



# Installation plan for LAB modules

CLIC Module Review 2015

Alex Vamvakas

22/06/15

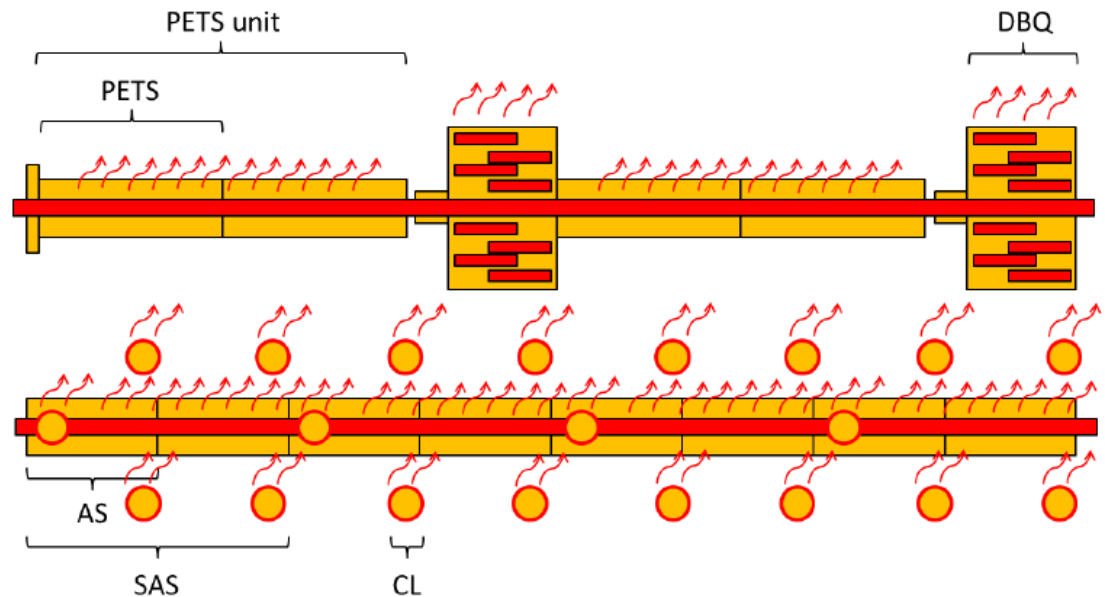


# Overview



- Current setup
- Configuration T0-T0-T1
- Component changes
- Testing Capabilities
- Schedule

- One TBM, type 0
- Components mock-ups
- Heaters simulate heat dissipation

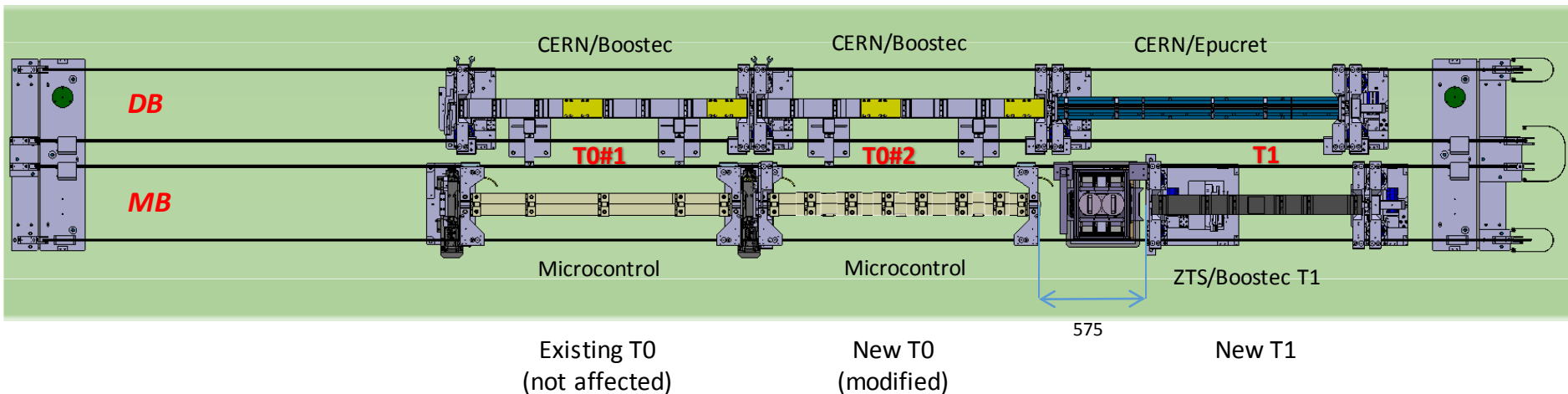


## Limitations:

- DBQ mock-ups without cooling
- Single heaters through beam lines – Poor testing range
- No UHV tests possible due to leaks
- Central vacuum mechanically couples the two beamlines

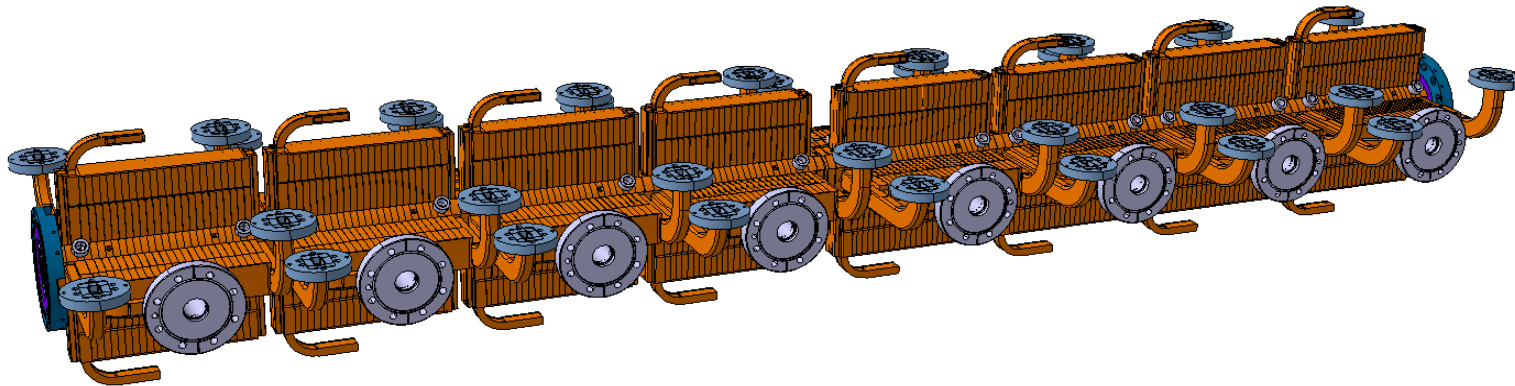


- Addition of 2 modules – 3 modules string
- Configuration T0-T0-T1
- Variety of supporting systems
- Great flexibility for testing



- Offset between MB and DB for TBM T1, due to MB quad

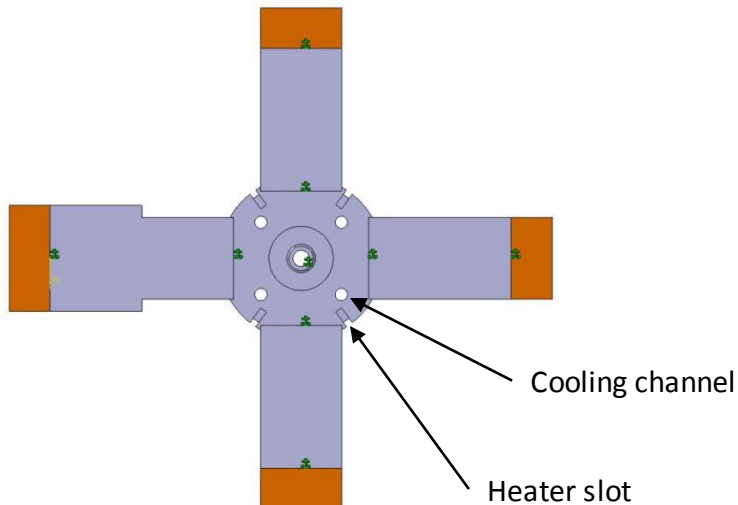
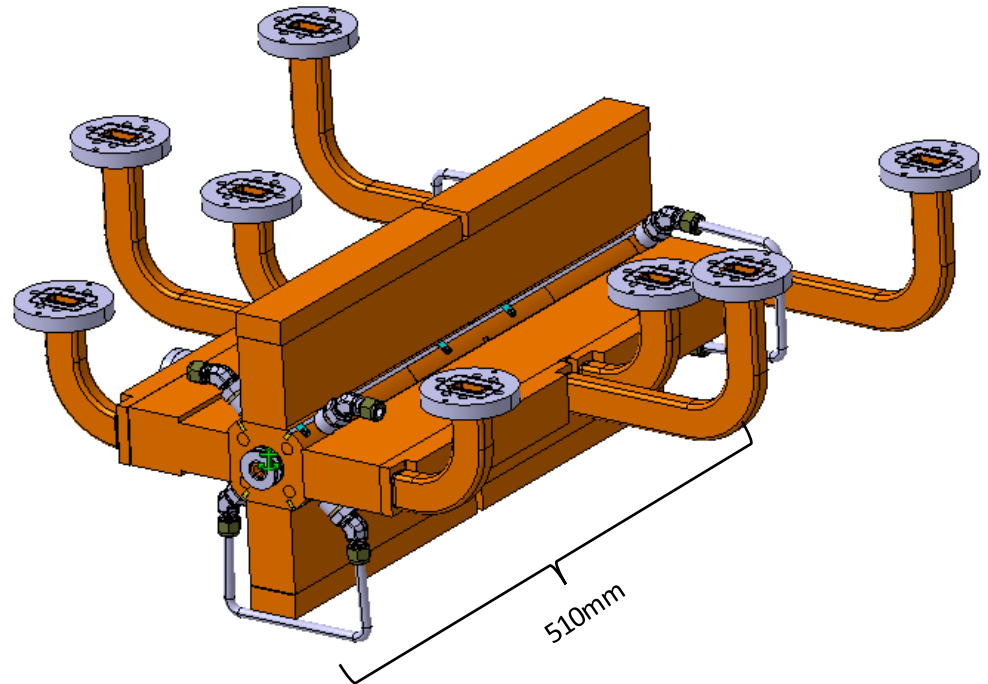
Current SAS mock-up:



Disc design	Complex brazing operations
2m long piece	Difficult alignment (banana shape) and handling
Single heater	No possibility for independent SAS control
Internal heating	No possibility for thermal tests under vacuum
Similar to real AS	High cost

## New SAS mock-up:

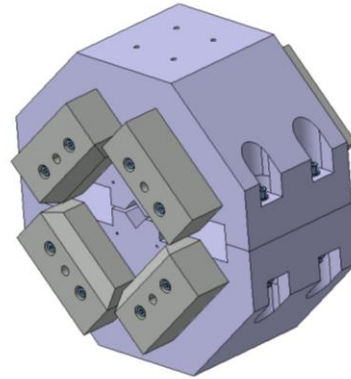
- Simplified single piece core
- Damping material included
- Independent heaters on the outer side
- Possibility of simultaneous vacuum and thermal loading
- Integrated cooling for both AS



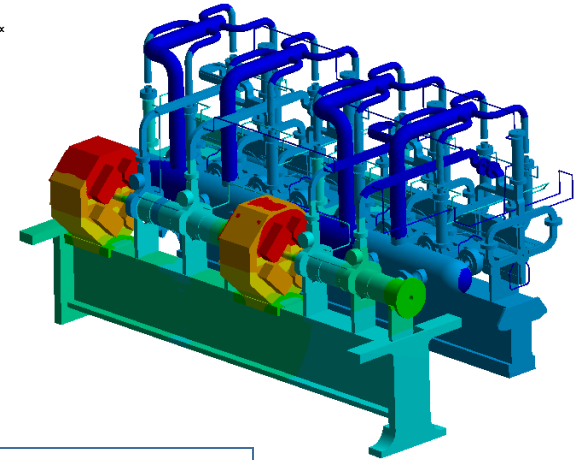
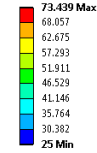
- 6 units in Industry
- 1 unit in CERN

## Current mock-ups

- No coils
- Partly heated from internal heater
- Rest of power comes from cartridge heaters
- No cooling
- **Distorted thermal results – too much heat to the girder**

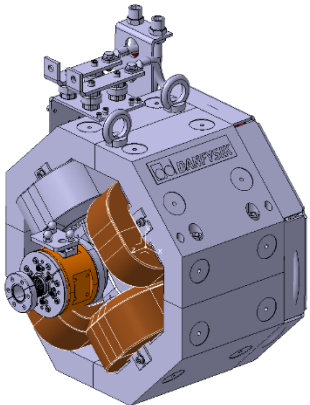


Temperature  
Type: Temperature  
Unit: °C  
Time: 1  
8.12.2012 18:56



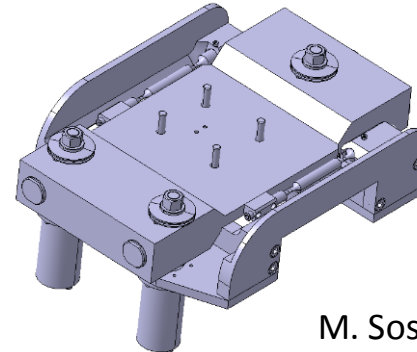
## Real DBQs

- Water cooled
- Real heat dissipation



## Adjustable supports

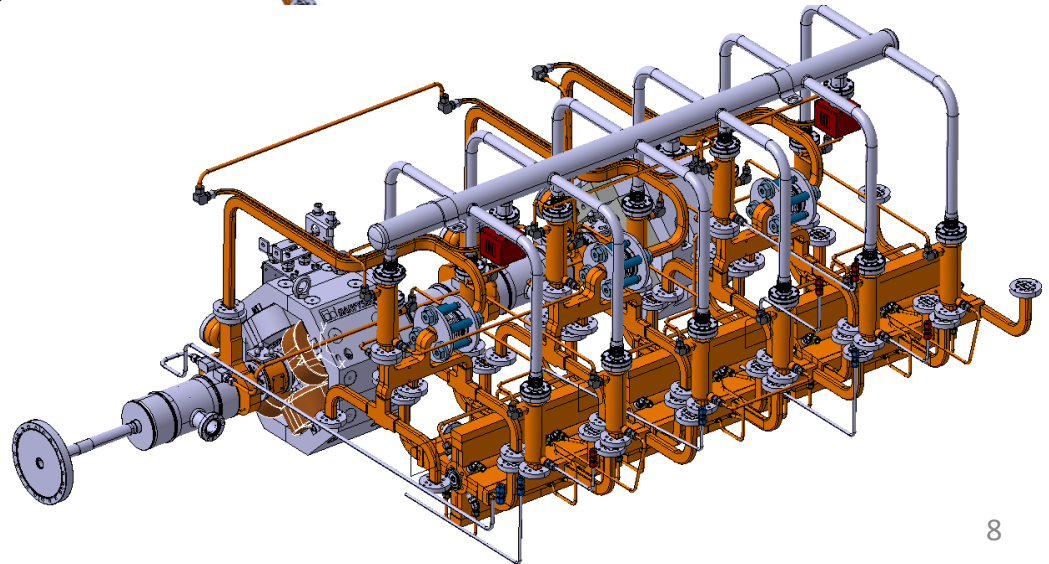
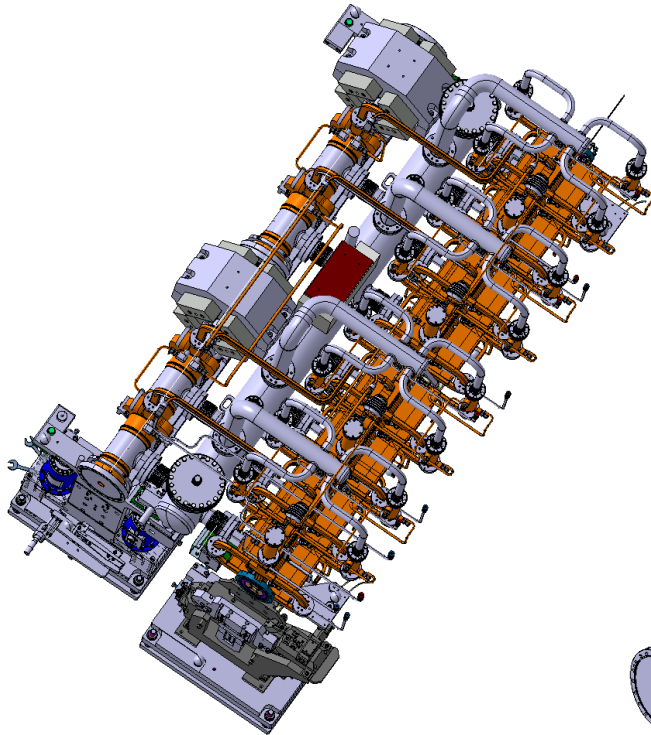
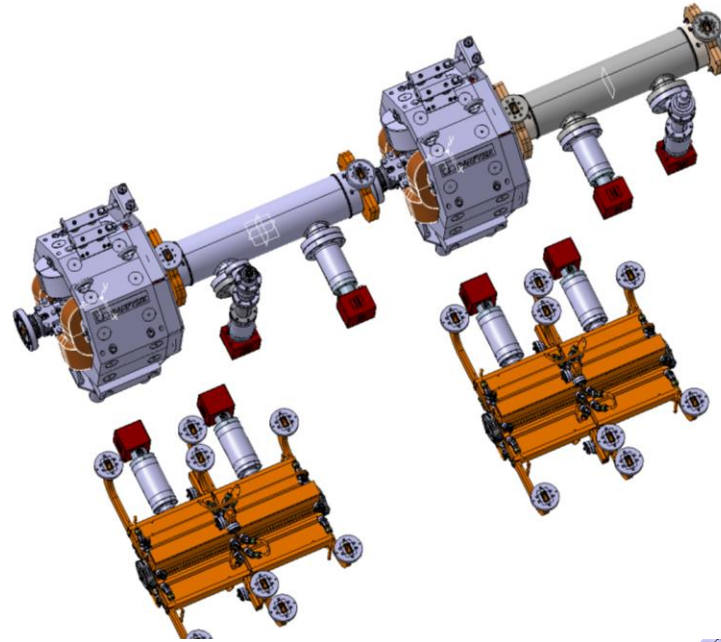
- Big success in CLEX
- Option for motorisation



M. Sosin

Decoupling of the two girders:

- Mini pumps on PETS and SAS
- Independent vacuum tank for MB
- Tested in CLEX

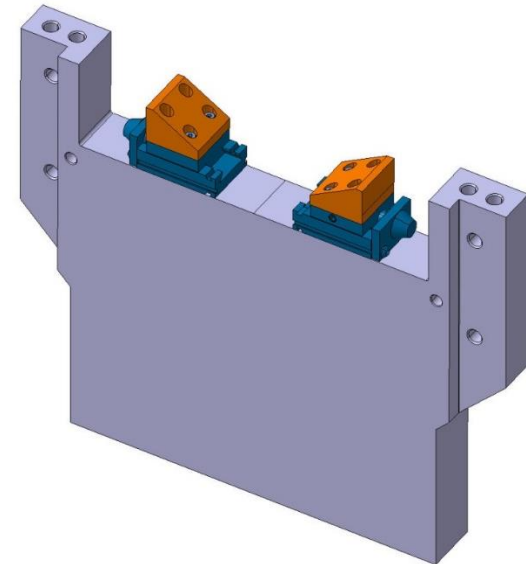




- Epucret girder
  - Cheaper
  - Removable supports
  - Testing flexibility

## Adjustable V-supports

- Easier alignment
- Under development



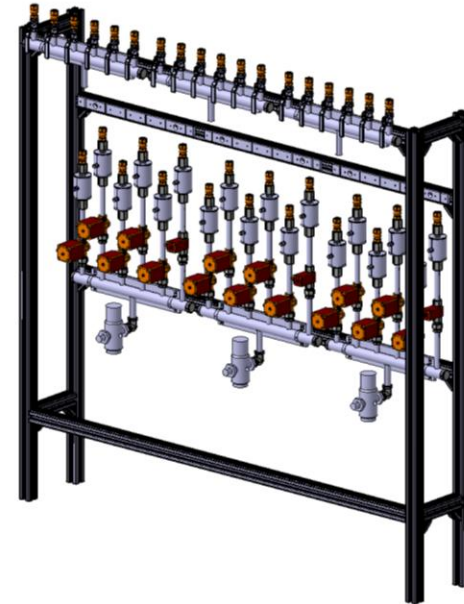
V. Soldatov



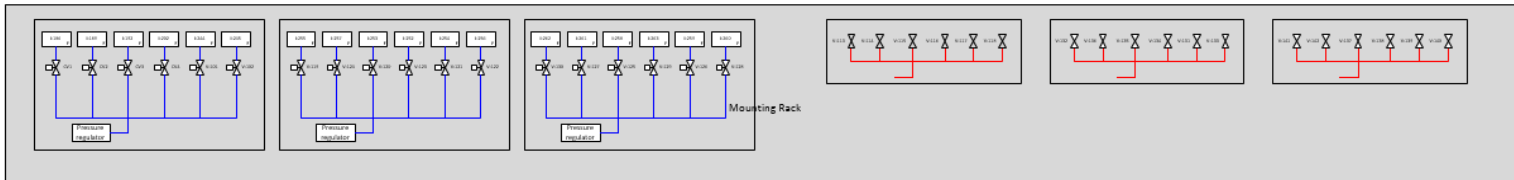
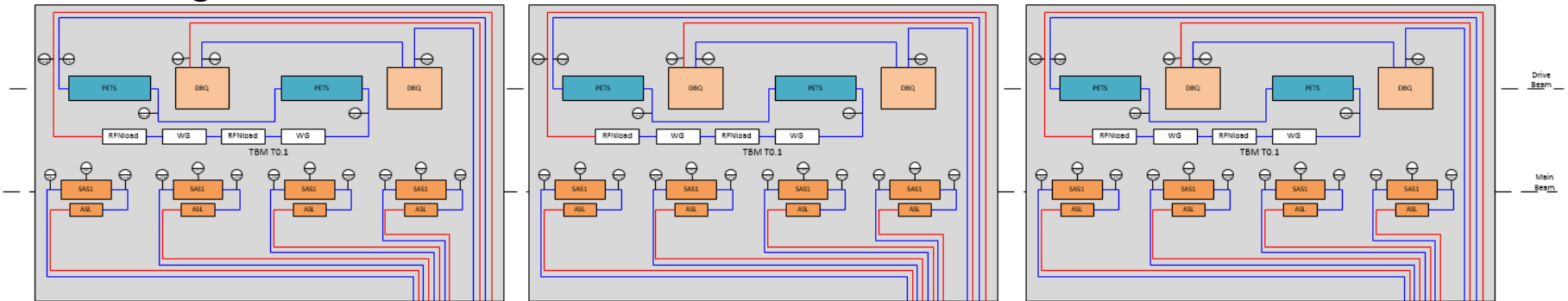
# Cooling System



- Maximum measurement flexibility
- Dynamics control through flow regulation
- DAQ system
  - 18 flow meters
  - 18 control valves
  - ~65 temperature sensors



- Integration with the module for CLIC





# Testing capabilities



- Vacuum tests
- Vacuum + thermal
- Independent SAS breakdown study
- Module interconnection, including MB quad
- Accurate DBQ thermal behaviour
- More relevant alignment experiments on module string

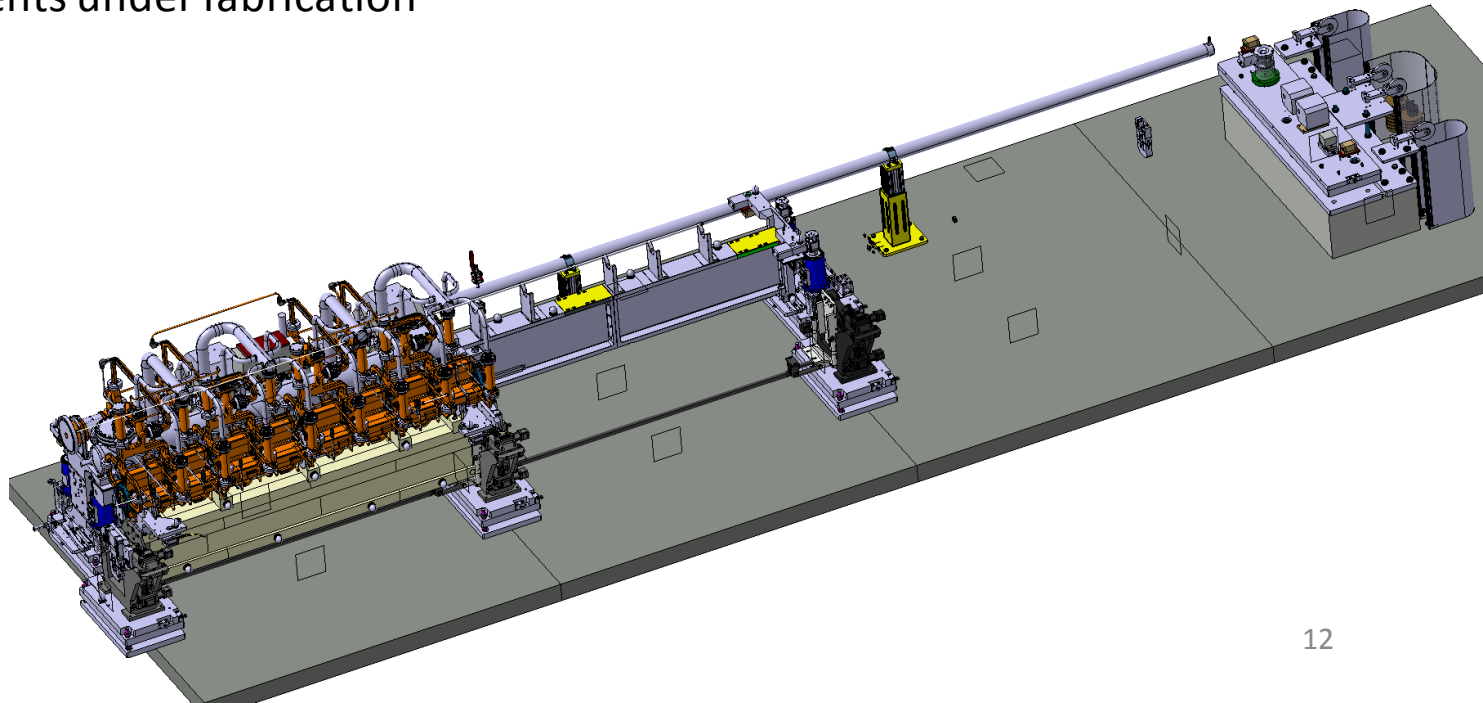


# Installation plan



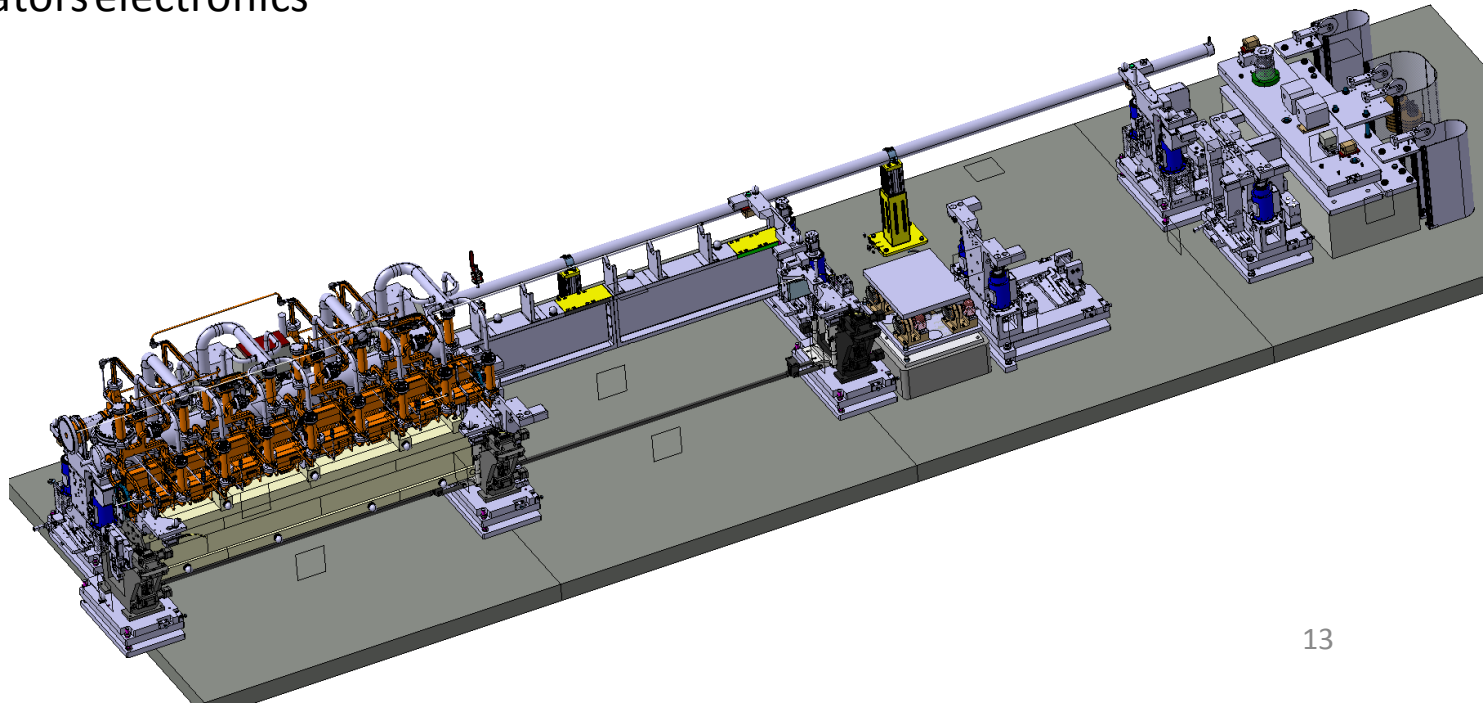
## Current status

- MB girder removed and modified
- Girders measurement ongoing
- SAS mock-ups ordered
- RF components under fabrication



## Supporting system

- Drilling floor for MB
- DB is tricky, reverse installation order
- MB Quad supporting system
- Test of actuators electronics



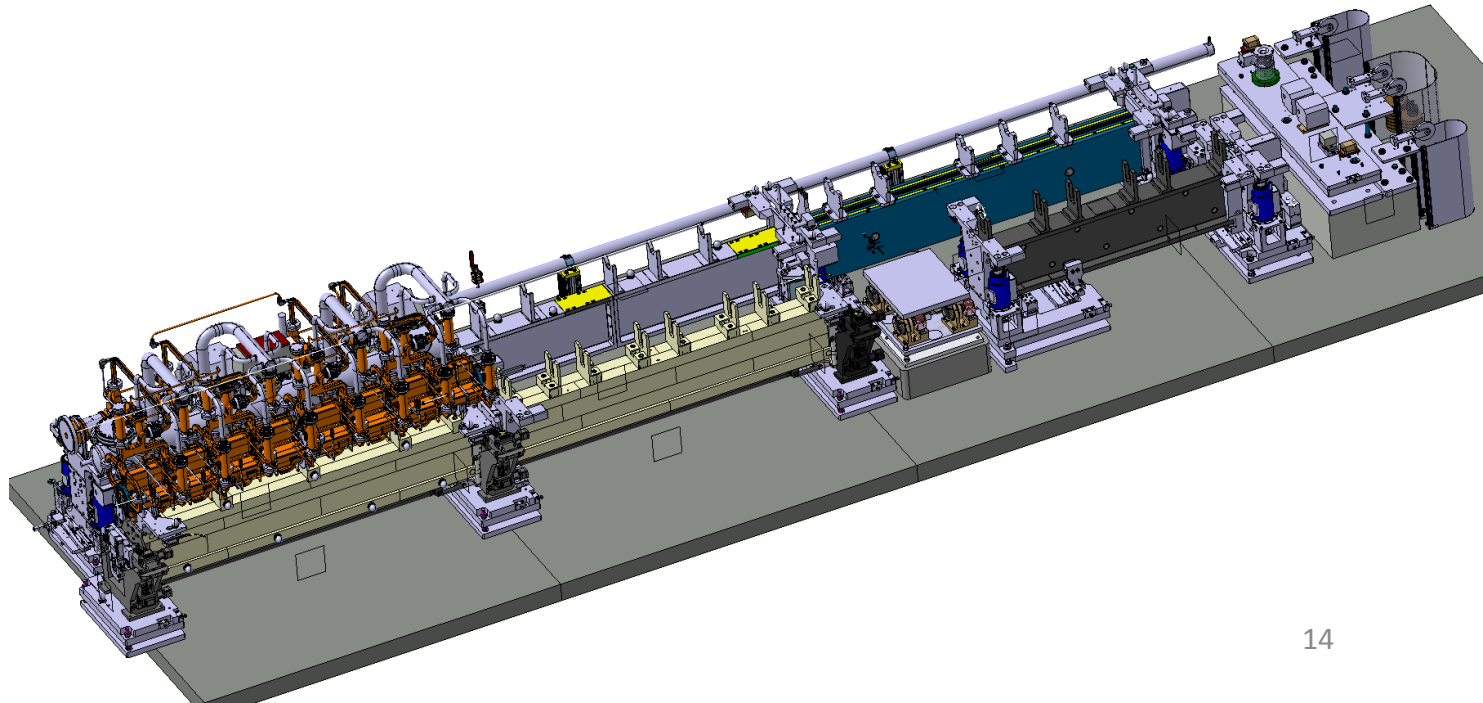


# Installation plan



## Girders

- Girder measurement & fiducialisation - ongoing
- Girder installation
- Alignment



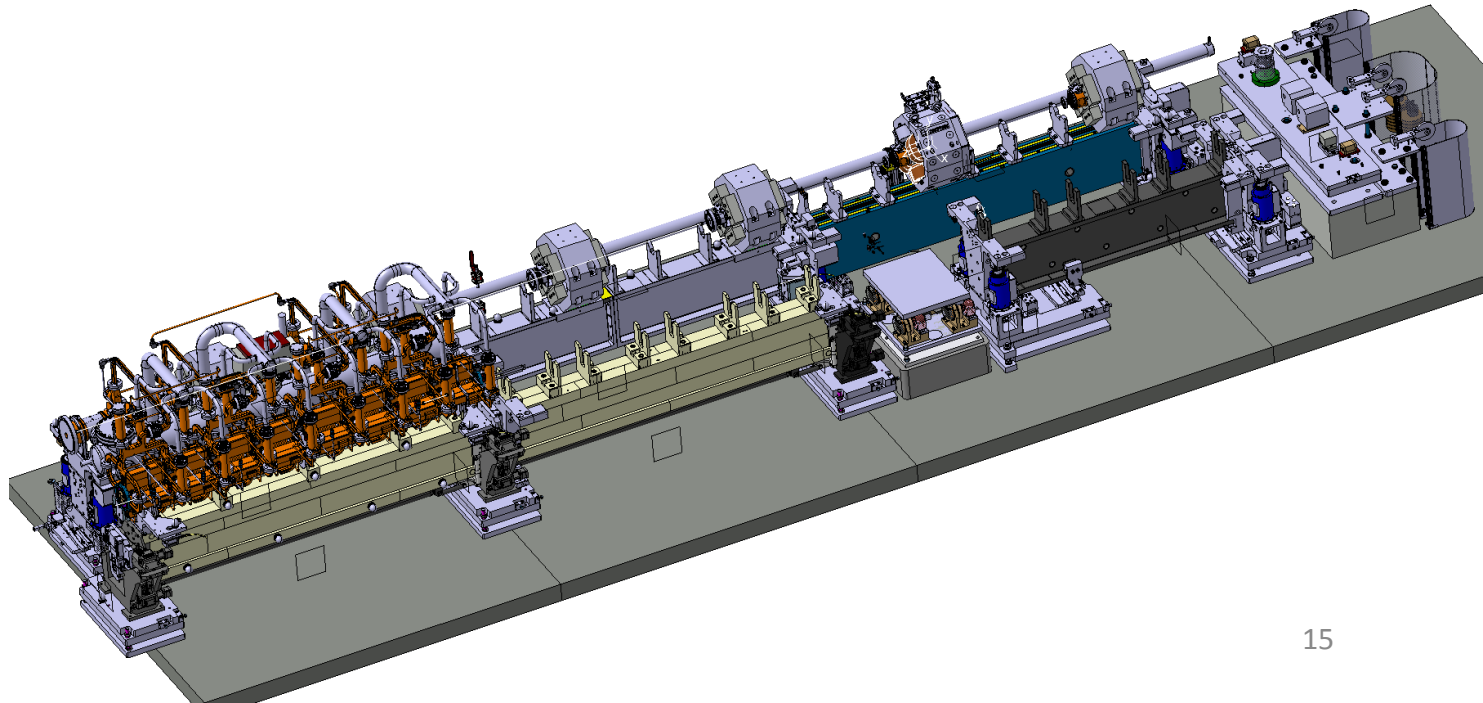


# Installation plan



## DBQ

- Supporting system under fabrication
- Measurement - fiducialisation
- Installation



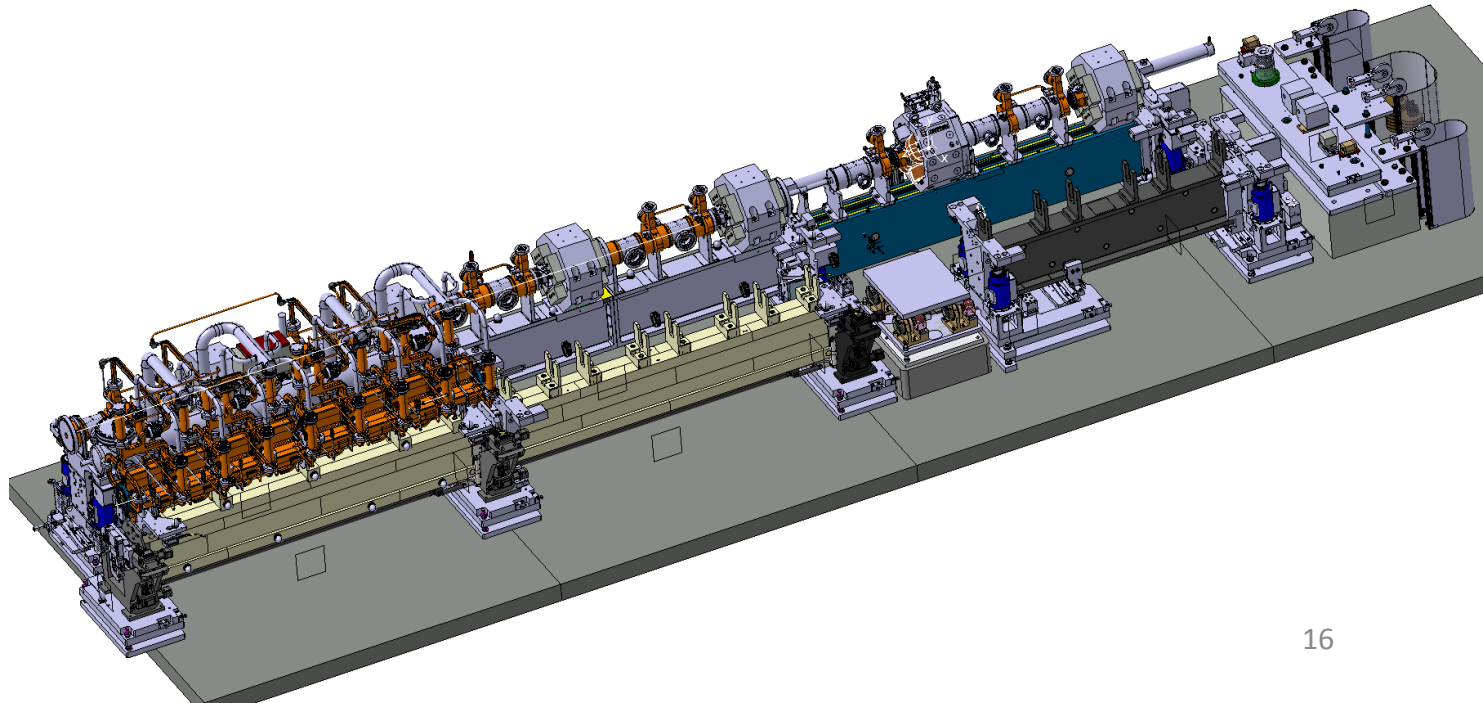


# Installation plan



## PETS

- Under fabrication
- Fiducialisation
- Installation





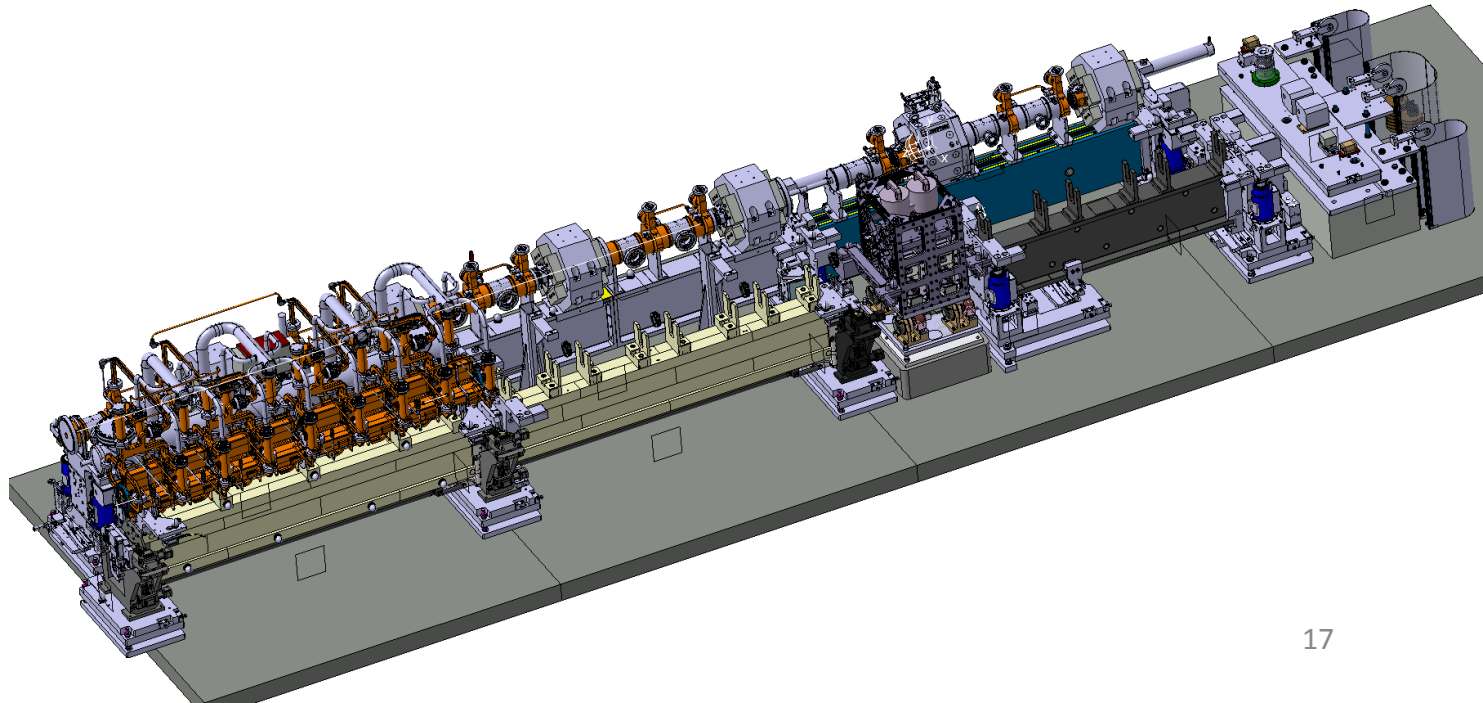


# Installation plan



## MB Quad

- Position fixed
- Designing support
- Installation



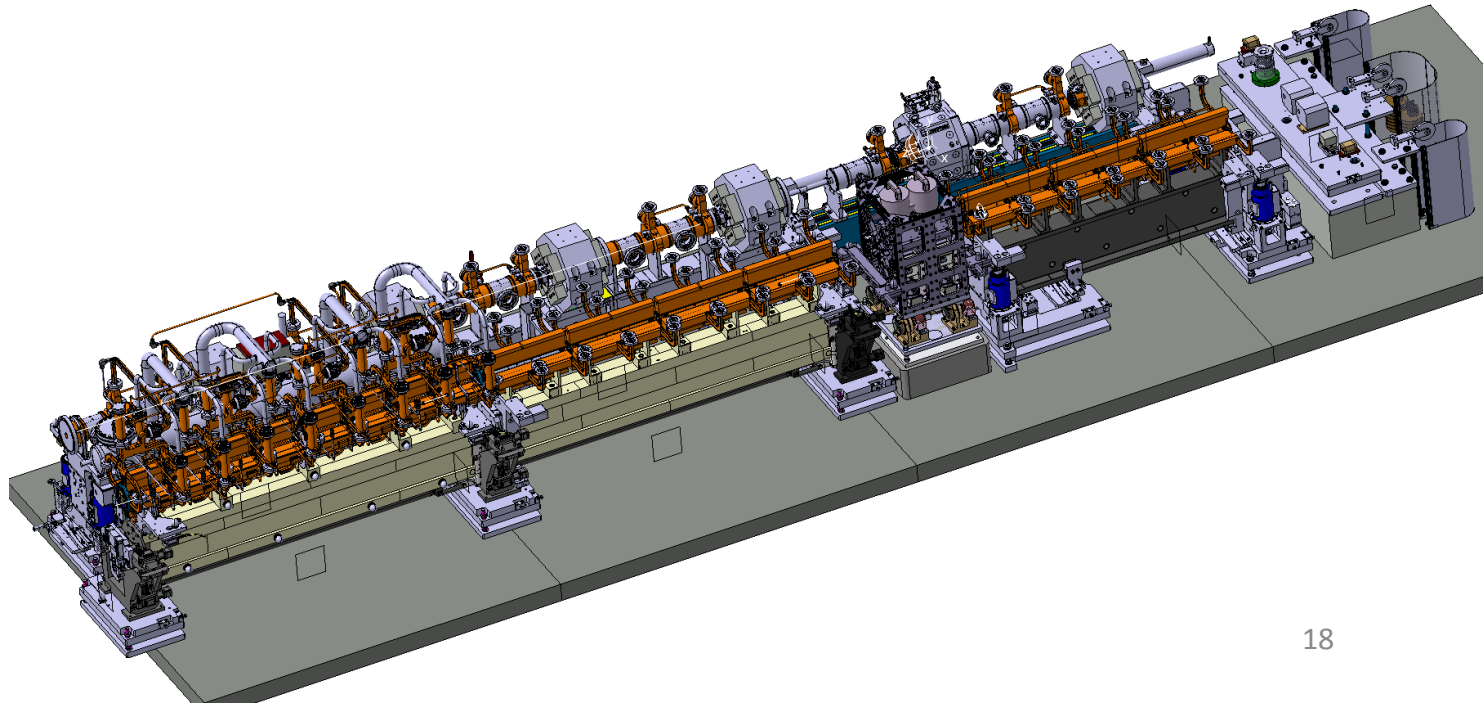


# Installation plan



## SAS

- Manufacturing, lead time 6 months
- Fiducialisation
- Installation



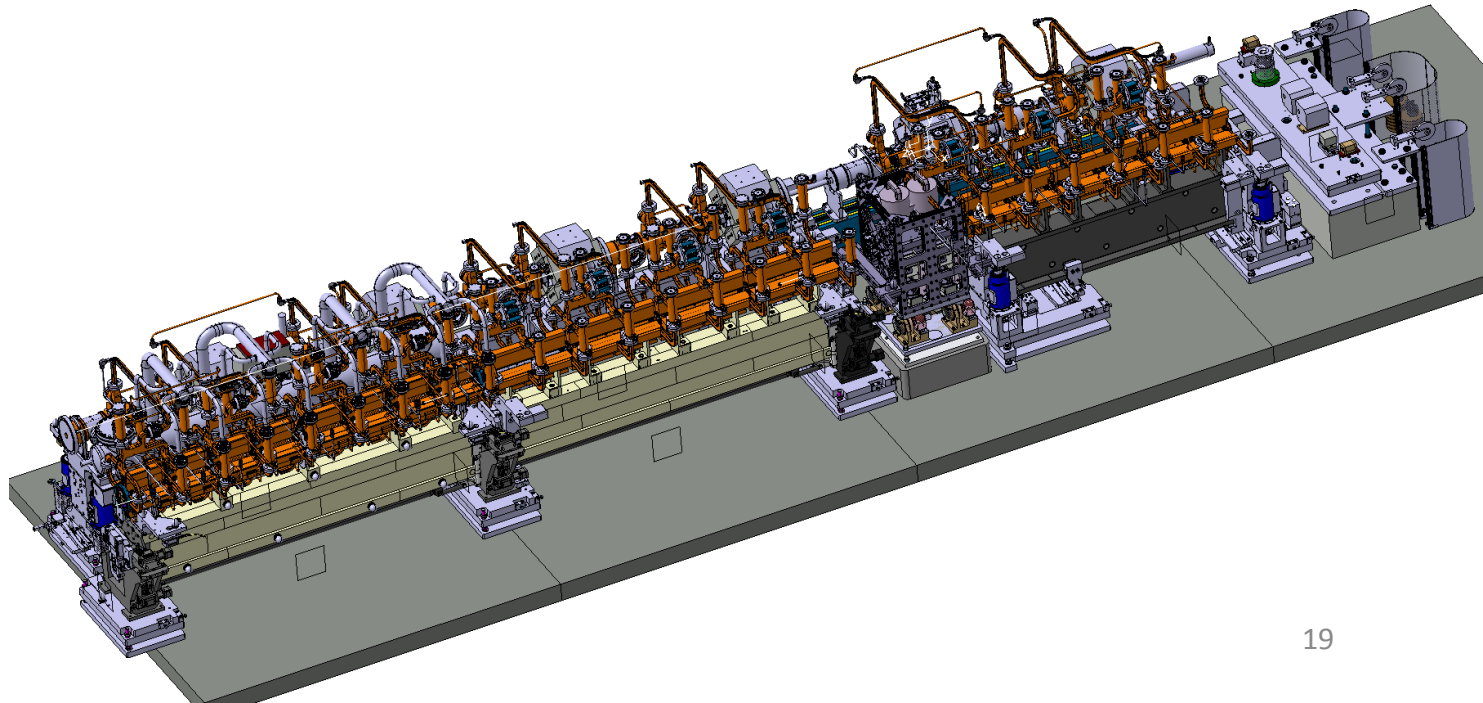


# Installation plan



## RF network

- Under fabrication
- RF network installation
- Compact loads installation



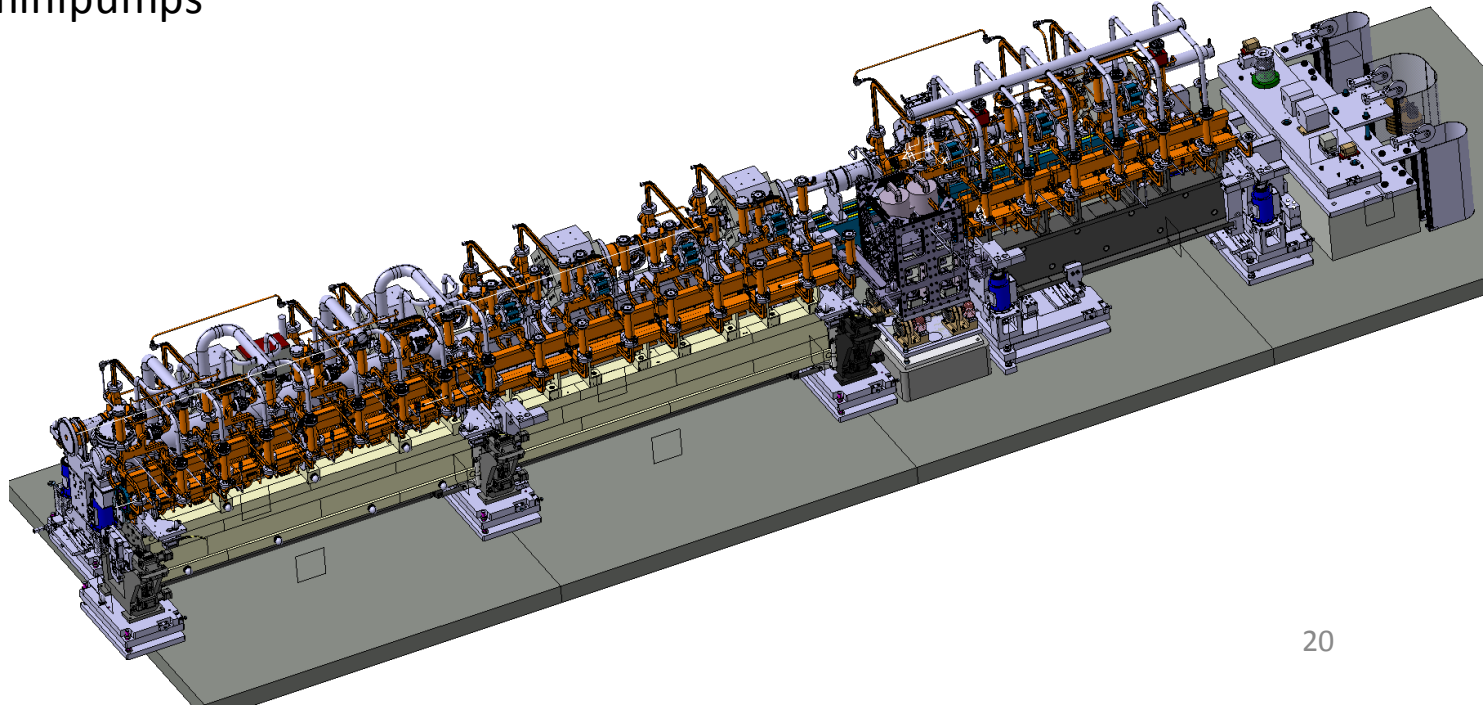


# Installation plan



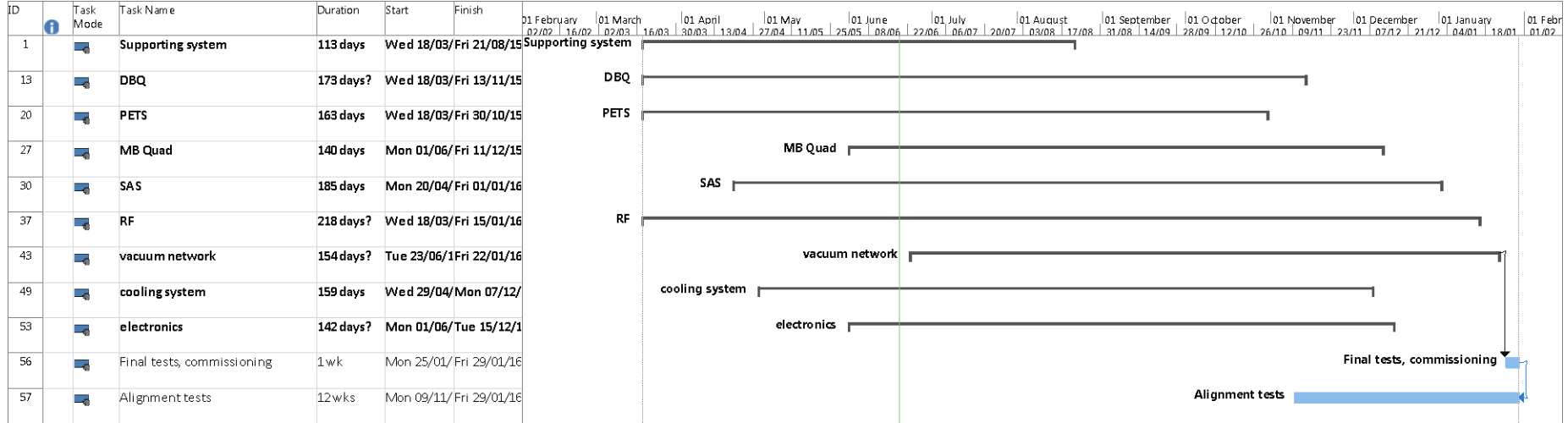
## Vacuum network

- Finalising design
- Fabrication
- Installation
- Support of minipumps





# Schedule



- Projected finish date: 29/01/16
- Last 3 months combine installation with alignment tests



# Summary



- T0-T0-T1 configuration
- More relevant components design
- Great testing flexibility
- Projected finish 31/01/2016

Thank you!!