

2017 – 2021

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# STRATEGIC PLAN OBSERVATORIOS DE CANARIAS



Instituto de Astrofísica de Canarias

## SUMMARY

April 2018

## EXECUTIVE SUMMARY

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The *Observatorios de Canarias* (OOC) are one of the most productive and lowest cost terrestrial scientific resource in the world, available to Spanish astrophysicists.

This ICTS is dedicated to the exploitation of the sky, a natural resource over the Canary Islands. These astronomical reserves, protected by Law, have attracted, over the last 40 years, more than 60 institutions of around 27 countries to install their telescopes and instruments. This fact is a clear demonstration of the advantageous conditions offered by the host country. In addition to the remarkable RTD returns for the Spanish community, the estimated total international inversion cached by the OOC from its origin are of more than 1 billion euros, and in the years to come it will be possible to even double this quantity.

The OOC undoubtedly represents the largest collection of multinational telescopes to be found anywhere in the world. This has been the result of much more than just the extraordinary astronomical properties; the continuous characterization; the proper conditions of infrastructure, services, etc, have been developed, maintained and offered in an optimized and flexible manner. The OOC has had to adapt to the needs of both large telescopes and the simplest experiments, from on-site observations to remote or even fully robotic operations.

The OOC works somewhat as a “community of neighbours” assessed by the CCI (International Scientific Committee), established by the 1979 Agreement on Cooperation in Astrophysics. The IAC manages properly the common services and ensures that the support infrastructures are well maintained and developed by obtaining specific funding. Moreover, the IAC has modernised the entire communications network by laying optical fibres to connect both Observatories with the main headquarters and the world-wide academic network.

In the past four years, there has been in the OOC a breakthrough, with the installation of 10 new facilities and the selection of the ORM as the site for CTA North, which has begun the installation of the first 23m prototype telescope, LST1. In addition, the OOC will host the European Solar Telescope (EST), and the ORM is selected as alternative site for the installation of Thirty Meter Telescope (TMT), if it cannot be settled in Hawaii.

As a reference concerning the quality and quantity of the science carried out at OOC, it is worth to mention a high scientific productivity of more than 2600 peer-reviewed papers in period 2012-2017 for telescopes at the OOC.

### 1. VISION, MISSION AND VALUES

**Mission.** Provide and support state-of-the-art facilities to perform frontier research in Universe Sciences, ensuring the best natural, technological and logistical conditions, while fostering a fruitful framework of international collaboration.

**Vision.** Become one of the best astronomical reserve of the world, promoting the installation and operation of world-class research infrastructures and enabling Spanish scientific community to reinforce its leadership in Astrophysics, favouring synergies with other major research infrastructures (including Space missions).

The **core values** of the Observatorios de Canarias are:

**-SUSTAINABILITY:** A sustainable exploitation of the Canarian's skies, protected by law and characterized over a period of several decades, as well as a functioning sustainable model based on international collaborations.

**-EXCELLENCE:** The pursuit of excellence in research as the ultimate goal, providing the infrastructures, conditions and genuine communication among User Institutions to achieve this objective.

**-TEAMWORK:** To favour education and training of early-stage researchers and technicians, and the transfer of knowledge among scientific communities.

**-INTEGRITY:** Contribute towards social awareness on research and the importance of a knowledge-based economy.

## 2. SWOT ANALYSIS

Following standard methodologies we have identified the strengths, weaknesses, opportunities and threats listed below:

### Strengths

- The extraordinary astronomical quality of the summits of the Canary Islands, protected by law and continuously monitored.
- International recognition as one of the best observatories in the world.
- Scientific productivity of the observatories for Spanish astrophysicists.
- Strong and established institutional commitment towards the continued characterization and protection of the skies.
- Sustainable financing model.
- Ownership and operation by a top-level international scientific and technological centre.
- Strong implementation in the Canaries; a reference for regional society. Social support to the Observatories.
- Recognition and significant presence in EU funding programmes.
- The excellent telecommunications infrastructure.
- Possibility of synergies for simultaneous multi-telescope multi-instrument and multi-wavelength observations.

### Opportunities

- An 'astronomical reserve', capable of attracting newest and most advanced international projects currently under way (TMT, EST, CTA, NRT, etc.).
- Added value within the European Research Area (ERA) as the European Observatory of the Northern Hemisphere.
- Specialization in robotic telescopes.
- The development of advanced instrumentation in close collaboration with industry, contributing thus to industrial development and commercialization of innovative value-added products.
- Touristic exploitation of the OOC as an economic activity and funding source.
- Construction of the ORM Visitor Centre as a base to foster social roots and support.
- Astrophysics is considered as one of the main priorities under the Smart Specialization Strategy RIS3 for the Canaries.
- The Canary Islands as a very suitable place for meetings and workshops.
- Boost nature preservation as a resource to gain general knowledge.
- Synergies of ground-based and satellite observations.

### Weaknesses

- Decreasing funding for maintenance and update in terms of both user-institution investment and basic common infrastructure.
- Limited flexibility in financial management.
- The financial support for infrastructures of the Spanish ICTS is timely unpredictable.
- Difficulties in multi-year planning and management.
- Poor condition of the main access road.
- Unsuitable infrastructures for tourist exploitation.
- Excessive rigidity on environmental standards as a result of being installed in national park areas (Natura 2000).
- Complexity and dilated-time of installation permits procedures for new infrastructures and telescopes (independently of its size).
- Difficulties in following up the scientific publications resulting from access awarded by all the telescopes.
- Loss of human resources (scientists and engineers) as a result of the low salary competitiveness.

### Threats

- The new laws that changed the procedure to obtain authorization to sign any national or international agreement or MOU.
- The current economic situation affecting the maintenance of RTD activities worldwide.
- Closure or diminished performance of facilities currently in operation.
- Use of telescope time for research of low interest and poor quality.
- Loss of prominence as a first-class observatory attracting advanced instrumentation for astrophysical research.
- Inability to manage the funding obtained in relation to corresponding commitments.
- Not being able to attract and retain the best international facilities.
- Application of generic procedures of the Spanish AGE unsuitable for management in an international context.
- Some local small groups related to environment preservation against the installation of new facilities at the OOC.

### 3. MAIN GOALS 2017 - 2021

#### 3.1 Objectives

This plan outlines the strategic direction, goals, and priorities we will pursue to make our Vision of the future a reality. We have identified three strategic goals that will strengthen OOC's ability to accomplish its Mission and contribute to Spanish leadership in Astrophysics research and related technology development. Our strategic goals need to be suitably coordinated and implemented by means of appropriate strategies and actions, as described later.

#### 1. LEADERSHIP:



**To ensure leadership of the Observatories for the next decade and beyond.** The OOC is internationally renowned for hosting one of the largest batteries of telescopes all around the world, the development and construction of innovative telescope instrumentation and related technologies, and the subsequent cutting-edge science providing key insights in the understanding of the Universe. To maximize the scientific impact of OOC facilities, and to continue the great trajectory of discoveries, we will not only maintain our existing instruments, telescopes, and infrastructure to ensure the most efficient possible use of telescopes'

precious time, but also to attract new and excellent RIs, including the major RIs future projects, all within the broader context of the OOC user community and the forthcoming enormous scientific opportunities

#### 2. INTERNATIONALITY:

**To promote a sustainable framework of international collaborations for the joint operation of first-class research facilities at the Observatories.**



The OOC complex is open to the international astrophysics community through the participation of some 60 scientific institutions in 27 countries. Its international scope has grown exponentially with the installation of new facilities and with the deployment of fibre optic networks allowing the terabytes of data generated by its activity to be transmitted to all countries involved. New model of collaborations will ensure the long-term sustainability of this world-class ICTS.

**3. INNOVATION:** To update the set of basic and advanced supporting infrastructures available at the Observatories, and to introduce valuable innovation of services provided. The OOC, whose capabilities are highly valued by the user institutions and scientific community, will continue being developed to assure the best quality and efficiency in logistic, safety and technical support, including new modes of operation and observing.



### 3.2 Strategic Approach

The huge amounts of knowledge and skills involved in this new era of astronomy together with the international dimension of the OOC require the implementation of a very ambitious plan to successfully accomplish the aforementioned main goals. The present Plan will pursue six specific strategies, broken down in subsequent actions over the period 2017–2021:

STRATEGY	OBJECTIVES		
	1	2	3
<b>S1: ENABLE WORLD-CLASS RESEARCH</b> The OOC will continue to enable high-impact science by facilitating and supporting the installation of the forefront international telescopes with major investment in the construction and instruments of these major Research Infrastructures, with specific effort towards the installation of the cutting edge international telescopes in the main research fields of Astrophysics: the Cherenkov Telescope Array Northern Observatory (CTA-N), the European Solar Telescope (EST), the New 4m Robotic Telescope (NRT) and the Thirty Meter Telescope (TMT).	✓	✓	✓
<b>S2: ENHANCE THE SCIENTIFIC SUPPORT AND TECHNOLOGICAL CAPABILITIES AT THE OBSERVATORIES, INCLUDING THE JOINT DEVELOPMENT OF STATE-OF-THE-ART INSTRUMENTATION.</b> In this area the OOC will continue to develop key technologies, extend collaborations with external research groups, pursue international contracts, and recruit and retain outstanding skilled staff, to keep the OOC at the forefront in the design and construction of world-class astronomical instrumentation for both national and international telescopes. The OOC will work with industry partners to identify and develop commercialisation opportunities based on instrumentation technologies.	✓		✓
<b>S3: CONTINUE TO IMPROVE THE QUALITY AND QUANTITY OF THE SERVICES AND SUPPORTING INFRASTRUCTURES AT THE OOC.</b> The OOC will strive in guaranteeing the adequate performance of general purpose infrastructures at both observatories (access, telecommunications, electricity, water supply and sewerage, residence and other support installations), simplifying logistics for the scientific institutions working at the observatories.		✓	✓
<b>S4: SKY QUALITY AND SURROUNDING ENVIRONMENT.</b> The OOC will work continuously monitoring the quality of the sky and updating the technology and tools according to the new needs and opportunities. The OOC are also committed to protect the exceptional quality of the Canary Islands' sky, so that astronomers can continue to pursue world-leading science with telescopes already in operation or to be located there, assuring at the same time appropriate preservation of surrounding environment.	✓	✓	✓
<b>S5: STRENGTHENING THE SCIENCE, TECHNOLOGY AND ENGINEERING SKILLS AND IMPROVING SOCIAL PERCEPTION.</b> The OOC will assist students at every level and make the public aware of its scientific, technological and engineering achievements in astronomy. The OOC will attract and retain highly skilled employees, and use its research and technological environment to enhance and broaden technical training and capacity within the workforce of the Observatories. Moreover, it will ensure a more active involvement from the society of the region, increasing awareness on astrophysics and improving social perception.	✓		✓

## 4. PLANNING AND ASSESSMENT

### 4.1 Planning

The specific strategies identified to accomplish the three major goals of this Strategic Plan are broken down in a total of **33** defined actions. Our strategic goals are challenging, but with a strong performance focus, we believe we will accomplish much toward this Plan over the period 2017-2021. We embrace transparency and accountability and we commit ourselves to being leaders and identifying best practices for communicating our performance both our successes and our setbacks to our stakeholders.

For the proper execution of the aforementioned actions we need to consider the own resources available, which include the people, materials, technologies, funds, etc., and those resources that are subject to the grant of external funding.

In the gantt chart below we summarise the Strategic Plan schedule, showing the sequence of actions:

STRATEGIC PLAN SCHEDULE					
Planned actions	2017	2018	2019	2020	2021
Action OCCC1					
Action OCCC2					
Action OCCC3					
Action OCCC4					
Action OCCC5					
Action OCCC6					
Action OCCC7					
Action OCCC8					
Action OCCC9					
Action OCCC10					
Action OCCC11					
Action OCCC12					
Action OCCC13					
Action OCCC14					
Action OCCC15					
Action OCCC16					
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Action OCCC20					
Action OCCC21					
Action OCCC22					
Action OCCC23					
Action OCCC24					
Action OCCC25					
Action OCCC26					
Action OCCC27					
Action OCCC28					
Action OCCC29					
Action OCCC30					
Action OCCC31					
Action OCCC32					
Action OCCC33					

As part of the strategic planning, specific progress reports for each action will be produced including major achievements and possible deviations of the planned work.

## 4.2 Assessment

Since the Strategic Plan will be continuously monitored and new opportunities for this ICTS could arise during this 5-year period, the set of proposed actions is subject to modifications and new ones could be included in the Strategic Plan. Some flexibility to adapt our work plan to the opportunities that could arise in the near future is also a must for the OCCC.

The IAC has an adequate number of committees and structure, at several levels, to ensure proper follow-up of the 2018-2021 Strategic Plan. The IAC Steering Committee meets on weekly periodicity, to monitor all activities related to this research centre, but it is twice a year, immediately before the meetings of International Scientific Committee (CCI, in April and October generally), when a comprehensive monograph on the Observatories is conducted. Similarly, the various subcommittees of the CCI, which also meet with the same periodicity, address and give follow-up to specific topics of special relevance for the observatories:

- ORM/OT Common Services Committees: Advisory body to the IAC and to the CCI on those matters related to the operation of ORM/OT observatories, as well as on their future developments. Management of Common Budget (contributions from UIs).
- The Sky Quality Group - SUCOSIP: To advise to the IAC and CCI on site characterisation issues and protection of the sky quality for astronomical research.
- The Sky Quality Group – SUCOSIP lasers WG: To advise on the use of lasers for astronomy and develop the laser traffic control system protocol at the OCCC

There is also a framework agreement between the AEMet and the IAC that foster their insitutional collaboration through the Supervisory Board AEMET-IAC.

Apart from these committees, there are two on-site managers at ORM and OT observatories, responsible for the day-to-day activities. Given the relevance of the Strategic Plan, the Director of the IAC assigns its management to the “Institutional Projects and Transfer of Knowledge Office (OTRI)”, which depends on the Director’s Office, with wide experience on strategic projects’ management and monitoring of the different activities. In this sense, it is expected the recruitment of one Project Manager specifically devoted to the follow up of the strategic Plan. The corresponding departments at the IAC or at the UIs will be directly responsible for the implementation of these activities. The project manager in close coordination with the on-site managers, will report to the IAC Steering Committee and to the CCI - through the aforementioned sub-committees when appropriate-, about the progress of the Strategic Plan and about possible corrective actions, if any.

It is proposed that the project manager will prepare a progress report every three months, supervising the proper execution of the Plan, to be presented at the IAC Steering Committee. This committee will decide about informing or not at that moment to the corresponding sub-committees and to the CCI, or to wait until the next scheduled meeting.

The project manager will be also responsible for the preparation and implementation of a Risk Management Plan, bearing in mind the specificities of each action. For each of the foreseen risks at least one preventive or mitigating measure has been defined. Should these measures prove to be insufficient to reduce risk to an acceptable level then the project will take further steps in order to identify and implement appropriate corrective measures

Above the Steering Committee, the IAC Governing Body (Consejo Rector), where the Consortium Administrations are represented, is responsible for the approval of the IAC Annual Action Plan, including the observatories. A “Research Advisory Committee”, whose members are scientists of international prestige, provides also their opinion and recommendations to the IAC Governing Body on achievements and long-term activity of this research centre and its observatories. As part of this top-level follow up, the 2017-2021 OCCC Strategic Plan will be properly reviewed and monitored.