



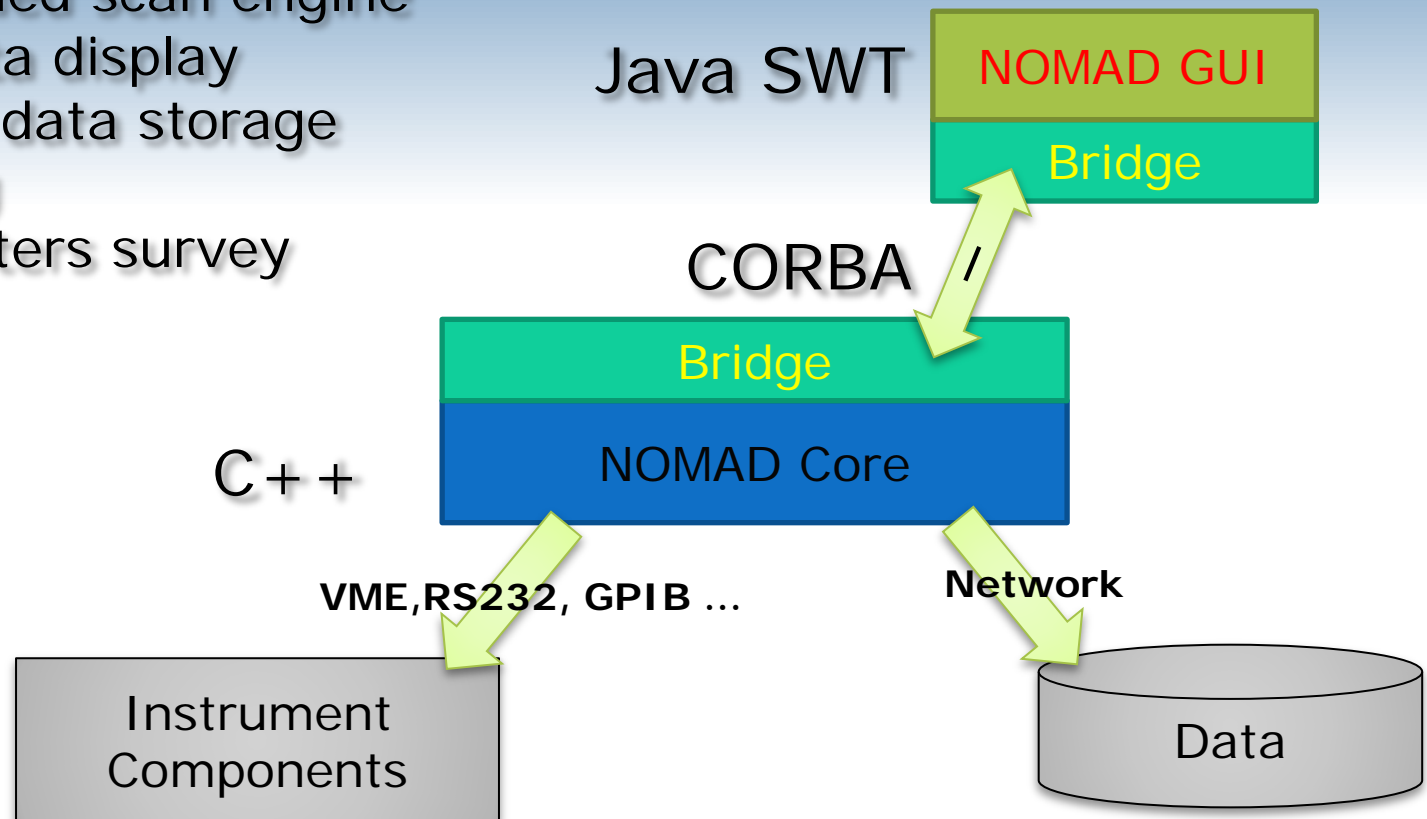
NOMAD GOES MOBILE

Outline

- What is NOMAD
- Why we need mobile solutions
- Our choice
- NOMAD mobile
- Problems and perspectives

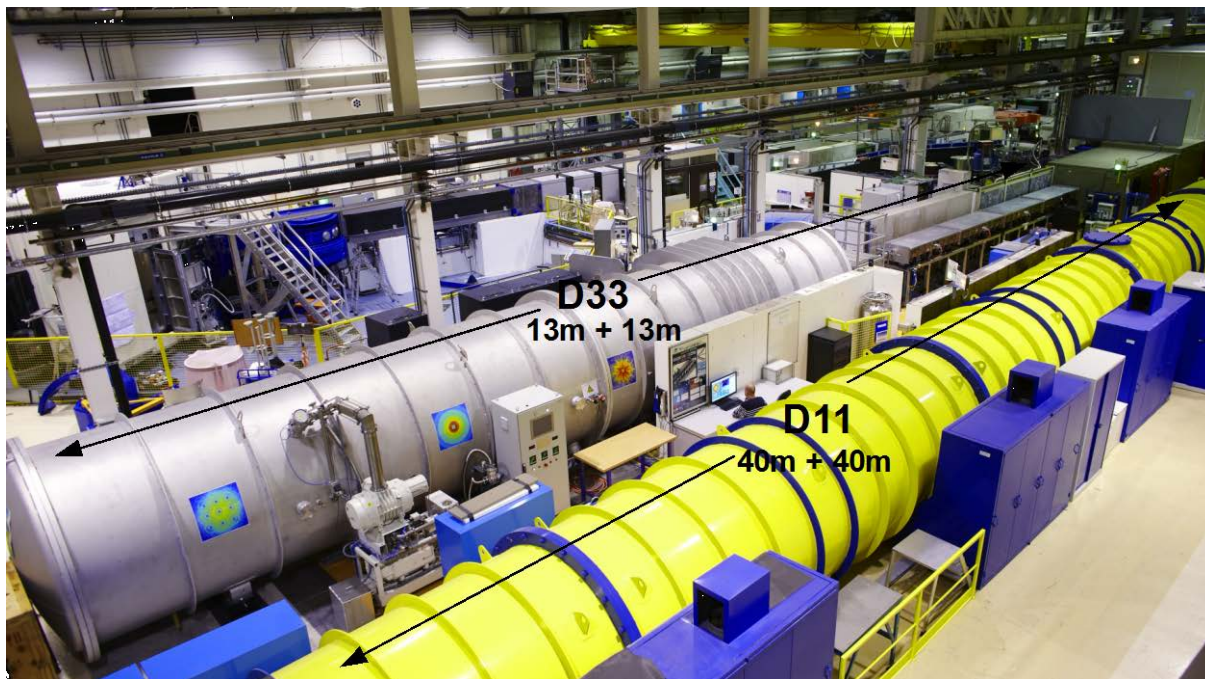
Instrument Control Software at ILL

- Sequencer
- Embedded scan engine
- Live data display
- Central data storage
- Logging
- Parameters survey



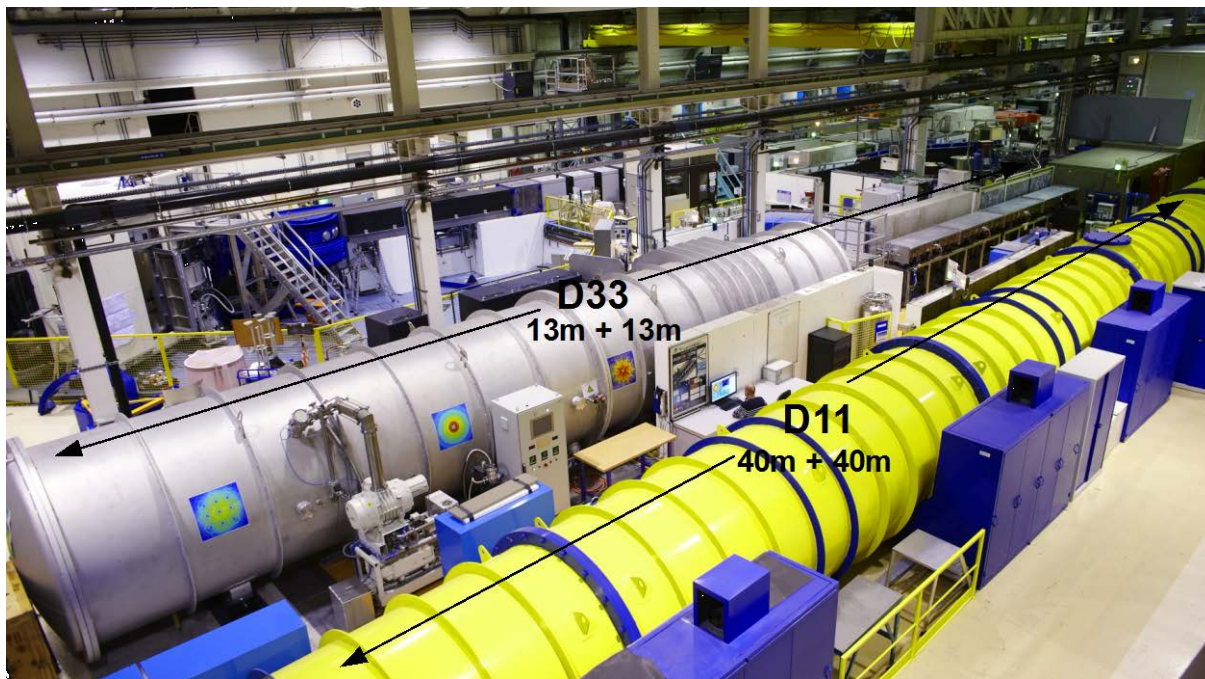
Why?

- Evolution towards bigger instruments
 - Control room often far from instrument
 - Sample area difficult to access



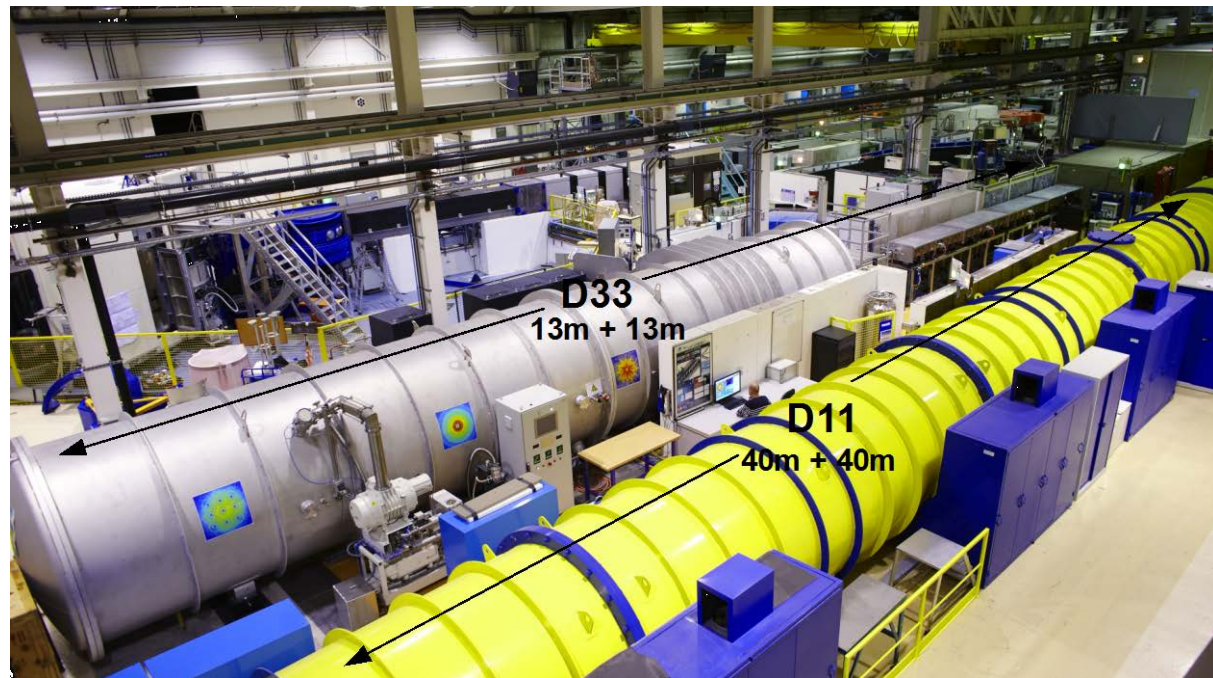
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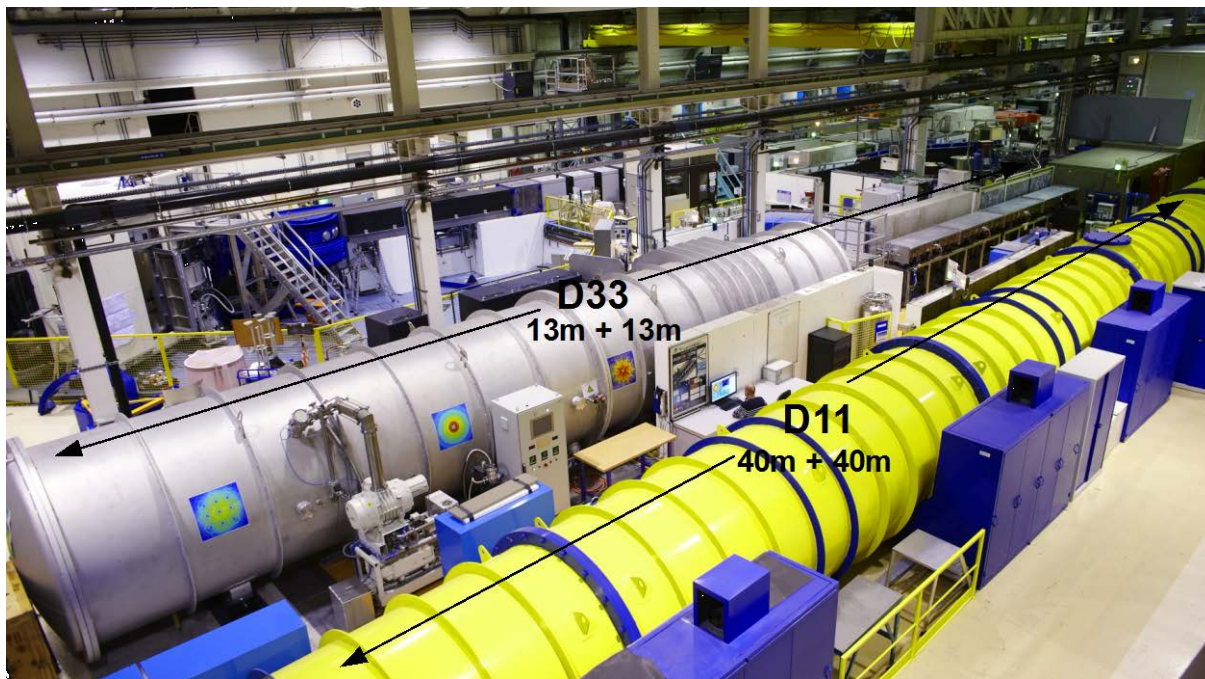
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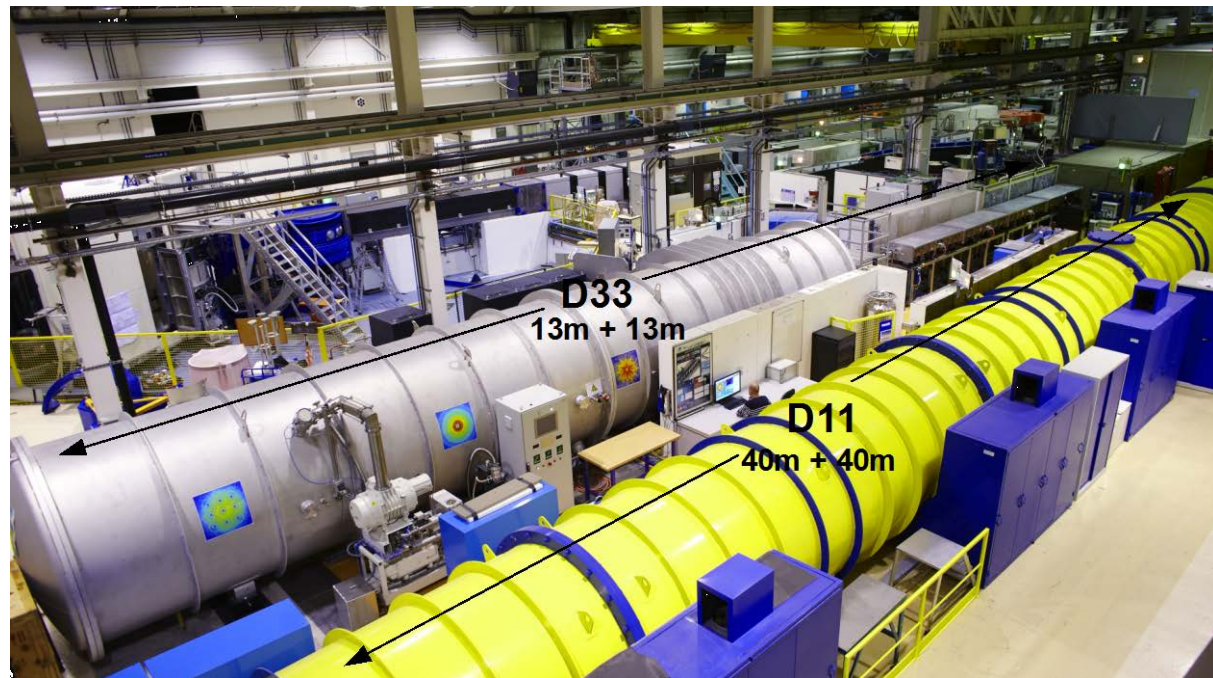
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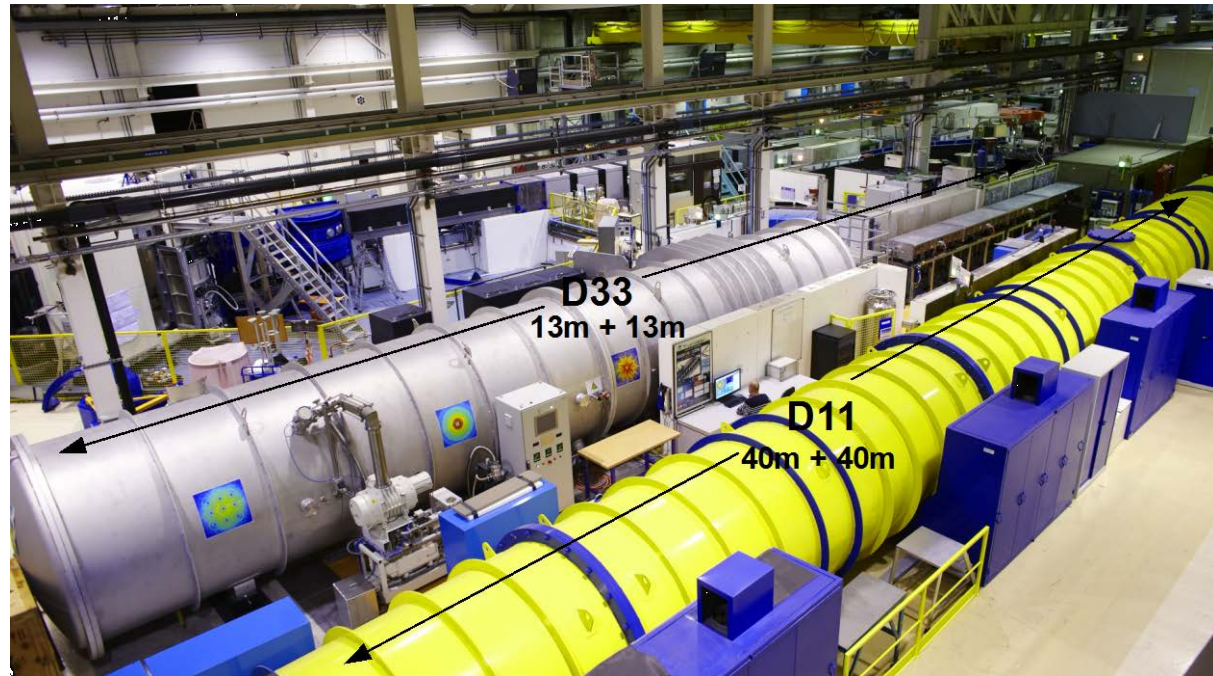
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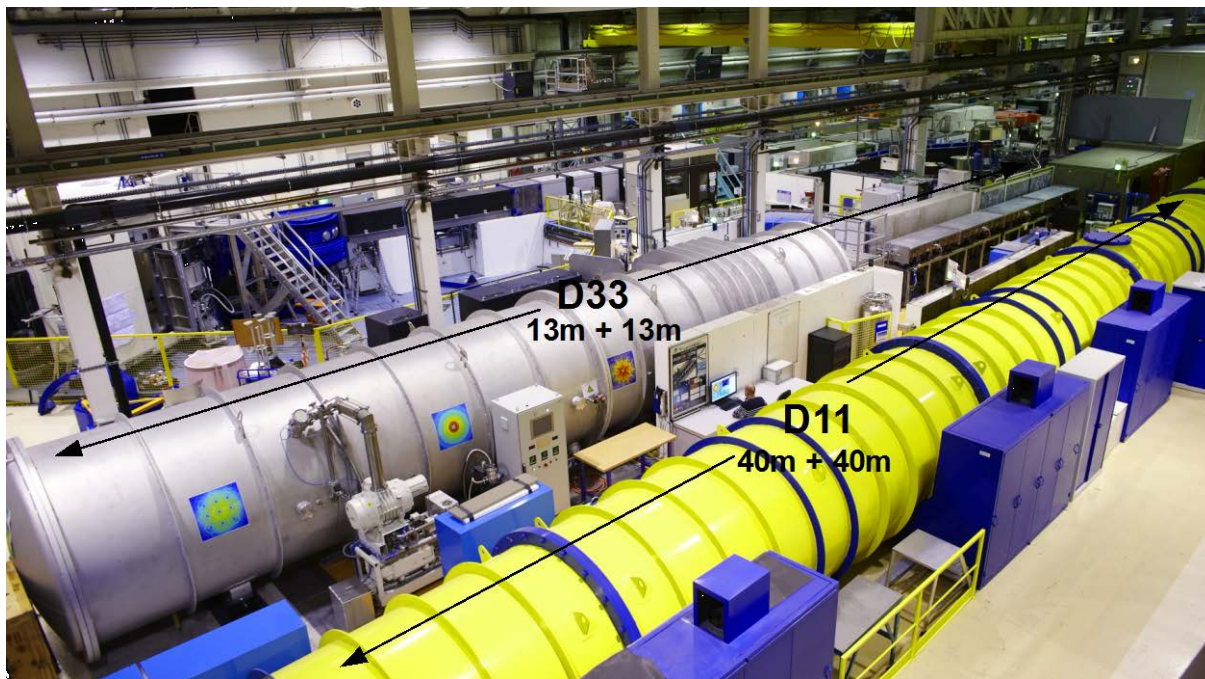
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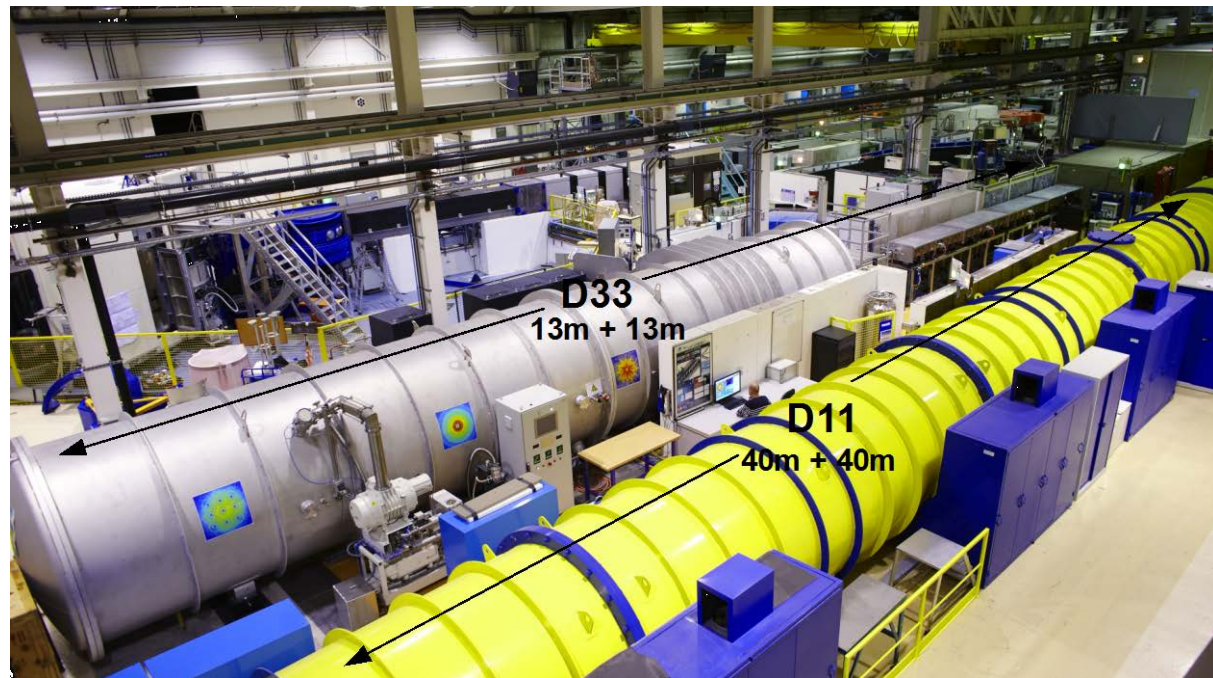
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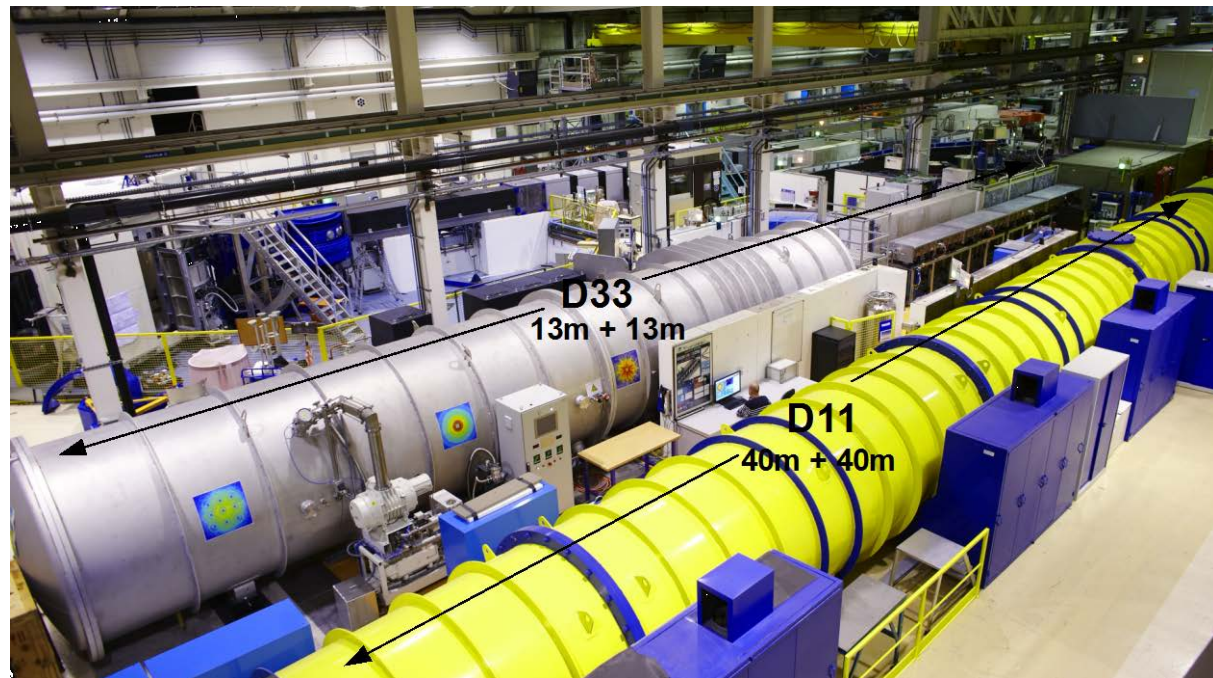
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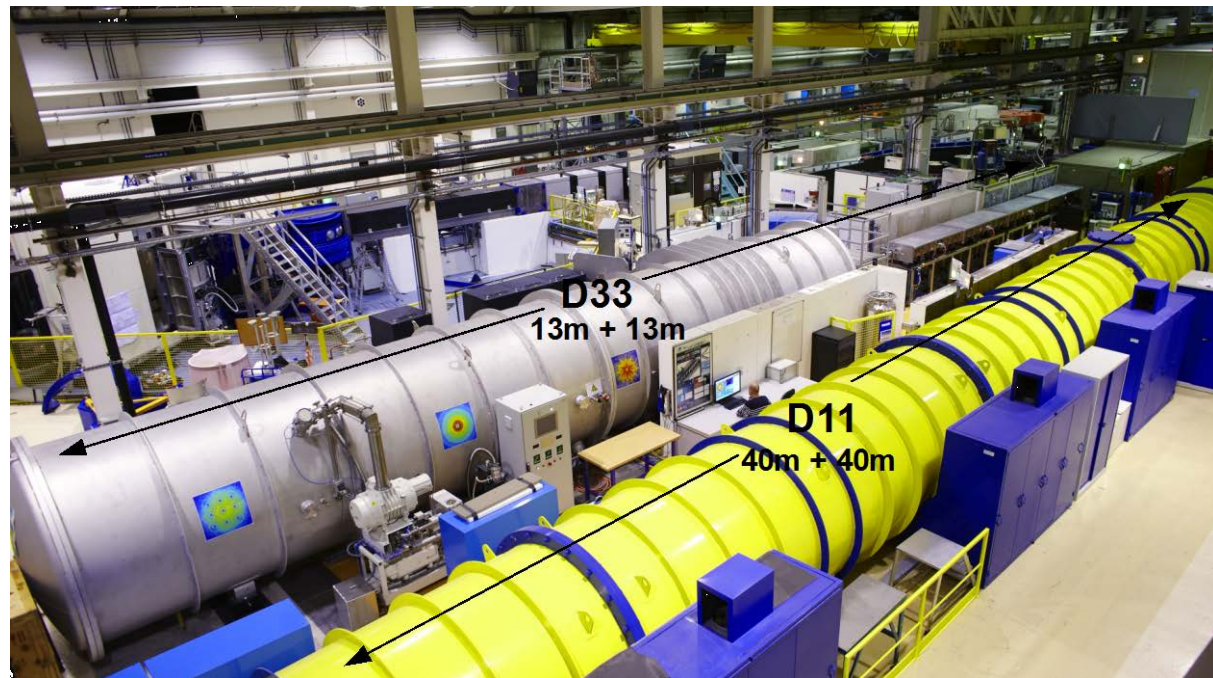
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Why?

- Evolution towards bigger instruments
 - Control room often far from instrument
 - Sample area difficult to access
- Easy setup of a new measurement
- Remote control
- It's cool!



Looking Back

- Cable link with electronics
- Limited to motor control
- Limited to 8 axis
- Limited functionalities
- Often broken
- Expensive



Axis remote control 2.0

Hardware Choice

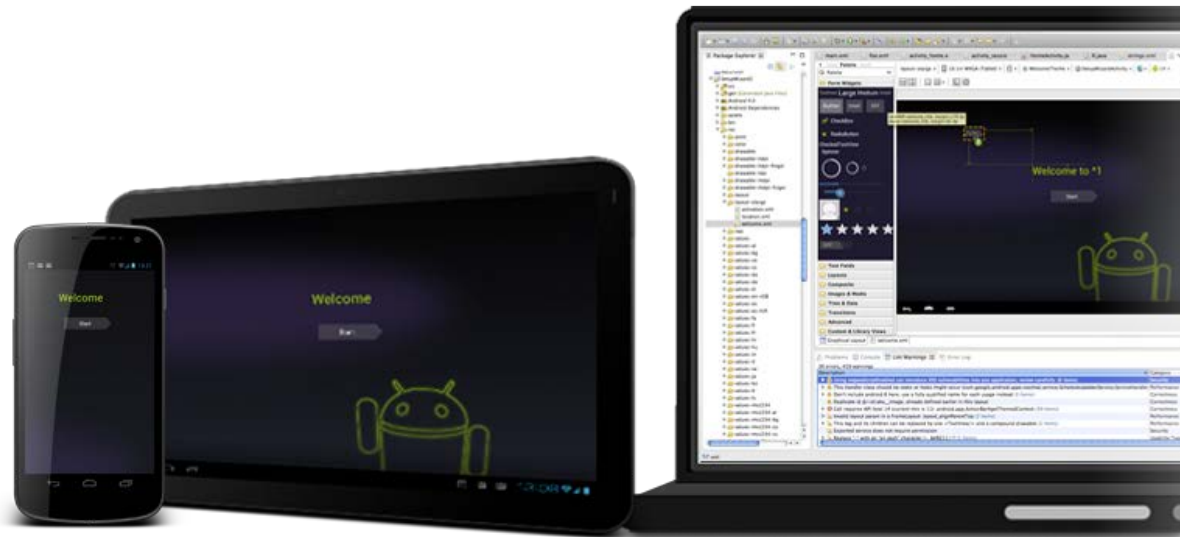
- Weight
- Screen format and size
- Battery life
- Minimum gadgets
- Quality vs price



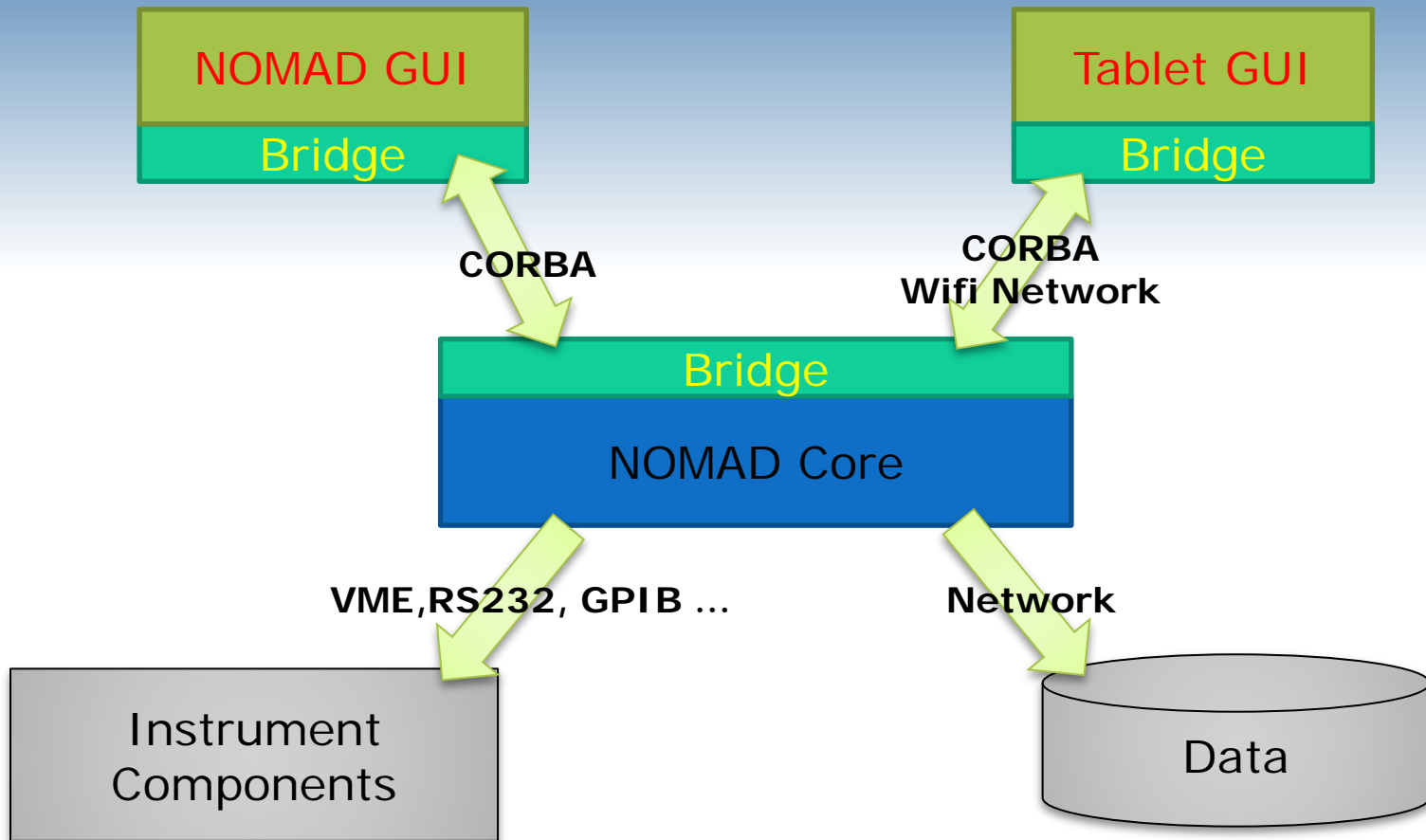
Software Choice

ANDROID

- Development on Linux Workstation
- Android SDK
- ADT eclipse plug-in
- USB debugging



NOAMD Integration



Implementation

- A tablet is affected to one instrument
 - MAC Address verification
- Dedicated screens
 - Use finger instead of a mouse
 - Large icons, Texts, Labels
 - Specifics options for the tablet

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Not replacing the Main GUI

Axis Screen

Nomad

File Edit View Hardware Settings Editor Command Spy

Hardware Settings

Instruments

- Acquisition
- Axis
 - Axis1
 - Axis2
 - Axis3
- Beam parameters
- Currents
- GeneralPurposeIO
- Instrument settings
- admin
- Parameter survey
- Conditions

Axis1

Actual position 0.0 mm

Set-point 217.5 mm ☐ Relative

☐ Fixed

☒ In tolerance

Timeout 360 s for 10 mm

Max retry 3

Offset 0.0 mm

Low limit 0.0 mm

High limit 550.0 mm

Backlash 0.00 mm (+/- give the sense of backlash)

Unit mm

Reference position 0.0 mm Set to

Less options

▶ ◀ ⏮ ⏭ ⏭ ⏮

Axis Screen

 gamma12

axis

- BStopX
- BStopY
- Chi
- Courbeur
- Det
- Gamma
- Omega
- Phi
- Rot_Mono
- Til_Mono
- Til_Mono2
- Tx
- Ty
- X_Mono
- Z_Mono

Det

Actual position : **717.00**
Status : ○ Moving

Set-point 570.00 ☐ Relative

Min : **400.00**
Max : **950.50**
Offset : **-528.00**

Manual Move

Down  Up

 Saving screenshot...
Screenshot is being saved.

Sample Environment Screen

Nomad

File Edit View Hardware Settings Editor Command Spy

Hardware **Settings**

▼ Instruments

- ▶ Acquiring data
- ▶ Axis
- ▶ Beam parameters
- ▶ Currents
- ▶ Experiment
- ▶ Function generator
- ▶ GeneralPurposeIO
- ▶ Instrument settings
- ▶ Polarization
- ▼ Sample environment
 - ColdValve
 - OrangeCryostat**
 - Bath
 - BathExtSample
 - SampleSequencer
 - ExternTemp
- ▶ Statistics
- ▶ admin
 - Parameter survey
 - Conditions

OrangeCryostat [Less options](#)

Temperature Control

Temperature Setpoint K

☐ FastMode Ramp

☒ Time Out ☐ h ☐ m ☒ s

☒ Stabilisation ΔT ☐ h ☒ m ☐ s

Summary

Regulation Temperature 0.00 K
Sample Temperature 0.00 K
SetPoint Temperature 0.00 K
Power 0.000 W
Cold Valve Value 0.8 mBAR
Cold Valve SetPoint 0.8 mBAR
Helium 0
Nitrogen 0

Device connection

☒ Cold Valve Connected ☒ Levels Connected

Temperature Parameters

Max Temp K Min Temp K

Maximum Power % Minimum Power %


Tolerance (+/-) K on

Cold Valve Parameters

☒ Operates automatically


Used	Min Temp	Max Temp	Sensor	Mode	State	Open	Closed	Normal	Cooling ΔT	Warming ΔT	Stabilisation ΔT
<input checked="" type="checkbox"/>	<input type="text" value="1.00"/>	<input type="text" value="3.00"/>	<input type="text" value="Regulation"/>	<input type="text" value="Auto"/>		<input type="text" value="4.0"/>	<input type="text" value="0.7"/>	<input type="text" value="3.5"/>	<input type="text" value="2.00"/>	<input type="text" value="10.00"/>	<input type="text" value="2.00"/>
<input checked="" type="checkbox"/>	<input type="text" value="3.00"/>	<input type="text" value="15.00"/>	<input type="text" value="Regulation"/>	<input type="text" value="Auto"/>		<input type="text" value="10.0"/>	<input type="text" value="0.7"/>	<input type="text" value="3.5"/>	<input type="text" value="2.00"/>	<input type="text" value="10.00"/>	<input type="text" value="1.00"/>
<input checked="" type="checkbox"/>	<input type="text" value="15.00"/>	<input type="text" value="50.00"/>	<input type="text" value="Regulation"/>	<input type="text" value="Auto"/>		<input type="text" value="20.0"/>	<input type="text" value="0.8"/>	<input type="text" value="3.5"/>	<input type="text" value="2.00"/>	<input type="text" value="10.00"/>	<input type="text" value="1.50"/>
<input checked="" type="checkbox"/>	<input type="text" value="50.00"/>	<input type="text" value="100.00"/>	<input type="text" value="Regulation"/>	<input type="text" value="Auto"/>		<input type="text" value="20.0"/>	<input type="text" value="0.8"/>	<input type="text" value="1.5"/>	<input type="text" value="2.00"/>	<input type="text" value="10.00"/>	<input type="text" value="3.00"/>

Sample Environment Screen

 gamma12

axis

cryostat_orange

 OrangeCryostat

OrangeCryostat

Set-point **310.00 K** ☒ Fast Mode

Regulation Temperature : **43.60K**

Sample Temperature : **44.67K**

set-point Temperature : **319.50K**

Power : **0.00%**

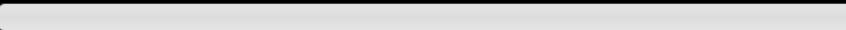


ColdValve Actual : **0.80mBAR**

ColdValve Set-point : **1.00mBAR**







Helium Level : **50.00%**

Nitrogen Level : **60.00%**

Status : **○ Changing**

← ⏠ 📁

    09:23  

Acquisition Screen

Nomad

File Edit View Hardware Settings Editor Command Spy

Hardware Settings

Instruments

- Acquisition
 - noToF Count**
 - ToF Count
 - Kinetic Count
 - FCU Count
 - FCU_TOF Count
 - CountRepeater
 - ScanAxis
 - DPP Count
 - DPP Kinetic Count
- Axis
 - Axis1
 - Axis2
 - Axis3
- Beam parameters
- Currents
- GeneralPurposeIO
- Instrument settings
- admin
- Parameter survey
- Conditions

noToF Count

Subtitle: Test det3 p1-1pad3

10.00 h m s

Repetitions: 1

☒ Save data

☒ Allow user to choose the count preset


Less options

Summary


Status: 100 %
Finishing at
Still 0 h 0 m 0 s
Loop 0 / 1
RUN 0
Detector: 0.000 (0.000 c/s)
Monitor 1: 0.000 (0.000 c/s)

▶ ◀ ⏏


Acquisition Screen

 gamma12

axis
cryostat_orange
acquisition
Count


 Count

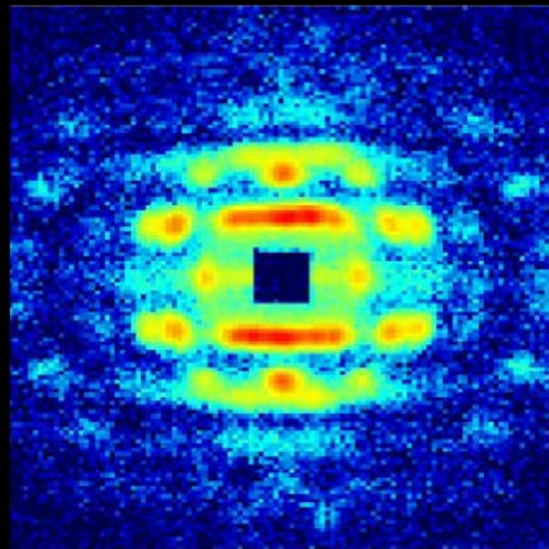
Subtitle scan tx





 50.00 h m s



Repetitions 1

☒ Save data

Status: Counting 1%
Finished at 14:26
Still 0h 0m 49s
Loop 1 / 1
RUN 58105
Detector: $3.072E5$ ($5.633E4$) c/s
Monitor 1: $4.918E3$ ($9.998E2$ c/s)
Monitor 2: $2.459E3$ ($4.999E2$ c/s)
 Running



14:26  

Problems And Perspectives

- Replace CORBA technology
 - ØMQ, Protocol Buffer and JeroMQ
- Generate view from the main GUI Description
 - XML resource files and Java classes
- Integrate a light plot library

x Security for loose connection!

Conclusion

- Android client operational on several instruments
- Very good user feedback
- Available on Google Market

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But it won't work for you ...