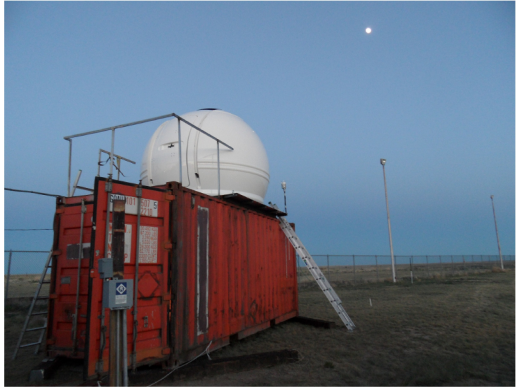
The ARCADE Raman Lidar



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 **α(h)** and backscattering coefficient **β(h)** profiles as well as the **water vapour mixing ratio** : all information will help to characterize the optical properties of aerosols on site.

Work in progress : upgrading the lidar

The upgrade includes :

- 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

Current status of the upgrade

- 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 from Torino to L'Aquila, where the tests will take place.

- April 2016 : design of the new receiver finalized *(M. Marengo)*

- May 2016 : realization of the new receiver *(G. Dughera) – waiting only for the anodization*

- June 2016 : laser tests in L'Aquila.

Next steps ...

- June-July 2016 : test of the laser functionality and performances in L'Aquila, stand-alone and through the optic elements in the laser bench (divergence, energy, stability)

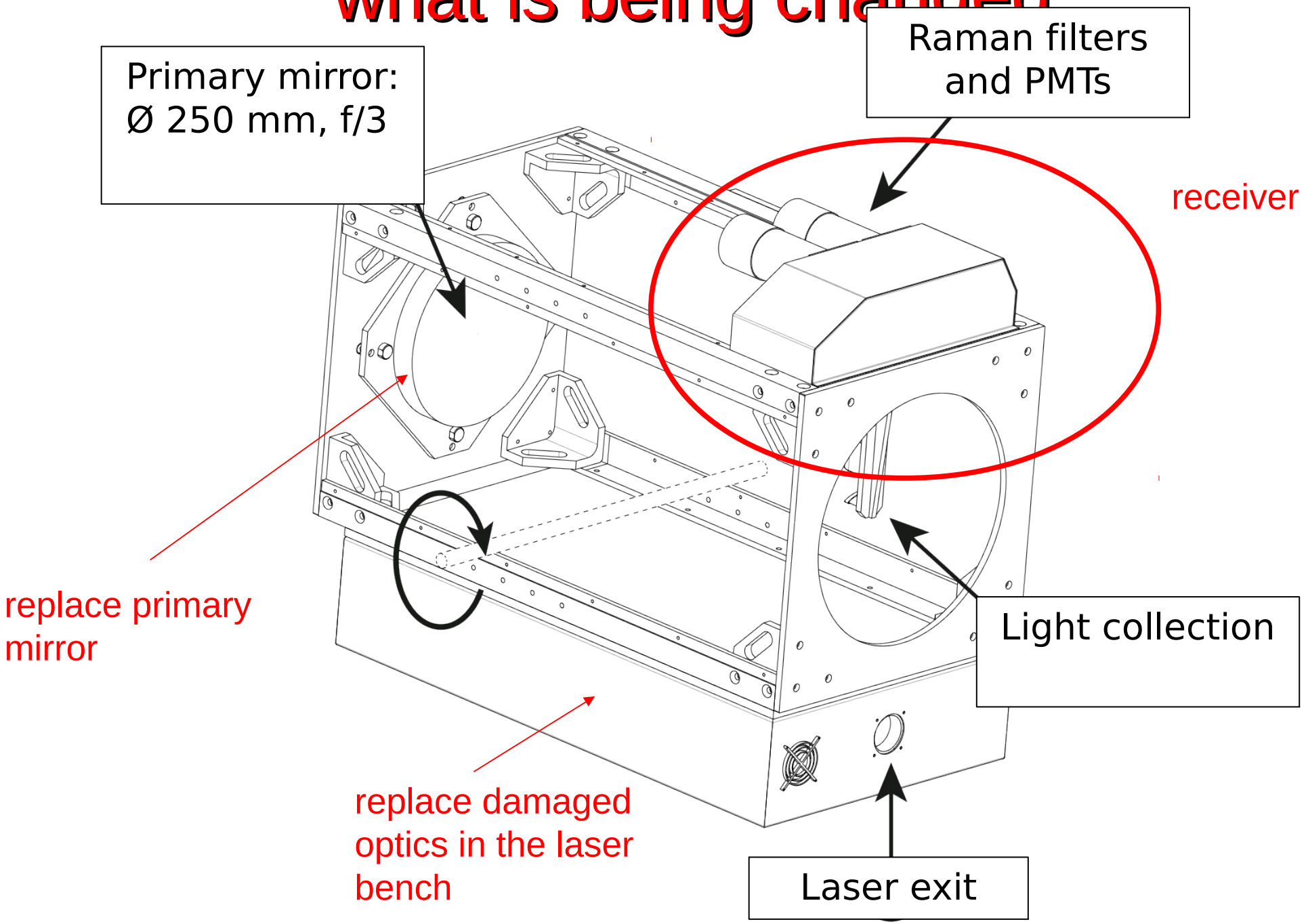
- July 2016 : trip from Torino to L'Aquila to bring the upgraded Lidar to L'Aquila. Assembly of the full lidar system on site.

- next months : test of the new ARCADE lidar in parallel with the Lidar of the EARLINET network in L'Aquila (V. Rizi group)

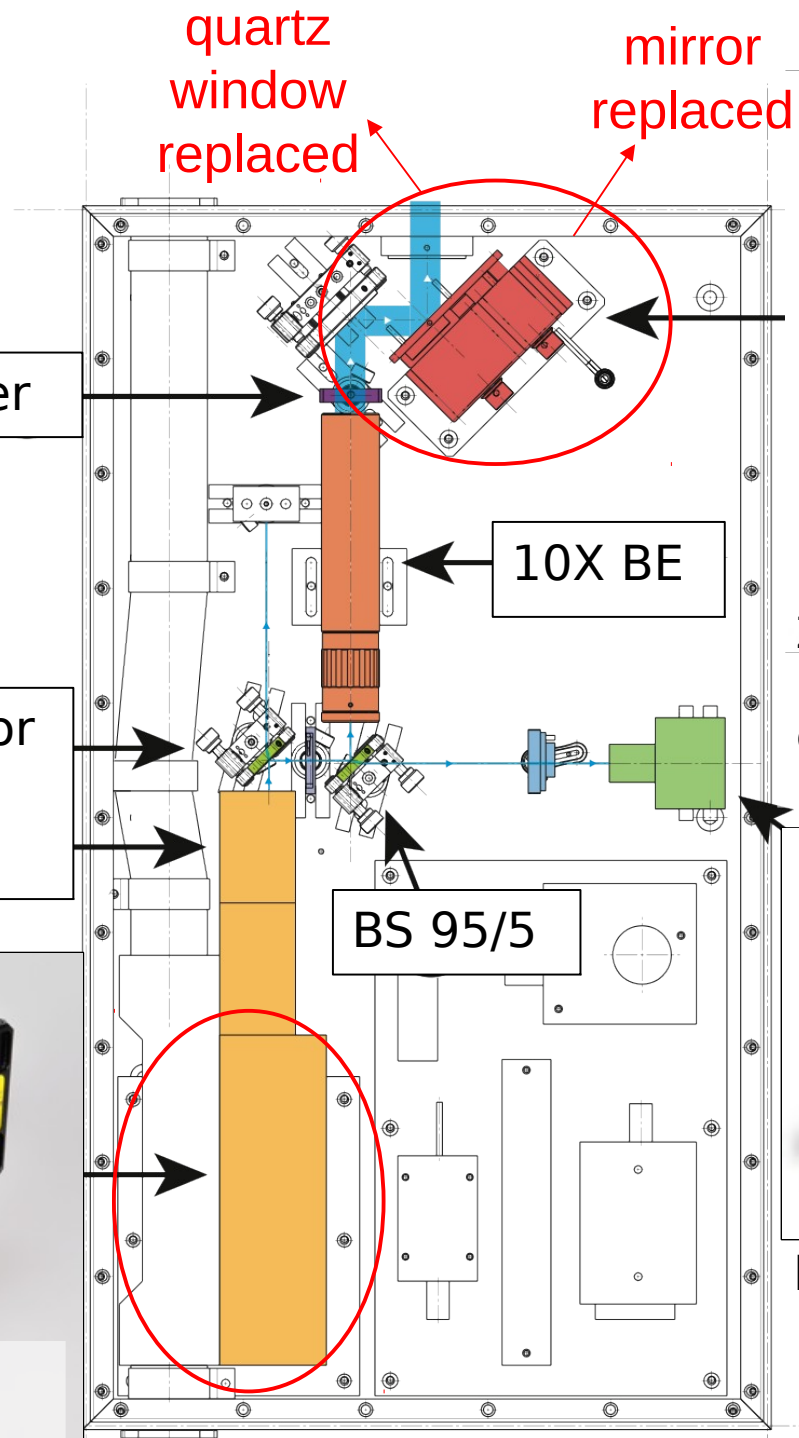
Schedule a trip to La Palma to establish the location of the Lidar (End of July 2016?)

Installation in La Palma expected in the first months of 2017. 1 month needed on site for the installation. 1 year of data taking.

what is being changed



The laser bench

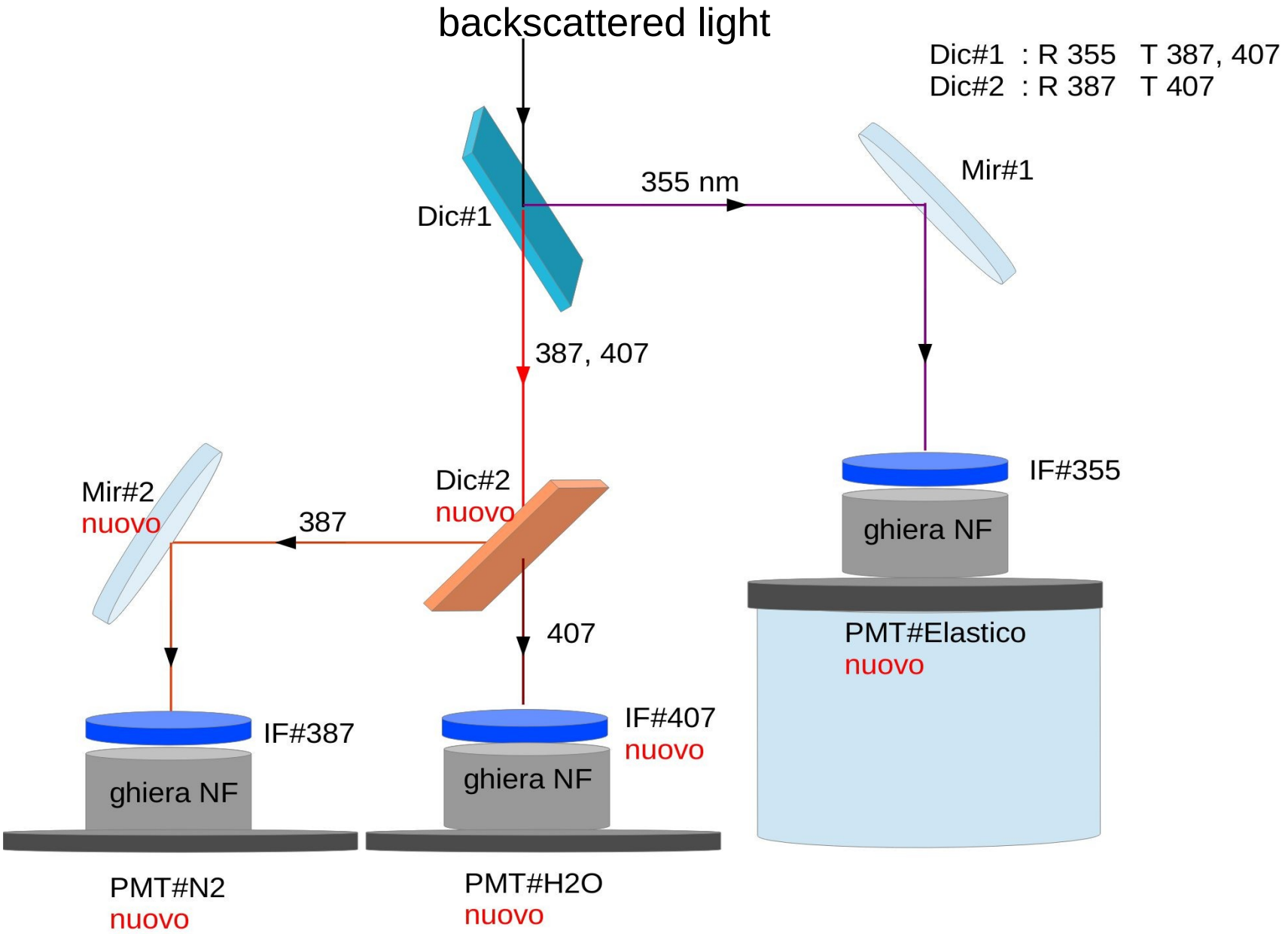


Quantel Centurion Nd:YAG laser

Zaber motorized mirror mount: remotely computer controlled fine alignment

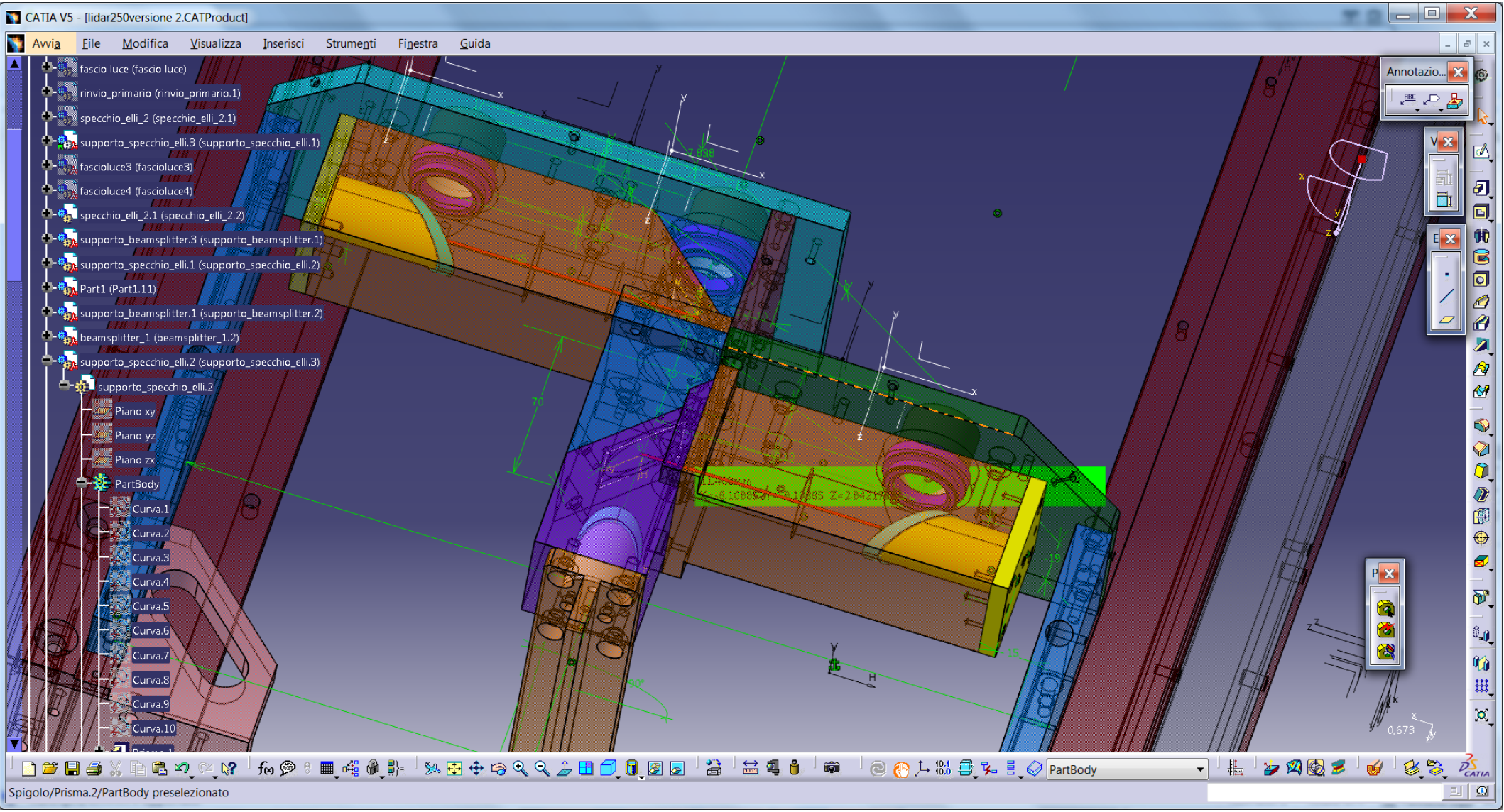
Laser probe RjP-445

The final design of the new receiver



Technical design of the new receiver

M. Marengo – INFN Torino



DOMANDA DI UTILIZZO DEI SERVIZI DI BASE

Data della richiesta: 17/06/2016

Lab. Tecnologico	Lab. Elettronica	Centro di Calcolo
✔		

nuova richiesta	
richiesta di continuazione	✔

Esperimento: CTA-RD

Responsabile locale: Piero Vallania

Responsabile dell'attivita': Carlo Vigorito

Descrizione dettagliata dell'attivita' richiesta

1) Installazione del Raman Lidar ARCADE presso il sito Nord di CTA a La Palma.

PLANNING													MILESTONES	
Subattivita'	G	F	M	A	M	G	L	A	S	O	N	D	Data-mese	Descrizione
Missione			✓										Mar-2017	Conclusione dell'attività 1)

Tecnici e tecnologi attualmente assegnati all'attivita'					Richieste di supporto tecnico per		
INFN		ALTRI ENTI				l'anno:	
Nome	mesi/U	Ente	Nome	mesi/U	Tipologia	N.	mesi/U
Marengo	1				Tecnici mecc. /elettr/CdC	1	1
Dughera	1				Disegnatori meccanici	1	1
					Microsaldatori		
					Tecnologi progett. mecc.		
					Tecnologi elettronici/CdC		
					Tecnologi microelettronica		

Note: