Title	***X-ray bpm System Enhancement***			
Project Requestor	Glenn Decker			
Date	March 25, 2008			
Group Leader(s)	Glenn Decker			
Machine or Sector Manager	Louis Emery			
Category	Beam Stability			
Content ID*	APS_XXXXXX	Rev.	ICMS_Revision	ICMS Document Date

*This row is filled in automatically on check in to ICMS. See Note [1]

Description:

Start Year (FY)	**FY08**	**Duration (Yr)**	**5**

Objectives:

Design and install hard x-ray beam position monitors for all APS insertion device beamline front ends; Install retractable hard x-ray flux monitors in beamline first optic enclosures (FOEs).

Benefit:

Improved long term pointing stability, at or below the level of 0.5 microradians peak-to-peak over a one-week time period; improved AC pointing stability at the level of 220 nanoradians rms .017 – 20 Hz.

Risks of Project: See Note [2]

This involves vacuum intervention in beamline front ends, which is presently conducted on a routine basis. Vacuum intervention in beamline FOEs should produce comparably low risk.

Consequences of Not Doing Project: See Note [3]

Users will not benefit from the best possible pointing stability. Certain classes of experiments requiring outstanding beam stability may not be possible.

Cost/Benefit Analysis: See Note [4]

The desired level of improvement should be possible for $35k per beamline. As such the total system cost would be around $1.2M for 34 beamlines, not including 20% contingency.

Description:

In the first year, the design of the non-intercepting hard x-ray beam position monitor will to finalized. This design is based on studies performed at 19-ID-C over the past two years. For each beamline, a replacement of the existing vacuum internals for one of the two photon beam position monitors located in beamline front-ends is envisioned. All of the existing infrastructure at these locations, including vacuum enclosures, mechanical translation stages, and data acquisition will be retained.

A retractable destructive hard x-ray flux monitor is presently under construction for testing in sector 35. A value-engineered version of this first-production article will be installed in beamline first optic enclosures (FOEs) where space permits (approx. 40% of beamlines) for absolute beam alignment determination.

The front-end detectors will be nondestructive and will be included in continuously operating orbit feedback systems, while the intercepting retractable FOE detectors will be used for periodic recalibration / offset correction of the front end bpms.

Funding Details

Cost: ($K)
Use FY08 dollars.

Year	AIP	Contingency
1	250	50
2	250	50
3	250	50
4	250	50
5	250	50
6		
7		
8		
9		
Total	1250	250

Contingency may be in dollars or percent. Enter figure for total project contingency.

Effort: (FTE)
The effort portion need not be filled out in detail by March 28

Year	Mechanical Engineer	Electrical Engineer	Physicist	Software Engineer	Tech	Designer	Post Doc	Total
1	0.3	0.3	0.1	0.2	0.1	0.3		1.3
2		0.2	0.05	0.05	0.2			0.5
3		0.2	0.05	0.05	0.2			0.5
4		0.2	0.05	0.05	0.2			0.5
5		0.2	0.05	0.05	0.2			0.5
6								0
7								0
8								0
9								0

Notes:

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[1] **ICMS**. Check in first revision to ICMS as a *New Check In*. Subsequent revisions should be checked in as revisions to that document i.e. C*heck Out* the previous version and C*heck In* the new version. Be sure to complete the *Document Date* field on the check in screen.

[2] **Risk Assessment.** Advise of the potential impact to the facility or operations that may result as a consequence of performing the proposed activity. Example: If the proposed project is undertaken then other systems impacted by the work
include ... (If no assessment is appropriate then enter NA.)

[3] **Consequence Assessment.** Advise of the potential consequences to the facility or to operations if the proposal is not executed. Example: If the proposed project is not undertaken then ____ may happen to the facility. (If no assessment is appropriate then enter NA.)

[4] **Cost Benefit Analysis.** Describe cost efficiencies or value of the risk mitigated by the expenditure. Example: Failure to complete this maintenance project will result in increased total costs to the APS for emergency repairs and this investment of ___ will also result in improved reliability of ____. (If no assessment is appropriate then enter NA.)