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Advanced Collaboration Tools To Support Integration & Steering of Multi-Site Experiments

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Large Facility

- Only a handful of facilities available in Europe used by Materials Scientists for stress measurement:
 - SRF, Daresbury Lab – (X-ray)
 - ISIS, Oxford – (Neutron)
 - ESRF, Grenoble, France – (Synchrotron)
 - Materials Science Centre, Manchester

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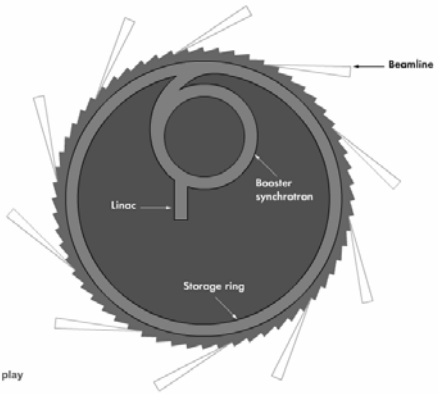
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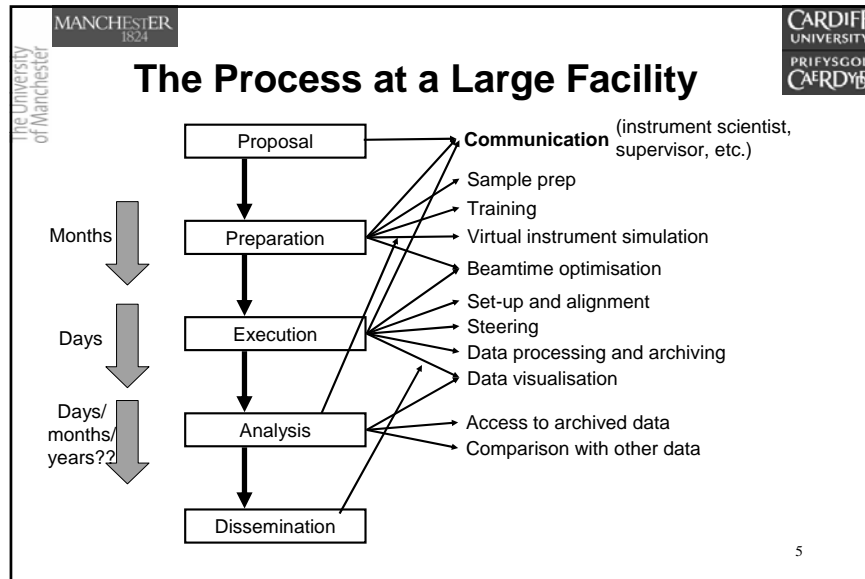
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Large Facility - Example

- ESRF, Grenoble, France

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- ## Problems...
- Phone/email inadequate communication methods
 - Experimental schedule planned, scripted during beamtime
 - Increasing data size → slower data processing
 - Non-standard, non-user-friendly data analysis routines
 - Human memory – what did we do? How did we do it?
 - Poorly annotated data
 - Lack of powerful, user-friendly visualisation routines
 - Lack of training & experience
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- ## Engineering Science is concerned with
- Practical component size scales
 - Complex systems and behaviours
 - Realistic environmental conditions
 - Realistic timescales
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- ## The Needs for Advanced Collaboration Tools
- It is a 24-hours tasks and hence support from home is often required.
 - Current widely available broadband technology can
 - improve way for experimental support
 - used to enhance experiment steering
 - have better problem solving environments.
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The Project:

ISME - Integration & Steering of Multi-site Experiments to Assemble Engineering Body Scans

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- **Main aim:**
 - To develop and refine the experimental steering process for distributed teams
- **Specific objectives:**
 - » To achieve multi-site experiment steering, to discuss progress
 - » Set up a medium for collaboratively managing, viewing and analysing data
 - » Improve the HCI issues within the shared-workspace between the dispersed sites
 - » Create guidelines for the use of remote steering and collaborative environments.

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Tools

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- Improved of existing open-source tools / technologies / frameworks to be used:
 - Access Grid will be used as a communication tool.
 - Shared Workspace on web page to help experiment management.
- Low technology – available at home using broadband

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The Project

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- **Benefits:**
 - The experimenters to seek expertise advice more efficiently to detect early defect
 - Experiment steering from the trainers or support can be achieved remotely to save time and efforts
- **Practical Outcomes:**
 - Broadband technology penetration provides new test environment between non-traditional users and traditional Access Grid nodes.
 - Allows experimenters to seek and secure (remote) expert advice to assist problem solving
 - Experiment steering can be achieved remotely efficiently using Mobile Access Grid

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Remote Experiment Steering

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- **Access Grid**
 - Alternative way to assist and steer the way an experiment can be achieved !!!
 - Mobile-AG technology can change the way remote advisor perceive the whole experiment



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The needs for Web-based Shared Workspace

- Many commercial and non-commercial tools are becoming widely available;
 - Incompatibility issues may need to be tackled
- These tools can often be restricted by skills and network restrictions;
 - Prior technical skills and efforts are needed;
 - Upload bandwidth from low broadband (Home) sites can impact negatively on problem solving sessions;

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Enhancements

- The Shared-Desktop is enhanced by combination of IP-address logged and Personal password security;
- Mouse & Keyboard control over the Shared Desktop can be passed between parties;

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The needs for Web-based Shared Workspace

- Time & efforts should not be spent (wasted) on technology set-up;
- Web-based Shared Workspace Environments
 - Solve the problem by bring everyone to a same virtual workspace (Centralised visualisation server);
 - Network restriction is not an issue (using outgoing traffic connection such as http)
 - Low network broadband required only “Download” bandwidth (usually is a lot of faster than upload rate)
 - “Almost” equal performance for all parties on 2D / 3D visualisation

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Example

- Case study based on stress measurement for a welded materials



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Example

- 3D stress mapped to geometry data using our Shared-Desktop portlet

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Pluggable Web Portlet

- Number of other similar functionalities portlets are available elsewhere but may not be easily adopted;
- Pluggable Web Service (using WSRP) can be considered to be a solution for these incompatible portal issue.
- Using “Screen Scapping” concept that used XML-based Web Services Description Language (WSDL) means:
 - A pluggable XML-based Web Service portlet is now possible to deploy or consume web portlet to / from another web portal

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Example

- 2D Log-book to keep track of experimental history and record using our Virtual Experimental Log-book portlet

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Conclusion

- Project is still at early stages.
- Installation and trial at Daresbury Lab with a group of Dutch scientists
- Investigate alternate reliable technology to suit a low bandwidth home broadband;
- Recent conducted interviews also allow us to form certain workflow in our web portal services.

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Acknowledgement

JISC The Joint Information Systems Committee

 CCLRC

 ISIS

 NEUTRONS FOR SCIENCE

 ESRF

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Finally

- Suggestions, comments are always welcome...
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Any Questions...

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