

SM18 Clean Room and SRF Infrastructure Refurbishment

Upgrade for high gradient cavities

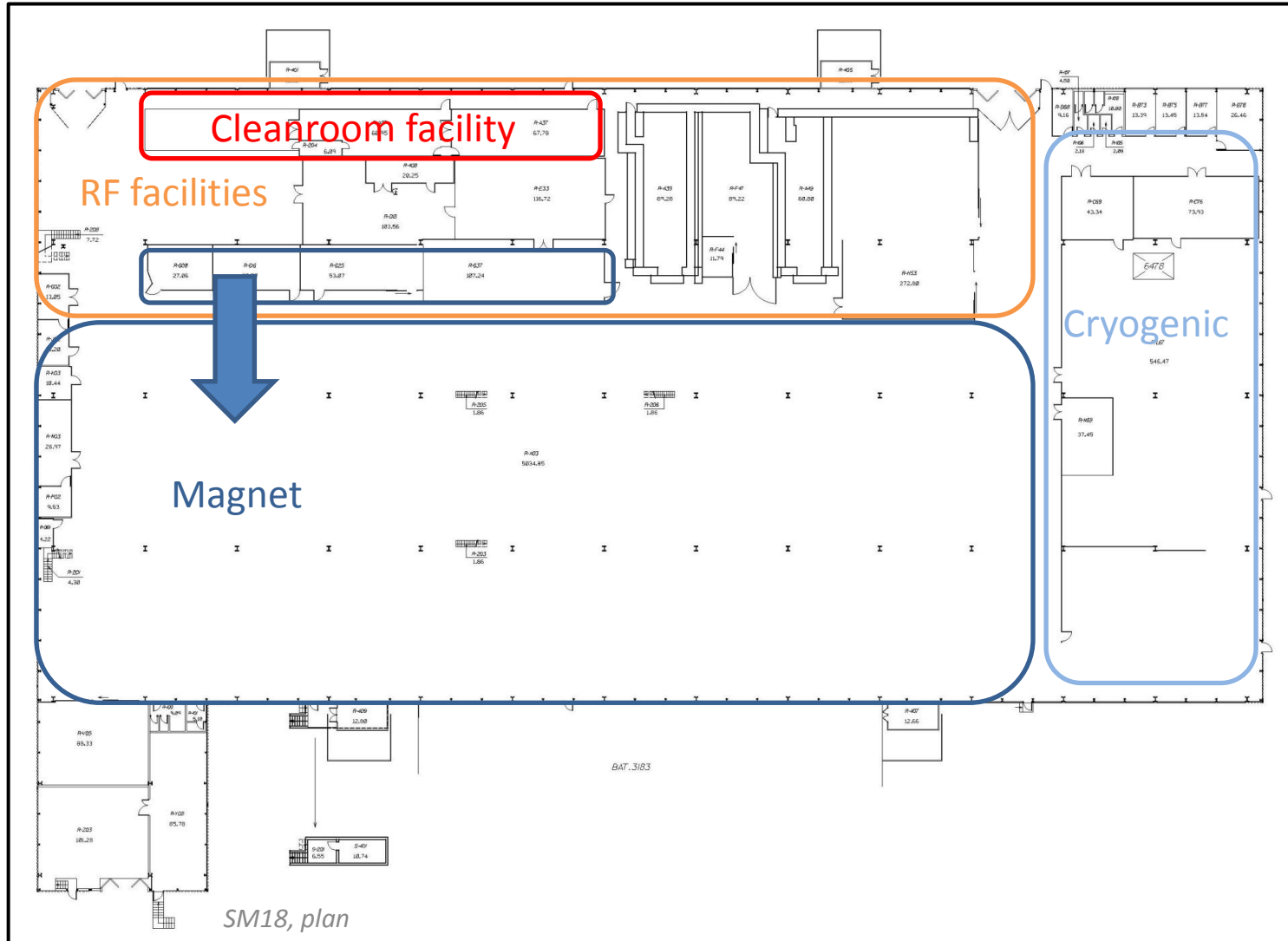
- Reminder
- Existing facility – Clean room layout
- Cavity rinsing (UPW & HPR)
- Cavity diagnostic
- RF vertical and horizontal test area
- Conclusion

- CERN Clean room is 20 years old (designed for LEP)
- Cleanliness is essential to reach gradient > 20 MV/m

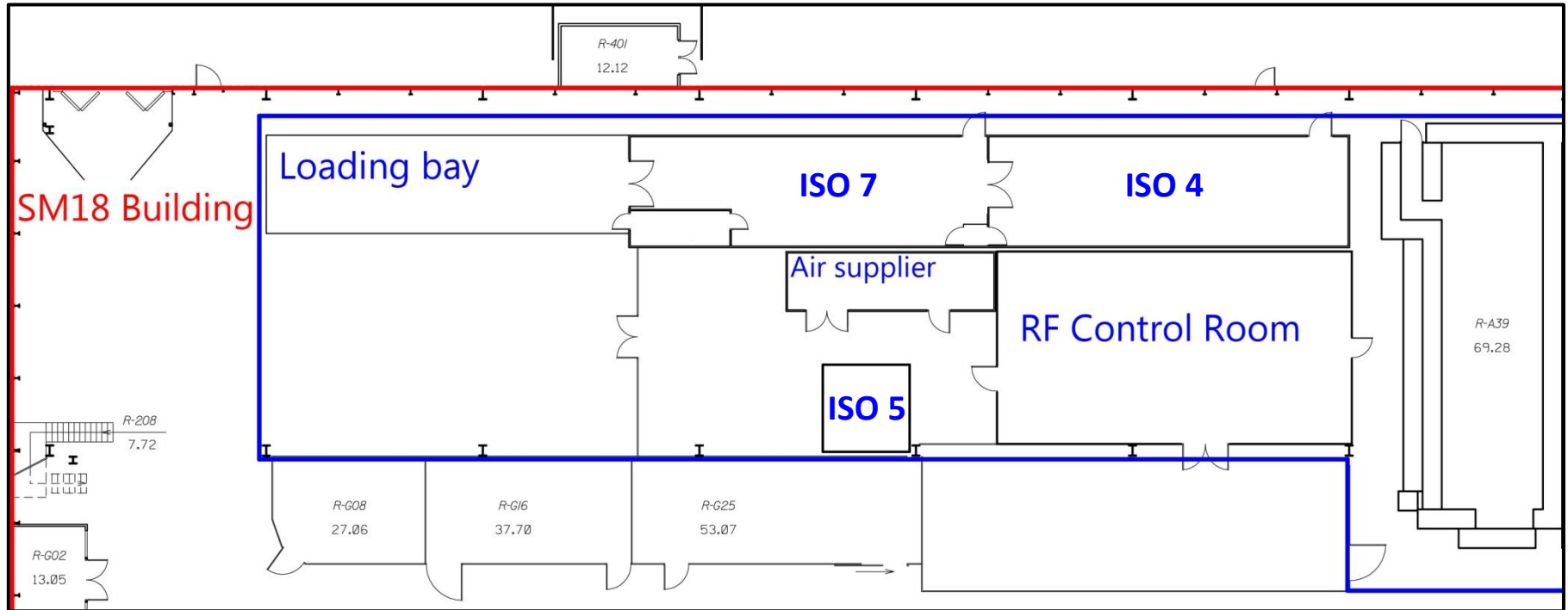
Aim of the refurbishment:

- Further increase clean room quality
- High Pressure Rinsing inside clean room
- Deploy cavity new diagnostic strategy
- Group activities in one place

Existing facility at SM18



Actual layout

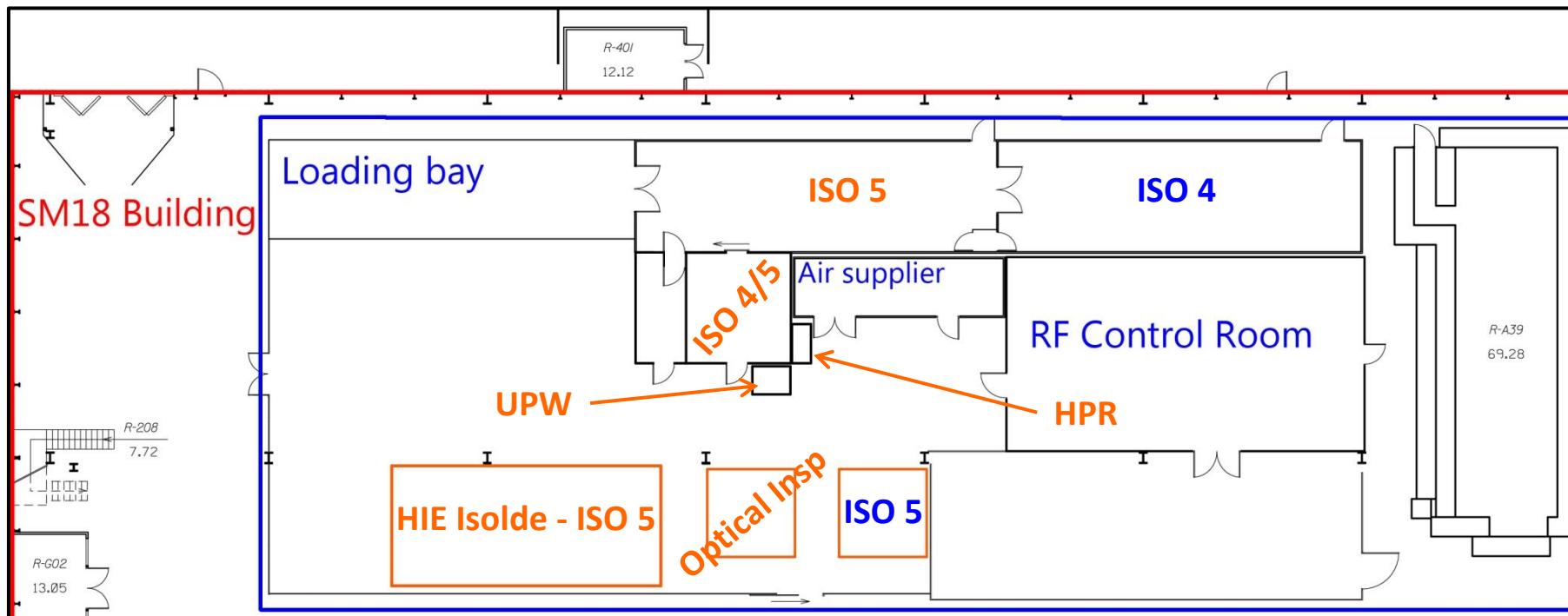


UPW : Ultra Pure Water

HPR : High Pressure Rinsing

ISO 14644-1	FS 209
4	10
5	100
7	10 000

Upgrade layout



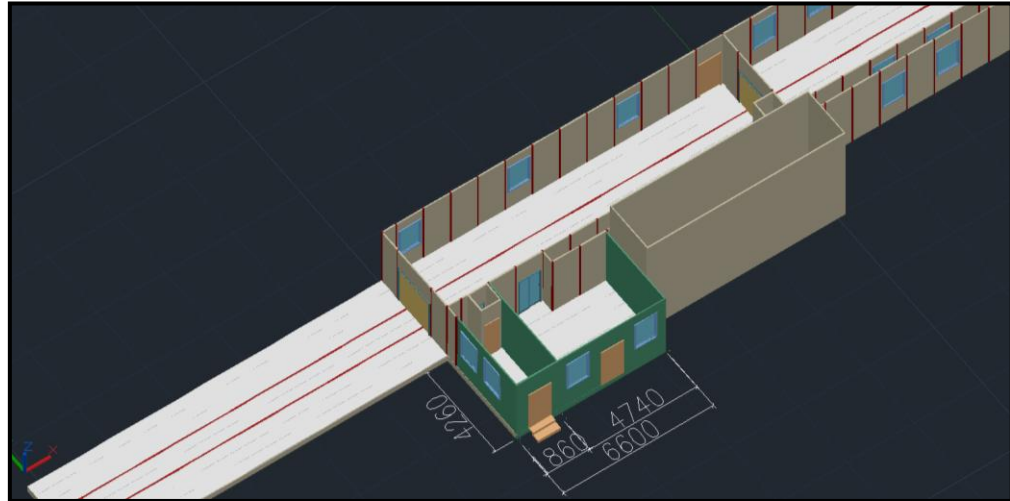
UPW : Ultra Pure Water

HPR : High Pressure Rinsing

ISO 14644-1	FS 209
4	10
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And also:

- New gas inlet (N₂, Ar..)
- New pumping outlet
- Particle monitoring during critical assembly
- Roller doors?

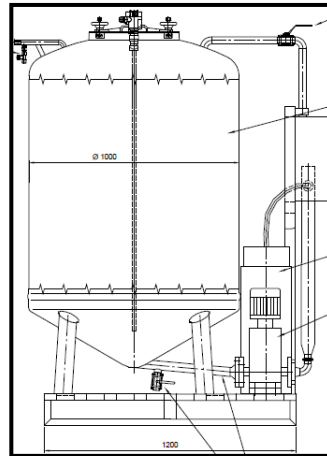


3D preview of clean room upgrade

UPW:

- Produced Water from 0.5 to 1 m³ / h
- Continuous Electro-Deionisation (CEDi), no need to regenerate the water polishing resins
- Compact system
- Integral automatic sanitization
- Mobility

1 m³ buffer tank example (B252-CERN), including pump, UV lamp and softener



IonPRO LX from Veolia

HPR:

Systems known: DESY, FNLab, J-Lab,
Brookhaven

⇒ Expensive system adapted from industry

Last update: contact with ANL

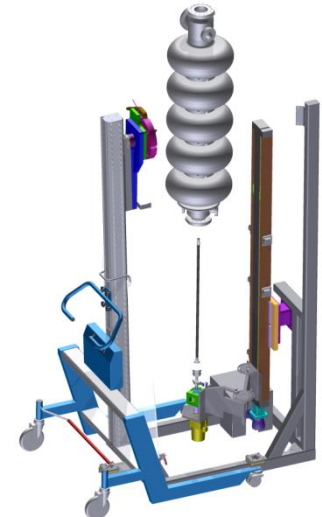
⇒ Cheaper, simple and versatile

⇒ Need higher cleaning room (0.5 m
missing, **3.5 m needed**) & **8-10 month**
manufacturing time

⇒ Still investigating for new HPR



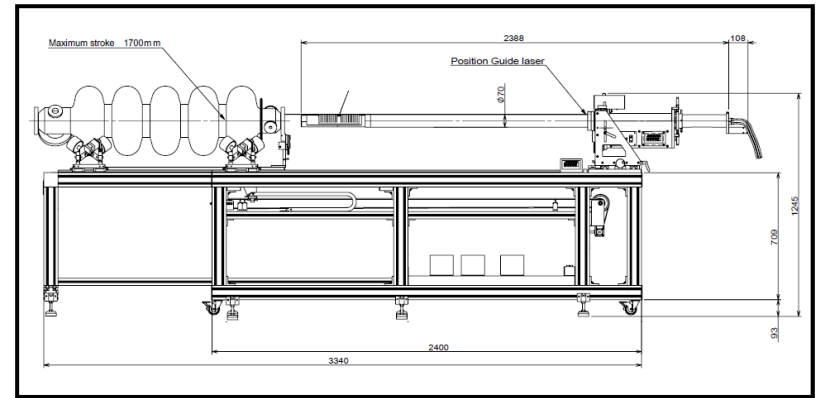
ANL's HPR - Courtesy of Michael Kelly



SPL cavity integration onto ANL's HPR - Courtesy of Michael Kelly

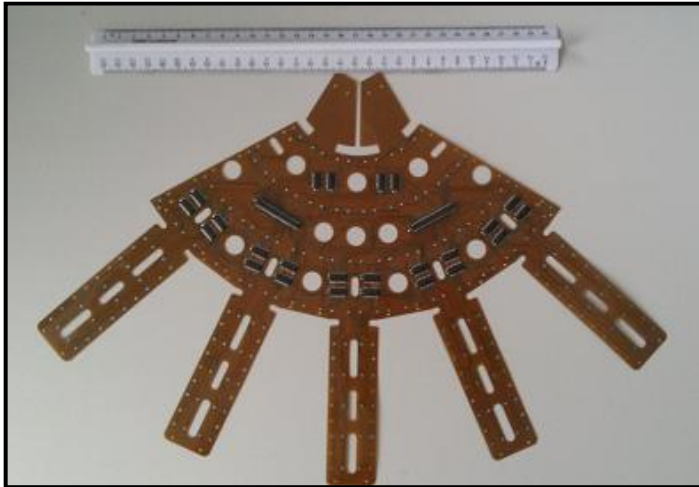
KEK/Kyoto Optical Inspection:

- Received at CERN, but waiting for free space to unpack it close to the clean room.
- First inspection will be performed into mono-cell cavities (SPL $\beta=0.6$, and INFN $\beta=0.5$ $\beta=1.0$)

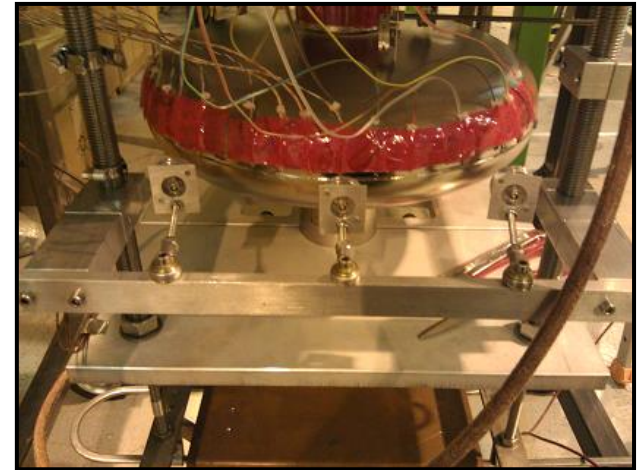


Optical inspection tool waiting for its final place

Second sound detection (OST):



T-mapping element in progress- Courtesy of Kitty Liao

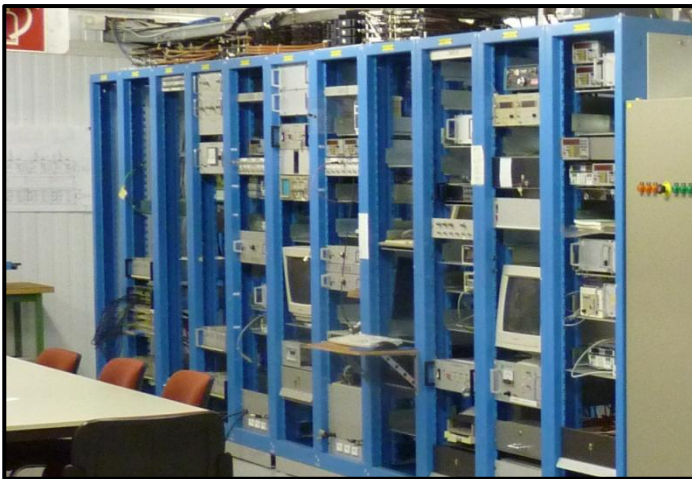


*OST and heaters onto the SPL monocell cavity
- Courtesy of Kitty Liao*

T-mapping:

See “*Cavity vertical tests and diagnostics*” by Kitty Liao in this conference

- Status : operational for mono-cell cavity
- Some modifications on going for the 5-cells cavity
- Implementation of new Labview code in progress
- Cryo-line full refurbishment to allow continuous operation at 2 K

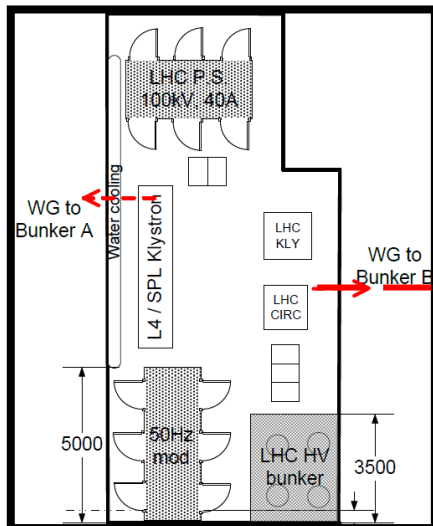


RF control room



*SPL mono-cell ($\beta=0.6$) ready for vertical test -
Courtesy of Mathieu Therasse*

- Bunker (A) will be modified for 2 K operation
- SPL modulator to be installed
- SPL klystron to be installed
- Wave guide layout being designed



RF power area, integration plan - Courtesy of Olivier Brunner

LHC bunker, bunker B

- Writing of the new clean room technical specifications in progress, but waiting for HPR solution to be finalized. Taking contact with potential suppliers (CERN DR & Market Survey).
- Current planning is to obtain the HPR system before the full clean room upgrade, in order to process the SPL cavities.
- Optical inspection should be ready for end of June.

Acknowledgments:

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