XAL Status Report Spring, 2008

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What is XAL?

- **Development environment for creating accelerator physics applications, scripts and services**
  - **Control room applications**
  - **Analysis applications**

- **Application framework**

- **Toolbox of Java packages**

- **Ant based build system (independent of IDE)**

- **Developed initially for the Spallation Neutron Source (SNS)**

- **Used in commissioning and running SNS**

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Collaboration

- **Source Forge Project: xaldev**
  - **http://sourceforge.net/projects/xaldev**
  - **Source code managed using Subversion**

- **Dozens of developers among several sites**
  - **SNS, SLAC, BNL, JPARC, GANIL and others**

- **Contact us to participate**

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Development Requirements

- **Java JDK J2SE 5**

- **Ant 1.7**

- **Your favorite editor or IDE**

- **Subversion client (if you want to share code)**

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Sample from Over Four Dozen Applications

- **Orbit Correction**

- **Knobs**

- **Optics Measurement and Matching**

- **Quadrupole Shaking for alignment measurement**

- **Snapshot and Restoring conditions**

- **RF Cavity phase and amplitude setting**

- **Logging machine conditions**

- **Database browsing**

- **Virtual Accelerator**

Managed by UT-Battelle
for the Department of Energy

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Toolbox

- **Channel Access API abstraction wrapping JCA**

- **Correlator for correlating channel access events by time stamp**

- **Optimization**

- **Data Adaptor for object archiving**

- **Plotting**

- **Statistics Package**

- **Math packages**

Accelerator Physics

- **Accelerator device hierarchy**
  - **Object representation of accelerator hierarchy**
  - **Relational database -> XML -> object tree**

- **Online Model**
  - **Models the accelerator beam dynamics**
  - **Performs twiss function generation**
  - **Synchronizes with live machine, design or historical machine snapshots**

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Application Development

- **Application Framework**
  - **Consistent look and feel**
  - **Document based applications**
  - **Pre-baked modern application features**

- **Bricks GUI Builder**
  - **Rapid visual development of user interfaces**
  - **Model-View-Controller compliant**
  - **Integrates with application framework**
  - **Supports compile-free application development with scripts (jython or jruby)**

Recent Core Developments

- **Adopt JRuby for scripting**
  - **http://jruby.codehaus.org**
  - **more powerful alternative to Jython**

- **Menu and toolbar items gain standard icons**

- **Automatic Copy, Cut and Paste support for any control with drag and drop support**

- **Bricks user interface builder**

- **Support for site specific devices**

Recent Applications and Scripts

- **Magnet Cycling**

- **Ring Tune Monitor**

- **Loss Viewer II**

- **RF Simulator**

- **Quad Shaker**

- **Lab Book**

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Current Development Efforts

- **Significant improvements to the Online Model**

- **Support for rolled magnets and alignment errors**

- **Distributed agent based services**

- **Configuration Management**

- **Support for full featured scripted applications**

- **Generate both web and Java user interfaces from the same Bricks description**

- **Adding new features to existing applications**

- **Bug fixing**

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XAL 2

- **Fresh effort**
  - **Borrow XAL technology and concepts that work**
  - **Rewrite code from scratch as necessary**
  - **Parallel to XAL effort**

- **Cross Site compatibility**
  - **Work closely with collaborators to design XAL for compatibility across laboratories**

- **Long Term development (no timeline)**

- **Source Forge Project: xal2**
  - **http://sourceforge.net/projects/xal2**

- **Chris Allen is leading this effort**

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XAL Course

- **USPAS course on "Control Room Accelerator Physics" is being offered**
  - **Will use XAL extensively**
  - **June 23 - 27, 2008**
  - **http://uspas.fnal.gov/programs/UMD/ ControlRoomAccelPhys.html**
  - **http://uspas.fnal.gov/programs/umd.html**

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