

DLR Dornier DO 228

Airborne Research Platform



German Aerospace Center
Flight Operations



Introduction

DLR is Germany's aerospace research center and space agency with about 4700 employees in 31 research institutes distributed over 8 main research centers in Germany. DLR performs basic research and operates large scale test facilities which include two Research Flight Facilities in Braunschweig and Oberpfaffenhofen.

The Flight Facility Oberpfaffenhofen is exclusively dedicated to the provision and operation of aircraft for atmospheric research and earth observation and is Europe's largest operator for this kind of research platforms.

The facility provides a fleet of research aircraft ranging from a single-engine turboprop to a midsize business jet aircraft including five DO228. These twin engine turboprops being the workhorse of the fleet are operated in two versions : The lighter DO228-101 and the heavier DO228-212 with an extended fuselage.

Three of these aircraft (228-101 (2), 228-212 (1)) are owned by DLR, one of them operated by (Natural Environment Research Council, UK) for remote sensing purpose. Two more aircraft operated by DLR (DO228-101) are owned by Alfred-Wegener-Institute for Polar Research providing ski operation capability for research and cargo flight in arctic and antarctic areas.

Within DLR the DO228 is used for remote sensing, atmospheric research and flight testing.

DLR operates a huge pool of in situ and remote sensing instrumentation for environmental airborne research and offers access to various scientific institutes dedicated to atmospheric physics and chemistry, active and passive remote sensing , meteorology, modelling, as well as different calibration and test facilities.

Performance

The Dornier DO228 is designed as a reliable commuter aircraft. Due to its modern wing the aircraft is capable to travel fast and to use short and unpaved runways at low costs. Strong engines, excellent handling qualities and the unpressurized spacious rectangular cabin make it an ideal platform for any kind of airborne research. As a twin engine aircraft it is capable to perform extended missions overhead remote areas and open water.

DO228-212

Overall length	16.56 m
Wingspan	16.97 m
number of seats	2+19
Max takeoff weight (MTOW)	6.4 t
Engines	2 x TPE331 (785 SHP)
Max altitude (ISA):	7.6 km (25 000 ft)
Max range (max.cruise power, FL100)	2220 km (1200 nm)
Max endurance	8:20 h
Max Payload	1470 kg
Max fuel	2250 kg
speed at max. cruise power (FL 100, TAS)	389 km/h (210 kts)
Landing reference speed (MLW, IAS)	165 km/h (89 kts)

Aircraft System

Due to world wide operation, the aircraft are airline-like equipped. Modern avionic systems and on-going development makes the 228 a highly efficient tool. Compared with each other the aircraft are slightly different equipped.

- Weather Radar
- Radio altimeter
- VHF / HF radios including SELCAL
- Navigation Management system GNS-X
- IRS system
- GPS system
- ADF
- 2 VOR / DME
- 2 ILS, Marker
- Autoflight system including yaw-damper
- 2 Mode S Transponder
- TCAS
- Oxygen system for crew and passengers
- Air Data Computer
- Experimental power DC 28V/225A, AC 220V/50Hz



Modifications

Due to various modifications on the aircraft structure and aircraft system the DLR DO228 is a unique multipurpose research aircraft



3 small roof openings \varnothing 150mm
1 large roof opening \varnothing 400mm



hardpoints on aircraft tail
for up to 20 kg



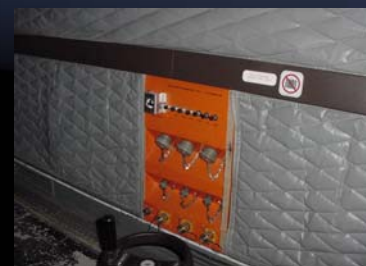
large cargo door
1280 mm x 1300 mm



ski operation
(AWI aircraft only)



hardpoint for
noseboom installation



experimental power system



4 hardpoints under the wings
for up to 250kg / 150 kg
preinstalled PMS wiring
between cabin and outer hardpoint



2 observer windows



hardpoints at side of fuselage
for up to 50 kg



hardpoints under the fuselage
for up to 200 kg



2 large openings in the bottom of
fuselage with rollerdoor cover
2060 mm x 515 mm
Ø 500 mm

Precision Navigation System

Computer Controlled Navigation System (CCNS4) and AEROcontrol for Aerial Survey Flight Missions (manufactured by IGI, Germany)

The Standard CCNS4 is a guidance, positioning, and sensor management system for aerial survey flight missions. It provides complete and comprehensive solutions for mission planning, aircraft guidance and camera (as well as other sensors) management during photo flights or scanner missions, additionally post-flight record keeping, data management and documentation. Since the complete mission can be prepared pre-flight single crew operation for sensor missions is possible.

The system consists of the airborne computer unit, 2 control & display units (5 "), the AEROcontrol system, the DGPS Omnistar system and the CCNS World Wide Mission Planning software (WWMP)

Meteo Sensors & Data Acquisition

The DLR DO228 can be equipped with a sensor package for meteorological measurements. The sensors measure the basic units like temperature, pressure and humidity as well as wind speed and direction. Therefore a noseboom carrying a flow angle sensor will be mounted to the aircraft. The sensor system is capable of turbulence measurements.

As part of the sensor package a data acquisition system is installed capable of storing analog signals of the meteorological sensors as well as digital ARINC data from the aircraft avionics system. The system can be scaled according to the number of existing data channels and is able to store user provided analog data.

An onboard quicklook system allows scientific users to look at the meteorological and aircraft data in realtime during flight. This information can be used to adjust the flight parameters or flight pattern according to the present conditions.

'PMS' (Particle Measurement System) standard wiring into the wing stations for power and data transfer is available.



Service

The Flight Facility is an autonomous institution within DLR which intends to support scientists from in- and outside DLR in planning, setting up and conducting flight campaigns on their research aircraft. Besides the research flight operation various groups within the Facility offer a variety of related services to achieve this goal:

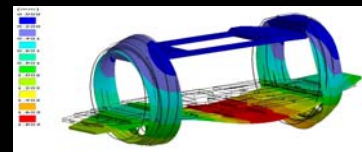
- Logistical support
- Support in integration and certification of user equipment
- Flight planning, flight permits
- High quality data evaluation of meteorological basic sensors and aircraft system data immediately after flight
- Certified calibration of pressure, temperature and humidity

The Flight Facility is a certified “LBA Maintenance Facility” (LTB) and thus authorized to perform maintenance and repair on the research aircraft. This fact is mandatory for the operation of aircraft in remote locations and extreme climatic environment. DLR’s certification as “JAR21 Design Organisation” (EB) assures that user designed sensors and instrumentation can be integrated and certified

Infrastructure

The infrastructure associated with the Flight Facility is prerequisite for these services and can also be used by the visiting scientists.

- Heated hangar (50 x 30 x 6 m) with avionics workshop
- 6500 m² apron with refueling station for Jet A 1 and 100 LL
- Mechanical and electronic workshop
- Fully equipped office and lab rooms for external users
- Large environmental simulation chamber (pressure and temperature, 500 l) for testing of equipment
- Highly sophisticated calibration benches for pressure, temperature and humidity



Flight Facility Braunschweig

German Aerospace Center

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