DFHX integration sequence in SM18 Updates
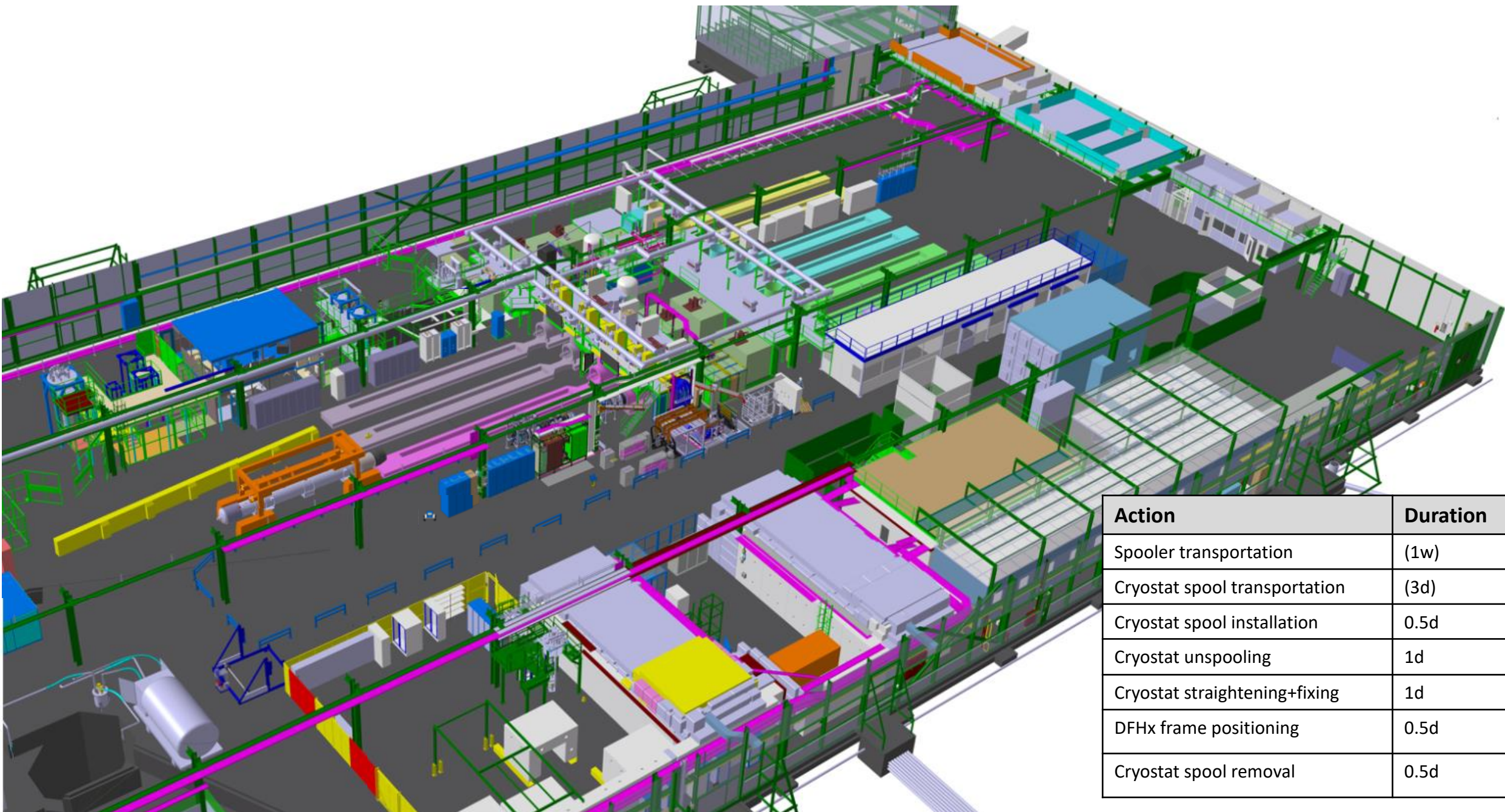
27/04/2022

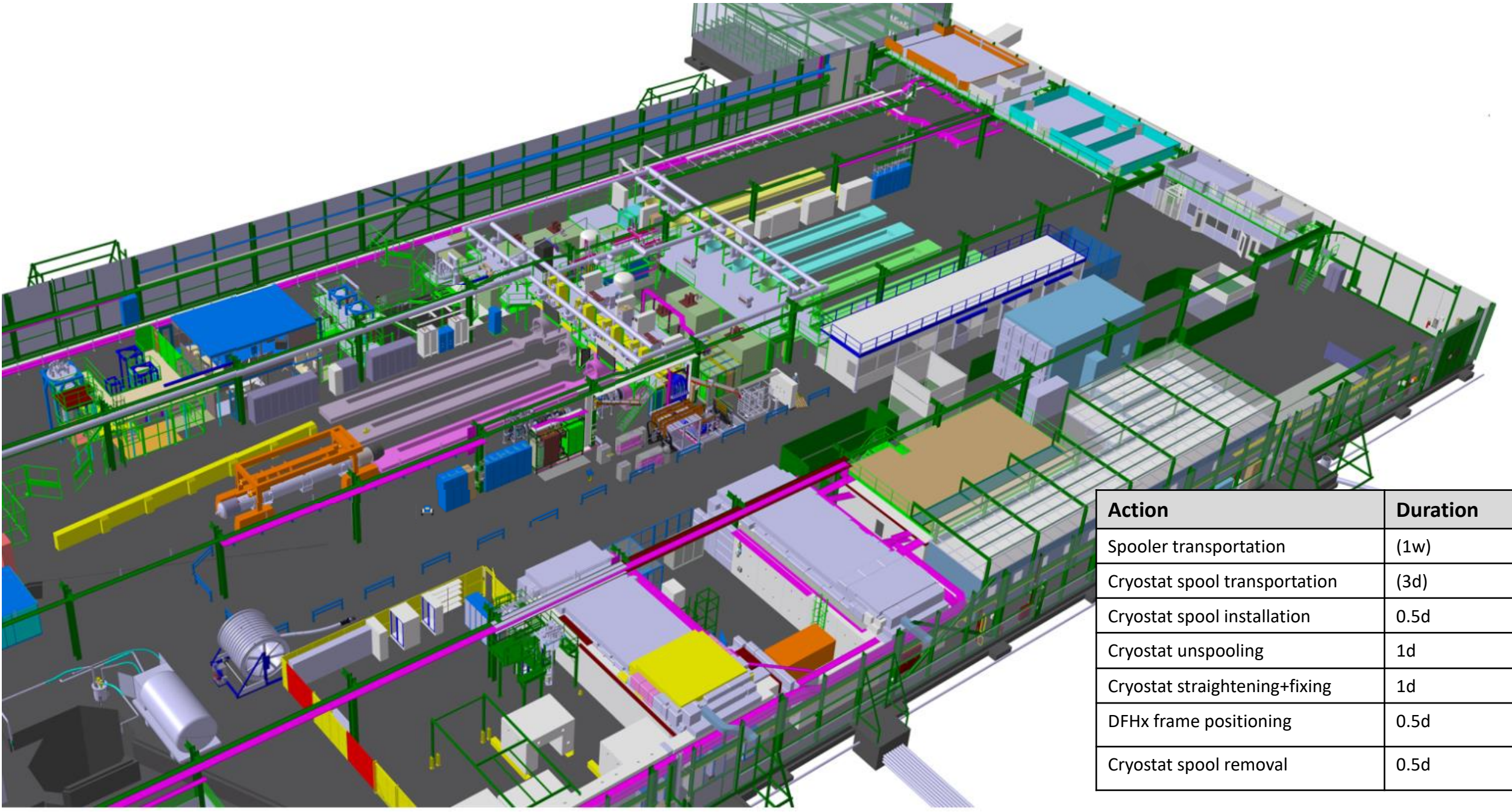Stefanos Christos Spathopoulos

Overview

- Iterative process to study various options conducted through the weekly WP6a technical meetings

- Presented time durations are preliminary, iterations in progress for fine tuning (time unit is "day", on-going work to define "hours" rather than days)

- Agenda
  - Latest integration sequence (iterations in progress)
  - Preliminary "optimistic" planning overview
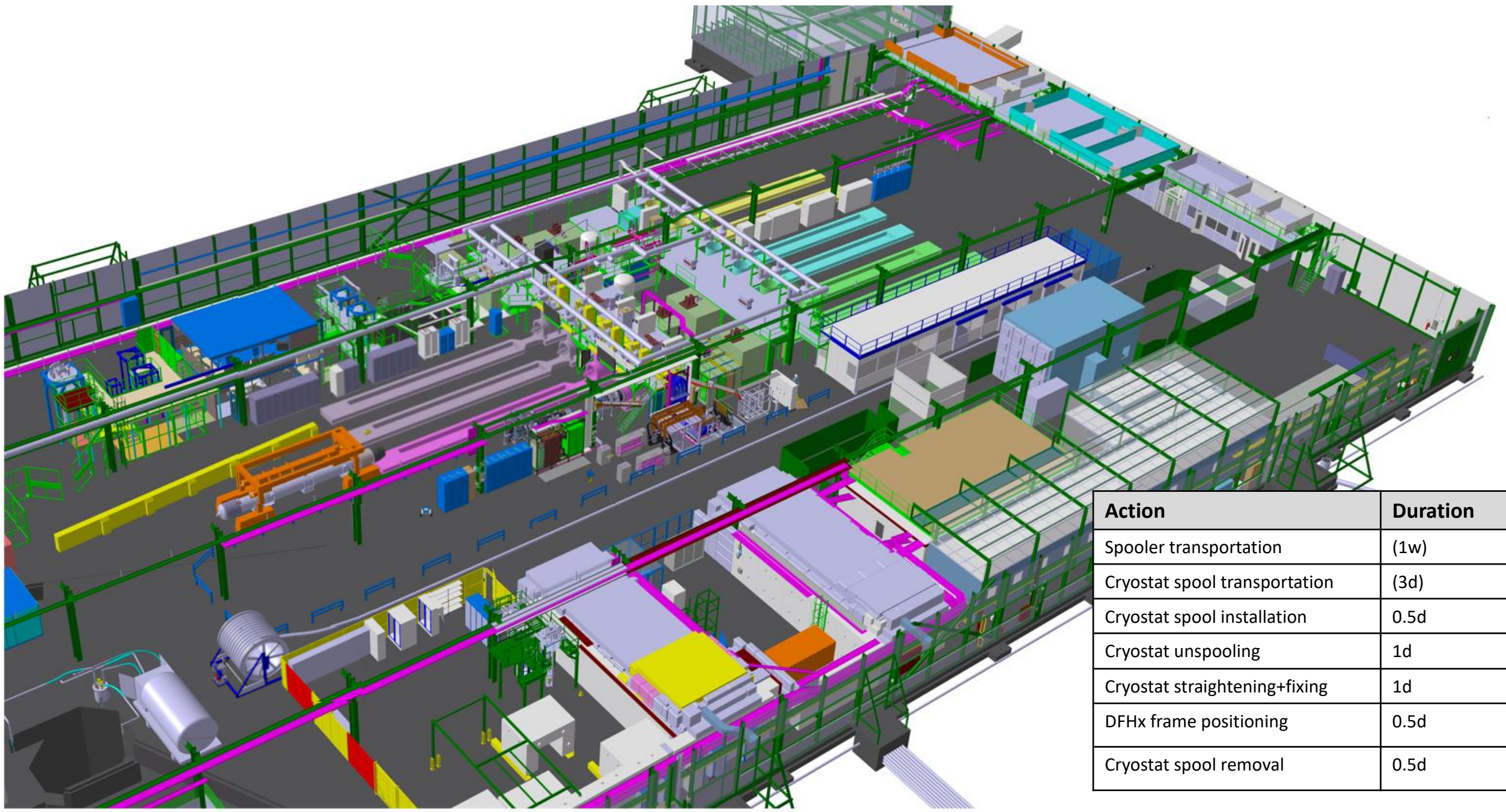
Phase 0: SCLink Cryostat+DFHx frame installation

Action	Duration
Spooler transportation	(1w)
Cryostat spool transportation	(3d)
Cryostat spool installation	0.5d
Cryostat unspooling	1d
Cryostat straightening+fixing	1d
DFHx frame positioning	0.5d
Cryostat spool removal	0.5d

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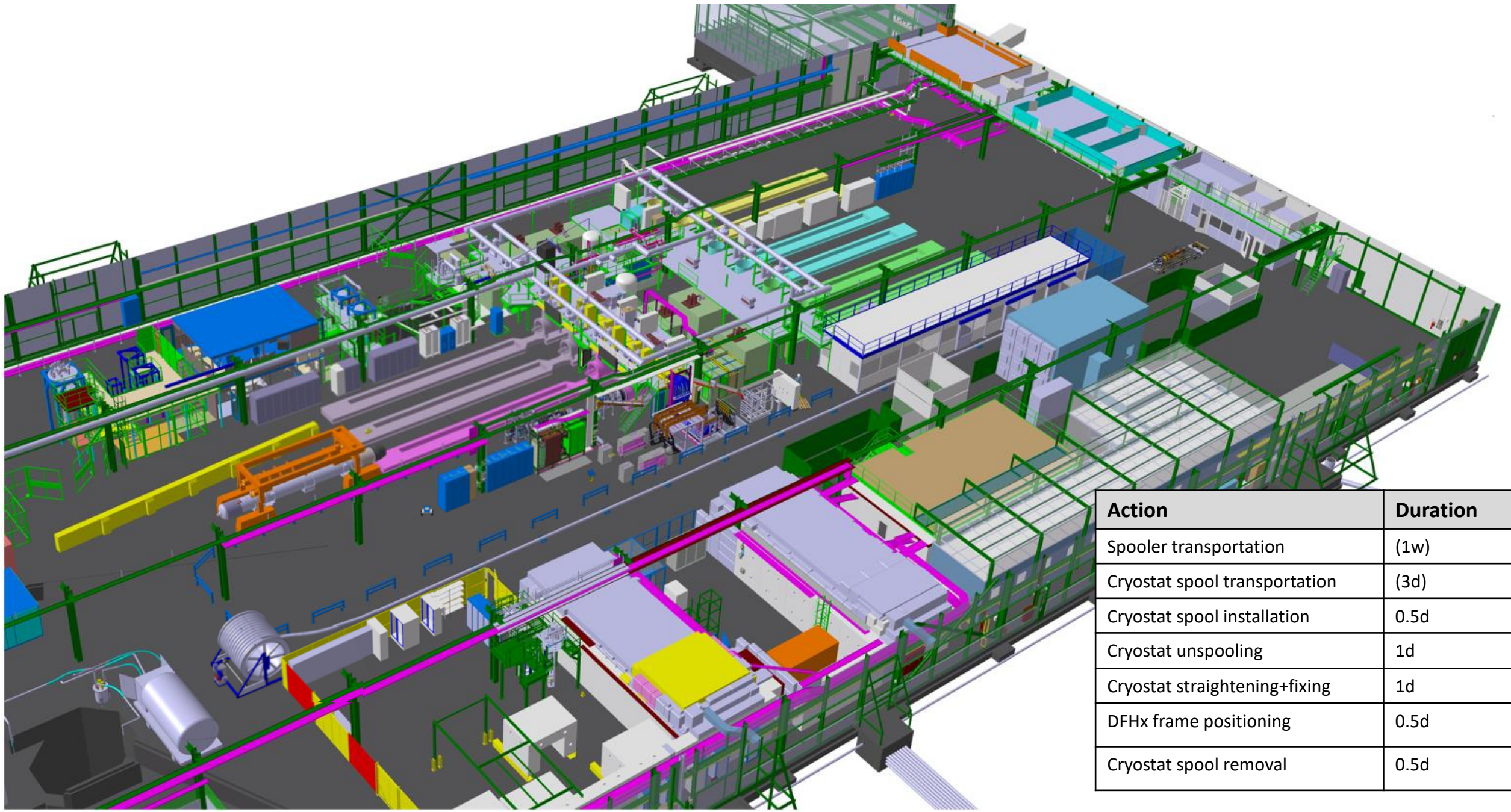# Phase 0: SCLink Cryostat+DFHx frame installation

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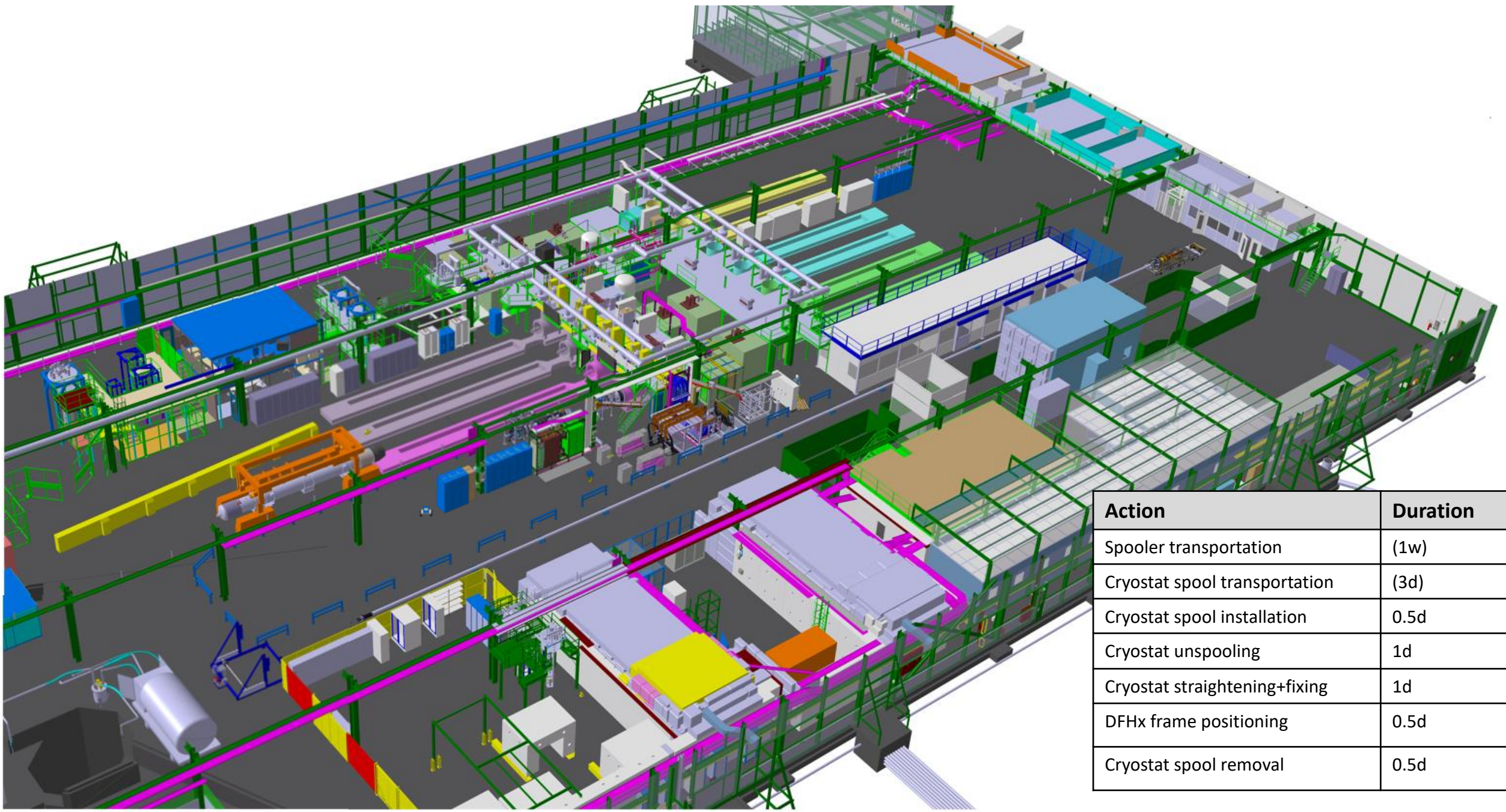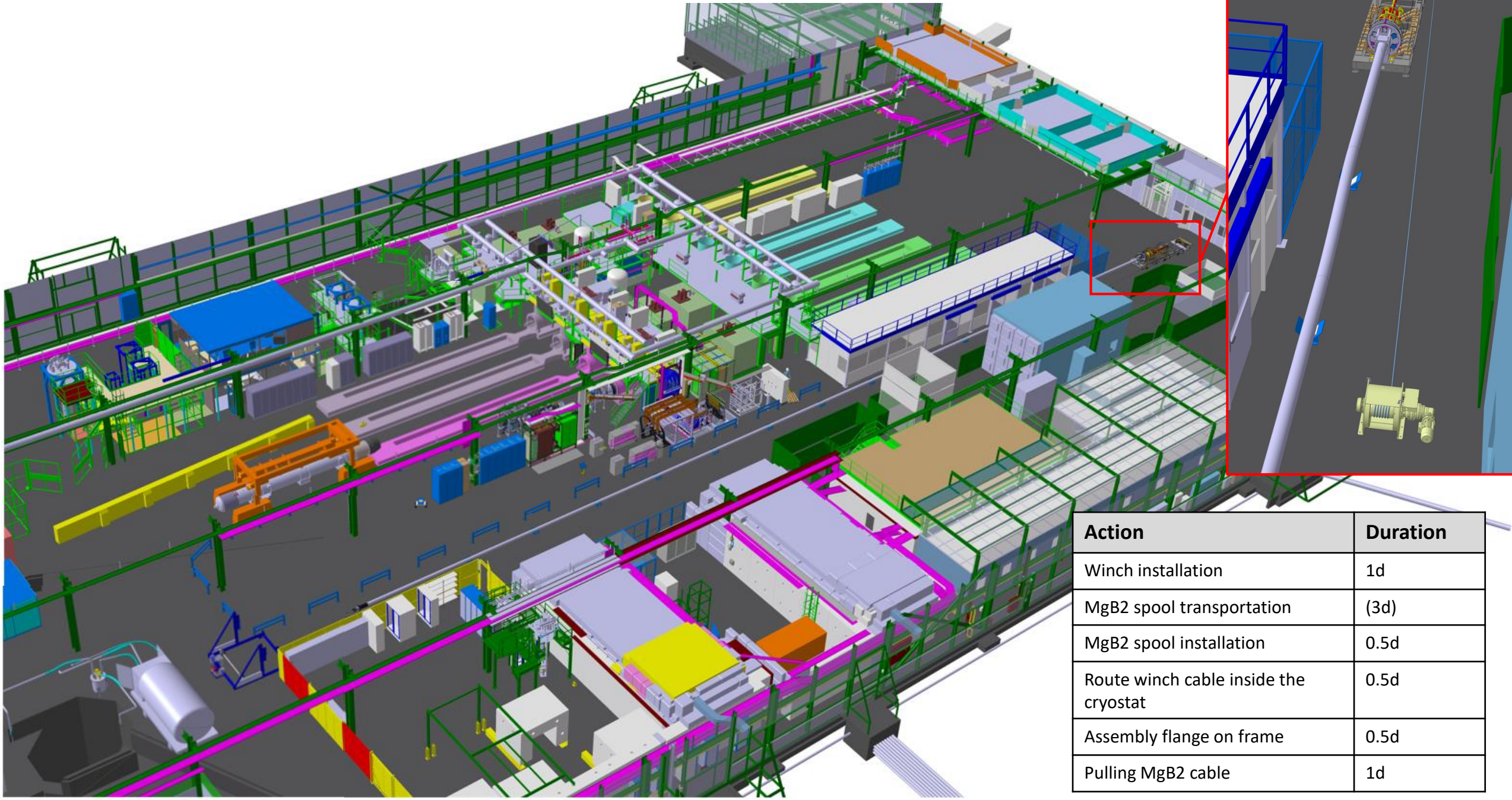# Phase 0: SCLink Cryostat+DFHx frame installation

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Phase 1: MgB2 spool installation + cable pulling

Action	Duration
Winch installation	1d
MgB2 spool transportation	(3d)
MgB2 spool installation	0.5d
Route winch cable inside the cryostat	0.5d
Assembly flange on frame	0.5d
Pulling MgB2 cable	1d

Phase 1: MgB2 spool installation + cable pulling

5m
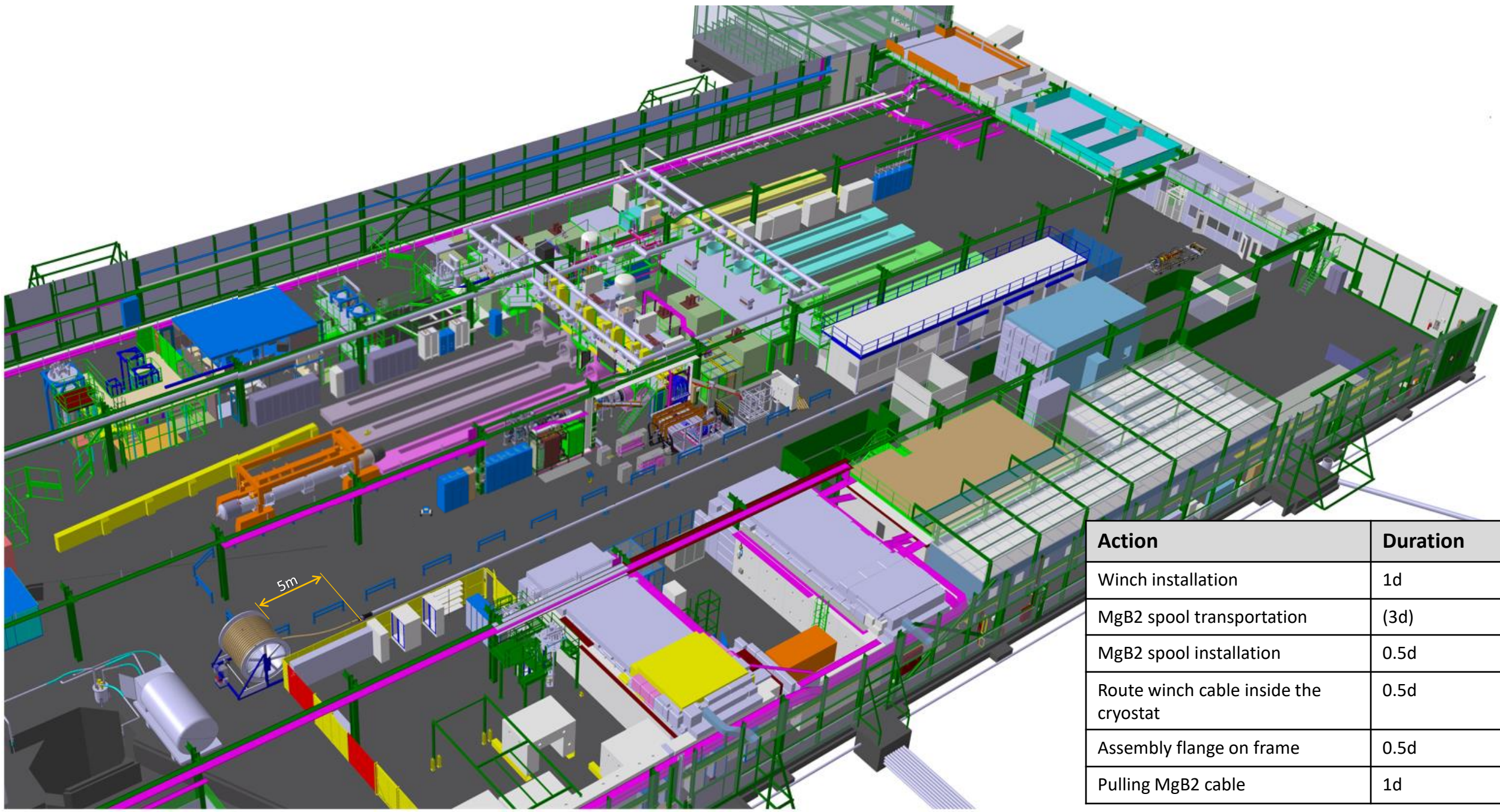
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Route winch cable inside the cryostat	0.5d
Assembly flange on frame	0.5d
Pulling MgB2 cable	1d

Phase 1: MgB2 spool installation + cable pulling

-Partially occupying the main transport corridors
(2m and 2.5 space available)

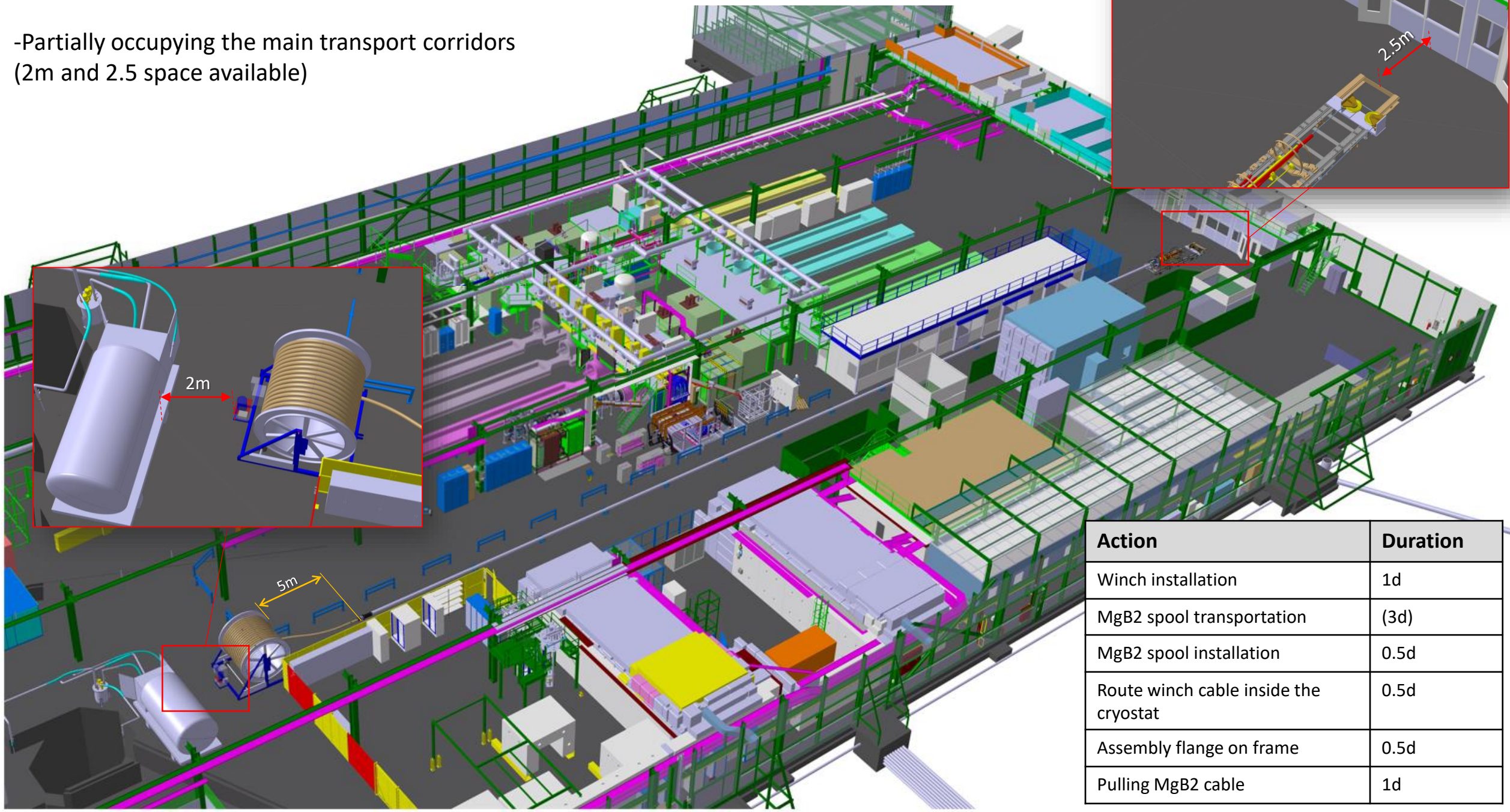| Action	Duration
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Phase 2: MgB2 spare cable unspooling
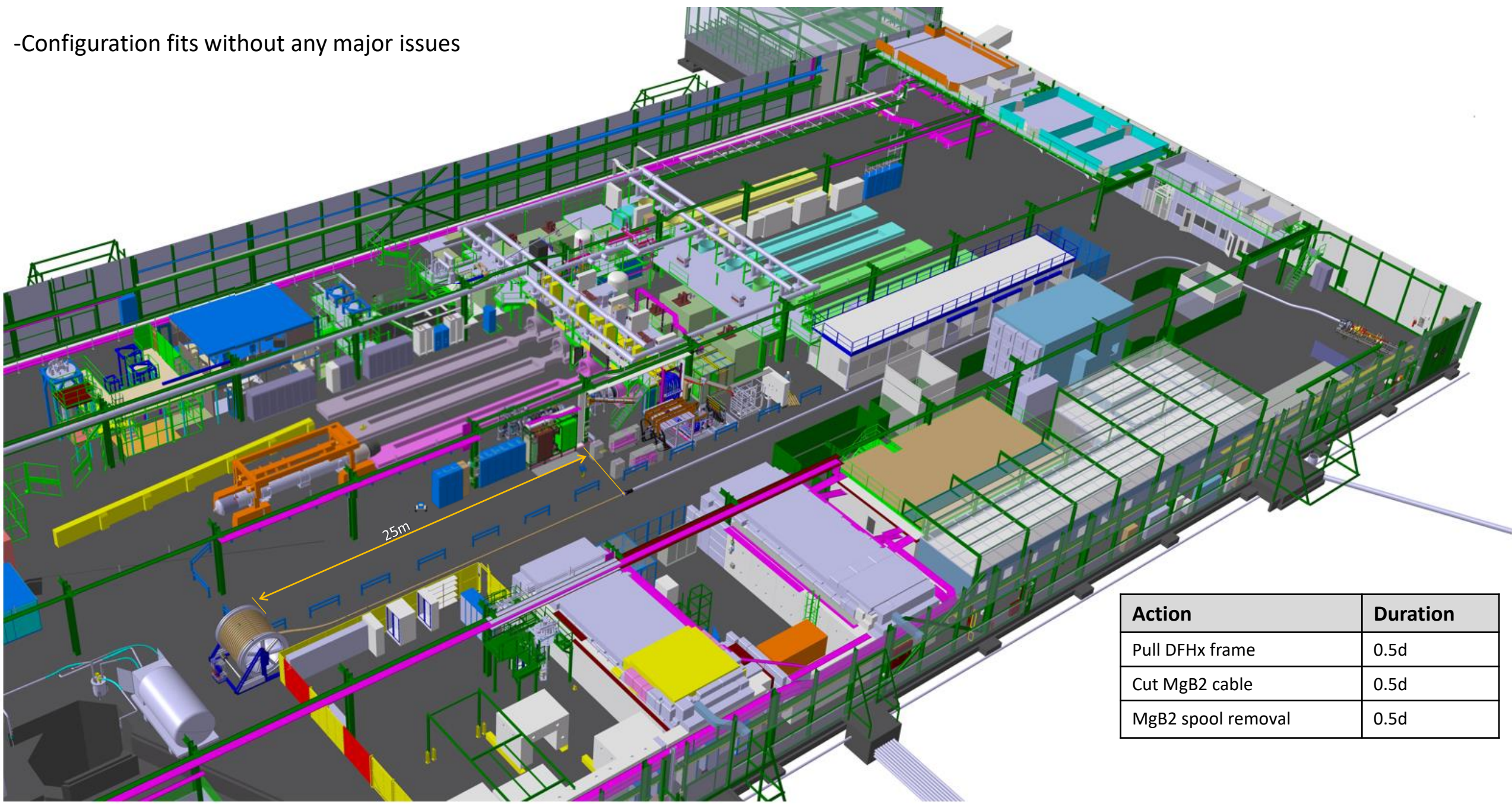
-Configuration fits without any major issues

25m

Action	Duration
Pull DFHx frame	0.5d
Cut MgB2 cable	0.5d
MgB2 spool removal	0.5d

Phase 2: MgB2 spare cable unspooling

-Configuration fits without any major issues

25m

Action	Duration
Pull DFHx frame	0.5d
Cut MgB2 cable	0.5d
MgB2 spool removal	0.5d

Phase 2: MgB2 spare cable unspooling

-Configuration fits without any major issues
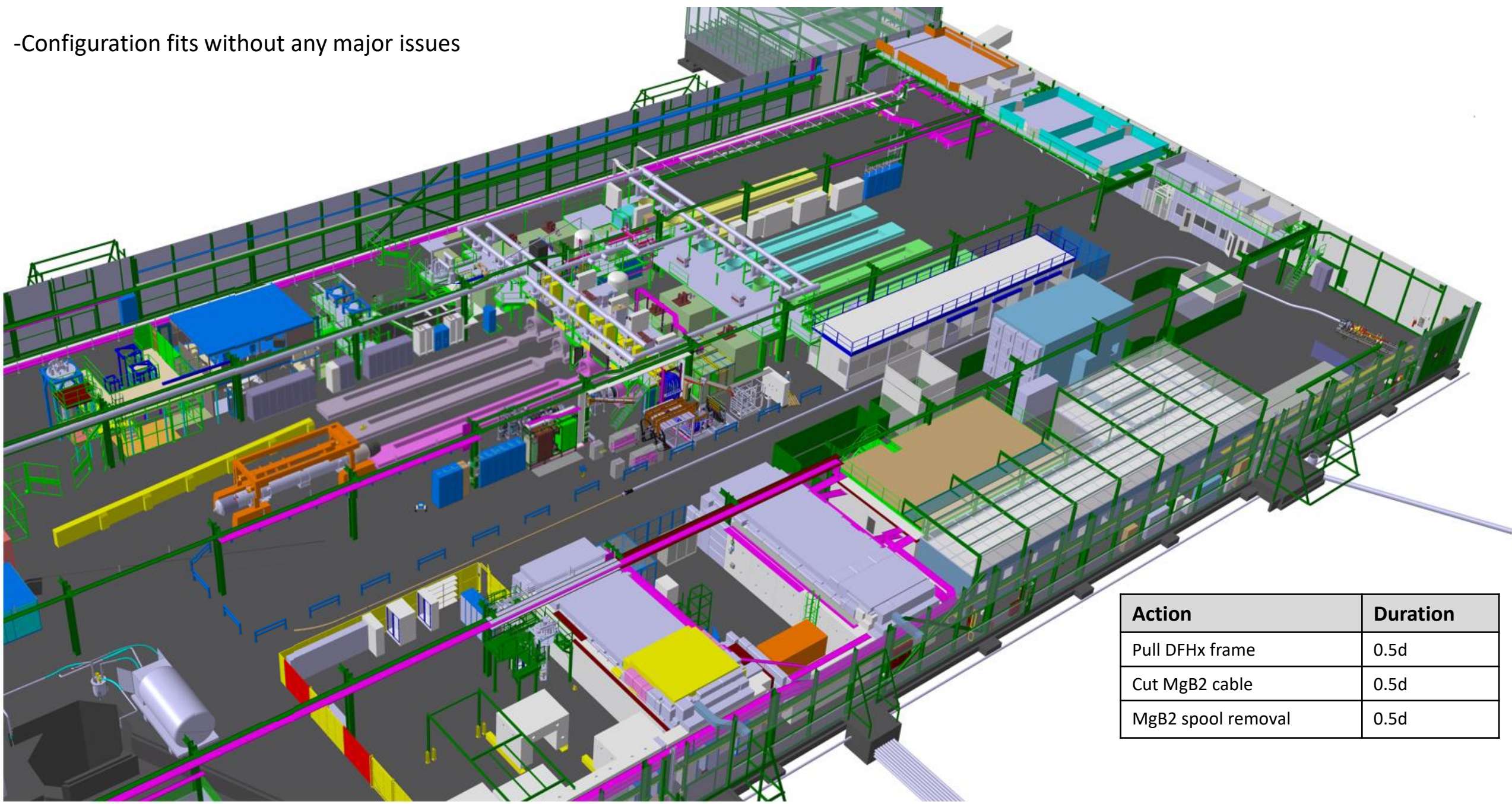
Action	Duration
Pull DFHx frame	0.5d
Cut MgB2 cable	0.5d
MgB2 spool removal	0.5d

Phase 3: DFHx +SCLink positioning at the reserved WP6a zone
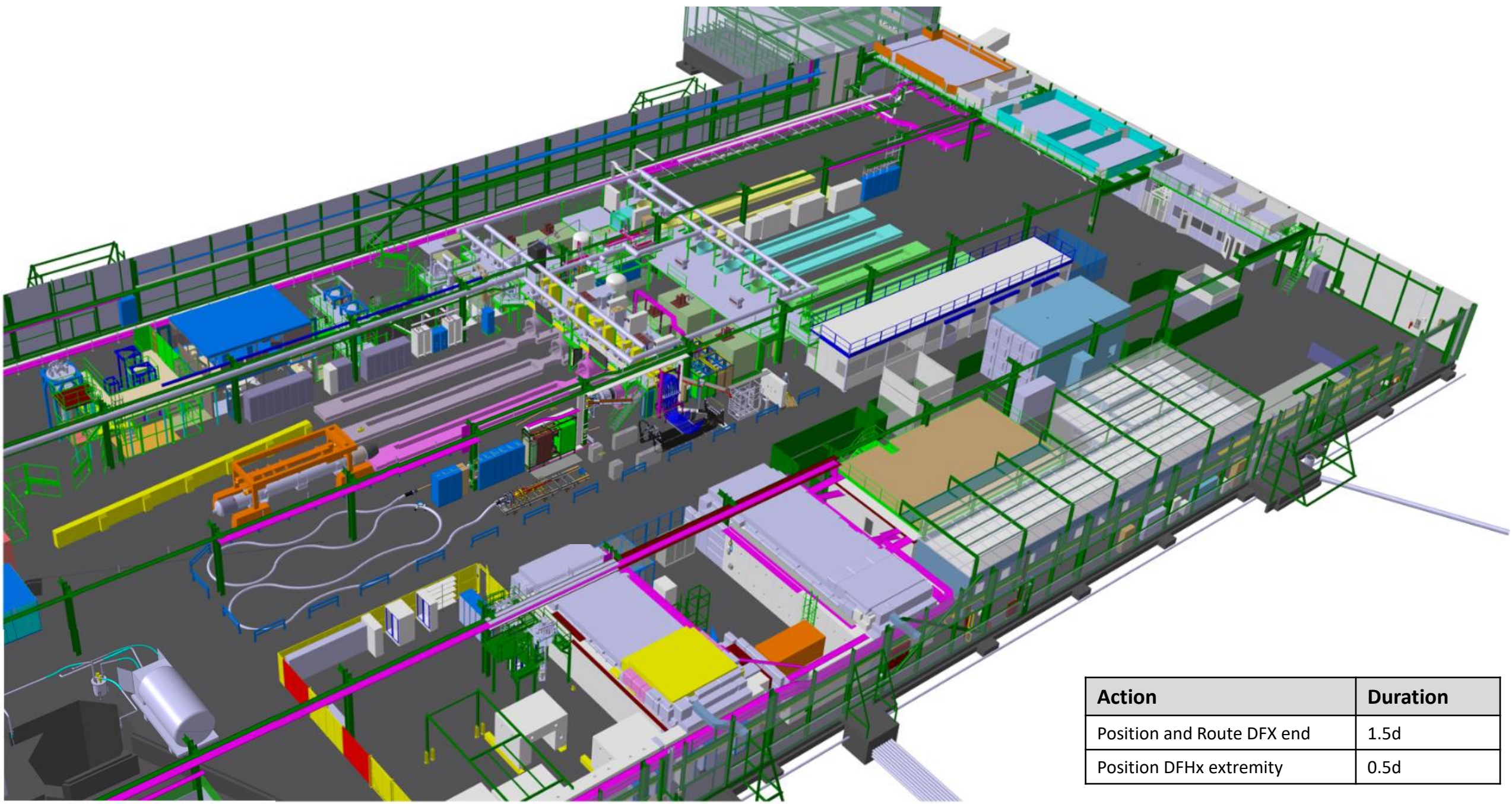
Action	Duration
Position and Route DFX end	1.5d
Position DFHx extremity	0.5d

Phase 3: DFHx +SCLink positioning in reserved space

MgB2 routing (Sc1)

5m
10m
15m
20m
25m

R: 2m
R: 2m

MgB2 cable pass near the patch panel-> Crowded area-Limited space
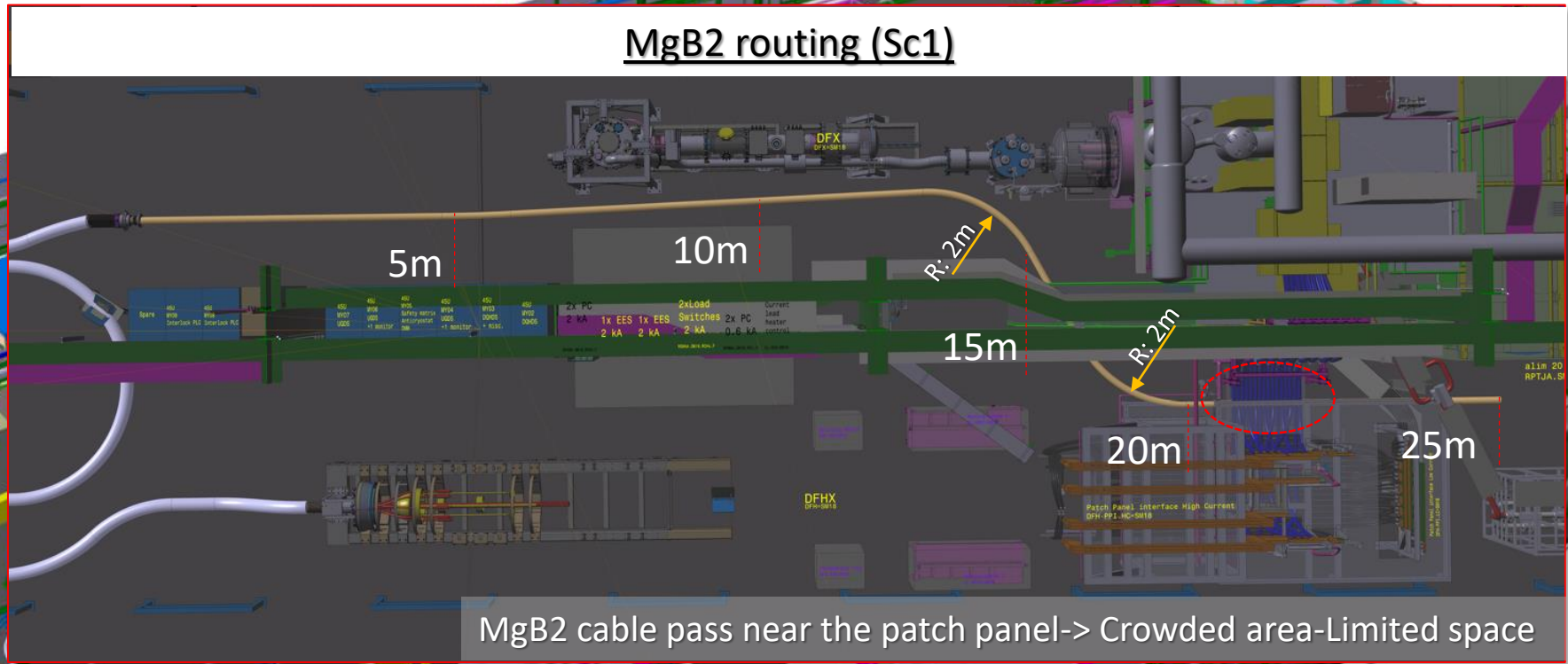
Action	Duration
Position and Route DFX end	1.5d
Position DFHx extremity	0.5d

Phase 3: DFHx +SCLink positioning in reserved space

MgB2 routing (Sc2)

R: 2m
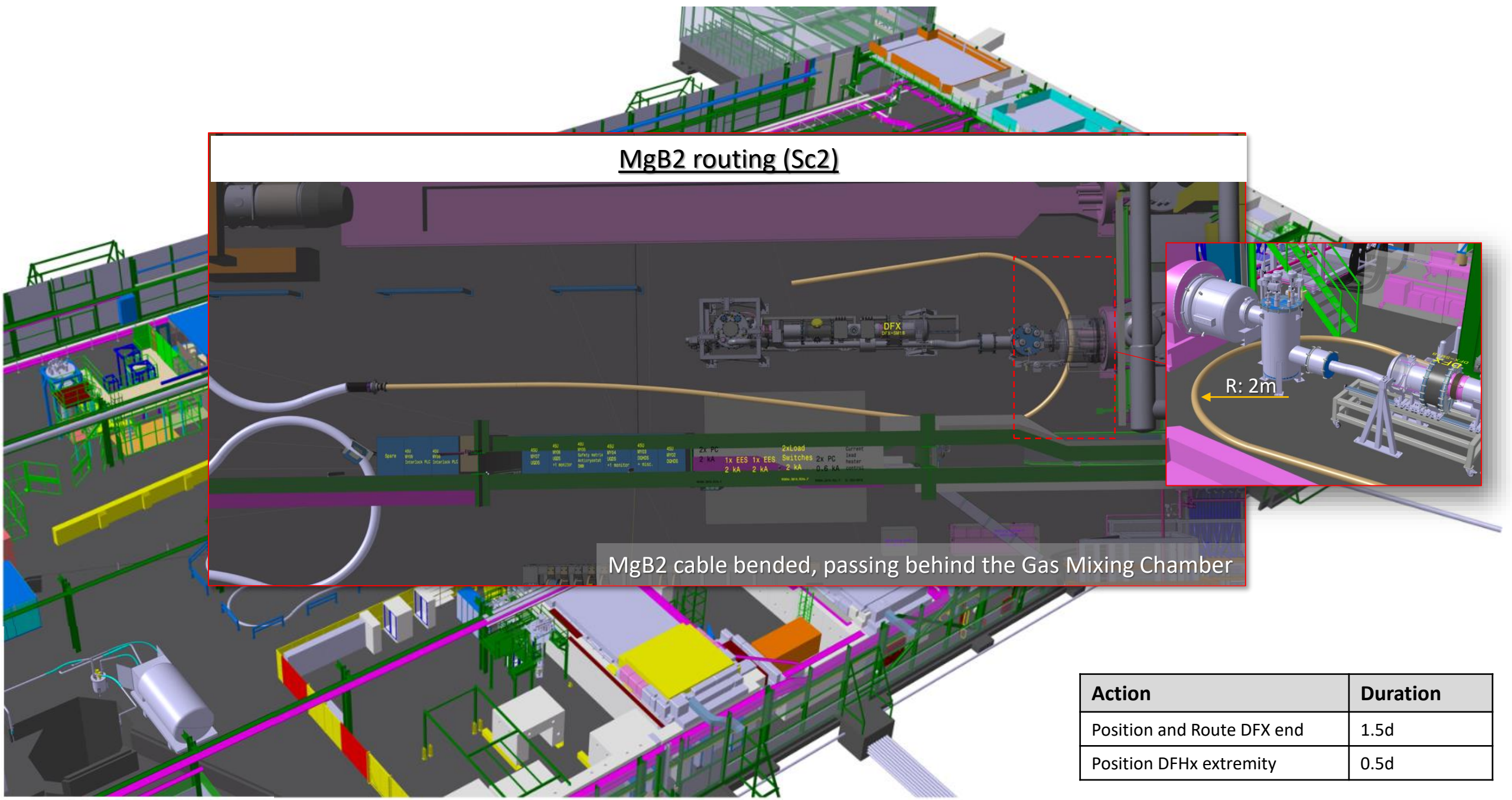
MgB2 cable bended, passing behind the Gas Mixing Chamber

Action	Duration
Position and Route DFX end	1.5d
Position DFHx extremity	0.5d

Phase 3: DFHx +SCLink positioning in reserved space

MgB2 routing (Sc3)

MgB2 cable remain straight -> MgB2 cable of max 22m can be accomodated

Action	Duration
Position and Route DFX end	1.5d
Position DFHx extremity	0.5d

Phase 3: DFHx +SCLink positioning in reserved space

MgB2 routing (Sc3)

22m

MgB2 cable remain straight -> MgB2 cable of max 22m can be accomodated
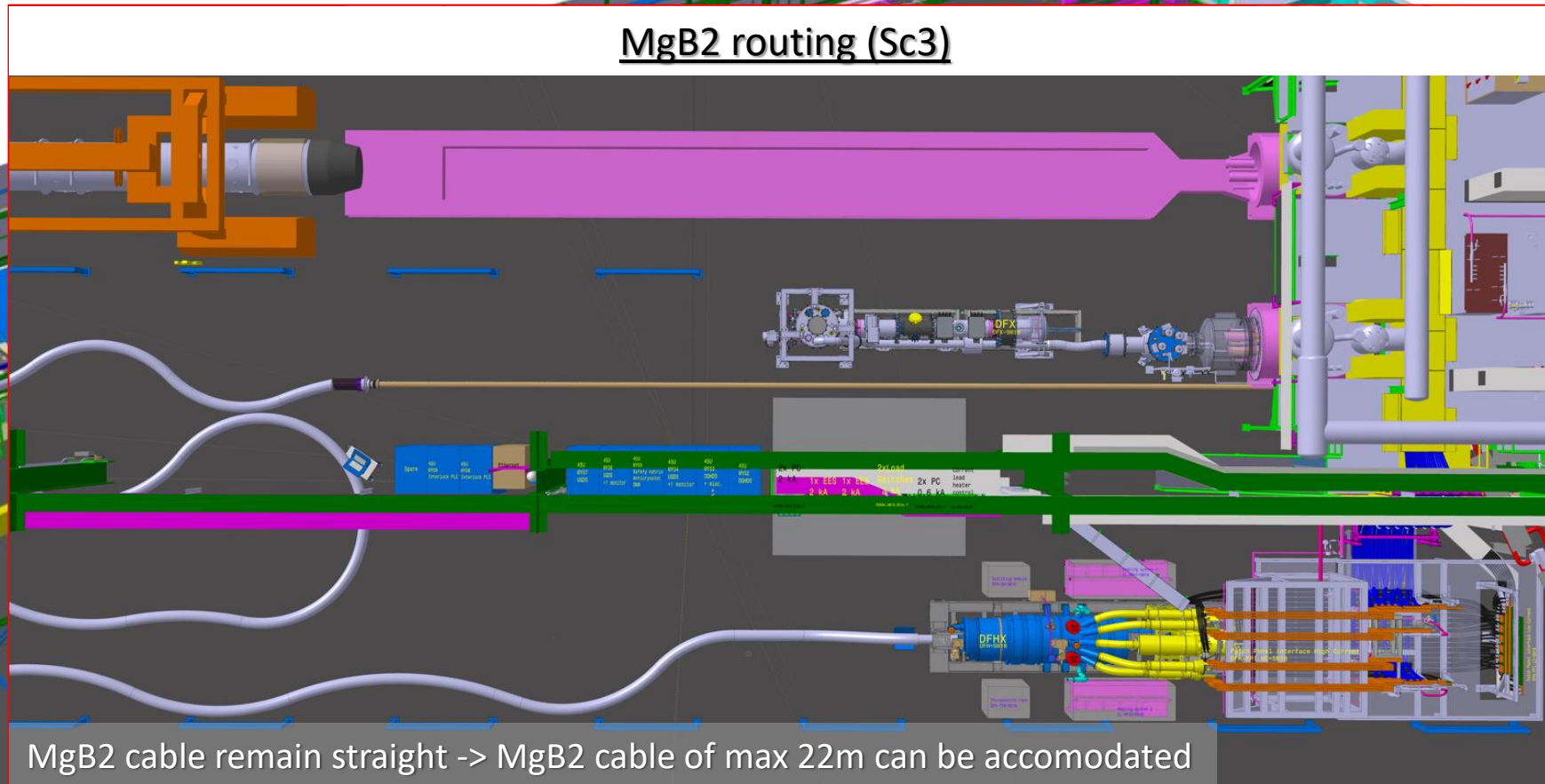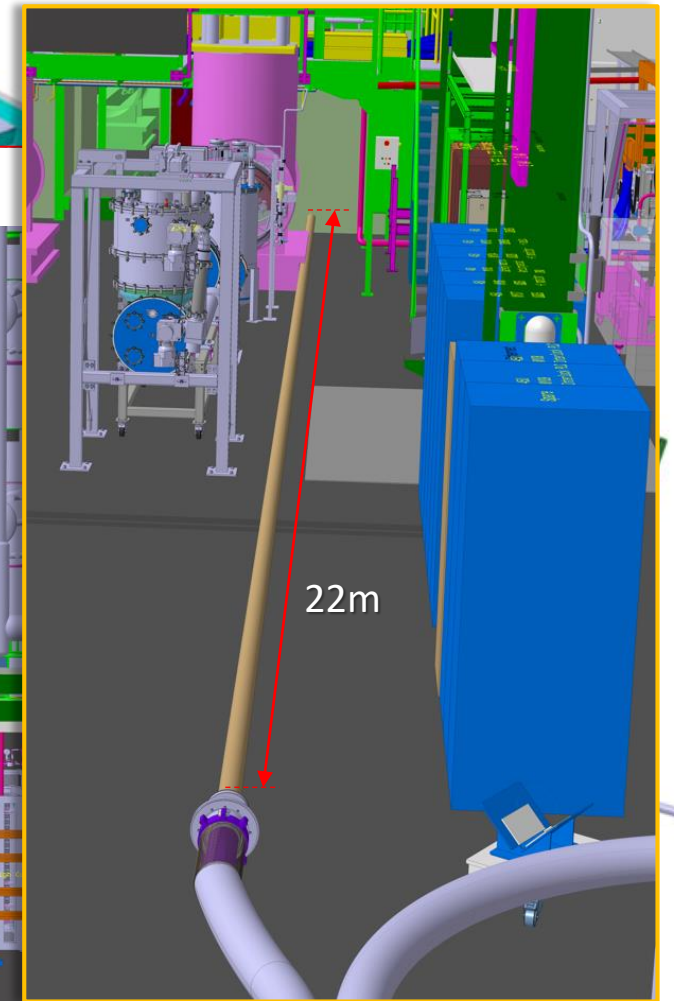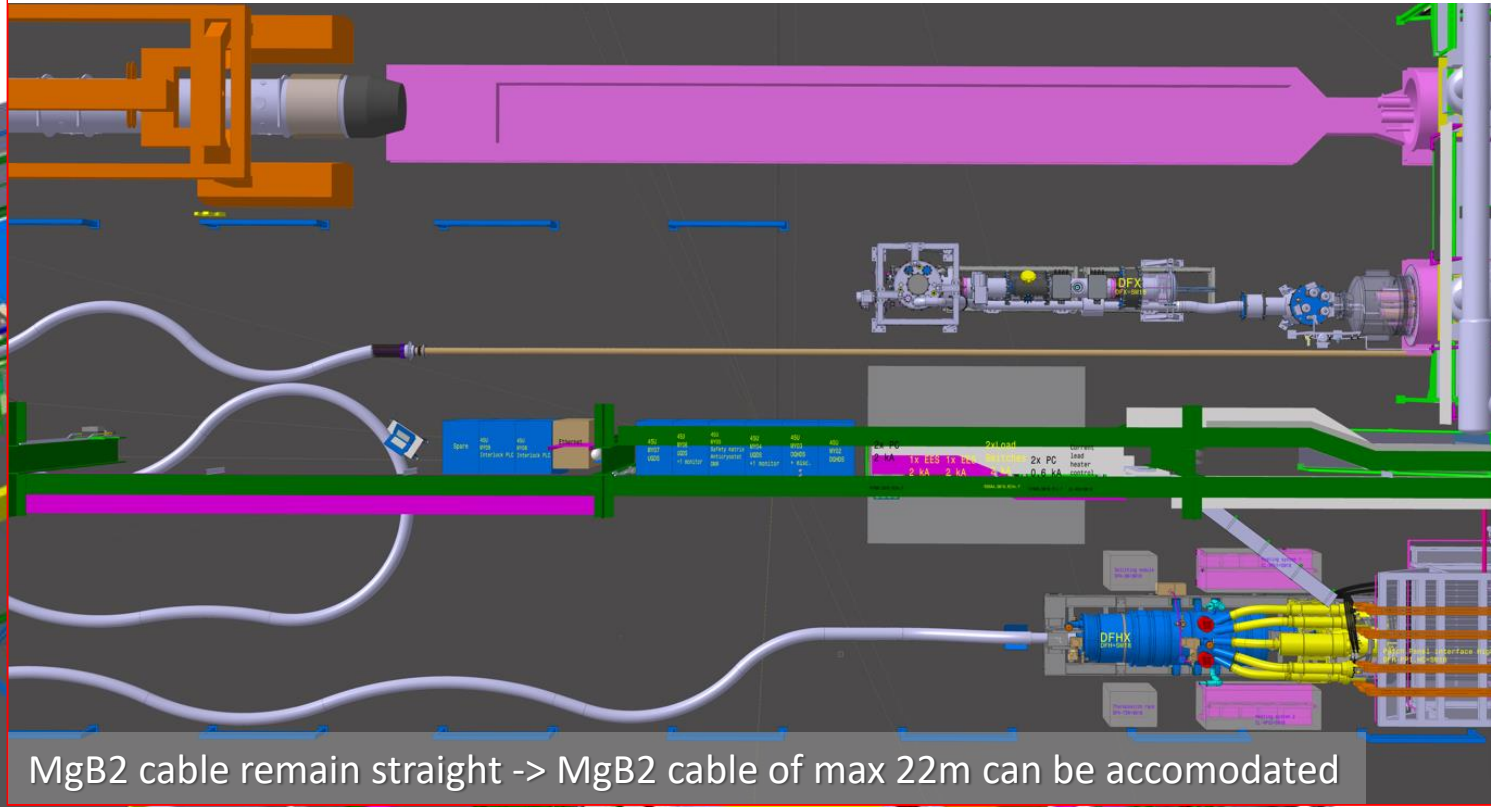
Action	Duration
Position and Route DFX end	1.5d
Position DFHx extremity	0.5d

Phase 3: DFHx +SCLink positioning at the reserved WP6a zone

Space of 7m left between the DFHx frame and patch panel -> Provide enough space for assembly

7m

Action	Duration
Position and Route DFX end	1.5d
Position DFHx extremity	0.5d

Phase 4: DFHx assembly & preparation to connect to Cluster F2

Action	Duration
DFHx assembly & Connection to ClusterF2	4.5m

Step 1: Position the frame at the nominal assembly position

Step 2: Install the jacks under the frame

Step 3: Lift the frame till the wheels are detached from the floor [Maintain the whole configuration straight]

Step 4: Assemble the cryostat

Step 5: Lower down the assembled cryostat

Step 6: Slide it towards the patch panel and reach the final installation position

Step 7.1: Install the jacks under the frame

Step 8: Lift the cryostat till the wheels are detached from the floor

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Step 10: Lower down the jacks (or brackets) till the cryostat reach the needed inclined position

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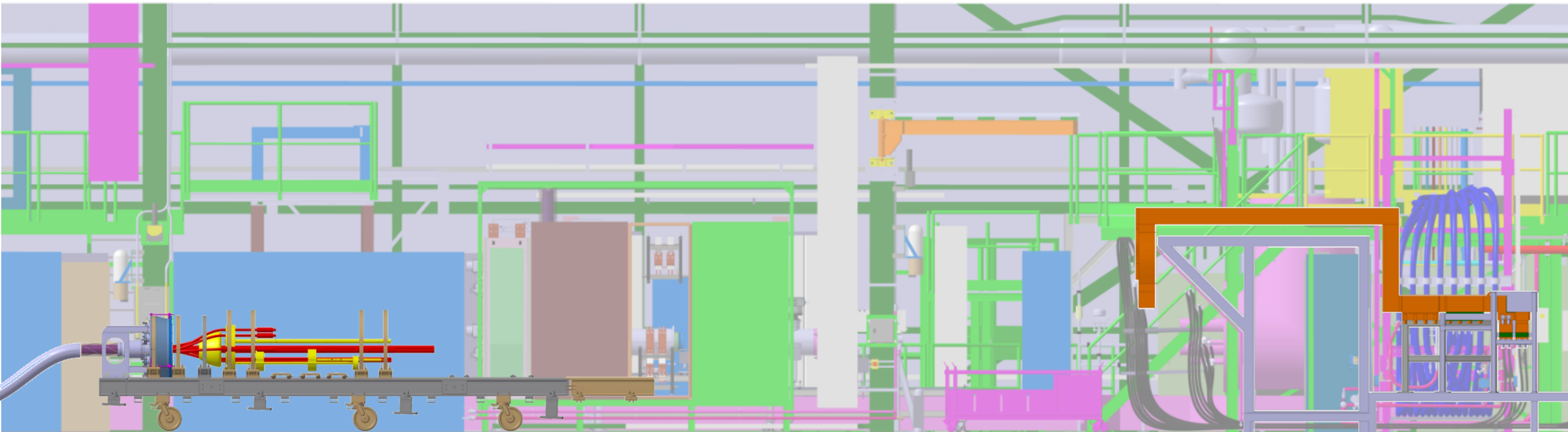Step 7.1: Install the jacks under the frame
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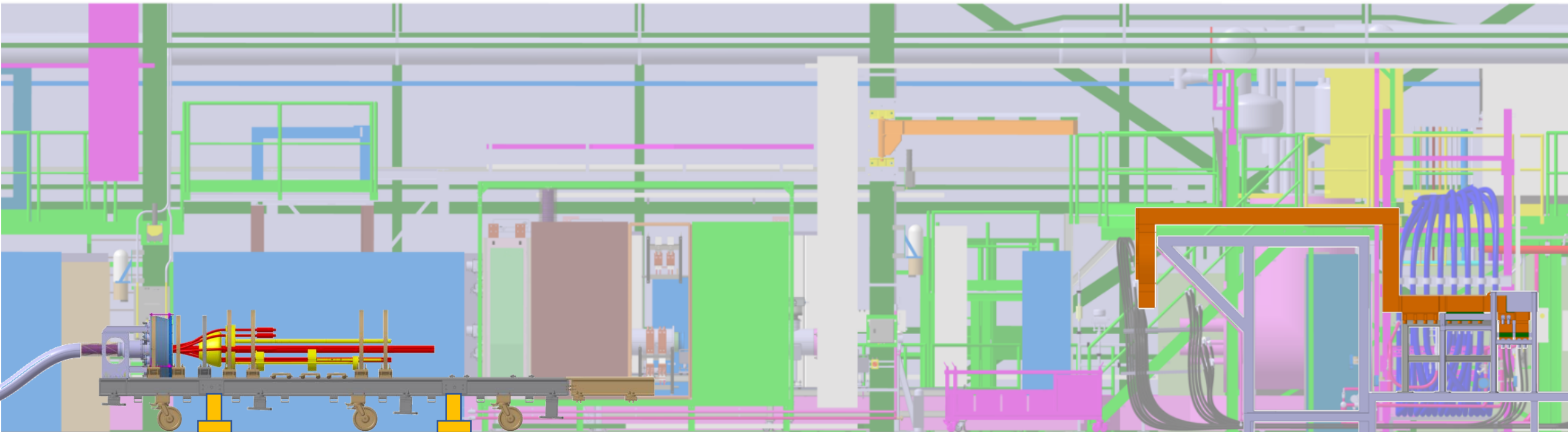Step 7.1: Install the jacks under the frame

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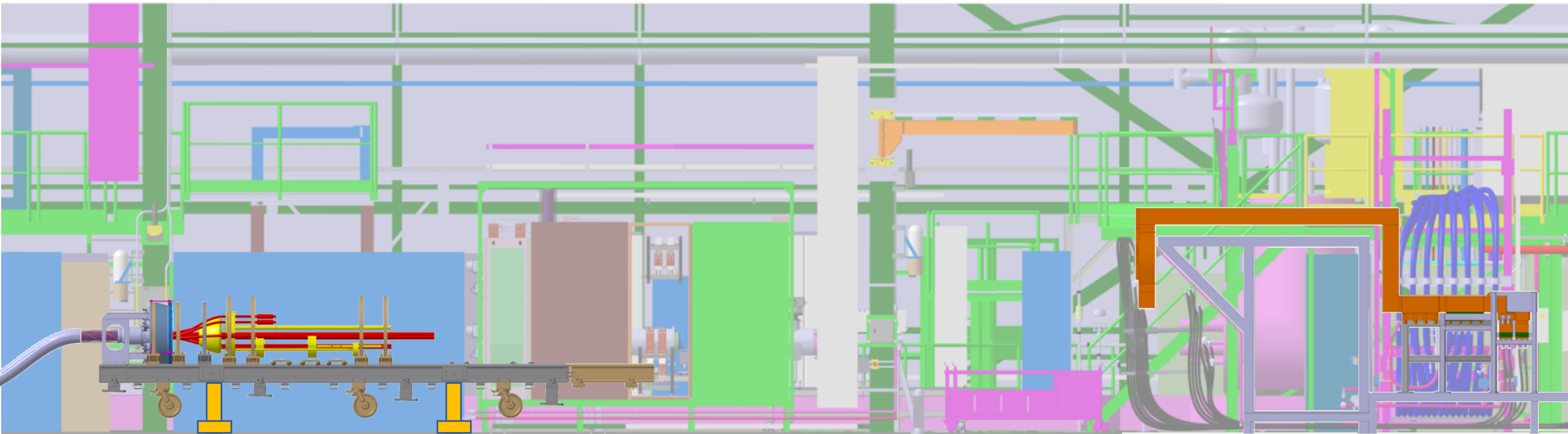Step 7.1: Install the jacks under the frame
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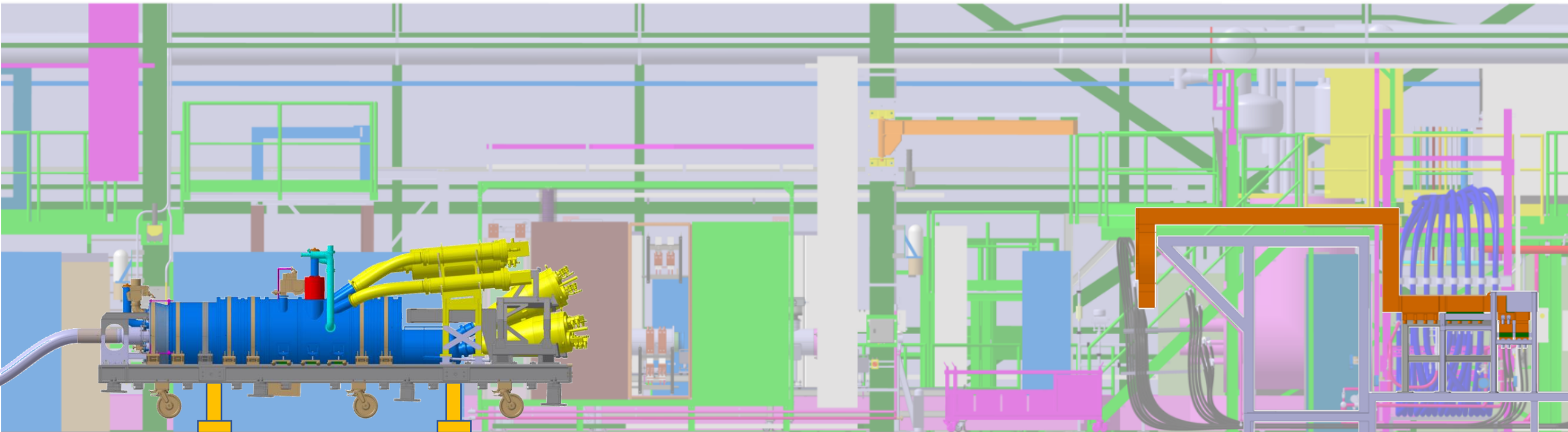Step 7.1: Install the jacks under the frame
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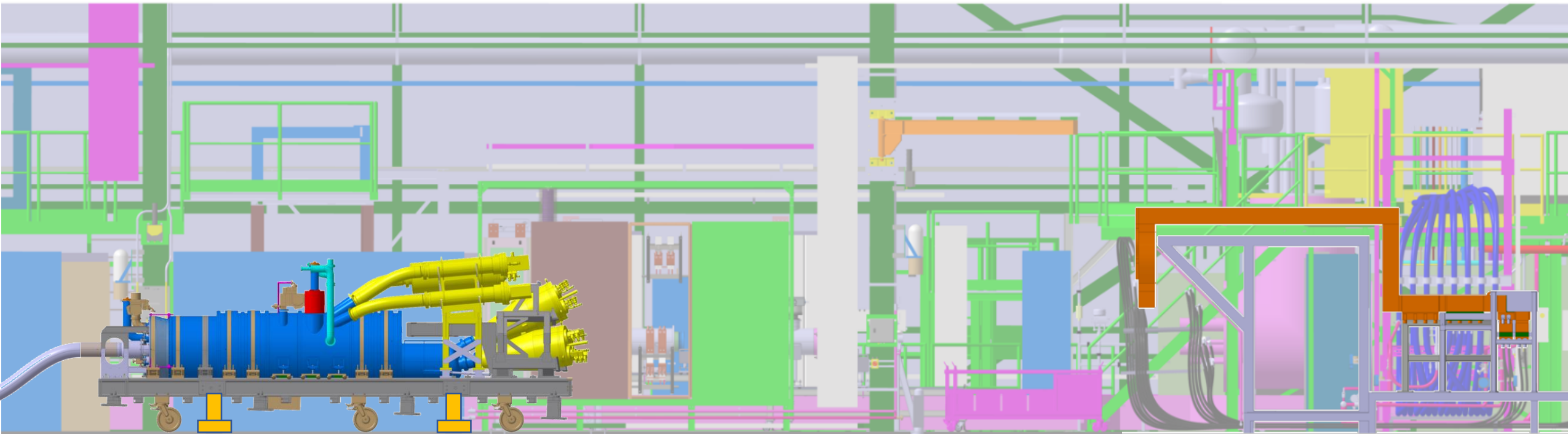Step 7.1: Install the jacks under the frame

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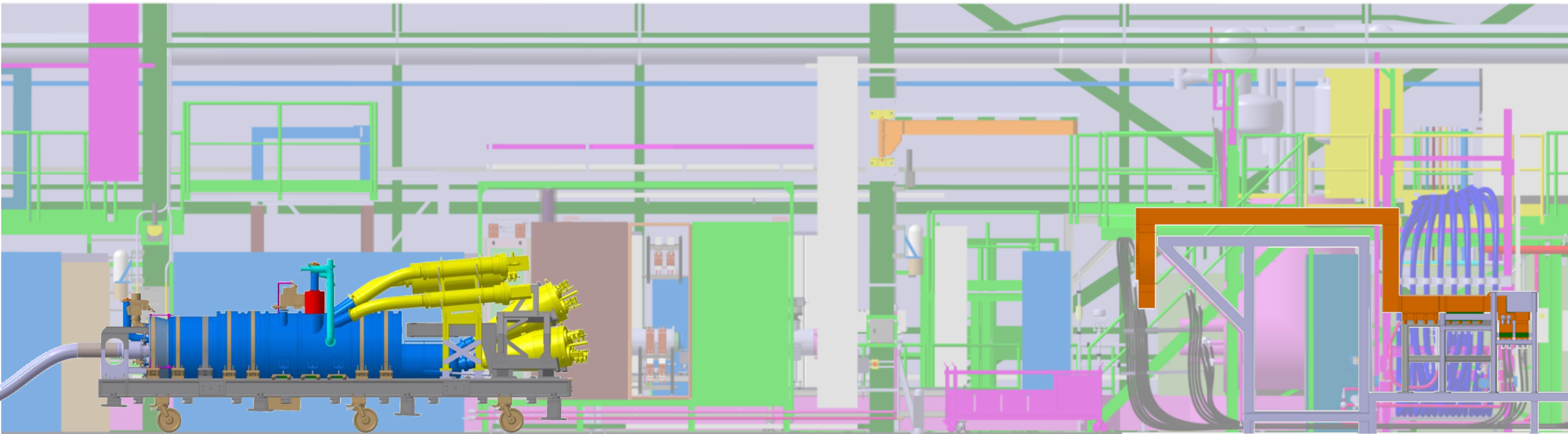Step 7.1: Install the jacks under the frame
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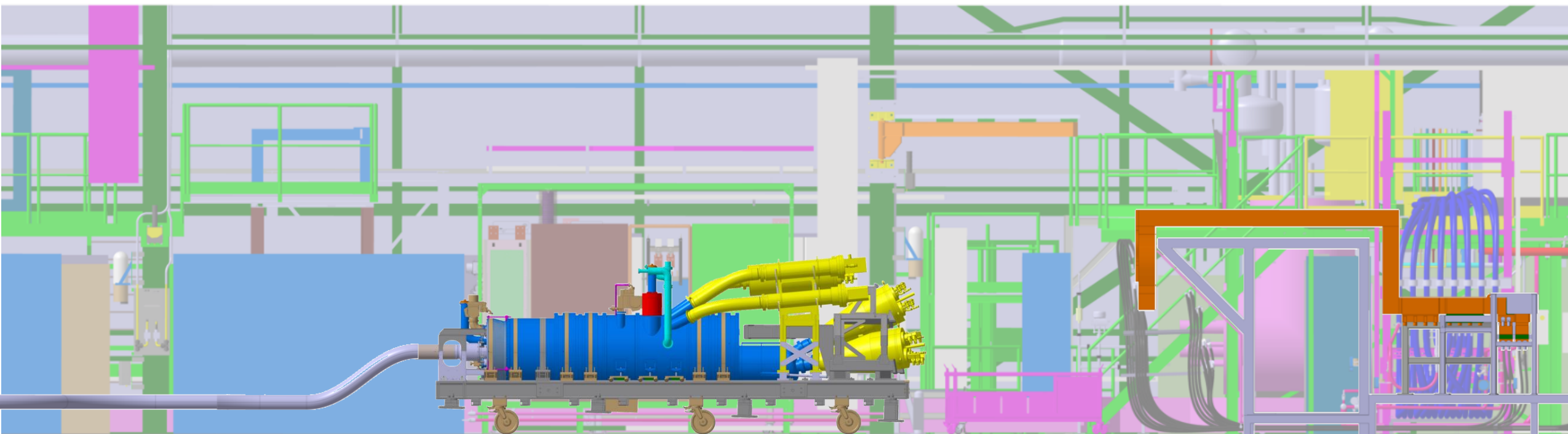Step 7.1: Install the jacks under the frame
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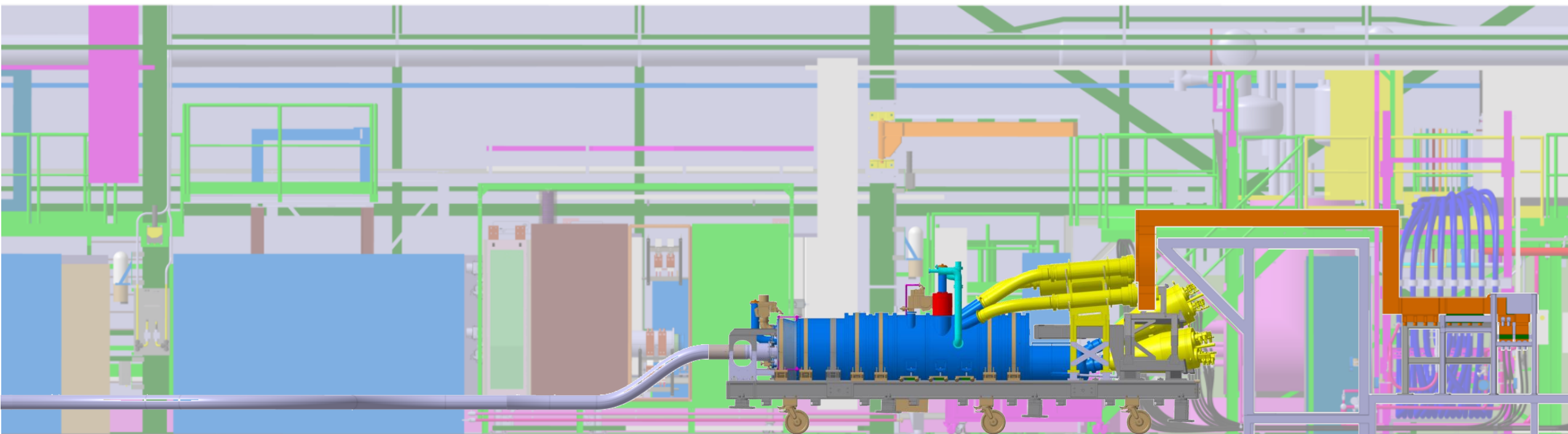**Step 7.1: Install the jacks under the frame**
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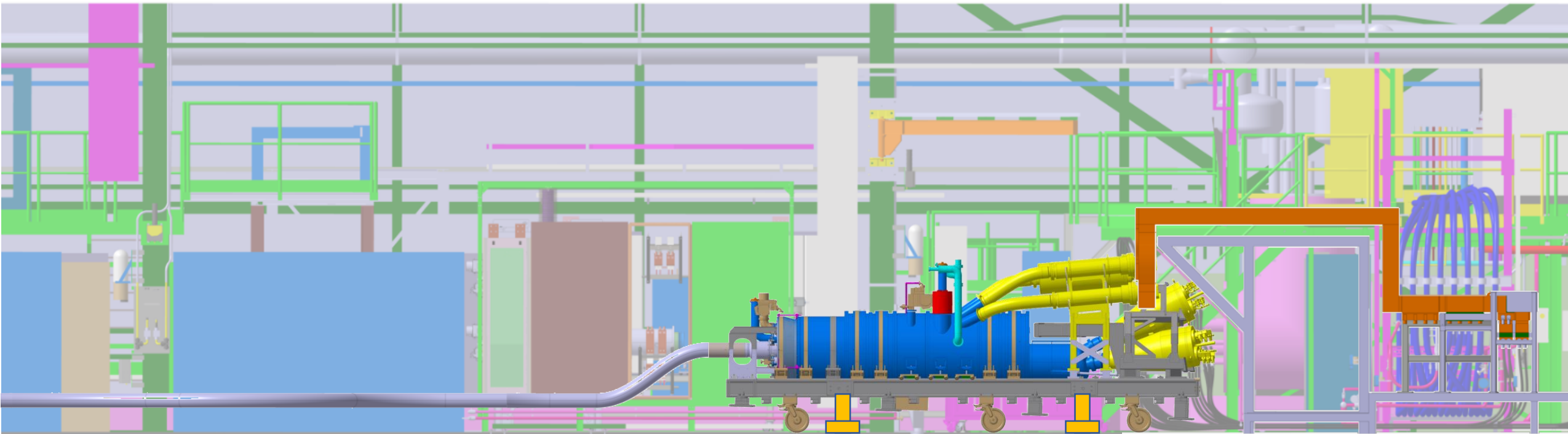Step 7.1: Install the jacks under the frame
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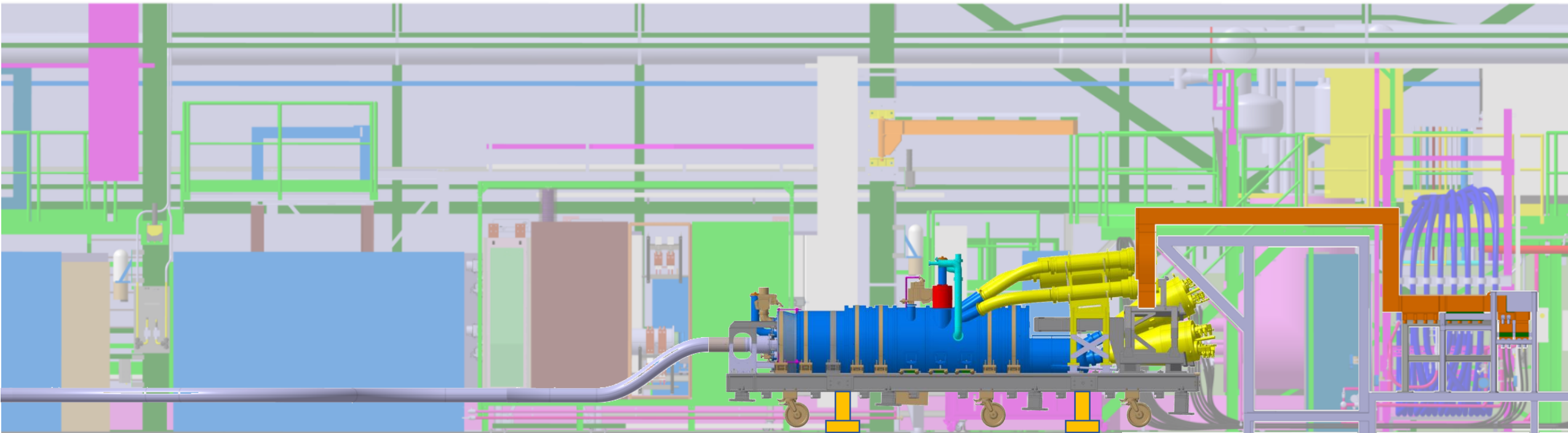Step 7.1: Install the jacks under the frame
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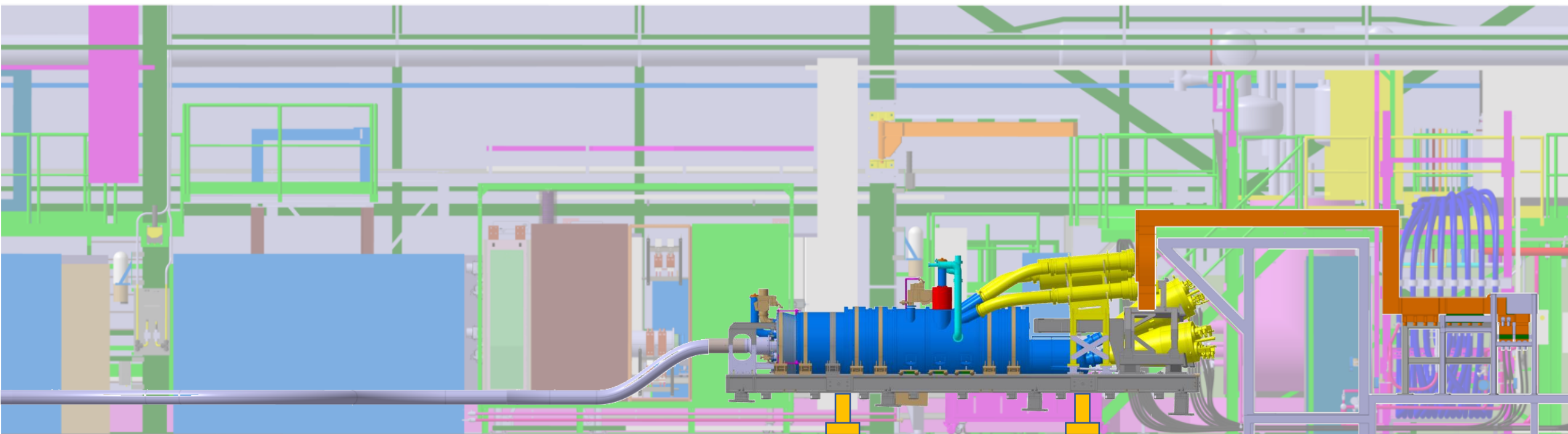Step 7.1: Install the jacks under the frame
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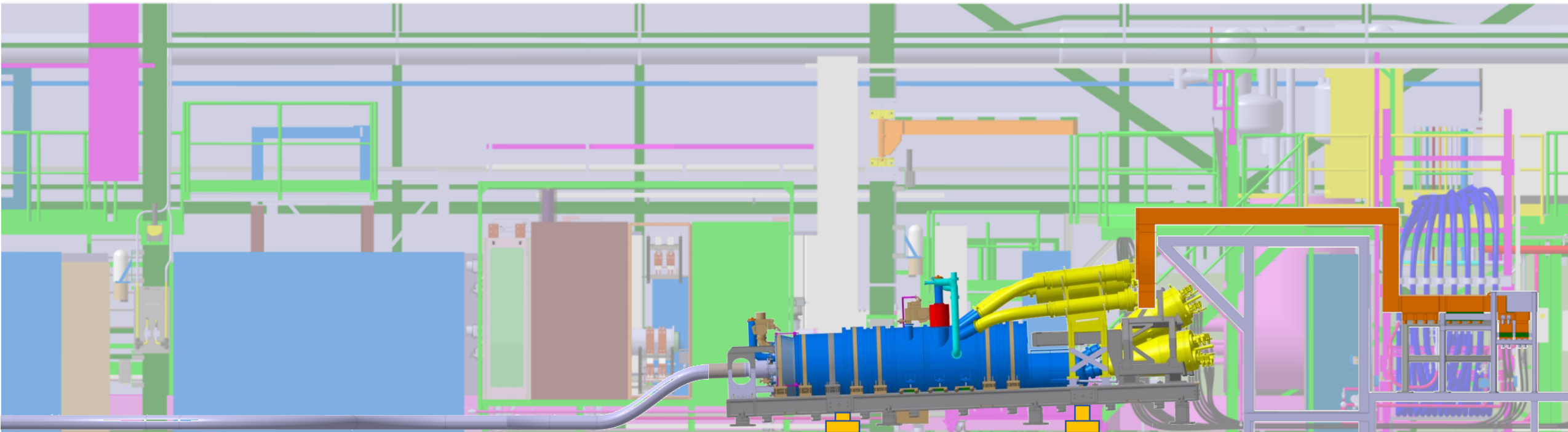Step 7.1: Install the jacks under the frame
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Step 12: Connect the cryostat to the patch panel

Phase 4: DFHx assembly & preparation to connect to Cluster F2

Action	Duration
DFHx assembly & Connection to ClusterF2	4.5m

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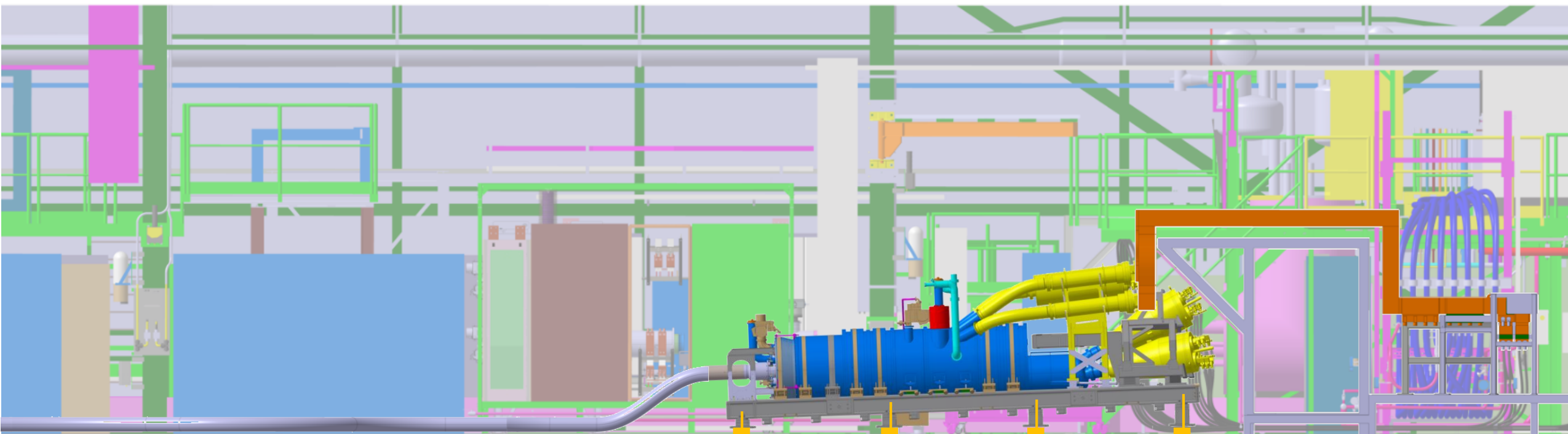Step 7.1: Install the jacks under the frame
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Courtesy:
Franco Di Ciocchis

Phase 4: DFHx assembly & preparation to connect to Cluster F2

Action	Duration
DFHx assembly & Connection to ClusterF2	4.5m

Step 1: Position the frame at the nominal assembly position
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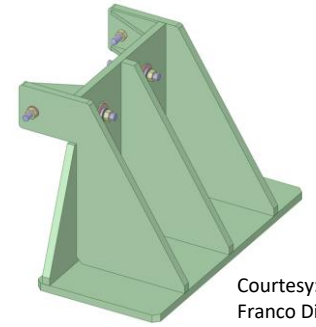Step 7.1: Install the jacks under the frame
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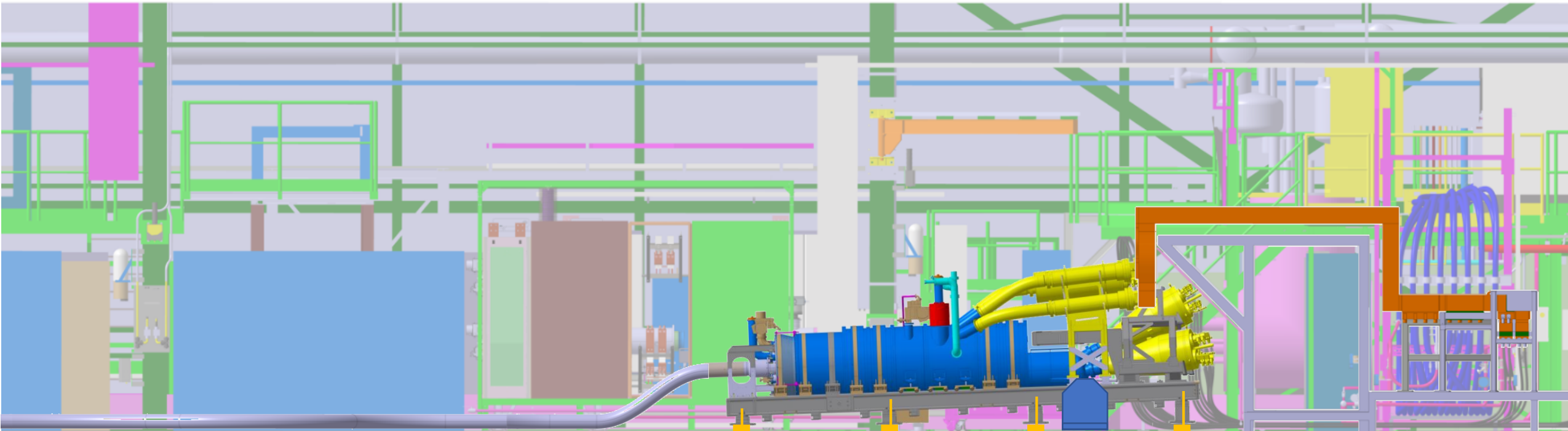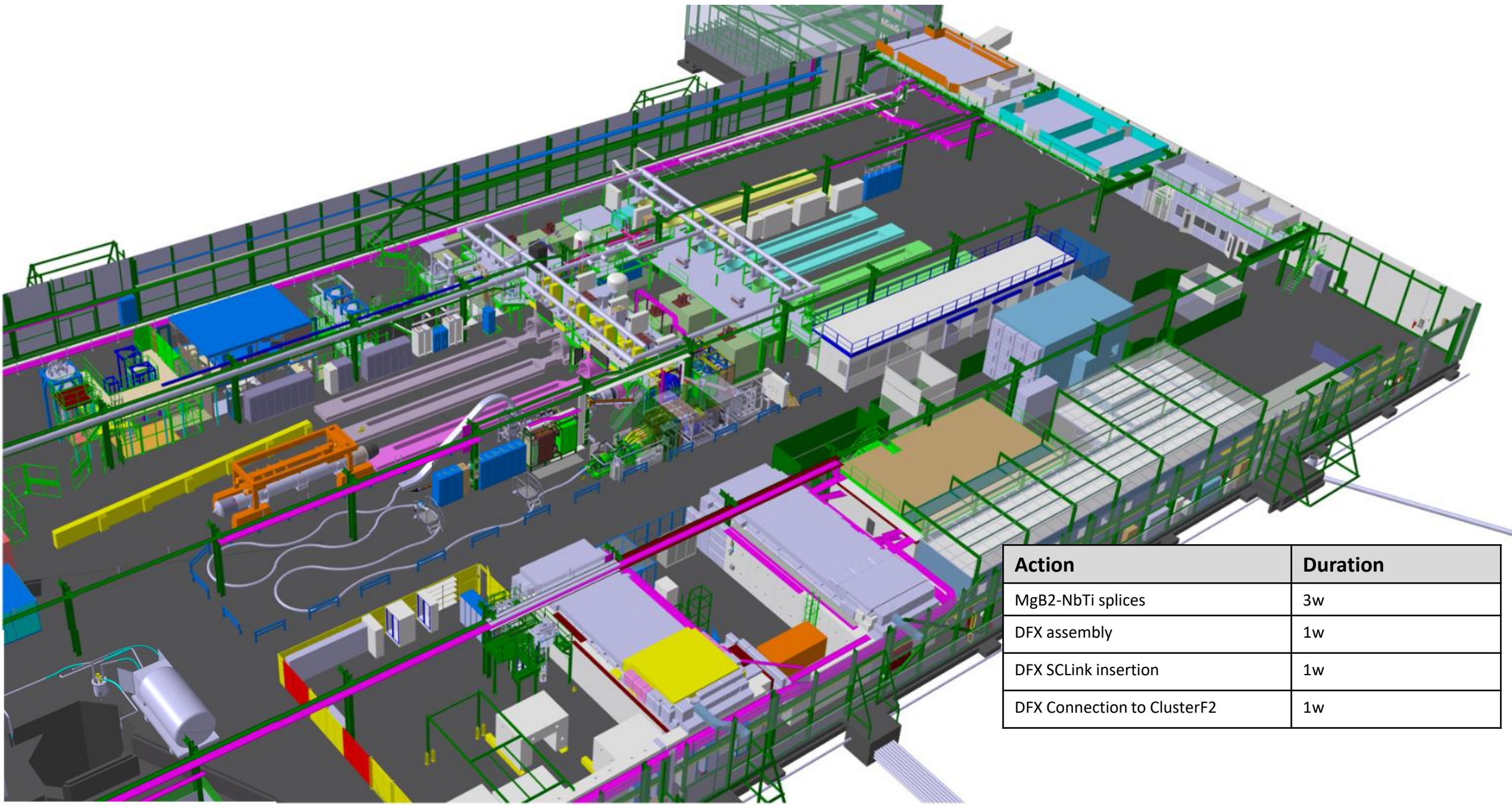Step 9: Remove the wheels
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Phase 5: DFHx connection to ClusterF

Action	Duration
MgB2-NbTi splices	3w
DFX assembly	1w
DFX SCLink insertion	1w
DFX Connection to ClusterF2	1w

Preliminary overview of <u>optimistic</u> planning until DFX-DSHX-DFHX are located in the reserved WP6a zone

- Assuming resources, space and services are available
  - 8 days to fit in the WP6a reserved zone
  - 4 days to be ready to pull MgB2 cable

	Action	Duration	Cumulative days
			1 2 3 4 5 6 7 8 9
Phase 0	Spooler transportation	(1w)	
	Cryostat spool transportation	(3d)	
	Cryostat spool installation	0.5d	
	Cryostat unspooling	1d	
	Cryostat straightening+fixing	1d	
	DFHx frame positioning	0.5d	
	Cryostat spool removal	0.5d	
Phase 1	Winch installation	1d	
	MgB2 spool transportation	(3d)	
	MgB2 spool installation	0.5d	
	Route winch cable inside the cryostat	0.5d	
	Assembly flange on frame	0.5d	
	Pulling MgB2 cable	1d	
Phase 2	Pull DFHx frame	0.5d	
	Cut MgB2 cable	0.5d	
	MgB2 spool removal	0.5d	
Phase 3	Position and Route DFX end	1.5d	
	Position DFHx extremity	0.5d	
Phase 4	DFHx assembly & Connection to ClusterF2	4.5m	
Phase 5	MgB2-NbTi splices	3w	
	DFX assembly	1w	
	DFX SCLink insertion	1w	
	DFX Splice box installation + closure	1w	
	DFX Connection to ClusterF2	1w	