



# ALMA Construction Status

## February 2011

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# Site Infrastructure

- Power
  - AOS Temporary Power System
    - Good reliability since mid-2010
    - Upgrades in fuel supply and power capacity underway
  - Permanent Power System – completion due 25 Aug 2011
    - 23 kV power distribution, including OSF-AOS transmission line, on schedule (FO line operational)
    - Multifuel turbine generator power station on schedule
    - New AOS utilities installation contract underway – critical item is Central Cluster antenna station connection in March
- Residence
  - CfT for design released in February



# Antennas

- ALMA antennas are manufactured to a common specification by three contractors

<i>Partner/Contractor</i>	<i>Number to be supplied</i>	<i>Delivered to Site</i>	<i>Delivered to AIV</i>
North American/ Vertex	25 12m	19	12
European/ TAS-EIE-MTM Consortium	25 12m	9	(Mar 2011)
East Asian/ Mitsubishi Electric Corp	4 12m 12 7m	4 5	3 (Feb 2011)



# Front Ends

- Integrated FEs accepted at OSF
  - EA FEIC: 7
  - EU FEIC: 3
  - NA FEIC: 5
- ACD – 19 accepted at OSF
- WVR – 58 accepted at OSF

Cartridge	Status	Cold Cartridges Completed
Band 3	Production	49
Band 4	Pre-production	1
Band 5	Development	1
Band 6	Production	41
Band 7	Production	42
Band 8	Pre-production	3
Band 9	Production	55
Band 10	Development	(Jul 2011)



# Back End & Correlators

- Back End
  - Antenna Articles: 30 delivered to OSF, 16 through PAS
  - CLOA2 deployment Apr/Mar 2011
- Correlators
  - 64-antenna correlator
    - Three quadrants installed and operational at AOS
    - Fourth quadrant being held in Charlottesville as a test bed for correlator software
  - ACA correlator
    - Four quadrants accepted at AOS



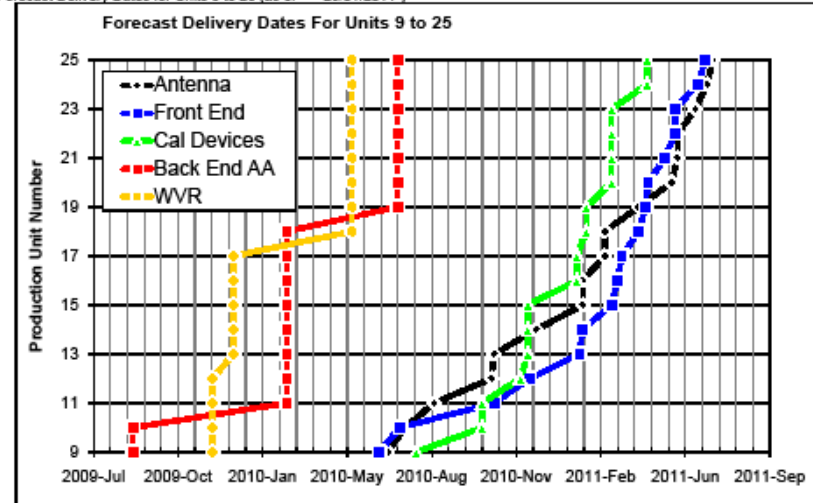
# Computing and SE&I

- Computing
  - Deployment of Release 8.0 has taken much longer than expected – more to follow in the CSV report
- System Engineering & Integration
  - System engineering & verification will be covered in the following report
  - System integration (AIV)
    - 11 antennas through AIV and handed over to CSV
    - 7 antennas currently in AIV, includes 2 returned from AOS
    - Up to now throughput limited by availability of components to be integrated

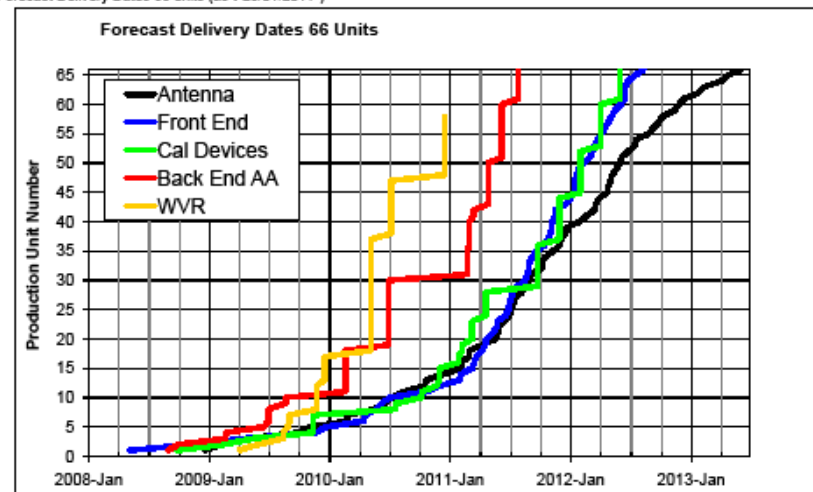
# Schedule

- Front ends are the critical path in the near term
- Antennas are the critical path in the long term
- Delivery of the 66<sup>th</sup> antenna to AIV in May 2011 makes the completion of construction earlier than Sep 2013 essentially impossible

Forecast Delivery Dates for Units 9 to 25 (as of 28/01/2011)



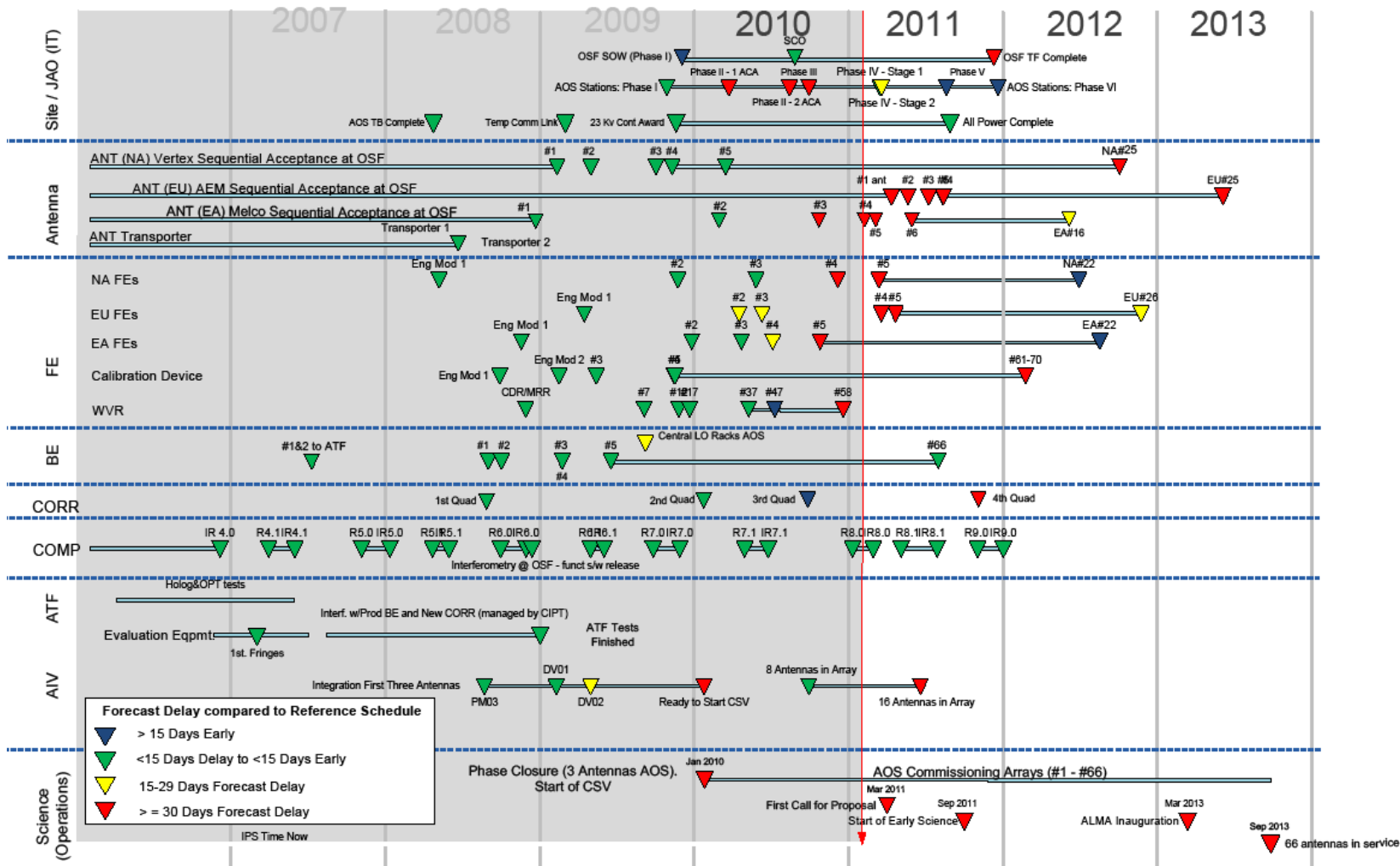
Forecast Delivery Dates 66 units (as of 28/01/2011)





# Schedule

## ALMA General Overview – Forecast Dates as of 28 Jan 2011







# Budget Overview

End of 2010 Summary		NA	EU	ALMA
		(MTY\$)	(M 2010€)	(M Y2000\$)
A P P R O V E D	Actual Cost	425	298	578
	(as a fraction of Budget at Completion)	83%	70%	77%
	Earned Value	444	304	597
	(Cost Performance Index)	104%	102%	103%
	Planned Value	440	375	654
	(Schedule Performance Index)	101%	81%	91%
	Budget at Completion	510	426	751
	Estimate to Completion	85	128	173
	Contingency + Reserve	25.4	17.3	34.1
	(as fraction of Estimate to Completion)	30%	14%	20%
P R O C E S S  I N	Budget changes in process	15	8.1	18.3
	Revised Budget at Completion	525	434	769
	Revised Estimate to Completion	81	130	172
	Uncommitted Estimate to Completion	69	26	81
	Residual Contingency	10.3	9.2	15.7
	(as fraction of revised Estimate to Completion)	13%	7%	9%
	(as fraction of uncommitted EtC)	20%	33%	25%



# Responses to Oct 2010 ASAC Report

- Section 4.1
  - Reliability: see SE presentation following
  - Third holography receiver and AOS polarized source: proceeding at NRAO and U. of Chile
  - EU Antenna #1 acceptance holding in Mar 2011, but hostage to faulty holo receivers and OPTs. 15-week AIV schedule with objective to get to AOS ASAP. Low temperature check on surface behavior needed.
  - Nutator: continuing concern. Now at Green Bank for servo development/optimization. “Getting close to meeting specification”



# Responses to Oct 2010 ASAC Report

- Section 6 (not in formal charge from the Board)
  - Experience with the multifuel turbine power station illustrates the fundamental obstacle noted by the ASAC
  - In Feb 2009 the Directors Council and Board agreed on sharing the costs > diesel-powered island mode system, but deferred a decision on combined cycle, which would cost an additional 10 MEuro. Considered again in Nov 2010 and most recently in Feb 2011 with no decision.
  - Awaiting an “unsolicited” investor-funded proposal for solar augmentation at the OSF, but getting a decision from the partners will be very difficult.