Budget, Schedule, Contingency

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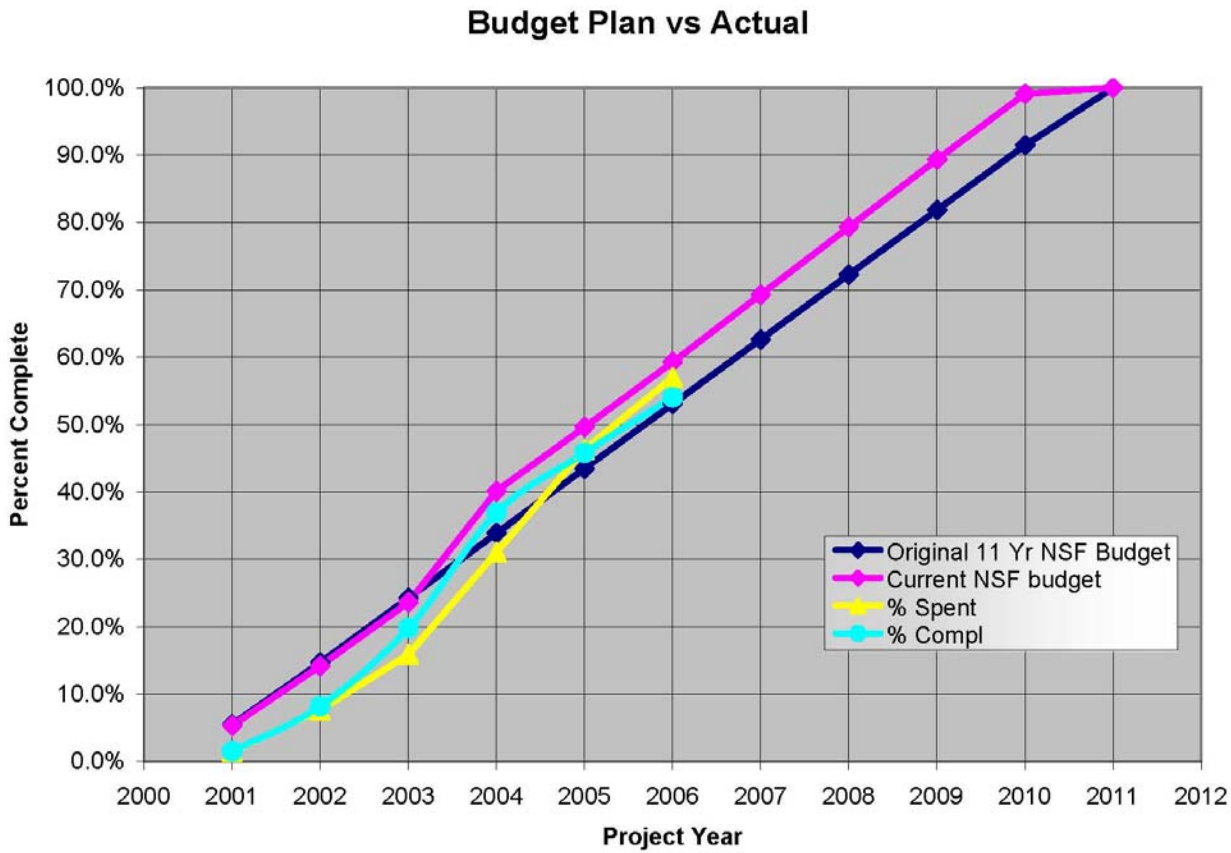
Project Manager

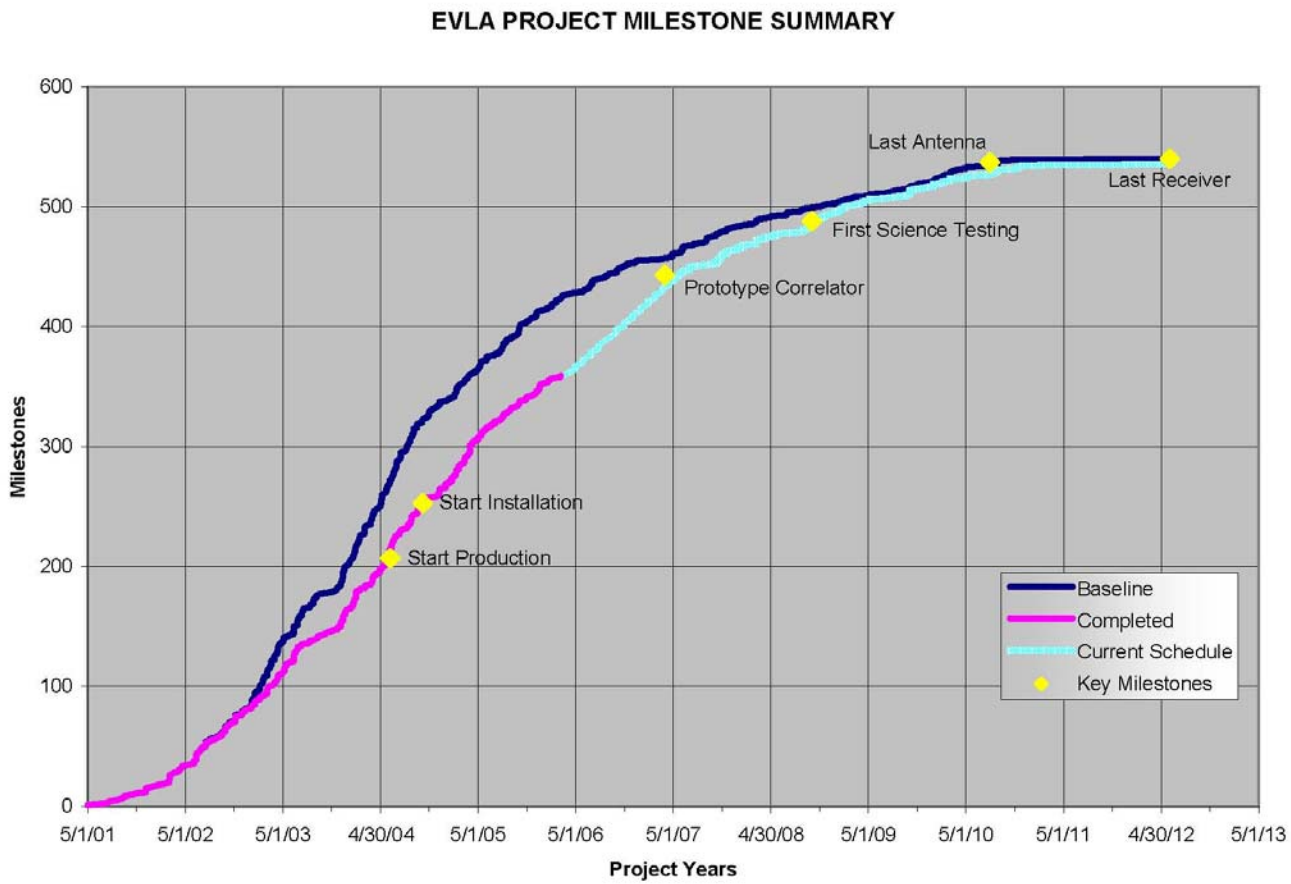
Outline

- Schedule
- Budget
- Contingency
- Project Risks
- Risk Analysis
- Descope Options

Schedule Completion



Milestone Completion



WBS Level 2 Completion Status

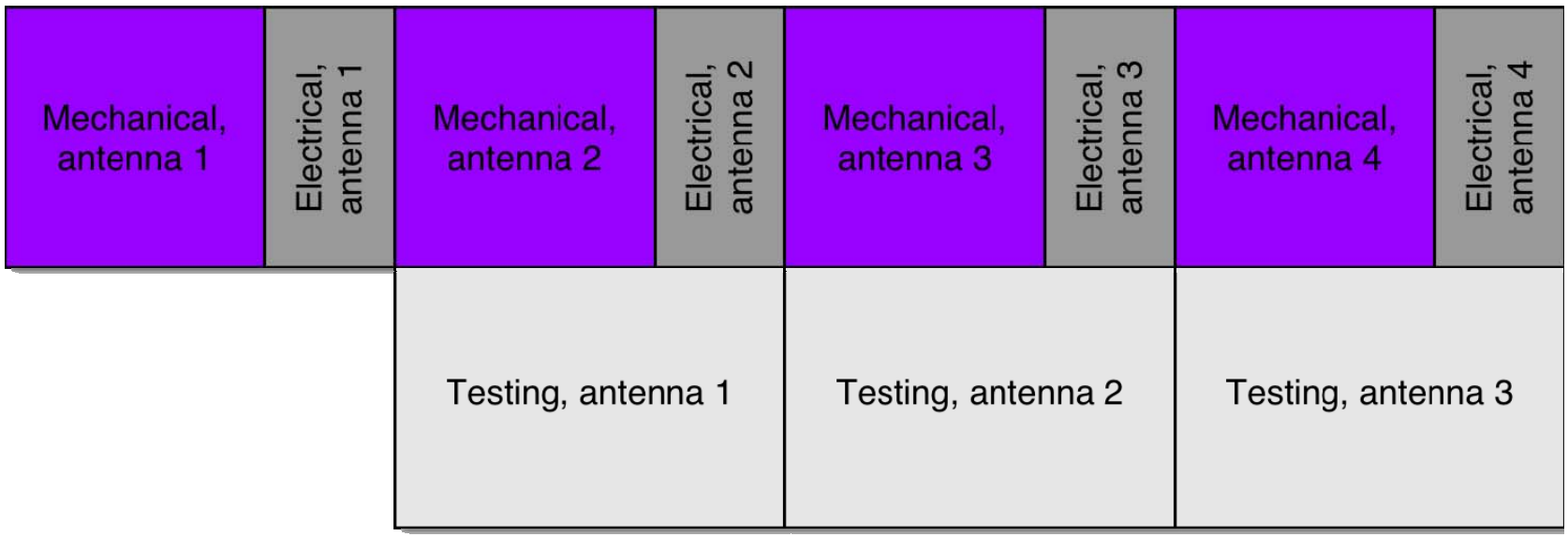
WBS Element	% Spent	% Complete
Project Management	52.1	45.8
Systems Integration	76.1	70.1
Civil Construction	87.8	80.5
Antennas	69.1	59.2
Front End Systems	55.1	43.4
LO Systems	75.5	75.1
Fiber Optic Systems	64.4	58.8
IF Systems	61.5	52.7
M&C System	57.6	51.1
Data Mgt. & Computing	51.2	40.0

Maintaining Schedule -1

- To maintain project schedule, we need to accelerate retrofits from the planned rate of 5 antennas per year to 5.5
- Can we accelerate the antenna retrofit rate?
  - Retrofits are becoming an assembly line
    - Major components stockpiled (e.g. cryo compressors, HVAC units, L-band feed horns, antenna platforms)
    - Most electronics designs are mature
  - Staff continues to become more efficient in antenna retrofits
  - VLA antennas have been adequately maintained. Their reliability is excellent.

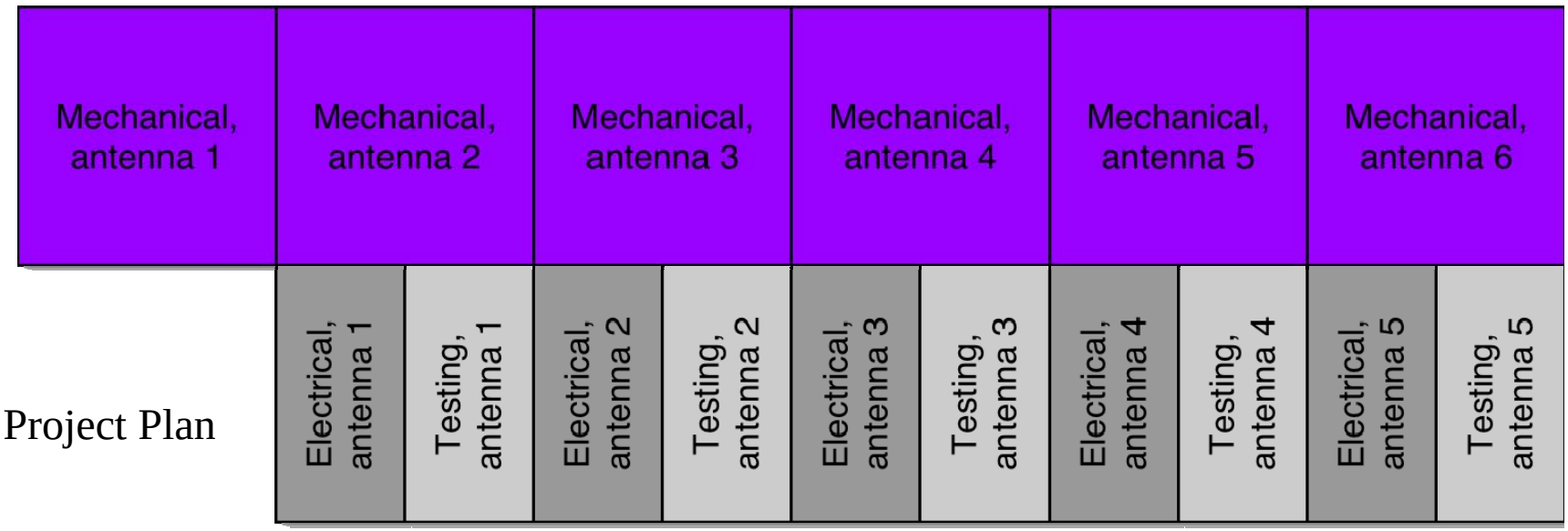
Antenna Retrofit Sequence: Current

Up until now, we have been pursuing the mechanical and electrical outfitting of EVLA antennas serially, with testing proceeding in parallel.

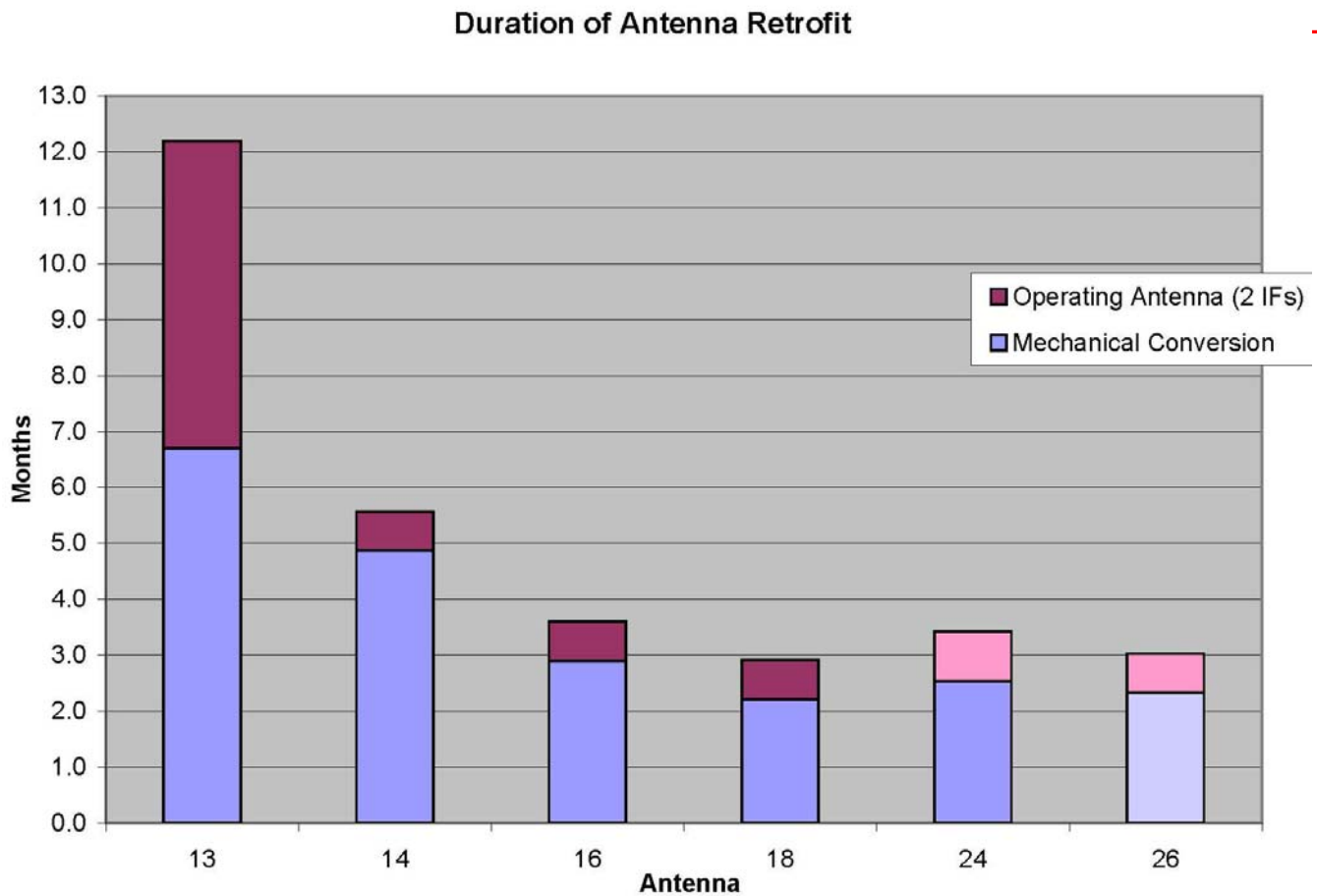


Antenna Retrofit Sequence: Future

In full production, mechanical outfitting of antennas can proceed in parallel with both electrical outfitting and testing.



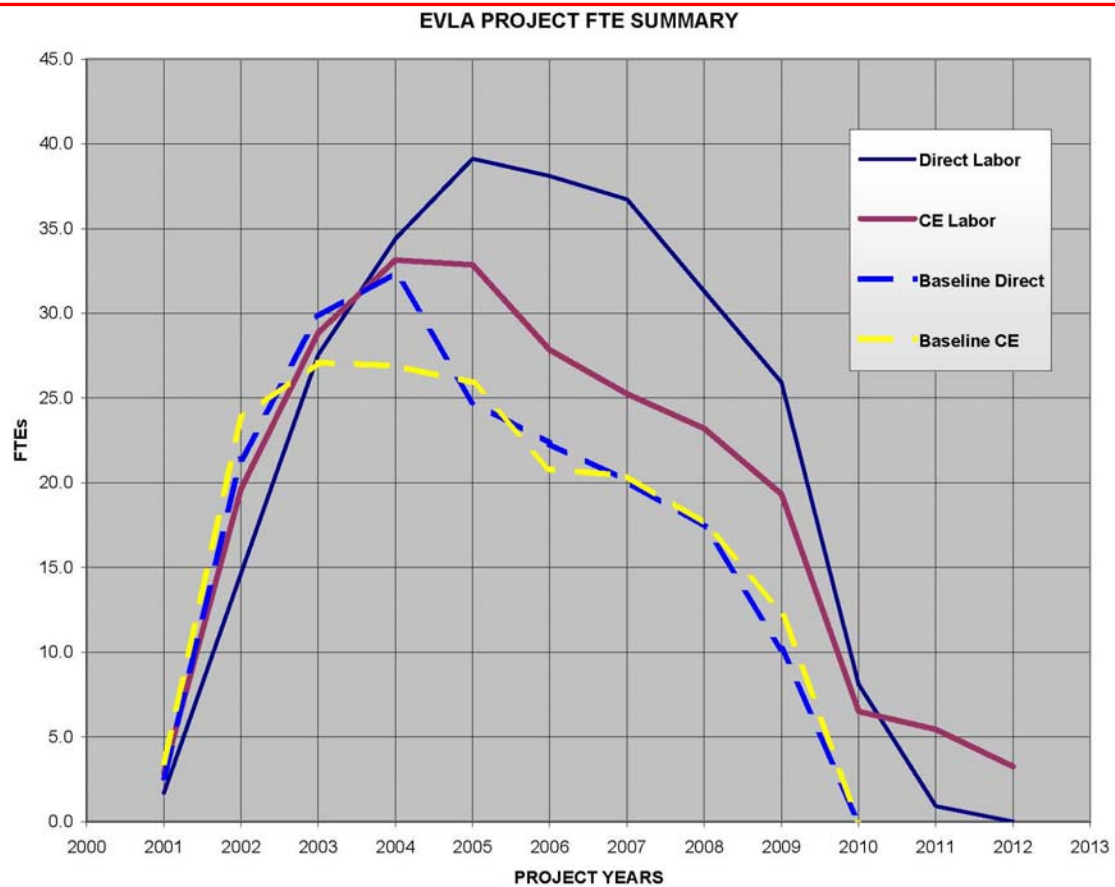
Retrofit Duration



Maintaining Schedule-2

- Antenna rate of up to 6 per year is possible if :
  - Duration of mechanical overhaul is 2 months.
  - Duration of parallel activities for electrical outfitting and testing is 1 month each.
- … but need to monitor impact on reliability of VLA antennas. Possible issue for VLA users.
- Expect progress in software areas of the project because of additional e2 staffing resources and finalization of M&C design.
- Shift front end production emphasis to Ka-band while solving design issues with wideband OMT.

Budget: Staff Profile



Contingency

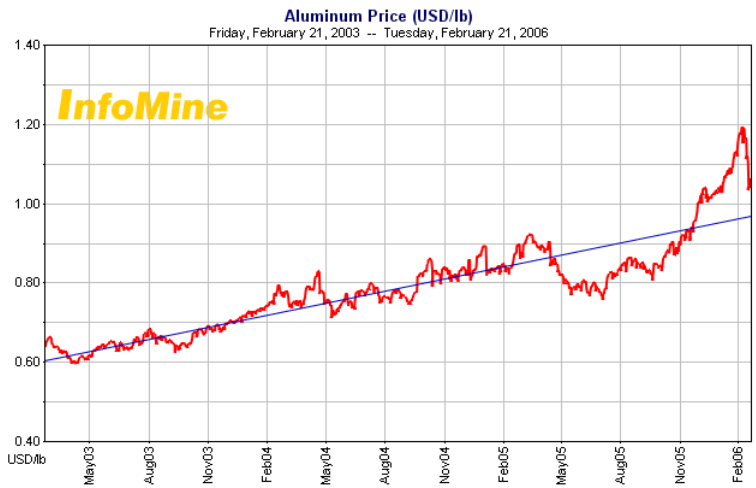
Detailed calculation of percent contingency depends upon whether or not project contingency is used to cover the cost to complete the correlator (corr.).

	Corr. Exclusive	Corr. Inclusive
Contingency, $	$2.8M	$2.8M
Cost to Complete	$32.1M	$44.8M
Contingency, %	8.7%	6.2%

Correlator project carries its own contingency

External Risk Factors

- NRAO operating budget
  - Project dependence upon contributed effort.
  - Ability of operations budget to absorb personnel (e.g. e2e and CASA) moving from project to operations. Ability to support science staff. Plan developed.
- Strength of Canadian dollar
- Correlator funding profile
- Commodity prices
  - Aluminum, steel
  - Gold plating



Retirement of Risk

- Bulk purchase of half transponders
- Bulk purchase of module interface boards
- M&C software support of transition mode observing, including successful implementation of reference pointing
- Eliminated spurious correlation with redesign of digitizer in DTS
- Solved timing problem between EVLA and VLA antennas
- Solved image rejection problem in 4P downconverter (T301) with new filter design
- Solved aliasing problem in baseband downconverter (T304) that limited sensitivity with new filter design
- Selected appropriate fire protection system for new correlator shielded room

Project Risks

• Failure to stay on manpower curve	$1.2M
• Correlator peripherals	$0.8M
• Contribute to EPO program	$0.5M
• Improve RFI protection	$0.3M
• Additional module parts	$0.3M
• Additional feed costs (S, X, Ku)	$0.3M
• Spare correlator boards	$0.2M
• Improve phase stability & RTP	$0.2M
• Improve wideband OMT	$0.2M
• Improve synthesizer (L302)	$0.1M
• Correlator installation manpower	$0.1M
• Redesign 3-bit, 4Gsps samplers	$0.1M
• IF retrofits	$0.1M
• Feed demoisture system	$0.1M

Risk Analysis

- Sum total risk = $4.5M
- Root sum square risk = $1.7M
- Contingency = $2.8M. Comparable to value of a year ago.
- Conclusion:
  - Still possible that project can be completed within budget and on schedule
  - Contingency coverage of risk is marginal, but no urgency now to implement descope options.
- Goal for FY06 is to refine contingency and risk analysis at finer level of detail (i.e. increase contingency and more accurately assess risk).

Value of Possible Descope Options

- Eliminate receiver bands:
  - X (8-12 GHz) $1.0M
  - Ku (12-15 GHz) $1.3M
  - S (2-4 GHz) $1.4M
  - Ka (26-40 GHz) $1.2M
- Purchase receiver components, but assemble/install as part of operations
  - X $0.2M
  - Ku $0.2M
  - S $0.4M
  - Ka $0.2M
- Eliminate solar observing mode $0.2M
- Transfer project-funded e2e effort (6 FTE years) to operations budget $0.7M

Other Possible Descope Options

- Reduce number of antenna retrofits
- Shut down the VLA part of the array for some time period
- Halve the observing bandwidth