



NASA's Aeronautics Test Program

# Western Aeronautical Test Range

NASA Dryden Flight Research Center's Western Aeronautical Test Range (WATR) supports aerospace flight research and technology integration, space exploration concepts, airborne remote sensing and a wide variety of science missions.

The WATR supplies a comprehensive set of resources for the control and monitoring of flight activities, real-time acquisition and reduction of research data, and effective communication of information to flight and ground crews.

## Facility Benefits

- Precision RADAR provides time space positioning information (TSPI) on research vehicles, space shuttle, and other targets, including satellites.
- Fixed and mobile telemetry antennas receive real-time data, video data and transmit uplink from and to the research vehicle and relay this data to telemetry processing areas.
- The processed data is displayed at the engineering stations in the mission control center and archived in a post-flight storage area.
- Audio communication networks support aeronautics research and space operations in the WATR, covering a broad frequency spectrum for transmitting and receiving voice communications and flight termination signals for unmanned aerial vehicles.
- Video monitoring provides real-time and recorded data for the control and safety of flight test missions.



## Facility Applications

The WATR supports aerospace flight research and technology integration, space exploration concepts, airborne remote sensing and science missions, as well as space shuttle and International Space Station operations.

## Characteristics

### WATR Mission Control Centers

- 26 test engineering stations in MCC1 and 19 in MCC2 including:
  - Communications (radio and intercom) panels
  - video monitors,
  - weather data
  - IRIG-B timing
  - Specialized graphics displays.
- Range and mission control, test operations, range safety and test director consoles provide critical analysis and display capabilities.

### The WATR mobile systems

- Available for rapid deployment to a specified location on short notice. These systems provide:
  - radio-frequency communication,
  - video and telemetry-tracking support.
  - telemetry tracking for test missions outside local airspace boundaries.

## Data Acquisition and Processing

Data is acquired and merged from multiple sources in various formats to a single, time-correlated, composite stream for processing, distribution, real-time display and storage archival. Segments of post-mission data are immediately available on portable media.

Post-flight RADAR data is provided in the appropriate engineering parameters.

The mobile operations system can process and display data onsite, or reformat data and transmit it to a customer's facility.

## Telemetry

WATR telemetry tracking systems consist of:

- Multiple fixed antennas and available mobile systems
  - Downlinked telemetry and video signals in C-, L-, and S-bands.
  - Uplinked commands in either L- or S-bands.
  - Track targets from horizon to horizon.
  - Certified for full on-orbit capability. Downlinked telemetry may be received in either analog or digital format.

## Communications

Radio Frequency (RF) Communications:

- More than 40 ultra-high-frequency (UHF), very-high-frequency (VHF), and high-frequency (HF) transmitter receivers.
- UHF flight termination systems.
- Extensive range intercommunication system consists of:
  - Trunk lines
  - Public address systems
  - Commercial telephone systems



- Military ground-communication networks.
- An integrated communications system, including:
  - Ground-based fiber optics.
  - Orbital satellites
- Satellite Communication capability.
  - used to relay telemetry, radar, audio and video data

## RADAR

- Two high-accuracy, C-band instrumentation radars.
- Track targets out to a distance of 3,000 nautical miles with accuracies to 0.0006 degrees in angle and 30 feet in range.

## Video

- Numerous fixed and mobile camera systems for flight monitoring, safety and mission control.
- Long-range, broadcast-quality, high-definition optical system providing day and night (including infrared) coverage
- Coverage of the flight line, ramp areas and runways.
- Mobile video vans
  - Capability to relay live-action imagery via microwave links.
  - Capability to relay live action imagery via ground video van c Band TM uplink.
  - Downlinked video from research vehicles or chase aircraft can be received in C-, L-, or S-band frequencies.
  - Video recording is provided on Super VHS, Beta Superior Performance, DVD, and other high-definition media.

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### Contact Information

[www.aeronautics.nasa.gov/atp](http://www.aeronautics.nasa.gov/atp)

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