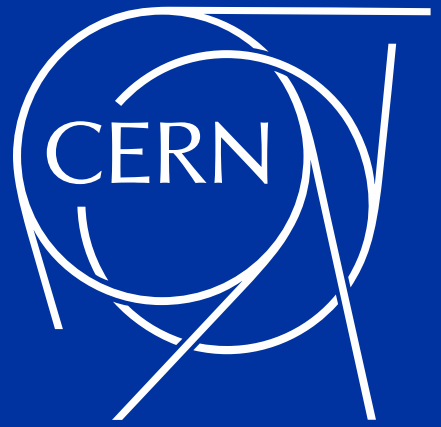


CMS LS2 Beam-pipe upgrade
Status update meeting 24/06/2020

Josef Sestak

TE-VSC-BVO

Content

- **Central beryllium chamber;**
- **Forward aluminum chambers;**
- **Structural supports;**
- **Bake-out and fibers;**
- **Optimization in 16 – 18m zone;**

Points for discussion

- **Forward assembly removal;**
- **Installation planning;**

Central beryllium chamber
HCVC5C0038-MN000001

Recent process and outlook
- Central chamber NEG coated;
- NEG performance tests;
- Expected “Ready for Installation” by July.

Foreseen activities with accepted chamber
- Pre-installation metrology;
- Installation of the fibers;
- Installation of the 1.6m collars;
- Survey test in b.113 with fully equipped chamber.

Issues
- **No equipment related issues for the moment.**
- Process (handling) issues during the NEG coating.
- Seals – new series of seals is being tested; we have reliable solution with older type of seal.

Forward aluminium chambers
VC5F Forward chambers HCVC5F0010-CR*

Recent process and outlook

- 3 chambers NEG coated and accepted;
- **Ready for installation** – now.

Issues

- Short circuit on one of the heaters during NEG performance test.
- Faulty segment replaced by spare heater.

Forward aluminium chambers
VC5FP Forward pumping chambers HCVC5FP002-CR*

Recent process and outlook

- 3 chambers – vacuum acceptance ongoing;
- 3 chambers – NEG coating by next two weeks;
- 3 chambers – NEG performance test by mid-July;
- Ready for installation – by end of July;

Issues

- Mechanical problems with insertion of the RF screen
- Once solved – mechanical damage of the screen ☹.

Forward aluminium chambers
HF-CT2 chambers (2+1) HCVC5HFCT1-CR*

Recent process and outlook

- Chamber #1 – vacuum acceptance completed;
- Chamber #2 – bake-out wrapping ongoing;
- Chamber #3 – stand-by;

Issues

- On chamber #1 again short circuit during the bake-out
  - Probably related with the glue within the sandwich
  - We are starting with systematic test of all heaters.

- On chamber 1;3 a slight surface decolorization was observed; RGA spectrum OK; XPS shows sign of elevated silicon on the surface.

Surface issue discussed with chemistry & coating experts
Recommendation
We etch the chamber using circulation method before the NEG

Expected readiness - August

Forward aluminium chambers
End-cap chambers (2+1) HCVC5E0035-CR*

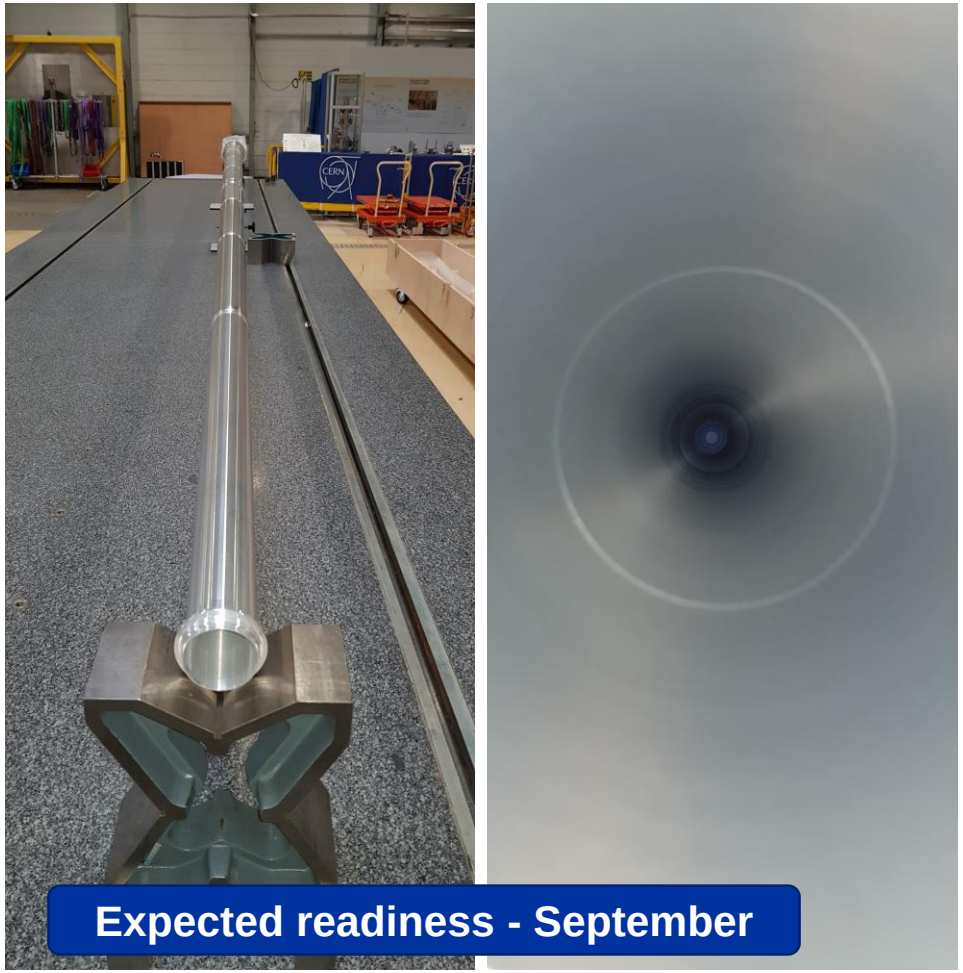
Recent process and outlook

- Chamber #1 – production completed – stand-by;
- Chamber #2 – production completed – stand-by;
- Chamber #3 – production completed – stand-by;

Issues

- **No equipment issues observed**
- XPS samples from the final cleaning shows similar silicone contamination as for the HF-CT2.

Surface issue discussed with chemistry & coating experts
Recommendation
We etch the chamber using circulation method before the NEG



Expected readiness - September

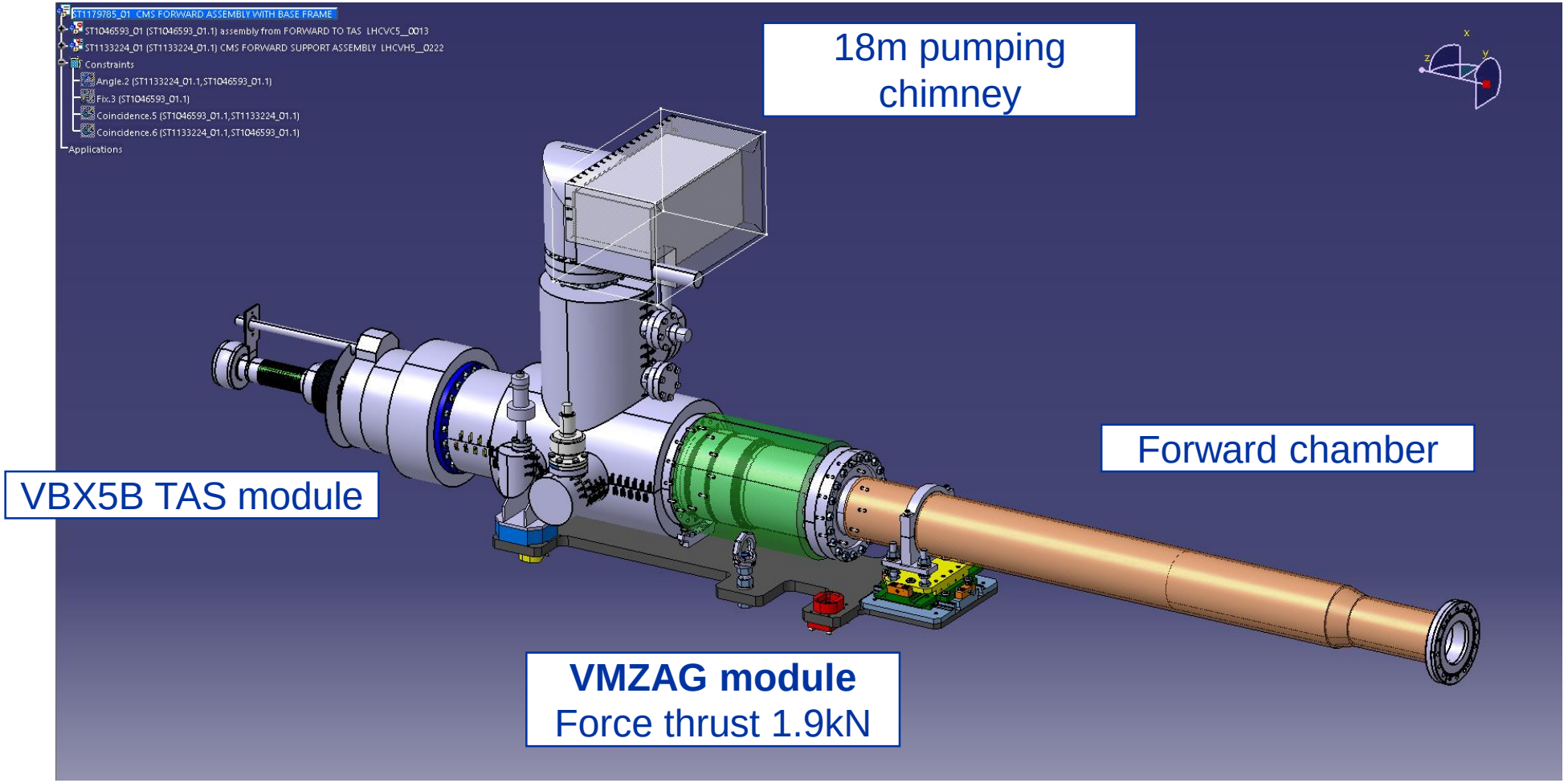
Structural supports (codes LHCVH5_%)

- **Design of all operational supports completed;**
  - Supports at 3.2 and 3.5m to be checked by tracker team (LHCVH5__0140; LHCVH5__0168);
  - Support interface 16 – 18m designed according to the agreed layout and ready for production;
- **Production**
  - Operation support at 1.6m (2parts collar) – **production completed**;
  - Operational support at 10.6m (new collar and Ti bar) – **in production**;
  - Support assembly 15.4 – 15.8m (Forward nose) – **in production**;

Bake-out and fibers

- Installation of the fibers after the NEG coating
- Please let us know about delivery dates and expected installation availability for all 3 types of chambers (central; HF-CT2; End-cap)
- Position of Lemo connectors TBD.

Optimization in 16 – 18m zone;



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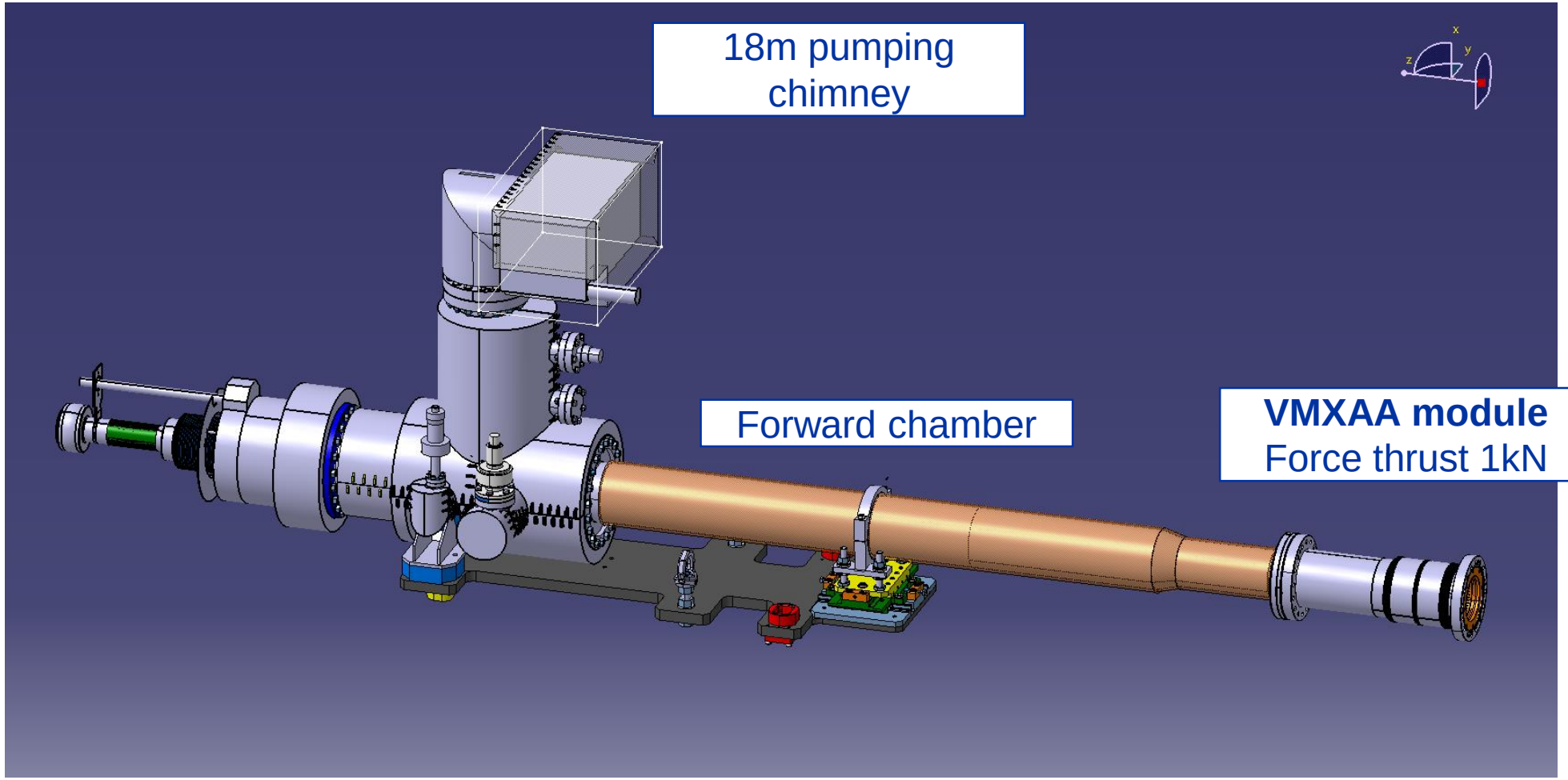
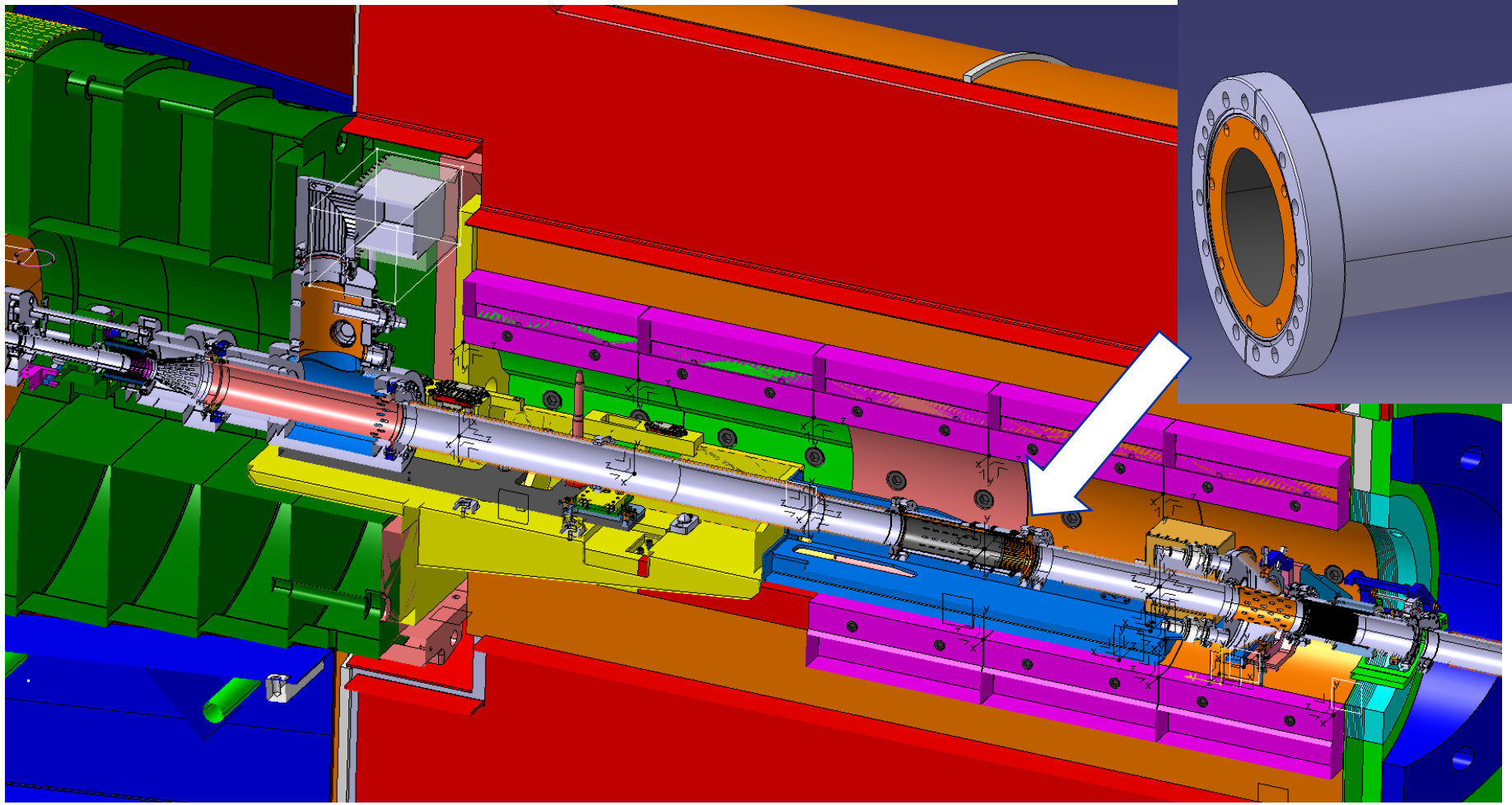
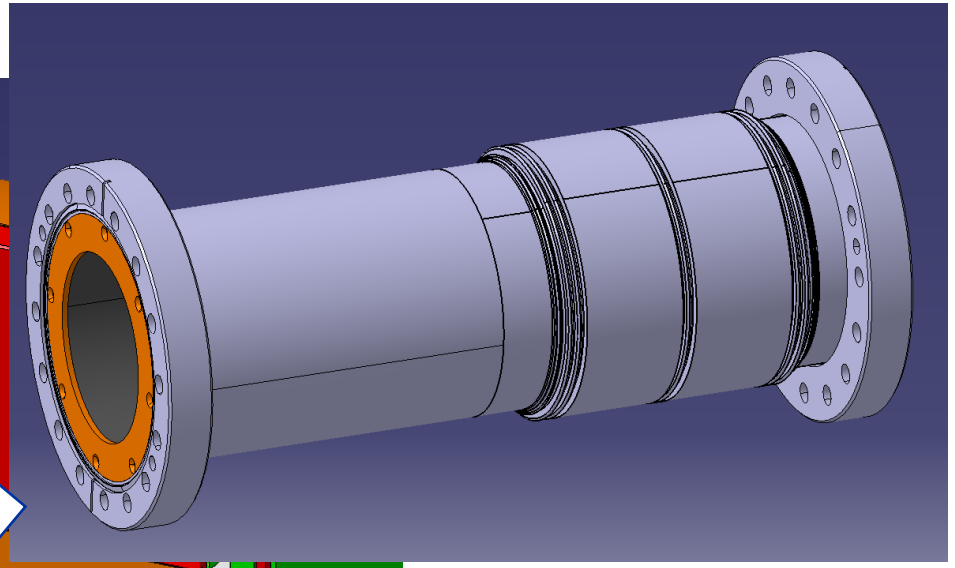


Optimization in 16 – 18m zone;

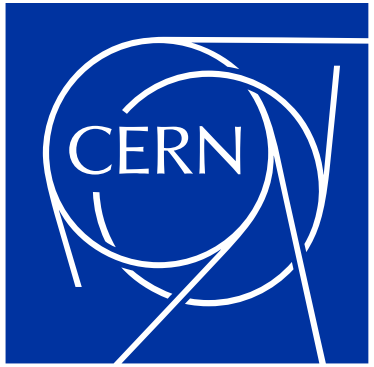




Optimization in 16 – 18m zone;

- **Advantages**
  - Reduced force load on 16m fix point from 850N (TAS) to 25N (IP5);
  - Reduced force load on 18m fix point from 1420N (IP5) to 550N (IP5);
  - Easier installation – flexibility between forward and forward pumping;
  - Reduced mass of 316L material;

- **Implications**
  - Aperture restriction moves towards IP5 (no problem as aperture margin is sufficient at that position);
  - Design modifications of 18m support – minor;
  - Production of a new components ≈ 8kCHF.



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