An Overview of the ITER EC Transmission Line

F. Gandini[a], F. Albajar[b], T. Bigelow[c], B. Becket[a], T. Bonicelli[b], J. Caughman[c], C. Darbos[a], G. Denisov[d], T. Gassman[a], M. Henderson[a], O. Jean[a], K. Kajiwara[e], N. Kobayashi[e], C. Nazare[a], J. Oda[e], T. Omori[a], D. Purohit[a], S.L. Rao[f], D.Rasmussen[c], D. Ronden[g], G. Saibene[b], K. Sakamoto[e], M. Shapiro[h], K.Takahashi[e], R. Temkin[h]

[a] ITER Organization, St. Paul-lez-Durance, 13067 France;

[b] Fusion for Energy, C/ Josep Pla 2, Torres Diagonal Litoral-B3,E-08019 Barcelona – Spain

[e] US ITER Project Office, ORNL, 055 Commerce Park, PO Box 2008, Oak Ridge, TN 37831, USA

[d] Institute of Applied Physics, 46 Ulyanov Street, Nizhny Novgorod, 603950 Russia

[e] Japan Atomic Energy Agency (JAEA) 801-1 Mukoyama, Naka-shi, Ibaraki 311-0193 Japan

[f] Institute for Plasma Research, Near Indira Bridge, Bhat, Gandhinagar, 382428, India

[g] Association EURATOM-FOM, 3430 BE Nieuwegein, The Netherlands

[h] MIT Plasma Science and Fusion Center, Cambridge, MA 02139, USA

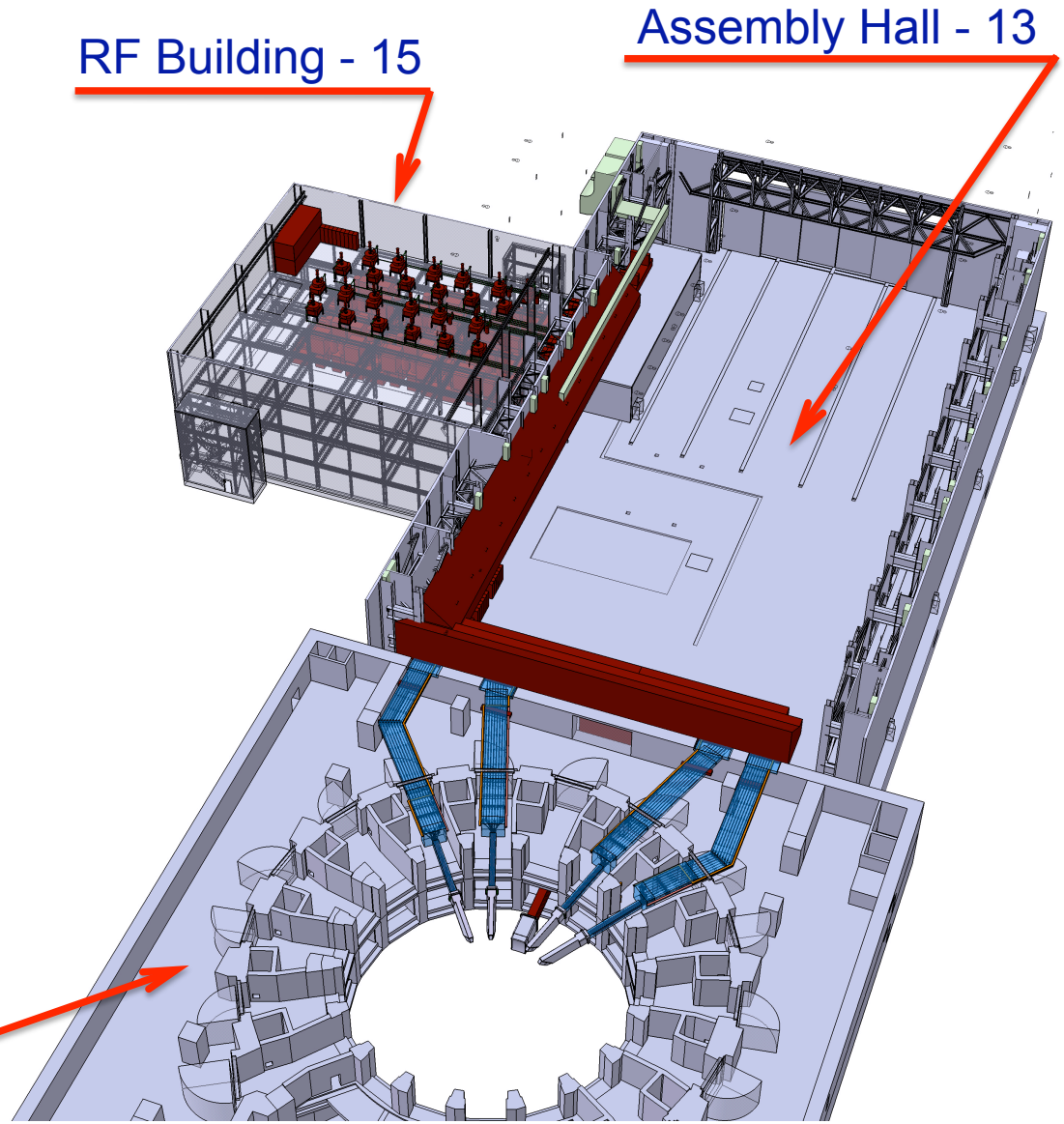
Outline

- General description of a typical TL
- Transmission Line Functional Requirements
- 2 MW source option

Generic TL description

The Transmission Line (TL):

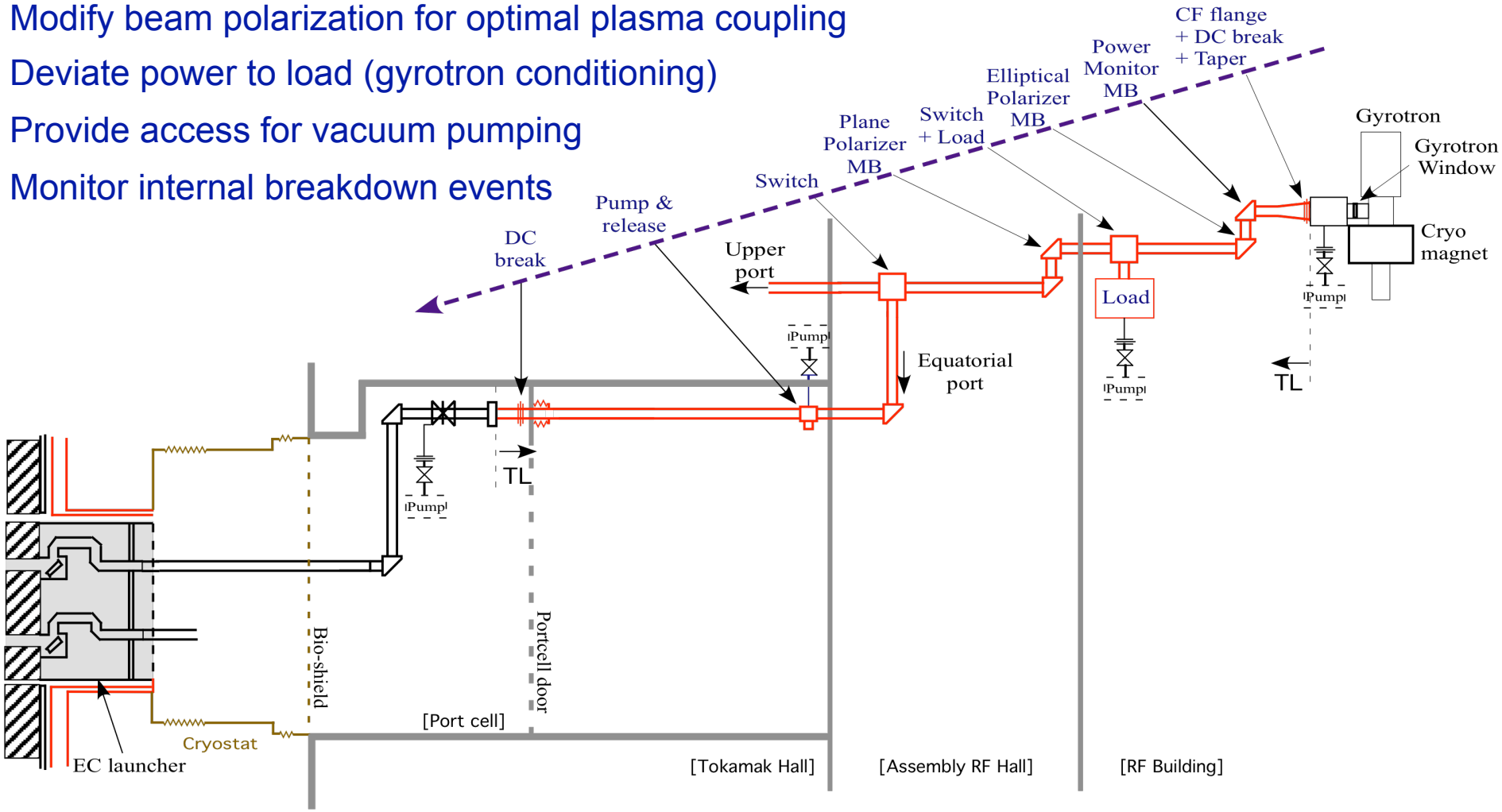
- ✓ Uses evacuated HE_{11} waveguide
- ✓ Rated for 2 MW transmission
- ✓ Roughly 160 m in length
- ✓ Transmission efficiency ≤ 90%
- ✓ Directs power to either EL or UL
- ✓ Provides 2nd tritium confinement



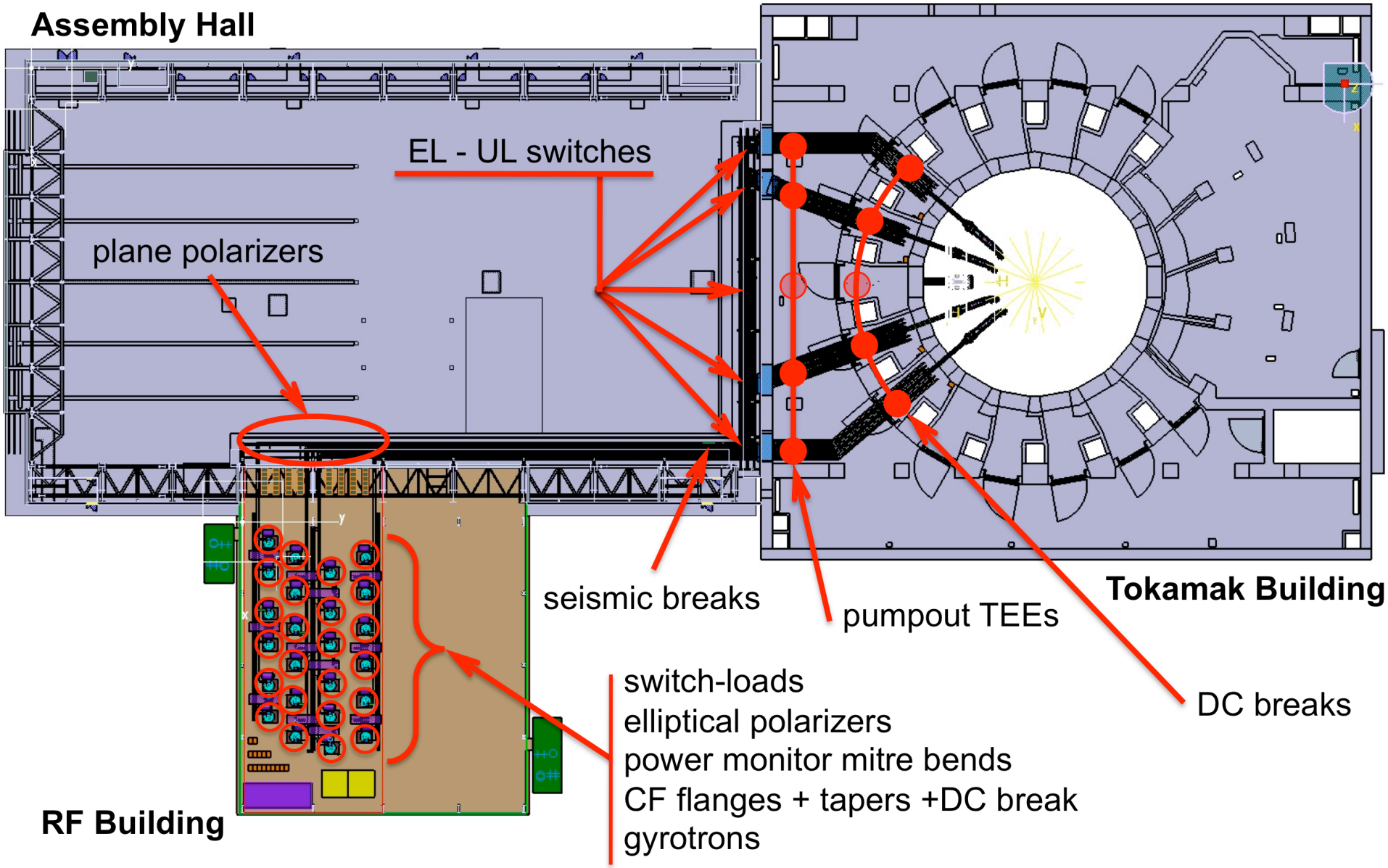
Layout of a generic Transmission Line

The TL also has the following functions:

- ✓ Provide DC isolation at gyrotron and tokamak
- ✓ Monitor forward and reflected power
- ✓ Modify beam polarization for optimal plasma coupling
- ✓ Deviate power to load (gyrotron conditioning)
- ✓ Provide access for vacuum pumping
- ✓ Monitor internal breakdown events

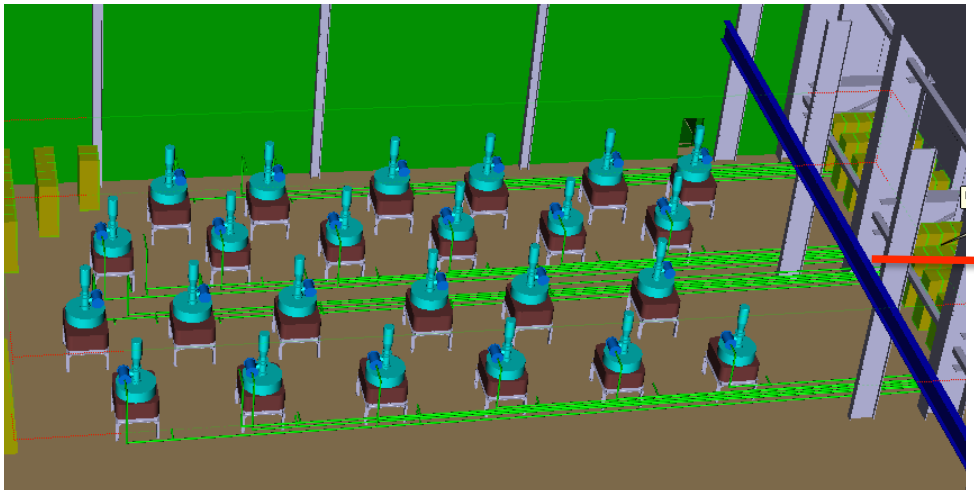


Generic TL description – 1MW EU gyrotron option

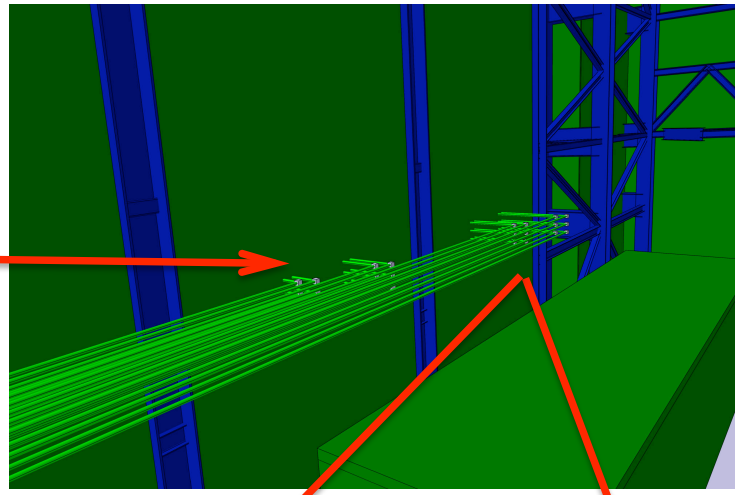


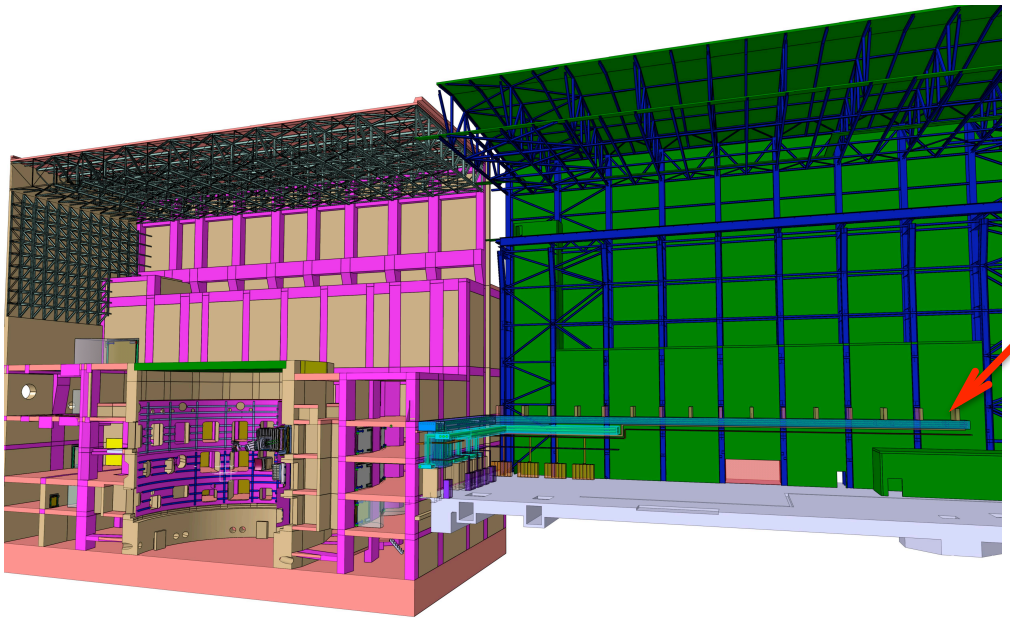
Generic TL description

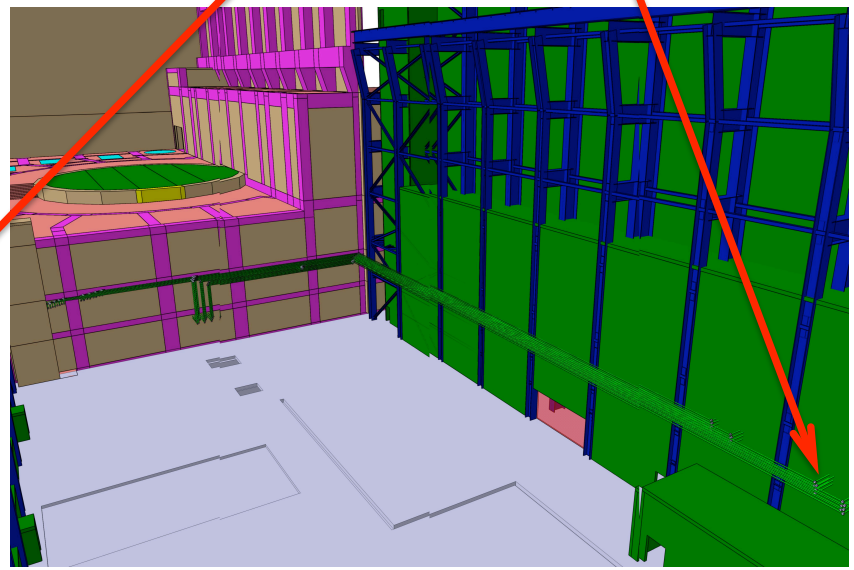
RF Building



Assembly Hall



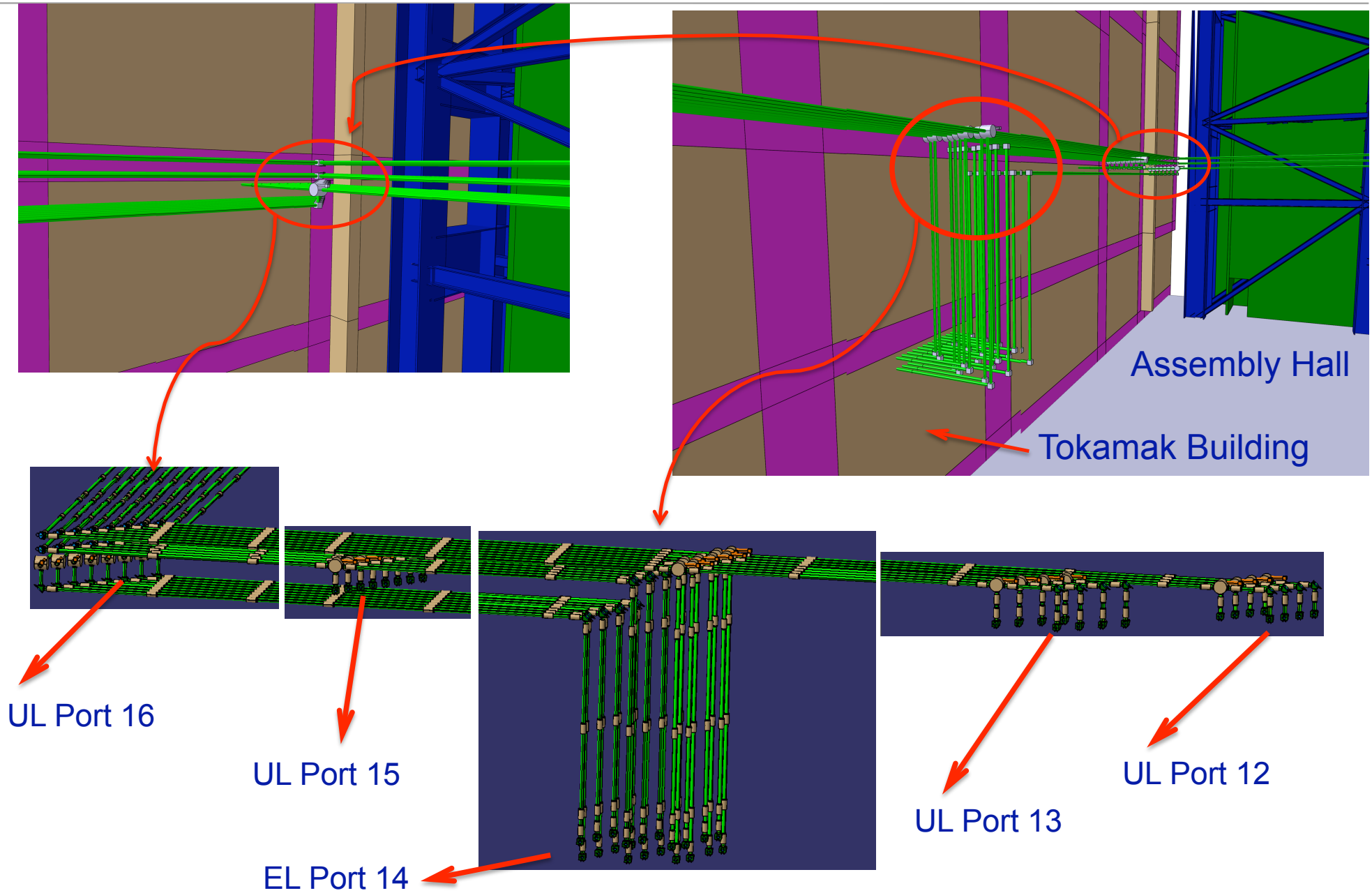




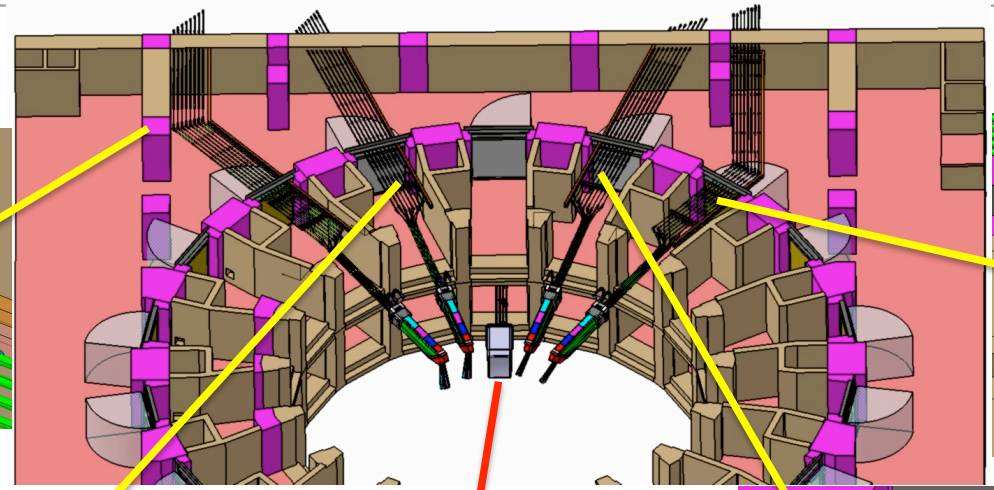
Tokamak Building

Assembly Hall

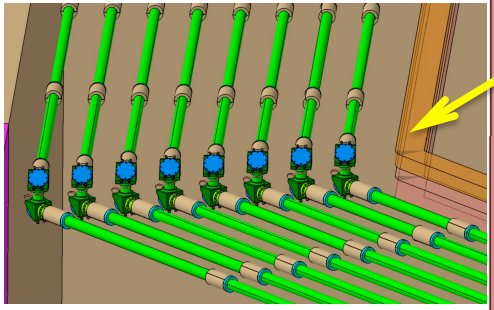
Generic TL description: interface Assembly/Tokamak



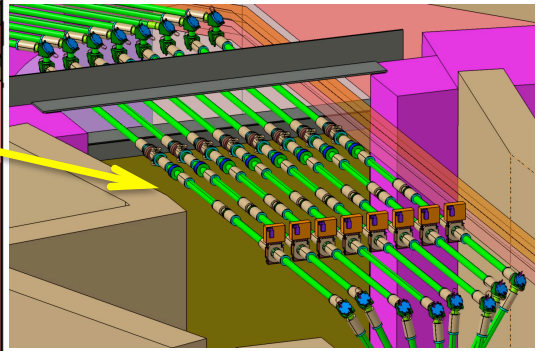
Generic TL description: Tokamak penetration

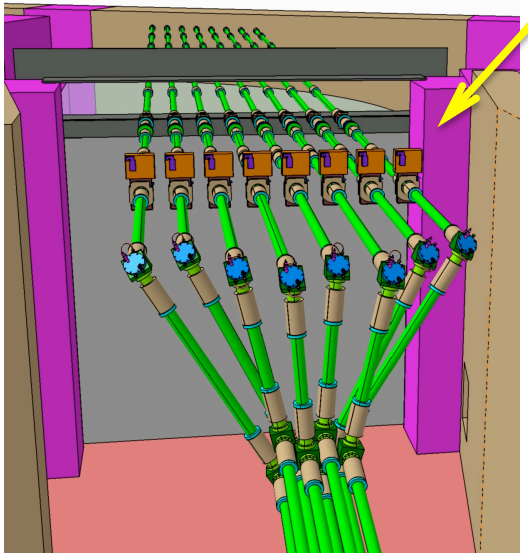


to UL - 16



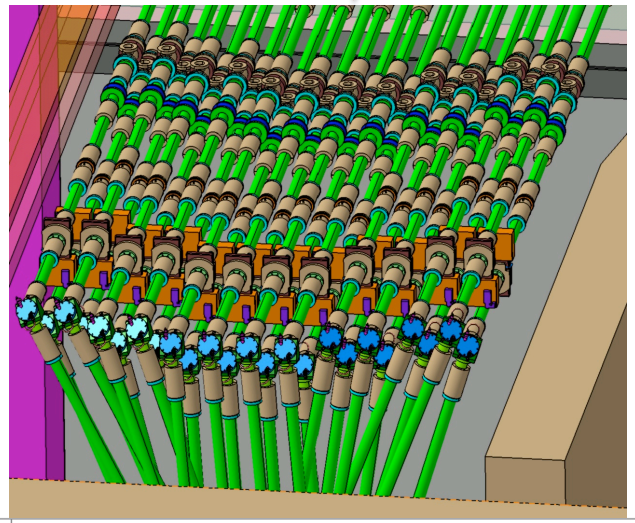
to UL - 12

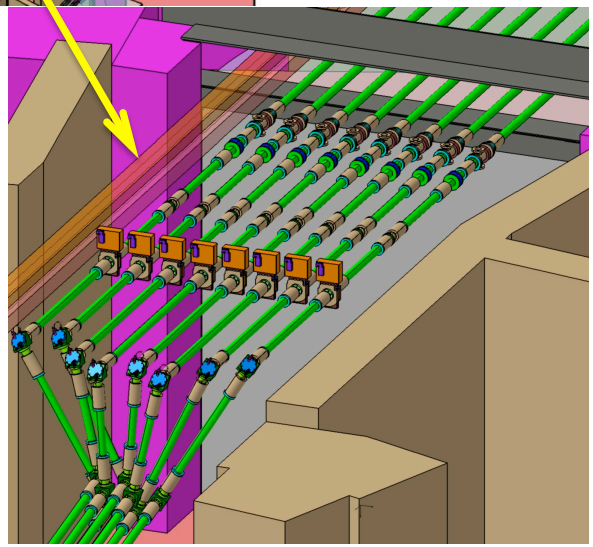




to UL - 15

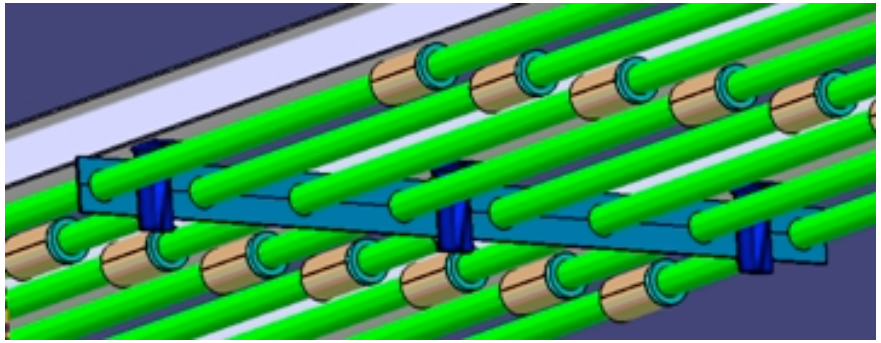
To EL - 14

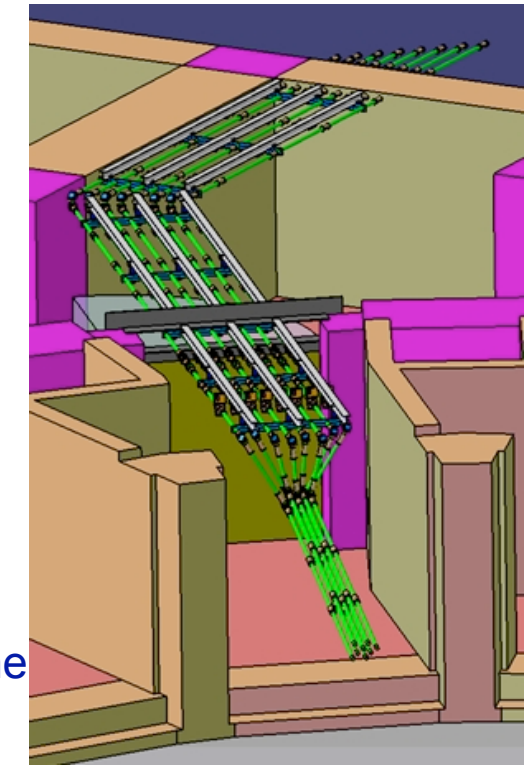




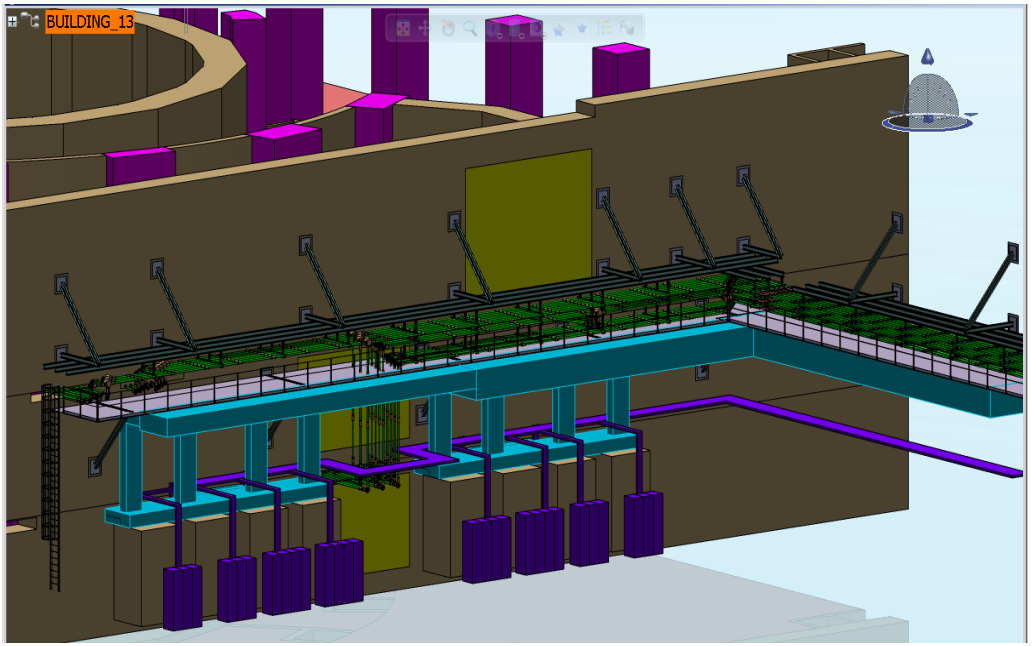
to UL - 13

Supports and maintenance

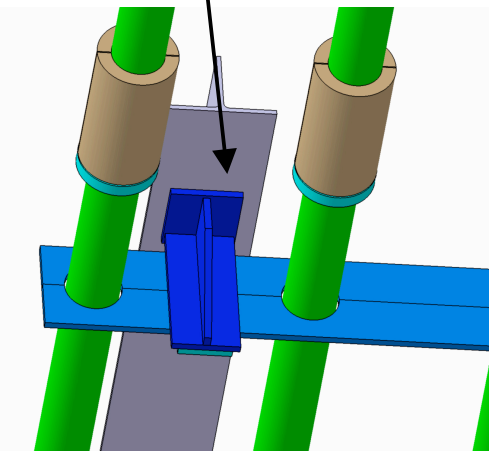




- Embedments for support structure
- Access platform



Welded on the plate



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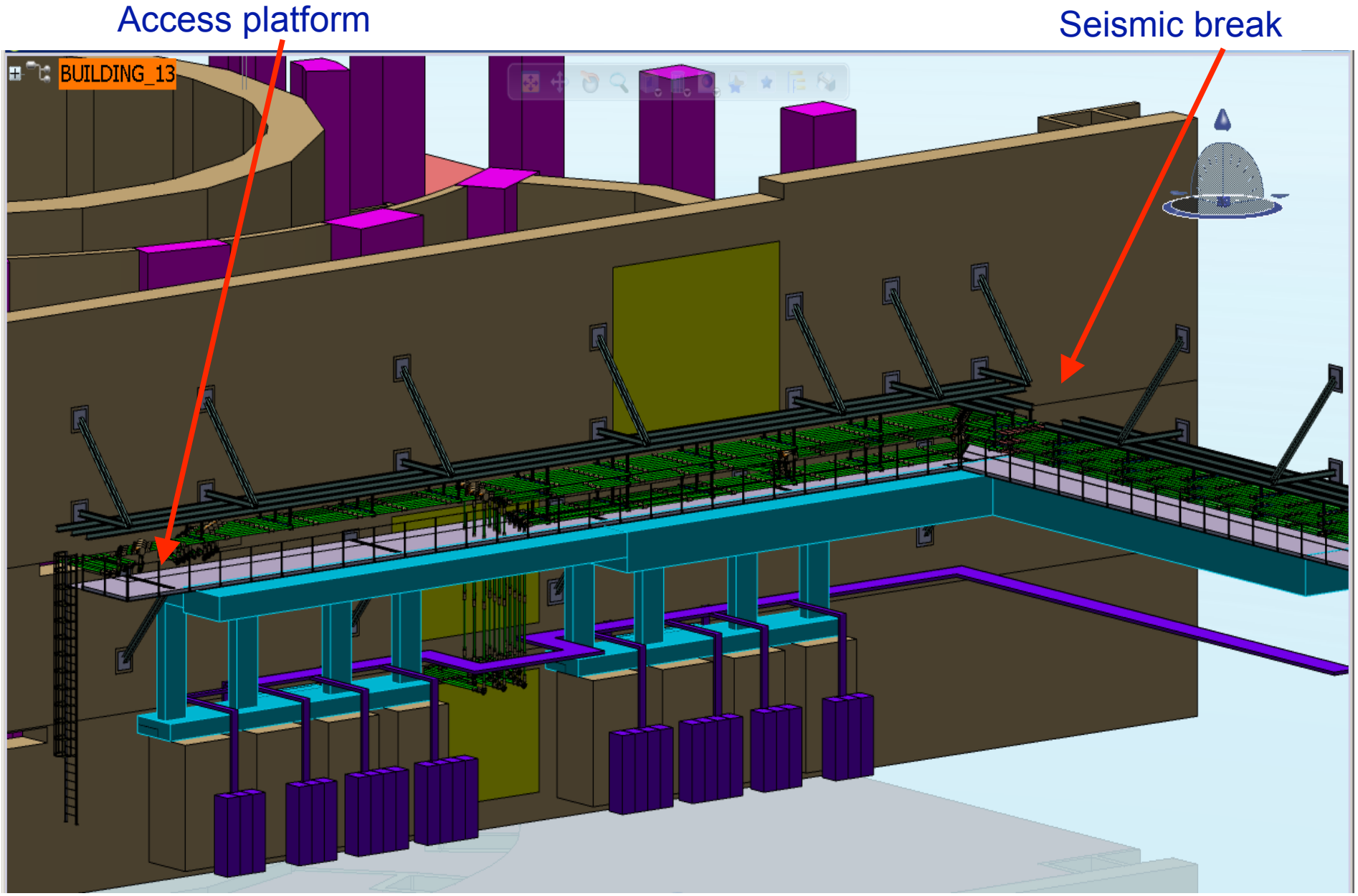
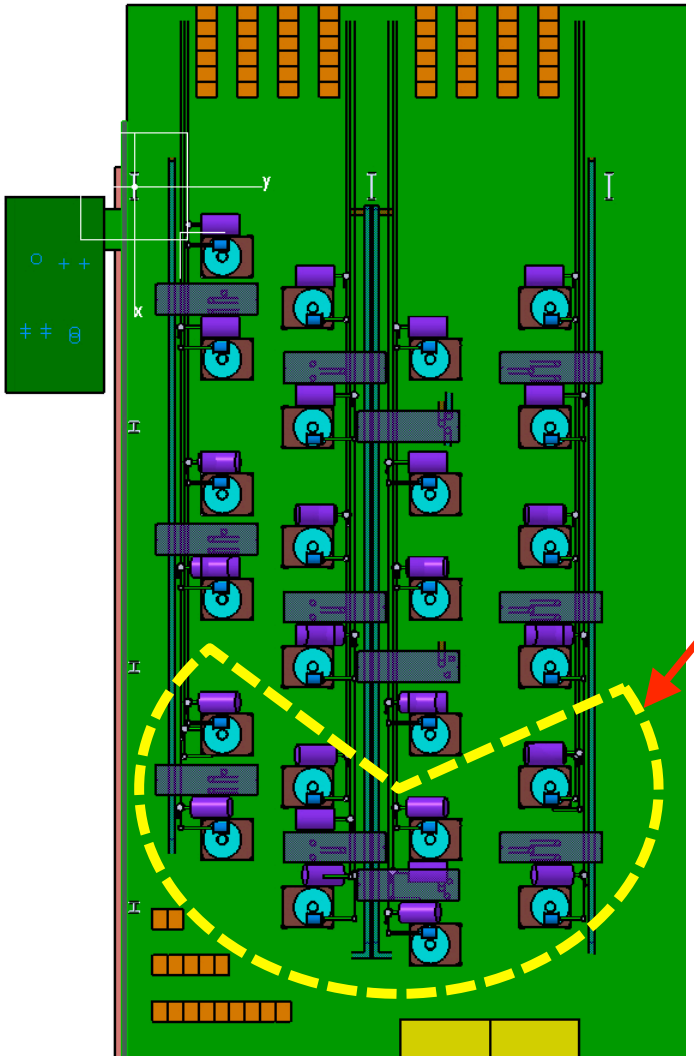


EU gyrotron's configurations

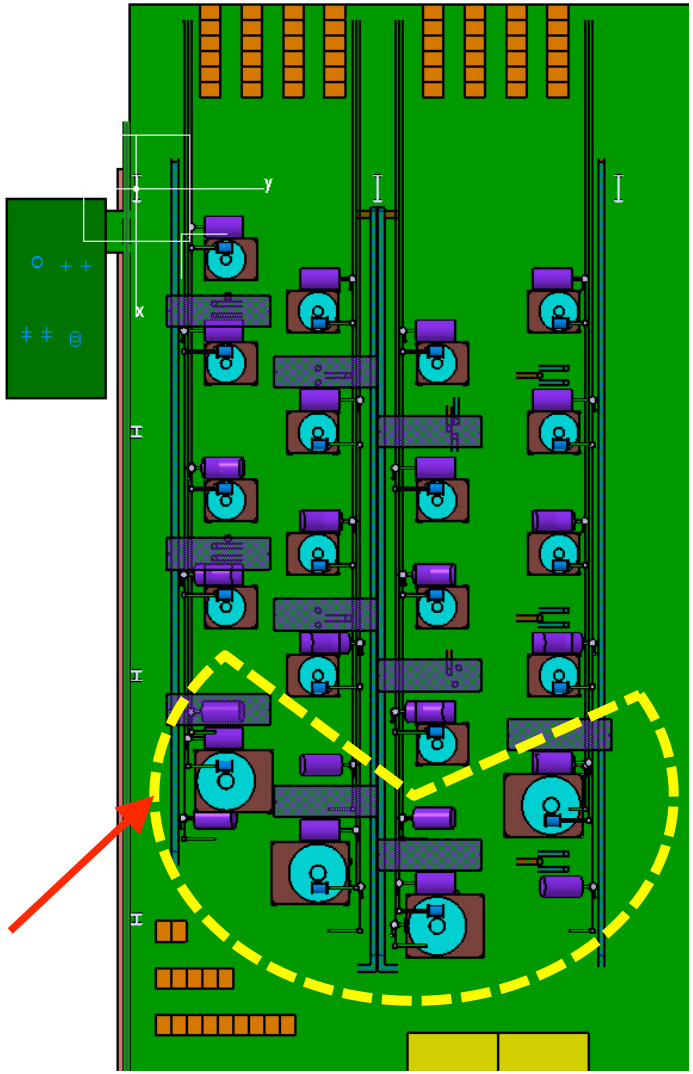
Pending the final decision about the EU 2 MW gyrotron two configurations have been considered



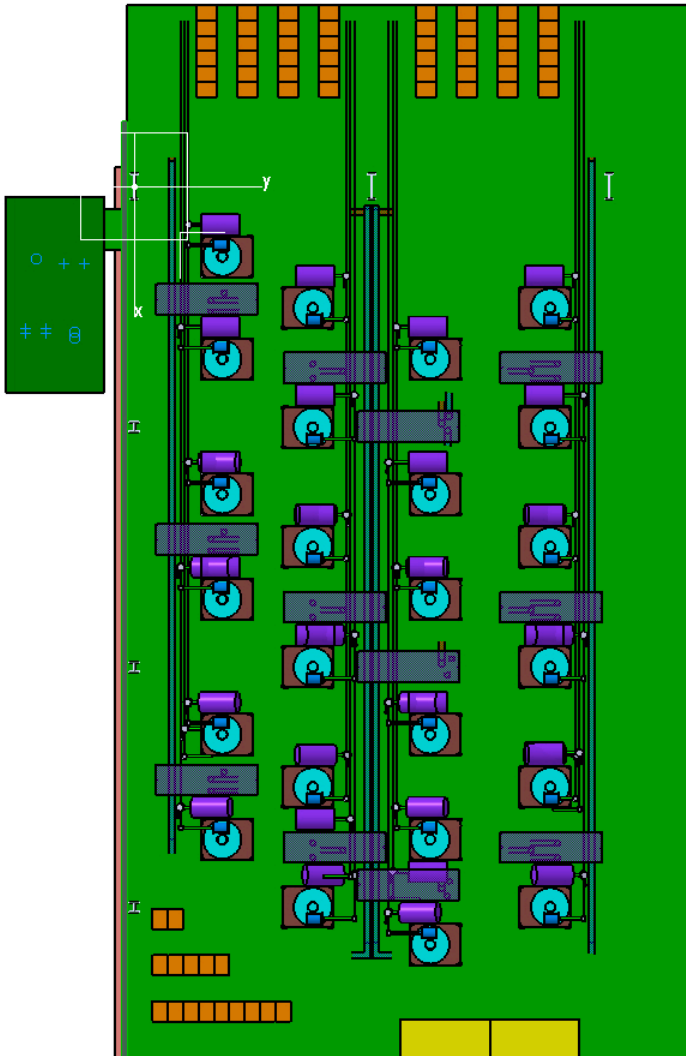
8 units of 1MW each

or

4 units of 2MW each



1MW EU gyrotron option



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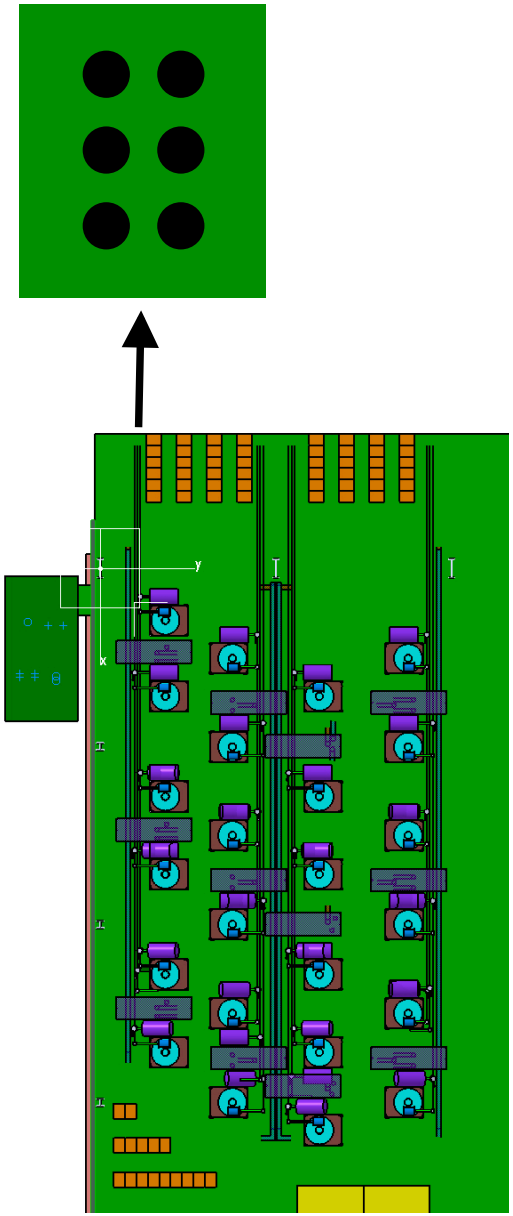

1MW EU gyrotron option

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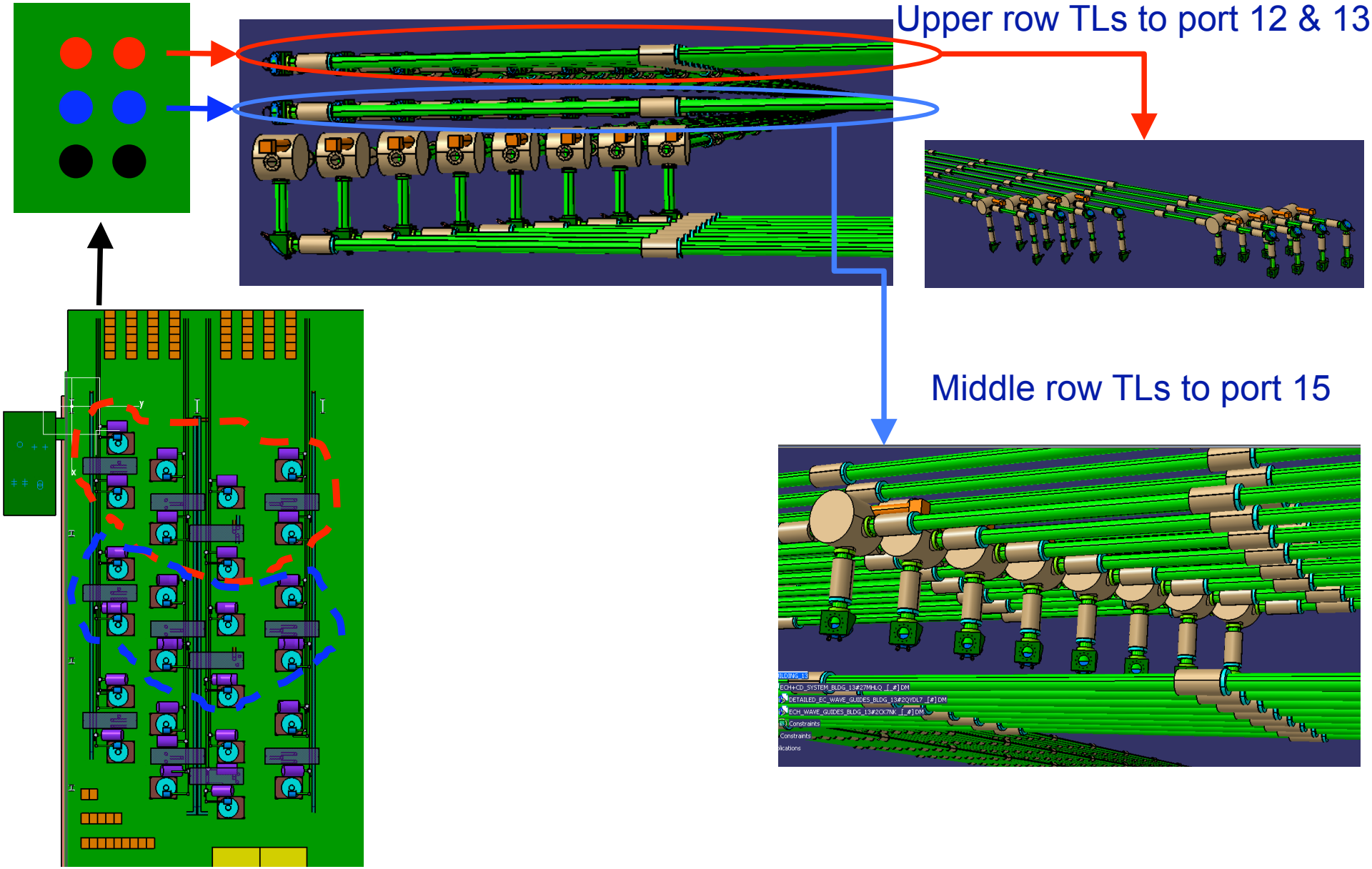

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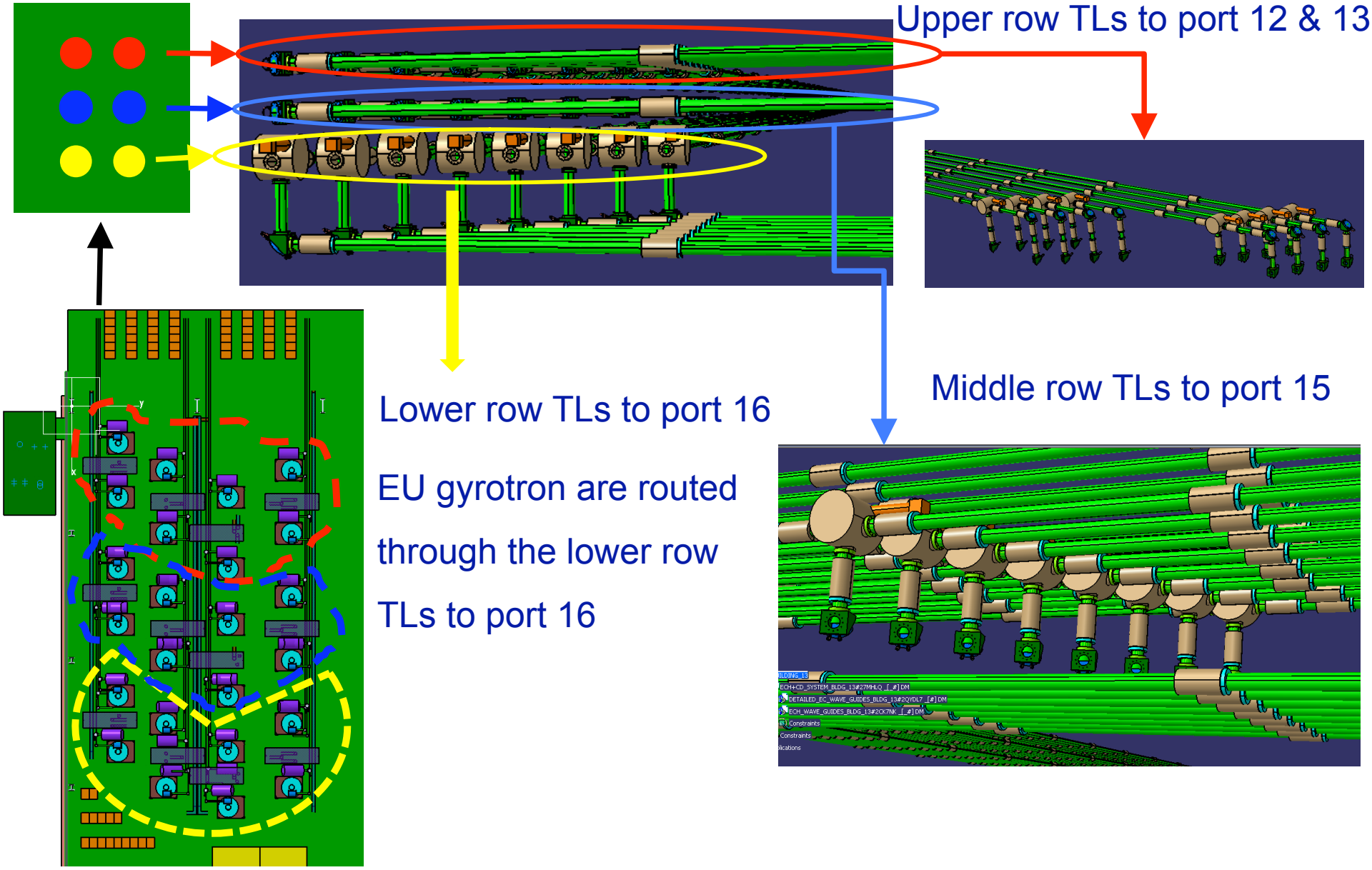
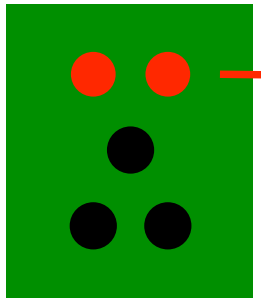
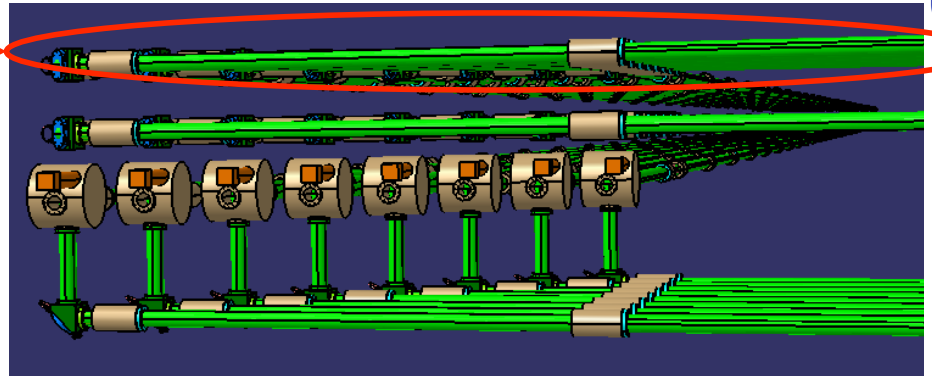
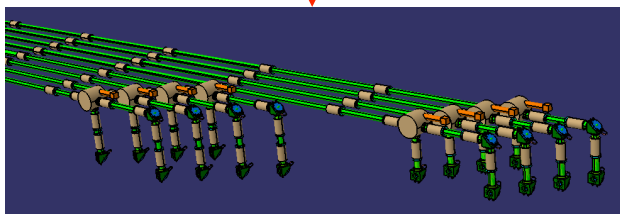


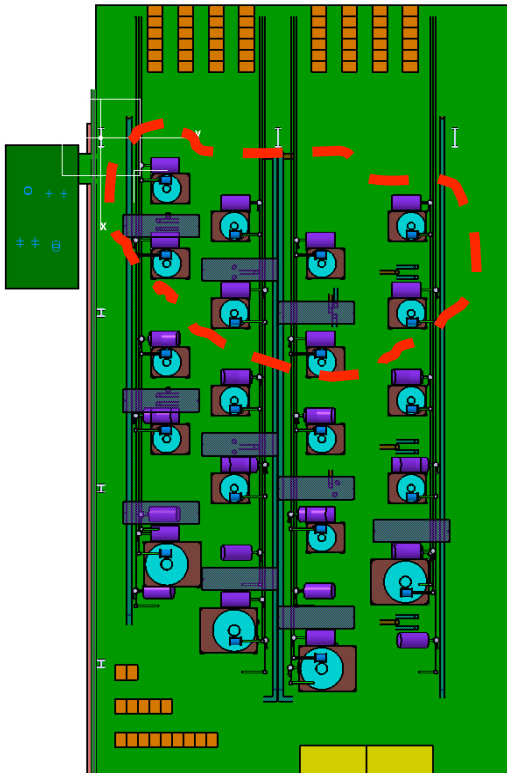
2MW EU gyrotron option

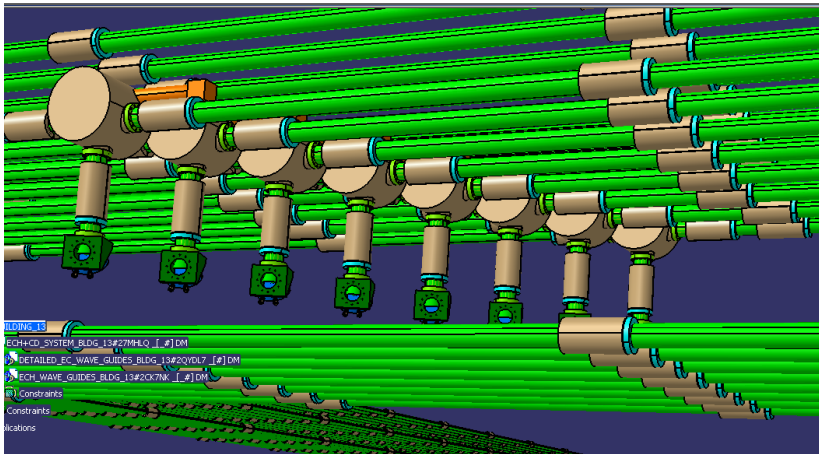




Upper row TLs to port 12 & 13







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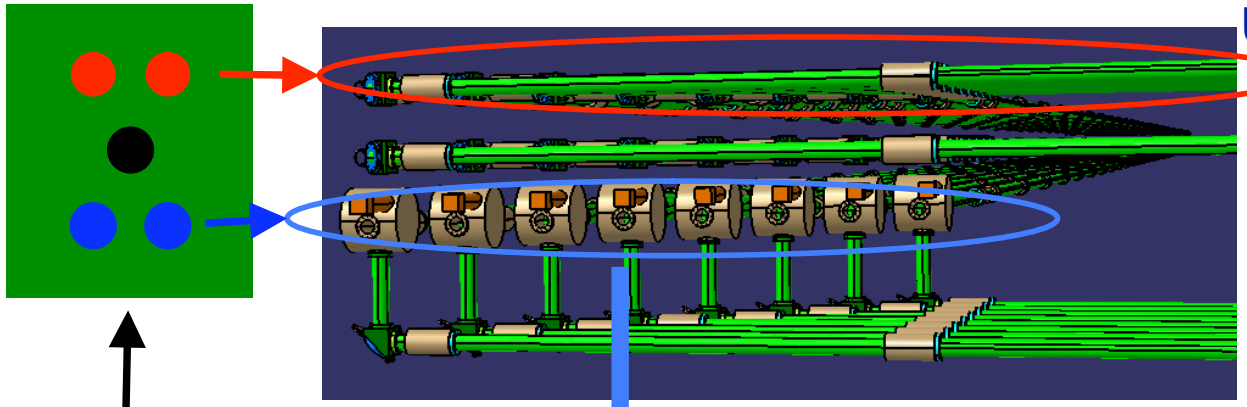

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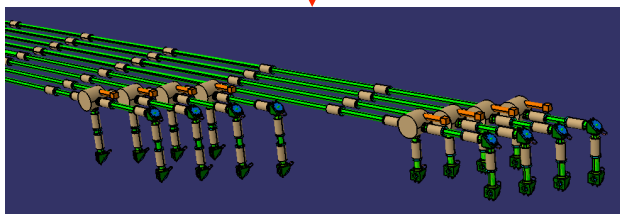
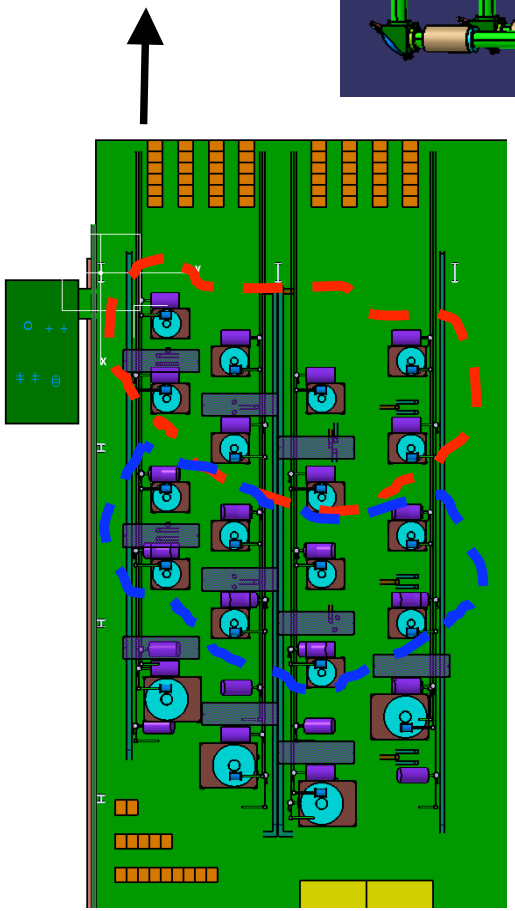
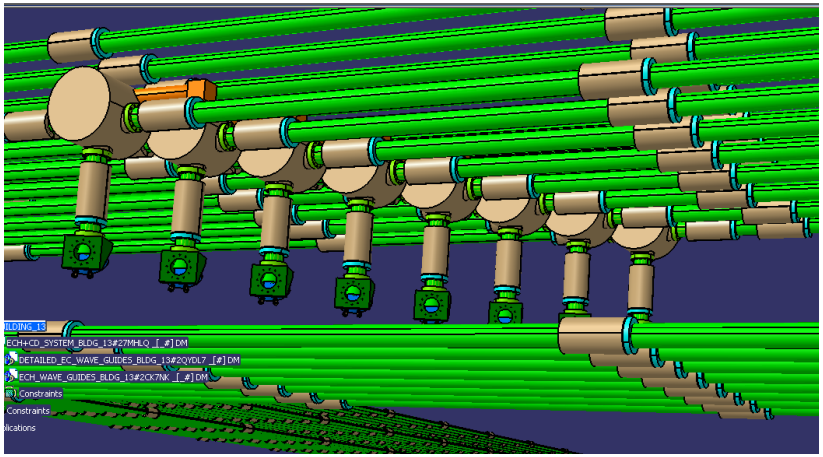




Lower row TLs to port 16



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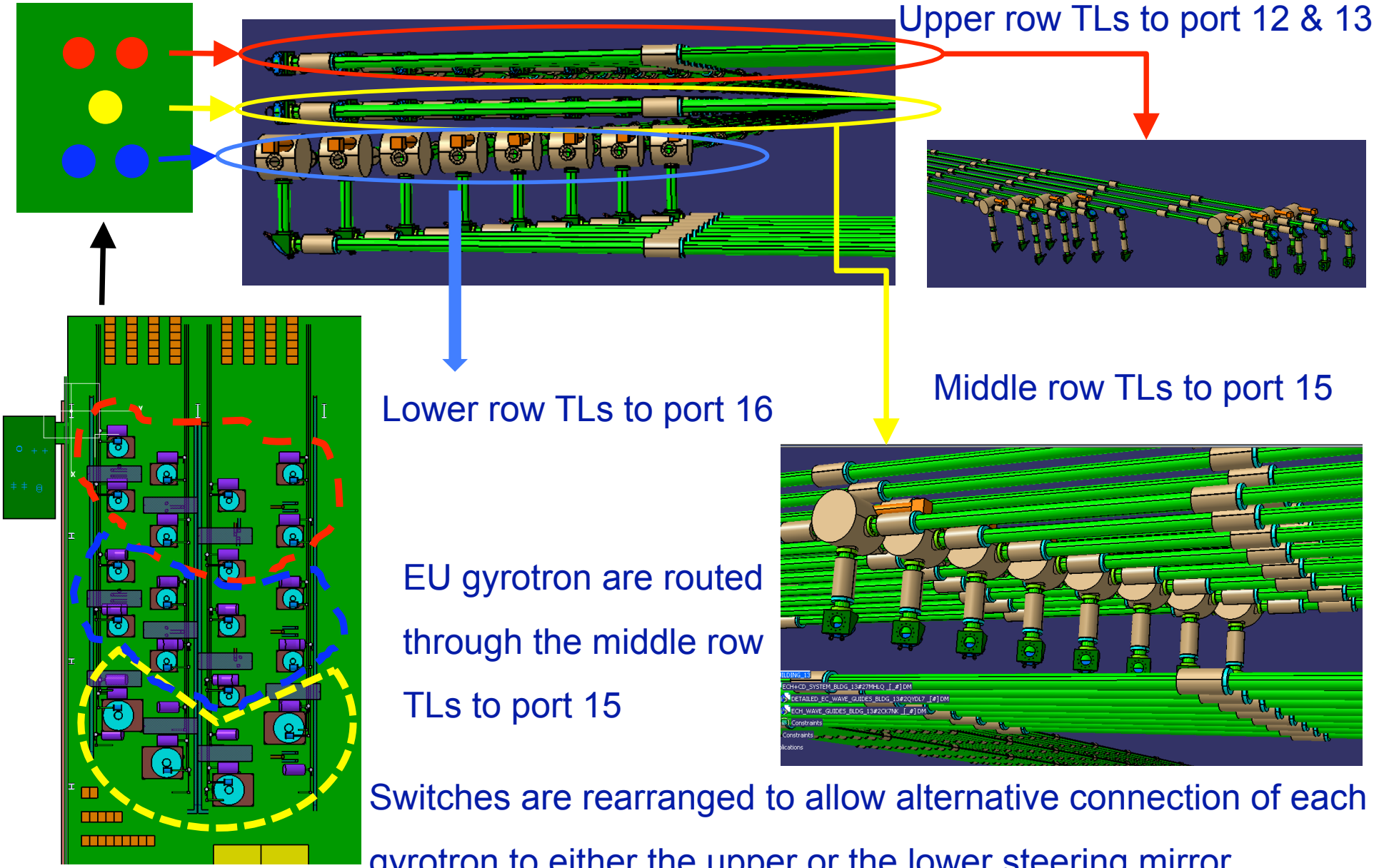

Switches are rearranged to allow alternative connection of each gyrotron to either the upper or the lower steering mirror

THANK YOU!