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Material illustrating and promoting the work of the project

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N1SEI: Strategy and European Integration

N1SEI: EUFAR stand at annual EGU General Assembly

N1SEI: EUFAR Stand at EGU 2017, Vienna

N1SEI: EUFAR Stand at EGU 2016, Vienna

N1SEI: Published articles on EUFAR in various journals

Supporting the future of airborne research

Instrumented aircraft are an important scientific tool, allowing researchers to gather data on the Earth's surface and atmosphere, yet such facilities are not always available in some countries. The EUFAR2 project helps widen access to airborne research facilities and supports the growth of the environmental science research community, as Philip Brown explains.

On the FAAM BAe–146 aircraft we have a range of instruments which are carried under the wing, for sampling atmospheric aerosol particles, and cloud precipitation particles, across a whole range of sizes

N1SEI: Screenshot of first two pages of EU Research magazine article on EUFAR (2017 Spring edition)

PROFILE

EUFAR – Coordinating airborne environmental sciences

Instrumented aircraft are an important scientific tool, allowing researchers to support a range of applications in environmental sciences, says EUFAR

EUFAR is currently supported by the 7th Framework Programme (FP7) of the European Commission. It combines 24 European institutions and organisations involved in airborne research, operating 19 instrumented aircraft and 5 remote-sensing instruments, providing a broad measurement capability.

There is a long history of airborne observational research contributing towards incremental developments in the scientific understanding of Earth-system processes. These developments have proceeded in parallel with similar developments in the capabilities to observe these processes on a global scale from space and to model them in operational Numerical Weather Prediction (NWP), Climate and Earth-System Models. The fields of science that are impacted by an airborne research observing capability are very broad and span the atmosphere, ocean, land surface and biological systems. Maintaining access to a broad range of airborne observing facilities is critically important to our future ability to study processes in the environment and to develop and use the models that will, for example, be used to study mitigation strategies in a changing climate.

EUFAR aims to:

- develop transnational access to national facilities;
- improve the quality of the services provided by aircraft and instrument operators by strengthening expertise through knowledge exchange;
- develop and maintain a central database of airborne data and the standards for this database to be interoperable with other environmental science and Earth observation databases;
- support joint instrumental research activities centred on the development of improved data processing and calibration techniques;
- promote the use of research aircraft and instruments by providing education and training courses on airborne research topics;
- support innovation in airborne research, working with industry to transform airborne research instruments, methodologies and software into new products and services.

EUFAR activities

i) Transnational access

Transnational Access provides fully-funded flight time to Principal Investigators and User Groups without access to the required airborne observing facilities via national funding within their country of employment. To maximise the scientific impact, applications are encouraged that can be clustered with larger nationally- or internationally-supported flight campaigns. 32 projects have been approved for funding, evenly split between the use of in-situ atmospheric measurements and the use of imaging systems for Earth Observation. As a result of clustering, TA flight activities have been possible in West Africa as part of the multi-national DACCIWA campaign, in the Cape Verde Islands and also in Namibia.

Figure 1. The 4 aircraft operated by DLR, the German Aerospace Research Centre at Oberpfaffenhofen. From front to back: HALO Gulfstream 550, Dornier 228, Cessna Caravan and Falcon-20. The latter three aircraft have all participated in Transnational Access projects.

ii) Networking activities

EUFAR supports a number of Networking Activities that share its objectives of improving efficiency and spreading best practice in airborne research observations.

Education and Training are designed to attract and train both early-stage researchers and university lecturers in airborne atmospheric research observations and remote sensing of the

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Figure 2. Students at a lecture during the SWAMP training course on the use of airborne imaging for studies of photosynthesis in a wetland region that was held in Poland in 2015.

Earth surface and to develop/consolidate EUFAR training course educational material. By the end of its present contract, EUFAR will have supported a further four summer schools on airborne research topics hosting approximately 80 students.

Standards and protocols aim to harmonise and document processes in the management of data within EUFAR, including both in-situ and Earth observation data. A focus has been on the update and extension of previously-developed common protocols and standards and assuring their compatibility with international standards. EUFAR is engaging with the ENVRIplus community of research infrastructures via the implementation of its data Reference Model. This promotes interoperability and will put access to airborne data on the same footing as that from other infrastructures.

A database ensures that valuable data, metadata and documentation are widely available to facilitate data discovery, exchange, collaboration and re-use. The archive is maintained by the Centre for Environmental Data Analysis (CEDA) in the UK and is accessible via the EUFAR website.

PROFILE

iii) Joint Research Activities (JRA)

Two JRAs are currently being undertaken, both aiming to improve the quality of airborne data and developing new data products and services supplied to scientific users.

HYLIGHT is working to develop, test and validate improved software tools for the combined use of Hyperspectral Image (HSI) and Airborne Laser Scanning (ALS) data and improved ALS data processing using HSI and to make them freely available. These tools will, for example, contribute to better management of forest ecosystems for both recreational and economic purposes, where the combined measurements yield more detailed information on the nature of the forest canopy. HYLIGHT tools, installation guides and user manuals can be downloaded from the EUFAR website

TGOE is working to develop robust calibration systems for gas-phase chemical measurements made on board research aircraft.

These contribute substantially to the development of numerical models used for both air-quality forecasting and longer-term climate studies, providing information on the vertical distribution of species that are difficult to obtain by other means. They are also an important source of local and regional validation for satellite observations that are used for global-scale measurements. Studies of trace gas emissions and evolution often involve one or more aircraft together with fixed, ground-based measurements. Working with the IAGOS and ACTRIS communities to develop the best calibration techniques, TGOE seeks to reduce measurement uncertainties and so enable them to be used to provide more detailed analyses of the processes involved in the transport and chemical evolution of atmospheric trace gases.

The future of EUFAR

EUFAR is seeking to establish itself as an AISBL (international non-profit association). Such an association, supported by members' cash and in-kind contributions will ensure that key EUFAR activities can continue beyond its present funding by the European Commission. These activities will include the maintenance of its website and broadening access both to the aircraft themselves and to data obtained from flight campaigns. EUFAR is also currently seeking Expressions of Interest in future Joint Research Activities that may be undertaken within the framework of the AISBL.

Significant progress has been made by a core group of members to form such an association. Agreements will enable as wide a range of organisations as possible to participate in its work, as members or partners, hence broadening its impact in countries not presently operating their own research aircraft. The AISBL will be formally established at the start of 2018.

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N1SEI: Screenshot of article on EUFAR in the Open Access Government Journal, August 2017Article on "EUFAR-Coordinating airborne environmental sciences" in the Open Access Government journal: ISSB 2055-7612, August 2017 (pages 282-283). Accessible via the following link: http://edition.pagesuite-professional.co.uk/html5/reader/production/default.aspx?pubname=&edid=f8abf7ad-bc1b-4a51-b42b-d7b202a02971

PROFILE

EUFAR – Looking to the future of airborne environmental research in Europe

Philip R.A. Brown from EUFAR AISBL at the UK's Met Office takes us on a journey to explore the exciting future of airborne environmental research in Europe today

Instrumented aircraft are an important scientific tool, allowing researchers to observe the atmosphere and land and ocean surfaces in support of a wide range of applications in the environmental sciences. EUFAR – the European Facility for Airborne Research – promotes collaboration between the operators and scientific users of research aircraft, seeking to broaden access and improve efficiency in the use of these resources.

EUFAR (www.eufar.net) has been supported by the 7th FrameworkProgramme (FP7) of the European Commission. It combines 24 European institutions and organisations involved in airborne research, operating 19 instrumented aircraft and 5 remote-sensing instruments, providing a broad measurement capability.

There is a long history of airborne observational research contributing incremental developments in the scientific understanding of earth-system processes. These developments have proceeded in parallel with similar developments in the capabilities to observe these processes on a global scale from space and to model them in operational Numerical Weather Prediction (NWP), climate and Earth-System models.

The fields of science that are impacted by an airborne research observing capability are very broad and span the atmosphere, ocean, land surface and biological systems. Maintaining access to a broad range of airborne observing facilities is critically important to our future ability to study processes in the environment and to develop and use the models that will, for example, be used to study mitigation strategies in a changing climate.

EUFAR AISBL

A key outcome of the present consortium has been the agreement of several leading partners to constitute EUFAR as an international non-profit association (AISBL). This organisation will provide a framework for European collaboration in airborne science beyond the framework of funding from the European Commission. The objectives of the AISBL are broadly the same as the present consortium, namely to:

- Develop open access to national facilities, broadening the scientific user base and providing users with access to a facility best suited to their scientific requirements;
- Improve the quality of the services provided by aircraft and instrument operators by strengthening expertise through knowledge exchange;
- Develop and maintain a central database of airborne data and the standards for this database to be interoperable with other environmental science and Earth observation databases;
- Support joint instrumental research activities centred on the development of improved data processing and calibration techniques;
- Promote the use of research aircraft and instruments by providing education and training courses on airborne research topics and;
- Support innovation in airborne research, working with industry to transform airborne research instruments, methodologies and software into new products and services.

Membership of the AISBL is open to any institution with a scientific or technical interest in the development and application of airborne facilities in environmental research. The founding members of the AISBL includes eight different organisations in six European countries:

- VITO, Belgium;
- CzechGlobe, Czech Republic;
- CNRS, France;
- Météo-France, France;
- ONERA, France;
- DLR, Germany;
- University of Warsaw and;
- Met Office, UK.

In addition, INTA (Spain), CNR (Italy), Free University of Berlin (Germany) and Tel Aviv University (Israel) are well-advanced on the formal path to membership, and other organisations in the UK, Romania and Greece have expressed an interest in membership.

The airborne research community is widely spread across national meteorological services, other national public research centres, universities and SMEs. Any interested organisation that is unable to participate in the AISBL as a fee-paying member can do so as a partner. Partners will be able to participate in AISBL activities and attend its meetings but without a role in the formal governance of the association.

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Figure 1. The Bae-146 of the Facility for Airborne Atmospheric Measurements (jointly operated by Natural Environment Research Council and Met Office) in the UK. This aircraft is comprehensively-equipped for measurements of atmospheric aerosols, cloud and precipitation particles, trace gases and radiometry from visible to sub-millimetre wavelengths

Figure 2. The Falcon-20 of DLR, Germany. This aircraft is equipped for a wide range of atmospheric measurements and has participated in many national and international observing campaigns over a long career. It has recently seen significant demand through the EUFAR Transnational Access process

Figure 3. The CASA-212 airborne remote-sensing aircraft of INTA, Spain. This aircraft carries a range of hyperspectral imaging sensors from visible to thermal infra-red wavelengths and has also been in high demand through EUFAR Transnational Access

EUFAR AISBL actively welcomes wider participation in its activities. Any organisation wishing to join EUFAR AISBL in future, either as a member or partner should contact the Executive Board Chair in the first instance.

EUFAR AISBL facilities and capabilities

EUFAR AISBL members will provide access to several leading airborne research facilities (both aircraft and instrumentation). These include:

- BAE-146, Facility for Airborne Atmospheric Measurements (FAAM), UK;
- Falcon-20, HALO and Do-228, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany;
- ATR-42 and Falcon-20, Service des Avions Francais Instrumentés pour la Recherche en Environnement (SAFIRE), France and;
- CASA-212, Instituto Nacional de Tecnica Aeroespacial (INTA), Spain.

Other aircraft and instruments operated both within the AISBL and by other institutions in Europe can be viewed on the EUFAR website (www.eufar.net).

These provide state-of-the-art measurements, both in situ and remotely-sensed, that cover a broad range of scientific applications that include but are by no means limited to:

- Atmospheric aerosol physical, chemical and optical properties;
- Cloud microphysics and precipitation development;
- Atmospheric trace gases and their evolution;
- Atmospheric radiative transfer and spectroscopy, from visible to sub-millimetre wavelengths, including the development of measurement capabilities for future space-borne application;
- Vegetation studies including responses to environmental stress factors;
- Soils and mineral characterisation;
- Physical and biological processes in rivers, lakes and inshore waters;
- Energy exchange processes at the land and ocean surfaces;
- Cryospheric processes;
- Calibration and validation of space-borne measurements.

Links to other European environmental research infrastructure activities

It is very common that airborne measurements are combined with those from ground-based or ship-borne platforms as part of joint observing campaigns at both national and international level. Scientific users of airborne data will be assisted in their efficient exploitation of these facilities when common approaches to data and metadata formatting, storage and access are used by the different observing infrastructures.

ENVRIplus (www.envriplus.eu) is a Horizon 2020 project bringing together Environmental and Earth System Research Infrastructures, projects and networks together with technical specialist partners to create a more coherent, interdisciplinary and interoperable cluster of Environmental Research Infrastructures across Europe.

EUFAR is represented in its governing board and will work closely with related infrastructures in the atmospheric, ecosystem and oceanic domains to maximise the benefits of the large investments that are required to provide and maintain world-class airborne observing facilities in Europe.

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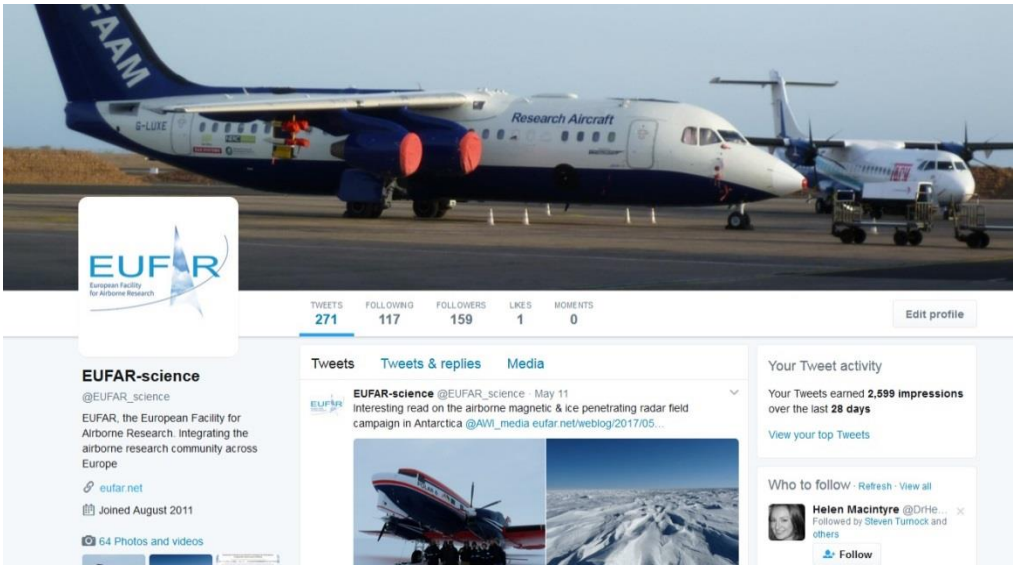
N1SEI: Screenshot of article on "EUFAR – looking to the future of airborne environmental research in Europe" in the Open Access Government journal: ISSB 2055-7612, February 2018 (pages 294 - 295). Accessible via the following link: http://edition.pagesuite-professional.co.uk/html5/reader/production/default.aspx?pubname=&edid=100e4ef2-b7dd-4f7e-91e2-4484fd9457b7

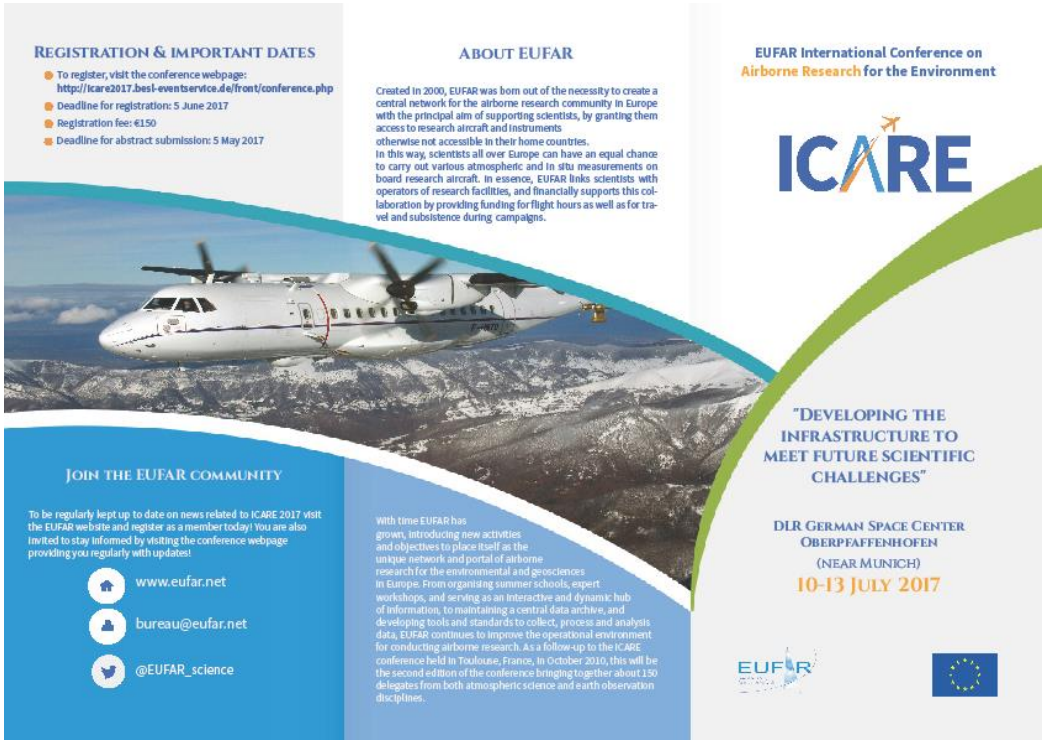
N1SEI: Dissemination - Example of the EUFAR newsletter, issue 19, March 2017



N1SEI: Dissemination - EUFAR Twitter account @EUFAR_science (234 followers)

N1SEI: Images linked to the 2nd International Conference on Airborne Research for the Environment (ICARE 2017), DLR, Oberpfaffenhofen, 10-13 July 2017

N1SEI: Screenshot of BESL ICARE2017 webpage; a conference management tool used to handle registrations, registration fees, abstract submissions, disseminate information, etc.



N1SEI: ICARE2017 flyer

N1SEI: Aircraft on exhibition during ICARE2017, Oberpfaffenhofen, Germany, July 2017
Photo credit: DLR(CC-BY 3.0)

N1SEI: Photo for ICARE 2017 announcement: Aerial shot of DLR premises, Oberpfaffenhofen. Photo credit: DLR (CC-BY 3.0)

2 Excel Aviation	Piper Aircraft PA-31 Navajo	
CzechGlobe	Cessna Aircraft Company C-208B Grand Caravan	
DLR	Cessna Aircraft Company C-208B Grand Caravan	
DLR	Dassault Mystere / Falcon 20 E-5	
DLR	Dornier Flugzeugwerke Do 228-212	
DLR	Gulfstream G550 "HALO"	
FAAM	BAE Systems BAe 146-301	
Grob Aircraft	Grob Aircraft G520T Egrett	
INTA	Construcciones Aeronauticas S.A. C-212-200	
KIT	Ultraleichtflug Schmidtler Enduro	
MetAir	Diamond Aircraft HK36 TTC ECO Dimona	

N1SEI: Aircraft on exhibition during ICARE2017, Oberpfaffenhofen, Germany, July 2017

N1SEI: ICARE conference & aircraft exhibition, DLR, Oberpfaffenhofen, from 10 to 13 July 2017

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N1SEI: ICARE conference & aircraft exhibition, DLR, Oberpfaffenhofen, from 10 to 13 July 2017

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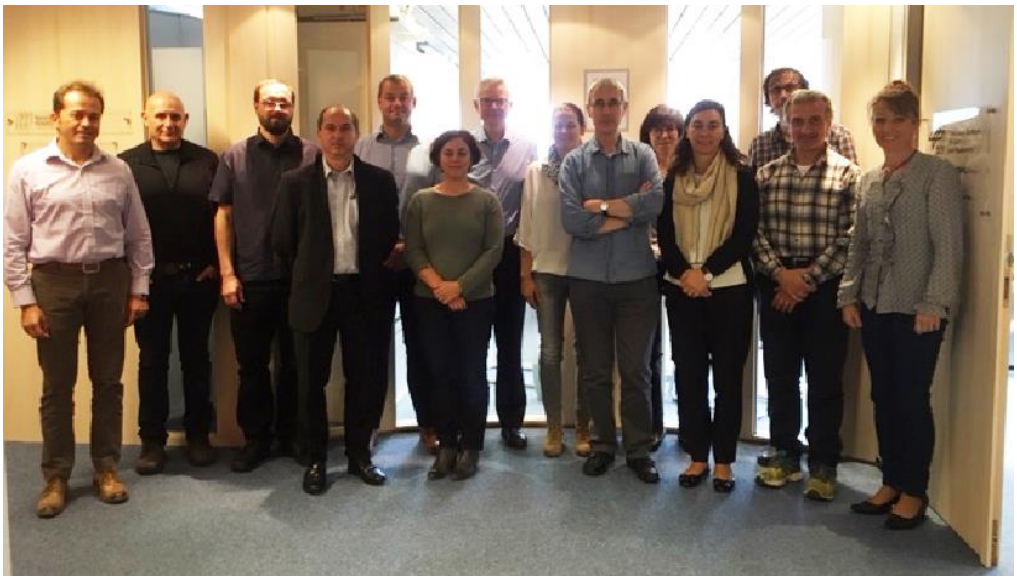
Countries	Organisations	General Assembly representatives (organisation level)	Executive Board members (country level)
Belgium	VITO	Steven Krekels Ils Reusen (deputy)	Steven Krekels
Czech Republic	CzechGlobe	Jan Hanus	Jan Hanus
France	CNRS	Gérard Ancellet Paola Formenti (deputy)	Paola Formenti
	Météo-France	Philippe Bougeault	
	ONERA	Bernard Rosier	
Germany	DLR	Stefanie Holzwarth Andreas Minikin (deputy)	Andreas Minikin
	FUB	Thomas Ruhtz	
Italy	UNICH	Piero Di Carlo	
Poland	UW	Hanna Pawlowska	Hanna Pawlowska
Romania	INCAS	Andreea Calcan	
UK	Met Office	Phil Brown	Phil Brown Stacey Harvey (Treasurer)

General Assembly	President	Philippe Bougeault
	Vice-President	Stefanie Holzwarth
Executive Board	Chair	Phil Brown
	Vice-Chair	Steven Krekels
Executive Secretariat	Executive Secretary	Elisabeth Gérard

N1SEI: List of GA representatives appointed by the organisations and EUFAR AISBL elected members as of 26 January 2018



N1SEI: Participants at the 1st EUFAR AISBL Executive Board and General Assembly meetings, Brussels, Belgium, 10-11 October 2017

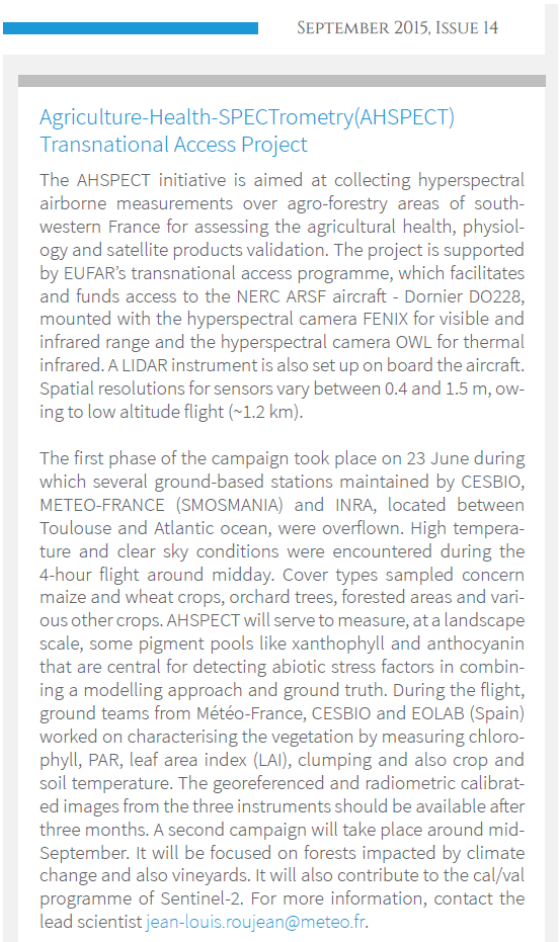
N1SEI: Participants at the 2nd EUFAR AISBL Executive Board and General Assembly meetings, Lugo, Spain, 25–26 January 2018

N2TAC – Transnational and Open Access Coordination

N2TAC: Images from Agriculture-Health-SPECTrometry (AHSPECT) TA campaign (France, July 2015)

N2TAC: DLR's DO228 Dornier flight path during the AHSPECT TA campaign July 2015, France

N2TAC: Image captured using webcam during the AHSPECT TA campaign July 2015, France



SEPTEMBER 2015, ISSUE 14

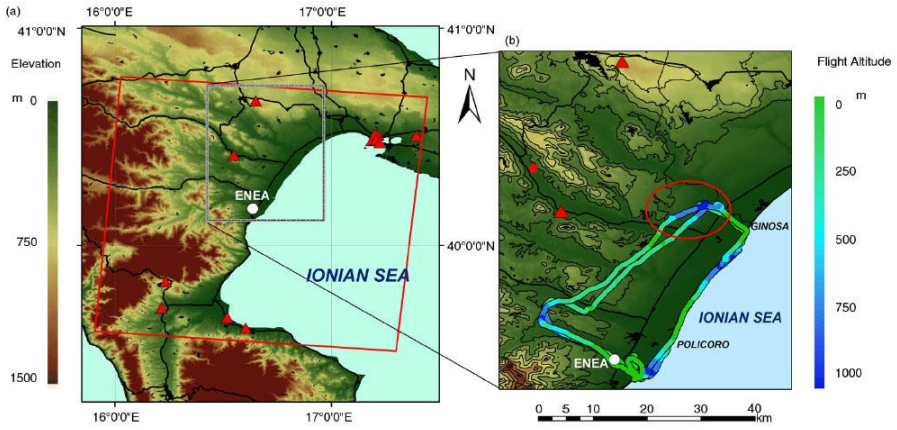
Agriculture-Health-SPECTrometry(AHSPECT) Transnational Access Project

The AHSPECT initiative is aimed at collecting hyperspectral airborne measurements over agro-forestry areas of south-western France for assessing the agricultural health, physiology and satellite products validation. The project is supported by EUFAR's transnational access programme, which facilitates and funds access to the NERC ARSF aircraft - Dornier DO228, mounted with the hyperspectral camera FENIX for visible and infrared range and the hyperspectral camera OWL for thermal infrared. A LIDAR instrument is also set up on board the aircraft. Spatial resolutions for sensors vary between 0.4 and 1.5 m, owing to low altitude flight (~1.2 km).

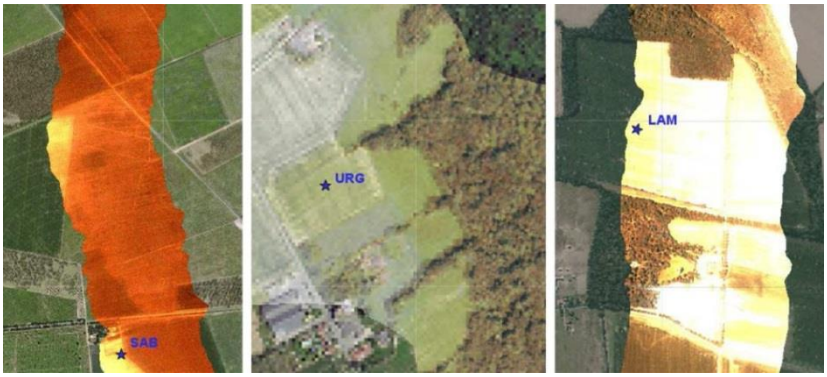
The first phase of the campaign took place on 23 June during which several ground-based stations maintained by CESBIO, METEO-FRANCE (SMOSMANIA) and INRA, located between Toulouse and Atlantic ocean, were overflown. High temperature and clear sky conditions were encountered during the 4-hour flight around midday. Cover types sampled concern maize and wheat crops, orchard trees, forested areas and various other crops. AHSPECT will serve to measure, at a landscape scale, some pigment pools like xanthophyll and anthocyanin that are central for detecting abiotic stress factors in combining a modelling approach and ground truth. During the flight, ground teams from Météo-France, CESBIO and EOLAB (Spain) worked on characterising the vegetation by measuring chlorophyll, PAR, leaf area index (LAI), clumping and also crop and soil temperature. The georeferenced and radiometric calibrated images from the three instruments should be available after three months. A second campaign will take place around mid-September. It will be focused on forests impacted by climate change and also vineyards. It will also contribute to the cal/val programme of Sentinel-2. For more information, contact the lead scientist jean-louis.roujean@meteo.fr.

N2TAC: Article on AHSPECT TA campaign, published in the EUFAR Newsletter no. 14, September 2015

N2TAC: Image captured using the hyperspectral camera – FENIX, during the AHSPECT TA campaign July 2015, France

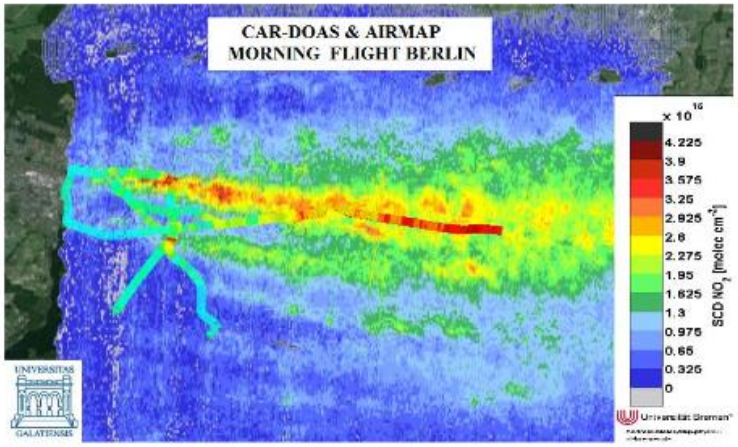


N2TAC: Map of the experiment region. In red, the domain of the meteorological field used to calculate the high-resolution back-trajectories. Red triangles and black spots show, the chimney stacks and the urban areas; the main roads are indicated by black lines. The white circle indicates the ENEA Research Centre of Trisaia. (b) The paths of the 17 June morning and afternoon flights are shown on a detailed map of the study area. The red circle shows the location of the air quality station at Ferrandina. The red oval indicates the inland area sampled in the afternoon flight (AHSPECT TA campaign)



N2TAC: AHSPECT research campaign - Projection of orthorectified FENIX scene, 23 June & October 2015, France

N2TAC: Preliminary mobile-DOAS and AirMAP measurement results of the morning flight, during the AROMAPEX campaign (APEX flights for the AROMAT-2 activity, Berlin, Germany, April 2016)

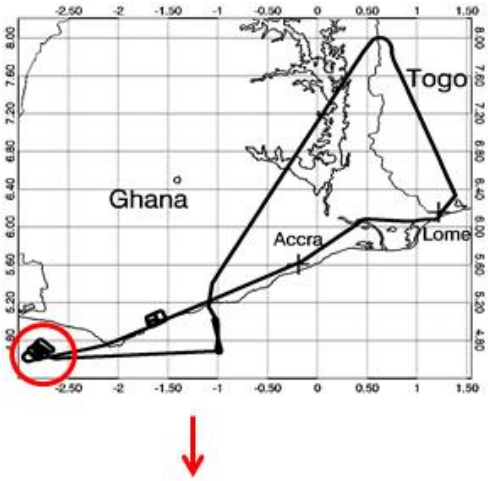


N2TAC: Preliminary mobile-DOAS and AirMAP measurement results of the morning flight, during the AROMAPEX campaign April 2016, Berlin

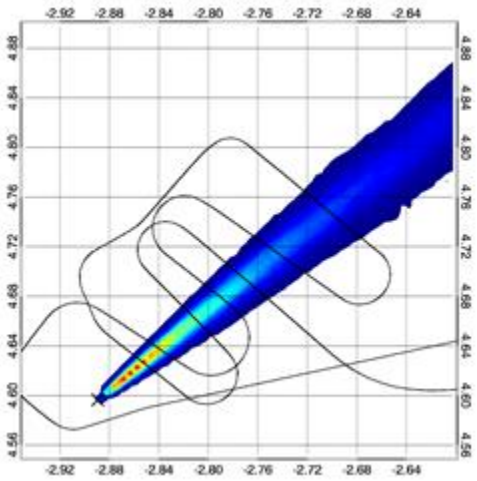
N2TAC: EUFAR APSOWA Flight Campaign - Atmospheric Pollution from Shipping and Oil platforms of West Africa)

N2TAC: View from inside the DLR Falcon-20 cabin with the instruments in operation, APSOWA flight campaign, Nigeria, July 2016, clustered with multinational campaign DACCIWA (Dynamics Aerosol Chemistry Cloud Interactions in West Africa)

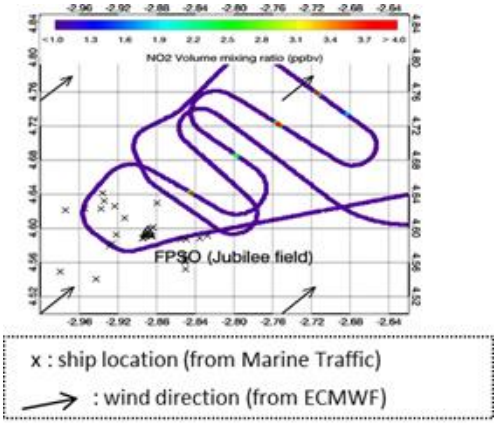
N2TAC: Entire map of the aircraft trajectory on 10 July 2016, from Lomé to Lomé, Togo (EUFAR APSOWA flight campaign)



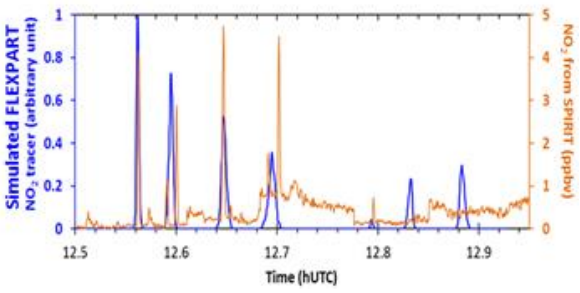
N2TAC: NO_2 plume simulated by FLEXPART, in agreement with the NO_2 aircraft sampling



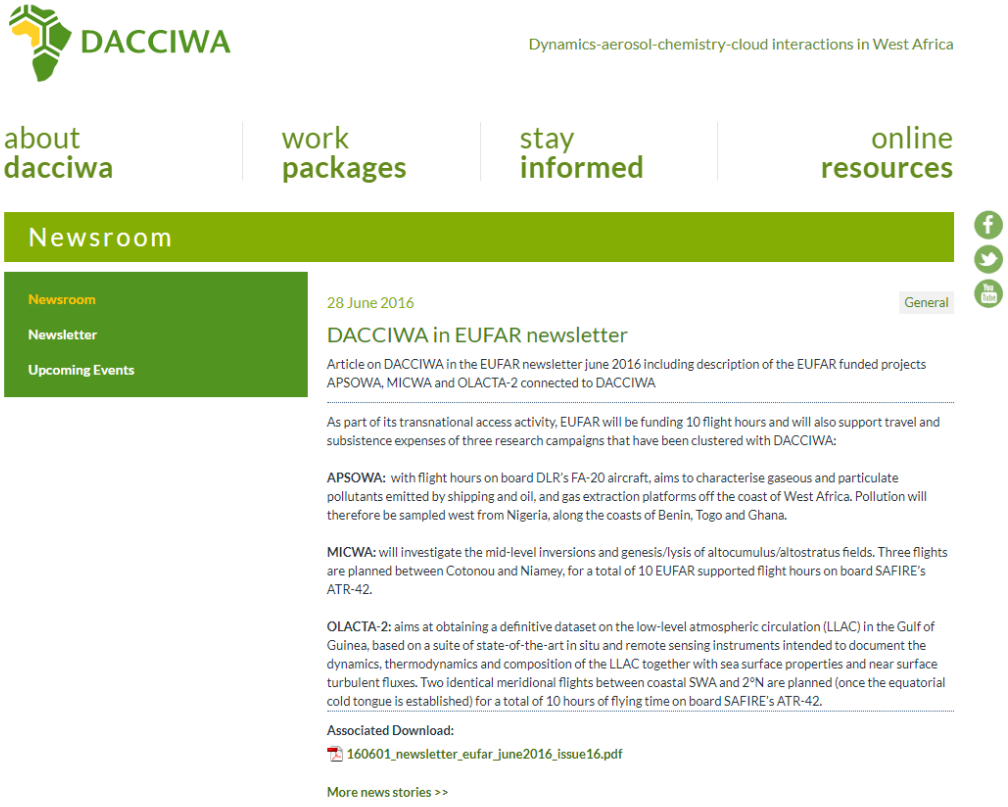
N2TAC: Zoomed map (°E-°N) showing aircraft trajectory around the oil platform (FPSO) and NO_2 mixing ratios peaks downwind, 10 July 2016, Lomé, Togo (APSOWA flight campaign)



N2TAC: NO_2 peaks vs. time measured by aircraft in agreement with simulations by FLEXPART model(APSOWA flight campaign)



N2TAC: Screenshot of EUFAR mention on DACCIWA website (https://www.dacciwa.eu/DB/news-2/dacciwa-in-eufar-newsletter)



N2TAC: French team group photo in front of SAFIRE's ATR-42, during the DACCIWA campaign, July 2016, Lomé, Togo

Species	Descritpion	SAFIRE ATR-42	NERC BAS Twin Otter	DLR Falcon
		TEI 42 CTL/ BLC NO_2	**Chemiluminescence /BLC NO_2**	**QCL NO_2 (SPIRIT)**
NO/NO_2	110ppb NO in nitrogen (spectra seal) cylinder (YoU)	X	X	X
	100ppb NO_2 in nitrogen (spectra seal) cylinder (YoU)	X	X	X
		API-T100U/fluo	**TEI 43i (Fluo)**	**TEI 43i (Fluo)**
SO_2	100 ppbv (Messer) (SAFIRE)	X	X	X
	BOC 5ppm, 1ppm (DLR?)		X	X
		CRDS Picarro	**CEAS (LGR)**	**QCL (CO/CH_4) SPIRIT**
$CO/CO_2/CH_4$)	ambient air ICOS standards - NOAA scale (SAFIRE)	X	X	X
		PTR-MS	**WAS-GC-FID**	**Sorbent tubes**
VOCS	NPL-UK NMHC ozone precursors (4ppb)(YoU)	X	X	X

N2TAC: Table of intercalibration exercises made during the DACCIWA campaign, by EUFAR Traceability in Gas-phase Observations (TGOE) joint research activity, Togo, July 2016

N2TAC: SAFIRE's ATR 42 during DACCIWA campaign, July 2016, Lomé, Togo (c) ULISSE

N2TAC: *DLR Falcon aircraft as seen from the FAAM aircraft during a previous experiment during DACCIWA*

N2TAC: *SAFIRE's fleet of research aircraft: Falcon-20 (far left), Piper Aztec and the ATR-42*

N2TAC: EUFAR TA projects HIDHAZ_N_ICELAND (hidden hazard of melting ground-ice in Northern Iceland) and HOLUHRAUN_HAZ (Assessing the hazard and testing our understanding of environmental and geophysical responses from emplacement of a large volume lava flow field)

N2TAC: Costanza Morino (team member of HIDHAZ_N_ICELAND GPS surveying at Móafellshyrna landslide, August 2015, Iceland.

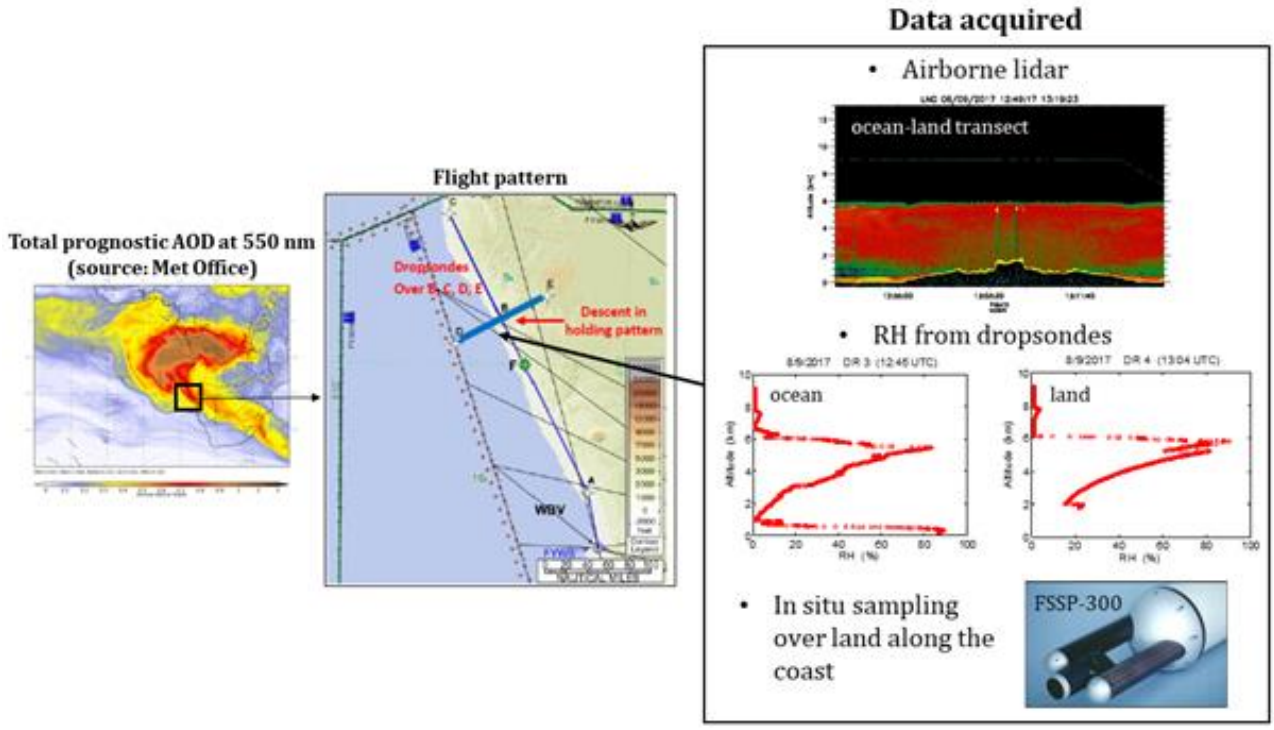
N2TAC: Site overflown by NERC ARSF Dornier DO228 aircraft in Iceland (HIDHAZ_N_ICELAND & HOLUHRAUN_HAZ (Assessing the hazard and testing our understanding of environmental and geophysical responses from emplacement of a large volume lava flow field) TA campaigns. Photo credit - Gro Pedersen

N2TAC: Screenshot of publication of ENVRIplus Calls for Proposals on EUFAR website

N2TAC: EUFAR TA campaigns: EriSMA (Investigating the Effects of Satellite assimilation of dust in NMM-DREAM Model over SW Africa) and ALLDUST-SA (The Etosha Pan as an Alluvial Dust Source – A Sub-basin Analysis), Namibia, Aug/Sept 2017

N2TAC: ALLDUST-SA & EriSMA TA campaigns (Aug & Sept 2017), photo of area under study - Namibia from above: a glance out of the Falcon's window reveals the aridity of the country (image courtesy Dominique Duchanoy)

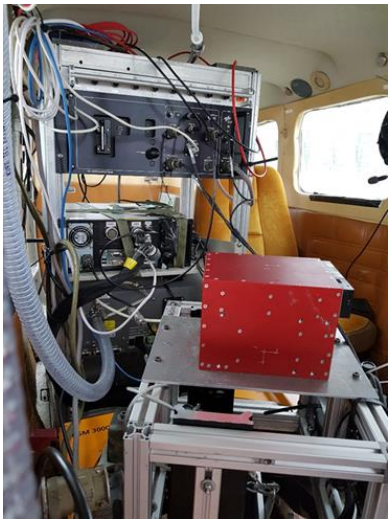
N2TAC: ALLDUST-SA & EriSMA TA campaigns (Aug & Sept 2017): Scientist team in front of SAFIRE's F20 aircraft for the airborne campaign at Walvis Bay airport, Namibia (Image courtesy Laurent Labbouz)



N2TAC: EriSMA TA campaign (Aug & Sept 2017): Flight overview on 8 September 2017, at 11 UTC. Data shown are from the ocean-land transect part of the flight, during which we acquired possible interesting smoke particle hydration profiles for ERiSMA project

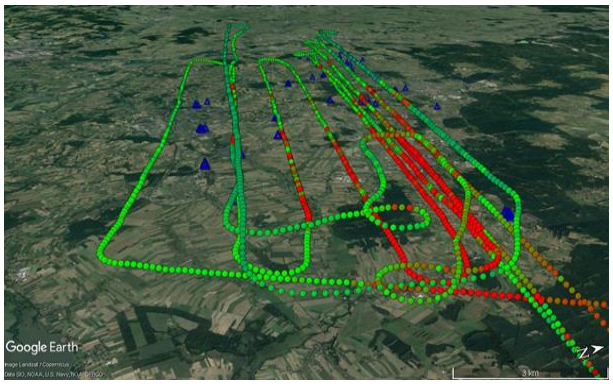
N2TAC: EUFAR TA campaign FOAM - Silesia (Flight Operated Atmospheric Measurements at Silesia upper coal district), Poland, 28 Sep. - 4 Oct 2017)

N2TAC : FOAM airborne campaign (Katowice Pyrzowice, Poland, 28 Sep. - 4 Oct 2017) - Aircraft Crew and ground based team meeting at Katowice-Pyrzowice airport



N2TAC: FOAM airborne campaign (Katowice Pyrzowice, Poland, 28 Sep. - 4 Oct 2017) - Equipment in FUB Cessna (red and black box in front – Attitude and Heading reference System over hyper-spectral HYSPEX camera; back rack contains Picarro CRDS G2311-f analyser and the HYSPEX data acquisition system).

N2TAC: FOAM airborne campaign (Katowice Pyrzowice, Poland, 28 Sep. - 4 Oct 2017) - Map of planned flight on 2 October with important waypoints, also showing the different TRAs and CTAs inside the measurement area



N2TAC: FOAM airborne campaign (Katowice Pyrzowice, Poland, 28 Sep. - 4 Oct 2017) - Preliminary results obtained from the Picarro CRDS analyser installed on board of the FUB Cessna from 29.09.2017 (red colour indicates elevated methane concentration). Flown was a search pattern at lowest altitude downwind of the Pniowek mine for searching of plume positions inside the Rybnik TRA. In addition also two "walls" in downwind direction from Pniowek were flown for flux inversion.

N2TAC: EUFAR TA campaign MASOMED (MApping SOil variability within rainfed MEDiterranean agroecosystems using hyperspectral data), Camarena, Madrid, Spain, 03-19 May 2017

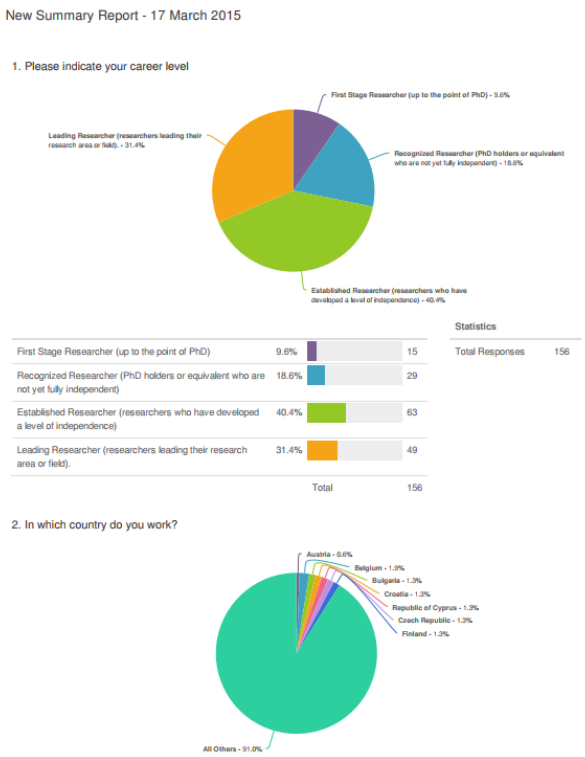
N2TAC: MASOMED field teams by the dark calibration target, for the day and night overflight passes. MASOMED field and airborne campaign (Camarena, Madrid, Spain, 03-19 May 2017)

N2TAC: Measurements during the MASOMED field and airborne campaign (Camarena, Madrid, Spain, 03-19 May 2017)

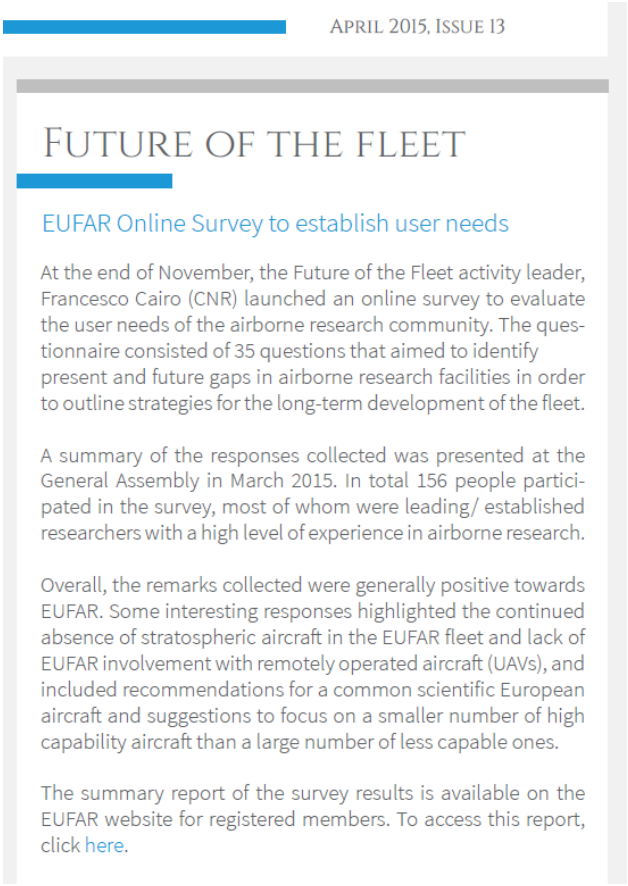
N3FF – Future of the Fleet

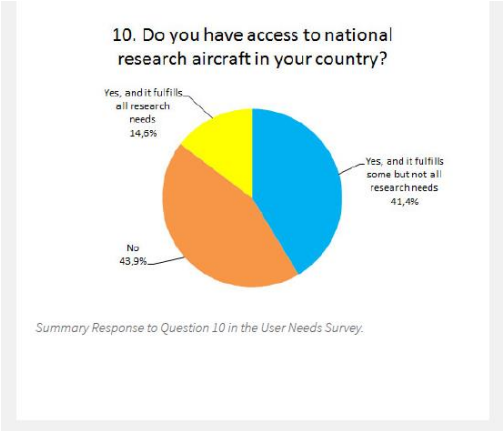
N3FF: EUFAR Online Survey to establish User Needs, 2015

N3FF: Screenshot of summary report presenting the results of the user needs survey



N3FF: Article on the EUFAR online survey to establish user needs, published in the EUFAR Newsletter no. 13, April 2015





Summary Response to Question 10 in the User Needs Survey.

N3FF: Conference of the International Society for Atmospheric Research using Remotely-piloted Aircraft (ISARRA), May 2016, Meteo-France, Toulouse, France

N3FF: Photos from the ISARRA 2016 conference's RPAS exhibition and plenary session

N3FF: Advertising of stratospheric aircraft available to European science community on the EUFAR website

N3FF: Advertising of G520T EGRETT aircraft operated by Grob Aircraft (previously called Grob Aerospace)

N3FF: Advertising of M55 - Geophysica aircraft operated by Myasishchev Design Bureau

N3FF: Advertising of WB-57F operated by NASA - Johnson Space Centre

N4EWG: Expert Working Groups

N4EWG: EUFAR handbook on Airborne Measurements: Wendisch & Brenguier (Eds.), Airborne Measurements for Environmental Research: Methods and Instruments, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany, 2013, ISBN: 978-3-527-40996-9, 655 pp

N4EWG: Photos from expert workshops

N4EWG: Airborne Laser Scanning EWG Workshop, 20-21 November 2014, Vienna

(Left) N4EWG : Group photo from workshop on Data Processing, Analysis and Presentation Software of Cloud Probe, University of Manchester, UK, 23-24 July 2016

(Above) N4EWG: Group photo from workshop on Hyperspectral Remote Sensing for Soil Applications, GFZ, Potsdam, Germany, 28-29 September 2016

N4EWG: Group photo from workshop on Hyperspectral Imaging from UAVs - Applications in Precision Farming, University of Milano-Bicocca (UNIMIB), Milan, 14 December 2016

N4EWG: Group photo from expert workshop on Atmospheric Correction of Remote Sensing Data, Freie Universität Berlin (FUB), Berlin, Germany, 26-28 October 2016

01 Regis DUPUY, *Fr*	**07** Mengistu WOLDE, *CA*	**13** Sorin VAJAIAC, *RO*	**19** Max MAHN, *US*	**25** Yvonne BOOSE, *DE*	**30** Jonny Croisier, *UK*
02 Aaron BANSEMER, *US*	**08** Stavros KEPPAS, *UK*	**14** Victor PETROV, RU	**20** Alexei KOROLEV, *CA*	**26** Matt FREER, *US*	**31** David Plummer, *US*
03 A. KIRCHGAESSER, *UK*	**09** David DELENE, *US*	**15** Valerian HAHN, *DE*	**21** Pierre COUTRIS, *FR*	**27** Jeff FRENCH, *US*	**32** Greg McFARQUHAR, *US*
04 Graeme NOTT, *UK*	**10** Thomas LACHLAN-COPE, *UK*	**16** Larry OOLMAN, *US*	**22** Mizanur RAHMAN, *BD*	**28** Jea Min YEOM, *KOR*	**33** Elisabeth OSTROM, *GB*
05 Tina JURKAT, *DE*	**11** Marina SCHIMPF, *UK*	**17** Max PORT, *DE*	**23** C.G. DESHPANDE, *IN*	**29** Joe FINLON, *US*	**34** Darrel BAUMGARDNER, *US*
06 Nicolas GAPP, *US*	**12** Junghwa LEE, *DE*	**18** Christiane VOIGT, *DE*	**24** Keshaw RAJHANS, *IN*		

Legend: ***id number***, First name FAMILY NAME, Country code (of work, not necessarily nationality)
Not shown: Colin GURGANUS,*US*, Alisia SADYKOVA,*RU*, Stefan KAUFMANN,*DE*, Jonas KLEINE,*DE*, *Adam MAJEWSKI, US.*

Photo: Voigt Arrangement: Hans Volkert

N4EWG: EUFAR/ IAMAS/IUGG/ICCP expert working group workshop on Processing of Cloud Particle Measurements, DLR, Oberpfaffenhofen, Germany, 8 July 2017

N5TTO: Technology Transfer Office

N5TTO: Screenshots of articles on TTO published on the EUFAR website

Transfer of innovative technologies developed within EUFAR

By DIARRA Lilian

EUFAR's TTO activity seeks to support the transfer of technology between experts in airborne measurements and industry partners, including small to medium enterprises. Each year 2/3 promising technologies will be selected and studied for presentation to industry partners, who will thereafter be invited to attend presentations by EUFAR experts on their most innovative research developments. These workshops will be an opportunity for experts and industry partners to closely interact and develop partnerships for upgrading airborne research instruments, methodologies and software into innovative and useful products.

A technology sheet template was circulated to experts within the EUFAR network allowing them to list any potentially interesting technologies and innovative breakthroughs. Following this step, 10 innovative research developments were identified, and the technology transfer team together with the expert working group coordinator organised a one-day workshop in Frankfurt in early February 2016. This meeting brought together the relevant scientists, in their capacity as a member of a EUFAR joint research activity or expert working group. During this workshop, 4 technologies were selected for their scientific expertise and innovation. The technology transfer team also shared information on issues related to best practices on knowledge transfer, intellectual property rights management, R&D contracts and different kinds of possible partnership models to facilitate subsequent interaction with industry partners.

The technologies collected up to date include the following:

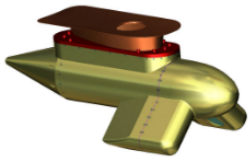
- Airborne laser interferometric Drop Size (ALIDS) – JRA3 led by Emmanuel Porcheron, IRSN. Click here for more information.
- Standardised assembly to measure soil reflection under undistributed conditions in the field (Eyal Ben-Dor, TAU). Click here, to see the technology sheet.
- Field detector for assessing soil contamination with total petrol hydrocarbon (TPH) Eyal Ben-Dor, TAU). Click here, to see the technology sheet.
- Leak detection by water absorption measurements (Martin Zoeger, DLR)
- Monitoring CO2 and CH4 fluxes, perceiving leaks and monitoring authorised CO2 and/or CH4 emission (Jim McQuaid, University of Leeds)

The next workshop is set to take place before the end of the year, to fine tune the offer to industry and take the activity forward. Furthermore a booklet will be developed to serve as a guiding framework for scientists on how to transfer and market innovative technologies, and work with industry partners.

Interested in transferring your technology? Download the technology sheet template by clicking here and send it to the EUFAR Office or TTO coordinator Cecile Gaillard today!

For more detailed information, contact Manfred Wendisch and/or Cecile Gaillard.

Entry gallery



External envelope of the ALIDS probe

Related entries

- Guide on Technology Transfer Issues for R&D partnership

Recent entries

- New publication from the EUFAR DeInVader flight campaign
- 6th ENVRI week, Zandvoort, Netherlands, 14-18 May 2018.
- ENVRI community booth
- RS4forestEBV Training Course and Flight Campaign: Scientific Report
- EUFAR AISBL holds its 2nd Executive Board and General Assembly and meetings

Recent comments

- No comments yet.

Archives

Guide on Technology Transfer Issues for R&D partnership

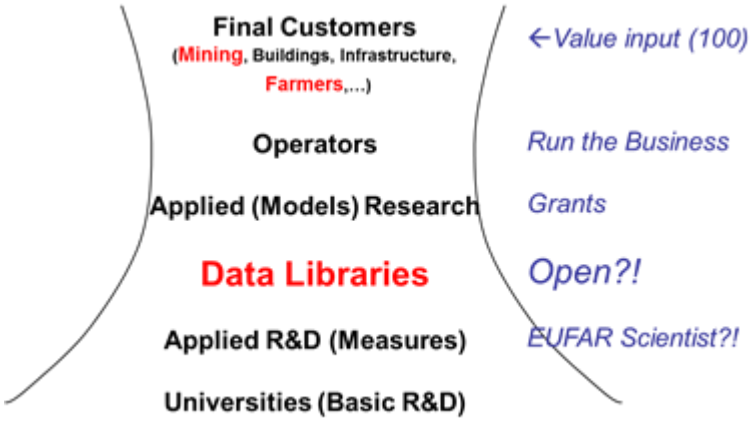
By DIARRA Lilian

EUFAR's TTO activity seeks to support the transfer of technology between experts in airborne measurements and industry partners. Each year 2 to 3 promising technologies will be selected and studied for presentation to industry representatives, who will thereafter be invited to attend presentations by EUFAR experts on their most innovative research developments. These workshops will be an opportunity for experts and industry representatives to closely interact and develop partnerships for upgrading airborne research instruments, methodologies and software into innovative and useful products.

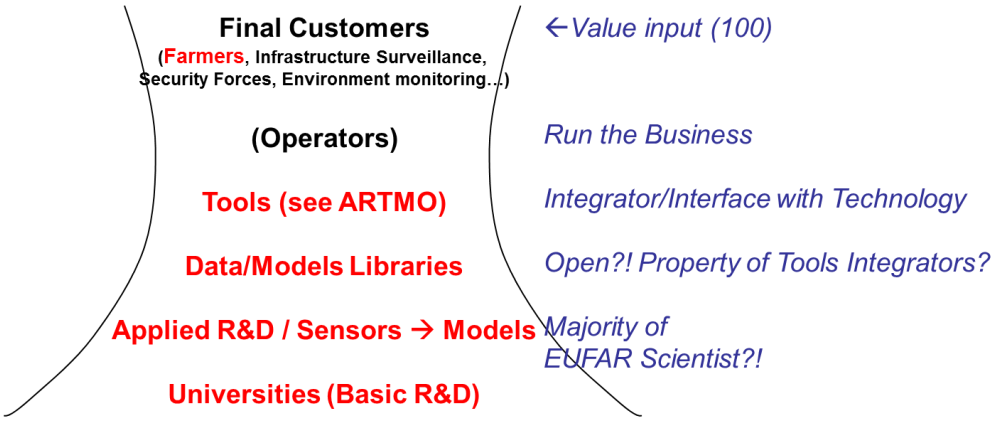
A guide on technology transfer prepared by Florin Paun - the former TTO activity leader (ONERA) and has been made available on the EUFAR website. The guide specifically addresses the EUFAR scientist community, and showcases the operating existing markets and the long time to market (10 years+) specificity to successfully implement a new technology. Click here, to access the guide (open to all EUFAR members).

Are you part of EUFAR's community of scientists and interested in transferring your technology? Download the technology sheet template by clicking here and send it to bureau@eufar.net or Cecile Gaillard, the TTO coordinator - cecile.gaillard@onera.fr today!

N5TTO : Exhibition of the ALIDS probe at the 2nd edition of "Gold Nuggets of Research, Technology and Innovation" event during the Normandie AeroEspace Tech Day, 24 November 2015. From left to right - Pascal Lemaître (IRSN), Marc Brunel (CORIA), EUFAR Project Coordinator Elisabeth Gérard (Météo-France) and ALIDS lead scientist Emmanuel Porcheron (IRSN).



N5TTO: Diagram for the specific value chain specific to the soil spectroscopy case



N5TTO: Diagram for the specific value chain specific to the precision farming case

N5TTO: Cécile Gaillard (ONERA) – EUFAR N5TTO activity leader - presenting EUFAR, the TTO networking activity and the 11 technology sheet booklet at the RPAS CivOps conference, Paris, 16-17 January 2018

Tech Sheet 1	-	Standardised assembly to measure soil reflection under undisturbed conditions in the field
Tech Sheet 2	-	Field detector for assessing soil contamination with total petrol hydrocarbon
Tech Sheet 3	-	Airborne Laser Interferometric Drop Sizer
Tech Sheet 4	-	Optical Parametric Oscillator - Accordable laser source with continuous variable frequency
Tech Sheet 5	-	Surveillance and Observation Radar
Tech Sheet 6	-	Analysis of Atmospheric Icing
Tech Sheet 7	-	Analysis and prevention of the risks of lightning
Tech Sheet 8	-	Diagnosis of electromagnetic compatibility
Tech Sheet 9	-	Cryogenic Technology
Tech Sheet 10	-	Sethi: The new-generation airborne imaging system with radar and optronic sensors
Tech Sheet 11	-	The COSI camera system, high ground resolution hysperspactral mapper

N5TTO: EUFAR innovative technology sheets presented at the RPAS CivOps conference, Paris, 16-17 January 2018

Addouche, Sid-Ali University Paris 8 / IUT de Montreuil, France	Delaye, Jean-Luc Gendarmerie des Transport Aériens, France	Hvalsø-Dybdahl, Morten Defence Acquisition & Logistics, Denmark
Alty, Peter EUROCONTROL, International	Demeyer, Hans Belgian Defence, Belgium	Ibalot, Julie SESAR JU, EU
Asveld, Wouter Gemeente Enschede, Netherlands	Donzel, Carine DGAC, France	Indra, Thorsten Thorsten Indra Photography, Germany
Babiarz, Sebastian AirMap, Germany	Drapier, Jean-Luc DGA /DSNA DTI, France	Inisan, Pierre SBG Systems, France
Barbot, Gwénaël Ministry of Interior - DGSCGC, France	Drouet, Xavier Thales Communications & Security, France	Jonker, Robert Clear Flight Solutions, Netherlands
Baskaya, Elgis ENAC, France	Drüner, Bernhard Swiss Federation of Civil Drones, Switzerland	Jouve, Col Philippe Etat-Major de l'Armée de Terre, France
Bertrand, Sylvain ONERA, France	Eliau, Haris Elbit Systems, Israel	Jupp, Louise Terreco Aviation, South Africa
Besada, Juan Universidad Politécnica de Madrid, Spain	Fabre, Renaud ESSP, France	Kamp, Raimund Min. of Transport & Digital Infrastructure, Germany
Biasci, Alain Ministry of Interior - UIISC7, France	Fibingier, Ireneusz Polish Air Force Academy, Poland	Karoly, Bianca HungaroControl, Hungary
Bonnassie, Fabien UN World Food Programme, International	Figuier, Flavien Altametris, France	Kegelaers, Marc UniFly, Belgium
Borja, Col Jean Patrick DSAÉ - BFEA, France	Fortner, Raoul AAI, Austria	Koenig, Alain Gendarmerie des Transport Aériens, France
Bottke, Alain Airbus DS Airborne Solutions, Germany	Gaillard, Cécile ONERA, France	Kruiswijk, Gert CAA, Netherlands
Botton, Frédéric BKPresse, France	Galabert, Col Alain DSAE / Drones, France	Krumm, Malte European Parliament Research Service, EU
Boutet, Emilie DGAC DTA, France	Gandara, Marc Thales Alenia Space, France	Kruse Brandao, Jacques NXP Semiconductors, Germany
Burgun, LtCdr Raphael French Navy / Aeronautic P, France	Gandil, Patrick DGAC, France	Kwiecien, Katarzyna Polish Armaments Group, Poland
Bütter, Reto Swiss Federation of Civil Drones, Switzerland	Garcia Rivero, Manuel FADA CATEC, Spain	Lafaye, Maj Laurent French Air Force / SIMMAD, France
Butterworth-Hayes, Philip PMI Media, UK	George, Erwin ENGIE, France	Laing, Mungo Survey Sense, UK

N5TTO: Contact list of all the RPAS CivOps conference (Paris, 16-17 January 2018) participants with focus on potential interesting contacts

N6ET: Education & Training

N6ET: New EUFAR Education and Training flyer

N6ET: SWAMP Training Course "Spectrometry of a Wetland and Modelling of Photosynthesis with Hyperspectral Airborne Reflectance and Fluorescence", Obrzycko-Rzecin, Poland, 6-16 July 2015

N6ET: EUFAR/OPTIMISE SWAMP training course flyer

N6ET: Different activities at the SWAMP training course, Poland, 6-16 July 2015

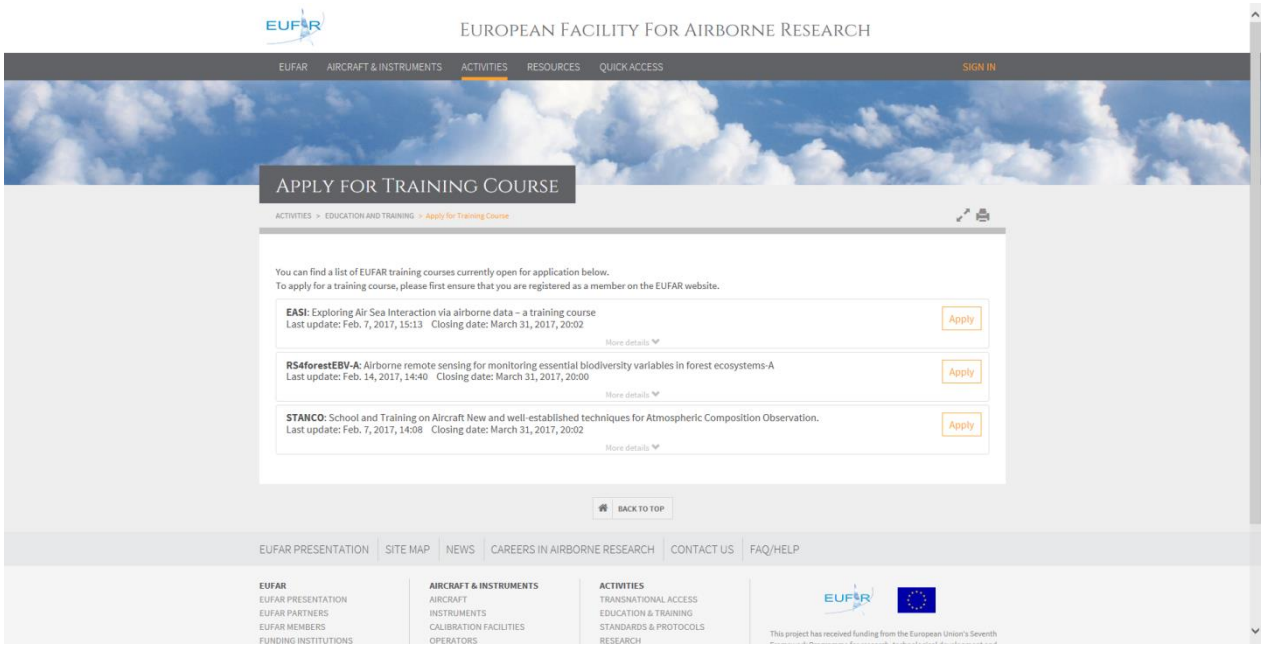
N6ET: GEO Week 2017 from 23-27 October 2017 in Washington DC, USA

Above left: VITO represented EUFAR at the ENVRI booth at the GEO Week 2017

Above right: Ils Reusen (VITO) – EUFAR N6ET and JRA1-HYLIGHT activity leader - presenting examples of EUFAR contribution as in situ contribution to GEOBON and the GEO Aquawatch Initiative (tweet from @asmi_ari)

Left: From left to right: representatives of the LifeWatch, eLTER, EUFAR and ICOS research infrastructures at the ENVRI booth.

N6ET: *MSCA Trustee course on drone operations, University of Exeter, UK, 30 October to 3 November 2017*

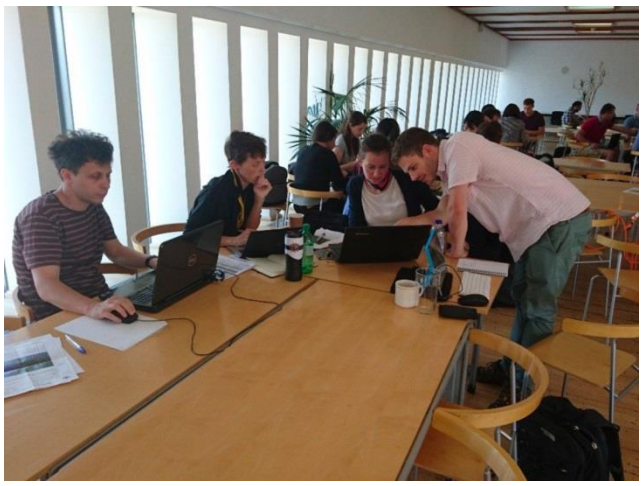


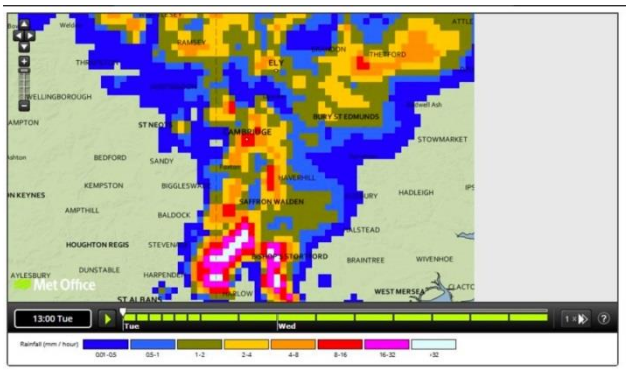
N6ET: *Screenshot of ET-TC (Training Courses) calls for proposals on EUFAR website*

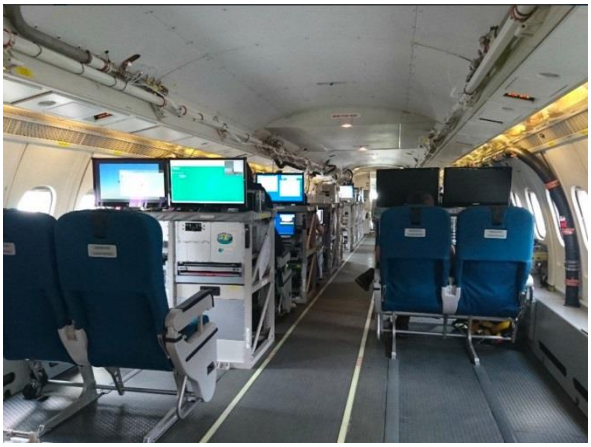
N6ET: Participants of the EUFAR EASI training course" Exploring Air-Sea Interaction via Airborne Measurements" (25 June – 4 July 2017), Shannon, Ireland, training with SAFIRE's ATR42 aircraft

N6ET: Participants of the EUFAR EASI training course (26 June – 4 July 2017), Shannon, Ireland, training with SAFIRE's ATR42 aircraft

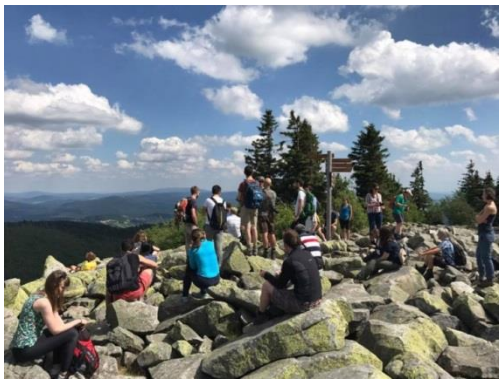
N6ET: Participants during the EUFAR STANCO training course, “School and Training on Aircraft New techniques for Atmospheric Composition Observation”, Cambridge, UK, 26 June to 6 July 2017, flight campaign with EUFAR funded flight hours on board FAAM’s Bae-146 aircraft



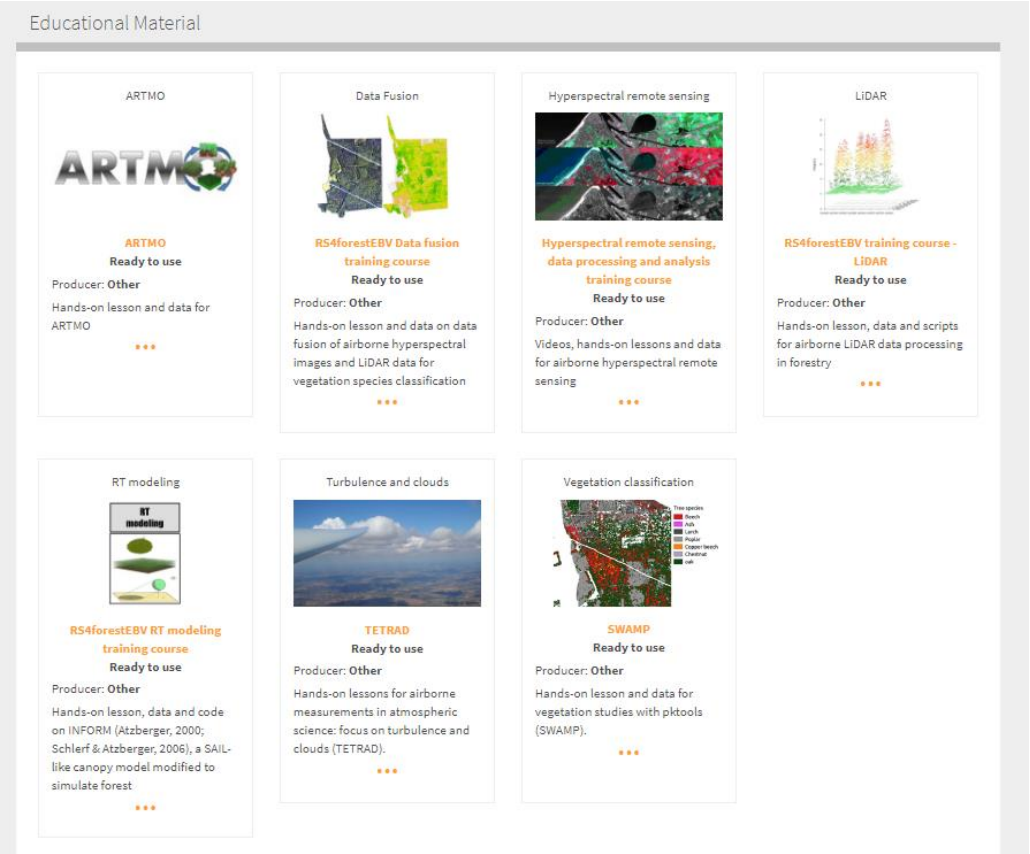




N6ET: EUFAR RS4forestEBV training course “RS4ForestEBV - Airborne remote sensing for monitoring essential biodiversity variables in forest ecosystems", held in the Bavarian Forest National Park and the German Aerospace Center - DLR in Oberpfaffenhofen from 3 to 14 July 2017, with flight campaign carried out on board NERC’s Twin Otter aircraft



N6ET: EUFAR Training Course Posters – EASI, STANCO & RS4forestEBV training courses, summer 2017

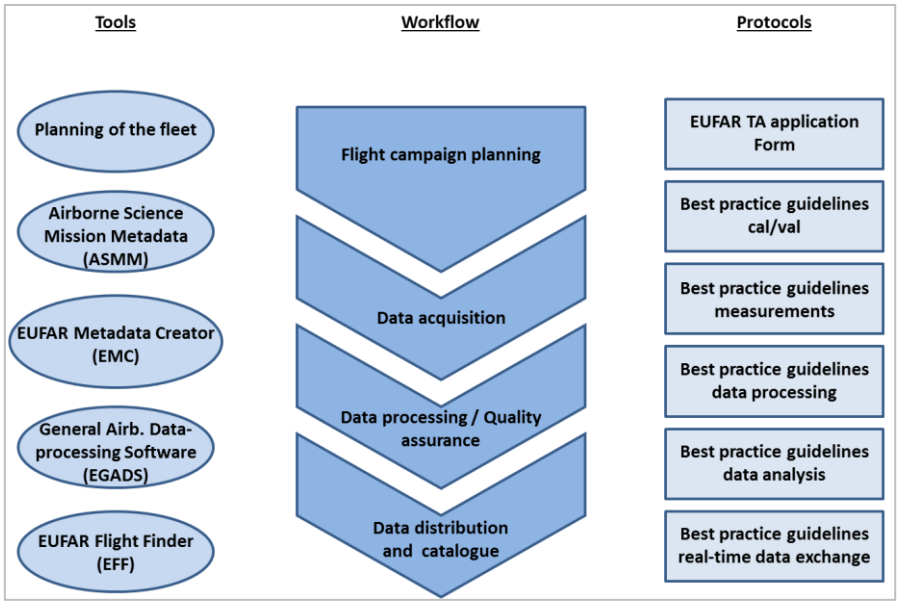


N6ET: Screenshot of educational material and tools available on the EUFAR website

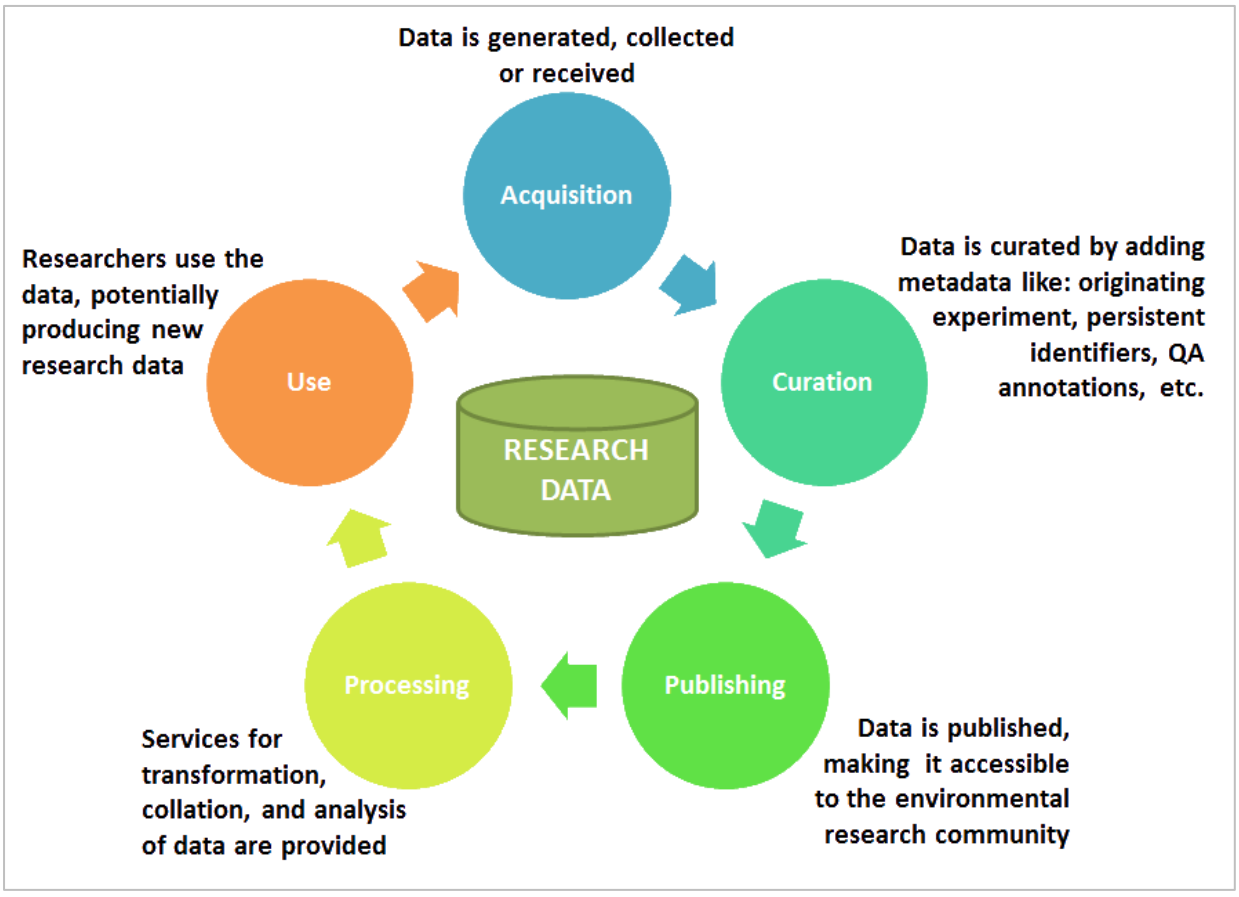
Short name	Expanded name	Location	Period	Organiser	Operator	Aircraft/instrument	No. of trainers & organisers	No. of candidates	No. of trainees selected (PhD students and post-docs)
SWAMP	Spectrometry of a Wetland And Modelling of Photosynthesis with Hyperspectral Airborne Reflectance and Fluorescence	Obrzycko-Rzecin near the instrumented POLWET wetland study site (Poland)	6 – 16 June 2015	Poznan University of Life Sciences	DLR (Germany) and VITO (Belgium)	Dornier 228 aircraft and VITO APEX sensor	21	47	20 trainees from 12 EU member states and associated countries
EASI	Exploring Air-Sea Interaction via Airborne Measurements	Shannon (Ireland)	25 June - 4 July 2017	CNR-ISAC (Italy) and VITO (Belgium)	SAFIRE (France)	ATR42	9	29	20 trainees of 12 nationalities working in 11 EU member states and associated countries
STANCO	School and Training on Aircraft New techniques for Atmospheric Composition Observation	Univ. of Cambridge and FAAM, Cranfield (UK)	26 June - 6 July 2017	Univ. "G. d'Annunzio" of Chieti-Pescara (Italy)	FAAM (UK)	Bae-146	15	35	19 trainees of 10 nationalities working in 9 EU member states
RS4forestEBV	Airborne Remote Sensing for Monitoring Essential Biodiversity Variables in Forest Ecosystems	Bavarian Forest National Park and DLR Oberpfaffenhofen (Germany)	3 - 14 July 2017	Univ. of Twente - Faculty ITC (The Netherlands) and DLR (Germany)	NERC (UK)	Twin Otter	22	92	19 trainees of 15 nationalities working in 10 EU member states

N6ET: Summary of the EUFAR training courses held in 2015 and 2017

N7SP: Standards & Protocols

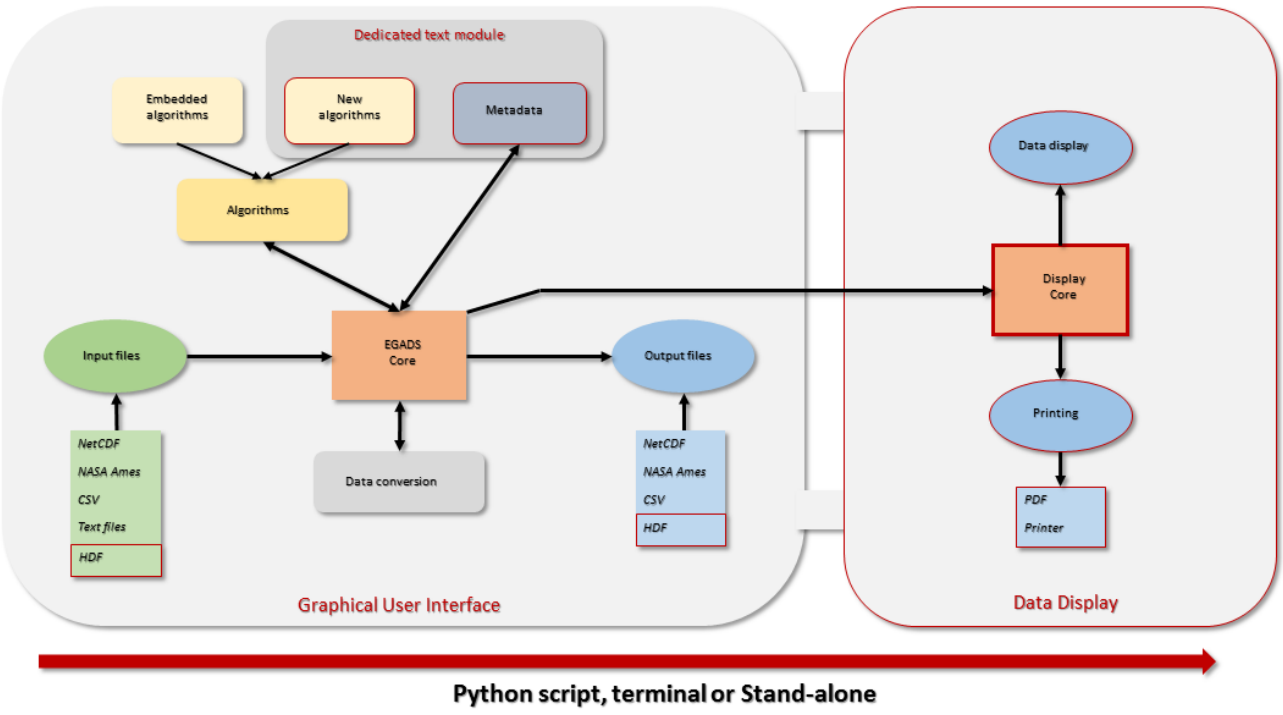


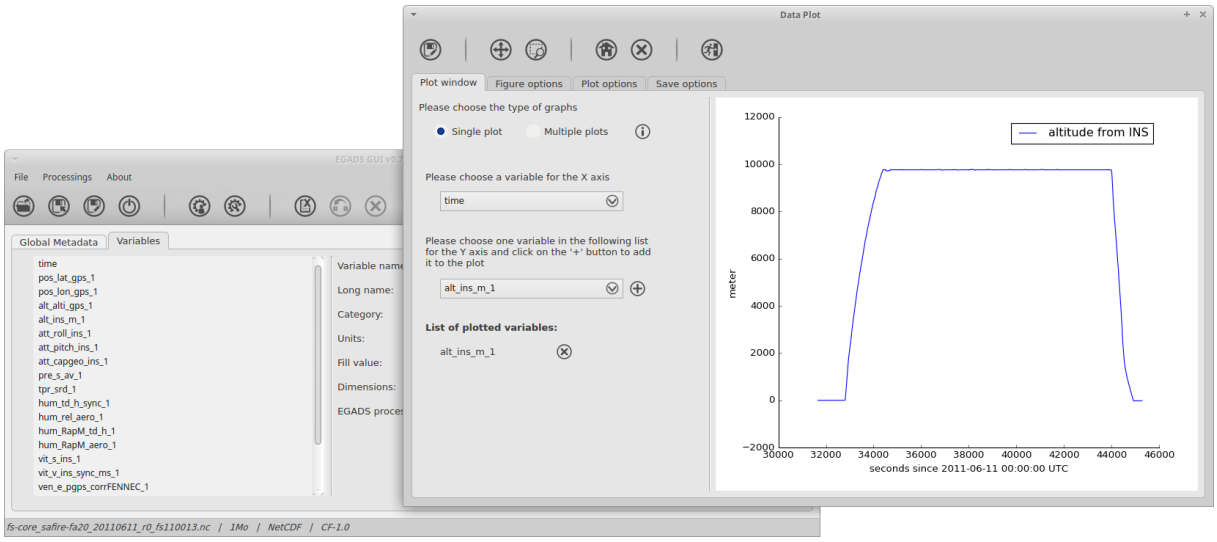
N7SP: Workflow of a survey realisation within EUFAR including the related tools and protocols



***N7SP**: Data Life Cycle*

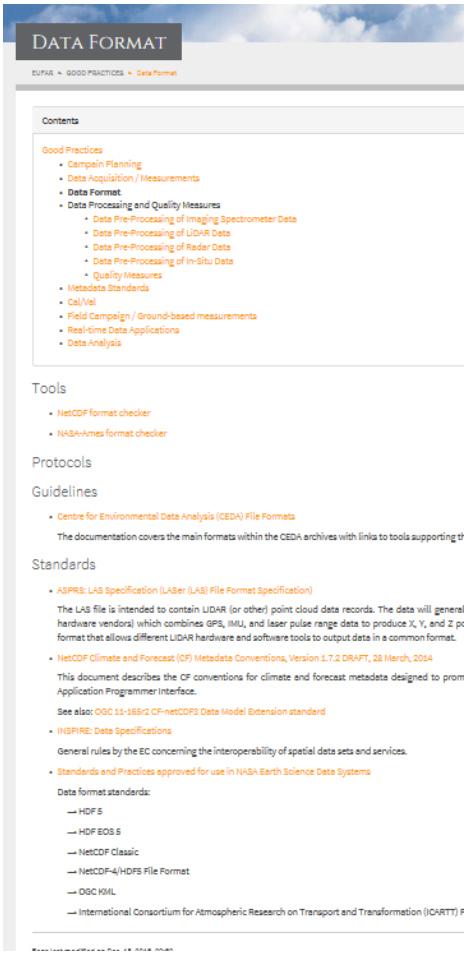
Future EGADS, GUI and API

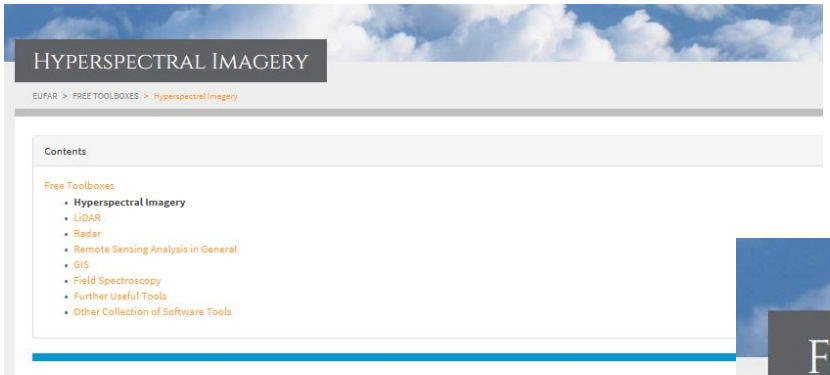


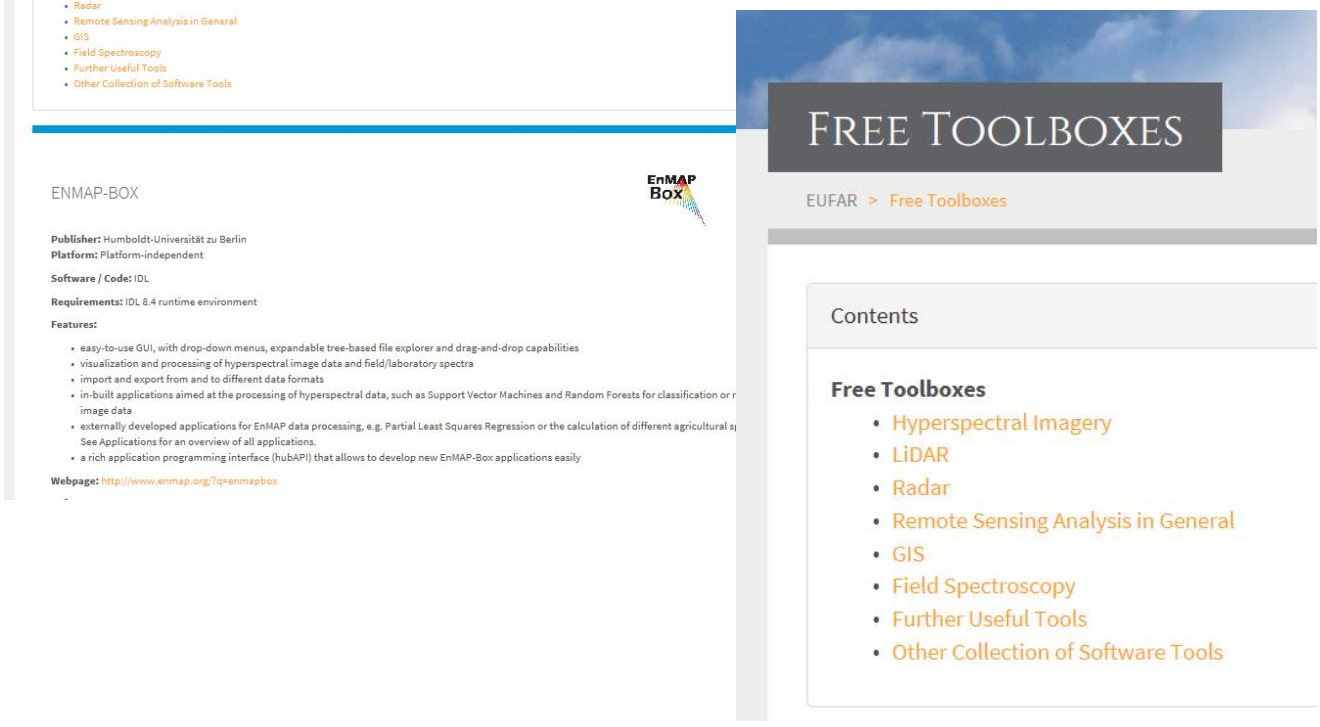


***N7SP**: Future EGADS, GUI and API*

N7SP: Snapshots of N7SP related webpages and toolboxes, EUFAR glossary and recommendations on best practice for data pre-processing and data analysis available on the EUFAR website



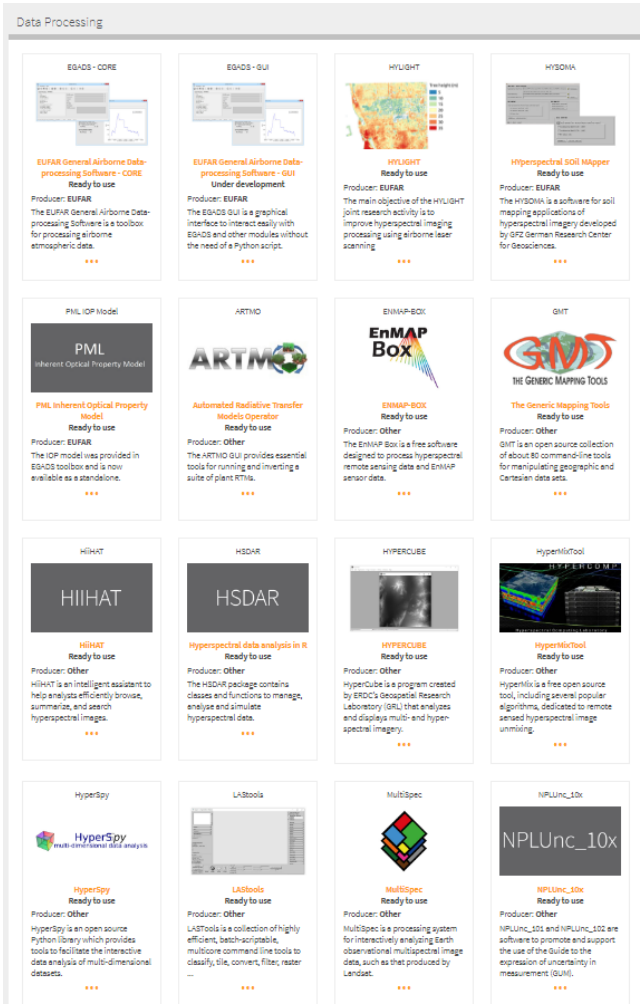




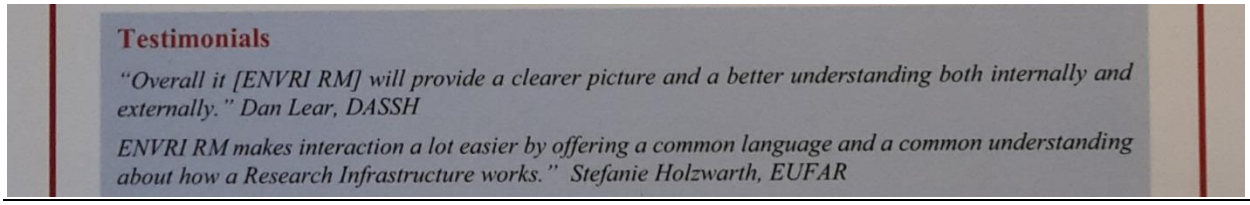
N7SP: Screenshot of the EUFAR Glossary on the website

N7SP: Screenshot of EUFAR Metadata Creator (EMC) on the website

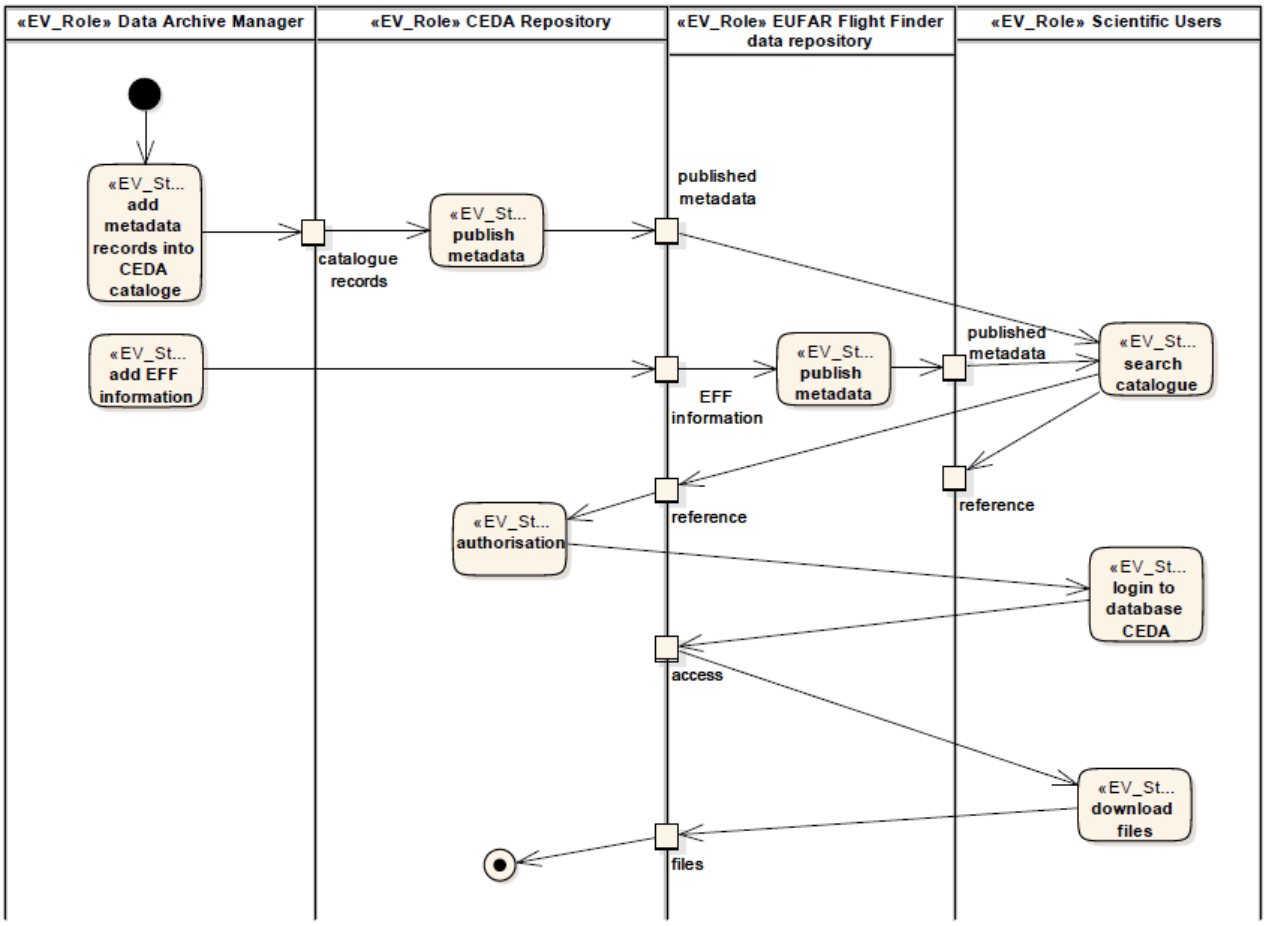
N7SP: *Screen shot of Airborne Science Mission Metadata (ASMM) tool on the website*



N7SP: *Screenshot of data processing tools and toolboxes on the website*



***N7SP**: Extract from the "ENVRI Reference Model News"*



***N7SP**: Activity Diagram of EUFAR process "Data Discovery and Access"*

3.5.8 Tutorial

Here is a NetCDF file, created by EGADS, and viewed by the command `ncdump -h ...`:

```
=> ncdump -h main_netcdf_file.nc
    netcdf main_netcdf_file {
    dimensions:
        time = 5 ;
    variables:
        double time(time) ;
            time:units = "seconds since 19700101T00:00:00" ;
            time:long_name = "time" ;
        double sea_level(time) ;
            sea_level:_FillValue = -9999. ;
            sea_level:category = "TEST" ;
            sea_level:scale_factor = 1. ;
            sea_level:add_offset = 0. ;
            sea_level:long_name = "sea level" ;
            sea_level:units = "mm" ;
        double corrected_sea_level(time) ;
            corrected_sea_level:_FillValue = -9999. ;
            corrected_sea_level:units = "mm" ;
            corrected_sea_level:add_offset = 0. ;
            corrected_sea_level:scale_factor = 1. ;
            corrected_sea_level:long_name = "corr sea level" ;

    // global attributes:
            :Conventions = "CF-1.0" ;
            :history = "the netcdf file has been created by EGADS" ;
            :comments = "no comments on the netcdf file" ;
            :institution = "My institution" ;
    }
```

This file has been created with the following commands:

- import EGADS module:

```
>>> import egads
```

- create two main variables, following the official EGADS convention:

```
>>> data1 = egads.EgadsData(value=[5.0,2.0,-2.0,0.5,4.0], units='mm', name=
...'sea level', scale_factor=1., add_offset=0., _FillValue=-9999)
>>> data2 = egads.EgadsData(value=[1.0,3.0,-1.0,2.5,6.0], units='mm', name=
...'corr sea level', scale_factor=1., add_offset=0., _FillValue=-9999)
```

- create an independant variable, still by following the official EGADS convention:

```
>>> time = egads.EgadsData(value=[1.0,2.0,3.0,4.0,5.0], units='seconds since_
...19700101T00:00:00', name='time')
```

- create a new EgadsNetCdf instance with a file name:

```
>>> f = egads.input.EgadsNetCdf('main_netcdf_file.nc', 'w')
```

- add the global attributes to the NetCDF file:

```
>>> f.add_attribute('Conventions', 'CF-1.0')
>>> f.add_attribute('history', 'the netcdf file has been created by EGADS')
>>> f.add_attribute('comments', "no comments on the netcdf file")
>>> f.add_attribute('institution', 'My institution')
```

- add the dimension(s) of your variable(s), here it is `time`:

```
>>> f.add_dim('time', len(time))
```

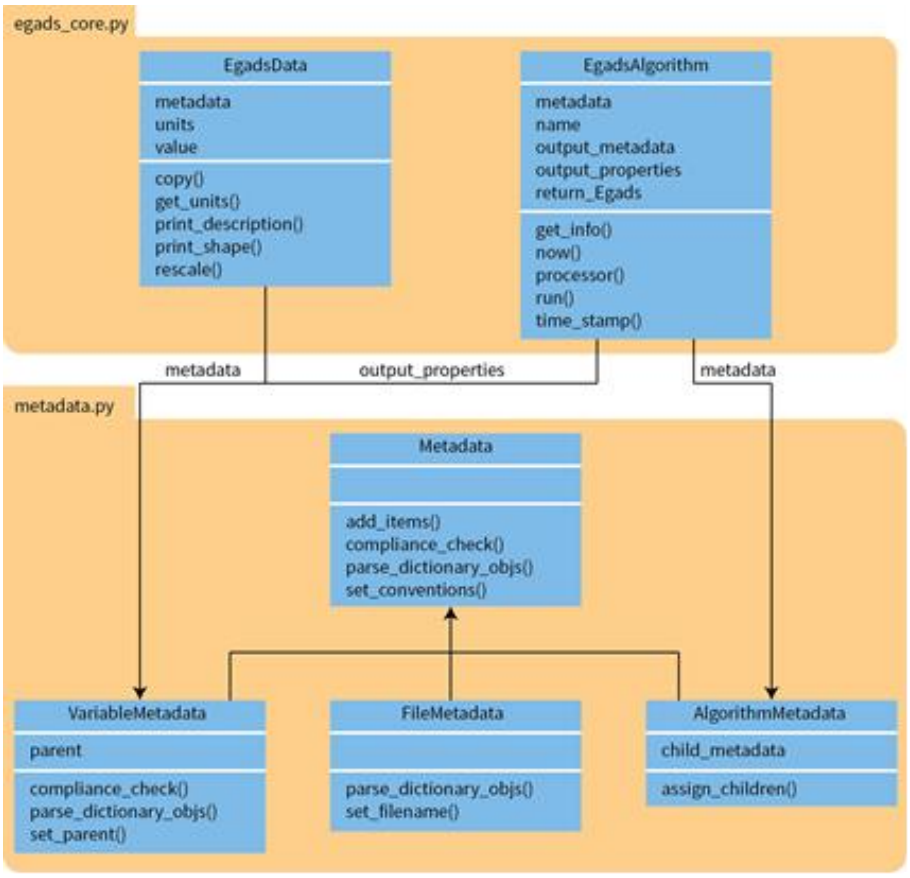
- write the variable(s), it is a good practice to write at the first place the independant variable `time`:

```
>>> f.write_variable(time, 'time', ('time',), 'double')
>>> f.write_variable(data1, 'sea_level', ('time',), 'double')
>>> f.write_variable(data2, 'corrected_sea_level', ('time',), 'double')
```

- and do not forget to close the file:

```
>>> f.close()
```

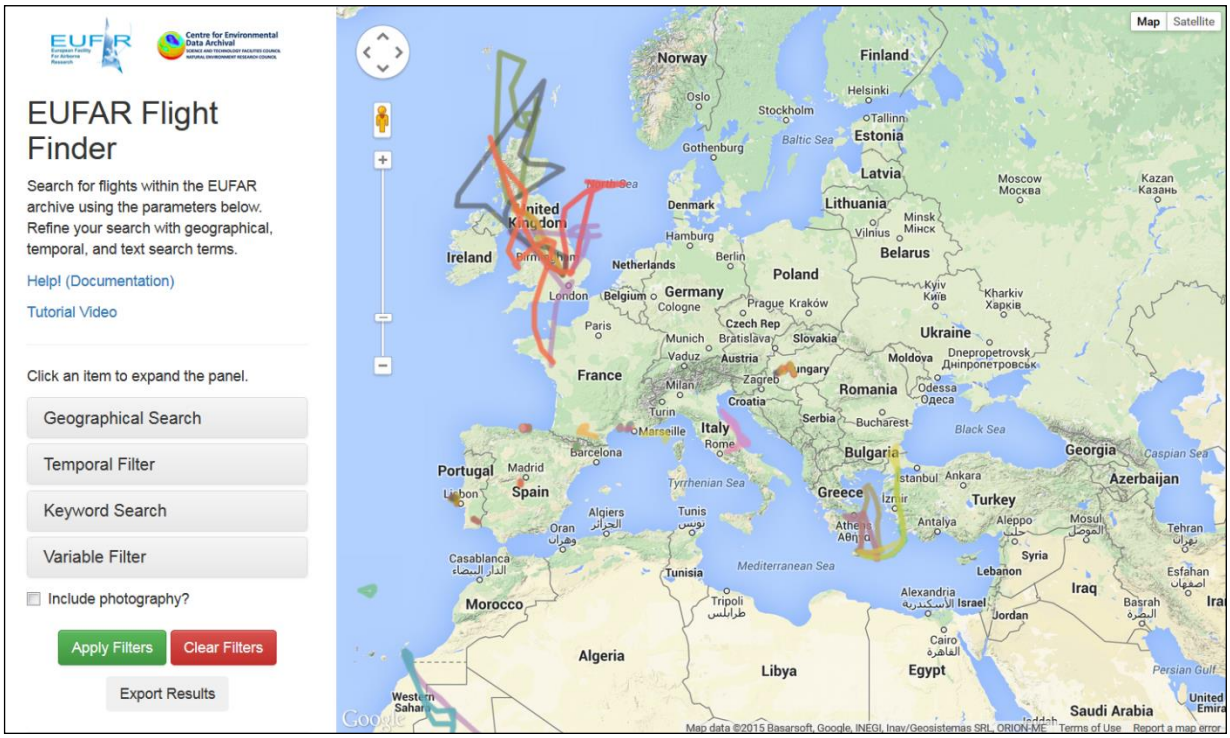
N7SP: *Example of a tutorial included in the EGADS documentation*



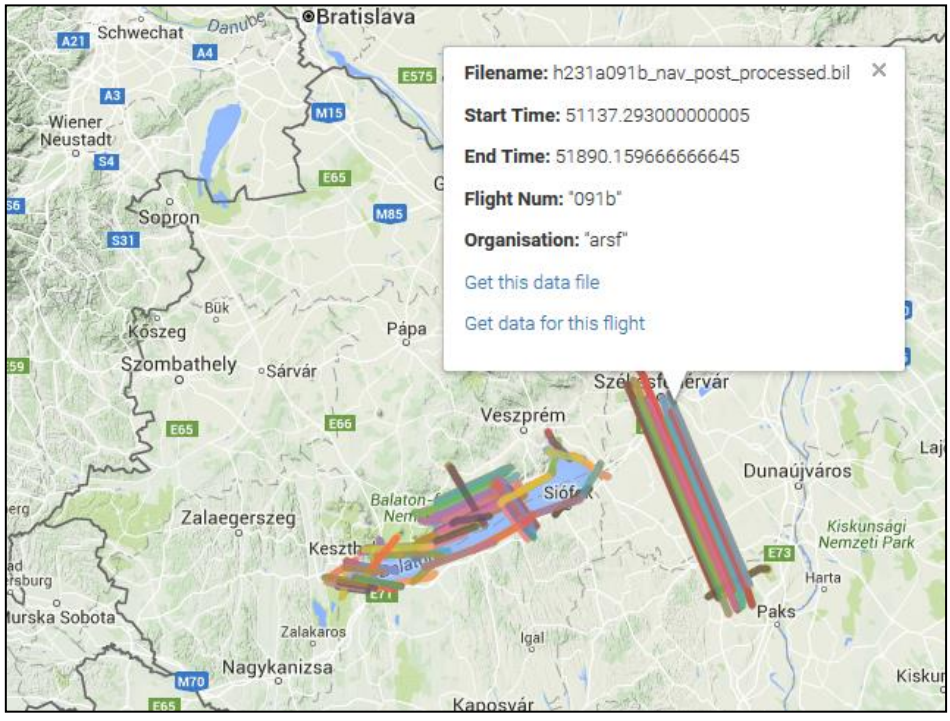
N7SP*: UML representation of EGADS core and metadata classes*

N8DB: Data Base

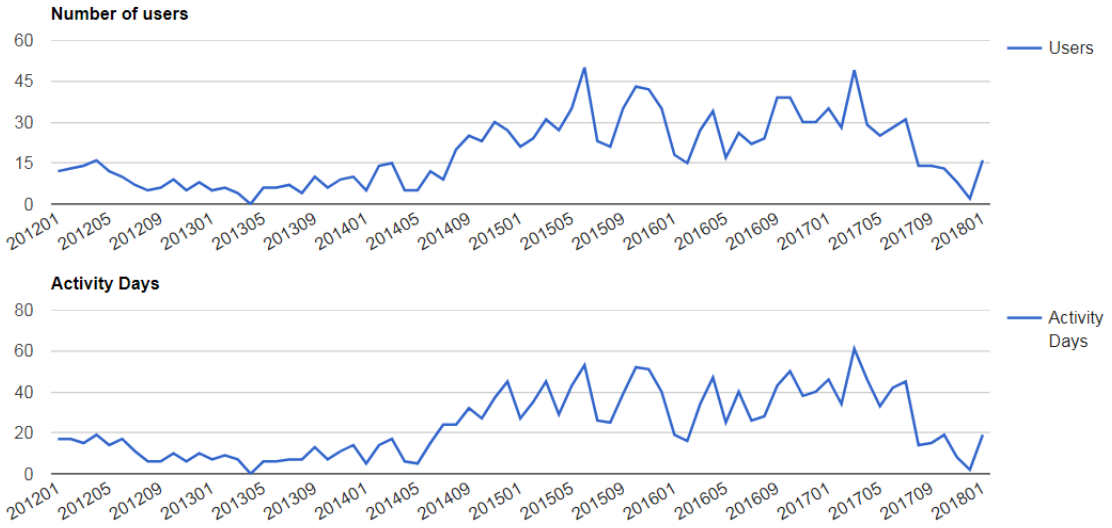
N8DB: EUFAR Flight Finder - http://flight-finder.ceda.ac.uk/



N8DB: Screen shot EUFAR Flight Finder



N8DB: Example of flight details and link to the data associated, on the EUFAR Flight Finder



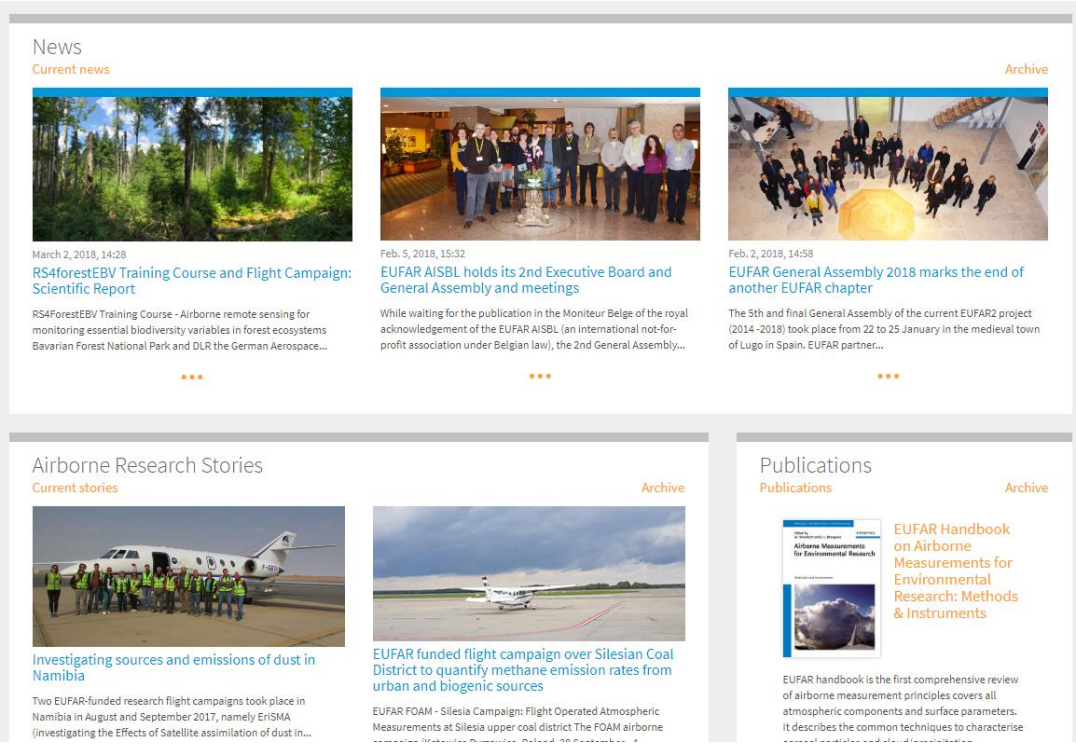
N8DB: Download statistics including number of users and activity days (equivalent to download sessions) per month from January 2012 to March 2018. An increase in usage has been observed since the launch of the EFF.

N8DB: EUFAR Data and Standard & Protocols Team Meeting with IAGOS representative, Météo-France, Toulouse, June 2016

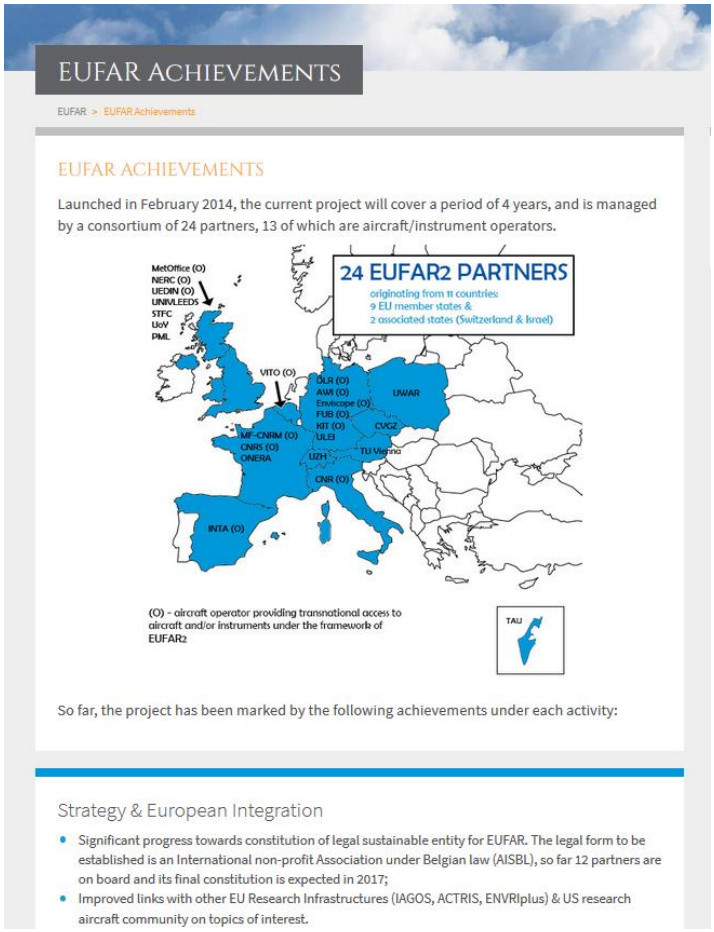
N8DB: Permanent featured article on EFF in newsletter

N9EC: E-Communication

N9EC: Screenshot of EUFAR website homepage



N9EC: Screenshot of EUFAR website homepage: news section



EUFAR ACHIEVEMENTS

EUFAR > EUFAR Achievements

EUFAR ACHIEVEMENTS

Launched in February 2014, the current project will cover a period of 4 years, and is managed by a consortium of 24 partners, 13 of which are aircraft/instrument operators.

(O) - aircraft operator providing transnational access to aircraft and/or instruments under the framework of EUFAR2

So far, the project has been marked by the following achievements under each activity:

Strategy & European Integration

- Significant progress towards constitution of legal sustainable entity for EUFAR. The legal form to be established is an International non-profit Association under Belgian law (AISBL), so far 12 partners are on board and its final constitution is expected in 2017;
- Improved links with other EU Research Infrastructures (IAGOS, ACTRIS, ENVRIplus) & US research aircraft community on topics of interest.

N9EC: Screenshot of summary of the main achievement and EUFAR presentation on the website

Transnational & Open Access Coordination

- So far, EUFAR has coordinated 20 research flight campaigns, funding 225.25 fully-funded flight hours out of a planned total of 38 projects (approximately 430 flight hours). To view the research projects funded and supported by EUFAR, click here;
- Successful clustering of EUFAR-funded flight campaigns with multinational campaigns such as DACCIWA and ICEX-D.

Future of the Fleet

- Launch of EUFAR user needs survey in Nov. 2014 to evaluate the future needs of the airborne research community. Publication of survey results published on the website;
- Report to the EUFAR consortium partners provided on the availability of stratospheric and HPLE platforms, and on progress of UAS platforms for Earth science. Click here, for more information.

Expert Working Groups

There are currently 13 thematic expert working groups that meet regularly to address technical and scientific issues specific to airborne measurements, through specialised workshops, with a view to exchange knowledge and promote best practices in airborne research. EUFAR organised and supported expert workshops on the following topics:

- Airborne Laser Scanning software (Vienna, Nov 2014);
- Certification and Operations (Amsterdam, Sept 2015 & Athens, Feb 2016);
- Technology Transfer to select promising measurement/instrument technologies developed within EUFAR to present to industry players (Frankfurt, Feb 2016);
- Data Processing, Analysis & Presentation of Software of Cloud Probes (Manchester, July 2016);
- Hyperspectral remote sensing for soil applications (Potsdam, September 2016)
- Atmospheric Correction of Remote Sensing Data (Berlin, October 2016)
- Hyperspectral Imaging from UAVs – Applications in Precision Farming (Milan, December 2016).

EUFAR-led Research Activitiess

HYLIGHT- Integration of airborne laser-scanning and hyperspectral imaging to improve image processing

- Development of Algorithm Theoretical Basis Document (ATBD) and Detailed Processing Model (DPM) for improved HSI processing using ALS and improved ALS processing using HSI;

EUFAR PRESENTATION

EUFAR > EUFAR Presentation

WELCOME TO EUFAR, THE UNIQUE PAN-EUROPEAN PORTAL AND NETWORK FOR AIRBORNE RESEARCH INFRASTRUCTURES DEDICATED TO ENVIRONMENTAL SCIENCES.

Created in 2000, EUFAR was born out of the necessity to create a central network for the airborne research community in Europe with the principal aim of supporting scientists, by granting them access to research aircraft and instruments otherwise not accessible in their home countries. In this way, scientists all over Europe can have an equal chance to carry out various atmospheric and in situ measurements on board research aircraft. In essence, EUFAR links scientists with operators of research facilities, and financially supports this collaboration by providing funding for flight hours as well as for travel and subsistence during campaigns.

With time EUFAR has grown, introducing new activities and objectives to place itself as the unique network and portal of airborne research for the environmental and geosciences in Europe. From organising summer schools, expert workshops, and serving as an interactive and dynamic hub of information, to maintaining a central data archive, and developing tools and standards to collect, process and analysis data, EUFAR continues to improve the operational environment for conducting airborne research.

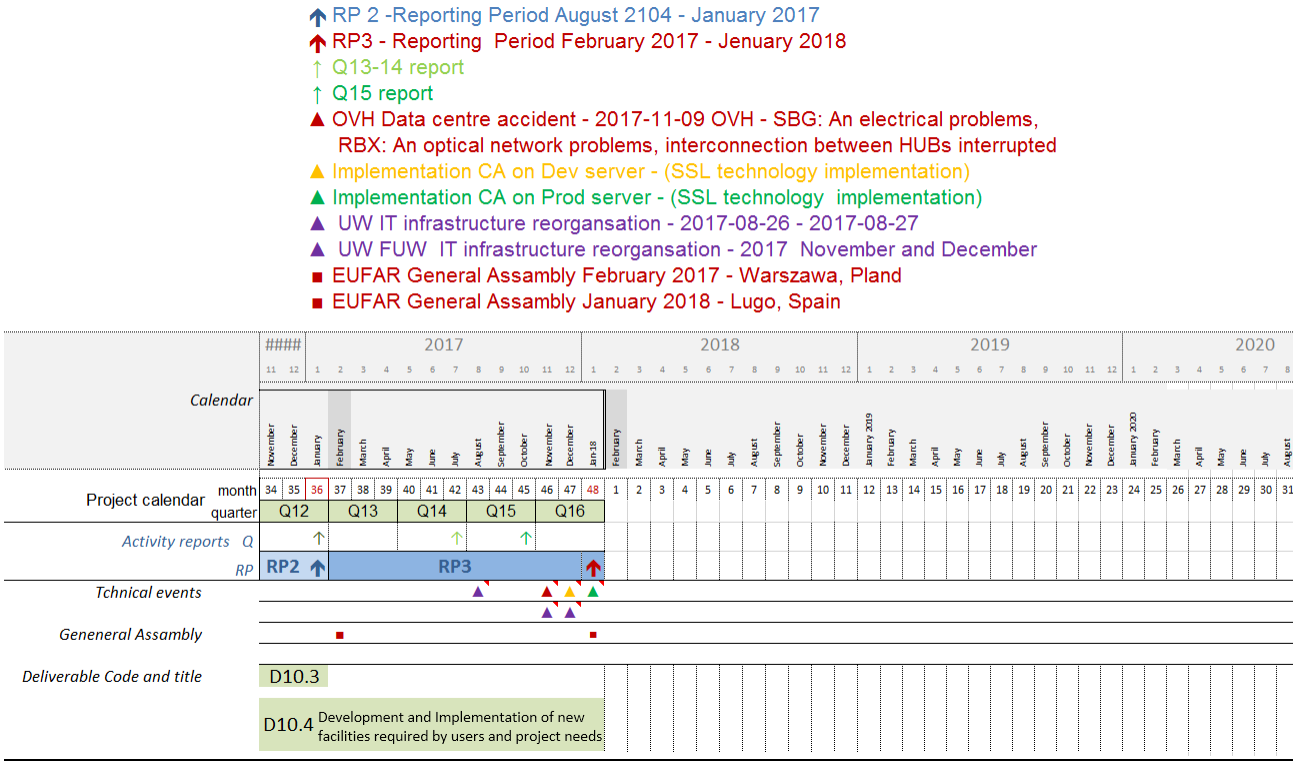
EUFAR2 Project Presentation

The current EUFAR project covers a 4-year period (2014 – 2018) and is financed by the European Commission under its 7th Framework Programme (FP7) under grant agreement 312609. Following three previous contracts dating 2000, the current project is governed by a consortium of 24 European research organisations originating from 11 countries, including 12 research aircraft and instrument operators.

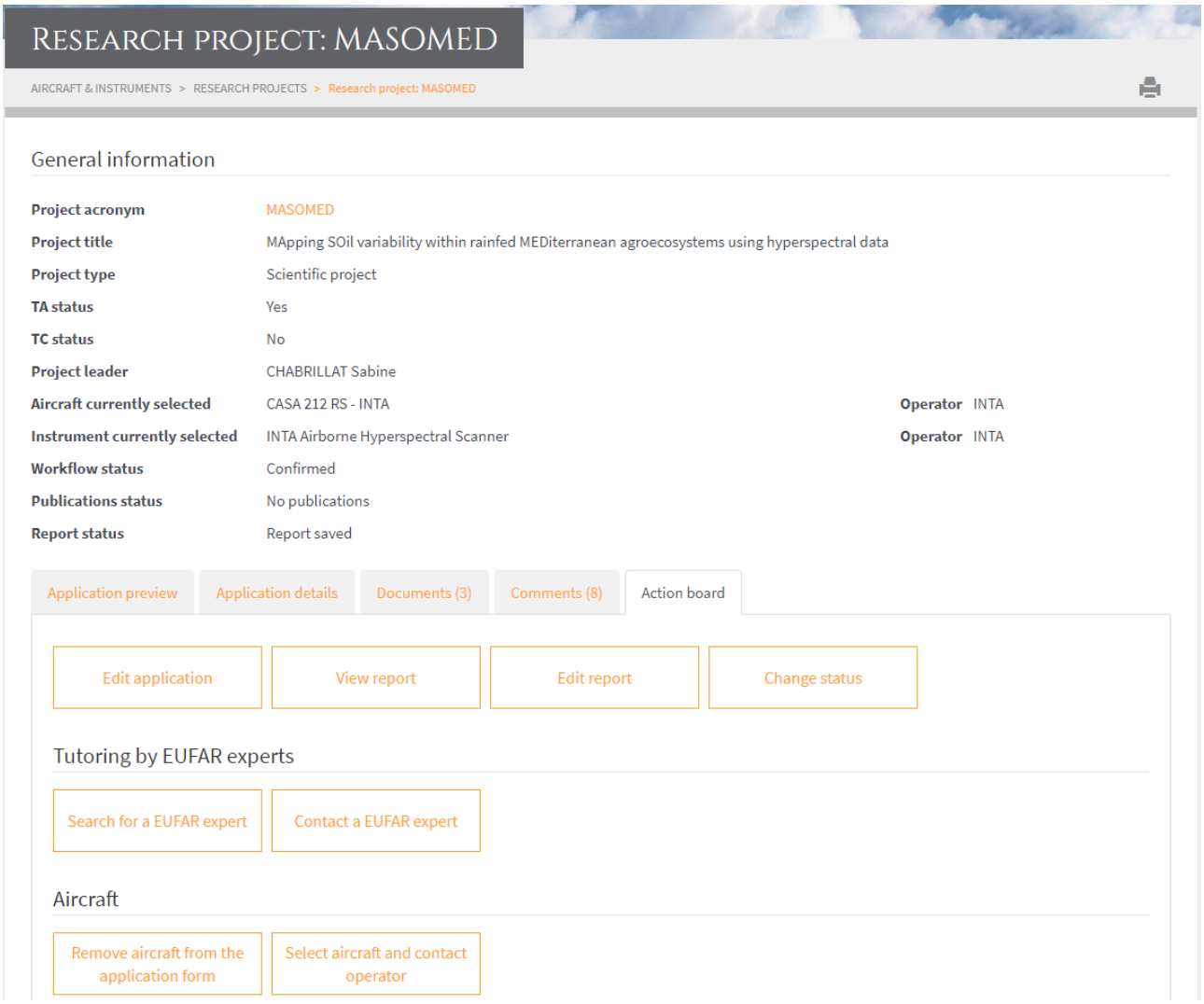
Chemistry payload intercalibration day in Cranfield for the FAAM, ARSF Dornier-228 and MOCCA Cessna 421 research aircrafts, July 2014. Photo credit: FAAM

EUFAR2 Objectives

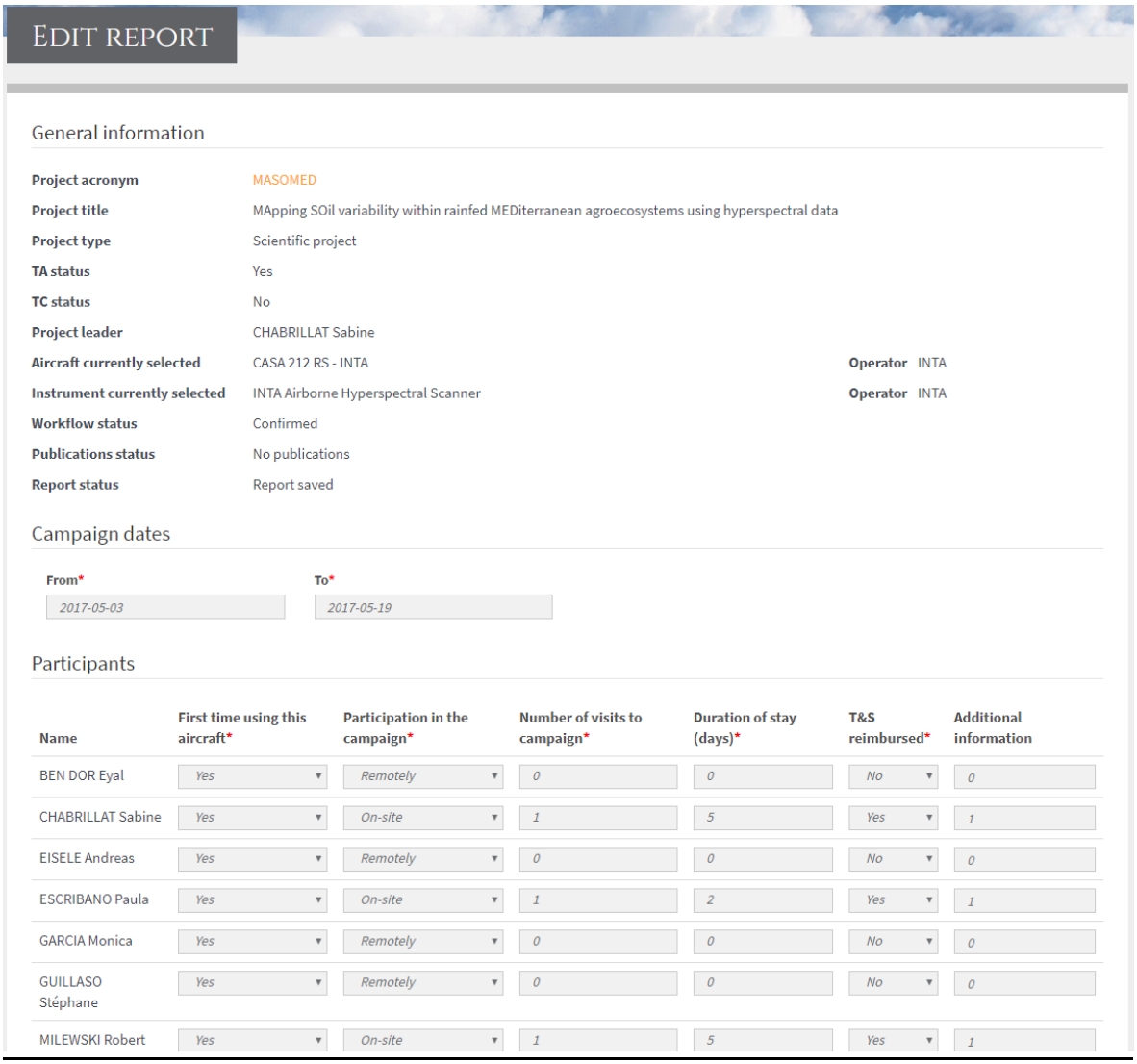
- Facilitate and promote transnational access to national research aircraft and instruments
- Reduce redundancy, fill the gaps, and optimise the use and development of airborne facilities to



N9EC: Example of E-communication timetable - reporting period February 2017 - January 2018



N9EC: Edit report option – Research project page



EDIT REPORT

General information

Project acronym	MASOMED		
Project title	MApping SOil variability within rainfed MEDiterranean agroecosystems using hyperspectral data		
Project type	Scientific project		
TA status	Yes		
TC status	No		
Project leader	CHABRILLAT Sabine		
Aircraft currently selected	CASA 212 RS - INTA	**Operator**	INTA
Instrument currently selected	INTA Airborne Hyperspectral Scanner	**Operator**	INTA
Workflow status	Confirmed		
Publications status	No publications		
Report status	Report saved		

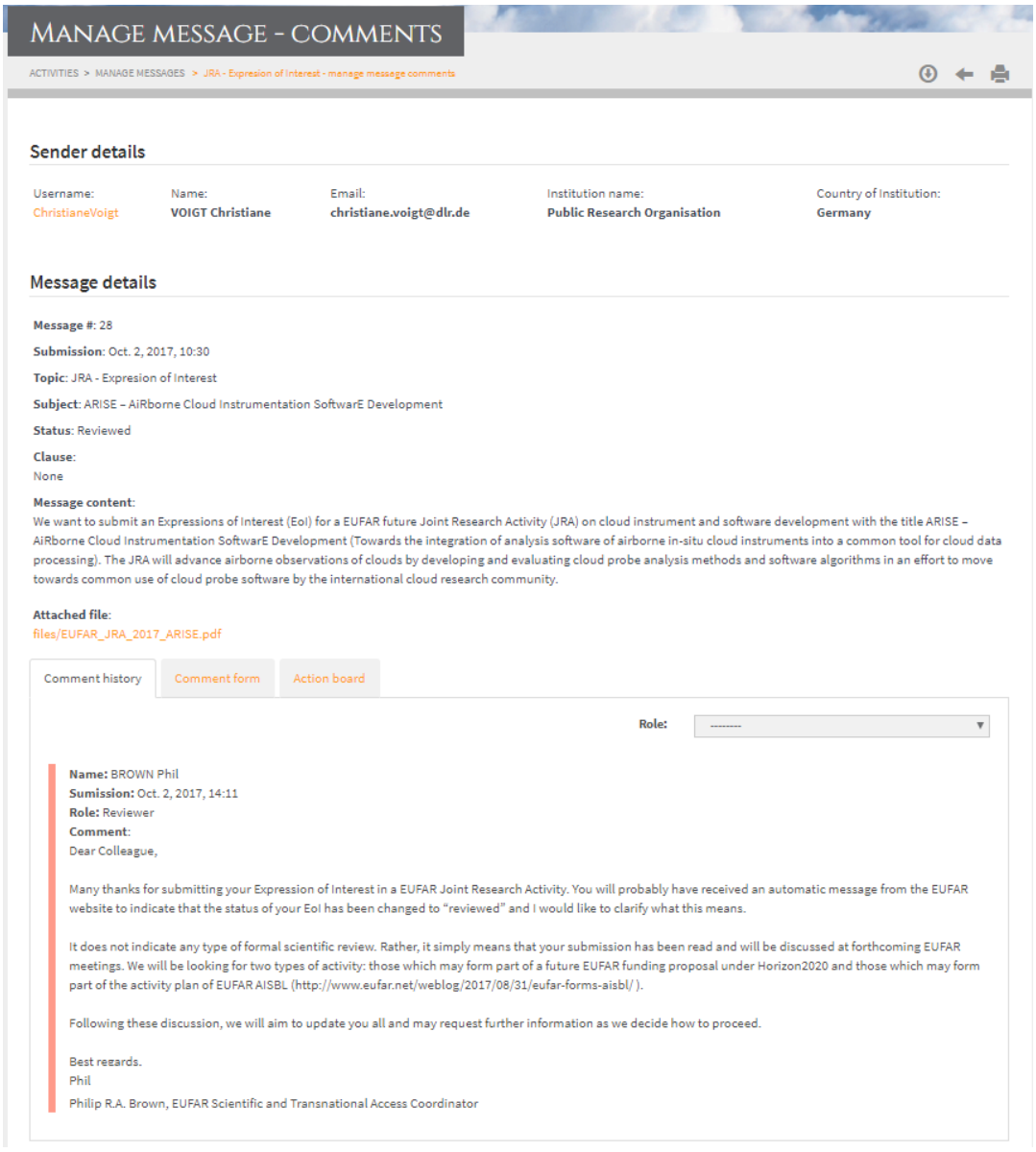
Campaign dates

From*	**To***
2017-05-03	2017-05-19

Participants

Name	First time using this aircraft*	Participation in the campaign*	Number of visits to campaign*	Duration of stay (days)*	T&S reimbursed*	Additional information
BEN DOR Eyal	Yes	Remotely	0	0	No	0
CHABRILLAT Sabine	Yes	On-site	1	5	Yes	1
EISELE Andreas	Yes	Remotely	0	0	No	0
ESCRIBANO Paula	Yes	On-site	1	2	Yes	1
GARCIA Monica	Yes	Remotely	0	0	No	0
GUILLASO Stéphane	Yes	Remotely	0	0	No	0
MILEWSKI Robert	Yes	On-site	1	5	Yes	1

N9EC: Edit report option – Edit report form



N9EC: Manage message- comments

This email has been sent automatically, please do not reply.
If you see an error or if you are not the correct recipient, please contact: bureau@eufar.net

Dear Administrator,

Your comment to the inquiry has been submitted to the sender.
You can find your response and hyperlinks to the inquiry details in the comment section below.

Topic:	EUFAR web site issues and suggestions
Topic coordinator:	Administrator
Message:	#52
Subject:	Test message
Sent:	Oct. 10, 2017, 06:55
Sender:	DUDEK Krzysztof
Affiliation:	AAAAA
Recorded email:	dudek@gmail.com
Status:	Reviewed
Clause:	The status changed to "reviewed" does not indicate any type of formal scientific review. Rather, it simply means that your submission has been read and will be discussed at forthcoming EUFAR meetings. We will be looking for two types of activity: those which may form part of a future EUFAR funding proposal under Horizon2020 and those which may form part of the activity plan of EUFAR AISBL (http://www.eufar.net/weblog/2017/08/31/eufar-forms-aisbl/).
Usefull hyperlink:	Message # 52: Message details, comments history and comment form

Message content:

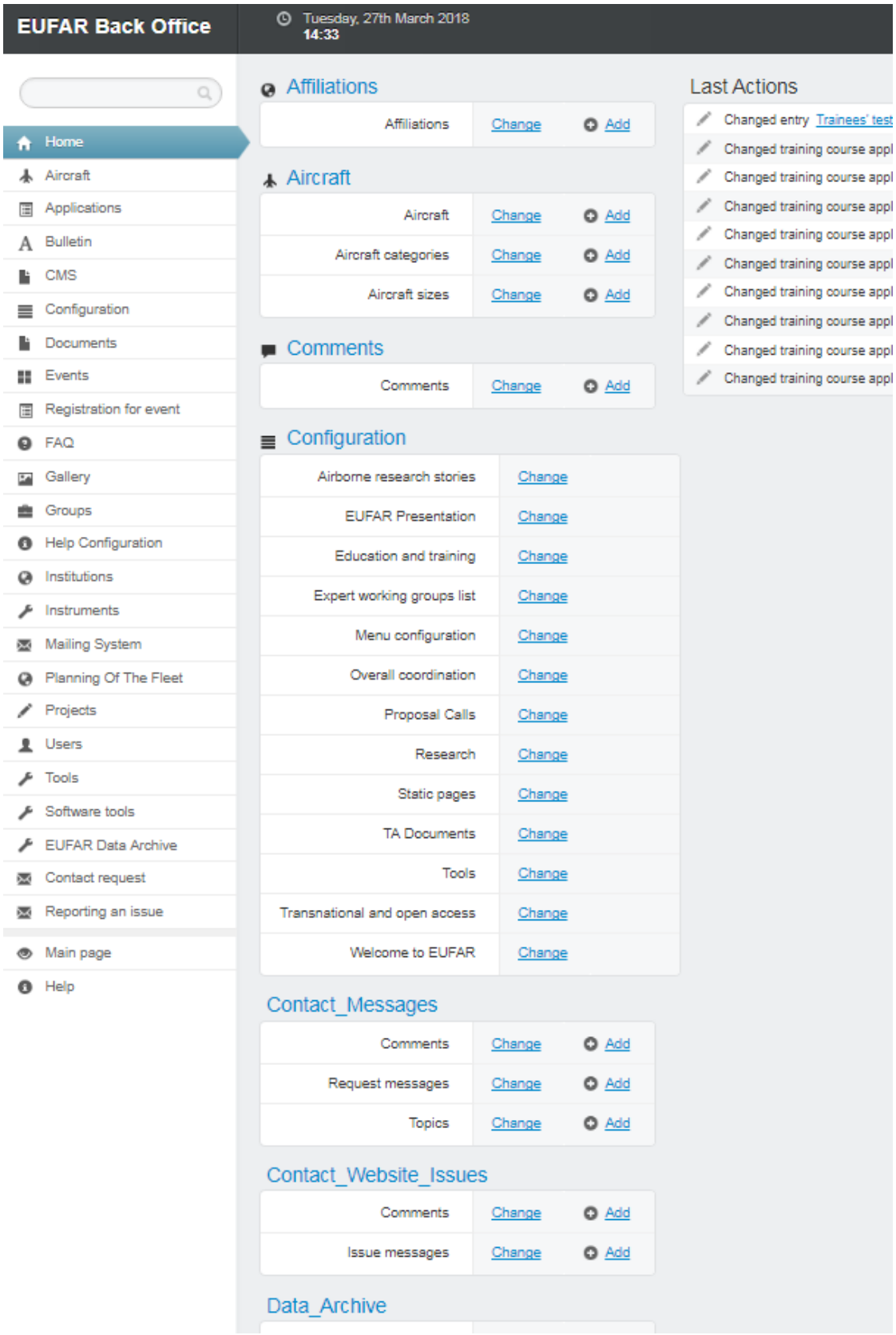
This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content.

This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content. This is a message content.

Comment details:	
Comment sent:	Dec. 5, 2017, 11:23
Comment sender:	DUDEK Krzysztof
Request:	#52
Comment content:	This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content. This is a comment content.

Message template: CM-25-52, Sent: 11:23 (CET)

N9EC: Message template

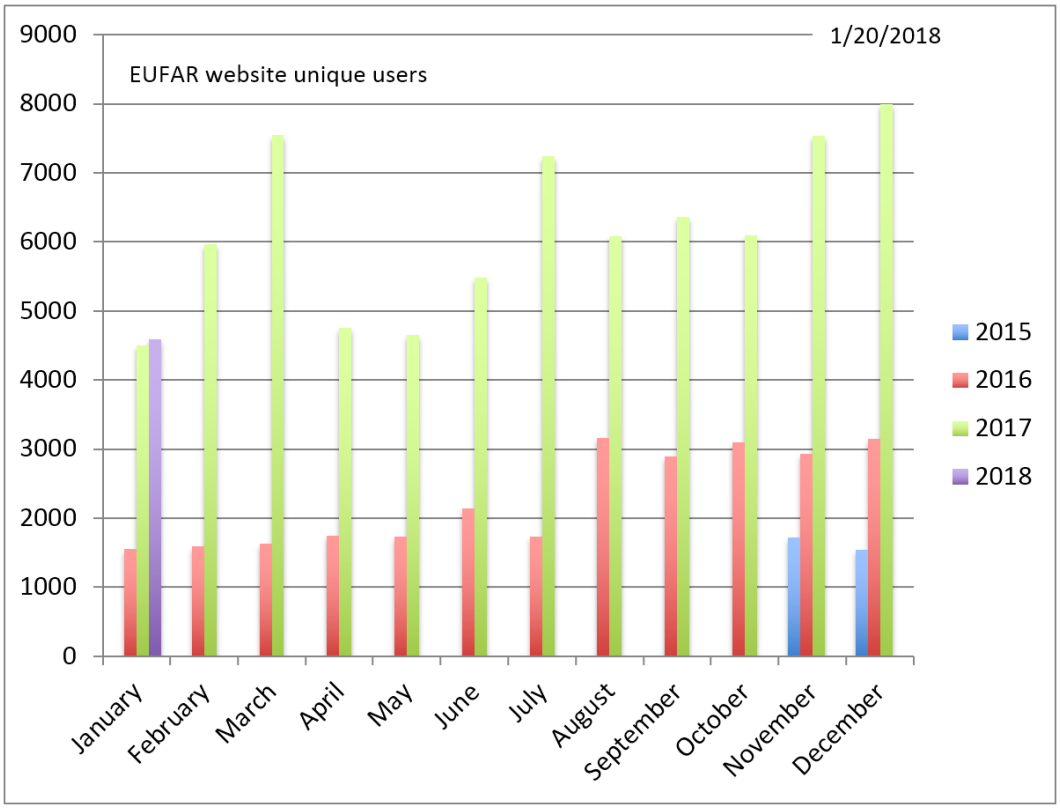


N9EC: Screenshot of EUFAR website Back Office

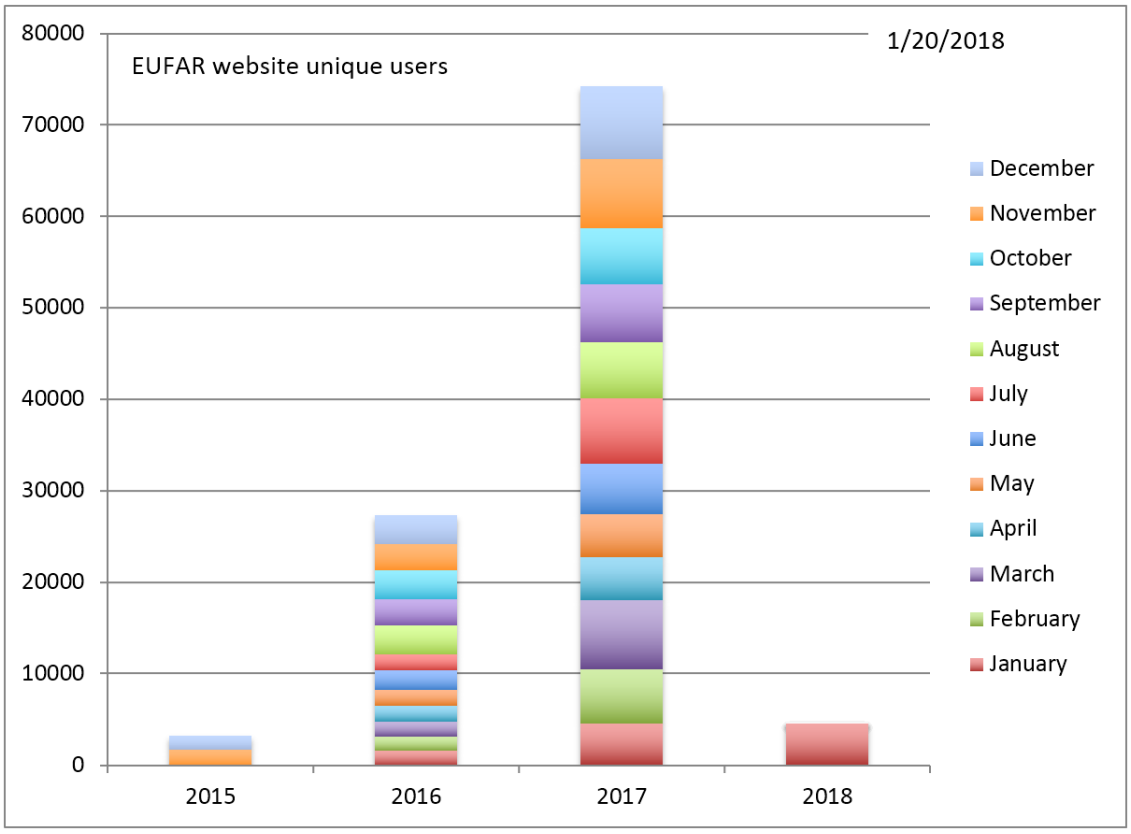
EUFAR website unique users table 1/20/2018

Month	2015	2016	2017	2018	Sum
January	0	1,549	4,506	4,594	10,649
February	0	1,591	5,967	0	7,558
March	0	1,625	7,551	0	9,176
April	0	1,747	4,755	0	6,502
May	0	1,727	4,652	0	6,379
June	0	2,145	5,487	0	7,632
July	0	1,739	7,240	0	8,979
August	0	3,163	6,080	0	9,243
September	0	2,897	6,360	0	9,257
October	0	3,093	6,093	0	9,186
November	1719	2,930	7,542	0	12,191
December	1543	3,154	7,991	0	12,688
Sum	**3,262.00**	**27,360**	**74,224**	**4,594**	**109,440**

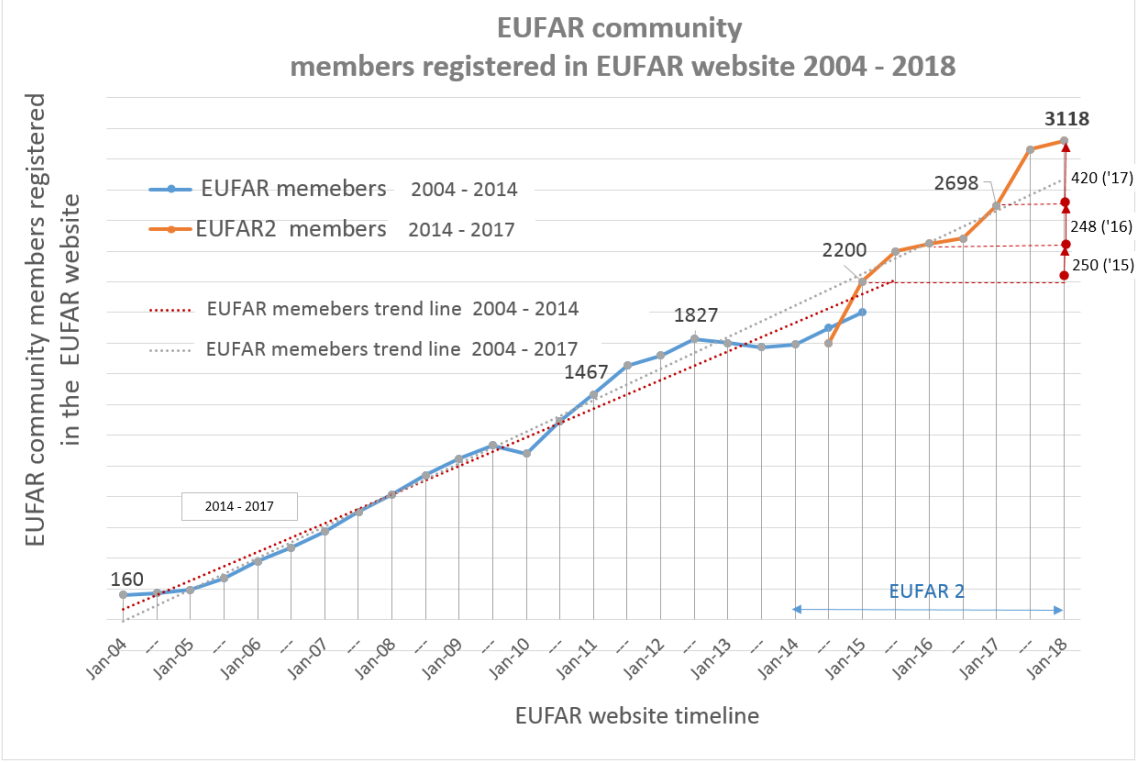
N9EC: EUFAR website unique users table



N9EC: EUFAR website unique users monthly

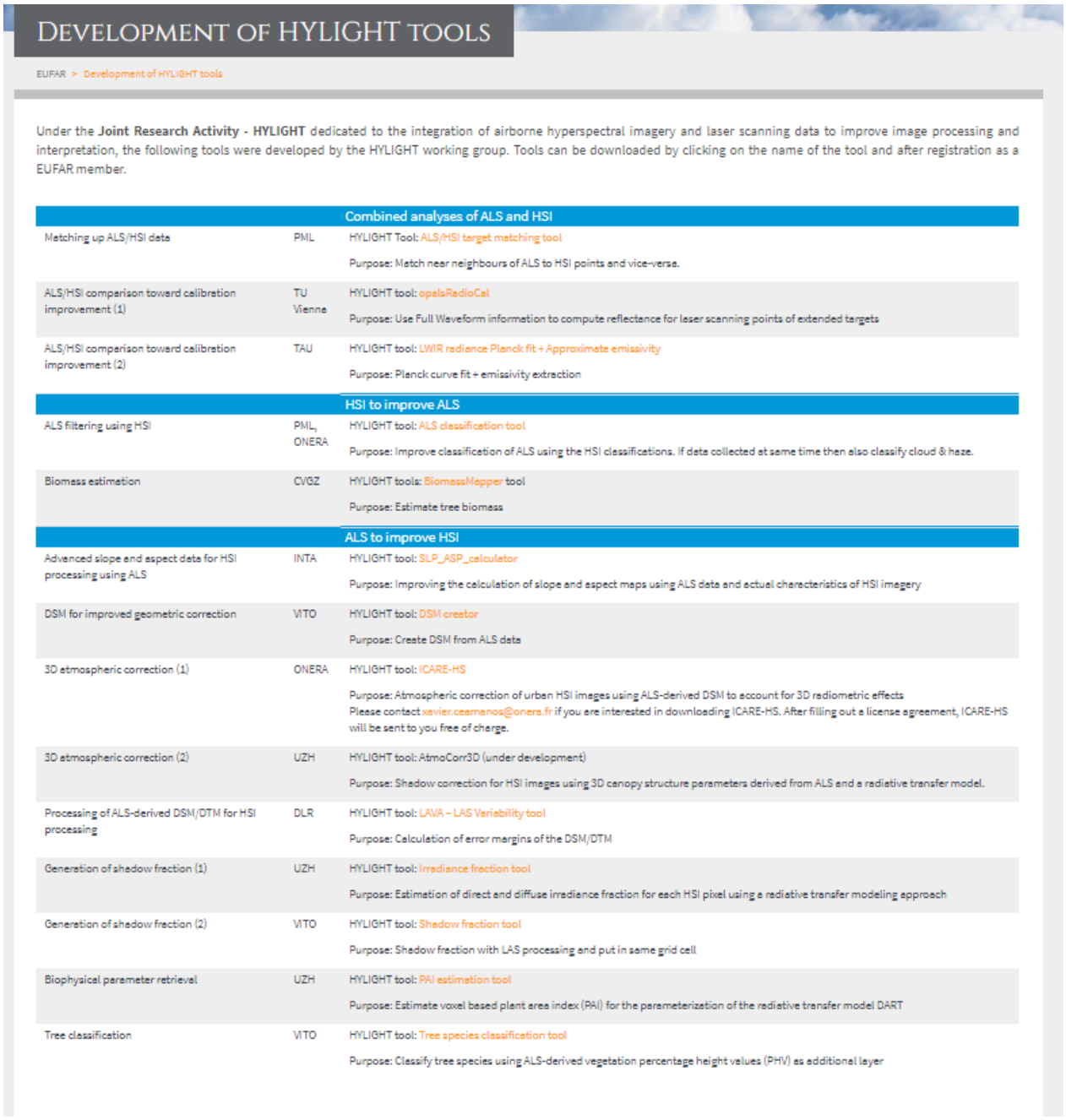


N9EC: EUFAR website unique users yearly



N9EC: EUFAR community members registered in the EUFAR website 2004-2018

JRA1-HYLIGHT



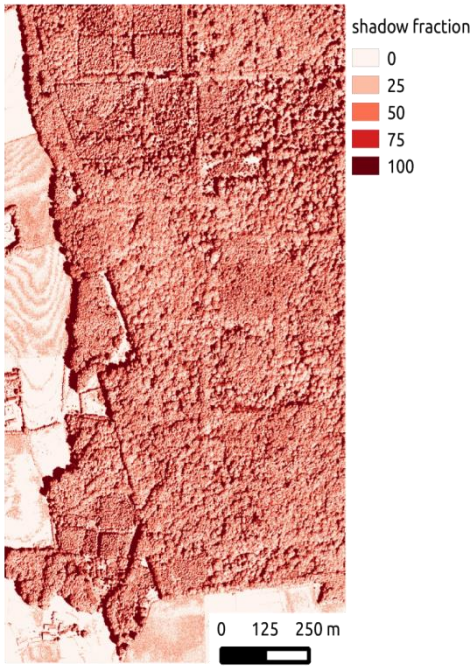
DEVELOPMENT OF HYLIGHT TOOLS

EUFAR > Development of HYLIGHT tools

Under the **Joint Research Activity - HYLIGHT** dedicated to the integration of airborne hyperspectral imagery and laser scanning data to improve image processing and interpretation, the following tools were developed by the HYLIGHT working group. Tools can be downloaded by clicking on the name of the tool and after registration as a EUFAR member.

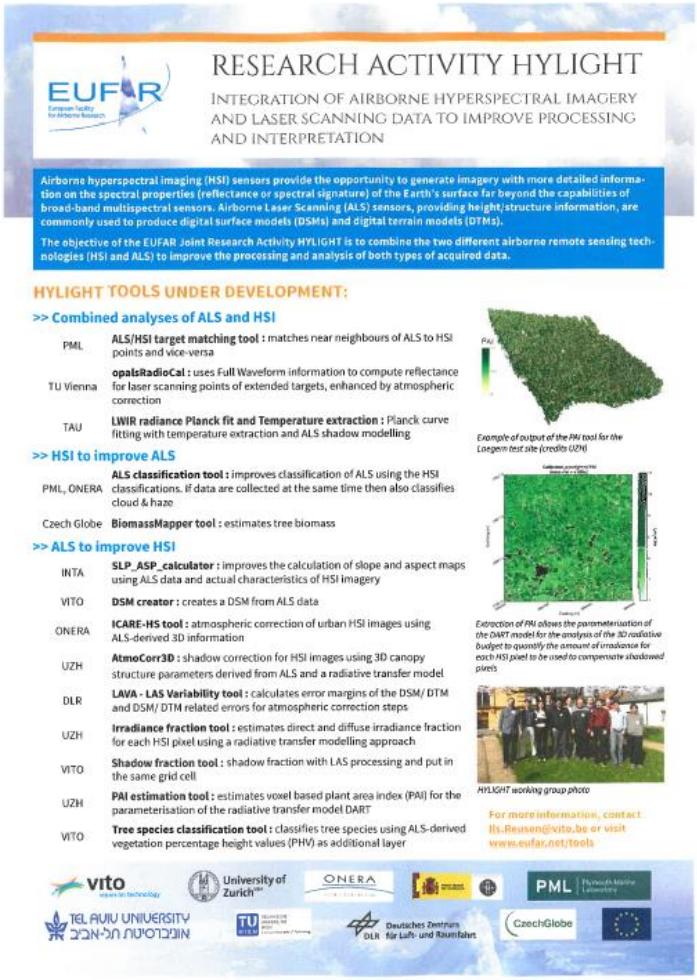
Combined analyses of ALS and HSI		
Matching up ALS/HSI data	PML	HYLIGHT Tool: ALS/HSI target matching tool Purpose: Match near neighbours of ALS to HSI points and vice-versa.
ALS/HSI comparison toward calibration improvement (1)	TU Vienna	HYLIGHT tool: opalsRadioCal Purpose: Use Full Waveform information to compute reflectance for laser scanning points of extended targets
ALS/HSI comparison toward calibration improvement (2)	TAU	HYLIGHT tool: LWIR radience Planck fit + Approximate emissivity Purpose: Planck curve fit + emissivity extraction
HSI to improve ALS		
ALS filtering using HSI	PML, ONERA	HYLIGHT tool: ALS classification tool Purpose: Improve classification of ALS using the HSI classifications. If data collected at same time then also classify cloud & haze.
Biomass estimation	CVGZ	HYLIGHT tools: BiomassMapper tool Purpose: Estimate tree biomass
ALS to improve HSI		
Advanced slope and aspect data for HSI processing using ALS	INTA	HYLIGHT tool: SLP_ASP_calculator Purpose: Improving the calculation of slope and aspect maps using ALS data and actual characteristics of HSI imagery
DSM for improved geometric correction	VITO	HYLIGHT tool: DSM creator Purpose: Create DSM from ALS data
3D atmospheric correction (1)	ONERA	HYLIGHT tool: ICARE-HS Purpose: Atmospheric correction of urban HSI images using ALS-derived DSM to account for 3D radiometric effects Please contact xavier.ceamanos@onera.fr if you are interested in downloading ICARE-HS. After filling out a license agreement, ICARE-HS will be sent to you free of charge.
3D atmospheric correction (2)	UZH	HYLIGHT tool: AtmoCorr3D (under development) Purpose: Shadow correction for HSI images using 3D canopy structure parameters derived from ALS and a radiative transfer model.
Processing of ALS-derived DSM/DTM for HSI processing	DLR	HYLIGHT tool: LAVA – LAS Variability tool Purpose: Calculation of error margins of the DSM/DTM
Generation of shadow fraction (1)	UZH	HYLIGHT tool: Irradiance fraction tool Purpose: Estimation of direct and diffuse irradiance fraction for each HSI pixel using a radiative transfer modeling approach
Generation of shadow fraction (2)	VITO	HYLIGHT tool: Shadow fraction tool Purpose: Shadow fraction with LAS processing and put in same grid cell
Biophysical parameter retrieval	UZH	HYLIGHT tool: PAI estimation tool Purpose: Estimate voxel based plant area index (PAI) for the parameterization of the radiative transfer model DART
Tree classification	VITO	HYLIGHT tool: Tree species classification tool Purpose: Classify tree species using ALS-derived vegetation percentage height values (PHV) as additional layer

JRA1-HYLIGHT: Screenshot of featured HYLIGHT tools on EUFAR website

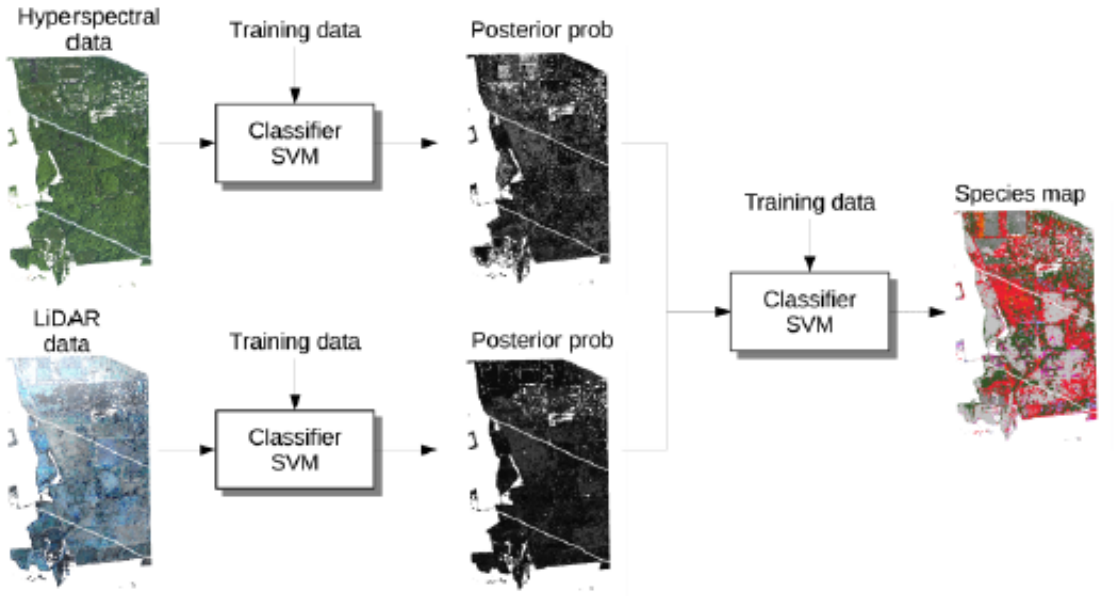


JRA1-HYLIGHT: Shadow fraction map (in percentage) per HSI APEX pixel based on ALS-derived DSM and sun geometry, Wijnendale forest (Belgium), credit shadow fraction map VITO, credit APEX and ALS data Belgian Science Policy

JRA1-HYLIGHT: Photo of HYLIGHT working group, with members from 9 EUFAR partners (TU Vienna, VITO, ONERA, TAU, PML, UZH, CzechGlobe, INTA and DLR), Prague, Czech Republic, April 2016

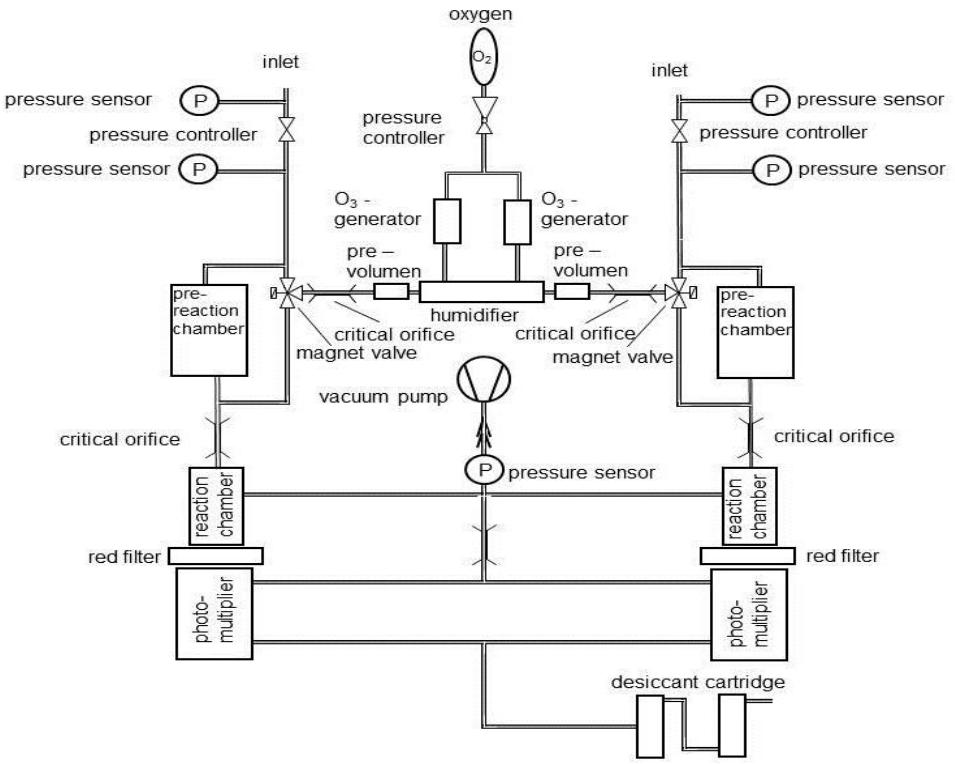


JRA1-HYLIGHT: HYLIGHT tools flyer circulated within the EUFAR community and beyond

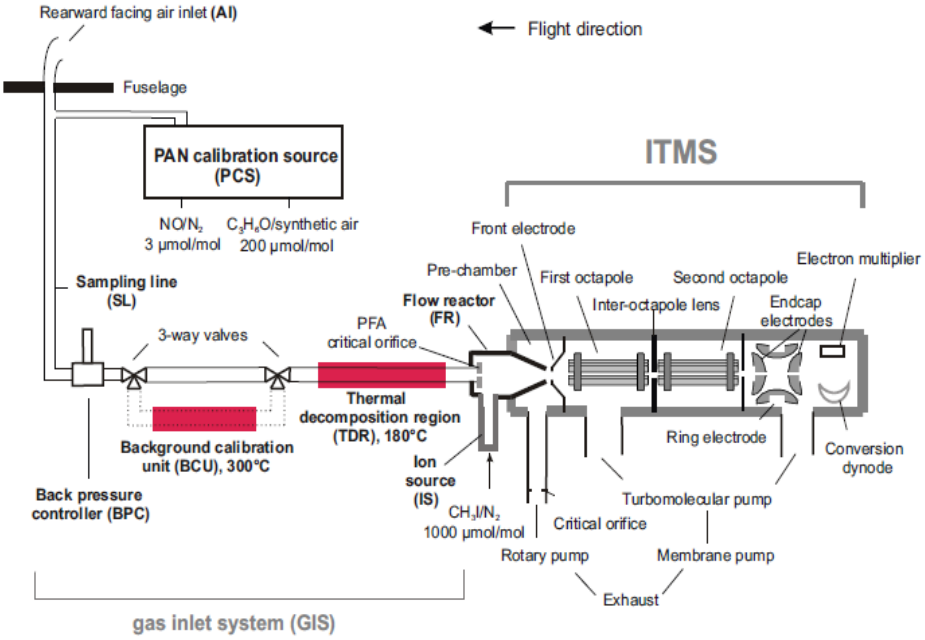


JRA1-HYLIGHT: Schematic overview of the decision fusion approach

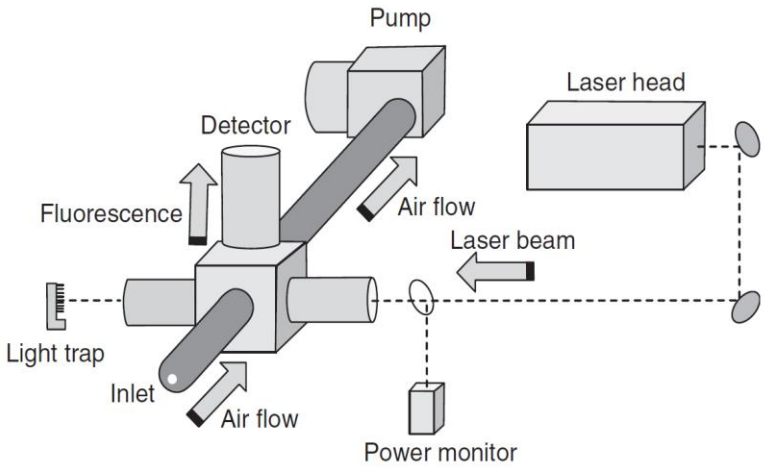
JRA2–TGOE



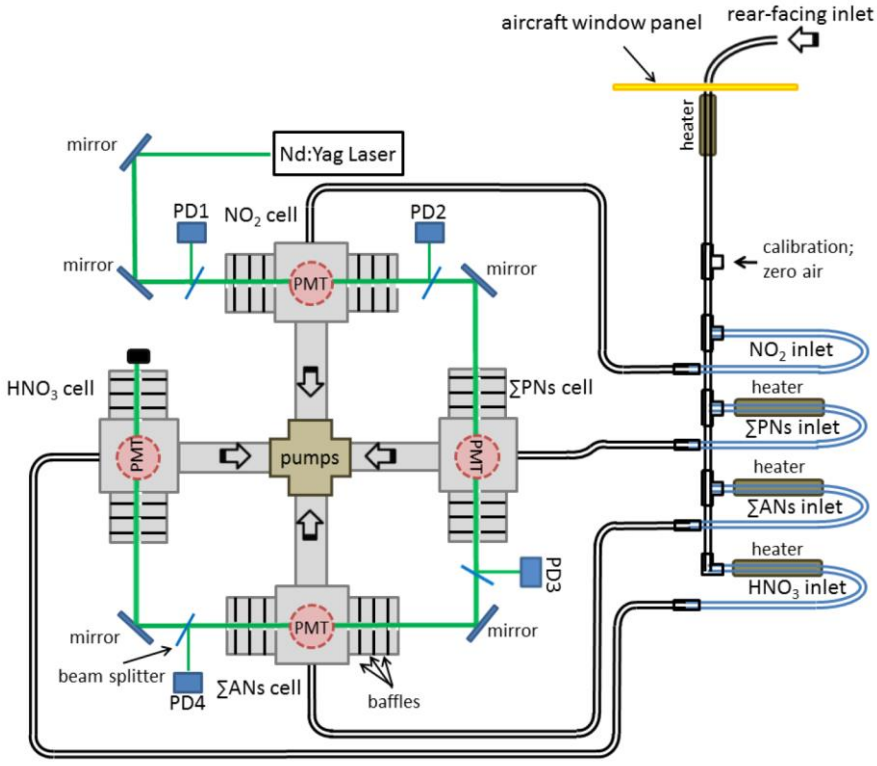
JRA2–TGOE: Schematic diagram of a two-channel CLD. The sample air is passed through the reaction chambers. Ozone is added to the sample flow either in the pre-reaction chamber or in the main reaction chamber, depending on in which mode the instrument is operated



JRA2–TGOE: Schematics of the set-up of the DLR Chemical Ionisation Ion Trap Mass Spectrometer. The main components are a gas inlet system (GIS), a PAN calibration source (PCS), a tubular flow reactor (FR), an ion source (IS) and an ion trap mass spectrometer (ITMS)



JRA2–TGOE: Schematic of the detection cell with its main parts of a LIF system, Wendisch and Brenguier, 2013



JRA2–TGOE: Optical layout of the TD-LIF, Di Carlo et al., 2013

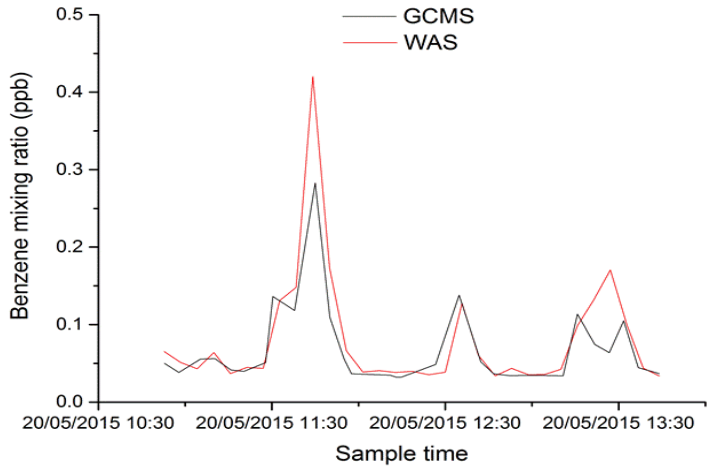
Aircraft acronym:	Type:	Operator:
FA20-DLR	Dassault Falcon 20	DLR, Germany
HALO	G550 Gulfstream	DLR, Germany
BAe146-FAAM	BAe146-301	FAAM, UK
Learjet-Enviscope	Learjet 35A	GDF/Enviscope, G
ATR42-SAFIRE	ATR42-320	SAFIRE, France
FA20-SAFIRE	Falcon 20	SAFIRE, France
Geophysica	M-55	MDB, Russia
IAGOS-CARIBIC	A340-600	Lufthansa, Germany
IAGOS-CORE	A340-300	Different Airlines

JRA2–TGOE: European Research aircraft with certified nitrogen oxide instruments

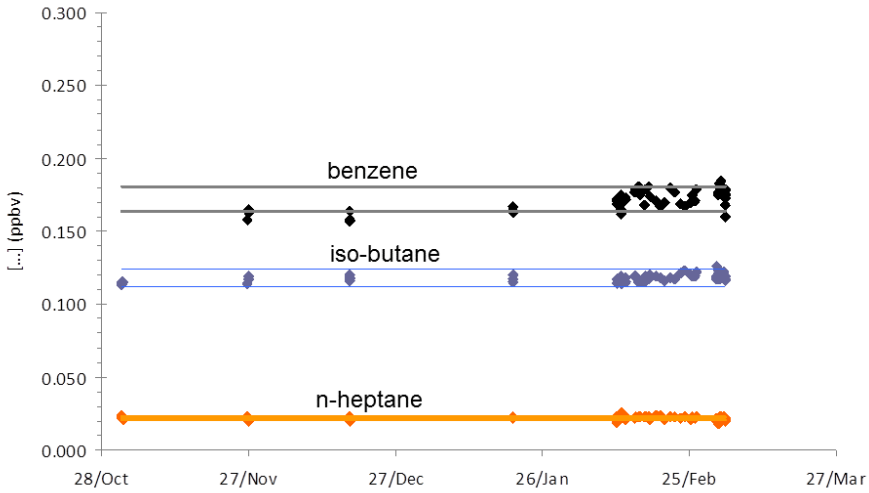
Species	Instrument	Aircraft	Reference (exemplary)
NO	CLD- SR[a] EcoPhysics (mod.)	FA20-DLR, HALO, Geophysica	*Schlager et al., 1997, Ziereis et al., 2000*
	CLD- SR EcoPhysics (mod.)	IAGOS-CARIBIC	*Stratmann, 2015*
	CLD- Teco 42c	ATR42 – SAFIRE, FA20 – SAFIRE	*Freney et al., 2014*
	CLD- Air Quality Design Inc	BAe146 – FAAM	*Brough et al., 2003*
NO2	Photolytic conversion+CLD	FA20 – DLR, HALO, BAe146 – FAAM	*Schulte et al., 1997*
	TD-LIF[b]	BAe146 – FAAM	*Di Carlo et al., 2013*
	CAES[c]	Bae146-FAAM	*Kenedy et al. 2011.*
	LIF	HALO	*Harder et al.*
NOy	Au-Converter+CLD[d]	FA20 – DLR	*Ziereis et al., 2000* *Stratmann, 2015*
	Au-Converter+CLD	IAGOS-CARIBIC, IAGOS-CORE	*Volz-Thomas et al., 2005*
HNO3, HNO2	CI-ITMS[e]	FA20 – DLR, HALO, BAe146 – FAAM	*Huntrieser et al. 05, Jurkat et al., 2010*
HNO3	CIMS-QMS[f]	Learjet 35A	*Crowley et al.*
HNO3, HNO2	CIMS-QMS	FA20 – DLR, HALO	*Arnold et al,. 1992, Jurkat et al., 2014*
PAN	GC-ECD[g]	BAe146 – FAAM	*McQuaid et al.*
	CI-ITMS	FA20 – DLR	*Roiger et al., 2010*
	CIMS-QMS	Learjet 35A	*Crowley et al.*
NO3, N2O5	CRDS[h]	BAE146-FAAM	*Kennedy et al. 2011*
NO2	QCL[i]	Falcon20-DLR	*Catoire et al.*

[a] Chemiluminescence Detector, [b] thermal dissociation laser-induced fluorescence, [c] Cavity-Enhanced Absorption Spectrometer, [d] catalytic reduction in a heated gold tube, [e] ion trap Chemical Ionization Mass Spectrometry, [f] Chemical Ionisation Quadrupole Mass Spectrometer, [g] gas chromatography with an electron capture detector, [h] Cavity-Ring-Down Spectrometer, [i] Dual Laser Quantum Cascade Laser Trace Gas Monitor

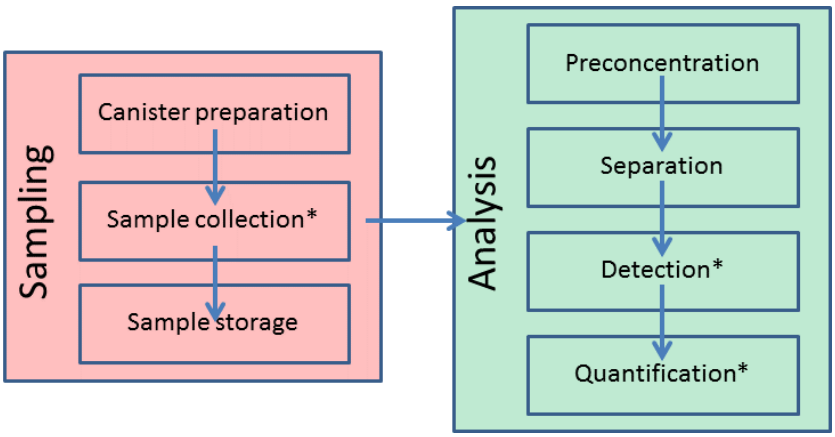
JRA2-TGOE: Overview of nitrogen oxides measurement techniques used on-board European aircraft



JRA2–TGOE: Comparison of GCMS and WAS-GCFID observations of benzene during a research flight in the North Sea in 2015

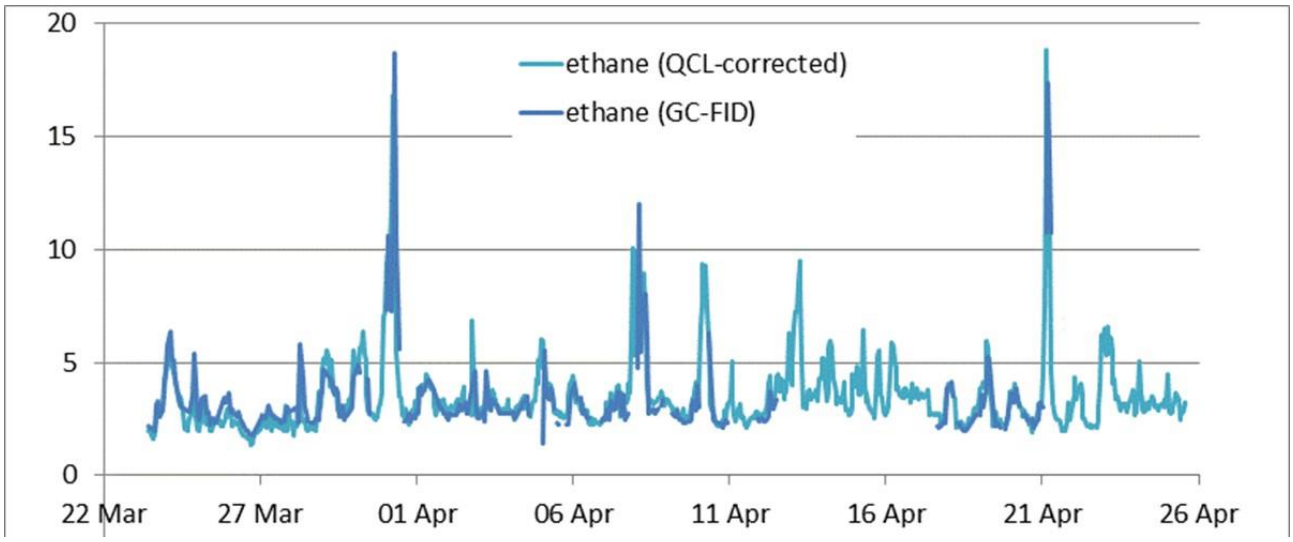


JRA2–TGOE: Analysis of the stability of selected VOC compounds at a range of mixing ratios in air within the working standard cylinder



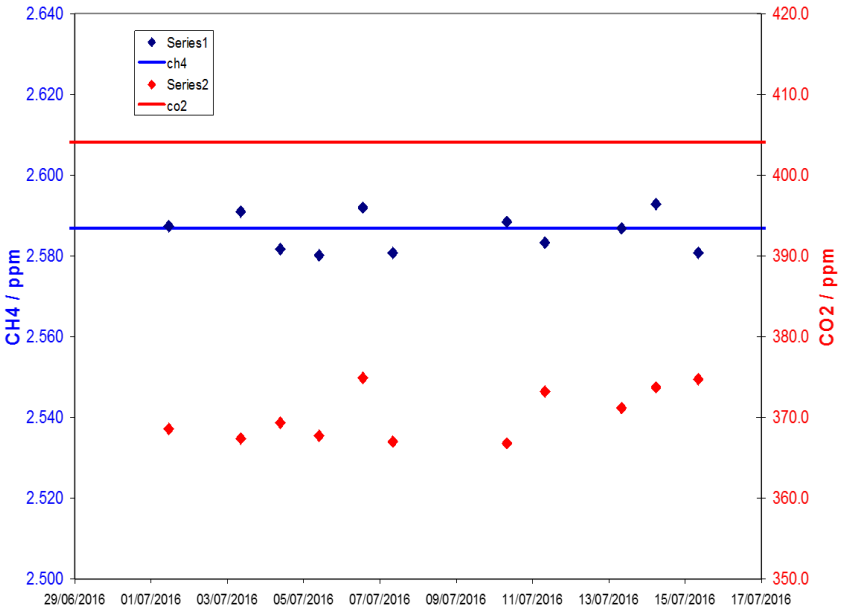
*JRA2 – TGOE: Schematic representation of the processes involved in airborne observations of VOCs, each of which introduces uncertainty into the observations; * represents those processes common to all instrumentation regardless of methodology*

JRA2–TGOE: On 8 July 2014, FAAM organised a chemistry payload intercalibration day in Cranfield for the FAAM, ARSF Dornier-228 and MOCCA Cessna 421 research aircrafts, attended by over 20 scientists

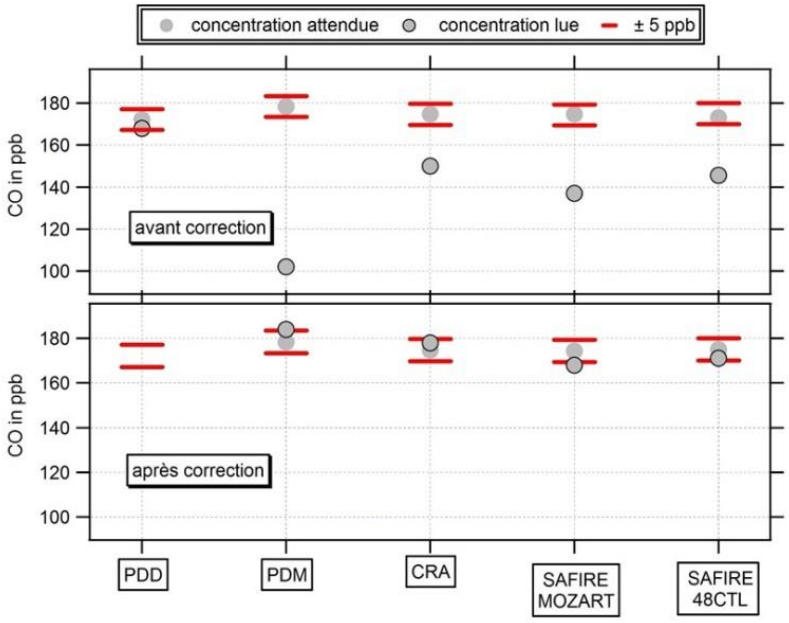


JRA2 –TGOE: Comparison between the GC-FID data for ethane (calibrated to the NPL/GAW-VOC calibration scale) and that from the Aerodyne QCL instrument which has been corrected by removing the instrument background only (and averaged to give hourly data).

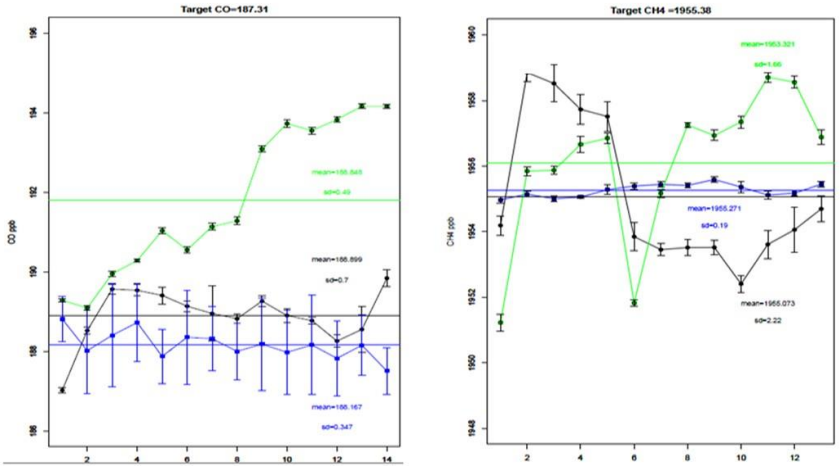
JRA2-TGOE: Pictures taken from the NERC's Twin Otter aircraft flying over Accra during DACCIWA 2016



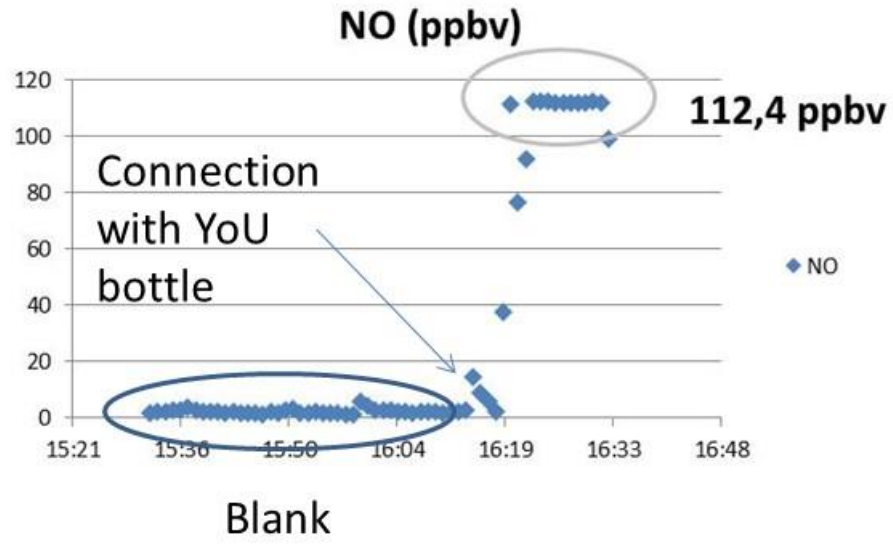
JRA2-TGOE: DACCIWA LGR uGGA CO_2/CH_4 target result



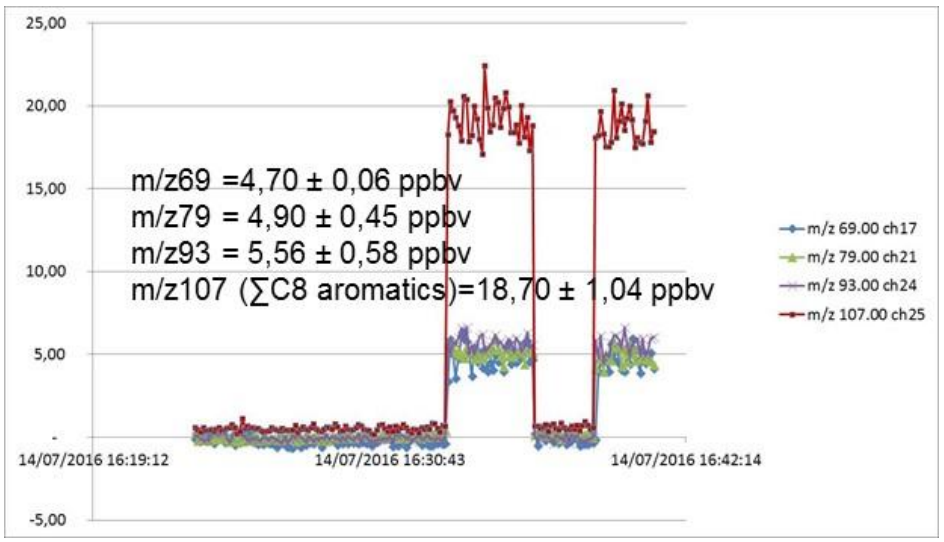
JRA2-TGOE: CO analyser responses at various French platforms (PDD = puy de Dôme Research Observatory; PDM: Pic du Midi Research Observatory; CRA: Centre de Recherches Atmosphériques) before correction (top panel figure) and after correction (bottom panel figure).



JRA2-TGOE: Screening the drift of the tested instruments relative to a target gas of CO and CH_4 injected at regular time intervals during the ChemCalInt intercomparison at the ground.



JRA2-TGOE: Connecting the NO cylinder (110 ppbv) provided by University of York (UoY) to the NOx analyser installed on board ATR-42



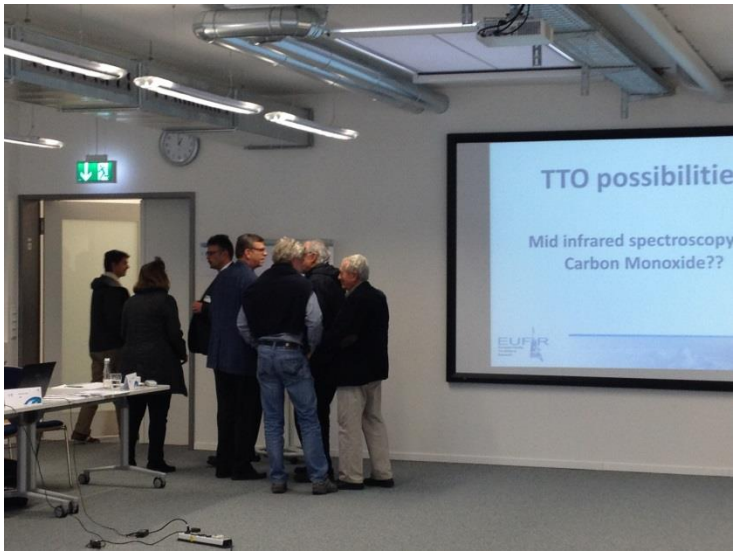
JRA2-TGOE: Connecting the NPL standard cylinder (4 ppbv at ±2%) to the PTR-MS installed on-board ATR-42. PTRMS was previously calibrated with a diluted standard mixture provided by Ionimed (1 ppm ±5%). Volume mixing ratios (VMR) reported on the graphic area are the VMR measured by the PTRMS when connected to the NPL standard

JRA2-TGOE: UK BAe146 aircraft observed from DLR HALO during formation flying to provide an in-flight instrument comparison during EMERGE-EU (2017, Munich)

Management

MNGT: Kick-off meeting & General Assembly 01
Brussels, Belgium, 24 – 27 March 2014

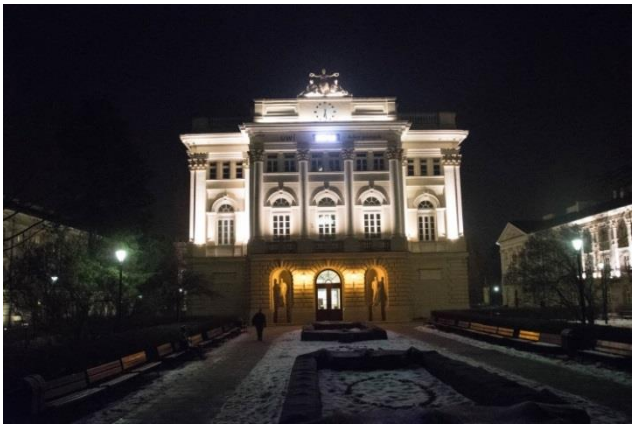
MNGT: General Assembly 02, DLR (the German Aerospace Research Centre) Oberpfaffenhofen, Germany, 25 – 27 March 2015



MNGT: General Assembly 03 & Mid-Term Review
Prague, Czech Republic, 5 – 8 April 2016

MNGT: General Assembly 04
Warsaw, Poland, 14-17 February 2017

MNGT: Group photo outside the Auditorium Minus at the University of Warsaw's main campus General Assembly 04, Warsaw from 14 to 17 February 2017



MNGT: General Assembly 04 (2017), Auditorium Minus at the University of Warsaw's main campus

MNGT: General Assembly 05,
Lugo, Spain, 22-25 January 2018

MNGT: General Assembly 05, Lugo, Spain, 22-25 January 2018
EUFAR representatives together with Mayor and Municipal Spokesperson of Lugo

MNGT: General Assembly 05, Lugo, Spain, 22-25 January 2018
Mayor of Lugo handing replica of Roman Walls of Lugo to EUFAR's coordinators

MNGT: General Assembly 05, Lugo, Spain, 22-25 January 2018
EUFAR General Assembly 2018 participants at the town hall

MNGT: General Assembly 05, Lugo, Spain, 22-25 January 2018
EUFAR General Assembly 2018 proceedings

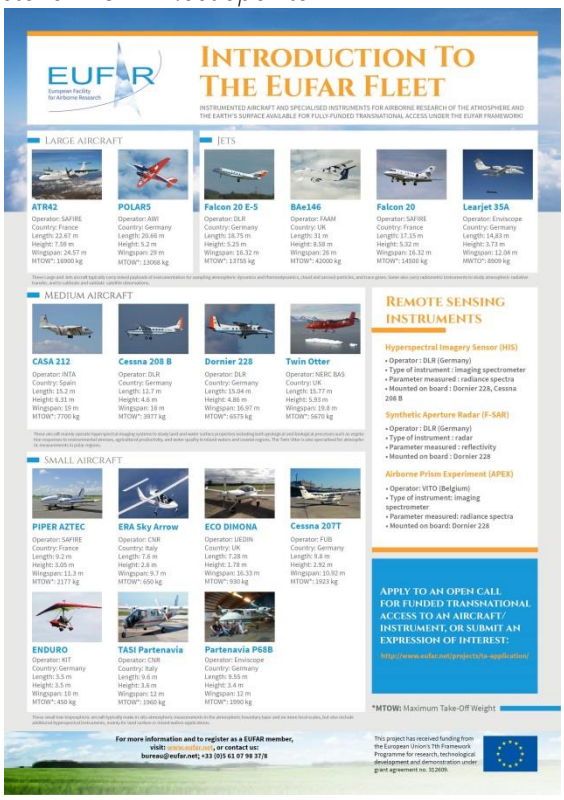
MNGT: General Assembly 05, Lugo, Spain, 22-25 January 2018
Aircraft exhibited at the Rozas Aerospace Research Centre (CIAR)

MNGT: General Assembly 05, Lugo, Spain, 22-25 January 2018
Participants discuss INTA UAV during the visit to the Rozas Aerospace Research Centre (CIAR)

Dissemination

Revised communication materials

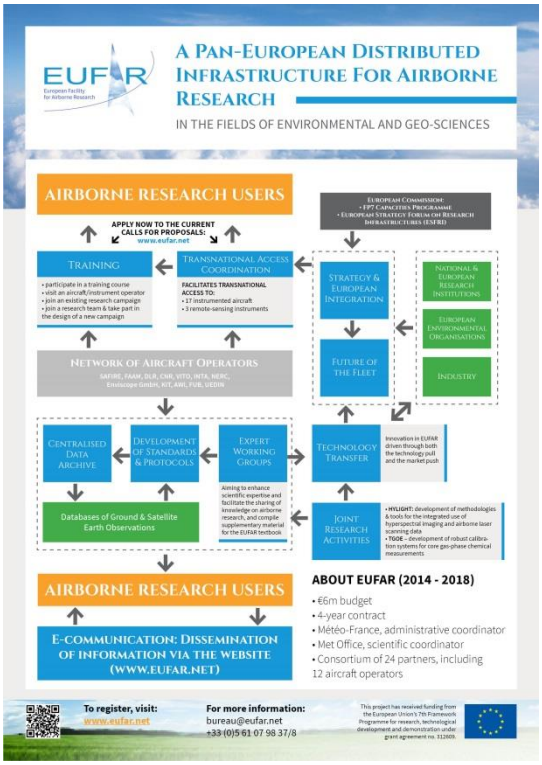
Poster on EUFAR fleet open to TA



Activity poster (example E&T poster)

Poster on EUFAR handbook

EUFAR General Activity poster



EUFAR Post Card:

New EUFAR logo as of 2016:

Previous EUFAR logo: