M&S 1.1 SILICON TRACKER

Revision: 6 (Freeman) 7-Apr-02

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*				2,678,531	25	681,640	3,360,171
1.1.1.1	*Probe station setup*	ea	2	83,000	166,000	0	0	166,000
1.1.1.1.1	HP LCR	ea	2	10,000	20,000	0	0	20,000
1.1.1.1.2	Probe Station	ea	2	65,000	130,000	0	0	130,000
1.1.1.1.3	Peripherals	ea	2	8,000	16,000	0	0	16,000
1.1.1.2	*Layer 0 sensors*				222,800	30	66,840	289,640
1.1.1.2.1	Mask development	ea	2	55,000	110,000	30	33,000	143,000
1.1.1.2.2	Prototype sensors	ea	40	1,200	48,000	30	14,400	62,400
1.1.1.2.3	Production sensors	ea	216	300	64,800	30	19,440	84,240
1.1.1.3	*Layer 1 sensors*				252,000	30	75,600	327,600
1.1.1.3.1	Mask development	ea	2	60,000	120,000	30	36,000	156,000
1.1.1.3.2	Prototype sensors	ea	30	800	24,000	30	7,200	31,200
1.1.1.3.3	Production sensors	ea	216	500	108,000	30	32,400	140,400
1.1.1.4	*Layer 2-5 sensors*				1,694,000	31	524,200	2,218,200
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	750	75,000	30	22,500	97,500
1.1.1.4.3	Production sensors	ea	2280	675	1,539,000	30	461,700	2,000,700
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	10	5,000	55,000
1.1.1.7	*Sensor probing*	lot	1		253,731	0	0	253,731
1.1.1.7.1	KSU: wages + fringe	lot	1	74,208	74,208	0	0	74,208
1.1.1.7.2	KSU: indirect	lot	1	33,765	33,765	0	0	33,765
1.1.1.7.3	SB: wages + fringe	lot	1	11,825	11,825	0	0	11,825
1.1.1.7.4	SB: matching	lot	2	56,980	113,960	0	0	113,960
1.1.1.7.5	SB: materials + indirect	lot	1	19,973	19,973	0	0	19,973
1.1.2	*Readout System*				4,029,215	45	1,797,590	5,826,805
1.1.2.1	*SVX4 Readout IC's*				1,015,240	39	392,040	1,407,280
1.1.2.1.1	Prototype Wafers	ea	0.5	366,000	183,000	0	0	183,000
1.1.2.1.2	Production Wafers	lot	8	60,375	483,000	30	144,900	627,900
1.1.2.1.3	Test fixtures	ea	30	500	15,000	50	7,500	22,500
1.1.2.1.4	*Testing*	lot			107,100		12,500	119,600
1.1.2.1.4.1	MRI: Brown testing and supplies	lot	1	82,100	82,100	0	0	82,100
1.1.2.1.4.2	Testing	lot	1	25,000	25,000	50	12,500	37,500
1.1.2.1.5	LBL engineering	lot	1	227,140	227,140	100	227,140	454,280
1.1.2.2	*Hybrids*				863,075	42	362,300	1,225,375
1.1.2.2.1	*Fingers*				0		0	0
1.1.2.2.1.1	Design and Layout	lot	1	0	0	50	0	0
1.1.2.2.1.2	Prototypes	ea	1200	0	0	50	0	0
1.1.2.2.1.3	Production	ea	10000	0	0	50	0	0
1.1.2.2.1.4	Fixturing	lot	1	0	0	50	0	0
1.1.2.2.1.5	Testing	lot	1	0	0	50	0	0
1.1.2.2.2	*Layer 0*				95,250	50	47,625	142,875
1.1.2.2.2.1	Design and Layout	lot	1	4,500	4,500	50	2,250	6,750
1.1.2.2.2.2	Prototypes	ea	25	650	16,250	50	8,125	24,375
1.1.2.2.2.3	Production	ea	190	350	66,500	50	33,250	99,750
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*				117,250	39	46,175	163,425
1.1.2.2.3.1	Design and Layout	lot	1	4,500	4,500	30	1,350	5,850
1.1.2.2.3.2	Prototypes	ea	75	770	57,750	30	17,325	75,075
1.1.2.2.3.3	Production	ea	100	470	47,000	50	23,500	70,500
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*				650,575	41	268,500	919,075
1.1.2.2.4.1	Design and Layout	lot	2	4,500	9,000	50	4,500	13,500
1.1.2.2.4.2	Prototypes	ea	40	1,200	48,000	50	24,000	72,000
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			138,575		12,500	151,075
1.1.2.2.4.5.1	MRI Fresno:	lot	1	58,575	58,575	0	0	58,575
1.1.2.2.4.5.2	MRI KU	lot	1	55,000	55,000	0	0	55,000
1.1.2.2.4.5.3	Supplies	lot	1	25,000	25,000	50	12,500	37,500
1.1.2.3	*Cables*				1,022,400	47	485,480	1,507,880
1.1.2.3.1	*Analog flex cables*				232,000	46	106,000	338,000
1.1.2.3.1.1	Design and Layout	lot	1	10,000	10,000	30	3,000	13,000
1.1.2.3.1.2	Prototypes	ea	40	1,000	40,000	30	12,000	52,000
1.1.2.3.1.3	Production	ea	380	400	152,000	50	76,000	228,000
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*				389,400	46	178,980	568,380

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1.1.2.3.2.1	Design and Layout	lot	1	4,400	4,400	30	1,320	5,720
1.1.2.3.2.2	Prototypes	ea	140	530	74,200	30	22,260	96,460
1.1.2.3.2.3	Production	ea	1160	255	295,800	50	147,900	443,700
1.1.2.3.2.4	Fixturing	lot	1	10,000	10,000	50	5,000	15,000
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*				309,000	50	154,500	463,500
1.1.2.3.3.1	Design and 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	250	290,000	50	145,000	435,000
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	50	14,500	43,500
1.1.2.3.5	High-mass cables	ea	100	270	27,000	50	13,500	40,500
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*				156,400	46	71,720	228,120
1.1.2.4.1	Design and Layout	lot	2	16200	32,400	30	9,720	42,120
1.1.2.4.2	Prototypes	ch	200	150	30,000	50	15,000	45,000
1.1.2.4.3	Production	ch	1,160	75	87,000	50	43,500	130,500
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	*Purple Test Card*				74,900	50	37,450	112,350
1.1.2.5.1	Design and Layout	lot	1	11,400	11,400	50	5,700	17,100
1.1.2.5.2	Prototypes	ch	20	425	8,500	50	4,250	12,750
1.1.2.5.3	Production	ch	200	250	50,000	50	25,000	75,000
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*				379,800	50	189,900	569,700
1.1.2.6.1	Design and Layout	lot	2	29,600	59,200	50	29,600	88,800
1.1.2.6.2	Prototypes	ch	200	340	68,000	50	34,000	102,000
1.1.2.6.3	Production	ch	1160	210	243,600	50	121,800	365,400
1.1.2.6.4	Fixturing	lot	1	4,000	4,000	50	2,000	6,000
1.1.2.6.5	Testing	lot	1	5,000	5,000	50	2,500	7,500
1.1.2.7	*Interface Boards*				77,800	50	38,900	116,700
1.1.2.7.1	Design and Layout	lot	1	8800	8,800	50	4,400	13,200
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
1.1.2.7.4	Testing	lot	1	5000	5,000	50	2,500	7,500
1.1.2.7.5	Additional Boards	each	10	3000	30,000	50	15,000	45,000
1.1.2.8	*DAQ improvements*	lot			100,000		50,000	150,000
1.1.2.8.1	SEQ improvements	lot	1	30000	30,000	50	15,000	45,000
1.1.2.8.2	VRB/VTM improvements	lot	1	15000	15,000	50	7,500	22,500
1.1.2.8.3	VRBC improvements	lot	1	15000	15,000	50	7,500	22,500
1.1.2.8.4	Integration tests	lot	1	40000	40,000	50	20,000	60,000
1.1.2.9	*Power supplies*				339,600	50	169,800	509,400
1.1.2.9.1	*Low-voltage supplies*				90,000	50	45,000	135,000
1.1.2.9.1.1	Design and Layout	lot	1	10000	10,000	50	5,000	15,000
1.1.2.9.1.2	Prototype	each	1	5000	5,000	50	2,500	7,500
1.1.2.9.1.3	Production	each	10	7000	70,000	50	35,000	105,000
1.1.2.9.1.4	Testing	lot	1	5000	5,000	50	2,500	7,500
1.1.2.9.2	*High-voltage supplies*				249,600	50	124,800	374,400
1.1.2.9.2.1	Motherboards	ea	25	2600	65,000	50	32,500	97,500
1.1.2.9.2.2	Pods	ea	380	370	140,600	50	70,300	210,900
1.1.2.9.2.3	VME crates & PS	ea	2	10000	20,000	50	10,000	30,000
1.1.2.9.2.4	Fanout Boxes	ea	12	2,000	24,000	50	12,000	36,000
1.1.3	*Mechanical Design and Fabrication*				1,340,696	51	679,818	2,020,514
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, Drawings	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, Drawings	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*				50,500	55	27,600	78,100

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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
1.1.3.3.3	Layer 0/1 Installation Tooling	set	5	2,300	11,500	60	6,900	18,400
1.1.3.3.4	Travel	set	10	1,000	10,000	30	3,000	13,000
1.1.3.4	*Layer 2-5 stave and module parts*				326,896	51	165,948	492,844
1.1.3.4.1	*Cooling tubes*	ea	205	91	18,656	59	11,078	29,734
1.1.3.4.1.1	Fabrication fixtures	ea	5	1,200	6,000	75	4,500	10,500
1.1.3.4.1.2	PEEK tubing	ft	1200	3.38	4,056	50	2,028	6,084
1.1.3.4.1.3	Nozzles	ea	410	10.00	4,100	50	2,050	6,150
1.1.3.4.1.4	Leak checking stand	ea	2	2,000	4,000	50	2,000	6,000
1.1.3.4.1.5	Connecting tubing	ft	1250	0.40	500	100	500	1,000
1.1.3.4.2	*Stave cores*	ea	205	177	36,300	52	18,900	55,200
1.1.3.4.2.1	Fabrication fixtures	ea	4	1,200	4,800	50	2,400	7,200
1.1.3.4.2.2	Carbon fiber	lb	25	1,200	30,000	50	15,000	45,000
1.1.3.4.2.3	Aluminized mylar	sq. ft.	250	3	750	100	750	1,500
1.1.3.4.2.4	Kapton	sq. ft.	250	3	750	100	750	1,500
1.1.3.4.3	*Stave shells*	ea	410	141	58,000	50	29,000	87,000
1.1.3.4.3.1	Fabrication fixtures	ea	5	1,200	6,000	50	3,000	9,000
1.1.3.4.3.2	Carbon fiber	lb	52	1,000	52,000	50	26,000	78,000
1.1.3.4.4	Component fixtures		0	0	0	0	0	0
1.1.3.4.5	*Readout module assembly fixtures*	ea	12	2,867	34,400	50	17,200	51,600
1.1.3.4.5.1	Shop services	hr	400	50	20,000	50	10,000	30,000
1.1.3.4.5.2	Materials	ea	12	1,200	14,400	50	7,200	21,600
1.1.3.4.6	*Wirebonding fixtures*	ea	6	1,867	11,200	50	5,600	16,800
1.1.3.4.6.1	Shop services	hr	200	50	10,000	50	5,000	15,000
1.1.3.4.6.2	Materials	ea	6	200	1,200	50	600	1,800
1.1.3.4.7	*Stave assembly fixtures*	ea	8	2,750	22,000	50	11,000	33,000
1.1.3.4.7.1	Shop services	hr	400	50	20,000	50	10,000	30,000
1.1.3.4.7.2	Materials	ea	8	250	2,000	50	1,000	3,000
1.1.3.4.8	*Cover gluing fixtures*	ea	4	1,600	6,400	50	3,200	9,600
1.1.3.4.8.1	Shop services	hr	96	50	4,800	50	2,400	7,200
1.1.3.4.8.2	Materials	ea	4	400	1,600	50	800	2,400
1.1.3.4.9	*Silicon positioning bulkheads*	ea	4	7,560	30,240	50	15,120	45,360
1.1.3.4.9.1	Shop services (fixtures)	hr	400	50	20,000	50	10,000	30,000
1.1.3.4.9.2	Materials (fixtures)	set	4	250	1,000	50	500	1,500
1.1.3.4.9.3	Carbon fiber	lb	3.2	1,200	3,840	50	1,920	5,760
1.1.3.4.9.4	*Positioning rings*	ea	4	1,350	5,400	50	2,700	8,100
1.1.3.4.9.4.1	Shop services (fixtures)	hr	64	50	3,200	50	1,600	4,800
1.1.3.4.9.4.2	Materials (fixtures)	set	2	250	500	50	250	750
1.1.3.4.9.4.3	Carbon fiber	lb	8.5	200	1,700	50	850	2,550
1.1.3.4.10	*Support cylinders*	ea	4	9,850	39,400	50	19,700	59,100
1.1.3.4.10.1	Mandrels	ea	2	7,500	15,000	50	7,500	22,500
1.1.3.4.10.2	Shop services (fixtures)	hr	40	50	2,000	50	1,000	3,000
1.1.3.4.10.3	Materials (fixtures,misc.)	set	2	1,000	2,000	50	1,000	3,000
1.1.3.4.10.4	Carbon fiber	lb	17.0	1,200	20,400	50	10,200	30,600
1.1.3.4.11	*Extension cylinders*	ea	4	4,400	17,600	50	8,800	26,400
1.1.3.4.11.1	Shop services (fixtures)	hr	40	50	2,000	50	1,000	3,000
1.1.3.4.11.2	Materials (fixtures,misc.)	set	1	1,000	1,000	50	500	1,500
1.1.3.4.11.3	Carbon fiber	lb	6	1,200	7,200	50	3,600	10,800
1.1.3.4.11.4	*Positioning rings*	ea	4	1,350	5,400	50	2,700	8,100
1.1.3.4.11.4.1	Shop services (fixtures)	hr	64	50	3,200	50	1,600	4,800
1.1.3.4.11.4.2	Materials (fixtures)	set	2	250	500	50	250	750
1.1.3.4.11.4.3	Carbon fiber	lb	8.5	200	1,700	50	850	2,550
1.1.3.4.11.5	Connections to CFT barrel 1	set	2	1,000	2,000	50	1,000	3,000
1.1.3.4.12	*North / south mating fixture*	ea	1	4,000	4,000	50	2,000	6,000
1.1.3.4.12.1	Shop services (fixtures)	hr	60	50	3,000	50	1,500	4,500
1.1.3.4.12.2	Materials (fixtures)	set	1	1,000	1,000	50	500	1,500
1.1.3.4.13	*Rotating fixture*	ea	2	4,350	8,700	50	4,350	13,050
1.1.3.4.13.1	Shop services (fixtures)	hr	150	50	7,500	50	3,750	11,250
1.1.3.4.13.2	Materials (fixtures)	set	2	600	1,200	50	600	1,800
1.1.3.4.14	*Stave installation fixture*	ea	2	5,000	10,000	50	5,000	15,000
1.1.3.4.14.1	Shop services (fixtures)	hr	60	50	3,000	50	1,500	4,500
1.1.3.4.14.2	Materials (fixtures)	set	2	3,500	7,000	50	3,500	10,500
1.1.3.4.15	Hardware and misc. components	lot	1	30,000	30,000	50	15,000	45,000
1.1.3.5	*Coolant / anchoring bulkheads*	ea	4	25,000	56,100	50	28,050	84,150
1.1.3.5.1	Procuremnt of sub-assemblies	ea	8	6,700	53,600	50	26,800	80,400
1.1.3.5.2	Assembly Fixtures	set	1	2,500	2,500	50	1,250	3,750
1.1.3.6	*Junction card mountings*	ea	2	3,000	6,000	50	3,000	9,000
1.1.3.6.1	Shop services	hr	60	50	3,000	50	1,500	4,500
1.1.3.6.2	Assembly Fixtures	set	1	1,000	1,000	50	500	1,500
1.1.3.6.3	Carbon fiber	lb	20	100	2,000	50	1,000	3,000

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1.1.3.7	*Adhesives*	lot	1	6,900	6,900	50	3,450	10,350
1.1.3.7.1	Silver epoxy	pkg	400	11	4,400	50	2,200	6,600
1.1.3.7.2	High purity epoxy & testing	gal	5	300	1,500	50	750	2,250
1.1.3.7.3	Structural adhesives	gal	5	200	1,000	50	500	1,500
1.1.3.8	*Cooling system*	lot			88,600		44,300	132,900
1.1.3.8.1	Chillers for -20 C operation	ea	2	15,000	30,000	50	15,000	45,000
1.1.3.8.2	Vacuum insulated piping	ft	300	17	5,100	50	2,550	7,650
1.1.3.8.3	Vacuum equipment	ea	2	6,000	12,000	50	6,000	18,000
1.1.3.8.4	Vessels	ea	3	2,000	6,000	50	3,000	9,000
1.1.3.8.5	Filters	ea	4	100	400	50	200	600
1.1.3.8.6	Deionization equipment	ea	2	250	500	50	250	750
1.1.3.8.7	Instrumentation	ea	48	200	9,600	50	4,800	14,400
1.1.3.8.8	System test at SiDet	lot	1	20,000	20,000	50	10,000	30,000
1.1.3.8.9	Welding, pipe fitting	lot	1	5,000	5,000	50	2,500	7,500
1.1.3.9	*Dry gas purge*	lot	1	86,000	86,000	50	43,000	129,000
1.1.3.9.1	Additional compressor capacity	lot	1	40,000	40,000	50	20,000	60,000
1.1.3.9.2	Additional gas storage	lot	1	10,000	10,000	50	5,000	15,000
1.1.3.9.3	Compressor maintenance	lot	2	15,000	30,000	50	15,000	45,000
1.1.3.9.4	Tube trailer maintenance	lot	1	6,000	6,000	50	3,000	9,000
1.1.3.10	*Interlocks and safety monitoring*	lot	1	160,000	160,000	46	73,000	233,000
1.1.3.10.1	Replacement PLC system	lot	1	60,000	60,000	50	30,000	90,000
1.1.3.10.2	Readout modules	lot	1	70,000	70,000	40	28,000	98,000
1.1.3.10.3	Spares	lot	1	30,000	30,000	50	15,000	45,000
1.1.3.11	Beam tube	ea	1	125,000	125,000	35	43,750	168,750
1.1.3.12	Capital Equipment at SiDet	ea	1	35,000	35,000	30	10,500	45,500
1.1.4	*Detector Assembly and Testing*				445,250	37	165,415	610,665
1.1.4.1	*Test stands (refurbished)*	ea	15		75,000	25	18,750	93,750
1.1.4.1.1	PC	ea	15	3,000	45,000	25	11,250	56,250
1.1.4.1.2	Infrastructure	lot	15	2,000	30,000	25	7,500	37,500
1.1.4.2	*Hybrid burn-in test stand (refurbished)*	ea	2		36,300	29	10,590	46,890
1.1.4.2.1	PC	ea	2	3,000	6,000	25	1,500	7,500
1.1.4.2.2	SASEQ	ea	20	1,315	26,300	30	7,890	34,190
1.1.4.2.3	Infrastructure	lot	2	2,000	4,000	30	1,200	5,200
1.1.4.3	*Module burn-in test stand*	ea	2		137,650	40	54,625	192,275
1.1.4.3.1	PC	ea	2	3,000	6,000	25	1,500	7,500
1.1.4.3.2	Crate/power supply	ea	2	2,325	4,650	50	2,325	6,975
1.1.4.3.3	bit 3, model 620	ea	2	3,400	6,800	25	1,700	8,500
1.1.4.3.4	SASEQ	ea	40	1,315	52,600	30	15,780	68,380
1.1.4.3.5	LV for SVX4	ea	2	1,200	2,400	30	720	3,120
1.1.4.3.6	Crate power supply for HV system	ea	2	3,000	6,000	50	3,000	9,000
1.1.4.3.7	HV Modules	ea	10	2,400	24,000	50	12,000	36,000
1.1.4.3.8	HV Pods	ea	80	400	32,000	50	16,000	48,000
1.1.4.3.9	J2 backplane	ea	2	600	1,200	50	600	1,800
1.1.4.3.10	fans, harness, chiller for HV	ea	2	1,000	2,000	50	1,000	3,000
1.1.4.4	Cooling for test stand	ea	2	13,650	27,300	50	13,650	40,950
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	80	100	8,000	50	4,000	12,000
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	150	100	15,000	50	7,500	22,500
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	*Monitoring*				55,000	45	24,500	79,500
1.1.5.1	*Radiation monitoring*				15,000	30	4,500	19,500
1.1.5.1.1	Si diodes	lot	1	3,000	3,000	30	900	3,900
1.1.5.1.2	Si diode hybrids	lot	1	2,000	2,000	30	600	2,600
1.1.5.1.3	Low-mass cables	lot	1	5,000	5,000	30	1,500	6,500
1.1.5.1.4	Hi-mass cables	lot	1	2,000	2,000	30	600	2,600
1.1.5.1.5	Readout electronics	lot	1	3,000	3,000	30	900	3,900
1.1.5.2	Temperature Monitoring	lot	1	40,000	40,000	50	20,000	60,000
1.1.6	*Installation*				90,000	47	42,500	132,500
1.1.6.1	Transport cart	ea	1	10,000	10,000	25	2,500	12,500
1.1.6.2	Installation trolley	ea	1	30,000	30,000	50	15,000	45,000
1.1.6.3	Cooling and dry gas	ea	1	50,000	50,000	50	25,000	75,000
1.1.7	*Computing*				101,000	11	11,400	112,400
1.1.7.1	CPUs	ea	14	3,000	42,000	25	10,500	52,500
1.1.7.2	Laptops	ea	3	3,000	9,000	10	900	9,900
1.1.7.3	QA Database	ea	1	50,000	50,000	0	0	50,000

M&S 1.1 SILICON TRACKER

Revision: 6 (Freeman) 7-Apr-02

M&S	ITEM	MATERIALS & SERVICES (M&S)				CONTINGENCY		
1.1	SILICON TRACKER	Unit	#	Unit Cost	M&S TOTAL	%	Cost	TOTAL Cost
1.1	SILICON TRACKER				8,739,692	39	3,402,863	12,142,555