M&S 1.1 SILICON TRACKER

Revision: 2 (Demarteau, Bean) 21 November, 2001

M&S 1.1	ITEM SILICON TRACKER	MATERIALS & SERVICES (M&S) Unit	#	Unit Cost	M&S TOTAL	CONTINGENCY %	Cost	TOTAL Cost
1.1.1	*Silicon Sensors*				2,244,400	31	703,320	2,947,720
1.1.1.1	Probe station setup	ea	2	100,000	200,000	25	50,000	250,000
1.1.1.2	Layer 0 sensors				184,800	30	55,440	240,240
1.1.1.2.1	Mask development	ea	2	40,000	80,000	30	24,000	104,000
1.1.1.2.2	Prototype sensors	ea	40	1,000	40,000	30	12,000	52,000
1.1.1.2.3	Production sensors	ea	216	300	64,800	30	19,440	84,240
1.1.1.3	Layer 1 sensors				241,600	30	72,480	314,080
1.1.1.3.1	Mask development	ea	2	40,000	80,000	30	24,000	104,000
1.1.1.3.2	Prototype sensors	ea	40	800	32,000	30	9,600	41,600
1.1.1.3.3	Production sensors	ea	216	600	129,600	30	38,880	168,480
1.1.1.4	Layer 2-5 sensors				1,528,000	32	490,400	2,018,400
1.1.1.4.1	Mask development	ea	2	40,000	80,000	50	40,000	120,000
1.1.1.4.2	Prototype sensors	ea	100	800	80,000	50	40,000	120,000
1.1.1.4.3	Production sensors	ea	2280	600	1,368,000	30	410,400	1,778,400
1.1.1.5	Radiation testing	lot	1	40,000	40,000	25	10,000	50,000
1.1.1.6	Vendor qualification and monitoring	lot	1	50,000	50,000	50	25,000	75,000
1.1.2	*Readout System*				3,637,520	46	1,672,004	5,309,524
1.1.2.1	SVX4 Readout IC's				504,000	55	277,000	781,000
1.1.2.1.1	Masks and wafer fabrication NRE	ea	0.5	128,000	64,000	50	32,000	96,000
1.1.2.1.2	Chips	ea	15000	25	375,000	50	187,500	562,500
1.1.2.1.3	Test fixtures	ea	30	500	15,000	50	7,500	22,500
1.1.2.1.4	Testing	lot	1	50,000	50,000	100	50,000	100,000
1.1.2.2	Hybrids				709,000	50	354,500	1,063,500
1.1.2.2.1	Fingers				38,000	50	19,000	57,000
1.1.2.2.1.1	Layout	lot	1	5,000	5,000	50	2,500	7,500
1.1.2.2.1.2	Prototypes	ea	1200	5	6,000	50	3,000	9,000
1.1.2.2.1.3	Production	ea	10000	2	20,000	50	10,000	30,000
1.1.2.2.1.4	Fixturing	lot	1	2,000	2,000	50	1,000	3,000
1.1.2.2.1.5	Testing	lot	1	5,000	5,000	50	2,500	7,500
1.1.2.2.2	Layer 0				79,500	50	39,750	119,250
1.1.2.2.2.1	Layout	lot	1	4,500	4,500	50	2,250	6,750
1.1.2.2.2.2	Prototypes	ea	20	500	10,000	50	5,000	15,000
1.1.2.2.2.3	Production	ea	190	300	57,000	50	28,500	85,500
1.1.2.2.2.4	Fixturing	lot	1	3,000	3,000	50	1,500	4,500
1.1.2.2.2.5	Testing	lot	1	5,000	5,000	50	2,500	7,500
1.1.2.2.3	Layer 1				72,500	50	36,250	108,750
1.1.2.2.3.1	Layout	lot	1	4,500	4,500	50	2,250	6,750
1.1.2.2.3.2	Prototypes	ea	60	500	30,000	50	15,000	45,000
1.1.2.2.3.3	Production	ea	100	300	30,000	50	15,000	45,000
1.1.2.2.3.4	Fixturing	lot	1	3,000	3,000	50	1,500	4,500
1.1.2.2.3.5	Testing	lot	1	5,000	5,000	50	2,500	7,500
1.1.2.2.4	Layer 2-5				519,000	50	259,500	778,500
1.1.2.2.4.1	Layout	lot	2	4,500	9,000	50	4,500	13,500
1.1.2.2.4.2	Prototypes	ea	40	1,000	40,000	50	20,000	60,000
1.1.2.2.4.3	Production	ea	880	500	440,000	50	220,000	660,000
1.1.2.2.4.4	Fixturing	lot	1	15,000	15,000	50	7,500	22,500
1.1.2.2.4.5	Testing	lot	1	15,000	15,000	50	7,500	22,500
1.1.2.3	Cables				1,114,000	48	540,200	1,654,200
1.1.2.3.1	Analog flex cables				358,000	50	179,000	537,000
1.1.2.3.1.1	Layout	lot	1	20,000	20,000	50	10,000	30,000
1.1.2.3.1.2	Prototypes	ea	40	2,000	80,000	50	40,000	120,000
1.1.2.3.1.3	Production	ea	380	600	228,000	50	114,000	342,000
1.1.2.3.1.4	Fixturing	lot	1	10,000	10,000	50	5,000	15,000
1.1.2.3.1.5	Testing	lot	1	20,000	20,000	50	10,000	30,000
1.1.2.3.2	Layer 0-5 jumper cables				297,000	50	148,500	445,500
1.1.2.3.2.1	Layout	lot	1	10,000	10,000	50	5,000	15,000
1.1.2.3.2.2	Prototypes	ea	100	400	40,000	50	20,000	60,000
1.1.2.3.2.3	Production	ea	1160	200	232,000	50	116,000	348,000
1.1.2.3.2.4	Fixturing	lot	1	10,000	10,000	50	5,000	15,000

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1.1.2.3.2.5	Testing	lot	1	5,000	5,000	50	2,500	7,500
1.1.2.3.3	Twisted-pair readout cables				367,000	50	183,500	550,500
1.1.2.3.3.1	Layout	lot	1	3000	3,000	50	1,500	4,500
1.1.2.3.3.2	Prototypes	ea	20	500	10,000	50	5,000	15,000
1.1.2.3.3.3	Production	ea	1160	300	348,000	50	174,000	522,000
1.1.2.3.3.4	Fixturing	lot	1	3000	3,000	50	1,500	4,500
1.1.2.3.3.5	Testing	lot	1	3000	3,000	50	1,500	4,500
1.1.2.3.4	Clock cables	ea	1160	25	29,000	20	5,800	34,800
1.1.2.3.5	High-mass cables	ea	100	270	27,000	20	5,400	32,400
1.1.2.3.6	L0-1 high-voltage cables	lot	280	50	14,000	50	7,000	21,000
1.1.2.3.7	L2-5 high-voltage cables	lot	880	25	22,000	50	11,000	33,000
1.1.2.4	Junction Card				197,000	50	98,500	295,500
1.1.2.4.1	Layout	lot	1	10000	10,000	50	5,000	15,000
1.1.2.4.2	Prototypes	ea	20	300	6,000	50	3,000	9,000
1.1.2.4.3	Production	ea	1,160	150	174,000	50	87,000	261,000
1.1.2.4.4	Fixturing	lot	1	2000	2,000	50	1,000	3,000
1.1.2.4.5	Testing	lot	1	5000	5,000	50	2,500	7,500
1.1.2.5	Test Card				26,000	50	13,000	39,000
1.1.2.5.1	Layout	lot	1	5,000	5,000	50	2,500	7,500
1.1.2.5.2	Prototypes	ea	20	300	6,000	50	3,000	9,000
1.1.2.5.3	Production	ea	50	200	10,000	50	5,000	15,000
1.1.2.5.4	Fixturing	lot	1	2,000	2,000	50	1,000	3,000
1.1.2.5.5	Testing	lot	1	3,000	3,000	50	1,500	4,500
1.1.2.6	Adaptor Cards				392,000	50	196,000	588,000
1.1.2.6.1	Layout	lot	1	26,000	26,000	50	13,000	39,000
1.1.2.6.2	Prototypes	ea	20	500	10,000	50	5,000	15,000
1.1.2.6.3	Production	ea	1160	300	348,000	50	174,000	522,000
1.1.2.6.4	Fixturing	lot	1	3,000	3,000	50	1,500	4,500
1.1.2.6.5	Testing	lot	1	5,000	5,000	50	2,500	7,500
1.1.2.7	Interface Boards				39,000	50	19,500	58,500
1.1.2.7.1	Layout	lot	1	5000	5,000	50	2,500	7,500
1.1.2.7.2	New J1 backplane	ea	10	3000	30,000	50	15,000	45,000
1.1.2.7.3	IB modifications	ea	160	25	4,000	50	2,000	6,000
1.1.2.8	DAQ improvements	lot	1	100000	100,000	50	50,000	150,000
1.1.2.9	Power supplies				556,520	22	123,304	679,824
1.1.2.9.1	Low-voltage supplies				40,000	50	20,000	60,000
1.1.2.9.1.1	Modifications	ea	10	2000	20,000	50	10,000	30,000
1.1.2.9.1.2	Fuse panel	ea	10	2000	20,000	50	10,000	30,000
1.1.2.9.2	High-voltage supplies				516,520	20	103,304	619,824
1.1.2.9.2.1	Motherboards	ea	63	2600	163,800	20	32,760	196,560
1.1.2.9.2.2	Pods	ea	656	370	242,720	20	48,544	291,264
1.1.2.9.2.3	VME crates & PS	ea	11	10000	110,000	20	22,000	132,000
1.1.3	*Mechanical Design and Fabrication*				1,649,700	50	830,445	2,480,145
1.1.3.1	Layer 0				205,900	59	122,240	328,140
1.1.3.1.1	Support Structure Design	ea	1	76,800	76,800	60	46,080	122,880
1.1.3.1.2	Prototype Structural Analysis, Drawing	set	1	20,000	20,000	50	10,000	30,000
1.1.3.1.3	Assembly Fixtures	set	1	36,500	36,500	60	21,900	58,400
1.1.3.1.4	Support Structure Fab Tooling Design	set	1	13,100	13,100	60	7,860	20,960
1.1.3.1.5	Support Structure Tooling Production	ea	5	3,500	17,500	64	11,200	28,700
1.1.3.1.6	Support Structure Fabrication	ea	3	14,000	42,000	60	25,200	67,200
1.1.3.2	Layer 1				193,800	59	114,980	308,780
1.1.3.2.1	Support Structure Design	ea	1	63,700	63,700	60	38,220	101,920
1.1.3.2.2	Prototype Structural Analysis, Drawing	set	1	20,000	20,000	50	10,000	30,000
1.1.3.2.3	Assembly Fixtures	set	1	31,500	31,500	60	18,900	50,400
1.1.3.2.4	Support Structure Fab Tooling Design	set	1	13,100	13,100	60	7,860	20,960
1.1.3.2.5	Support Structure Tooling Production	ea	5	3,500	17,500	64	11,200	28,700
1.1.3.2.6	Support Structure Fabrication	ea	4	12,000	48,000	60	28,800	76,800
1.1.3.3	Layer 0/1 Assembly				40,500	61	24,600	65,100
1.1.3.3.1	Support Membranes	ea	5	3,000	15,000	62	9,300	24,300
1.1.3.3.2	Layer 0/1 Assembly Fixture	ea	5	2,800	14,000	60	8,400	22,400

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M&S	ITEM	MATERIALS & SERVICES (M&S)				CONTINGENCY		
1.1	SILICON TRACKER	Unit	#	Unit Cost	M&S TOTAL	%	Cost	TOTAL Cost
1.1.3.3.3	Layer 0/1 Installation Tooling	set	5	2,300	11,500	60	6,900	18,400
1.1.3.4	Layer 2-5 stave and module parts				505,500	50	250,375	755,875
1.1.3.4.1	Cooling tubes	ea	205	100	20,500	75	15,375	35,875
1.1.3.4.2	Stave cores	ea	205	200	41,000	50	20,500	61,500
1.1.3.4.3	Stave shells	ea	410	100	41,000	50	20,500	61,500
1.1.3.4.4	Component fixtures	ea	24	3,000	72,000	50	36,000	108,000
1.1.3.4.5	Readout module assembly fixtures	ea	12	5,000	60,000	50	30,000	90,000
1.1.3.4.6	Wirebonding fixtures	ea	6	3,000	18,000	50	9,000	27,000
1.1.3.4.7	Stave assembly fixtures	ea	8	5,000	40,000	50	20,000	60,000
1.1.3.4.8	Cover gluing fixtures	ea	4	1,000	4,000	50	2,000	6,000
1.1.3.4.9	Silicon positioning bulkheads	ea	4	20,000	80,000	50	40,000	120,000
1.1.3.4.10	Support cylinders	ea	4	10,000	40,000	50	20,000	60,000
1.1.3.4.11	Extension cylinders	ea	4	6,000	24,000	50	12,000	36,000
1.1.3.4.12	North / south mating fixture	ea	3	3,000	9,000	50	4,500	13,500
1.1.3.4.13	Rotating fixture	ea	4	4,000	16,000	50	8,000	24,000
1.1.3.4.14	Stave installation fixture	ea	4	2,500	10,000	50	5,000	15,000
1.1.3.4.15	Hardware and misc. components	lot	1	30,000	30,000	25	7,500	37,500
1.1.3.5	Coolant / anchoring bulkheads	ea	4	25,000	100,000	50	50,000	150,000
1.1.3.6	Junction card mountings	ea	4	1,000	4,000	50	2,000	6,000
1.1.3.7	Adhesives	lot	1	40,000	40,000	50	20,000	60,000
1.1.3.8	Cooling system	lot	1	115,000	115,000	50	57,500	172,500
1.1.3.9	Dry gas purge	lot	1	80,000	80,000	50	40,000	120,000
1.1.3.10	Interlocks and safety monitoring	lot	1	100,000	100,000	50	50,000	150,000
1.1.3.11	Alignment monitoring	lot	1	40,000	40,000	50	20,000	60,000
1.1.3.12	Beam tube	ea	1	225,000	225,000	35	78,750	303,750
1.1.4	*Detector Assembly and Testing*				429,000	32	138,050	567,050
1.1.4.1	Test stands (refurbished)	ea	15	5,000	75,000	25	18,750	93,750
1.1.4.2	Hybrid burn-in test stand (refurbished)	ea	2	12,000	24,000	25	6,000	30,000
1.1.4.3	Module burn-in test stand	ea	2	70,000	140,000	25	35,000	175,000
1.1.4.4	Cooling for test stand	ea	2	10,000	20,000	50	10,000	30,000
1.1.4.5	Test stand spare parts	lot	1	20,000	20,000	25	5,000	25,000
1.1.4.6	Dry Boxes	ea	3	3,000	9,000	20	1,800	10,800
1.1.4.7	Hybrid boxes	ea	400	50	20,000	30	6,000	26,000
1.1.4.8	L0 module boxes	ea	150	100	15,000	50	7,500	22,500
1.1.4.9	L1 module boxes	ea	80	100	8,000	50	4,000	12,000
1.1.4.10	10/10 module boxes	ea	90	100	9,000	50	4,500	13,500
1.1.4.11	20/20 module boxes	ea	90	100	9,000	50	4,500	13,500
1.1.4.12	Commercial Software Licenses	lot	1	20,000	20,000	25	5,000	25,000
1.1.4.13	Full system test	lot	1	30,000	30,000	50	15,000	45,000
1.1.4.14	Stave cooling test	lot	1	30,000	30,000	50	15,000	45,000
1.1.5	*Installation*				90,000	47	42,500	132,500
1.1.5.1	Transport cart	ea	1	10,000	10,000	25	2,500	12,500
1.1.5.2	Installation trolley	ea	1	30,000	30,000	50	15,000	45,000
1.1.5.3	Cooling and dry gas	ea	1	50,000	50,000	50	25,000	75,000
1.1.6	*Software*				51,000	22	11,400	62,400
1.1.6.1	CPUs	ea	14	3,000	42,000	25	10,500	52,500
1.1.6.2	Laptops	ea	3	3,000	9,000	10	900	9,900
1.1	**SILICON TRACKER**				**8,101,620**	**42**	**3,397,719**	**11,499,339**

M&S	1.2	CALORIMETER TRIGGER						
Revision:	2 (Wood)	29-Nov-01						
M&S	**ITEM**	**MATERIALS & SERVICES (M&S)**				**CONTINGENCY**		
1.2	**CALORIMETER TRIGGER**	**Unit**	**#**	**Unit Cost**	**M&S TOTAL**	**%**	**Cost**	**TOTAL Cost**
1.2.1	*Calorimeter Trigger*				725,750	50	362,875	1,088,625
1.2.1.1	ADC/Digital Filter (ADF) stage				440,500	50	220,250	660,750
1.2.1.1.1	ADF cards	ea	105	3,500	367,500	50	183,750	551,250
1.2.1.1.2	ADF crates	ea	8	4,500	36,000	50	18,000	54,000
1.2.1.1.3	ADF crate control cards	ea	8	2,000	16,000	50	8,000	24,000
1.2.1.1.4	ADF power supplies	lot	1	21,000	21,000	50	10,500	31,500
1.2.1.2	Trigger Algorithm Board (TAB) stage				236,000	50	118,000	354,000
1.2.1.2.1	TAB cards	ea	30	7,500	225,000	50	112,500	337,500
1.2.1.2.2	TAB crate control cards	ea	4	500	2,000	50	1,000	3,000
1.2.1.2.3	TAB crates and backplanes	ea	3	2,000	6,000	50	3,000	9,000
1.2.1.2.4	TAB power supplies	ea	3	1,000	3,000	50	1,500	4,500
1.2.1.3	Links, readout and controls				49,250	50	24,625	73,875
1.2.1.3.1	LVDS cables, ADF to TAB	ea	200	75	15,000	50	7,500	22,500
1.2.1.3.2	LVDS cables, CTT & TAB to cal-track match	ea	150	75	11,250	50	5,625	16,875
1.2.1.3.3	VRB's	ea			0	50	0	0
1.2.1.3.4	VME masters for ADC crates	ea	10	2,300	23,000	50	11,500	34,500
1.2.2	*Calorimeter-Track Matching*				97,046	50	48,523	145,570
1.2.2.1	Muon track match cards				62,100	50	31,050	93,150
1.2.2.1.1	MTCxx cards	ea	9	2,300	20,700	50	10,350	31,050
1.2.2.1.2	Serial link daughter boards	ea	256	100	25,600	50	12,800	38,400
1.2.2.1.3	Muon trigger flavor boards	ea	9	1,000	9,000	50	4,500	13,500
1.2.2.1.4	Muon trigger crate manager	ea	2	3,400	6,800	50	3,400	10,200
1.2.2.2	Serial link cables				17,446	50	8,723	26,170
1.2.2.2.1	lmr-200	ft?	25600	0.5	12,800	50	6,400	19,200
1.2.2.2.2	Connectors	ea	256	10	2,560	50	1,280	3,840
1.2.2.2.3	lmr-100	ft?	128	0.3	38	50	19	58
1.2.2.2.4	Connectors	ea	256	8	2,048	50	1,024	3,072
1.2.2.3	Crate infrastructure				17,500	50	8,750	26,250
1.2.2.3.1	Crates	ea	2	4,000	8,000	50	4,000	12,000
1.2.2.3.2	MVE processors	ea	2	2,000	4,000	50	2,000	6,000
1.2.2.3.3	Vicor supplies	ea	2	2,500	5,000	50	2,500	7,500
1.2.2.3.4	Power supply case	ea	1	500	500	50	250	750
1.2.3	*Track Trigger*				359,000	50	179,500	538,500
1.2.3.1	Fabricate/stuff new DFE daughter boards	ea	88	500	44,000	50	22,000	66,000
1.2.3.2	FPGAs	ea	350	900	315,000	50	157,500	472,500
1.2	**CALORIMETER TRIGGER**				**1,181,796**	**50**	**590,898**	**1,772,695**

M&S	1.3	L2 Beta Upgrade						
Revision:	v4 (Linnemann, Hirosky)	19 November 2001						
M&S	**ITEM**	**MATERIALS & SERVICES (M&S)**				**CONTINGENCY**		
1.3	**Level 2 Beta Processor 2b**	**Unit**	**#**	**Unit Cost**	**M&S TOTAL**	**%**	**Cost**	**TOTAL Cost**
1.3.1	*Motherboard*				10,000	50	5,000	15,000
1.3.1.1	Firmware support	yr	0.10	100,000	10,000	50	5,000	15,000
1.3.2	*Processors*				62,100	34	21,330	83,430
1.3.2.1	Upgrade boards				49,500	30	14,850	64,350
1.3.2.1.1	New SBC	ea	12	3,500	42,000	30	12,600	54,600
1.3.2.1.2	Heat sink modification	ea	12	125	1,500	30	450	1,950
1.3.2.1.3	Disk drive	ea	12	200	2,400	30	720	3,120
1.3.2.1.4	2nd CPU chip	ea	12	300	3,600	30	1,080	4,680
1.3.2.2	Disk connector for new SBC				12,600	51	6,480	19,080
1.3.2.2.1	Design & layout	lot	1	10,000	10,000	50	5,000	15,000
1.3.2.2.2	Adaptor prototypes	ea	2	500	1,000	100	1,000	2,000
1.3.2.2.3	Adaptor production	ea	16	100	1,600	30	480	2,080
1.3	**Level 2 Beta Processor Upgrade**				**72,100**	**37**	**26,330**	**98,430**

M&S	1.4	SILICON TRACK TRIGGER						
Revision:	draft 5 (Heintz)	19 November 2001						
M&S	**ITEM**	**MATERIALS & SERVICES (M&S)**				**CONTINGENCY**		
1.4	**Level 2 STT Upgrade**	**Unit**	**#**	**Unit Cost**	**M&S TOTAL**	**%**	**Cost**	**TOTAL Cost**
1.4.1	*Boards (more of existing types)*				285,730	36	104,083	389,813
1.4.1.1	Motherboard	ea	32	2,065	66,080	30	19,824	85,904
1.4.1.2	STC Logic Board	ea	20	2,565	51,300	30	15,390	66,690
1.4.1.3	Link Transmitter Board (LTB)	ea	52	265	13,780	30	4,134	17,914
1.4.1.4	Link Receiver Board (LRB)	ea	33	615	20,295	30	6,089	26,384
1.4.1.5	Buffer Controller Board (BC)	ea	32	1,015	32,480	30	9,744	42,224
1.4.1.6	VME Transition Module (VTM)	ea	20	2,565	51,300	50	25,650	76,950
1.4.1.7	Track Fit Card (TFC)	ea	8	5,065	40,520	50	20,260	60,780
1.4.1.8	Hotlink transmitter	ea	15	665	9,975	30	2,993	12,968
1.4.2	*Link Echo Board*				48,290	84	40,607	88,897
1.4.2.1	Design & Prototyping	hrs	960	35	33,600	100	33,600	67,200
1.4.2.2	Production	ea	26	500	13,000	50	6,500	19,500
1.4.2.3	Testing	ea	26	65	1,690	30	507	2,197
1.4.3	*Software & Firmware changes*				33,600	100	33,600	67,200
1.4.3.1	STC	hrs	960	35	33,600	100	33,600	67,200
1.4.4	*J3 Backplane*				15,131	41	6,266	21,397
1.4.4.1	Design & Layout	lot	1	5,000	5,000	50	2,500	7,500
1.4.4.2	Setup for production	lot	1	1,500	1,500	30	450	1,950
1.4.4.3	Backplanes	ea	10	500	5,000	30	1,500	6,500
1.4.4.4	Connectors	ea	10	363	3,631	50	1,816	5,447
1.4.5	*Cables*				18,950	35	6,675	25,625
1.4.5.1	LVDS	ea	165	30	4,950	50	2,475	7,425
1.4.5.2	Splitters	ea	80	125	10,000	30	3,000	13,000
1.4.5.3	Fibers	ea	160	25	4,000	30	1,200	5,200
1.4	**Level 2 STT Upgrade**				**401,701**	**48**	**191,231**	**592,932**

M&S	1.5	Online						
Revision:	draft 1 (Fuess)	27 November 2001						
M&S	**ITEM**	**MATERIALS & SERVICES (M&S)**				**CONTINGENCY**		
1.5	**Online**	**Unit**	**#**	**Unit Cost**	**M&S TOTAL**	**%**	**Cost**	**TOTAL Cost**
1.5.1	*Cisco 6509 Upgrade*	lot	1	80,000	80,000	25	20,000	100,000
1.5.2	*Level 3 Filter nodes*	lot	1	250,000	250,000	10	25,000	275,000
1.5.3	*DAQ Host System*				100,000	34	34,000	134,000
1.5.3.1	R&D system	lot	1	40,000	40,000	10	4,000	44,000
1.5.3.2	Production system	lot	1	60,000	60,000	50	30,000	90,000
1.5.4	*Control Room Systems*	lot	1	100,000	100,000	10	10,000	110,000
1.5.5	*Monitoring Systems*	lot	1	100,000	100,000	10	10,000	110,000
1.5.6	*ORACLE Systems*				100,000	34	34,000	134,000
1.5.6.1	Development system	lot	1	40,000	40,000	10	4,000	44,000
1.5.6.2	Production system	lot	1	60,000	60,000	50	30,000	90,000
1.5.7	*File Servers*				40,000	30	12,000	52,000
1.5.7.1	Development system	lot	1	20,000	20,000	10	2,000	22,000
1.5.7.2	Production system	lot	1	20,000	20,000	50	10,000	30,000
1.5.8	*Control System Maintenance*				180,000	12	21,000	201,000
1.5.8.1	Muon processor replacements	lot	1	45,000	45,000	10	4,500	49,500
1.5.8.2	Controls M68K replacements	lot	1	15,000	15,000	10	1,500	16,500
1.5.8.3	PowerPC spares	lot	1	20,000	20,000	25	5,000	25,000
1.5.8.4	1553 Hardware replacements	lot	1	100,000	100,000	10	10,000	110,000
1.5	**Online**				**950,000**		**166,000**	**1,116,000**

M&S	2.1	L2 Beta						
Revision:	v8, w/corrections (Linnemann, Hirosky)	19 November 2001						
M&S	**ITEM**	**MATERIALS & SERVICES (M&S)**				**CONTINGENCY**		
2.1	**Level 2 Beta Processor**	**Unit**	**#**	**Unit Cost**	**M&S TOTAL**	**%**	**Cost**	**TOTAL Cost**
2.1.1	*Motherboard*				274,689	26	71,318	346,006
2.1.1.1	Engineering and Design				155,544	2	2,863	158,408
2.1.1.1.1	Exploratory Design (Maryland)	lot	1	3,000	3,000	0	0	3,000
2.1.1.1.2	Design and schematics (Orsay)	yr	0.7	100,000	70,000	0	0	70,000
2.1.1.1.3	PCB Layout (Orsay)	yr	0.17	100,000	17,000	0	0	17,000
2.1.1.1.4	Mechanical Engineering (Thales)	lot	1	9,544	9,544	30	2,863	12,408
2.1.1.1.5	Testing and Commissioning (Orsay)	yr	0.56	100,000	56,000	0	0	56,000
2.1.1.2	Setup Engineering by Assembler (Thales)				10,252	50	5,126	15,378
2.1.1.2.1	PC Board	lot	1	1,974	1,974	50	987	2,961
2.1.1.2.2	Assembly	lot	1	2,952	2,952	50	1,476	4,428
2.1.1.2.3	Testing	lot	1	5,326	5,326	50	2,663	7,989
2.1.1.3	Prototype Board				17,764	100	17,764	35,529
2.1.1.3.1	PC Board	ea	4	1,259	5,037	100	5,037	10,074
2.1.1.3.2	Assembly	ea	4	335	1,341	100	1,341	2,681
2.1.1.3.3	Testing	ea	4	75	300	100	300	599
2.1.1.3.4	Mechanical parts	ea	4	1,109	4,435	100	4,435	8,870
2.1.1.3.5	BGAs	ea	5	832	4,162	100	4,162	8,324
2.1.1.3.6	Other Components	ea	4	247	990	100	990	1,979
2.1.1.3.7	Connectors	ea	4	375	1,500	100	1,500	3,000
2.1.1.4	Production Board				91,128	50	45,564	136,692
2.1.1.4.1	PC Board	ea	38	637	24,195	50	12,098	36,293
2.1.1.4.2	Assembly	ea	38	132	5,024	50	2,512	7,536
2.1.1.4.3	Testing	ea	38	81	3,083	50	1,542	4,625
2.1.1.4.4	Mechanical parts	ea	42	347	14,578	50	7,289	21,867
2.1.1.4.5	BGAs	ea	42	806	33,857	50	16,929	50,786
2.1.1.4.6	Other Components	ea	42	247	10,390	50	5,195	15,585
2.1.1.4.7	Connectors	ea	42	0	0	50	0	0
2.1.2	*Processors*				129,523	49	63,050	192,573
2.1.2.1	Prototypes				23,651	43	10,114	33,765
2.1.2.1.1	VMIC processor	ea	1	3,423	3,423	0	0	3,423
2.1.2.1.2	CPCI Crate	ea	1	3,375	3,375	50	1,688	5,063
2.1.2.1.3	CPCI Crate Equipment	lot	1	565	565	50	283	848
2.1.2.1.4	Advantech SBC	ea	4	3,513	14,052	50	7,026	21,078
2.1.2.1.5	Heat Sink Modification	ea	4	125	500	50	250	750
2.1.2.1.6	Disk Drive	ea	4	200	800	50	400	1,200
2.1.2.1.7	2nd CPU Chip	ea	4	234	936	50	468	1,404
2.1.2.2	Production Boards				105,872	50	52,936	158,808
2.1.2.2.1	Advantech SBC	ea	26	3,513	91,338	50	45,669	137,007
2.1.2.2.2	Heat Sink Modification	ea	26	125	3,250	50	1,625	4,875
2.1.2.2.3	Disk Drive	ea	26	200	5,200	50	2,600	7,800
2.1.2.2.4	2nd CPU Chip	ea	26	234	6,084	50	3,042	9,126
2.1.3	*Maintenance Facilities*				38,400	50	19,200	57,600
2.1.3.1	VIPA Crate	ea	2	5,000	10,000	50	5,000	15,000
2.1.3.2	Mbus Backplane	ea	2	500	1,000	50	500	1,500
2.1.3.3	Mbus Terminators	ea	4	100	400	50	200	600
2.1.3.4	Power	ea	2	5,000	10,000	50	5,000	15,000
2.1.3.5	Bit3 Interface	ea	2	4,000	8,000	50	4,000	12,000
2.1.3.6	Control PC	ea	2	2,000	4,000	50	2,000	6,000
2.1.3.7	Test Equipment	ea	2	2,500	5,000	50	2,500	7,500
2.1	**Level 2 Beta Processor**				**442,612**	**35**	**153,568**	**596,179**

M&S	2.2	SIFT REPLACEMENT						
Revision:	2 (Johnson)	19 November, 2001						
M&S	**ITEM**	**MATERIALS & SERVICES (M&S)**				**CONTINGENCY**		
2.2	**SIFT REPLACEMENT**	**Unit**	**#**	**Unit Cost**	**M&S TOTAL**	**%**	**Cost**	**TOTAL Cost**
2.2.1	*TriP ASIC*				458,000	18	81,500	539,500
2.2.1.1	Fabrication	submission	2	200,000	400,000	10	40,000	440,000
2.2.1.2	Wafer testing	lot	1	10,000	10,000	100	10,000	20,000
2.2.1.3	Packaging	chips	2200	15	33,000	50	16,500	49,500
2.2.1.4	Chip testing	fixture	1	15,000	15,000	100	15,000	30,000
2.2.2	*AFE/MCM*				423,000	31	132,300	555,300
2.2.2.1	Prototypes				37,000	46	17,100	54,100
2.2.2.1.1	Layout	lot	1	10,000	10,000	50	5,000	15,000
2.2.2.1.2	Parts	boards	5	2,000	10,000	50	5,000	15,000
2.2.2.1.3	PCBs	boards	5	700	7,000	30	2,100	9,100
2.2.2.1.4	Test jigs	jig	1	10,000	10,000	50	5,000	15,000
2.2.2.2	Production				362,000	30	108,000	470,000
2.2.2.2.1	Layout	lot	1	2,000	2,000		0	2,000
2.2.2.2.2	Parts	boards	240	1,150	276,000	30	82,800	358,800
2.2.2.2.3	PCBs	boards	240	350	84,000	30	25,200	109,200
2.2.2.2.4	Testing		0	0	0	0	0	0
2.2.2.3	Power Supplies	crates	8	3,000	24,000	30	7,200	31,200
2.2	**SIFT Replacement**				**881,000**	**24**	**213,800**	**1,094,800**

M&S	2.3	COMMODITY DAQ						
Revision:	1.1 (Brooijmans)	27 November, 2001						
M&S	**ITEM**	**MATERIALS & SERVICES (M&S)**				**CONTINGENCY**		
2.3	**COMMODITY DAQ**	**Unit**	**#**	**Unit Cost**	**M&S TOTAL**	**%**	**Cost**	**TOTAL Cost**
2.3.1	*Switches*				95,188	49	46,678	141,866
2.3.1.1	Cisco 6509				75,600	36	27,090	102,690
2.3.1.1.1	Cisco WS-C6509-2500AC (chassis)	ea	1	11,200	11,200	10	1,120	12,320
2.3.1.1.2	Cisco WS-CAC-2500W/2 (second power supply)	ea	1	4,200	4,200	10	420	4,620
2.3.1.1.3	Cisco WS-X6K-S2-PFC2 (supervisor engine)	ea	1	16,800	16,800	10	1,680	18,480
2.3.1.1.4	Cisco WS-X6548-TEL (48 port 10/100 blade)	ea	1	14,000	14,000	10	1,400	15,400
2.3.1.1.5	Cisco WS-X6516-GBIC (16 port Gb blade)	ea	1	17,500	17,500	100	17,500	35,000
2.3.1.1.6	Cisco WS-G5484-GBIC (short wavelength GBIC)	ea	12	350	4,200	100	4,200	8,400
2.3.1.1.7	Cisco WS-X6500-SFM2 (switch fabric module 2)	ea	1	7,700	7,700	10	770	8,470
2.3.1.2	Cisco 2948G				19,588	100	19,588	39,176
2.3.1.2.1	Cisco WS-C2948G	ea	4	4,197	16,788	100	16,788	33,576
2.3.1.2.2	Cisco WS-G5484-GBIC (short wavelength GBIC)	ea	8	350	2,800	100	2,800	5,600
2.3.2	*SBC's*				278,140	30	83,442	361,582
2.3.2.1	VMIC 7750	ea	70	2,902	203,140	30	60,942	264,082
2.3.2.2	Acromag PMC470 (digital I/O)	ea	70	700	49,000	30	14,700	63,700
2.3.2.3	Extender Boards	ea	70	300	21,000	30	6,300	27,300
2.3.2.4	Console server and concentrator	ea	1	5,000	5,000	30	1,500	6,500
2.3.3	*Level 3 Nodes*				35,000	100	35,000	70,000
2.3.3.1	16 node rack	lot	1	35,000	35,000	100	35,000	70,000
2.3.4	*Cables, patch panels, etc.*	lot	1	35,000	35,000	50	17,500	52,500
2.3.5	*Network Diagnostic Equipment*	lot	1	20,000	20,000	30	6,000	26,000
2.3.6	*Test Stand*				19,000	46	8,650	27,650
2.3.6.1	Crate	ea	1	4,500	4,500	10	450	4,950
2.3.6.2	Power supply and cables	ea	1	1,500	1,500	10	150	1,650
2.3.6.3	Crate Controller	ea	1	2,500	2,500	10	250	2,750
2.3.6.4	Disk drive and other support	ea	1	2,000	2,000	100	2,000	4,000
2.3.6.5	Rack	ea	1	3,000	3,000	10	300	3,300
2.3.6.6	PC	ea	1	2,500	2,500	100	2,500	5,000
2.3.6.7	"Handshake Generator"	ea	1	3,000	3,000	100	3,000	6,000
2.3	**Total**				**482,328**	**41**	**197,270**	**679,598**