

National Ignition Facility Data Repository

Robert Carey

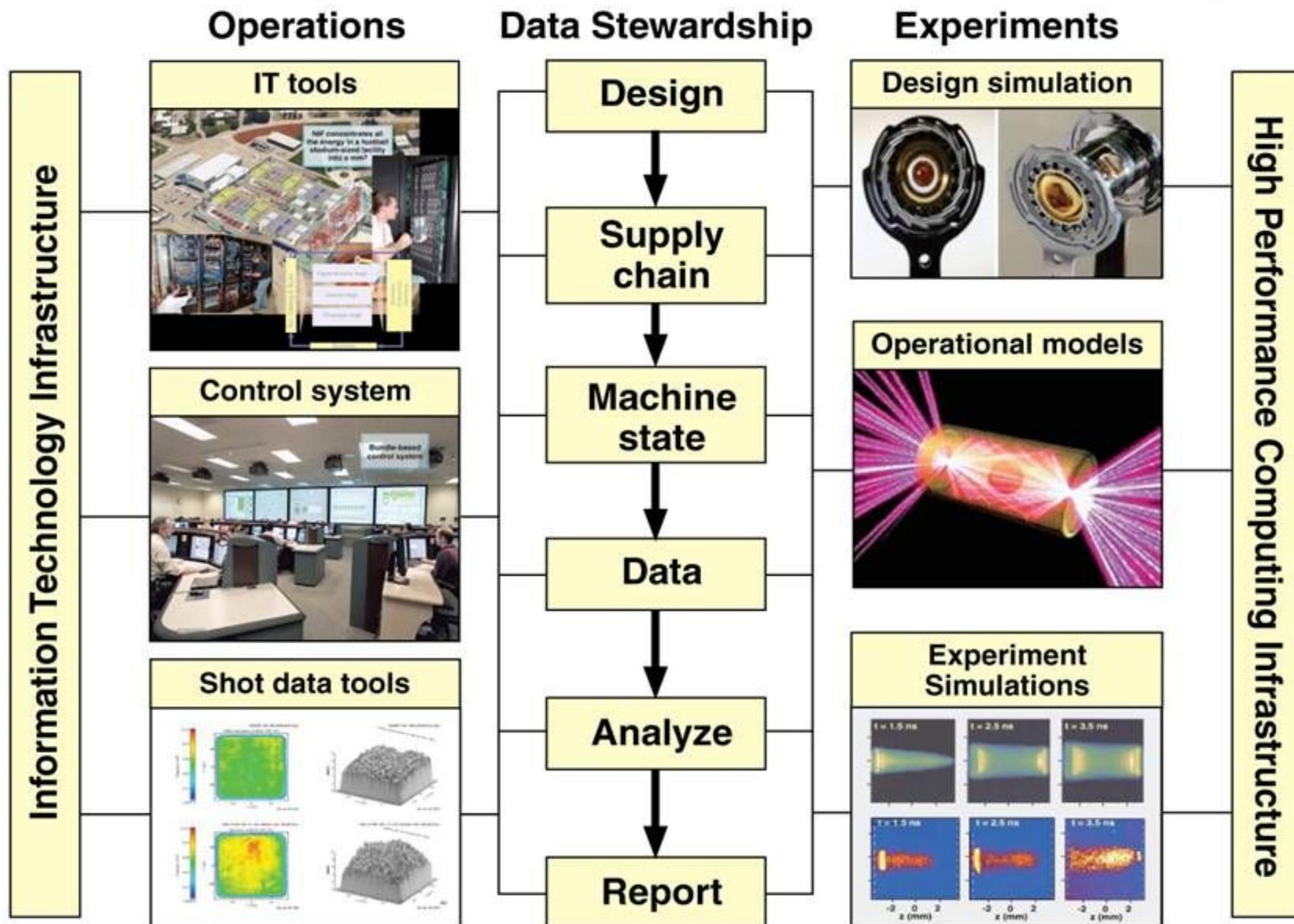


2009 International Conference on Accelerators and Large Experimental Physics Control Systems, Kobe, Japan
October 13, 2009
Lawrence Livermore National Laboratory, USA

NIF Federated Database and Information Systems

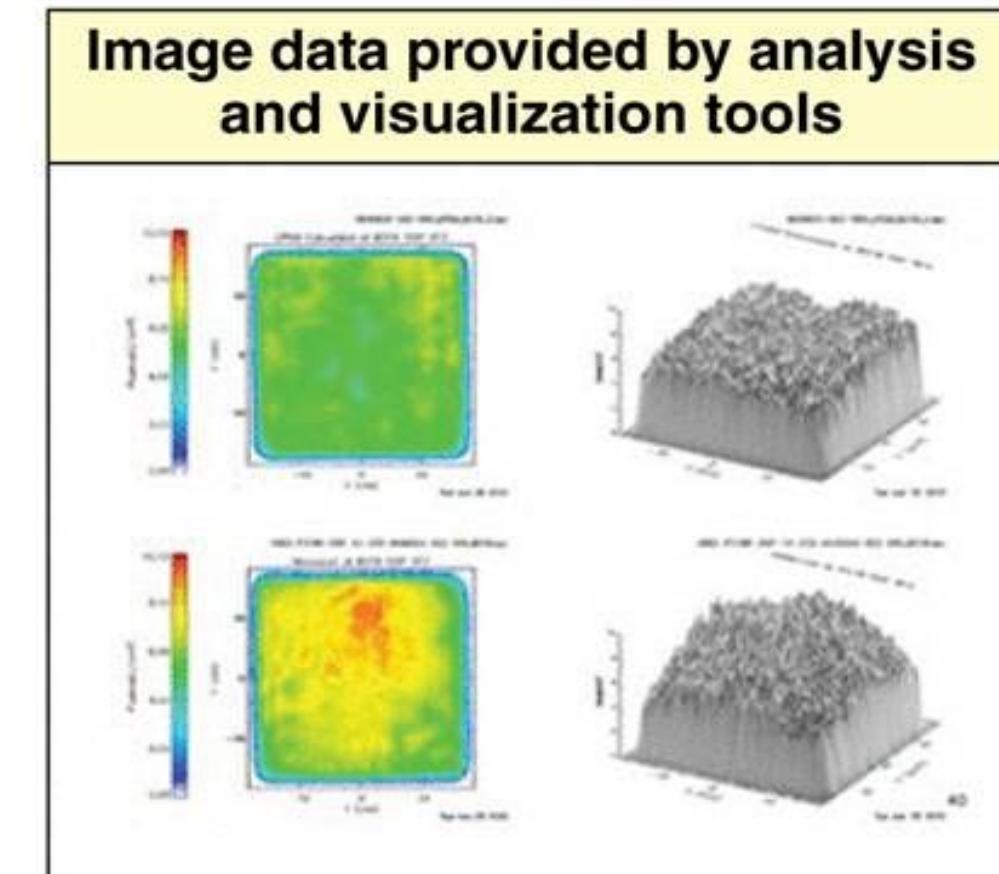


The National Ignition Facility



Tools are built to manage and integrate:

- Data originate from multiple sources
 - Simulations
 - Machine state
 - Configuration
 - Calibration
 - Instantiation
 - Inspection
 - Experimental shot data
- Data are generated in multiple formats
- Data are analyzed in multiple, parallel work-flows with a strict time budget of 30 minutes
- Data will survive beyond NIF's 30 year lifespan

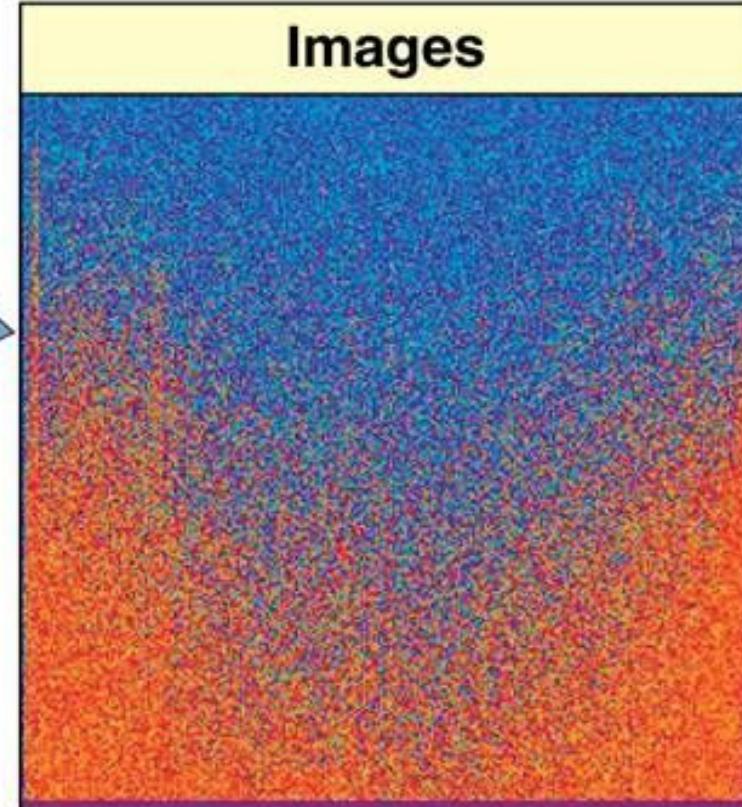


Simulations Produce a Variety of Formats



Delimited text

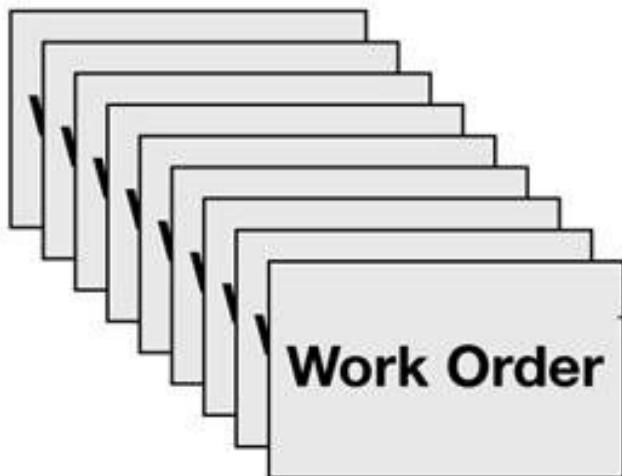
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Work Orders & Supply Chain Produce Transactional Data



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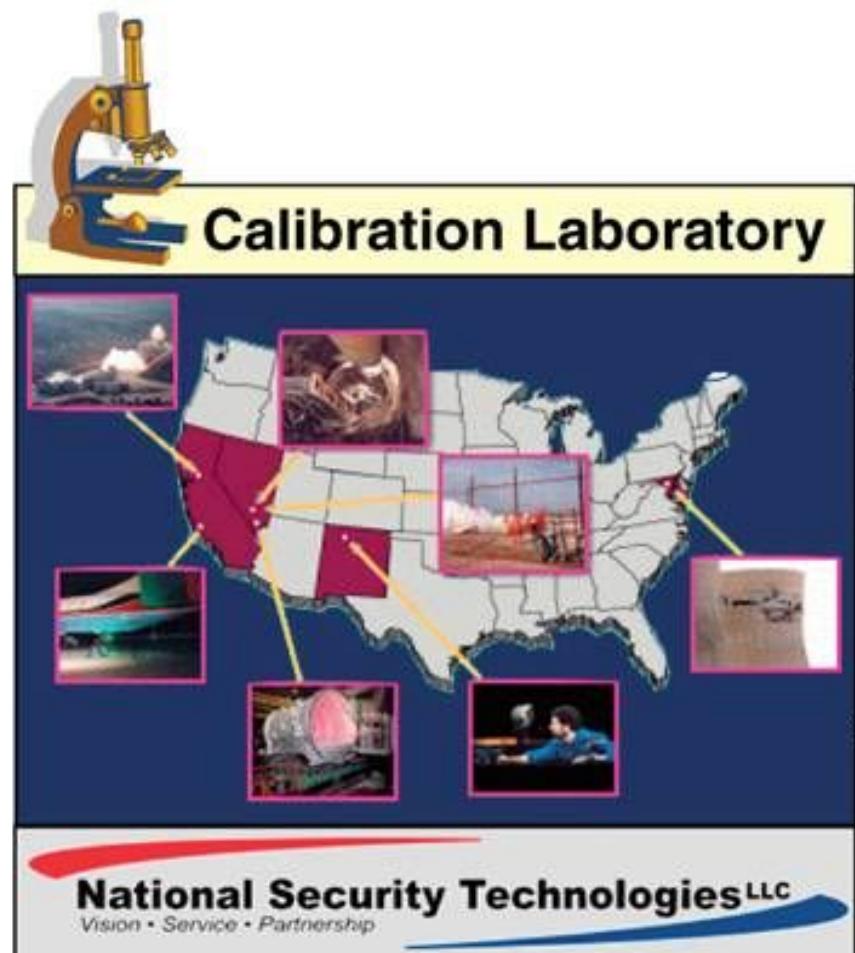


Supply Chain / Enterprise Resource Planning (Glovia)

Calibration Produces Hierarchical Data Format (HDF) & Excel



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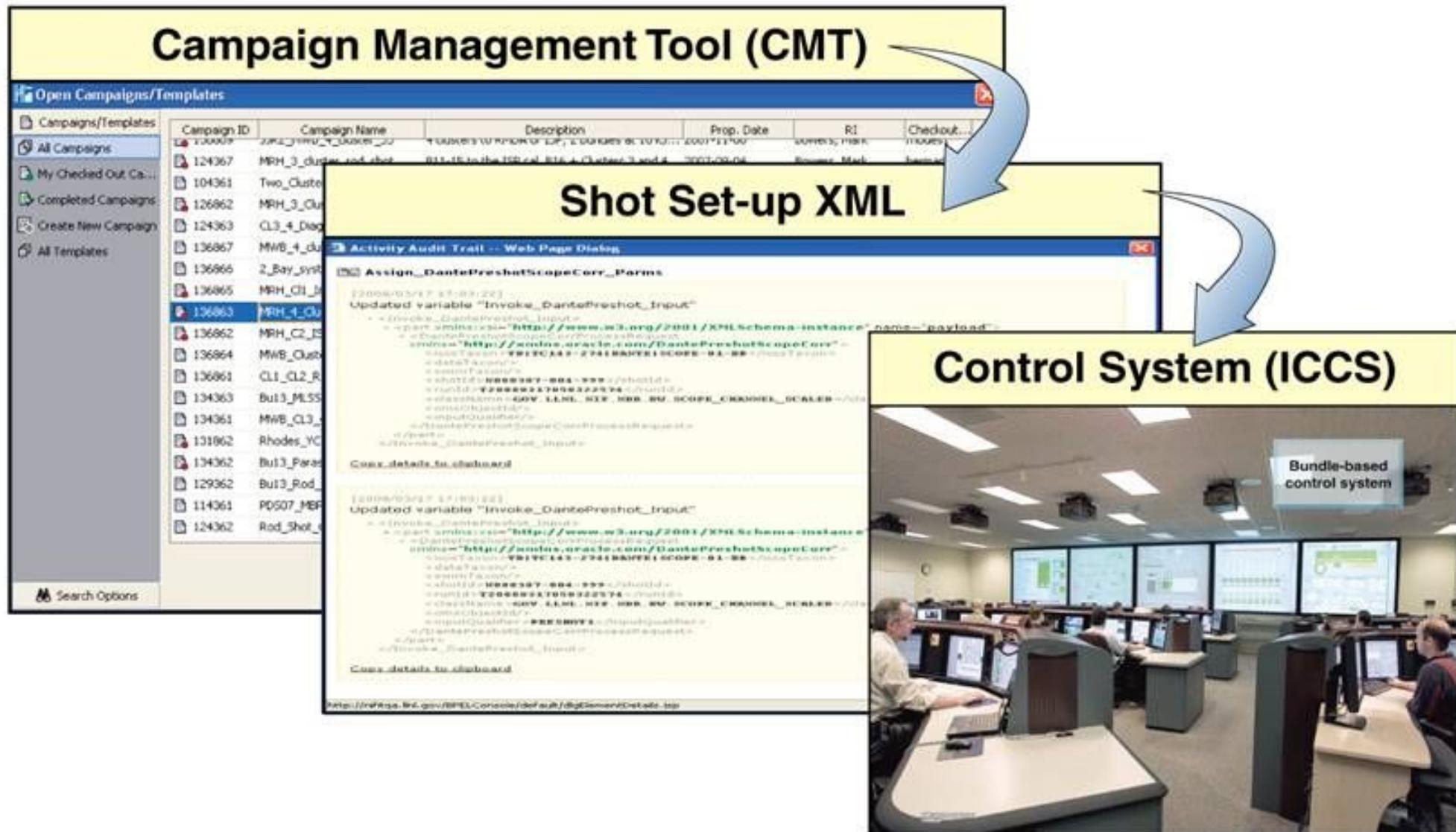
Non-scalar calibration values in HDF

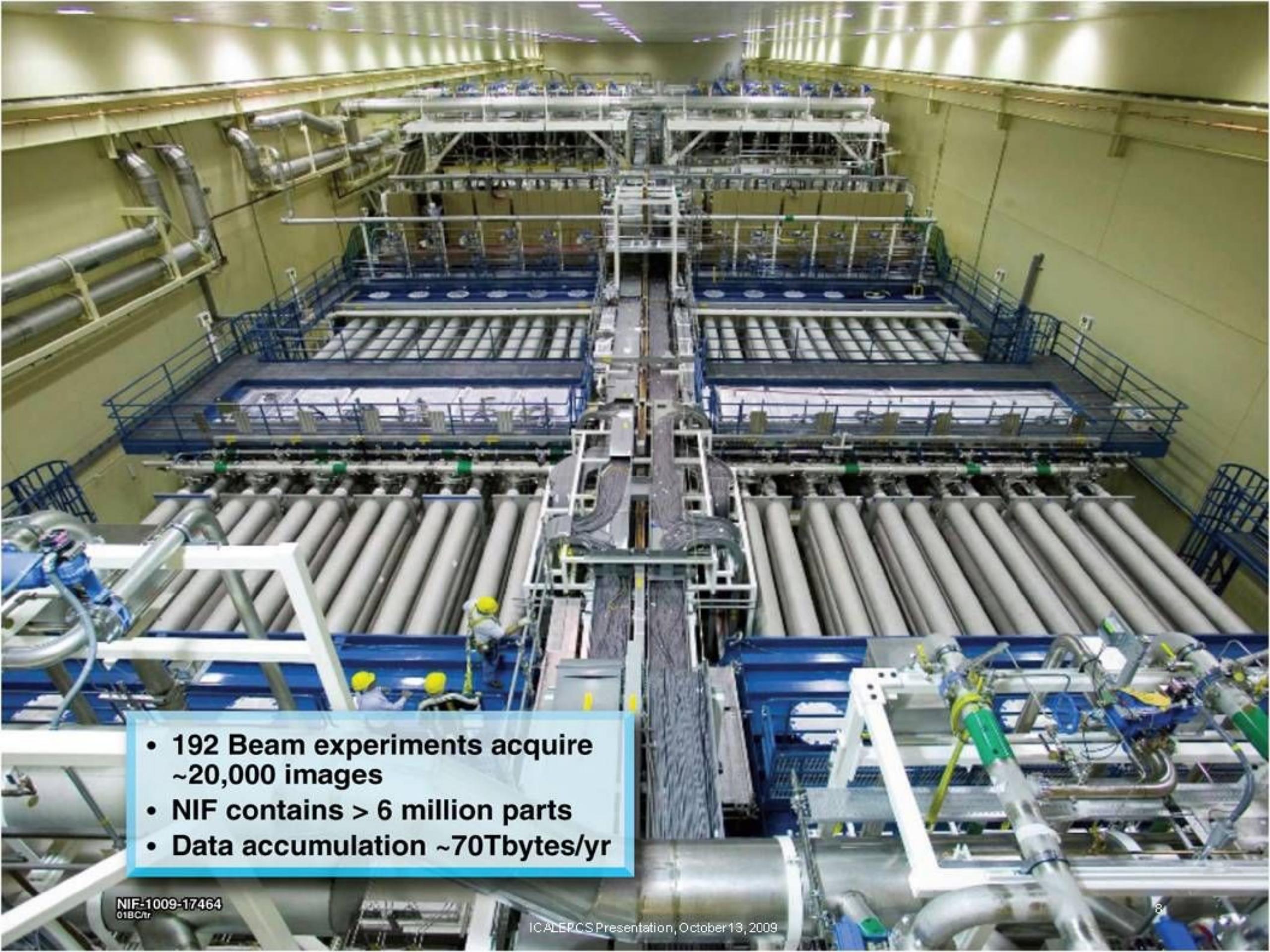
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Table View: C:\Documents and Settings\Reader\My Documents\Confluence\2008\Comp_Annual_Report\POSTSHOT_E2_57944.H5 - DATA\DATA\Scalar

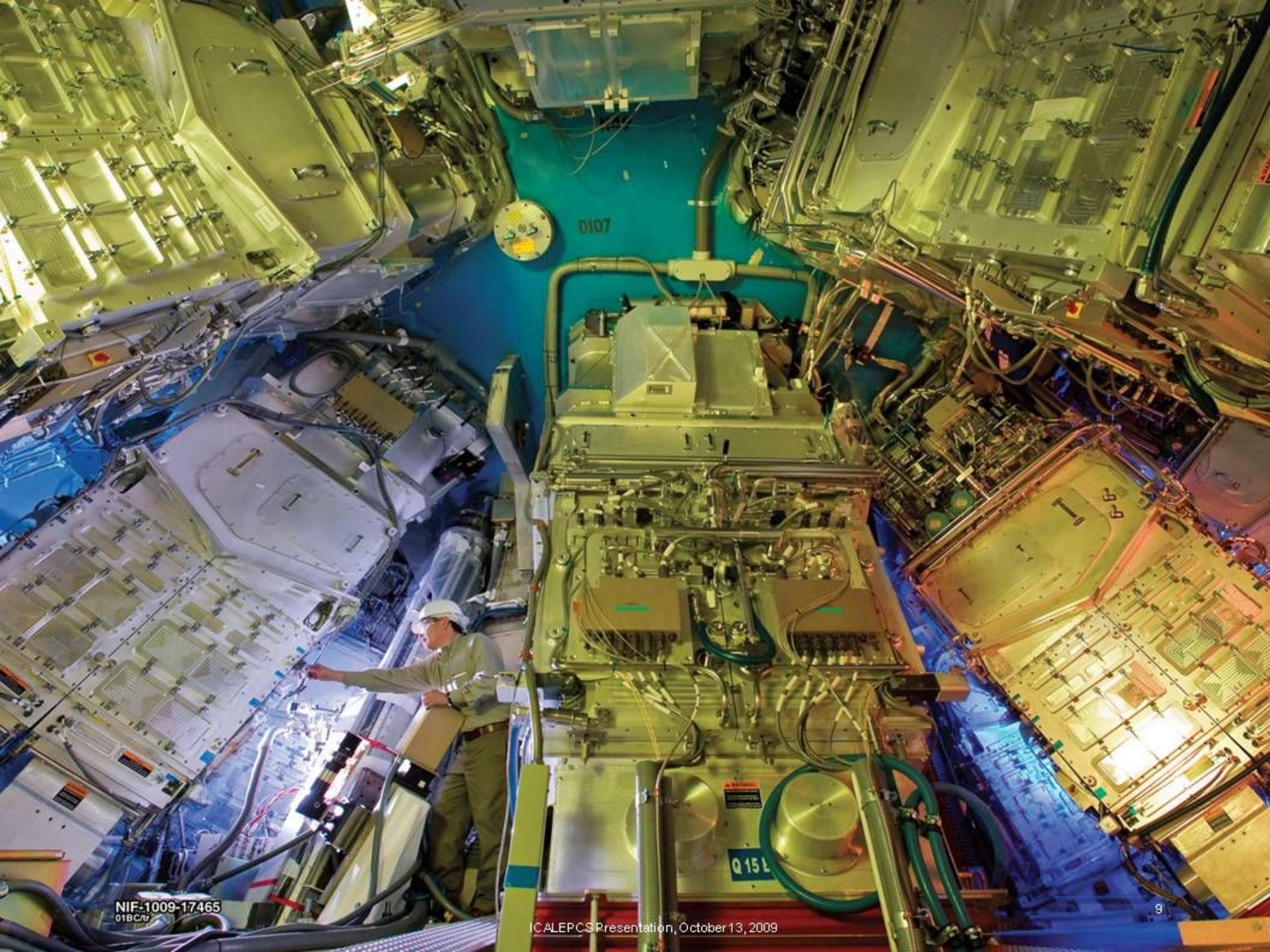
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Shot Set-up Produces XML





- 192 Beam experiments acquire ~20,000 images
- NIF contains > 6 million parts
- Data accumulation ~70Tbytes/yr

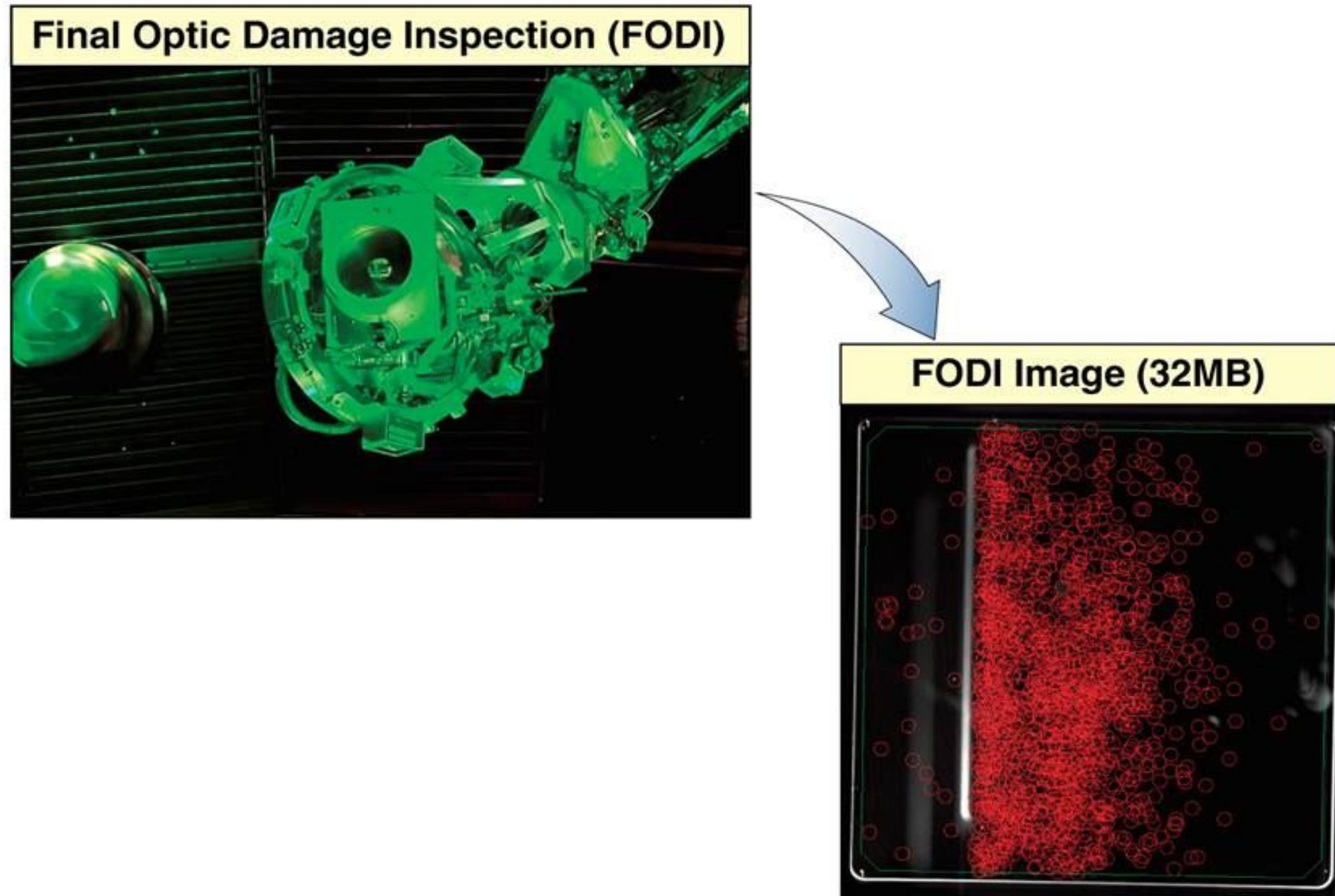


NIF-1009-17465
01BCtr

Optics Inspection Produces High-Resolution Images



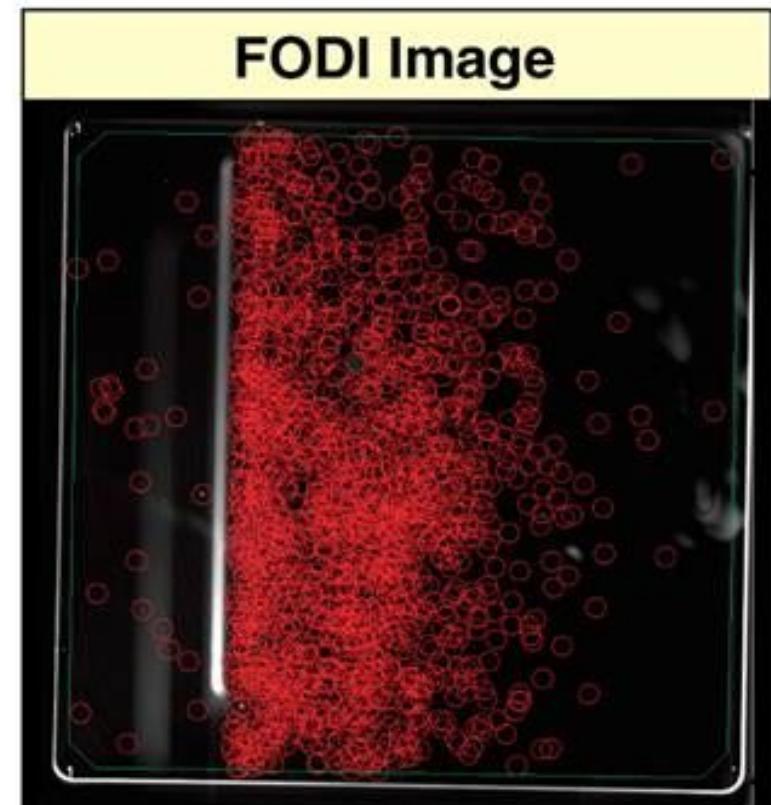
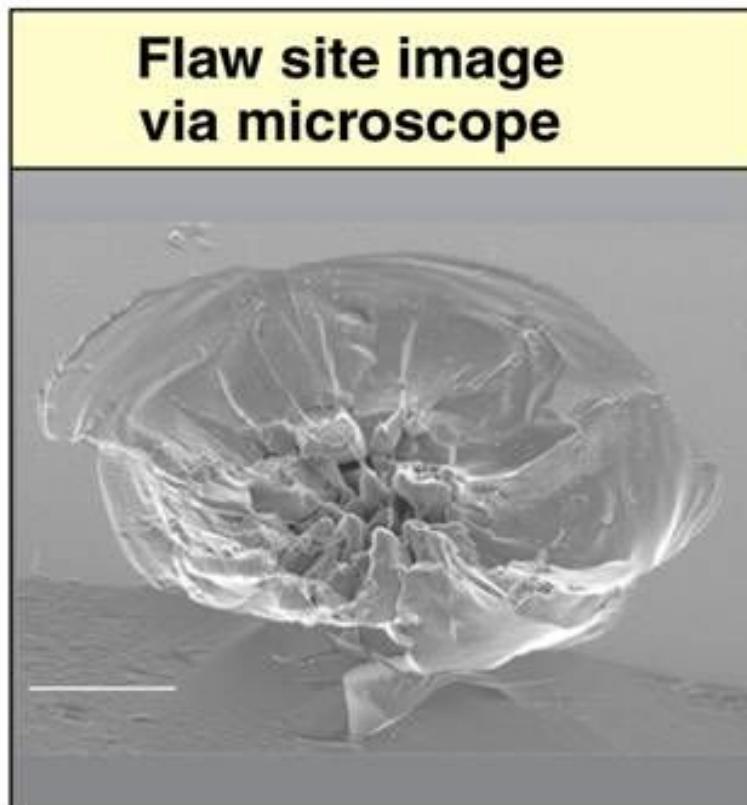
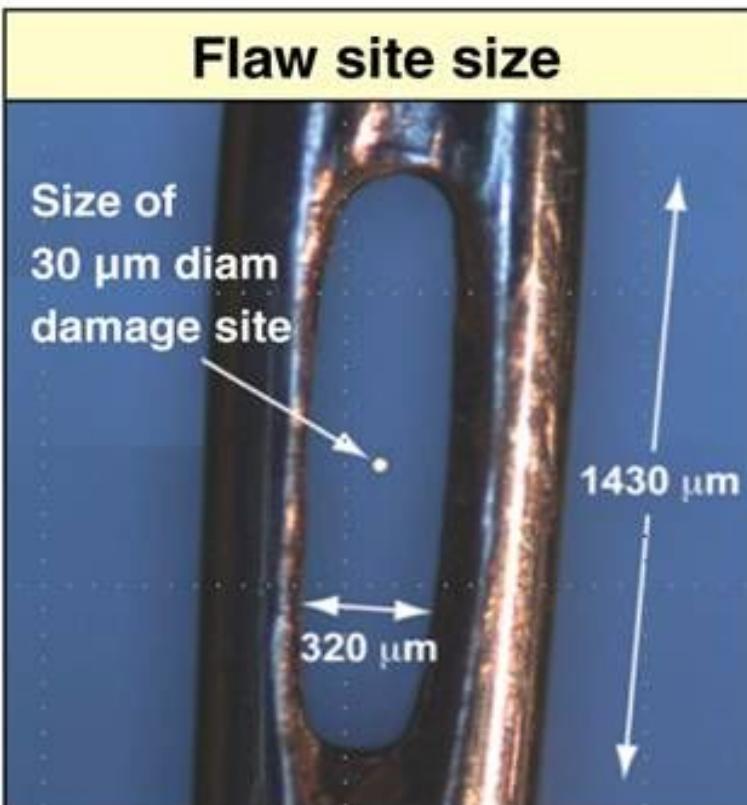
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Optics Inspection Requires Sophisticated Analysis to Identify Flaws



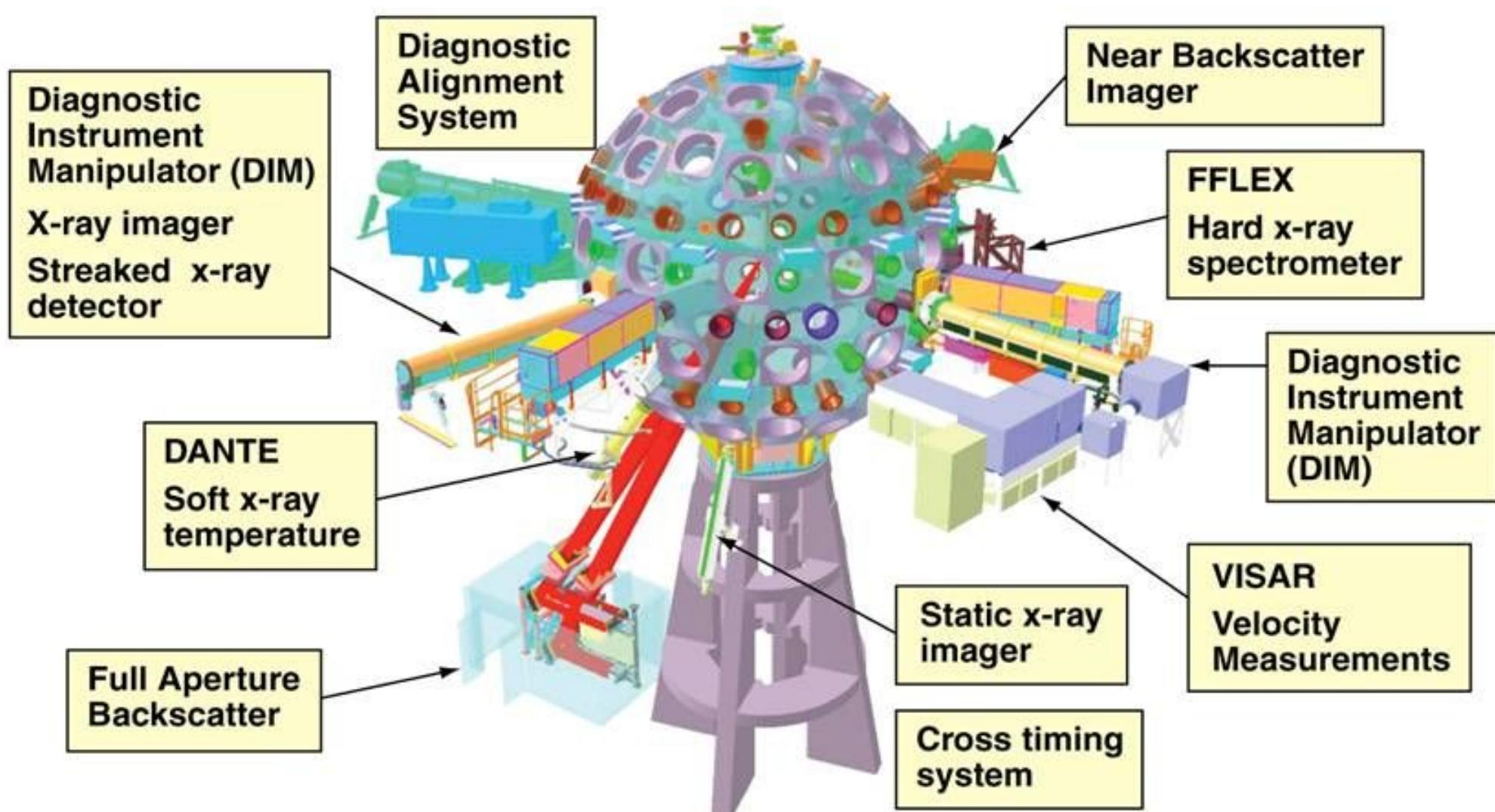
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Data from each diagnostic is automatically analyzed by a scientific workflow system



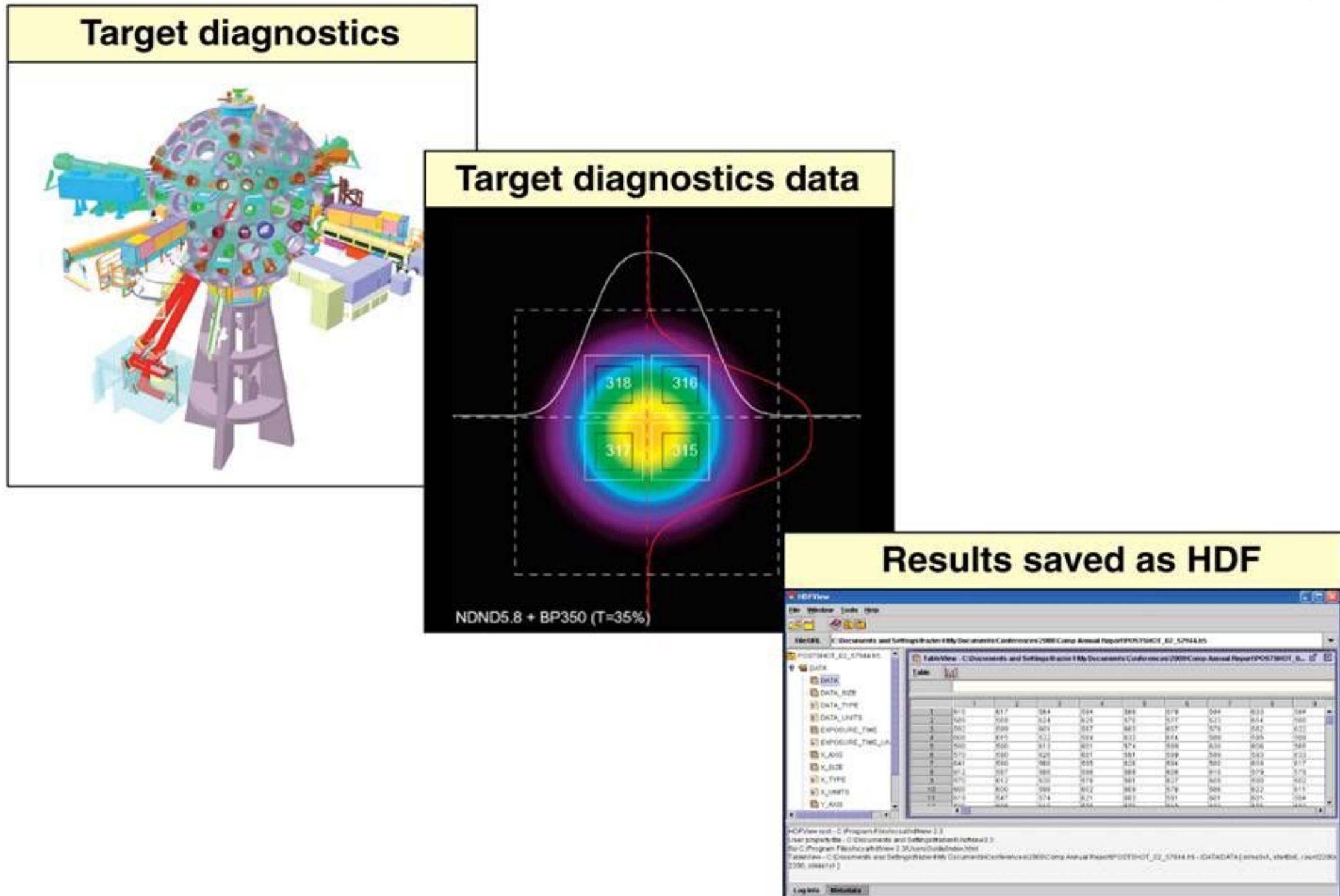
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Experiments Produce Hierarchical Data Format (HDF5)



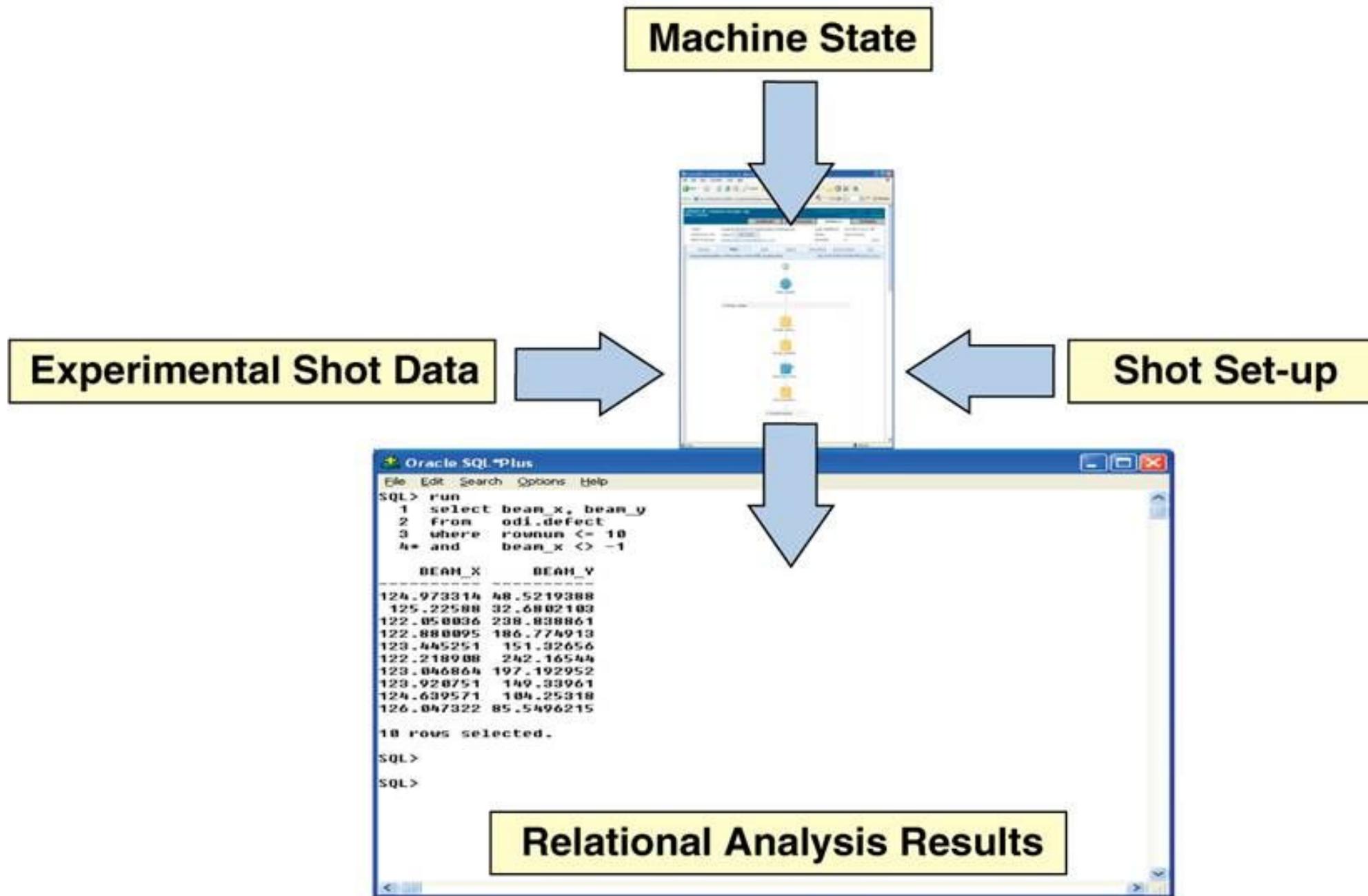
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Shot data analysis produces relational data and files stored in a content management system



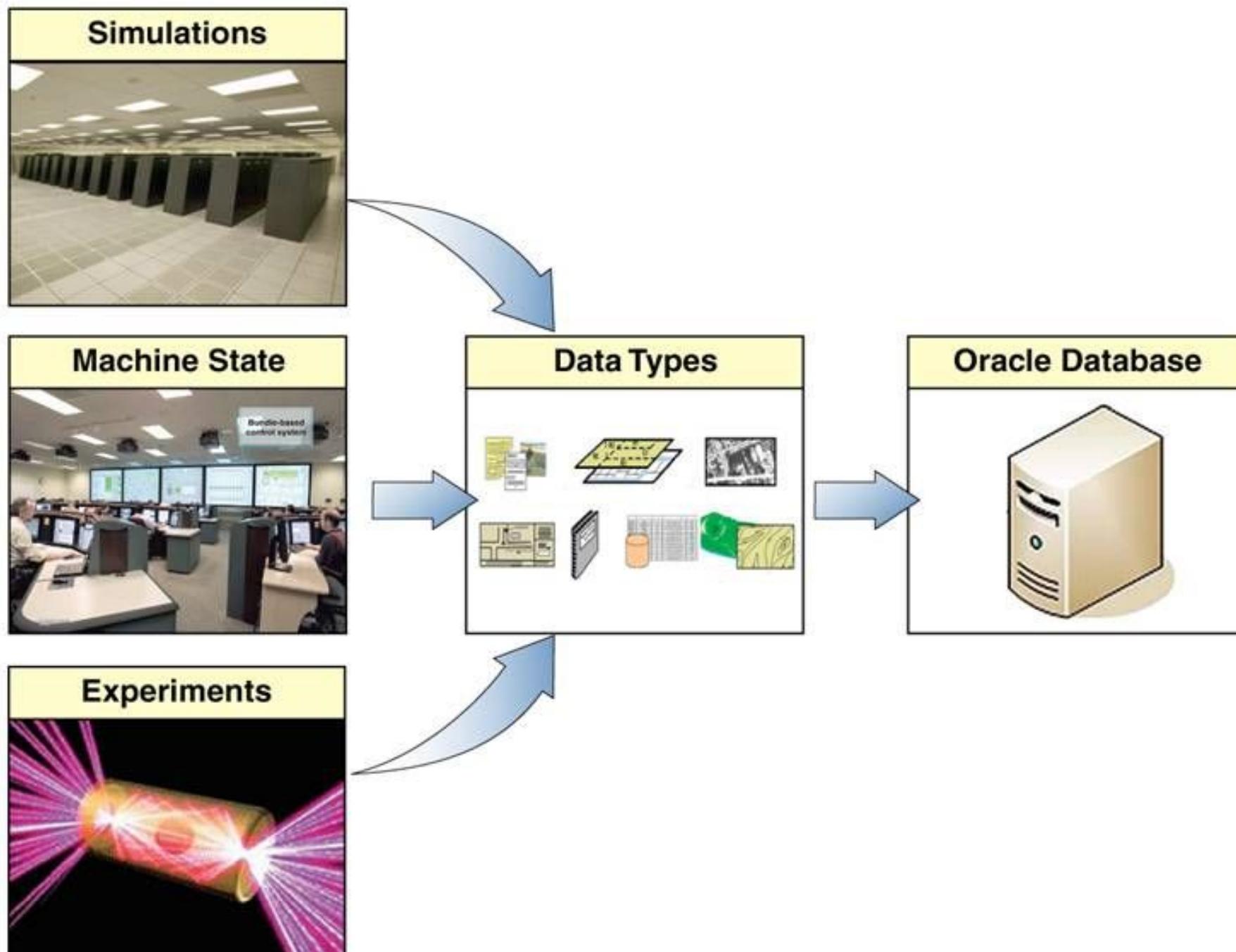
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A Common Database Platform Enables Integrated Tools



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NIF Federated Database and Information Systems



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The Systems Engineering approach used to design, build and operate the NIF requires large-scale data integration

- Design documents
- Supply chain
- Machine state

NIF science also depends on the integration of a variety of data

- Simulations
- Machine state
- Experimental shot data

Data integration requires a common platform for data management & analysis tools

- Analysis
- Visualization

