



## WP6a: DFH Detailed Design Review

# Maintenance & repair in underground area

Paul Cruikshank on behalf of WP6a contributors

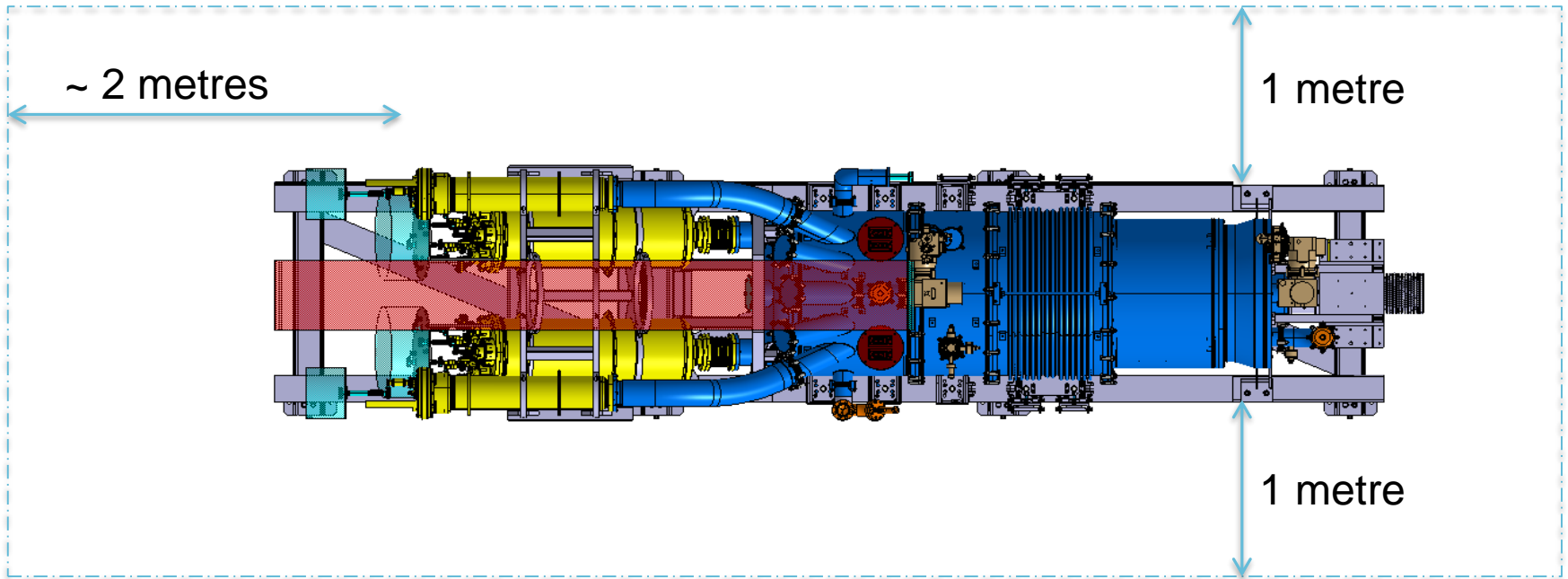
CERN, 16 June 2020

# Repair & Maintenance: Considerations

- Intervention types:
  - Corrective maintenance/repair
  - Preventive maintenance
- By technology:
  - vacuum,
  - cryogenics,
  - warm powering,
  - cold powering,
  - instrumentation,
  - safety,
  - handling,
  - ....

# Accessibility for Maintenance & Repair

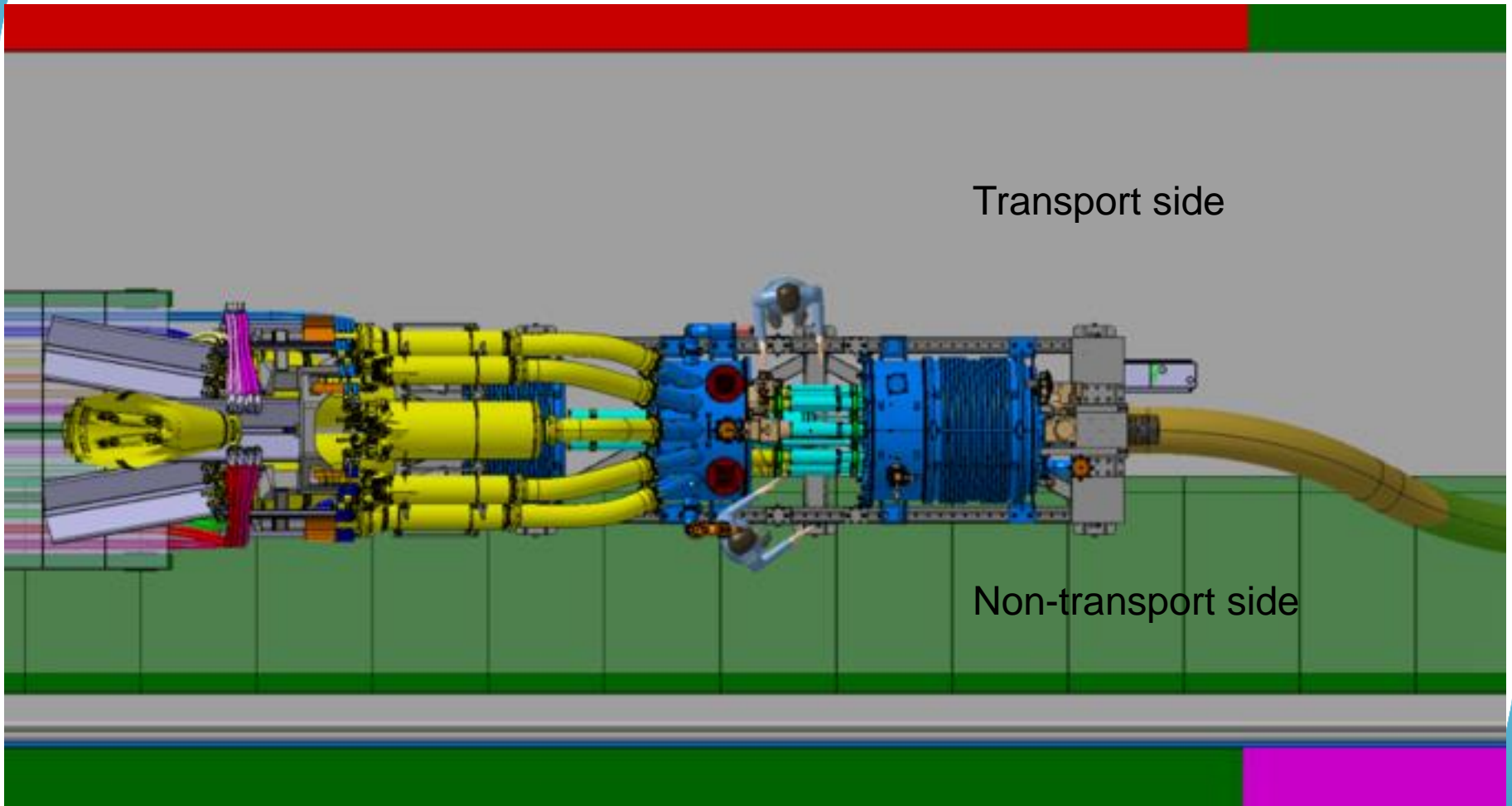
- Generic approach
  - Consider space/accessibility needed to assemble/disassemble the DFH in a surface building



Do we have similar space in UR gallery ?

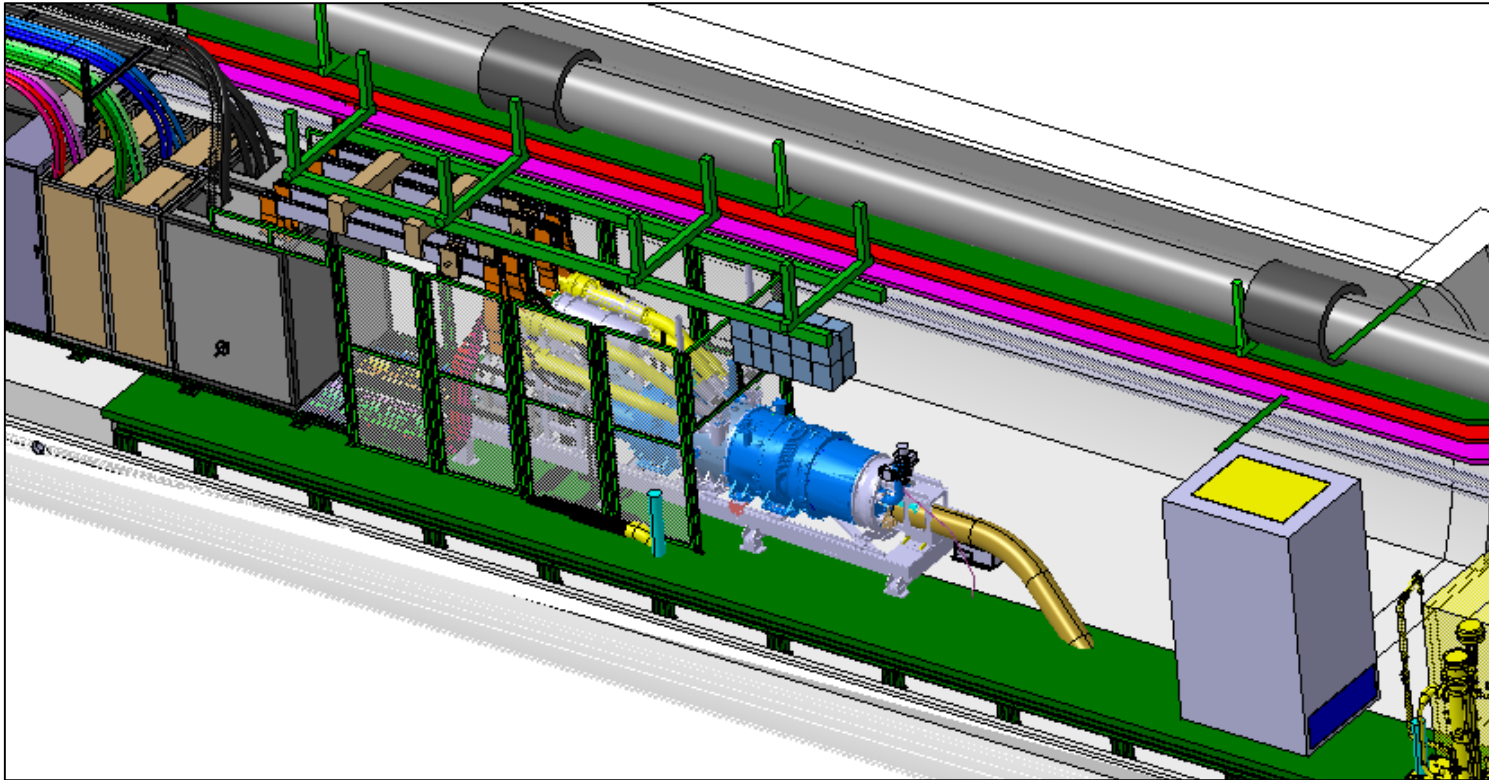
# Accessibility for Maintenance & Repair

Top view in UR gallery



Courtesy S.Maridor & R.Betemps

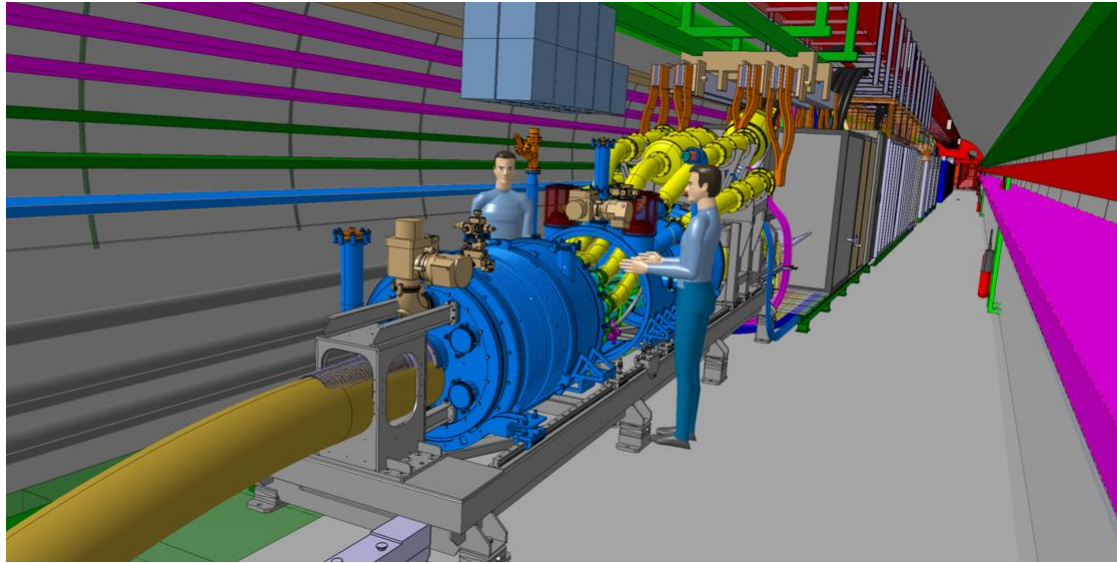
# Accessibility for Maintenance & Repair



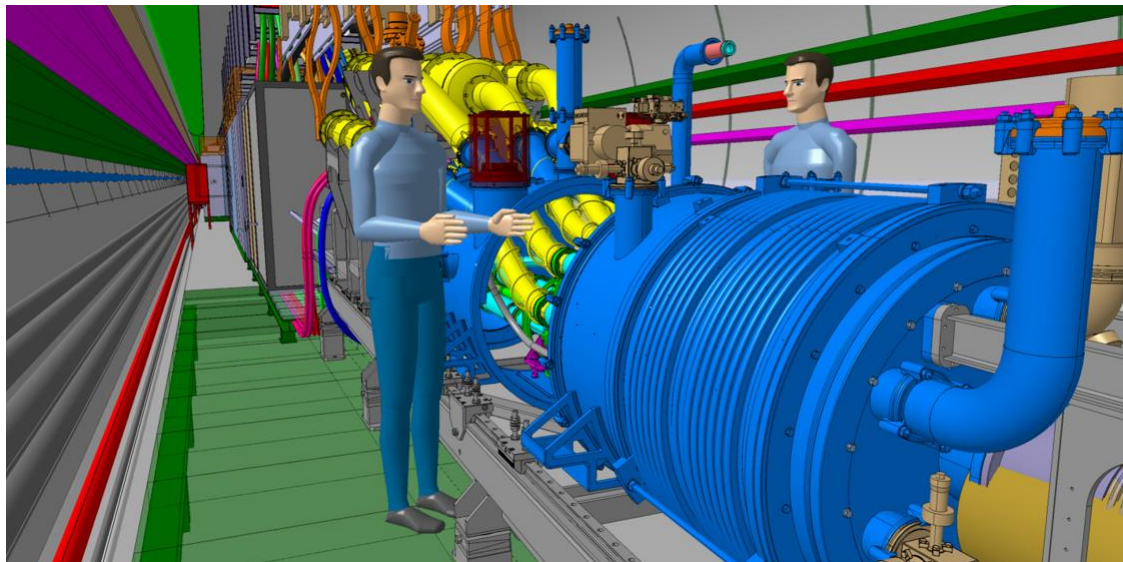
In the following slides, the IP2X cage is not shown.  
For significant interventions at the DFH interconnects or  
currents leads, it's assumed that the cage walls are not present



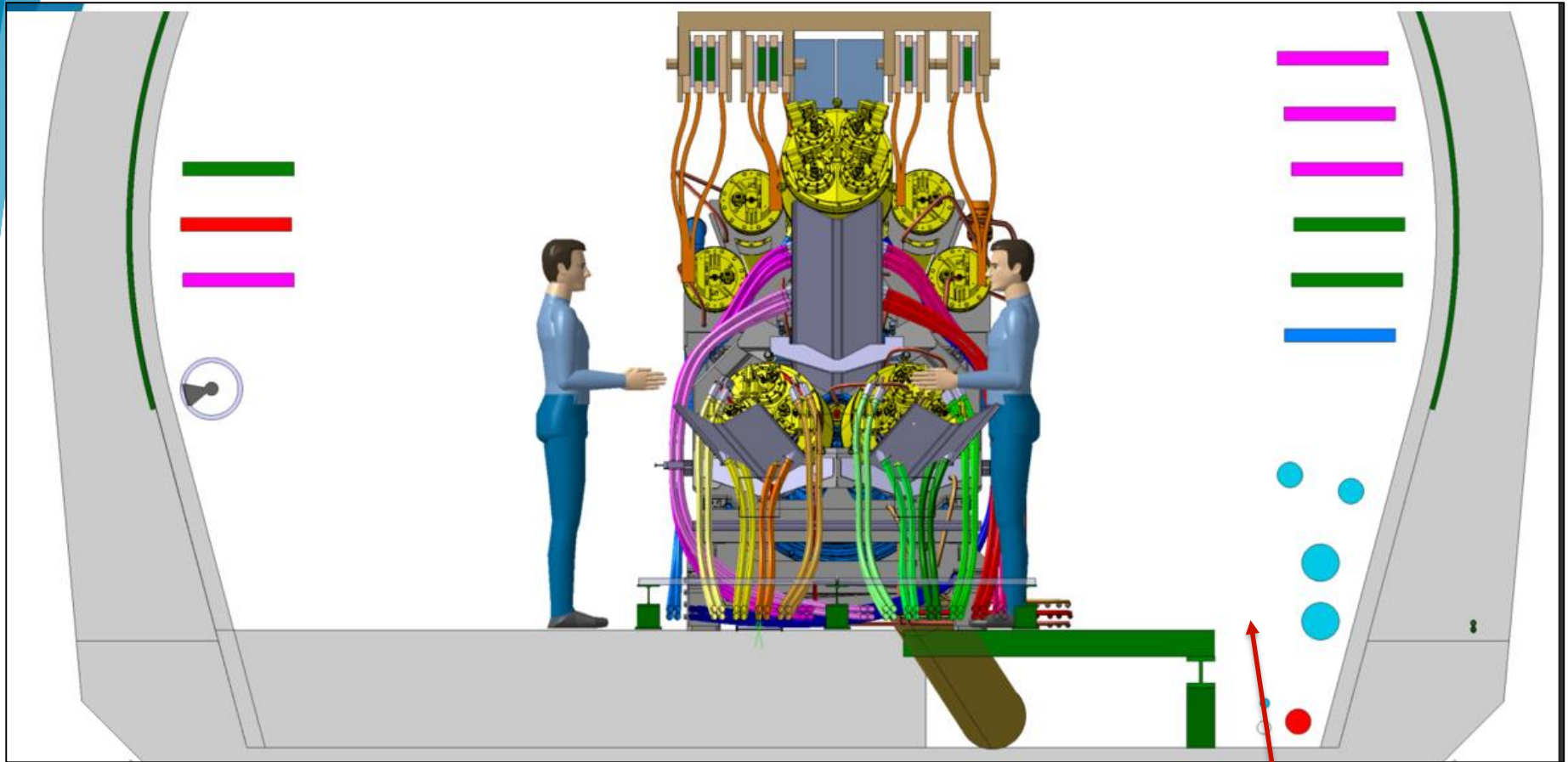
# Accessibility for Maintenance & Repair



Courtesy S.Maridor & R.Betemps teams

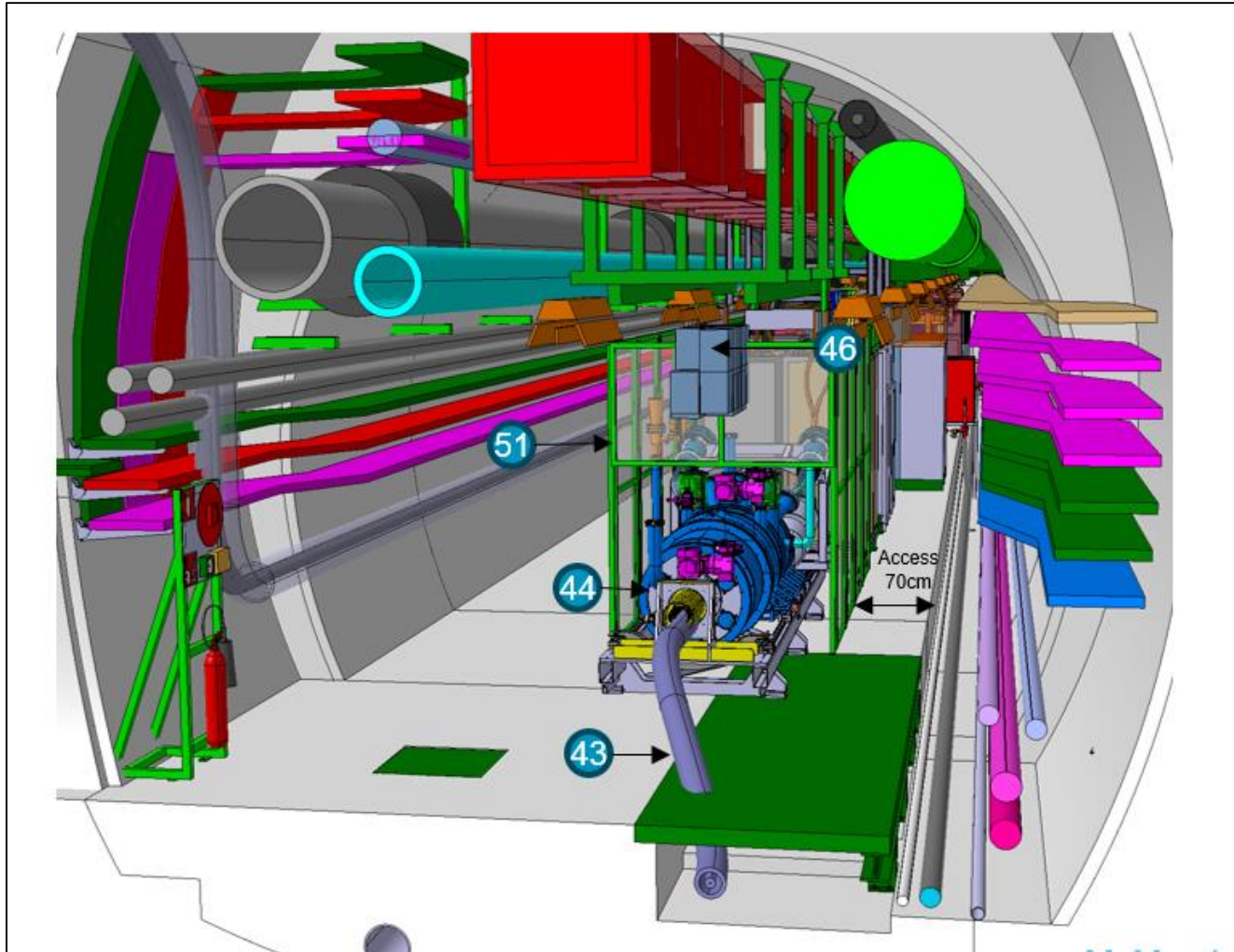


# Accessibility for Maintenance & Repair



Local barrier or false floor extension ?

# DFH Accessibility

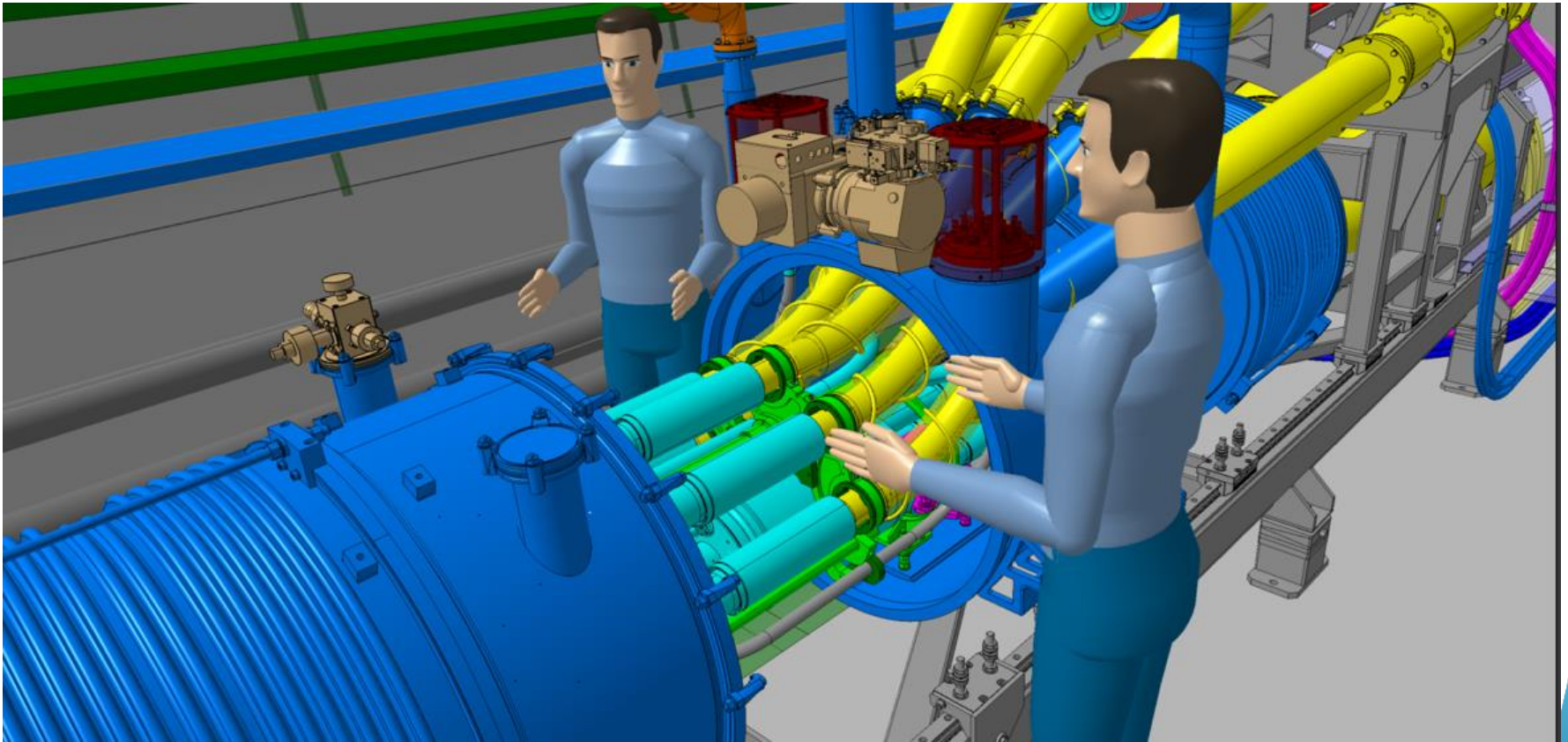


Access is reduced when the IP2X cage is in place

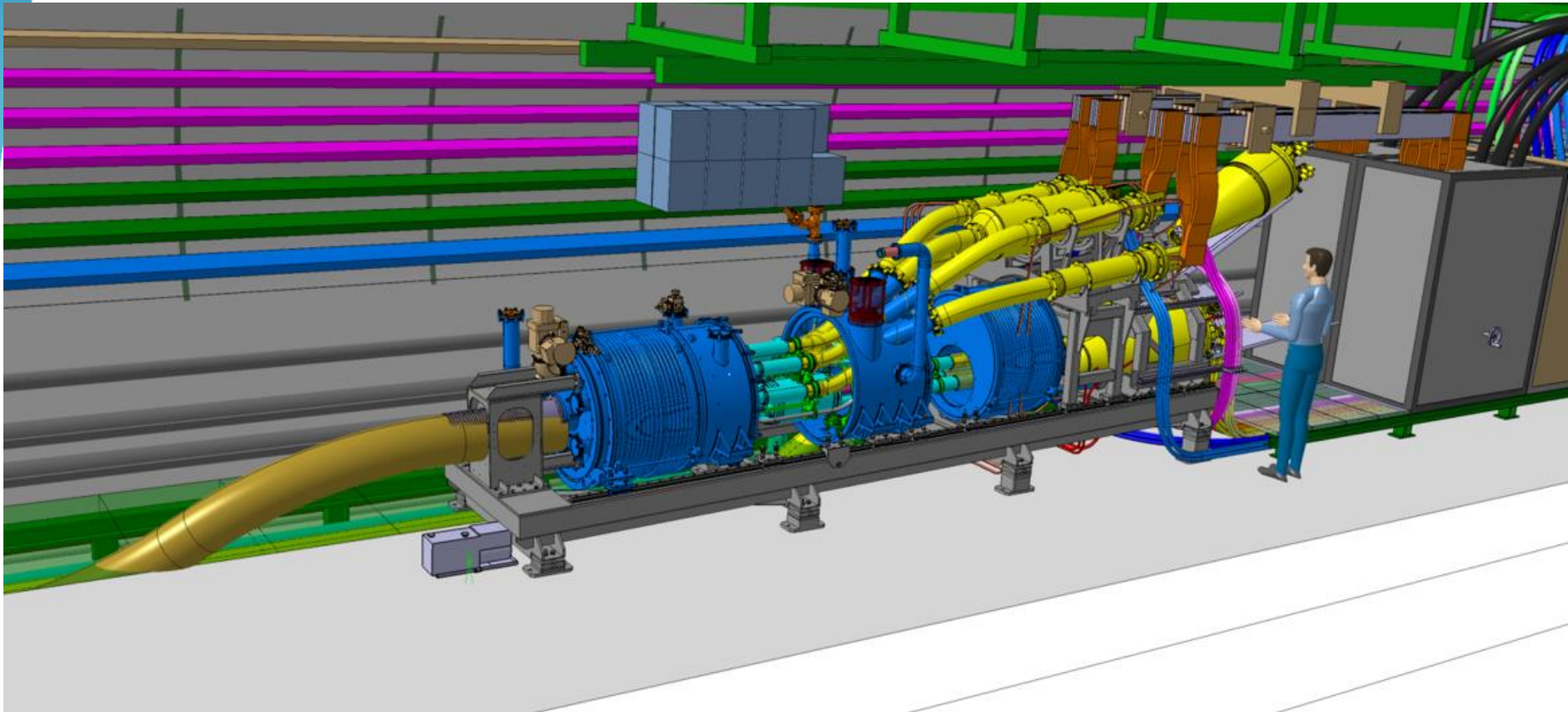


# Repairs: Access to splices

Interventions (repairs) at sliding bellows are similar to surface assembly (& LHC interconnects), so valid for mech, cryo, electrical, instrumentation tasks.

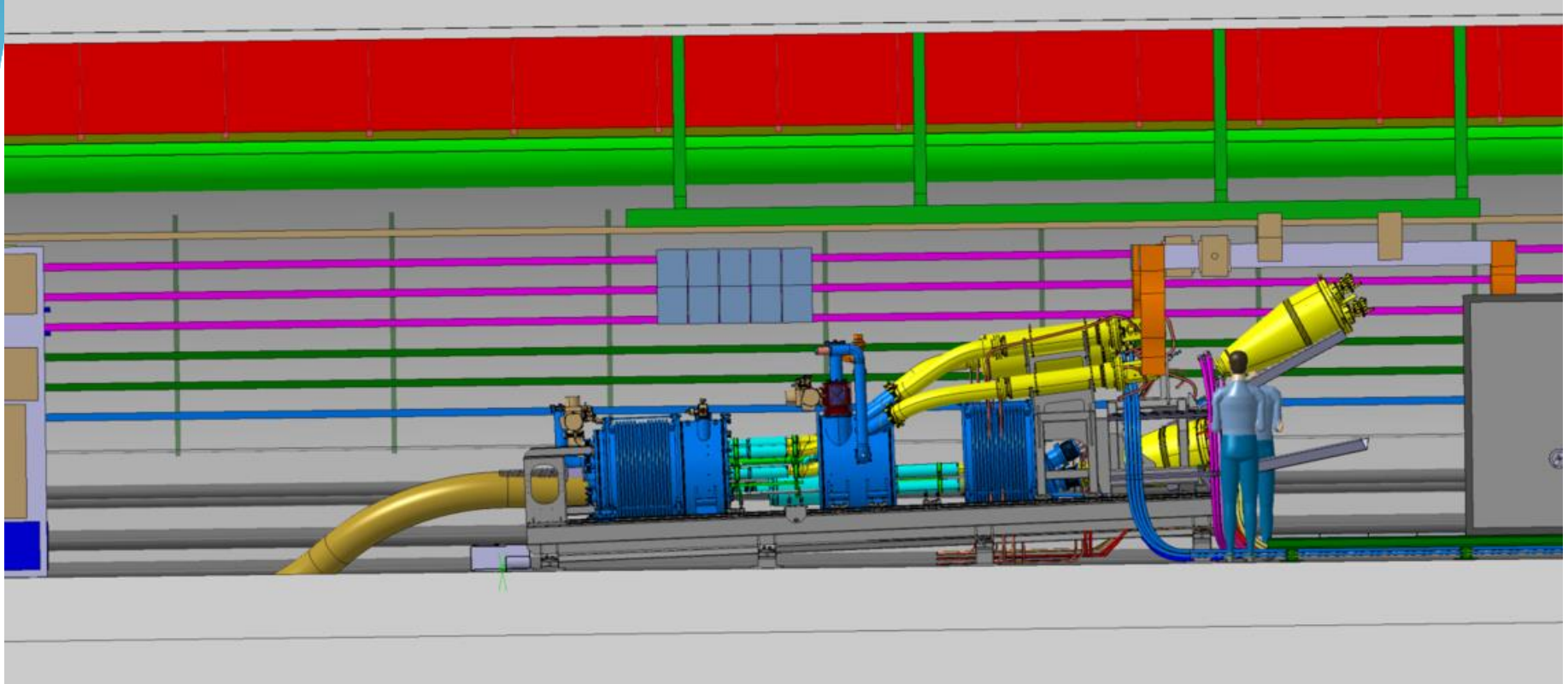


# Exchange of Current lead in UR



Space reservation between the DFH  
and Circuit Disconnecter Box  
for current lead exchange  
(IP2X cage not shown)

# DFH full assembly in the UR (non-baseline)



Assembly activities at interconnects and DFH extremities are possible around the full perimeter



# Preventive maintenance interventions

- Unlike the LHC tunnel environment, activation is not an issue in the UR galleries
- Access appears better than existing DFB's in LHC tunnel
  - Vacuum
    - Turbo & primary pumps exchange; gauge repairs; leak detection.
  - Cryogenics
    - Visual inspections; maintenance of cryo panel (displaced) containing valves, valve controllers & flow meters;
  - Cold power instrumentation & protection
    - IFS, proximity equipment (heater power supplies, patch panels, voltage taps – outside IP2X) and heater power supply controllers (displaced)
  - Safety
    - Access to rated valve and rupture disc
  - Interventions within the IP2X cage (to be minimized)
    - Access to CL extremities with heaters and instrumentation feedthroughs.



***Thanks for your attention***