



ALS Survey Data Management System

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Agenda



- Background & Motives
- Implementation
- Data Control/Access
- MonCor Calculation
- Data Comparisons & Demonstration
- Conclusions



ALS Background



- Advanced Light Source Synchrotron
 - 12 Sectors, six-strut supports for components and girders
 - Floor monument network
 - Component fiducials
- Survey & Alignment Methods
 - Past theodolite / mekometer / optical tooling
 - Now laser tracker / retro-reflectors + level



Survey Data Management Motives



- Understand puzzling data
 - Scale issues / seasonal & thermal effects
- Vetting of data
 - Evaluate and compare with trusted data
- Realignment decisions
 - Do corrections make sense?
- MonCor calculation



Implementation



- Linux / Apache / PHP / MySQL
 - Virtualized Centos OS
 - PHP / MySQL
 - LBNL libraries
 - Multiple virtual hosts
 - Standardized layout and themes
 - Authentication / LDAP integration
 - JGraph library
 - Dynamic graphs PNG & PDF formats



Data Control / Access



- Only configured users can access data
- Permission structure controls changes
- User and time stamp recorded
- Data states
 - Provisional (temporary / un-vetted)
 - Official (trusted / vetted)
 - MonCor (latest superset of official data)



MonCor Calculation



- Leverage history of trusted data
 - Two steps
 - 1. Query for latest official horizontal and elevation data for all monuments
 - 2. For each monument, query for oldest survey date with identical value within specified tolerance
 - Automated creation of tie in to network
 - Extend to components with MonMagCor
 - Components used for tie ins too



Data Comparisons



- Horizontal Changes
 - Scale plan view for “base” survey
 - Color-coded exaggerated offsets from base for comparison surveys
- Elevation Changes
 - Category Plot
 - Zero offset for “base” survey
 - Color-coded differences from base for comparison surveys



Bells & Whistles



- **Selecting Data**
 - State hiding (reduce lists to choose from)
 - Filtering (select matching data sets)
- **Physical representations**
 - Girder outlines
 - Beam paths
 - Expected flex connection offsets resulting from executing corrections



Data Comparison Demonstration



- Horizontal Comparisons
 - Monument changes from 1995 - 2003
 - Storage ring components ideal versus current surveyed positions in 2006 (showing expected flex connection offsets resulting from executing corrections)
- Elevation Comparisons
 - Monument changes from 1995 - 2003



Conclusions



- **Extremely valuable tool**
 - Compare and vet new data
 - Investigate “what if” scenarios
 - Automated calculation of MonCor and now MonMagCor files for field tie in
- **Future Enhancements**
 - Store/Retrieve past comparisons
 - Smart plots (for example: storage ring monuments, past four years)



The End



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