NI-DS AIT Status

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PM#16   29-30/11/2017
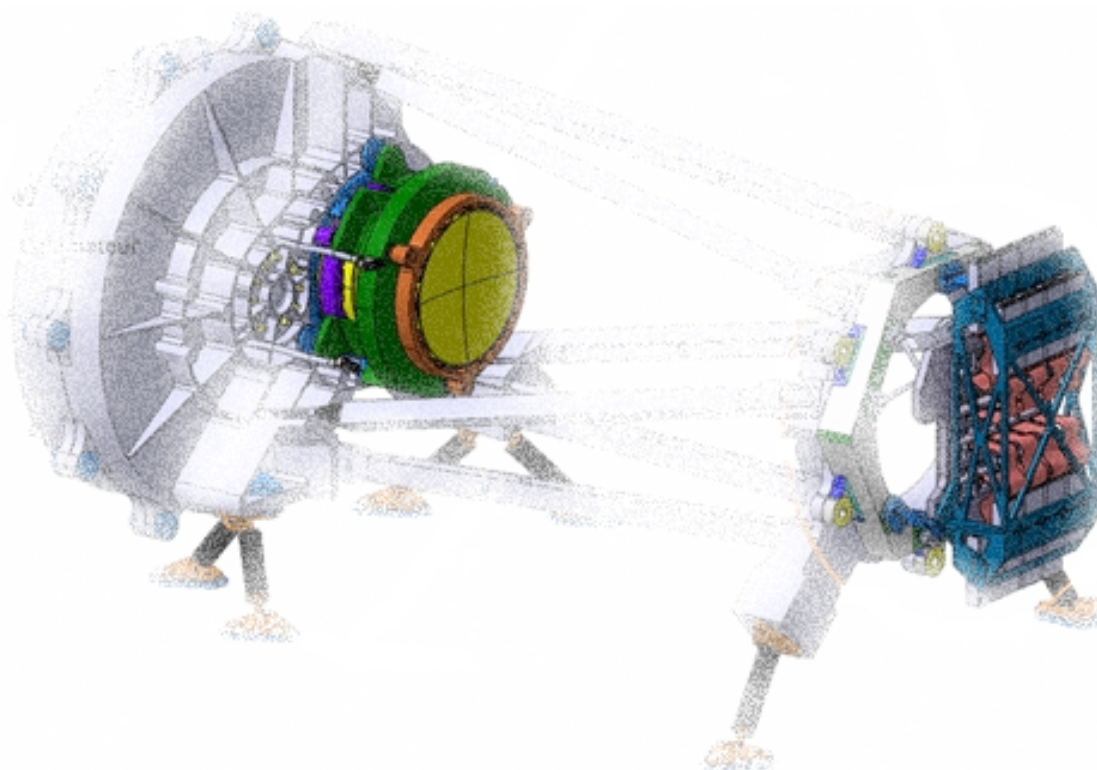
- **NI-DS EQM AIT activities advancement**
  - EQM integration started in sep. 2017
  - Achieved steps
    - ISO5 cleanroom equipment
    - MGSE set up
    - CSS & SSS thermal control sensors integration
    - P4 integration and metrology
    - CSS bipods integration and metrology
    - SCA integration and metrology

  - Steps to be done and milestones
    - CSS + SCA integration on P4 and metrology
    - SSS bipods integration and metrology
    - SSS integration on P4
    - SCE & CFC integration
    - Mosaic deformation @OT **Test** (CSL facility) → end of jan. 2018
    - Baffle integration and metrology
    - Vibration **Test** (at LAM) → end of feb. 2018
    - NI-DS EQM **Delivery** to NISP → mar. 2018

- **NI-DS FM AIT schedule**
  - FM integration start → mar. 2018
  - Flight SCA integration → beginning of apr. 2018
  - Vibration acceptance **Test** (at LAM) → beginning of jun. 2018
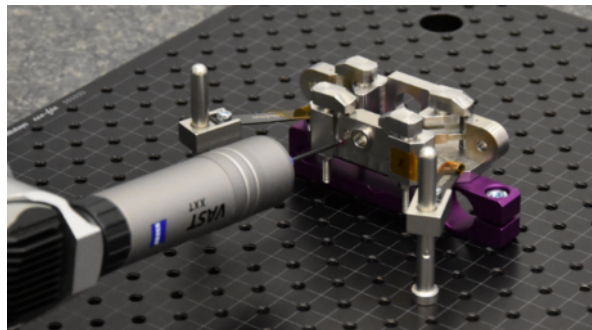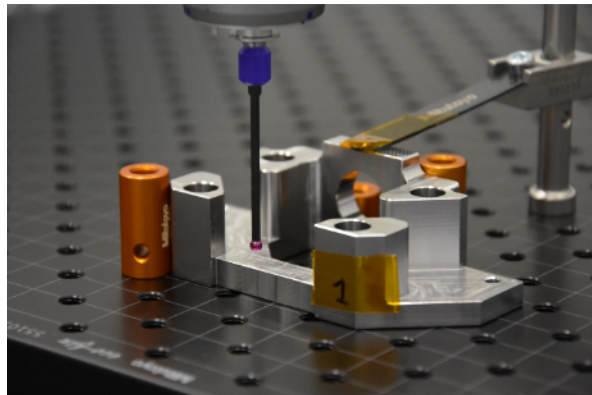 - FM delivery to NISP → jun. 2018
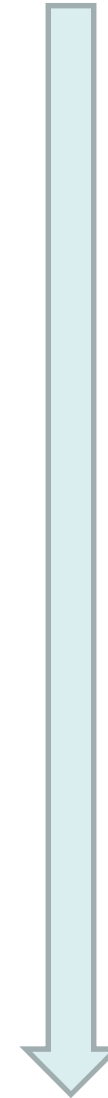
- **NI-DS EQM mechanical integration**
 - CSS & SSS thermal control sensors integration
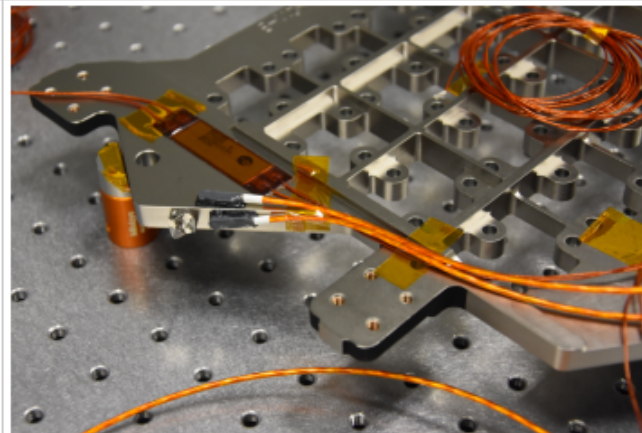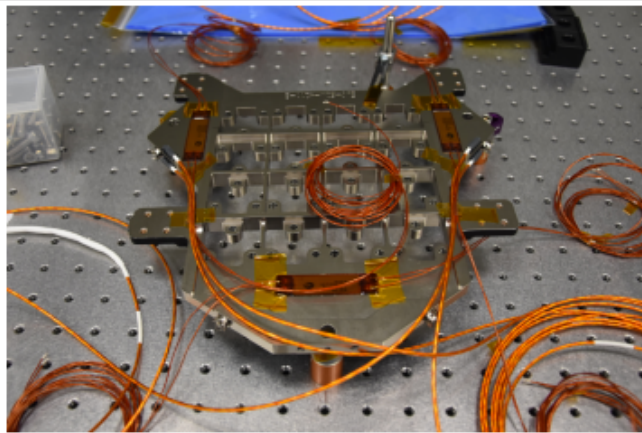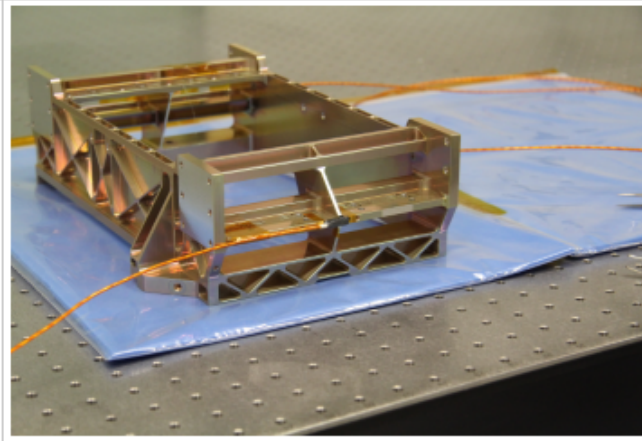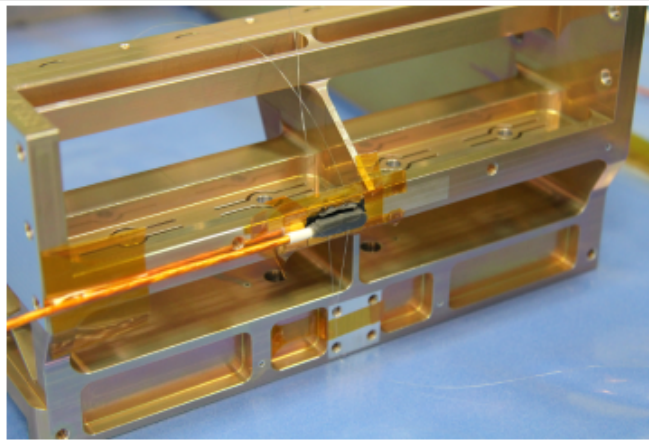
- **NI-DS EQM mechanical integration**
  - Tightening operations on P4 and CSS bipods
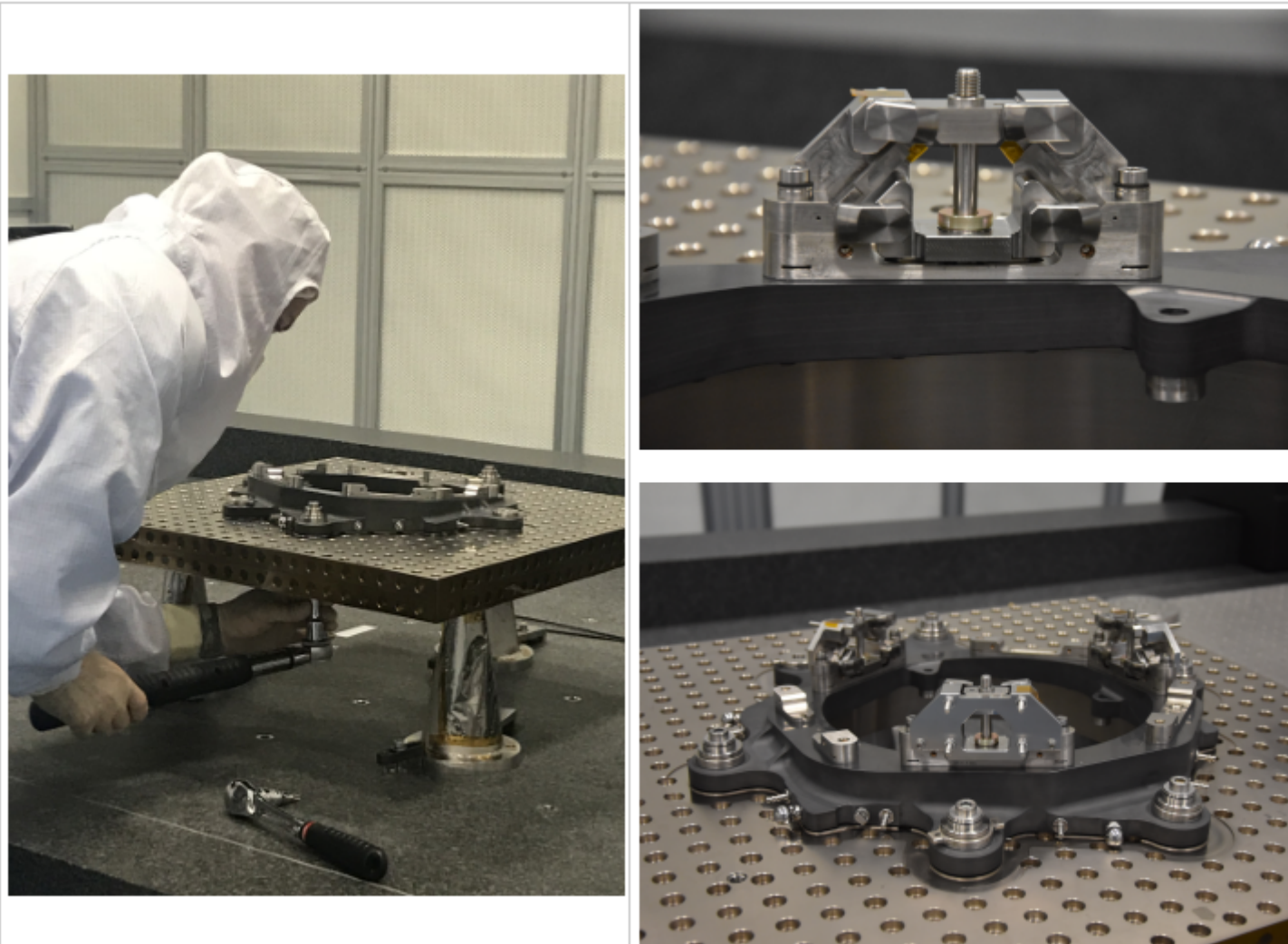
- **NI-DS EQM mechanical integration**
   - CSS bipods anti-rotation integration & validation

- Anti-rotation MGSE objectives
    - Avoid bipods deformations during screws tightening thanks to a stiffer assembly
    - Low mechanical constraint induced into the bipods – max deformation in the direction of the contact plane specified with « AIT defaults » budgets from NI-FPA: 50µm

- Metrology in different configurations
    - Bipods and anti-rotation in stand-alone configurations
    - Bipods mounted in the anti-rotation MGSE

- Validation & shimming procedure
    - Measurement of the deviation of each points form the contact planes regarding a mean theoritical plane. Example with bipod #3:
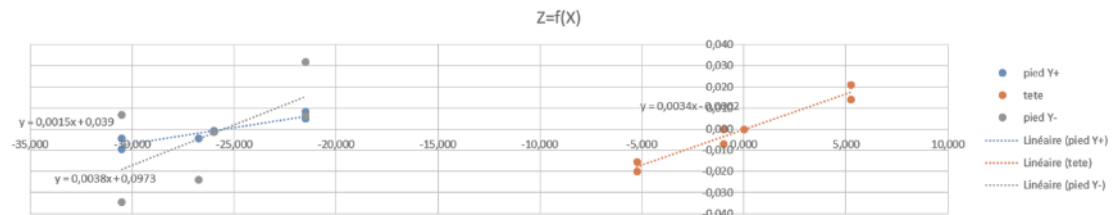
- Anti-rotation & bipods pairing + shims calculation to minimize the assembly resulting deformation
- Bipods and anti-rotation assembly with bipods placed on P4
- Bipods deformation verification by measuring the opposite plane

Bipods n°	#1	#2	#3
Max deviation	46µm	25µm	38µm

- **NI-DS EQM mechanical integration**
 - CSS handling MGSE integration & validation
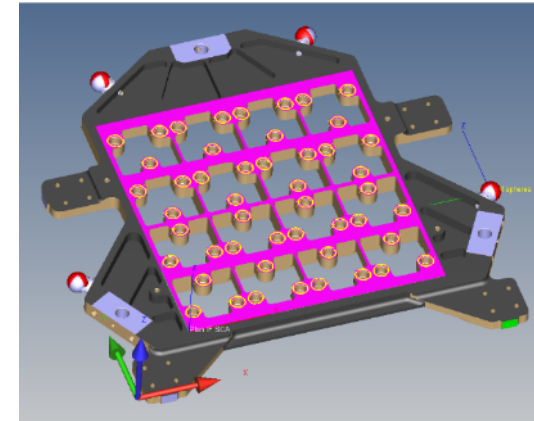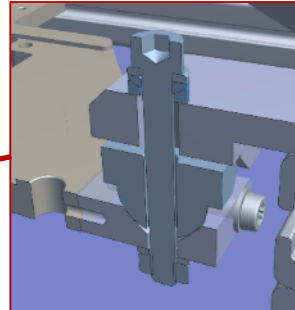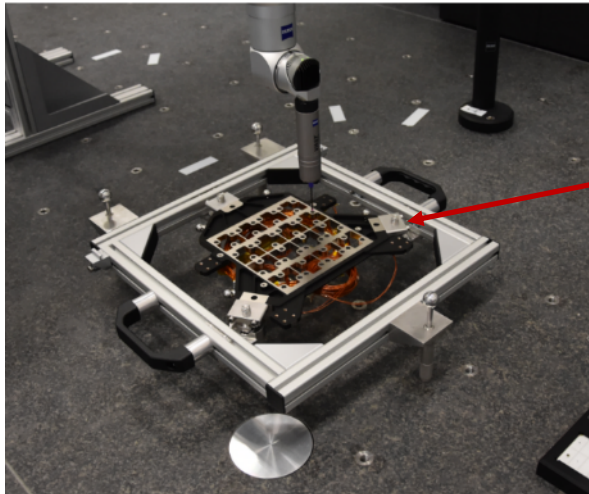
- CSS MGSE objectives
  - Handle the CSS + mosaic
  - Interface with other MGSE
  - Low mechanical constraints (isostatic mount) – deformation budget formalized in « NI-FPA alignement in X axis » RFD: ±5µm (EUCL-LAM-RFD-7-046-v2.0)

- CSS metrology in different configurations
  - CSS stand-alone
  - CSS + handling frame
  - CSS + handling frame + vertical bracket

- Metrology results
  - SCA interface flatness < 10µm – **deviation < 1µm** with MGSE
 - Max deviation of the position of SCA IF & bipods IF centers (focus axis) **≈ 5,5µm**

- **NI-DS EQM mechanical integration**
 - Interfaces measurement and focal plane shims calculation
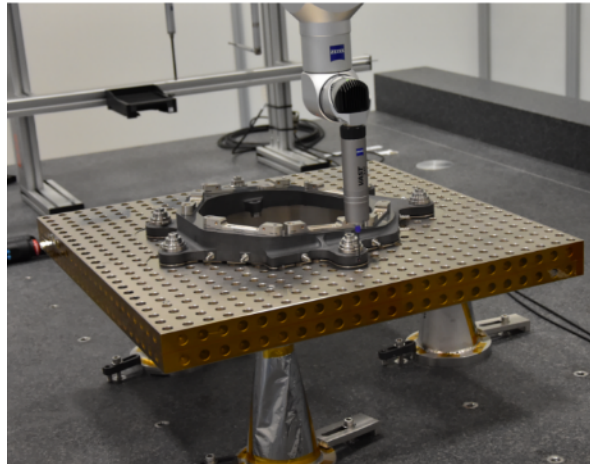
- Focal plane shims objectives
  - Perform the focus alignement in X direction and the focus tilt angle considering nominal data from CALA
  - Shims specified after specimen metrology to consider manufacturing and integration deviations
- Metrology in different configurations
  - P4 mounted on the integration plate → NI-DS axis system defined by the P4/P3 plane
  - Shims IF on CSS bipods
  - Shims and mosaic IF on CSS plate
- Focal plane shims specification
  - Mosaic **mechanical interface** axis system placed at nominal position in NI-DS axis system (CAD soft)
  - Measured shims IF planes placed in the assembly
  - Height and direction vector of the upper face retrieved for each shim
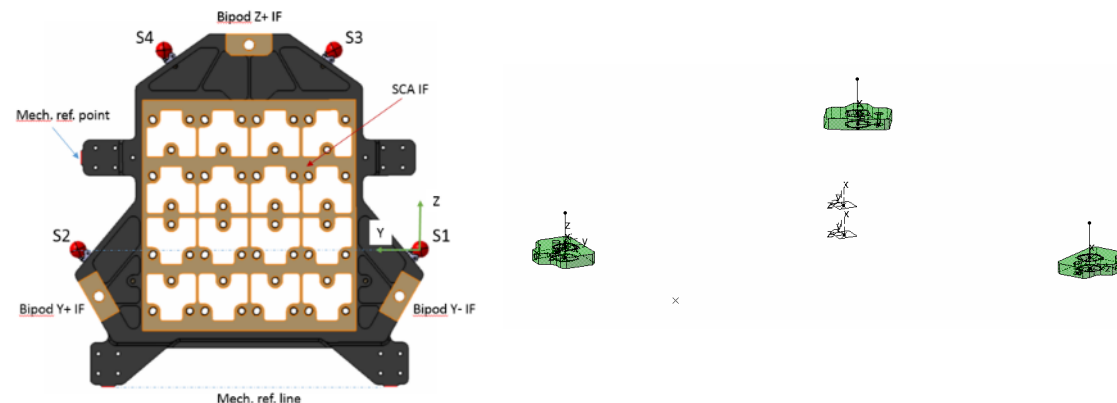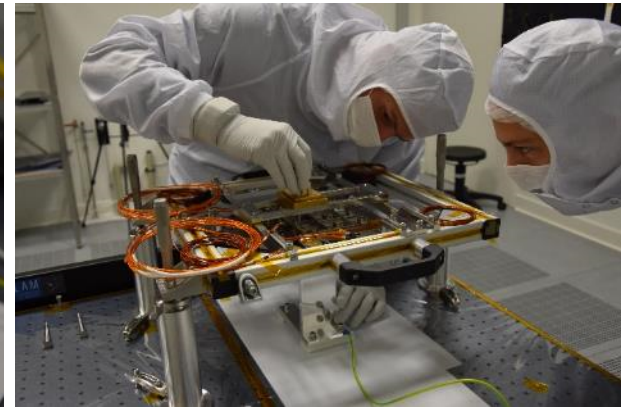
- **NI-DS EQM mechanical integration**
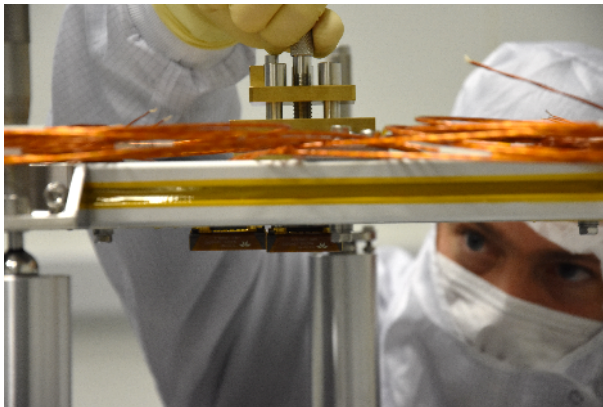 - SCA mosaic integration & measurement (1/2)
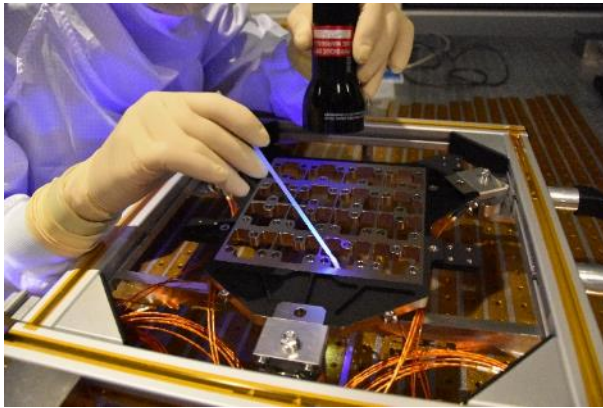
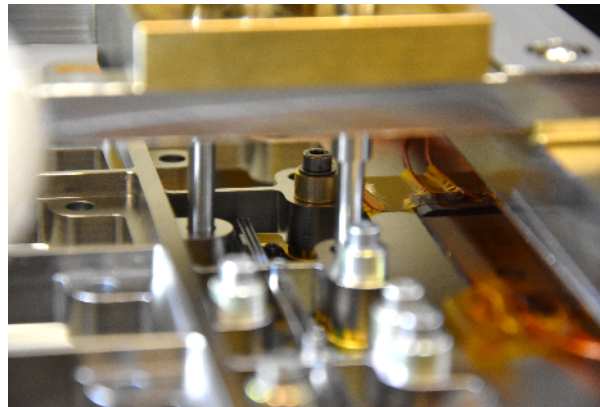Contamination inspection and cleaning
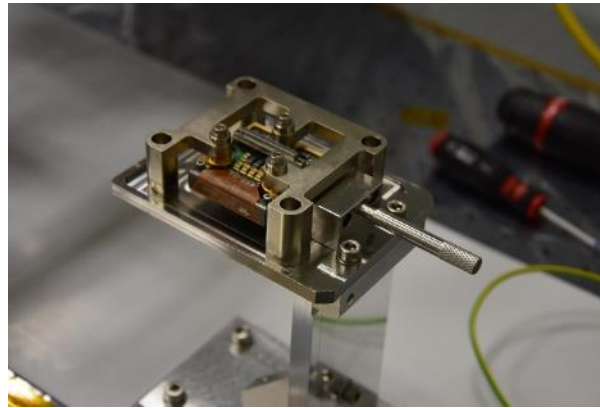
SCA loaded on the first handling tool

SCA manual alignement below its
fixation IF and 3x pins insertion

SCA lifting up thanks to the pins
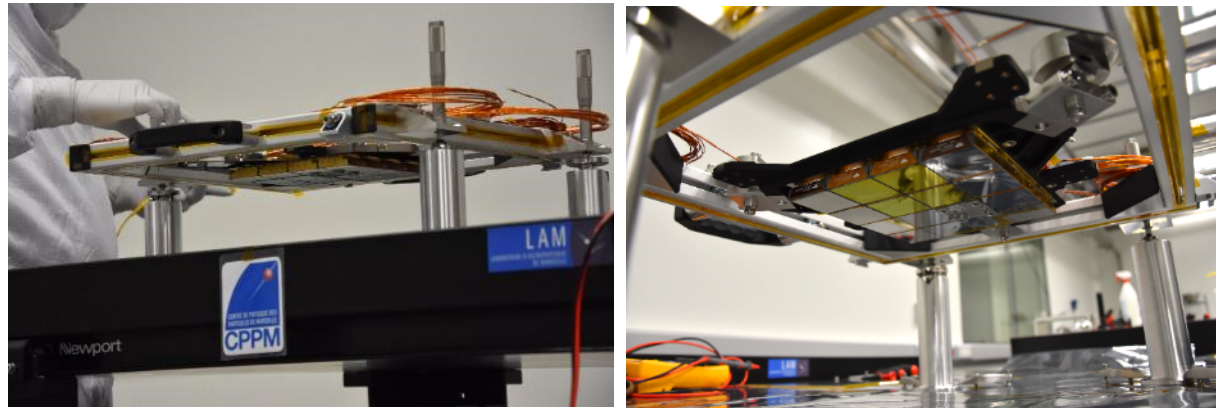guide tool

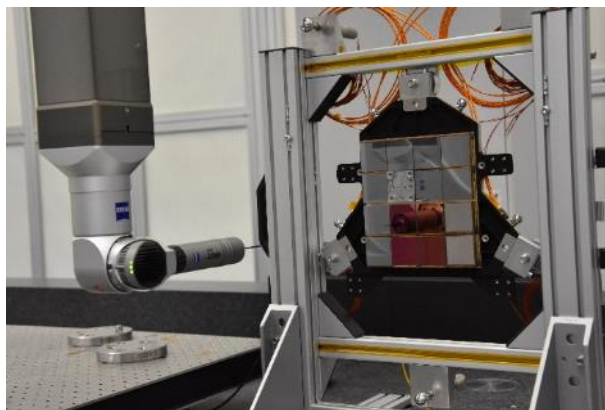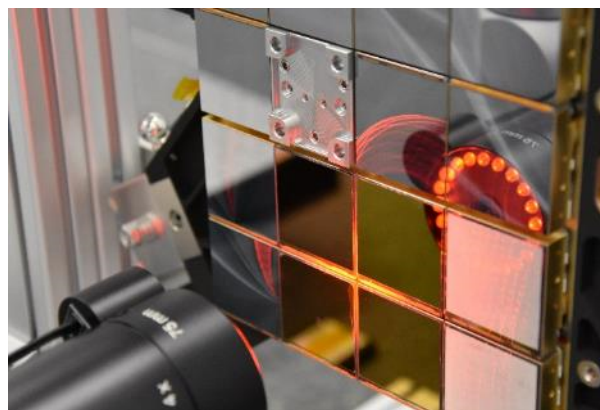Pins replaced by screws one by one

SCA dummy integration

- **NI-DS EQM mechanical integration**
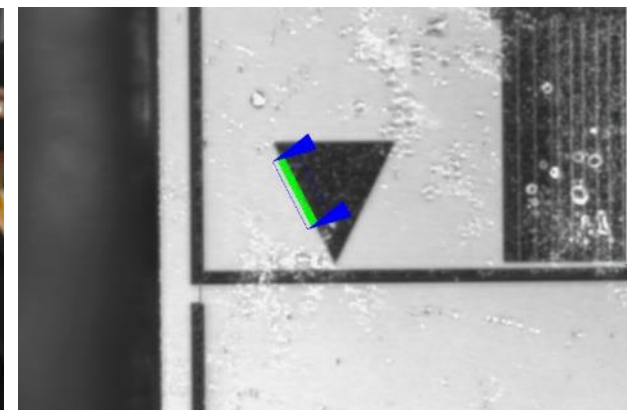 - SCA mosaic integration & measurement (2/2)

Mosaic integration completed

SCA mosaic holded in metrology configuration

SCA measurement with optical camera

SCA fiducial marks measurement