

Linear scanner mechanics development Project status February 2023

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February 14 - 2023

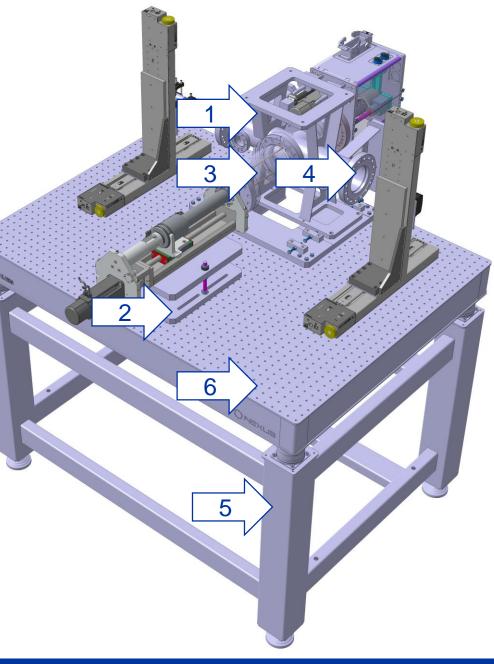
Contents

- BWS calibration bench status
- New linear system development



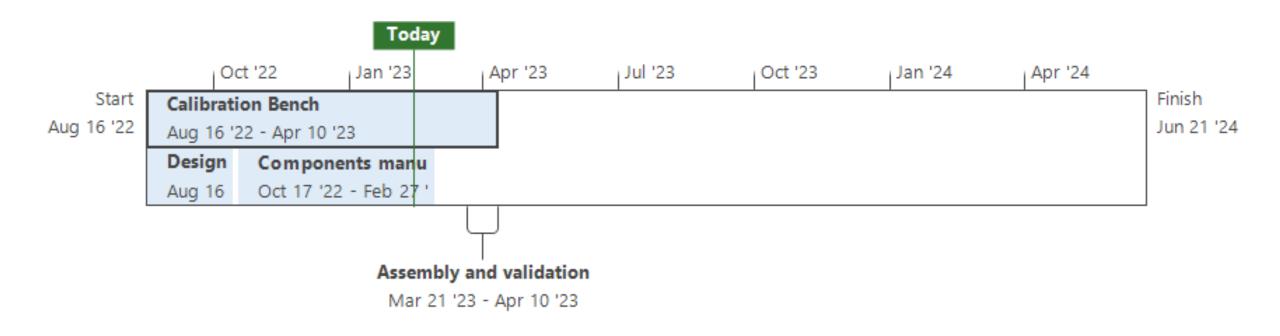
Status

#	ltem	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





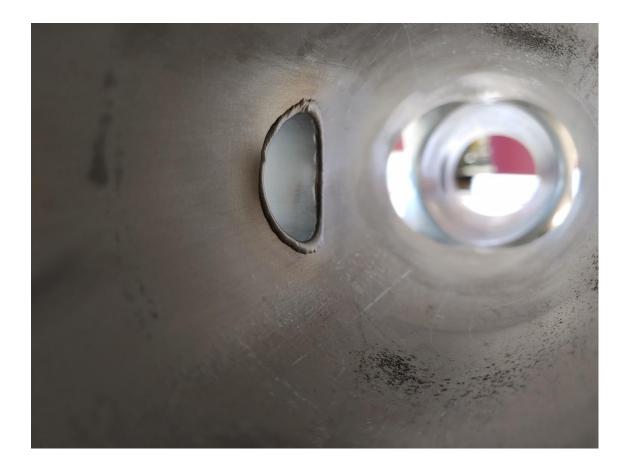
Calibration Bench Schedule





Vacuum Chamber Manufacturing – mid January





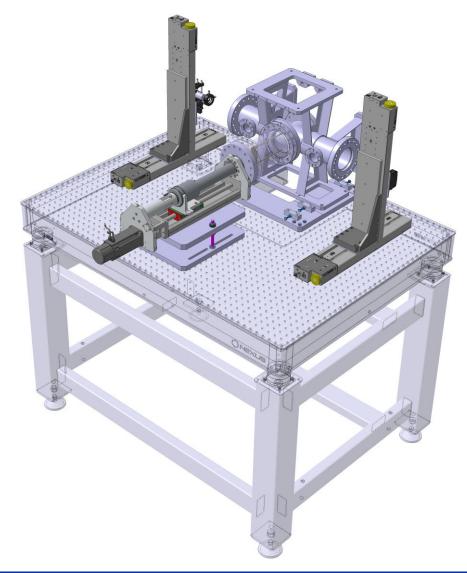


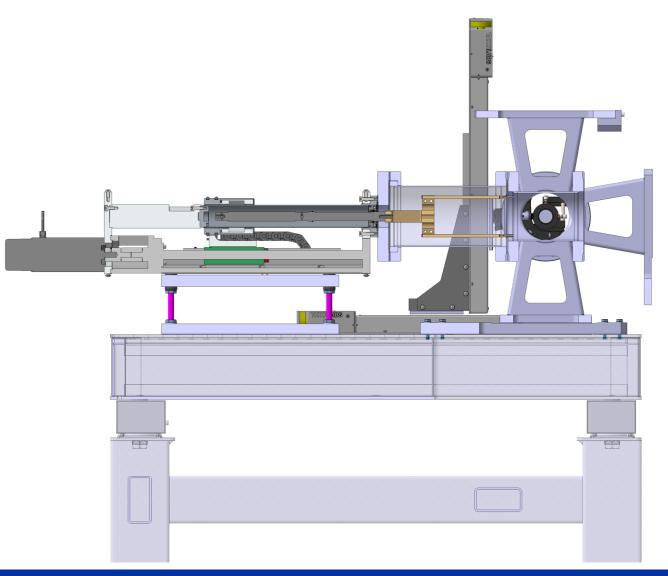






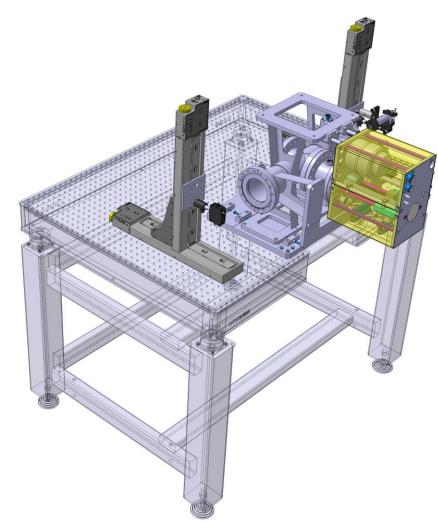
Compatibility: UHV push-pull prototype

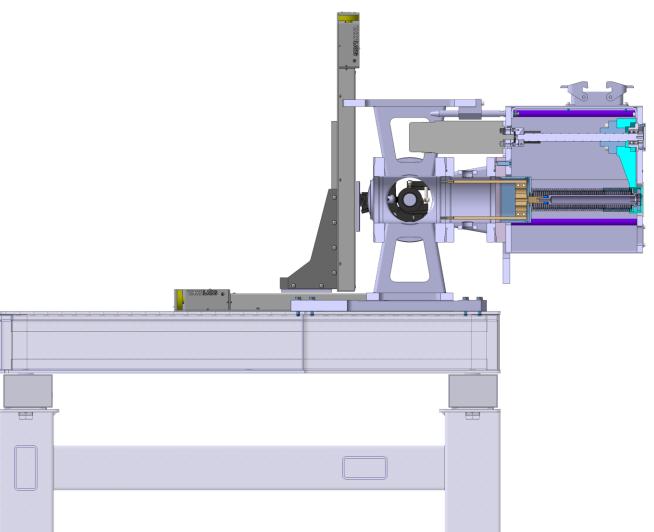






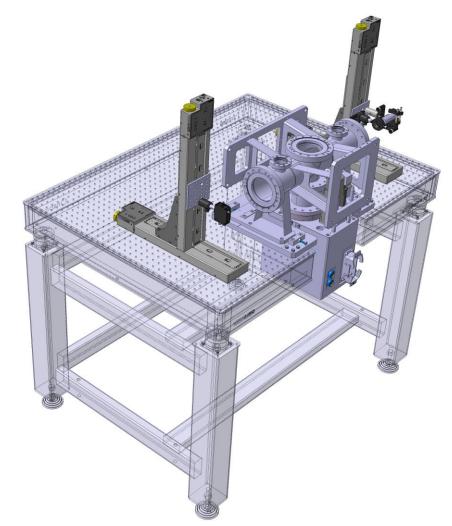
Compatibility: Horizontal Scanner (Operational or Prototype)

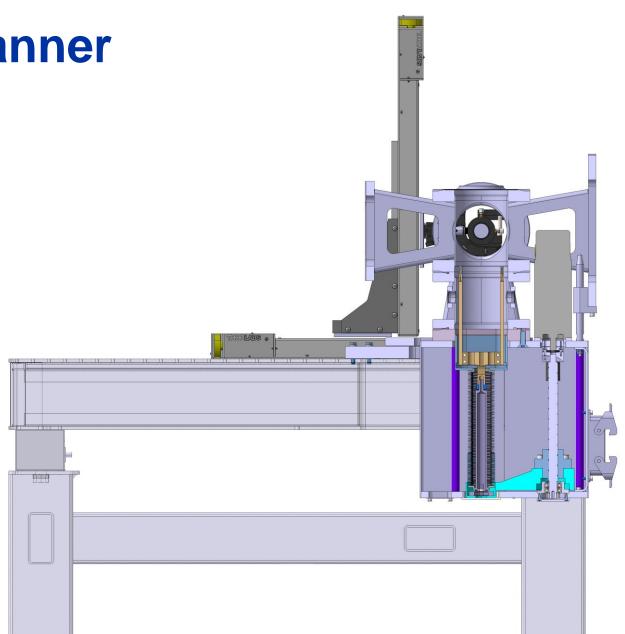






Compatibility: Vertical Scanner (Operational or Prototype)

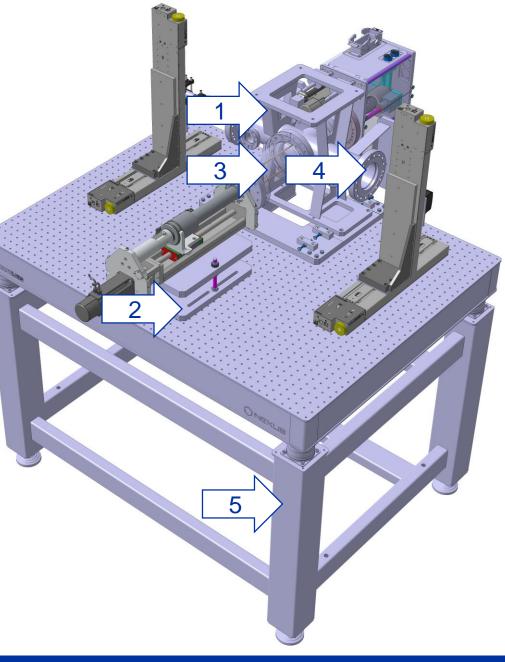






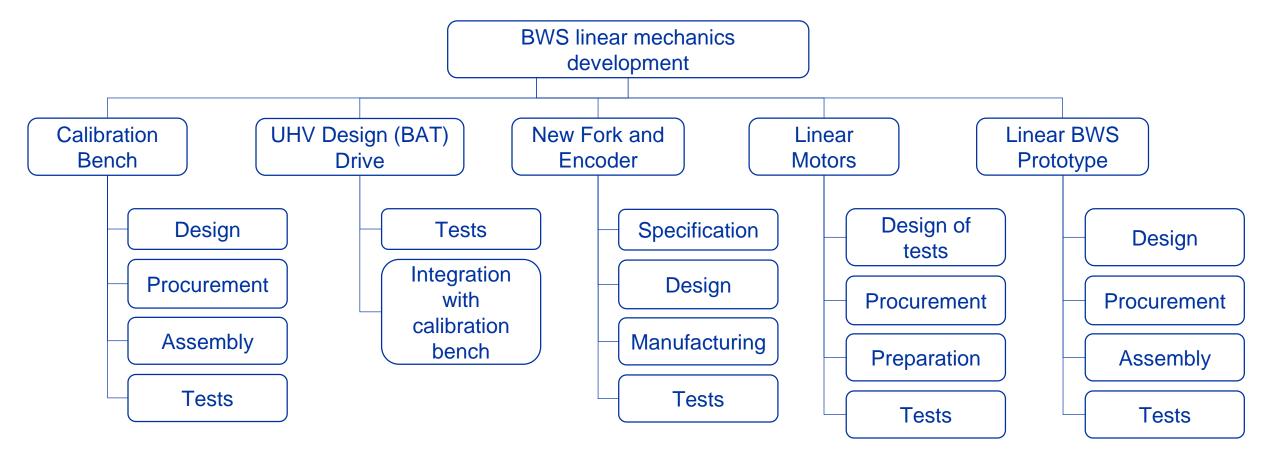
Planned Expenses

# Item	Q-y	Total cost, CHF
1 Vacuum Chamber	1	~ 50008000
2 UHVD Unit Support	1	~ 500
3 UHVD DN100 Adapter	1	~ 1200
4 DN100 Viewport	2	~ 500
5 Frame	1	~ 2000
Total		~920012200



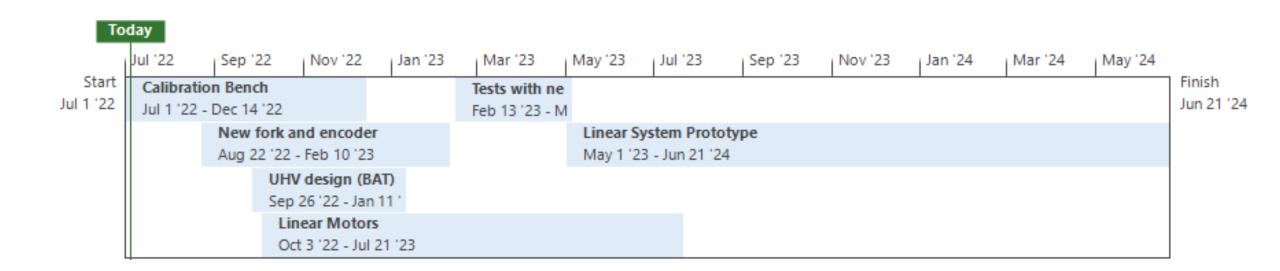


BWS linear mechanism – work breakdown





Schedule proposal 2022 – 2024



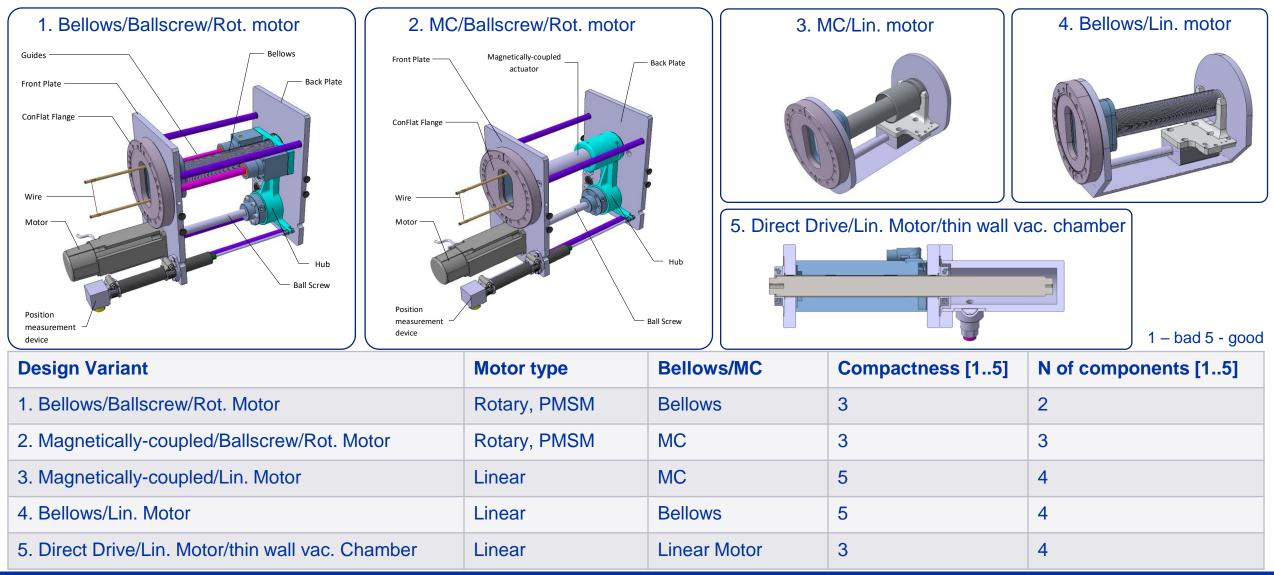


Schedule proposal 2022 – 2024

Task Name	Duration	Start	Finish
Calibration Bench	119 days	Jul 1 '22	Dec 14 '22
Design	44 days	Jul 1 '22	Aug 31 '22
Select and order commercial components	86 days	Jul 1 '22	Oct 28 '22
Components manufacturing	60 days	Sep 1 '22	Nov 23 '22
Vacuum chamber	60 days	Sep 1 '22	Nov 23 '22
Supports	25 days	Sep 1 '22	Oct 5 '22
Adapters	45 days	Sep 1 '22	Nov 2 '22
Assembly and validation	15 days	Nov 24 '22	Dec 14 '22
UHV design (BAT) Drive	78 days	Sep 26 '22	Jan 11 '23
Test phase 1: Dspace + commercial encoders	30 days	Sep 26 '22	Nov 4 '22
Integration with calibration bench	20 days	Dec 15 '22	Jan 11 '23
New fork and encoder	125 days	Aug 22 '22	Feb 10 '23
Specification	30 days	Aug 22 '22	Sep 30 '22
Design	60 days	Sep 19 '22	Dec 9 '22
Manufacturing	45 days	Dec 12 '22	Feb 10 '23
Tests with new forks and encoder	60 days	Feb 13 '23	May 5 '23
Tests with existing linear BWS	30 days	Feb 13 '23	Mar 24 '23
Tests with BAT drive	30 days	Mar 27 '23	May 5 '23
Linear Motors	210 days	Oct 3 '22	Jul 21 '23
Design of test	120 days	Oct 3 '22	Mar 17 '23
Procurement of motors	60 days	Mar 20 '23	Jun 9 '23
Tests	30 days	Jun 12 '23	Jul 21 '23
Linear System Prototype	300 days	May 1 '23	Jun 21 '24
Design	100 days	May 1 '23	Sep 15 '23
Manufacturing	120 days	Sep 18 '23	Mar 1 '24
Assembly	20 days	Mar 4 '24	Mar 29 '24
Tests	60 days	Apr 1 '24	Jun 21 '24



Linear Wire Scanner Design Alternatives





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.)

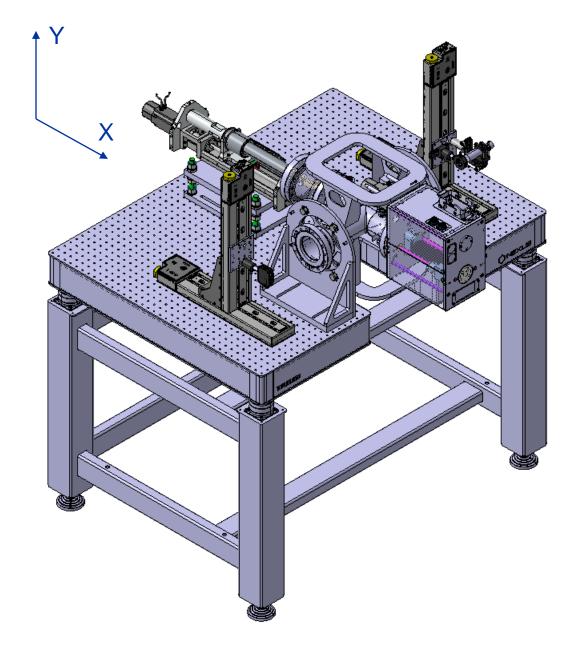
Wire diagnostics

• 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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