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Peter Heimgartner:: Design Engineer :: AIK :: Paul Scherrer Institut

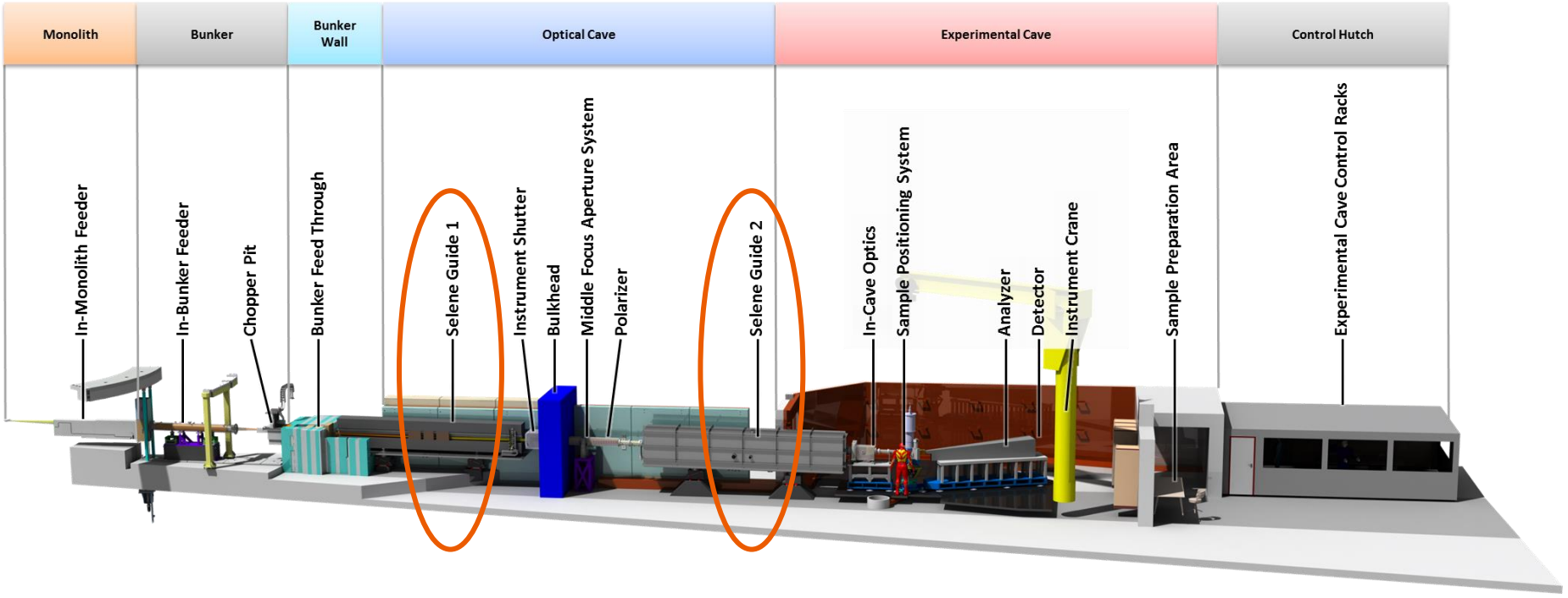
Robot System of the Selene Guide in ESS-ESTIA Instrument

DENIM 2018, Instrument Projects, 19.9.2018

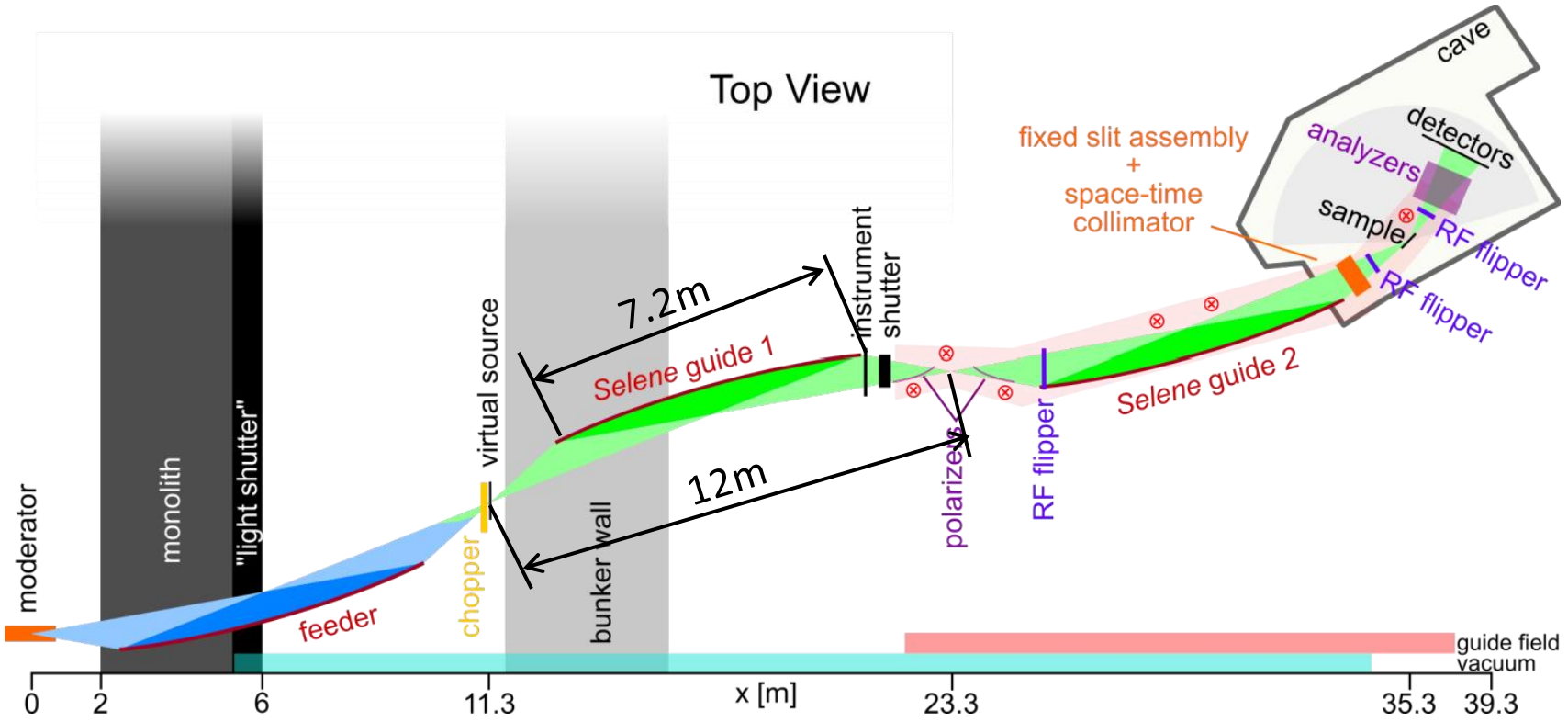
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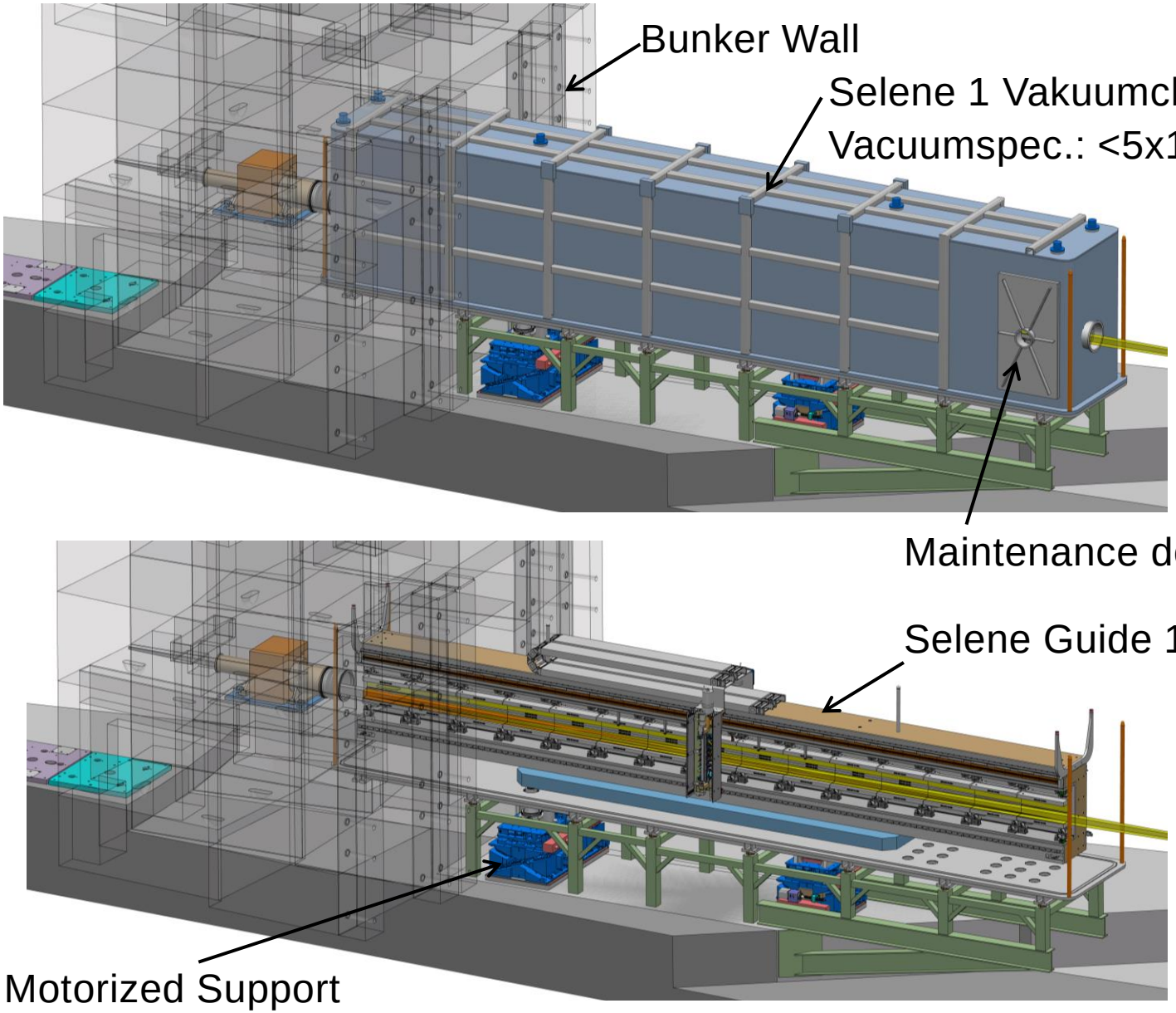
ESTIA Concept



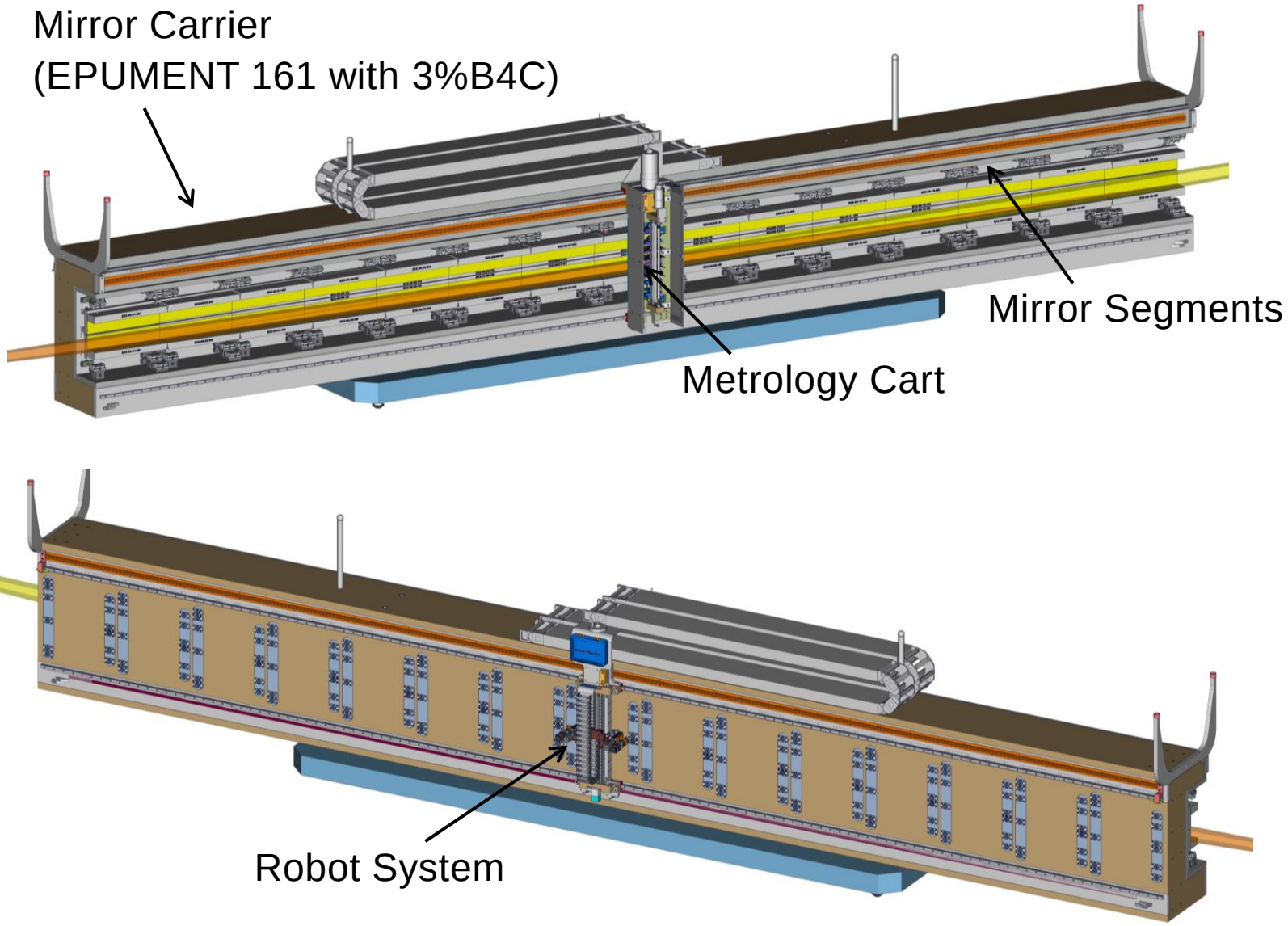
ESTIA Concept



Selene Guide - Overview



Selene Guide - Overview

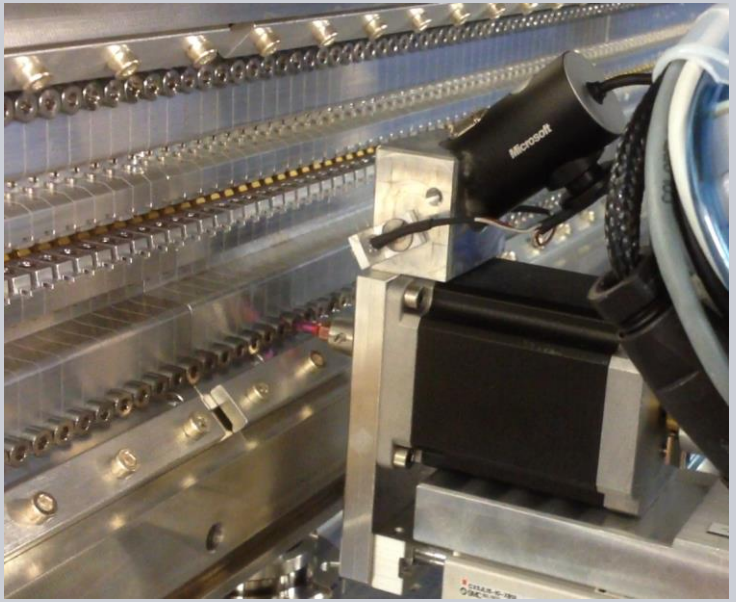


Selene Guide – Mirror Actuator



15 Segments → 1 Mirror
30 Segments → 1 Guide
60 Segments → 2 Guides, Function with one beam
120 Segments → 2 Guides, Completed Function with two beam
180 kinematic holder with one beam
360 kinematic holder with two beams

Selene Guide – Mirror Actuator

Single Actuator	Robot Actuator
	 Courtesy of Steffen Danner, PSD, PSI

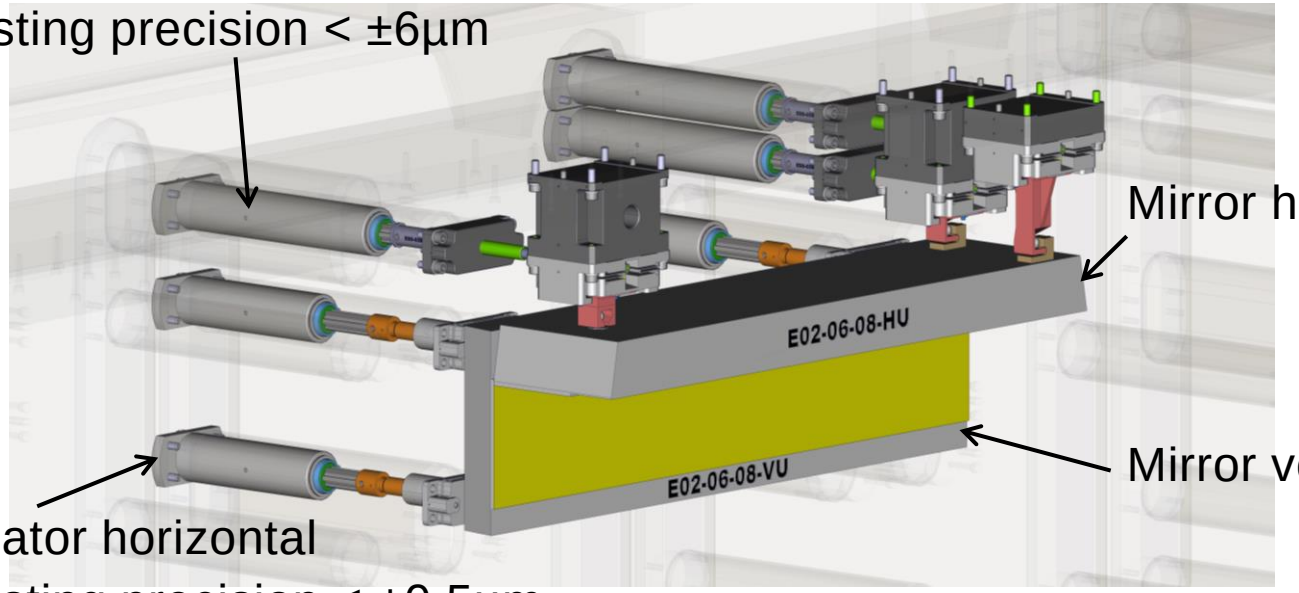
Robot versus Single Actuator

	Advantage
Costs	
Leaktightness for vacuum	
Number of Vacuum feedthrough	
Operation mode (single, simultaneous)	
Performance reliability	
Maintenance	

Selene Guide – Mirror Actuator

Actuator vertical

Adjusting precision < ±6µm

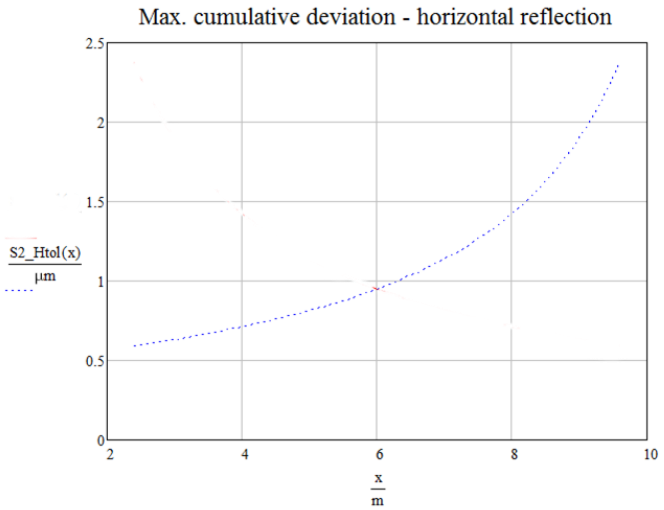


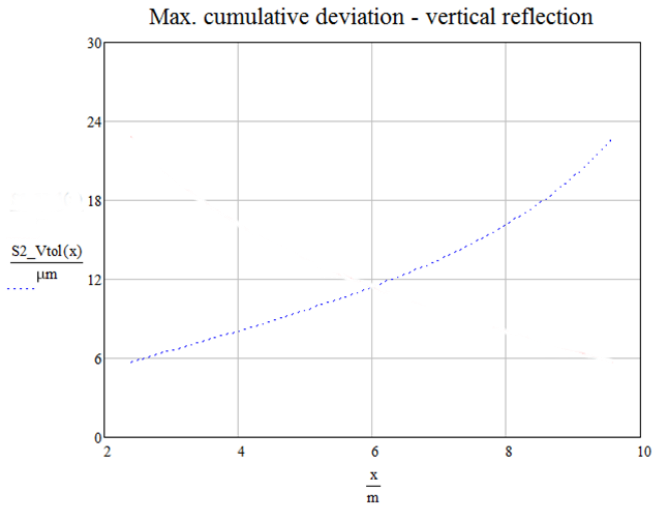
Mirror horizontal

Mirror vertical

Actuator horizontal

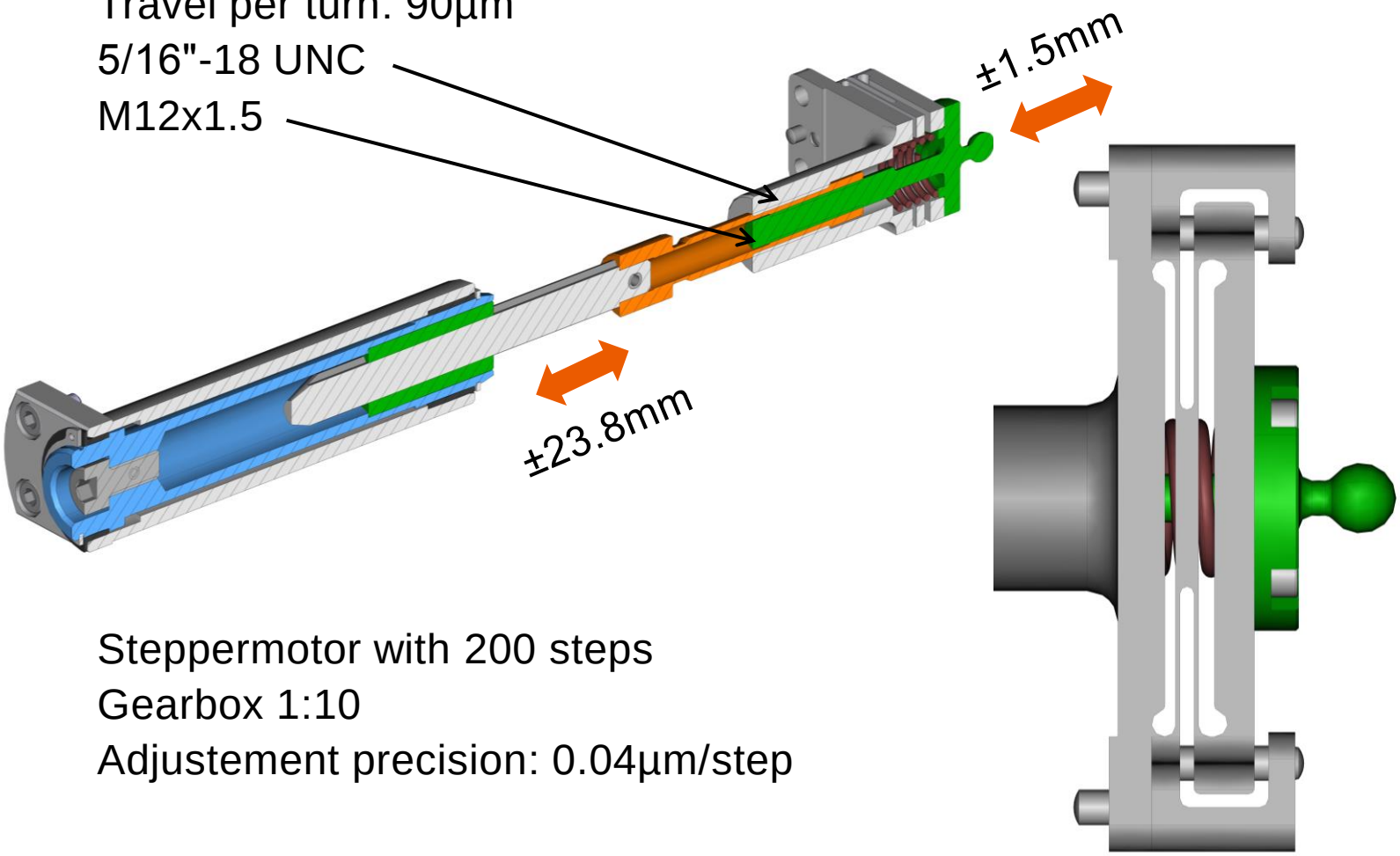
Adjusting precision < ±0.5µm





Selene Guide – Actuator horizontal

Differential thread
Travel per turn: 90µm
5/16"-18 UNC
M12x1.5

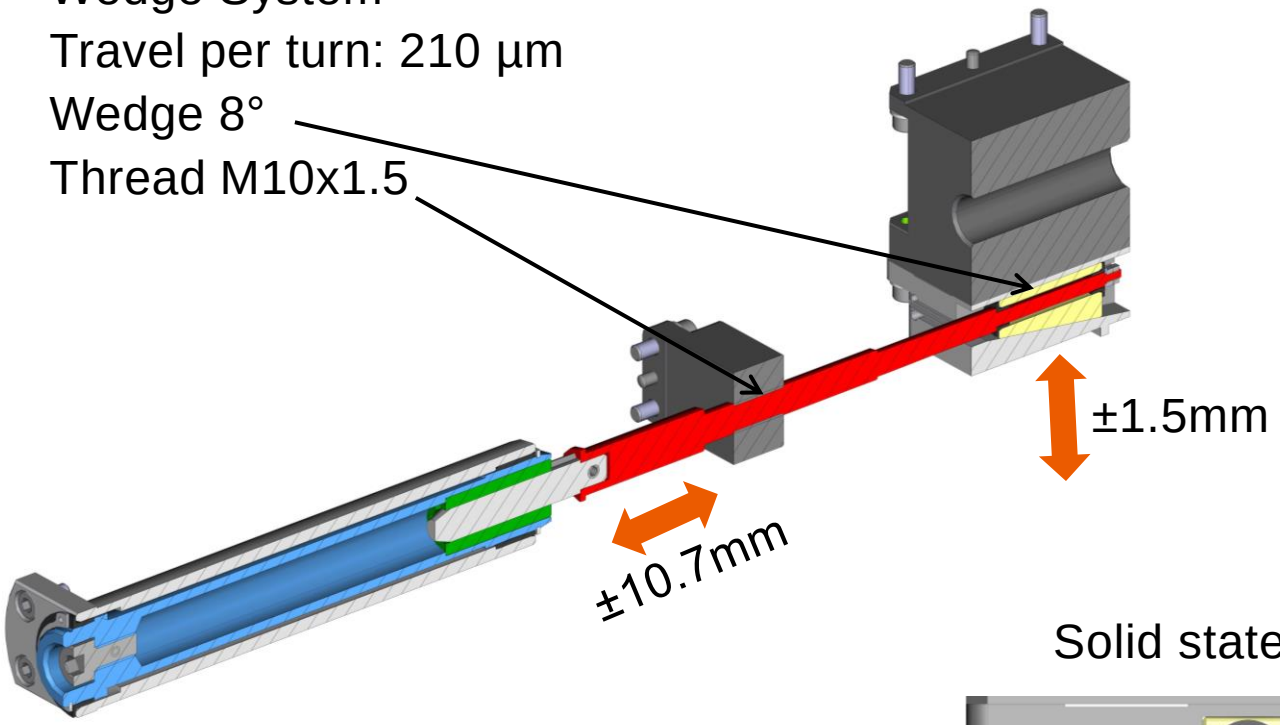


Steppermotor with 200 steps
Gearbox 1:10
Adjustement precision: 0.04µm/step

Solid state hinges

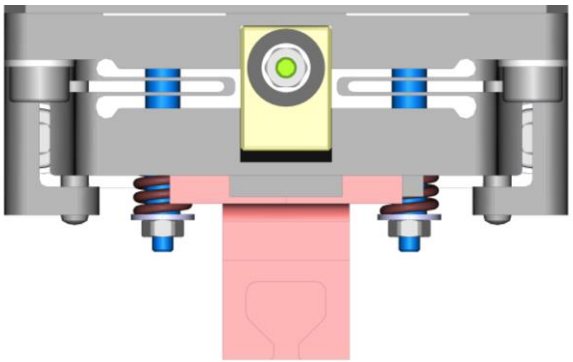
Selene Guide – Actuator vertical

Wedge System
Travel per turn: 210 µm
Wedge 8°
Thread M10x1.5

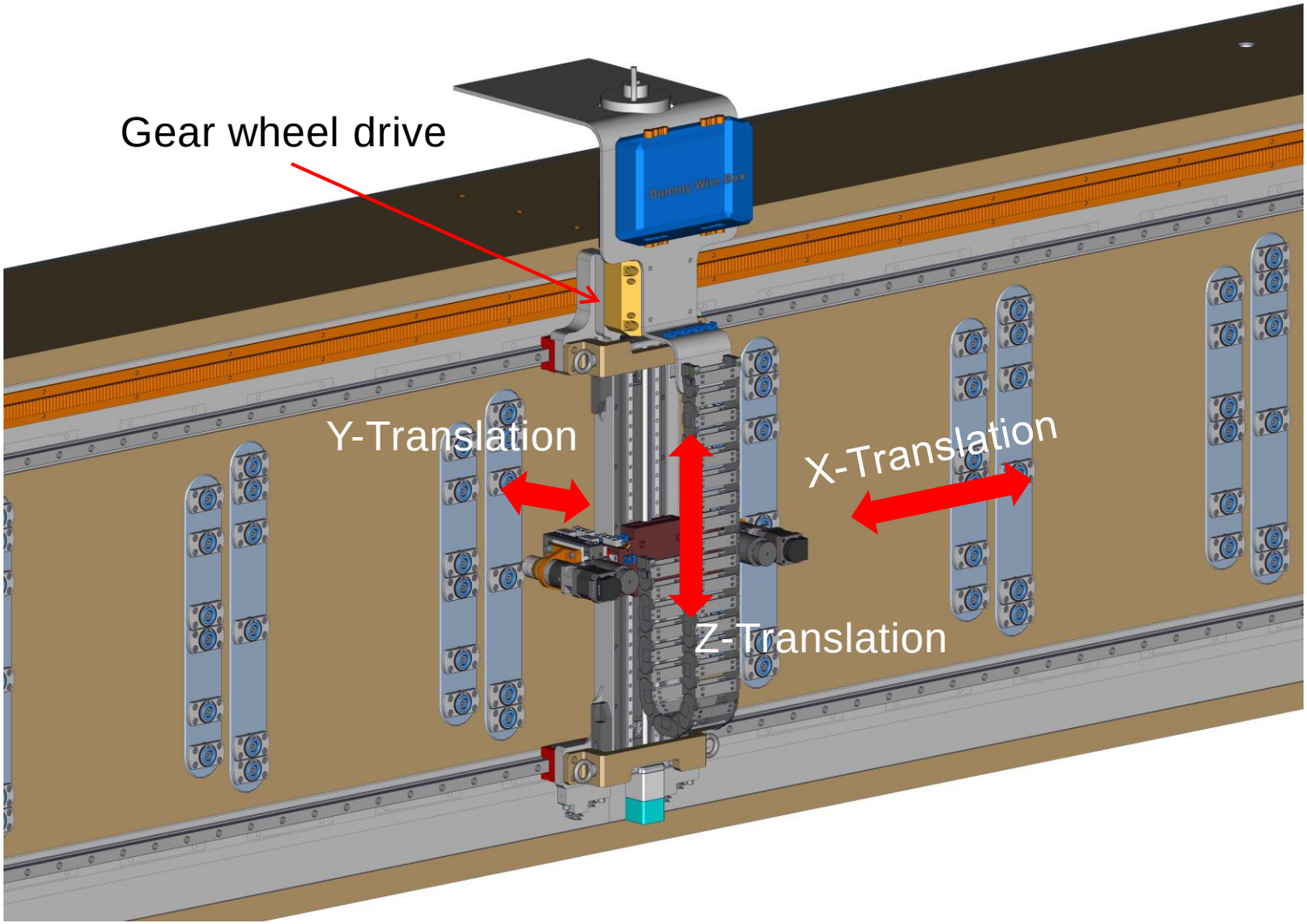


Steppermotor with 200 steps
Gearbox 1:10
Adjustement precision: 0.10 µm/step

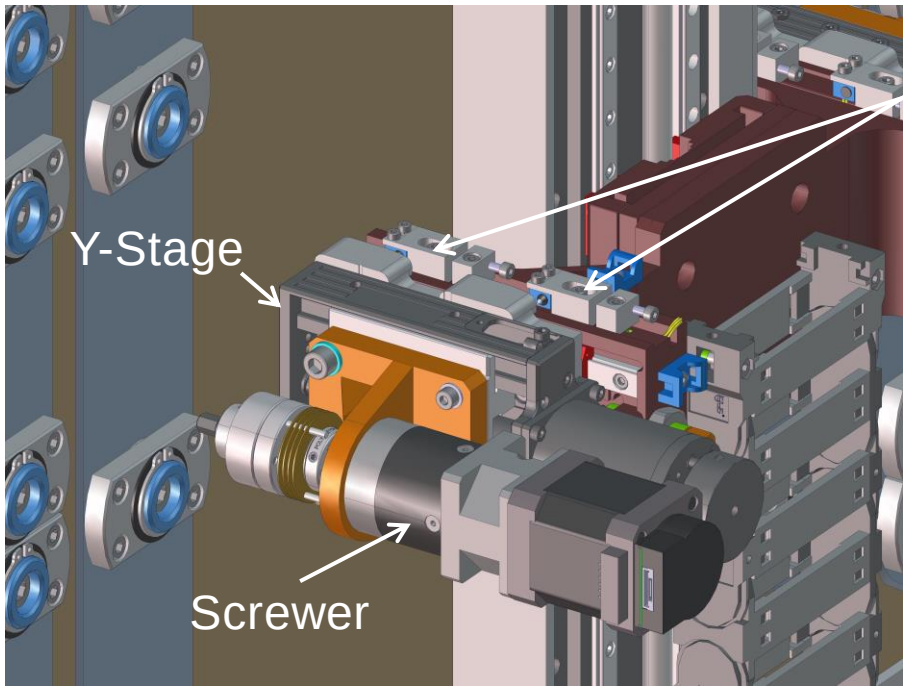
Solid state hinges



Selene Guide – Robot System

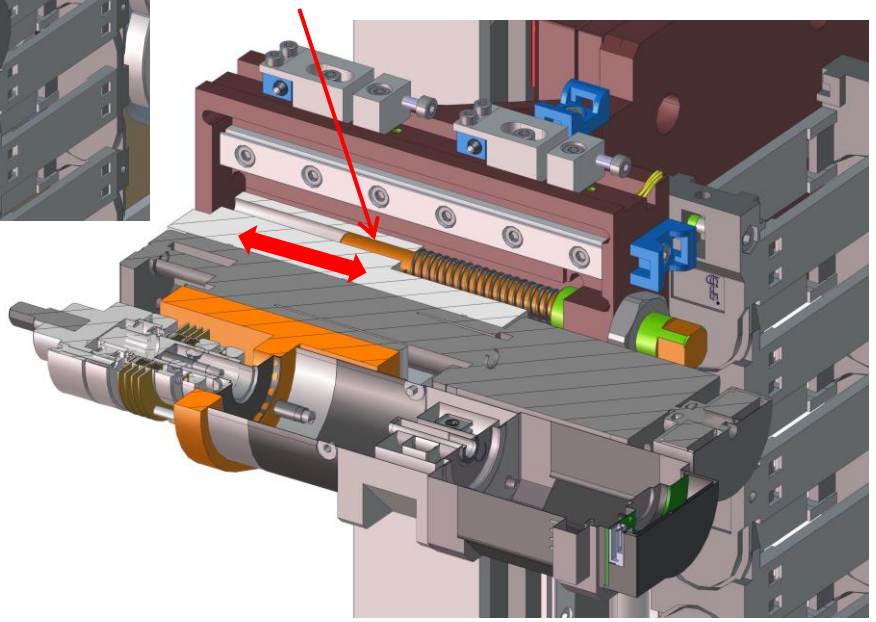


Selene Guide – Robot System



Endswitch to detect Collision

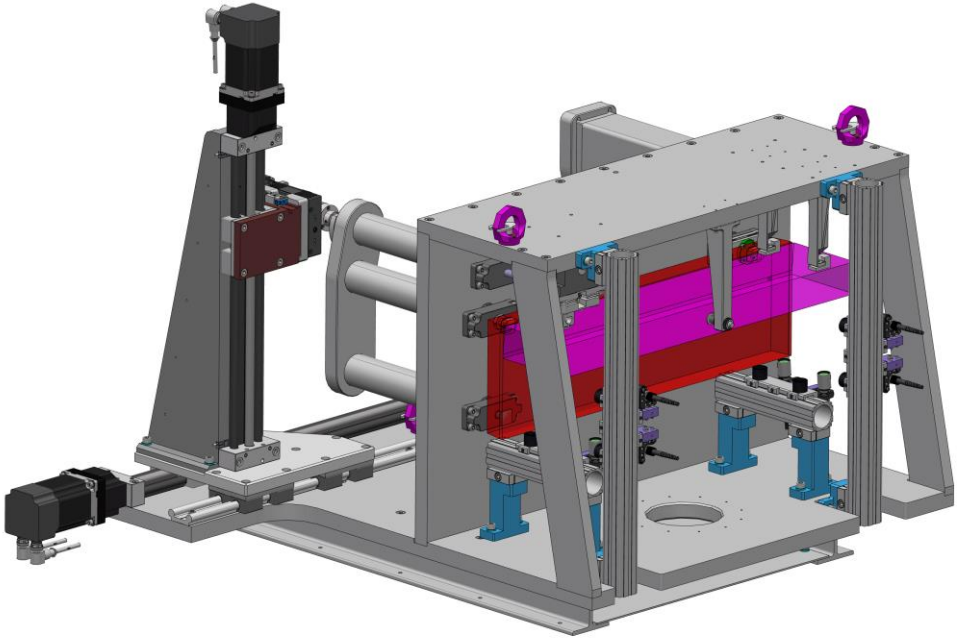
Stage for Collision detection



Test stand Robot System

Goals:

- Test of the actuator functionality
- Measure the precision of the Actuator
- Programming the Robot control system and testing it
- Optimise the screwer head for remote operation



Wir schaffen Wissen – heute für morgen

My thanks go to

- **Artur Glavic** (Project leader)
- **Sven Schütz** (Lead Instrument Engineer)
- **Fabian Cortesi** (Mechanical Designer)

and every body participating in various discussions for their support!

