


		<p align="center">ASTRI Mini-Array Astrofisica con Specchi a Tecnologia Replicante Italiana</p>					
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Interface Control Document for M1 panels



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DOCUMENT HISTORY		
Issue/Revision	Date	Modification
1.0	05/04/2019	First release
2.0	23/10/2020	Second release

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1 Introduction

The ASTRI Mini-Array is an INAF project aimed to construct, deploy and operate a set of 9 Cherenkov telescopes of the 4 meters class at the Observatorio del Teide in Tenerife (IAC, Spain). The ASTRI Mini-Array will observe astronomical sources emitting at very high-energy in the TeV spectral band.

1.1 Purpose

This document is the Interface Control Document regulating the hardware interface between the ASTRI Mini-Array telescope and the segments of the primary mirror. The segments will be delivered to the ASTRI telescope contractor by INAF.

1.2 Scope

This document describes the mechanical interface of the M1 mirror to the ASTRI telescope.



1.3 Content

Section 3 describes the mechanical interface between the M1 mirror and the telescope.

1.4 Definitions and Conventions

1.4.1 Abbreviations and acronyms

ASTRI	Astrofisica con Specchi a Tecnologia Replicante Italiana
IAC	Instituto de Astrofisica de Canarias
INAF	Istituto Nazionale di Astrofisica
M1	ASTRI Mini-Array Telescope primary mirror

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APPLICABLE DOCUMENTS

- [AD1] ASTRI-DES-GEC-3100-027
- [AD2] 3257-0004----DWR03.stp
- [AD3] 1101-0008----ASM01.stp
- [AD4] 1101-0009----REV03.stp
- [AD5] 1101-0011----ASM01.stp

REFERENCE DOCUMENTS

- [RD1] ASTRI-DES-GEC-3100-027b – ASTRI Telescope Mechanical Design Description

2 M1 Interface

2.1 M1 mechanical interface

The mechanical interface of the M1 segments provides the connection between the mirror panel itself and the M1 segment support triangle that is part of the telescope. Each mirror panel will be manufactured by MLT already equipped with its mechanical interfaces while the M1 panel support triangle will be provided by EIE.

The mechanical interface consists of three metallic pads glued on the backside of the mirror. The pads are made in stainless steel type AISI 304. The mechanical drawing of the pad is reported in Figure 1 (see also [AD2]).

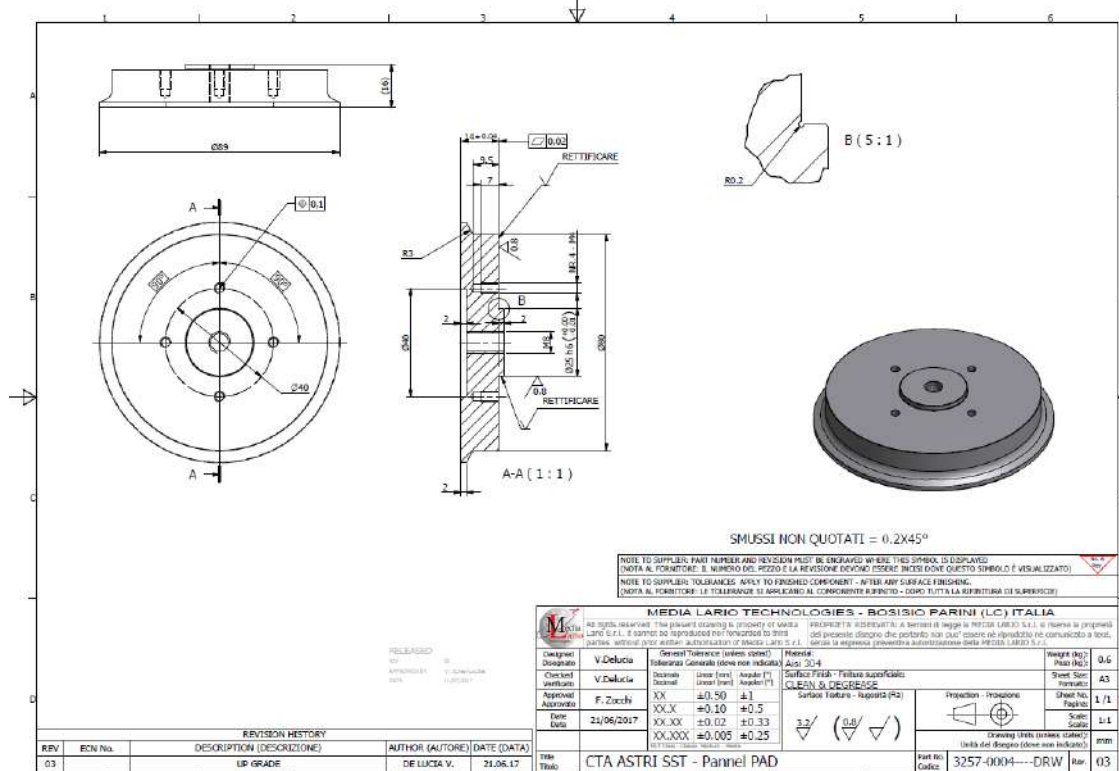


Figure 1 - Mechanical drawing of the interface pad

Each support triangle is defined as an equilateral triangle with vertices positioned at a distance of $R_p = 283 \pm 0.1$ mm. from the center of the mirror projection on the dish.

The position of the PAD on the mirrors are then obtained projecting the supports vertices at the height of the mirror segments defined by M1 optical design (as described in [AD1]). In particular for each panel the pads are rotated to have:

- one vertex positioned along the radial direction;
- the triangle base at the inner radius for corona 1;
- the triangle base at the outer radius for corona 2 and 3.

The final positions of the pads are then shown in Figures 3-5 as per drawings [AD3], [AD4], and [AD5].

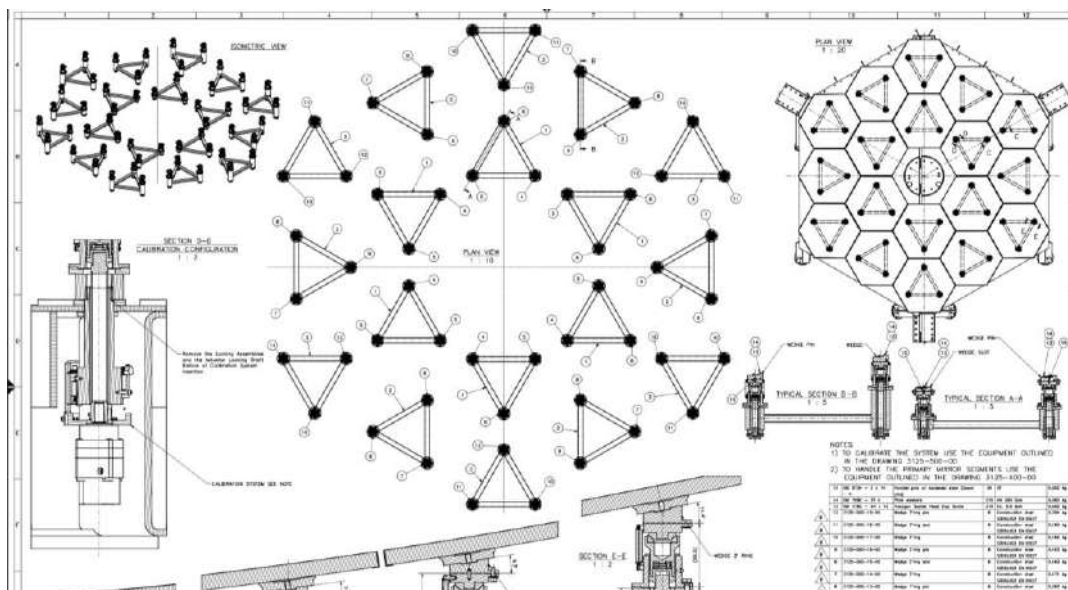


Figure 2 - Representation of the triangles rotation for each corona as defined in [AD1]

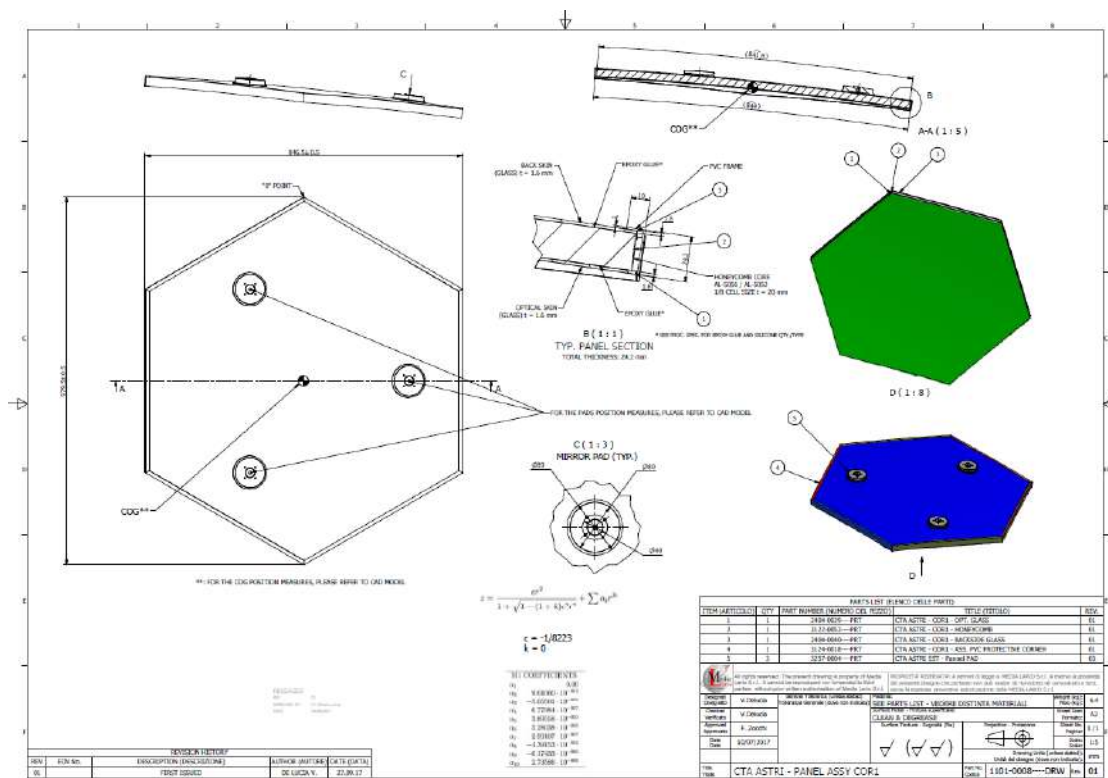


Figure 3 - Definition of the M1 COR1 segment rotation as in drawing 1101-0008---ASM01

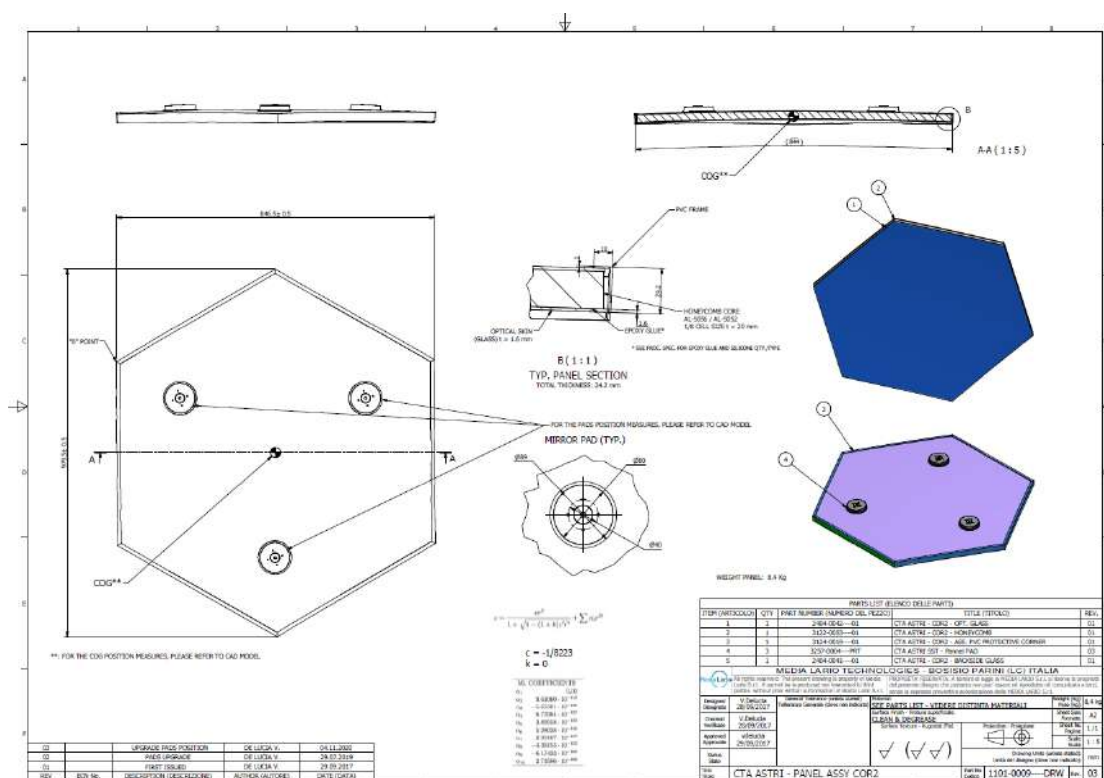


Figure 4 - Definition of the M1 COR2 segment rotation as in drawing 1101-0009----REV03

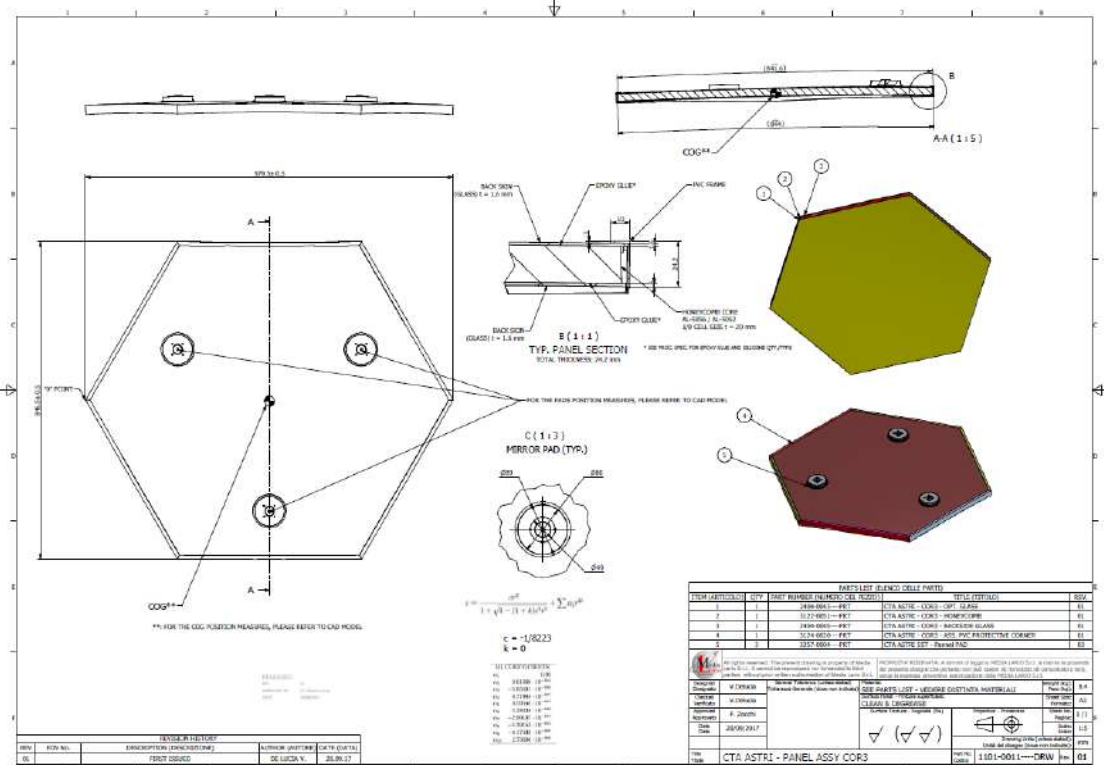


Figure 5 - Definition of the M1 COR3 segment rotation as in drawing C1101-0011----ASM01

2.2 M1 segments orientation on the telescope

The positions of the pads are defined to match the support triangle taking into consideration the asymmetric mirror curvature. This means that to mount correctly the mirror on the telescope one shall define a reference called “0” angular position.

On the finished mirror the “0” angle position is identified by an arrow on one of the pad, near the item code. An example of the “0” angle identification symbol is reported in Figure 6.



Figure 6 – Example of the “0” angle identification symbol etched on a pad.

The position of the “0” corners of the segments belonging to the three different coronae is given in figure 7.

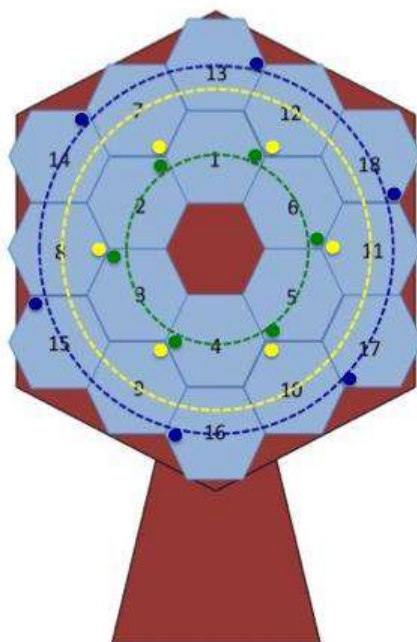


Figure 7 – Orientation of the “0” reference of the segments when mounted on the dish.