



# Update on hot commissioning plans and examples from ODIN, LOKI, DREAM, C-SPEC



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**PLUS INPUT FROM**  
**MANY OF YOU!**

# Update on hot commissioning plans – IKON21



## RECAP

Purpose of this session

Integrated Commissioning Planning (Accelerator, Target, NSS)

The proposed template for instrument specific HC plans

Examples from LOKI

Examples from ODIN

Some general considerations/remarks

Discussion

# Update on hot commissioning plans



## RECAP

### Hot Commissioning **is** ...

- Testing the combined instrument subsystems with the **presence of the neutron beam**.
- Intended to get the instrument to a **reliable operating state** ready for users
- Intended to show that the instrument produces **reliable data** ready for users
- The responsibility of the instrument scientists – get to know your instrument as craftsman knows their tools
- Hard work – and keep calm

### Hot Commissioning **is not** ...

- Quick and easy – unknown unknowns
- An opportunity to do your own research
- A project – need to move to ops thinking
- Ever finished – HC activities roll into ongoing improvement and optimization of beamline. (*Other facilities implemented beamline development time also during User Operations.*)

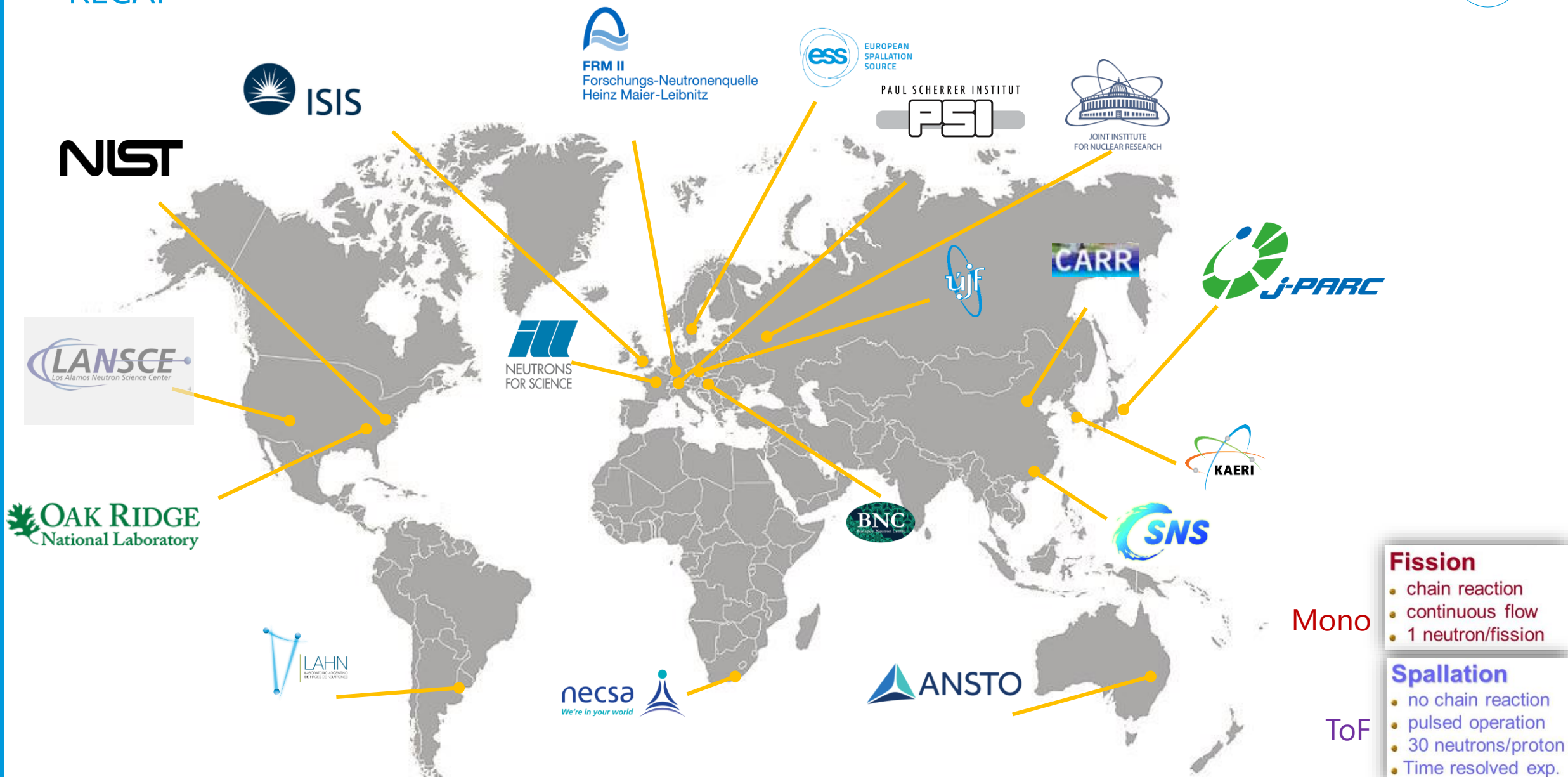
### Remember:

- We will not only Hot Commissioning the instruments, but also the Accelerator and Target!

# Update on hot commissioning plans



## RECAP



### Fission

- chain reaction
- continuous flow
- 1 neutron/fission

Mono

### Spallation

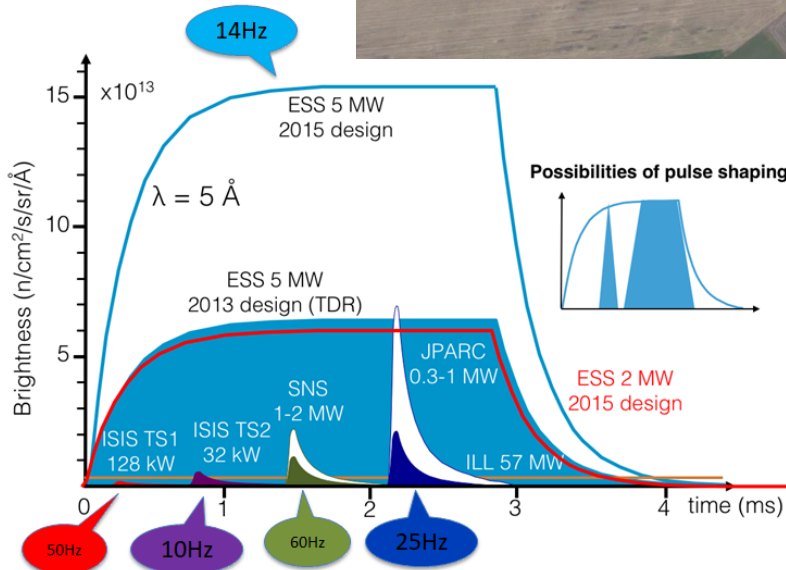
- no chain reaction
- pulsed operation
- 30 neutrons/proton
- Time resolved exp.

ToF

# Update on hot commissioning plans



## RECAP



**Spallation**

- no chain reaction
- pulsed operation
- 30 neutrons/proton
- Time resolved exp.

ToF

# Update on hot commissioning plans



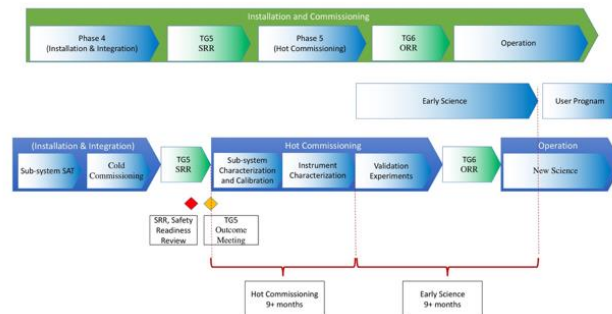
## RECAP

- A generic Hot Commissioning Plan was written by Anton Khaplanov

### Generic ESS Instrument Commissioning Plan

2020 January  
Anton Khaplanov

This document outlines commissioning activities for an instrument at the ESS. The activities apply generally to all instruments. Instrument-specific activities are taken into account where needed. As conclusion, time required for Hot Commissioning and Early Science phases are estimated. The overall process is pictured below.



- Triggered important considerations and provided a first timeline
- Used as input for instrument specific commissioning plans
- Each instrument is way too specific as a generic plan to capture what is needed

- We started to work on the instrument specific Hot Commissioning plans for ODIN, LOKI, DREAM, C-SPEC
- A working group has been formed for Integrated Commissioning between Accelerator, Target and NSS
- This space collects all relevant HC information:  
<https://confluence.ess.lu.se/display/NID/Commissioning>

# Update on hot commissioning plans



RECAP <https://confluence.esss.lu.se/display/NID/Commissioning>

## SPACE SHORTCUTS

- LoKI
- NMX
- ODIN
- DREAM
- BEER
- ESTIA
- CSPEC
- SKADI
- BIFROST
- FREIA
- HEIMDAL
- MAGIC
- File lists

- Neutron Instruments Division
  - V20 Test Beamline at HZB (operated M...
  - STAP Meetings and Reports
  - Common Guide Shielding Project
  - ICC meeting minutes
  - Instrument Scientists meeting minutes
  - Instrument Line Group Meeting minutes
  - New SWIM
- Commissioning
  - Commissioning Plans for Neuro...

Pages / Neutron Instruments Division / Commissioning

## Commissioning Plans for Neutron Instruments

Created by Robin Woracek, last modified on Aug 23, 2021

This page will collect and link to relevant commissioning plans and documents. It is a working page (@all: Please edit and/or leave comments)

### Generic ESS Instrument Commissioning Plan (by @Unknown User (antonkhaplanov))

Commissioning\_Plan\_Generic.docx (version 21 June 2021)

- serves as a reference for the instrument specific plans.
- serves to plan for resources

### Instrument specific Commissioning Plans

We will collect the instrument specific commissioning plans here (they are currently being updated; next meeting on August: @Mikhail Fedorov)

@Robin Woracek ; @Daria Noferini )

- DREAM: *draft currently being updated*
- ODIN: *draft currently being updated*
- LOKI: *draft currently being updated*
- C-SPEC: Preliminary plan shared for STAP April 2021: <https://indico.esss.lu.se/event/2021/>

### Commissioning Plans from other facilities (Reference material)

- Corelli (SNS): [corelli commissioning plan.pdf](#)

### Commissioning plans discussed by Instrument Data Scientists

a confluence page is hosted here: [Commissioning plans - IDS](#)

### Reports from Gold Foils Task Force (2019) and report on Beam Monitors

- Report: [Gold foil use -v1.docx](#)
- Neutron Beam Monitor Use cases for commissioning and operation of neutron instruments and processing of neutron data: [ESS-0419542.docx](#)

## Generic ESS Instrument Commissioning Plan

2020 January  
Anton Khaplanov

SING209-00-PN0002-R00

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NATIONAL LABORATORY  
MANAGED BY UT-BATTELLE  
FOR THE DEPARTMENT OF ENERGY



Pages / Data Reduction, Analysis and Modelling Home / IDS

## Commissioning plans - IDS

Created by Celine Durniak, last modified by Unknown User (antonkhaplanov) on Apr 29, 2021

This space collects feedback, comments of the IDS, the instrument teams and other DMSC groups about

## Use of gold foil activation measurements at ESS

Authors: Ken Andersen, Anton Khaplanov, Kelly Kanaki, Jon Taylor, Oliver Kirstein, Günter Muhrer, Erik Iverson, Joffrey Germa

### Abstract

The use of gold foils at other facilities was evaluated in light of the needs at ESS.

We recommend to use gold foils at ESS, primarily for calibration of absolute efficiencies of beam monitors at the near-monolith position and immediately before the sample position on all instruments. This will need to be done repeatedly during commissioning and troubleshooting and up to a few times a year during normal operations.

It is urgent to ensure that those monitors are appropriately designed for gold foil activation measurements.

The impact of epithermal resonances on the gold-foil results needs to be determined soon. If they turn out to be problematic, dysprosium foils can be considered as an alternative.

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- The proposed template for instrument specific HC plans

- Examples from LOKI

- Examples from ODIN

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- Discussion

# Update on hot commissioning plans



## Purpose of this session

- Present you a possible template of a HC plan
- Collect input from the participants and identify what might be missing
  - *You are welcome to type in chat, email later, add comments to confluence*
- Show a few selected examples of HC activities on ODIN and LOKI
- Identify common activities (and related hardware)
  - Trigger certain actions that need to be taken (by NSS divisions, DMSC, RP, etc.)
  - Plan resources accordingly
- Present you how the Accelerator and Target plans their HC and ramp up
  - Trigger internal discussions within each instrument team on this and then among all instruments for the best shape of accelerator ramp-up

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## Integrated Commissioning Planning (Accelerator, Target, NSS)

- Some relevant documents:
  - ESS-0420218 'Early operations of the ESS Neutron Instruments and first scientific results'
  - ESS-0011768' Updated Report on Operations'
  - ESS-2756565 'A FRAMEWORK FOR TIMING ACROSS THE ESS LINAC'

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Early operations of the ESS Neutron Instruments and first scientific results

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### ESS-0420218

	Name	Role/Title
<b>Owner</b>	Sofie Ossowski	Project Coordinator NSS
	Christian Vettier	Senior Advisor
<b>Reviewer</b>	Mats Lindroos	Accelerator
	Iain Sutton	NSS
	Jonathan Taylor	NSS
	Oliver Kirstein	NSS
	Andreas Jansson	Accelerator
	Ken Andersen	NSS
	Peter Jacobsson	ES&H
	Henrik Carling	ICS
	Rikard Linander	Target
	Hector Novella	ICS
	Lali Tchelidze	Accelerator
	Linda Coney	Target
Carlo Bochetta	Machine	
<b>Approver</b>	Shane Kennedy	NSS Project Leader
	Roland Garoby	Technical Director
	Andreas Schreyer	Science Director

# Update on hot commissioning plans



## Integrated Commissioning Planning (Accelerator, Target, NSS)

- A working group has been formed for Integrated Commissioning between Accelerator, Target and NSS: <https://confluence.esss.lu.se/pages/viewpage.action?pageId=368419533>
- Some important information:
  - Accelerator: “Since we do not have a high power tuning dump, all of our high power tuning will need to be done to the target. Will start with short pulse and small beam.”
  - Beam energy can have a significant impact and that is asymmetric - W and S sectors suffer more.
  - Early Accelerator shift agreement: Use 8h shift first, then go to 2x8h shifts, then full 24h shift; INITOPS staff plan does not have sufficient operators for sustained 24/7 operation.
  - TBL has number of tasks in this context: imaging and diagnostics of the moderator + detect 1st neutrons.
- NSS Goals:
  - Goal 1: verify spallation (and neutron detection)
  - Goal 2: verify timing between Accelerator + Target + NSS (neutron detection) makes sense
  - Overarching: Consistency! (pulse to pulse, get the repetition rate right first). Then HC the instruments.
  - NSS priorities concerning ramping up accelerator (current, pulse length, repetition rate)
    - pulse length (*under discussion for early stage*) > repetition (getting to a pulse 14 times a second) > power

# Update on hot commissioning plans



## Integrated Commissioning Planning (Accelerator, Target, NSS)

- ESS-0420218 'Early operations of the ESS Neutron Instruments and first scientific results'

1 - Up to Beam on Target (-July 2022).

.....

2 - The ESS initial stages (July 2022-December 2023).

This 18-month period covers the critical period during which the first instruments are being hot commissioned, and when the performance of the ESS facility is tested by expert users. Scientifically significant experiments will be performed.

- **Early Days: BOT to (BOT + 3 months)** (July – September 2022).
- **Consolidation Days: The next 3 months: (BOT + 3 months) to (BOT + 6 months)** (October – December 2022).
- **Performance Assessment days: (BOT + 6 months) to (BOT + 9 months)** (January – March 2023).
- **First Performance Demonstration Days: (BOT + 9 months) to (BOT + 12 months)** (April – June 2023).
- **Ramp up and Early Science for six months: (BOT + 12 months) to (BOT + 18 months)** (July – December 2023).



Definitions of periods



Definitions of periods



Split in 3 months periods

HC will fall into this period for early instruments



Definitions of periods

3 - The start of the ESS User programme SOUP (2024-2027)

At the SOUP milestone, the source power must be close to 0.5 MW with a beam availability

# Update on hot commissioning plans



## Integrated Commissioning Planning (Accelerator, Target, NSS)

- ESS-0420218 'Early operations of the ESS Neutron Instruments and first scientific results'
- **Early Days: BOT to (BOT + 3 months)** (July – September 2022).

- **Main activities.** The first neutrons will be produced from the target at very low beam power, including ramp up and testing from Accelerator, Target and ICS systems. This is also an anticipated condition from SSM. The Test Beamline and up to 5 user instruments will be ready to accept neutron beams and will start their Hot Commissioning which requires the production of neutron beams at low power levels. Emphasis shall be on availability of beam over beam power. This corresponds to the Target Studies Operation Mode (OpM) in ESS-OM, providing confidence in .....



Summary for each period

- **Overall objectives:** The establishment of the beam characteristics (long pulse 2.86ms with a stable current throughout the pulse, based on a time grid of 14Hz) that match the design of the neutron instruments is the highest priority along with the production of neutron beams to commission instruments. Within these parameters, the repetition rate can be adjusted to ramp up the accelerator power.
- **Neutron pulse parameters:** Pulse length: 2.86 ms stable current throughout the pulse, based on a time grid of 14Hz.
- **Proton Beam parameters** (indicative): Current ~6 mA and beam energy ~570 MeV.
- **Operating cycle for NSS:** 1 x 8-hour shift at least once a week at minimum power (0.1MW). More shifts will be needed for the neutron source itself: their planning will be coordinated with NSS.



Objectives



Parameters



Needs to be revisited!

# Update on hot commissioning plans



## Integrated Commissioning Planning (Accelerator, Target, NSS)

Pages / ... / Integrated Commissioning Discussions (Accelerator, Target, NSS)

<https://confluence.ess.lu.se/x/7r8HFg>

### Operation Parameters Accelerator, Target, NSS during start-up

(BOT + 3 months) to (BOT + 6 months)

	Accelerator	Comments	Target	Comments	NSS	Comments
Status	<p><b>Proton Beam parameters:</b></p> <ul style="list-style-type: none"><li>• Current ~6mA</li><li>• Beamenergy ~570 MeV</li><li>• Power: 0.1MW (with possible ramp-up; at no expense to availability).</li></ul> <p><b>Neutron pulse parameters:</b></p> <ul style="list-style-type: none"><li>• Pulse length: 2.86 ms</li><li>• stable current throughout the pulse,</li><li>• based on a time grid of 14Hz (less frequent?)</li></ul>	<p>Operating cycle: ESS-0420218 mentions 2 consecutive days (6 shifts) per week at minimum power. <i>See NSS comments</i></p>	<p>Moderator: MARK-I</p>		<ul style="list-style-type: none"><li>• start first planned HC activities</li></ul>	<p>ODIN shift preference: 4 hours of stable beam every day.</p> <p>Acceptable also two days of stable beam every week but <u>not consecutive</u></p>

need as input for HC planning

Collect preference of NSS

Iterative process!

# Update on hot commissioning plans – IKON21



RECAP

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The proposed template for instrument specific HC plans

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Examples from LOKI

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Examples from ODIN

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Some general considerations/remarks

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Discussion

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# Update on hot commissioning plans

## The proposed template for instrument specific HC plans



- Based on the system validation plan (TG3 document)



Document Type Document Template  
Document Number ESS-1108651  
Date Jul 18, 2016  
Revision 0.3  
State Draft  
Confidentiality Level Internal  
Page 1 (13)

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### LoKI System Validation Plan IT

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	Name	Role/Title
<b>Owner</b>	Judith Houston	LoKI Lead Scientist (ESS)
<b>Author</b>	Richard Heenan Jim Nightingale William Halcrow Clara <u>Lopéz</u> Wojciech Potrzebowski	LoKI Instrument Scientist (STFC) UK-ESS Instruments Project Manager (STFC) LoKI Lead Engineer (STFC) Instrument Integration Engineer (ESS) SANS data scientist (ESS)
<b>Reviewer</b>	Andrew Jackson Peter <u>Sångberg</u>	Head of Neutron Instruments Division (ESS) Systems Engineer (ESS)
<b>Approver</b>	Gabor Laszlo	NSS Lead Instrument Engineer (ESS)

# Update on hot commissioning plans

## The proposed template for instrument specific HC plans



- Based on the system validation plan (TG3 document)
  - Identification of high level activities/sub-systems to be tested

The envisaged activities for a successful hot commissioning are as follow:

1. Shielding (steered by RP)
2. Hot Commissioning of beam monitors
3. white beam profile with imaging detector
4. Flight path calibration
5. Beam spectrum
6. Gold foil measurement
7. Choppers phases verification
8. Beam limiters and pinhole
9. WFM
10. Characterization of background (incl. T0 chopper)
11. Gamma strikes
12. Characterization of position and tilt of detectors
13. Resolution (ToF and spatial), including potential spatial dependencies.
14. Tomography and Bragg edge (First science).
15. Commissioning of SE
16. Commissioning of polarized neutron equipment

# Update on hot commissioning plans



## The proposed template for instrument specific HC plans

- Based on the system validation plan (TG3 document)
  - Identification of high level activities/sub-systems to be tested
  - Description of the testing procedure for each of them. Example:

### 3.1 Shielding (steered by RP)

#### 3.1.1 Goal:

Demonstrate the performances of the shielding to the licensing authority

#### 3.1.2 Assumptions:

- Successful Cold Commissioning
- Accelerator stable enough for the foreseen duration of the experiment

#### 3.1.3 Resources needed:

- RP group available

#### 3.1.4 Procedure:

- Bridge beam guide and heavy shutter closed, check radiation level in various points of the instrument
- Bridge beam guide open and heavy shutter closed, check radiation level in various points of the instrument (to be repeated every time the accelerator changes some setting).
- Radiation around the beam stop area and around the door
- Verify the cave shielding according to the procedure defined in H1H2 document
- See also generic plan in Anton's document

#### 3.1.5 Check point:

The measured dose outside any points of the bunker, guide shielding and cave is below the threshold of 3  $\mu\text{Sv/h}$  and  $<25 \mu\text{Sv/h}$  on the roof.



What needs to be demonstrated



What is required at this stage (incl. HW)



Which additional resources are needed



High level description of what needs to be done



What marks the achievement of the activity

# Update on hot commissioning plans: timeline



## The proposed template for instrument specific HC plans

- Should be an exercise to carefully think about:
  - what one wants to do
  - how long does it take
  - what would be the best accelerator conditions to achieve it

Need mutual definition of beam day:

- Three consecutive 8h shifts may not be of same use for HC one 8h shift per day
- Simple use of shifts instead of beam days is hence also not useful for planning.

	A	B	C	D	E	F	G	H	I	J	K	
		Accelerator power	projected beam days	#	Activity	required continuous beam days	data analysis days	No. of people required during beamtime	No. of people required during data analysis	Groups potentially required	estimated person days	
1	BOT -> BOT+3	<100 kW	~13	1	Fulfil radiation protection requirements <b>HOLD POINT</b>	2	0	2	0	RP	4	
2				1	Fulfil radiation protection requirements <b>HOLD POINT</b>	2	0	2	0	RP	4	
3				2	Gold foil measurement	1	0	2	0	RP?	2	
4				3	HC of beam monitors (0-4)	3	2	2	2	DG, ECDC	6	
5				4	Choppers phases verification	5	5	2	2	CG	10	
6				5	Beam profile with imaging detector	3	2	2	2	DG, ECDC	6	
7				6	Flight path calibration	10	2	2	1	MCAG, ECDC	20	
8	BOT+3 -> BOT+9	100 kW	~70 (the plan is 48h continuous neutron production a week for the first 3 months and then 3-4 days of continuous beam a week)	7	Characterization of background	4	2	2	1		8	
9				8	Collection of detector calibration mask data	15	5	2	2	DG, ECDC	30	
10				9	Commissioning of sample environment	2	0	2	0	ECDC, MCAG, SEG	4	
11				10	Standard samples for detector efficiency iterations.	15	5	2	2	DG, ECDC	30	
12												
13												
14					<b>Total beam days required in phase: :</b>	<b>60</b>						
15					<b>Total data analysis days:</b>		<b>23</b>					

# Update on hot commissioning plans: timeline

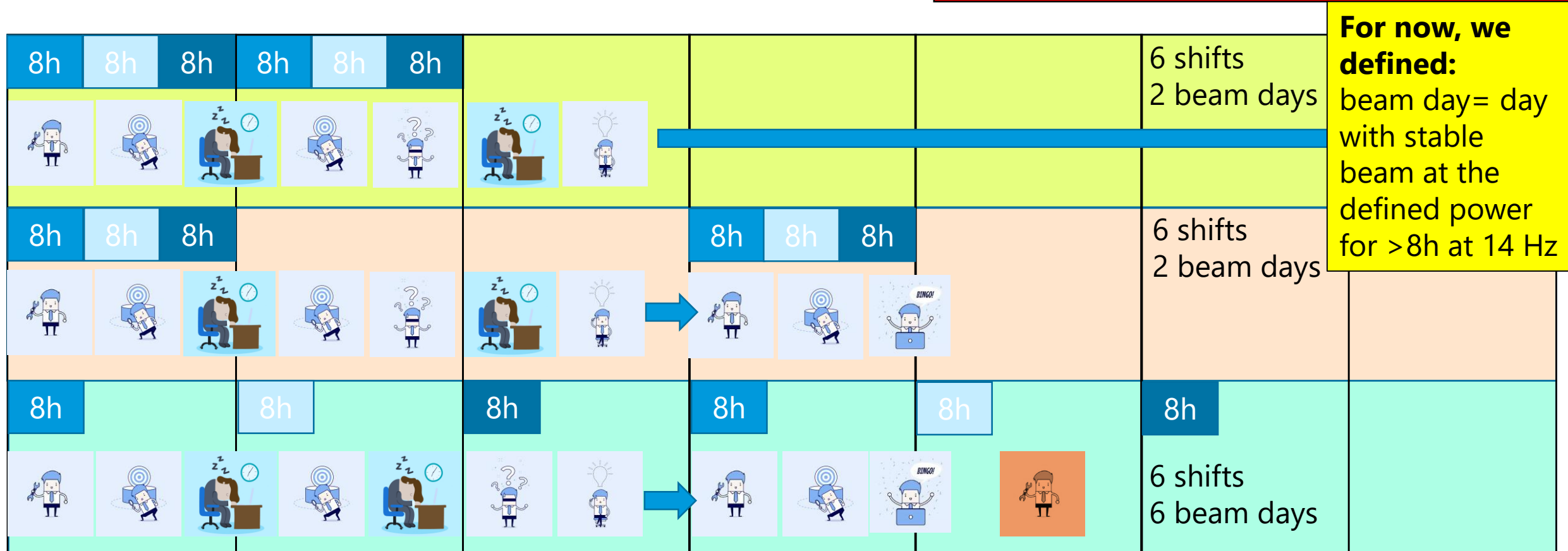


## The proposed template for instrument specific HC plans

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3				2	Gold foil measurement	1					2	
4				3	HC of beam monitors (0-4)	3					6	
5				4	Choppers phases verification	5					10	
6				5	Beam profile with imaging detector	3					6	
7				6	Flight path calibration							
8	BOT+3 -> BOT+9	100 kW	~70 (the plan is 40h continuous neutron production a week for the first 3 months and then 3-4 days of continuous beam a week)	7	Characterization of background							
9				8	Collection of detector calibration mask data							
10				9	Commissioning of sample environment	2	0	2	0	ECDC, MCAG, SEG	4	
11				10	Standard samples for detector efficiency iterations.	15	5	2	2	DG, ECDC	30	
12												
13												
14						<b>Total beam days required in phase: :</b>	<b>60</b>					
15						<b>Total data analysis days:</b>		<b>23</b>				

**For now, we defined:**  
 beam day= day with stable beam at the defined power for >8h at 14 Hz

Should contain repeated activities to be performed, e.g. when accelerator conditions change

Ideally, match the beam availability of that accelerator phase (safety factor)

# Update on hot commissioning plans: timeline

## Schedule



- This planning should not really change in view of any schedule slip

### Re-Baseline NSS Level 1 Schedule BASE Position

NSS schedule is impacted by target schedule



Open Bunker ~15m

Instruments delivering user days

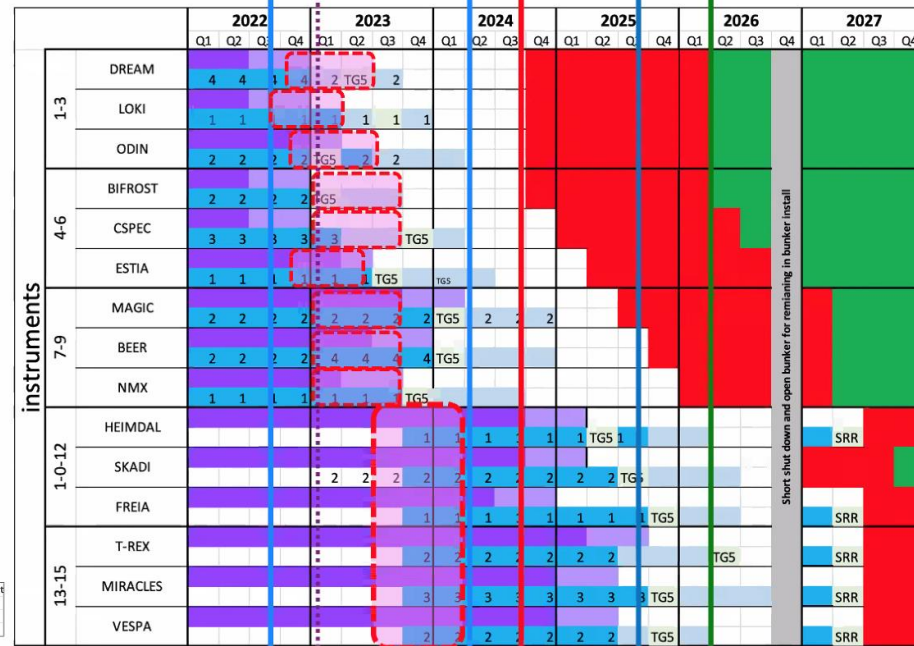
Access to bunker delayed by target installation NBOAs & LSS.

Duration for installation in bunker constrained by access and RBOT --> BOT

In bunker installation likely to require short 2<sup>nd</sup> open bunker period

- Delaying final installation and for 5 instruments until after BOT.

Further discussion & detail in integrated schedule session.



Short shut down and open bunker for remaining in bunker instal



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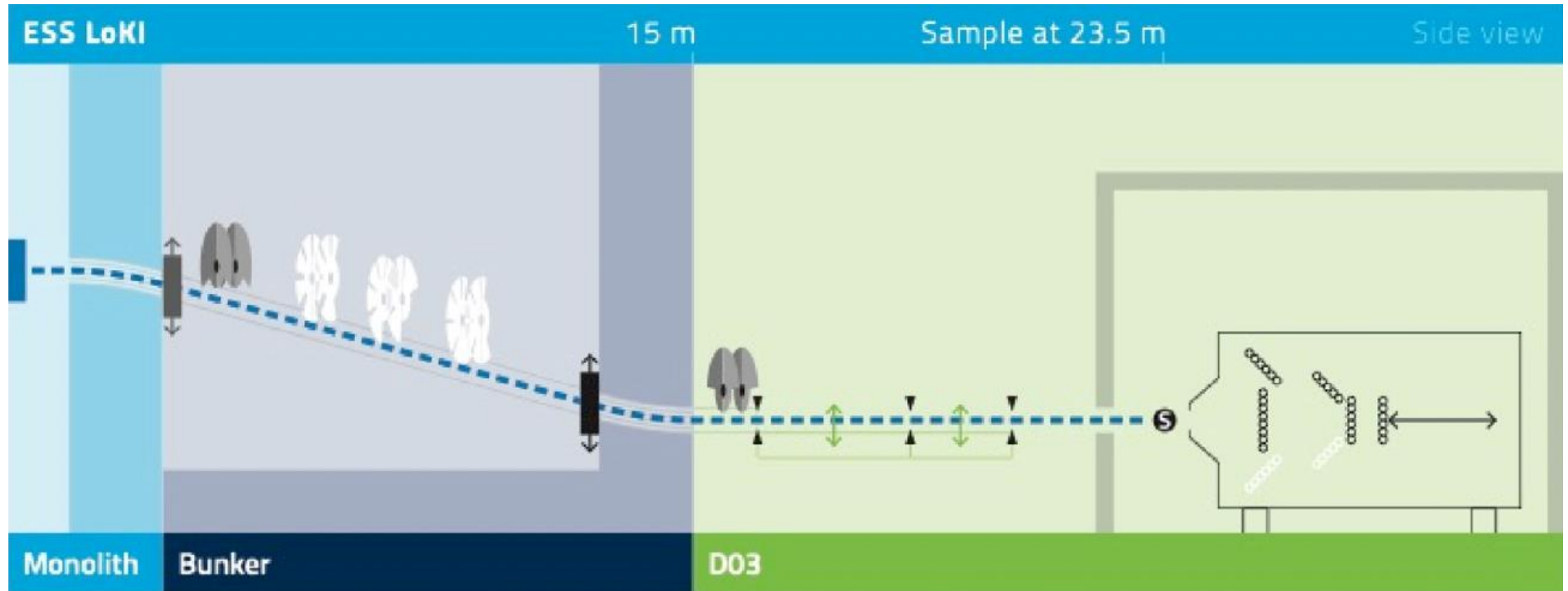
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# Update on hot commissioning plans

Examples from LOKI HC plan/validation plan



# Update on hot commissioning plans

## Examples from LOKI: Flux and beam profiles

**Key personnel:** instrument team, detector group, DMSC, and RP for the Au-foil measurements

**Requirements/assumptions:** Access to a portable neutron camera. Data chain pipeline from monitors and detectors to data reduction software will be tested. Sufficiently powerful and stable beam.

### 3.2.1 Monitors

Before proceeding with most of the instrument HC

Measure pulse height spectra, count rates, discriminator levels and testing the data chain.

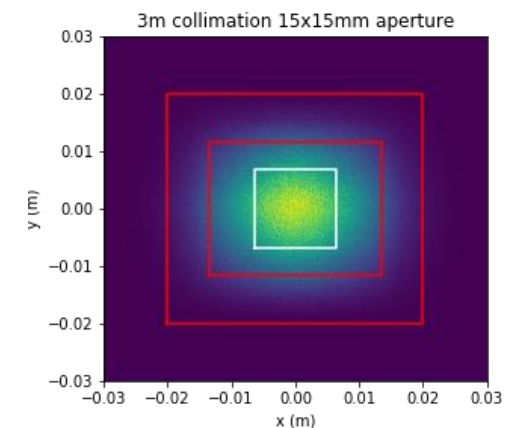
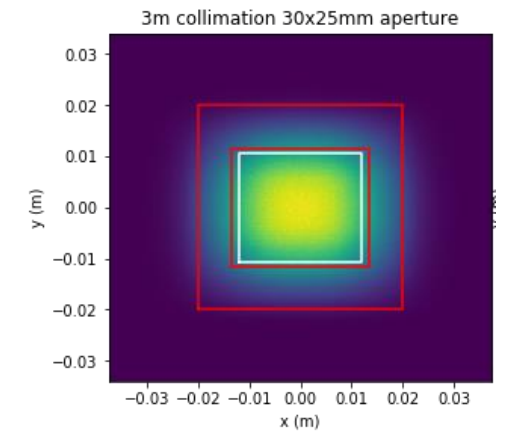
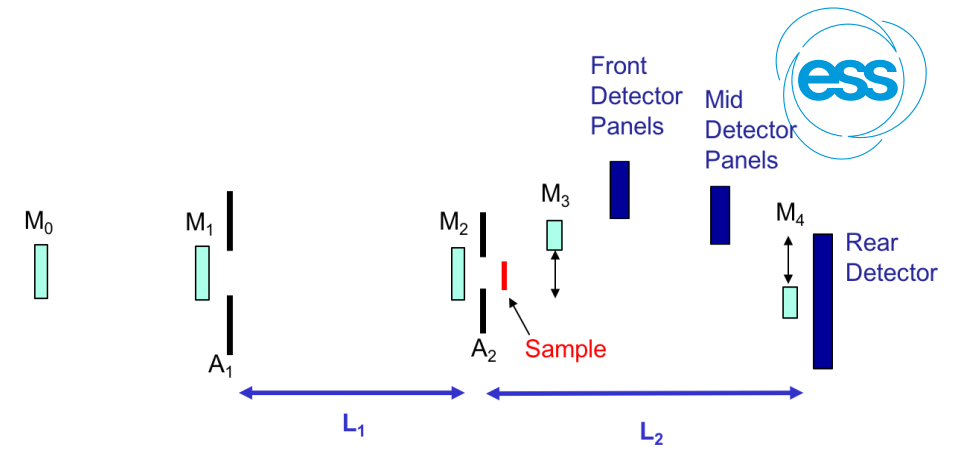
NOTE: The main transmission monitor directly after the sample position may be used for commissioning of the earlier beamline components, e.g. heavy shutter, choppers, collimation slits.

### 3.2.2 Flux measurements

Calibrate the flux measured by the beam monitors in their predefined positions using gold foils. Compare to McStas data.

### 3.2.3 Beam profile

Using an imaging detector, we will characterise the beam profile, across a range of instrument configurations, and then compared with McStas simulations.



# Update on hot commissioning plans



## Examples from LOKI: Detector verification

**Key personnel:** instrument scientist and data scientist, DMSC\*, detector group\*

**Requirements/assumptions:** The monitors are commissioned. The data acquisition stream will have been tested with simulated and test data.

### 3.5.1 Detector and TOF distances and for Q

The positions of the detectors will be most accurately determined by the surveying. The reduction process for the different detector banks will also be checked against a rotating silver behenate standard.

### 3.5.2 Detector position calibration

Position calibration along the length of the detector straws can be made using a Cd, or boron-painted, mask with precisely machined slits, which is mounted directly on the front window of the detector panels

### 3.5.3 Detector efficiency calibration

Long SANS and M3 & M4 transmission measurements of standard reference polymer, glassy carbon, empty beam, etc, at all commonly used collimation and aperture sizes.

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## Examples from ODIN: chopper cascade commissioning



### 3.7 Chopper phases verification

#### 3.7.1 Goal

Ensure that the chopper cascade is working nominally

#### 3.7.2 Assumptions:

- Sufficiently powerful and stable beam
- Pulse length as by design

#### 3.7.3 Resources needed:

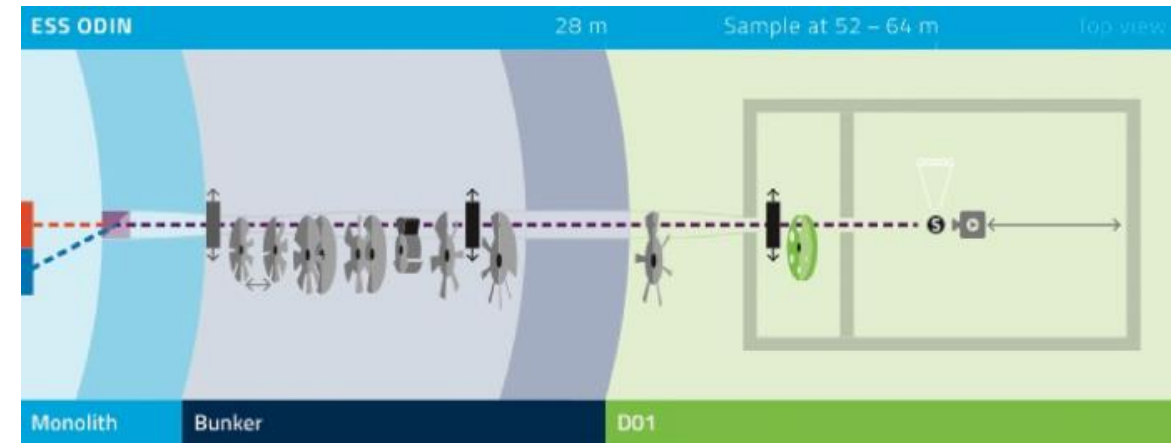
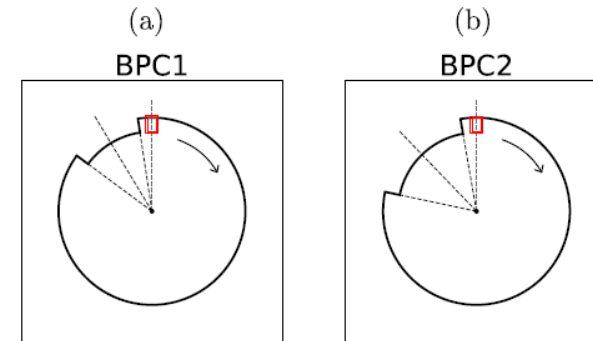
- Chopper group available on demand
- Detector group available on demand

#### 3.7.4 Procedure:

- From downstream and go upstream. Use monitors
- Park all choppers open. Step BPC1 in 1deg (or finer) steps
- Park all choppers open. Step BPC2 in 1deg (or finer) steps
- Same for FOCs, WFMs.
- BPC: use Bragg edges to test wavelength ranges.
- Repeat steps a-e with chopper spinning at the source frequency

#### 3.7.5 Check point

The chopper cascade is sufficiently understood that a user interface can be developed so that the user can directly choose the wavelength range, bandwidth and resolution instead of playing with chopper phases and positions



# Update on hot commissioning plans

## Examples from ODIN: WFM data reduction



### 3.9 Wavelength Frame Multiplication

#### 3.9.1 Goal

Commission the WFM technique for user operation

#### 3.9.2 Assumptions:

- Sufficiently powerful and stable beam
- Data reduction fully functional (at least in “expert mode”)
- All detectors fully integrated
- Data acquisition chain fully established

#### 3.9.3 Resources needed:

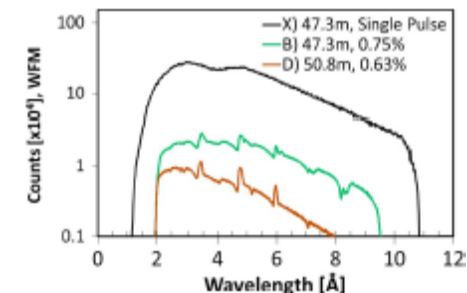
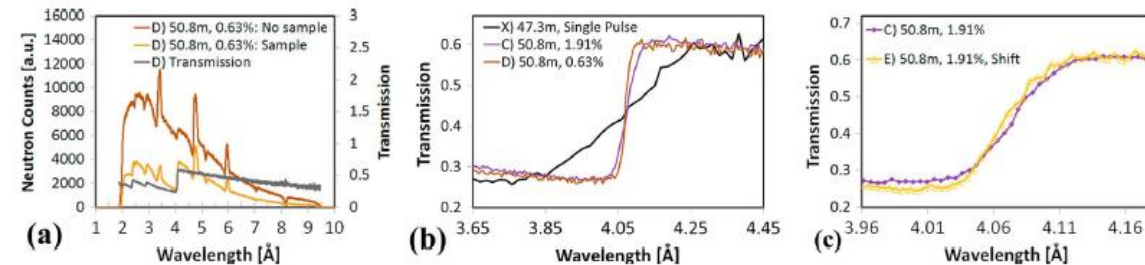
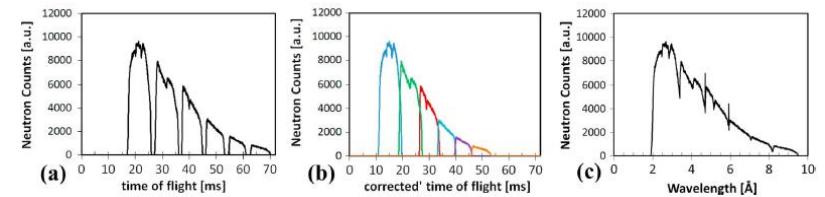
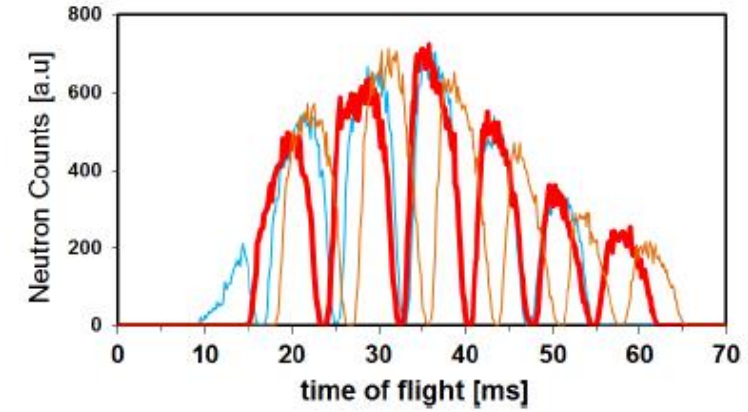
- Resources from DMSC

#### 3.9.4 Procedure:

- Verify the correct phasing of the chopper cascade ([link with McStas](#))
- Test the data reduction algorithm ([frame stitching](#)) with 3 and 6 frames
- Verify the obtain resolution with known samples
- Test for local variation of the stitching performance
- Repeat for higher and higher resolution
- Check effect of global phase delay

#### 3.9.5 Check point

The reduced data matches the expectation and the mcstas model



# Update on hot commissioning plans – IKON21



- RECAP

- Purpose of this session

- Integrated Commissioning Planning (Accelerator, Target, NSS)

- The proposed template for instrument specific HC plans

- Examples from LOKI

- Examples from ODIN

- Some general considerations/remarks

- Discussion

# Update on hot commissioning plans

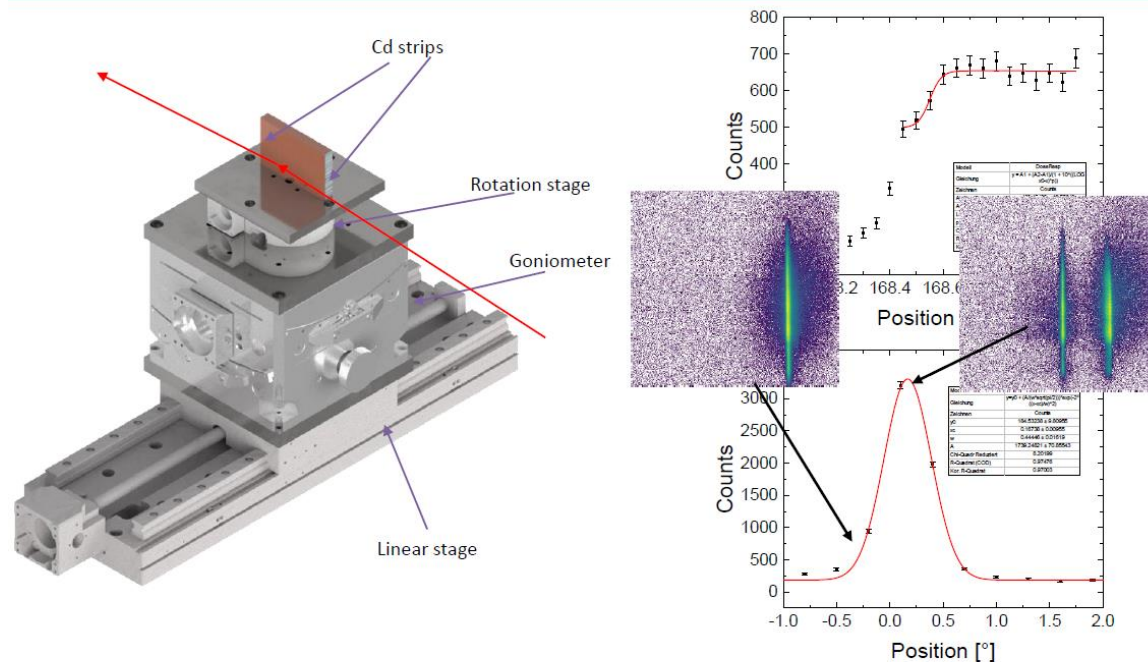
## Some general considerations/remarks

- Think about the software tools that you will need!
- And also the hardware!



### Position scanning

Alignment of a sample for reflectometry



Total detector counts vs motor position

- Si almost transparent for neutrons
- Hard to define reversal point
- Rotation scan leads to wrong peak because the total reflection leads to higher total signal

Live visualization needs masking

Discuss with your IDS!

# Update on hot commissioning plans

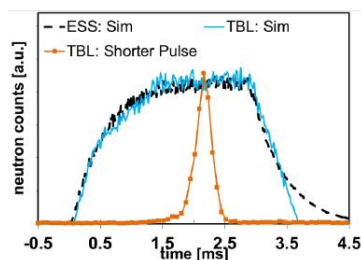
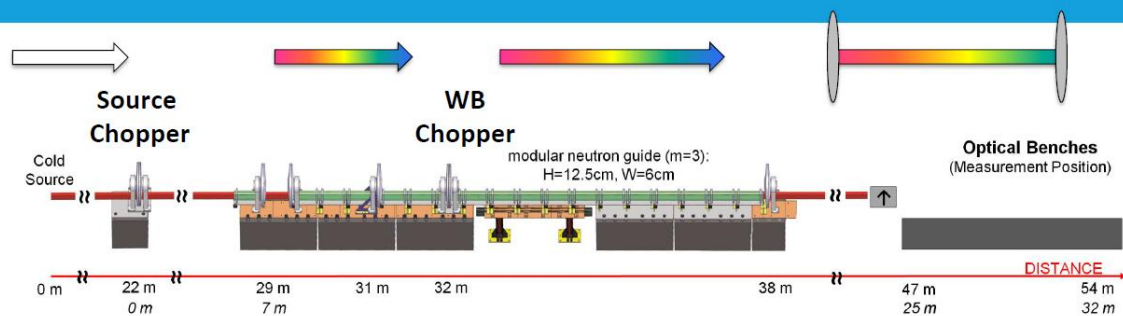


## Some general considerations/remarks

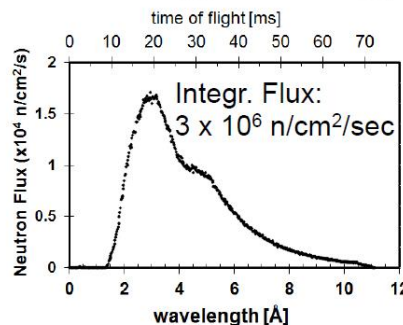
- Experience from V20: the possibility to easily change to a short pulse source made many HC task much easier

### ESS testbeamline V20

The chopper system



**Flexibility!**  
→ *Vitess & McStas model available*

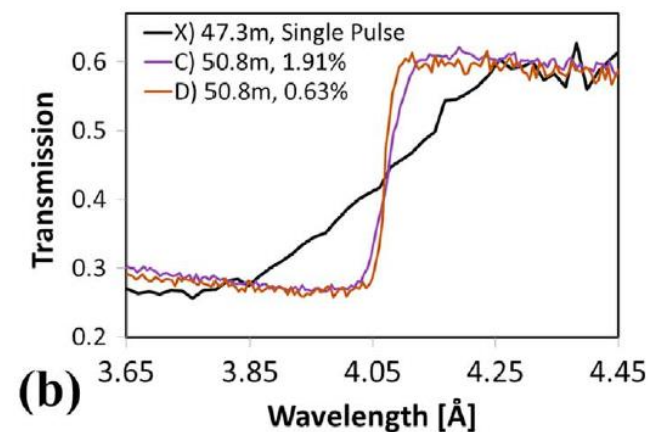


Wavelength resolutions: 4%-23%

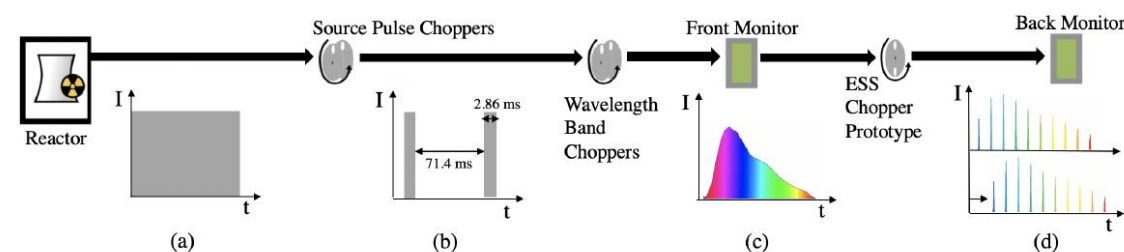
0.7%-3%

Repetition: **variable**

Strobl et al. NUCL INSTRUM METH A 705 (2013) 74-84



L. Vergara *et al.*



# Update on hot commissioning plans

## Some general considerations/remarks



- Gold Foils:



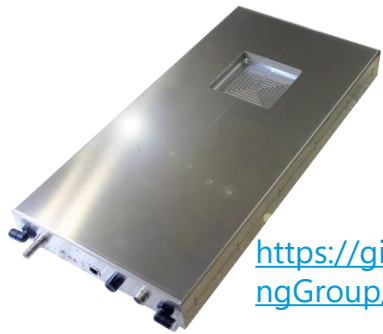
- In-bunker measurements? -> discussion ongoing
- Form 2019 report: The impact of epithermal resonances on the gold-foil results needs to be determined soon. If they turn out to be problematic, dysprosium foils can be considered as an alternative.
- Practicalities still to be organized: Au foils itself; holders; HPGe detectors; include gamma image plate reader to allow position-sensitive readout of foils; etc.)

# Update on hot commissioning plans

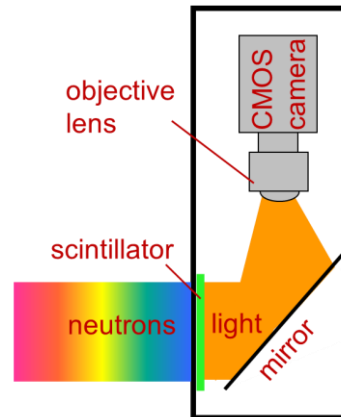


## To do's

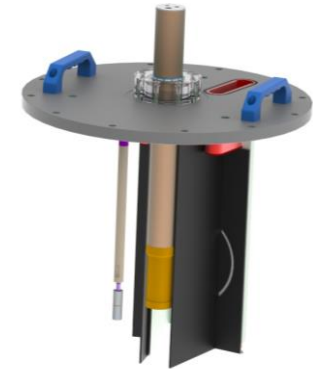
- @Instruments: Start your HC plan!
  - Provide feedback to each other.
- @Instruments: What calibration samples + equipment do you need
  - Share a list of equipment and devices that you need for HC of your instrument
  - For information: NID plans to provide neutron cameras (nGEM and camera box in preparation)



<https://github.com/ISISComputingGroup/EPICS-nGEM-BBTX>



- RAF rig pending



- @(early)Instruments: Iterated plan with Accelerator and Target - Need the instruments feedback!
- @(early) Instruments: Prepare a list of useful HC activities that can be done with a sort pulse
- @ESS: Define the term cold commissioning and the overlap with hot commissioning

# Update on hot commissioning plans – IKON21



RECAP

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Purpose of this session

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Integrated Commissioning Planning (Accelerator, Target, NSS)

---

The proposed template for instrument specific HC plans

---

Examples from LOKI

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Examples from ODIN

---

Some general considerations/remarks

---

Discussion

---

# Update on hot commissioning plans



Final slide....

Hardware  
(tests and calibration)  
Sub-system neutron tests

Shutters

Choppers

Collimation

Monitors

Detectors

Timing

Motion

PPS, MPS

Beam Delivery  
Instrument Neutron  
Characterization

n Flux / Current

Beam Profile,  
Divergence

ToF Spectrum

Energy/Resolution/  
WFM Modes

E/Q resolution /  
peak shape / quality

Instrument Functionality  
Neutron Operation

Standard samples

Energy/Resolution  
/WFM Mode Setting

Rate performance

Background

Signal-to-Noise

Integrated  
Instrument Control

Background Dose  
Rates

Data Analysis  
Scientific Performance

Data Reduction  
Workflow

Detector Pixel  
Alignment  
Characterization

Instrument-specific  
samples

Scientific  
performance  
characterization



# Thank you!

Website : <http://www.europeanspallationsource.se>