



Australian Government



How to relocate a Neutron Beam Instrument to the other side of the Globe – Part 1

Stewart Pullen

Australian Centre for Neutron Scattering

About the Project

The closure of the BER-II Research Reactor in 2020 means that the HZB are considering the transfer of their neutron scattering instruments to other institutions.

An agreement was signed between ANSTO and HZB in September 2015 for the transfer of the BioRef reflectometer (V18) to ANSTO by December 2016.

The agreement stipulates that ANSTO is responsible for the transfer of BioRef to Australia

We have plans with HZB to disassemble and ship the instrument this September (We are currently doing this now!)

The instrument will be named Spatz (Sparrow) once at ANSTO.

Donation Agreement

Donation Agreement

between

Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (HZB)
Represented by the board of directors
Hahn-Meitner-Platz 1, D-14109 Berlin, Germany

-herein referred as **HZB** -

and

Australian Nuclear Science and Technology Organisation
a body corporate established under the *Australian Nuclear Science and Technology Organisation Act 1987* (Cth) of New Illawarra Road, Lucas Heights, New South Wales 2234 Australia

-herein referred as **ANSTO** -

Berlin, 23.09.2015

Lucas Heights,

Helmholtz-Zentrum Berlin
für Materialien und Energie GmbH

Australian Nuclear Science and
Technology Organisation



Prof. Anke Kaysser-Pyzalla
Scientific Director / Chief Executive



Dr. Adrian Paterson
CEO



Dr. Birgit Schröder-Smeibidl
Confidential Clerk

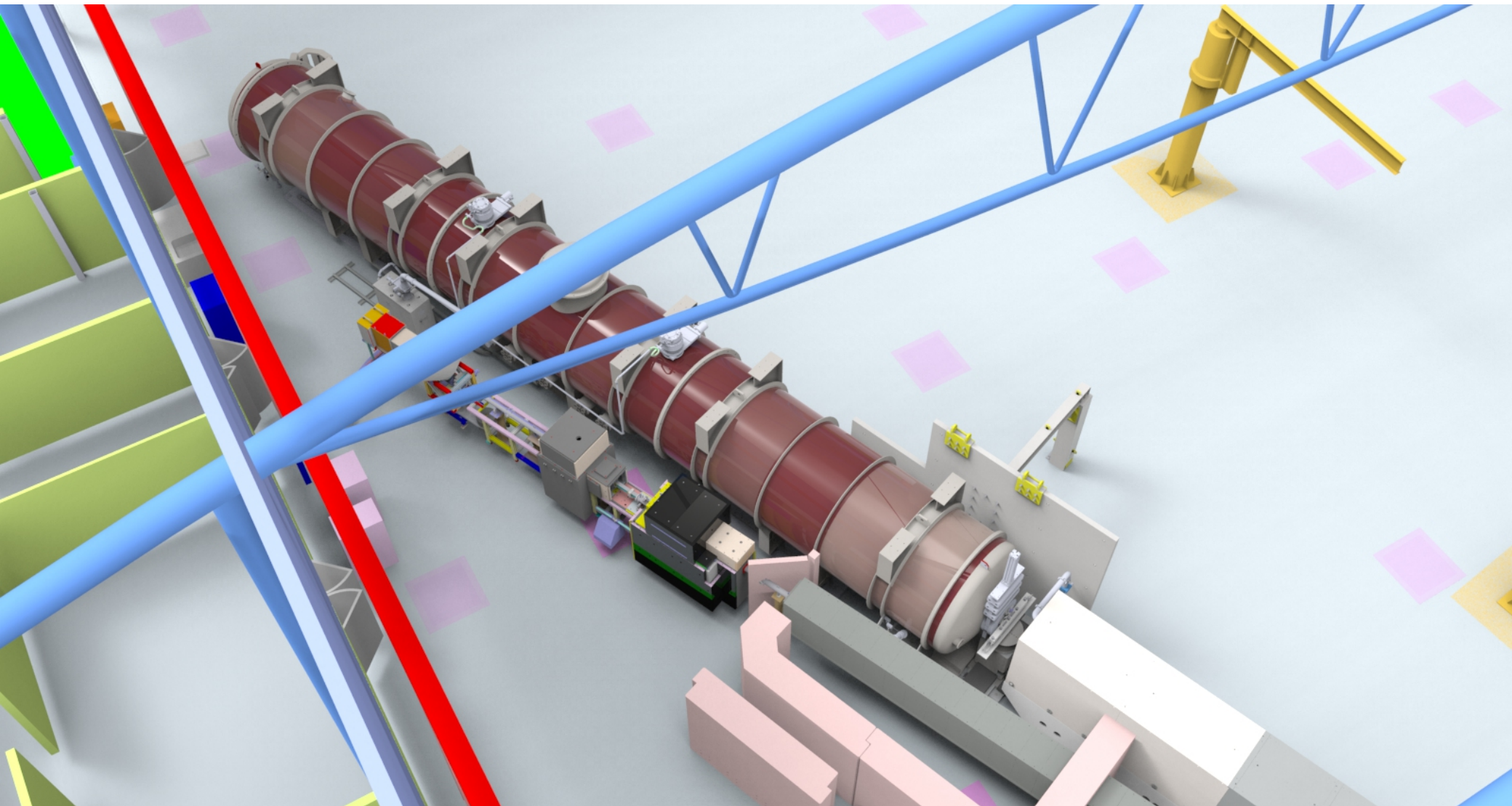


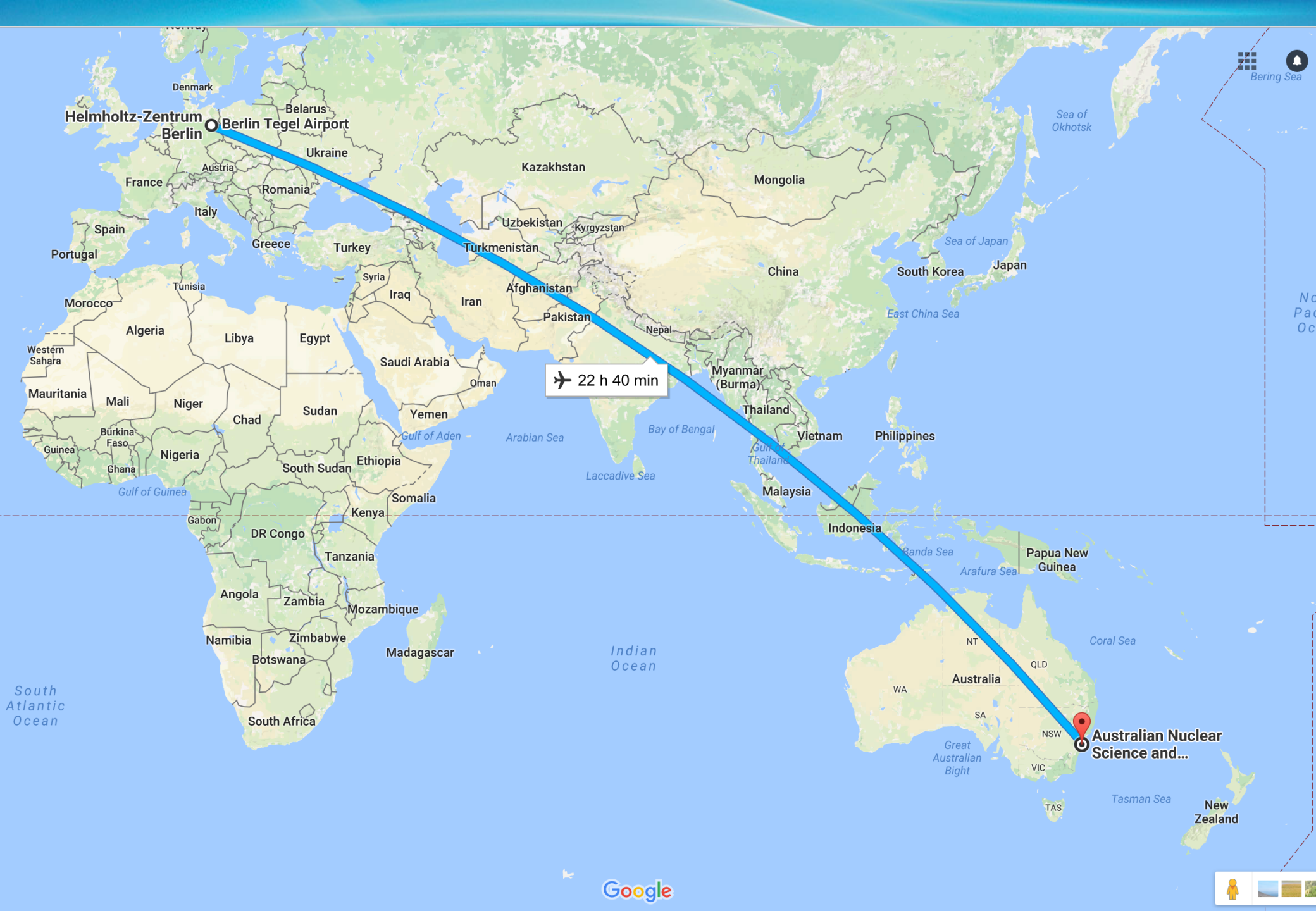
P. KRAM
ANSTO
WITNESS

BioRef (V18) at HZB



Spatz (Sparrow) at ANSTO





Helmholtz-Zentrum
Berlin Berlin Tegel Airport

✈ 22 h 40 min

Australian Nuclear
Science and...

BioRef's cruise to Australia

A Wannsee, 14109 Berlin,

P Bremerhaven, Germany

P Botany Bay, Australia

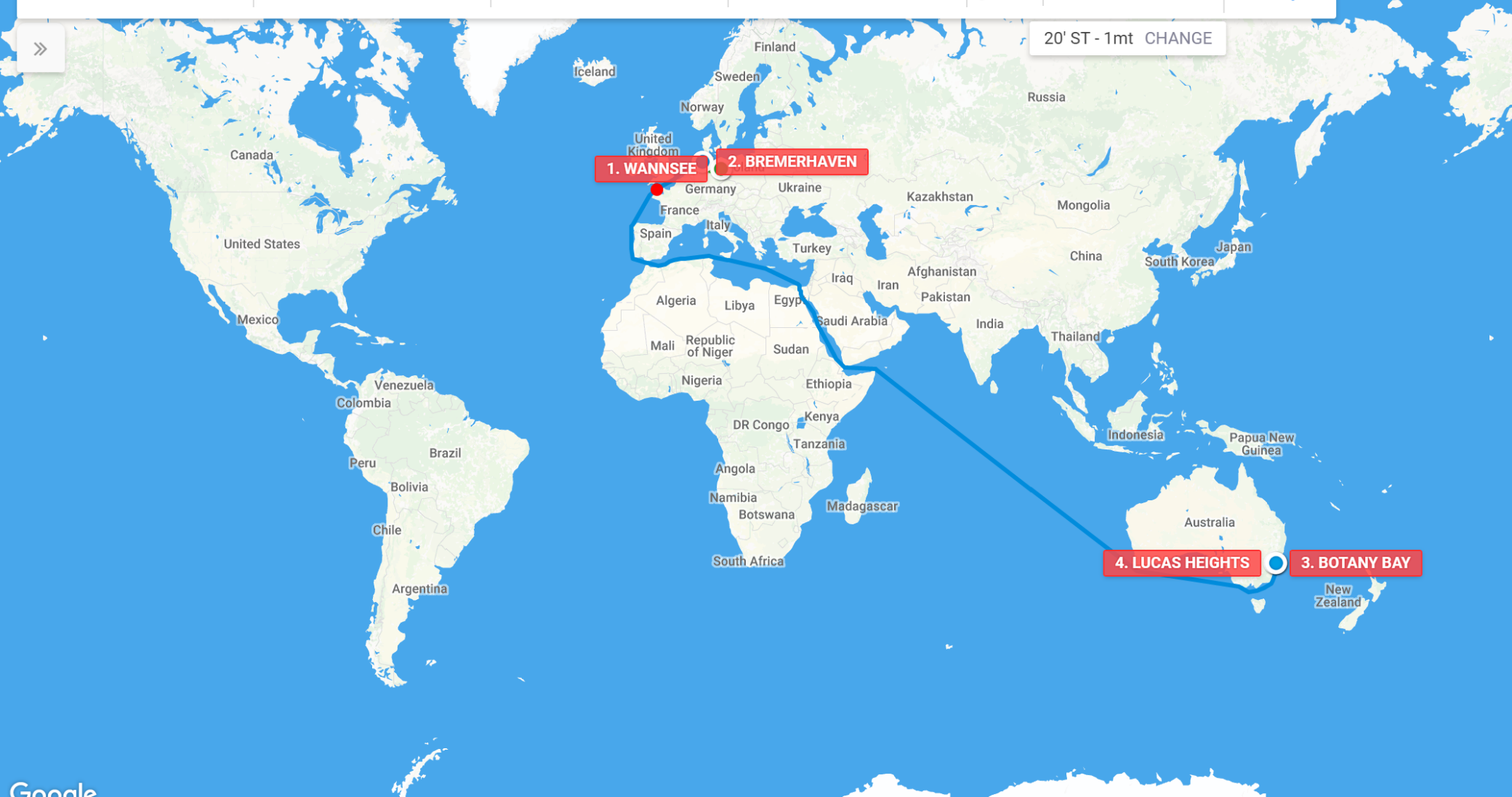
B Lucas Heights NSW 22:



FCL



20' ST - 1mt CHANGE



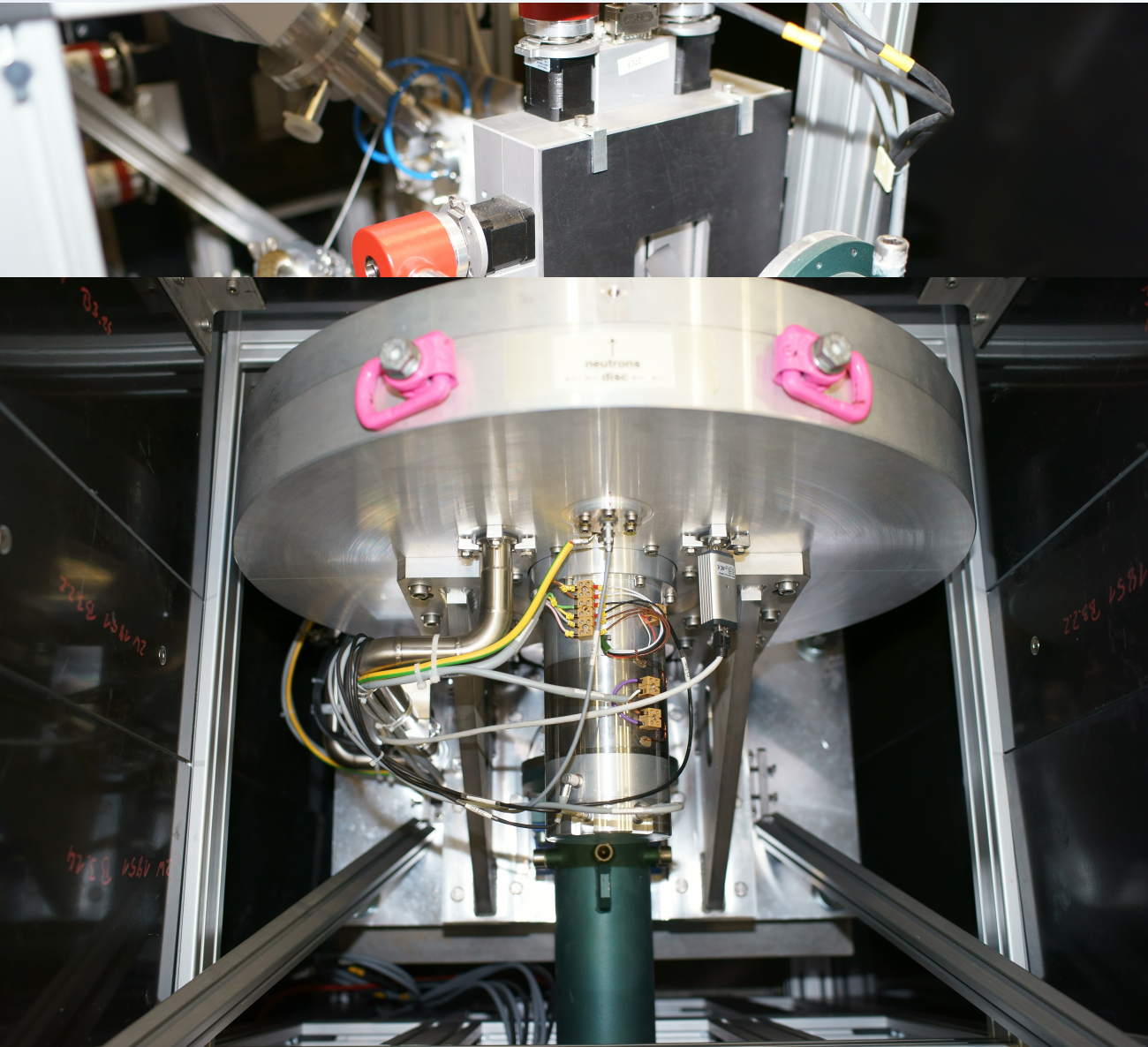
Planning the transfer

- Site visit to HZB February and June.
- Obtain copy of the CAD model and drawings.
- Planned the disassembly of the instrument.
- Consider safety hazards (risk assess).
- Instruction for the Disassembly of BioRef.
- Plan for and obtain necessary approvals prior to departure.

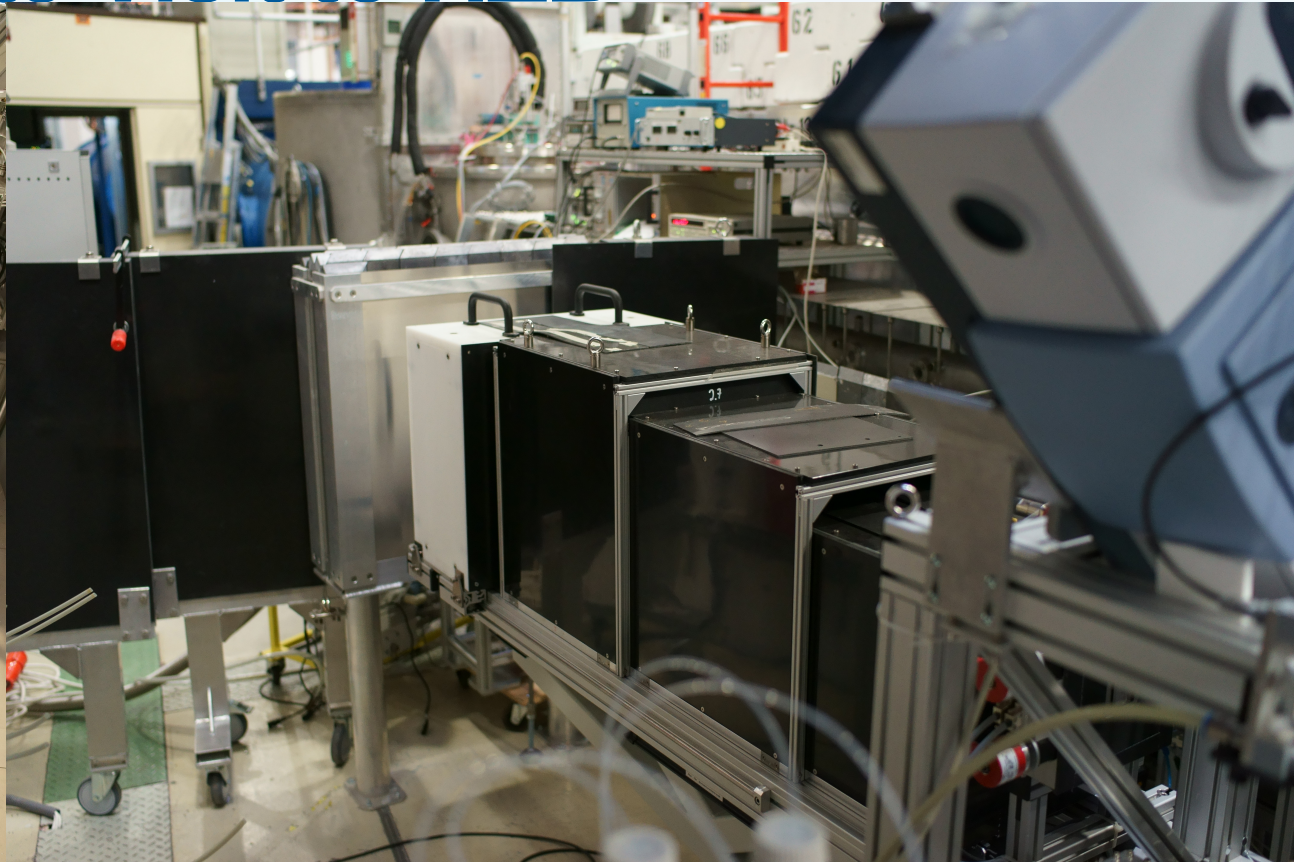
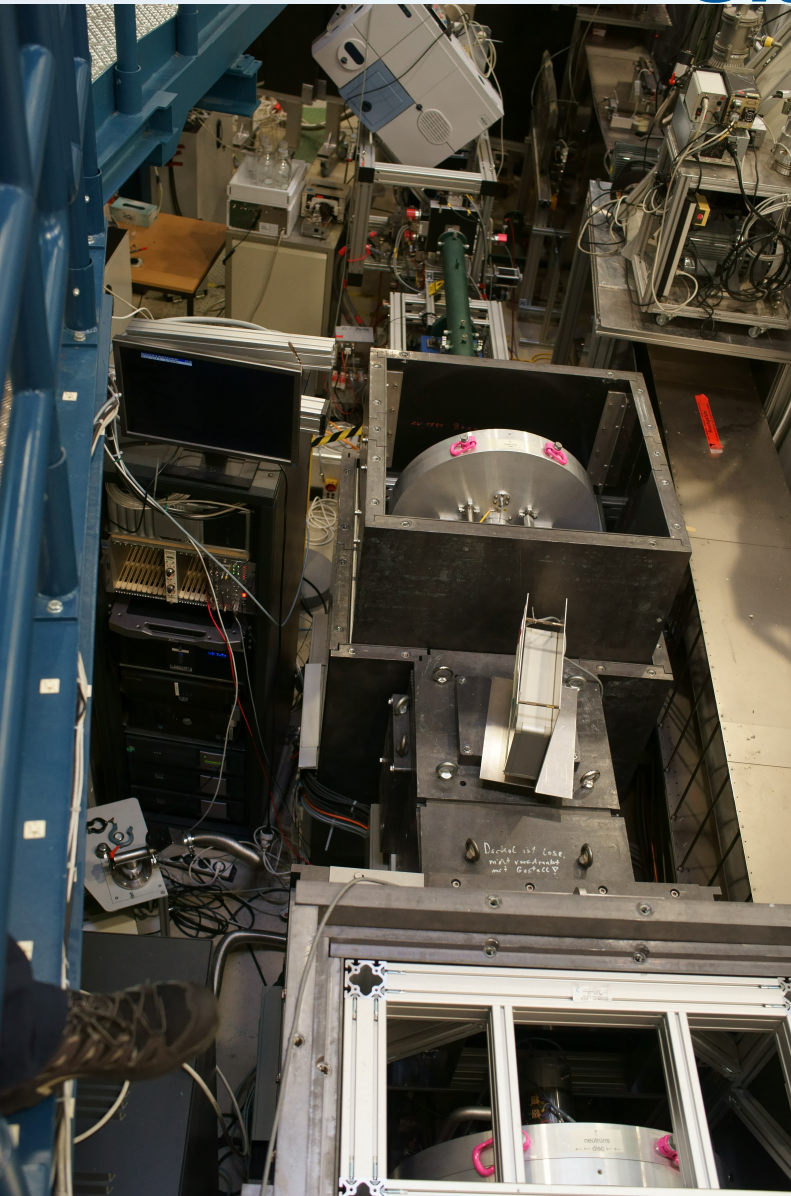
Site Visit to HZB



Site Visit to HZB



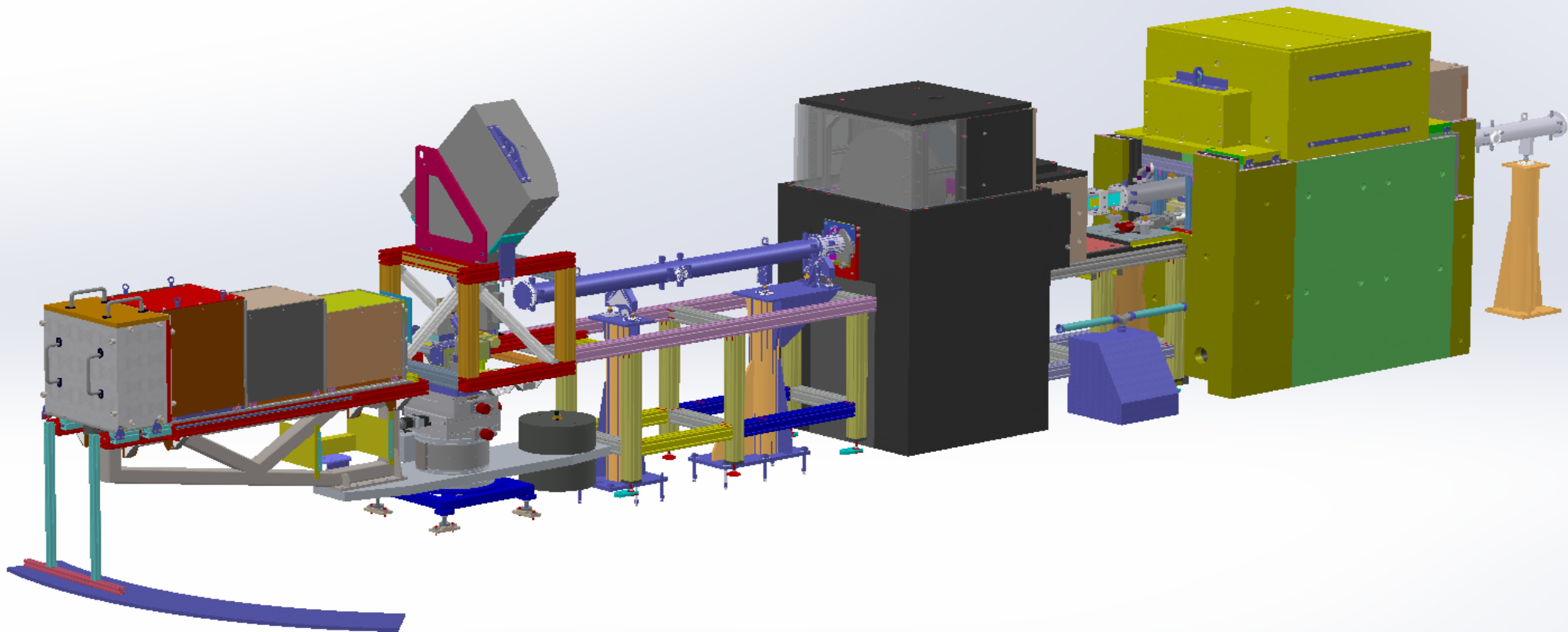
Site Visit to HZB

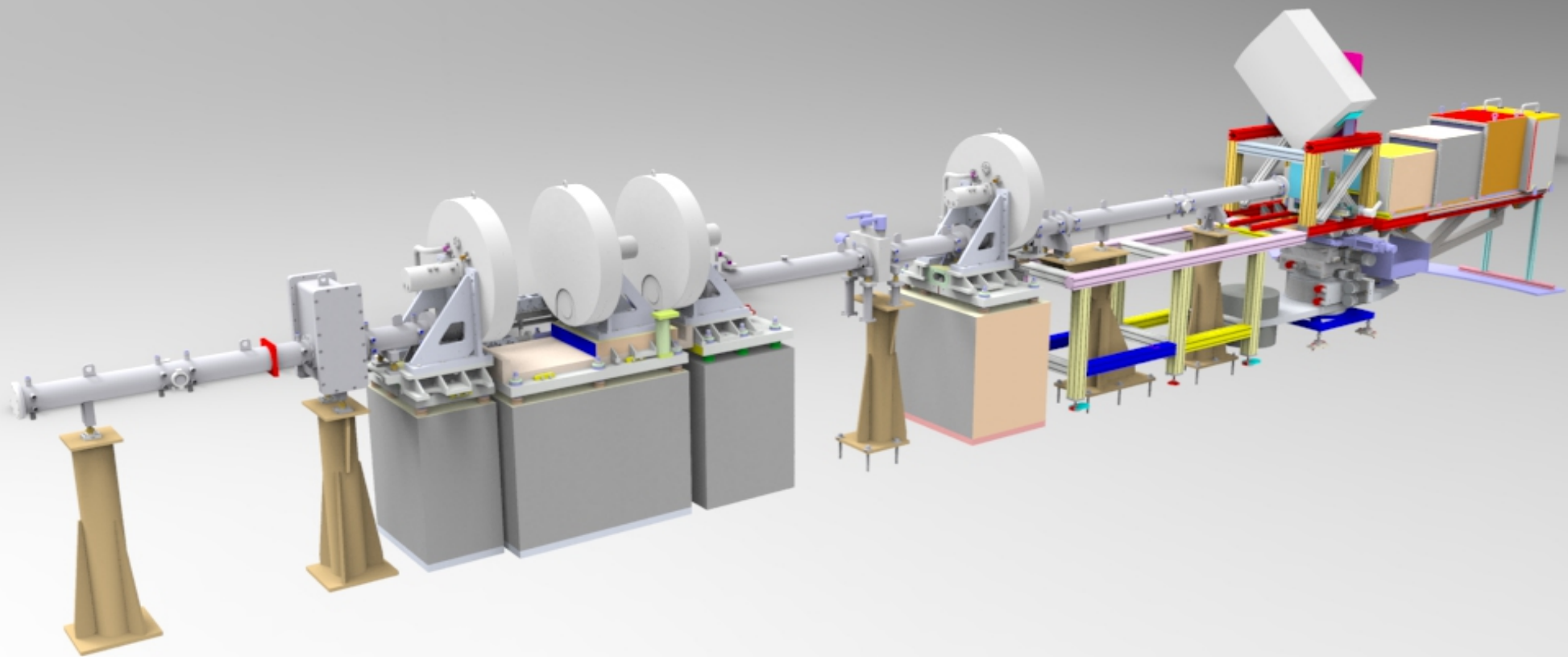


CAD Model

- Foundation of the disassembly process.
- There were challenges with relying so heavily on the CAD model
 - Different file types (native SW vs. STEP)
 - Parts made with Educational license
 - Some parts were absent from the assembly.
 - Two versions (initial design and upgrade design)
 - Fittings and fixtures using the DIN standard
- This really comes down to a compatibility in the way each institute uses their CAD software.

BioRef CAD Model





The Disassembly Instruction

- Scope
- Hazards and safety considerations
- Equipment Lists
- Survey and alignment needs
- Stages detailing the disassembly of BioRef

It is a plan aimed at providing a detailed strategy!



**INSTRUCTION FOR THE
DISASSEMBLY OF THE BIOREF
INSTRUMENT AT HZB,
GERMANY**

**Technical Document Template -
BioRef Disassembly Instruction**



Revision: 1
Approved by: Quality Management Systems Manager
<Approved>

Effective Date: 14/07/2016
Custodian: Bioref Instrument Scientist

For Official Use Only

12.1. Stage 1 – IR Spectrometer and Frame

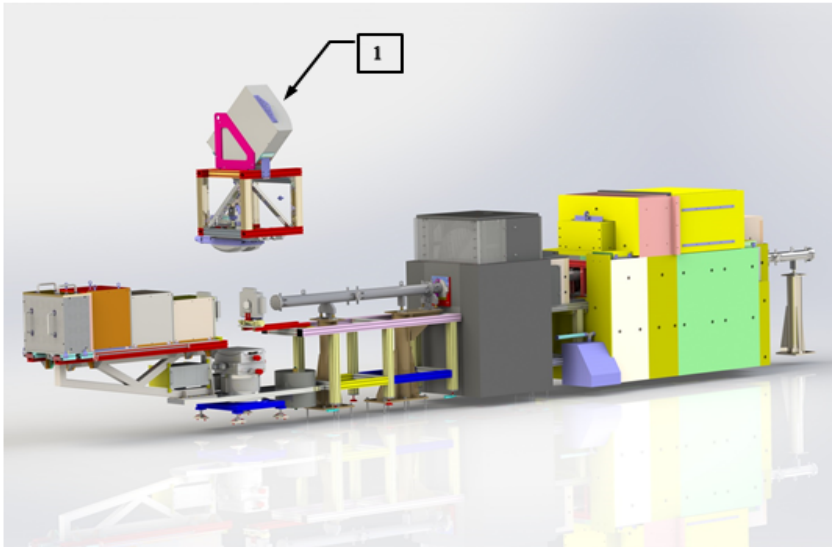


Figure 1: Stage 1 lift summary

Lift Sequence no.	Part Description	Material description	Lifting equipment	Est. Mass (Kg)	Rough Dimensions (mm)
1	IR Spectrometer and Frame	Electronics and Aluminium Extrusion	Slings	250	1585 X 710 X 917

This is a common operational task and has been performed by HZB staff on numerous occasions. The IR Spectrometer and frame shall be connected to the crane via appropriate sling or chain to the lifting points of the IR Spectrometer frame.

To release this assembly there are 8 X M8 Hex nuts located on 2 rails sitting on the sample stage tilt axis (see Figure 2).

Nuts and washes are to be placed in Ziploc bag labelled "Stage 1, Item 1 of 1".

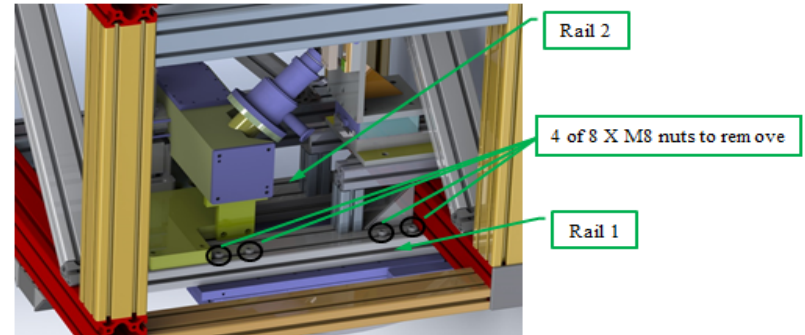


Figure 2: Nut locations to release IR Spectrometer frame assembly

The IR Spectrometer can then be separated from the frame by removing 4 X M5 Hex nuts and studs. Nuts and studs are to be placed in the same Ziploc bag as the mounting nuts (labelled "Stage 1, Item 1 of 1")

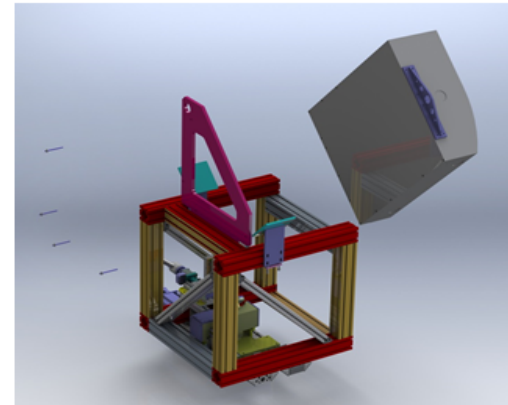
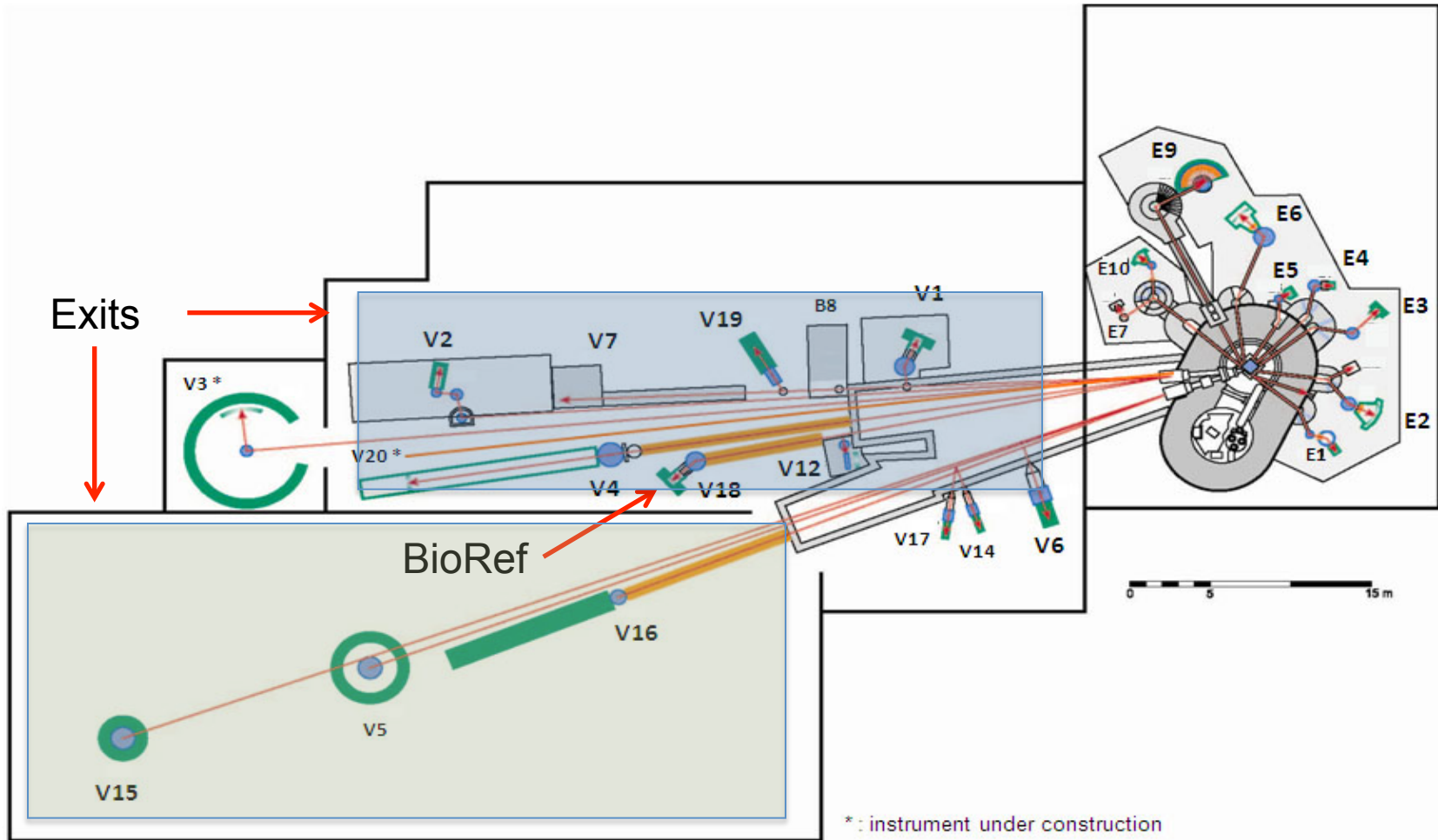
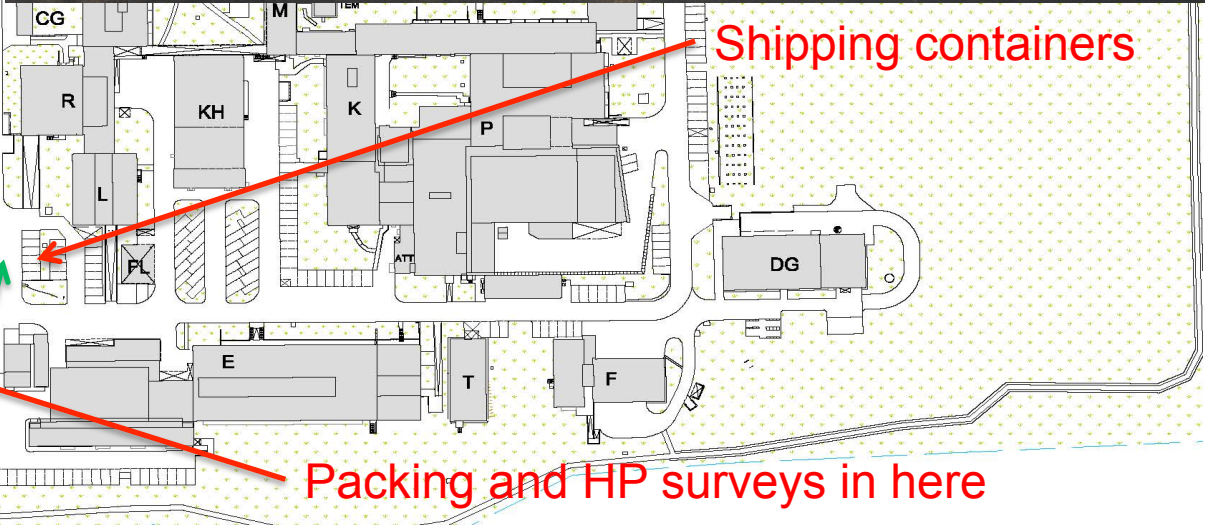
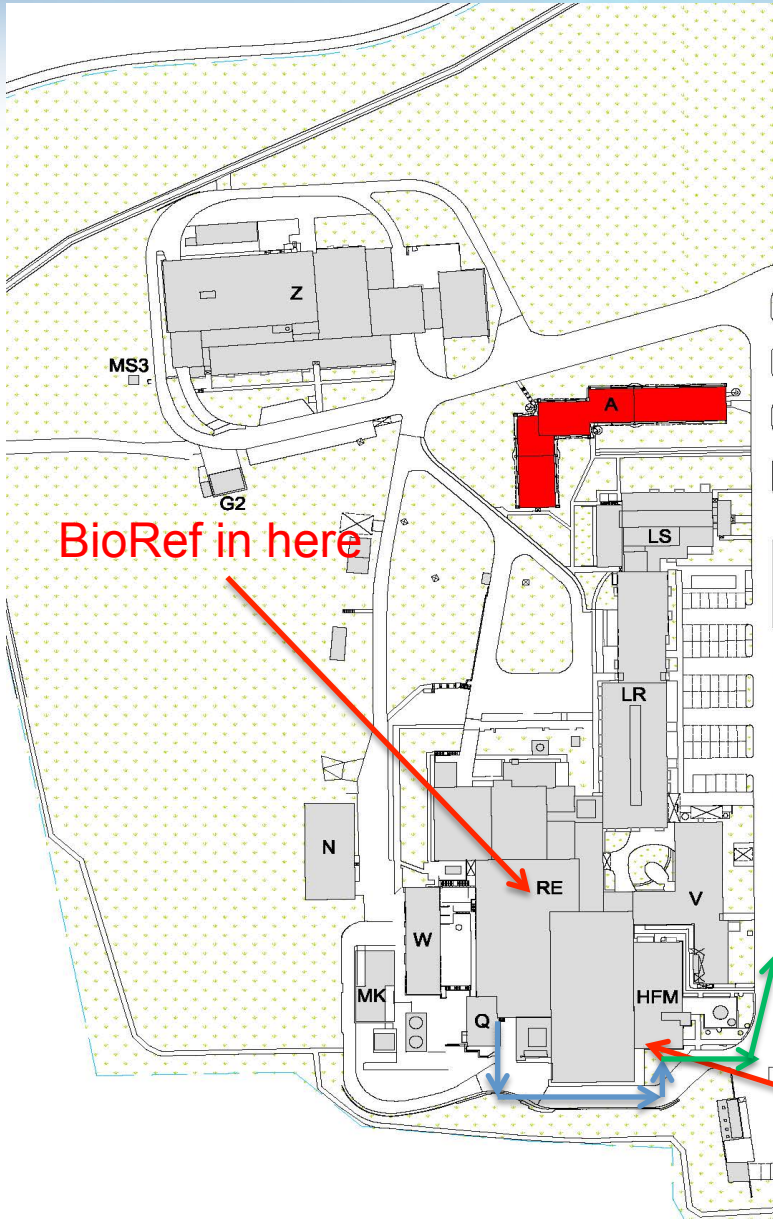


Figure 3: Detaching the IR Spectrometer from the frame

The IR Spectrometer and the frame can then be cleared by Health Physics and placed into shipping crates. The IR Spectrometer should be packed in such a way that prevents any excess moisture from entering the device.

Logistical issues with disassembly



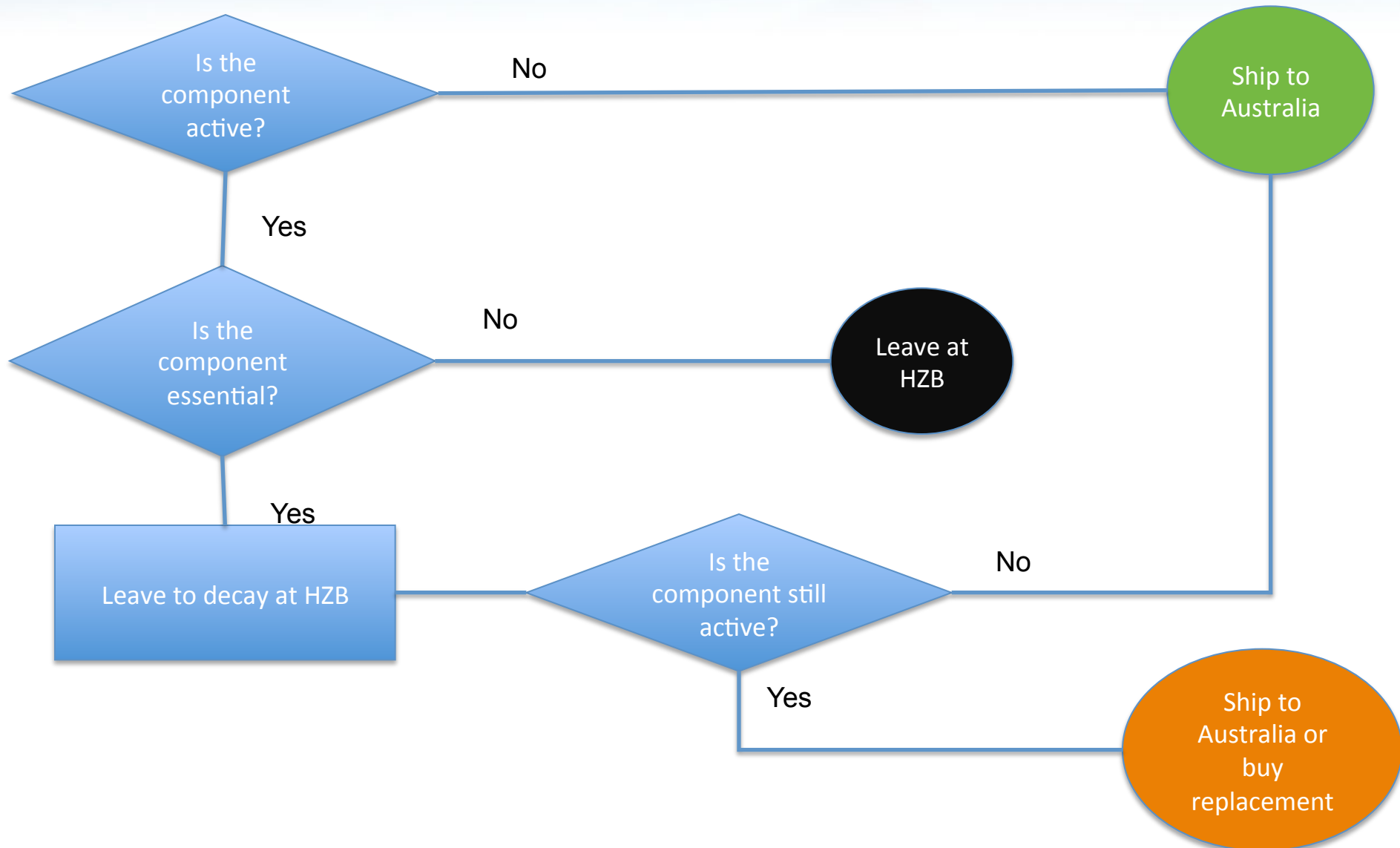


BioRef in here

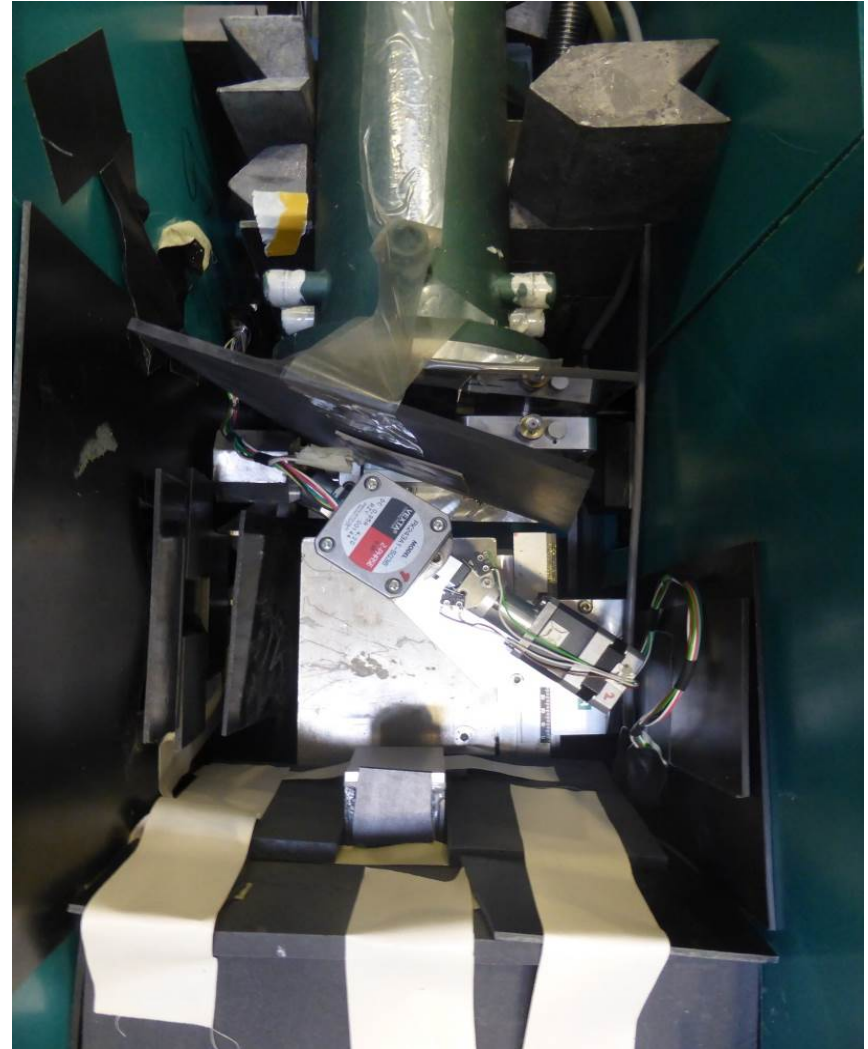
Shipping containers

Packing and HP surveys in here

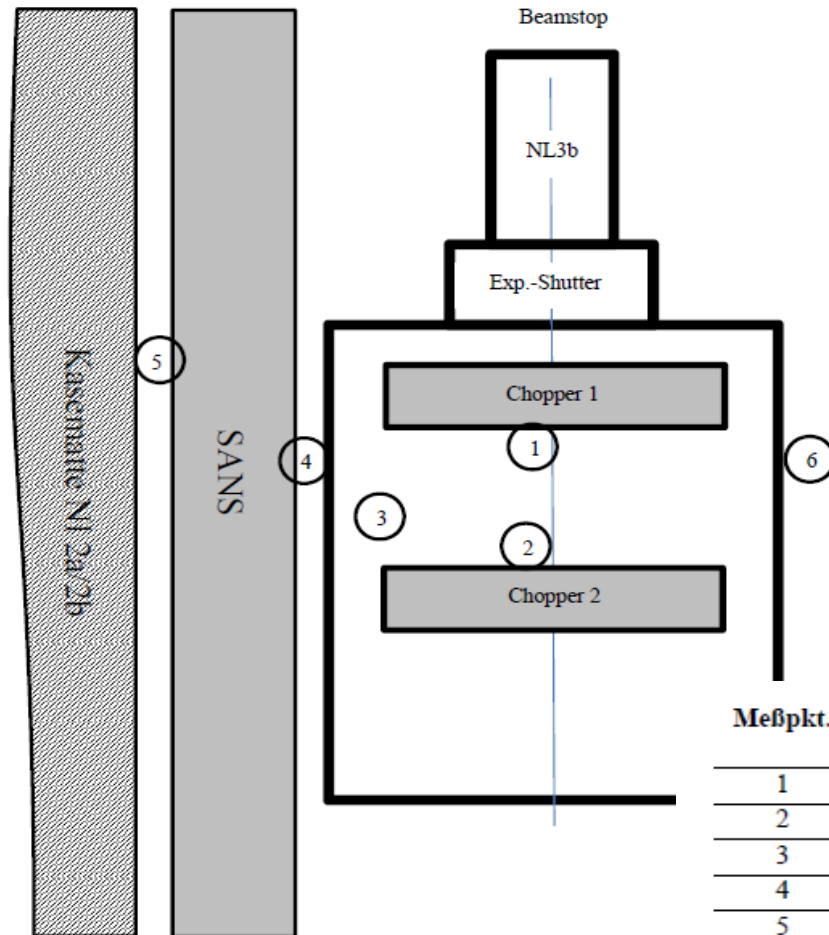
Plan for activated components



Isolating the Instrument from Neutrons



Survey Results



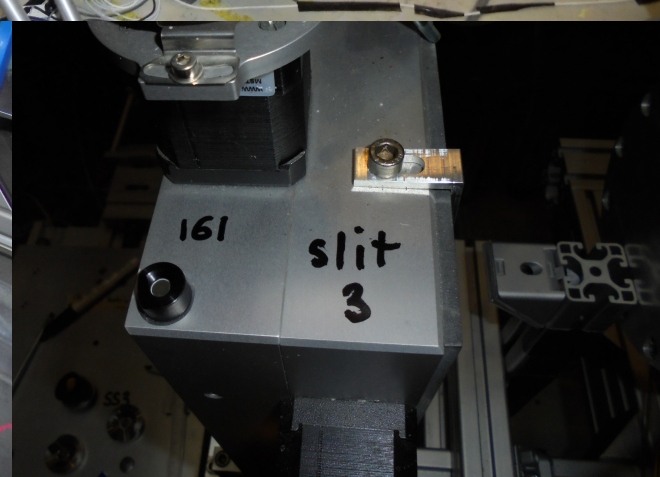
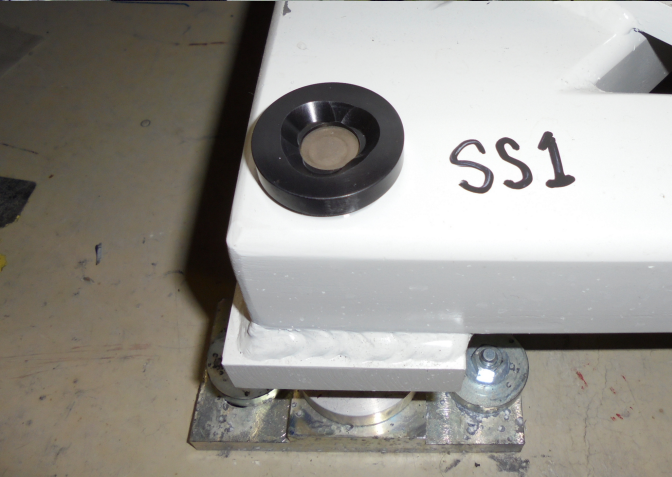
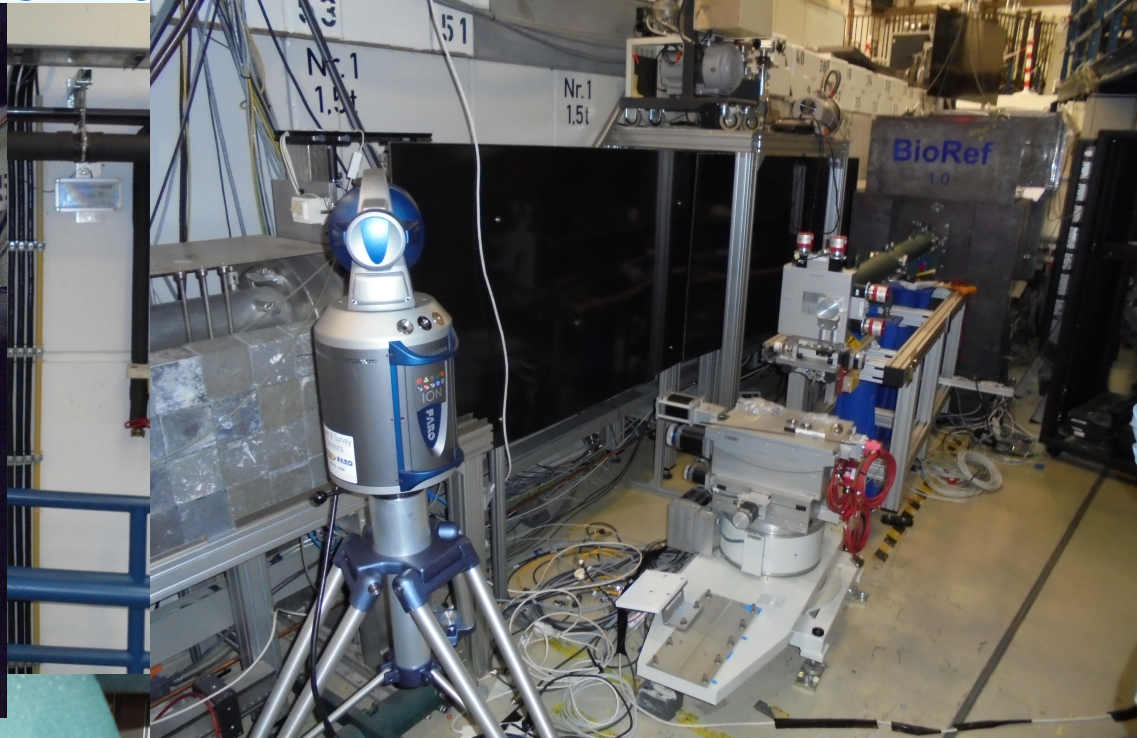
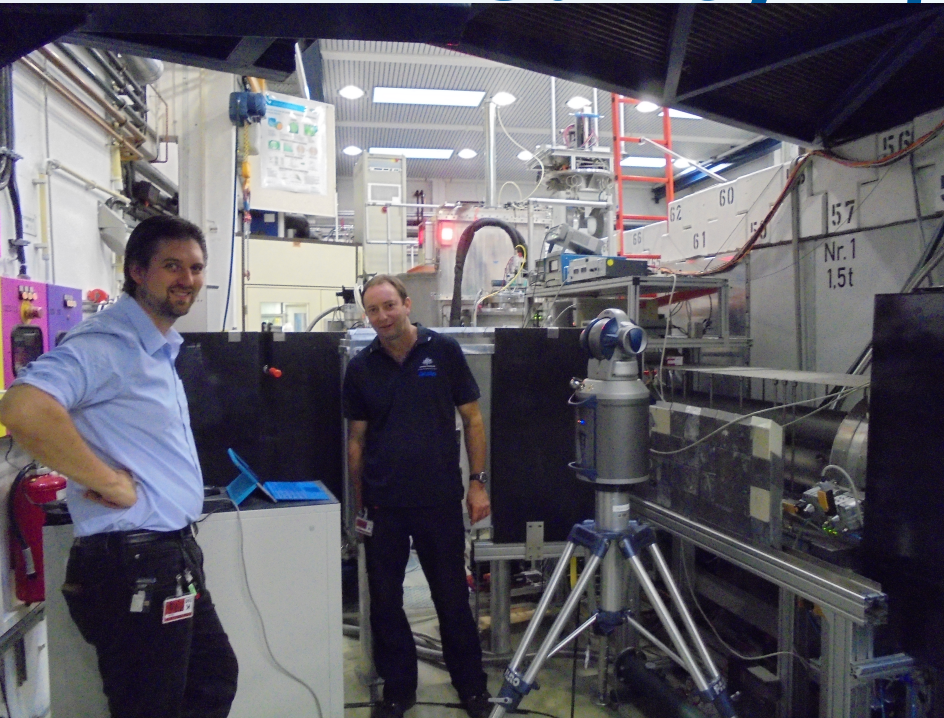
Darstellung der Messpositionen

Meßpkt.	γ -DL [μ Sv/h]	n-DL [μ Sv/h]	Bemerkungen
1	12	5	Austrittsfenster Chopper 1
2	7	5	Eintrittsfenster Chopper 2
3	1	5	Beliebige sonstige Position innerhalb der Abschirmung
4	1	5	direkt neben der Bleiabschirmung
5	2	20	Kasemattenwand
6	1	2-3	vor der Bleiabschirmung

Lead Insert Testing

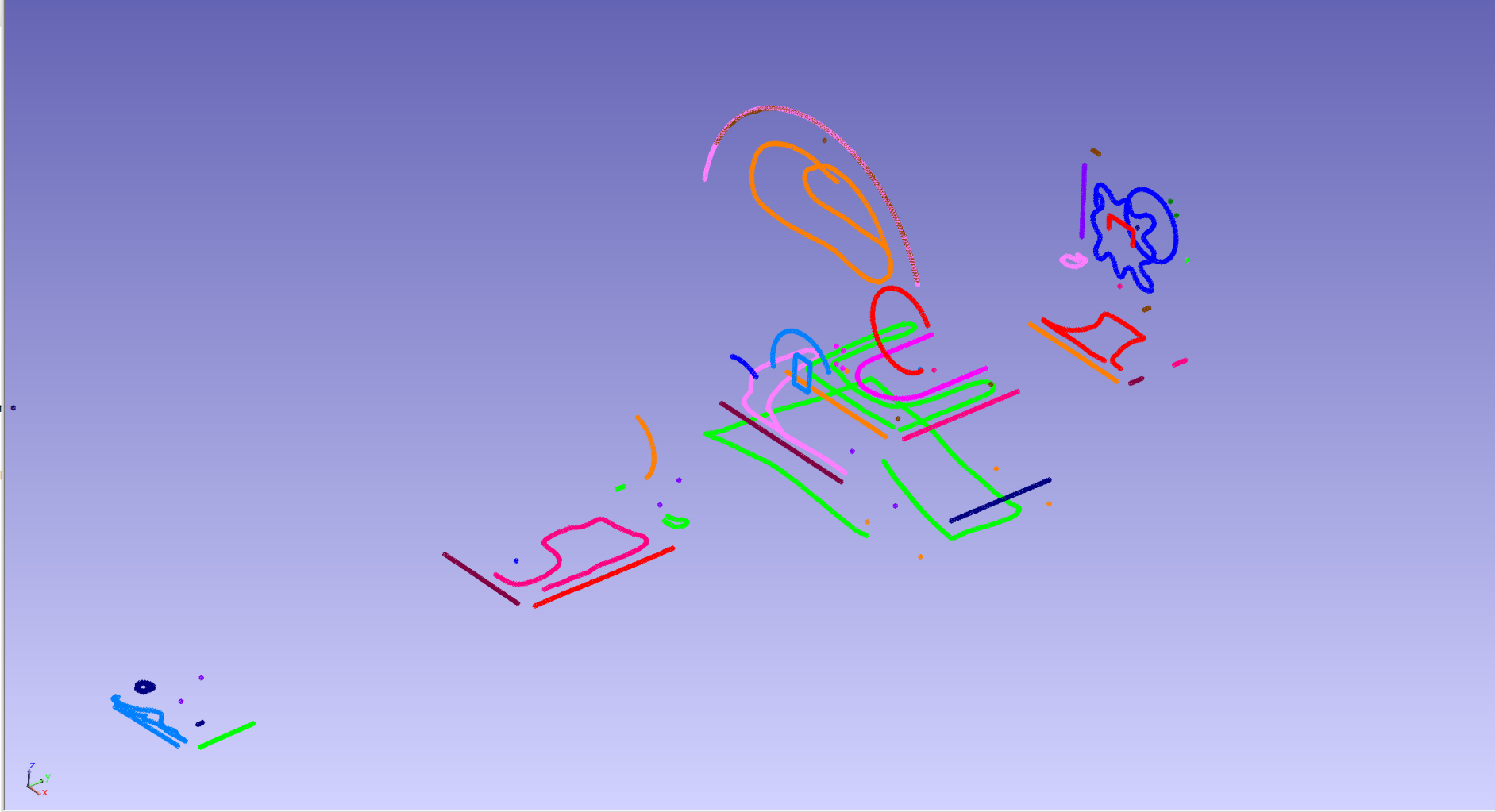
- As part of the lifting approval requirements.
- Pull out testing of the RAMPA Type B Inserts.
- Preliminary results 540Kg/insert for M16 (FOS 5)
- Follows from Andreas Ofner's talk last year "Using Lead as construction material"
- I hope to present a more final report at the next DENIM.

Surveying and Measuring



SA TreeBar

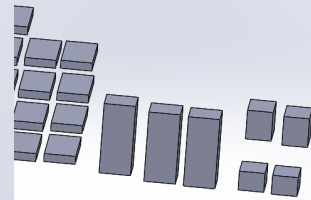
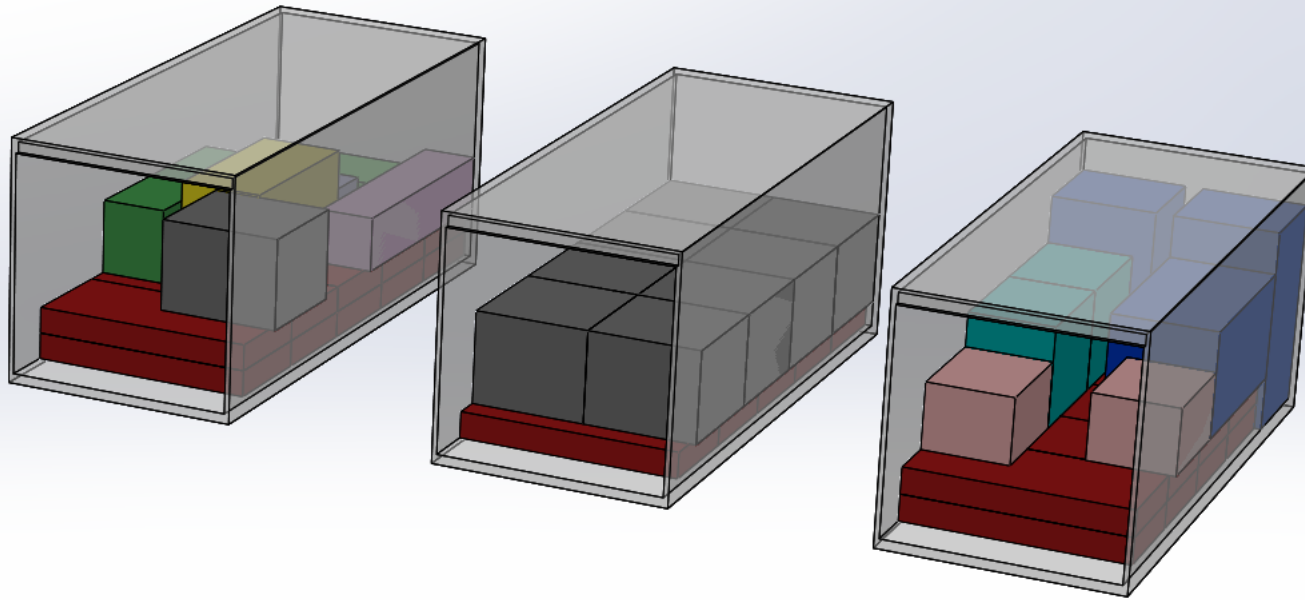
- ▶ A
- ▶ Default Folder
- ▶ Locate
- ▶ Instruments
- ▶ Point Groups
- ▶ Frames
- ▶ Events
- ▶ Sample Stage
- ▶ Slit 3
- ▶ Point Groups
- ▶ Guide Housing 5
- ▶ Instruments
- ▶ Point Groups
- ▶ Events
- ▶ Chopper 3
- ▶ Point Groups
- ▶ Guide Housing 4
- ▶ Point Groups
- ▶ chopper 3 mount
- ▶ Point Groups
- ▶ Slit 2
- ▶ Point Groups
- ▶ Copper 3 Concrete Plin
- ▶ Point Groups
- ▶ Plinth 3
- ▶ Point Groups
- ▶ Guide Housing Assem
- ▶ Instruments
- ▶ Point Groups
- ▶ Callouts
- ▶ Events
- ▶ Guide Housing 1
- ▶ Instrument Shutter
- ▶ Point Groups



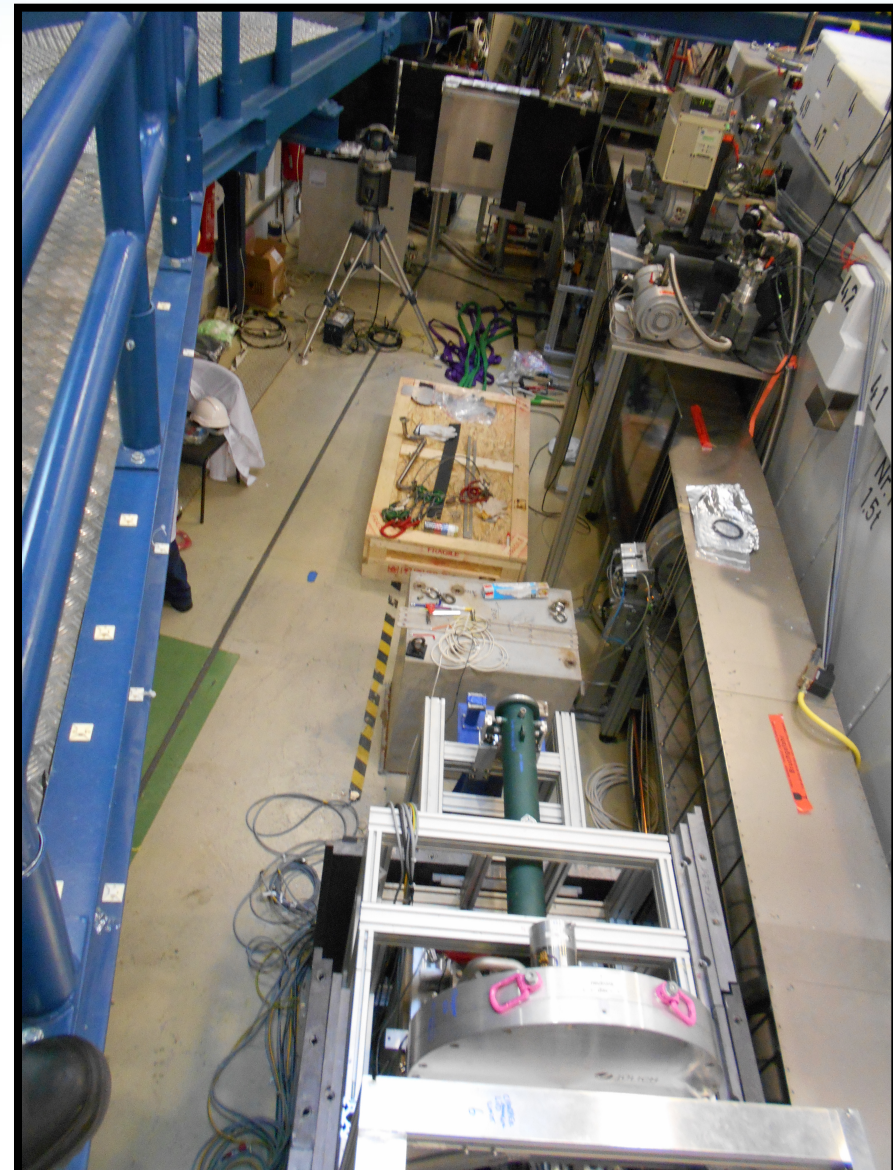
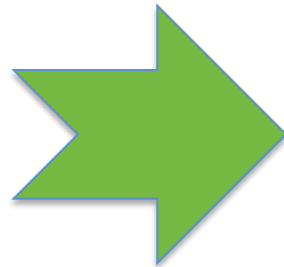
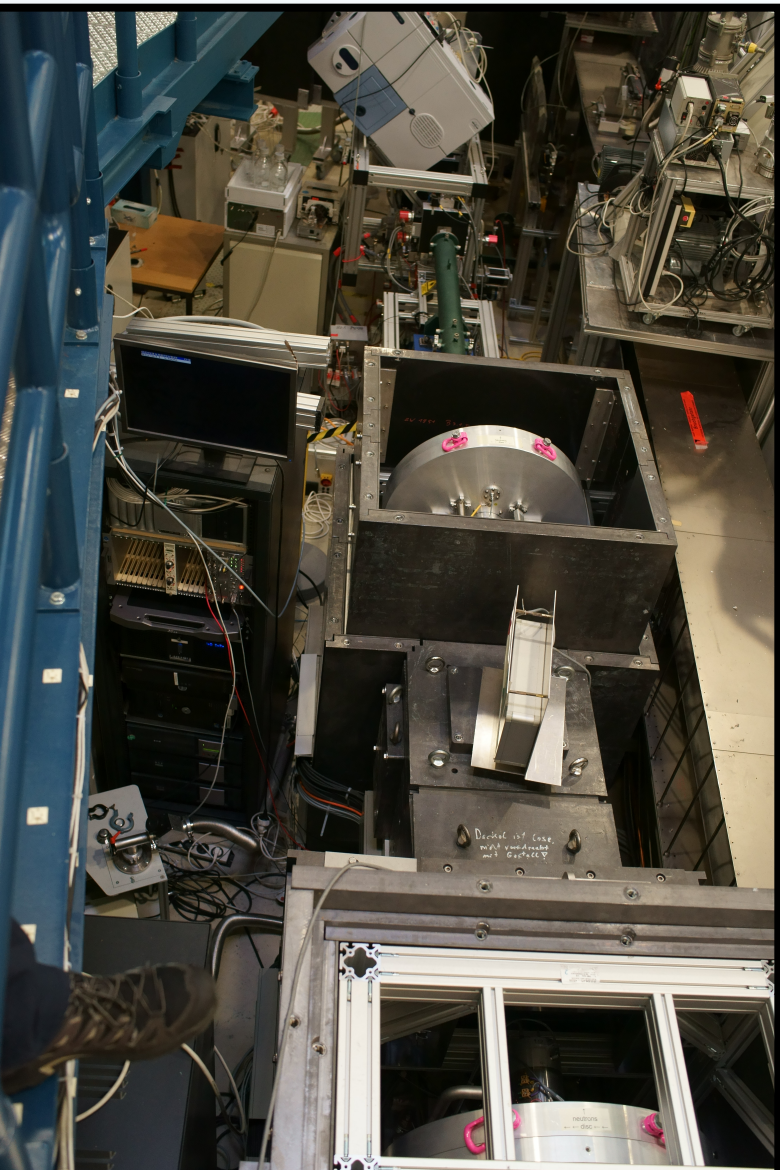
Report Bar (WCF: A::WORLD)

Point Name	X	Y	Z
Instrument Shutter::Shutter upstream flange inner			

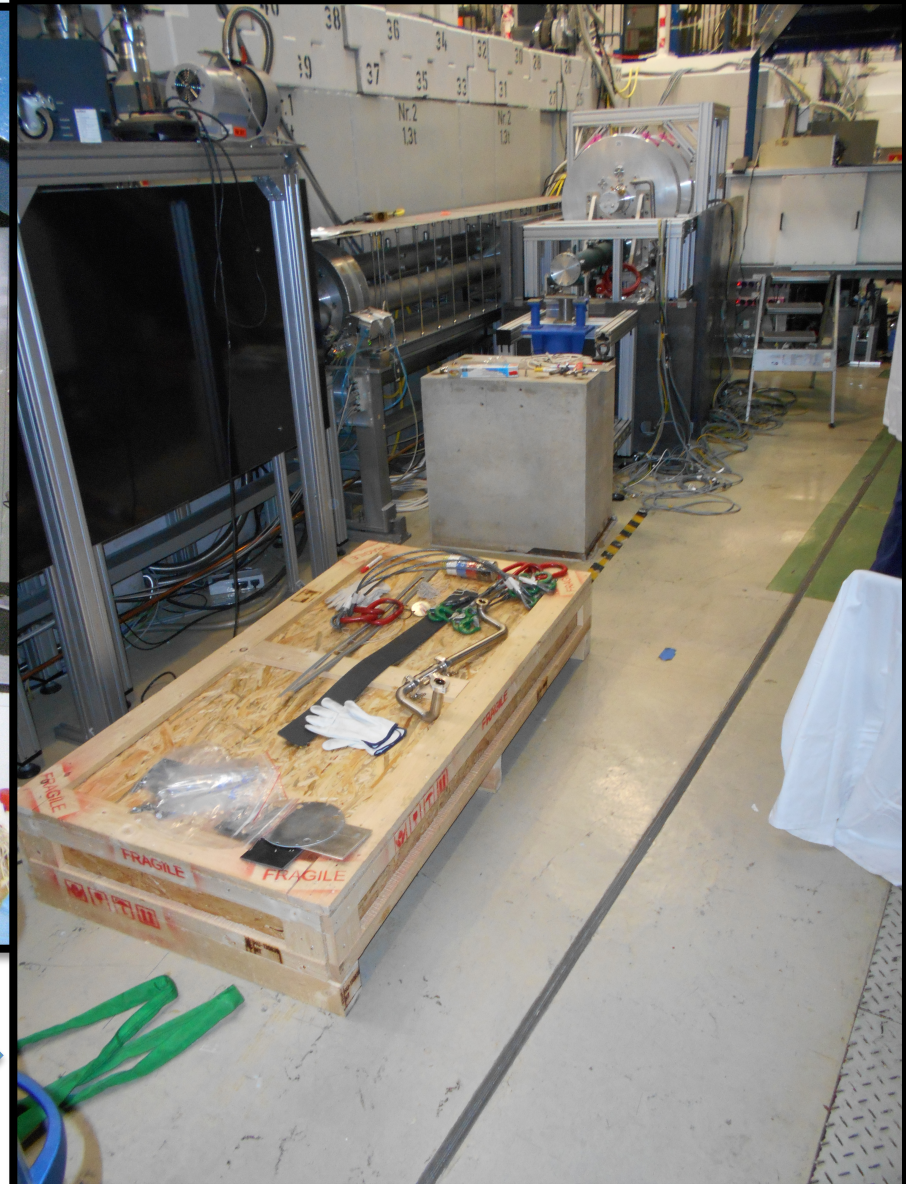
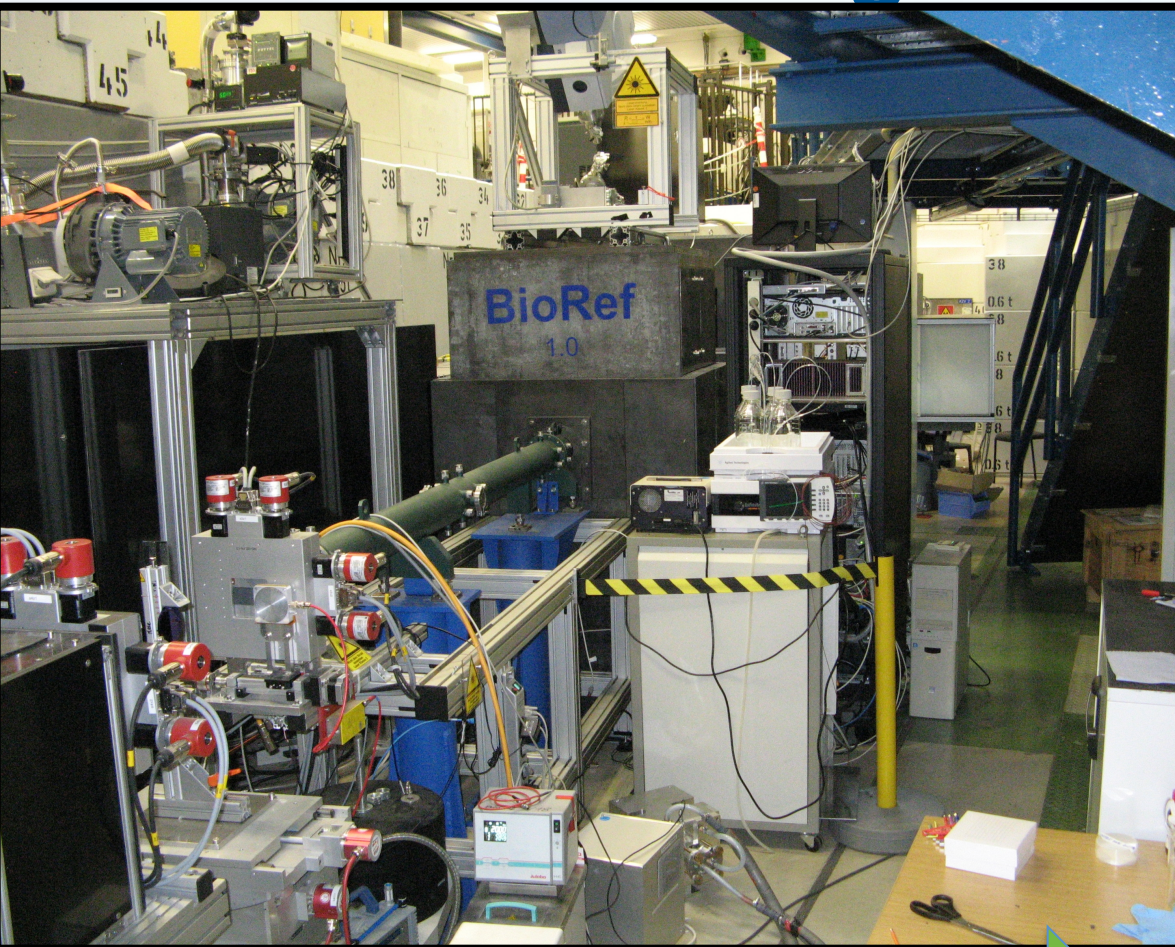
Preparing for Shipping



Progress so far.



Progress so far.



The Team



- In the Photo: Marcus Trapp (HZB), David Roach, Stewart Pullen (me), John Affleck, Scott Olsen, Andrew McGregor, Anton Le Brun
- Not in the Photo: Paris Constantine, Jason Christoforidis, James Spedding, Werner Graf (HZB), Geza Steiner (HZB), Axel Rupp (HZB), Rolf Hellhammer (HZB).

PART 2

Should cover transport and installation.

So make sure you attend the next DENIM!



Australian Government

Ansto

Thank You!

