



# SAFIRE

The atmosphere is our laboratory

FRENCH OFFICE OF AIRCRAFT INSTRUMENTED FOR ENVIRONMENTAL RESEARCH



**METEO FRANCE**  
Toujours un temps d'avance



CENTRE NATIONAL D'ÉTUDES SPATIALES



**INSU**  
Observer & comprendre

Unité Mixte de Services n°2859





## Your expert in airborne measurements

**SAFIRE is the french operator of environmental research aircraft available to the international scientific community and to the industry.**

SAFIRE brings together the staff and the 3 research aircraft of the CNRS/INSU, Météo-France and the CNES. These 3 institutes have long experience in airborne research, they have operated research aircraft since 1947.

### Typical measurements performed onboard

The SAFIRE aircraft has the following core instrumentation:

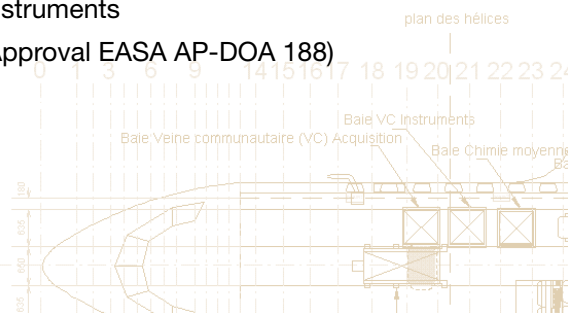
- **Thermodynamics:** High speed and sonic thermometers, lyman-alpha, dew-point hygrometers
- **Turbulence and wind:** 5 holes modified radome or boom with pressure sensors, high sensitivity Inertial Navigation System + GPS
- **Air Chemistry:** CO, NOx, O3
- **Aerosols:** specific air-inlets
- **Microphysics:** underwing pods for standard Particle Measurement Systems (0.3 to 6000  $\mu\text{m}$ )
- **Radiative measurements:** down and up visible, IR and UV radiations, radiance temperature
- **Remote sensing:** large openings with quartz/BK7 windows (optionnal) for Lidars, Radiometers, etc.
- Video, photography

*All racks are standard 19 inches, for easy user's intruments integration.*



### SAFIRE can fly all instruments provided by the users

- Mechanical Integration of instruments
- Aeronautical Certification (Approval EASA AP-DOA 188)
- Data real-time acquisition
- Data processing

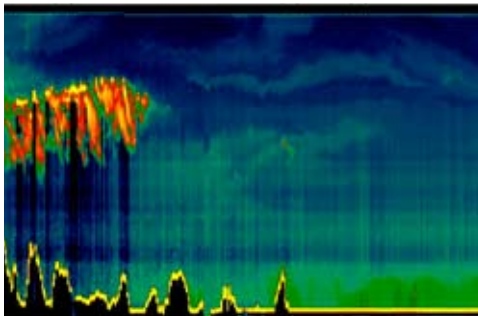


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## Research campaigns

- ❖ **Urban pollution**  
 Capitoul (Toulouse, 2004),  
 Megapoli (Paris, 2009)
- ❖ **Climate & Environment**  
 CarboEurope (Midi-Pyrénées 2005), AMMA (Africa 2006), CAROLS (France-Spain 2007 to 2010), Hymex (Mediterranean Sea 2012), Polarcat (Sweden and Greenland 2008), EUCAARI (Netherlands 2008)
- ❖ **Instrument validations**  
 Pod-Airbus (2005), Adeline-Thalès (Toulouse 2005 to 2007)
- ❖ **Aeronautics weather hazards**  
 Flysafe (2008)
- ❖ **Space programs**  
 A-Train, Calipso, SMOS
- ❖ **Ocean surface**  
 CAROLS (France-Spain 2007 to 2010)  
 HYMEX (Mediterranean Sea 2012)



## Our partners:

### Laboratories

Météo-France/research center  
 LAMP, Clermont-Ferrand  
 LA, Toulouse  
 LOA, Lille  
 LATMOS, Paris  
 LISA, Créteil  
 IRD

### Industries

THALES  
 Airbus  
 RTRA STAE

## SAFIRE helps you to prepare your airborne experiment by:

- Selecting the appropriate aircraft
- Integrating and certifying the instrumentation
- Negotiating the flight plans with aviation authorities
- Consolidating the financial plan and obtaining grants

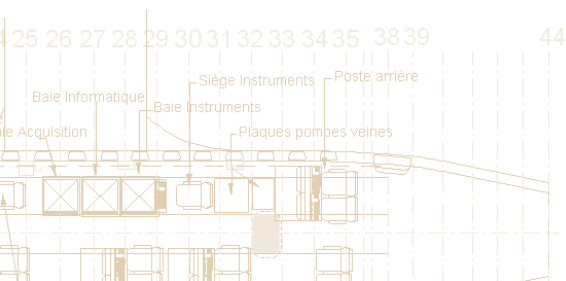
## A european involvement:

### EU-FAR

SAFIRE is a member of the european network of research aircraft ([www.eufar.net](http://www.eufar.net))

### COPAL

SAFIRE participates to the european project of heavy payload and large endurance aircraft.







Piper Aztec

ATR 42

Falcon 20

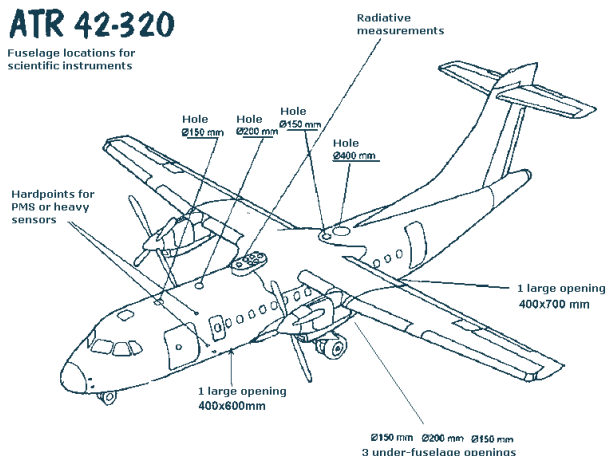
<b>Max distance at max payload</b>	600 km	2500 km	4100 km
<b>Endurance</b>	3h30	4h30	4h30
<b>Ceiling</b>	10000 ft	25000 ft	41000 ft
<b>Max scientific payload</b>	150 kg	2500 kg	1200 kg
<b>Measurement speed</b>	80 m/s	100 m/s	200 m/s
<b>Aircraft Owner</b>	Météo-France	Météo-France	CNRS-INSU
<b>Measures</b>	Low troposphere studies: urban pollution, air chemistry, turbulence, wind...	Medium troposphere studies: chemistry, microphysics, remote-sensing, turbulence...	Multidisciplinary studies in high troposphere and low stratosphere: remote-sensing, chemistry, microphysics...

### The infrastructures

25 engineers and technicians operate the aircraft and instruments from Toulouse Francazal where are located the SAFIRE offices, laboratories and hangar.

### ATR 42-320

Fuselage locations for scientific instruments



We can help you prepare your project. Contact us:

**SAFIRE**

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