



**CENIEH**

Centro Nacional de Investigación  
en Evolución Humana

# ANNUAL ACTIONS AND PROJECTS PLAN

## FISCAL YEAR 2024

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## I. Background.

The year 2023 stands out for the CENIEH's successful achievements in all areas, both as a research center and as an ICTS receiving demands for knowledge from society. All the infrastructures cataloged as essential have been open in competitive access mode for more than 30% of their capacity and have contributed to the blossoming of R+D+I in this country. One highlight is the particular dedication of its staff to attracting excellent talent and competitive funds in pursuit of the objectives of the Center. All the laboratories have undergone some type of improvement in equipment or methodology, placing the CENIEH in the vanguard of research into our origins and carrying its advances into other technological and industrial fields. This specialized labor has at all times gone hand in hand with a bustling societal activity, through a multi-format, inclusive program of communication and knowledge transfer.

Among these achievements, we should emphasize:

- The ongoing rise in **SCI scientific publications was maintained**, with almost 80% within the top two quartiles. This parameter is one of the best indicators of the health of the Center's research programs, as well as of external demand for the expertise of its staff and laboratories from other research centers and the technological and industrial community. These figures do not include a significant number of books, book chapters, reports and outreach articles, which also underpin this international showcase of the Center's scientific excellence.

| SCI PUBLICATIONS                | 2019      | 2020      | 2021      | 2022       | 2023                    |
|---------------------------------|-----------|-----------|-----------|------------|-------------------------|
| CENIEH                          | 71        | 90        | 83        | 97         | 92 *14 in press         |
| Linked to the ICTS <sup>1</sup> | 14        | 9         | 16        | 18         | 19 *3 in press          |
| <b>TOTAL</b>                    | <b>85</b> | <b>99</b> | <b>99</b> | <b>115</b> | <b>111 *17 in press</b> |

\*Counted at November 28th 2023.

<sup>1</sup>This refers to publications related to the use of the ICTS for which no members of the CENIEH are listed as authors.

- The CENIEH has maintained intense activity in **field excavations and interventions** in which it not only recovers unique items from which the history of the human lineage is reconstructed, but it also participates in the geochronological contextualization of this archaeological and paleontological material. These excavations are distributed all over the world, especially on the African continent, at enclaves such as Olduvai, Lothagam, Panga ya Saidi, Gona, Tighennif, and Ain Hanech, and on the Iberian Peninsula, at emblematic sites like Atapuerca, Orce, Abrigo de la Malia, Cueva de Guantes, Albalá, and Prado Vargas.



- The positive trend in **both participation and success in competitive calls for staff hiring and attracting funds continued**, with no fewer than 16 hires funded by diverse programs, especially the Juan de la Cierva Program of the Agencia Estatal de Investigación, the First Experience Program run by the SEPE of the Ministerio de Trabajo y Seguridad Social ("PRTR funds"), and multiple hires for projects financed by the European Research Council. There are also the hires arising out of calls resolved the previous year, like those of the "Programa Investigo" for hiring young jobseekers for research and innovation initiatives of the Junta de Castilla y León.
- In addition, 25 applications were submitted to calls of a regional, national and international nature, also for research projects or excavations, with funds being received from such sources as the FECYT, the Junta de Castilla La Mancha, and *the Leakey Foundation*. The total grants received, to date, stand at €3,533,262.88, more than two million euros higher than when execution of the current Strategic Plan started.
- **Competitive financing currently represents no less than 44%** of the Center's funding. With competitive funding starting at 28% in 2019, the four-year average stands at around 40%, meaning that almost half of the Center's activity is financed from its own resources. This percentage, together with this highly significant trend over the last four years, reflect the effort and proactive engagement by CENIEH staff in the sustainability of its research and technical activity.

|                                | 2020             |            | 2021             |            | 2022              |            | 2023 *           |            |
|--------------------------------|------------------|------------|------------------|------------|-------------------|------------|------------------|------------|
|                                | €                | %          | €                | %          | €                 | %          | €                | %          |
| <b>Financing (Consortio)</b>   | 4,051,667        | 63         | 4,201,666        | 72         | 4,305,000         | 40         | 4,305,000        | 56         |
| <b>Financing (competitive)</b> | 2,231,480        | 35         | 1,454,463        | 25         | 6,337,540         | 59         | 3,208,798        | 41         |
| <b>ICTS services</b>           | 109,702          | 2          | 179,329          | 3          | 154,444           | 1          | 206,471          | 3          |
| <b>Total</b>                   | <b>6,392,849</b> | <b>100</b> | <b>5,835,459</b> | <b>100</b> | <b>10,796,984</b> | <b>100</b> | <b>7,720,269</b> | <b>100</b> |

\*Recognized rights counted at December 31st 2023. The figure at final closure might be different.

- The Center's activity and dynamics had to be reorganized during a large part of the fiscal year due to the **major doubling work** for the central space on the 4th and 5th floors, all entailing important work of coordination, planning and OHS work to ensure staff safety, the protection of the Center's equipment and its activity, which were almost unaffected. We are now entering the final phase of this great project, which is the construction of the Paleoproteomics Laboratory with the support of funding from the MCIU and the



European Union “NextGenerationEU”/PRTR (Recovery, Transformation and Resilience Plan).

- With regard to the laboratories, we should note the milestone that **all the essential facilities are currently open in competitive access mode**, with an average opening of 57% of this type, and therefore well above the minimum requirement of 20%, demanded for consideration as an ICTS.
- At the close of 2023, 319 **access requests had been received** (compared with 298 in 2022), of which 53 were of a competitive nature and 276 on-demand. Competitive accesses represent more than half, on average, of the requests accepted at the essential laboratories, while the number of non-competitive ones also includes the activity of the non-essential laboratories such as Archaeometry and Geology. Overall, there is a rise in requests for use of the infrastructure, in the international spread, and in income from the ICTS services (206,471.07 euros for this year compared with 154,444 euros in 2022), setting the invoicing record for the history of the CENIEH. This growing demand consolidates the role of the ICTS as a fundamental actor in furthering R+D+I in Spain. Apart from these accesses, there are those channeled through the participation of the CENIEH in European **infrastructure networks like IPERION HS**, and these have fomented the conduct of innovative experiments and analyses for the study and conservation of cultural heritage.
- Another significant point is the progress on the schedule leading to the ***Human Resources Excellence in Research Award***. Having furnished the necessary documentation for the first phase on the platform *Euraxess*, the CENIEH is awaiting evaluation of its eligibility, which would allow it to start on implementation of the principles and practices required for the award.
- With regard to the **Quality Management System**, the Center is making progress on expanding its scope, by implementing the requirements of the ISO 9001:2015 standard at new laboratories such as Experimental Archaeology and Taphonomy, and Cosmogenic Nuclides.
- Finally, the striving by the CENIEH to reach an ever larger and more diverse part of society has not flagged. Following the inclusion of rural areas in holding the main events of its **outreach calendar**, and the adaptation of a major part of its transfer activities for the hearing-impaired, a new communication format was launched in 2023, a podcast called “Tutisapiens”, focusing in this case on the youngest audience. Once again, this has been made possible with the support of the FECYT and the generous collaboration and engagement of Center staff.



## II. Objectives and actions.

This Annual Actions and Projects Plan 2024 sets out the principal objectives and lines of action of the CENIEH for 2024, structured around two main lines: i) meet the targets set as part of the Strategic Plan 2021-2024; and ii) work on the foundations and proposal of a new Strategic Plan 2025-2028. The overall aim is to **enhance R+D+I** in both the scientific and technical senses and in the offering extended to the scientific, technological and industrial community, always within a **context of safety, sustainability and social** responsibility, which is pursued, fundamentally, through a series of transversal objectives. Given these premises, the objectives for this year are:

### O.1. Enhance the quality of the scientific and technical production.

Through investigation of both the materials recovered in the context of unique excavations and collaborations with other institutions and teams, and the development and commissioning of the methods employed for studying them, the CENIEH aspires to continue leading the progress of R+D+I in its field. Publications in high-impact journals, and success in calls for unique projects and human resources, are the best indicators of the rude health of its scientific-technical muscle. The compilation of a new Strategic Plan will be the backbone of both analysis of the current panorama and the short- and medium-term scientific horizon.

#### **O.1.1. Compile a new Strategic Plan for the period 2025-2028.**

##### **A.1. Prepare a draft Strategic Plan 2025-2028 between all the Center's areas.**

The year 2024 is the last for execution of the Strategic Plan 2021-2024 and, therefore, requires not only the effort necessary to complete the pending targets, but also reflection and critical analysis enabling us to assess the present situation, and therefore define the starting point for a new Strategic Plan. Over 2024, several working groups will be set up within and among the different Areas of the Center, with the idea of having a draft Strategic Plan by the end of the year for submission to the Governing Bodies and the Scientific Advisory Board ("CAC") for evaluation and comments. This objective will require a lot of staff and time resources, as it includes an analysis and, in certain cases, rethinking of tools and work processes.

- *Indicator: Strategic Plan evaluation report by the CAC (Done: Yes/No).*

#### **O.1.2. Promote the attraction of researchers and technicians.**

##### **A.2. Attract staff using competitive calls.**

The objective set in the Strategic Plan 2020-2024 was for a four-year average of 7 hires through competitive calls. On this point, and as is now habitual, the CENIEH will encourage



participation in calls which help to furnish the Center with sufficient critical mass to take on the scientific-technical objectives and the increasing demands for access to the infrastructure.

- *Indicator: Attainment of at least seven new hires in competitive staff attraction calls (Done: Yes/No).*

### **O.1.3. Promote publication in SCI impact journals.**

#### **A.3. Increase the number of SCI publications per researcher.**

The target set in the Strategic Plan 2020-2024 for SCI publications was to increase papers of this type by 10%, which means reaching an average of 3.3 publications per researcher. This is therefore the target set for this current final year: for there to be sufficiently many high-impact publications to make the new four-year average at least 3.3.

- *Indicator: Attainment of a four-year average (2020-2024) of at least 3.3 SCI publications per researcher (Done: Yes/No).*

### **O.1.4. Promote leadership and participation in prestigious paleontological and archaeological excavations.**

#### **A.4. Maintain the number of paleontological and archaeological excavations where the CENIEH participates.**

Participation in excavations and field interventions is the quintessence of the R+D+I activity of the CENIEH as this work feeds projects with original study materials against which to test hypotheses about the origin and evolution of the human lineage. This same work is also the engine of the laboratories, which are specialized in interdisciplinary analyses of biological and geological remains from which our history is reconstructed. Excavations are activities requiring intense and intensive dedication of resources and time, as this is unavoidably an in-person activity. The number rose from 19 in 2021, to 25 in 2022 and 26 in 2023. The objective for 2024 will be to maintain the numbers of 2023.

- *Indicator: Maintenance of the number of excavations and field interventions at which the CENIEH participates (26), compared with 2023 (Done: Yes/No).*

### **O.1.5. Promote leadership in unique research projects.**

#### **A.5. Increase the number of applications to project funding calls.**

The CENIEH is currently engaged in a large number of research projects, especially including three ERC (*European Research Council*) projects, and three more from the National R+D+I Plan of the MINCIU, this being a major milestone in view of the size of the scientific workforce. Managing pluriannual financing for active research projects makes the number of applications



each year fluctuate according to whether researchers need to apply for new calls (that is, a researcher on an active ERC project will not make submissions to any new call until the current one is close to closure). The rise in both submissions and success in competitive funding calls is one of the most outstanding trends in the Center's performance over the last five years. By submitting at least 10 applications in 2024 we would surpass the indicator set in the Strategic Plan (a four-year average of 25 applications). This will therefore be the target for the new year, but taking into account the importance of applying for international calls, so that 2 of these 10 shall be international ones.

- *Indicator: Submission of at least ten applications for research project calls (Done: Yes/No), two of them international (Done: Yes/No).*

## **O.2. Strengthen the uniqueness of the infrastructure.**

One of the milestones to be passed in the Strategic Plan 2021-2024 was the opening of all the essential laboratories ("outstanding facilities") to competitive access mode. This was fulfilled over the course of 2023, so that all the unique facilities have now been opened in this mode, and they also do so for more than the 20% set as one of the requirements for inclusion in the ICTS Map. For 2024 what is considered is i) to continue offering the essential laboratories through the launch of competitive access windows; and ii) to advance in the improvements and updating of the facilities or work procedures. Along these lines, the objectives for 2024 are:

### **O.2.1. Enhance the uniqueness of the Geochronology and Geology Program by expanding its capacities.**

Today, the CENIEH is a reference center for geological and chronological analyses of a broad range of sedimentary and temporal contexts and can thus answer interdisciplinary questions about the origin of humankind. This capacity rests upon the continuous improvement and updating of its facilities, their procedures, and their protocols. To remain internationally competitive, what is proposed is a series of improvements related to the acquisition of equipment and introduction of novelties, the opening of the facilities in competitive access mode for more than 20% of the minimum demanded for the standing of ICTS to be retained, and review and proposals for improvement in the processes of managing applications.

#### **O.2.1.1. Improve and update the capacities and offering of the Uranium Series Laboratory.**

**A.6. Acquisition, installation and entry into service of new amplifiers for the Neptune.**



The principal technological capacity of the Uranium Series Laboratory is the so-called multi-collector mass spectrometer MC ICP-MS (NEPTUNE *Thermo Fischer Scientific*). This is an advanced system for analyzing isotopes and isotope ratios using a technology that includes a bank of nine Faraday cup detectors, controlled by a matrix of nine resistive detectors rated at  $10^{11}$  ohms. Among the most unusual capacities of ICP-MS is the measurement of minute quantities of material. The precision and accuracy of this type of analysis are limited instrumentally by the signal/noise ratio of the detector, which plays a fundamental role in the amplifiers. Recent research indicates that combining resistors of different capacities makes it possible to give a single answer for simultaneous analyses of very sparse isotopes in the presence of much more abundant ones, such as  $^{230}\text{Th}$  in the presence of  $^{232}\text{Th}$  (critical for uranium series dating), or  $^{84}\text{Sr}$  in the presence of  $^{88}\text{Sr}$  (of fundamental importance in mobility or dietary research). With this combination, the analytical sensitivity of the NEPTUNE could be improved, while also expanding the types of questions and studies which the Laboratory could take on (dating, mobility). In view of all this, for 2024, it is proposed to replace at least three of the resistive-type amplifiers (RTIA) at  $10^{11}$  ohms by RTIA at  $10^{13}$  ohms. This action requires the acquisition, installation and tuning of the NEPTUNE, with recalibration work and analytical assays that would take several weeks before the ICTS service could be resumed.

- *Indicator: Documentation accrediting the purchase of the new amplifiers (Done: Yes/No).*

### **O.2.1.2. Improve and update the capacities and offering of the Cosmogenic Nuclides Laboratory.**

#### **A.7. Design the new Cosmogenic Nuclides Laboratory.**

Over the last three years, the CENIEH has made strong efforts to launch and mature the activity of the Laboratory for dating with Cosmogenic Nuclides. Agreements were entered into in 2021 with another ICTS, the Centro Nacional de Aceleradores (CNA) in Seville, to permit offering the complete sequence of sample preparation and measurement for  $^{10}\text{Be}$  and  $^{26}\text{Al}$  within Spain. In 2022 the protocol for measuring meteoric  $^{10}\text{Be}$  was tuned. Finally, in 2023 the steps necessary were taken to enable performing the last stage of sample preparation, prior to remission to the AMS, within the CENIEH itself. All of this has enhanced the autonomy and uniqueness of this Laboratory, recognized as an *essential facility* by the Scientific Advisory Board of Unique Infrastructures ("CAIS") in 2022 and open to competitive access ever since. Bound up with the doubling work for the space between the 4th and 5th floors of the Center, one of the strong points envisaged for the next Strategic Plan is the expansion of this Laboratory. This will require defining the design and equipment project for this facility in its new space on the 5th floor, setting out the construction work, equipment, and technical and budgetary needs for its future construction.





- *Indicator: Pre-project for design and equipment of the Laboratory for dating using Cosmogenic Nuclides in its new location (Done: Yes/No).*

## **O.2.2. Increase the capacities of the Transversal Laboratories to meet the demand from the scientific and technological community.**

### **A.8. Acquisition and commissioning of centimetric and submetric GNSS ("Global Navigation Satellite System") receivers for the Digital Mapping and 3D Analysis Laboratory.**

Since 2011, the Digital Mapping and 3D Analysis Laboratory has provided geolocalization and topography services to different internal and external projects using satellite positioning systems. GNSS devices are equipment that enable obtaining accurate geographical coordinates for specific points. It has multiple applications: geolocalization of samples, topographical surveys of sites, sequences, heritage and architectonic elements, etc.; in turn this is a fundamental basis for georeferencing 3D surveys created with laser scanners or photogrammetry. Therefore, this is essential equipment for the Laboratory, employed independently or on its own, and basic for accurate global georeferencing of any cartographic product.

The GNSS devices available at the Laboratory are more than a decade old. Over this period, technological progress has been significant, with improvements in signal stability, enhanced accuracy, the possibility of getting coordinates immediately in places without cellphone coverage or abroad or, even, the option of raising the number of measurements exponentially thanks to imaging systems incorporated into GNSS antennas. These points can be especially relevant for the projects conducted at the CENIEH and by external users, as these are on many occasions performed in remote natural environments and regions (such as in Africa or Asia). These are scenarios where new technologies can help to ameliorate deficiencies in satellite signals caused by interference, small number of satellites, nonexistent cellphone coverage or the lack of support networks for satellite positioning in real time. In addition, the possibility offered by the new GNSS receivers of performing massive data capture using images would expand the existing capacities of the Laboratory, which would also enable new synergies between the equipment available (3D scanners and terrestrial and aerial photogrammetry) and their application to the different projects.

-*Indicator: Documentation accrediting the purchase of the GNSS (Done: Yes/No).*

### **A.9. Creation of a spectrum library using the FTIR microscope.**

During 2022, an FTIR (Fourier transform IR spectrometry) analysis microscope was acquired for the Archaeometry Laboratory, and in 2023, the experiments were performed and the procedures established to allow it to come into service. As a way of showcasing this equipment, and linked to our vocation of open science and service to the community, in 2024 an FTIR



spectrum library useful for the analyses of the Archaeometry Laboratory will be compiled, but these will also be made openly available to the international community.

- *Indicator: Documentation accrediting the creation of the FTIR spectrum database (Done: Yes/No).*

### **O.2.3. Improve and enhance the capacities of the Collections, Conservation and Restoration Area.**

#### **A.10. Expand the reference collections of the Center.**

Over the last three years, the CENIEH has made a major and transversal effort between groups and laboratories to create and expand the Center's reference collections. These collections become living, dynamic repositories of information, open for consultation and study by the entirety of the scientific community, and they are growing continuously. The planning for 2024 includes incorporating new raw materials into the Mineral Collection (LITHO), a collection of petrological samples which it is hoped will eventually bring together specimens of all materials used or that could have been used by our ancestors to make tools.

- *Indicator: List of the new materials included in LITHO (Done: Yes/No).*

#### **A.11. Start digitalization of the reference collections.**

The natural next step in showcasing the Center's reference collections is their digitalization. The main objective here is to make the collections accessible by facilitating public access to information which is currently only available as a PDF inventory on the website. As these collections grow, it becomes necessary to define an effective Data Management Plan (DMP) that transforms them into shared research elements that satisfy the FAIR principles ([www.go-fair.org/fair-principles/](http://www.go-fair.org/fair-principles/)). In other words, items in collections should be Findable, Accessible, Interoperable and Reusable. This step enables creating a permanent, transferable, and easy-to-consult archive of the specimens in question.

As a pilot project for this initiative, in 2024, work will start on creating 3D models using microphotogrammetry for the specimens comprising the Taphonomy Collection (TAPHO), which is a catalog of the marks left on bones by the different agents that can modify the fossil record. The first step will be to start digitalizing the tooth marks of bears, wolves and lions obtained in the course of the European project DEATHREVOL run by the CENIEH Paleobiology Program, and in collaboration with the Digital Mapping and 3D Analysis Laboratory.

- *Indicator: List of the new digital models included in TAPHO (Done: Yes/No).*

#### **A.12. Acquisition and commissioning of a laser for the physical cleaning of surfaces and elimination of alteration layers on cultural assets.**



In interventions on cultural assets, surface cleaning is the most widely used direct action, and is particularly awkward as this is an irreversible process. Using laser technology adapted to heritage has been used for decades with satisfactory results from the conservation point of view, as it does not alter the nature (the surface) of cultural assets. Nevertheless, it is not used universally, as the absorption index for the laser energy given off needs to be higher for the material to be eliminated than for the surface of the cultural asset (that is, the alteration layer needs to be dark and the surface lighter). Despite this, laser cleaning is employed frequently with archaeological materials (such as metals, stone, wood, mosaics, bone, glass, ceramics, wall painting), and with fossils satisfying these physical characteristics. Devices for laser ablation of the pathologies of cultural assets do not transmit thermal or mechanical effects to them, enabling successful treatment of very weak and altered surfaces without any need for consolidation. Laser cleaning is selective, fostering the accuracy and effectiveness of the action (the ray emitted is absorbed by the dirt without reaching the surface of the asset), and it is adjustable (the power of the ray can be modified).

For 2024, the CENIEH proposes the acquisition of a laser unit (Nd-YAG type [1064 nm], with Q-switch operation), for the Conservation and Restoration Laboratory. Thus, it is hoped to expand its capacity for service to the general scientific community, and in the realm of conservation of cultural heritage in particular.

- *Indicator: Documentation accrediting the purchase of the laser (Done: Yes/No).*

## **O.2.4. Enhance the capacities of the CENIEH by augmenting the R+D+I areas where it works.**

### **A.13. Execution of the construction work for the Paleoproteomics Laboratory.**

In 2023, the work for the Paleoproteomics Laboratory was tendered, with the idea that this should overlap synergically with the doubling work of the 4th and 5th floors of the central block on the CENIEH building, that took place in the second half of 2023. The objective will be to complete construction of the Laboratory in 2024 and consider launching the new line of research for the new Strategic Plan, and in synergy with the hiring of a new researcher in 2024.

- *Indicator: Execution of the construction work of the Paleoproteomics Laboratory (Done: Yes/No).*

## **O.3. Expand and diversify the community to which the CENIEH offers its R+D+I capacities and services.**

The CENIEH not only works to meet the needs the scientific and technological community ask for, but it also makes innovative proposals about how to apply its expertise and resources in many fields, such as conservation of cultural heritage. Thus, apart from opening its laboratories



in competitive access mode, the CENIEH leads tasks within advanced infrastructure network projects which nurture international interaction with other institutions of excellence.

### **O.3.1. Promote the participation of the CENIEH in infrastructure networks.**

The European infrastructure network IPERION HS (Integrating Platforms for the European Research Infrastructure ON Heritage Science) will come to an end in spring 2024. Throughout this project, the CENIEH has participated in an outstanding way by opening its facilities to users as part of bilateral requests for European infrastructures (Working package [WP] 3) and played an active role in training and outreach (WP7) with such activities as a Training Camp held in Burgos in July 2022. In 2024, the CENIEH will round off its participation with the following activity:

#### **A.14. Study of the needs of the scientific community with regard to infrastructure networks in the heritage sciences.**

The CENIEH is the leader of the task 7.5 “Commitment to the paleoanthropology and paleontology” of WP7. The deliverable of this task is compilation and delivery of a report on the research needs of the paleoanthropology and paleontology community which could be met by using heritage sciences research facilities. This report will be encompassed in the report called D7.6 which covers other tasks (7.3, 7.4, 7.5 and 7.6 of WP7).

- *Indicator: Compilation and delivery of the report in question on time (Done: Yes/No).*

### **O.3.2. Promote the opening of all the essential laboratories to competitive access.**

The CENIEH currently has seven laboratories recognized as outstanding facilities, open for much more than 20% of their capacity to competitive mode, which reflects high demand for their use from the scientific, technological and industrial community. This would have been impossible without the continuous and "invisible" effort to design and implement tools for access and application management enabling the coordination of laboratories of a highly diverse nature with regard to the types of analysis, workflows, management needs, safety requirements, and times.

Over the course of 2023, work was under way continuously to align and quantify the activity of the infrastructure to the parameters demanded by the CAIS in the process of ICTS evaluation. This work is ongoing and has raised a series of needs to reorganize and rethink the procedures for managing requests and invoices which would optimize the compilation of indicators for the ICTS evaluation and, in turn, lead to an optimization of resources and process simplification.

Promoting competitive opening of the essential laboratories will principally be pursued through the following objectives:



## **A.15. Launch at least one competitive access call for the Luminescence Laboratory.**

This Laboratory has a high annual demand for samples which cover its maximum capacity, between the non-competitive and competitive access modes.

- *Indicator: Launch of at least one competitive access call for the Luminescence Laboratory (Done: Yes/No) and opening of at least 20% of its calculated maximum capacity (Done: Yes/No).*

## **A.16. Launch at least one competitive access call for the Archaeomagnetism Laboratory.**

This Laboratory only opens competitive access mode for qualified users for the equipment, as it currently does not have technical staff.

- *Indicator: Launch of at least one competitive access call to the Archaeomagnetism Laboratory (Yes/No) and opening of at least 20% of its calculated maximum capacity (Done: Yes/No).*

## **A.17. Launch at least one competitive access call for the ESR Laboratory.**

This Laboratory has been open in competitive access mode since 2021 and offers diverse services such as measurements at ambient and low temperature, with the possibility of “Q-band” and “X-band” measurements and sample irradiation for quartz and dentin.

- *Indicator: Launch of at least one competitive access call for the ESR Laboratory (Done: Yes/No) and opening of at least 20% of its calculated maximum capacity (Done: Yes/No).*

## **A.18. Launch at least one competitive access call for the Micro-Computed Tomography Laboratory.**

This Laboratory has been offered in competitive mode since 2019 and receives accesses of widely varying types due to its transversal nature. The acquisition of a new micro-tomography unit to enable biomechanical studies in situ and the tuning of the specific procedures for this type of test in 2023 expanded the possible offering in these access windows.

- *Indicator: Launch of at least one competitive access call for the Micro-Computed Tomography Laboratory (Done: Yes/No) and opening of at least 20% of its calculated maximum capacity (Done: Yes/No).*

## **A.19. Launch at least one competitive access call for the Uranium Series Laboratory.**



This laboratory was opened to competitive access mode in 2021, thus completing the offering of all the outstanding facilities to this kind of call. For 2024, it is sought to maintain access to these services using this system, including the new “Miami” method implemented in 2023 which reduces how long analyses take.

*- Indicator: Launch of at least one competitive access call for the Uranium Series Laboratory (Done: Yes/No) and opening of at least 20% of its calculated maximum capacity (Done: Yes/No).*

#### **A.20. Launch at least one competitive access call for the Conservation and Restoration Laboratory.**

This Laboratory is one of the two which embarked on competitive access mode in 2022. Its services include both the restoration and conservation of the Center's own collections, or those of the institutions so requiring.

*- Indicator: Launch of at least one competitive access call for the Conservation and Restoration Laboratory (Done: Yes/No) and opening of at least 20% of its calculated maximum capacity (Done: Yes/No).*

#### **A.21. Launch at least one competitive access call for the Cosmogenic Nuclides Laboratory.**

The opening of this Laboratory in 2023 has been consolidated. The agreements reached between this facility and the ICTS CNA (Centro Nacional de Aceleradores) strengthen the excellent scientific and technical offering in the field of cosmogenic nuclides.

*- Indicator: Launch of at least one competitive access mode for the Cosmogenic Nuclides Laboratory (Done: Yes/No) and opening of at least 20% of its calculated maximum capacity (Done: Yes/No).*

#### **A.22. Review and improvement in processes of request management and invoicing to optimizing the compilation of indicators for the ICTS evaluation.**

During 2024, it is proposed to review and improve the entire process from the reception of requests through the User Office, up to the issue of invoices, to offer a more user-friendly and efficient environment for users and mesh with the many national and international invoicing platforms (FACE, ChorusPro, etc). All of this will also take as its priority objective the compilation of information for more efficient integration of data with regard to the ICTS evaluation and calculating indicators.

*- Indicator: Compilation of analytical report with the improvements proposed and implemented, and the improvements in the compilation of data for the ICTS evaluation, so that this can be incorporated into the new Strategic Plan (Done: Yes/No).*



## **O.4. Increase the social impact and visibility of the CENIEH's activity.**

Any genuine scientific activity is incomplete unless it is bound up with a vocation for communication and social commitment. This work also has to be as inclusive as possible, and should also reach minority or disadvantaged sectors or groups. In 2024, we will continue to work on the quest for support which extends the reach of our impact on society and promotes the visibility of our Center's activity.

### **O.4.1. Enhance the engagement of the CENIEH in outreach.**

The development of a stable outreach program requires the involvement of other bodies and social institutions with which we can pool resources to allow us to reach an ever wider and more diverse audience. In addition to continuing with our usual outreach calendar in its multiple formats, in the year 2024 efforts will focus on:

#### **A.23. Quest for finance for carrying out the Center's outreach calendar.**

To help ensure the sustainability of the Center, and assist with its mission of knowledge transfer, in 2024 the CENIEH's Scientific Culture and Innovation Unit will work on a series of specific proposals that will be submitted to organizations or institutions that might support these as part of their social activity.

*- Indicator: Compilation and submission of proposals for financing the outreach calendar, to at least two institutions/organizations (Done: Yes/No).*

#### **A.24. Celebration of the 20th anniversary of the CENIEH.**

The year 2024 will mark two decades since the birth of the CENIEH and fifteen years since its current building was inaugurated within the Human Evolution Complex. With the idea of enhancing the visibility of the Center and its track record, an activity to commemorate all these years dedicated to science and outreach will be organized.

*- Indicator: Celebration of an event/activity to commemorate the 20th anniversary of the CENIEH (Done: Yes/No).*



## Transversal objectives

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The transversal objectives are the scaffolding around which the scientific and technical objectives of the Center are articulated, safeguarding the quality of the work and occupational safety and, in times of economic difficulties and uncertainty, promoting the stability and sustainability of the Center. We should highlight the following transversal objectives for 2024:

### **O.T.1. National Security Scheme (ENS).**

#### **A.25. Renew the ENS certification.**

In the interest of protecting people, their work, and the information flowing in the course of their activity, as well as in pursuit of the responsible exercise of our obligations, the CENIEH successfully achieved certification to the National Security Scheme ("ENS") in 2021. In 2024, the CENIEH will work on renewing the ENS certification in the basic category, to harmonize this to the new guidelines established by the Royal Decree 311/2022.

- *Indicator: Renewal of basic category ENS certification (Yes/No).*

### **O.T.2. Human Resources.**

#### **A.26. Continue with the accreditation process for the “HR Excellence in Research Award”.**

As part of the implementation process for the “HR Excellence in Research Award”, during 2024 it will be necessary to work on the distribution and schedule for the objectives identified in the *Action Plan* compiled and registered on the Eurasex platform in 2023.

- *Indicator: Presentation of the Action Plan 2024-2025 to the workforce (Yes/No), designation and appointment of the members of each Working Group (Yes/No), and definition of the 2024/2025 schedule for each Working Group.*

### **O.T. 3 Quality Management System (QMS).**

#### **A.27. Expand the scope of the QMS by implementing the requirements of the standard ISO 9001:2015 in new laboratories.**

Following drafting of the procedures and documents required by the standard in 2023, in the year 2024 monitoring will take place for the laboratories, depending on the staff available there, to ensure the proper implementation of the formats developed. This work will enable setting as an objective for 2025 the inclusion of these new laboratories within the scope of the ISO 9001:2015 Quality Management System, to coincide with renewal of the certification.





- *Indicator: Specific internal audit report prior to assessing whether to extend the scope of the QMS for the Cosmogenic Nuclides Laboratory in 2025 (Yes/No).*

### **A.28. Analysis of the working procedures in the quest for resource optimization, sustainability, and energy saving for the Center's activity.**

The delicate global economic backdrop, and that of the CENIEH in particular, emphasize the importance of the need to find working procedures which promote economic and environmental sustainability, guarantee responsible use of the resources available, and render possible the steady pursuit of targets within the time horizon of the new Strategic Plan to be put forward. In the course of 2024, within the Management Area and in each of the laboratories, an analysis will be conducted, with proposed measures for saving and optimization of resources and energy, from which a report will be compiled to support decisions about the new Strategic Plan. This report requires not only analyzing the current processes in place, but also exploring alternative methodologies or equipment which could improve the energy performance of the Center.

- *Indicator: Compilation of report on sustainability and saving proposals by the laboratories (Done: Yes/No).*

### **III. Summary table of the principal investments planned for fiscal year 2024.**

| <b>Project</b>   | <b>Related objective</b> | <b>Estimated cost</b> |
|--|--------------------------|-----------------------|
| Acquisition of amplifiers for the Neptune                            | O.2.1                    | €30,000               |
| Acquisition of GNSS receivers  | O.2.2                    | €40,000               |
| Acquisition of laser for the Conservation and Restoration Laboratory | O.2.3                    | €45,000               |



**IV. Summary table of objectives and indicators**

| Strategic objectives  | Specific objective   | Action and indicator  |
|---|--|---|
| <b>O.1. Enhance the quality of the scientific and technical production.</b> | O.1.1. Compile a new Strategic Plan 2025-2028.   | - <b>A1:</b> Strategic Plan evaluation report by the CAC (Yes/No).  |
|   | O.1.2. Attract staff using competitive calls.  | - <b>A2:</b> Hiring of at least seven new researchers/technicians (Yes/No).   |
|   | O.1.3. Increase the number of publications in SCI impact journals.   | - <b>A3:</b> Attainment of a four-year average of at least 3.3 SCI publications per researcher (Yes/No).  |
|   | O.1.4. Promote leadership and participation in prestigious paleontological and archaeological excavations.                         | - <b>A4:</b> Maintenance of the number of excavations and field interventions at which the CENIEH participates, with respect to 2023. (Yes/No). |
|   | O.1.5. Promote leadership in unique research projects.   | - <b>A5:</b> Submission of at least ten applications in project calls (Yes/No), two of these being international (Yes/No).                      |
| <b>O.2. Strengthen the uniqueness of the infrastructure.</b>                | O.2.1. Enhance the uniqueness of the Geochronology and Geology Program by expanding its capacities.                                | - <b>A6:</b> Documentation accrediting the purchase of new amplifiers for the Neptune (Yes/No).   |
|   |  | - <b>A7:</b> Pre-project for design and equipment of the Cosmogenic Nuclides Laboratory in its new location (Yes/No).                           |
|   | O.2.2. Increase the capacities of the Transversal Laboratories to meet the demand from the scientific and technological community. | - <b>A8:</b> Documentation accrediting the acquisition of GNSS receivers (Yes/No).  |
|   |  | - <b>A9:</b> Documentation accrediting the creation of a spectrum library using the FTIR microscope (Yes/No).                                   |
| <b>Strategic objectives</b>   | <b>Specific objective</b>  | <b>Action and indicator</b>   |



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| <b>O.2. Strengthen the uniqueness of the infrastructure.</b>                     | O.2.3. Improve and enhance the capacities of the Collections, Conservation and Restoration Area. | - <b>A10:</b> List of new samples included in LITHO (Yes/No).  |
|  |  | - <b>A11:</b> List of new digitalized samples included in TAPHO (Yes/No).  |
|  |  | - <b>A12:</b> Documentation accrediting the acquisition of laser (Yes/No).   |
|  | O.2.4. Increase the capacities of the CENIEH by augmenting the R+D+I areas where it works.       | - <b>A13:</b> Execution of the construction work for the Paleoproteomics Laboratory (Yes/No).  |
| <b>O.3. Expand and diversify the community to which the CENIEH offers R+D+I.</b> | O.3.1. Promote participation in infrastructure networks.   | - <b>A14:</b> Compilation and delivery of a report on the needs of the scientific community as part of IPERION HS (Yes/No).  |
|  | O.3.2. Promote the opening of all the essential laboratories to competitive access.              | - <b>A15:</b> Launch of at least one competitive access call to the Luminescence Laboratory and opening of at least 20% of its maximum capacity (Yes/No).              |
|  |  | - <b>A16:</b> Launch of at least one competitive access call to the Archaeomagnetism Laboratory (Yes/No) and opening of at least 20% of its maximum capacity (Yes/No). |
|  |  | - <b>A17:</b> Launch of at least one competitive access call to the ESR Laboratory and opening of at least 20% of its maximum capacity (Yes/No).                       |
|  |  | - <b>A18:</b> Launch of at least one competitive access call to the Micro-Computed Tomography Laboratory and opening of at least 20% of its maximum capacity (Yes/No). |

| Strategic objectives | Specific objective | Action and indicator |
|----------------------|--------------------|----------------------|
|----------------------|--------------------|----------------------|



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|---|--|--|
| <p><b>O.3. Expand and diversify the community to which the CENIEH offers R+D+I.</b></p> | <p>O.3.2. Promote the opening of all the essential laboratories to competitive access.</p>   | <p>- <b>A19:</b> Launch of at least one competitive access call to the Uranium Series Laboratory and opening of at least 20% of its maximum capacity (Yes/No).</p>               |
|   |  | <p>- <b>A20:</b> Launch of at least one competitive access call to the Conservation and Restoration Laboratory and opening of at least 20% of its maximum capacity (Yes/No).</p> |
|   |  | <p>- <b>A21:</b> Launch of at least one competitive access call to the Cosmogenic Nuclides Laboratory and opening of at least 20% of its maximum capacity (Yes/No).</p>          |
|   |  | <p>- <b>A22:</b> Compilation of report analyzing improvements for the management of ICTS requests and data compilation (Yes/No).</p>   |
| <p><b>O.4. Increase the social impact and visibility of the CENIEH's activity.</b></p>  | <p>O.4.1. Enhance the engagement of the CENIEH in outreach.</p>  | <p>- <b>A23:</b> Compilation and submission of funding proposal to two institutions/organizations (Yes/No).</p>  |
|   |  | <p>- <b>A24:</b> Celebration of event to mark 20th anniversary of the CENIEH (Yes/No).</p>   |
| <p><b>O.T.1. National Security Scheme (ENS).</b></p>                                    | <p>Renewal of certification to the basic category National Security Scheme (ENS) to harmonize this to the new guidelines established by the Royal Decree 311/2022.</p> | <p>- <b>A25:</b> Renewal of basic ENS certification (Yes/No).</p>  |
| <p><b>O.T.2. Human Resources.</b></p>   | <p>Obtain the “HR Excellence in Research Award”.</p>   | <p>- <b>A26:</b> Presentation of the Action Plan 2024-2025 (Yes/No), designation and appointment of the WG (Yes/No) and definition of the schedule for each WG (Yes/No).</p>     |
| <p><b>Strategic objectives</b></p>  | <p><b>Specific objective</b></p>   | <p><b>Action and indicator</b></p>   |



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|---|--|--|
| <b>O.T.3. Quality Management System (QMS)</b> | Expand the scope of the QMS implementing the standard ISO 9001:2015 in new laboratories. | - <b>A27:</b> Specific internal audit for the Cosmogenic Nuclides Laboratory (Yes/No). |
|   | Analysis of the working procedures in the quest for sustainability and saving.           | - <b>A28:</b> Compilation of report on sustainability and saving proposals (Yes/No).   |