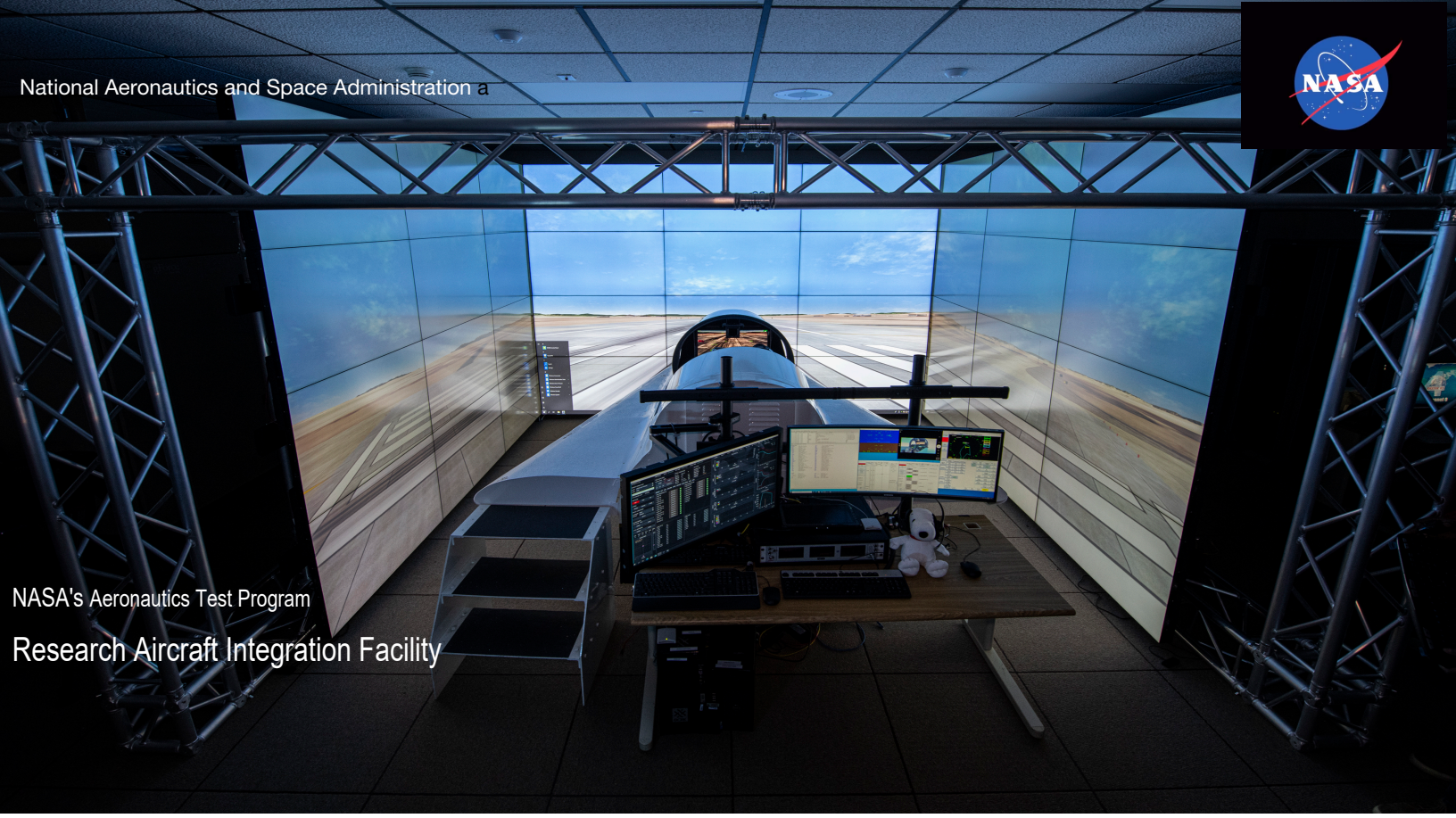

NASA's Aeronautics Test Program

Research Aircraft Integration Facility

NASA Armstrong's Research Aircraft Integration Facility (RAIF) provides the ability to seamlessly integrate simulation and vehicle software and hardware systems under a single roof. This one-of-a-kind facility can simultaneously support a wide variety of advanced, highly integrated aerospace vehicles through all phases of a research program from conceptual design to flight.

The RAIF offers high-fidelity 6-DOF (degree of freedom) batch and in-real-time flight simulation capabilities, as well as support for system integration and closed-loop verification and validation testing of vehicle components and flight vehicles. Also available are complete aircraft group-support services, including all electrical, hydraulic, and cooling-air systems required for vehicle-system integration, functional checks, and routine aircraft maintenance.

Facility Benefits

With simulation capabilities, the RAIF

- Provides research teams with the means to conduct efficient, thorough testing of advanced, highly integrated research vehicles.
- Provides configurable systems for all facets of a research program including simulation software and hardware, as well as direct vehicle support infrastructure.
- Provides scalable systems for:
  - Evaluation of design concepts
  - Piloted and vehicle- and hardware-in-the-loop operations
  - Combined systems testing capability
  - System integration and full mission support
  - Control-room training, mission planning and data analysis
- Can be configured to accommodate up to 11 simulation laboratories.
- Can be tailored to support varying access and security requirements within each lab.
- Offers audio, video and data connectivity to any of the six facility hangar bays, as well as to the Armstrong Mission Control Center.

Facility Applications

The RAIF has been a critical asset for the successful implementation of some of the nation's most revolutionary and valuable research efforts. These efforts supported a variety of classes of research vehicles that cover subsonic through hypersonic flight regimes, including X-43A (Hyper-X), F-18, F-15, X-57, X-59, and C-17.

Data Acquisition and Processing

- Simulation software capabilities:
  - High-fidelity, 6-DOF simulation packages.
  - Same software simulation package supports both real-time (human-in-the-loop and hardware-in-the-loop) and non-real time (desktop) operations.
  - Commons, configurable software supporting multiple projects.
  - Linux operation system platforms.
  - Multiple language support (FORTRAN, C, C++, Java and Ada).
  - Multiview out-the-window graphics with heads-up display (HUD) and three-dimensional model of flight vehicle.
  - Operable by one person in non-real-time and real-time environments.
- Simulation hardware capabilities:
  - Dedicated or configurable fix-base engineering simulation cockpits.
  - Configurable hardware interface units for vehicle-systems integration testing.
  - Common configurable hardware to support multiple projects.
  - Configurable simulation electric stick (SES) and rudder pedal force-feedback systems.
  - Configurable Cockpit Interface Unit (CIU).
  - Flight hardware interface capability (MIL-STD-1553, ARINC 429 and analog and discrete signals).

Characteristics

- Test bays 1, 2 and 3 provide over 30,000 ft2 hangar space.
- The 225 X 135 ft hangar, accessible through a split 225 X 50 ft door.
- Test bays 4 and 5 provide a total of 12,500 ft2 of hangar space.
- Test bay 6 is a single-vehicle bay of 10,000 ft2 of hangar space that can be configured to support programs with more stringer security requirements.
- Test bay data and communication connectivity to RAIF simulation labs and Armstrong control rooms.
- Co-located vehicle maintenance support staffing.
- Co-located program and vehicle engineering and technician staff.
- Complete vehicle support systems (aircraft cooling, electrical power and hydraulics).
- Electrostatic Discharge Association (ESD) certified support labs.

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