

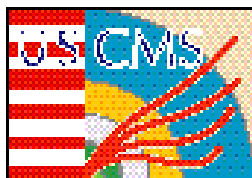
# Endcap Alignment Status

D. Eartly, J. Moromisato, 18 February 00

- **Considered changes – to the ME1 layer solution**

Locations of ME1/2 secondary linkline sensors and ME1/3  
Straight line monitor position sensors okay for “latest” MABs  
Within uncertainty of diagonal link cameras – **BUT LINK**  
**System wants changes to accommodate their R transfer**  
**Through ME1/2 CSC (provides a direct connection ME1/1)**  
**This requires outer radius sensor to overhang anode area**

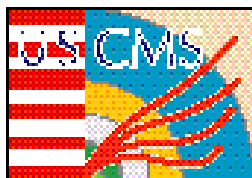
- Keep CSC extrusion locations for locating pins (in CSC strip panel) for position sensor bracket –special ME1/2 solution
- As in prototype- different Left (Z-), right (Z+) pin configuration
- Transparent aSi sensor electronics– split front end /readout electronics as stacked boards (2); uses only 15 mm (of 50 mm) between primary and secondary linklines –Santander ALMY III



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- **Considered changes – to the ME1 layer solution**
- **Link system does not offer crossed laser DCOPS lines**
- **ME1/3 Straight line monitor solutions clear magnet Z stops**
- **CERN integration group now specifying 30 mm clearance**
- **But proposing Z stop junction just 80 mm from Barrel iron**
- **Identification of Integration Engineer (Enrique Calvo)**
- **within the Muon Alignment systems to insure a co-ordinated solution of the Barrel Endcap Interface for the Engineering design review**



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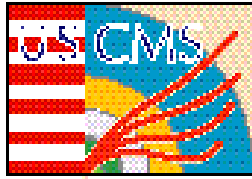
## Alignment Tests; MP9 – ISR

Developed a consistent layout of ISR supports for integrated alignment setup including mounting plates with PG targets, Correct EMU MAB sensor mounting, photogrammetry target And reference grid layout for the system, EMU DAQ location to allow the fabrication of cables/interconnects (for testing at FNAL), 110v power distribution, ethernet (CERN Feb 09)

Review of PG fiducialization for EMU system elements

Transfer plate assembly at FNAL, DCOPS boards complete  
Except missing parts, Z transfer system complete, R  
Transfer system complete - CSC panel section and potentiometers

Evaluation of a new precision miniature spring loaded  
Potentiometer for layer Z connection and proximity sensing  
(avoids LED/PSD lifetime issue, pulsing, synchronous readout)



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## Alignment Tests; MP9 – ISR

CERN is behind in the ISR setup schedule proposed by them

New MAB drawings did not exist, fabrication NOT started

Our clock continues to be Barrel/MAB setup start plus 5 weeks

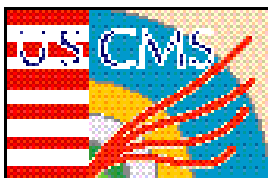
We will continue our setup/testing in the USA until appropriate

Interface software development started by Robert Lee (full time)

He will also work on system simulation and geometry reconstruction

PNPI collaborators will arrive shortly; they will help in system

Setup, DCOPS DSP readout / DCOPS front end development



# Endcap ME2-3-4 SLM Status

D. Eartly, J. Moromisato, 18 February 00

- **Optical Straight Line Monitors across CSC layers  
Milestone solution in supersymmetry configuration**

Transfer plate assembly designs in ME2 and ME3 nearing completion  $ME+2 = ME-3$ ,  $ME+3 = ME-2$  in DCOPS

Detailed final Sensor bracket/clip designs

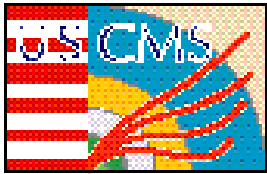
Iron Yoke support interference with Transfer plate/SLM configuration in Position 5 - ME3 ; we are developing a special solution

Yet to be done;

Some ME1 layer Transfer plate and mirror designs

Design of the Transfer plate support to Iron corner plates

ME1/2 and ME1/3 (DCOPS, ALMY III) sensor mounting designs



# Endcap Alignment Project

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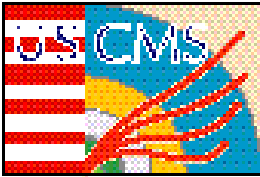
## System Definition and Project Planning

- New WBS structure -Project file tasks and schedules
- Technical requirements and specifications document
- Simulation requirements, ISR test detector decision
- Long term Readout system development
- Begin EDR outline and preparations

Information, meetings, minutes, presentations

Endcap Alignment system homepage

<http://home.fnal.gov/~maeshima/alignment/alignment.html>



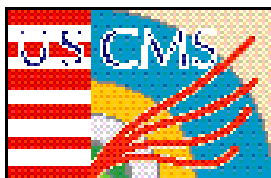
# Endcap Alg Sensor Selection

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- **Requirements, redundancy, technical features, status, test results, costs, availability, reliability, long term stability, risks, radiation tolerance, maintenance, failure modes**

Radiation testing of CCDs indicate DCOPS will work in CMS radiation environment, can speed up readout significantly with Analog Devices 9803 CCD signal processor for Cameras – still need Window configuration, filter, optical wedge, and absolute calibration setup

- **ISR successful test of multi bi-directional DCOPS readout (SLM), stable absorber/diffuser (long term), laser source results -temporal line and shape stability, valid calibration procedure, prove serial passthrough in failure (downstream detectors still readout), adapt to supply voltages or make regulators that work in medium and high magnetic fields**



# Endcap Alg Sensor Selection

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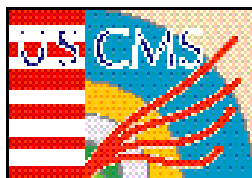
**ALMY III Transparent amorphous Silicon Optical detector development (R. Rusack, D. Quicker, G. Cibuzar, W. Fisher; Univ of Minnesota)**

Successful design studies and production trials to solve Optical transmission requirement at laser wavelength in Sensor non ageing optical region (Wronski-Stabler effect)

Successful procurement of very flat/low wedge glass wafers

Model sensors have transmissivity required for full SLM

Successful production of full layer/full masking detector Samples (with bonds and pads) with required optical Properties: production and consistency issues – pinholes, aSi delamination, ITO properties, etc



# Endcap Alg Sensor Selection

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**ALMY III Transparent amorphous Silicon Optical detector development (R. Rusack, D. Quicker, G. Cibuzar, W. Fisher; Univ of Minnesota)**

Sample detectors have been given to Link system people at CIEMAT for bonding, optical and electrical tests. These detectors have the required configuration for Link-ME1/2.

Further development will await the results on these tests

If the test results are favorable, production development issues (including a possible change of substrate) will be addressed/solved

If the effort exceeds our budget, the Link group is willing to help support the effort.