

# NectarCAM - Camera Mechanical Structure Status



# Outline

- **CDMR RIXes**
- **Status of NectarCAM 1 (QM)**
- **Production of Camera Structures**
- **Feedback on call for tender procedure**
- **Final remarks / conclusion**

# Mechanical System CDMR RIXes

## ❖ **High priority - closed**

- Camera mass: agreement of MST Structure to increase limit to 2.5 tons
  - Mass of QM is around 2.3 T, targeting < 2.2 T for production cameras
- Wind resistance of window blind: agreement of CTAO to accept ISO standard as reference document, commercial product meeting standard found by LP2iB

## ❖ **Several low priority still opened - on hold**

- Feedback to comments on CDMR documents: mostly done
- Couple of requests related to the window blind: will need some work
- Incomplete or missing maintenance documentation: major task to write the maintenance manuals, which concerns not only the Mechanical Work package.

## ❖ **Closure of the RIXes: currently not the priority for Mech. WP.**

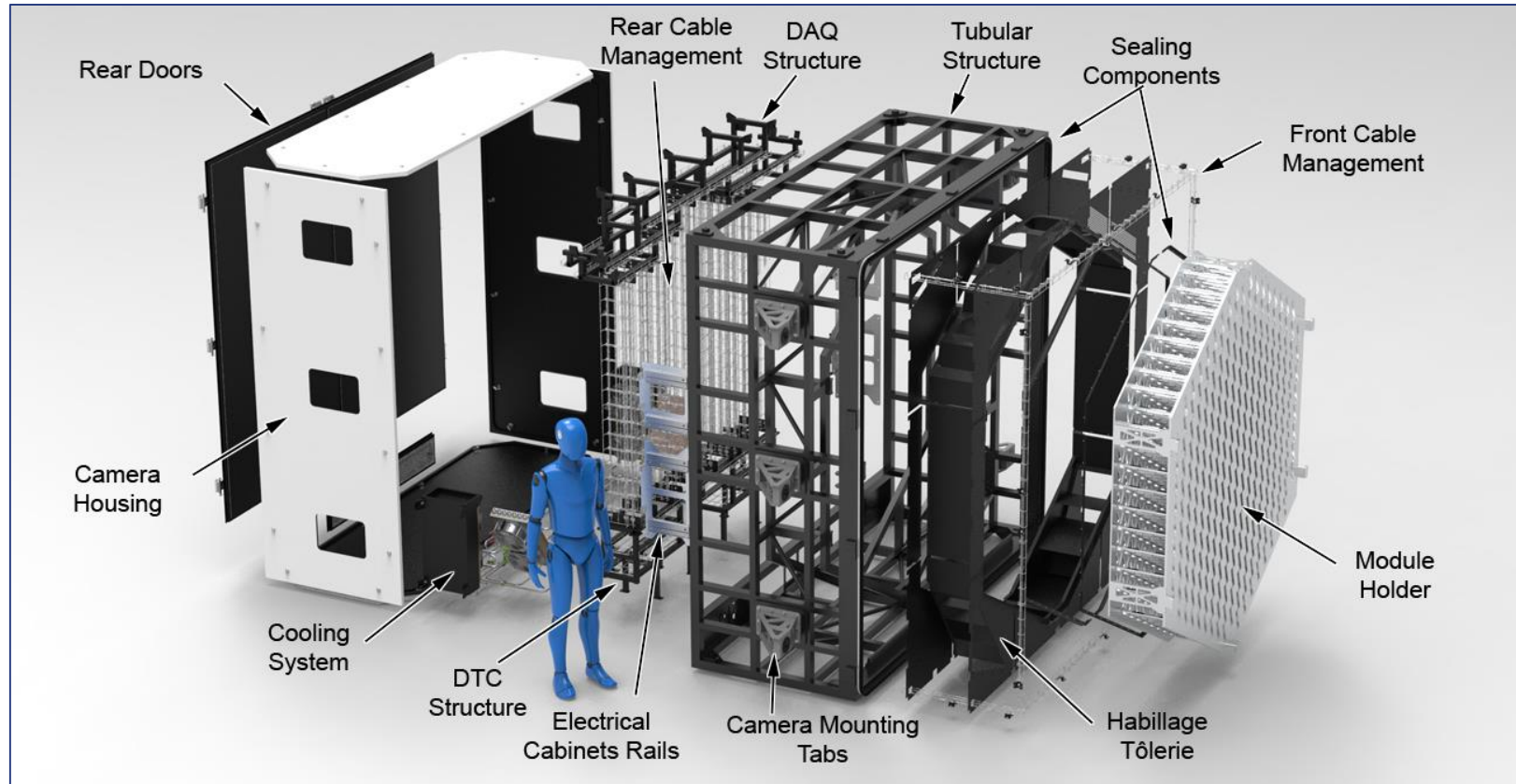
# NectarCAM 1 (QM) Status

- ❖ **Still a couple of missing components but non critical for the qualification and test of the camera**
- ❖ **Window is installed but without its blind**
- ❖ **Right PSB mechanical box has to be replaced**
  - Designed updated to solve an interference problem with the Backplane Ethernet cables
  - Currently waiting for quotation from manufacturer
- ❖ **A couple of small mechanical supports for new devices (power switches, network separators) are missing**
  - Procurement is ongoing
- ❖ **Dry air circuit is missing**
  - Procurement of the needed component has been done (valve, fittings...)
  - Installation is quick and simple with no impact on the other components

# Production of Camera Structures

- ❖ **One contract for the delivery of fully assembled Main Camera Structures with embedded cooling system**
  - Contract managed by LLR
  - Fabrication, mechanical assembly and tests performed by the contractor
  - All the procurements managed by the contractor, except heat exchangers and cooling system sensors
- ❖ **One contract for the production of the camera windows**
  - Contract managed by LP2iB
  - Some assembly work and tests done by LP2iB
  - Some procurements managed by LP2iB
- ❖ **Other mechanical items: small mechanical parts and supports, fasteners for Nectar Modules and Backplanes...**
  - TBD, probably a couple of different procurements
  - Collaboration between LLR and IRFU AIV team to manage them

# Production of Main Camera Structures



# Main Camera Structures

- ❖ **Call for tender done, contract awarded to Spanish company RAMEM/ARQUIMEA**
  - Same company that produced the LST cameras
  - Extensive expertise in manufacturing similar assemblies
  - Best offer in terms of price
- ❖ **Contract passed for the delivery of 4 Camera Structures with embedded cooling system**
- ❖ **Contract includes option for 1 to 4 additional Camera Structures (request from project NectarCAM project management)**
- ❖ **Delivery of one Camera Structure every 4 months**
- ❖ **Cost is around 12% above latest cost estimate (8% above for additional Camera Structures)**



# Camera Structure Production

## Delivery schedule (prepared by RAMEM)

- NCAM 2: March 2023
- NCAM 5: March 2024
- 
- NCAM 6: July 2024
- NCAM 9: July 2025

0	Contract Kick-off Meeting
1	PA docs Review
2	MRR Manufacturing Readiness Review
3	Completion of Machining
4	Completion of Welding
5	Completion of Main Assemblies
6	TRR Integration & Test Readiness Review
7	Start of the Assembling/Integration
8	Functional Tests Review
9	Final Acceptance & Handover

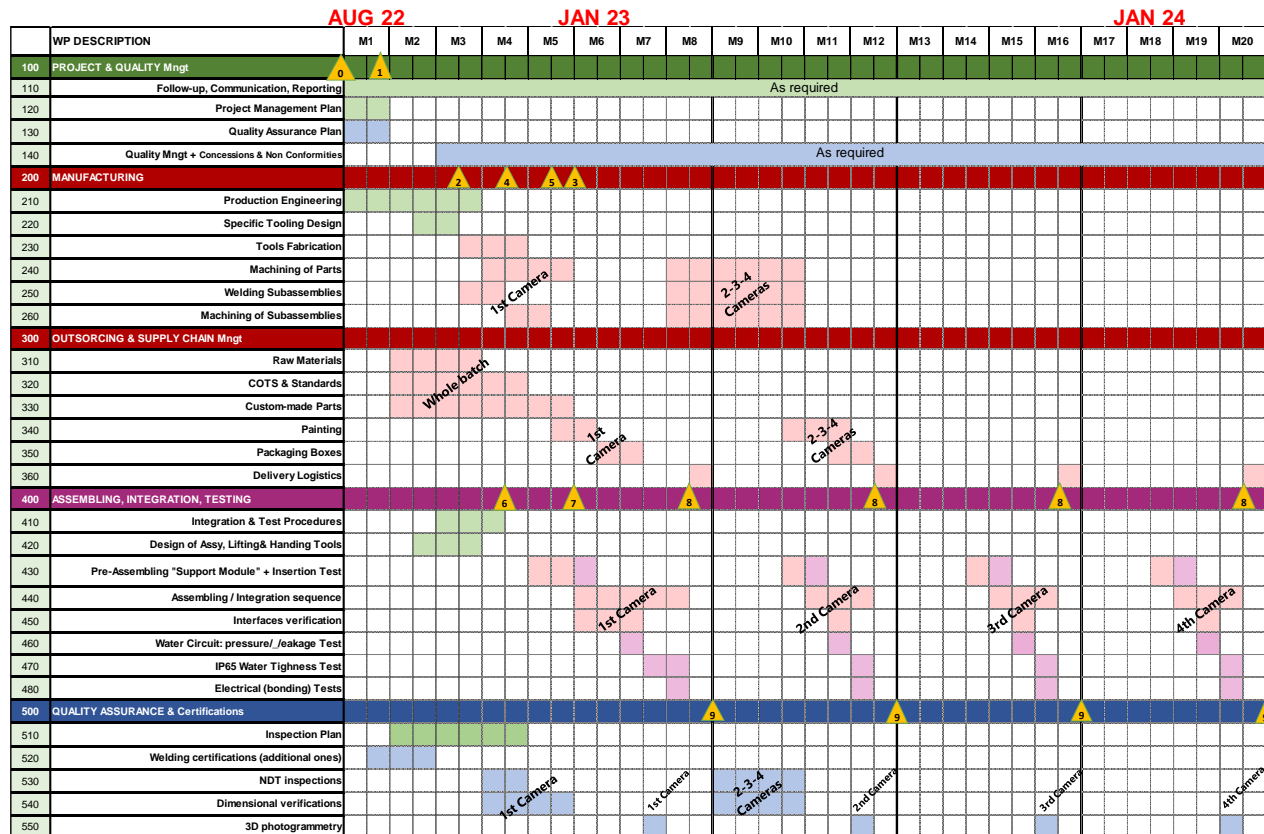
### NATURE OF WORKS

Engineering & Mngt

Operations

Test Execution

Quality Assurance





# Feedback on call for tender procedure

- ❖ **Oct 28<sup>th</sup> 2021 – First contact with regional CNRS Contracts and Procurements Office**
- ❖ **Jan 14<sup>th</sup> 2022 – First release of specification document delivered to CNRS**
- ❖ **April 12<sup>th</sup> 2022 – Final versions of all the documents available (technical and administrative)**
  - Many iterations to agree on criteria for tender acceptance and tender evaluation
- ❖ **April 19<sup>th</sup> 2022 – Call for tender was officially published**
- ❖ **June 7<sup>th</sup> 2022 – Due date for the bids (3 received)**
  - Several iterations to finalize the analysis report of the bids
- ❖ **July 5<sup>th</sup> 2022 – contract was officially awarded to RAMEM/ARQUIMEA**
- ❖ **August 3<sup>rd</sup> 2022 – Kick-off meeting with RAMEM**

# Conclusion

- ❖ **The production of the camera mechanical structures is on track for a delivery of the structures to AIV with a rate of 3 per year as expected**
  - The contract is passed for 4 structures only. Official decision for the 4 other ones has to be given at the latest early next year (*official chain of decision ?*)
- ❖ **The collaboration with RAMEM company is efficient thanks to the experience and expertise of the engineers in charge of the project.**
- ❖ **Preparing the fabrication of the first structure is still very time consuming: many request from the company, updates of drawings...**
- ❖ **Expecting to have some spare time to deal with other activities such as RIXes and maintenance documentation from early next year**