

ALMA Task Planning Form

Task Name Station Card Prototype		Responsibility Escoffier	
WBS Number 8.6.1	e.g., I.I.4.45	Start	<-or-> Predecessor
Estimator Webber	Name	Finish	<-or-> Duration
Basis of Estimate EN		(yyyy-mm-dd) (weeks)	
EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost			
Assigned Risk factors		Multipliers for Contingency	
Technical	4 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2 (2 or 4 are valid)
Cost	4 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1 (1 or 2 are valid)
Schedule	8 (2, 4 or 8; see definition)	Calc. Contingency: 20% (See definitions)	
Task Description (Text for the WBS dictionary)	The final version of the station card, of which an initial prototype will have been developed in 2000, will be designed, fabricated, and tested. A final test fixture will also be designed, fabricated, and tested.		

Labor

Name or Position	Sci,Eng,Prog, or Tech Position Type	Location	Estimated Effort (in person-months) for each position for each year							Totals (person-m)	
			1999	2000	2001	2002	2003	2004	2005		
Escoffier	Eng	E	CV			6.0					6.0
Treacy	Tech	T	CV			6.0					6.0
Totals (person-months):						12.0					12.0
Approx. Labor Costs (1999 \$K):						67.0					67.0
Total (person-years)										1.0	

WBS 8.6.1 Station Card Prototype

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999 2000 2001 2002 2003 2004 2005							Totals (1999 \$K)
			Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	
PC board fab	each	2.5			2					5.0
Components	each	1.2			2					2.4
Totals (1999 \$K):						7.4				7.4

WBS 8.6.1 Station Card Prototype

Contracts

Contract Description	1999	2000	2001	2002	2003	2004	2005	Totals (1999 \$K)
	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	
Totals (1999 \$K):								

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):			74.4					74.4
Estimated Contingency requirement (1999 \$K)			14.9					14.9

ALMA Task Planning Form

Task Name Correlator board		Responsibility	
WBS Number 8.6.2	e.g., 1.1.4.45	Start	<-or-> Predecessor
Estimator Webber	Name	Finish	<-or-> Duration
Basis of Estimate EN		(yyyy-mm-dd) (weeks)	
EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost			

Assigned Risk factors		Multipliers for Contingency	
Technical	4 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2 (2 or 4 are valid)
Cost	4 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1 (1 or 2 are valid)
Schedule	8 (2, 4 or 8; see definition)	Calc. Contingency: 20% (See definitions)	

Task Description
(Text for the WBS dictionary) The correlator card design will be completed and a prototype will be fabricated and tested. Any revisions needed will be made and a new prototype fabricated and tested. In addition, a test fixture for the correlator cards will be designed, fabricated, and tested.

Labor

Name or Position	(Sci,Eng,Prog. or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year							Totals (person-m)
			1999	2000	2001	2002	2003	2004	2005	
Greenberg	EN	E			6.0					6.0
Treacy	Tech	T			6.0					6.0
Totals (person-months):			12.0							12.0
Approx. Labor Costs (1999 \$K):			67.0							67.0
								Total (person-years)	1.0	

WBS 8.6.2 Correlator board

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999 Quantity	2000 Quantity	2001 Quantity	2002 Quantity	2003 Quantity	2004 Quantity	2005 Quantity	Totals (1999 \$K)
PC board fab	each	2.5			2					5.0
Components	each	1.2			2					2.4
Totals (1999 \$K):			7.4							7.4

WBS 8.6.2 Correlator board

Contracts

Contract Description	1999 Cost (\$K)	2000 Cost (\$K)	2001 Cost (\$K)	2002 Cost (\$K)	2003 Cost (\$K)	2004 Cost (\$K)	2005 Cost (\$K)	Totals (1999 \$K)
Totals (1999 \$K):								

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):			74.4					74.4
Estimated Contingency requirement (1999 \$K)			14.9					14.9

ALMA Task Planning Form

Task Name Long-Term Accumulator Board		Responsibility	
WBS Number 8.6.3	e.g., I.I.4.45	Start	<-or-> Predecessor
Estimator Webber	Name	Finish	<-or-> Duration
Basis of Estimate EN		(yyyy-mm-dd) (weeks)	
EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost			
Assigned Risk factors		Multipliers for Contingency	
Technical	4 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2 (2 or 4 are valid)
Cost	4 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1 (1 or 2 are valid)
Schedule	8 (2, 4 or 8; see definition)	Calc. Contingency:	20% (See definitions)
Task Description		A final version of the long-term accumulator board will be designed, fabricated, and tested. In addition, a final version of a test fixture will be designed, fabricated, and tested.	
(Text for the WBS dictionary)			

Labor

Name or Position	(Sci,Eng,Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year							Totals (person-m)	
			1999	2000	2001	2002	2003	2004	2005		
Broadwell	EN	E	CV			6.0					6.0
New hire	Tech	T	CV			6.0					6.0
Totals (person-months):						12.0					12.0
Approx. Labor Costs (1999 \$K):						67.0					67.0
							Total (person-years)			1.0	

WBS 8.6.3 Long-Term Accumulator Board

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999 Quantity	2000 Quantity	2001 Quantity	2002 Quantity	2003 Quantity	2004 Quantity	2005 Quantity	Totals (1999 \$K)
PC board fab	each	2.5			2					5.0
Components	each	1.2			2					2.4
Totals (1999 \$K):						7.4				7.4

WBS 8.6.3 Long-Term Accumulator Board

Contracts

Contract Description	1999 Cost (\$K)	2000 Cost (\$K)	2001 Cost (\$K)	2002 Cost (\$K)	2003 Cost (\$K)	2004 Cost (\$K)	2005 Cost (\$K)	Totals (1999 \$K)
Totals (1999 \$K):								

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):			74.4					74.4
Estimated Contingency requirement (1999 \$K)			14.9					14.9

ALMA Task Planning Form

Task Name	System Control Board		Responsibility		
WBS Number	8.6.4	<i>e.g., 1.1.4.45</i>	Start	<-or-> Predecessor	
Estimator	Webber	Name	Finish	<-or-> Duration	
Basis of Estimate	EN	EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost			(weeks)
Assigned Risk factors			Multipliers for Contingency		
Technical	4	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	1 (2 or 4 are valid)	
Cost	4	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	2 (1 or 2 are valid)	
Schedule	8	(2, 4 or 8; see definition)	Calc. Contingency:	20% (See definitions)	
Task Description <i>(Text for the WBS dictionary)</i>	The system control board will be designed, fabricated, and tested.				

Labor

Name or Position	(Sci,Eng,Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year							Totals (person-m)
			1999	2000	2001	2002	2003	2004	2005	
Esoffier	EN	E CV			3.0					3.0
New hire	Tech	T CV			3.0					3.0
Totals (person-months):					6.0					6.0
Approx. Labor Costs (1999 \$K):					33.5					33.5
									Total (person-years)	0.5

WBS 8.6.4 System Control Board

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999-2005							Totals (1999 \$K)
			Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	
PC board fab	each	2.5			1					2.5
Components	each	1.2			1					1.2
Totals (1999 \$K):					3.7					3.7

WBS 8.6.4 System Control Board

Contracts

Contract Description	1999	2000	2001	2002	2003	2004	2005	Totals (1999 \$K)
	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	
Totals (1999 \$K):								

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):			37.2					37.2
Estimated Contingency requirement (1999 \$K)			7.4					7.4

ALMA Task Planning Form

Task Name	Correlator chip		Responsibility		
WBS Number	8.7	e.g., 1.1.4.45	Start	<-or->Predecessor	
Estimator	Webber	Name	Finish	<-or-> Duration	
Basis of Estimate	EN	EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost	(yyyy-mm-dd)	(weeks)	
Assigned Risk factors			Multipliers for Contingency		
Technical	6	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2	(2 or 4 are valid)
Cost	6	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1	(1 or 2 are valid)
Schedule	8	(2, 4 or 8; see definition)	Calc.Contingency:	26% (See definitions)	
Task Description <i>(Text for the WBS dictionary)</i>	The correlator chip designed in the D&D phase will go to mask and wafer fabrication, and prototypes will be obtained for testing. Any required modifications and redesign will be done. The final production run will be made. 20% spares of this custom chip will be stocked.				

Labor

Name or Position	(Sci,Eng,Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year							Totals (person-m)	
			1999	2000	2001	2002	2003	2004	2005		
Greenberg	EN	E	CV			6.0					6.0
Totals (person-months):					6.0						6.0
Approx. Labor Costs (1999 \$K):					43.6						43.6
										Total (person-years)	0.5

WBS 8.7 Correlator chip

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999 Quantity	2000 Quantity	2001 Quantity	2002 Quantity	2003 Quantity	2004 Quantity	2005 Quantity	Totals (1999 \$K)
Totals (1999 \$K):										

WBS 8.7 Correlator chip

Contracts

Contract Description	1999 Cost (\$K)	2000 Cost (\$K)	2001 Cost (\$K)	2002 Cost (\$K)	2003 Cost (\$K)	2004 Cost (\$K)	2005 Cost (\$K)	Totals (1999 \$K)
Final design work (Innotech)			50					50.0
Mask fabrication			236					236.0
Package 100 prototypes			50					50.0
Fabricate production chips				1966				1,966.0
Totals (1999 \$K):								336.0 1,966.0 2,302.0

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):			379.6	1,966.0				2,345.6
Estimated Contingency requirement (1999 \$K)			98.7	511.2				609.8

ALMA Task Planning Form

Task Name	Prototype racks		Responsibility		
WBS Number	8.8	<i>e.g., 1.1.4.45</i>	Start	<-or-> Predecessor	
Estimator	Webber	Name	Finish	<-or-> Duration	
Basis of Estimate	EN	EN-Engineering/ Bottom Up/ Parametric: VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost	(yyyy-mm-dd)	(weeks)	
Assigned Risk factors			Multipliers for Contingency		
Technical	4	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2	(2 or 4 are valid)
Cost	4	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1	(1 or 2 are valid)
Schedule	8	(2, 4 or 8; see definition)	Calc. Contingency:	20% (See definitions)	
Task Description (Text for the WBS dictionary)	The racks for a prototype minimally-populated correlator will be designed, built, and tested. Any changes to the design needed before production fabrication will be designed.				

Labor

Name or Position	(Sci,Eng,Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year							Totals (person-m)	
			1999	2000	2001	2002	2003	2004	2005		
Engineer TBD	EN	E	CV			3.0					3.0
Tech TBD	Tech	T	CV			6.0					6.0
Totals (person-months):						9.0					9.0
Approx. Labor Costs (1999 \$K):						45.2					45.2
						Total (person-years)				0.8	

WBS 8.8 Prototype racks

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999-2005 Quantities							Totals (1999 \$K)
			1999 Quantity	2000 Quantity	2001 Quantity	2002 Quantity	2003 Quantity	2004 Quantity	2005 Quantity	
Racks and bins	each	10			1					10.0
Power supplies	each	1			3					3.0
Cables, connectors, metalwork	each	7.5			1					7.5
Backplanes	each	2.5			1					2.5
Computer	each	4.5			1					4.5
Test equipment	each	50			1					50.0
Totals (1999 \$K):					77.5					77.5

WBS 8.8 Prototype racks

Contracts

Contract Description	1999-2005 Costs							Totals (1999 \$K)
	1999 Cost (\$K)	2000 Cost (\$K)	2001 Cost (\$K)	2002 Cost (\$K)	2003 Cost (\$K)	2004 Cost (\$K)	2005 Cost (\$K)	
Totals (1999 \$K):								

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):			122.7					122.7
Estimated Contingency requirement (1999 \$K)			24.5					24.5

ALMA Task Planning Form

Task Name FIR filter			Responsibility		
WBS Number 8.5		e.g., 1.1.4.45	Start		<-or-> Predecessor
Estimator Webber		Name	Finish		<-or-> Duration
Basis of Estimate EN		EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost		(yyyy-mm-dd)	(weeks)
Assigned Risk factors			Multipliers for Contingency		
Technical 4		(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical 2		(2 or 4 are valid)
Cost 4		(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost 1		(1 or 2 are valid)
Schedule 8		(2, 4 or 8; see definition)	Calc. Contingency: 20% (See definitions)		

Task Description A final version of the FIR filter board will be fabricated and tested.
(Text for the WBS dictionary)

Labor

Name or Position	(Sci, Eng, Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year					Totals (person-m)			
			1999	2000	2001	2002	2003		2004	2005	
Escoffier	EN	E				3.0					3.0
Tech TBD	Tech	T				2.0					2.0
Totals (person-months):						5.0				5.0	
Approx. Labor Costs (1999 \$K):						29.6				29.6	
								Total (person-years)		0.4	

WBS 8.5 FIR filter

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999 Quantity	2000 Quantity	2001 Quantity	2002 Quantity	2003 Quantity	2004 Quantity	2005 Quantity	Totals (1999 \$K)	
PC board fab	each	2.5				2				5.0	
Components	each	1.2	2.5			2				2.4	
Totals (1999 \$K):						7.4				7.4	

WBS 8.5 FIR filter

Contracts

Contract Description	1999 Cost (\$K)	2000 Cost (\$K)	2001 Cost (\$K)	2002 Cost (\$K)	2003 Cost (\$K)	2004 Cost (\$K)	2005 Cost (\$K)	Totals (1999 \$K)	
Totals (1999 \$K):									

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):			37.0					37.0
Estimated Contingency requirement (1999 \$K)			7.4					7.4

ALMA Task Planning Form

Task Name	Prototype correlator production		Responsibility		
WBS Number	8.12	e.g., 1.1.4.45	Start	<-or-> Predecessor	
Estimator	Webber Name		Finish	<-or-> Duration	
Basis of Estimate	EN	EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost	(yyyy-mm-dd)		(weeks)
Assigned Risk factors			Multipliers for Contingency		
Technical	8	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2 (2 or 4 are valid)	
Cost	4	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1 (1 or 2 are valid)	
Schedule	8	(2, 4 or 8; see definition)	Calc. Contingency:	28% (See definitions)	
Task Description <i>(Text for the WBS dictionary)</i>	A deliverable prototype correlator with at least the capability of cross-correlating a dual-polarization 2 GHz bandwidth from 2 antennas will be built and tested.				

Labor

Name or Position	(Sci,Eng,Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year							Totals (person-m)	
			1999	2000	2001	2002	2003	2004	2005		
Engineer	EN	E	CV			6.0	24.0	12.0			42.0
Technician	Tech	T	CV			6.0	32.0	12.0			50.0
Totals (person-months):						12.0	56.0	24.0			92.0
Approx. Labor Costs (1999 \$K):						67.0	299.0	133.9			499.9
										Total (person-years)	7.7

WBS 8.12 Prototype correlator production

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999-2005							Totals (1999 \$K)
			Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	
Circuit boards and parts	each	2			16	32	16			128.0
Racks, bins, power supplies	each	5			1	2	1			20.0
Cables and connectors	each	10			1	1				20.0
Misc. parts	each	10			1	1				20.0
Computer	each	4.5				1				4.5
Totals (1999 \$K):			57.0	98.5	37.0					192.5

WBS 8.12 Prototype correlator production

Contracts

Contract Description	1999-2005							Totals (1999 \$K)
	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	
Totals (1999 \$K):								

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):			124.0	397.5	170.9			692.4
Estimated Contingency requirement (1999 \$K)			34.7	111.3	47.9			193.9

ALMA Task Planning Form

Task Name	First 1/4 Correlator		Responsibility		
WBS Number	8.13.1	<i>e.g., 1.1.4.45</i>	Start	<-or->	Predecessor
Estimator	Webber	<i>Name</i>	Finish	<-or->	Duration
Basis of Estimate	EN	EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost		(yyyy-mm-dd)	(weeks)
Assigned Risk factors			Multipliers for Contingency		
Technical	8	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2	(2 or 4 are valid)
Cost	4	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1	(1 or 2 are valid)
Schedule	8	(2, 4 or 8; see definition)	Calc. Contingency:	28% (See definitions)	
Task Description <i>(Text for the WBS dictionary)</i>	The first quadrant of the correlator will be fabricated and tested.				

Labor

Name or Position	(Sci, Eng, Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year					Totals (person-m)			
			1999	2000	2001	2002	2003		2004	2005	
Engineer	EN	E	CV				16.0	32.0	16.0		64.0
Technician	Tech	T	CV				16.0	32.0	16.0		64.0
Totals (person-months):							32.0	64.0	32.0		128.0
Approx. Labor Costs (1999 \$K):							178.5	357.1	178.5		714.1
							Total (person-years)			10.7	

WBS 8.13.1 First 1/4 Correlator

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999 Quantity	2000 Quantity	2001 Quantity	2002 Quantity	2003 Quantity	2004 Quantity	2005 Quantity	Totals (1999 \$K)
Station cards	each	1.5				106	106			318.0
Filter cards	each	2.5				70	70			350.0
Correlator cards (sans custom chips)	each	1				70	70			140.0
LTA cards	each	2				9	9			36.0
Control cards	each	1.5				13	13			39.0
Backplanes	each	2.5				25	25			125.0
Signal cables	each	0.05				1250	1250			125.0
Card bins	each	2.5				26	26			130.0
Racks (not antenna racks)	each	2.5				9	9			45.0
Power supplies	watts	0.002				28000	28000			112.0
Metal work	each	12.5				1	1			25.0
Computers	each	4.5				2	3			22.5
Software licenses	each	3.5				2	3			17.5
Totals (1999 \$K):						738.5	746.5			1,485.0

WBS 8.13.1 First 1/4 Correlator

Contracts

Contract Description	1999 Cost (\$K)	2000 Cost (\$K)	2001 Cost (\$K)	2002 Cost (\$K)	2003 Cost (\$K)	2004 Cost (\$K)	2005 Cost (\$K)	Totals (1999 \$K)
Totals (1999 \$K):								

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):				917.0	1,103.6	178.5		2,199.1
Estimated Contingency requirement (1999 \$K)				256.8	309.0	50.0		615.8

ALMA Task Planning Form

Task Name Second 1/4 Correlator		Responsibility	
WBS Number 8.13.2	e.g., 1.1.4.45	Start	<-or-> Predecessor
Estimator Webber	Name	Finish	<-or-> Duration
Basis of Estimate EN	EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost	(yyyy-mm-dd)	(weeks)
Assigned Risk factors		Multipliers for Contingency	
Technical	8 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2 (2 or 4 are valid)
Cost	4 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1 (1 or 2 are valid)
Schedule	8 (2, 4 or 8; see definition)	Calc. Contingency:	28% (See definitions)
Task Description (Text for the WBS dictionary)		The second quadrant of the correlator will be built and tested.	

Name or Position	(Sci, Eng, Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year					Totals (person-m)			
			1999	2000	2001	2002	2003		2004	2005	
Engineer	EN	E						32.0	32.0		64.0
Technician	Tech	T						32.0	32.0		64.0
			Totals (person-months):					64.0	64.0		128.0
			Approx. Labor Costs (1999 \$K):					357.1	357.1		714.1
			Total (person-years)								10.7

WBS 8.13.2 Second 1/4 Correlator

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999 Quantity	2000 Quantity	2001 Quantity	2002 Quantity	2003 Quantity	2004 Quantity	2005 Quantity	Totals (1999 \$K)
Station cards	each	1.5					106	106		318.0
Filter cards	each	2.5					70	70		350.0
Correlator cards (sans custom chips)	each	1					70	70		140.0
LTA cards	each	2					9	9		36.0
Control cards	each	1.5					13	13		39.0
Backplanes	each	2.5					25	25		125.0
Signal cables	each	0.05					1250	1250		125.0
Card bins	each	2.5					26	26		130.0
Racks (not antenna racks)	each	2.5					9	9		45.0
Power supplies	watts	0.002					28000	28000		112.0
Metal work	each	12.5					1	1		25.0
Computers	each	4.5					2	3		22.5
Software licenses	each	3.5					2	3		17.5
Totals (1999 \$K):							738.5	746.5		1,485.0

WBS 8.13.2 Second 1/4 Correlator

Contract Description	1999 Cost (\$K)	2000 Cost (\$K)	2001 Cost (\$K)	2002 Cost (\$K)	2003 Cost (\$K)	2004 Cost (\$K)	2005 Cost (\$K)	Totals (1999 \$K)
Totals (1999 \$K):								

Calculated Cost Summary	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):					1,095.6	1,103.6		2,199.1
Estimated Contingency requirement (1999 \$K)					306.8	309.0		615.8

ALMA Task Planning Form

Task Name	Third 1/4 correlator		Responsibility	
WBS Number	8.13.3	<i>e.g., 1.1.4.45</i>	Start	<-or-> Predecessor
Estimator	Webber	Name	Finish	<-or-> Duration
Basis of Estimate	EN	EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost	(yyyy-mm-dd)	(weeks)

Assigned Risk factors		Multipliers for Contingency	
Technical	8 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2 (2 or 4 are valid)
Cost	4 (1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1 (1 or 2 are valid)
Schedule	8 (2, 4 or 8; see definition)	Calc. Contingency:	28% (See definitions)

Task Description
(Text for the WBS dictionary)

The third quadrant of the correlator will be built and tested.

Labor

Name or Position	(Sci, Eng, Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year							Totals (person-m)	
			1999	2000	2001	2002	2003	2004	2005		
Engineer	EN	E							32.0	32.0	64.0
Technician	Tech	T							32.0	32.0	64.0
Totals (person-months):									64.0	64.0	128.0
Approx. Labor Costs (1999 \$K):									357.1	357.1	714.1
									Total (person-years) 10.7		

WBS 8.13.3 Third 1/4 correlator

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999 Quantity	2000 Quantity	2001 Quantity	2002 Quantity	2003 Quantity	2004 Quantity	2005 Quantity	Totals (1999 \$K)	
Station cards	each	1.5						106	106	318.0	
Filter cards	each	2.5						70	70	350.0	
Correlator cards (sans custom chips)	each	1						70	70	140.0	
LTA cards	each	2						9	9	36.0	
Control cards	each	1.5						13	13	39.0	
Backplanes	each	2.5						25	25	125.0	
Signal cables	each	0.05						1250	1250	125.0	
Card bins	each	2.5						26	26	130.0	
Racks (not antenna racks)	each	2.5						9	9	45.0	
Power supplies	watts	0.002						28000	28000	112.0	
Metal work	each	12.5						1	1	25.0	
Computers	each	4.5						2	3	22.5	
Software licenses	each	3.5						2	3	17.5	
Totals (1999 \$K):									738.5	746.5	1,485.0

WBS 8.13.3 Third 1/4 correlator

Contracts

Contract Description	1999 Cost (\$K)	2000 Cost (\$K)	2001 Cost (\$K)	2002 Cost (\$K)	2003 Cost (\$K)	2004 Cost (\$K)	2005 Cost (\$K)	Totals (1999 \$K)
Totals (1999 \$K):								

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):						1,095.6	1,103.6	2,199.1
Estimated Contingency requirement (1999 \$K)						306.8	309.0	615.8

ALMA Task Planning Form

Task Name	Fourth 1/4 correlator		Responsibility		
WBS Number	8.13.4	<i>e.g., 1.1.4.45</i>	Start	<-or-> Predecessor	
Estimator	Webber	Name	Finish	<-or-> Duration	
Basis of Estimate	EN	EN-Engineering/ Bottom Up/ Parametric; VQ-Vendor Quote; PO-Place Order; or AC-Actual Cost	(yyyy-mm-dd)	(weeks)	
Assigned Risk factors			Multipliers for Contingency		
Technical	8	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Technical	2	(2 or 4 are valid)
Cost	4	(1, 2, 3, 4, 6, 8, 10, or 15; see definition)	Cost	1	(1 or 2 are valid)
Schedule	8	(2, 4 or 8; see definition)	Calc.Contingency:	28%	(See definitions)
Task Description <i>(Text for the WBS dictionary)</i>	The fourth quadrant of the correlator will be built and tested.				

Labor

Name or Position	(Sci,Eng,Prog, or Tech) Position Type	Location	Estimated Effort (in person-months) for each position for each year							Totals (person-m)
			1999	2000	2001	2002	2003	2004	2005	
Engineer	EN	E							64.0	64.0
Technician	Tech	T							64.0	64.0
Totals (person-months):									128.0	128.0
Approx. Labor Costs (1999 \$K):									714.1	714.1
									Total (person-years)	10.7

WBS 8.13.4 Fourth 1/4 correlator

Materials

Material Description	Unit of Measure	1999 Unit Cost (\$K)	1999-2005							Totals (1999 \$K)
			Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	
Station cards	each	1.5							212	318.0
Filter cards	each	2.5							140	350.0
Correlator cards (sans custom chips)	each	1							140	140.0
LTA cards	each	2							18	36.0
Control cards	each	1.5							26	39.0
Backplanes	each	2.5							50	125.0
Signal cables	each	0.05							2500	125.0
Card bins	each	2.5							52	130.0
Racks (not antenna racks)	each	2.5							18	45.0
Power supplies	watts	0.002							56000	112.0
Metal work	each	12.5							2	25.0
Computers	each	4.5							5	22.5
Software licenses	each	3.5							5	17.5
Totals (1999 \$K):									1,485.0	1,485.0

WBS 8.13.4 Fourth 1/4 correlator

Contracts

Contract Description	1999	2000	2001	2002	2003	2004	2005	Totals (1999 \$K)
	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	Cost (\$K)	
Totals (1999 \$K):								

Calculated Cost Summary

	1999	2000	2001	2002	2003	2004	2005	Totals
Direct Estimate (Labor, Materials, & Contracts) (1999 \$K):							2,199.1	2,199.1
Estimated Contingency requirement (1999 \$K)							615.8	615.8