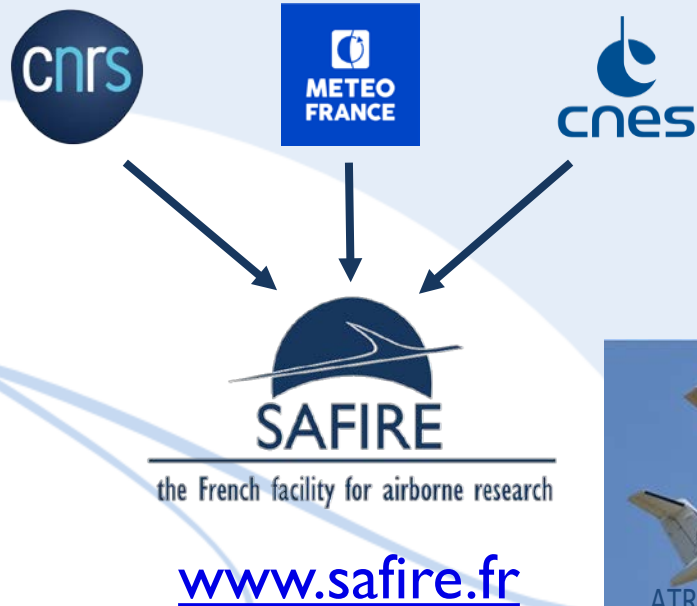


SAFIRE and airborne campaigns preparation

LIAISE Workshop 1 – 08 & 09-03/2021

JC Canonici – Deputy-director of SAFIRE



Mission: to carry out airborne measurement campaigns

- Observation (improving knowledge on environmental phenomena)
- Preparation and cal/val of space missions
- Aeronautical R&D support

Collaborations : Airbus, Airbus Defense & Space, ATR, SAFRAN, Dassault Aviation, Thales Alenia Space, Thales Avionics, etc.

Legal structure: CNRS Research Support Unit - UAR2859



- + **80 flight campaigns**, in mainland France, overseas and around the world
- + **50 laboratories as users**, French & foreign
- + **700 experts** to have flown
- + **150 students** to have flown
- + **230 A-rank publications**



Three flying-laboratories



Based at Toulouse-Francazal airport

The French facility for airborne research

www.safire.fr

- ATR 42-300 aircraft is registered F-HTMO. It has been deeply modified to a flying lab.
- Classified in “Aerial Work” category : no passengers allowed aboard
- Performances depending on weather conditions, on payload, on aerodynamics ...
- Typical performances :
 - Science speed: 100 m/s
 - Max endurance: 5 h
 - Max range : 900 NM
 - Max height: 25 000 ft



ATR42 : some unique particularities

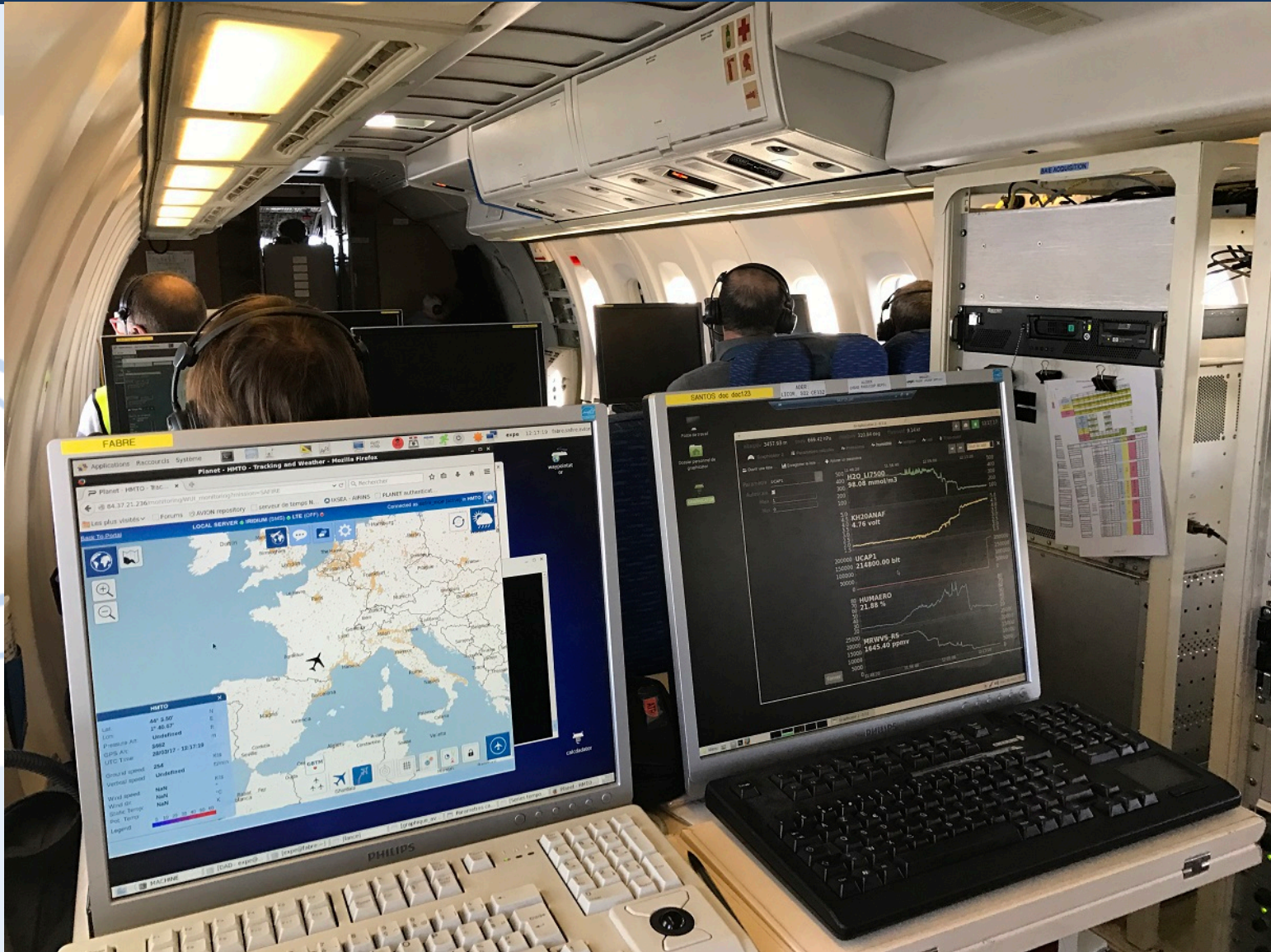


External pods
fuselage and
underwings

Great versatility

Adaptations
for each need





22 permanent people totally dedicated to support scientists before, during and after the campaign

- 1st February 2021 : 22 fellows
- (Météo-France, CNRS)
 - **Technicians and engineers**
 - ✓ Instruments
 - ✓ Data and acquisition
 - ✓ Certification
 - ✓ Logistics
 - **Pilots**
 - **Aircraft mechanics**
 - **Support**



- Various air spaces with each one specific ATC regulations
 - Flying over cities
 - Forbidden areas
 - Military airspace
 - Terminal Manoeuvring Areas (airports ...)
 - Strict procedures
 - Flight plans to be filed within time limits
- Influencing parameters such as
- Sampling altitude
 - Schedule
 - Manoeuvrability...



SAFIRE OPS team will take care of this with your inputs.
They will be the interface between you and the ATC

Please, apply asap to make it possible

Flight safety is NOT an option ...

- Very strict rules to comply with for each material on board :
 - Mechanical stress (in case of «emergency landing » for instance)
 - Non toxicity (in case, reliable confinement)
 - Fire resistance
 - Electrical load, etc.

For all equipment to be flown, SAFIRE must have it certified.

SAFIRE design office (BAC) will take care of this with your inputs.
They will be the interface between you and the Safety Agency (DGAC)

Please, apply asap to make it possible

Flight safety is NOT an option ...

- As a crew member, everyone on board must :
 - Know safety instructions and participate to each pre-flight briefing
 - Comply with the SAFIRE senior flight engineer, in charge of the cabin crew safety (*equivalent of purser in commercial flights*)



Safire has a catalogue of about 100 different instruments (thermo/dynamics, radiometry, microphysics /aerosol, chemistry, etc.)

<https://www.safire.fr/en/our-facilities/aircraft-a-instruments/instruments-list.html>

- Some may need a long-time preparation
- Some may be needed for another experiment at the same time
- Some can need the same slot on board
- ...

Please, apply asap to make it possible !

A wide offer of IT services

- Safire can provide certified rackable computers
- Safire distributes high-precision GPS time inside the aircraft
- Safire distributes high-accuracy aircraft position, speed and attitude parameters
- Planet system allows exchange of data and chat between ground and aircraft via IRIDIUM satellite link
- A real-time acquisition monitoring system is available on board for all instruments linked to the data-acquisition system

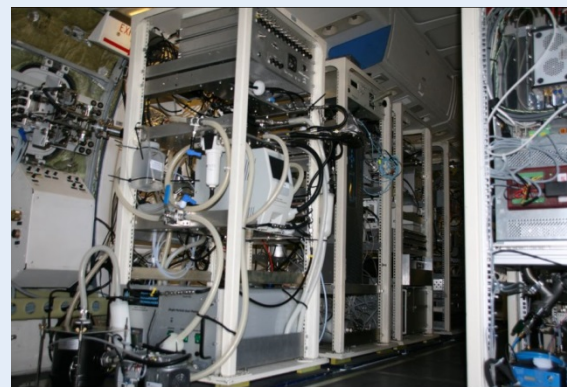
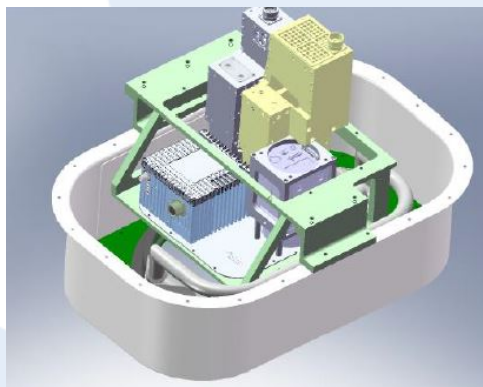
Please, apply as soon as possible to make it possible

Even your laptop is subject to certification to be used in SAFIRE aircraft !

Some weeks before the beginning of the experiment, equipment starts to be integrated in the aircraft.

- Always a SAFIRE personal inside the aircraft when work in progress
- The more careful the preparation, the shorter the integration time
- SAFIRE agenda defined a long time ago, so be careful when scheduling your participation to the integration of your own equipment (if needed).
- Pay attention to shipping equipments to Francazal.
- Don't forget to reserve time for unforeseen events

Please, apply asap to make it possible !



Short-term availability

- Data provided by Safire are coded following rules described in a [specific document](#). Processing takes some time (depends on the quality level)
- Quicklooks can be delivered shortly after the flight

Please, apply asap to make it possible

SAFIRE +

- All data acquired by SAFIRE are made available to the public through the SAFIRE+ website, a part of Aeris, the French Atmosphere research pole of data
- Aeris offers to project team specific campaign sites, directly linked to the data base of the pole.

Please, apply asap to make it possible



The screenshot shows the SAFIRE website homepage. The header features the SAFIRE logo and navigation links: HOME, OUR FACILITY (highlighted with a red circle), SCIENTIFIC MISSIONS, DATA AND PUBLICATIONS, WHAT IS SAFIRE?, and CONTACT. Below the header is a large banner image of an ATR42 aircraft with the text 'ATR42' and 'The ATR42 takes off from Avignon during the SAFMED experiment in 2014'. The main content area is titled 'the French facility for airborne research' and contains four blue boxes: 'An airborne research facility unique in France', 'A lab for airborne experiments', 'Highly specialized skills', and 'Videos and media about us'. Below these is a section titled 'Flying laboratories for scientific research' with a paragraph of text. To the right of this text are four smaller images: 'Falcon 20', 'Piper Aztec', 'ATR 42', and 'Our instruments'. At the bottom, there is a section titled 'Our selection' with the SAFIRE+ logo and text about the airborne data web portal, and a section titled 'SAFIRE experience since 2006' with a timeline showing '1947 year of the first flights of CAEM at Brétigny air force' and '3300 hours of in-flight data'.

www.safire.fr

Our facility

- [Aircraft description](#)
- [Instruments list and characteristics](#)
- [Planet system](#)



The screenshot shows the SAFIRE website with the 'SCIENTIFIC MISSIONS' menu item circled in red. The main banner features an ATR42 aircraft with the text: 'ATR42 The ATR42 takes off from Avignon during the SAFMED experiment in 2014'. Below the banner, the text reads 'the French facility for airborne research'. Four blue boxes highlight key features: 'An airborne research facility unique in France', 'A lab for airborne experiments', 'Highly specialized skills', and 'Videos and media about us'. A section titled 'Flying laboratories for scientific research' describes the facility's capabilities and lists the aircraft: Falcon 20, Piper Aztec, and ATR 42. It also mentions 'Our instruments'. At the bottom, a timeline shows 'SAFIRE experience since 2006' with '1947 year of the first flights of CAEM at Brétigny air force' and '3300 hours of in-flight data'. A sidebar on the left mentions 'Our selection' and 'The SAFIRE+ airborne data web portal'.

www.safire.fr

• Scientific missions

Prepare your scientific project

Normative documents

- [Safire service offer](#)
- [Instructions for equipment](#)
- [SAFIRE data guide for users](#)
- [How to cite SAFIRE in papers](#)

Documents to be filled at each stage of the project

- [Request for use](#)
- [Instrumental description](#)
- [Declaration of compliance](#)

For crew members

- [Authorization of employer](#)
- [Information sheet \(Health\)](#)
- [Aircraft safety instructions](#)

Media management

- According to news and location of the campaign
 - Press conference can be successful, so many journalists to manage ...
 - Impossible to accept every demand being onboard for a flight

Visits

- According to educational collaborations
 - School and students visits to be carefully prepared
 - VIP or local representatives to be informed and sometimes hosted

Social management

- Populations questions about unusual air-activity, to be anticipated
- Who knows ?

Feel free to contact anyone you know at SAFIRE ...

- Your main contacts :
 - Design office (BAC team) : laurent.guiraud@safire.fr
 - Instruments (INS team) : thierry.perrin@safire.fr
 - IT and data (ITD team) : tetyana.jiang@safire.fr
 - Air operations (OPS team) : jean-francois.bourdinot@safire.fr
 - Financial management (GES team) : marie-helene.cluzeau@safire.fr
 - Logistics, shipping : adrien.hue@safire.fr
- When mailing to SAFIRE, please always Cc the SAFIRE LIAISE project coordinator, jc.canonici@safire.fr

- Of course nothing can be definitively defined at first time
- We need to talk, to discuss, to find the best agreement between constraints and scientific objectives.
- SAFIRE – ACROSS meetings will periodically gather people in charge of preparation then realization of flights.
- Period will decrease within time to run until the campaign ...

See you soon !