A Guide to Flight Research Facilities
at the
NASA Langley Research Center

Return to: Paul Stough
MS 247
The truss-supported roof of the hangar of the Flight Research Facility provides a clear floor space with nearly 300 ft in each direction (over 87,000 ft²).

Door dimensions will allow entry of a Boeing 747. Features such as floor air and electrical power services, radiant floor heating to eliminate corrosion-causing moisture, a modern deluge fire suppression system, energy-saving lighting, modern maintenance spaces, and entry doors and taxiways on either side of the building make this structure equal or superior to any hangar in the country. Extensive and modern maintenance equipment makes it possible to maintain, repair, and modify aircraft ranging in sophistication from modern metal and composite airliners, fighters, and helicopters to fabric-covered light airplanes. Surrounding the hangar are ramp areas with load-bearing capacity sufficient to handle the largest current wide-body jet. The high-power turnup area can also handle a wide variety of aircraft.

The present array of research and research support aircraft includes an airliner, military fighters, trainers, experimental one-of-a-kind designs, helicopters, and single and multiengine light airplanes. This variety enables research to be carried out over a wide range of flight conditions, from hover to Mach 2 and from the surface to 60,000 ft. Research pilot currency in this wide spectrum of aircraft is important in conducting credible in-flight experiments as well as in-flight simulator assessments. A variety of research can be conducted in such areas as terminal traffic flow, microwave landing system (MLS) approach optimization, airfoil properties, single-pilot instrument flight rules (IFR), engine noise, turbulence research, natural laminar flow, winglet studies, stall/spin, and severe storm hazards.

Photo No.
87-01655 aerial view with LaRC in background
87-01657 aerial view of hangar looking northwest

Revision date: 10/24/90
Name / Model & date of manufacture
American Aviation AA-1 Yankee (modified)
SN 0001 manufactured 1969 Total time: 646 hr

Date airplane came to Langley
February 22, 1973

Brief description of airplane
2-place, single-engine, light airplane

Key characteristics:
   Engine       Lycoming O-235-C2C, 108 HP
   Max weight   1660 lb (755 kg)
   Useful load  300 lb (136 kg)
   Wing span    24.5 ft (7.5m)
   Min speed    57 kt
   Max speed    125 kt @ sea level
   Ceiling      11,000 ft (3350 m)
   Max range    435 nm (800 km)

Previous research program uses
1977-1987 Stall/Spin Flight Research

Current research use
In storage for transfer to Hampton Air and Space Museum

Contacts:
Project Engineer - H. Paul Stough 864-3860
Project Pilot - Philip W. Brown 864-3918

Photo of Airplane & photo No.
WL 1979 37-6 AA-1X+4 with Modified Wing Leading Edge
WL-77-67 AA-1X+4 left, rear quarter view from above
WL-77-69 AA-1X+4 left, rear quarter side view

Revision date: 10/24/90
NASA 502 (NASA 810)

Name / Model & date of manufacture
Schweizer SGS 1-36 Sprite
SN 001         Total time: 11 hr

Date airplane came to Langley
February 13, 1986

Brief description of airplane
high-performance, single-seat sailplane modified with a flight-variable tail incidence (flip tail)

Key characteristics:
- Engines: none
- Max weight: 710 lb (323 kg)
- Useful load: 240 lb (109 kg)
- Wing span: 46.2 ft (14.1 m)
- Max speed: 119 kt
- Aspect Ratio: 15.2
- Wing Loading: 5.0 psf (24.4 kg/sq m)

Previous research program uses
Deep-Stall Research at DFRF

Current research use
Inactive (storage)

Contacts:
Head, AOB - Harry A. Verstynen  864-3875

Photo of Airplane & photo No.
ECN 26841 overhead, left-side view in deep stall flight
ECN 26842 left, rear quarter view in deep stall

Revision date: 11/7/90
NASA 503

Name / Model & date of manufacture
Cessna model 402B Businessliner
SN 402B-0313 manufactured 1972    Total time: 1993 hr

Date airplane came to Langley
May 8, 1982

Brief description of airplane
6-8 seat, commuter / light cargo airplane

Key characteristics:
Engines (2)    Continental TSIO-520E, 300 HP ea
Max weight    6300 lb (2858 kg)
Useful load    2400 lb (1090 kg)
Wing span     39.9 ft (12.2 m)
Min speed     69 kt
Max speed     227 kt @ 16,000 ft (4875 m)
Ceiling       26,180 ft (7980 m)
Max range     1262 nm (2340 km)

Previous research program uses
1982-1985 Single Pilot IFR Research
1987-1988 Ride Quality Studies
1989 Shuttle Exhaust Particle Experiment (SEPEX)

Current research use
Emissions from Biomass Burning (EBB)

Contacts:
    Project Coordinator - Robert M. Thomas, Jr.    864-3913

Photo of Airplane & photo No.
L-82-10-155    left, front, quarter view in flight

Revision date: 11/7/90
Name / Model & date of manufacture
Cessna U-3A (civilian model 310)
SN 57-5921A manufactured 1957  Total time: 8721 hr

Date airplane came to Langley
February 7, 1971

Brief description of airplane
5-place, low-wing, twin-engine, utility airplane

Key characteristics:
- Engines (2)  Continental O-470-M23, 230HP ea
- Max weight  4830 lb (2195 kg)
- Max payload  800 lb (364 kg)
- Wing span  35.8 ft (10.9 m)
- Min speed  65 kt
- Max speed  206 kt @ sea level
- Ceiling  19,900 ft (6065 m)
- Max range  1175 nm (2174 km)

Previous research program uses
1984 Engine Slipstream Studies

Current use
Mission support

Contacts:
Head, AOB - Harry A. Verstynen  864-3875

Photo of Airplane & photo No.
L-74-7606 left, front, quarter view on the ground

Revision date 11/7/90
Name / Model & date of manufacture
Beech model 65-B80 Queen Air
SN LD-507 manufactured 1976  Total time: 2593 hr

Date airplane came to Langley
June 1, 1977

Brief description of airplane
10-seat, low-wing, twin-engine, utility airplane

Key characteristics:
- Engines (2)  Lycoming IO-720-A1B, 400 HP, ea
- Max weight  8800 lb (3992 kg)
- Useful load  2760 lb (1255 kg)
- Wing span  50.3 ft (15.3 m)
- Min speed  71 kt
- Max speed  215 kt @ 11,500 ft (3500 m)
- Ceiling  26,800 ft (8168 m)
- Max range  1317 nm (2440 km)

Current use
Mission support

Contacts:
Head, AOB - Harry A. Verstynen  864-3875

Photo of Airplane & photo No.
L-78-7483 left, rear, quarter view loading boxes on ramp

Revision date: 11/7/90
Name / Model & date of manufacture
Cessna model 172K Skyhawk
SN 17258729 manufactured 1969  Total time: 1272 hr

Date airplane came to Langley
May 8, 1972

Brief description of airplane
4-place, high-wing, single-engine, light airplane

Key characteristics:
Engine Lycoming O-320-E2D, 150 HP
Max weight 2415 lb (1098kg)
Useful load 450 lb (205 kg)
Wing span 36.2 ft (11.0 m)
Min speed 43 kt
Max speed 121 kt @ sea level
Ceiling 13,100 ft (3995 m)
Max range 557 nm (1030 km)

Previous research program uses
1975 Pilot landing studies
1979 Handling characteristics
1980-1989 Stall/Spin research

Current research use
Inactive (non-flyable storage)

Contacts:
Project Engineer - Gregory S. Manuel  864-3864

Photo of Airplane & photo No.
L-86-8893  C-172X with Wing Leading-edge Mods
WI-80-111-2 left, front quarter view of basic airplane

Revision date: 11/7/90
Name / Model & date of manufacture
Beech model T-34C Turbo-Mentor
SN GL-108 manufactured 1978   Total time: 1121 hr

Date airplane came to Langley
June 1, 1978

Brief description of airplane
2-place, low-wing, single-engine trainer

Key characteristics:
- Engine     Pratt & Whitney PT6A-25, 550SHP
- Max weight 4300 lb (1955 kg)
- Max payload 400 lb (182 kg)
- Wing span 33.3 ft (10.2 m)
- Min speed 55 kt
- Max speed 280 kt @ 17,500 ft (5335 m)
- Ceiling 25,000 ft (7620 m)
- Max range 650 nm (1205 km)

Previous research program uses
- 1983 Laminar Flow Glove Experiments
- 1985 & 1989 SEPEX
- Airspeed pacer airplane
- 1989 Vortex Detection Experiment photo platform

Current use
Mission support

Contacts:
Head, AOB - Harry A. Verstynen     864-3875

Photo of Airplane & photo No.
- L-83-7063 front, overhead view on ramp with glove
- L-80-3923 left, side view in flight with pods

Revision date: 11/7/90
Name / Model & date of manufacture
Northrop T-38A Talon
SN 65-10329 manufactured 1965  Total time: 3044 hr

Date airplane came to Langley
December 15, 1965

Brief description of airplane
2-seat, supersonic, lightweight, twin-jet trainer

Key characteristics:
Engine(s) (2) J85-GE-5H, 2900 lb ST ea
Max weight 11,820 lb (5362 kg)
Max payload 550 lb (250 kg)
Wing span 25.3 ft (7.7 m)
Min speed 127 kt
Max speed Mach 1.3 @ 36,000 ft (11000 m)
Ceiling 53,500 ft (16,300 m)
Max range 990 nm (1835 km)

Previous research program uses
1984 High-Speed Acoustic Flight Effects

Current use
Mission support

Contacts:
Head, AOB - Harry A Verstynen  864-3875

Photo of Airplane & photo No.
WL-79-143-2 right, side view over Wallops
L-80-599 right side view over Wallops

Revision date: 11/7/90
Name / Model & date of manufacture
Boeing B-737-130
SN 19437 manufactured 1968  Total time: 2608 hr
Number 1 production 737

Date airplane came to Langley
May 17, 1974

Brief description of airplane
twin-jet, short-range transport

Key characteristics:
Engine (2)  Pratt & Whitney JT8D-7, 14,000lb ST ea
Max weight  97,000 lb (44 000 kg)
Max payload  29,000 lb (13 182 kg)
Wing span  93.0 ft (28.4 m)
Min speed  97 kt
Max speed  522 kt @ 23,500 ft (7160 m)
Ceiling  30,000 ft (9150 m)
Max range  1950 nm (3605 km)

Previous research program uses
1975-1977 Microwave Landing System evaluation & demonstration
1975-1985 Velocity vector display development
1976-1980 CRT electronic cockpit displays & formats pioneered
1983 Profile descent control law development
1986 Total energy control law development
1989 Helmet mounted displays for precision manual landings

Current research use
- Satellite-based Global Positioning System for autoland
- Ground-air data-link in lieu of voice communication
- Traffic flow management
- ATC-compatible 4-D Flight Management System development

Contacts:
Project Engineer - James R. Hall 864-3851

Photo of Airplane & photo No.
L-89-13501 right, side view over Rte. 134
L-89-13503 right side view over LaRC

Revision date: 10/24/90
Name / Model & date of manufacture
Piper PA-28RT-201 Arrow IV prototype
SN 28R-7635243 manufactured 1976 as PA-28R-200
Total time: 613 hr

Date airplane came to Langley
August 2, 1978

Brief description of airplane
Low-wing, single-engine, 4-place, light airplane

Key characteristics:
Engine Lycoming IO-360-C1C, 200 HP
Max weight 2750 lb (1250 kg)
Useful load 1100 lb (500 kg)
Wing span 35.4 ft (10.8 m)
Min speed 55 kt
Max speed 152 kt @ sea level
Ceiling 16,000 ft (4877 m)
Max range 870 nm (1610 km)

Previous research program uses
1981-1983 Stall/spin research
1985 Wingtip vortex turbine research
1989-1990 In-flight wake vortex detection

Current research use
Infrared Off-Surface Flow Visualization
Explore feasibility of infrared imaging to visualize
a wing tip vortex
- Pressure belt measurements accuracy
Stagnation sensor evaluation

Contacts:
Project Engineer - Infrared - Gregory S. Manuel 864-3864
Press belt - Natale Strain 864-3944
Stag sens - Cynthia C. Lee 864-3865

Photo of Airplane & photo No.
L-81-6709 PA-28RX equipped for stall/spin research
L-83-1568 left, front quarter view with MOLE

Revision date: 11/7/90
Name / Model & date of manufacture
Bell Helicopter model 204B  
SN 2017 manufactured 1964   Total time: 1671 hr

Date airplane came to Langley
September 20, 1964

Brief description of airplane
10-seat, single-rotor, general-purpose helicopter

Key characteristics:
Engine         Lycoming T-53-11B, 1100 SHP
Max weight     8500 lb (3856 kg)
Max payload    2000 lb (909 kg)
Rotor span     48.0 ft (14.6 m)
Max speed      117 kt
Ceiling        15,800 ft (4815 m)
Max range      287 nm (532 km)

Previous research program uses
Free-flight-model drop platform (F-4, F-14, F-15, B-1, F-18, F-16XL, X-29)
Smoke sampling platform
Aerial photography
Tailboom strake aerodynamic research

Current research use
X-31 Drop Model Program
Evaluate high-angle-of-attack flight characteristics
(controllability, stall, departure, spin, tumble, recovery)

Contacts:
Program Manager - Luat T. Nguyen   864-1138
Project Engineer - David J. Fratello 864-1146

Photo of Airplane & photo No.
L-76-6425 overhead, right, side view with F5 model
89-07441 right, side view with X-29 model attached

Revision date: 10/24/90
Name / Model & date of manufacture
Bell OH-58A Kiowa
SN 71-20703 manufactured 1971 Total time: 1076 hr

Date airplane came to Langley
August 1, 1972

Brief description of airplane
4-place, light, utility helicopter

Key characteristics:
Engine Allison T63A-700, 317 SHP
Max weight 3000 lb (1360 kg)
Useful load 1318 lb (600 kg)
Rotor span 35.3 ft (10.8 m)
Max speed 120 kt @ sea level
Ceiling 18,900 ft (5760 m)
Max range 259 nm (481 km)

Current use
Mission support

Contacts:
Head, AOB - Harry A. Verstynen 864-3875

Photo of Airplane & photo No.
L-76-6431 right side view over water

Revision date: 11/7/90
Name / Model & date of manufacture
Northrop F-5F Tiger II
Manufactured in 1973 as F-5E SN 73-0889
Converted to F-5F in 1974 Total time: 3502 hr

Date airplane came to Langley
August 21, 1989

Brief description of airplane
2-seat, light, tactical fighter

Key characteristics:
- Engines (2) J85-GE-21B, 5000 lb ST ea
- Max weight 25,152 lb (11 409 kg)
- Max payload 4000 lb (1819 kg)
- Wing span 26.8 ft (8.1 m)
- Max speed Mach 1.56 @ 36,000 ft (10 975 m)
- Ceiling 50,800 ft (15 485 m)
- Max range 1270 nm (2353 km)

Current use
Mission support

Contacts:
Head, AOB - Harry A. Verstynen 864-3875

Photo of Airplane & photo No.
L-90-4788 left, front quarter view over water

Revision date: 11/9/90
Name / Model & date of manufacture
Gates Learjet model 28/29 Longhorn
SN 25-064 manufactured 1972   Total time: 1412 hr

Date airplane came to Langley
October 6, 1984

Brief description of airplane
Low-wing, twin-engine, light business jet

Key characteristics:
Engines (2)   GE CJ-610-8A, 2950 lb thrust ea
Max weight   15,000 lb (6804 kg)
Max payload  1550 lb (705 kg)
Wing span    43.8 ft (13.4 m)
Min speed     79 kt
Max speed     464 kt @ 41,000 ft (12 500 m)
Ceiling       51,000 ft (15 545 m)
Max range     600 nm (1100 km)

Previous research program uses
1984-1989 Laminar flow experiments

Current research use
SSP Airborne Field Mill Program
Measure electric fields aloft and correlate with meteorological conditions to determine conditions conducive to triggered lightning and enable safe increase in launch availability
Doppler Global Velocimeter (DGV) concept validation

Contacts:
Project Engineer - ABFM - Bruce D. Fisher 864-3862
DGV - Jimmy W. Usry 864-3863
NLF - Cynthia C. Lee 864-3865

Photo of Airplane & photo No.
L-90-8492   right, rear quarter view, ABFM equipped
L-84-11558  left, front quarter view of basic airplane
L-89-2827   left, front quarter view with glove

Revision date: 11/7/90
Name / Model & date of manufacture
General Dynamics (Convair) F-106B Delta Dart
SN 57-2516 manufactured 1957  Total time: 1540 hr

Date airplane came to Langley
January 29, 1979

Brief description of airplane
Single-engine, supersonic, all-weather interceptor

Key characteristics:
- Engine: Pratt & Whitney J75-P17, 24,500 lb ST
- Max weight: 43,500 lb (19 772 kg)
- Max payload: 2900 lb (1318 kg)
- Wing span: 38.3 ft (11.7m)
- Min speed: 130 kt
- Max speed: 1320 kt/Mach 2 @ 40,000 ft (12 190 m)
- Ceiling: 50,000 ft (15 000 m)
- Max range: 800 nm (1480 km)

Previous research program uses
1979-1986 Storm Hazards Research
1985 Off-Surface Flow Visualization System

Current research use
1986- present Vortex Flap Flight Experiment
Validate aerodynamic characteristics and design method
for wing leading-edge vortex flap

Contacts:
- Project Engineer - Daniel J. DiCarlo  864-3870
- Project Pilot - Philip W. Brown  864-3918
- Principal Investigator - James B. Hallissy  864-2865

Photo of Airplane & photo No.
L-88-8180 left, rear quarter view with vortex flap
L-90-7434 left side view with flow vis system & F5F

Revision date: 10/24/90
Name / Model & date of manufacture

HL-20 Personnel Launch System full-scale mock-up
Built in 1990 by Mars Mission Research Center at North Carolina State University and North Carolina A&T University

Date model came to Langley
October 2, 1990

Brief description of model
10-place lifting body candidate for manned orbital missions boosted to 100 nm (185 km) orbit by expendable launch vehicle

Key characteristics of vehicle concept:

- Engines: none
- Max weight: 22,000 lb (10,000 kg)
- Max payload: 3,000 lb (1,364 kg)
- Wing span: 23.5 ft (7.2 m)
- Max cross-range: 1100 nm (2040 km)
- Mission duration: 72 hours

Previous research program uses
None

Current research use
Human factors engineering
Ingress and egress procedures
Maintenance accessibility
Pilot visibility

Contacts:
Chief, Space Systems Div - William M. Piland 864-4451
Head, Vehicle Analysis Br - Delma C. Freeman 864-4502
Project Engineer - Howard W. Stone 864-4511

Photo of model & photo No.

Revision date: 10/24/90
Name / Model & date of manufacture
Gulfstream III
SN 309  Total time:  hr

Date airplane came to Langley
January 7, 1989

Brief description of airplane
15 passenger, low-wing, twin-turbofan, executive transport

Key characteristics:
Engines (2)          Rolls-Royce Spey 511-8, 11,400 lb ST ea
Max weight           68,200 lb (31 000 kg)
Useful load          30,000 lb (13 640 kg)
Wing span            77.8 ft (23.7 m)
Min speed             100 kt
Max speed             Mach 0.85
Ceiling               45,000 ft (13 700 m)
Max range             3200 nm (5930 km)

Current use
Administrative aircraft primarily dedicated for NASA
Administrator use, NASA Headquarters support, and various
Centers support on an as available basis

Contacts:
Contract Monitor - Robert A. Rivers  864-3917
Project Manager - Hugh Huleatt     864-3919

Photo of Airplane & photo No.
L-90-8331
L-90-8330

Revision date: 10/24/90