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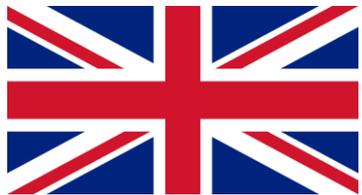
E-GAP



Use of a large atmospheric research aircraft

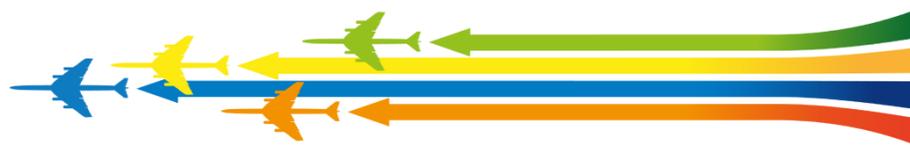
Dr. Guy Gratton

NCAS Head of airborne science and technology

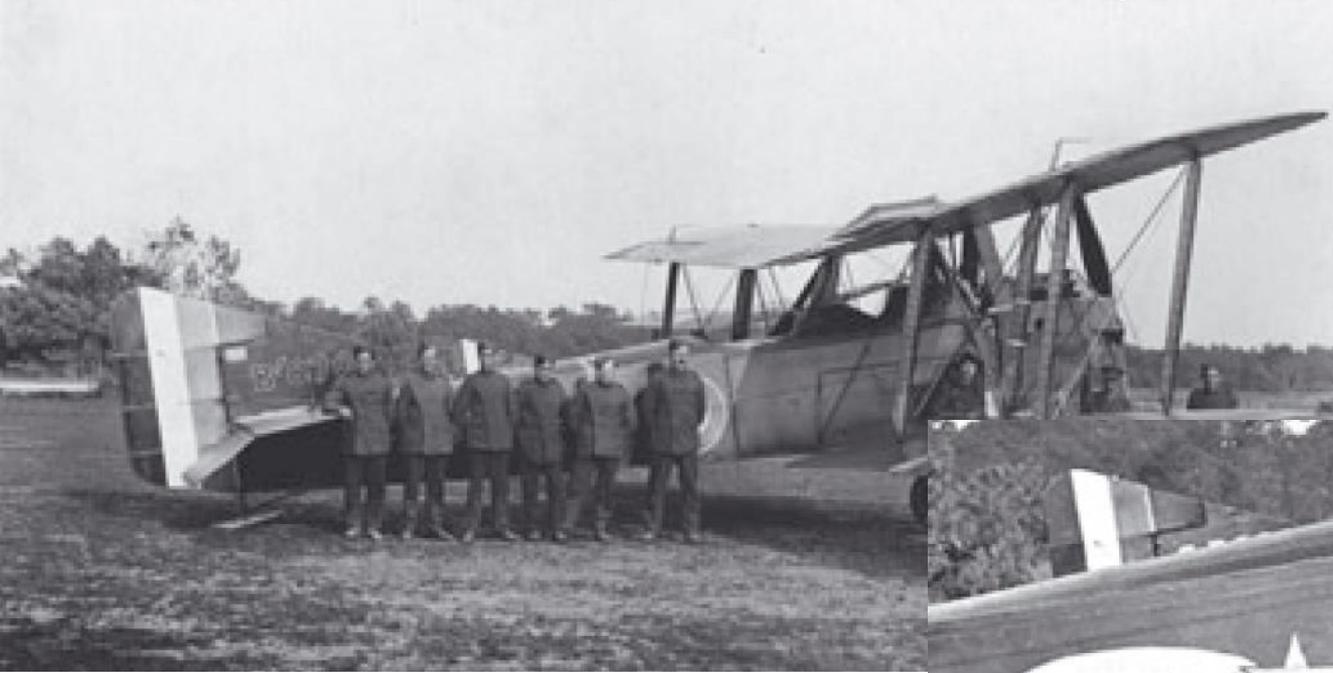


**National Centre for
Atmospheric Science**

NATURAL ENVIRONMENT RESEARCH COUNCIL



(British) Prehistory – 1918/19

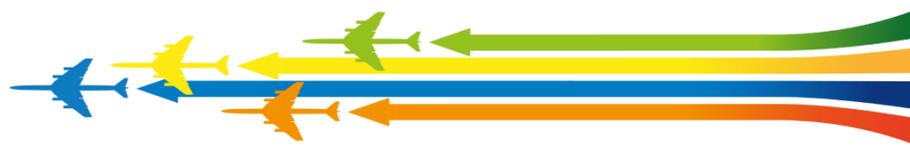




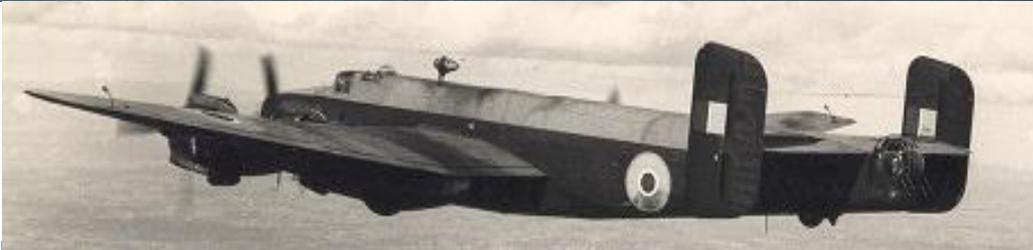
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In between



ICAO Global Aviation Partnerships on Emissions Reductions (E-GAP) Seminar
ICAO Headquarters, Montréal, 16 to 17 September 2015

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Since 2004 - FAAM

Facility for Airborne Atmospheric Measurements



The ARA



The BAe-146-301 Atmospheric Research Aircraft (ARA)

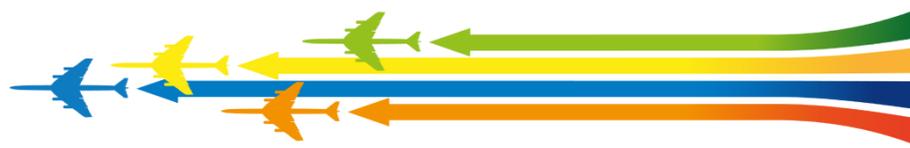
Started 2001, CofA 2004, UK government owned



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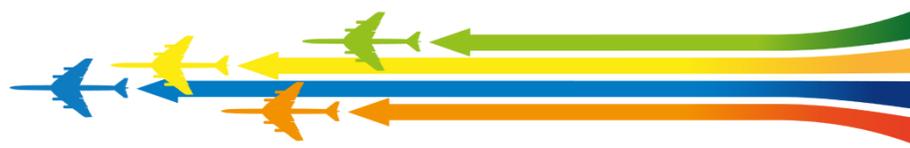
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Instrumentation and data system





The UK geosciences research fleet

- FAAM
 - BAe-146-301
- ARSF
 - Dornier Do-228
- Edinburgh
 - Super Dimona
- BAS
 - 4 x Twin Otter, Dash-7
- MOCCA
 - Cessna C421





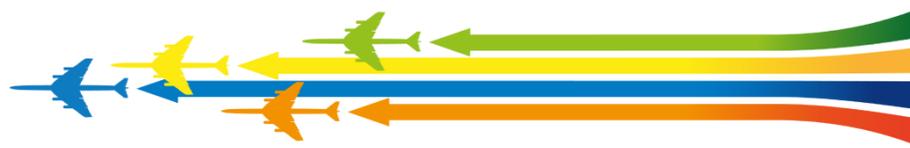
Other capability behind FAAM (and FAAM behind them)

- National Centre for Atmospheric Science
 - British national infrastructure in atmospheric science:-
 - Observational systems
 - Expertise
 - Modelling; laboratories; data centre
- Met Office
 - UK national forecaster
 - Management of *Unified Model* (MetUM)
 - Ground and space facilities
 - Large research capability, including the *Hadley Centre*.

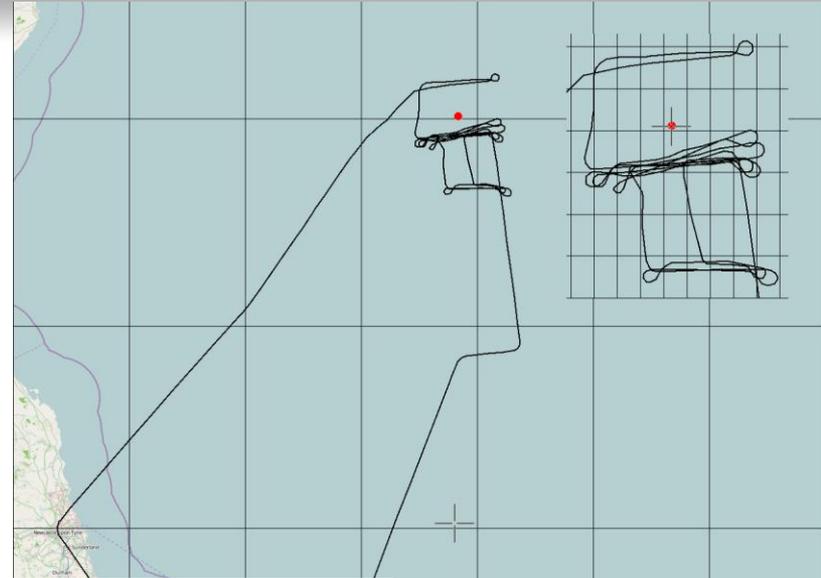
What can a research aircraft do?

- Some recent science programmes



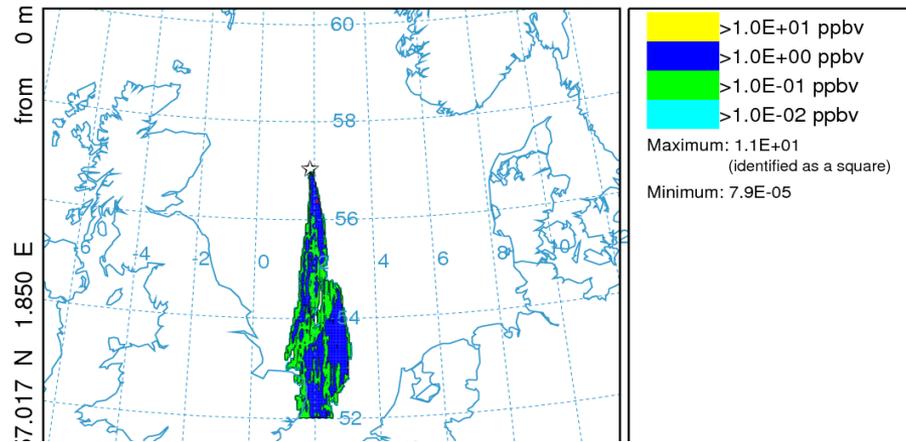


Elgin Platform



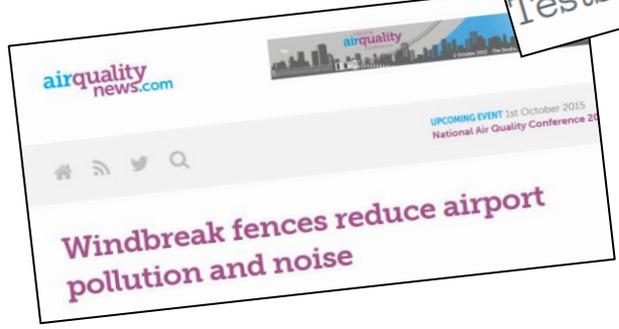
NOAA HYSPLIT MODEL

Concentration (ppbv) averaged between 700 m and 1000 m
Integrated from 1200 04 May to 1800 04 May 12 (UTC)
CH4 Release started at 1200 03 May 12 (UTC)



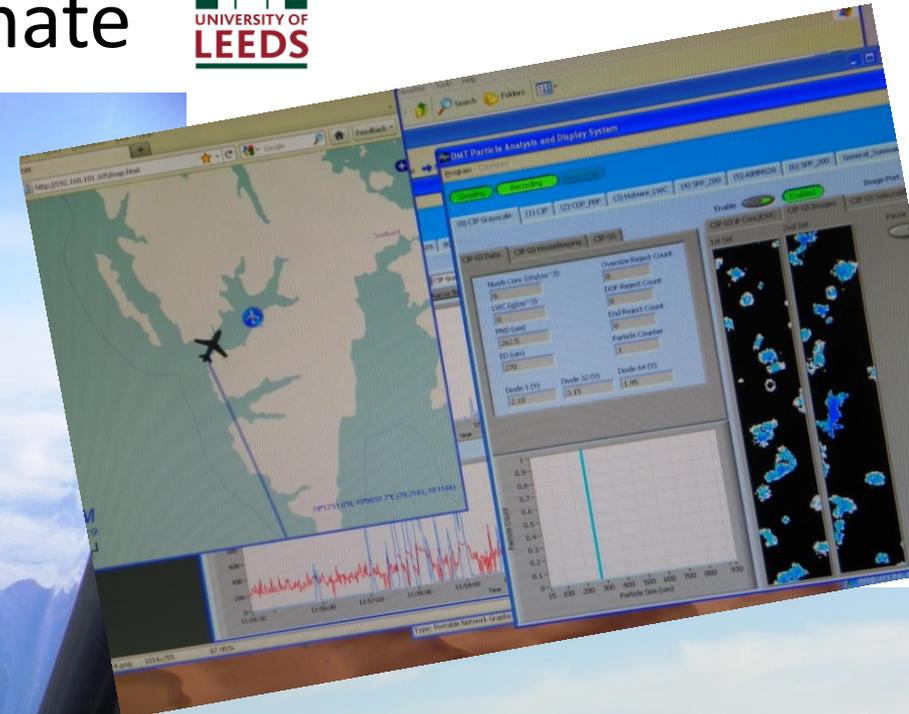


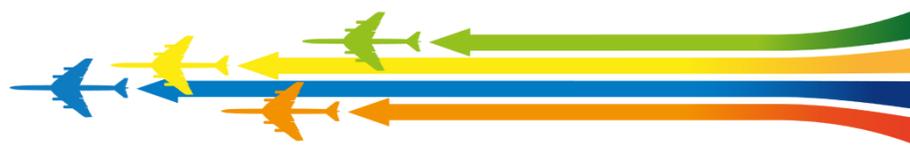
Baffles





ACCACIA Understanding the arctic climate





UK/US joint programme - CAST Guam...

Understanding the tropical atmosphere



UNIVERSITY OF
CAMBRIDGE



NCAR

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH



Armstrong Flight
Research Center



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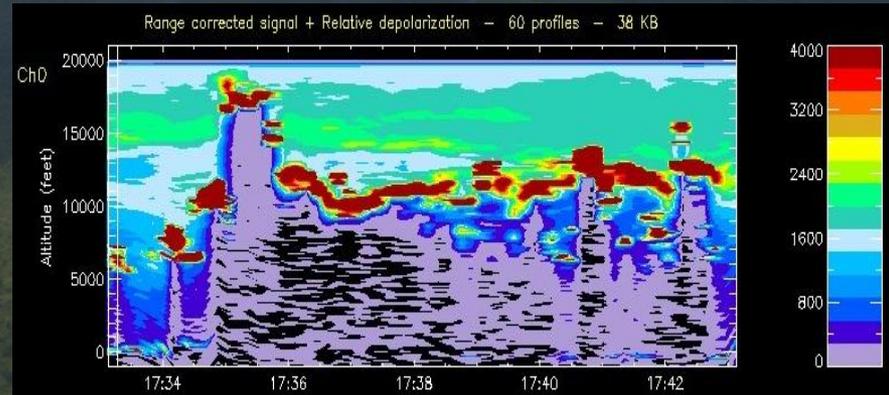
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“Forest” chemistry studies

- Deforestation (Brazil, Malaysia, Indonesia)
- Fires (Brazil, Canada)

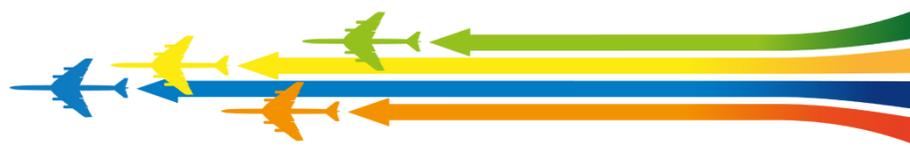




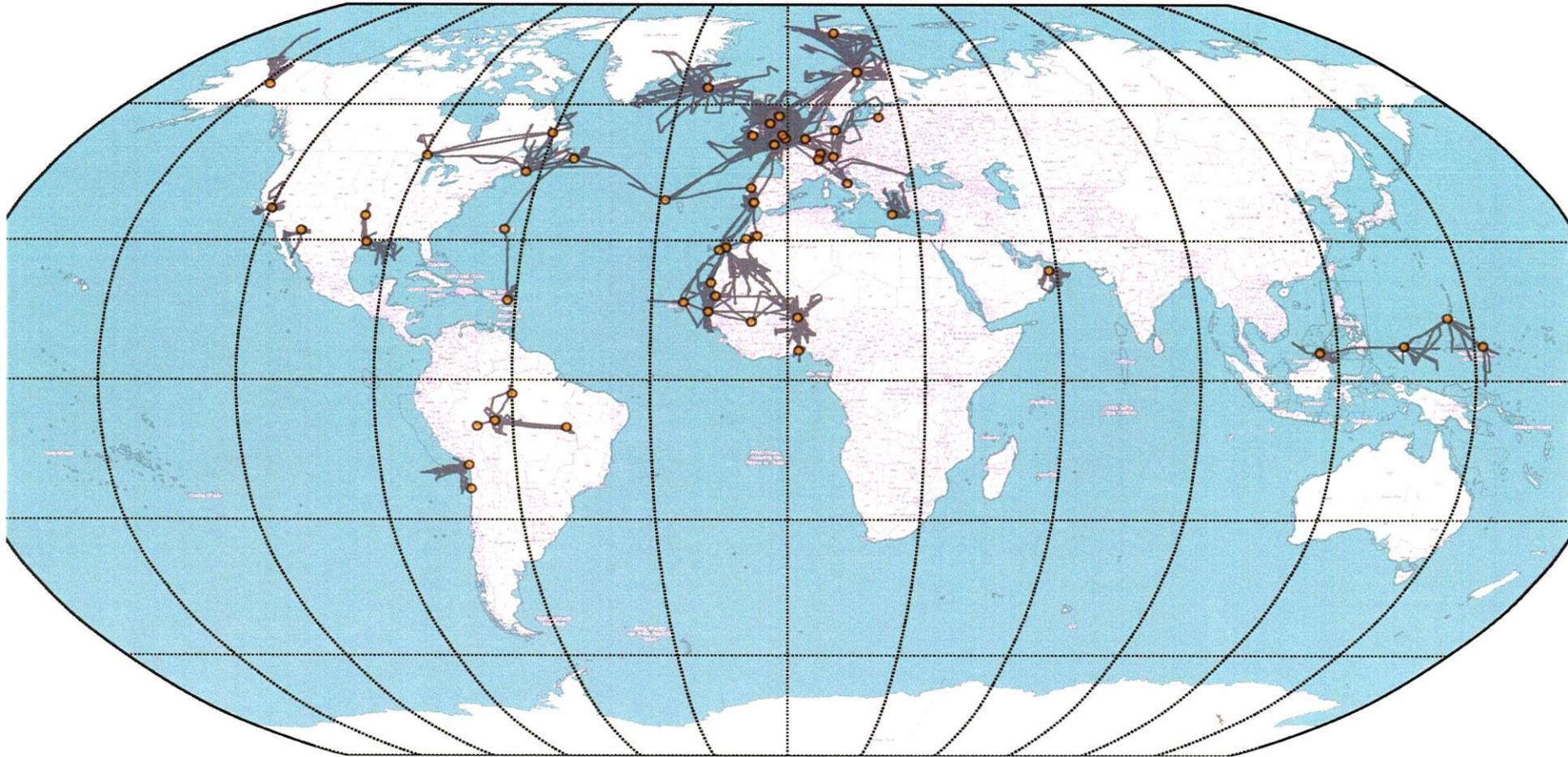
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10 years of science delivery





What else is possible?

- Measurement of wake turbulence
- Measurement of aircraft emissions
 - Or atmospheric profile elsewhere
- Dispersion modelling
- Modelling of predicted atmospheric change
 - And validation of models
- Supporting data for procedure design....

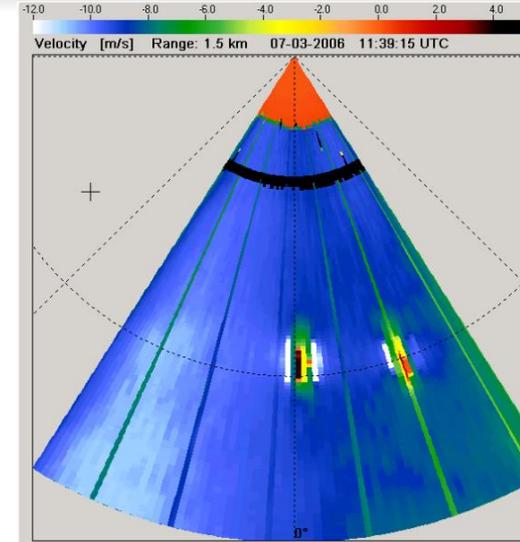


Figure from: FAA VALIDATION OF THE A380

Eugene Arnold: Federal Aviation Administration (FAA), Hugues van der Stichel: Airbus, SETP 2008



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