U.S. ATLAS Installation Cost Book

Funding All **Funding Type:** Project + MC

Institution All

WBS 1 **Descriptio** U.S. ATLAS Installation Estimate

Institution **Contact**

U.S. ATLAS Installation includes detector specific costs for installation of subsystems which are not currently in the approved baseline scope.

Cost Summary: (Project + MC)	Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project + MC	FTEs Other
	1153	400	35	1553	636	189	209	120	6.1	10.8

MANPOWER (k$) SUMMARY:	FY 03 (hrs) (k$)	FY 04 (hrs) (k$)	FY 05 (hrs) (k$)	FY 06 (hrs) (k$)	FY 07 (hrs) (k$)	FY 08 (hrs) (k$)	FY 09 (hrs) (k$)	FY 10 (hrs) (k$)	FY 11 (hrs) (k$)	FY 12 (hrs) (k$)	Total (hrs)
Computer Professional MC	0	0	1760	880	0	0	0	0	0	0	2640
	0	0	118.853	59.427	0	0	0	0	0	0	178.280
Electrical Engineer MC	0	0	1180	740	0	0	0	0	0	0	1920
	0	0	110.1	70.5	0	0	0	0	0	0	180.600
Mechanical Engineer MC	0	240	1400	880	0	0	0	0	0	0	2520
	0	19.2	112	70.4	0	0	0	0	0	0	201.600
Technician MC	0	240	1840	660	0	0	0	0	0	0	2740
	0	16.56	126.96	45.54	0	0	0	0	0	0	189.060
MC Total	0	480	6180	3160	0	0	0	0	0	0	9820
	0	35.76	467.913	245.867	0	0	0	0	0	0	749.540
Electrical Engineer P	80	200	200	0	0	0	0	0	0	0	480
	8.24	20.6	20.6	0	0	0	0	0	0	0	49.440
Technician P	80	200	200	0	0	0	0	0	0	0	480
	4.328	10.82	10.82	0	0	0	0	0	0	0	25.968
P Total	160	400	400	0	0	0	0	0	0	0	960
	12.568	31.42	31.42	0	0	0	0	0	0	0	75.408
Total	160	880	6580	3160	0	0	0	0	0	0	10780
	12.568	67.18	499.333	245.867	0	0	0	0	0	0	824.948

MATERIAL SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total w/ overhead (k$)
Other MC	0.0	0.0	45.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	65.000
Travel MC	0.0	15.0	171.0	59.0	0.0	0.0	0.0	0.0	0.0	0.0	245.000

MC Total	0.0	15.0	216.0	79.0	0.0	0.0	0.0	0.0	0.0	0.0	310.000
Other P	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.500
Travel P	0.0	7.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.000
P Total	0.0	9.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.500
Total	0.0	24.3	225.3	79.0	0.0	0.0	0.0	0.0	0.0	0.0	328.500

PROFILE SUMMARY:	**FY 03 (k$)**	**FY 04 (k$)**	**FY 05 (k$)**	**FY 06 (k$)**	**FY 07 (k$)**	**FY 08 (k$)**	**FY 09 (k$)**	**FY 10 (k$)**	**FY 11 (k$)**	**FY 12 (k$)**	**Total (k$)**
	13	91	725	325	0	0	0	0	0	0	1153

WBS 1.1 **Descriptio** Silicon

Institution **Contact**

Installation of the pixel, semiconductor tracker(SCT) and read-out driver(ROD) systems.

Cost Summary: (Project + MC)	Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project + MC	FTEs Other
	1153	400	35	1553	636	189	209	120	6.1	10.8

MANPOWER (k$) SUMMARY:	FY 03 (hrs) (k$)	FY 04 (hrs) (k$)	FY 05 (hrs) (k$)	FY 06 (hrs) (k$)	FY 07 (hrs) (k$)	FY 08 (hrs) (k$)	FY 09 (hrs) (k$)	FY 10 (hrs) (k$)	FY 11 (hrs) (k$)	FY 12 (hrs) (k$)	Total (hrs)
Computer Professional MC	0	0	1760	880	0	0	0	0	0	0	2640
	0	0	118.853	59.427	0	0	0	0	0	0	178.280
Electrical Engineer MC	0	0	1180	740	0	0	0	0	0	0	1920
	0	0	110.1	70.5	0	0	0	0	0	0	180.600
Mechanical Engineer MC	0	240	1400	880	0	0	0	0	0	0	2520
	0	19.2	112	70.4	0	0	0	0	0	0	201.600
Technician MC	0	240	1840	660	0	0	0	0	0	0	2740
	0	16.56	126.96	45.54	0	0	0	0	0	0	189.060
MC Total	0	480	6180	3160	0	0	0	0	0	0	9820
	0	35.76	467.913	245.867	0	0	0	0	0	0	749.540
Electrical Engineer P	80	200	200	0	0	0	0	0	0	0	480
	8.24	20.6	20.6	0	0	0	0	0	0	0	49.440
Technician P	80	200	200	0	0	0	0	0	0	0	480
	4.328	10.82	10.82	0	0	0	0	0	0	0	25.968
P Total	160	400	400	0	0	0	0	0	0	0	960
	12.568	31.42	31.42	0	0	0	0	0	0	0	75.408
Total	160	880	6580	3160	0	0	0	0	0	0	10780
	12.568	67.18	499.333	245.867	0	0	0	0	0	0	824.948

MATERIAL SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total w/ overhead (k$)
Other MC	0.0	0.0	45.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	65.000
Travel MC	0.0	15.0	171.0	59.0	0.0	0.0	0.0	0.0	0.0	0.0	245.000
MC Total	0.0	15.0	216.0	79.0	0.0	0.0	0.0	0.0	0.0	0.0	310.000
Other P	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.500
Travel P	0.0	7.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.000
P Total	0.0	9.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.500
Total	0.0	24.3	225.3	79.0	0.0	0.0	0.0	0.0	0.0	0.0	328.500

PROFILE SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total (k$)
	13	91	725	325	0	0	0	0	0	0	1153

WBS 1.1.1 **Descriptio** Pixels

Institution **Contact** M. Gilchriese

Installation of the U.S. supplied elements of the pixel system and of the completed pixel system into ATLAS. Integration of U.S. supplied components and of the complete pixel detector on the surface at CERN are included

Cost Summary: (Project + MC)	Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project + MC	FTEs Other
	965	338	35	1302	499	189	158	120	5.2	0.0

MANPOWER (k$) SUMMARY:	FY 03 (hrs) (k$)	FY 04 (hrs) (k$)	FY 05 (hrs) (k$)	FY 06 (hrs) (k$)	FY 07 (hrs) (k$)	FY 08 (hrs) (k$)	FY 09 (hrs) (k$)	FY 10 (hrs) (k$)	FY 11 (hrs) (k$)	FY 12 (hrs) (k$)	Total (hrs)
Computer Professional MC	0	0	1760	880	0	0	0	0	0	0	2640
	0	0	118.853	59.427	0	0	0	0	0	0	178.280
Electrical Engineer MC	0	0	880	440	0	0	0	0	0	0	1320
	0	0	79.2	39.6	0	0	0	0	0	0	118.800
Mechanical Engineer MC	0	240	1400	880	0	0	0	0	0	0	2520
	0	19.2	112	70.4	0	0	0	0	0	0	201.600
Technician MC	0	240	1840	660	0	0	0	0	0	0	2740
	0	16.56	126.96	45.54	0	0	0	0	0	0	189.060
MC Total	0	480	5880	2860	0	0	0	0	0	0	9220
	0	35.76	437.013	214.967	0	0	0	0	0	0	687.740
Total	0	480	5880	2860	0	0	0	0	0	0	9220
	0	35.76	437.013	214.967	0	0	0	0	0	0	687.740

MATERIAL SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total w/ overhead (k$)
Other MC	0.0	0.0	40.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	60.000
Travel MC	0.0	15.0	157.0	45.0	0.0	0.0	0.0	0.0	0.0	0.0	217.000
MC Total	0.0	15.0	197.0	65.0	0.0	0.0	0.0	0.0	0.0	0.0	277.000
Total	0.0	15.0	197.0	65.0	0.0	0.0	0.0	0.0	0.0	0.0	277.000

PROFILE SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total (k$)
	0	51	634	280	0	0	0	0	0	0	965

WBS 1.1.1.7 **Descriptio** Pixels Installation

Institution **Contact** M. Gilchriese

Integration of the pixel system on the surface at CERN and installation in the pit.

Details of Estimate: Engineering and technical labor, travel and supplies for installation of the pixel subsystem. This cost estimate presented in the next WBS elements assumes that the U.S. provides only critical engineering and technical labor. Tooling and supplies need for the specific integration of U.S. deliverables at CERN during the overall surface integration of the pixel system are covered in other WBS elements, since trial integration of the U.S. deliverables will occur in the U.S. before the final integration at CERN. Furthermore we assume that all tooling needed for insertion of the integrated pixel system into ATLAS in the pit is either supplied by non-U.S. sources or supported in part by U.S. M&O funds, since this tooling will be used for removal and maintenance of the pixel system. Similarly we assume that general facilities(cooling, power, etc) in the surface building have been supported by non-U.S. sources or in part by U.S. M&O funds.

In brief the U.S. deliverables are:
· Pixel support tube(PST) in three sections and tooling for bonding the mount for the barrel section into the SCT barrel
· Pixel support frame in three sections, barrel and two disk sections.
· Pixel disks, tooling for insertion of disks into support frame, testing hardware for verification of functionality before and after insertion into support frame
· Pixel service panels, handling tooling for the service panels and testing hardware to verify functionality
· Patch panel 1(PP1)
· Beam pipe and service panel support
· All pixel RODs, including software for operation of the RODs

The EU delivers the barrel regions(which must be inserted in the US-supplied barrel support frame), tooling for integration on the surface of the barrels, disks, services up through PP1 and the beam pipe and the "installation" tube for lowering the integrated pixel detector into the pit for insertion into the Inner Detector.

A very short summary of the installation of the U.S. pixel deliverables includes the following:

I. The barrel section of the pixel support tube(PST) is installed into the SCT/TRT barrel in the SR building. This requires bonding(gluing) mounts in place. The forward sections of the PST are bolted to the barrel and the alignment checked. The forward sections are then removed and stored.

II. The barrel ID, including the barrel section of the PST, is lowered into the pit and installed into the solenoid magnet. The heater elements of the barrel PST are cabled and checked. The forward sections of the PST are bolted to the barrel section and the alignment is checked. The forward parts for the SCT/TRT can then be installed.

III. In the SR building. Integration of the U.S-supplied disks into the disk sections of the support frame sections. Verification of their functionality. Integration of two disk sections with the barrel section. Integration of the beam pipe support and beam pipe. Integration of services panels and PP1. Verification of functionality using about 10% of the RODs temporarily installed in SR building. Insertion of the pixel “package” into an installation tube/support to be lowered into the pit. The pixel package is inserted into the pixel support tube. Coolant pipes, electrical cables and optical fibers are attached to PP1 and commissioning begins.

Overview of Manpower
The detailed task list, durations and manpower estimates are given in the WBS sections that follow. In this section we provide an overview of the technical manpower estimates that follow from the more detailed estimates.
· The initial PST installation occurs in mid-2004. The lead engineer and tech for this are at CERN for 6 weeks.
· The pixel RODs(some of them) have been in use at the barrel and disk assembly sites. They are all shipped to CERN by October 1, 2004. About 90% are installed in their final locations. About 10% are installed in the SR building for testing the pixel system during surface integration. The pixel systems engineer(J. Richardson) becomes resident at CERN as of October 1, 2004 and is the lead engineer for installation(and later commissioning) of the RODs and of the system test capability in the SR building. The lead engineer for the ROD design(currently J. Joseph) is at CERN for the initial phase of ROD installation.
· The remaining pixel deliverables(disks, beam pipe support, service panels, PP1) begin to arrive at CERN in January 2005. The lead mechanical engineer for pixel integration and installation is from the U.S. and becomes resident at CERN at this time. Mechanical technical manpower from the U.S. unpacks, inspects and assembles the

Number: **n:**

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U.S deliverables on the surface. The final PST assembly in the pit is done primarily by U.S. personnel under the direction of the lead mechanical engineer.
· Testing of the assembled pixel system is done on the surface. The pixel systems engineer(Richardson) is the lead engineer for this. Additional electrical engineering for the readout system(RODs) and for electronics participates at CERN but is not resident at CERN. The lead mechanical engineer is simultaneously coordinating the effort to install the pixel system in the pit.
· The pixel system is lowered into the pit, inserted into the PST. Cables, fibers and pipes are connected. Verification of functionality is done during the connection process. Richardson is the lead systems engineer for the electrical testing. The lead mechanical engineer is responsible for the cooling, cabling etc. Mechanical technicians **U.S. ATLAS % share of** 50.00%
from the U.S. are part of a team doing the connections, focusing on the critical region at PP1 that was done in the
· Commissioning follows the verification of installation. Richardson remains resident at CERN as the lead systems engineer for this and later for operations and is supported by M&O funding. All other personnel return to the U.S.

U.S. **Cost Summary:**	Total EDIA Cost (k$)	Mfg Cost (k$)	Cont %	Base EDIA Cost (k$)	Mfg Labor (k$)	FTEs Labor (k$)	FTEs Matls (k$)	Matls (k$)	Cont Project + MC	Other **Summary:** (k$)	**(Project + MC)**
	965	338	35	1302	499	189	158	120	5.2	0.0	

MANPOWER (k$) **SUMMARY:**	FY 03 (hrs) (k$)	FY 04 (hrs) (k$)	FY 05 (hrs) (k$)	FY 06 (hrs) (k$)	FY 07 (hrs) (k$)	FY 08 (hrs) (k$)	FY 09 (hrs) (k$)	FY 10 (hrs) (k$)	FY 11 (hrs) (k$)	FY 12 (hrs) (k$)	Total (hrs)
Computer Professional MC	0	0	1760	880	0	0	0	0	0	0	2640
	0	0	118.853	59.427	0	0	0	0	0	0	178.280
Electrical Engineer MC	0	0	880	440	0	0	0	0	0	0	1320
	0	0	79.2	39.6	0	0	0	0	0	0	118.800
Mechanical Engineer MC	0	240	1400	880	0	0	0	0	0	0	2520
	0	19.2	112	70.4	0	0	0	0	0	0	201.600
Technician MC	0	240	1840	660	0	0	0	0	0	0	2740
	0	16.56	126.96	45.54	0	0	0	0	0	0	189.060
MC Total	0	480	5880	2860	0	0	0	0	0	0	9220
	0	35.76	437.013	214.967	0	0	0	0	0	0	687.740
Total	0	480	5880	2860	0	0	0	0	0	0	9220
	0	35.76	437.013	214.967	0	0	0	0	0	0	687.740

MATERIAL SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total w/ overhead (k$)
Other MC	0.0	0.0	40.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	60.000
Travel MC	0.0	15.0	157.0	45.0	0.0	0.0	0.0	0.0	0.0	0.0	217.000
MC Total	0.0	15.0	197.0	65.0	0.0	0.0	0.0	0.0	0.0	0.0	277.000
Total	0.0	15.0	197.0	65.0	0.0	0.0	0.0	0.0	0.0	0.0	277.000

PROFILE SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total (k$)
	0	51	634	280	0	0	0	0	0	0	965

WBS 1.1.1.7.1 **Descriptio** Initial Pixel Support Tube Installation

Institution LBNL **Contact** M. Gilchriese

The three sections of the PST have been shipped to CERN. Tooling for bonding the mounts of the PST to the corresponding mounts in the barrel SCT interlinks has also been shipped. Tools and supplies for the U.S. team are a U.S responsibility. We assume that non-U.S. collaborators will provide the following:

· Space for unpacking and inspecting the PST sections upon delivery to CERN
· Some technician manpower for handling the PST sections and tooling.
· Temporary supports for holding the PST sections. We are assuming that the barrel section is inserted by hand into the SCT. This remains to be verified. Temporary supports will be needed for the forward PST sections when they are bolted to the barrel section for checking.
· All survey and alignment equipment and expert personnel

Physicist estimate **Basis of**

The estimated tasks and durations(in weeks) are the following: **Details of Estimate:**

Task	Duration(weeks)
Get organized. Unpack PST sections	1
Inspect, continuity test of heaters, repair	1
Install barrel, bond mounts, survey	2
Fit forwards, survey	1
Remove forwards, pack and store	1

The mechanical engineer responsible for the PST design must be present throughout this period. A trial assembly of the PST sections will have been done in the U.S. The lead tech that did this assembly must also be present throughout this period. We assume that we can get additional technical manpower at no cost to the U.S. for handling the PST sections during the operations above. The manpower estimates are the following :

Type of manpower	FTE(hours) FY04
Mechanical engineer	240
Mechanical technician	240

Travel costs are one round trip to CERN for these two people+ expenses at CERN.

U.S. ATLAS % share of 90.00%

Cost Summary: (Project + MC)	**Base Cost (k$)**	**Cont Cost (k$)**	**Cont %**	**Total Cost (k$)**	**EDIA Labor (k$)**	**Mfg Labor (k$)**	**EDIA Matls (k$)**	**Mfg Matls (k$)**	**FTEs Project + MC**	**FTEs Other**
	51	18	35	69	19	17	8	8	0.3	0.0

MANPOWER (k$) SUMMARY:	**FY 03 (hrs) (k$)**	**FY 04 (hrs) (k$)**	**FY 05 (hrs) (k$)**	**FY 06 (hrs) (k$)**	**FY 07 (hrs) (k$)**	**FY 08 (hrs) (k$)**	**FY 09 (hrs) (k$)**	**FY 10 (hrs) (k$)**	**FY 11 (hrs) (k$)**	**FY 12 (hrs) (k$)**	**Total (hrs)**
Mechanical Engineer MC	0	240	0	0	0	0	0	0	0	0	240
	0	19.2	0	0	0	0	0	0	0	0	19.200
Technician MC	0	240	0	0	0	0	0	0	0	0	240
	0	16.56	0	0	0	0	0	0	0	0	16.560
MC Total	0	480	0	0	0	0	0	0	0	0	480
	0	35.76	0	0	0	0	0	0	0	0	35.760
Total	0	480	0	0	0	0	0	0	0	0	480
	0	35.76	0	0	0	0	0	0	0	0	35.760

MATERIAL SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total w/ overhead (k$)
Travel MC	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.000
MC Total	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.000
Total	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.000

CONTINGENCY FACTORS:	*Risk*				*Weight*			Cont %
	Technical	C o s t	Schedule	Des i gn	Technical	C o s t	Schedule	
	4	4	8	15	2	1	1	35

PROFILE SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total (k$)
	0	51	0	0	0	0	0	0	0	0	51

WBS 1.1.1.7.2 **Descriptio** Final PST Installation

Institution LBNL **Contact** M. Gilchriese

The barrel ID with the barrel section of the PST is lowered into the pit and installed into the solenoid. Continuity of the barrel PST heaters is checked. The forward PST sections are lowered, brought into the solenoid and bolted to the barrel section. Heater continuity is checked. Alignment of the forward sections is checked.

Physicist estimate**Basis of**

The tasks and durations for U.S. manpower are given below.**Details of Estimate:**

Task	Duration(weeks)
Barrel heater continuity, cabling, check	0.5
Install forward PST sections, survey	1
Forward heater continuity, cabling, check	0.5

The manpower estimates are:

Type of manpower	FTE(hours) FY05
Mechanical engineer	80
Junior mechanical technician	80

Since this occurs during the same period as the pixel surface installation, the travel is included there.

U.S. ATLAS % share of 75.00%

Cost Summary: (Project + MC)	**Base Cost (k$)**	**Cont Cost (k$)**	**Cont %**	**Total Cost (k$)**	**EDIA Labor (k$)**	**Mfg Labor (k$)**	**EDIA Matls (k$)**	**Mfg Matls (k$)**	**FTEs Project + MC**	**FTEs Other**
	12	4	35	16	6	6	0	0	0.1	0.0

MANPOWER (k$) SUMMARY:	**FY 03 (hrs) (k$)**	**FY 04 (hrs) (k$)**	**FY 05 (hrs) (k$)**	**FY 06 (hrs) (k$)**	**FY 07 (hrs) (k$)**	**FY 08 (hrs) (k$)**	**FY 09 (hrs) (k$)**	**FY 10 (hrs) (k$)**	**FY 11 (hrs) (k$)**	**FY 12 (hrs) (k$)**	**Total (hrs)**
Mechanical Engineer MC	0	0	80	0	0	0	0	0	0	0	80
	0	0	6.4	0	0	0	0	0	0	0	6.400
Technician MC	0	0	80	0	0	0	0	0	0	0	80
	0	0	5.52	0	0	0	0	0	0	0	5.520
MC Total	0	0	160	0	0	0	0	0	0	0	160
	0	0	11.92	0	0	0	0	0	0	0	11.920
Total	0	0	160	0	0	0	0	0	0	0	160
	0	0	11.92	0	0	0	0	0	0	0	11.920

CONTINGENCY FACTORS:	***Risk***				***Weight***			**Cont %**
	Technical	**C o s t**	**Schedule**	**Des i gn**	**Technical**	**C o s t**	**Schedule**	
	4	4	8	15	2	1	1	35

PROFILE SUMMARY:	**FY 03 (k$)**	**FY 04 (k$)**	**FY 05 (k$)**	**FY 06 (k$)**	**FY 07 (k$)**	**FY 08 (k$)**	**FY 09 (k$)**	**FY 10 (k$)**	**FY 11 (k$)**	**FY 12 (k$)**	**Total (k$)**
	0	0	12	0	0	0	0	0	0	0	12

WBS 1.1.1.7.3 **Descriptio** Surface Integration

Institution LBNL **Contact** M. Gilchriese

The pixel disks, disk frame sections, tooling for insertion and testing of these, beam pipe and service panel support, service panels and PP1 are at CERN. The barrel sections being fabricated in the EU have also arrived at CERN. All work takes place in the SR building. We assume that testing electronics(RODs, crates, racks, PCs) have arrived previously and are ready to be used for testing. We assume that our non – U.S. collaborators or U.S M&O funds will provide the following:

· Space and facilities for unpacking and assembly of the U.S. deliverables(the SR building + tables, benches, etc)

· Cooling system for surface testing
· Cables and fibers for surface testing
· All alignment and survey instrumentation and expert personnel

Basis of Physicist estimate

Details of Estimate: The U.S. technical team during this period will consist of: 1 FTE lead pixel systems engineer for testing(Richardson), 1 FTE lead mechanical engineer, 2 FTE mechanical technicians(this will be 3-4 people sharing the load, traveling to CERN as particular expertise is needed), 0.5 FTE electrical engineer for pixel electronics debugging.

We assume here that the pixels are ready for in-pit installation 6 weeks into FY06.

Note that the systems engineer is resident at CERN is the lead engineer for all testing(not just of U.S. deliverables). He will establish the ROD and testing environment including software during the 1st quarter of FY05(440 hours). Once the U.S. deliverables start to arrive at CERN, he will coordinate all testing during unpacking to verify that no damage occurred during shipping(300 hours). He will similarly coordinate the testing of the disks as they are inserted into the disk frames(300 hours). He will also help coordinate the testing of the electronics parts of the service panels as they are unpacked(30 hours). Testing will also occur as the disk and barrel sections are integrated(500 hours). And testing after integration on the surface before lowering into the pit(410 hours).

We assume here that the U.S. mechanical engineer is the overall pixel project engineer and is responsible for coordination of all surface integration, in-pit installation and the associated cabling, cooling etc.

The manpower estimates are detailed below.

Type of manpower	FTE(hours) FY05	FTE(hours)FY06
Systems engineer	1760	220
Electrical engineer	880	110
Mechanical engineer	1320	220
Senior mechanical technician	880	110
Junior mechanical technician	880	220

Travel and supplies costs are estimated as below. Travel includes relocation costs to CERN or relocation to US, which we take as $30K and $10K, respectively. Costs for non-CERN-resident personnel are taken as $1.5K per trip and $1K per week at CERN. Supplies include stores items at CERN, other minor consumables and computers for personnel use. We have rounded costs to the nearest K

We assume the systems engineer becomes resident at CERN at the start of FY05 and that he makes two trips back to the US of one week duration each. His costs are then 30+2x(1.5+1)=35K.

We assume the mechanical engineer is the pixel project engineer and becomes resident at CERN by the 1st quarter of FY05 and that he makes two trips back to the US. His costs are therefore also 35K.

We assume that the electrical engineer(s) make 4 trips of three weeks duration. This cost is 4x(1.5+3)=18. Note that the EE are still working(remotely) even when not at CERN.

We assume that the senior mechanical technicians(2 of them) make 4 trips of 3 weeks duration so the cost is 2x4x(1.5+3)=36.

We assume the junior mechanical tech moves to CERN for 6 months during FY05 with 1 trip back to the US. His

Number: **n:**

: **:**

· The installation and test tool(ITT) for the surface installation and testing of the parts of the pixel detector and the final assembled detector

Estimate:

U.S. ATLAS % share of 50.00%

cost is then 30+2.5=33K

Note that the assembly and final assembly in the US will be done by these techs. No EU personnel will have ever seen or handled the disk sections, the service panels or PP1.

Base Cost (k$)	**Cont Cost**	**Total Cost (k$)**	**Cont %**	**EDIA Cost (k$)**	**Mfg Labor (k$)**	**EDIA Labor (k$)**	**Mfg MC Matls (k$)**	**EDIA Other Matls (k$)**	**Mfg FTEs**	**FTEs Project +**	**FTEs Other**	**Cost (k$)**
Cost Summary:												
Type of manpower				Travel(FY05)		Supplies(FY05)	687	241	35	928	346	144
113	84	3.8	0.0									

MANPOWER SUMMARY:	**FY 03 (hrs) (k$)**	**FY 04 (hrs) (k$)**	**FY 05 (hrs) (k$)**	**FY 06 (hrs) (k$)**	**FY 07 (hrs) (k$)**	**FY 08 (hrs) (k$)**	**FY 09 (hrs) (k$)**	**FY 10 (hrs) (k$)**	**FY 11 (hrs) (k$)**	**FY 12 (hrs) (k$)**	**Total (hrs) (k$)**
Computer Professional MC	0	0	1760	220	0	0	0	0	0	0	1980
	0	0	118.853	14.857	0	0	0	0	0	0	133.710
Electrical Engineer MC	0	0	880	110	0	0	0	0	0	0	990
	0	0	79.2	9.9	0	0	0	0	0	0	89.100
Mechanical Engineer MC	0	0	1320	220	0	0	0	0	0	0	1540
	0	0	105.6	17.6	0	0	0	0	0	0	123.200
Technician MC	0	0	1760	330	0	0	0	0	0	0	2090
	0	0	121.44	22.77	0	0	0	0	0	0	144.210
MC Total	0	0	5720	880	0	0	0	0	0	0	6600
	0	0	425.093	65.127	0	0	0	0	0	0	490.220
Total	0	0	5720	880	0	0	0	0	0	0	6600
	0	0	425.093	65.127	0	0	0	0	0	0	490.220

MATERIAL SUMMARY:	**FY 03 (k$)**	**FY 04 (k$)**	**FY 05 (k$)**	**FY 06 (k$)**	**FY 07 (k$)**	**FY 08 (k$)**	**FY 09 (k$)**	**FY 10 (k$)**	**FY 11 (k$)**	**FY 12 (k$)**	**Total w/ overhead (k$)**
Other MC	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.000
Travel MC	0.0	0.0	157.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	157.000
MC Total	0.0	0.0	197.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	197.000
Total	0.0	0.0	197.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	197.000

CONTINGENCY FACTORS:	*Risk* Technical	Cost	Schedule	Design	*Weight* Technical	Cost	Schedule	Cont %

PROFILE SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total (k$)
	0	0	622	65	0	0	0	0	0	0	687

WBS 1.1.1.7.4 **Descriptio** In-pit installation

Institution LBNL **Contact** M. Gilchriese

Installation of the pixel detector occurs in FY06. We assume that the mechanical installation and verification of installation is completed by the middle of FY06. As we have already noted, we assume that the lead mechanical engineer coordinating the installation is from the U.S. Since the U.S. deliverables include the PST rails, pixel mounts and PP1, we have included technical manpower from the U.S. for in-pit installation, the delicate cabling and checkout of PP1 and for verifying PST performance with the pixel detector in place. Richardson will continue to be the lead systems engineer for installation verification and later commissioning. Note that we assume that pixel installation, including cabling etc is completed by the middle of FY06.

Physicist estimate**Basis of**

Details of Estimate:

Only the installation part is given in the table below.

Type of manpower	FTE(hours) FY06
Systems engineer	660
Electrical engineer	330
Mechanical engineer	660
Senior mechanical technician	110
Junior mechanical technician	220

Travel and supplies costs are estimated below.

For the systems engineer we budget 2 trips back to the US or 2x(1.5+1)=5K

For the electrical engineer(s) we budget 2 trips of 3 weeks each to CERN or 2x(1.5+3)=9K

The mechanical engineer has 1 trip to the US + relocation back to the US(10K) or 1x(1.5+1)+10K=13K

For the senior tech(s) we budget 1 trip of 3 weeks or 1.5+3 = 5K

For the junior tech we budget 1 trip plus relocation back to the US or 13K

Type of manpower	Travel(FY06)	Supplies(FY06)
Systems engineer	5K	5K
Electrical engineer	9K	0K
Mechanical engineer	13K	5K
Senior mechanical technician	5K	5K
Junior mechanical technician	13K	5K
Total manufacturing	18	10
Total EDIA	27	10

U.S. ATLAS % share of 50.00%

Cost Summary: (Project + MC)	**Base Cost (k$)**	**Cont Cost (k$)**	**Cont %**	**Total Cost (k$)**	**EDIA Labor (k$)**	**Mfg Labor (k$)**	**EDIA Matls (k$)**	**Mfg Matls (k$)**	**FTEs Project + MC**	**FTEs Other**
	215	75	35	290	127	23	37	28	1.1	0.0

MANPOWER (k$) SUMMARY:	**FY 03 (hrs) (k$)**	**FY 04 (hrs) (k$)**	**FY 05 (hrs) (k$)**	**FY 06 (hrs) (k$)**	**FY 07 (hrs) (k$)**	**FY 08 (hrs) (k$)**	**FY 09 (hrs) (k$)**	**FY 10 (hrs) (k$)**	**FY 11 (hrs) (k$)**	**FY 12 (hrs) (k$)**	**Total (hrs)**

Computer Professional MC	0	0	0	660	0	0	0	0	0	0	660
	0	0	0	44.57	0	0	0	0	0	0	44.570
Electrical Engineer MC	0	0	0	330	0	0	0	0	0	0	330
	0	0	0	29.7	0	0	0	0	0	0	29.700
Mechanical Engineer MC	0	0	0	660	0	0	0	0	0	0	660
	0	0	0	52.8	0	0	0	0	0	0	52.800
Technician MC	0	0	0	330	0	0	0	0	0	0	330
	0	0	0	22.77	0	0	0	0	0	0	22.770
MC Total	0	0	0	1980	0	0	0	0	0	0	1980
	0	0	0	149.84	0	0	0	0	0	0	149.840
Total	0	0	0	1980	0	0	0	0	0	0	1980
	0	0	0	149.84	0	0	0	0	0	0	149.840

MATERIAL SUMMARY:	**FY 03 (k$)**	**FY 04 (k$)**	**FY 05 (k$)**	**FY 06 (k$)**	**FY 07 (k$)**	**FY 08 (k$)**	**FY 09 (k$)**	**FY 10 (k$)**	**FY 11 (k$)**	**FY 12 (k$)**	**Total w/ overhead (k$)**
Other MC	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	20.000
Travel MC	0.0	0.0	0.0	45.0	0.0	0.0	0.0	0.0	0.0	0.0	45.000
MC Total	0.0	0.0	0.0	65.0	0.0	0.0	0.0	0.0	0.0	0.0	65.000
Total	0.0	0.0	0.0	65.0	0.0	0.0	0.0	0.0	0.0	0.0	65.000

CONTINGENCY FACTORS:	***Risk***				***Weight***			**Cont %**
	Technical	**C o s t**	**Schedule**	**Des i gn**	**Technical**	**C o s t**	**Schedule**	
	4	4	8	15	2	1	1	35

PROFILE SUMMARY:	**FY 03 (k$)**	**FY 04 (k$)**	**FY 05 (k$)**	**FY 06 (k$)**	**FY 07 (k$)**	**FY 08 (k$)**	**FY 09 (k$)**	**FY 10 (k$)**	**FY 11 (k$)**	**FY 12 (k$)**	**Total (k$)**
	0	0	0	215	0	0	0	0	0	0	215

WBS 1.1.2 **Descriptio** Silicon Strip System

Institution **Contact**

Surface integration and in-pit installation of the SCT system at CERN.

Cost Summary: (Project + MC)	Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project + MC	FTEs Other
	0	0	0	0	0	0	0	0	0.0	3.0

WBS 1.1.2.4 **Descriptio** SCT

Institution **Contact**

Installation for the SCT subsystem.

Cost Summary: (Project + MC)	Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project + MC	FTEs Other
	0	0	0	0	0	0	0	0	0.0	3.0

WBS 1.1.2.4.1 **Descriptio** SCT Installation

Institution **Contact**

The US deliverables to the SCT system are ASICs and barrel modules. The barrel modules assembled and tested in the US are shipped to Oxford for placement on the barrel support structures. The barrels from the UK and Japan are shipped to CERN for integration(4 barrels) on the surface and insertion into the TRT barrel. The SCT/TRT barrel is then lowered into the pit. Cables and pipes are connected.

LBNL and UC Santa Cruz are currently the only US institutions involved in the SCT. No **Details of Estimate:**
technical manpower from LBNL is foreseen to be involved in the surface integration or in-pit installation of the SCT.

Cost Summary: (Project + MC)	**Base Cost (k$)**	**Cont Cost (k$)**	**Cont %**	**Total Cost (k$)**	**EDIA Labor (k$)**	**Mfg Labor (k$)**	**EDIA Matls (k$)**	**Mfg Matls (k$)**	**FTEs Project + MC**	**FTEs Other**
	0	0	0	0	0	0	0	0	0.0	3.0

WBS 1.1.2.4.1.1 **Descriptio** LBNL

Institution LBNL **Contact**

Physicist staff

Physicist estimate **Basis of**

Only physicist support is included, no technical labor. **Details of Estimate:**

U.S. ATLAS % share of 5.00%

Cost Summary: (Project + MC)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project + MC	FTEs Other
0	0	0	0	0	0	0	0	0.0	2.0

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	C o s t	Schedule	Des i gn	Technical	C o s t	Schedule	Cont %
8	15	4	8	2	1	1	43

WBS 1.1.2.4.1.2 **Descriptio** UCSC

Institution U. of California, Santa Cruz **Contact**

Physicist and technical staff surface integration, testing and in-pit installlation

Physicist estimate **Basis of**

Base supported engineer who has been responsible for grounding and shielding will **Details of Estimate:** provide about 0.5 FTE of support in FY04 and FY05.

U.S. ATLAS % share of 10.00%

Cost Summary: (Project + MC)	**Base Cost (k$)**	**Cont Cost (k$)**	**Cont %**	**Total Cost (k$)**	**EDIA Labor (k$)**	**Mfg Labor (k$)**	**EDIA Matls (k$)**	**Mfg Matls (k$)**	**FTEs Project + MC**	**FTEs Other**
	0	0	0	0	0	0	0	0	0.0	1.0

CONTINGENCY FACTORS:	***Risk***				***Weight***			**Cont %**
	Technical	**C o s t**	**Schedule**	**Des i gn**	**Technical**	**C o s t**	**Schedule**	
	8	15	4	8	2	1	1	43

WBS 1.1.3 **Descriptio** RODs

Institution **Contact**

Installation of the SCT and pixel RODs. Installation of SCT RODs is covered currently by project funds. Installation of pixels RODs is under the management contingency category.

Cost Summary: (Project + MC)	Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project + MC	FTEs Other
	189	62	33	251	137	0	52	0	0.9	7.8

MANPOWER SUMMARY: (k$)	FY 03 (hrs) (k$)	FY 04 (hrs) (k$)	FY 05 (hrs) (k$)	FY 06 (hrs) (k$)	FY 07 (hrs) (k$)	FY 08 (hrs) (k$)	FY 09 (hrs) (k$)	FY 10 (hrs) (k$)	FY 11 (hrs) (k$)	FY 12 (hrs) (k$)	Total (hrs)
Electrical Engineer MC	0	0	300	300	0	0	0	0	0	0	600
	0	0	30.9	30.9	0	0	0	0	0	0	61.800
MC Total	0	0	300	300	0	0	0	0	0	0	600
	0	0	30.9	30.9	0	0	0	0	0	0	61.800
Electrical Engineer P	80	200	200	0	0	0	0	0	0	0	480
	8.24	20.6	20.6	0	0	0	0	0	0	0	49.440
Technician P	80	200	200	0	0	0	0	0	0	0	480
	4.328	10.82	10.82	0	0	0	0	0	0	0	25.968
P Total	160	400	400	0	0	0	0	0	0	0	960
	12.568	31.42	31.42	0	0	0	0	0	0	0	75.408
Total	160	400	700	300	0	0	0	0	0	0	1560
	12.568	31.42	62.32	30.9	0	0	0	0	0	0	137.208

MATERIAL SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total w/ overhead (k$)
Other MC	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.000
Travel MC	0.0	0.0	14.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	28.000
MC Total	0.0	0.0	19.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	33.000
Other P	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.500
Travel P	0.0	7.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.000
P Total	0.0	9.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.500
Total	0.0	9.3	28.3	14.0	0.0	0.0	0.0	0.0	0.0	0.0	51.500

PROFILE SUMMARY:	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total (k$)
	13	41	91	45	0	0	0	0	0	0	189

WBS 1.1.3.9 **Descriptio** SCT ROD Installation

Institution **Contact** R. Jared

This item covers the installation for the SCT ROD cards

Engineering and other technical manpower for installation**Details of Estimate:**

U.S. ATLAS % share of 75.00%

Cost Summary: (Project + MC)	**Base Cost (k$)**	**Cont Cost (k$)**	**Cont %**	**Total Cost (k$)**	**EDIA Labor (k$)**	**Mfg Labor (k$)**	**EDIA Matls (k$)**	**Mfg Matls (k$)**	**FTEs Project + MC**	**FTEs Other**
	94	33	35	127	75	0	19	0	0.5	7.8

MANPOWER (k$) SUMMARY:	**FY 03 (hrs) (k$)**	**FY 04 (hrs) (k$)**	**FY 05 (hrs) (k$)**	**FY 06 (hrs) (k$)**	**FY 07 (hrs) (k$)**	**FY 08 (hrs) (k$)**	**FY 09 (hrs) (k$)**	**FY 10 (hrs) (k$)**	**FY 11 (hrs) (k$)**	**FY 12 (hrs) (k$)**	**Total (hrs)**
Electrical Engineer P	80	200	200	0	0	0	0	0	0	0	480
	8.24	20.6	20.6	0	0	0	0	0	0	0	49.440
Technician P	80	200	200	0	0	0	0	0	0	0	480
	4.328	10.82	10.82	0	0	0	0	0	0	0	25.968
P Total	160	400	400	0	0	0	0	0	0	0	960
	12.568	31.42	31.42	0	0	0	0	0	0	0	75.408
Total	160	400	400	0	0	0	0	0	0	0	960
	12.568	31.42	31.42	0	0	0	0	0	0	0	75.408

MATERIAL SUMMARY:	**FY 03 (k$)**	**FY 04 (k$)**	**FY 05 (k$)**	**FY 06 (k$)**	**FY 07 (k$)**	**FY 08 (k$)**	**FY 09 (k$)**	**FY 10 (k$)**	**FY 11 (k$)**	**FY 12 (k$)**	**Total w/ overhead (k$)**
Other P	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.500
Travel P	0.0	7.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.000
P Total	0.0	9.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.500
Total	0.0	9.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.500

PROFILE SUMMARY:	**FY 03 (k$)**	**FY 04 (k$)**	**FY 05 (k$)**	**FY 06 (k$)**	**FY 07 (k$)**	**FY 08 (k$)**	**FY 09 (k$)**	**FY 10 (k$)**	**FY 11 (k$)**	**FY 12 (k$)**	**Total (k$)**
	13	41	41	0	0	0	0	0	0	0	94

WBS 1.1.3.9.1 **Descriptio** SCT ROD Installation - Wisconsin

Institution University of Wisconsin, Madision **Contact** R. Jared

This items contains the labor and material to install the SCT RODs

Physicist estimate**Basis of**

This item contains the labor and material to install the SCT RODs. The labor costs are to **Details of Estimate:**

cover the repair of defective cards and installation support at CERN. Technical labor will be used to train and guide physicists during the installation. Technical personnel are required for board repair during the installation phase. We estimate that about 20% of the boards will require repair and that about 3 mandays per board will be required for each repair.

Material
4,000 for shipping of RODs for repair 20 RODs x 100=2K

Travel to CERN in FY04, we assume 4 trips of 2 weeks each or 4x(1.5+2)=13.5K

Miscellaneous expenses at CERN for computers, etc are taken to be 5K.

Technical labor for installation is

20x3=60 mandays of electrical tech or 480 hours in FY04

For installation we assume equal preparation time of 1 week for each trip to CERN + time at CERN or 12 weeks=480 hours

U.S. ATLAS % share of 100.00 %

Cost Summary: (Project + MC)	**Base Cost (k$)**	**Cont Cost (k$)**	**Cont %**	**Total Cost (k$)**	**EDIA Labor (k$)**	**Mfg Labor (k$)**	**EDIA Matls (k$)**	**Mfg Matls (k$)**	**FTEs Project + MC**	**FTEs Other**
	94	33	35	127	75	0	19	0	0.5	1.5

MANPOWER (k$) SUMMARY:	**FY 03 (hrs) (k$)**	**FY 04 (hrs) (k$)**	**FY 05 (hrs) (k$)**	**FY 06 (hrs) (k$)**	**FY 07 (hrs) (k$)**	**FY 08 (hrs) (k$)**	**FY 09 (hrs) (k$)**	**FY 10 (hrs) (k$)**	**FY 11 (hrs) (k$)**	**FY 12 (hrs) (k$)**	**Total (hrs)**
Electrical Engineer P	80	200	200	0	0	0	0	0	0	0	480
	8.24	20.6	20.6	0	0	0	0	0	0	0	49.440
Technician P	80	200	200	0	0	0	0	0	0	0	480
	4.328	10.82	10.82	0	0	0	0	0	0	0	25.968
P Total	160	400	400	0	0	0	0	0	0	0	960
	12.568	31.42	31.42	0	0	0	0	0	0	0	75.408
Total	160	400	400	0	0	0	0	0	0	0	960
	12.568	31.42	31.42	0	0	0	0	0	0	0	75.408

MATERIAL SUMMARY:	**FY 03 (k$)**	**FY 04 (k$)**	**FY 05 (k$)**	**FY 06 (k$)**	**FY 07 (k$)**	**FY 08 (k$)**	**FY 09 (k$)**	**FY 10 (k$)**	**FY 11 (k$)**	**FY 12 (k$)**	**Total w/ overhead (k$)**
Other P	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.500
Travel P	0.0	7.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.000
P Total	0.0	9.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.500

Total	0.0	9.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.500

CONTINGENCY FACTORS:	***Risk***				***Weight***			**Cont %**
	Technical	**C o s t**	**Schedule**	**Des i gn**	**Technical**	**C o s t**	**Schedule**	
	4	4	8	15	2	1	1	35

PROFILE SUMMARY:	**FY 03 (k$)**	**FY 04 (k$)**	**FY 05 (k$)**	**FY 06 (k$)**	**FY 07 (k$)**	**FY 08 (k$)**	**FY 09 (k$)**	**FY 10 (k$)**	**FY 11 (k$)**	**FY 12 (k$)**	**Total (k$)**
	13	41	41	0	0	0	0	0	0	0	94

WBS 1.1.3.9.2 **Descriptio** SCT ROD Installation - Iowa State

Institution **Contact** R. Jared

Support of RODs in use for macro assembly testing before 1st collisions and for Installation

Basis of Physicist estimate

Details of Estimate: Physicist manpower only

U.S. ATLAS % share of 50.00%

Cost Summary: (Project + MC)	Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project + MC	FTEs Other
	0	0	0	0	0	0	0	0	0.0	6.3

CONTINGENCY FACTORS:	*Risk* Technical	*Risk* C o s t	*Risk* Schedule	*Risk* Des i gn	*Weight* Technical	*Weight* C o s t	*Weight* Schedule	Cont %
	4	4	8	15	2	1	1	35

WBS 1.1.3.11 **Descriptio** Pixel ROD Installation

Institution University of Wisconsin, Madision **Contact**

Installation for the pixel RODs at CERN

Basis of Physicist estimate

Details of Estimate: We assume the RODs are at CERN by October 1, 2004. We assume 90% are installed in their final location and 10% in the SR building for testing the pixel system as it is integrated there. Systems integration engineering is covered under by the systems engineer in the pixel installation WBS The lead design engineer will participate in the installation at CERN and be available for handling problems as they arrive later during pixel installation. We estimate that 300 hours in both FY05 and FY06 will be needed, since it is only in FY06 that the full ROD system will be exercised.

Travel is estimated to 3 trips of 2 weeks each or 3x(1.5+3)=14K and supplies(computer at CERN, etc) at 5K in FY05

U.S. ATLAS % share of 100.00 %

Cost Summary: (Project + MC)

Base Cost (k$)	Cont Cost (k$)	Cont %	Total Cost (k$)	EDIA Labor (k$)	Mfg Labor (k$)	EDIA Matls (k$)	Mfg Matls (k$)	FTEs Project + MC	FTEs Other
95	29	31	124	62	0	33	0	0.3	0.0

MANPOWER SUMMARY:

(k$)	FY 03 (hrs) (k$)	FY 04 (hrs) (k$)	FY 05 (hrs) (k$)	FY 06 (hrs) (k$)	FY 07 (hrs) (k$)	FY 08 (hrs) (k$)	FY 09 (hrs) (k$)	FY 10 (hrs) (k$)	FY 11 (hrs) (k$)	FY 12 (hrs) (k$)	Total (hrs)
Electrical Engineer MC	0	0	300	300	0	0	0	0	0	0	600
	0	0	30.9	30.9	0	0	0	0	0	0	61.800
MC Total	0	0	300	300	0	0	0	0	0	0	600
	0	0	30.9	30.9	0	0	0	0	0	0	61.800
Total	0	0	300	300	0	0	0	0	0	0	600
	0	0	30.9	30.9	0	0	0	0	0	0	61.800

MATERIAL SUMMARY:

	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total w/ overhead (k$)
Other MC	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.000
Travel MC	0.0	0.0	14.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	28.000
MC Total	0.0	0.0	19.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	33.000
Total	0.0	0.0	19.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	33.000

CONTINGENCY FACTORS:

Risk				*Weight*			
Technical	C o s t	Schedule	Des i gn	Technical	C o s t	Schedule	Cont %
4	4	4	15	2	1	1	31

PROFILE SUMMARY:

FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)	Total (k$)
0	0	50	45	0	0	0	0	0	0	95