



Wir schaffen Wissen – heute für morgen

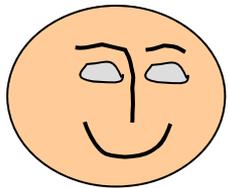
Paul Scherrer Institut

Elke Zimoch

Purpose and Benefit of Control System Training

# What is the Problem?

Accelerator



200 m



Operator  
in Control Room

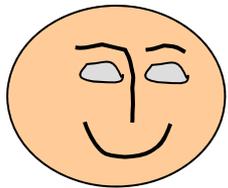
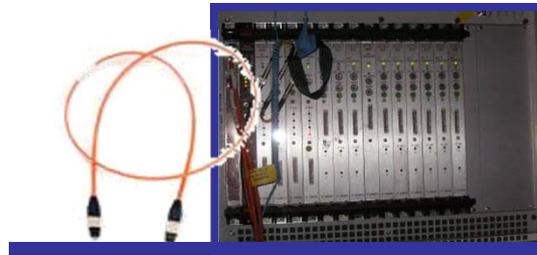


# What is the Problem?

Accelerator



Control System

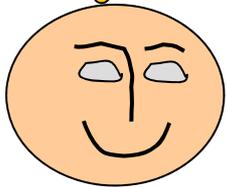
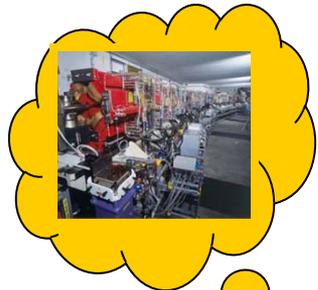


Operator  
in Control Room



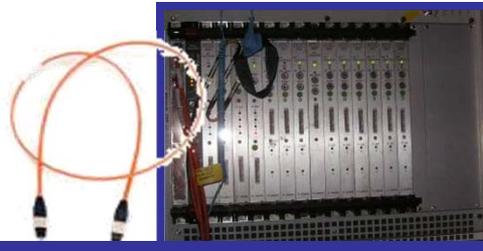
- The control system is the only connection between accelerator and operator

# What is the Problem?



Operator  
in Control Room

Control System

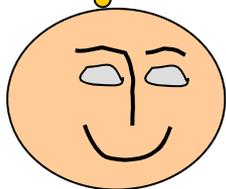


Accelerator



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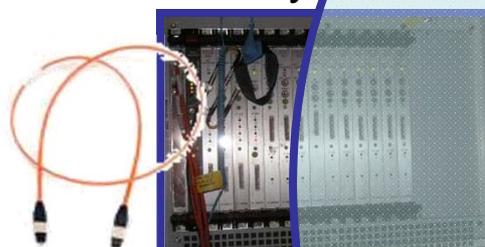
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Operator  
in Control Room



Control System

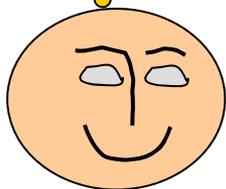


Accelerator



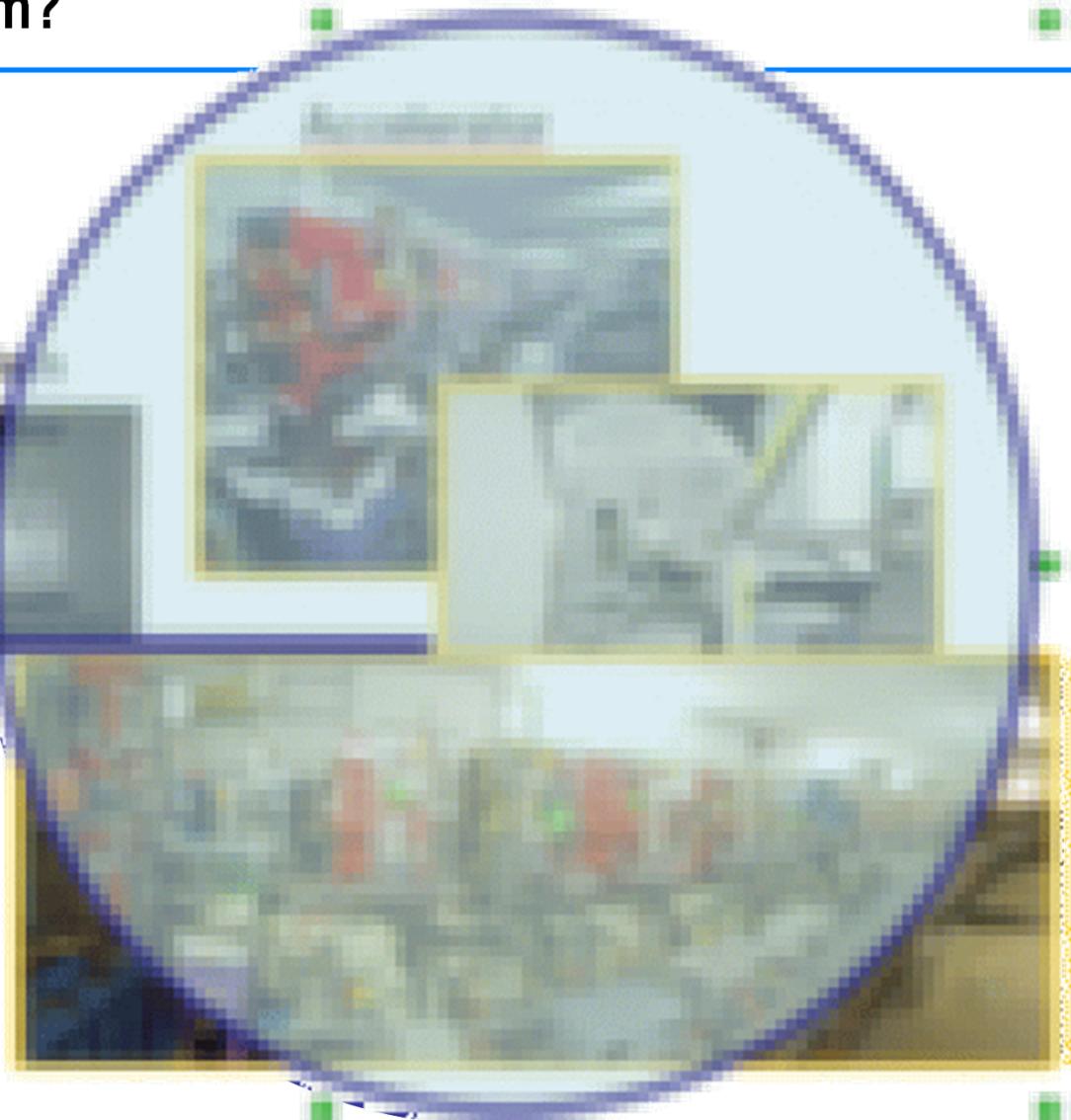
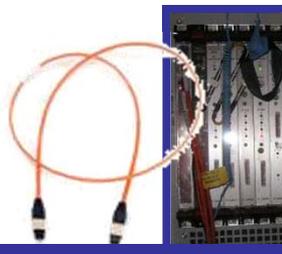
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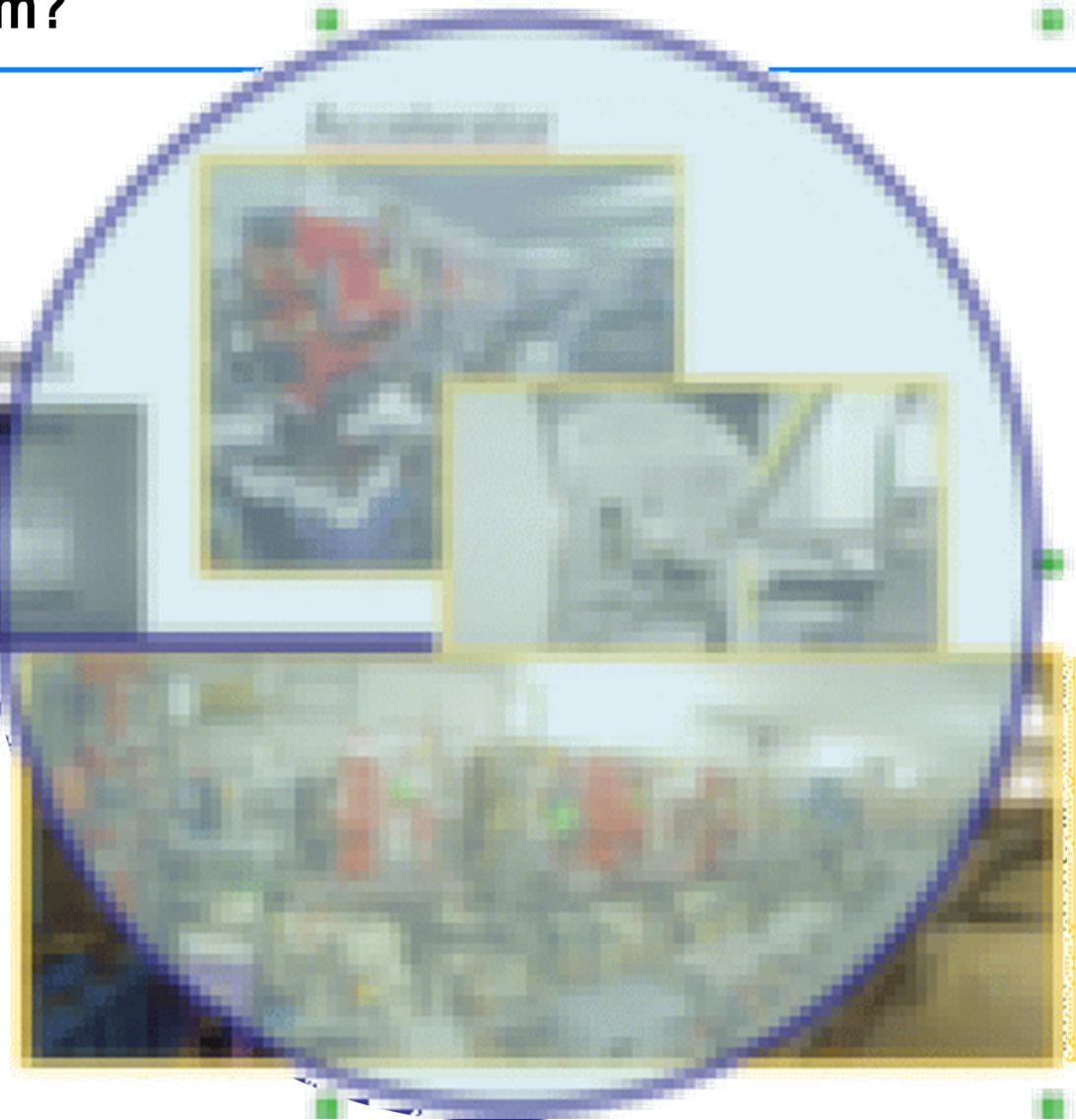
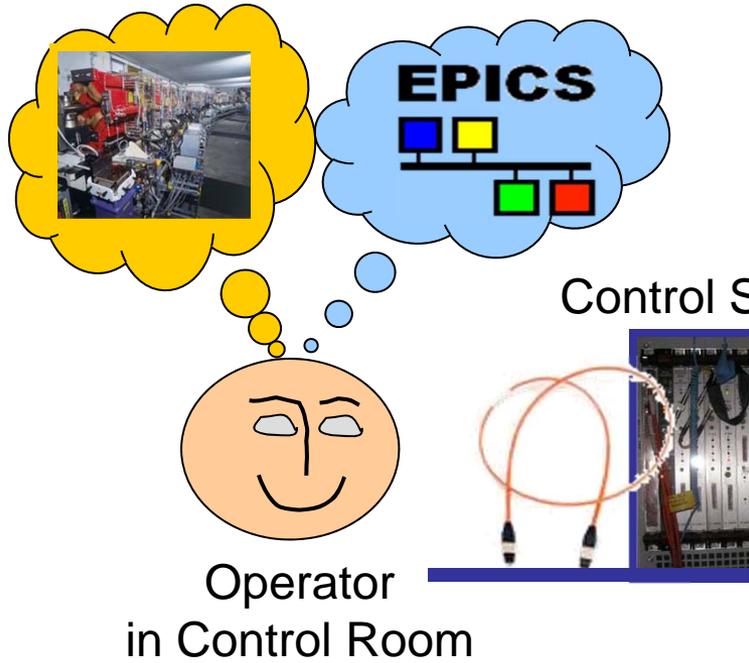
Operator  
in Control Room

Control S

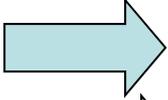
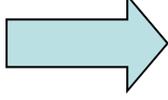


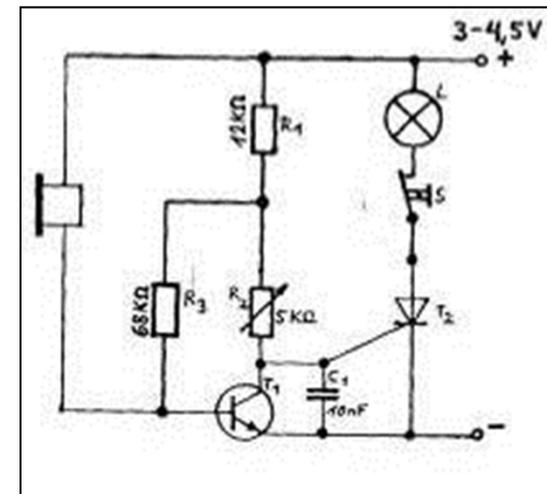
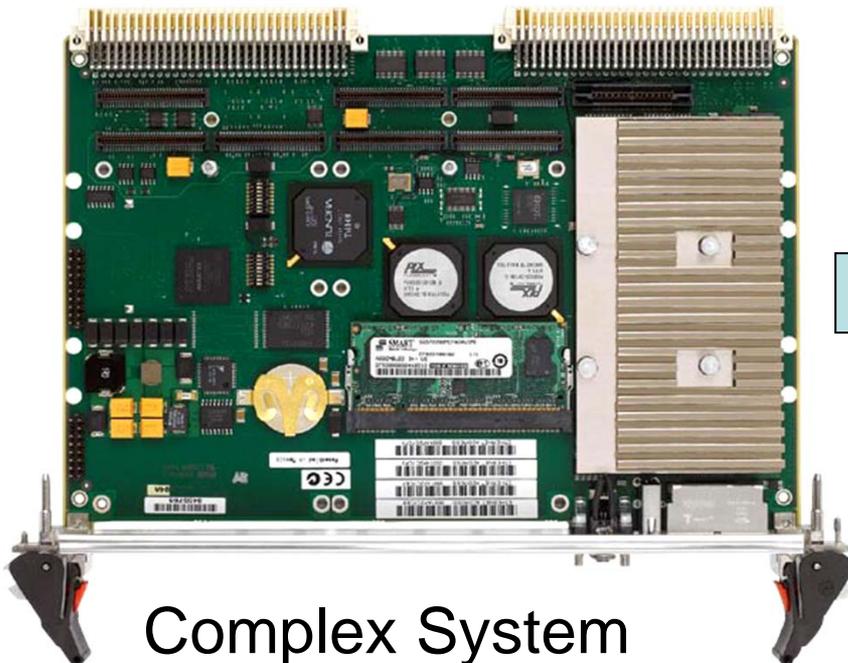
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# What is the Problem?



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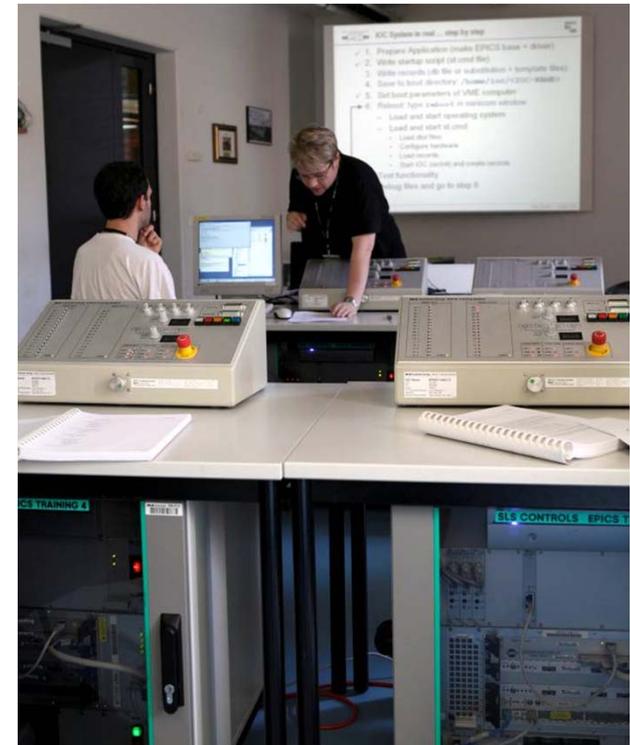
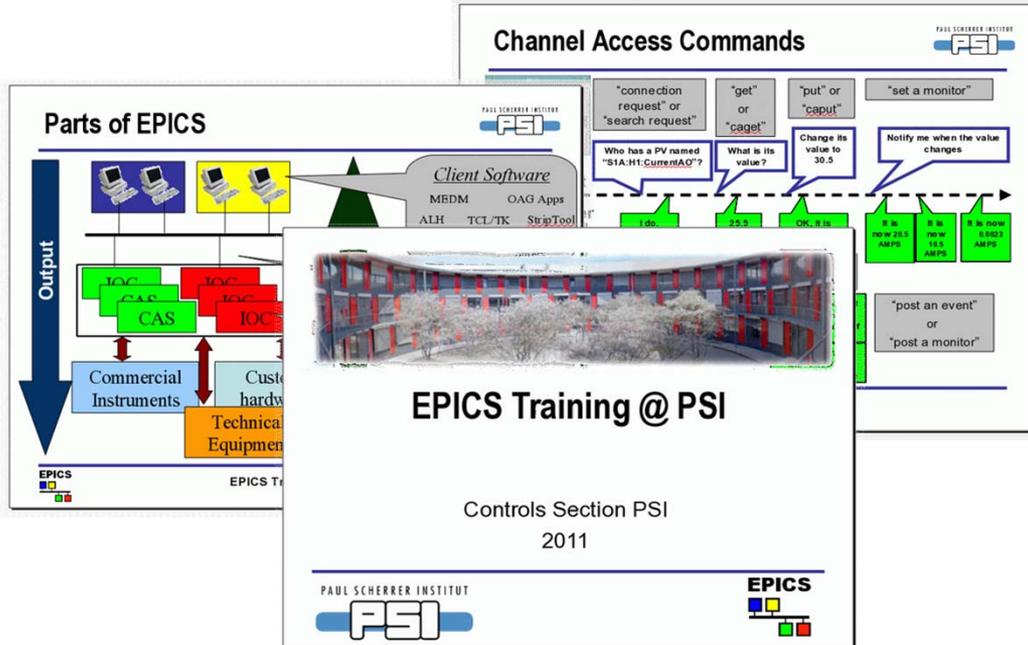
- Simplify complex systems (not necessarily correct)
- Allow reason about behavior of complex systems
- Represent aspects we learn/know about  Step 1
- Automatically constructed from experience  Step 2



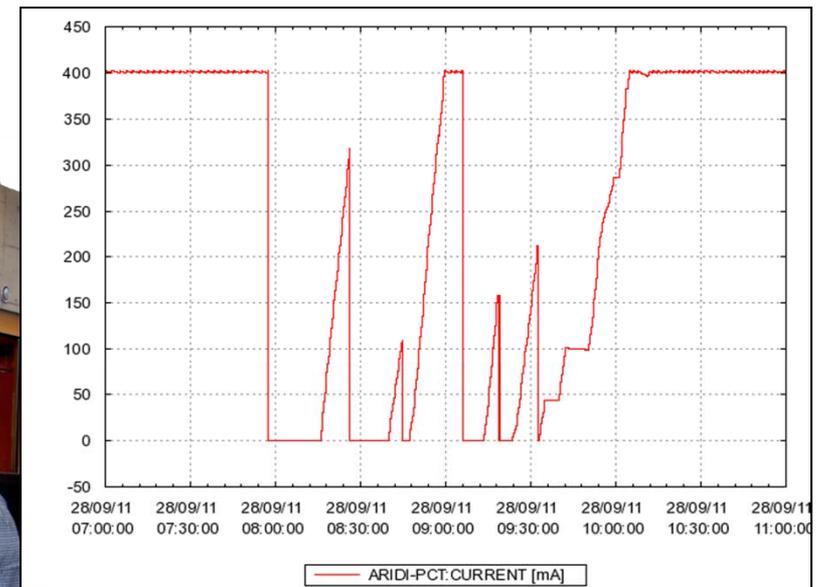
Mental Model

## Lay model foundation:

- Lectures: theoretical basis
- Hands-on training: learning by playing
- Hardware for every participant
- In native language of Operators (German)
- Small groups (4 participants)

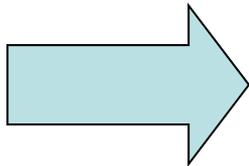


- SLS availability 99% (year 2010) = Experience decay
- Solution: special Operator training at SLS
- “sabotage” accelerator (cause beam loss)
- Real accelerator, real environment, real problems
- Operator solves problem while monitored by trainer
- Mental model refresh



A correct mental model of the control system enables Operators to

- Distinguish between accelerator and controls problems
- See through the control system blur
- Use the control system more efficiently



Control System Training is necessary to build correct mental models