AGREEMENT

between the

Istituto Nazionale di Astrofisica

and the

Instituto de Astrofísica de Canarias

of the Kingdom of Spain

for the installation and operation of the

ASTRI telescope network

at the

Observatorio del Teide

AGREEMENT

Professor Valentín Martínez Pillet, in his capacity as Director of the Instituto de Astrofísica de Canarias, ,(hereafter, "the IAC"), an organisation with address at Calle Vía Láctea, s/n, 38205 San Cristóbal de La Laguna, Santa Cruz de Tenerife, Spain and holding Fiscal number Q3811001A, acting on its behalf by virtue of the appointment made by the Governing Board of the IAC on July 1st 2024, and with the powers conferred on him in accordance with Law 14/2011 of June 1st on Science, Technology and Innovation and in the Statutes of the IAC (Official State Gazette, hereafter referred to by its Spanish acronym as "BOE", of December 21st 2018),

and

Roberto Ragazzoni, in his capacity as President of the Istituto Nazionale di Astrofisica (hereinafter, "INAF"), headquartered in Rome, viale del Parco Mellini, 84, 00136 Rome, Italy, acting on its behalf by virtue of the appointment made by the Ministero dell'Università e della Ricerca (MUR) on April 4th, 2024, and with the powers conferred in accordance with the current INAF Statutes and Italian Law Nos. 213 of December 31st, 2009, and 218 of November 25th, 2016, relating to Public Research Institutes.

The IAC and INAF shall hereafter be referred to jointly as the "Parties" and individually as a "Party". The Parties recognise their legal capacity to enter into this agreement on behalf of their institutions, and

DECLARE

I. That the Spanish General State Administration has exclusive competence for the promotion and general coordination of scientific and technical research, in accordance with the Spanish Constitution of December 29th 1978, section 149.1.15.

II. That the IAC is a Spanish Public Research Organization, legally constituted as a Public Consortium and formed by the Spanish General State Administration, the Public Administration of the Autonomous Community of the Canary Islands, the University of La Laguna and the Spanish National Research Council (Spanish acronym CSIC), in accordance with Law 14/2011.

III. That the purposes of the IAC, in accordance with its Statutes, are astrophysical research, development of scientific instrumentation, training of research personnel, administration of the IAC's observatories (hereafter, "the Observatorios de Canarias") and scientific outreach.

IV. That INAF is an Italian research organisation, legally established under Italian Law 488 of 23 December 1999 and subsequent amendments and reforms:

i. Italian Law 138 of 4 June 2003, "Reorganisation of the Istituto Nazionale di Astrofisica";

ii. Legislative Decree 213 of 31 December 2009, "Reorganisation of Public Research Institutions pursuant to Article 1 of Law 165 of 27 September 2007".

V. That INAF also operates the "Fundación Galileo Galilei, Fundación Canaria" (FGG), a Spanish non-profit foundation, with the purpose of supporting:

i. Astrophysical research through the management of the Telescopio Nazionale Galileo (TNG), located on the island of La Palma, and its associated scientific, technical, and administrative infrastructure; and

ii. Any other astrophysical activity that INAF may wish to pursue.

VI. That the Kingdom of Spain opened the Canary Islands Observatories to the international scientific community through the Agreement on Cooperation in Astrophysics and its Protocol (hereinafter, the "Intergovernmental Agreement"), signed on 26 May 1979. Based on the terms and conditions set forth in that Agreement and its Protocol, the IAC authorises the continued scientific operation of the ASTRI telescope network (hereinafter, "the ASTRI array") described in Appendix A, located at the Teide Observatory (hereinafter, "OT").

VII. That Italy signed the Protocol for Cooperation in Astrophysical Research in Spain on 2 July 1992.

VIII. That INAF, acting as the coordinating institution within the framework of the ASTRI Collaboration, whose minor project partners are listed in Appendix A, and the IAC share a common interest in the installation and operation of ASTRI at the OT, in accordance with the Memorandum of Understanding signed by Professor Rafael Rebolo and Professor Nichi D'Amico on 12 June 2019.

IX. That in the abovementioned Memorandum of Understanding at the clause 2.2 the ASTRI array will host from a minimum of nine (9) up to twelve (12) telescopes.

X. That ASTRI Array has been operating at the OT under the agreement signed by the IAC and INAF on 22 December 2020 and 7 January 2021, respectively and its subsequent renewals.

XI. That the OT is an ideal site for the ASTRI array due to its internationally recognised observational quality, low levels of precipitable water vapour (PWV), a high number of clear nights, and its favourable geographic location for accessing the northern sky. Its top-tier infrastructure and strong scientific collaboration potential make the IAC and the OT ideal hosts for the ASTRI array.

XII. The INAF, in its capacity as the coordinating institution, shall represent the ASTRI Collaboration before third parties related to the Observatorios de Canarias, such as the CCI, and shall have the right to appoint a representative on the corresponding Subcommittees and Working Groups established by the CCI.

XIII. That the Parties formalise this Agreement in accordance with the terms set forth herein and in Appendices A, B, and C, which form an integral part of this document, and hereby agree to the following:

CLAUSES

Clause 1 – Purpose of the agreement

In accordance with Article 3 of the Protocol, INAF is authorised to install and operate ASTRI at the OT, and persons authorised by INAF shall have free access to use the ASTRI Array described in Appendix A.

INAF has already implemented the infrastructure for operating nine (9) telescopes and the related auxiliaries (all sky camera, two meteo stations, ICT and data centre, transformation centre). Seven (7) telescopes have already been installed, while the other two (2) will follow in spring 2026. The infrastructure for the Lidar and the instrument itself will be installed during the period of validity of this agreement, based on a pre-approved technical design. A tenth telescope (ASTRI 10) is under construction and will be installed in the ASTRI ARRAY as an additional telescope not included

in the previous infrastructure, provided the approval of CCI, IAC and local authorities.

INAF shall use its best efforts to install and bring the ASTRI array facility into full operational status. INAF shall adopt, at its own expense, all necessary measures to protect the local environment, in accordance with the applicable legislation. Specifically, INAF shall avoid any kind of pollution, whether on the surface or underground, during the period in which the ASTRI Array is installed at the OT, and shall maintain its site and its surroundings in a clean and suitable condition after completion of construction works and throughout the operational period.

1.2 The IAC shall ensure that INAF is granted the right to use the site and the ARRAY located there, as detailed in Appendix A, and shall also ensure that INAF and the persons authorised by it have the right to operate the ASTRI Array facility. All persons must comply with the applicable Spanish health and safety regulations and observe the specific rules of the OT established by the Director of the IAC or his delegates.

1.3 For the installation and operation of the ASTRI ARRAY, INAF will be directly supported by FGG, with technical and administrative personnel at the ASTRI Array premises in Tenerife (for example, for the management and maintanece of the telescopes)

Clause 2 - Services at the Observatory

The IAC shall provide the site and the common services described in Appendix B for the correct operation of the ASTRI Array as defined in Appendix A. The existing facilities at the OT at the time of signature of this Agreement comply with Article 9(1) of the Intergovernmental Agreement. Therefore, any additional cost for common services required by INAF beyond those currently existing at the OT shall be borne by INAF, unless otherwise agreed in writing following negotiations in accordance with Article 9(2) of the Intergovernmental Agreement.

Clause 3 – Observation time arrangements

3.1 In accordance with Article 5 of the International Treaty and 4 of the Protocol:

The IAC to have at its disposal 20% of the observing time of all the telescopes and instruments installed at the Observatorios de Canarias free of charge and an additional 5% of the observing time to be dedicated to collaborative programmes between all of the User Institutions, as defined in the Protocol, including the IAC.

Given that the ASTRI array will not be operated as an entirely conventional telescopic installation, and hence the time allocation referred to in the aforementioned Articles of the International Treaty cannot be distributed in the standard way, under the provisions of this Agreement the IAC can have a research group which will participate as a full Partner in the scientific exploitation of the data of the ASTRI array.

The IAC will appoint at least one Representative on the highest decision making body of the ASTRI Collaboration carrying the weight equivalent to a third of voting rights.

In the event of one or more additional full partners joining this collaboration the weight of the IAC's voting rights shall not fall below the level of 25%, thereby respecting the basic provisions of the International Treaty in regard to the distribution of observing time on telescopes and instruments installed at the Observatorios de Canarias.

As with the Responsible Scientists, the parties may appoint other persons in the future by giving written notice.

3.2 All persons using any telescope or auxiliary instrument shall observe the rules of operation established by ASTRI Collaboration, under the supervision of a person in charge of the telescopes and their instruments, appointed for this purpose by INAF.

3.3 All persons using the common services shall observe the rules established by the IAC and approved by the CCI for use of the common services, under the supervision of the Director of the IAC or their delegates.

Clause 4 – Means of collaboration

4.1 The Parties shall strive to ensure that the implementation of this Agreement yields mutual benefits in terms of science, advanced training, and technological collaboration. To this end, both Parties shall appoint a Scientific Representative from among their permanent staff. The names of

these representatives will be identified by the Parties and their responsibilities are set out in Clause 4.2.

4.2 The duties of these Scientific Representatives shall include supervising the operation of the facilities to ensure that they produce the best possible quality and quantity of data, and that such data are used for research in accordance with the objectives of the research programmes of INAF and the IAC. These Scientific Representatives shall submit an annual report to the ASTRI Collaboration and to the Director of the IAC on the operations and achievements of the facilities and on the benefits received by each organisation as a result of the collaboration established in this Agreement. Any significant scientific achievement or major technological innovation resulting from the Facilities may be included in the Annual Report of the CCI.

4.3 INAF, through of the ASTRI Collaboration shall also act through it as a Publications Board, in charge of designating the scientific team responsible for each scientific project, defining the authorship (and author order) of each scientific publication and conference presentation, and handling invitations to present scientific results from ASTRI at conferences.

4.4 INAF, through of the ASTRI Collaboration , shall use its best efforts to ensure that any reference to data obtained includes appropriate acknowledgement of the IAC and the ASTRI collaboration in publications and press releases, indicating that the data were obtained at the Observatorio del Teide, Tenerife, operated by the Instituto de Astrofísica de Canarias. The CCI has agreed to the following wording:

"This article is based on observations carried out at the Observatorios de Canarias of the IAC with the ASTRI Array, operated by INAF, through of the ASTRI Collaboration at the Observatorio del Teide on the island of Tenerife."

4.5 Any exploitation of data and software outside the objective of this agreement must be agreed in writing between INAF and the IAC.

4.6 INAF, through of the ASTRI Collaboration has deployed additional infrastructure such as fiber ducts and electricity grid that has improved OT infrastructure. INAF should be informed duly of any request for its usage received by OT Site Manager.

Clause 5 – Financial arrangements

5.1 INAF shall bear its share of the cost of all recurrent expenditure of the common services, in accordance with Article 5, paragraphs 2 and 3 of the Protocol. This includes the observing time corresponding to the Spanish side, which is granted free of charge under Clause 4 of this Agreement and the corresponding provisions of the Intergovernmental Agreement and its Protocol. INAF shall pay the IAC its share of this expenditure as agreed each year.

5.2 While this Agreement is in force, and in exchange for hosting the ASTRI Array at the OT, INAF through of the ASTRI Collaboration, shall make a financial contribution to the IAC of €60,000 (sixty thousand euros) annually, equivalent to the salary cost of a postdoctoral researcher, plus €35,000 (thirty-five thousand euros) annually, equivalent to the salary cost of a PhD student. This amount shall be adjusted annually in accordance with the official Consumer Price Index of the Canary Islands. This contribution fulfils the provisions set out in Article 5.c of the Intergovernmental Agreement and Clause 4.1.c of its Protocol. These funds shall be used primarily to support the IAC's graduate and postdoctoral programme, and also to help cover the costs of management and monitoring activities related to this Agreement. To this regard IAC will appoint a Senior Reseacher for overseeing the activities of the 2 young researchers.

5.3 The IAC shall allocate the equivalent of one postdoctoral researcher and one predoctoral student annually to participate in the research group established under Clause 3.6. The research group will be involved in the campaign of observations made by ASTRI array.

5.4 The IAC shall provide INAF with access to and use of office space and vehicle parking spaces as described in Appendix B, under the conditions and financial terms stated therein.

5.5 The IAC shall also provide INAF with the space required to deploy ICT systems as described in Appendix B, under the financial terms indicated in that appendix.

5.6 The IAC shall also provide INAF with the space to deploy a container structure for warehouse of spare parts and other items at OT as described in Appendix B, under the financial terms indicated in that appendix.

5.7 Both parts shall ensure that the other part shall not be required to cover with its own funds any expenditure that descend from their responsibility.

5.8 No Party shall be liable to the other for any indirect loss or damage, understood as those not directly resulting from the breach of the obligations set forth in this Agreement. This limitation of liability shall not apply where such loss or damage has been caused intentionally or by gross negligence, where required by applicable law, or where it concerns the fulfilment of the financial obligations expressly set out in Clauses 5.1, 5.2 and Appendix B of this Agreement.

Clause 6 – Maintenance staff at the ASTRI Array

6.1 The maintenance staff for the ASTRI Array shall be employed by INAF, which shall seek, where possible, to hire local personnel.

6.2 Any local staff hired by INAF, whether directly or indirectly, shall be subject to the applicable Spanish labour and social security legislation.

6.3 If required, IAC may provide local assistance to INAF in the operation and maintenance of the ASTRI ARRAY, in accordance with the general work priorities of the OT. The cost of such assistance shall be invoiced in accordance with the Teide Observatory rates listed in Appendix C, which shall be adjusted annually in line with the official Consumer Price Index of the Canary Islands. Local assistance by the IAC shall include responding to alerts and potentially collaborating with INAF in periodic maintenance tasks (e.g., mirror cleaning) or emergency interventions during operations (e.g., on-site actions not possible remotely, such as parking the telescope or opening/closing cameras).

Clause 7 - Duration of the agreement

7.1 This Agreement shall enter into force upon signature by the representatives of both Parties.

7.2 This Agreement shall have the same duration as the Intergovernmental Agreement, that is, until May 16th, 2032. In the event that Spain or Italy withdraws from the Intergovernmental Agreement, this Agreement shall expire.

7.3 Upon completion of this initial period, the Agreement may be renewed for a period of up to five (5) years by written agreement between the authorised representatives of the Parties.

Clause 8 - Causes for termination of the agreement

This Agreement shall be deemed terminated when the objectives have been fulfilled or a cause for termination has occurred.

The following shall constitute grounds for termination:

a) The expiration of the validity period of the Agreement without prior written agreement to extend it.

b) Withdrawal of either Spain or Italy from the Intergovernmental Agreement, or expiration of that Agreement.

c) Mutual agreement of the Parties, in which case this Agreement shall be terminated by means of a written agreement signed at least six months before the intended date of termination.

d) Failure by either Party to comply with the obligations or commitments set out in this Agreement. In such case, the other Party may issue a written request for compliance within a period of ninety (90) days, unless otherwise agreed, and in no case less than one (1) month. The request shall specify the obligations considered unfulfilled. If the breach is rectified within the notice period, the termination shall not take effect. If the breach is not remedied, the Agreement shall be deemed terminated at the end of the notice period. Termination for this reason may include a claim for damages, if so provided.

e) Force majeure or other unforeseen circumstances that make it impossible to fulfil the objectives of this Agreement, including a failure of the ASTRI ARRAY to maintain the expected level of service following formal notification and a reasonable grace period to remedy the situation. Except for the payment of amounts due, neither Party shall be liable for failure to perform its obligations under this Agreement if such failure results from circumstances beyond its reasonable control. Should such delay continue for six (6) months or more, and it is reasonably foreseeable that the situation will persist, the Parties shall discuss whether to continue or terminate the Agreement.

f) Should INAF decide to terminate this Agreement, for example due to insufficient funding to continue the project, it shall provide formal written notice at least one (1) year in advance. Except for the PhD student contract, which funding must be granted for 4 years after its start independently of the termination notice. Likewise, should the Spanish authorities decide to terminate the Agreement before the end of any of its terms, they shall notify INAF and its collaborators at least one year in advance.

g) Any other cause as may be established by the applicable legislation.

Clause 9 - Modification the agreement

9.1 This Agreement may be amended in writing and by mutual agreement between the Parties prior to the expiration of its term or any applicable extension, following the legally established procedure.

9.2 Amendments may include changes in the scientific and technical scope of the ASTRI ARRAY, as detailed in Appendix A, or substantial changes to observation protocols.

9.3 In the event that the ASTRI ARRAY ceases operations, INAF and the IAC shall jointly explore possible future uses of the buildings and/or facilities, whether by INAF, by the IAC, or by third parties, in accordance with Article 10 of the Protocol.

9.4 If no future use or transfer of ownership is agreed upon, INAF shall be responsible for the dismantling and removal of the ASTRI ARRAY and its facilities. The site must be left free of waste or debris and must be restored to a condition similar to that of the surrounding environment. Access roads to the facilities shall be considered part of the observatory infrastructure and shall only be removed upon request by the IAC.

9.5 In the event that INAF fails to dismantle and remove the ASTRI ARRAY and its facilities within two years following the termination of the Agreement, the IAC reserves the right to carry out such tasks at its own cost and to seek full reimbursement of all expenses incurred from INAF. In addition, the IAC shall be entitled to claim compensation for any damages resulting from such non-compliance.

9.6 Any additional telescopes or facilities installed by mutual agreement of the Parties shall be governed by this Agreement. No such additional unit shall be recognised unless agreed upon in writing by the authorised representatives of both Parties, with the consent of the respective Scientific Representatives, and in accordance with the legally established procedure.

Clause 10 – Classification of the agreement

This Agreement is an International Administrative Agreement subject to International Law, in accordance with the provisions of Article 2.b of Spanish Law 25/2014 on Treaties and other International Agreements. Legal matters shall be resolved in accordance with customary international legal practice.

Clause 11 – Monitoring, surveillance and control committee

11.1 The Parties agree to establish a Monitoring, Surveillance and Control Committee to ensure the proper implementation, compliance, and oversight of the provisions of this Agreement. Each Party shall appoint a scientific representative from among its permanent staff as its principal representative in the collaborative project governed by this Agreement. The name and status of these representatives shall be specified in Appendix D.

11.2 This Committee shall resolve any issues related to the interpretation or fulfilment of this Agreement. In order to carry out its functions, the Committee shall meet at least once per year in an ordinary session, and in extraordinary session as often as requested by either Party. It shall be considered duly constituted when all Parties are represented. Any agreements shall be adopted unanimously.

11.3 Meetings of this Committee, whether ordinary or extraordinary, may be held in person or by electronic means.

11.4 The Parties agree to refer any unresolved matters to their respective legal representatives, who shall seek to reach a mutually acceptable decision.

11.5 In the event that a solution cannot be reached, the Parties may invite the CCI to appoint an independent arbitrator. If the matter still remains unresolved to the satisfaction of the Parties, it shall be settled in accordance with the procedure set forth in Clause 12.2 of this Agreement.

Clause 12 - Resolution of disputes

12.1 Any dispute regarding the interpretation or application of this Agreement shall first be submitted to the Monitoring, Surveillance and Control Committee and may be resolved by the legal representative of INAF and the Director of the IAC, or through arbitration by the CCI.

12.2 If the dispute cannot be resolved in accordance with Clause 12.1, the matter shall be settled by the usual means of resolution under International Law.

The following appendices are attached:

Appendix A: Description of the ASTRI ARRAY.
Appendix B: Description of the common services provided by the IAC.
Appendix C: Support and maintenance services provided by the IAC.

This Agreement is executed in Spanish and English, both versions having the same meaning and legal validity. In evidence of the parties' agreement and for due record purposes, the parties execute this Agreement by electronic signature, in a single electronic original, it being understood that the date of execution shall be the date of the last signature.

For the Instituto de Astrofísica de Canarias, of the Kingdom of Spain.

Firmado por MARTINEZ PILLET VALENTIN JUAN - ***6147** el día 18/12/2025 con un certificado emitido por AC FNMT Usuarios

Prof. Valentín Martínez Pillet
DIRECTOR

For INAF

Prof. Roberto Ragazzoni
PRESIDENT

INAF
ISTITUTO NAZIONALE DI ASTROFISICA
NATIONAL INSTITUTE FOR ASTROPHYSICS

ROBERTO
RAGAZZONI
17.12.2025 11:10:09
GMT+01:00

Appendix A – Description of the ASTRI ARRAY

A.1 Description of the status of the ASTRI ARRAY implementation

A.1.1 Introduction

The full ASTRI Array will be formed by 9 to 12 telescopes that will work in a stereoscopic way.

Providing a detailed description of the ASTRI ARRAY goes beyond the scope of this document. In this Appendix, we give a brief summary of the current status of the construction and integration activities of the ARRAY at the Teide Observatory.

Figure A.1 shows a Product Breakdown Structure (PBS) of the ARRAY up to the second level while figure A.2 shows the current layout at the Teide Observatory.

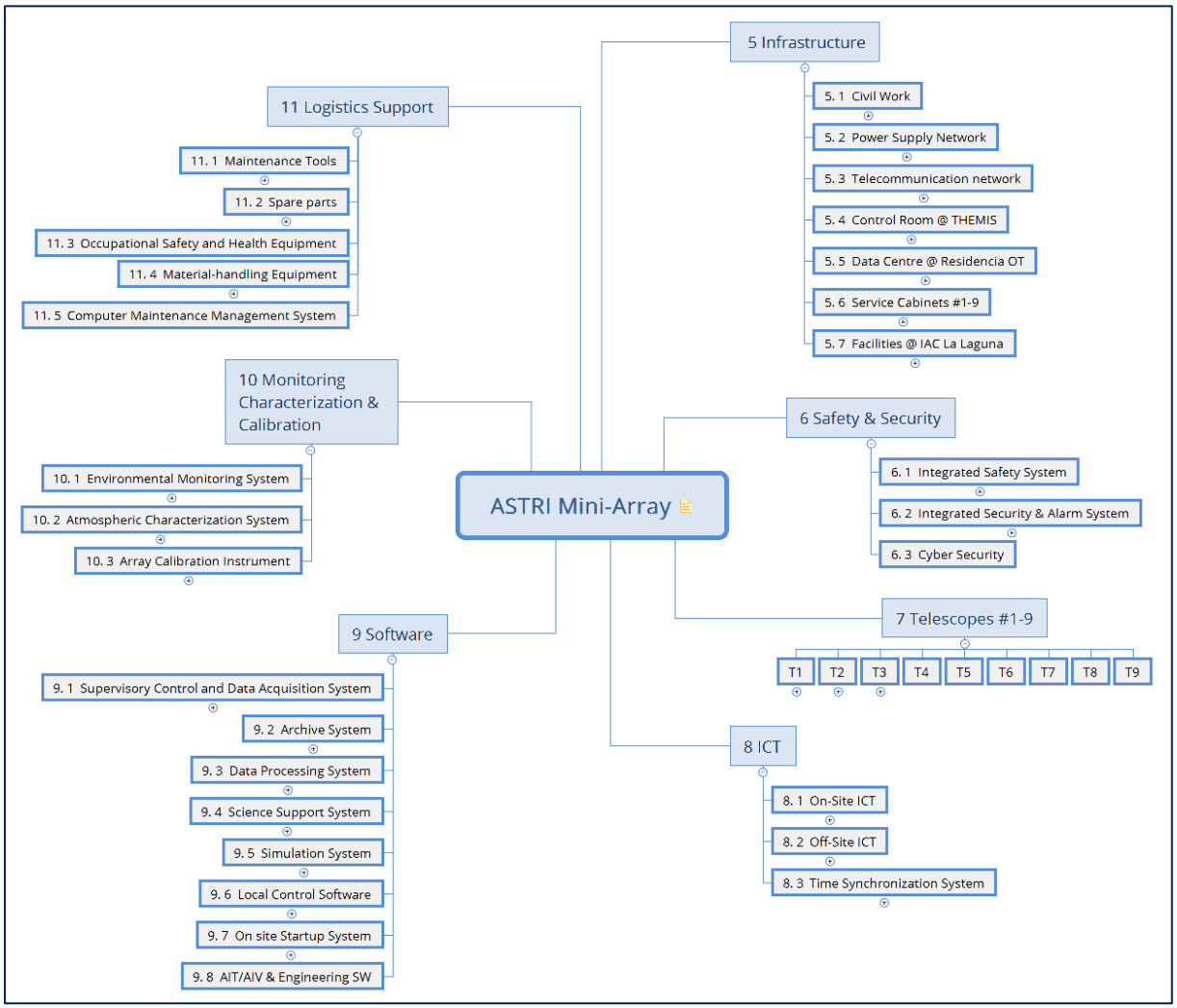

Figure A.1. PBS of the ASTRI Array

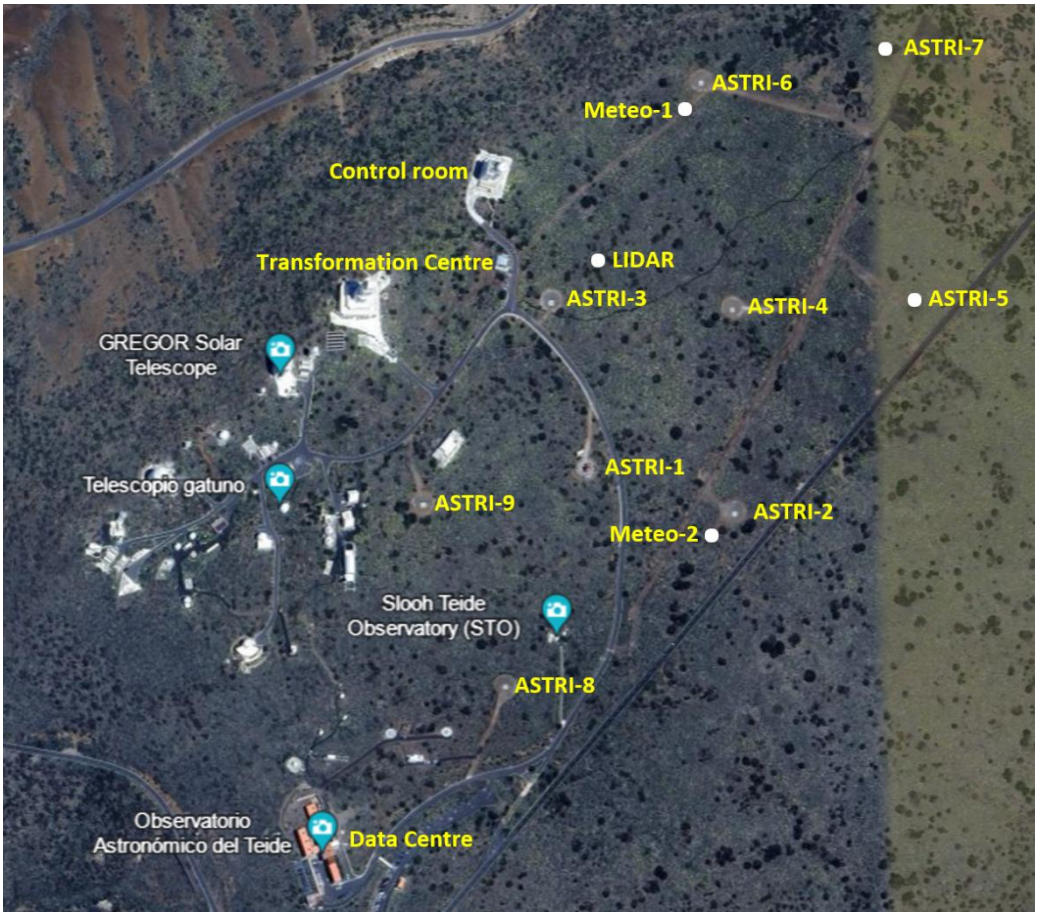

Figure A.2. The layout of the ASTRI Array at the Teide Observatory.

A.1.2 Infrastructure

The infrastructure of the ASTRI Array consists of all those subsystems which are necessary to ensure that the observation site is suitable for hosting the telescopes of the Array as, for example, the telescope foundations, the power and data network or the room devoted to the data center.

Figure A.3. The transformation center of the ASTRI Array.

The work to realize the infrastructure was entrusted to a Tenerife based company, started in October 2021 and was completed one year after. Figure A.3 shows the transformation center which is part of the power network and includes the ASTRI Array main switchboard, the dedicated UPS and back-up power generator. A new transformer with better performance was installed by the ASTRI Collaboration in the IAC transformation station.

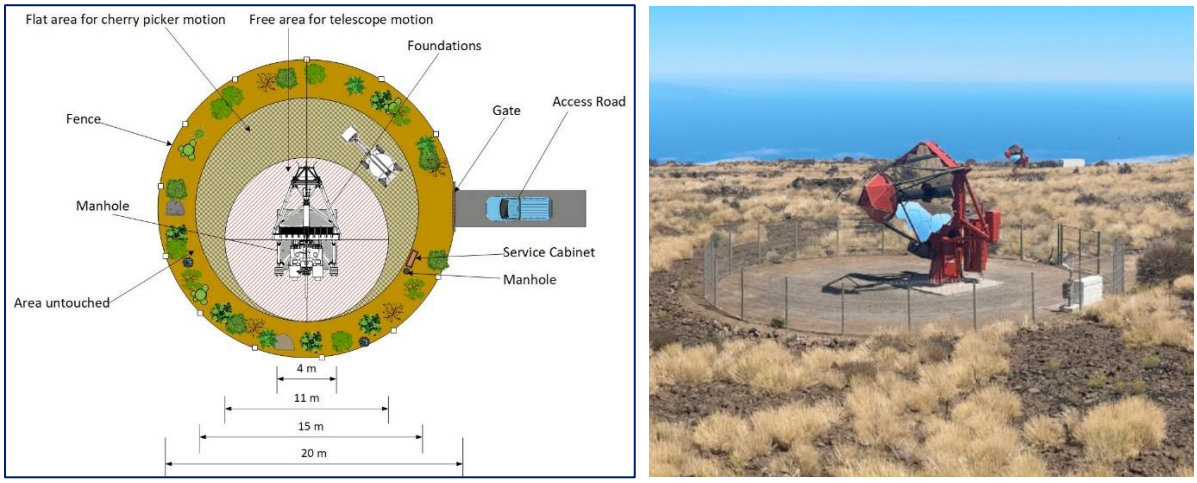

Figure A.4. Left panel: the design of the layout of the area surrounding each telescope and (right panel) the implementation of it in the case of ASTRI-3.

Another example of the implementation of the ARRAY infrastructure is shown in Figure A.4. A cleared and leveled area around the telescope is required to enable maintenance operations. A service cabinet makes the interface between the telescope and the external world. Finally, the area is enclosed by a fence and accessible only through a gate for security reasons.

Finally figure A.5 shows the control room of the ARRAY installed at the Themis observatory, mainly used during the installation and commissioning phases and during maintenance activities.

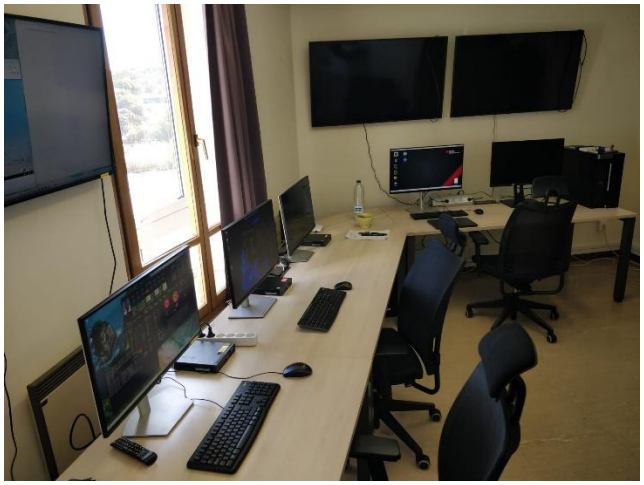

Figure A.5. The ASTRI ARRAY control room at the THEMIS observatory.

A.1.3 Security and Protection System

The Security and Protection System is an independent system designed to protect the facilities at the Observatory. The SPS will integrate all real-time information available from any of the ASTRI Array facilities. It provides an interface to monitor the operational status of all system installations. The system must include safety functions that allow remote shutdown of all facilities in the event of a hazard.

A.1.4 ASTRI Array Telescopes

Figure A.6 shows ASTRI-1, the first of the ASTRI Array telescopes that was installed at the Teide Observatory in June 2023. The telescope was equipped with a Cherenkov camera in October 2024 (see figure A.9) and has recently completed its technical and scientific commissioning. The ASTRI-1 telescope is now routinely used for scientific observations.

Figures A.7 and A.8 show the current (October 2025) status of the installation of telescopes of the ARRAY. Apart form the first one other six have been installed totaling a total of seven out of nine. Telescopes ASTRI-2 to ASTRI-7 are going through the technical commissioning phase during which the telescopes will be completely characterized in terms of pointing and tracking performance and their mirrors will be aligned.

Figure A.6. ASTRI-1 installed at the Teide Observatory. Photo by D.l Lopez.

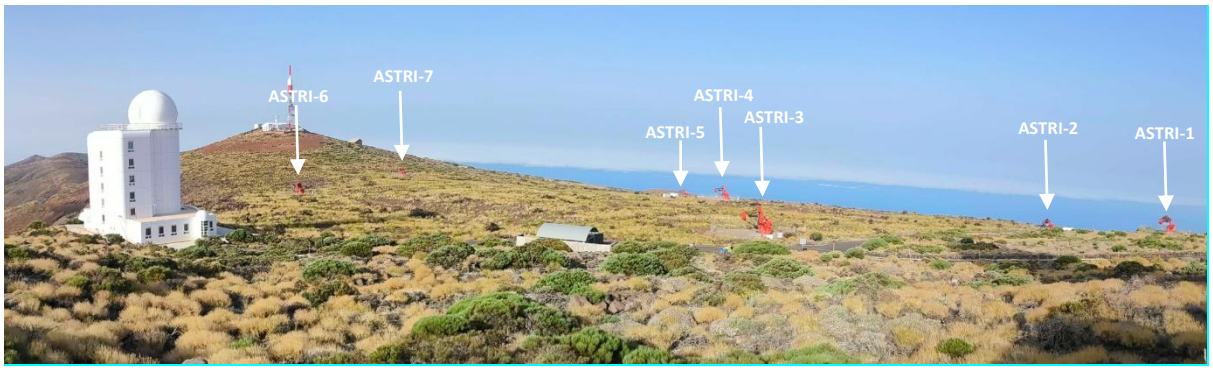

Figure A.7. View of the ASTRI ARRAY from the VTT area showing all the currently installed telescopes.

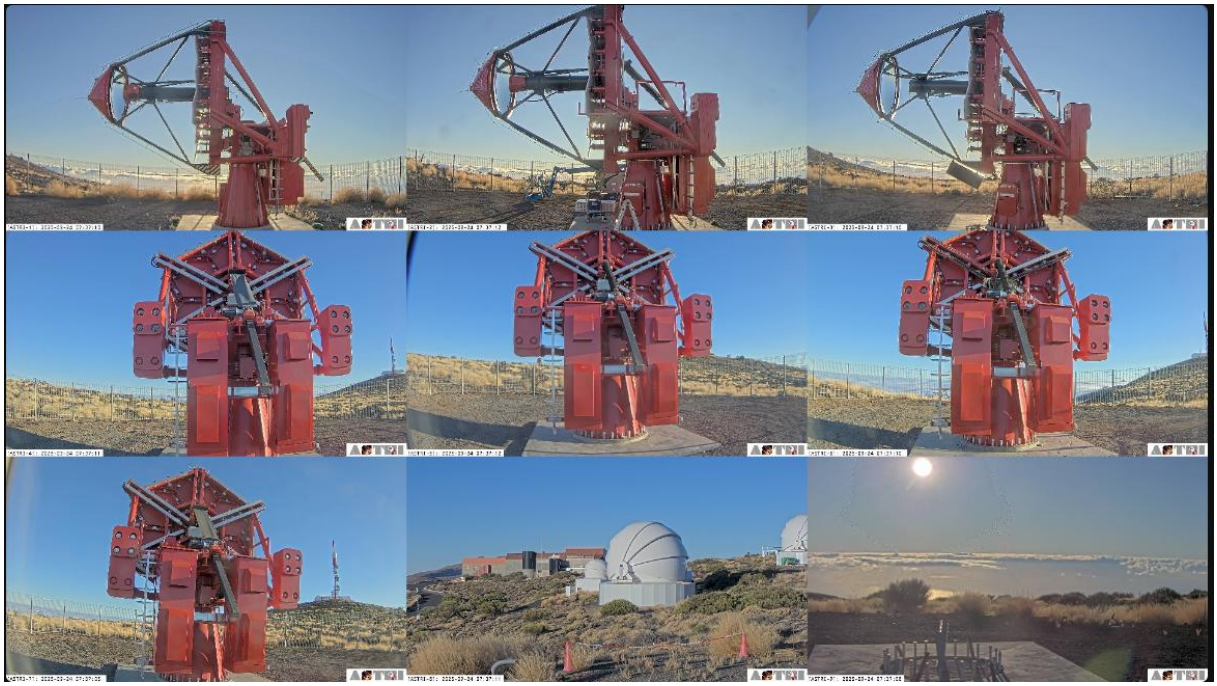

Figure A.8. The seven the ASTRI Array telescopes installed seen through the CCTV security cameras. The two cameras in the lower row are those of ASTRI-8 and ASTRI-9.

Telescopes ASTRI-8 and ASTRI-9 are being completed in Italy and will installed at the site in spring 2026.

The second telescope that will be equipped with a Cherenkov camera will be ASTRI-3. This camera (Figure A.9) is currently being tested in the INAF laboratories in Palermo and will be shipped soon. Once mounted on the telescope will allow to perform the first stereoscopic observations.

Two further cameras are foreseen for the beginning of spring 2026 and will be installed on telescopes ASTRI-2 and ASTRI-4.

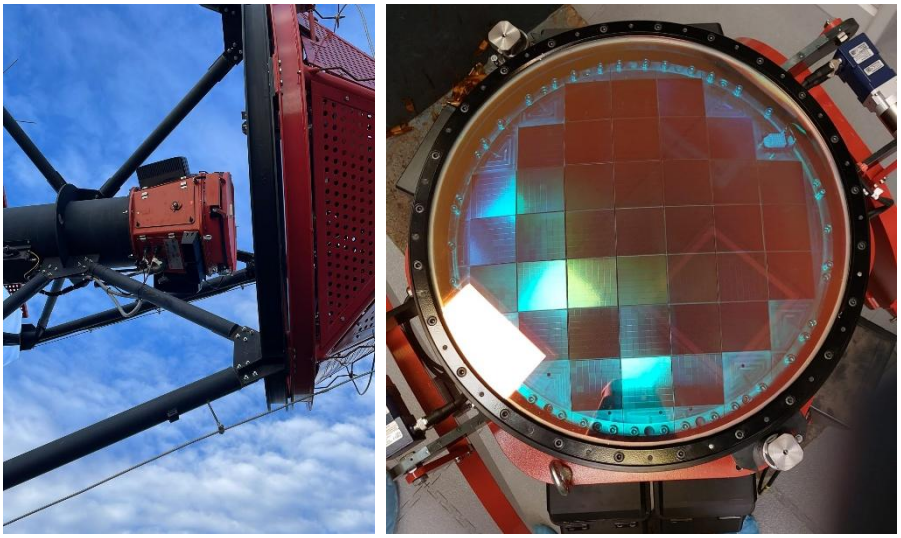

Figure A.8. Left panel: the first Cherenkov camera mounted on ASTRI-1. Right panel: the second camera in the INAF laboratories in Palermo.

A.1.5 Information and Communication Technology (ICT)

The ASTRI Array ICT consist of the hardware required to control the array, a large temporary buffer memory to store data from several nights of observation if needed, and the network devices required for system operations.

The ICT (figure A.9) was delivered at the site on October 2024 and it is now fully operational.

Figure A.9. The ASTRI Array data center in the Teide Observatory Residencia. The smaller rack on the right image belongs to another IAC project.

A.1.6 Software

The ASTRI ARRAY software has been designed to perform all steps necessary for the preparation and execution of scientific observations. The system will provide users with a set of tools ranging from proposal submission to the execution of observations, real-time data analysis, and retrieval of all data products from the archive.

The Supervisor Control And Data Acquisition software devoted to control all the operations carried out at the ARRAY site, including the startup of the system is being tested with the real hardware and the version to actually control the entire array will be released at the end of 2025.

The Data Processing System software, used to calibrate and reduce the data acquired and to check the quality of the final data productsm together with the Simualtion Software, providing simulated data for the development of recon-struction algorithms and for the characterization of real observa-tions, are currently being tested using the data obtained with the ASTRI-1 telescope.

A.1.7 Control, Characterization, and Calibration System

The Control, Characterization, and Calibration System consists of a set of devices designed to monitor environmental conditions at the Observatory, characterize the atmosphere during observation nights, and calibrate the ASTRI Array.

Currently installed at the site are two weather stations close to telescopes ASTRI-2 and ASTRI-6 and an All Sky Camera mounted together a Sky Quality Monitor mounted on a post above the transformation center. Those instruments are shown in figure A.10.

A mobile Illuminator device to calibrate the ARRAY has been recently tested but it is not operational yet.

Figure A.10. Left panel: the ASTRI ARRAY meteo station close to the ASTRI-2 telescope. Right panel: the All Sky Camera together with the Sky Quality Monitor.

Figure A.11. An example of LIDAR instrument.

A LIDAR instrument (see figure A.11) to characterize the atmposphere measuring the extinction in the direction of the observations was included in the project since the beginning and actually the project of the infrastructure (see figure A.12) foresaw the construction of the foundation of the dome to host the LIDAR close to the ASTRI-3 telescope.

The instrument will be ready by the end of the year and will be installed after the construction of the infrastructure and the installation of the dome.

Figure A.12. The location of the LIDAR instrument. Left panel: the original drawing from the infrastructure project. Right panel: map of the site showing ASTRI-3 foundation and the proposed position of the LIDAR.

A.2 Scientific Programme of the ASTRI ARRAY

The ASTRI Array project aims to deploy a network of at least 9 (and up to 12) dual-mirror "small-sized" telescopes with 4 m diameter mirrors to study the universe in gamma rays using the Imaging Atmospheric Cherenkov Technique (IACT). Compared to currently operating IACT systems, such as MAGIC, HESS, and VERITAS, the ASTRI ARRAY will extend sensitivity into the range of several hundred TeV—an energy domain that remains largely unexplored.

Thanks to the innovative dual-mirror configuration of the ASTRI Array telescopes (already tested with the end-to-end ASTRI-Horn prototype installed by INAF in Sicily in recent years), the ASTRI Array will benefit from a significantly wider field of view, allowing for the simultaneous monitoring of several nearby sources within a single pointing.

The combination of extended sensitivity beyond 100 TeV and homogeneous performance across the field of view will open new avenues for the study of, for example, extended sources such as supernova remnants and pulsar wind nebulae emitting above 10 TeV. The use of SiPM-based cameras will improve the system's duty cycle, allowing safe and efficient operation even under moonlight conditions.

The ASTRI ARRAY will be capable of performing astronomical observations with high energy resolution (approximately 10–15%). Moreover, a productive synergy is expected with targeted observations coordinated with HAWC (Mexico) and LHAASO (China), which observes a wide swath of the northern sky.

In summary, the ASTRI ARRAY will enable groundbreaking studies of galactic and extragalactic sources, addressing frontier topics at the intersection of astrophysics, cosmology, particle physics, and fundamental physics. The network is also expected to be used for intensity interferometry studies of stellar sources with unprecedented angular resolution.

A.3 THE ASTRI COLLABORATION

A.3.1 ASTRI Collaboration Partners

The ASTRI Array is a joint project involving universities and research institutes. At the time of signing this Agreement, the following institutions are full members of the ASTRI Collaboration:

- Istituto Nazionale di Astrofisica (INAF), Italy
- Instituto de Astrofísica de Canarias (IAC), Spain
- University of São Paulo and FAPESP, Brazil
- North-West University, South Africa
- University of Geneva, Switzerland
- Fundación Galileo Galilei, Italy and Spain
- University of Padua, Italy
- University of Perugia, Italy

The ASTRI Collaboration is subject to the incorporation of new members. The Collaboration itself shall ensure that any new members joining it are aware of and accept the rights and obligations acquired by INAF on its behalf. The ASTRI Collaboration shall notify, through INAF, any update concerning its membership.

A.3.2 Participation of the ASTRI Collaboration in the International Scientific Committee and its Subcommittees

The ASTRI Collaboration, through INAF, shall participate in the Common Services Committee (CSC) of the Teide Observatory through a representative appointed by the ASTRI partners and should be informed on any request to usage of the infrastructure deolyed by ASTRI in the OT. This representative may appoint a substitute in case of absence.

The ASTRI Collaboration, through INAF, shall also participate in the CCI's Astronomical Quality Subcommittee (SUCOSIP) through a representative appointed by the ASTRI partners. This representative may appoint a substitute in case of absence.

The ASTRI Collaboration, through INAF, shall appoint a safety officer who will oversee the facilities and operations to ensure compliance with the applicable Spanish legislation on Occupational Risk Prevention. This safety officer shall participate in meetings of the OT Safety Committee. The officer may appoint a substitute in case of absence.

Appendix B: Description of Common Services and Spaces Provided by the IAC to INAF

SERVICES PROVIDED BY THE IAC

1. The location for the installation of the ASTRI ARRAY and the use of existing roads and trenches.
2. Access to the Teide Observatory for ASTRI collaboration personnel and, during the construction phase, for personnel involved in carrying out related works
3. Maintenance and cleaning of the access roads to the ASTRI Array facilities at the Teide Observatory, including:
    a. 9 telescopes (expandable to 12);
    b. 2 meteorological towers.
    c. 1 LIDAR

5. Access to the Teide Observatory's internet, telephone, and general power supply networks.

SPACES PROVIDED BY THE IAC TO INAF AND ASSOCIATED COMPENSATION

Given the specific requirements of the ASTRI Network, INAF will need certain spaces and support services for its deployment. The IAC shall provide the following facilities within its premises under the terms detailed below, along with the corresponding financial compensation:

1. Offices for the ASTRI Array Administration and Coordination

   Access and use will be granted to office space located within IAC-managed premises to house the administration and coordination office of the ASTRI Network. The assigned space shall be at least 17 m² and will initially be located in the IACTEC building, without prejudice to possible changes of location or expansions, provided these are mutually agreed by the Parties during the term of this Agreement.

   As compensation for this space, INAF shall pay the IAC an annual fee of 12.000 euros. These amounts will be updated annually based on the official Consumer Price Index (CPI) of the Canary Islands.

2. Parking Spaces for Service Vehicles

Two (2) parking spaces for service vehicles will be made available within IAC-managed premises in the same building where the offices described above are located. Each space will measure between 4.50 and 5.00 metres in length and between 2.25 and 2.50 metres in width.

The annual compensation for these spaces is included in the amount established for the office space, with no additional cost.

3. Storage Space at the Teide Observatory

   Storage space will be provided for spare parts and maintenance tools, via the installation of two containers provided by INAF at the Teide Observatory: one standard 40-foot container (12 m x 2.4 m) and one 20-foot container (5.9 m x 2.4 m).

   As compensation, INAF shall pay the applicable cost for the use of built-up space, in accordance with the budget allocation formulas approved by the CCI.

4. ICT Hosting Service

   The ICT infrastructure associated with the ASTRI ARRAY will require the equivalent of three standard racks, plus half a rack for telecommunications infrastructure, with a maximum energy consumption of 20 kW. This space is provided in a 27,56 m2 room which is occupy 60% by the ASTRI Array.

   Alternatively, the ASTRI Network may use a dedicated container (approximately 7 x 3 m). In that case, a revision of this Agreement will be promoted to amend this clause accordingly.

   In addition to electricity consumption, as compensation for the use of ICT space, INAF shall pay the amount corresponding to the use of built-up space, in accordance with the budget distribution formulas approved by the CCI, while IAC will assume the responsability of the insurance and maintenance of the room

COMMON SERVICES

Additional Infrastructure for the Deployment of the ASTRI ARRAY

The IAC shall provide the necessary connection points to enable the passage of power and data cables to the locations of the ASTRI ARRAY elements. Responsibility for the works and cost of all connections—both civil infrastructure and passive infrastructure—from these points to the

common services shall rest with INAF. Once this additional infrastructure is installed and validated, it will be integrated into the OT's common services for its use and maintenance under the Observatory management rules. However for the usage of this infrastructure by other projects and Users Institutions, it should exist a previous exchange of letters between the OT Site Manager and INAF Scientific Representative in the ASTRI Collaboration formally assesing its viability.

Electrical Power

Electrical energy will be acquired as a separate service for both the telescope network and the data centre. The maximum power requirement of the ASTRI ARRAY during operations will be 100 kW, supplied at 380/220 V.

Communication Systems

The ASTRI Collaboration, through INAF, shall provide its own communication system, which will be connected to the various systems (telephone, IT connections, etc.) at the Teide Observatory. The specifications must comply with the standards used at the Observatory, unless otherwise agreed.

The IAC shall ensure that the ASTRI Array has access to the same Common Services as other telescope facilities at the OT. The use of these services is financed through a Common Services budget, and the costs are shared among OT telescope installations in accordance with a common rule. These services include access to the IAC Communications Network (IACNET). The current bandwidth between OT facilities and IAC headquarters is 10 Gbps, with onward connection through academic networks.

Dedicated point-to-point optical circuits from the ASTRI ARRAY to INAF headquarters via academic networks are also available and may be used under the same financial terms offered to other facilities at the Observatorios de Canarias.

Water Supply

If necessary (e.g., for cleaning operations), the IAC will provide access to its water supply. Costs will be agreed upon if the supply is required.

Canteen and Accommodation

Under normal operating conditions, no personnel are expected to be present at the ASTRI ARRAY site during nighttime operations at the Teide Observatory.

Occasionally, between two and three persons may need to stay at the Observatory to perform daytime maintenance tasks. In such cases, use of the canteen and accommodation will be necessary.

Access to the Residencia facilities will be required for up to ten people during the installation, commissioning, and initial operational phase of the ASTRI ARRAY.

At the IAC or its associated premises, use of the canteen and office space will be required for resident INAF and the ASTRI Collaboration personnel (up to a maximum of four people).

Light Pollution Interference

The operation of the ASTRI telescopes, which observe the faint Cherenkov light generated by particle showers in the Earth's atmosphere, requires protection against stray light interference. The ASTRI Collaboration expects that the same preventive measures against light pollution from the Residencia and from vehicles will be applied as those in place for optical telescopes. The ASTRI Collaboration, through INAF, will be authorised to place warning signs along nearby roads.

Appendix C: Support and Maintenance Services Provided by the IAC

The technical assistance described in Section 6.3 shall be provided according to the following rate table:

Resource	Cost per hour
Department Head / Administrator	119,12 €/hour
Instrument Maintenance Technician	98,00 €/hour
Civil Maintenance Technician	99,33 €/hour