



VertexRSI Antenna:

- Foundation completed by NRAO and subcontractors August 2001
- Currently being erected at ALMA Test Facility (ATF) site
- Joint outfitting of antenna and software testing started in Nov. 2002
- Provisional Acceptance Scheduled for February 2003

Alcatel-European Industrial Engineering Consortium (AEC) Antenna:

- Foundation completed January 2003
- Currently being fabricated and shipped
- Metrology Design Review scheduled for February 2002
- Joint outfitting of antenna planned for April to July 2003
- Preliminary acceptance scheduled for May 2003
- Provisional acceptance schedule for July 2003

AEC Antenna



VertexRSI Antenna

VertexRSI

- 264 Panels, 8 rings
- Machined AL panels, open back
- 8 adjusters / panel
- 24 CFRP BUS sectors, open back
- Feed legs and Apex in CFRP
- Hexapod Apex Mechanism (6 –axes)
- Invar support cone
- Large cylindrical Invar/steel Rx. Cabin
- Pinion drive
- Base mounted with 3-point connection
- Absolute Encoders
- Mass ~106 tons
 - Elevation structure ≈ 45%
 - Azimuth structure $\approx 55\%$
- 1st Frequency (locked rotor)
 - Elevation ≈ 7.1 Hz
 - Azimuth ≈ 8.0 Hz

ALCATEL/ EIE

- 120 Panels, 5 rings
- Replicated Nickel panels, Rhodium coated, close back
- 5 adjusters / panel
- BUS in CFRP, 16 sectors, close back
- Feed legs and Apex in CFRP
- Three axes Apex mechanism
- Direct connection Cabin BUS
- Cabin in CFRP
- Direct drives on both axes
- 6 Points support base
- Incremental encoders
- Total Mass ~76 tons
 - Elevation structure ≈ 30%
 - Azimuth structure $\approx 70\%$
- 1st Frequency (locked rotor)
 - Elevation \approx 10.5 Hz
 - Azimuth ≈ 15.9 Hz

- ► Options
 - **1.) Exercise contract option for production** *(Single Source)*
 - 2.) Issues RFP/CFT for antenna designs to specification
 - 3.) Issues RFP/CFT for antenna designs to print

-Add nine month to start of procurement of the antenna

Scope

- Deliver 63+1 Antennas to Chile (Obligations of 31+1 NA, 32 Europe)
 - +1 is retro-fitting of the selected prototype to be identical to production antenna
- Goal of a single design (accept possibility of two designs of 32 antennas each)
- Functional specification from current antenna contracts updated for production and delivery to Chile (same specification appied in case of two different antenna designs)
- Interface Control Documentation (ICD) will be valid for both antenna designs if different. A common foundation design will be implemented.
- Delivery at Operations Support Facility (OSF)
 - Status of delivery surface accuracy 100 um and 2 arc-sec full sky.
 - Project required to adjust surface to accuracy and calibrate.

Cost

- Antenna Budget for Production Antennas of \$183.5m (Y2000\$)
 - \$2.9m each, Year 2000 \$, ALMA Work Element #500 & #505
 - Budget in 2004 is \$3.4m, Antenna estimated in 2003 to be \$3.5m-\$4.0m

► Schedule

- 2002Nov Start of Shared Access of VertexRSI Antenna
- 2003Feb Provisional Accept VertexRSI Antenna
- 2003May Start of Shared Access of AEC Antenna (Preliminary acceptance)
- 2003Jul Provisional Acceptance of AEC Antenna
- 2003Apr Complete Antenna IPT Technical Performance Report on VertexRSI Antenna
- 2003Sep Complete Antenna IPT Technical Performance Report on AEC Antenna
- 2003Mar RFQ for VertexRSI Antenna Contract Binding Price Quotation
 » 31+1 and 63+1 option
- 2003Apr Binding Price Quotation due from VertexRSI
- 2003Oct Binding Price Quotation due from AEC
- 2003Jun CFT/RFP Bid Package Submitted to Project Office
- 2003Jul Issue CFT/RFP for production antennas Design(s)

► Schedule

- 2003Nov Closing date for CFT/RFP packages
- 2004Jan Bid Evaluation to Project Office (Competitive tender)
- 2004Jan Earliest Possible Single Source Contract

(VertexRSI, pending Antenna Evaluation Group (AEG) performance report)

- 2004May Sign Production Contracts
- 4Q 2005 First Production Antenna Available in Chile at OSF
- **3Q 2007** Start Early Science Operation (8 fully operation antennas at AOS)
- Q4 2011 Completion of Construction Project

► Assumptions

- Procure lowest cost antenna meeting specifications
 - Goal to contract to meet specifications as opposed to build-to-print
 - Two separate contracts will be issued at different times
 - Contracts via member countries (North Am. & Euro partners)?
 - *Through two parallel procurement activities?*
- Must Meet Project Plan Schedule (1st antenna in Chile 4Q2005)
- Antenna Validation by AEG prior to signing contract
- From antenna vendor selection to signed contract a minimum of about 4 months
 - Contract and price negotiation ~1 months
 - Funding approval ~2 months (NRAO→AUI→JAO→NSF→ALMA Board) (ESO →JAO→Finance Committee→EAC→ALMA Board)
 - Final price negotiation and sign contract ~1 months
- Contractor will require 2 years from signing contract to 1st antenna on site in Chile with production proceeding right after of one antenna a month.
 - Retrofitted Prototype antenna could be deliver within one year of signing contract
 - Most cost effective schedule
 - Contractor needs time to negotiate best production prices from several contractor
 - Setup supply lines and production process that is very efficient (Advanced Procurement)
 - Prepare for pre-production reviews

- ► CFT/RFP Bid Package Contains:
 - 1.) Special Conditions Governing this CFT/RFP
 - 2.) Statement of Work
 - **3.)** Technical Specification and Interface Control Documents
 - 4.) As built drawing for VertexRSI and AEC
 - 5.) Description of the terms and conditions of procurement for each executive.