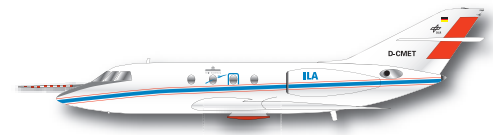
Dassault Falcon 20E-5 (D-CMET)

Flying for atmospheric research

Brief description

The Dassault Falcon 20E-5, registered as D-CMET, has been an indispensable part of the DLR research fleet since 1976. This twin-jet aircraft, which is based at the DLR site in Oberpfaffenhofen, has undergone thorough conversion to make it suitable for atmospheric research, including the installation of additional air inlets and measuring probes.



Aims

Aircraft-based atmospheric and climate research. One area of focus is investigating the effects of aircraft emissions on atmospheric composition.

Parties involved

DLR institutes as well as universities and external clients

Applications

- Flying laboratory for environmental and climate research
- Platform for remote sensing and in-situ measuring devices
- Comparative measurements; validation measurements in relation to ground stations, satellites and climate models

Outlook

- A better understanding of the causes and progress of climate change
- State-of-the-art satellite measuring instruments for atmospheric and climate research after testing in flight

Facts and figures

Length: 17.2 m
Height: 5.4 m
Wingspan: 16.3 m
Empty weight: 8.4 t
Total weight: 13.8 t
Thrust: 21 kN
Flight altitude: max. 12,800 m (42,000 ft)
Range: max. 3,700 km
Maximum speed: 917 km/h (0.9 Mach)

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When the Icelandic volcano Eyjafiallajökull erupted in April 2010, the Falcon 20E-5 had its most spectacular deployment to date – flying into the ash cloud over Germany, the UK and Iceland as a 'volcano ash hunter'. There, it investigated the composition and concentration of the volcanic particles that had brought scheduled air traffic to a standstill. Scientists still use the Falcon to **investigate an array of queries relating to the atmosphere and climate research**. On board, they directly measure trace gases and aerosols, and collect air samples for subsequent laboratory analysis.

In recent years, the Falcon has become one of DLR's most important elements of large-scale research equipment to **research the effects of aircraft emissions on the composition of the atmosphere.** The Falcon's unique modifications and instruments make it a useful multi-purpose platform for research applications that can be adapted to specific requirements.

The following **modifications and additions** have been made to the structure of the Dassault Falcon 20E D-CMET aircraft: nose boom with integrated flow probe for measuring air inflow velocity and direction; a total of three special windows in the fuselage roof and floor, used, amongst other applications, for LIDAR atmospheric measuring instruments (the lower special windows can be protected against stone chippings during take-off and landing by covering them with a sliding screen); new engines with additional electrical generators to facilitate experiments (two at 300 A and 28 V); four small openings (8 cm diameter) on the top side of the fuselage; four attachment points under the wings for attaching particle measurement systems (PMSs); a central attachment point on the underside of the fuselage for mounting different measuring devices; side window for infrared and radar antennas (so-called microwave-measuring devices) as well as attachment points on the lower rear fuselage for radiometers.

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