



Telescopio Nazionale Galileo

Batman: CCD mounting procedures

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1 Introduction

1.1 Scope

This document is intended to give some information about the mounting procedure and the connections of the two cryostats that host the Imager and Spectra detectors.

1.2 Additional information

No additional information, at the moment.

1.3 Contact information

Feedback on this document is encouraged. Please email to cosentino@tng.iac.es

1.4 Reference documents

[RD01] E2V datasheet: CCD42-80 Back Illuminated Hight Performance CCD sensor

[RD02] TN 906/419 - The e2v Buttable CCD Package: Design & Mounting Philosophy

[RD03] Reference Data MIL-STD-681 Wire Color Code

[RD04] Datasheet: Straight Micro-D Solder Connector

1.5 Applicable documents

2 The CCD mounting

2.1 The CCD detectors

The batman instrument use two cryostats, each Dewar hosts one E2V 4280 scientific grade CCDs (Figure 1) mounted in an inclined cold finger as shown in Figure 2.

FEATURES

- 2048 by 4096 Pixel Format
- 13.5 μm Square Pixels
- Image Area 27.6 x 55.3 mm
- Wide Dynamic Range
- Symmetrical Anti-static Gate Protection
- Back Illuminated Format for Enhanced Quantum Efficiency
- 3-side Buttable Close Butting Package
- Gated Anti-blooming Readout Register (Dump Gate and Drain)
- Low Noise Variable Gain Output Amplifier
- Flatness better than 15 μm peak to valley



Figure 1 - E2V 4280 CCD

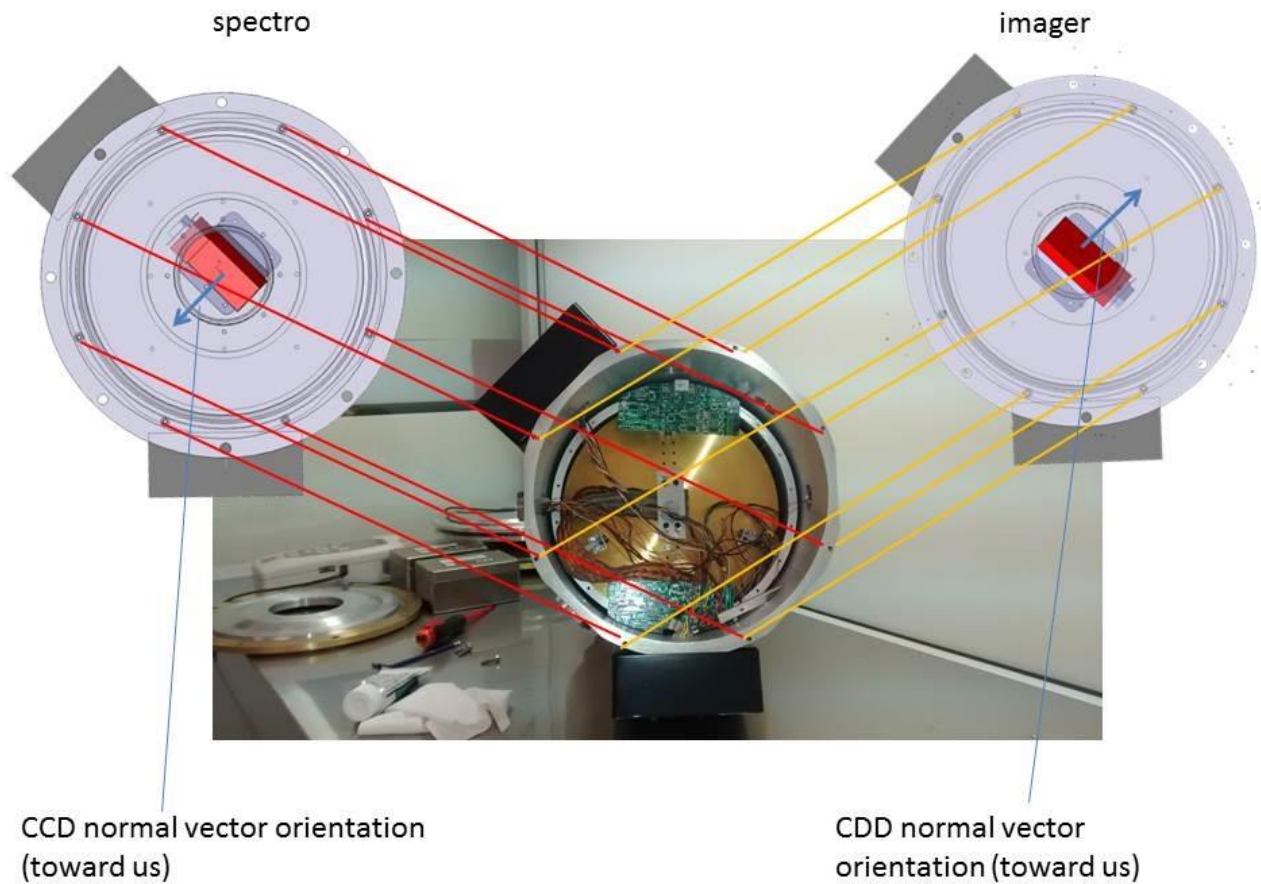


Figure 2 - detail of the CCD orientation in the image and spectra cryostat

2.2 Mounting procedure

All the operations, especially the actions that involve the detector, have to be done in a clean-room, considering all the precautions against the electrostatic hazard.

In Figure 3 and Figure 4 are shown the breakdown of the mechanics.

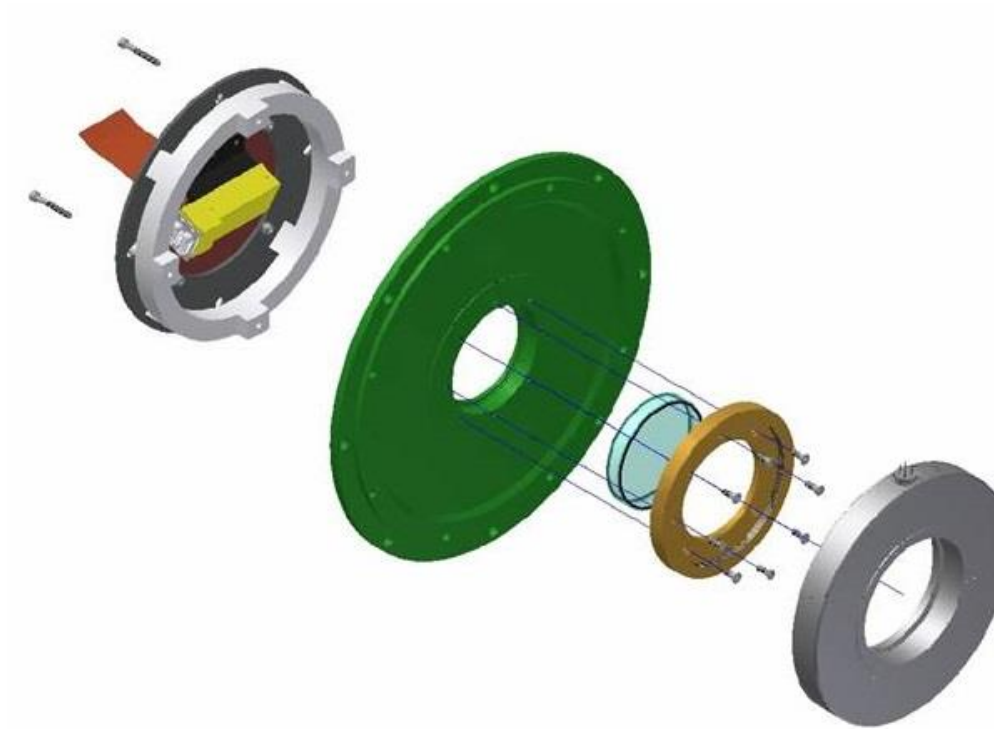


Figure 3 - parts diagram of the flange together with the glass window and the detector mounting

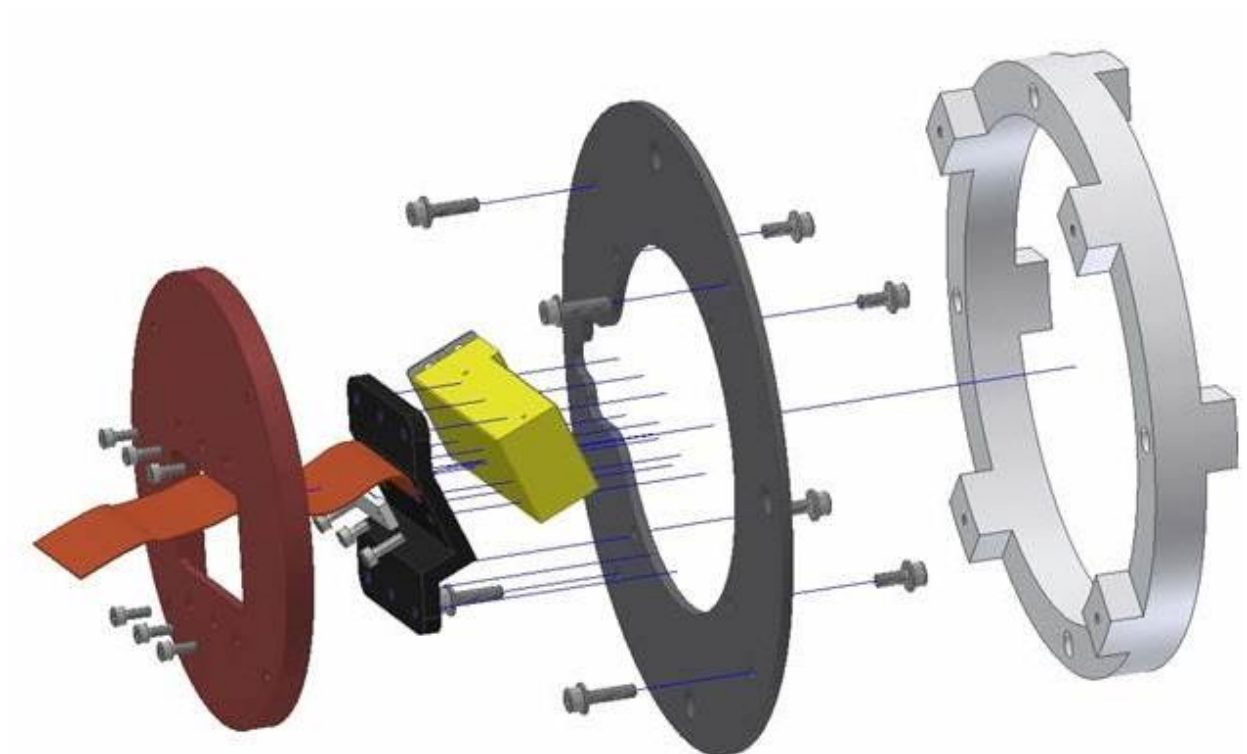


Figure 4 - parts diagram of the detector mounting

2.2.1 Mount procedure

The first operation is the assembling of the glass window in the flange; take care to put the two O-ring in contact with the window and tighten the bolts by using a dynamometer tool.

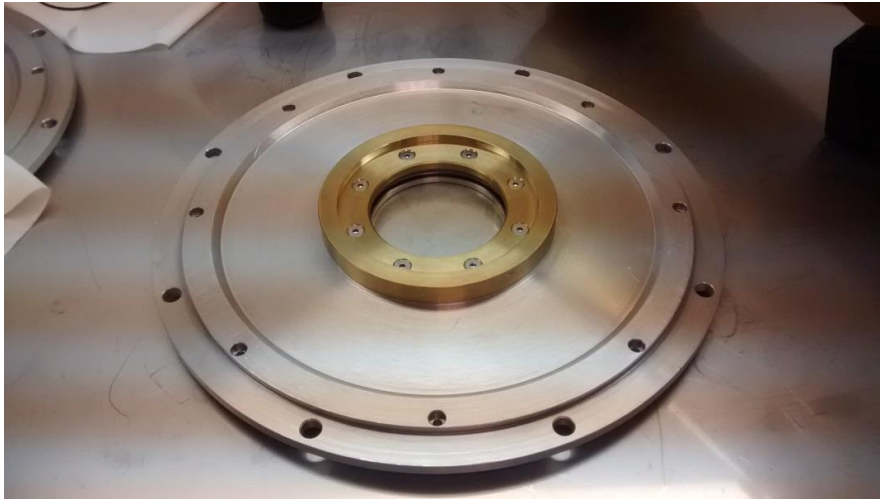


Figure 5 - cryostat flange with the glass windows and shutter support

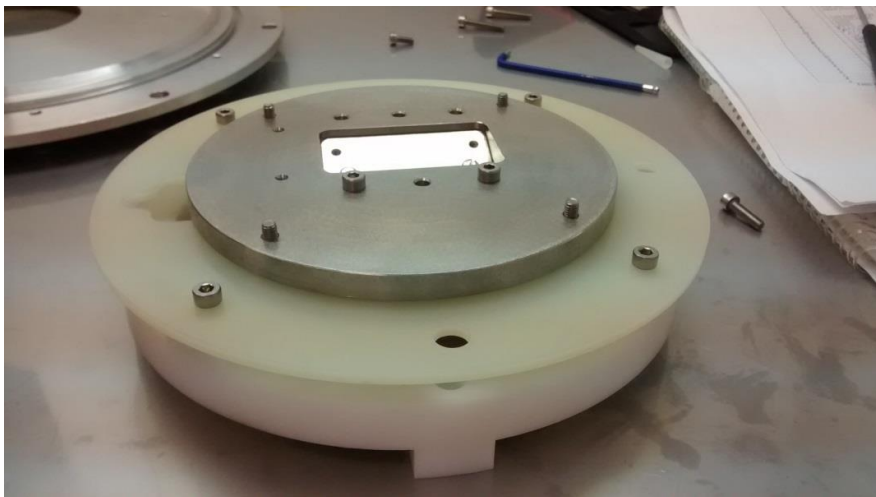


Figure 6 - mechanical mount backside

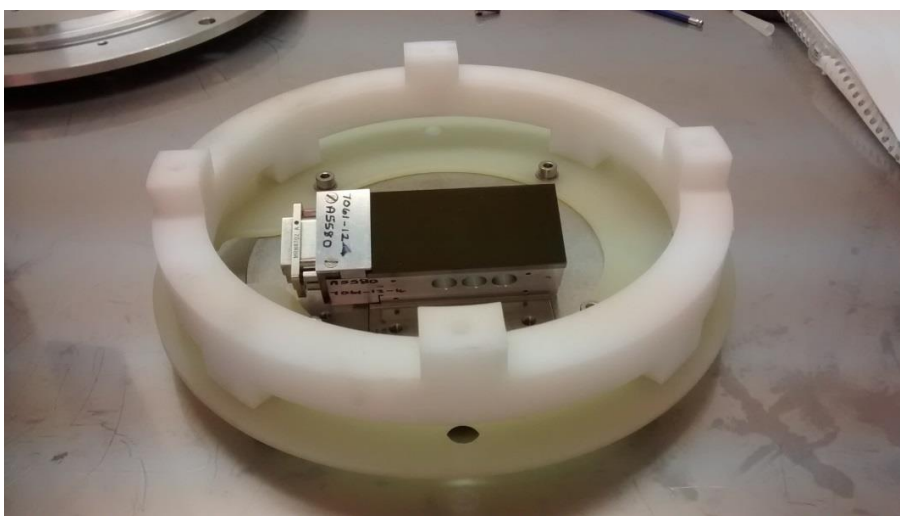


Figure 7 - mechanical mount front side

2.2.2 The Cryostats wiring

In the rear side of the cold finger are connected the braided cables, the heater and the temperature sensors

The imager detector has been mounted by using the B connector of the internal cables.



Figure 8 - Imager

Table 1 - Wiring of temperature control

Connettore Dewar	Connessioni dewar		
62GB-16F16-26SN	Signal	sensor	Color
A			
B			
C			
D			
E			
F			
G			
H	Heater	resistor	
J	Heater	resistor	
K	Cold finger	PT100	black
L	Cold finger	PT100	black
M	NL2	PT100	orange
N	NL2	PT100	black
P	NL2	PT100	orange
R	NL2	PT100	black
S			
T			
U			
V			
W			
X			
Y	Cold finger	PT100	orange
Z	Cold finger	PT100	orange
a			
b			
c			
d			
e			

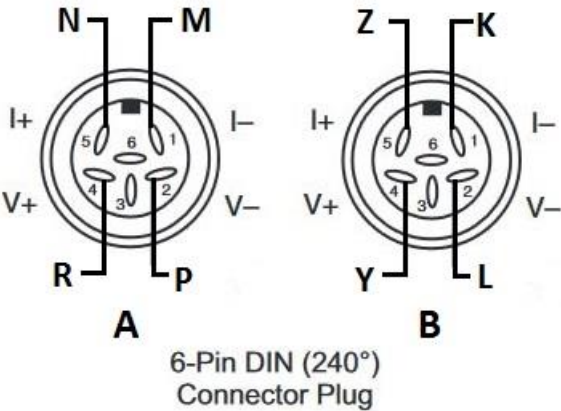


Figure 9 - Lakeshore 311 pinout

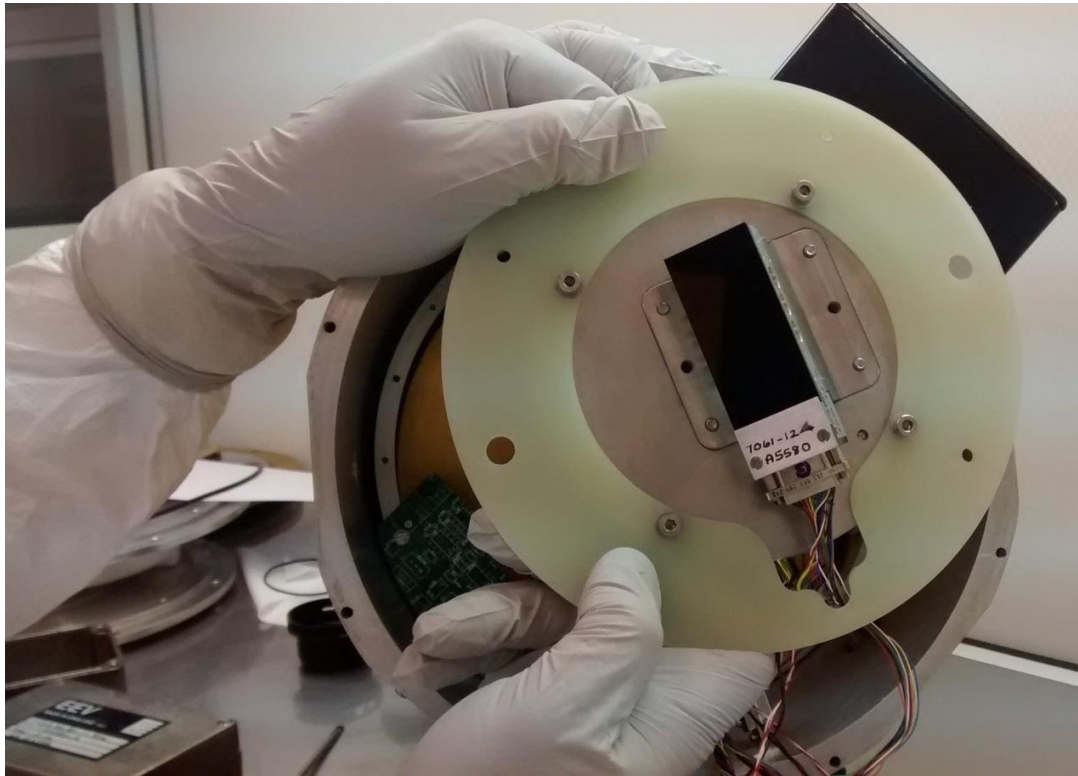


Figure 10- Detail of the detector mounting



Figure 11 - Imager (left) and Spectro (right) cryostats

Table 2 - Pinout and connections of clock

Dewar Connector	Clock filter				Nanonics connector (CCD)		Used
62GB-16F16-26SN	Clock	Segnale	C.colors	board	CCD:Pin:conn	Color	
A	H1	R01L	Green/red	J2-1	AB:5:n21	Yellow	YES
B	H2	R02L	Yellow/red	J2-2	AB:4:n21	Orange	YES
C	RET	RET	White/red	AGND			
D	H3	R03-A	Red/black	J2-3	A:6:n21	green	NO
E	H4	R01R	White	J2-4	AB:7:n21	Blue	YES
F	H5	R02R	Black	J2-5	AB:8:n21	Violet	YES
G	H6	R03-B	Red/Blue	J2-6	B:6:n21	green	YES
H							
J	H7	0R-LR	Blue	J2-7	AB:3-9:n21	Red-grey	YES
K	H8	SWRL	Turquoise	J2-8	AB:1-11:n21	Black-black	YES
L	V1	I01-A	Green	J5-9	A:15:n21	yellow	NO
M	V2	I02-A	Pink	J5-10	A:14:n21	Orange	NO
N							
P	V3	I03-A	Orange	J5-11	A:16:n21	green	NO
R	V4	I01-B	Brown	J5-12	B:15:n21	yellow	YES
S	V5	I02-B	Red	J5-13	B:14:n21	Orange	YES
T							
U							
V							
W							
X	V8	DG-B	Grey	J5-16	B:2-10:n21	Brown-white	YES
Y	V7	DG-A	Violet	J5-15	A:2-10:n21	Brown-white	NO
Z							
a	V6	I03-B	Yellow	J5-14	B:16:n21	green	YES
b-c-d-e	NOT USED						

Table 3 - Pinout and connections of bias and video

Dewar Connector	Preamplifier				Nanonics connector (CCD)		Used
62GB-16F16-26SN	Signal (value)	board	Signal	C.colors	CCD:Pin:conn	Color	
A	Bias 1 (17.8 V)	J8-1	Vrd A	Blue	A:2-7:n15	Brow-blue	NO
B	Bias 2 (17.8 V)	J8-2	Vrd B	Grey	B:2-7:n15	Brow-blue	YES
C	Bias 3 (20.78 V)	J8-3	Vdd AB	Violet	AB:1-8:n15	Black-violet	YES
D	Bias 4 (28.7 V)	J8-4	Vod AB	Orange	AB:9-15:n15	Gray-yellow	YES
E	Bias 5 (9.2 V)	J8-5	Vss	Brown	AB:11-12-13:n15 AB:13-20:n21	Red-brown-black Red-white	YES
F	Bias 9 (4.2 V)	J8-9	Vog2	Pink	AB:3-6:n15	Red-green	YES
G	Video 3 - pos	Vin1-1	ODL-A	Red-shield	A:10:n15	White	NO
H	NC	Nc					
J	Video 4 - pos.	Vin1-2	ODR-A	Red-shield	A:14:n15	Orange	NO
K	NC	Nc					
L	bias.shield						YES
M	Video 1 - pos	Vin1-3	ODL-B	Red-shield	B:10:n15	white	YES
N	NC						
P	Video 2 - pos.	Vin1-4	ODR-B	Red-shield	B:14:n15	Orange	YES
R	NC						
S		Nc					
T		Nc					
U	bias.shield	Vin1234		Black-shield			YES
V	A_Gnd						
W				Turquoise			
X	Bias 10 (3.2)	J8-10	Vog1	Yellow	AB:12-21:n21	Brown-black	YES
Y							
Z							
a							
b							
c							
d							
e							

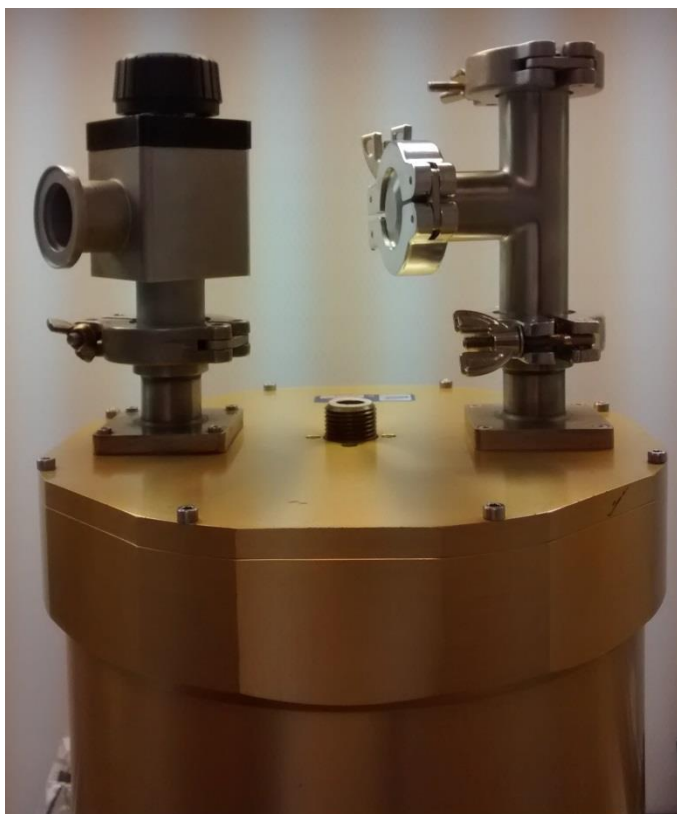


Figure 12 - encumbrance of the Dewar's taps

Appendix A

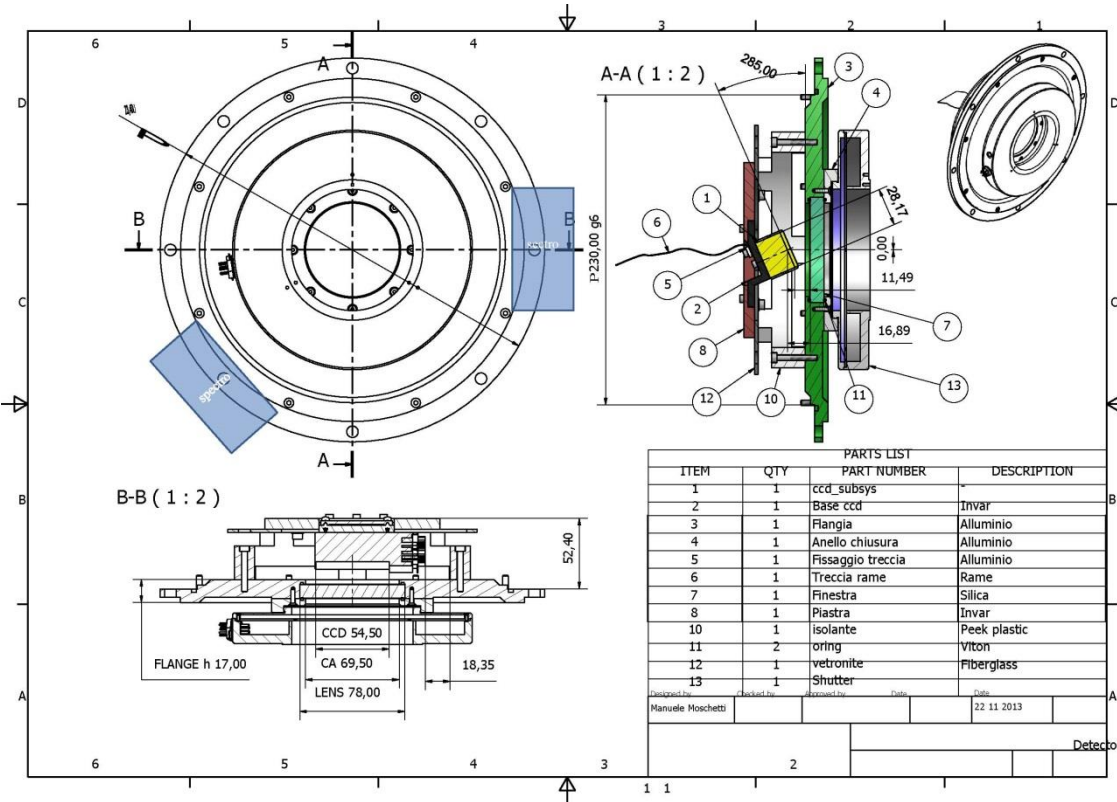
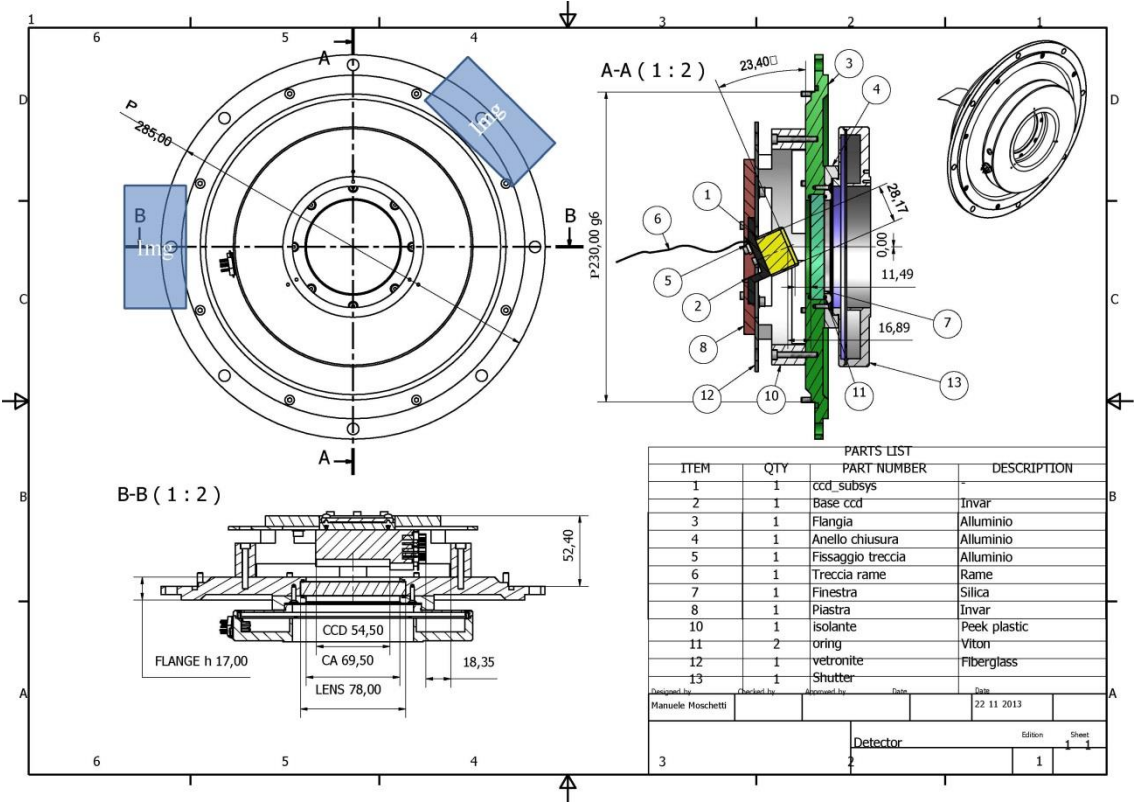


Figure 13 - Spectra CCD mounting design



Appendix A – Document identification code

ORG-TYP-INS-NCOD

ORG = Originator field (i.e. TNG)

TYP = Document Type (see Table 4)

PRJ = project element (see Table 5)

NCOD= numeric code (i.e. 0001)

Example: TNG-MAN-HAN-0001

Table 4 - Document type code

AD	Assumption Document
AN	AN Analysis
COS	Cost Documents (Estimate/CaC/CtC, etc)
DD	Design Description
DP	Data Package
DRD	Document Requirements Description/Definition
DRL	Document Requirements List
DW	Drawing/Diagram
EID	Experiment Interface Document
FI	File (Software/Configuration/Network)
ICD	Interface Control Document
IRD	Interface Requirement Document
ITT	Invitation to Tender
MAN	Manual/User Guide/Handbook
MEM	Memo
MOM	Minutes of Meeting
MOU	Agreement/Memorandum of Understanding
MX	Matrix/Compliance
NCR	Non-Conformance Report
NOT	Note
OPS	Operations Document

PLN	Plan
PO	Proposal
PRE	Progress Report/Status Report
RFQ	Request for Quotation
SOW	Statement of Work
TOR	Terms of Reference
TN	Technical Note
TP	Test Procedure/Test Plan
TR	Test Report/Test Result
TS	Test Specification
VC	Verification Control Document
WBS	Work Breakdown Structure
WP	Working Paper
WPD	Work Package Description

Appendix C – List of acronyms (Example)

CCD	Charge Coupled Device
CDS	Correlated Double Sampling
TBC	To Be Confirmed
TBD	To Be defined
TBF	To be fixed
TNG	Telescopio Nazionale Galileo