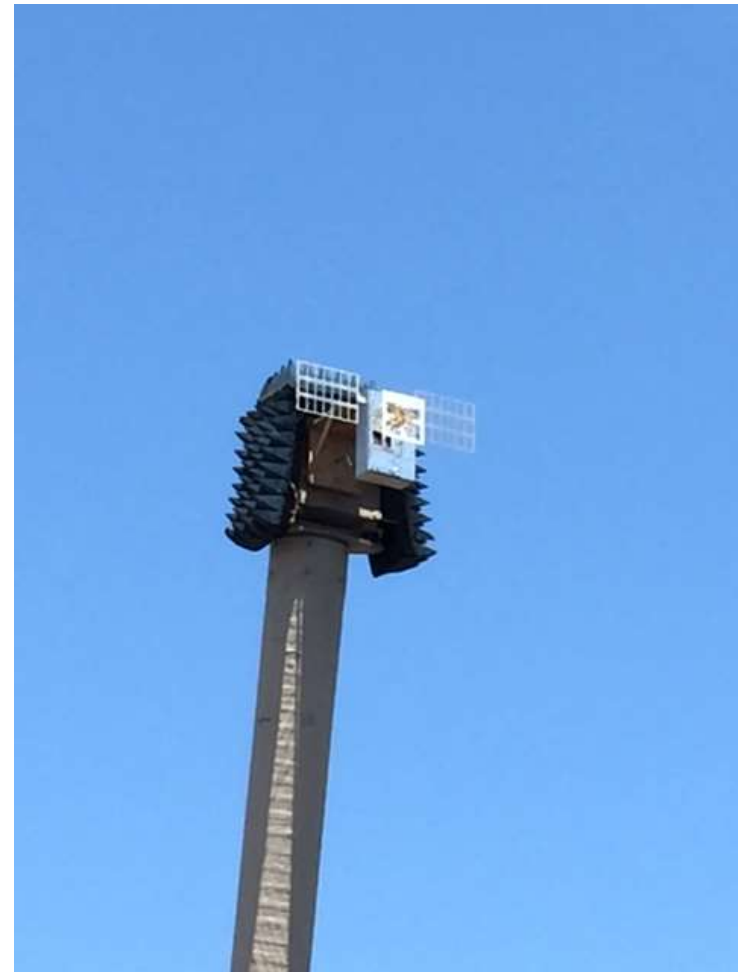
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Mars Cube One (MarCO) 2015

JPL Mesa
Antenna Test
Facility



MarCO UHF antenna at Mesa West Range





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Rain Cube 2015

JPL Mesa
Antenna Test
Facility



Rain Cube Antenna in Mesa 60ft Chamber





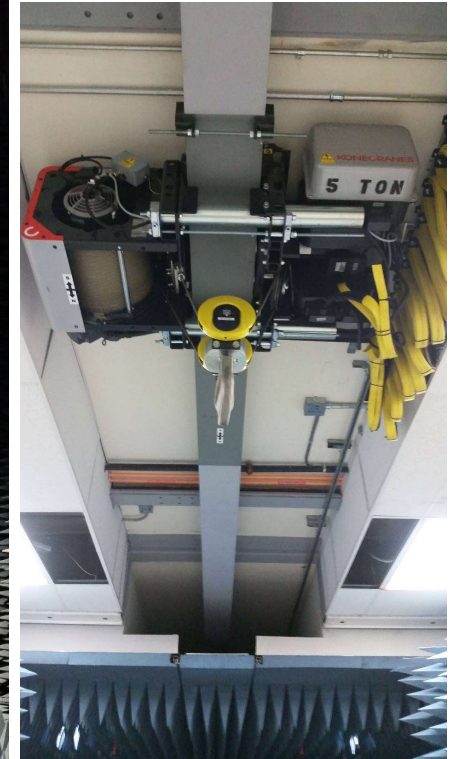
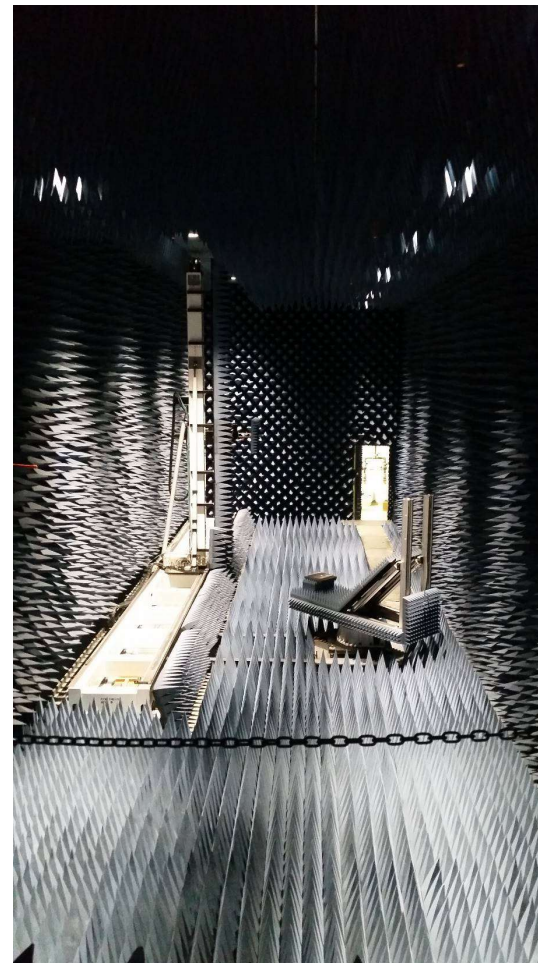
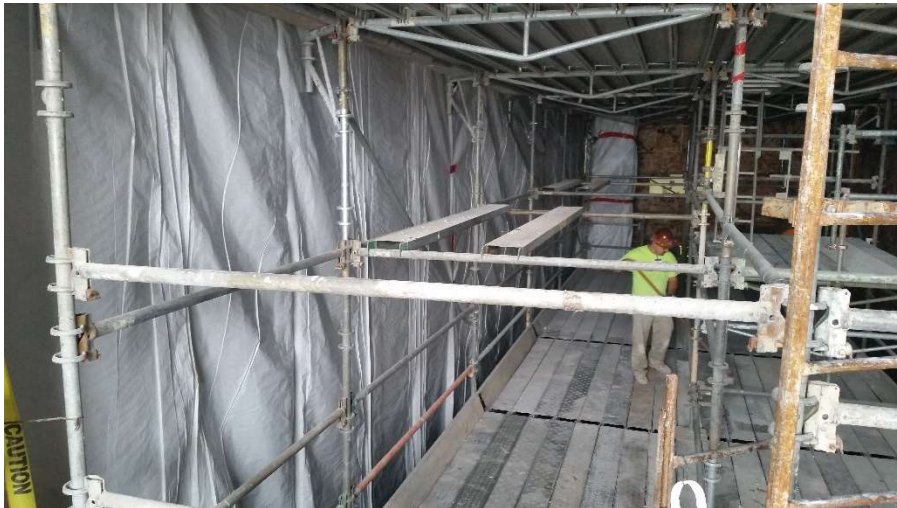
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Mesa 60ft Chamber Upgrade 2016

JPL Mesa
Antenna Test
Facility



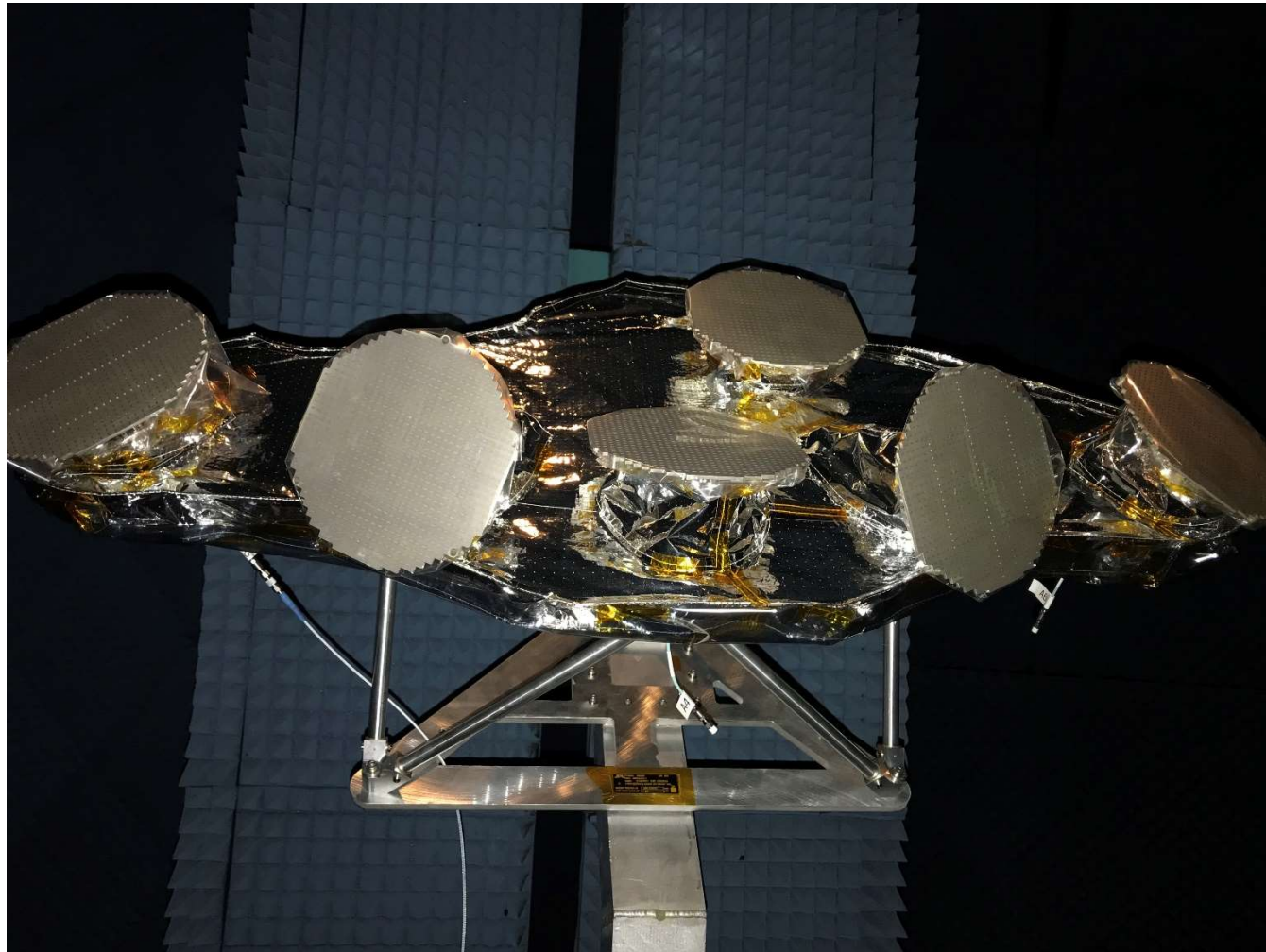
Installation of new (18" & 24" absorber), dry-gas fire suppression system, and 5 Ton Crane in 60 ft chamber



Mars 2020 Landing Radar Antennas 2017



Mars 2020 (Perseverance) Landing Radar
antennas under test in 40 ft Chamber

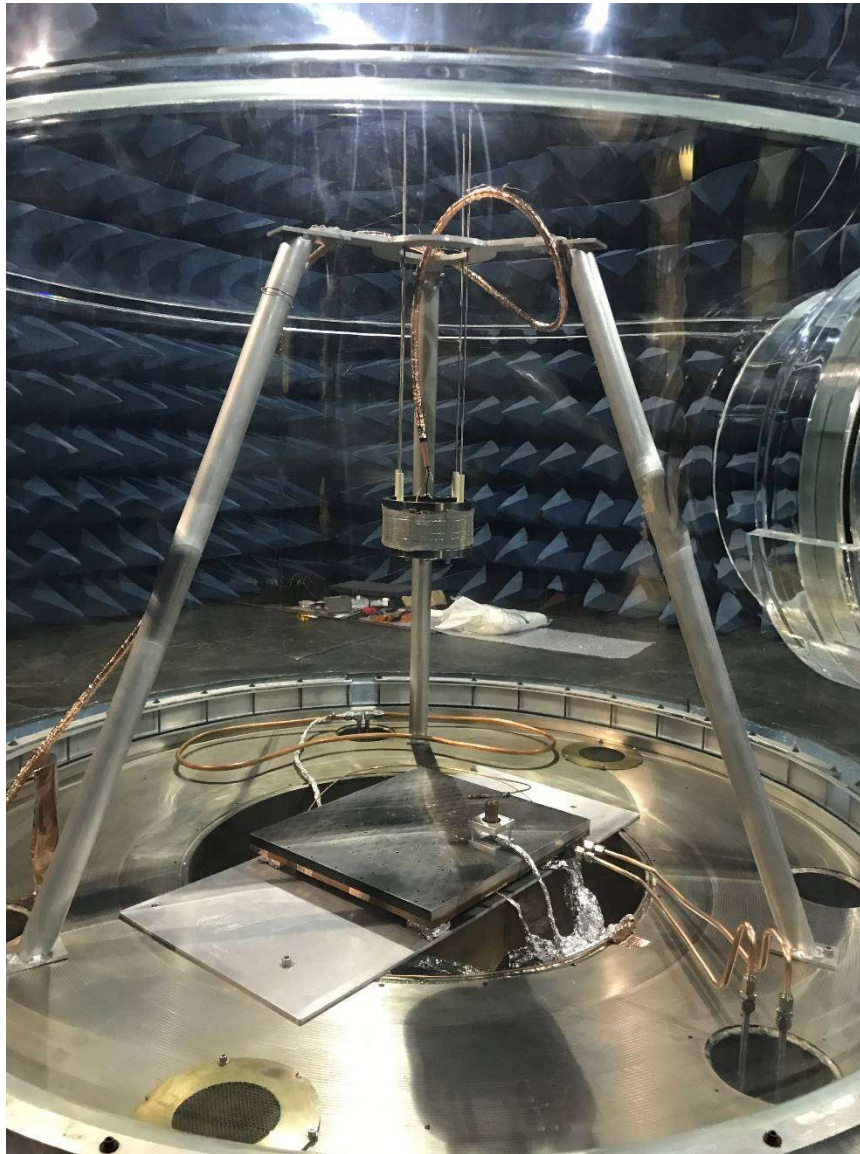




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Europa Clipper ESD Testing 2018

JPL Mesa
Antenna Test
Facility



Testing RF radiation due to ESD discharge of Europa Clipper Solar Panels

Sample of panel illuminated using an Electron Gun setup in the Mesa Vacuum Chamber.



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NASA-ISRO Synthetic Aperture Radar 2019

JPL Mesa
Antenna Test
Facility



NISAR L-band Feed in Mesa 60ft Chamber





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REASON HF Antenna 2020

JPL Mesa
Antenna Test
Facility



Test of the HF Antenna used on the **R**adar for **E**uropa
Assessment and **S**ounding: **O**cean to **N**ear-Surface
(REASON) on the Mesa West Range

