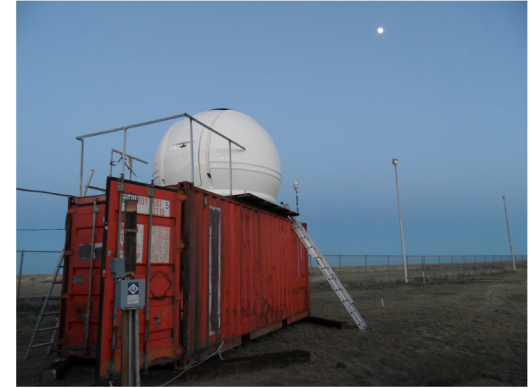


The future of the ARCADE Raman Lidar in CTA



TARGET :

The ARCADE Lidar will operate at the CTA sites with the goal of making **a first survey of the aerosol conditions of the selected site** and to use it as **a calibrated benchmark for the other Lidars that will be installed on site.**

groups involved :

- INFN Napoli → L. Valore, C. Aramo
- INFN / CETEMPS L'Aquila → V. Rizi, M. Iarlori
- INFN Torino → P. Vallania, G. Dughera, M. Marengo

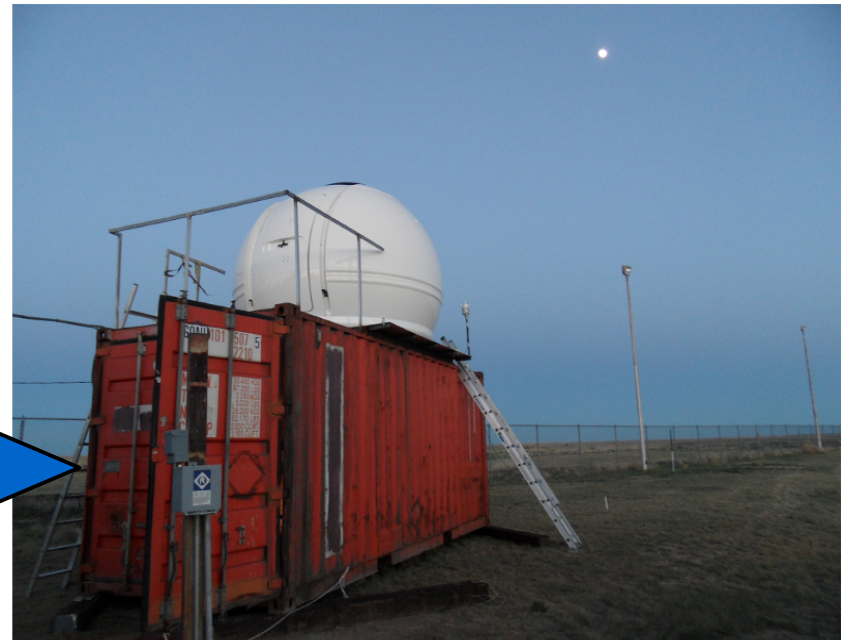
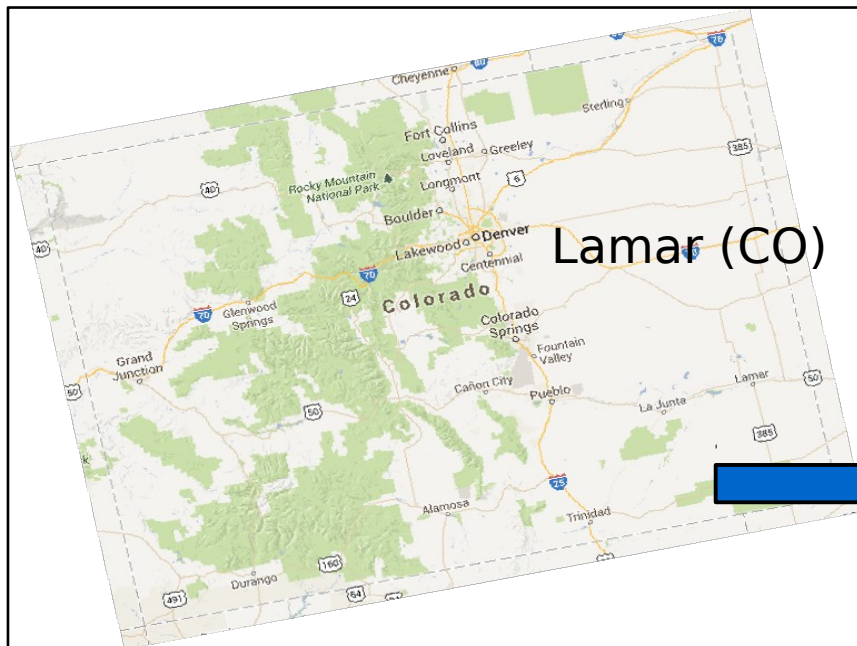
It will measure the aerosol extinction $\alpha(h)$ and backscattering coefficient $\beta(h)$ profiles as well as the **water vapour mixing ratio** : all information will help to characterize the optical properties of aerosols on site.

Steps done in CTA

The ARCADE Lidar was built in Italy and operated in Colorado for 1 year (July 2014 – July 2015) within the ARCADE project.

In July 2015, the Lidar was unmounted and shipped back to Italy (Torino). At the same time, the laser (Quantel Centurion) was sent to Quantel for maintenance. A problem in the control board was found and fixed.

Between September 2015 and May 2016 the ARCADE lidar has been upgraded at the INFN mechanical workshop in Torino.



what is being changed

Primary mirror:
Ø 250 mm, f/3

Raman filters
and PMTs

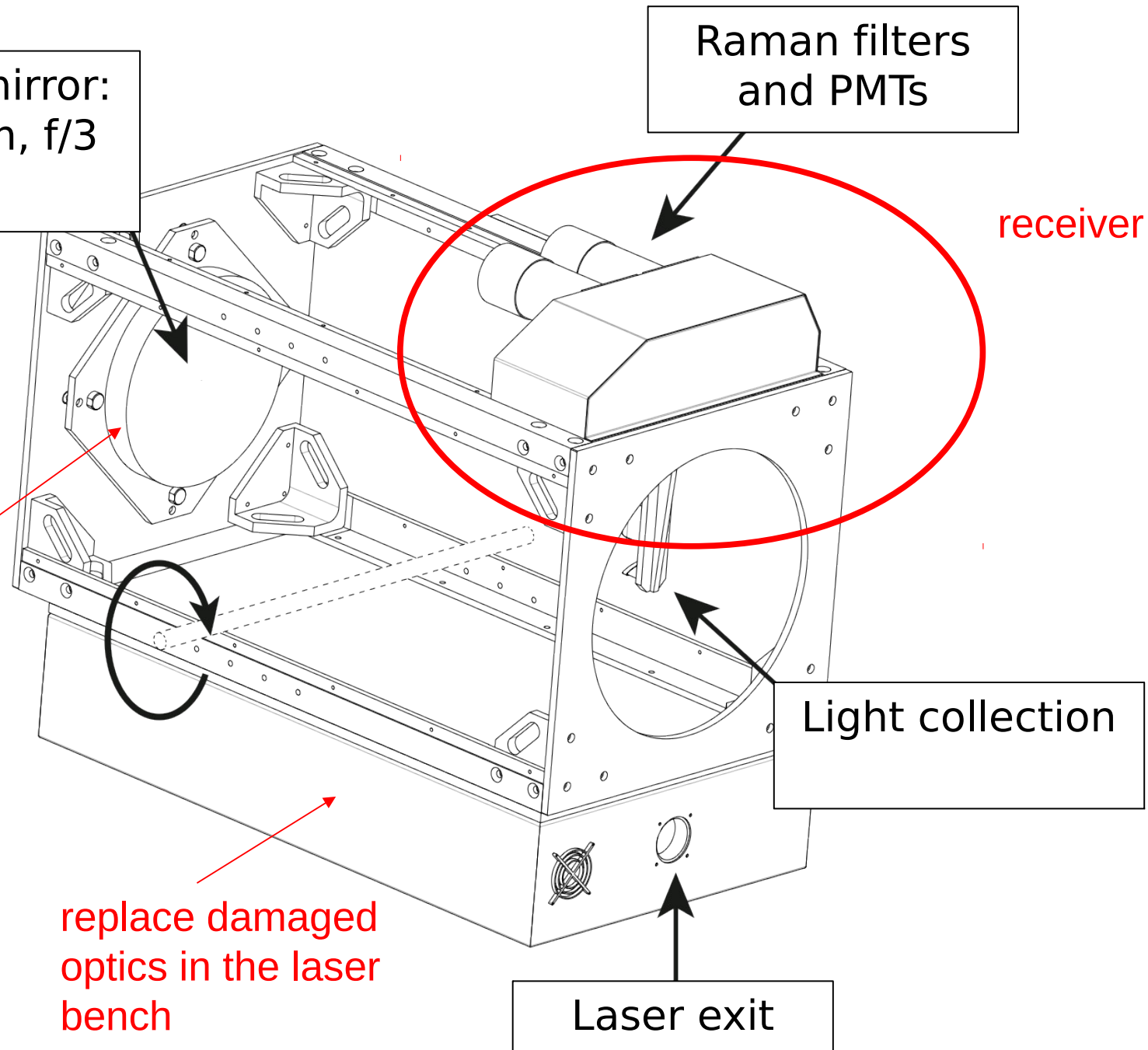
receiver

replace primary
mirror

replace damaged
optics in the laser
bench

Light collection

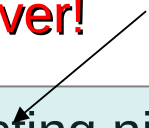
Laser exit



Lidar Upgrade

The upgrade includes :

design and realization of a
new receiver!



- the addition of a 2nd Raman channel, in addition to the pre-existing nitrogen and elastic channels : the **water vapour Raman channel**.
- new DAQ system : Isocomp APCv26 modules. The very same modules are being used for the DAQ of the Raman lidar operating at the Auger Observatory.
- new PMTs : Electron Tubes 9829B. The PMTs used for the ARCADE project were very old (spares recovered from a previous experiment)
- replacement of some of the optics that have been damaged while used in Colorado

Steps done

- Gen-Feb 2016 : received almost all the new components (new optics for the receiver, primary mirror, PMTs, ...). *Waiting only for the DAQ modules (minor problems on the boards ordered are being fixed)*
- March 2016 : laser bench & laser unmounted and transferred to L'Aquila.
- April 2016 : design of the new receiver finalized
- May 2016 : new receiver realized
- July 2016 : the upgraded Lidar transferred to L'Aquila

Next steps ...

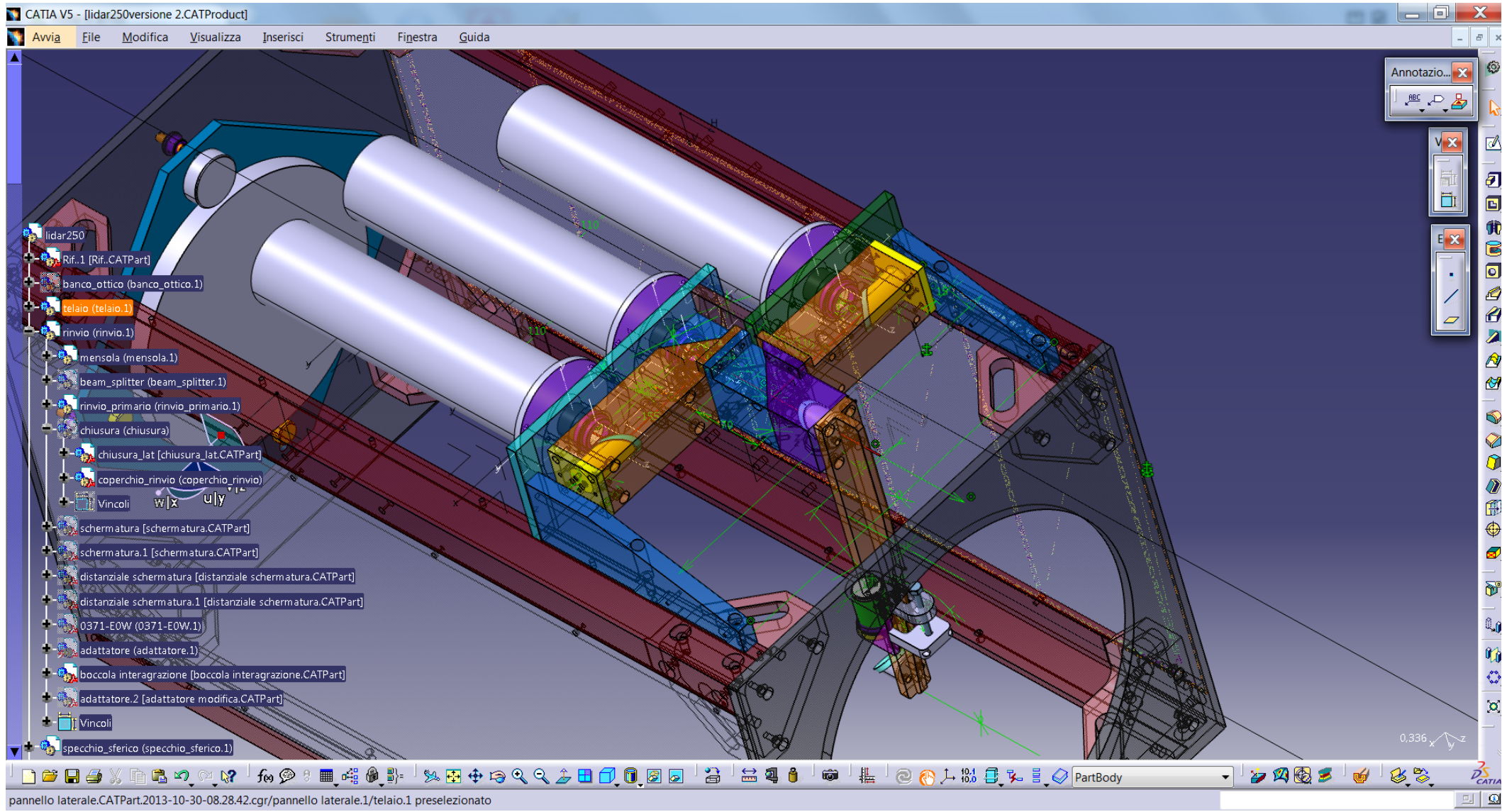
- test of the laser functionality and performances in L'Aquila, stand-alone and through the optic elements in the laser bench (divergence, energy, stability, xxx)
- assembly of the new Lidar in L'Aquila
- test of the new ARCADE lidar in parallel with the Lidar of the EARLINET network in L'Aquila (V. Rizi group)

Schedule a trip to La Palma to establish the location of the Lidar

Installation in La Palma expected in 2017. 1 year of data taking.

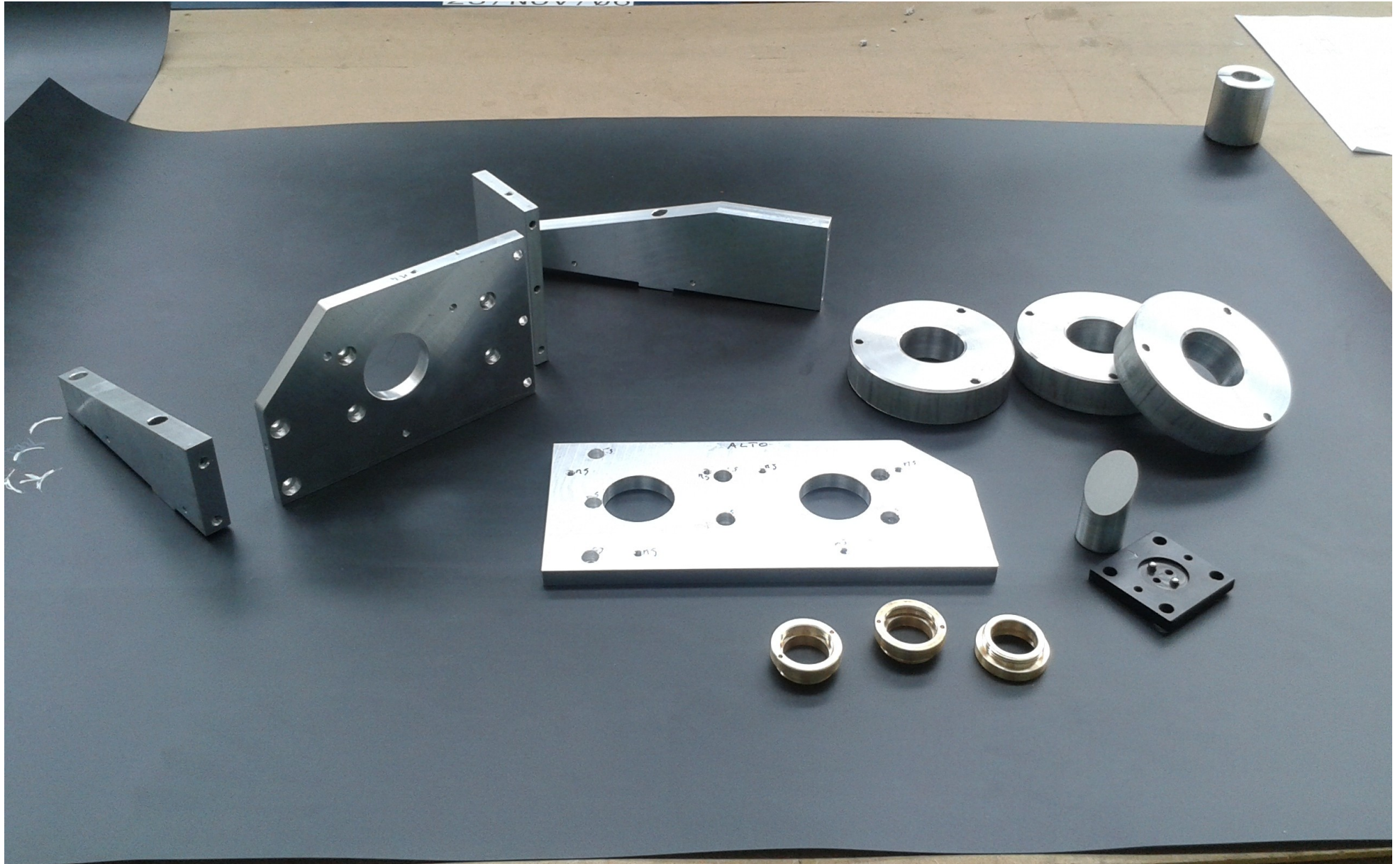
Technical design of the new receiver

M. Marengo – INFN Torino



Realization of some parts of the new receiver - May 10th

G. Dughera – INFN Torino



DOMANDA DI UTILIZZO DEI SERVIZI DI BASE

Data della richiesta:	Lab. Tecnologico	Lab. Elettronica	Centro di Calcolo	nuova richiesta
				richiesta di continuazione

Esperimento: _____ Responsabile locale _____

Responsabile dell'attivit a' _____

Descrizione dettagliata dell'attivit a' richiesta _____

PLANNING											MILESTONES			
Subattivit�a'	G	F	M	A	M	G	L	A	S	O	N	D	Data-mese	Descrizione

Tecnici e tecnologi attualmente assegnati all'attivit�a'					Richieste di supporto tecnico per		
INFN		ALTRI ENTI					l'anno:
Nome	mesi/U	Ente	Nome	mesi/U	Tipologia	N.	mesi/U
					Tecnici mecc. /elettr/CdC		
					Disegnatori meccanici		
					Microsaldatori		
					Tecnologi progett. mecc.		
					Tecnologi elettronici/CdC		
					Tecnologi microelettronica		

Note: _____