



Linear scanner mechanics development Project status February 2023

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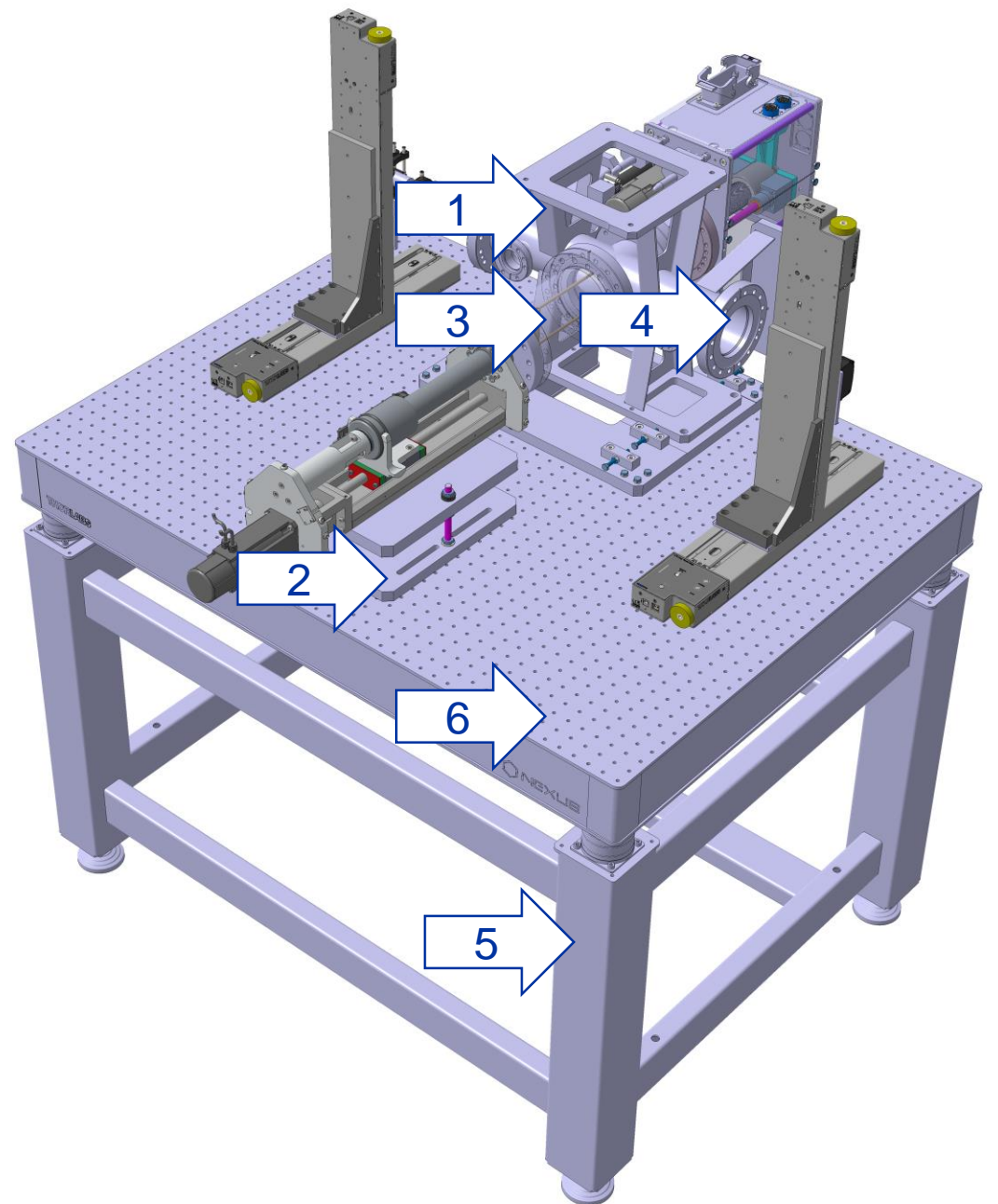
February 14 - 2023

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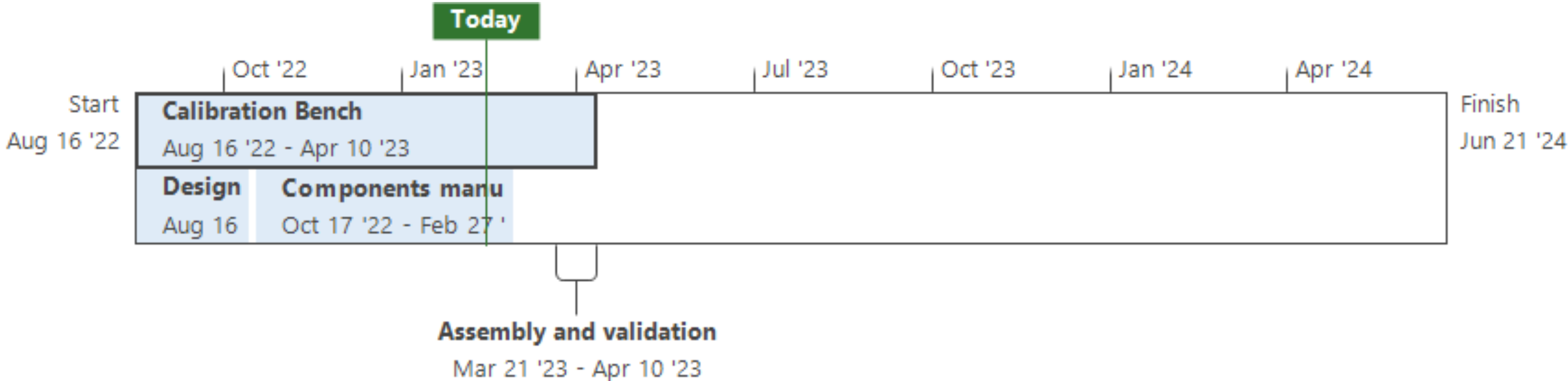
- **BWS calibration bench – status**
- **New linear system development**

Status

#	Item	Q-y	Status
1	Vacuum Chamber	1	In production (MME), ready in February
2	UHVD Unit Support	1	Design ready preparing production
3	UHVD DN100 Adapter	1	Ready
4	DN100 Viewport	2	Ready
5	Frame	1	Ready
6	Breadboard	1	In production, delivery in March



Calibration Bench Schedule

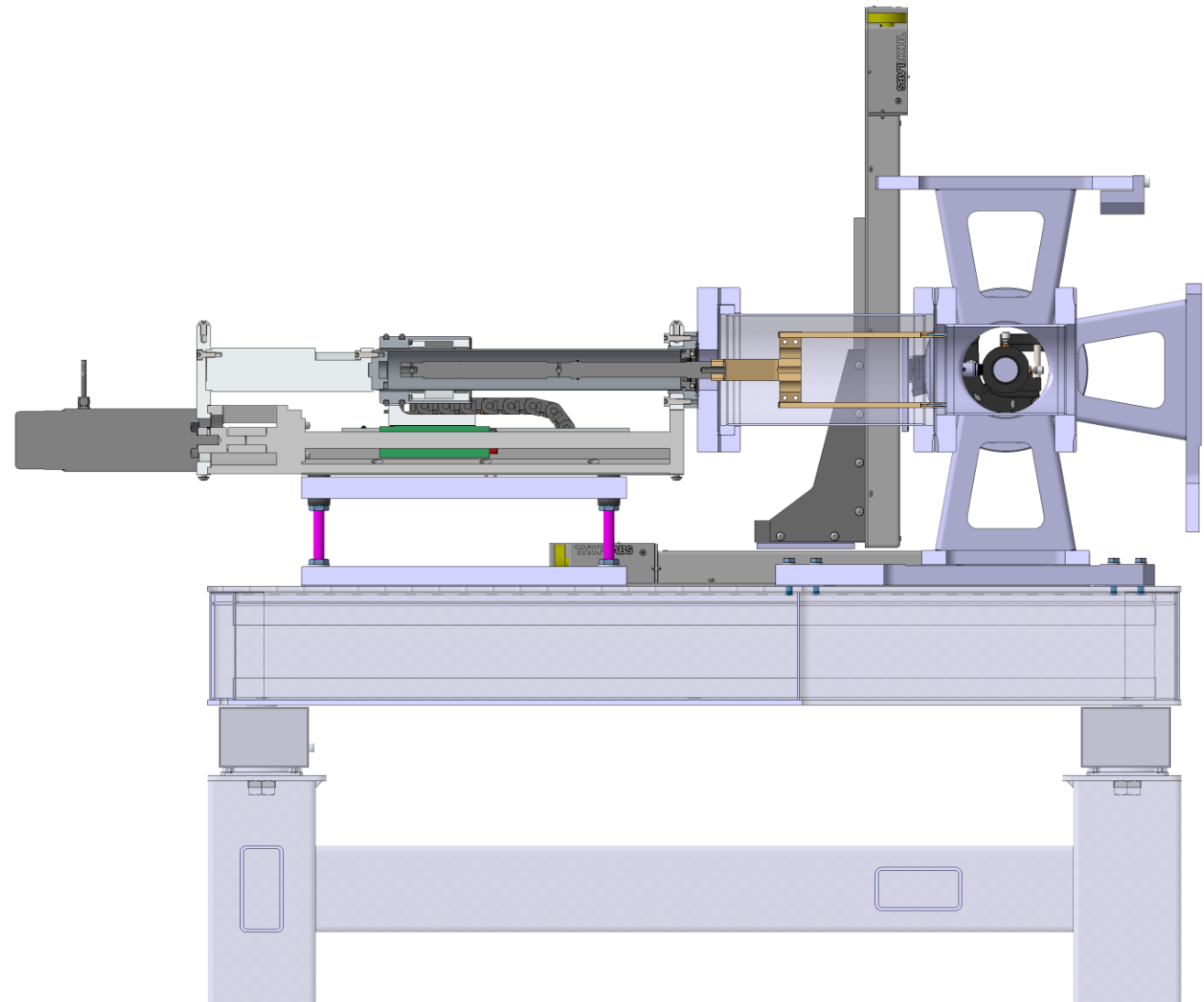
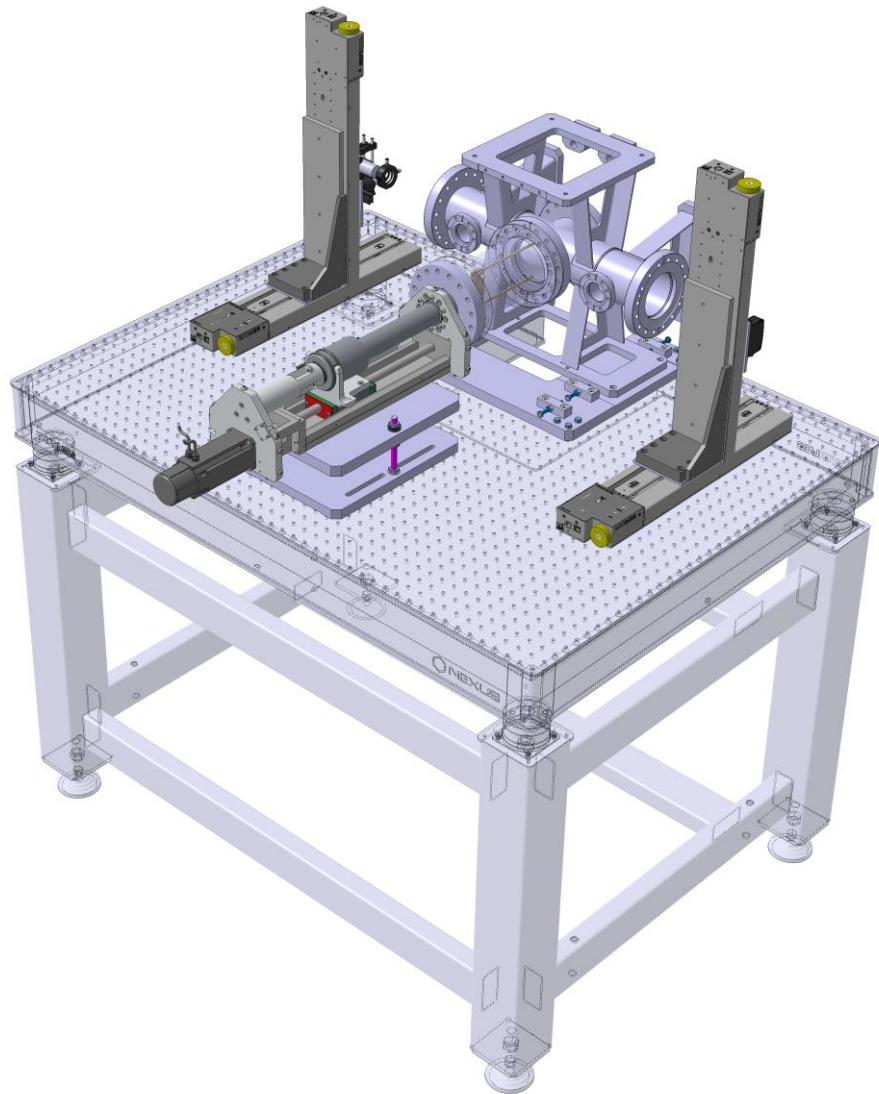


Vacuum Chamber Manufacturing – mid January

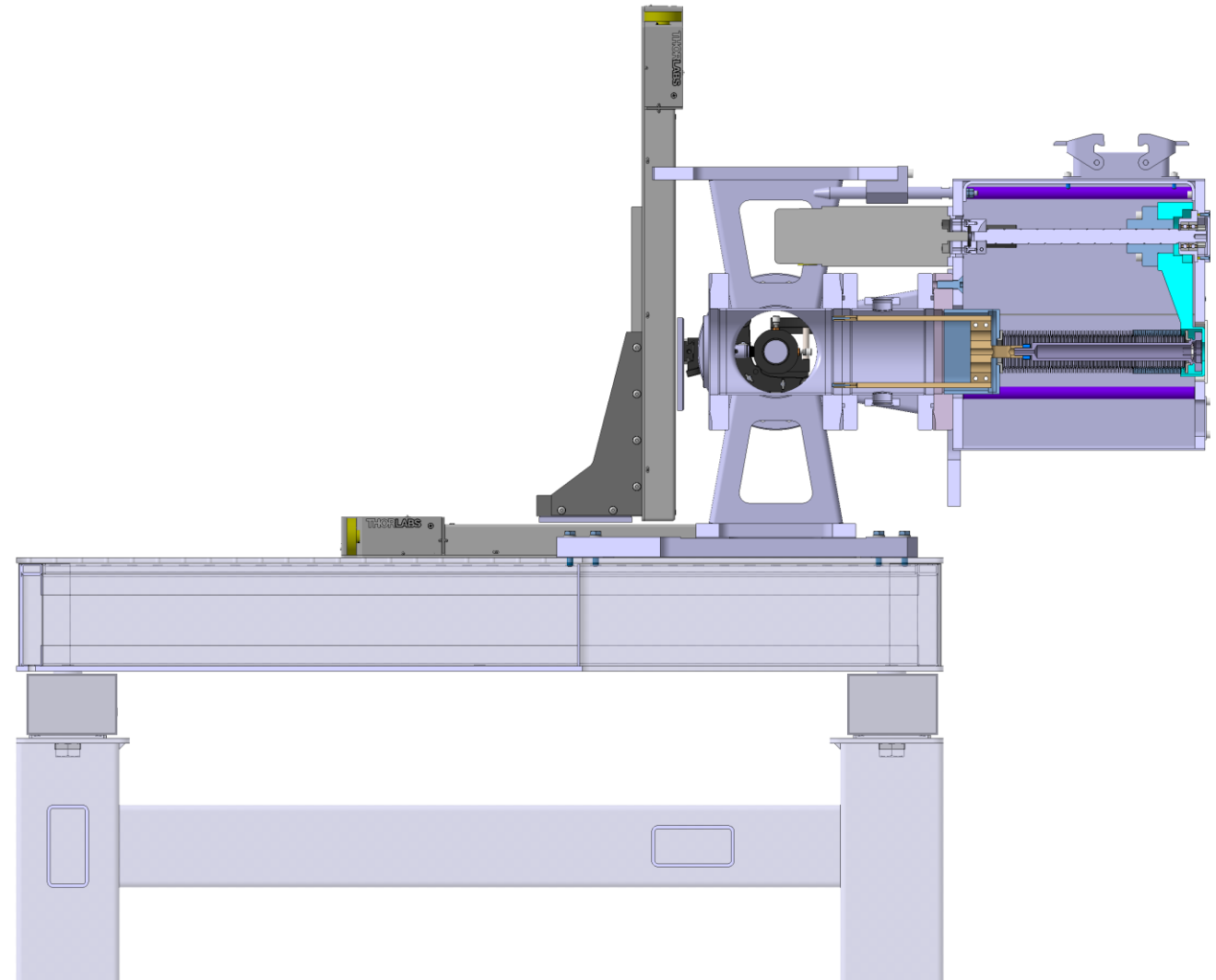
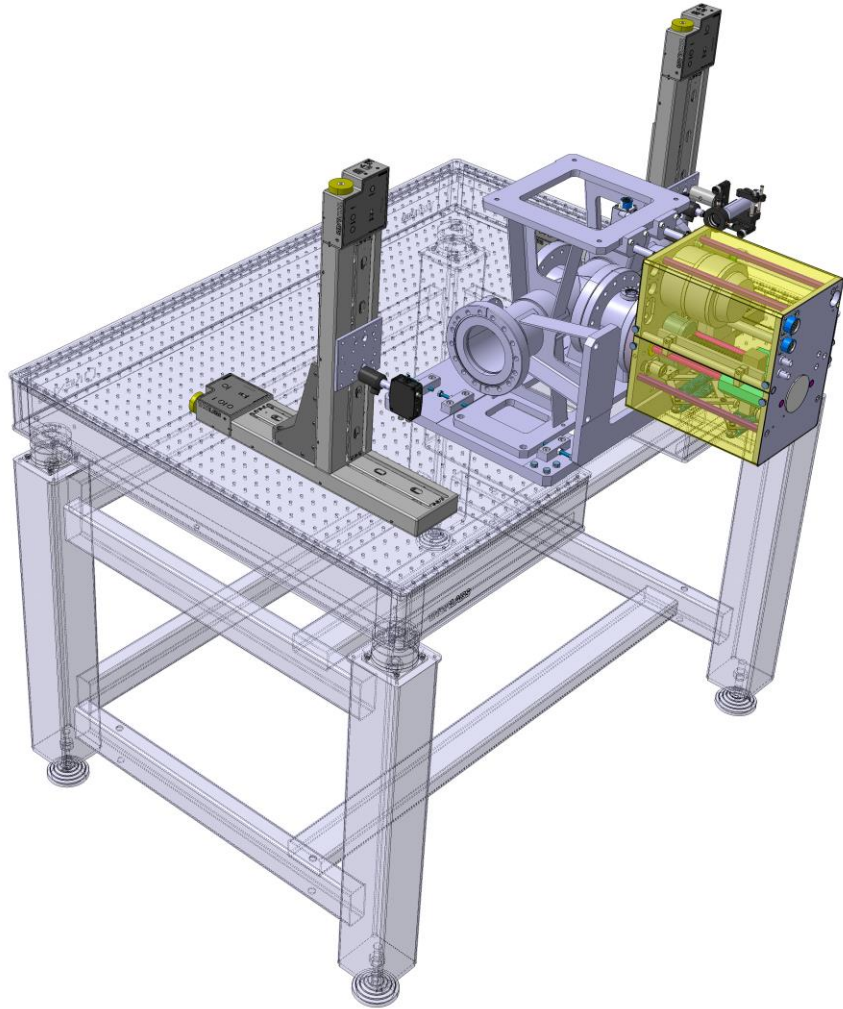


Extra Slides

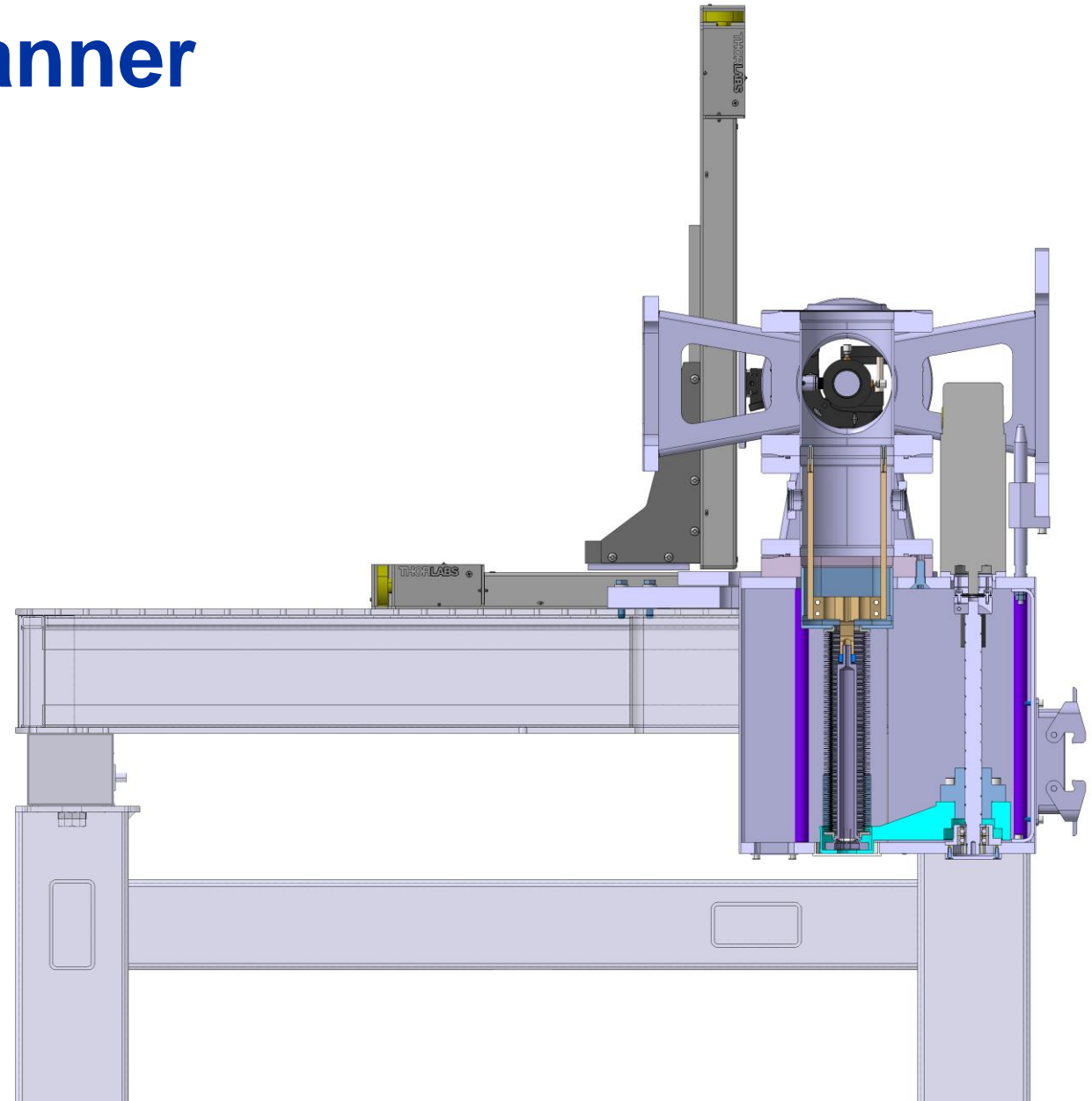
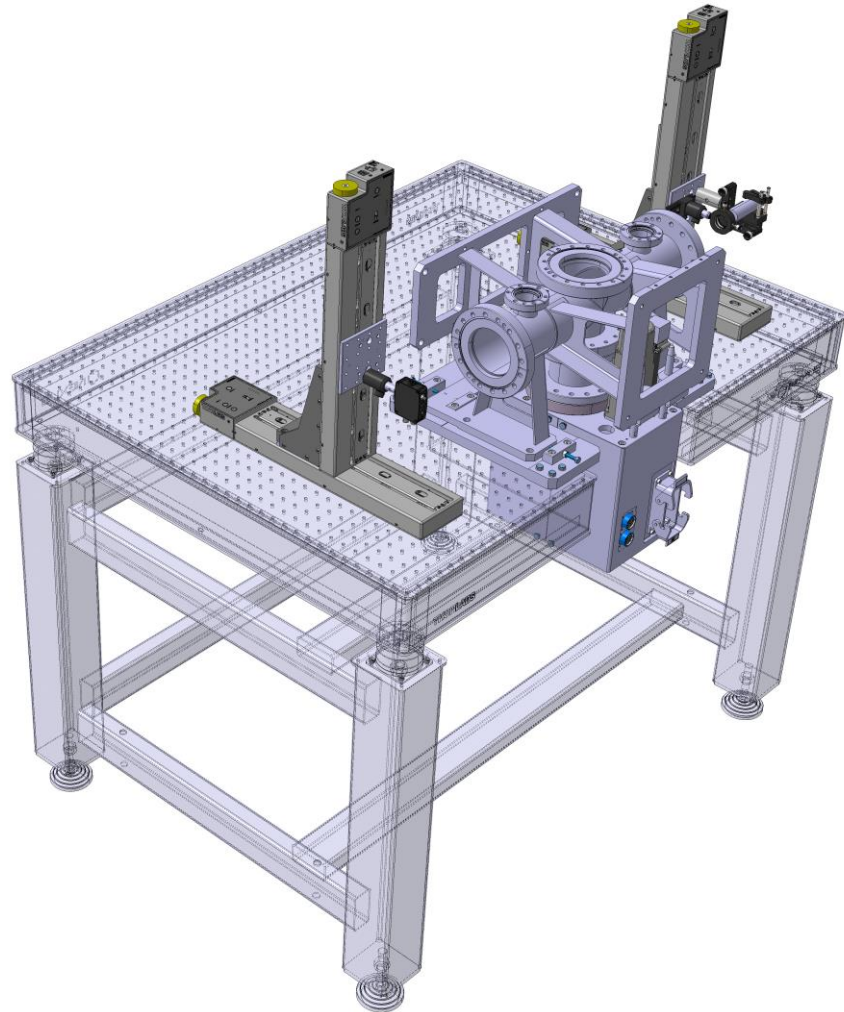
Compatibility: UHV push-pull prototype



Compatibility: Horizontal Scanner (Operational or Prototype)

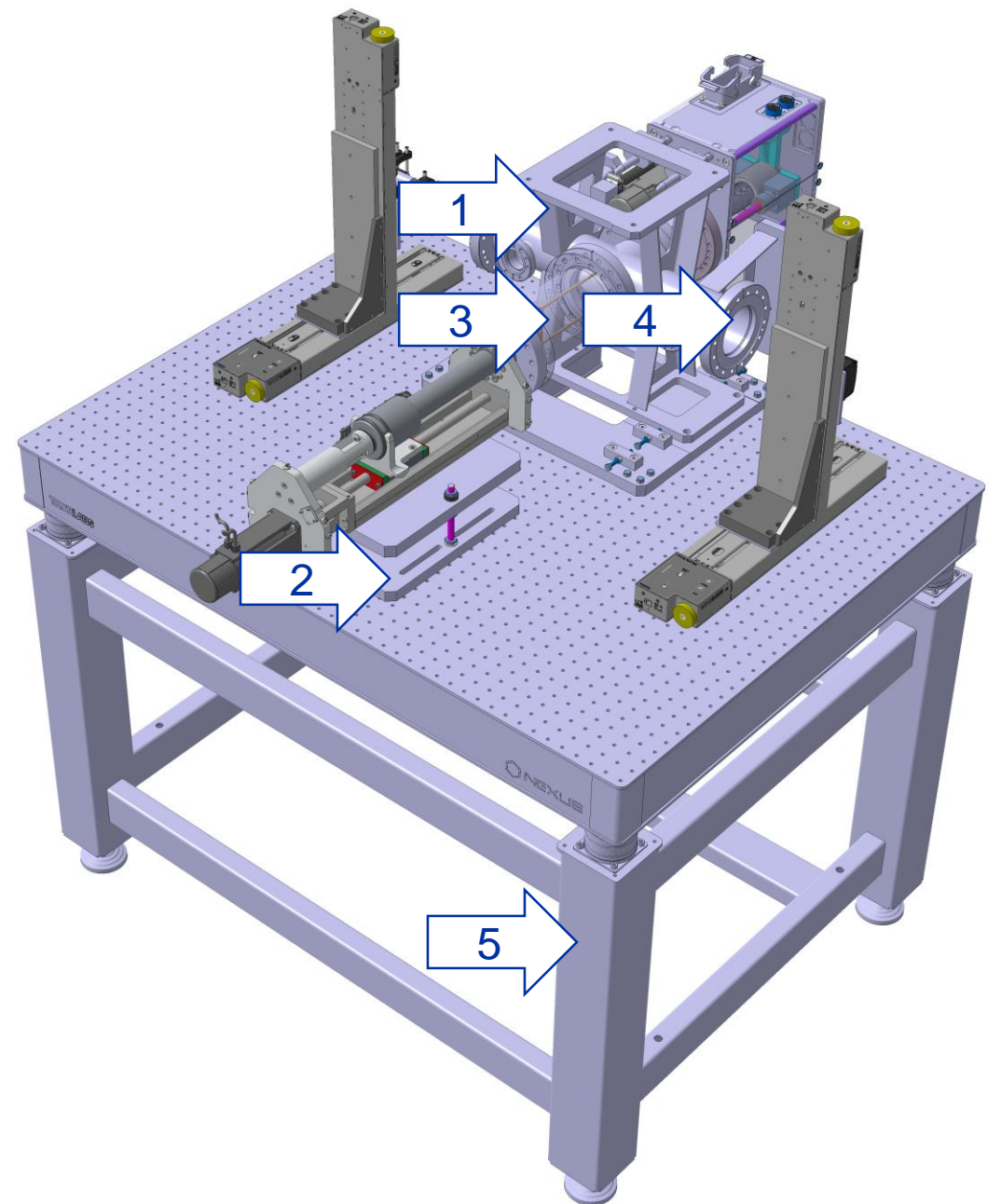


Compatibility: Vertical Scanner (Operational or Prototype)

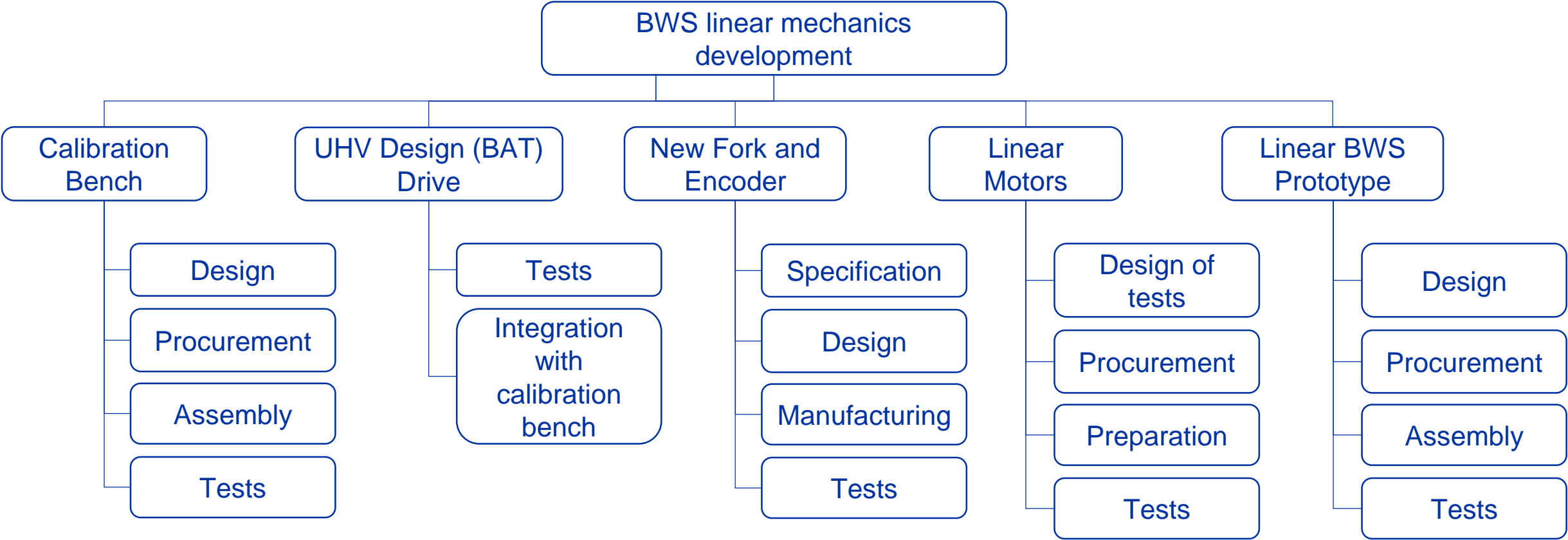


Planned Expenses

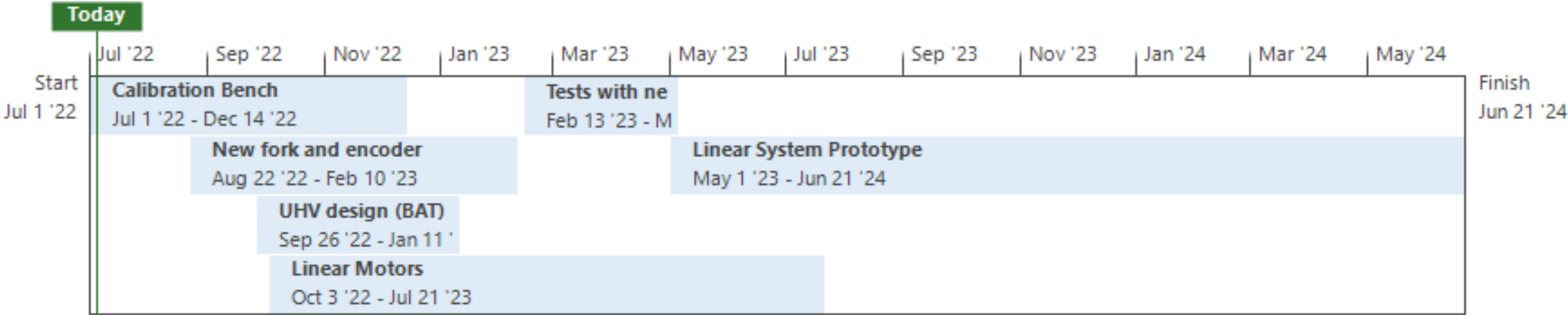
#	Item	Q-y	Total cost, CHF
1	Vacuum Chamber	1	~ 5000...8000
2	UHVD Unit Support	1	~ 500
3	UHVD DN100 Adapter	1	~ 1200
4	DN100 Viewport	2	~ 500
5	Frame	1	~ 2000
Total			~9200...12200



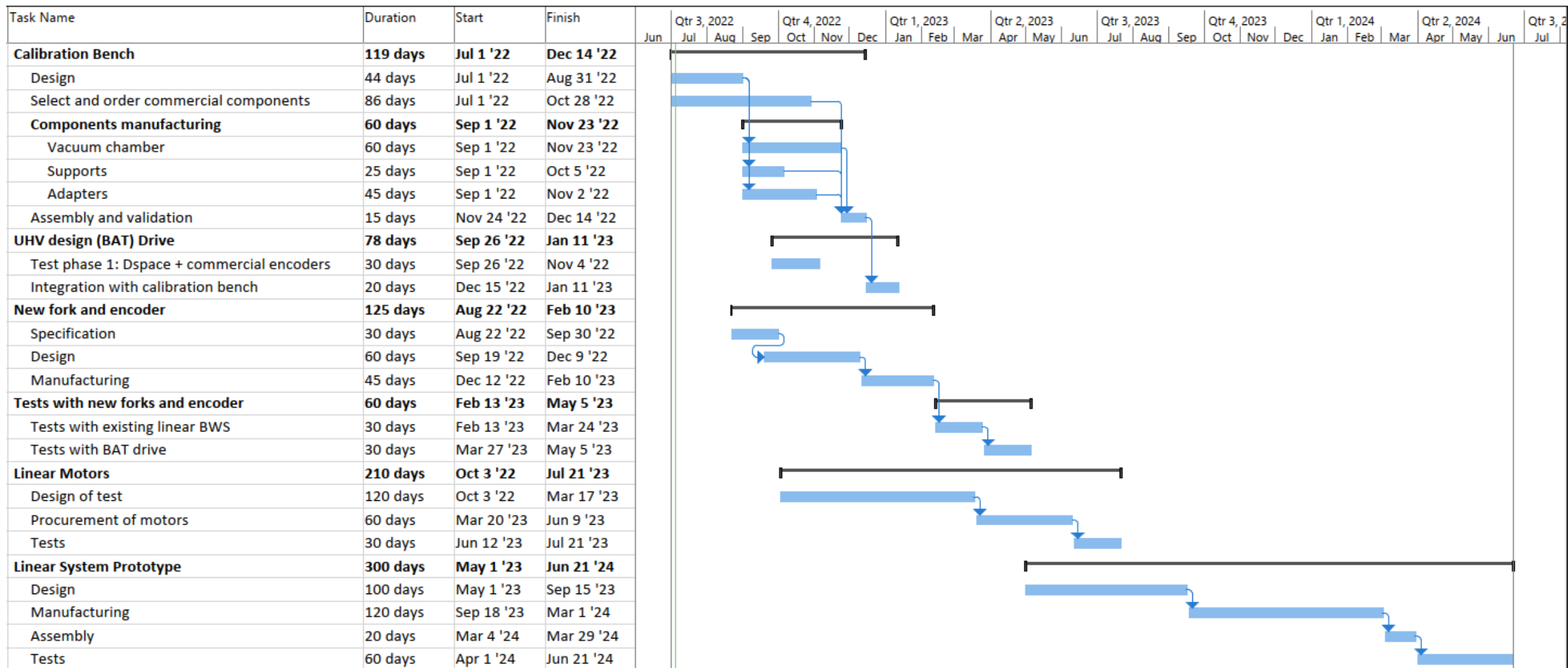
BWS linear mechanism – work breakdown



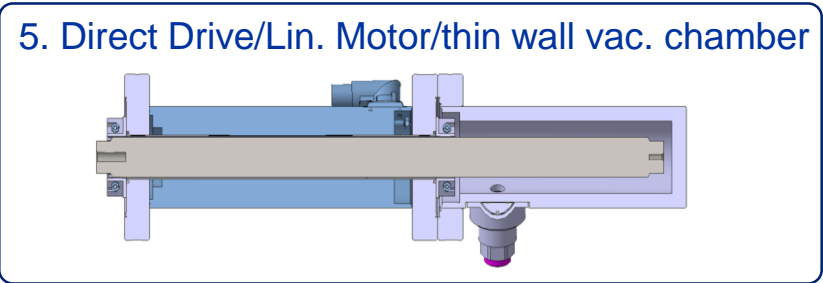
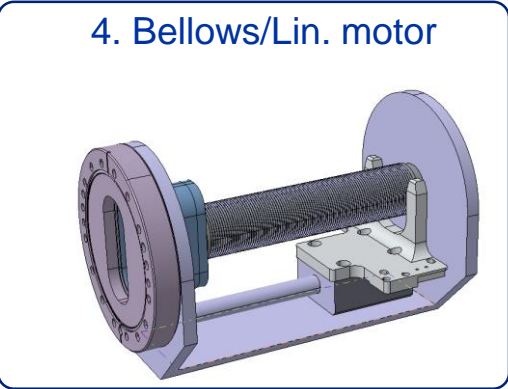
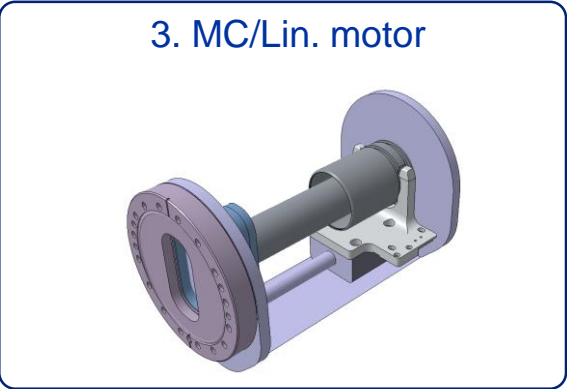
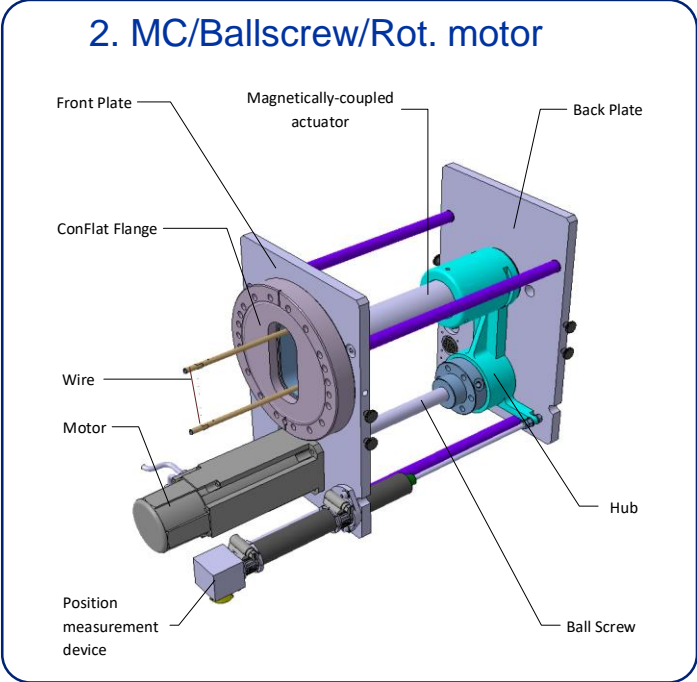
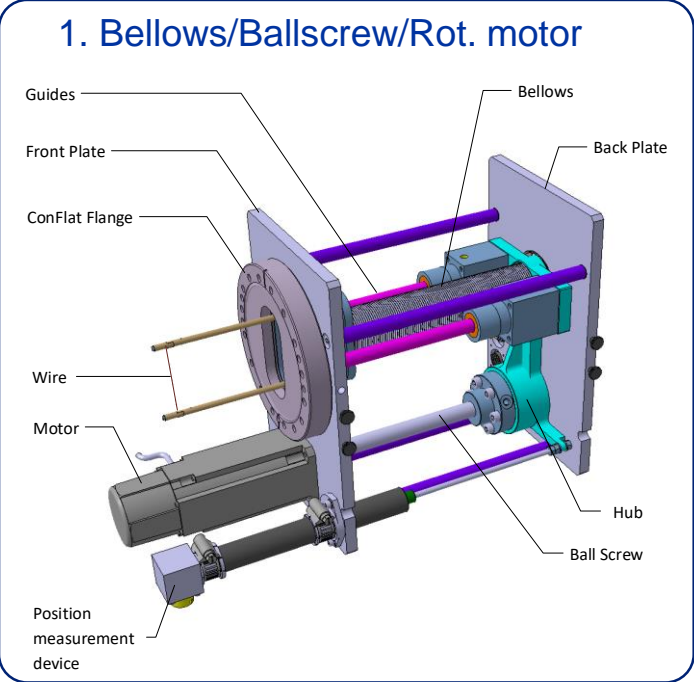
Schedule proposal 2022 – 2024



Schedule proposal 2022 – 2024



Linear Wire Scanner Design Alternatives



1 – bad 5 - good

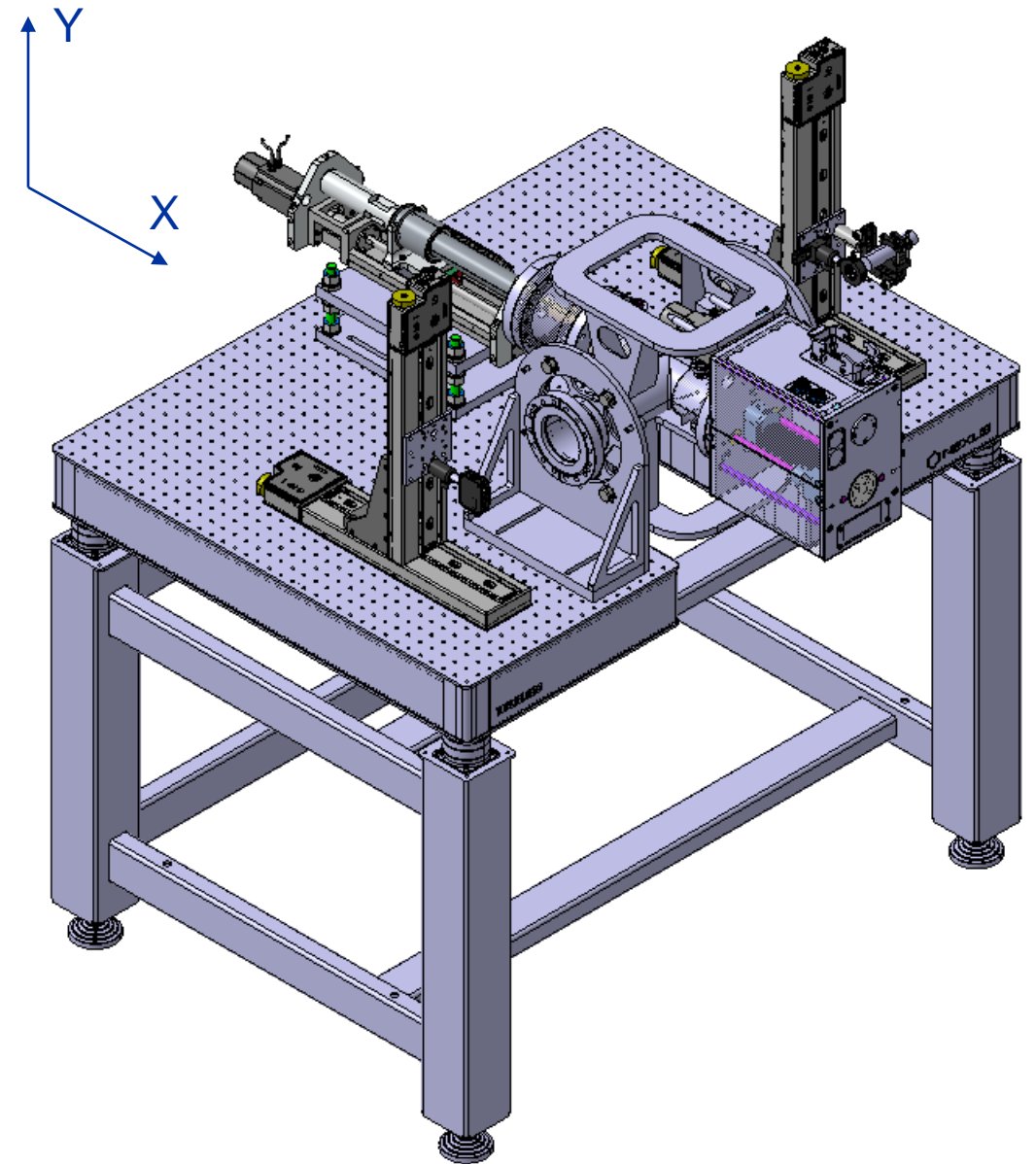
Design Variant	Motor type	Bellows/MC	Compactness [1..5]	N of components [1..5]
1. Bellows/Ballscrew/Rot. Motor	Rotary, PMSM	Bellows	3	2
2. Magnetically-coupled/Ballscrew/Rot. Motor	Rotary, PMSM	MC	3	3
3. Magnetically-coupled/Lin. Motor	Linear	MC	5	4
4. Bellows/Lin. Motor	Linear	Bellows	5	4
5. Direct Drive/Lin. Motor/thin wall vac. Chamber	Linear	Linear Motor	3	4

Components

- **Magnetically coupled push-pull feasibility study**
 - UHV-design prototype with two encoders
- **Position sensor alternatives: wire**
 - Linear optical encoders vs. Interferometry sensors vs. Potentiometers vs. Combined Solution
 - Should be a part of the instrument (not a vacuum chamber/beam pipe)
- **Fork [wire support]**
 - Analysis of current design
 - Specification
 - Design options (additive, subtractive etc.)
- **Wire diagnostics**
 - Resistance measurement (LIU-like) or Integrity monitoring (Camera)

Test Bench Status

- **Scanner in V or H orientation**
- **4 linear stages [control of X and Y]**
- **Vacuum Chamber**
- **Compatible with all linear scanners and UHV prototype drive**
- **Preliminary design done**
- **3D model readiness 60%**
- **2D to be completed**
- **Commercial components can be purchased**





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