

<b>WBS</b>		<b>TASK NAME</b>
<b>6.01</b>	<b>C. Langley</b>	<b>Project Management</b>
	<u>6.01.01</u>	<u>Management/Subsystem Engineering</u>
	<u>6.01.06</u>	<u>Project Book, Manuals and Documentation</u>
	<u>6.01.10</u>	<u>Office Equipment &amp; Supplies</u>
	<u>6.01.15</u>	<u>Drafting and Lab Services</u>
	<u>6.01.20</u>	<u>Advisory Comm Support</u>
<b>6.02</b>	<b>Jackson/Butler</b>	<b>System Integration and Testing</b>
	<u>6.02.01</u>	<u>Management/Subsystem Engineering</u>
	6.02.01.05	Block Diagrams for Systems & Subsystems
	6.02.01.10	Engineering Performance Specifications
	6.02.01.15	Basic Engineering Interface Specifications
	<u>6.02.05</u>	<u>Test and Lab Equipment</u>
	6.02.05.05	Production Test and Lab Equipment, FO
	6.02.05.10	Production Test and Lab Equipment, FE
	6.02.05.15	Production Test and Lab Equipment, LO
	6.02.05.20	Test and Lab Equipment General
	<u>6.02.10</u>	<u>Power Supply System</u>
	6.02.10.05	Central Electronics Room
	6.02.10.10	Master LO Power Supply
	6.02.10.15	Antenna Vertex Room Power Supply
	6.02.10.20	Antenna Pedestal Room Power Supply
	<u>6.02.15</u>	<u>Site RFI Characterization &amp; Suppression</u>
	6.02.15.05	Facilities Development
	6.02.15.09	Limits for RFI Emmission Levels
	6.02.15.10	Acceptance Test Development
	6.02.15.15	RFI/EMC Analysis of Electronics & Computers
	6.02.15.20	Site RFI Mitigation
	<u>6.02.16</u>	<u>External RFI &amp; System Immunity</u>
	6.02.16.05	Measurement of PFD/BW Levels of RFI at Each Band
	6.02.16.10	EVLA Antenna Sidelobe Gain Patterns 2-120 Degrees
	6.02.16.15	Distribution of Gains, SNRs & Headroom of existing Rcvrs
	6.02.16.20	Spec's for Distribution of System/Subsystem Gains, SNRs
	6.02.16.25	Spec's/Development of RFI Filters for Rcvrs
	6.02.16.30	Spec's/Development of RFI Filters in IF System
	<u>6.02.20</u>	<u>Scientific Support</u>
	6.02.20.05	Development of Scientific Performance Specifications
	6.02.20.10	Spec's for Minimum Limits for Angular Separation from Satellites
	<u>6.02.25</u>	<u>Modules, Bins and Racks</u>
<u>6.02.30</u>	<u>Transition Planning</u>	
<b>6.03</b>	<b>G. Stanzione</b>	<b>Civil Construction</b>
	<u>6.03.01</u>	<u>Management/Subsystem Engineering</u>
	<u>6.03.05</u>	<u>FO Cable, Trench, Install</u>
	6.03.05.05	FO Cable, Trench and Install (200 kft)
	6.03.05.10	FO Cable (550kft)
	<u>6.03.10</u>	<u>New Correlator Room</u>
	6.03.10.05	New Correlator Shielded Chamber
	6.03.10.10	Remodeling and Demolition
	6.03.10.15	IPG Shielded Chamber
	6.03.10.20	Power Distribution
6.03.10.25	Install New Correlator	
<u>6.03.15</u>	<u>Power Distribution</u>	
<u>6.03.20</u>	<u>HVAC and Fire Suppression</u>	

<b>WBS</b>	<b>TASK NAME</b>
<b>6.04</b>	<b>L. Serna</b>
<u>6.04.01</u>	<b>Antennas</b>
<u>6.04.02</u>	<u>Management/Subsystem Engineering</u>
<u>6.04.05</u>	<u>Precision Machining</u>
<u>6.04.10</u>	<u>Feed Cone and Towers</u>
<u>6.04.15</u>	<u>Antenna Structural Modifications</u>
	<u>Antenna Electrical &amp; HVAC Service</u>
	6.04.15.05 Antenna Electrical
	6.04.15.10 Antenna HVAC
<u>6.04.20</u>	<u>Feed Moisture Control and Pointing Improvements</u>
<b>6.05</b>	<b>C. Kutz</b>
<u>6.05.01</u>	<b>Front End Systems</b>
<u>6.05.05</u>	<u>Management/Subsystem Engineering</u>
	<u>Card Cage, Controllers</u>
	6.05.05.01 Front End Card Cage
	6.05.05.02 FE Control Modules
	6.05.05.03 F-Rack
<u>6.05.RX</u>	<u>Receivers</u>
	6.05.05.05 L Band
	6.05.05.10 S Band
	6.05.05.15 C Band
	6.05.05.20 X Band
	6.05.05.25 Ku Band
	6.05.05.30 K Band
	6.05.05.32 K Band Completion (7 units)
	6.05.05.35 Ka Band
	6.05.05.40 Q Band
	6.05.05.45 Q Band Completion (5 units)
<u>6.05.10</u>	<u>Feeds</u>
	6.05.10.05 L Band
	6.05.10.10 S Band
	6.05.10.15 C Band
	6.05.10.20 X Band
	6.05.10.25 Ku Band
	6.05.10.32 K Band
	6.05.10.30 K Band Completion (7 units)
	6.05.10.35 Ka Band
	6.05.10.40 Q Band
	6.05.10.45 Q Band Completion (5 units)
<u>6.05.30</u>	<u>Cryogenics</u>
	6.05.30.05 Vacuum Pump and Manifolds
	6.05.30.10 Compressors & He Lines
	6.05.30.15 Refrigerators
<b>6.06</b>	<b>T. Cotter</b>
<u>6.06.01</u>	<b>Local Oscillator System</b>
<u>6.06.05</u>	<u>Management/Subsystem Engineering</u>
	<u>Master LO System</u>
	6.06.05.05 H Maser Frequency Standard (&Rb)
	6.06.05.10 PPS Generator & Distributor
	6.06.05.25 LO Ref Generator
	6.06.05.30 LO ref Distributor - Control Bldg
	6.06.05.35 LO Driver
	6.06.05.40 512 MHz Offset Generator
<u>6.06.07</u>	<u>Central Antenna System</u>
	6.06.07.05 Round Trip Phase Receiver
<u>6.06.10</u>	<u>12-20 GHz Synthesizer</u>
<u>6.06.15</u>	<u>10.8-14.8 GHz Synthesizer</u>
<u>6.06.20</u>	<u>Antenna Reference System</u>
	6.06.20.05 Antenna LO Reference Generator

<b>WBS</b>	<b>TASK NAME</b>
<b>6.07</b>	<b>D. Gerrard</b>
<u>6.07.01</u>	<b>Fiber Optic System</b>
<u>6.07.05</u>	<u>Management/Subsystem Engineering</u>
	<u>IF Fiber System</u>
6.07.05.05	Formatter
6.07.05.10	Deformatter
6.07.05.15	Laser Transmitter
<u>6.07.10</u>	<u>Infrastructure and Antenna Outfitting</u>
6.07.10.05	Fiber Infrastructure
6.07.10.10	Antennas
<u>6.07.15</u>	<u>Samplers &amp; MCB</u>
6.07.15.05	Monitor and Control
6.07.15.10	2-4 GHz Sampler
6.07.15.15	1 GHz Sampler
<u>6.07.20</u>	<u>LO Fiber System</u>
6.07.20.10	LO/Reference
<b>6.08</b>	<b>T. Cotter</b>
<u>6.08.01</u>	<b>Intermediate Frequency System</b>
<u>6.08.05</u>	<u>Management/Subsystem Engineering</u>
<u>6.08.10</u>	<u>Switches and RF Cabling</u>
<u>6.08.15</u>	<u>4/P &amp; L/S/C-Band Converters</u>
<u>6.08.20</u>	<u>U/X Converter Module</u>
	<u>IF Down Converter</u>
<b>6.09</b>	<b>B. Carlson/M. Revnell</b>
<u>6.09.01</u>	<b>Correlator</b>
<u>6.09.05</u>	<u>Management/Subsystem Engineering</u>
<u>6.09.10</u>	<u>NRAO Correlator Interface</u>
<u>6.09.15</u>	<u>Pre-project Tooling/Setup</u>
	<u>Station Board H/W Development</u>
6.09.15.02	Station Board
6.09.15.05	FIR Filter Chip Development
6.09.15.10	Course Delay Module
<u>6.09.20</u>	<u>Sub-band Distribution Backplane</u>
<u>6.09.25</u>	<u>Station Data Fanout Board</u>
<u>6.06.30</u>	<u>Baseline Entry Backplane</u>
<u>6.09.35</u>	<u>Baseline Board H/W Development</u>
6.09.35.02	Baseline Board
6.09.35.05	Correlator Chip Development
<u>6.09.40</u>	<u>Phasing Board</u>
<u>6.09.45</u>	<u>Phasing Board Entry Backplane H/W Deployment</u>
<u>6.09.50</u>	<u>TIMECODE Generator Box H/W Deployment</u>
<u>6.09.55</u>	<u>Real-time S/W Development</u>
<u>6.09.60</u>	<u>System Design (Racks, Main Pwr, Cabling, Computer)</u>
<u>6.09.65</u>	<u>Production Model Test/Burn-in</u>
<u>6.09.70</u>	<u>System Integration &amp; Test (Pentecton)</u>
<u>6.09.75</u>	<u>System Integration &amp; Test (VLA off-line)</u>
<u>6.09.80</u>	<u>Online Debug, Test (VLA on-line)</u>
<b>6.10</b>	<b>B. Butler</b>
<u>6.10.01</u>	<b>Monitor &amp; Control System</b>
<u>6.10.05</u>	<u>Management/Subsystem Engineering</u>
	<u>M&amp;C Electronic Hardware</u>
6.10.05.05	Physical Interface
6.10.05.10	Utility Module
<u>6.10.10</u>	<u>M&amp;C Network, Hardware &amp; Software</u>
<u>6.10.15</u>	<u>M&amp;C Computing Systems Hrdwre &amp; Sftwre</u>
<u>6.10.20</u>	<u>M&amp;C EVLA Software</u>
6.10.20.05	Stabilization of the VLA
6.10.20.10	Requirements
6.10.20.15	High Level Software Architecture & Design
6.10.20.20	Test & Devel Support, Enhanced Antennas
6.10.20.25	Mid Level Analysis & Design
6.10.20.30	Test & Devel Support, Correlator
6.10.20.35	Detailed Design & Coding
<u>6.10.25</u>	<u>Switch Interface Module</u>
<u>6.10.30</u>	<u>M&amp;C Transition Hardware</u>

<b>WBS</b>		<b>TASK NAME</b>
<b>6.11</b>	<b>B. Butler/J. Robnett</b>	<b>Data Management and Computing</b>
	<u>6.11.01</u>	<u>Management/Subsystem Engineering</u>
	<u>6.11.05</u>	<u>Proposal Preparation and Submission</u>
	6.11.05.05	Requirements
	6.11.05.10	Proposal submission toolkit
	<u>6.11.10</u>	<u>Observation Preparation Software</u>
	6.11.10.05	Requirements
	6.11.10.10	Observation description toolkit
	6.11.10.15	Observation planning toolkit
	<u>6.11.15</u>	<u>Observation Scheduling</u>
	6.11.15.05	Requirements
	6.11.15.10	Observation scheduling toolkit
	6.11.15.15	Observing toolkit
	6.11.15.20	EVLA-specific Observing toolkit
	<u>6.11.20</u>	<u>Image Pipeline</u>
	6.11.20.05	Requirements
	6.11.20.10	Pipeline toolkit
	6.11.20.15	Pipeline heuristics
	6.11.20.20	EVLA-specific pipeline heuristics
	<u>6.11.25</u>	<u>Data Archive</u>
	6.11.25.05	Requirements
	6.11.25.10	Archive toolkit
	<u>6.11.30</u>	<u>Data Post Processing</u>
	6.11.30.05	Requirements
	6.11.30.10	CASA package (formerly EVLA AIPS++)
	<u>6.11.35</u>	<u>Networking</u>
	6.11.35.05	Upgrade Servers
	6.11.35.10	Replace copper by optical fiber
	6.11.35.15	Upgrade Clients
	6.11.35.20	Update VLA/AOC Datalink
	6.11.35.25	Update Non-Operations VLA Network
	6.11.35.30	VOIP Antenna Phones
	<u>6.11.40</u>	<u>Computing Hardware</u>
	6.11.40.05	Development hardware
	6.11.40.10	Archive hardware
	6.11.40.15	Data Reduction Hardware
	<u>6.11.45</u>	<u>Correlator Backend Network</u>
	6.1145.05	Correlator Backend Network
<b>6.12</b>		<b>Education and Public Outreach</b>
	<u>6.12.05</u>	<u>EVLA Contribution to new Visitor Center</u>
<b>6.13</b>	<b>C. Langley</b>	<b>Project Contingency</b>
	<u>6.13.05</u>	<u>Unallocated Funds</u>