DENIM 2016 ENGINEERING FOR SCIENCE
19-21 September 2016
ESS - Lund - Sweden

DENIM 2016 Parallel Workshop

Automation for Scientific Use - Notes

Schedule

Introduction	20 min	8:30
4 Topics (15 to 20 min each)	70 min	
Coffee Break	30 min	
4 Topics (15 to 20 min each)	70 min	
Wrap up and Summary	20 min	12:00

Introduction round

- Around 16 people attending.
- Mixture of engineers (mech and elec) including IT.
- More than 7 institutes represented.
- About half had been in industry before working in science.

Topics

1. Innovation
2. Standardisation
3. Technical Standards
4. Relationship to Industrial Suppliers
5. Workflow of Projects
6. Quality Control / Acceptance Tests
7. Documentation
8. Service, Maintenance

General Questions

- What are the differences between industry and science?
- What are the communalities?
- How do I do in my own daily business?
- How do I transfer industrial approaches into science?
- What explicitly I don't want to transfer?

Innovation

Q:

- What is innovation for you, how you would define it?
- What is driving innovations in your facility, what's the driver in industry?
- How do you handle innovations in your job?
- Do you have a budget for this?
- What's your innovation cycle (for different technologies 5, 10, 20 y)?
- What about "old" products with a proven record?
- How do you keep yourself updated?

D:

- Obsolescence is main force of innovation, e.g. vendor stops selling a type of PLC.
- Competition can be a force of innovation e.g. another institution has better equipment. This often comes from a Scientist saying that they can do a better or easier experiment somewhere else.
- Safety regulations can be a force of innovations.
- Management can hinder innovation, funding not available.
- Sometimes engineers aren't great at selling innovation or often want to innovate just for the sake of innovation (i.e. they are interested in the technology) but if it's not saving money then managers might not approve.
- Engineers need people to understand long term benefits and they should promote innovation as early as possible; don't leave it until it's too late.
- Seek allies: All the best innovation projects at ANSTO are championed by a scientist.
- In industry if you come up with an innovation you may get a bonus where as in Science you need to plead your case and/or beg to get the opportunity to do it.
- Constant or frequent reviews of standards and standard systems can help innovation.
- Collaborative innovation from science instead of competitive innovation in Industry.
- Definition of innovation can be slightly different between science and industry. Is innovation really just choosing an automation platform or is innovation solving a problem that hasn't been solved before?
- Quality control can be a tool to maintain or create innovation.
- Innovation can be cultural and/or personal; institutes can foster an innovation culture.
- Can be good to have a group with two types of personalities: people who like to innovation and people who like to stick with what they know. This way you get both perspectives.
- R&D specific money can help drive innovation.

Standardisation

Q:

- Do you have standardised components?
- Do you have a list of certified components?
- Do you have a PLM system?
- How do you handle obsolescence?
- What about customized solutions? What is the balance between customised/standardised?

D:

- Not so easy to standardise Sample Environment.
- Important to standardise pins and inlet/oulets for not only electrical/electronics but also gases and water.
- PLM systems? EPDM (just a repository for CAD models and approvals) system implemented at ANSTO.
- PLM systems used to stop individuals "stuffing things up". Can be used to track certifications and lifecycle for parts.
- PLM can be related to size of a company. Can be more beneficial in big companies where employee turnover is large and all data is available.
- PLM systems can provide benefits but are high overhead in terms of learning the system and maintaining data.

Industrial Suppliers

Q:

- How do you handle industrial supplier?
- How do you select a supplier (smaller, innovative companies? how long on the market? other criteria)
- How specialised are your suppliers?
- How do you establish relationship?
- Do you find always 3 supplier for tender?
- Do you know relationships between suppliers (who is producing for whom)? Do you care?

D:

- Supplier always want to know the application and requirements. Sometimes difficult to fix in scientific projects.
- Science projects are different customers, suppliers needs time to understand.
- Prestige or reputations of an institute can have an influence on how suppliers deal with you.
- In most cases science is too small a customer for the automation industry to be able to demand or influence developments at the supplier. The more stringent your requirements the less options you have for suppliers.
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- Suppliers that want to get into science or are interested in science can be more easily engaged. They tend to be themselves smaller innovative companies.
- Risks related to dealing with one man specialized companies exist. Can be positives and negatives: they may not be around in 20 years but they may be very dedicated to you because you're a big job.
- Location can affect suppliers available: e.g. Oak Ridge or Grenoble would have access to more companies and/or larger/head offices where as for example Australia may be isolated.

Workflow of Projects

Q:

- What about requirements / specifications lists?
- What about project planning?
- What about resources planning?
- What about the tendering process?
- What should we take over from industry?
- What are the limitations / differences to industry?
- Do you foresee remote diagnostics / remote configuration? What about IT security with this?

D:

- Proximity of Scientist to engineer (customer to supplier) may be a factor in them contributing to requirements and project input/planning.
- Experience with a centralized workshop: you never know if your component will be built in house or outsourced.
- Advantage of highly integrated technical groups: you don't have to fully specify designs because they know what you want or will do things as they always have.
- Always a question of whether scientists should be project managers.
- Jülich: meeting every two weeks between mechanical and electrical.
- PSI uses a "white board" ticket system for support (small project support). ANSTO uses a weekly Gantt chart.
- In a system where a technician is responsible for 1 or 2 instruments they have more ownership and often they find problems before a scientist comes across it e.g. "this bearing is sounding bad maybe we should do something".
- ISIS and PSI doesn't have beamline-dedicated technicians for operating instruments.
- No institutes substitute Neutron Beam technicians with source technicians.
- Not ideal to have Mechanical and Electrical people separated.
- Important for a motion group to act as an advisory role in some cases.
- In maintenance people tend to stick to their own areas but projects are less clear cut, project based work leads you to think across different elements/areas.
- As a guide to integration you can look at where people are physically sitting. If all electrical engineers are sitting together then you're functionally focused and maybe not so project/matrix focused. Might because harder for the line/functional manager but easier for the project manager.

Quality Control/Acceptance Tests

Q:

- How do you implement quality control ? Do you have a quality management system (ISO 9000 etc.)?
- How often do you perform Factory / Site Acceptance Tests?
- How does the tests look like?
- How do you prepare, how do you conduct?
- How firm are you with the results?
- Difference experience from your job in industry?

D:

- Trouble with FATs, you end up having to accept components anyway and work on them back at the institute. Jülich try to build as much in house as possible to avoid this.
- A common question is who is qualified to attend the FATs? Should it be the engineer, installing technician etc.? Should be one mechanical and one electrical; Scientists don't often attend. Data and/or compromises are relayed to scientists and they make the decision either to accept or reject.
- Common problem with Scientists buying things "on a whim" and having to adapt equipment when it arrives on site.
- You can run into problems if you are specifying specific components for tenders and then the equipment doesn't work. The supplier will often say "well it doesn't work because you told use to use this components", e.g. encoder.
- Contracts with products out of warranty or do not include spares can lead to big costs down the road.
- While it is important to recognise when a company is quoting too high it can be equally important to recognise when a company is quoting too low. This can be difficult since Procurement departments often force you to take the cheapest quote.
- At ANSTO and ISIS they sometimes pay a small fee to get a financial report on a companies applying for tenders.