

## MMA Design & Development Phase Milestones

WBS Milestone tasks, sorted by WBS and date

WBS (f)	Milestone / Deliverable	Baseline	Current	Actual	Responsible
<b>1</b>	<b><u>Administration</u></b>				<b><u>Brown</u></b>
1.1.1.10	Project Book: Version 1	1998-07-20	1998-07-20	1998-07-20	Emerson
1.1.4.10	Deliver WBS for D&D phase	1998-09-30	1998-10-16	1998-10-16	Brown
1.1.1.20	Draft Interface Standards	1998-10-30	1998-11-09	1998-11-09	Emerson
1.1.6.10	Deliver Management Plan for D&D	1999-01-29	1998-11-30	1998-11-30	Brown
1.1.3.10	Complete Draft of Business Procedures	1998-10-30	1998-12-04	1998-12-04	Porter
1.1.1.35	Schedule of Reviews	1999-01-29	1999-02-09	1999-02-09	Brown
1.1.2.15	Schedule of Meetings	1999-01-29	1999-02-09	1999-02-09	Wootten
1.1.5.10	Deliver Personnel, Safety & Health Procedures	1999-01-29	1999-03-01	1999-03-01	Brown
1.1.4.15	Deliver preliminary WBS Entire Project	1999-01-29	1999-03-26	1999-03-26	Brown
1.1.4.35	Complete prelim cost estimate	1998-12-31	1999-04-30	NA	Brown
1.1.4.40	Deliver Prelim Cost Estimate	1999-04-30	1999-04-30	NA	Brown
1.1.3.15	Deliver Business Procedures for D&D	1999-04-30	1999-06-01	NA	Porter
1.4.4	Partnership Recommendations to NSF	1999-06-30	1999-06-30	NA	Brown
1.3.2	CONICYT Use Permissions	1999-09-30	1999-09-30	NA	Hardy
1.3.3.15	Access to OSF Land	1999-06-30	1999-12-27	NA	Hardy
1.1.6.15	Deliver Management Plan for Construction	1999-09-30	2000-01-02	NA	Brown
1.1.1.25	Interface Standards	2000-01-31	2000-01-31	NA	Emerson
1.1.4.20	Deliver final WBS entire project	2000-01-31	2000-01-31	NA	Brown
<b>2</b>	<b><u>Site Development</u></b>				<b><u>Gordon</u></b>
2.1.4	Deliver Development Plan, v. 1	1998-12-15	1999-01-15	1999-01-15	Gordon
2.2.4	Deliver revised development Plan	2000-06-30	2000-06-30	NA	Gordon
2.5	Start Facilities Construction in Chile	2001-01-01	2001-01-01	NA	Gordon
2.15.2	Hire Construction Manager for Chile	2001-03-01	2001-03-01	NA	Gordon
2.20.5.3	Bid Civil Works Construction	2001-12-03	2001-12-03	NA	Gordon
2.25.5.3	Bid Civil Works Construction	2001-12-03	2001-12-03	NA	Gordon
2.30.5.3	Bid OSF/Array Link Construction	2001-12-03	2001-12-03	NA	Gordon
2.20.10.3	Award Array Site Contracts	2002-03-01	2002-03-01	NA	Gordon
2.25.10.3	Award Contracts	2002-03-01	2002-03-01	NA	Gordon
2.30.10.3	Award Contracts	2002-03-01	2002-03-01	NA	Gordon
2.30.15.3	Accept OSF/Array Link	2002-12-13	2002-12-13	NA	Gordon
2.20.15.3	Accept Site Facility	2004-03-15	2004-03-15	NA	Gordon
2.25.15.3	Accept OSF Facility	2004-03-15	2004-03-15	NA	Gordon
	<b><u>Antenna</u></b>				<b><u>Napier</u></b>
3.2.2	PDR: Antenna	1998-07-28	1998-07-28	1998-07-28	Napier
3.3.5	Vendor Information Meeting	1998-09-23	1998-09-23	1998-09-23	Napier
3.2.4	CDR: Antenna RFP	1998-11-30	1999-03-05	1999-03-05	Napier
3.3.15	Issue Prototype Antenna RFP	1999-01-29	1999-04-06	1999-04-06	Napier
3.3.17	Antenna Bidders Meeting	1999-03-05	1999-05-18	NA	Napier
3.3.20	Receive Prototype Antenna Bid Response	1999-04-30	1999-06-30	NA	Napier
3.3.30	Sign Contract (#1+Option #2)	1999-06-30	1999-10-01	NA	Napier
3.3.35.05	Prototype Antenna PDR	2000-02-15	2000-02-15	NA	Napier
3.6.2	PDR: Antenna Metrology	2000-05-24	2000-03-01	NA	Napier

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3.5.30	CDR: Antenna Apex	1999-10-29	2000-03-14	NA	Napier
3.8.2	Deliver Transporter Requirements	2000-03-31	2000-03-16	NA	Napier
3.8.4	Issue Transporter RFP	2000-06-30	2000-06-04	NA	Napier
3.3.35.10	Prototype Antenna CDR	2000-07-03	2000-07-03	NA	Napier
3.3.35.15	Prot Antenna Complete Design Doc	2000-10-02	2000-10-02	NA	Napier
3.3.35.20	Prot Antenna Final Design Approval	2000-11-01	2000-11-01	NA	Napier
3.8.10	Sign Transporter Contract	2001-01-26	2000-12-24	NA	Napier
3.6.40	CDR: Antenna Metrology	2001-02-14	2001-01-28	NA	Napier
3.5.40	Deliver Prototype Antenna Apex	2001-01-31	2001-01-31	NA	Napier
3.3.35.25	Prot Antenna Fabrication Complete	2001-04-02	2001-04-02	NA	Napier
3.3.35.30	Prot Antenna Assembly Complete	2001-04-30	2001-04-30	NA	Napier
3.6.12	Deliver Prototype Antenna Metrology	2001-05-17	2001-05-17	NA	Napier
3.3.45	Delivery of Antenna #1	2001-06-01	2001-06-01	NA	Napier
3.8.20	Deliver/Accept Transporter #1	2001-06-01	2001-06-01	NA	Napier
<b>4</b>	<b>Receivers</b>				<b>Emerson</b>
4.1.12.7	Complete 86 GHz vacuum window prototype	1998-11-20	1998-11-20	1998-11-20	Webber
4.1.6.10	Complete 230 LO Plate, sideband source plates	1999-02-19	1998-12-01	1998-12-01	Webber
4.1.8.1.10	Comp. Eval. 200-300 GHz bal & sb-sep prototypes	1999-01-22	1999-03-08	1999-03-08	Webber
4.2.7	Deliver Test Ant Amplifier: 30 GHz Band	1999-06-29	1999-06-29	NA	Webber
4.1.18.5	Deliver Test Ant mixer: 86 GHz band	1999-06-30	1999-06-30	NA	Webber
4.1.1.2	PDR: SIS Mixer	1999-01-29	1999-09-15	NA	Webber
4.1.12.10	Complete 86 GHz Vac. Window Development	1999-04-23	1999-09-20	NA	Webber
4.1.18.3	Deliver Test Ant mixer: 230 GHz band	1999-06-30	1999-09-30	NA	Webber
4.2.9	Deliver Test Ant Amplifier: 90 GHz Band	1999-09-30	1999-09-30	NA	Webber
4.3.5	Complete Eval. Rcvr. Interface agreements	1999-05-31	1999-10-01	NA	Emerson
4.3.10	CDR: Evaluation Receiver	1999-11-29	1999-11-29	NA	Emerson
4.1.4.7	Complete Cryogenic IF plates for mixer testing	1999-06-01	1999-11-29	NA	Webber
4.1.11.2.10	First MMIC IF Amplifier Tests	1999-04-09	1999-11-30	NA	Webber
4.1.10.10	Complete Wafer Evaluation circuits	1999-08-13	1999-12-01	NA	Webber
4.1.9.10	Complete automated mixer testing	1999-12-03	1999-12-03	NA	Webber
4.1.6.11	Complete 650 LO plate	1999-10-22	1999-12-12	NA	Webber
4.1.8.3.1.9	Start 650 building block mixer tests	1999-10-22	1999-12-20	NA	Webber
4.2.8	Deliver Prototype Amplifier: 30 GHz Band	2000-01-31	2000-01-31	NA	Webber
4.1.11.2.14	Complete integrated MMIC IF development	1999-10-01	2000-02-28	NA	Webber
4.4.4	PDR: MMA Receiver	1999-09-24	2000-03-31	NA	Emerson
4.1.11.4.4	Complete IF development	2000-03-01	2000-04-17	NA	Webber
4.1.8.2.3.9	230 balanced mixer tests	1999-11-08	2000-05-02	NA	Webber
4.1.13.15	Complete Fourier Transform Spectrometer	2000-03-03	2000-05-03	NA	Webber
4.1.1.5	CDR: SIS Mixer	1999-09-30	2000-07-07	NA	Webber
4.1.8.3.2.9	Start 650 SSB Mixer tests	2000-04-21	2000-09-25	NA	Webber
4.1.8.3.3.9	Start 650 balanced mixer tests	2000-04-21	2000-09-25	NA	Webber
4.1.8.2.4.9	230 bal., sideband-sep. mixer tests	2000-05-08	2000-12-05	NA	Webber
4.4.35	CDR: MMA Receiver System	2000-07-05	2000-12-29	NA	Emerson

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4.10.10	PDR: Cryogenics Development	2000-07-05	2000-12-29	NA	Emerson
4.1.8.2.10	Deliver prototype 230 GHz	2000-07-03	2001-02-06	NA	Webber
4.10.15	CDR: Cryogenics Development	2001-03-30	2001-03-30	NA	Emerson
4.3.20	Deliver Antenna Test Eval Receiver	2001-05-01	2001-05-01	NA	Emerson
4.4.30.4	Deliver Prototype Dewar	2001-01-31	2001-07-27	NA	Emerson
4.1.8.3.4.9	Start 650 Bal. sb. sep. mixer tests	2001-04-20	2001-09-24	NA	Webber
4.10.20	Deliver Prototype Cryogenics System	2001-11-30	2001-11-30	NA	Emerson
4.1.8.3.5	Deliver prototype 650 GHz	2001-11-02	2002-04-08	NA	Webber
4.4.50	Complete Prototype MMA Receiver	2002-03-29	2002-05-24	NA	Emerson
4.4.65	Release MMA Receiver for manufacture	2002-10-25	2002-12-20	NA	Emerson
<b>5</b>	<b>LO System</b>				<b>Emerson</b>
5.3.4	PDR: Multiplier Chain LO	1998-11-16	1999-02-19	1999-02-19	Webber
5.4.2.2	Optical R/T Phase Lab Demo	1999-02-26	1999-03-29	1999-03-29	Emerson
5.4.1.3	Photonic Phase Cal Feasibility Demo	1998-12-31	1999-04-15	1999-04-15	Emerson
5.4.2.4	PDR: Optical R/T phase meas.	1999-04-30	1999-06-30	NA	Emerson
5.2.3	PDR: LO Reference	1999-06-30	1999-06-30	NA	Sramek
5.4.1.5	PDR: Photonic Phase Cal System	1999-05-31	1999-06-30	NA	Emerson
5.4.5	PDR: Photonic LO	1999-06-30	1999-06-30	NA	Emerson
5.3.3.3.9	Deliver 230 GHz Doubler Power Demo	1998-12-31	1999-07-01	NA	Webber
5.4.6.6	Deliver 100 GHz Velocity Matched photomixer	1999-10-29	1999-10-29	NA	Emerson
5.3.6.4	Deliver Prototype 230 GHz LO for Prot. Rcvr.	1999-12-27	1999-12-27	NA	Webber
5.4.1.7	CDR: Photonic Phase Cal System	1999-12-31	1999-12-31	NA	Emerson
5.4.2.8	CDR: Optical R/T Phase Measurement	1999-12-31	1999-12-31	NA	Emerson
5.4.2.9	Decision: Opt or Microwave R/T Phase Meas for MMA	2000-01-30	2000-01-30	NA	Sramek
5.3.5.10	Deliver 230 GHz MC LO for Eval Rcvr	2000-03-01	2000-03-01	NA	Webber
5.4.10	CDR: Photonic LO	2000-03-31	2000-03-31	NA	Emerson
5.5	CDR: LO System	2000-06-30	2000-06-30	NA	Emerson
5.6	Decision: Multiplier Chain or Photonic LO	2000-06-30	2000-06-30	NA	Emerson
5.3.3.8	CDR: Multiplier Chain LO	2000-03-31	2000-12-01	NA	Webber
5.4.1.9	Deliver Photonic Phase Cal prototypes	2000-12-31	2000-12-31	NA	Emerson
5.2.35	Deliver LO Reference bench prototype	2001-01-31	2001-01-31	NA	Sramek
5.2.40	Deliver LO Ref Field Prototypes	2002-03-01	2002-03-01	NA	Sramek
5.4.13	Deliver Prototype Photonic LO	2002-08-23	2002-08-23	NA	Emerson
5.8	Production Review: LO	2003-02-28	2003-02-28	NA	Emerson
5.4.1.11	Production Review: Photonic Phase Cal	2003-05-05	2003-03-03	NA	Emerson
<b>6</b>	<b>IF System</b>				<b>Sramek</b>
6.3	PDR: IF System	1999-04-30	1999-05-17	NA	Sramek
6.10	CDR: IF System	2000-03-31	2000-03-31	NA	Sramek
6.15	Deliver (Bench) Prototype IF System	2001-01-31	2001-01-31	NA	Sramek
6.20	Deliver IF Field Prototypes to Test Interfeometer	2002-03-01	2002-03-01	NA	Sramek
<b>7</b>	<b>FO System</b>				<b>Sramek</b>
7.3	PDR: FO System (IF Transmission)	1999-05-14	1999-05-17	NA	Sramek
7.6.6	PDR: FO System (LO Transmission)	1999-06-30	1999-06-30	NA	Sramek

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7.13	Decision: Analog/Digital Transmission	1999-07-30	1999-10-29	NA	Sramek
7.10	CDR: FO System	2000-03-31	2000-03-31	NA	Sramek
7.12	Deliver Bench Prototype FO System	2001-01-31	2001-01-31	NA	Sramek
7.20	Deliver FO Field Prototypes to Test Interferometer	2002-03-01	2002-03-01	NA	Sramek
<b>8</b>	<b><u>Correlator</u></b>				<b><u>Webber</u></b>
8.5.3.3	Decision: FIR Filter or Analog BBC	1998-12-31	1999-02-18	1999-02-18	Webber
8.3.5	PDR: Correlator	1999-08-02	1999-08-02	NA	Webber
8.5.8	CDR: Finite Impulse Response Filter	1999-07-01	2000-02-28	NA	Webber
8.2.6	Deliver Test Correlator to VLA site	2000-03-31	2000-03-31	NA	Webber
8.10	CDR: Prototype Correlator	2000-07-31	2000-07-31	NA	Webber
8.5.16	Deliver FIR Filter for Test Interferometer	2000-12-01	2000-12-01	NA	Webber
8.12.5	Deliver Prototype Correlator to VLA site	2003-05-30	2003-05-30	NA	Webber
8.13.1.5	Deliver 1/4 Correlator to MMA site	2004-06-18	2004-06-18	NA	Webber
8.13.2.4	Deliver 1/4 Correlator to MMA site	2005-03-25	2005-03-25	NA	Webber
8.13.3.4	Deliver 1/4 Correlator to MMA site	2005-12-30	2005-12-30	NA	Webber
8.13.4.4	Deliver 1/4 Correlator to MMA site	2006-10-06	2006-10-06	NA	Webber
<b>9</b>	<b><u>Computing</u></b>				<b><u>Glendenning</u></b>
9.4.4	Deliver: M&C Draft Interface specifications	1999-06-01	1999-06-01	NA	Glendenning
9.2	PDR: Comp. Requirements & Control Software	1999-06-30	1999-06-30	NA	Glendenning
9.7.4	CDR: Test Correlator Software	1999-09-01	1999-10-31	NA	Glendenning
9.4.8	CDR: Monitor & Control System	2000-03-31	2000-01-30	NA	Glendenning
9.5.7	CDR: Single Dish Antenna Test System	2000-03-01	2000-03-01	NA	Glendenning
9.4.10	M&C Board available	2000-03-31	2000-03-31	NA	Emerson
9.7.7	Deliver Test Correlator Software	2000-03-01	2000-05-28	NA	Glendenning
9.13.3	CDR: Archiving	2000-05-29	2000-05-29	NA	Glendenning
9.5.11	Deliver Single Dish Antenna Test System	2001-03-01	2001-03-01	NA	Glendenning
9.4.13	Deliver: M&C System	2001-03-30	2001-03-30	NA	Glendenning
9.6.1.4	Deliver Holography System Software	2001-03-30	2001-03-30	NA	Emerson
9.14.3	CDR: Real-time Imaging	2001-07-24	2001-07-24	NA	Glendenning
9.15.3	CDR: Scheduling	2000-12-28	2003-12-01	NA	Glendenning
<b>10</b>	<b><u>System Integration</u></b>				<b><u>Emerson</u></b>
10.7.3	Design Review: Holography System	1999-03-29	1999-04-19	1999-04-19	Emerson
10.2.3	Deliver MMA Interfaces and Standards Document	1999-04-30	1999-06-30	NA	Emerson
10.10.2	Deliver Prot. Ant. Testing Plan	1999-07-02	1999-07-02	NA	Emerson
10.4.2	Design Review: Test Int. Site Preparation	2000-04-03	2000-04-03	NA	Sramek
10.7.6	Deliver Holography System	2000-06-30	2001-03-30	NA	Emerson
10.4.7	Test Interferometer Site Complete	2001-04-30	2001-04-30	NA	Sramek
10.10.4.4	Antenna #1 Outfitting Complete	2001-11-02	2001-09-03	NA	Emerson
10.10.9.4	Antenna #2 Outfitting Complete	2002-05-31	2002-04-01	NA	Emerson
<b>11</b>	<b><u>Calibration &amp; Imaging</u></b>				<b><u>Wootten</u></b>
11.1.6.1	Site Char. & Monitoring Review (URSI meeting)	1999-01-11	1999-01-11	1999-01-11	Radford
11.3.3.4	Initial Amplitude Cal Review	1999-05-31	1999-05-31	NA	Wootten
11.3.2.1	Initial Radiometric Phase Cal Review	1999-05-31	1999-06-09	NA	Wootten

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11.3.2.4	Decision: 183 or 22 GHz Phase monitor	2001-05-31	1999-07-01	NA	Wootten
11.2.3	Design Review: Array Configuration	2000-01-31	2000-01-31	NA	Wootten
11.1.6.2	Mid-term Site Char. & Monitoring Review	2000-03-31	2000-03-31	NA	Radford
11.3.2.2	Mid-term Radiometric Phase Cal Review	2000-05-31	2000-05-31	NA	Wootten
11.3.3.5	Mid-term Amplitude Cal Review	2000-05-31	2000-05-31	NA	Wootten
11.1.6.3	Final Site Char. & Monitoring Review	2001-03-30	2001-03-30	NA	Radford
11.3.2.3	Final Radiometric Phase Cal Review	2001-05-31	2001-05-31	NA	Wootten
11.3.3.6	Final Amplitude Cal Review	2001-05-31	2001-05-31	NA	Wootten