ESA AIRBORNE CAMPAIGNS – A NEW SOURCE OF DATA FOR REMOTE SENSING SCIENCE

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1. INTRODUCTION

In support of its Earth Observation Satellite Programs, ESA has conducted over 60 airborne and ground campaigns since 1981. The covers several key objectives including:

1. Technological Objectives: This includes the development of new technologies including for example lidar and SAR technology, limb sounding spectrometers, imaging spectrometers and microwave radiometers.
2. Geophysical objectives: This includes support to geophysical modeling and the development of processing algorithms
3. Simulation: Here ESA campaign activities support application development, in conjunction with scientific and techniques studies to help prepare the user community for future satellite systems.
4. Calibration and Validation: These are required for the calibration of spaceborne sensors and data products and overall assessment of the geophysical data product accuracy.

A typical implementation of an airborne campaign is illustrated in Figure 1. A phased approach is usually adopted including experiment definition, data acquisition, data processing and analysis phases with a total duration of the campaign typically of the order of 12-18 months.

More recently there has been recognition that data resulting from ESA campaigns have great scientific value beyond the immediate objective of providing direct support to ESA Earth Observation programs. As a result, ESA has been populating a database with airborne and ground campaign data and is making these available to the remote sensing scientific community.

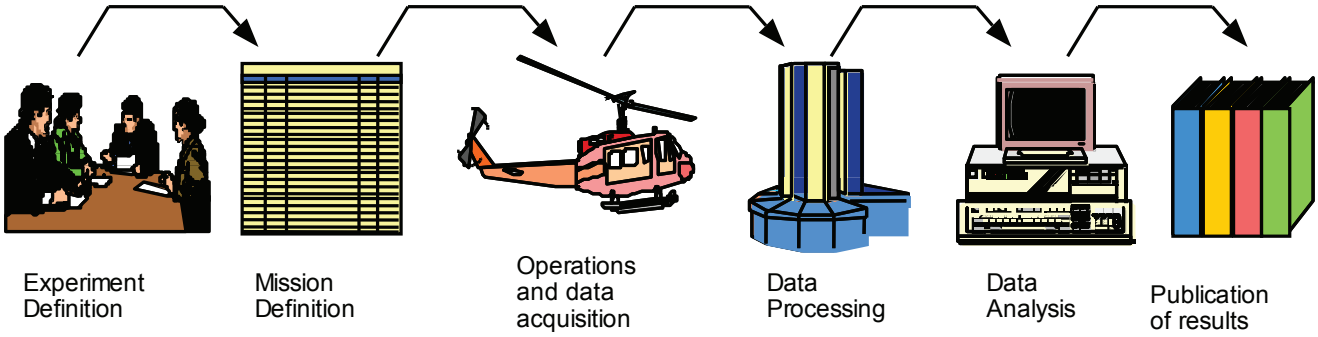

Figure 1: Campaign phases and typical duration

2. RECENT CAMPAIGN DATASETS AVAILABLE THROUGH ESA

The table below summarises the main campaign datasets available to the scientific community:

Campaign	Year	Site	Main sensors	Field of Application
BioSAR	2007	Remningsthorp (Sweden)	Airborne SAR	Forest biomass mapping using L - and P-Band SAR
AgriSAR	2006	Demmin (Western Pomerania, D)	Airborne SAR, Hyperspectral	Agriculture
EAGLE	2006	Cabauw, Loobos, Speulderbos (NL)	Hyperspectral	Grassland and Forest
AIRFIRE	2006	Central Italy	Hyperspectral	Forest and bushes fire monitoring
AQUIFEREX	2005	Ben Gardane, Gabes (Tunesia)	Airborne SAR	Soil moisture, land use, land cover classification
SEN2FLEX	2005	Barrax (E)	Hyperspectral, Fluorescence	Agriculture
WALEX	2005	Indian Ocean, Micronesia	Lidar	Atmosphere
BACHUS-DOC	2005	Frascati (I)	Airborne SAR	Agriculture
INDREX-2	2004	Borneo (Indonesia)	Airborne SAR	Tropical forest mapping using SAR
DOMEX	2004	Dome Concordia (Antarctica)	L-Band Radiometer	SMOS
SPARC	2003/2004	Barrax (E)	Hyperspectral	Agriculture
TerraSARsim	2003	Barrax (E)	Airborne SAR	Agriculture
CryoVex	2003	Greenland, Svalbard	Radar Altimeter, Laser Scanner	Sea and land ice
WALEX	2002	Atlantic Ocean	Lidar	Atmosphere
SIFLEX	2002	Sodankyla (Finland)	Ground Hyperspectral and Fluorescence	Forest fluorescence
ESAG	2002	Greenland, Svalbard	Airborne Gravity	Gravity field
LARA	2002	Greenland, Svalbard	Laser and radar altimeters	Sea and land ice
LOSAC	2000/2002	North Sea	L-Band Radiometer	Ocean
WISE	2000/2001	Spanish Catalan Shelf	L- and Ka-band radiometers	Wind and Salinity (SMOS)
CLARE	1998/2000	Brest (UK), Britigny (F)	Airborne lidar and cloud radar	Atmosphere

3. THE PRESENTATION

The presentation will provide an overview of the ESA campaign activities and highlight some key results derived from recent campaigns. In addition, details on current campaign datasets and how to access them will be presented.