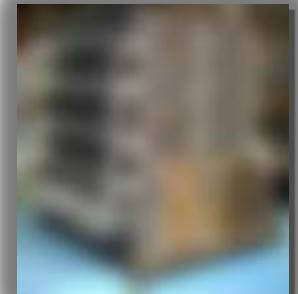
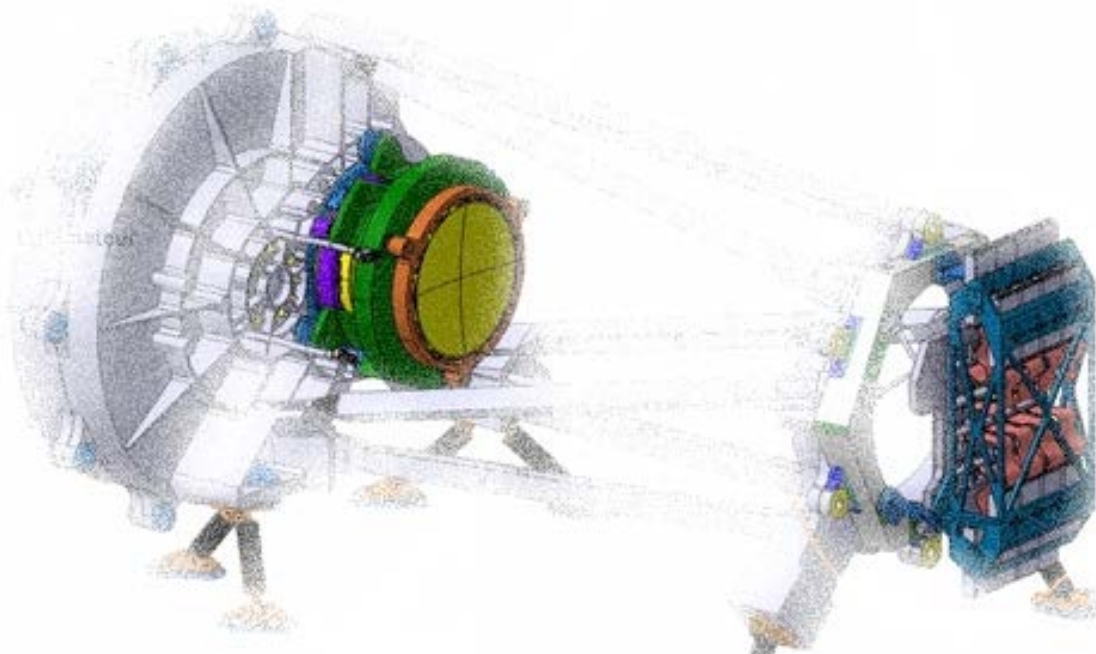




# NISP INSTRUMENT STATUS



**Euclid France days @ IAP**

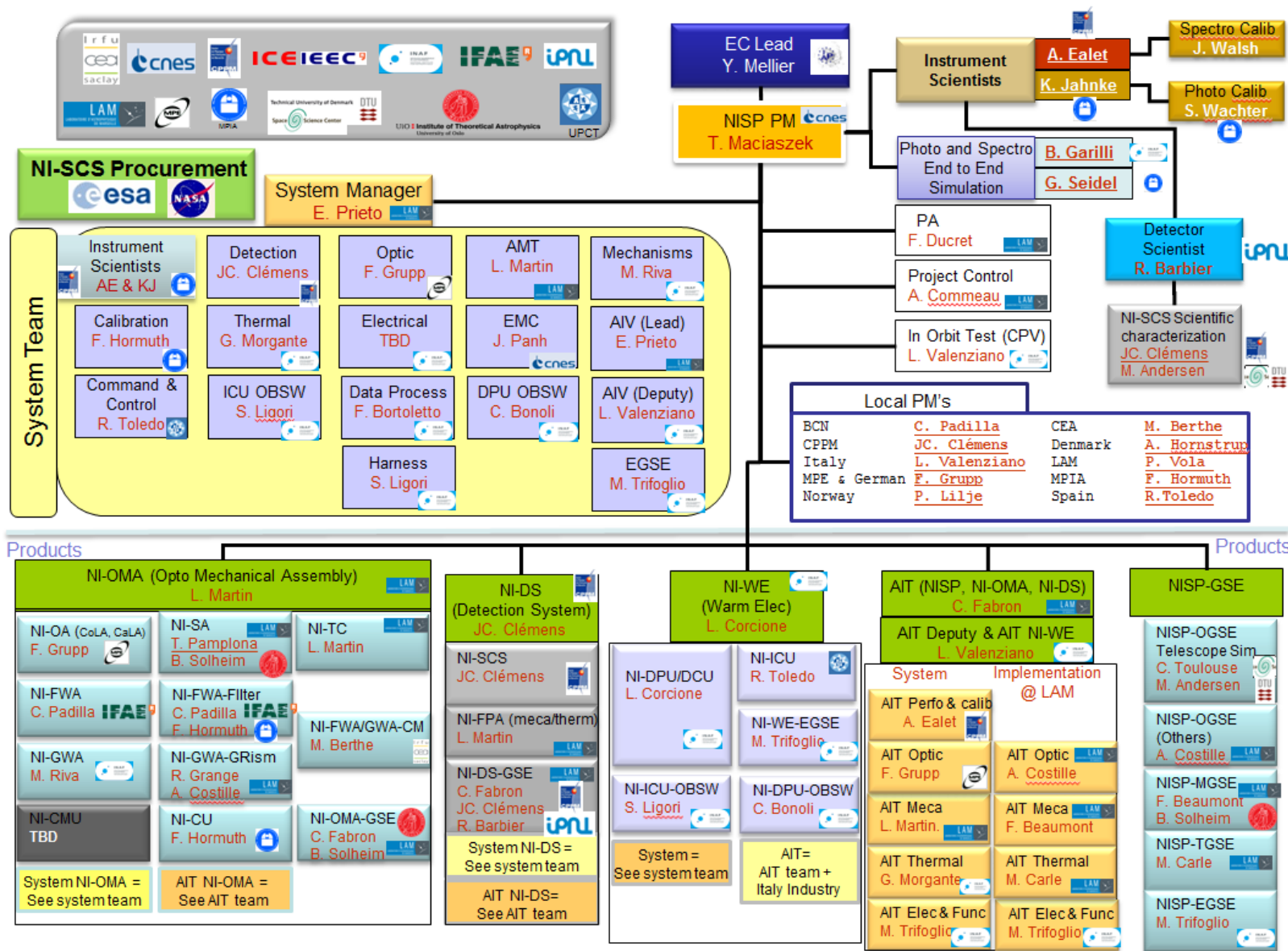


- NISP ORGANISATION and PRODUCTS MODIFICATIONS
  - Rémi Barbier (IPNL) : Detector scientist
  - Italy has selected CGS for the hardware development (Data Processing Unit and Grism Wheel Assembly). Slight reorganization (software is INAF now) and reinforcement of the team
  - Spain has selected CRISA for the Instrument Control Unit
  - Germany has selected Kaiser Trade for the Optics
  - Kristian Pedersen (DTU) is replaced by Allan Hornstrup (DTU) as Danish PM
  - Reinforcement of the LAM team :
    - ✓ Anne Costille : Grism and AIT optical and OGSE interfaces with LAM
    - ✓ Florent Beaumont : Mechanical AIT responsible
    - ✓ Anne Commeau : NISP project control responsible
    - ✓ ...
  - NI-DS (Detection System) is now under the CPPM responsibility (was LAM)



# GENEAL PROJECT INFO

Euclid Consortium





- I-SRR status (june 2013)

- Operability requirement of detectors

- ✓ The Board was seriously concerned by the impact on the Instrument performance of the mismatch between the flow-down of requirements done by the NISP Team and the operability requirements in the SCS (Sensor Chip System) specification which has to be resolved urgently.
  - ✓ Renegotiation with TIS / NASA in good progress
  - ✓ ESA and EC on the same line
  - ✓ The NISP detector requirements (95% of the pixels compliant with the science request) are about to be accepted by NASA

- CMOS versus LVDS protocol for detector data transmission

- ✓ LVDS is now decided. CMOS is killed due to 6m harness between Sidecar and DPU
- ✓ BUT, this could have **SIGNIFICANT** schedule impacts (delta qualification of the Sidecar ASIC; add transceiver CMOS->LVDS at cold !, ...)

- NISP Instrument Schedule

- ✓ The Board is concerned that the presented schedule contains only six weeks of margin to the need date and does not include explicit contingencies
  - ✓ NISP is unable to proposed development plan modification and reduction of the NISP schedule in order to find margins for contingencies



## ➤ CMU trade-off (Compensation Mechanism)

- ✓ EC has issued a technical note in which it is clearly stated that the CMU is not needed.
- ✓ Waiting for the formal ESA approval to remove the CMU from the baseline




## ➤ MASS

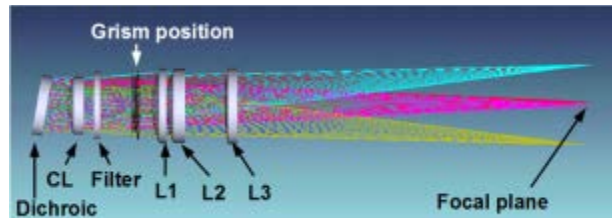
- ✓ NISP is compliant with the total mass allocation
- ✓ Work has to be done for NIOMADA mass reduction

## ➤ Data processing concept

- ✓ The Board notes that the recent change of the data processing scheme led to a modification of the DPU architecture that could not be fully reviewed at the SRR.
- ✓ Hardware redesign has been done by CGS with the new data processing requirement. 4 Maxwell boards is the baseline (as previously) but with additional memory capacity → NISP is confident to go to PDR with this baseline





- NI-SA : Structure Assembly ; SiC Structure  
- NI-OA : Optical Assembly 





✓ CoLA : Corrector Lens Assembly

✓ CaLA : Camera lens Assembly

- NI-FWA : Filter Wheel Assembly 

- ✓ Cryo mechanism 
- ✓ 3 Filters + CLOSE + OPEN 

- NI-GWA : Grism Wheel Assembly 

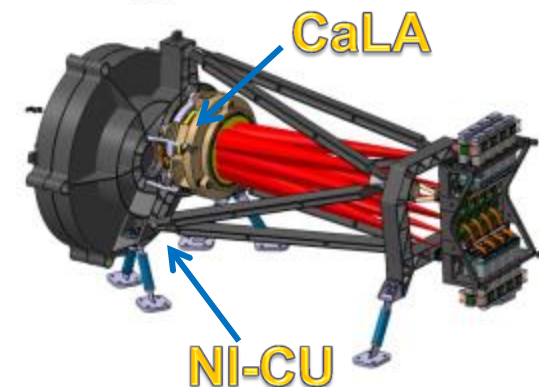
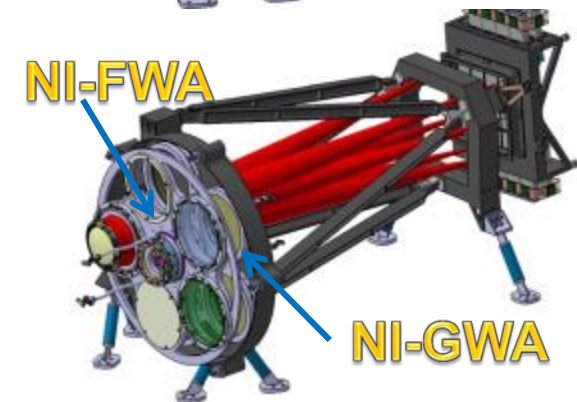
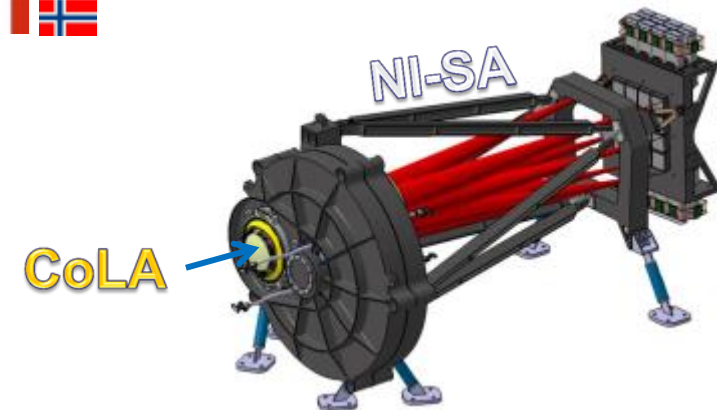
- ✓ Cryo mechanism 
- ✓ 4 Grisms + OPEN 

- NI-CU : Calibration Unit 

- ✓ 6 wavelength's

- NI-TC : Thermal Control 

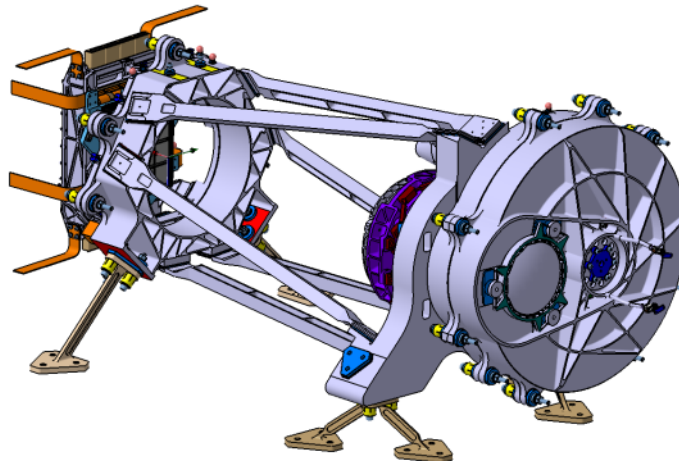
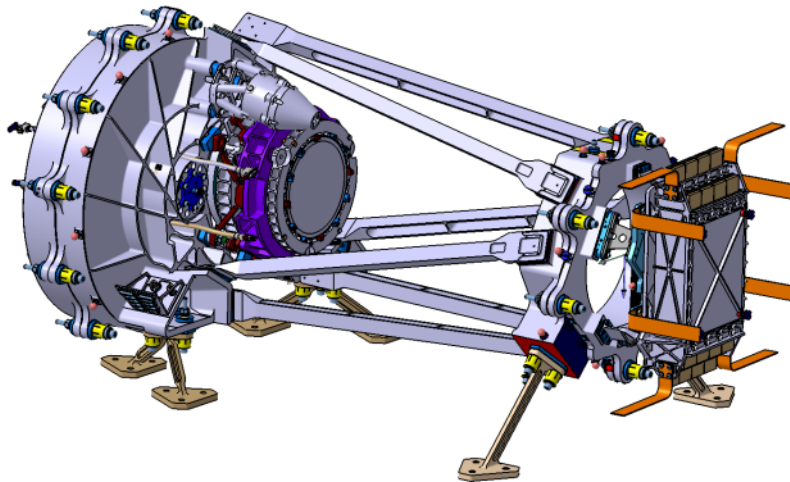
- ✓ To control the optics at +/-0.3K all life (≈135K)





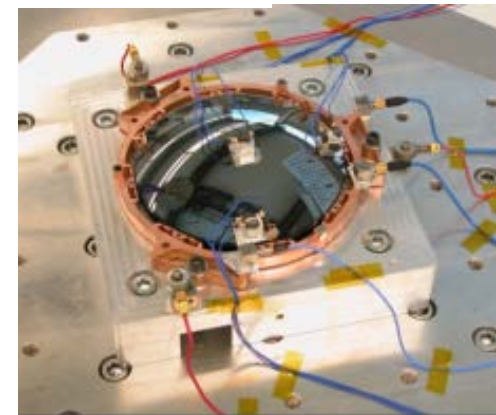
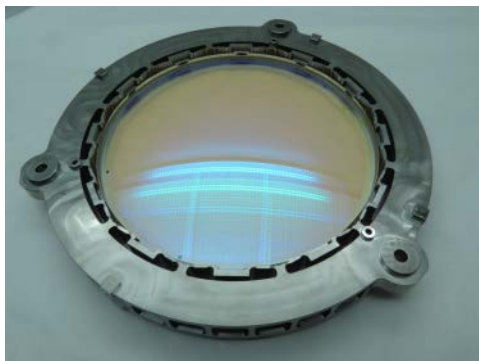
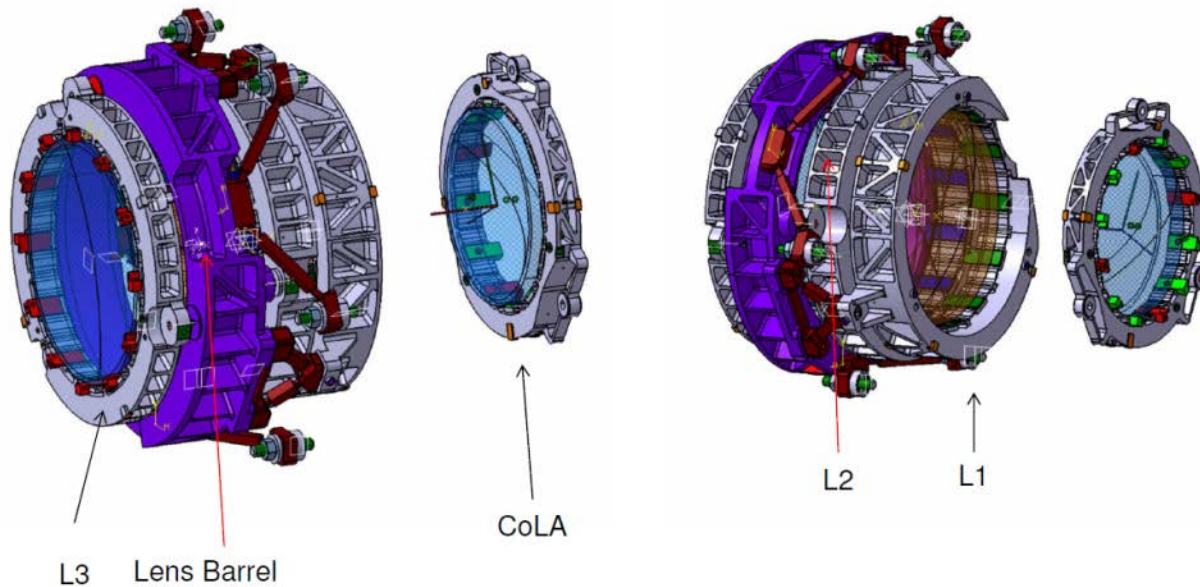


- NI-SA (LAM) : Structure Assembly
  - ✓ SiC Structure
  - ✓ Boostec selected





- NI-OA (MPE) : Optical Assembly
  - ✓ Detailed design in progress







- NI-FWA (Spain) : Filter Wheel Assembly
  - Invar wheel optimization done

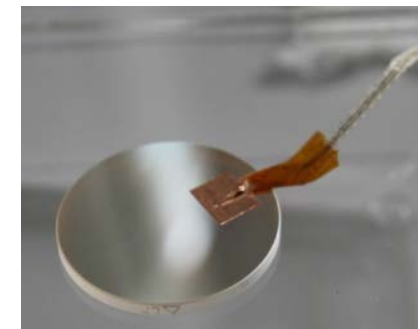
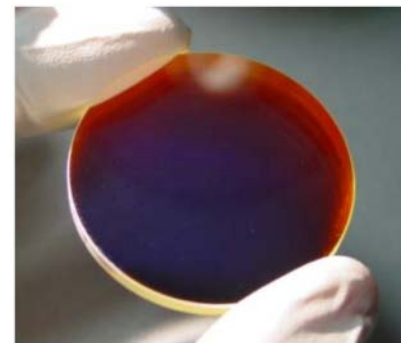
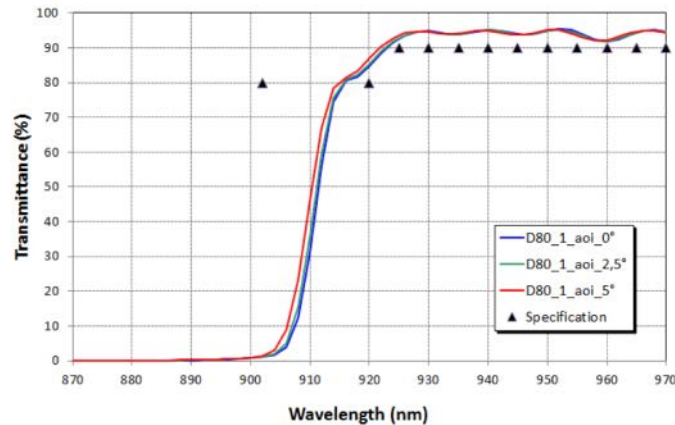
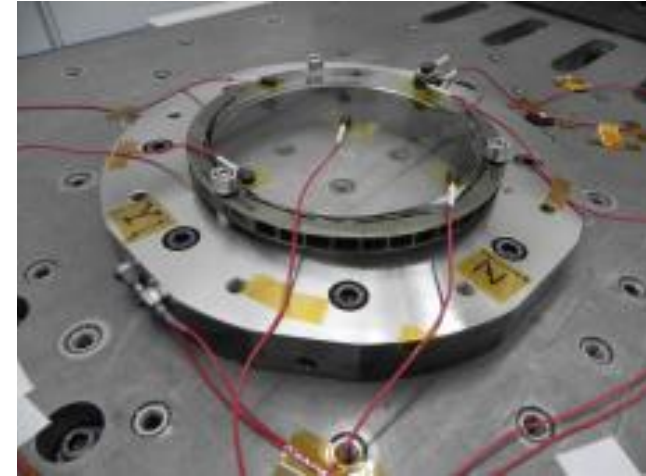


- NI-GWA (Italy) : Grism Wheel Assembly
  - Invar wheel optimization done
- NI-CM (CEA) : Cryomechanism
  - STM manufacturing started
  - BBM (Breadboard model (quasi flight representative))
    - Breadboard conception review done in June





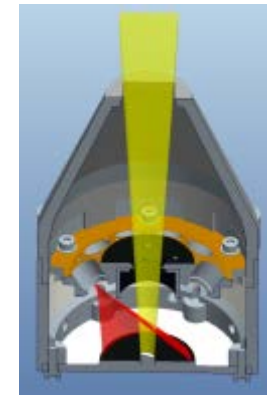
- NI-GR (LAM) : Grism
  - BBM (mechanical and thermal)
    - Vibration and thermal vacuum cycles OK
  - BBM optic
    - 100mm Grism in progress
- NI-FI (MPIA) : Filter optic
  - BBM scale one
  - Tested in cryo : OK
  - Good performances

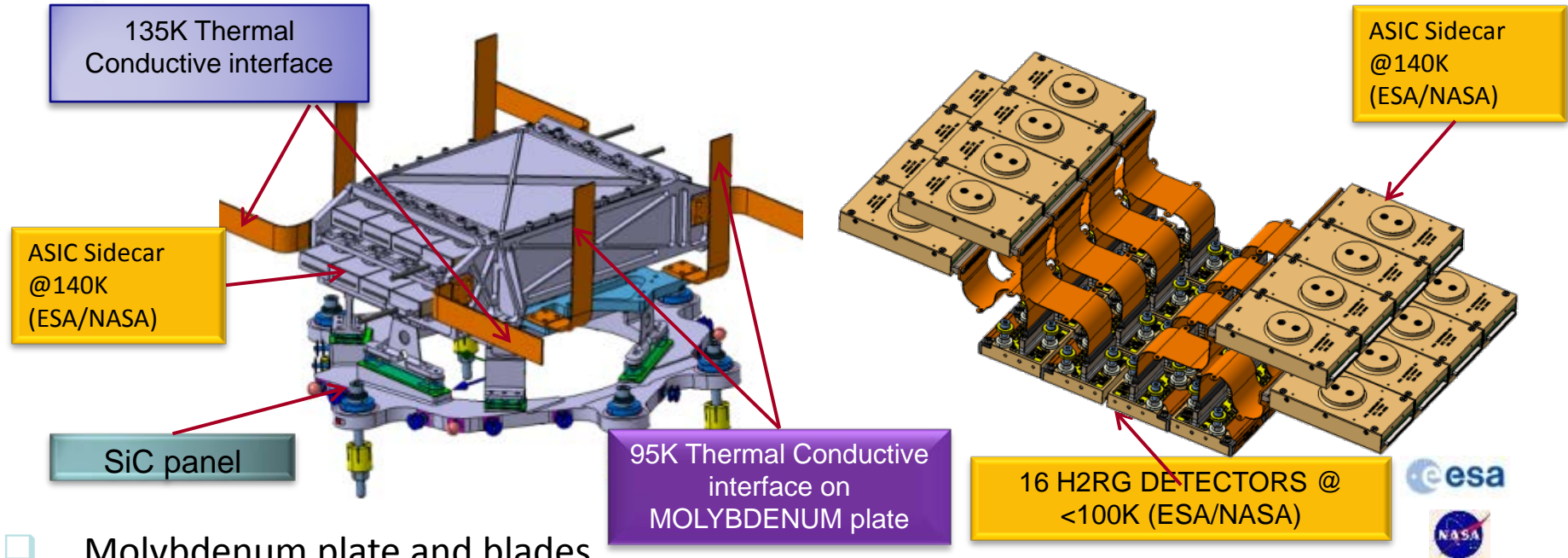




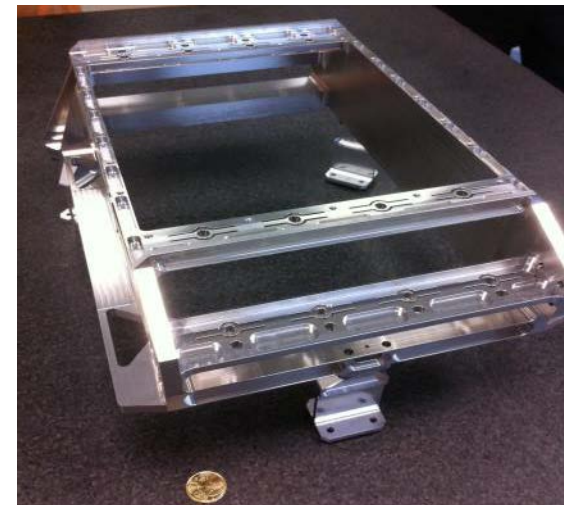
➤ NI-CU (MPIA) : Calibration Unit

- Led's evaluation (radiation effect, temperature effect)
- Design done





- ❑ Molybdenum plate and blades
  - Design done. Procurement started
- ❑ Sidecar support (Alu) and blades (Norway)
  - First mockup has been delivered to LAM





## □ SiC interface panel with NI-OMA (P4 panel)

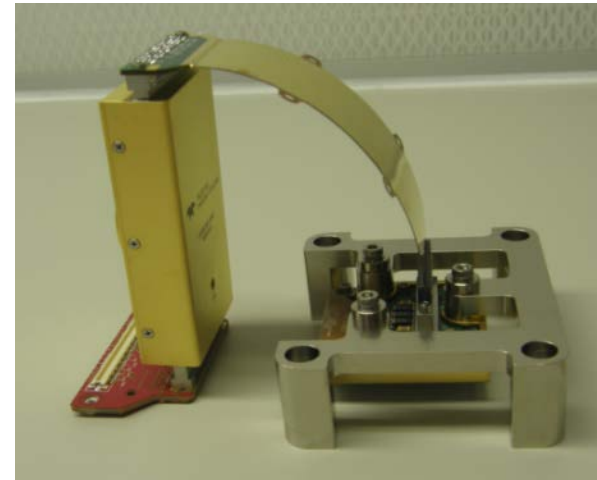
- Shall be ready for January 2014







- SCS (Sensor Chip System = detector + flex + Sidecar)
  - Very good Engineering detectors produced by TELEDYNE (8 grade 1 produced).
  - 3 of them tested by Goddard for cross verification. Globally better data than TELEDYNE measured by Goddard
  - **All the 8 grade 1 meet the NISP requirements in QE, noise and dark current for 95% of the pixels**
- CPPM tests to start in december



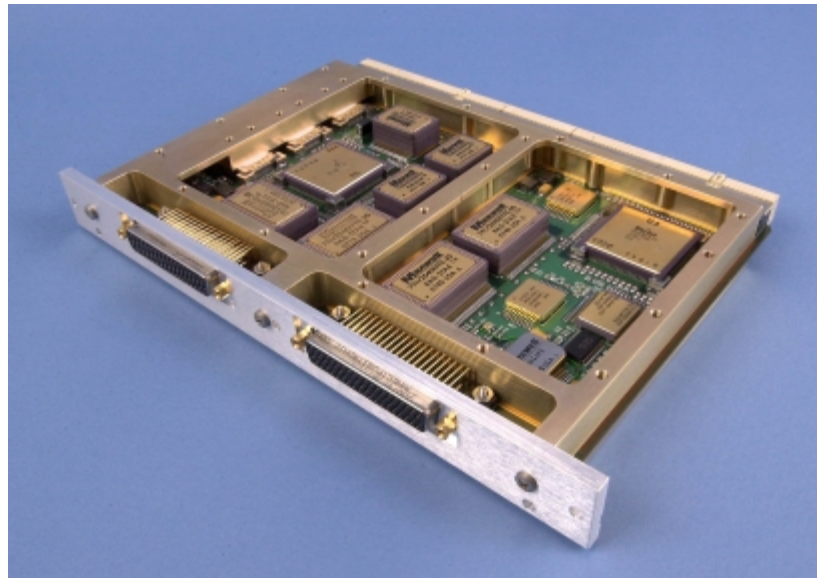


- NI-WE (Warm Electronics)
  - NI-ICU (Instrument Control Unit); Spain
    - ✓ TM/TC interface with SVM agreed to be 1553





- NI-DPU/DCU hardware (Detection Control / Data Processing Unit); Italy
  - ✓ Hardware redesign. New on board data processing requirement taken into account (Ki2 indices of quality)
  - ✓ 4 Maxwell boards is the baseline (as previously) but with SIGNIFICANT additional memory capacity
  - ✓ FPGA for controlling the Sidecar (1 FPGA for 2 sidecars)
  - ✓ Interface with the satellite agreed



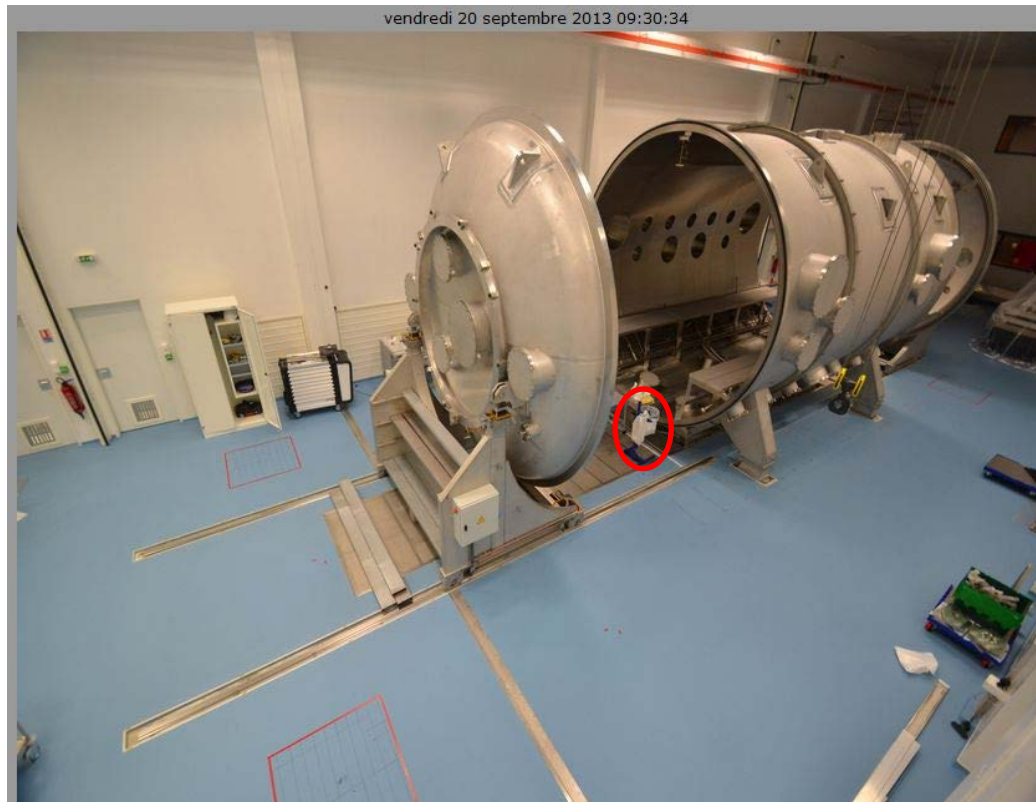


- CMU on board or not. NISP DOES NOT WANT IT !!
- GHOST and STRAYLIGHT to be analyze in details. Hardware impact (baffling). To be done for PDR
- Modification of the Grism requirement : 4 red grisms are requested now (0, 90, 180, 270 Deg) instead of 2 blue and 2 red. See Anne talk
- Detector persistence: under study with Goddard data. See Anne talk



- AIT

- ERIOS is AT LAM

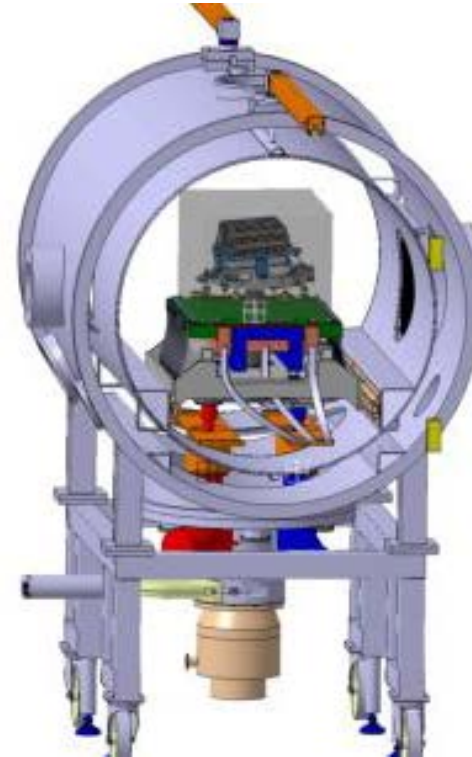






- AIT

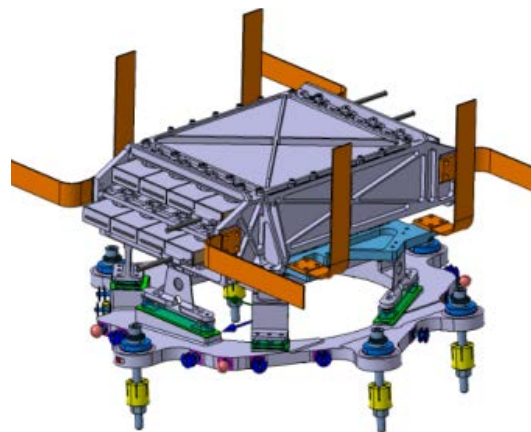
- The Thermal Vacuum Setup for the NI-DS Demonstration model is defined and will be available for feb 2014



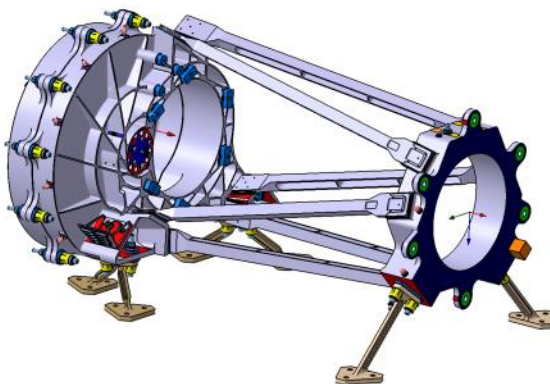
- NISP OGSE : concept selected
- EGSE : normal progress
- NI-DS DM start of integration January 2014



- PDR preparation : march 2013
- NI-DS Demonstration Model Integration and test : until mid 2014
  - NI-DS DM = FLIGHT like with 2 good detectors and sidecar + 2 MUX and sidecar + 12 STM detector and sidecar



- NI-OMA + NI-DS Demonstration Model manufacturing and test : 2014





- NO MODIFICATION
- DM : Demonstration Model
  - The first model to measure the detector noise on the focal plane with detector working together
  - To validate the SiC structure design
  - No optics
- STM : Structural and Thermal Model
  - = DM
  - to be deliver to ESA without the detectors
- EQM : Engineering and Qualification model
  - The first model to measure the NISP end to end performances
- AVM: Avionic Model
  - = WE EQM
  - to be deliver to ESA
- FM



### NISP : INSTRUMENT REVIEW & DELIVERY

