How To Successfully Renovate A Controls System?

Lessons Learned From The Renovation of The CERN Injectors’ Controls Software

Grzegorz Kruk on behalf of the InCA team
CERN, Beams Department, Controls Group
Different Worlds

Different:
- Epochs
- Philosophy
- People
LHC Software Architecture

- Development shared between Controls and Operations
- All functionality needed to control SPS and LHC
Renovation: Apply successful model to other accelerators
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Renovation: Apply successful model to other accelerators
We thought it’s just technical...

? Integration
? Configuration
? Performance
? Scalability
? …
But users have a bit different view...
So when we came with the new system…
So when we came with the new system...
So when we came with the new system...
So when we came with the new system...
So when we came with the new system...
So when we came with the new system...
So when we came with the new system...

1960s → Hardware

1980s → X/Motif
So when we came with the new system...

1960s → Hardware

1980s → X/Motif

2000s → Java
So when we came with the new system...

1960s → Hardware

1980s → X/Motif

2000s → Java

“We didn’t ask for this, we want it as it was before!”
So when we came with the new system...

“We didn’t ask for this, we want it as it was before!”
So when we came with the new system...

“We didn’t ask for this, we want it as it was before!”
But why?
But why?

- Not just habits → accelerators are different, really
  - Fast vs. slow, model, impact, …
- The renovation was in Controls’ interest, not really in Operations’
- Insufficient commitment
But why?

- Not just habits → accelerators are different, really
  - Fast vs. slow, model, impact, …
- The renovation was in Controls’ interest, not really in Operations’
- Insufficient commitment

We focused on technical problems and underestimated human aspects.
Involvement and Commitment
Involvement and Commitment
How did we address it?

- Increase **mutual understanding**
  - Spend time in the control room
  - Observe, Listen, Discuss
  - Help resolving problems
  - Engage Operations in the development and testing

- Promote the **new ideas** while respecting their habits
  - Go for compromises

- **Iterative Improvement**
A few practical GUI recommendations
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- Short Contextual Help
A few practical GUI recommendations

- Hardware
- Front-End Process
- Middleware
- Java Server
- GUI Bug

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Contextual
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Clear
Error
Reporting
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Clear Error Reporting
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The KISS Principle
Keep It Simple, Stupid
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The KISS Principle
Keep It Simple, Stupid

Short
Contextual Help

Clear
Error Reporting
Quick GUI sketches

Make a quick wireframe of the main screens

Send it around

Tweak it

Build

Basamiq Mockups
Quick GUI sketches

Basamig Mockups

Make a quick wireframe of the main screens

Send it around

Tweak it

Build

Add new table, chart, etc after selected table or at the end of the WorkingSet if no table was selected yet

Remove selected table, chart, etc

Change tables/charts order using the draggable anchors

New empty tables added

Remove selected table, chart, etc

OpConfig
- CPSOP
- CPSOP + -

Process
- MAIN + -

WorkingSet Selector / Editor
- CPS.PFW-MPS
- CPS.PFW-MPS + -

WorkingSet
- POW-V
  - Status: On
  - CCV: 123.45
  - AQN: 123.45
  - Units: Amp.
- PR.DHZ01
  - Status: On
  - CCV: 123.45
  - AQN: 123.45
  - Units: Amp.
- PR.DHZ02
  - Status: On
  - CCV: 123.45
  - AQN: 123.45
  - Units: Amp.
- PR.DHZ03
  - Status: On
  - CCV: 123.45
  - AQN: 123.45
  - Units: Amp.
- PR.DHZ04
  - Status: On
  - CCV: 123.45
  - AQN: 123.45
  - Units: Amp.
Lessons Learned

• Don’t underestimate habits
• Stay close with users
• Focus on simplicity – it’s the key