US CMS NSF Cost Estimate

WBS Number	Description	US Mfg M&S (K$)	US Mfg Labor (K$)	US EDIA (K$)	US Base Cost (K$)	US Cont (K$)	Total US Cost (K$)	NSF Request (K$)
Total US CMS NSF Project Request								**20,032**
FY'96 R&D							100	100
US CMS Total NSF Estimated Cost		**13,134**	**1,528**	**1,368**	**16,030**	**3,902**	**19,932**	**19,932**
1	**Endcap Muon System**	**778**	**237**	**311**	**1,326**	**338**	**1,664**	**1,664**
1.1	**Muon Measurement System**	**778**	**237**	**311**	**1,326**	**338**	**1,664**	**1,664**
1.1.7	Alignment	778	237	311	1,326	338	1,664	1,664
1.1.7.1	System Development			200	200	44	244	244
1.1.7.2	Phi Global Linking	292	57	32	381	83	464	464
1.1.7.3	Local CSC Plane Alignment	486	180	79	745	211	956	956
2	**Hadron Calorimeter**	**4,404**	**907**	**140**	**5,451**	**1,635**	**7,086**	**7,086**
2.1	**Barrel Hadron Calorimeter (HB)**	**1,208**	**321**	**50**	**1,578**	**473**	**2,052**	**2,052**
2.1.1	Barrel	94	88	50	231	69	300	300
2.1.1.8	Prototypes	94	88	50	231	69	300	300
2.1.2	Barrel Late Shower Detector	1,115	233	0	1,347	404	1,751	1,751
2.1.2.3	Phototransducers	738	33	0	770	231	1,001	1,001
2.1.2.4	Electronics	377	200	0	577	173	750	750
2.2	**Endcap Hadron Calorimeter (HF)**	**3,196**	**587**	**90**	**3,873**	**1,162**	**5,035**	**5,035**
2.2.1	Endcap	2,304	356	90	2,750	825	3,575	3,575
2.2.1.2	Optical System	158	96	90	344	103	448	448
2.2.1.3	Phototransducers	1,608	60	0	1,667	500	2,168	2,168
2.2.1.4	Electronics	539	200	0	739	222	960	960
2.2.2	Endcap Late Shower Detector	892	231	0	1,122	337	1,459	1,459
2.2.2.3	Phototransducers	569	31	0	599	180	779	779
2.2.2.4	Electronics	323	200	0	523	157	680	680

WBS Number	Description	US Mfg M&S (K$)	US Mfg Labor (K$)	US EDIA (K$)	US Base Cost (K$)	US Cont (K$)	Total US Cost (K$)	NSF Request (K$)
3	**Trigger/Data Acquisition**	**1,153**	**148**	**170**	**1,471**	**387**	**1,858**	**1,858**
3.3	**Luminosity Monitor**	**345**	**42**	**48**	**435**	**87**	**522**	**522**
3.3.1	Interaction Rate Monitor (2)	106	21	18	145	29	174	174
3.3.2	Beam Condition Monitor (6)	0	0	0	0	0	0	0
3.3.3	Roman Pot Detectors (6)	143	21	30	194	39	233	233
3.3.4	Power Supplies	42	0	0	42	8	50	50
3.3.5	Cables	35	0	0	35	7	42	42
3.3.6	Testing Facilities	19	0	0	19	4	23	23
3.4	**Data Acquisition System**	**808**	**106**	**122**	**1,036**	**300**	**1,336**	**1,336**
3.4.2	Readout Data Link (RDL)	313	32	122	467	135	602	602
3.4.2.1	Design and Document	20	0	48	68	20	88	88
3.4.2.2	Prototypes	28	0	37	65	19	84	84
3.4.2.3	Production	225	32	0	257	75	332	332
3.4.3.4	Installation and Test	40	0	37	77	22	99	99
3.4.3	Readout Crate Supervisor (RCS)	495	74	0	569	165	734	734
3.4.3.1	Design and Document	40	0	0	40	12	52	52
3.4.3.2	Prototypes	50	0	0	50	15	65	65
3.4.3.3	Production	405	74	0	479	139	618	618
3.4.3.4	Installation and Test	0	0	0	0	0	0	0

WBS Number	Description	US Mfg M&S (K$)	US Mfg Labor (K$)	US EDIA (K$)	US Base Cost (K$)	US Cont (K$)	Total US Cost (K$)	NSF Request (K$)
4	**Electromagnetic Calorimeter**	**2,057**	**86**	**50**	**2,193**	**579**	**2,772**	**2,772**
4.1	**Barrel Photodetectors**	**2,057**	**86**	**50**	**2,193**	**579**	**2,772**	**2,772**
4.1.1	Characterization Test Stand	14	0	17	32	5	37	37
4.1.2	Prototypes	17	4	8	29	7	36	36
4.1.4	Procurement and Characterization	2,025	32	0	2,057	555	2,612	2,612
4.1.4.1	Prepare Specifications and Bid Package	0	3	0	3	0	4	4
4.1.4.2	Procure APD's	2,025	0	0	2,025	547	2,572	2,572
4.1.4.3	Characterization	0	15	0	15	4	19	19
4.1.4.4	Tracking	0	2	0	2	0	2	2
4.1.4.5	Final Inspection/Test	0	12	0	12	4	16	16
4.1.6	Project Coordination	0	50	25	75	12	87	87
5	**Tracking**	**1,559**	**150**	**697**	**2,406**	**963**	**3,369**	**3,369**
5.1	**Forward Pixel Tracker**	**1,559**	**150**	**697**	**2,406**	**963**	**3,369**	**3,369**
5.1.1	Detectors	991	0	206	1,197	479	1,676	1,676
5.1.1.1	Diode Arrays	991		206	1,197	479	1,676	1,676
5.1.2	FE Electronics	213	0	120	333	133	466	466
5.1.2.2	Data Collection Chip	213		120	333	133	466	466
5.1.3	Mechanical Support & Services	356	150	172	678	271	949	949
5.1.3.1	Kapton Interconnect	112	60	120	292	117	409	409
5.1.3.2	Fibers and Modulators	244	90	52	386	154	540	540
5.1.5	Calibration/Testing	0	0	198	198	79	278	278
5.1.5.2	Pixel Diode Array Chip Testing			124	124	50	174	174
5.1.5.3	Data Collection Chip Testing			74	74	30	104	104
6	**Common Projects**	**3,183**	**0**	**0**	**3,183**	**0**	**3,183**	**3,183**