

Project Information Summary
EVLA Advisory Committee
May 8-9, 2006

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1. Project scientific objective: an order of magnitude improvement in key observational capabilities of the VLA, except for angular resolution. Examples of science programs:
 - a. Providing accurate positions, sizes, and expansion estimates for up to 100 gamma-ray bursts every year
 - b. Disentangling starburst from black hole activity in the early universe
 - c. Mapping the magnetic fields in individual galaxy clusters
 - d. Looking through the enshrouding dust to image the formation of high-redshift galaxies
 - e. Observing ambipolar diffusion and thermal jet motions in young stellar objects
 - f. Measuring the three-dimensional motions of ionized gas and stars in the center of the Galaxy
 - g. Conducting unbiased searches for redshifted atomic and molecular absorption lines
 - h. Measuring the three-dimensional structure of the magnetic field on the Sun
 - i. Using the scattering of radio waves to map the changing structure of the dynamic heliosphere
 - j. Measuring the rotation speeds of asteroids
 2. Project technical objectives
 - a. Sensitivity: 1uJy in 12 hours between 2 & 40 GHz
 - b. Spectral coverage: entire spectral range between 1 & 50 GHz (in 8 receiver bands)
 - c. Bandwidth: up to 8 GHz of IF bandwidth in each polarization
 - d. Phase stability: 0.5 degrees per GHz of observing frequency
 - e. Polarization accuracy: 2-5% purity over wide receiver bands. With calibration techniques, measure polarization to accuracy of 0.1%.

- f. Frequency resolution: down to 1 Hz.
 - g. Bandpass stability: improved over VLA by an order of magnitude
3. Design reviews
- a. M&C CDR & e2e PDR (Nov 14-15, 2006)
 - b. Front End CDR (Apr 24-25, 2006)
 - c. Correlator PDR (Jul 11-14, 2005)
 - d. Receiver Feed CDR (Feb 17, 2005)
 - e. Correlator Chip CDR (Jan 24-25, 2005)
 - f. M&C Hardware CDR (Oct 20, 2004)
 - g. Software Design Review (June 14, 2004)
 - h. LO/IF/FO CDR (May 19-21, 2004)
 - i. Data Processing Architecture Design Review (July 18-19, 2002)
 - j. Fiber Installation CDR (Jun 12, 2002)
 - k. M&C Software System Design Review (May 14-15, 2002)
 - l. Numerous other internal reviews
4. EVLA Advisory Committee Meetings
- a. May 8-9, 2006
 - b. Dec 14-15, 2004
 - c. Sep 8-9, 2003
 - d. Jun 10-11, 2002
5. Examples of ALMA Collaborations
- a. Digital Transmission System (DTS)
 - b. Bins and modules
 - c. 3-bit, 4Gsps sampler
 - d. Observer's Project Data Model
 - i. EVLA Proposal Tool
 - ii. ALMA Observation Preparation Tool

EVLA Project Coordination Meeting Summary

for Monday 4/10/06

Target Dates

Date	End Date	Description	Location	Coordinator	Original		
Fri	3/03/06	4/07/06		Project book updates	Perley	2/03/05	
Mon	4/03/06	4/05/06		Correlator face-to-face meeting	AOC	4/03/06	
Tue	4/04/06			M301, converters & switches ready for functional testing	Cotter/Peck	4/04/06	
Fri	4/07/06			Complete M302/3 functionality tests - hardware	Koski/Luce	4/07/06	
Mon	4/10/06			Determine polarization properties of L-band feed	Perley/Moellenbrock	3/27/06	
Mon	4/10/06			Document Doppler tracking workaround	Claussen	4/10/06	
Mon	4/10/06			Requirements for final version of Observation Executor complete	Butler	5/13/05	
Mon	4/10/06			UX converter's enclosure bid package to Purchasing	Cotter/Dinwiddie	3/23/06	
Tue	4/11/06			Implement F317 software functionality	Sahr/Ben Frej	4/04/06	
Wed	4/12/06			Evaluate round-trip monitor data, L352/353	Dhawan	3/15/06	
Thu	4/13/06		Ant 13	Begin feed moisture monitoring	Hayward	4/13/06	
Fri	4/14/06			Implement M302/M303 software functionality, MIB	Sahr/Whiteis	3/09/06	
Fri	4/14/06			Latest L302 module version ready for use	Jackson	3/14/06	
Fri	4/14/06		Ant 24	M301 installed on antenna	Cotter/Peck	2/28/06	
Fri	4/14/06		Ant 24	M302/3 Utility module J-boxes installed	Koski	3/01/06	
Sat	4/15/06			*L-band wideband receiver lab test complete	Hayward/Lilie	12/15/05	
Wed	4/19/06			Install UX converter	Ant 18	Long/Harden	4/11/06
Thu	4/20/06			Improve TP detectors for auto level setting (hardware)	Newton	3/17/06	
Fri	4/21/06			*Complete Part 2 hardware bench integration - M301, M302, F317	Jackson	6/30/03	
Fri	4/21/06		Ant 18	*L-band wideband receiver installed	Hayward	2/08/06	
Fri	4/21/06		Ant 24	M302/3 utility module ready for use	Gerrard/Koski	3/29/06	
Fri	4/21/06			Rehearsal for Advisory Committee meeting	McKinnon	4/21/06	
Mon	4/24/06	4/25/06	AOC	*Front Ends CDR	Hayward	10/19/04	
Mon	4/24/06		AOC	Change Control Board Meeting - tentative	Cole	3/27/06	
Tue	4/25/06		Ant 16	4/P-band (L304 switch version) available for use	Cotter/Harden	2/09/06	
Tue	4/25/06			Implement feed heater control function in M303	Gerrard/Koski	3/01/06	
Wed	4/26/06			Submittals of presentation mat'l for Advisory Committee mtg	McKinnon	4/26/06	
Fri	4/28/06			AC relay card redesign	Hayward/Kutz	4/28/06	
Fri	4/28/06			Improve TP detectors for auto level setting (software)	Sahr	4/03/06	
Fri	4/28/06			Report on Rx stability, bandpass shapes, linearity of RF design	Jackson/Perley	8/12/05	
Mon	5/01/06			Initial EVLA antenna OPS checkout procedure available	P.Perly	5/01/06	
Mon	5/01/06			Test UX converter's converted path	Perley	5/01/06	
Wed	5/03/06		Ant 18	T304 modules w/TPD installed	Newton	2/21/06	
Fri	5/05/06		Ant 18	*Hardware acceptance tests complete	Durand/Jackson	10/19/05	
Mon	5/08/06	5/09/06	AOC	EVLA Advisory Committee Meeting	Perley	5/08/06	
Mon	5/08/06			Implement automatic level setting	Sowinski/Brisken	4/17/06	
Thu	5/11/06	5/12/06	AOC	NSF EVLA Review Meeting	McKinnon	5/11/06	
Fri	5/12/06			Correlator shielded chamber flooring installed	Stanzione	5/12/06	
Fri	5/19/06		Ant 24	T304 modules w/TPD installed	Newton	5/19/06	
Mon	5/22/06			RTP data multicast from L352, w/ listener thread in interim Observ-X	Clark	7/29/05	
Mon	5/22/06	5/26/06		WBS level 2 budget & schedule reviews	McKinnon/Cole	5/22/06	
Tue	5/23/06		Ant 24	*Hardware acceptance tests complete	Durand/Jackson	5/23/06	
Fri	5/26/06		Ant 13	4/P-band (L304 switch version) available for use	Cotter/Harden	2/27/06	
Mon	5/31/06			VLA antenna setup w/ Observation Executor	Clark	10/15/05	
Wed	5/31/06			*Baseline Board prototype	Carlson/Cole	11/15/05	
Wed	5/31/06			*Station Board prototype	Carlson/Cole	11/15/05	
Thu	6/01/06			Antenna status update - software & Hardware	Butler/Jackson	6/01/06	
Thu	6/01/06			Determine quantity & type of spare correlator boards	Revnell/McKinnon	6/01/06	
Thu	6/01/06			GUI's available for initial EVLA antenna OPS checkout	P.Perley	6/01/06	
Thu	6/01/06			Refined correlator installation plan available	Jackson/Stanzione	6/01/06	
Thu	6/01/06			Specify extensions to evla script and obs2script	Sowinski	9/30/05	
Mon	6/05/06			Implement antenna autophasing	Clark	6/05/06	
Mon	6/05/06			Investigate probable error in Tsys measurement	Sowinski	6/05/06	
Fri	6/09/06			*First correlator chip prototype	Carlson/Cole	11/28/05	
Thu	6/15/06			Agreement on common project model - software	Butler	9/01/05	
Mon	6/19/06			Include current weather data for pointing	Clark	6/19/06	
Fri	6/30/06			New VLA correlator controller operational, controlled from Modcomps	Sowinski	8/30/05	
Fri	9/29/06			New VLA correlator controller controlled from EVLA M&C system	Clark	11/30/05	
Mon	10/02/06			Final decision on 3-bit sampler design	McKinnon/Revnell	10/01/06	
Mon	10/16/06			Implement tipping curves for opacity determination	Butler	10/16/06	

Bold – Priority Action Items; * Milestones

EVLA Project Coordination Meeting Summary

for Monday 4/10/06

Date	End Date	Description	Location	Coordinator	Original	
Mon	11/13/06	Write SNOW program to prevent snow accumulation		Butler	11/13/06	
Tue	11/14/06	11/15/06	*M/C CDR & e2e PDR	AOC	van Moorsel	11/02/05
Tue	11/21/06	*Correlator shielded chamber completed		Stanzione	11/21/06	
Mon	12/18/06	Provide capability for moving source observation		Clark	12/18/06	
Fri	12/29/06	*Modcomps retired		Sahr	12/31/05	
Fri	12/29/06	Archive records written using Modcomp independent format		Sowinski	10/15/05	

Bold – Priority Action Items; * Milestones

EVLA Antenna Modifications/Retrofits

Ant	Loc	Overhaul Complete	First Fringes	4 IF-Bands Working	MODS	Receivers					
						4/P-band	1.5 GHz	6 GHz	8 GHz	22 GHz	45 GHz
13	W40	9/14/05	1/06/06	1/25/06 t	†, l, s, k,	(?) m	5/19/05	1/31/06	8/27/03	2/11/04	2/22/06
14	N16	1/31/05	9/09/04	8/25/05 t	†, j, k, s	3/21/06 m	12/15/04	1/27/05	11/17/04	12/15/04	3/15/05
16	E24	5/10/05	3/10/05	7/20/05 t	†, l, k, p, s	4/25/06 m	5/05/05	7/28/05	5/03/05	5/05/05	11/16/05
18	N6	9/01/05	3/15/06	5/03/06	†, k, p, s	(?) m	3/29/06	4/14/06	11/10/05	11/10/05	4/12/06
24	MP	4/04/06	5/03/06	5/19/06	†, k, p, wl	(?)	4/27/06	4/27/06	4/28/06	4/28/06	4/28/06
26	AAB	6/12/06	7/06/06	7/06/06	†, k, p	(?)	6/14/06	6/14/06	6/14/06	6/14/06	6/14/06

Bold - Estimated Date, (?) - Date Uncertain
 k - New Antenna Key
 l - Hybrid L-band; wl – Wideband L-band

p - 4/P-band Cable Replacement
 s - L304 Style Switching
 † - Existing X-band Used

t - w/out total power detectors
 m – without M301

Procurement Status

Critical	PO #	Vendor	Description	Ship/Delivery	Remarks/Status
	30346	Data Translation	Formatter boards	7/15/06	Partial delivery 5/11/06
	304749	Data Translation	Deformatter boards	5/31/06	

Production

Description	Spec/SOW	PR/PO#	RFP/RFQ	Bid Due	Approved	Vendor	Delivery Date (need date)
MIB Assembly	1/12/06	304476	1/23/06	2/15/06		GTC	
Half Transponders	3/24/06	304703	--	3/06/06	5/09/06	Multiplex	

Open Positions

Division	Position	Status	Loc	Budget	Req#	Posting Date	Offer Date	Start Date	Name
ES	Antenna Mechanic		VLA	EVLA	SO2617	10/17/2005			
EVLA	Project Manager		AOC	EVLA	CV2326	11/15/2005	3/17/2006	4/03/2006	Mark McKinnon
Elect	Electronics Tech -FO		VLA	SOC	SO2627	3/22/2006			

Status: F=position frozen, P=part time, T=temporary, A=awaiting approval, S=delayed hire

Distribution

CV	S. Durand	D. Morgan	J. Ulvestad	R. Gutierrez
S. Srikanth	D. Frail	K. Morris	P. Van Buskirk	R. Latasa
GB	D. Gerrard	P. Napier	G. van Moorsel	P. Madigan
D. Egan	M. Goss	T. Newton	C. Walker	L. Major
Penticton	P. Harden	F. Owen	B. Willoughby	J. Ruff
B. Carlson	D. Harland	G. Peck	P. Whiteis	L. Serna
SOC	R. Hayward	P. Perley	J. Wrobel	G. Stanzione
BB Socorro	D. Hicks	R. Perley	**AOC West**	J. Sullivan
L. Abetya	J. Jackson	M. Pokorny	E. Gonzales	S. Tenorio
L. Appel	W. Koski	M. Revnell	J. Lagoyda	J. Thunborg
T. Baldwin	C. Kutz	J. Robnett	A. Lewis	
H. Ben Frej	J. Langevin	T. Romero	S. Reasner	
W. Brisken	P. Lilie	J. Romney	L. Romero	
B. Butler	L. Locke	B. Rowen	M. Romero	
C. Cai	K. Long	M. Rupen	**VLA Site**	
C. Chandler	R. Long	K. Ryan	BB AAB	
B. Clark	S. Loveland	B. Sahr	BB Control	
M. Claussen	M. Luce	R. Serna	BB TS	
E. Cole	D. McKee	K. Shores	BB VLA Ops	
T. Cotter	M. McKinnon	K. Sowinski	S. Aragon	
V. Dhawan	D. Mertely	D. Tody	B. Broilo	
H. Dinwiddie	G. Moellenbrock	S. Thompson	C. Chavez	
F. Dunn	R. Moeser	B. Truitt	S. Grayson	

WBS	Task Name	Actual 2001	Actual 2002	Actual 2003	Actual 2004	Actual 2005	Budget 2006	2007	2008	2009	2010	2011	2012	Totals
6.01	Project Management	77.0	175.4	119.8	277.8	148.1	246.7	215.2	250.8	311.5	362.1	156.4	0.0	2340
6.02	System Integration & Testing	212.0	478.0	236.4	746.1	571.2	339.2	390.4	394.3	227.3	0.0	0.0	0.0	3595
6.03	Civil Construction	0.2	252.0	40.1	229.0	197.4	330.3	0.0	93.0	0.0	0.0	0.0	0.0	1142
6.04	Antennas	0.0	46.7	98.5	497.2	172.3	138.4	69.2	77.6	38.8	26.6	0.0	0.0	1165
6.05	Front End Systems	385.5	114.6	596.5	1312.8	1894.2	1408.1	861.0	923.6	1300.8	1351.3	213.0	0.0	10362
6.06	Local Oscillator System	14.1	292.4	253.0	1188.4	357.9	299.3	238.2	189.5	220.2	156.6	0.0	0.0	3210
6.07	Fiber Optic System	4.7	603.8	735.5	1175.6	685.8	784.7	1119.5	601.7	430.3	167.0	0.0	0.0	6309
6.08	Intermediate Frequency System	0.0	105.5	327.5	215.4	819.9	446.8	423.5	459.2	384.0	56.2	0.0	0.0	3238
6.09	Correlator	149.0	362.0	155.0	618.0	37.0	4281.5	1879.0	45.0	17.0	0.0	0.0	0.0	7544
6.10	Monitor & Control System	0.0	209.2	255.8	367.0	540.8	783.1	291.7	314.5	285.1	249.2	0.0	0.0	3296
6.11	Data Management & Computing	2.8	0.2	219.1	180.8	37.2	51.4	28.7	206.0	602.0	2.0	2.0	0.0	1332
6.12	Education & Public Outreach	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	M&S Total	845	2640	3037	6808	5465	9109	5516	3555	3817	2371	371	0	43533
	Travel	7	93	72	76	109	134	84	62	56	32	0	0	727
	Direct Labor	126	1115	1689	2297	3066	2828	2689	2117	1846	645	132	0	18549
	NRAO Indirect Labor	195	1549	2317	2186	1891	1656	1672	1808	1538	443	368	228	15851
	NRAO Wages & Benefits	321	2664	4006	4483	4957	4484	4361	3925	3383	1088	500	228	34400
	Canadian Labor	54	414	671	533	523	438	499	321	136	0	0	0	3589
	Sub Total	1228	5810	7787	11901	11054	14165	10460	7863	7393	3491	872	228	82248
	Contingency	0	0	0	0	0	0	0	451	0	2376	0	0	2827
	Redirected NRAO Effort	-195	-1549	-2317	-2186	-1891	-1656	-1672	-1808	-1538	-443	-368	-228	-15851
	Canadian Contribution	-203	-776	-826	-1151	-560	-4720	-2378	-366	-153	0	0	0	-11133
	Mexican Contribution						-1747							-1747
	EVLA Project Funds	830	3486	4643	8563	8603	6043	6410	6140	5702	5424	503	0	56345
	Carryover to next yr	2170	3685	4363	5140	1880	1277	433						
	Carryover from prior yr		-2170	-3685	-4363	-5140	-1880	-1277	-433				0	
	NSF Funded	3000	5000	5322	9340	5340	5440	5566	5707	5702	5424	503	0	56345
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Totals

EVLA PROJECT

PRIMARY MILESTONES COMPLETED

WBS	TASK	DATE
PROJECT MANAGEMENT		
1.1.1	Start EVLA project	5/1/01
1.6.1	Scientific Requirements defined	6/4/01
1.6.2	Technical Requirements defined	7/19/01
1.1.3	Schedule of Reviews	8/13/01
1.1.20.3	Management Plan published	9/10/01
1.1.20.5	FY02 budget issue	9/10/01
1.1.20.6	Cost estimates refined	12/21/01
1.6.4	Project Book version 1	3/1/02
1.1.4	Change Control Procedures	3/4/02
1.20.2	Advisory Committee formed	3/4/02
1.20.3	1st Advisory committee meeting	6/10/02
1.1.40.1	Start installation of fiber optics on Wye	11/4/02
1.1.40.2	Start prototype system lab integration & test	1/15/03
1.1.40.3	Install prototype system on test antenna	4/14/03
1.1.40.5	Start electronics production	4/5/04
1.1.40.4	Complete electronics CDRs	5/21/04
1.1.40.6	Start retrofitting antennas w/ new system	10/5/04
SYSTEM INTEGRATION & TESTING		
2.1.12	System PDR	12/5/01
2.1.21	System block diagram under revision control	3/1/02
2.15.15.1	Shielding requirements for racks and modules	7/16/02
2.1.50.1	EVLA test antenna chosen	10/14/02
2.15.10	Acceptance Test Development	1/17/03
2.1.19	Engineering specifications document complete	3/4/03
2.1.50.12	Functional design freeze	1/30/04
2.1.50.13	Physical design freeze	4/30/04
2.1.30.2	LO/IF & FO CDR incl pwr supp & packaging	5/19/04
2.1.50.10.8	Test antenna moved to array (W10)	7/21/04
2.25.30.3	Spec & order all LO and FE shielded racks	8/23/04
2.1.30.6	M&C Hardware & Network CDR	10/20/04
2.1.50.17	Start interferometry tests w/two EVLA antennas	12/2/04
2.30.17	Start ELVA transition planning	1/13/05
2.1.30.4	Feed CDR	2/17/05
2.1.60.1	Verify linearity of RF designs - rcvr to correl	4/15/05
2.1.50.30	Start antenna production outfitting	5/11/05
2.1.60.3	Check for interference and bandpass shapes: 8, 22 & 45 GHz	5/12/05
2.1.60.5	Receiver stability tests: 8, 22 and 45 GHz	5/12/05
2.30.17.2	1st Antenna (14) turnover to Operations	10/28/05
2.30.17.3	2nd Antenna (16) turnover to Operations	12/20/05
2.30.17.4	3rd Antenna (13) turnover to Operations	1/19/06
CIVIL CONSTRUCTION		
3.10.15.20	Shielded test chamber complete	4/1/02
3.1.15	Fiber Underground Installation CDR	6/12/02
3.5.3.21	Delivery of array fiber cable	7/30/02
3.5.5.23	Trench fiber to W10 & master pad complete	11/26/02
3.5.5.27	West Arm trench fiber complete	5/1/03
3.15.2	Develop CB interim cooling plan	8/25/03
3.5.5.49	East Arm trench fiber complete	9/9/03

EVLA PROJECT

PRIMARY MILESTONES COMPLETED

3.5.5.69	East Arm trench fiber complete	1/30/04
3.10.10.6	Old correlator room ready for EVLA equipment	2/11/04
3.5.5.80	Array fiber burial completed	2/13/04
3.10.6	Shielded room spec's written	3/8/05
3.10.9	Shielded room delivered	10/3/05
ANTENNAS		
4.1.12	Feed Cone PDR	2/12/02
4.10.3	Start 1st test antenna retrofit	4/9/03
4.1.18	Test antenna available	4/14/03
4.1.4.7	L-band feed & fixture drawings complete	5/23/03
4.20.15	ACU/FR system ready for test antenna	1/15/04
4.1.4.11	L-band feed prototype ready to install	3/31/04
4.1.2.17	Fiber cable wrap revision on antenna 13	6/16/04
4.1.4.18	C-band feed prototype ready to install	7/1/04
4.10.12	Test antenna (13) mechanical retrofit complete	7/12/04
4.10.10	C-band feed prototype on test antenna	9/15/04
4.2.10.14.2	Start C-band feed horn production	10/4/04
4.1.4.11b	L-band feed redesign - sectional version complete	12/7/04
4.2.10.12.2	Start L-band feed horn production	12/7/04
4.1.21	Antenna/Feed Cone CDR	2/17/05
4.20.25	Start ACU/FR digital loop design	3/31/05
FRONT END SYSTEM		
5.1.5	Receiver/Feed Cone PDR	2/28/02
5.2.2.3.2	Finalize EVLA Q-band requirements	3/7/03
5.2.2.2.2	Finalize EVLA K-band requirements	3/28/03
5.2.2.1.1.3	X-band transition prototype complete	8/8/03
5.2.2.2.12	K-band Rcvr prototype complete	12/12/03
5.2.2.3.14	Q-band Rcvr prototype complete	12/12/03
5.2.2.4.6	L-band transition Rcvr complete	3/24/04
5.3.2.13	L-band feed prototype complete	4/13/04
5.2.1.2.3c	Doors and Side Panels Installed	6/9/04
5.2.2.1.2.3	X-band transition FE complete	7/9/04
5.4.6.7	Start cryo compressor assembly	8/10/04
5.3.4.10	C-band feed prototype complete	9/16/04
5.3.9.1	Start Feed Production	12/30/04
5.2.2.5.10	1st C-band Rcvr prototype complete	1/21/05
5.2.2.5.11	Require C-band feed	1/21/05
5.3.4.11	Begin C-band Feed Production	1/21/05
5.4.4	Prototype cryogenics system ready	1/31/05
5.1.9	Feed CDR	2/17/05
5.2.1.1.1.14	Card cage prototypes complete	3/7/05
5.3.2.14	Begin L-band Feed Production	3/31/05
5.2.2.6.7.5	L-band OMT available for Rcvr test	4/29/05
5.2.2.2.15	Start K-band Rcvr upgrade production	9/16/05
LOCAL OSCILLATION SYSTEM		
6.10.1	Start L301 1st LO prototype	8/27/01
6.15.1	Start L302 2nd LO prototype	10/29/01
6.1.5	LO/IF PDR, Start prototype development	1/22/02
6.20.5.1	Start L304 ant ref rcvr	4/22/02
6.5.25.1	Start L350 ref generator	6/3/02

EVLA PROJECT

PRIMARY MILESTONES COMPLETED

6.5.10.1	Start L351 offset generator	6/10/02
6.7.5.1	Start L352 RTP prototype	7/15/02
6.20.10.1	Start L305 ant ref gen/distr prototype	9/20/02
6.5.30.1	Sart L354 ref distrib prototype design	12/15/03
6.5.25.5	Develop L350 hardware ICD	12/19/03
6.5.10.6	Develop L351 hardware ICD	12/19/03
6.5.35.3	Master LO sys ready for functional tests	4/27/04
6.1.10	LO/IF CDR	5/21/04
6.1.15	Start LO/IF module production	6/14/04
6.20.10.15.2	Develop L305 production specifications	8/23/04
6.10.20.3	Develop L301 production specifications	8/25/04
6.15.20.3	Develop L302 production specifications	8/25/04
6.20.5.15.2	Develop L304 production specifications	12/30/04
6.25.12	Start LO/IF production outfitting	5/31/05
6.25.10.3	3 antennas with 4 IF-bands working	1/25/06
FIBER OPTIC SYSTEM		
7.10.5.1.1	Fiber Selection Review	10/17/01
7.1.8	Fiber Optics System PDR	12/5/01
7.5.5.1	Start Formatter prototype	3/18/02
7.5.10.1	Start Deformatter prototype	4/8/02
7.1.20	Fiber Underground Installation CDR	6/12/02
7.10.5.1.7	Award fiber cable bid	6/24/02
7.5.10.4	Defformatter prototype assembled	10/1/02
7.10.5.1.11	Fiber ready for burial	11/4/02
7.10.5.5.1	Start fiber installation	11/4/02
7.10.10.5.1	Begin antenna structure design	1/3/03
7.10.10.10.1	Start Antenna Outfitting	6/9/03
7.10.10.10.3	Prototype fiber available on test antenna	1/30/04
7.5.25.3	Start DTS production specifications	4/12/04
7.1.25	Fiber Optic System CDR	5/19/04
7.10.10.10.5	Start production assembly of antenna fiber	5/19/04
7.15.2.15	Start production hardware assembly	8/12/04
7.5.15.12	Complete assembly of transponder design	12/30/04
7.5.5.8.1g	D30x ICD ready for software	4/18/05
7.5.10.18	Procure production assembly	6/30/05
7.5.5.8.1g	D30x ICD ready for software	7/29/05
7.10.5.5.15.17	Array splices complete	8/26/05
7.5.5.9	Start production DTS link hardware	10/26/05
7.15.1.9aa	Develop plan for alternate 3-bit chip design	3/2/06
INTERMEDIATE FREQUENCY SYSTEM		
8.20.5.0	Start down converter prototype	3/4/02
8.15.15.1	Start UX-band converter prototype	7/15/02
8.20.5.6	T304 bench prototype test ready	12/19/02
8.10.5.6	T301 bench prototype complete	3/1/03
8.10.10.6	T302 bench prototype complete	3/21/03
8.20.10.1	Start down conv integrated version	4/30/03
8.5.1	Decision on band switches	5/5/03
8.15.15.7	T303 bench prototype complete	6/10/03
8.20.5.14	T304 down conv ready for test antenna	5/18/04
8.15.15.15	T303 UX converter ready for test antenna	5/21/04

EVLA PROJECT

PRIMARY MILESTONES COMPLETED

8.5.7	Band switches ready for test antenna	6/21/04
8.20.10.10	Down conv integrated module assembled	1/21/05
8.15.15.25	Integrated UX converter design available	3/23/05
8.10.5.10	Install T301 in test antenna	8/2/05
MONITOR & CONTROL SYSTEM		
10.10.2	Specify & design network system	12/3/01
10.1.10	Hardware PDR	3/13/02
10.1.18	M&C Software PDR	5/15/02
10.20.10.25	High Level (Raw) Requirements complete	6/26/02
10.20.30.2	Correl M&C, Correl Backend vacancies filled	7/31/02
10.20.25.10.15	e2e PDR, M&C Interfaces	9/27/02
10.10.15	Network connection tested - antenna to CB	12/23/03
10.20.15.37	Overall software design complete	6/14/04
10.5.5.38	Start MIB production	9/20/04
10.15.7	Determine requirement of real-time database	10/13/04
10.1.24	M&C System Hardware CDR	10/20/04
10.5.10.4	M302 detail design	6/17/05
DATA MANAGEMENT & COMPUTING		
11.1.1.3.1	EVLA System PDR	12/3/01
11.1.1.3.2	EVLA Postprocessing PDR	7/15/02
11.1.1.1.3	EVLA science requirements	3/2/04
11.1.1.1.4	EVLA operational requirements	4/1/04
11.1.1.1.7	Data Mgt reorganization	6/9/04
11.1.10.6	Acceptance of VLA archive	2/24/05
11.1.13.1	Routine test observing software available	3/21/05
11.1.13.2	Routine observing - EVLA antennas with VLA	3/31/05
11.1.13.3	Routine control of VLA using EVLA software	6/30/05
11.1.13.4	WIDAR correlator PDR	7/22/05

EVLA PROJECT

PRIMARY MILESTONES PLANNED

WBS	TASK	DATE
PROJECT MANAGEMENT		
1.1.40.7	Start observing in transition mode	6/1/06
1.1.40.8	Test prototype correlator on 3 or 4 antennas	3/30/07
1.1.40.9	Start outfitting new correlator room	10/31/07
1.1.40.10	Start tests of 1st correlator subset at VLA	5/15/08
1.1.40.11	1st shared risk science w/ new correlator subset	10/1/08
1.1.40.12	New correlator declared operational	11/13/09
1.1.40.13	Last antenna retrofitted to EVLA design	7/29/10
1.1.40.14	Last receiver installed	6/1/12
2.1.30.4a	Front End CDR	4/24/06
SYSTEM INTEGRATION & TESTING		
2.1.60.7	Phase stability tests - all bands	4/28/06
2.1.60.9	Initial report on system performance	4/28/06
2.30.13	Production specifications document complete	6/30/06
2.30.17.6	7 antennas handed over to Operations	11/6/06
2.1.30.6a	M&C & Data Mgt CDR	11/14/06
2.30.17.8	15 antennas handed over to Operations	3/10/08
2.30.17.10	22 antennas handed over to Operations	2/27/09
2.30.17.12	28 antennas handed over to Operations	4/30/10
CIVIL CONSTRUCTION		
3.10.5.16	Shielded room available	11/21/06
3.1.100	Civil Construction Completed	11/1/07
ANTENNAS		
4.2.10.14.10	C-band feed assembly completed	7/5/06
4.1.4.24	S-band feed prototype ready for testing	7/25/06
4.1.4.27	S-band feed fit test on test antenna	8/8/06
4.20.25	ACU/FR digital loop design complete	10/26/06
4.2.10.12.10	L-band feed assembly completed	9/24/08
4.2.10.16.2	S-band feed horn production	10/6/08
4.10.60	Antenna Outfitting Complete	11/12/10
4.2.10.16.10	S-band feed assembly completed	4/14/11
FRONT END SYSTEM		
5.1.10	Front End CDR	5/2/06
5.2.2.3.17	Start Q-band Rcvr upgrade production	5/17/06
5.3.5.9	Mount design & Fab complete	6/2/06
5.3.8.7	Mounting avail	6/30/06
5.2.2.6.9	Require card cage (VLA Style)	6/30/06
5.2.2.7.6.6	Require OMT & Polarizer	6/30/06
5.2.2.6.11	1st L-band prototype complete	11/27/06
5.2.2.5.13.6	C-band OMT available for Rcvr test	12/12/06
5.2.2.6.14	Start L-band Rcvr Production	2/28/07
5.2.2.7.12	1st Ka-band Rcvr prototype complete	6/1/07
5.3.8.9	Ka-band feed complete	7/14/07
5.2.2.7.14	Start Ka-band Rcvr production	8/2/07
5.2.2.10.12	X-band prototype complete	1/8/09
5.4.8	Last antenna cryo outfitting	9/9/09

EVLA PROJECT

PRIMARY MILESTONES PLANNED

5.5.2.9.12	1st S-band Rcvr prototype complete	10/2/09
5.5.2.9.15	Start S-Band Rcvr Production	12/4/09
5.3.6.9	Ku-band feed complete	1/20/10
5.2.2.8.12	1st Ku-band Rcvr prototype complete	8/26/10
5.2.2.8.15	Start Ku-band Rcvr upgrade production	11/9/10
5.1.11	Last Receiver Installed	6/12/12
LOCAL OSCILLATION SYSTEM		
6.20.10.13d	Continue L305 production assembly	5/2/06
6.5.10.15	L351 module complete	8/2/06
6.5.35.9	Master LO system complete	8/2/06
6.5.35.13	Redundant Master LO rack functional	8/31/06
6.25.10.6	7 antennas w/ 4 IF-bands working	10/18/06
6.7.5.29	Round Trip Phase module complete	10/12/07
6.25.10.9	12 antennas w/ 4 IF-bands working	10/23/07
6.20.5.20	L304 Ref Reciever complete	1/18/08
6.7.10.30	L353 module assembly complete	3/4/08
6.10.25	L301 synthesizer module assembly complete	11/13/08
6.25.10.12	18 antennas w/ 4 IF-bands working	11/24/08
6.20.10.20	L305 synthesizer module complete	12/8/08
6.15.25	L302 synthesizer module assembly complete	3/19/09
6.25.10.15	24 antennas w/ 4 IF-bands working	12/28/09
6.1.50	LO/IF System Complete	3/1/10
6.25.10.18	28 antennas w/ 4 IF-bands working	11/23/10
FIBER OPTIC SYSTEM		
7.20.10.35	Order 1st qty production parts & start assembly	3/31/06
7.5.20.10	Start interfaces to new shielded room	3/31/06
7.5.5.11	Start production WDM hardare	3/31/06
7.15.1.10	Determine source for 3-bit sampler	11/16/06
7.5.25.12	Order final quantities of DTS hardware	2/1/07
7.10.5.5.15.20	Station pedestal fiber complete	6/1/07
7.15.1.17	Start production assembly of 3-bit sampler	6/29/07
7.10.5.5.15.25	Array fiber terminations complete	7/13/07
7.15.2.18	Assembly of 1 GHz sampler 8-bit complete	12/26/07
7.20.10.37	L353 module assembly complete	4/9/08
7.5.10.22	Deformatter board assembly complete	5/21/08
7.15.1.21	3-bit sampler assembly complete	1/14/09
7.5.25.18	IF System hardware complete	1/14/09
7.5.20.15	Complete interfaces to WIDAR correlator	6/30/09
7.1.99	Fiber Optics System Complete	8/10/10
INTERMEDIATE FREQUENCY SYSTEM		
8.20.10.30a	T304/5 modules assembled (2-24)	8/1/06
8.20.10.30b	T304/5 modules assembled (25-48)	8/15/06
8.15.15.30d	Delivery of UX conveters complete	12/15/06
8.15.20	Rcvr converters assembled (9-16)x3ea	7/1/07
8.20.10.30c	T304/5 modules assembled (49-72)	9/17/07
8.15.20	Rcvr converters assembled (16-23)x3ea	9/1/08
8.20.10.30d	T304/5 modules assembled (73-96)	11/17/08
8.15.20	Rcvr converters assembled (24-30)x3ea	10/1/09
8.5.15	Band switches complete	10/1/09
8.20.10.30e	T304/5 modules assembled (97-120)	3/1/10

EVLA PROJECT

PRIMARY MILESTONES PLANNED

MONITOR & CONTROL SYSTEM		
10.20.20.15	Test & Dev Support for Enhanced Ants Rdy	4/4/06
10.20.35.12	Full Support, Enhanced Antennas	4/28/06
10.20.15.46	Hybrid array software online	4/28/06
10.32.18	Start production of M301 modules	5/8/06
10.1.25	Monitor & Control System CDR	6/6/06
10.20.30.5.18	Correlator board manuals available	7/27/06
10.20.35.35.1	Test prototype correlator on 3 or 4 antennas	3/30/07
10.20.35.35.3	Begin Installation of Correlator at VLA	10/16/07
10.20.35.35.17	Start tests of 1st correlator subset at VLA	10/1/08
10.20.35.35.12	Begin Correlator Test Observations	10/1/08
10.20.32	M&C System Rdy For WIDAR Correl Tst & Dev Support	4/8/09
10.20.33	M&C System, Ready For Archive	4/8/09
10.20.35.40	EVLA Correlator Operational	10/2/09
10.20.35.45	VLA Correlator Shutdown	5/19/10
DATA MANAGEMENT & COMPUTING		
11.1.13.7	Spec EVLA science data archive format	5/1/06
11.1.13.5	Control VLA correlator controller by Modcomp software	5/15/06
11.1.13.6	Control new correlator controller by EVLA software	5/15/06
11.1.13.8	Science data archiving-EVLA sftwr, VLA format	6/1/06
11.1.13.12	DCAF software ready for testing	6/23/06
11.1.13.13	TelCal software ready for testing	6/30/06
11.1.12.5	MAL acceptance	10/13/06
11.1.13.9	Modcomps retired	12/29/06
11.1.13.21	WIDAR Correlator CDR	3/30/07
11.1.9	Pipeline heuristics	6/8/07
11.1.13.14	Acceptance of WIDAR correlator subset	11/16/07
11.1.13.16	Start shared-risk observing w/ correlator subset	10/1/08
11.1.13.17	Acceptance of full WIDAR correlator	11/13/09
11.1.13.18	Commissioning & turnover WIDAR correlator	12/31/09
11.1.13.19	Earliest retirement of VLA correlator	1/31/10
11.1.13.20	End of hybrid array operations	8/27/10

WBS	TASK	START	FINISH	% COMPL
10	Monitor & Control	5/1/01	5/19/10	60%
10.1.25	Monitor & Control System CDR	11/14/06	11/14/06	0%
10.1.30	CDR Analysis & Revision	10/26/04	11/30/06	50%
10.10	M&C Network Hardware/ Software	12/3/01	4/30/07	94%
10.10.25	Acquire & setup network services servers	3/1/07	4/30/07	0%
10.20	M&C EVLA Software	5/1/01	5/19/10	40%
10.20.15	High Level Sftwre Arch & Design	1/4/02	4/28/06	98%
10.20.15.41	Overall design for hybrid array control	11/3/03	4/28/06	90%
10.20.15.46	Hybrid array software online	4/28/06	4/28/06	0%
10.20.15.47	Test antenna monitor data archive	5/19/03	4/4/06	99%
10.20.20	Test & Dev Support, Enhanced Ants	5/19/03	4/4/06	99%
10.20.20.10	Software Development	6/10/03	4/4/06	99%
10.20.20.15	Test & Dev Support for Enhanced Ants Rdy	4/4/06	4/4/06	0%
10.20.25	Mid-Level Analysis & Design	1/8/02	4/8/09	22%
10.20.25.10	e2e IF Specifications	6/27/02	4/3/06	96%
10.20.25.10.13	Real-time analysis calibration tool	4/3/06	4/3/06	0%
10.20.25.10.14	Archive data from old to new correlator	4/3/06	4/3/06	0%
10.20.25.20	Observing Layer	11/1/04	6/2/06	15%
10.20.25.25	System Timing	4/3/06	5/30/06	0%
10.20.25.30	Scan Setup & Supervision	4/3/06	5/15/06	0%
10.20.25.35	Antenna Control	1/2/03	6/27/06	1%
10.20.25.40	Monitor Data	6/2/03	7/27/06	50%
10.20.25.45	Hybrid Array Operation	4/3/02	4/8/09	24%
10.20.30	Test & Dev Support, Correlator	4/3/02	4/8/09	24%
10.20.30.5	Correlator Monitor & Control	9/30/02	2/8/08	27%
10.20.30.5.9	Device Driver Interface Specification	10/6/03	10/10/06	35%
10.20.30.5.12	Virtual Correl Sftwre Coding & Tsting	10/11/06	7/31/07	0%
10.20.30.5.15	Test Sftwre Coding & Testing	8/1/07	2/8/08	0%
10.20.30.5.18	Correlator board manuals available	7/27/06	7/27/06	0%
10.20.30.5.21	Device Driver Sftwre Coding & Testing	7/28/06	2/5/07	0%
10.20.30.10	Correl Data Products - FFTs, Fits File Fragments	4/8/02	5/28/08	22%
10.20.30.10.6	System Specification	1/28/03	10/10/06	60%
10.20.30.10.9	Coding & Testing	10/11/06	11/26/07	0%
10.20.30.10.12	FITS/AIPS++ Extensions	11/27/07	5/28/08	0%
10.20.30.15	System Integration & Testing, Penticton	5/29/08	4/8/09	0%
10.20.32	M&C System Rdy For WIDAR Correl Tst & Dev Support	4/8/09	4/8/09	0%
10.20.33	M&C System, Ready For Archive	4/8/09	4/8/09	0%
10.20.35	Detailed Design & Coding	10/5/01	5/19/10	25%
10.20.35.3	Observing Layer	11/2/04	12/5/06	35%
10.20.35.6	Scan Setup & Supervision	4/3/06	4/18/07	0%
10.20.35.9	Antenna Control	11/2/04	12/19/06	35%
10.20.35.15	Monitor Data	11/2/04	5/23/06	60%
10.20.35.18	Warnings & Alarms	3/18/05	9/6/06	45%
10.20.35.21	Data Flagging	9/23/05	1/19/07	30%
10.20.35.24	Logging	4/4/06	5/31/07	30%
10.20.35.27	User Interfaces	11/2/04	9/14/07	30%
10.20.35.30	Hybrid Array support	11/2/04	12/5/06	35%
10.20.35.35	Correlator, at VLA Site	3/30/07	10/2/09	0%
10.20.35.35.1	Test prototype correlator on 3 or 4 antennas	3/30/07	3/30/07	0%
10.20.35.35.3	Begin Installation of Correlator at VLA	10/16/07	10/16/07	0%
10.20.35.35.6	System Integration & Testing, VLA	10/16/07	10/1/08	0%

WBS	TASK	START	FINISH	% COMPL
10.20.35.35.9	Preparation for Correlator Observations	4/10/08	9/29/08	0%
10.20.35.35.12	Begin Correlator Test Observations	10/1/08	10/1/08	0%
10.20.35.35.15	Coding of Operational Sftwre, Correlator	10/2/08	10/2/09	0%
10.20.35.35.17	Start tests of 1st correlator subset at VLA	10/1/08	10/1/08	0%
10.20.35.40	EVLA Correlator Operational	10/2/09	10/2/09	0%
10.20.35.45	VLA Correlator Shutdown	5/19/10	5/19/10	0%
10.20.35.50	Data Archive Interface	5/5/09	2/16/10	0%
11	Data Management	10/1/01	8/27/10	62%
11.1	e2e Project	10/1/01	8/27/10	62%
11.1.2	Infrastructure	1/6/03	9/12/06	59%
11.1.2.2	AIPS++/ACS prototype	3/2/04	8/24/06	60%
11.1.2.3	Common Framework design	3/2/04	9/12/06	55%
11.1.7	Observation scheduling toolkit	3/31/03	5/26/06	20%
11.1.7.2	Prototype VLA sched	4/3/06	5/26/06	0%
11.1.8	Pipeline toolkit	4/1/02	6/8/07	29%
11.1.8.3	Second prototype pipeline	4/3/06	9/29/06	0%
11.1.8.4	ACS-based pipeline prototype	10/2/06	6/8/07	0%
11.1.9	Pipeline heuristics	6/8/07	6/8/07	0%
11.1.13	Transition Plan	3/21/05	8/27/10	0%
11.1.13.5	Control VLA correlator controller by Modcomp software	5/15/06	5/15/06	0%
11.1.13.6	Control new correlator controller by EVLA software	5/15/06	5/15/06	0%
11.1.13.7	Spec EVLA science data archive format	5/1/06	5/1/06	0%
11.1.13.8	Science data archiving-EVLA sftwr, VLA format	6/1/06	6/1/06	0%
11.1.13.10	On-sky test of EVLA correlator prototype	3/29/07	6/20/07	0%
11.1.13.12	DCAF software ready for testing	6/23/06	6/23/06	0%
11.1.13.13	TelCal software ready for testing	6/30/06	6/30/06	0%
11.1.13.21	WIDAR Correlator CDR	3/30/07	3/30/07	0%
11.1.13.14	Acceptance of WIDAR correlator subset	11/16/07	11/16/07	0%
11.1.13.15	Science data archiving via EVLA software	11/30/07	11/30/07	0%
11.1.13.16	Start shared-risk observing w/ correlator subset	12/17/07	12/17/07	0%
11.1.13.17	Acceptance of full WIDAR correlator	6/30/08	6/30/08	0%
11.1.13.18	Commissioning & turnover WIDAR correlator	12/31/08	12/31/08	0%
11.1.13.19	Earliest retirement of VLA correlator	1/30/09	1/30/09	0%
11.1.13.20	End of hybrid array operations	8/27/10	8/27/10	0%

EVLA PROJECT MASTER SCHEDULE

As of March 31, 2006

ID	WBS	Task Name	Start	Finish	% Complete	2006				2007				2008				2009				2010				2011				2012			
						Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
1	1	Project Management	5/1/01	6/1/12	78%																												
1	1.1	Management/Subsystem Engineering	5/1/01	7/6/09	92%																												
8	1.1.20	Management Plan	5/21/01	8/9/02	100%																												
17	1.1.21	Project Management & Tracking	10/5/01	7/6/09	83%																												
27	1.1.40	Key Milestones	11/4/02	6/1/12	0%																												
42	1.6	Project Book	6/4/01	3/1/02	100%																												
47	1.10	Office Equipment & Supplies	6/4/01	6/23/06	93%																												
51	1.20	Advisory Committee	10/15/01	9/11/08	61%																												
2	2	System Integration & Testing	5/1/01	4/30/10	83%																												
1	2.1	Management/Subsystem Engineering	5/1/01	6/1/07	82%																												
12	2.1.30	System CDRs & analysis	5/19/04	11/14/06	50%																												
20	2.1.50	Test Antenna Plan	10/14/02	9/14/06	87%																												
22	2.1.50.2	Hardware Bench Integration	1/6/03	7/10/06	80%																												
27	2.1.50.5	1st Test Antenna Outfit	4/14/03	6/3/04	100%																												
32	2.1.50.10	System Tests on Antenna	5/13/03	9/14/06	81%																												
47	2.1.60	System Performance & Testing	4/15/05	4/28/06	0%																												
53	2.5	Test and Lab Equipment	5/1/01	11/8/07	99%																												
59	2.10.1	Power Supply System	9/3/02	10/31/08	92%																												
73	2.10.28	P302 Power Supply	8/8/05	10/27/05	100%																												
78	2.10.30	P351 Power Supply	12/5/05	7/11/06	0%																												
85	2.15	Site RFI characterization & Suppression	4/9/02	4/17/06	78%																												
90	2.15.15.1	RFI/EM Analysis of electronics & computers	7/16/02	4/17/06	57%																												
94	2.16	External RFI & Systems Immunity	4/22/02	10/16/09	99%																												
96	2.16.10	EVLA antenna sidelobe gain patterns 2-120	3/31/06	10/16/09	0%																												
109	2.20	Scientific Support	4/9/02	11/6/02	100%																												
112	2.25	Modules Bins & Racks	2/1/02	10/28/08	71%																												
116	2.25.10	Prototype module, bin & rack assembly	6/17/02	3/1/05	100%																												
130	2.25.30	Module Parts Production	2/9/04	10/28/08	32%																												
139	2.30	Transition Planning	12/19/03	4/30/10	32%																												
146	2.30.17	EVLA Transition Planning	1/13/05	4/30/10	0%																												
3	3	Civil Construction	6/4/01	11/1/07	89%																												
1	3.1	Management/Subsystem Engineering	6/4/01	11/1/07	94%																												
8	3.5	Fiber Optic Cable	1/2/02	2/6/04	99%																												
21	3.5.5	Trench & install FO cable (200kft)	2/14/02	2/13/04	100%																												
23	3.5.5.10	West Arm	10/30/02	5/1/03	100%																												
33	3.5.5.30	East Arm	4/11/03	9/9/03	100%																												
43	3.5.5.50	North Arm	4/11/03	1/30/04	100%																												
55	3.10	New Correlator Room	12/14/01	11/21/06	88%																												
66	3.10.5	Shielded Room	10/3/05	11/21/06	56%																												
72	3.10.10	Remodeling	12/19/02	6/7/06	86%																												
88	3.10.15	RFI Shielded Test Chamber	12/14/01	4/1/02	100%																												
93	3.15	CB HVAC	8/25/03	10/9/06	63%																												
103	3.20	Power Distribution	1/6/03	11/1/07	72%																												
4	4	Antennas	5/1/01	4/14/11	62%																												

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						Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
1	4.1	Management/Subsystem Engineering	6/4/01	2/19/09	81%																												
10	4.1.2	Design & Prototyping	1/23/02	2/17/06	93%																												
22	4.1.3	Laminated Feed Horn Design	1/1/02	12/1/03	100%																												
29	4.1.4	Prototype Feed Assembly	6/3/02	2/19/09	62%																												
53	4.2	Precision Machining	1/14/02	2/24/10	83%																												
55	4.2.5	Mechanical fab & assembly	1/14/02	7/31/06	88%																												
58	4.2.10	Front End & Feed	4/15/02	2/24/10	74%																												
61	4.2.10.12	L-band horn production	12/7/04	9/24/08	42%																												
67	4.2.10.14	C-band horn production	10/4/04	7/5/06	79%																												
72	4.2.10.16	S-band horn production	10/6/08	4/14/11	0%																												
78	4.5	Feed Cone Prototype	10/15/01	12/5/03	100%																												
93	4.5.50	Feed Cone production	5/14/04	9/1/09	30%																												
97	4.10	Antenna overhaul & EVLA conversion	4/9/03	11/12/10	35%																												
125	4.15	Antenna Electrical & HVAC	7/7/03	9/6/06	79%																												
132	4.20	Pointing Improvements	5/1/01	8/17/06	86%																												
5	5	Front End & Feeds	6/4/01	7/5/12	45%																												
1	5.1	Management/Subsystem Engineering	6/4/01	6/12/12	79%																												
7	5.1.7	MMIC Development	4/2/02	8/10/06	93%																												
41	5.2	Front-end Subsystems Engineering	11/18/02	11/26/07	67%																												
42	5.2.1	Subsystems Engineering	11/18/02	11/26/07	67%																												
277	5.2.2	Receiver Build & Installation	1/7/02	7/5/12	23%																												
278	5.2.2.1	X-band Transition Rcvr	11/4/02	7/14/06	57%																												
291	5.2.2.2	K-band Prototype Rcvr	11/4/02	9/16/05	100%																												
309	5.2.2.3	Q-band Prototype Rcvr	10/11/02	5/17/06	78%																												
329	5.2.2.4	L-band Transition Rcvr	3/4/03	3/31/05	100%																												
352	5.2.2.5	C-band Prototype Rcvr	1/7/02	3/26/07	69%																												
401	5.2.2.5.17	Start C-band Rcvr Production	12/30/04	3/31/06	48%																												
406	5.2.2.6	L-band Prototype Rcvr	1/7/02	2/28/07	32%																												
453	5.2.2.7	Ka-band Prototype Rcvr	10/22/02	9/6/06	11%																												
493	5.2.2.8	Ku-band Prototype Rcvr	2/2/09	11/9/10	0%																												
541	5.2.2.9	S-band Prototype Rcvr	1/7/08	12/4/09	0%																												
589	5.2.2.10	X-Band Prototype Rcvr	7/1/02	7/5/12	3%																												
651	5.3	Feed Design, Prototype & Production	5/1/02	7/20/11	58%																												
652	5.3.1	Design and Prototype	6/3/02	9/25/06	92%																												
658	5.3.2	L-Band Feed Prototype	7/31/02	3/31/05	100%																												
673	5.3.3	S-Band Feed Prototype	8/1/05	9/24/08	49%																												
682	5.3.4	C-Band Feed Prototype	6/10/02	1/21/05	100%																												
694	5.3.5	X-Band Feed Prototype	6/11/03	7/17/06	75%																												
707	5.3.6	Ku-Band Feed Prototype	4/3/06	9/9/10	0%																												
718	5.3.7	K-Band Feed Modification	5/1/02	6/25/03	100%																												
728	5.3.8	Ka-Band Feed Prototype	6/11/03	7/17/06	88%																												
739	5.3.9	Feed Production	7/1/02	7/20/11	25%																												
751	5.4	Cryogenics	10/16/01	9/9/09	65%																												
756	5.4.5	Vacuum Pump & Manifolds	6/11/03	1/29/09	52%																												

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						Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
761	5.4.6	Compressors & Helium Lines	3/4/03	8/18/09	87%																												
769	5.4.7	Refrigerators	5/5/03	9/9/09	47%																												
6	6	LO/IF	6/4/01	11/23/10	58%																												
1	6.1	Management/Subsystem Engineering	6/4/01	3/1/10	95%																												
12	6.5	Master LO System	11/12/01	8/31/06	91%																												
15	6.5.10	L351- 512MHz Offset Generator	6/10/02	8/2/06	83%																												
29	6.5.25	L350 Central Reference Generator	6/3/02	11/14/05	100%																												
42	6.5.30	L354 Central Reference Distributor	12/15/03	12/13/05	100%																												
53	6.5.31.5	L355 Digital Timing Distributor	6/30/05	12/21/05	100%																												
62	6.7	Central Antenna System	1/21/02	3/4/08	59%																												
64	6.7.5	L352 RTP Measurement	7/15/02	12/1/05	100%																												
80	6.7.5.15	L352 RTP Hardware Production	12/15/05	10/12/07	4%																												
88	6.7.10	L353 LO Transmitter Module	1/21/02	3/4/08	58%																												
105	6.10	L301 12-20 GHz Synthesizer	8/27/01	11/13/08	56%																												
123	6.10.20	L301 Synthesizer Hardware Production	8/25/04	11/13/08	17%																												
133	6.15	L302 10.8-14.8 GHz synthesizer	10/29/01	3/19/09	54%																												
149	6.15.20	L302 Synthesizer Hardware Production	8/25/04	3/19/09	27%																												
158	6.15.22	L300 Synthesizer Reference Generator	3/7/05	3/1/07	40%																												
165	6.20.1	Antenna Reference System	11/5/01	12/8/08	49%																												
167	6.20.5	L304 Reference Receiver	4/22/02	1/18/08	52%																												
185	6.20.10	L305 Reference Generator/Distributor	9/20/02	12/8/08	46%																												
208	6.25	Antenna Outfitting	8/12/03	11/23/10	29%																												
222	8.0	Band/LO Switches & Converters	11/19/01	3/1/10	79%																												
223	8.5	Band Switches	5/5/03	10/1/09	99%																												
235	8.10	4/P & L/S/C Converter Modules	1/28/02	6/1/06	94%																												
258	8.15.15	T303 U/X-band Converter	7/15/02	2/12/08	56%																												
281	8.15.20	T301 & 302 Converter Production	4/3/06	10/1/09	0%																												
289	8.20	Base Band Converters	11/19/01	3/1/10	92%																												
7	7	Fiber Optics	6/4/01	8/10/10	68%																												
1	7.1	Management/Subsystem Engineering	6/4/01	8/10/10	99%																												
14	7.5	IF Fiber System	3/18/02	6/30/09	78%																												
15	7.5.5	Formatter	3/18/02	3/31/06	99%																												
35	7.5.10	Deformatter	4/8/02	5/21/08	59%																												
52	7.5.15	Laser Transmitter	11/1/02	12/15/05	100%																												
65	7.5.20	IF Interface	6/18/02	6/30/09	99%																												
74	7.5.25	IF System Production	4/12/04	1/14/09	0%																												
82	7.10	Fiber Infrastructure & Antennas	10/17/01	8/10/10	59%																												
83	7.10.5	Fiber Infrastructure	10/17/01	7/13/07	76%																												
148	7.10.10	Antenna Fiber	9/30/02	8/10/10	43%																												
178	7.15	Samplers & MCB	3/1/02	1/14/09	59%																												
179	7.15.5	Monitor & Control	3/1/02	4/8/05	100%																												
195	7.15.10	2-4 GHz Sampler 3-Bit	4/19/02	1/14/09	37%																												
214	7.15.15	1 GHz Sampler 8-Bit	3/4/02	12/26/07	49%																												
231	7.20.10	LO Transmitter Module - L353	1/21/02	4/9/08	55%																												

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						Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
8	10	Monitor & Control	5/1/01	5/19/10	60%																												
1	10.1	Management/Subsystem Engineering	6/5/01	6/6/06	91%																												
16	10.5	M&C Electronic Hardware	1/14/02	10/8/07	70%																												
17	10.5.5	Physical Interface	1/14/02	10/8/07	59%																												
45	10.5.10	Utility Module - M302, M303	11/24/03	4/28/06	85%																												
52	10.5.15	Front End Interface Module - F317	8/1/03	4/21/06	98%																												
60	10.5.16	Analog boards	1/10/05	7/20/06	39%																												
65	10.30	Transition Module - F320	1/2/03	8/17/05	100%																												
72	10.32	MIB Slot Identification	1/27/04	5/1/06	89%																												
81	10.32	Converter Interface - M301	6/2/03	5/8/06	93%																												
88	10.10	M&C Network Hardware/ Software	12/3/01	4/30/07	94%																												
102	10.15	M&C Computing Systems, Hardware & Software	5/1/01	5/8/06	96%																												
116	10.15.20	MIB prototype board, design & dev	5/1/01	9/18/03	100%																												
129	10.20	M&C EVLA Software	5/1/01	5/19/10	40%																												
130	10.20.5	Stabilization of the VLA	5/1/01	6/10/04	100%																												
139	10.20.10	Requirements (High Level, Raw)	10/5/01	6/26/02	100%																												
153	10.20.15	High Level Sftwre Arch & Design	1/4/02	4/28/06	98%																												
171	10.20.25	Mid-Level Analysis & Design	1/8/02	4/8/09	22%																												
214	10.20.35	Detailed Design & Coding	10/5/01	5/19/10	25%																												
9	11	Data Management	10/1/01	8/27/10	62%																												
1	11.1	e2e Project	10/1/01	8/27/10	62%																												
2	11.1.1	Management and Project Book	12/3/01	6/9/04	100%																												
10	11.1.2	Infrastructure	1/6/03	9/12/06	59%																												
14	11.1.3	Proposal submission toolkit	9/16/02	5/11/05	100%																												
21	11.1.7	Observation scheduling toolkit	3/31/03	5/26/06	20%																												
24	11.1.8	Pipeline toolkit	4/1/02	6/8/07	29%																												
30	11.1.10	Archive toolkit	10/1/01	3/24/05	100%																												
38	11.1.11	Calibration toolkit	4/1/02	3/3/03	100%																												
44	11.1.12	Master Address List	4/3/06	10/13/06	0%																												
50	11.1.13	Transition Plan	3/21/05	8/27/10	0%																												

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