

WP 10 “Calibration devices”

XY motion system status for QM

Mechanics (hardware)

Control (software)

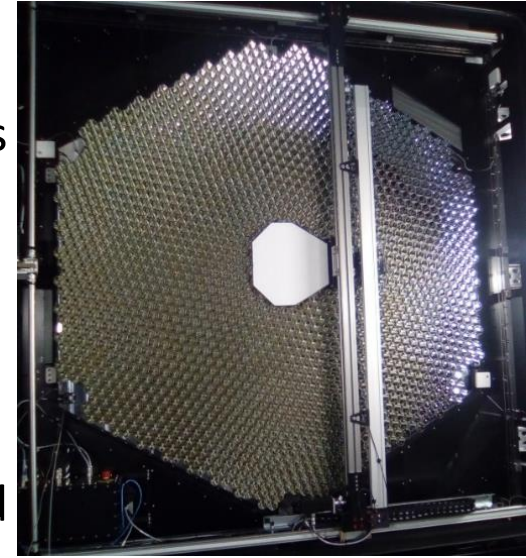
Flat-field calibration light source status for QM

Production plan

Mounting and maintenance tools

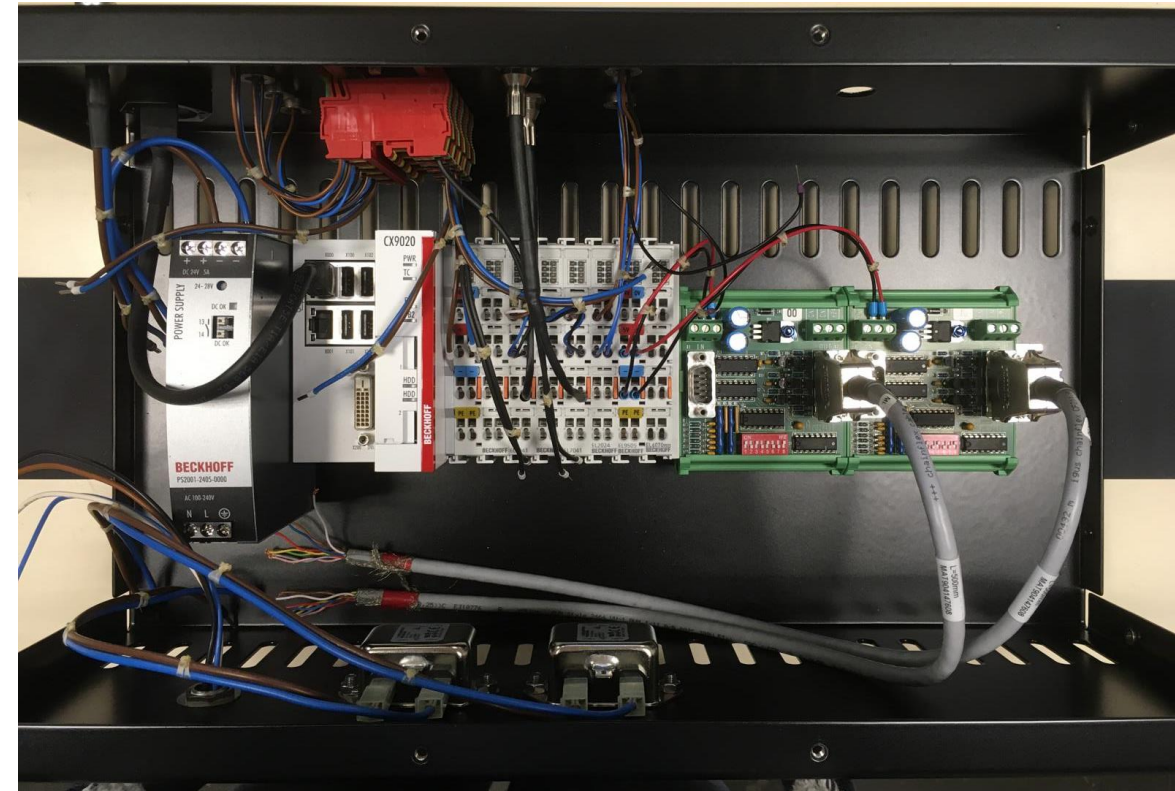
XY motion system status for QM: mechanics

- Mechanics reliability: motion with no jolt at every camera elevation. New interfaces allowing a smooth motion along X axis to be integrated at IRFU (more degree of freedom).
- Full accessibility to the focal plane:
 - Pixels on the right will not be masked anymore in the parking position
 - Pixels on the top are now accessible (longer Y cable chain set up in July)
 - Pixels on the bottom left corner will be accessible without hitting the MCB.
- Horizontal cable chain and protection in the window structure to be designed and integrated to avoid mechanical interference.
- Integration from November onwards:
 - Camera must be horizontal
 - Functionality test first
 - Long-term reliability test in spring 2023.
- Product assurance with Hensoldt Space Consulting:
 - Procurement with sub-contractors
 - Certificate before shipment to IRFU
 - Test report and procedure
 - ...
- Documentation to be updated: drawings.
- No RIXs.



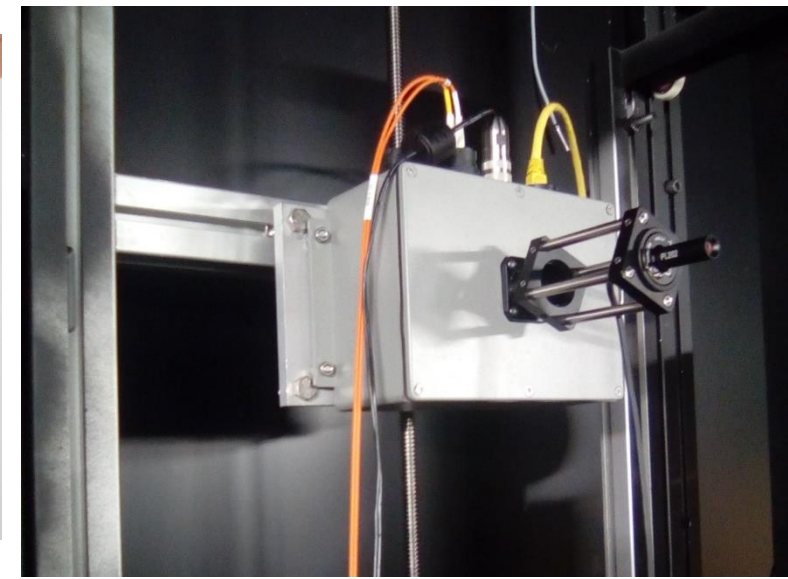
XY motion system for QM: motorization control

- Design updates:
 - Power supply modularity: 24 VDC from PSB and 230 VAC from PDB (EMC with FPM ?)
 - High current for holding torque (in addition of the motor brake)
 - No emergency stop
 - Y oscillations
 - Code already within the OPCUA architecture.
- New MCB integration from November onwards:
 - Functionality test first
 - Long-term reliability test in spring 2023.
- Software product assurance?
- Documentation to be updated: ICD and design.
- No RIXs.



Flat-field calibration light source for QM

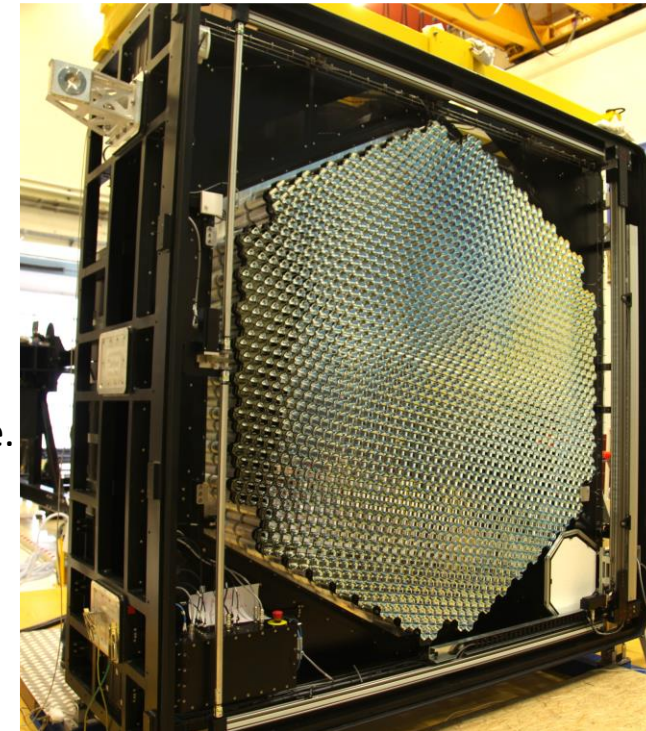
- Complete redesign since Adlershof prototype:
 - Alignment with camera optical axis: laser system
 - Mechanics and IP67 validated (Q3 2021)
 - Optical board validated (October 2021)
 - Ethernet board with humidity sensor to be validated
 - New optics (ND filter) to be tested (October 2022)
 - Closure of a non-conformity on the prototype
- Product assurance implication in the procurement (mass production)
- No RIXs.



- Connectors in accordance to MST-STR-ICD v1.0b:
 - Lumberg 0318 03
 - Amphenol Socapex RJF RB 71RA
 - CONEC 17-300240 (or similar 14-300710)
- Dimensions: $200*140*130 < 300*200*600$

Production planning

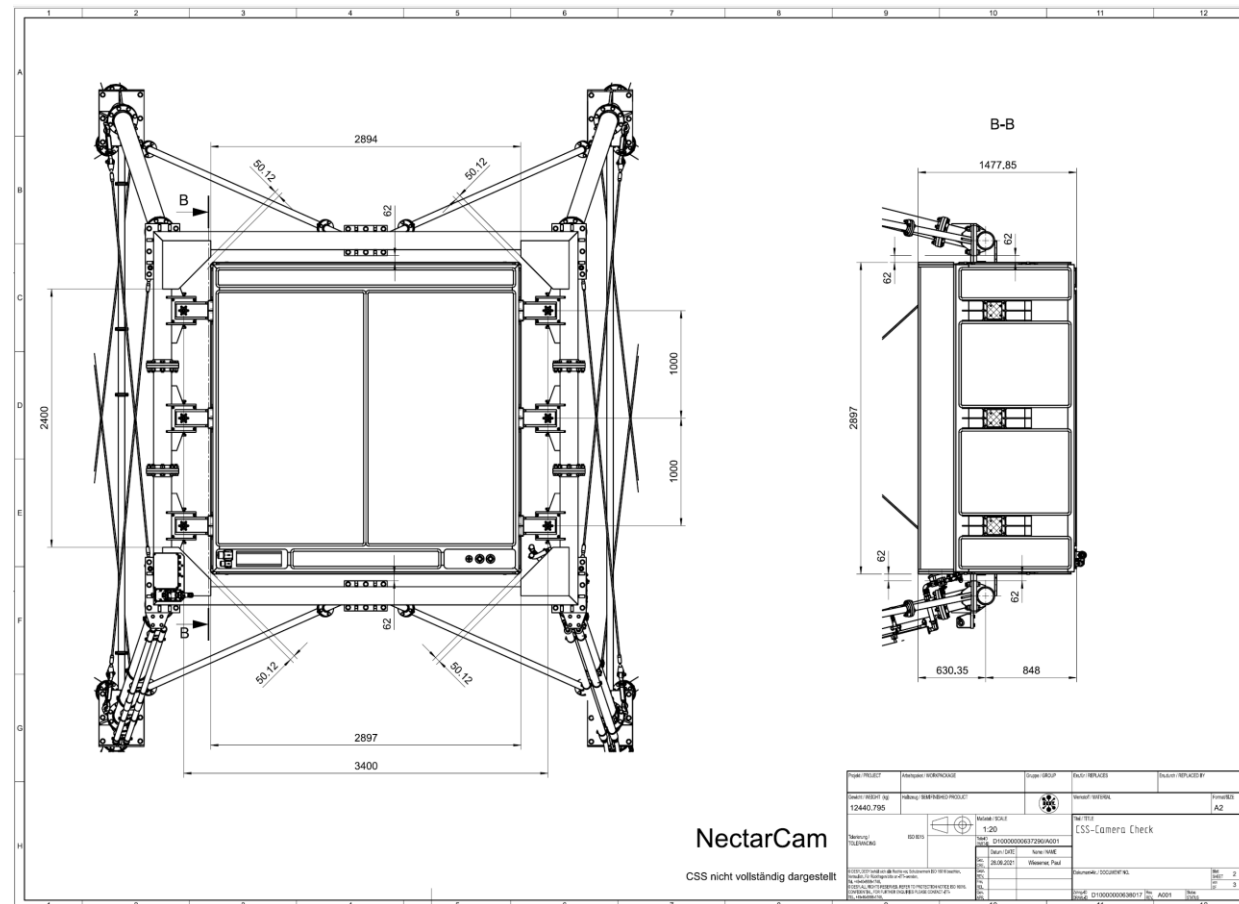
- IJCLab production planning for calibration devices 2 -> 9 + spare:
 - Productions are launched after integration and test validation at IRFU.
 - Mechanical pieces will be manufactured at IJCLab in 2022 and 2023.
 - Motorization and control components will be procured in 2022-2024.
 - MCB will be assembled at IJCLab.
 - SPE and FF boards designed at LUPM: production done by June 2022, tests performed at Elecis place.
 - Reflective target and light guide in current production. The assembly and painting will be performed at IJCLab.
 - SPE calibration system will be characterized before shipment to IRFU.



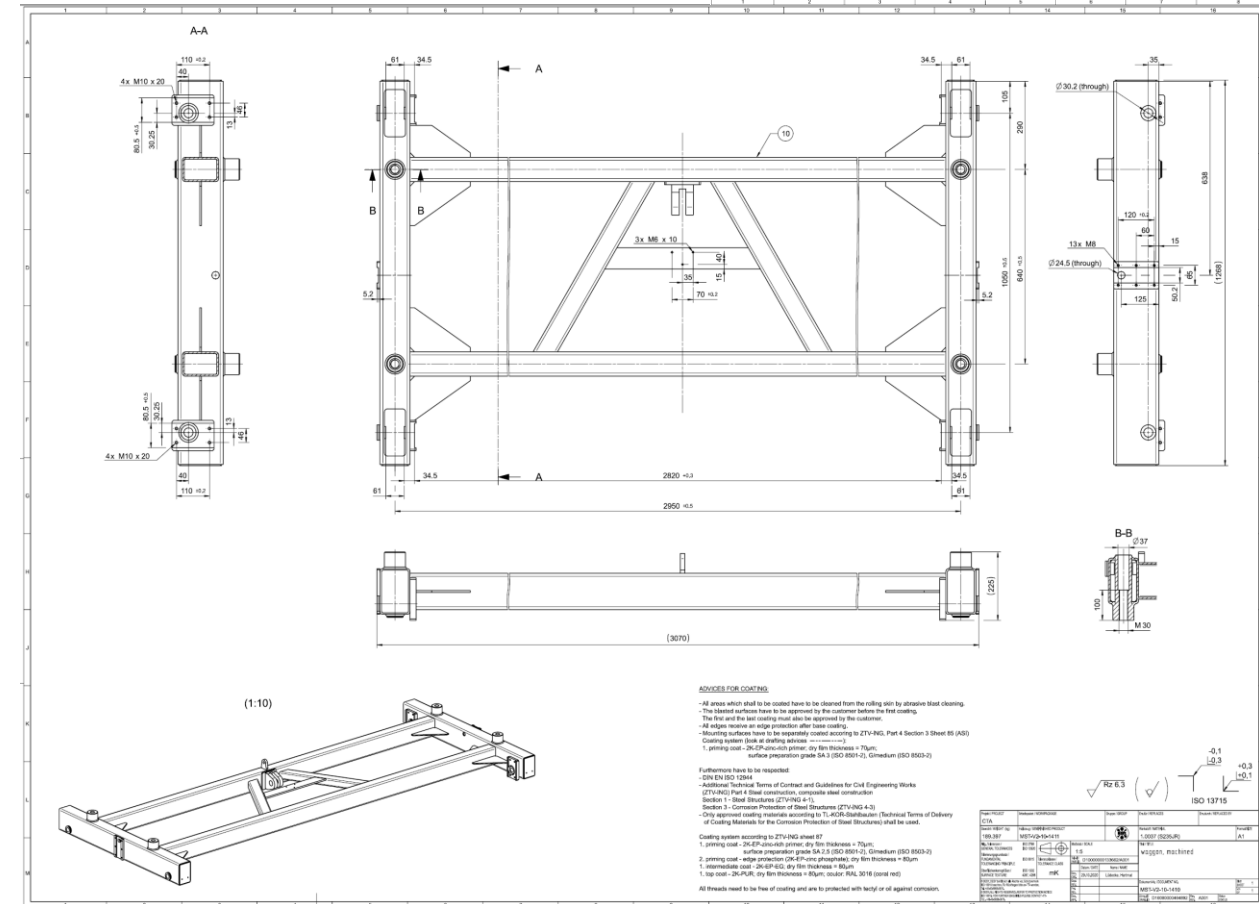
	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024	Q1 2025	Q2 2025	Q3 2025	Q4 2025	2026
Réalisation @ IJCLab																	
Fabrications mécaniques "RT & SPE c.s."	#1			#2 -> #3	#4 -> #6		#8 -> #9										
Tests instrumentaux "SPE c.s."	#1			#2 -> #5			#6 -> #9										
Fabrication "Flat-field c.l.s."	#1 -> #3				#4 -> #8				#9								
Suivi de production "Mounting & maintenance tools"	#1				#2 -> #5				#6 -> #9								
Intégration @ IRFU																	
Intégration et tests "RT & SPE c.s."	#1				#2				#3 -> #5				#6 -> #8				#9
Tests instrumentaux "Flat-field c.l.s."	#1				#2				#3 -> #5				#6 -> #8				#9

Mounting and maintenance tools

- Mounting tool:
 - Mechanical design and study performed, following the MST trolley design (MST-STR-ICD v1.0b below).
 - Procurement for NectarCAM 1 in early 2023.
 - Documentation to be updated: performance verification, drawings, and ICD.



October 11, 2022



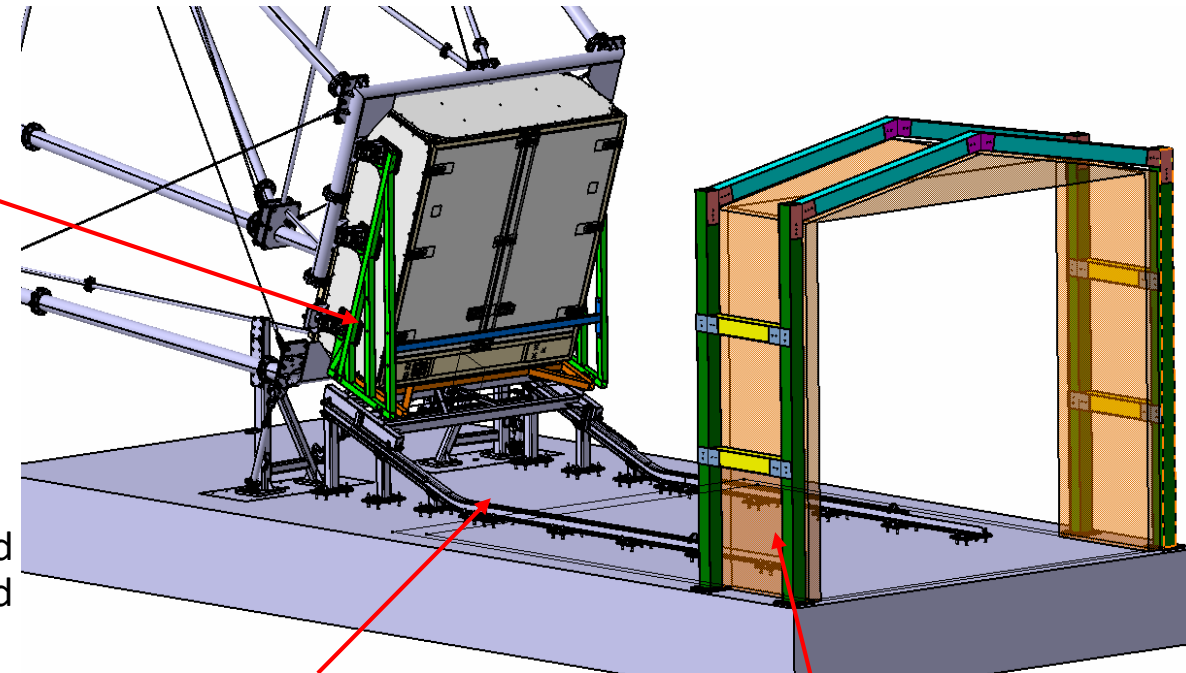
NectarCAM F2F @ Bordeaux - WP10 Calibration - Pressard

6

Mounting and maintenance tools

- Maintenance tools:
 - Light rear maintenance can be performed while the camera is still on the MST structure. Rear doors are opened and a dedicated platform is brought up to the camera.
 - Front maintenance and heavy rear maintenance are performed once the camera is dismounted from the MST structure, put onto the trolley and brought up under the tunnel. Platform enables accessibility for maintenance activities.
- Platforms are necessary for operations above 1.5 m from the slab.
- Tunnel to protect from UV and dust. The tunnel has to be protected itself from wind gust with a dedicated steel-based structure clamped to the concrete slab (drills location already taken into account).
- Procurement for NectarCAM 1 in 2023.
- Documentation to be updated (last version November 2020!): design, performance verification, drawings and ICD.

Mounting tool design to be updated



Platforms design to be added

Protective tunnel (folded here)

Human resources

	2022	2023	2024	2025
Mécanique	1,25	1,75	0,75	0,6
Instrumentation	0,9	1,1	0,45	0,4
TOTAL	2,15	2,85	1,2	1
IR	0,9	1,1	0,85	0,7
IE	0	0	0	0
AI	0,85	1,2	0,25	0,25
TCN	0,4	0,55	0,1	0,05