



PETAL-II

Preliminary Eurocontrol Test of Air/ground data Link, Phase II

Early Operational Implementation

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PETAL

“Operations first, then technology.”

- GOAL: requirements validation & capture
Are we headed in the right direction?
- We implement:
 - ◆ ODIAC operational concept, service descriptions, procedures, and abnormal modes
 - ◆ a few new, operationally focused services
 - ◆ international standards where ever possible
 - ◆ **with** the ops floor and cockpit skeptics
 - ◆ **with** airlines, industry, ATC/M/S
 - ◆ **with**out backing a technology (triple stack)

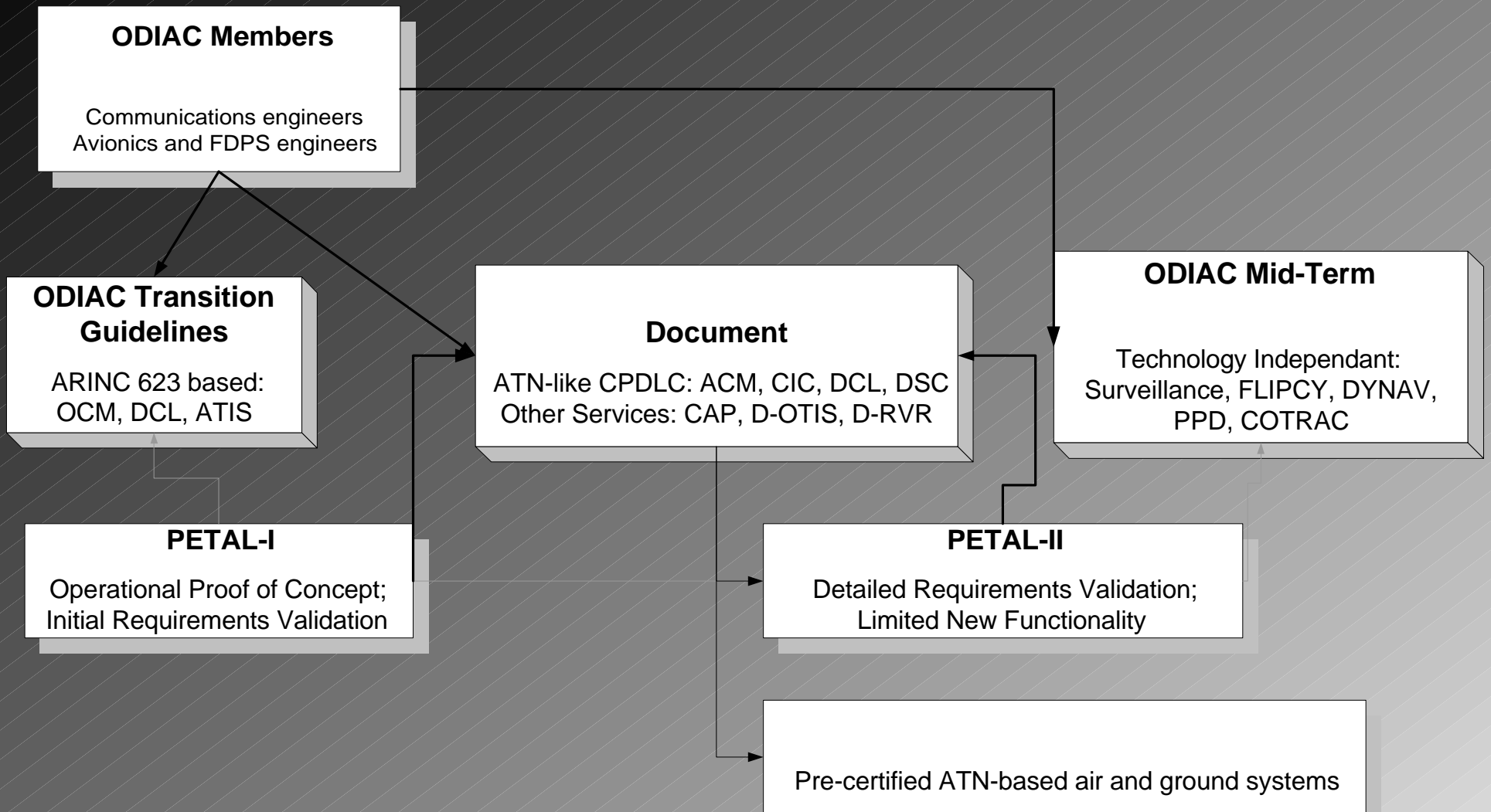


Topics

- Trials Description (what and why)
- A little hardware and design
- Some observations

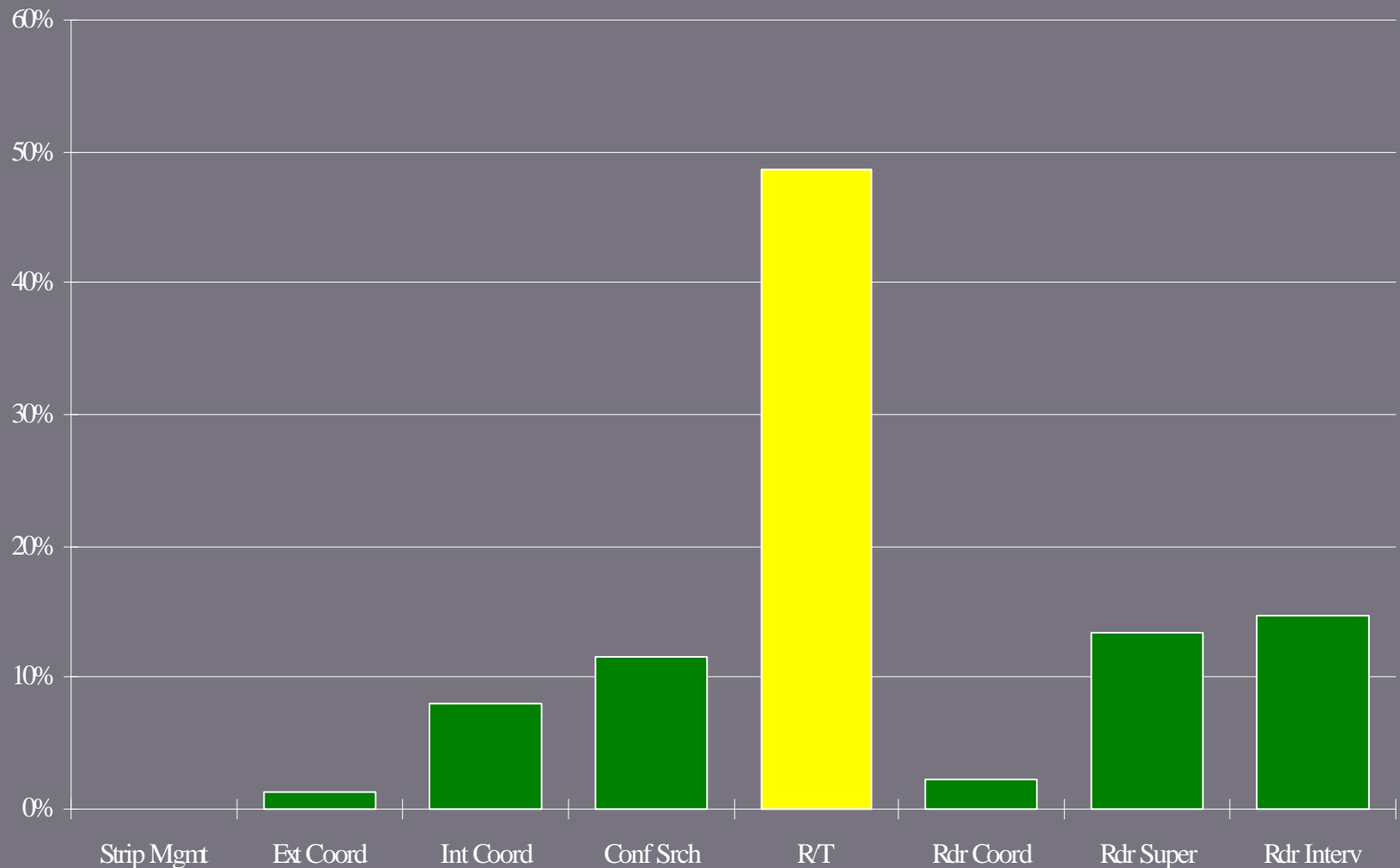
- NO: milestones, partner lists, or progress reports.
(available on request)

PETAL Context





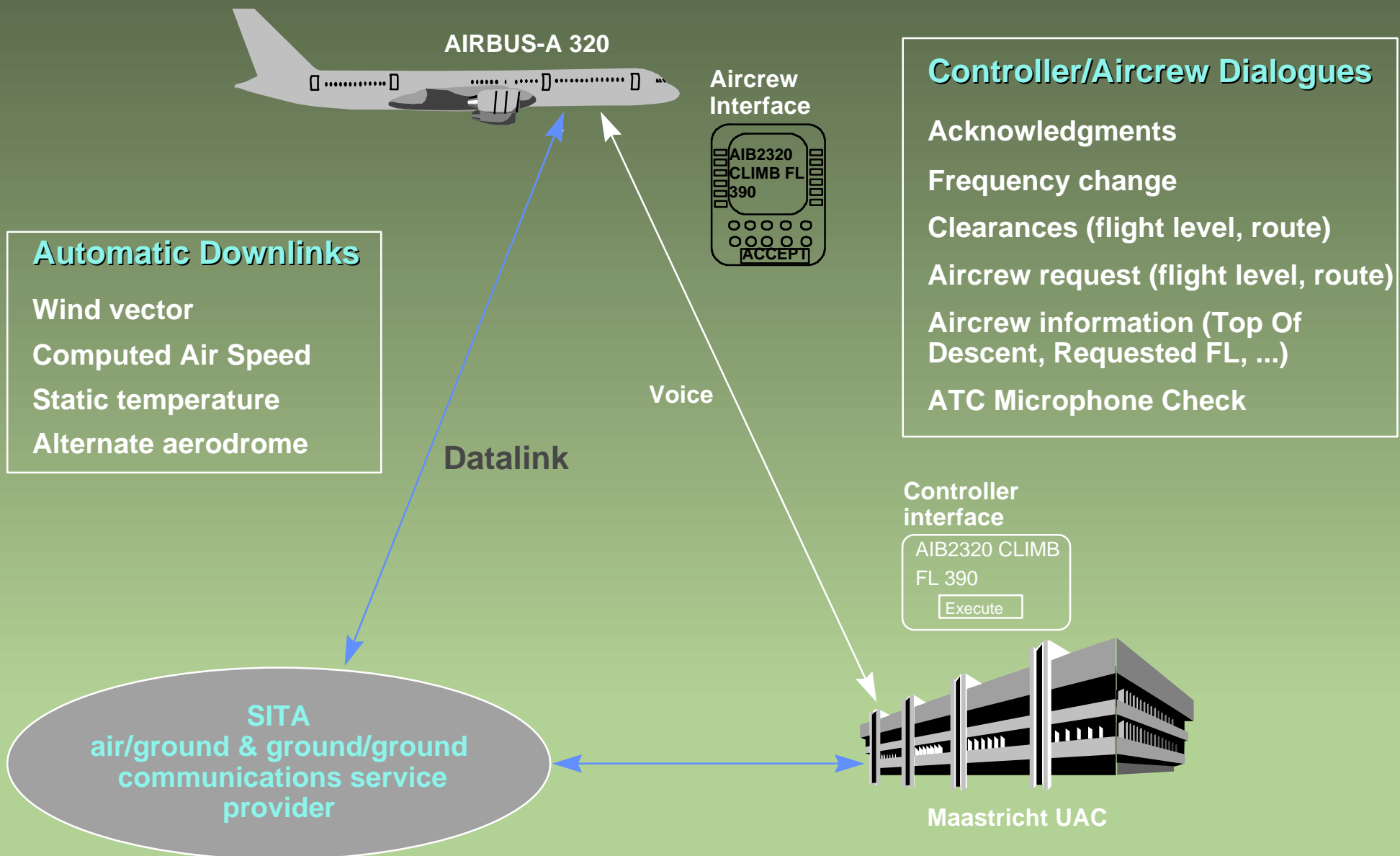
Initial Operational 'Direction'



'SYSCO' Approximate Controller Workload Distribution

PETAL-I: Concept Validation

Eurocontrol / Aerospatiale





Initial Concept Validated

- 'Line' controllers & test aircrew confirm:
 - ◆ CPDLC **will** increase controller productivity
 - ◆ CPDLC **will** increase sector capacity
 - ◆ CPDLC **will** improve communications access
 - ◆ CPDLC **will** improve service to airlines

- If operationally focused, CPDLC can bring:
 - ◆ Rapid implementation with few prerequisites
 - ◆ Operational influence on standards
 - ◆ Operational acceptance
 - ◆ Operational systems and HMI experience
 - ◆ Operational benefits



PETAL-II Objectives

- ODIAC Operational Requirements Doc:
 - ... further validation through a full end to end safety assessment, trials and actual operations"
- Define and progress transition period
- Progress EATCHIP a/g datalink at Maastricht
- Extend
 - ◆ operational a/g systems experience.
 - ◆ operational and administrative acceptance.
 - ◆ user contact (controllers, airlines & line aircrew).
- Airlines: closer ties & greater influence

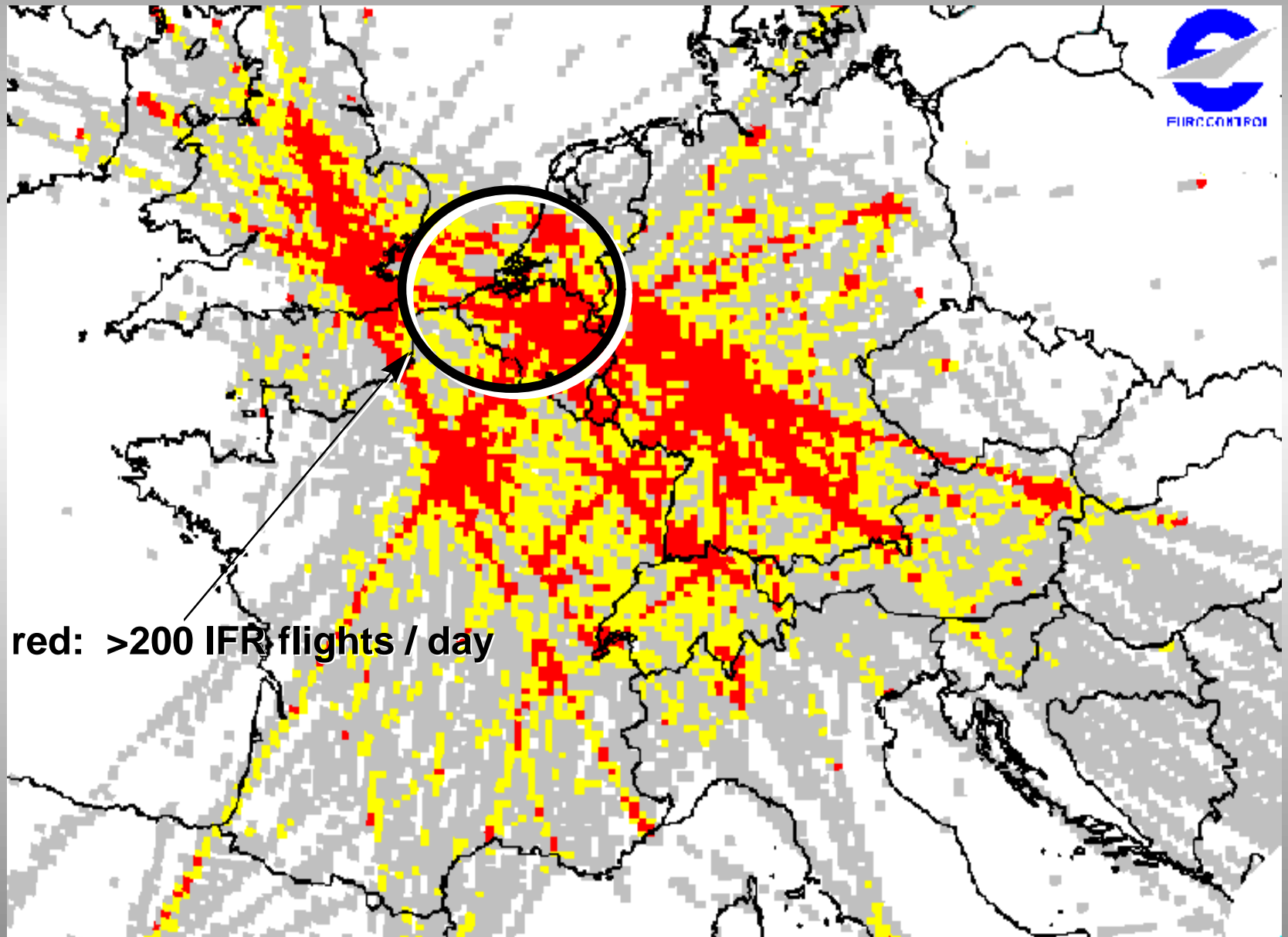


PETAL-II Operational Package

- ◆ Operational ATC trials, in situ, with users
- ◆ Multiple a/g datalink-equipped aircraft.
- ◆ 44 Operational input: 32 uplink & 12 downlink
 - ◆ Acknowledgements (2 down & 4 up not used).
 - ◆ Flight level clearances and requests (2 auto).
 - ◆ Route and heading clearances and requests.
 - ◆ Speed clearances and requests.
 - ◆ Vertical rate clearances and requests.
 - ◆ 'Passive' requests (preferred level and TOD).
 - ◆ Transfer of voice communications.
- ◆ ADS: flight plan conformance and parameters
- ◆ ATN (and FANS-1/A) compliant events.
- ◆ Flight Data Processing System logic constant



Applicable Airspace (in 2010)



HMI Overview



Downlink

- request
- reply



Uplink

- clearance
- reply



Uplink Clearance - LEVEL

Airborne Equipment



SDD



FDM - PETAL Line 2

```
P ...H.../...S.../..V../TOD....  
L CLMB F330 / RF330  
R  
S  
T  
G
```

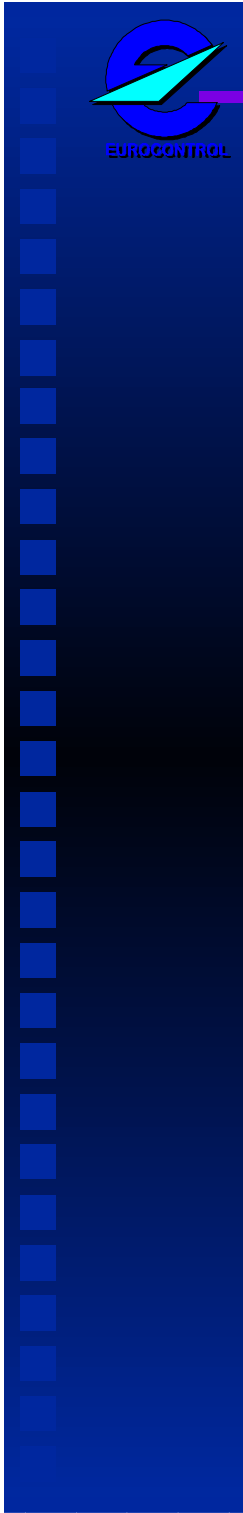
ECM-Petal:

|KLM355 *0707 | | |290 FK28 CF330

TID sequence:

KLM355 - IFL - 330 - CLIMB - EXE

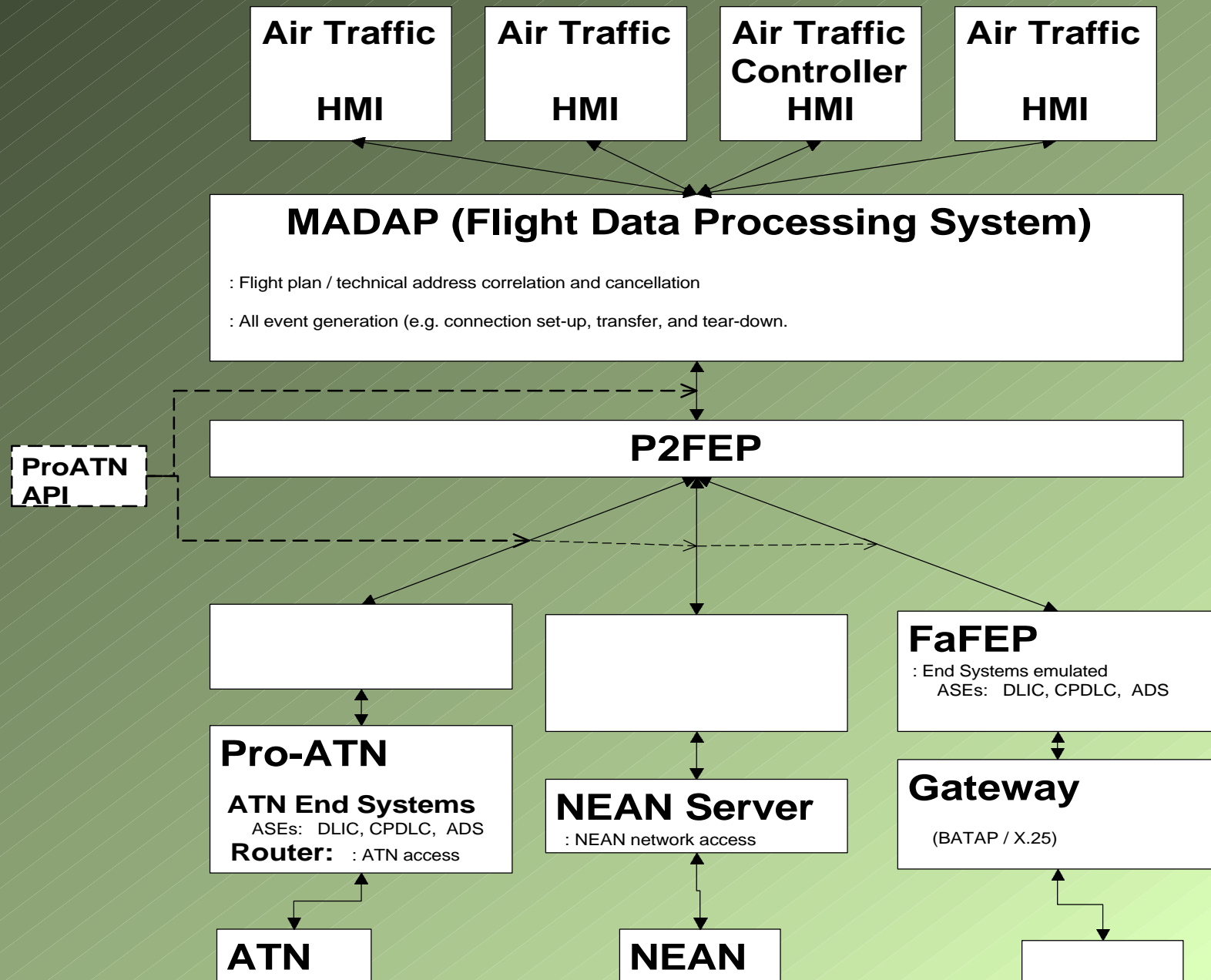
FDM data available throughout ATCC



NEAN Airborne HMI



Ground Architecture





System Evolution

■ Current state:

- ◆ FDPS supports NEAN, FANS-1/A, ATN 1.1.
- ◆ NEAN support fully available.
- ◆ FANS-1/A FEP integration testing begun.

■ Next steps:

- ◆ Re-engineering to support ATN (version ???)
- ◆ Examine business / operations case to retain.
- ◆ Refine and enhance ground systems.

■ Introduction of new ODS (controller HMI)

■ Ground system cost: 1.2mECU (\$1.33m)

■ Live Operations.



Implementation Observations

- ODIAC: datalink is international
- Airlines / avionics: datalink is international
- Sort the procedures **during** design
- Cut the message set, at least for initial ops
- Fix the HMI, & provide automation
- Start in the control room / cockpit
(and stay there).
- Late consideration of **interoperability:**
problems, delays, **costs!**



Momentum and Convergence

■ 1998 - 1999: Standards

- ◆ ODIAC: ORD defects and Ops Manual
- ◆ ICAO ADSP: operational SARPS
- ◆ WG-53 / SC189 ATN / Transition interoperability
- ◆ PETAL-II Transition and Final Reports

■ 1998 - 1999: Implementation

- ◆ Airlines ready to upgrade (e.g. VDL-2, VDL-4)
- ◆ World seeks voice > dl; FANS-1/A > ATN transition
- ◆ ADS-B exploration and standardisation underway
- ◆ Tech implementations (ProATN, EOLIA, EuroVDL)
- ◆ PETAL-II ATN, FANS-1/A, and VDL-4 live op's.

■ One globally interoperable implementation



Conclusion

- Questions arising today?
- Monthly progress report distribution?
- You can influence PETAL-II:
 - ◆ Individual or organizational input
 - ◆ Additional partners welcome.
 - ◆ E-mail, phone or visit.