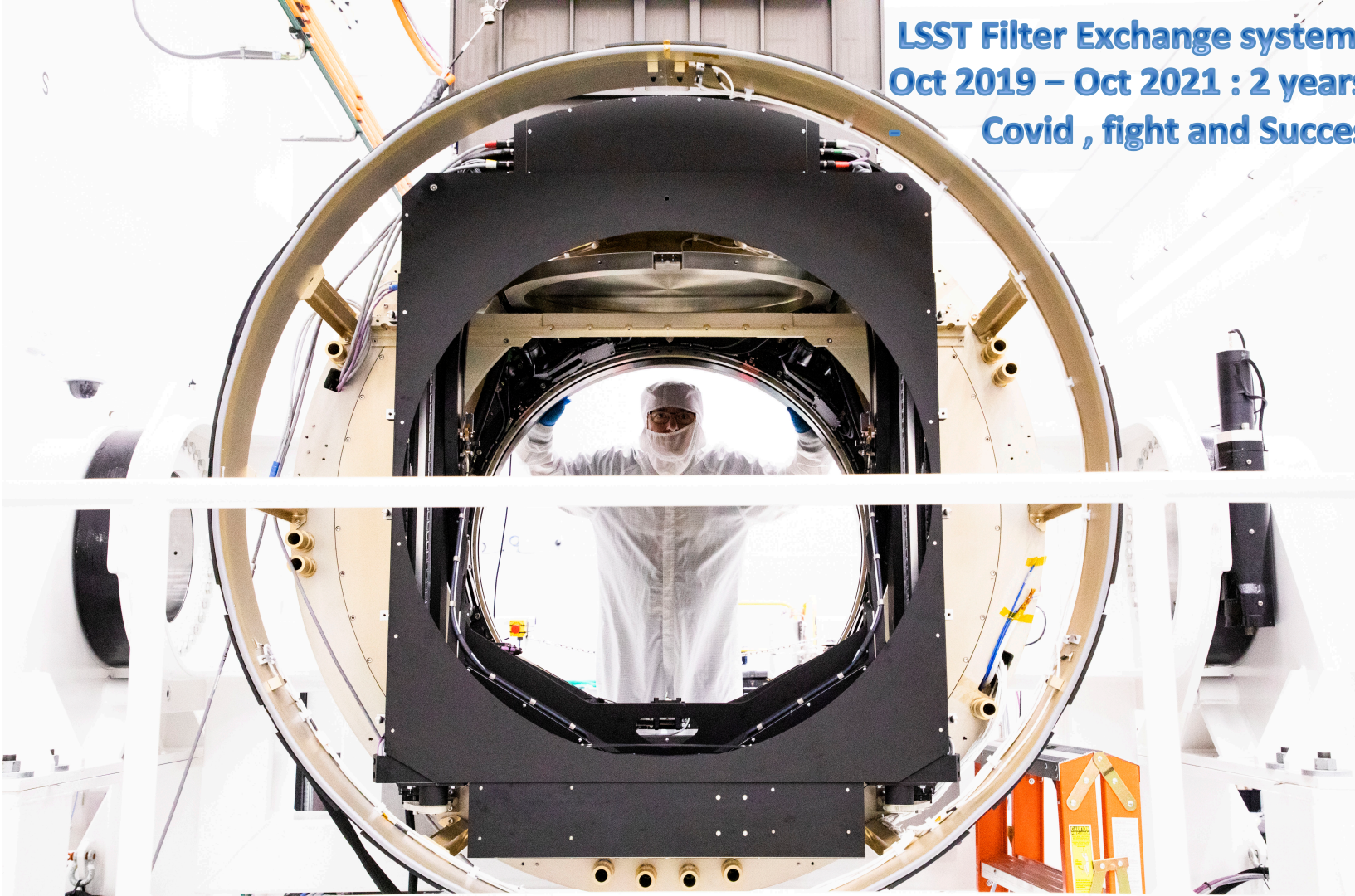




New on the Commissioning of
the LSST-Camera
Pierre Antilogus
LPNHE-IN2P3,
Universités de Paris & Sorbonne

LSST-France
22 novembre 2022

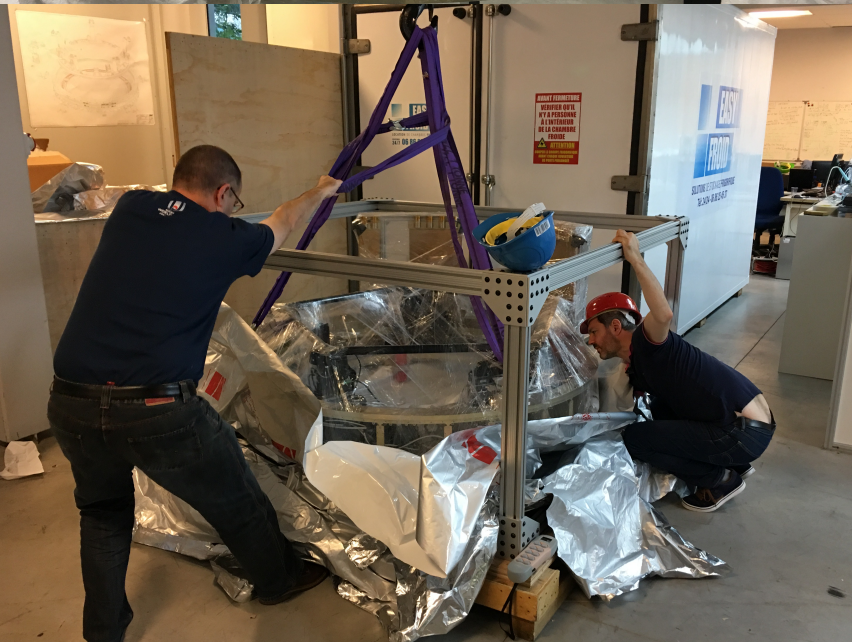
**LSST Filter Exchange system
Oct 2019 – Oct 2021 : 2 years of
- Covid , fight and Success !**



Filter Exchange System : Commissioning at SLAC ...and remote

- **Early October 2019** : send filter exchange system to SLAC
- **Octobre 2019** : integration carousel in camera
- **Decembre 2019** : get ready for filter exchange system running/operation
- **Janv-Fev 2020 : First Operation in Camera at SLAC**
- ~~spring 2020 : commissioning & final~~ covid
- **Sep 2020-** : restarted tests at SLAC with a remote support from France
- **Jun 2020-Fed 2021 : re-activation of the demonstrator at LPNHE :**
 - Validation / debug / commissioning of operation that can then be done safely at SLAC
 - We were late on the hardware-software integration and operation , covid crisis allowed us to catch-up and even go beyond our initial expectation . **Succes !!!!!!!**
- **Since Fed 2021** : test & qualification in LPNHE hall (will run up to 2023)
- **July and Oct 2021 : Back to SLAC for 8 weeks !!!! Was not easy to set it up, but this was a success : the system is fully operational , with very good performances .**
- **Plan for 2022 : Missions en 2022 :**
 - January – Feb : ~ 4 weeks to close all the open points , including the connection with the utility trunk)
 - Spring : Start of the full operation of the camera : This will be a serious commissioning step for all camera parts and for the camera as a all !!!

OCTOBRE 2019 : SEND THE FILTER EXCHANGE SYSTEM TO SLAC



OCTOBE 2019 : READY TO SEND THE FILTER EXCHANGE SYSTEM TO SLAC 12 BOXES , 4,2 TONS



NOVEMBER 2019 : FULL SYSTEM AT SLAC





**NOV-DEC2019-JAN 2020 INSTAL IT IN
THE CAMERA BODY , AND START THE
COMMISSIONING**

**MARS 12TH 2020 ,
START OF THE 4TH
PLANNED TRIP TO
SLAC (6 WEEKS OF KEY
COMMISSIONING) :
IR2 – SLAC CLOSED
DUE TO THE CCOVID
CRISIS .
15 MONTHS TO WAIT
WITH A SYSTEM
“STUCK” –PARTICIALY
ACTIVATED – WITH
MANY ISSUES**



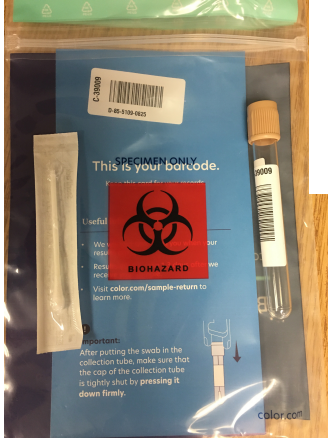
Juillet & Oct 2021 : 8 weeks at SLAC



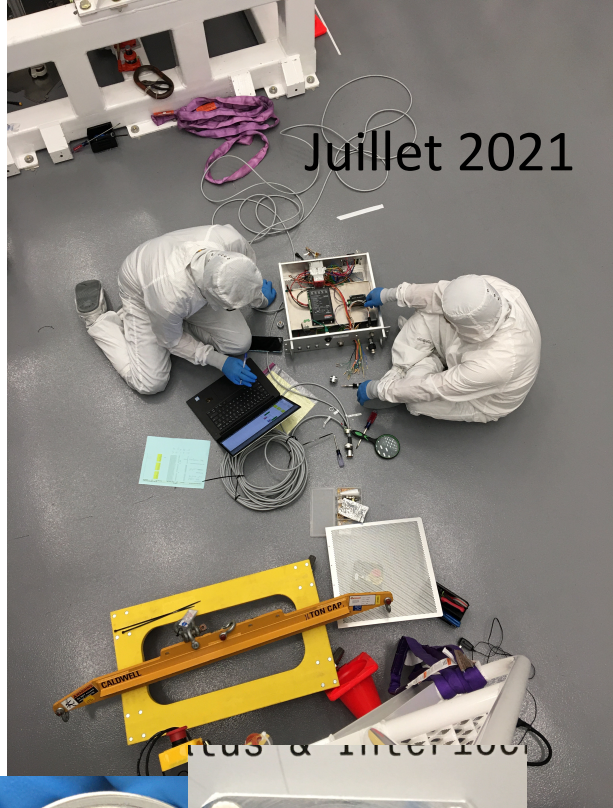
July 2021 : Mechanical and Electrical fixes and upgrades



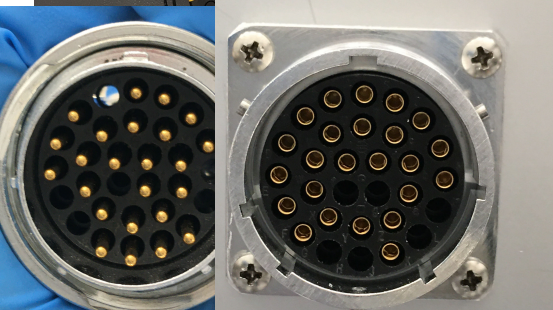
Oct 2021 : fine tuning and Optimization



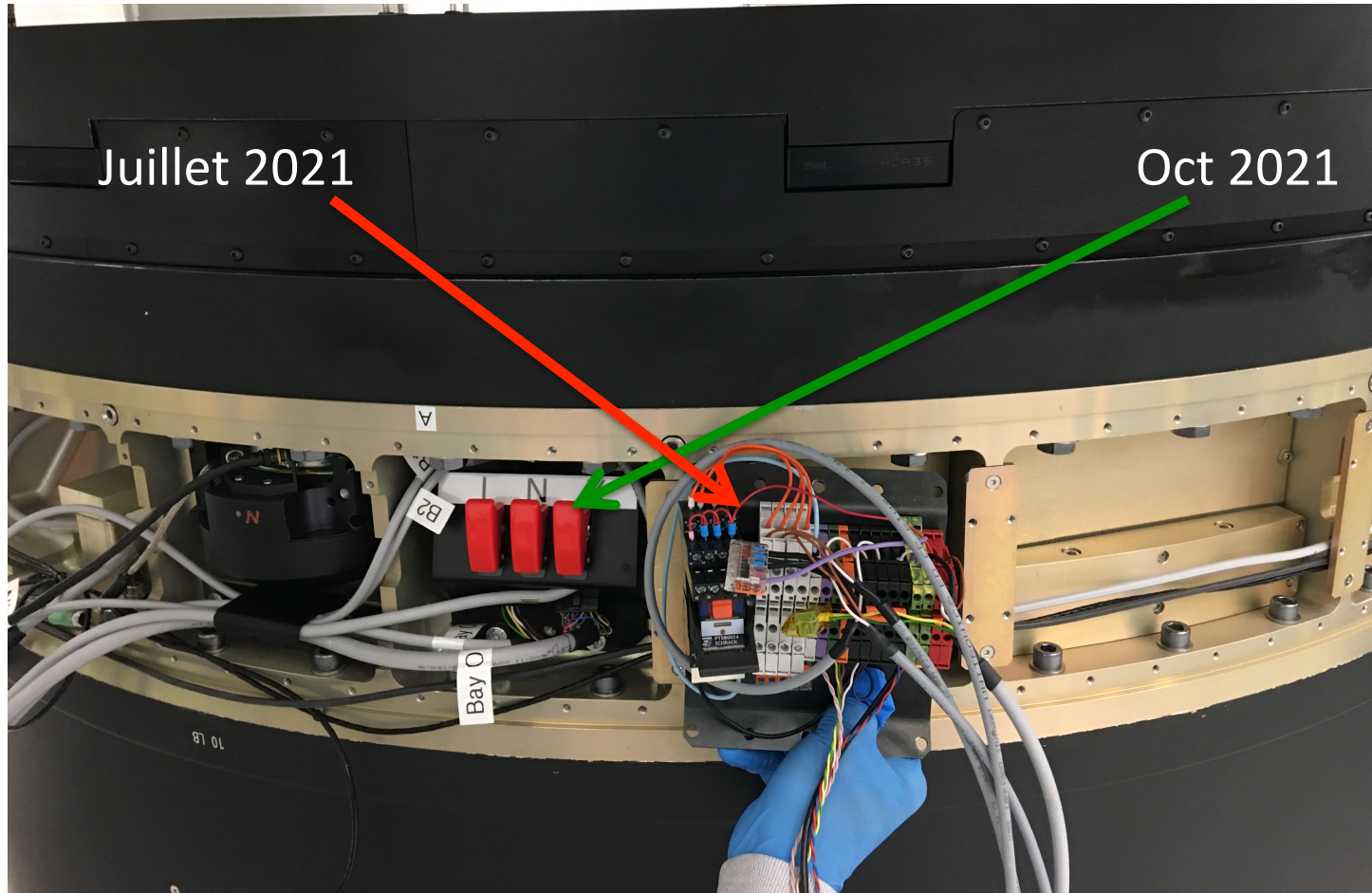
Juillet 2021

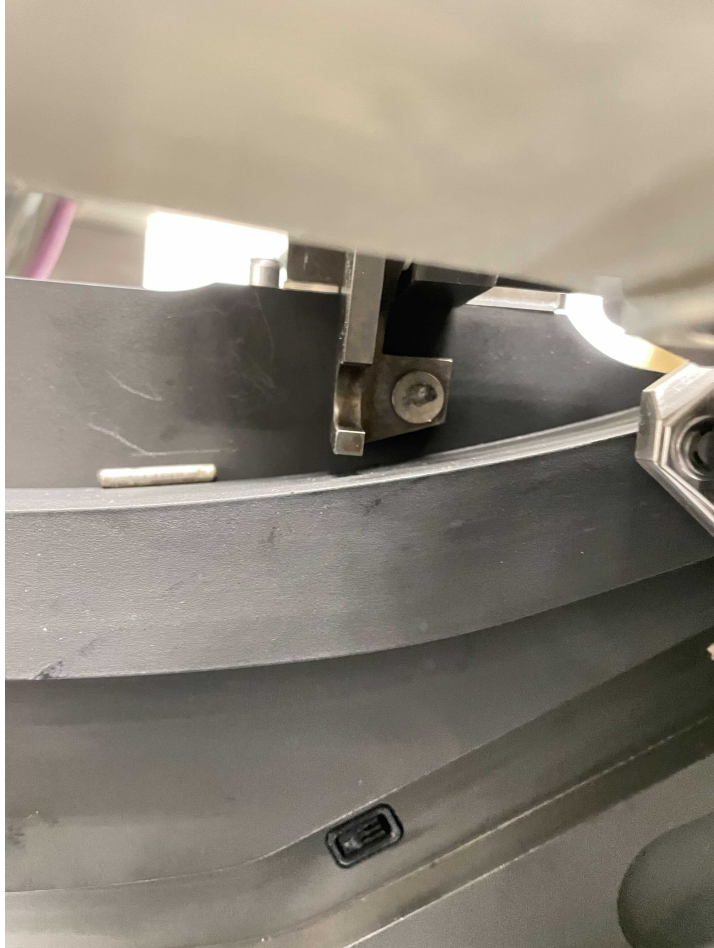


Oct 2021



+ Final upgrades before connection to the camera utility trunk (Jan 2022 ?) are done now





1 incident in July :
“self-dismounting” of a vendor part !

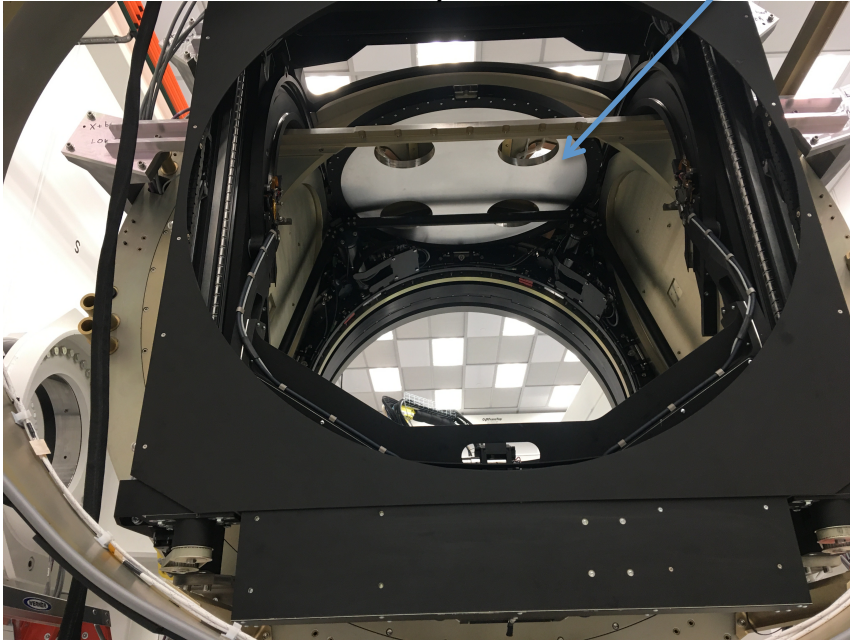
The part (clamp of the filter in the focal plane)
had a temporary fix in July and was replaced in
October.

The system is still young, and we will need to
provide close-support for some time still and to
follow closely the first sign of agging by a
dedicated monitoring .

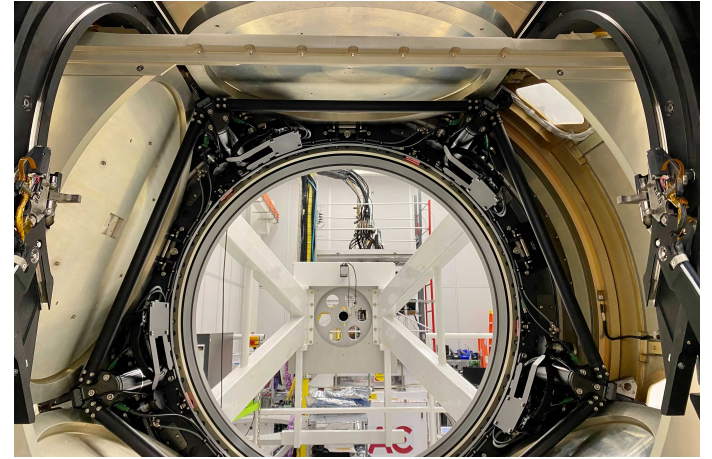
Still the maturity reached today is at the level
expected for the start of a safe operation .

Oct 2021 : 2 days of long sequence of automated filter exchange without human intervention (~150 exchanges) on top of operation of specific function during 3 weeks of tests (equivalent to 200 extra filter exchanges).

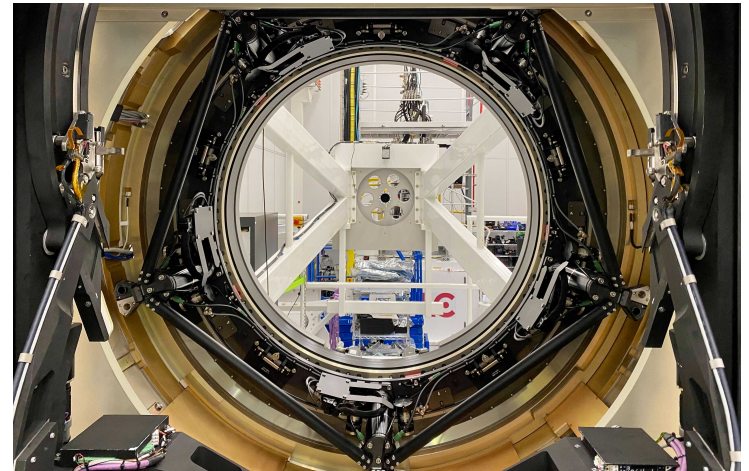
Also run with the LNL test filter (=final filter frame with aluminum as filter) : Good !



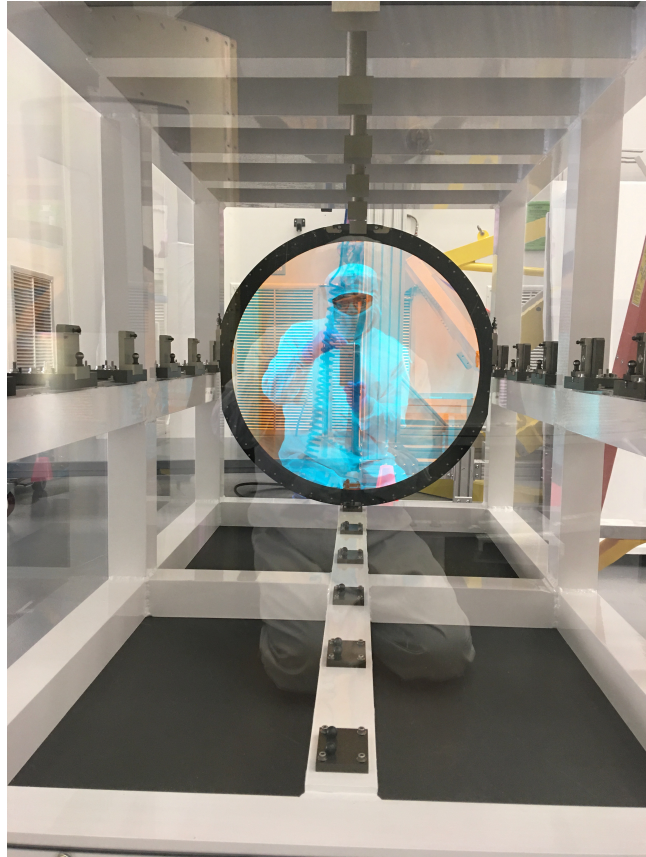
Oct 2021 , dummy filter in carousel



Nov 2021 , carousel empty : loader did the job

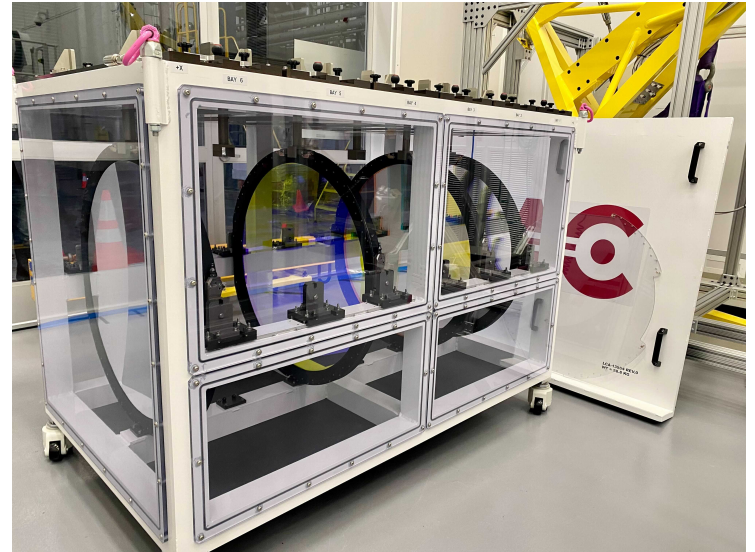


All LSST Filters delivered at SLAC



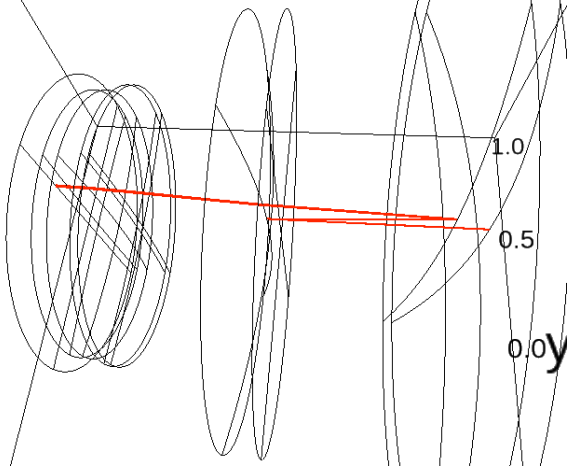
Juillet 2021
R filter in
Storage box

Picture Oct 2021
u,r,z,y in LSST Filters in the storage box
3 Nov g was added too



Show

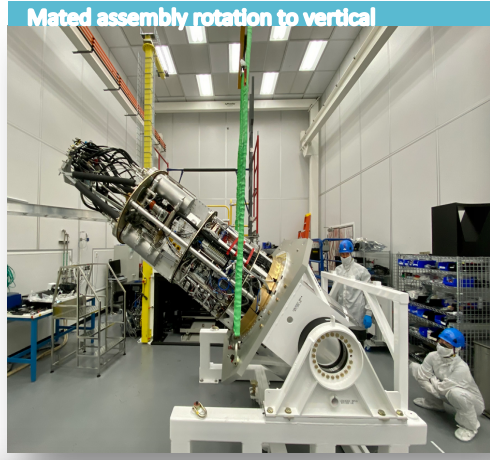
CCOB thin beam : arrived at SLAC at last !!!!
The boat used for its transport from Europe took fire ...



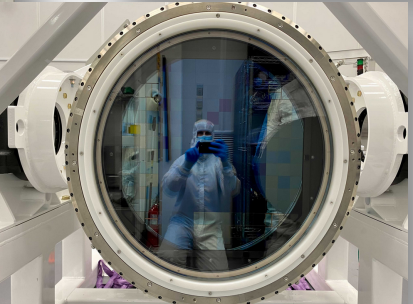
Cryostat & Focal Plane



Cryostat being installed in the tip-tilt fixture



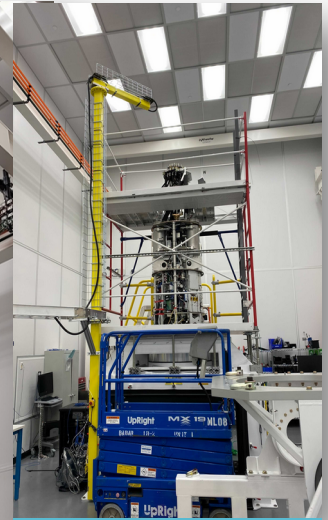
Mated assembly rotation to vertical



Inspection of the focal plane after rotation showed no issues



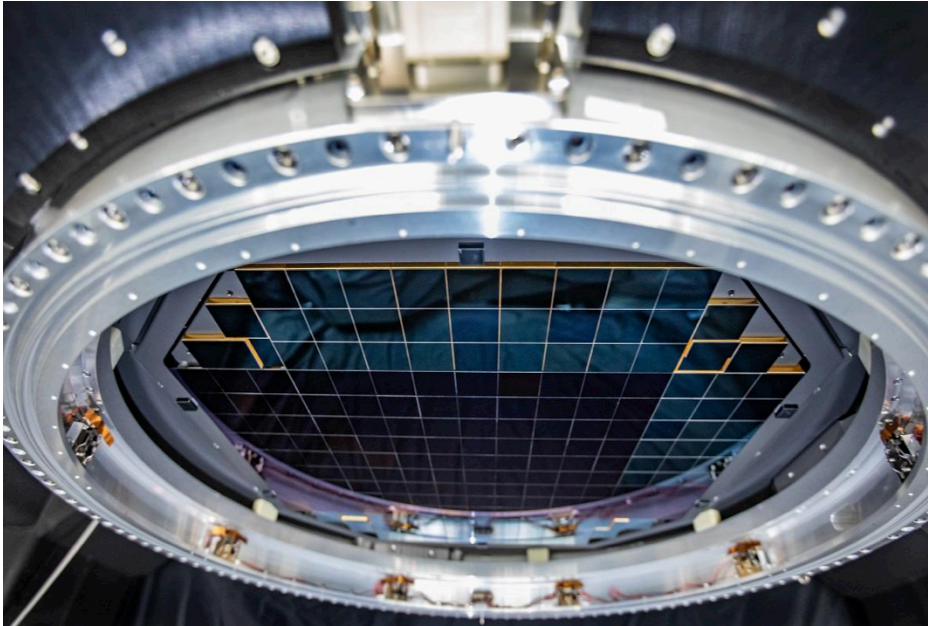
Mated assembly being lifted



Mated assembly installed on the BOT

Focal Plane

Completed since summer 2020



21+4 raft test summer and fall 2020
with “temporary cooling system “

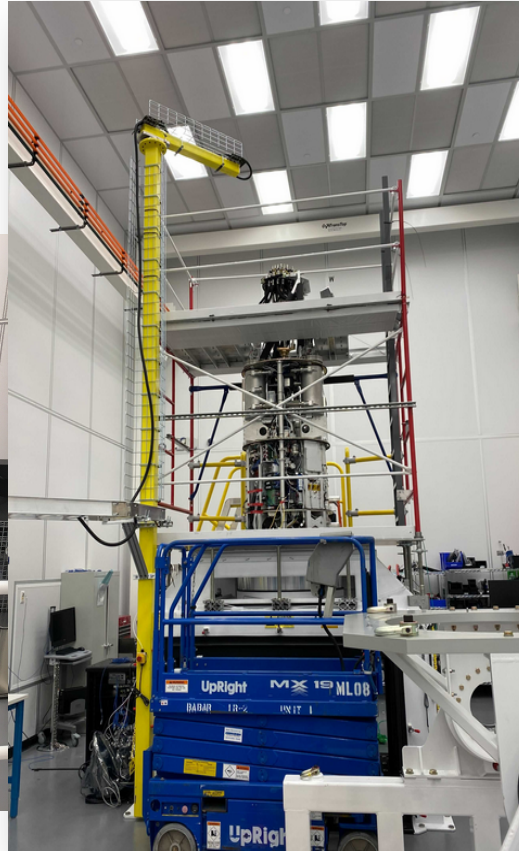


As July 2021

Final step for running
with the final cooling
system



Oct 2021 : It works and in
place for new data taking!



Full Focal Plane data
taking underway since
~Nov 4th 2021. It run up
to the end of the year .
End of January the
cryostat will be installed
in the camera , and the
optic will follow .

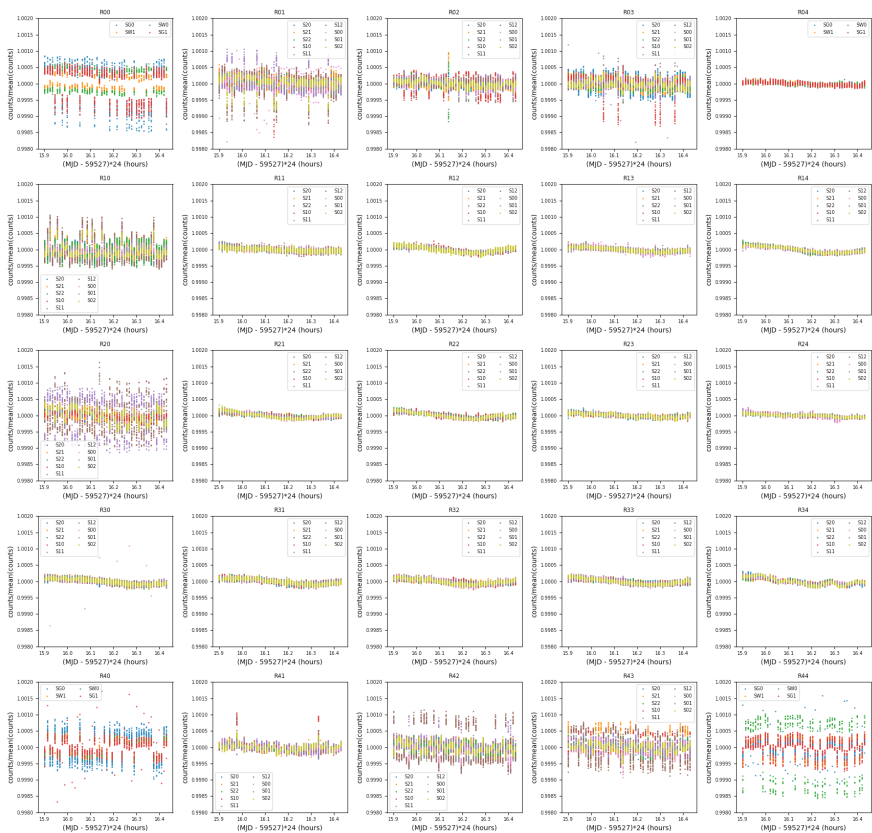
Start of the qualification
of the full camera :
Spring 2022 (~<6
months)

End 2022 : The camera
should be ready to fly to
Chile.

Example of Optimization : gain stability in ITL

below the 21 raft + 4 corner rafts , left : with ITL OD = 25 V , right ITL OD = 26.9 V
relative signal measured over time for a series of flat taken at the same flux

Flat gain stability, Run 13026 (acq 13019)



Flat gain stability, Run 13033

