

In-service Aircraft for a Global Observing System

WP-5 New technical developments

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WP-5 : New Technical Developments

No	Objective/Deliverable	Partner	due
D5.1	Characterisation of BCP	UCAM	24
D5.2	Documentation of Critical Design Review (CDR) for certification of small instrument package	UCAM	36
D5.3	Modified and re-certificated CARIBIC-container system for routine operation (incl. documentation for certification)	IFT	36

Task 5.1 : Construction of a Very Compact Instrument Package

Deliverable(s)	D5.1: Characterisation of BCP (UCAM/M24) D5.2: Documentation of Critical Design Review (CDR) for certification of small instrument package (UCAM/M36)
Milestone(s)	M5.1.1: Preliminary Design Review of small package (UCAM/M24) M5.1.2: Data acquisition system completed (FZJ/M24)
Status	On Schedule
Achievements	PDR initiated based on the outcomes of IAGOS DS task 5. Instrument development under WP9 is ongoing (in conjunction with EUFAR/DENCHAR programme). 2 installation locations identified and being investigated.
Deviations from Contract	None

Characterisation of BCP

- The IAGOS BCP design is finalised
- Delivery of manufactured units is proceeding. One unit has been delivered to FAAM for installation on the Bae146.
- FAAM technical team report concludes no issues concerning installation.
- BCP installation and CAA certification (FAAM) delayed from Oct to Nov 2009.
- Current schedule for BCP data validation will be January-March 2010 as part of the NERC funded APPRAISE, CONSTRAIN and COSIC missions.
- BCP data will be compared with a range of cloud instruments including CDP-100, CAPS-CAS, CIP-15, J-W and Nevzorov.
- Analysed data products will be provided through other NERC funded projects (APPRAISE-Clouds).
- BCP will also be characterised in the MICC cloud chamber starting November, post FAAM certification.
- Comparison with WELAS-2000 OPC, and various NCAS cloud instruments as available will be conducted by Dr. Beswick.

Preliminary Design Review

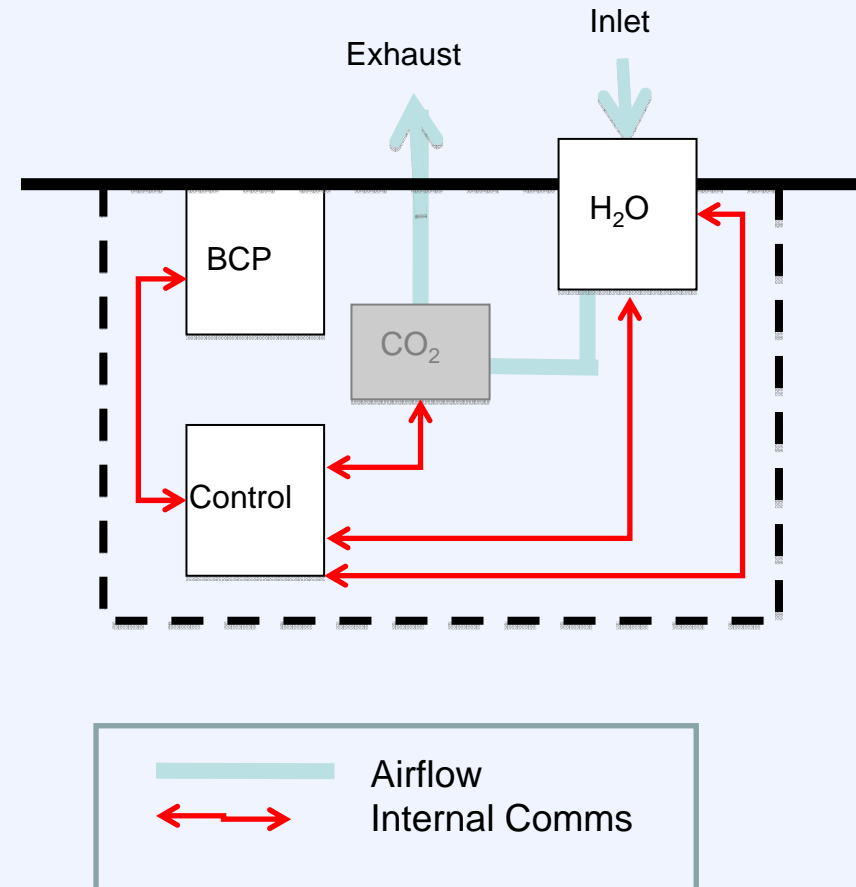
- **The very small package instrument suite is being finalised in IAGOS-DS.**
- **The recommendations from the design phase feed directly into the very small package for ERI.**

- **Selected instrumental outcomes from IAGOS-DS task 5**
- A combined/integrated hygrometry measurement philosophy (SAW & Humicap) will be adopted.
- No internal particle counter will be included (inlet issues).
- The O₃ instrument solution is unclear. Possibly conceptually too difficult in the context of the small instrument package. Dropped from instrument suite at this stage with the option that it be re-included later if the technical issues are resolved.
- UCAM will purchase a number of blank B777-200 dry inspection hatch covers in preparation for the build of a prototype small sensor unit. (under IAGOS DS)
- UCAM to generate/integrate CAD for the whole package in preparation for flight certification of the small package.

Installation

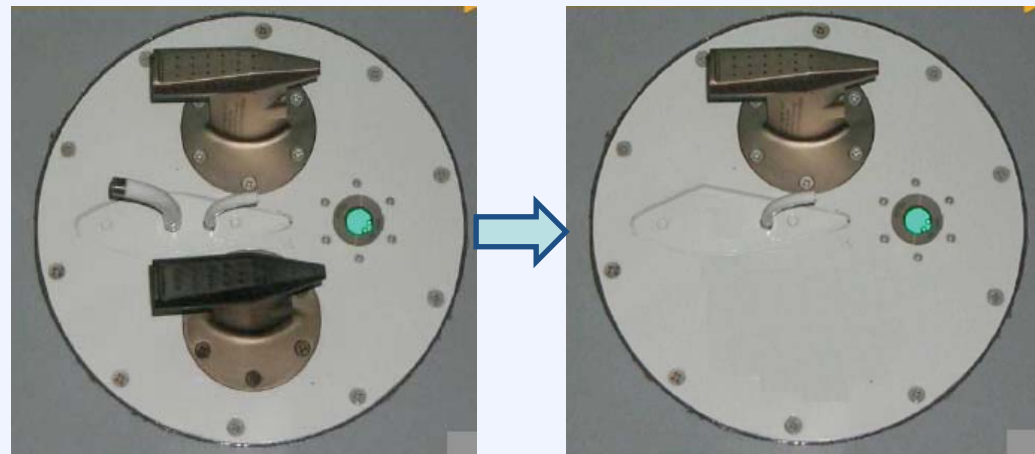
- Single Package approach
- All instruments mounted on back of reduced flange.

- Two installation options will be pursued in parallel.
 - Adapted B777-200 dry fuel bay hatch cover
 - Reduced MOZAIC flange.

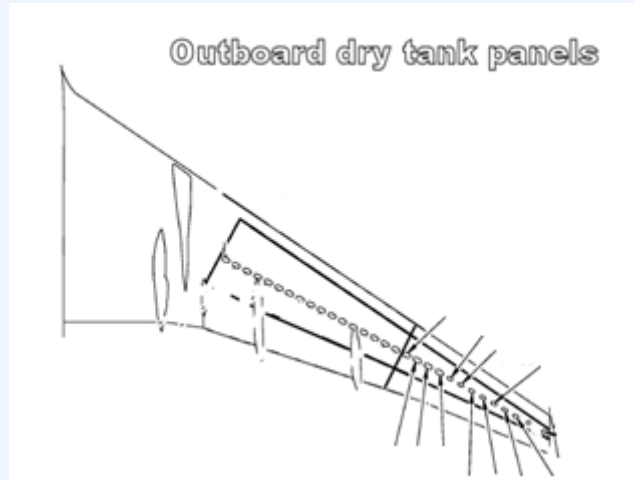


Reduced MOZAIIC Flange

- 1 x Rosemount & sapphire window (to which BCP attaches).
- Remove the pitot inlet, leaving the exhaust only.
- Combine sensor inlets into single Rosemount probe (with internal sleeving/flow splitting).
- No pump, ram pressure used for sampling.

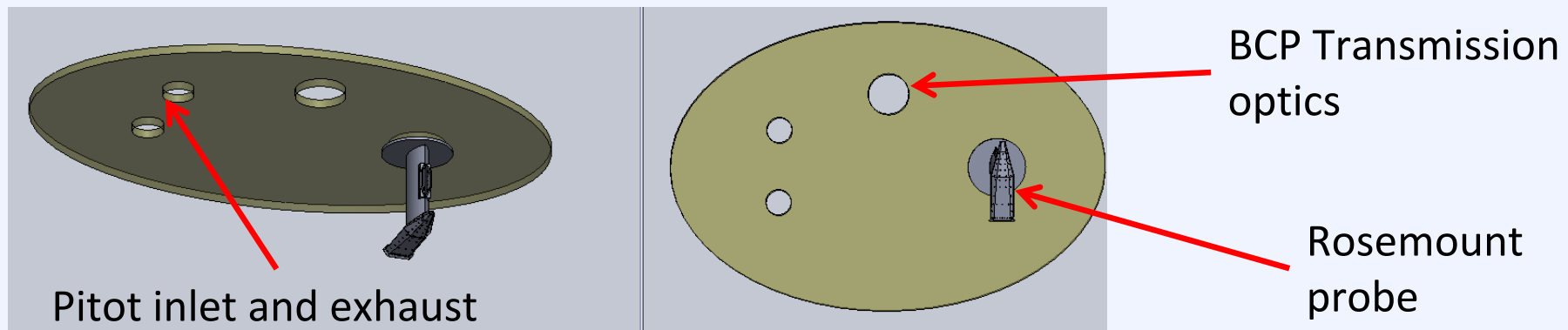


Adapted Hatch Cover

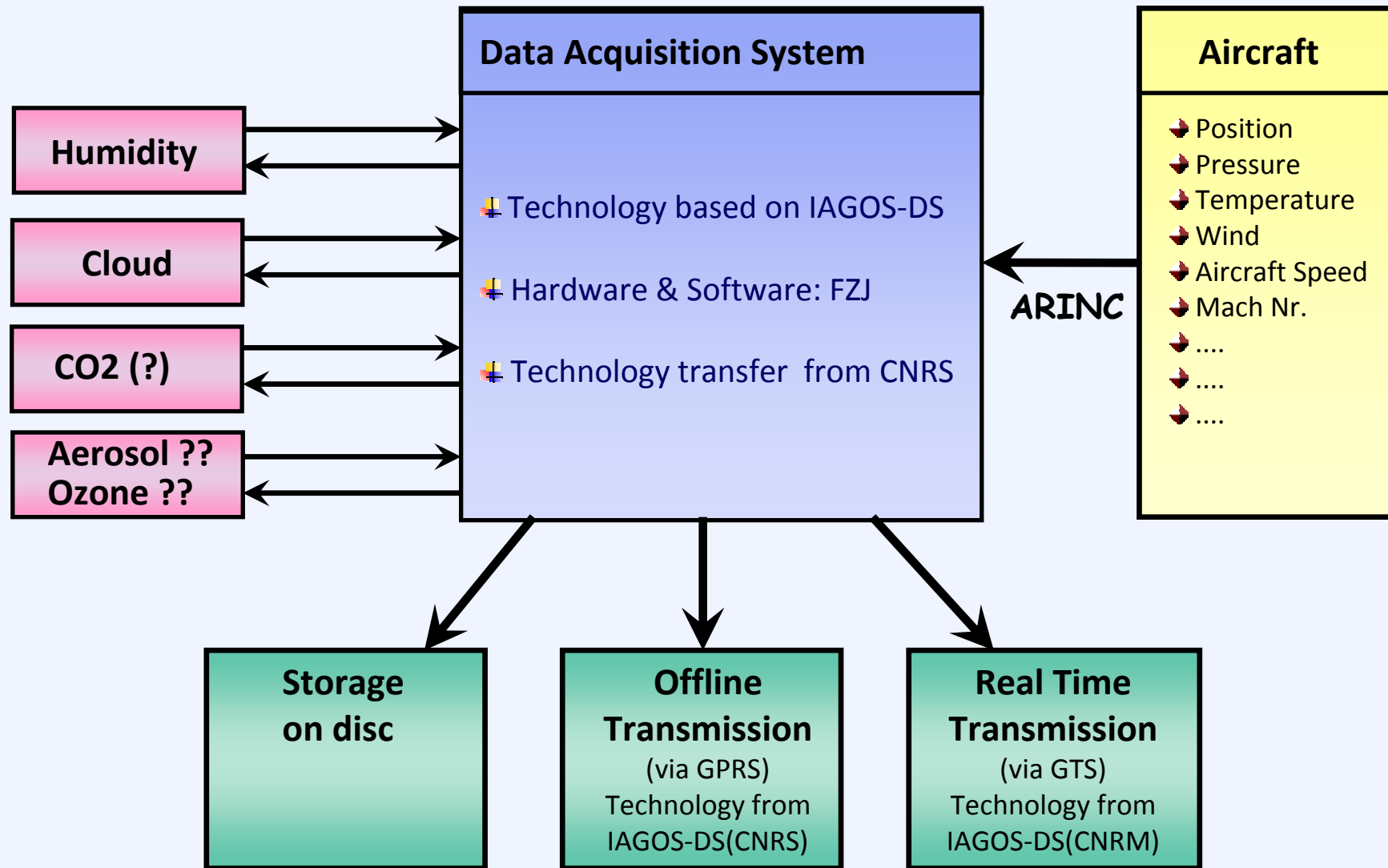


- Located in wing-space of outboard dry tank panel.
- To remove from service instrument can be replaced by blank panel cover.

Alternatively, modified MOZAIC flange could be installed onto hatch cover blank.



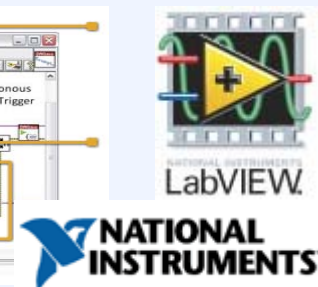
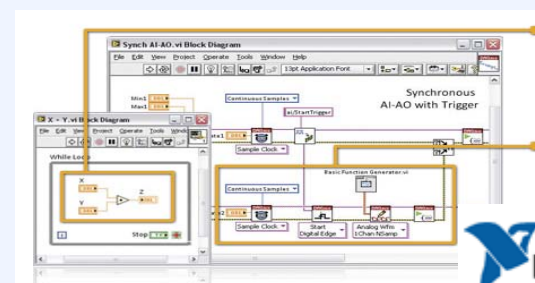
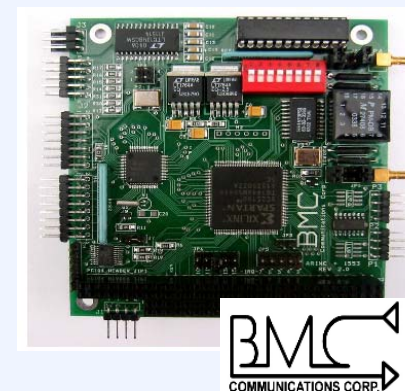
WP5-Task 5.1-C (Lead FZJ): Development of Prototype of Data Acquisition System



WP5-Task 5.1-C (Lead FZJ) : Development of Prototype of Data Acquisition System

no	Milestones	Partner	start	due	del
M5.1.2	Prototype Data Acquisition system (DAS) will be provided for the integration into small flight package	FZJ	1	24	P&R

- Hardware from IAGOS-PI/II:
 - ✚ Embedded CPU with Data Acquisition (Hercules II-EBX5.75" x 8", Diamond Systems)
 - ✚ ARINC-PC104
- Software: Labview
- Programme structure: IAGOS-PI/II
- Task is on schedule



Use of Resources

- Projected person months is as per work-package plan.
- No changes to main deliverable items envisaged.
- Additional resource usage of NCAS instrument staff envisaged for aircraft data validation phase (2010) but these will be provided along with data exchange by existing science programmes in collaboration with FAAM and UK Met Office.
- Additional resource usage of UCAM staff is envisaged for instrument validation phase. This will be provided by EUFAR/DENCHAR programme.
- Additional staff resources are envisaged for MICC chamber setup and operation but agreement with existing funded programmes has been reached to provide this for IAGOS.

Deviations from Annex I

- No deviations from workplan are envisaged with no additional actions required.
- The very compact instrument package is on track for the construction of prototype instruments suitable for the integrated package and final critical design review.

Task 5.2 : Transfer of CARIBIC into a Routine Operational System

Deliverable(s)	D5.3: Modified and re-certificated CARIBIC-container system for routine operation (incl. documentation for certification) (IFT/M36)
Milestone(s)	M5.2.1: Modified CARIBIC-container system ready for routine operation (IFT/M33)
Status	running
Achievements	engineer hired
Deviations from Contract	none

Summary

- For the transfer of the CARIBIC system into a routine operation system an engineer was hired. He became acquainted with the system and started to improve the reliability of individual instruments.
- For the CO₂ instrument a new molecular sieve was tested, which should allow to operate it in the instrument for more than three years, thereby reducing the servicing of the instrument.
- The engineer also tested newly designed ethernet cards for the internal communication system. These cards were necessary to reduce false communication between the master computer, controlling the container, and the measurement instruments.

Deviations from Annex I

- Because of difficulties to find and hire a competent engineer, a respective person was not found before month 7 of IAGOS-ERI. The engineer started month 10 of the project and consequently Task 5.2 is delayed by 9 month. However, this does not have implications on the success of this task, because the transfer will still be finished within the project period of IAGOS-ERI.

Use of Resources

- Besides the salary for the engineer, money was spent for the job advertisement.