



Atacama
Large
Millimeter/submillimeter
Array



JAO ALMA Development

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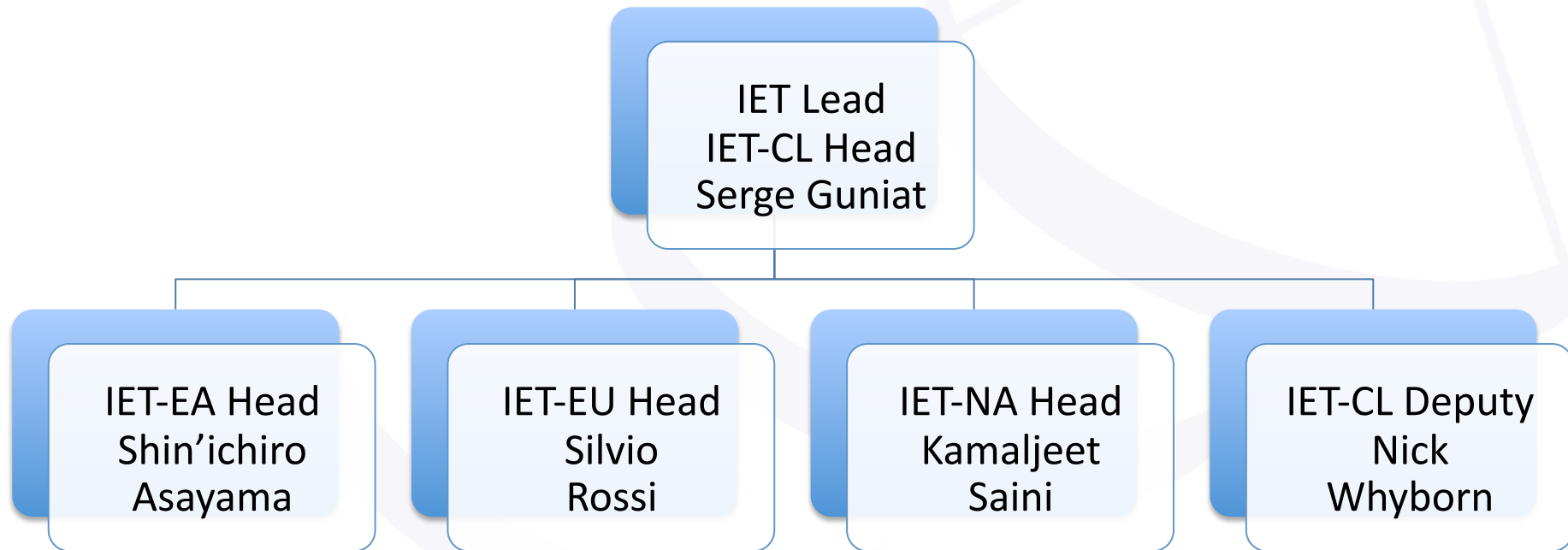


Overview

- JAO Engineering & IET Overview
- JAO Engineering Role in the ALMA Development Programme
- JAO Projects

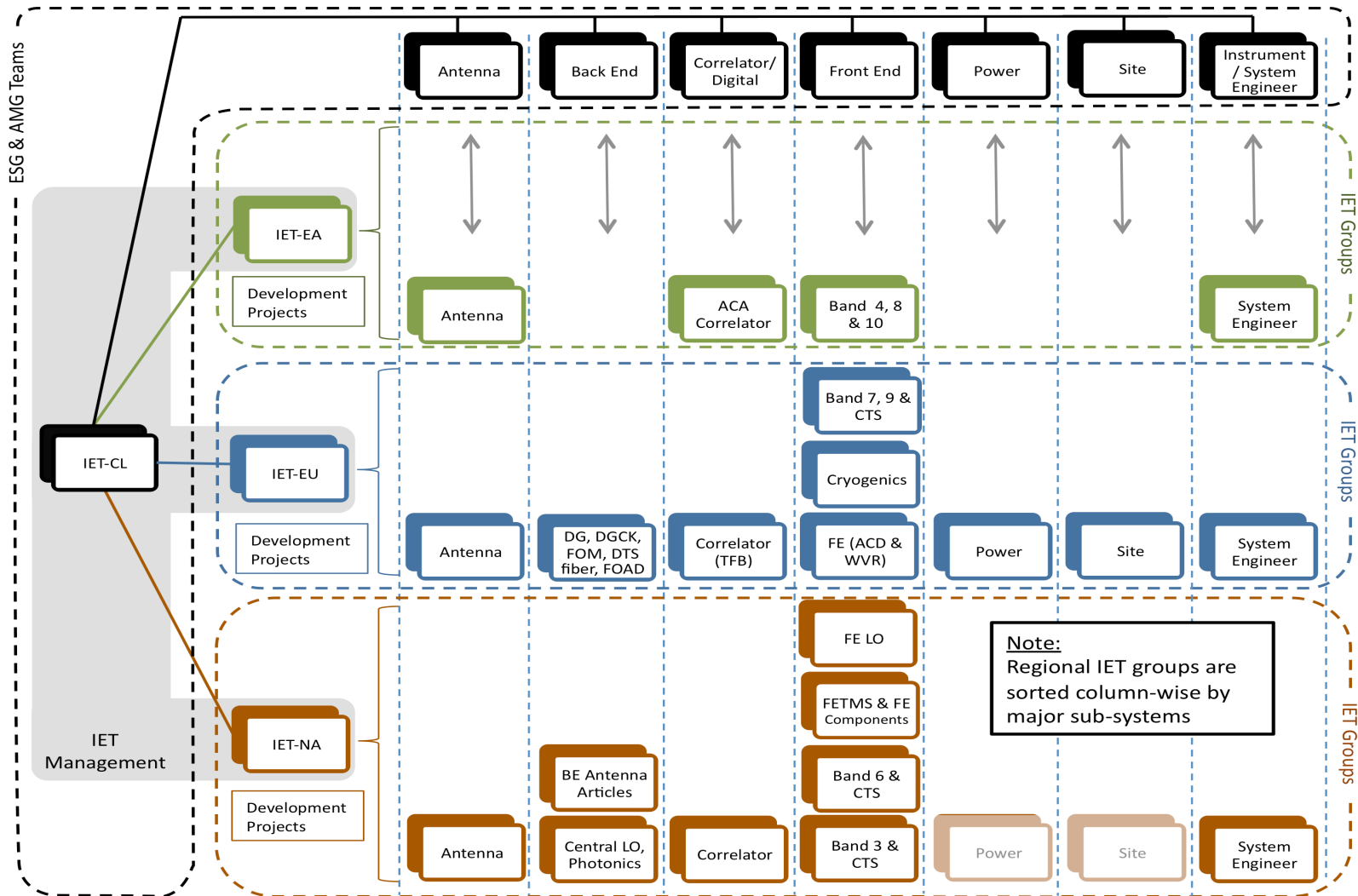


Integrated Engineering Team – Management



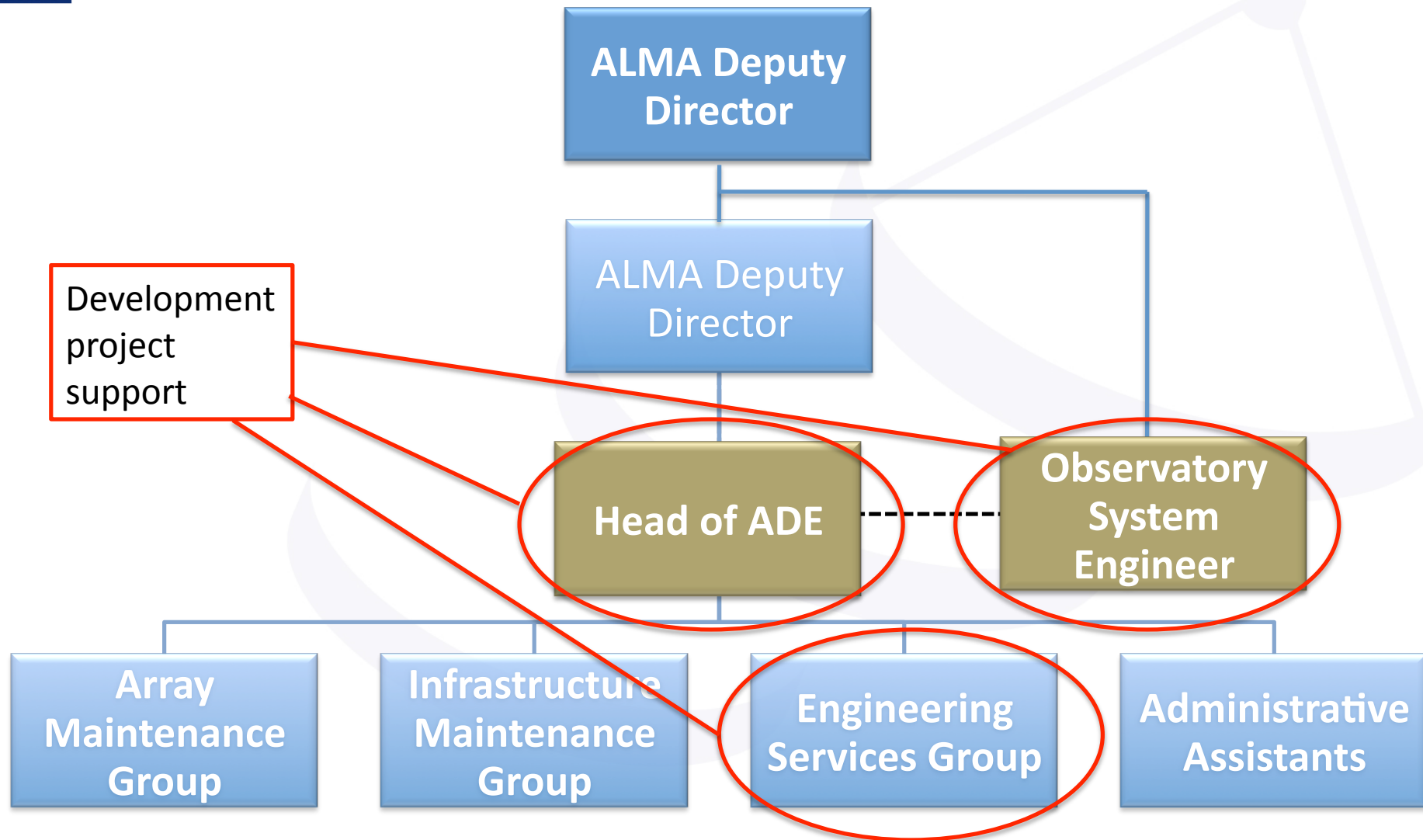


IET Organisation Matrix





JAO Engineering Organisation





JAO Role in the Development Program

- Support of the project selection process
 - Definition of applicable requirements
 - Technical evaluation of proposals
- System Engineering
 - Requirements management
 - Maintain ALMA-wide standards documents
 - Maintain technical budgets
 - Chair or support project reviews
 - Oversee acceptance process
 - Document approval & configuration control
 - Electronic Document Management (EDM)
- Project roll-out coordination
 - Interface between development project and other JAO departments
 - AIT
 - Commissioning



JAO Projects Overview

- So far JAO projects are generally funded from on-site operations budget, not development funds
 - This is evolving...
- JAO projects are directed towards improving operations efficiency etc, not technical (scientific) performance
- Many projects are cross-group
 - Horizontally across disciplines (science, software, engineering...)
 - Vertically with the executives
- Projects cover a wide range of sizes
 - from few kUSD up to ~500 kUSD
- Projects selected internally within JAO based on perceived priority and availability of resources (man-power, funds)



Hardware simulator for software testing

Objective: Provide a platform for software testing to reduce the need for telescope test time

Comprises:

- “5th quadrant of correlator
- 2 antennas
- Mini CLO
- RT control computers
- Consoles
- Mini archive

Status:

- Proposal being written



Array Weather Recovery

Objective: Provide a mean of remote inspection of antennas to allow more rapid recovery from bad weather. Reduces downtime and manpower needed for recovery.

Comprises:

- Cameras and other sensors mounted in key locations on antennas etc
- Tools for inspecting collected information
- Procedures

Status:

- In project definition phase
- Target date for completion is first half of 2017



Antenna Surface Improvement Project

Objective: 1) Improve the surface accuracy of antennas using astrophotography results,
2) Develop tools for monitoring and maintaining surface accuracy during operations.

Comprises:

- Definition of hardware installations
- Procedures
- Observing tools
- Tools for analysis of (astro)-holography data

Status:

- Running (5 of 10 antennas adjusted)



Problem Reporting & Tracking System

Objective: Provide a suite of tools for reporting problems and managing the CM process; extraction of key performance indicators such as downtime, failure rates.
Expected to improve antenna availability through more rapid repair and elimination of unreliable systems.

Comprises:

- JIRA projects (forms, filters etc)
- scripts for extraction of data from PRTS data base and shiftlog
- scripts for report generation
- JIRA filters for oversight & management of PR

Status:

- Partially implemented and in operation
- Completion within ~2 months



Array Performance Monitoring

Objective: Provide tools for monitoring the performance of the telescope and using trends etc to trigger intervention before systems fail. Expected to reduce downtime and allow for planned corrective maintenance actions which are more labour efficient

Comprises:

- Implement a database for archiving and providing access to monitor data
- Links to other data sources (e.g. TELCAL output)
- Tools for extraction, analysis and visualisation of data from multiple sources
- Automatic detection and notification of impending failure

Status:

- Prototype monitor db implemented
- Requirements analysis for visualisation & analysis tools ongoing
- Target date for completion is early 2017



Infrastructure Projects

Title	Status
Replacement of AOS oxygenation system	Ongoing, completion ~Sept 2016
Digital VHF radio system completion	Ongoing, Completion ~Oct 2016
Vehicle workshop relocation	Ongoing, completion ~Oct 2016
Relocation of fuel station	Planning phase, expected end 2016
OSF-AOS road drainage improvements	Pending availability of funds
Replacement of EDM	Requirements drafted, procurement TBD

There are many other small projects...