

PHYSICS MONITORING SYSTEM
WBS 1.2.3

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LIGO-G960048-00-M

PHYSICS MONITORING SYSTEM
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Cost:

	cost	% cont.	cont.	total
Design				
	\$ 338K	5%	\$ 17K	\$ 355K
Fab				
WA	\$ 1642K	5%	\$ 82K	\$ 1724K
LA	\$ 1114K	5%	\$ 56K	\$ 1169K
TOTAL	\$ 3093K	5%	\$ 155K	\$ 3248K

Function:

Measure time and amplitude of disturbances in the physical environment of the interferometers.

- Veto in burst detection to reduce non-Gaussian noise
- Correlation in periodic and stochastic source detection
- Determine sensitivity to environment for interferometer development
- Provide diagnostic information on interferometer and facility performance
- Measure or set limits on correlation of environmental noise at separated sites

Instruments and requirements:

Seismic noise			
3 axis seismometer	10^{-10} m	@ 1Hz	1/bldg
2 axis tiltmeter	10^{-9} rad	@ 1Hz	1/bldg
1 axis accelerometer	10^{-11} m	@ 100Hz	9/tank
1 axis accelerometer	10^{-11} m	@ 100Hz	12/tube module
Acoustic noise			
Electret microphone	10^{-8} atm	@ 100Hz	1/tank
Magnetic fields			
3 axis magnetometer	10^{-4} gauss	@ 100Hz	1/tank
Radio Interference			
Multichannel receiver	3μ volt/cm	6 chan	1/bldg
Cosmic ray muons			
Scintillation detector	10^{-2} μ /sec cm^2	≤ 100 Mev	1/bldg
Power line fluct.			
Line monitor	10^{-3}	$\geq 10^{-3}$ sec	1/bldg
Residual gas			
Residual gas analyser	$\leq 10^{-14}$ torr	1 - 300 amu	1/bldg
Residual gas analyser	$\leq 10^{-14}$ torr	1 - 300 amu	2/tube module
Contamination			
Crystal monitor head	monolayer/week		1/tank
RGA head	$\leq 10^{-14}$ torr	1 - 300 amu	1/tank
Control			1/bldg

DESIGN (1997)

WBS: 1.2.3.1

Personnel

scientist	12 man months
engineer	9
technician	6

Tasks:

- Final definition of system requirements
- Define system interface to CDS
- Define test program and software algorithm development
- System documentation
- Test of contamination monitor

FABRICATION (1998)

WBS: 1.2.3.2, 1.2.3.3

Personnel

scientist	2 man months
engineer	4
technician	6

Tasks:

- Instrument procurement
- Fabricate specialized fixtures for facility installation
- Test some of the instruments (Q&A)
- Develop operating software and documentation
- Design facility installation schedule and test program