

CENIEH
STRATEGIC
PLAN

2021-2024

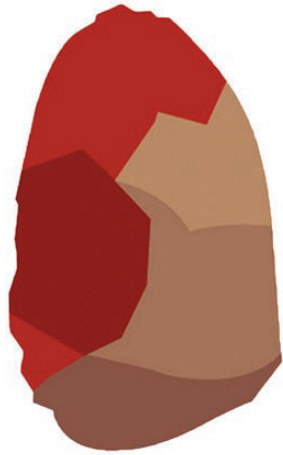


CENIEH

Centro Nacional de Investigación
sobre la Evolución Humana



Infraestructuras
Científicas y Técnicas
Singular



CENIEH

Centro Nacional de Investigación
sobre la Evolución Humana

CENIEH STRATEGIC PLAN 2021 - 2024



GOBIERNO
DE ESPAÑA

MINISTERIO
DE CIENCIA
E INNOVACIÓN



Junta de
Castilla y León

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chapter 1

ANALYSIS OF COMPLIANCE WITH THE PREVIOUS STRATEGIC PLAN

The CENIEH Strategic Plan 2017-2020 set three major objectives:

- O.1. To increase scientific and technical production and quality
- O.2. To reinforce the uniqueness of the CENIEH to increase and diversify the accesses to the infrastructure
- O.3. To raise the impact on society and the national and international visibility of the CENIEH

The degree of compliance with the previous Strategic Plan can be considered to be highly satisfactory. The table below sets out how the values of the indicators proposed in the former Strategic Plan have evolved.

INDICATOR	Starting point	Goal	Final value
Number of SCI publications (four-year average)	66	Increase by 10%	74
Number of SCI publications/total	0.71	Increase to 0.75	0.78
Number of applications in calls for incorporation of human resources	14	Average of 15	Average of 23
Number of people hired in calls for incorporation of human resources	2	Achieve 3 per year	Average of 5
Number of grants with external co-financing	0	Maintain an average of 3	Average of 4
Number of competitive project applications	60	70	68
Number of competitive projects awarded in four years	37	45	39
Increase in % of competitive financing from the % in 2016	11.36%	15%	35%
Number of scientific and infrastructure network projects in four years	3	5	5
Number of contracts of private and technological/ industrial scope for the four-year period	0	4	8
Annual access requests since 2016 ¹	156	300	203
Access request that result in publications annually (four-year average) ¹	55	100	106
National projects related to access requests (four-year average)	29	40	63
International projects related to access requests (four-year average)	5	10	15

Number of institutional visits to CENIEH facilities annually	5	7	Average of 15
Number of collaboration agreements with scientific and infrastructure institutions in the four-year period	20	20	20
Internship staff at the Center (average for the four-year period) ²	18	18	18
Number of congresses and scientific meetings organized and/or held at the CENIEH during the four-year period ³	12	15	12
Number of outreach activities organized by the CENIEH during the four-year period	6	36	39
Number of followers of @CENIEH	6.401	Reach 10.000 followers	10.800 followers
Number of followers of CENIEH Instagram ⁴	0	--	1665

¹ We would like to point out a change in how the requests are counted. Certain accesses require transversal and sequential use of different laboratories: these were formerly reckoned as separate requests, while now they are grouped into a single entry at the User Office. Even so, we can verify that occupancy of the laboratories open to competitive access was 100%.

² The annual average for 2017-2019 was 21 but COVID limited internships during 2020. Still, the goal is achieved.

³ The pandemic has forced us to cancel all the in-person activities for 2020, including the Luminescence World Conference in Burgos and two workshops from the Paleobiology Program, hence preventing us from achieving this goal.

⁴ This indicator is proposed as an alternative to "Influence indicator for social networks (Kloud)" proposed in the Strategic Plan 2017-2020, since the Kloud index is obsolete.

During this period, projects of special importance which enhanced the uniqueness and excellence of the Center in relation to its research programs and its ICTS standing were carried out. In particular, **the two main recommendations of the Scientific Advisory Board of Unique Infrastructures (CAIS) in its most recent assessment have been implemented:**

- > The need to implement a **competitive access system to the ICTS.**
- > The importance of reaching an **agreement on the custody of the Atapuerca collections** at the Center.

Over the period 2017-2020, three of the five laboratories considered **Outstanding Facilities have been opened to the scientific and technological community via the competitive access mode**, and the tools and planning necessary to do the same for the remaining two, in 2021, are already underway. There is great demand for these facilities, and the access requests are financed by an ever-rising number of national and international competitive research projects, which contribute to the excellence of the CENIEH's activity. In addition to this, **all the Outstanding Facilities have been open since 2020 to access via the European infrastructure network IPERION HS** (Integrated Platform for the European Research Infrastructure for Heritage Science), and this will also be the case once the deployment of E-RIHS (European Research Infrastructure for Heritage Science), in which the CENIEH is involved, is complete.

In this context, the CENIEH continues its drive for a **strategic positioning in the ESFRI** (European Strategy Forum on Research Infrastructure) roadmap through its participation in E-RIHS (European Research Infrastructure for Heritage) and nurturing its involvement in other European infrastructure network projects.

Currently, the Center is engaged in various initiatives among which, because of the volume and scope of the work they involve, we can highlight IPERION HS and ARIADNEplus (Advance Research Infrastructure for Archaeological Dataset Networking in Europe) which contribute to the **Open Access** philosophy of the ICTS.

As one of the most idiosyncratic activities of the Center, the CENIEH staff are currently **leading or contributing to research on thirty archaeological and paleontological sites which are crucial for tackling fundamental questions about the biological and cultural evolution of humans** in Spain (Atapuerca, Ambrona and Torralba, Arambazta), Algeria (Tighennif, Ain Boucherit-Ain Hanech), India (Sendrayanpalayam), Ethiopia (Gona, Afar), Kenya (Turkana), Israel (Qesem), Tanzania (Olduvai) and China (Nihewan Basin), to name just a few. The ICTS infrastructures have been involved in paradigmatic studies such as the earliest evidence of tool use in humans, the first appearance of modern humans outside Africa, the recovery of the oldest human proteins with close to 1 million years of antiquity, or the characterization of new and unknown hominin populations in China. Its research activity has also contributed **to reconstructing past climate changes and landscapes and linking them to specific human and faunal evolutionary events**. Interestingly, apart from providing a chronological frame for archaeological and fossil findings, the Geochronology and Geology laboratories are crucial for investigating the timescales and rates of Earth surface processes such as floor erosions, and other environmental events (e.g., glaciations, floods related to glaciers retreats, tsunamis) that can help assess the degree of human adaptation to ecological and global challenges as well as the impact that humans may have had on nature throughout time. This type of research enhances the importance of investigating **human-environment interactions** and emphasizes **the role that the study of the past can have in modelling the future and assessing the sustainability of our technological relationship with nature**. Investigation about topics such as cannibalism, self-domestication, growth and development, diet and metabolism have contributed to a better understanding of the flexibility and adaptability of human nature.

Seeking to revitalise the study of humans, during the last four years the CENIEH **has built the base to launch in the next period a research line in Cognitive Archaeology** that aims to bring a more dynamic approach by understanding the mind that manufactured tools and exploited the environmental resources. This area combines concepts from Cognitive Sciences, Psychology and Experimental Archaeology, and it will enhance the synergy between the Archaeology Program and the Paleoneurobiology research line at CENIEH that is devoted to the analysis of brain evolution and the neuronal activity and neurophysiological aspects related to tool use and manipulation. With this vision, during the 2017-2020 period, **the CENIEH built an Experimental Archaeology and Taphonomy Laboratory, which will be pivotal to infer the abilities and behavior of past human populations** by reproducing and interpreting the marks their activities leave in the fossil and archaeological record.

As one of the best indicators of the quality and scientific leadership of the CENIEH **we highlight the scientific publications in journals of the Science Citation Index (SCI)**. Between 2017 and 2020, CENIEH researchers have published over 300 papers, of which more than half are ranked in the first quartile. Some of them have received **worldwide media attention and appear among the most important scientific discoveries of the year in the annual lists of journals such as Science and Nature**. The average number of SCI publications per researcher has increased from 2.6 in 2016 to 4, with an exceptional proportion of **no less than 1.7 papers per scientist in the first quartile**.

The number of access requests to the infrastructure has increased steadily during this period. Particularly noteworthy is **the rise in the number of demands from the private sector** (up to 20%). This is evidence of the CENIEH's potential for technological transfer and innovation, participating in several endeavors requested from the **pharmaceutical and construction sector in relation to quality control analyses, science of materials, contamination and palaeo-seismic analyses for environmental risk assessment in nuclear power plants, as well as research in heritage conservation**. Apart from contracts with technological companies, opening up to the industrial community is boosted through the synergies with the Science and Technology Park of the University of Burgos.

As encouraged by the CAIS, in 2019 the Covenant with the Consejería de Cultura y Turismo of the Junta

de Castilla y León and the Fundación Siglo, para el Turismo y las Artes de Castilla y León was finally signed, formalizing **the CENIEH collaboration on the collections management program and research program of the Atapuerca System**. To accomplish this milestone, the CENIEH made significant investments in human and financial resources for the climate-control and armoring of the vault for the Atapuerca fossils, and to develop and implement specific management software for consultation. These actions were partly subsidized by the funding call for acquisition of scientific-technical equipment under the auspices of the National Scientific and Technical Research and Innovation Plan, co-financed with ERDF funds from the MINECO. The period 2017-2020 can be considered essential to the enhancement of the Collections, Conservation and Restoration Area. The creation of an **Experimental Archaeology Laboratory represents a further important source of materials to augment the Experimental Traceology Collection (CET) and the Mineral Collection (LITHO) which, in conjunction with the Comparative Anatomy Osteological Collection (COAC), are open to online consultation in the spirit of open access that characterizes the ICTS.**

Regarding the competitive applications for funding we highlight **the increase in the applications and success rate in relevant and international calls** (such as those from the European Research Council: Starting Grant and MSC-European Training Network) as well as the rise in absolute and relative income. In 2020, **income for research projects represented 35% of the total income of the CENIEH** as compared to 11% in 2016. In absolute terms, this financing stood at 4,985,478.53 euros over 2017-2020 compared with 2,805,205.46 euros awarded between 2013 and 2016.

		FUNDING (in euros)							
		2017		2018		2019		2020	
Consortium		970,000.0	62%	1,485,000.0	48%	3,841,667.0	74%	4,051,667.0	63%
Competitive		447,882.7	28%	1,082,761.2	35%	1,223,354.8	24%	2,231,479.8	35%
Other		155,917.9	10%	529,912.6	17%	125,863.0	2%	109,701.8	2%
Total		1,573,800.6	100%	3,097,673.8	100%	5,190,884.8	100%	6,392,848.6	100%

There is also a **positive trend in the increase of applications and rate of success in competitive calls for human resources**, highlighting, because of their prestige, the incorporation of 5 researchers through Juan de la Cierva and Ramón y Cajal calls. All of this is evidence of the reinforcement of the uniqueness, excellence and competitiveness of the CENIEH.

Regarding teaching, CENIEH staff have been involved in the annual supervision of more than twenty **doctoral theses** during this period, most of them registered at the University of Burgos which offers a Human Evolution Master and Doctorate Program the CENIEH staff is closely involved in.

It is crucial to **underscore the commitment of CENIEH personnel to outreach as well as the activity of its UCC+I (Scientific Culture and Innovation Unit)**. In 2018, the agency SINC, the first nationwide science news agency, created by the FECTY (Fundación Española de Ciencia y Tecnología), awarded a prize to the CENIEH UCC+I for its work of conveying the scientific advances in human evolution to society at large. During 2017-2020, the CENIEH has regularly offered a **varied, inclusive and diverse calendar of outreach activities** such as Women and Science Week, European White Night, European Researchers' night, Science Week and summer courses. In the last few years, this programme has been expanded with talks, workshops and activities of broader scope and audience to **stimulate a scientific and evolutionary approach to global questions and challenges such as gender equality, climate change and the coming of the Anthropocene era**. This calendar also promotes **Citizen Science** with activities such as "Ratón Pérez collection" which gathers milk teeth donated by children for scientific studies of evolutionary and forensic value. The participants assist in the collection of relevant data and are aware of the methods and results of the studies they take part in.

Furthermore, our work abroad always involves **balanced partnerships** with local stakeholders and knowledge exchange in addition to the specific research activities, to make sure that **our work is both socially responsible and sustainable into the future.**

Finally, CENIEH is devoted to the implementation of a **Quality Management System** that ensures that the activities and procedures of the center regarding quality and user's satisfaction, as well as occupational health and safety, comply with the highest standards. Through official annual audits, the CENIEH has been recertified to the standard ISO 9001:2015 and continues with the implementation of the ISO 45001:2018. This Quality Management System also observes sustainable science with the implementation of an **Integrated Waste Management Plan** for all the laboratories. We are also involved in the implementation of a **shared energy supply system** (Central de Instalaciones y servicios) for the entire Human Evolution Complex (CENIEH, MEH and Forum) based on the joint co-generation of electricity and heat based on natural gas, that ensures low emission of greenhouse gases and guarantees efficiency and saving of primary energy.

chapter 2

MISSION AND VISION

MISSION: What are we?

The mission of the CENIEH is to promote **excellent and interdisciplinary research in the field of human evolution**, including the reconstruction of landscape, environment and climate changes and their implication in hominin and other faunal migrations and settlements. The CENIEH will provide support to singular research projects and excavations at archaeological and paleontological sites all over the world. As an ICTS, the CENIEH must act as a **source of knowledge and resources at the service of the scientific, technological and industrial community** as well as to build **effective cooperation between science and society**, pairing scientific excellence with social awareness and responsibility.

VISION: CENIEH 2024

A European benchmark in the **generation and transmission of knowledge** regarding human evolution to the scientific and technical community.

A **leading institution** that stands out thanks to its **interdisciplinary approach** to the study of our origins, combining innovation at an intellectual and technological level.

An excellent research center, with a **unique and recognizable identity**, that promotes technological advances in other fields.

An instrumental player in **connecting science to society**, promoting the value of science to address global challenges such as environmental sustainability, climate change, heritage conservation and responsibility in the use of technology.

A reference institution **decolonizing the discipline** through a critical awareness of the risks of unequal relationships working in other countries, and an active engagement in developing balanced, **equal and sustainable relationships** with multiple stakeholders.

chapter 3

SWOT ANALYSIS

Weaknesses

- High number of staff on fixed term contracts leads to loss of technical and research expertise and impedes long term planning.
- Lack of a career plan and an appropriate incentive system to attract talent and align staff with the institutional objectives.
- Financial and administrative limitations on hiring and replenishing staff to allow the structural needs of the Center to be met.
- Difficulty in establishing collaborations with the business community as an ICTS in the field of the Social Sciences and Humanities.

Threats

- Risk of reduction in overall science funding in a context of instability and economic crisis, and a restrictive post-COVID fiscal policy.
- Difficulty in competing for funds due to excessive emphasis by the public authorities on the so-called “applied sciences” as against “basic sciences”.
- Emerging pandemic-related risks to activity requiring personal attendance.

Strengths

- Being the only ICTS in the field of the Social Sciences and Humanities reinforces the singularity of its activity and the expertise it can contribute.
- Availability of singular or unusual equipments, some of them unique at national and European level, with applicability to human evolution and other related areas such as heritage science, environmental studies, studies of new materials, climate change and pollution.
- The possibility of tackling all the essential aspects of any investigation in the field of human evolution in a single place, through the Center’s unique laboratories and its Research Programs (Paleobiology, Archaeology and Geochronology and Geology).
- International recognition of the scientific excellence of the CENIEH because of its high-impact publications.
- Proximity to worldwide reference sites like those of the Sierra de Atapuerca, and presence at some of the world’s most outstanding paleontological and archaeological sites.
- Social recognition thanks to a powerful and multi-format communication and outreach program enhancing the visibility of the Center and encouraging critical and constructive thinking on the role of science in today’s world.

Opportunities

- Recognition of research into Human Evolution, Anthropology and Archaeology as a strategic priority line in the Spanish Strategy for Science, Technology and Innovation (EECTI) 2021-2027 and Horizon Europe.
- Participation in advanced European infrastructure networks as an opportunity for innovation and diversification of research and technological activity.

- The possibility of benefiting, as ICTS, from infrastructure support actions like the European Regional Development Fund (ERDF).
- The possibility of synergy with the immediate environment, the Museo de la Evolución Humana and the University of Burgos, to develop a complete plan for the generation and transmission of knowledge.

chapter 4

OBJECTIVES FOR THE FOLLOWING FOUR-YEAR PERIOD

4.1 Description of the objectives

As an ICTS and research center, the CENIEH continues its commitment to excellence within the R+D+I sector, leading the advances in its most representative broad lines and fomenting its own development in other emerging areas. This ambition can only be attained by:

- i) **A critical mass of excellent scientists and technicians**
- ii) **A drive for innovation and continuous improvement in its infrastructures**
- iii) An effort **to expand and diversify the** community to which the CENIEH transfers its knowledge and its technology

Further, the CENIEH aspires to encourage the development **of a scientific culture** to nurture the engagement of society at large with R+D+I. By means of outreach and teaching, it hopes to improve the impact of science on society, to **encourage critical and constructive thinking on sustainability science** and on the role that scientific and technical knowledge can play in today's world and the future.

The strategic objectives for 2021-2024 are:

OE.1. To enhance the quality of the scientific and technical production by

- Increasing the critical mass of researchers and technicians.
- Promoting publication in SCI impact journals.
- Promoting leadership and participation in prestigious excavations and unique research projects.

OE.2. To strengthen the uniqueness of the infrastructure by

- Enhancing the uniqueness of the Geochronology and Geology Program through the expansion of the capabilities of its facilities and laboratories.
- Increasing the capacities of the Transversal Laboratories of the CENIEH as well as the Collections, Conservation and Restoration Area.
- Completing the areas of R+D+I where the CENIEH works by developing a Molecular Biology research infrastructure and a Cognitive Archaeology Research Line.

OE.3. To expand and diversify the community to which the CENIEH offers R+D+I by

- Participating in advanced networks of excellent infrastructures in Europe.

- Extending the ICTS competitive access mode to the essential laboratories.
- Transferring the knowledge generated to society and to the technological and industrial spheres.

OE.4. To increase the social impact and visibility of the CENIEH by

- Promoting the participation of the CENIEH in training and teaching programs such as supervision of PhD and Master students and internships.
- Enhancing the engagement of the CENIEH in Science with and for society with a broad, dynamic, diverse and inclusive outreach program.
- Exploring and further developing Inclusive Science Communication and Citizen Science initiatives.

OE.5. Nurture an optimal framework for professional development and productivity by

- Promoting an institutional quality model that seeks for optimization and environmentally-responsible use of resources and occupational health and safety.
- Developing and implementing human resources policies and practices that promote equality and transparency.
- Enhancing equality by developing a Gender Equality plan.
- Observing an Integral Waste Management plan that aims for energy saving and efficiency.

4.2 and 4.3 Strategies to meet the objectives and actions envisaged

Strategic objectives	Specific objective	Strategy	Actions envisaged
OE.1. Enhance the quality of the scientific and technical production	O.1. Increase the leadership and quality of the scientific research and projects	E.1. Increase the critical mass of researchers and technicians	A.1. Encourage participation in competitive calls to attract staff
		E.2. Publish in SCI impact journals, especially in the first quartiles (Q1/Q2)	A.2. Encourage publication in SCI impact journals, especially in the first quartiles (Q1/Q2)
		E.3. Lead and participate in prestigious paleontological and archaeological excavations	A.3. Encourage leadership at prestigious excavations
		E.4. Lead unique research projects, especially European ones	A.4. Encourage participation in research project calls, especially international ones
		E.5. Organize prestigious scientific conferences and meetings	A.5. Encourage the organization of scientific conferences and meetings
OE.2. Strengthen the uniqueness of the infrastructure	O2. Enhance the uniqueness of the Geochronology and Geology Program by expanding its capacities	E.6. Update and improve the capacities of the Uranium Series Laboratory	A.6. Acquire and set up an alpha spectrometer A.7. Create a Chemical Preparation Laboratory

Strategic objectives	Specific objective	Strategy	Actions envisaged
<p>OE.2. Strengthen the uniqueness of the infrastructure</p>	<p>O2. Enhance the uniqueness of the Geochronology and Geology Program by expanding its capacities</p>	<p>E.6. Update and improve the capacities of the Uranium Series Laboratory</p>	<p>A.8. Upgrade the hardware of the ICP-MS Neptune A.9. Update the laser ablation equipment</p>
	<p>E.7. Update and improve the capacities of the Luminescence Laboratory</p>	<p>A.10. Acquire and set up a detector fitted with a dual scintillator A.11. Acquire and set up a TL/OSL RISØ luminescence reader fitted with spectrometer A.12. Acquire and set up an electrical cooling system for the germanium detectors</p>	
	<p>E.8. Update and improve the capacities of the Cosmogenic Nuclides Laboratory</p>	<p>A.13. Develop a collaboration program with other centers to be able to offer a comprehensive cosmogenic dating service, if possible in Spain (CNA-ICTS) A.14. Expand the Cosmogenic Nuclides Laboratory to implement analysis of ¹⁰Be and ³⁶Cl</p>	
	<p>E.9. Improve the capacities of the ESR Laboratory</p>	<p>A.15. Acquire new HPGe Xtra gamma spectrometry equipment</p>	
	<p>E.10. Improve the capacities of the CENIEH by optimizing the use of the spaces</p>	<p>A.16. Prepare a space occupancy plan allowing for the forecast growth A.17. Execute the doubling work for the 4th and 5th floors of the central space in accordance with the occupancy plan</p>	
	<p>O.3. Improve and enhance the capacities of the Collections, Conservation and Restoration Area</p>	<p>E.11. Expand the CENIEH Collections and open them to the scientific community</p>	<p>A.18. Expand the Comparative Anatomy Osteological Collection (COAC) A.19. Augment the Mineral Collection (LITHO) and the Experimental Traceology Collection (CET) and open them to the scientific community</p>
	<p>E.12. Encourage the deposit of external collections</p>	<p>A.20. Continue the deposit, inventorying and consultation management for external collections regulated by covenant (e.g. Atapuerca)</p>	
	<p>E.13. Improve the capacities and services of the Collections, Conservation and Restoration Area</p>	<p>A.21. Develop and implement an Emergency Plan A.22. Develop and implement a Conservation Plan for the CENIEH and MEH collections A.23. Acquire and implement laser treatment for the restoration of a wider variety of materials</p>	

Strategic objectives	Specific objective	Strategy	Actions envisaged
	O.4. Increase the capacities of the Transversal Laboratories to meet the demand from the scientific-technological community	E.14. Enhance the Microscopy and Computerized Axial Tomography Laboratory	A.24. Install and set up new microCT equipment and carry out the updates necessary A.25. Update the current microCT equipment A.26. Acquire and set up a 3D microscopy unit A.27. Capture the human resources necessary for the functioning of the Laboratory
		E.15. Increase the capacities of the Archaeometry Laboratory	A.28. Acquire and set up an FTIR microscope
		E.16. Update and improve the capacities of the Digital Mapping and 3D Analysis Laboratory	A.29. Acquire new equipment and software (GPS, 3D field scanner, drones...)
	O.5. Increase the capacities of the CENIEH by completing the R+D+i areas where it works	E.17. Develop a Paleoproteomics line of research	A.30. Create a Paleoproteomics Laboratory A.31. Capture the human resources necessary to launch the paleoproteomics research line A.32. Develop a collaboration program with other centers
		E.18. Develop a Quantitative Genetic Analysis line of research	A.33. Create a molecular analysis cluster
		E.19. Increase the research focus of the Archaeology Program with a cognitive and experimental approach	A.34. Capture the human resources necessary to launch a Cognitive Archaeology line A.35. Set up the Experimental Archaeology Laboratory equipment
OE.3. Expand and diversify the community to which the CENIEH offers R+D+i	O.6. Promote open, transparent and diverse access to the ICTS	E.20. Promote the participation of the CENIEH in infrastructure networks (E-RIHS, ARIADNE, IPERION)	A.36. Participate in heritage networks (E-RIHS and IPERION HS) A.37. Participate in digitalization and open access networks for data or results A.38. Create a European Projects Office
		E.21. Extend the ICTS competitive access mode to all the Geochronology laboratories	A.39. Open the Uranium Series Laboratory to competitive access A.40. Open the Cosmogenic Nuclides Laboratory to competitive access A.41. Open the Conservation and Restoration Laboratory to competitive access A.42. Open the ESR Laboratory to competitive access

Strategic objectives	Specific objective	Strategy	Actions envisaged
<p>OE.3. Expand and diversify the community to which the CENIEH offers R+D+i</p>	<p>O.7. Enhance knowledge transfer</p>	<p>E.22. Establish collaborations with the industrial and private sectors</p>	<p>A.43. Develop and implement a plan to present the CENIEH to technological centers, business platforms and companies</p> <p>A.44. Apply for European funding calls in collaboration with private entities or technological centers</p>
	<p>O.8. Boost the involvement of the CENIEH in teaching</p>	<p>E.23. Promote the participation of the Center in training and teaching programs such as those from the University of Burgos</p>	<p>A.45. Encourage direction/supervision of doctoral and master's theses and final-year projects</p> <p>A.46. Encourage the supervision of internships</p> <p>A.47. Encourage organization and participation in training courses</p>
<p>OE.4. Increase the social impact and visibility of the CENIEH</p>		<p>O.9. Enhance the engagement of the CENIEH in outreach</p>	<p>E.24. Promote Science with and for Society</p>
	<p>E.25. Promote a Science Inclusive Communication program</p>		<p>A.53. Adapting the main events of the outreach calendar to the hearing-impaired</p>
	<p>E.26. Develop and implement a digital transformation plan</p>		<p>A.54. Create an audiovisual recording and communication studio and acquire a field recording system</p> <p>A.55. Develop new stable communication formats (podcasts, radio, courses, workshops...)</p>

Strategic objectives	Specific objective	Strategy	Actions envisaged
OE.5. Nurture an optimal framework for professional development and productivity	O.10. Guarantee security in the use of electronic media and IT systems	E.27. Obtain basic ENS (National Scheme of Security) certification	A.56. Define the documentary framework and implement the procedures and software necessary to obtain ENS certification (2021) and to renew it in 2023
	O.11. Promote an institutional quality model	E.28. Promote the optimization and environmentally-responsible use of resources as well as ensuring quality of procedures and occupation health and safety	A.57. Continue to define and integrate the processes of the ISO 45001:2018 standard A.58. Maintain the Integral Waste Management and recycling plans for CENIEH's activity
		E.29. Promote equality and transparency by implementing human resources policies that promote equality and transparency.	A.59. Development of the "HR Excellence in Research Award" A.60. Develop a Gender Equality Plan
	O.12. Ensure an up-to-date and effective ICT system	E.30. Renew and update the ICT tools	A.61. Renew the security and management software systems, increase the storage capacity and expand the server capacity

4.4 Resources

The following tables show the breakdown by functional area and gender (M: male, F: female) of the human resources for the 2021-2024 period.

	2017			2018			2019			2020		
	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Researchers	13	6	19	13	6	19	15	6	21	15	8	23
Pre-doctoral researchers	3	6	9	3	5	8	2	2	4	2	5	7
Technicians	6	11	17	8	10	18	7	15	22	6	16	22
Internationalization	-	1	1	-	1	1	-	1	1	-	1	1
Administration and Research Support	4	7	11	4	7	11	4	7	11	4	6	10
Total	26	31	57	28	29	57	28	31	59	27	36	63
	46%	54%		49%	51%		47%	53%		43%	57%	

The CENIEH has positively accomplished gender balance including prominent roles for women at leading positions such as the center direction, general laboratories management, human resources and leading

scientists in laboratories and research projects. Still, a gender equality plan will be implemented to improve and guarantee the balance.

For the implementation of the present Strategic Plan, it will be necessary **to raise the number of human resources at the Center**, especially for the development of projects aimed to reinforce the uniqueness of the CENIEH and to increase the diversity of the accesses to the infrastructure. The high turnover of the staff (currently 46% on fixed term contracts) will require a continuous effort to replace the personnel through the usual competitive calls (e.g., Personal Técnico de Apoyo-PTA, Ayudas Juan de la Cierva and Ramón y Cajal). Apart from the basic coverage of the personnel needed to maintain the optimal functioning of the laboratories and unique research lines of the Center, there are some key technical and research positions that should be covered in the coming 2021-2024 period.

1. Research Scientist/Doctor and Senior Technician in Molecular Biology:

As this is an ICTS dedicated to a holistic conception of the biological and cultural evolution of the human being, it is necessary for the CENIEH to incorporate a molecular approach into its laboratories and lines of research. The creation a Molecular Paleo-Biology Research Unit in collaboration with the Instituto de Biología Evolutiva (IBE, UPF-CSIC) will require the construction of a sample treatment laboratory at CENIEH for the first stage of the analysis, extractions of paleoproteins that will be sequenced at the IBE. This endeavour requires the hiring of a scientist and a technician to implement the activity.

2. Senior Technician in Cosmogenic Nuclides:

The present Strategic Plan incorporates an important enhancement of the Cosmogenics Nuclides laboratory, with the idea of providing to this line of research more weight and infrastructural autonomy. CENIEH could represent the first infrastructure in Spain capable of preparing samples for expanding $^{10}\text{Be}/^{26}\text{Al}$, ^{10}Be (meteoric) and ^{36}Cl incrementing the type of dating techniques as well as allowing for environmental and climate reconstructions. Currently, this lab operates with one senior scientist and the partial support of a technician from the Geology area. For this laboratory to be operational a Senior technician is needed.

3. Technician in Microscopy and Microtomography.

The micro-computed tomography (microCT) is one of the techniques most demanded in relation to research and the technological-industrial sector, as well as being one of those with the greatest potential for transferring knowledge to other areas. The CENIEH has acquired a new computerized axial microtomography apparatus which, compared to the existing unit, will enable larger pieces to be scanned, reduce analysis times and complement what the current equipment offers. This can potentially increase in significant manner the services that the CENIEH can offer to the scientific and technical community, but additional personnel support is needed to make it operational. In addition, the Microscopy Laboratory will incorporate a new 3D Digital Microscopy unit, which will complement the existing confocal microscopy equipment and has a great variety of applications for traceological and taphonomic studies, in clear synergy with the new Experimental Archaeology and Taphonomy Laboratory. Overall, this Laboratory needs a technician with expertise in acquiring, processing and interpreting virtual images to develop the full potential of the facilities.

4. Research Scientists in Cognitive Archaeology.

One of the objectives of the Strategic Plan for 2021-2024 is the establishment of a research line in Cognitive Archaeology, a discipline that is closely connected to the use of the Experimental Archaeology and Taphonomy Laboratory and the Paleoneurobiology Research Line at the centre. This will allow the CENIEH to lead an emerging discipline and to enhance the possibilities of the new infrastructures developed in the center in the previous period.

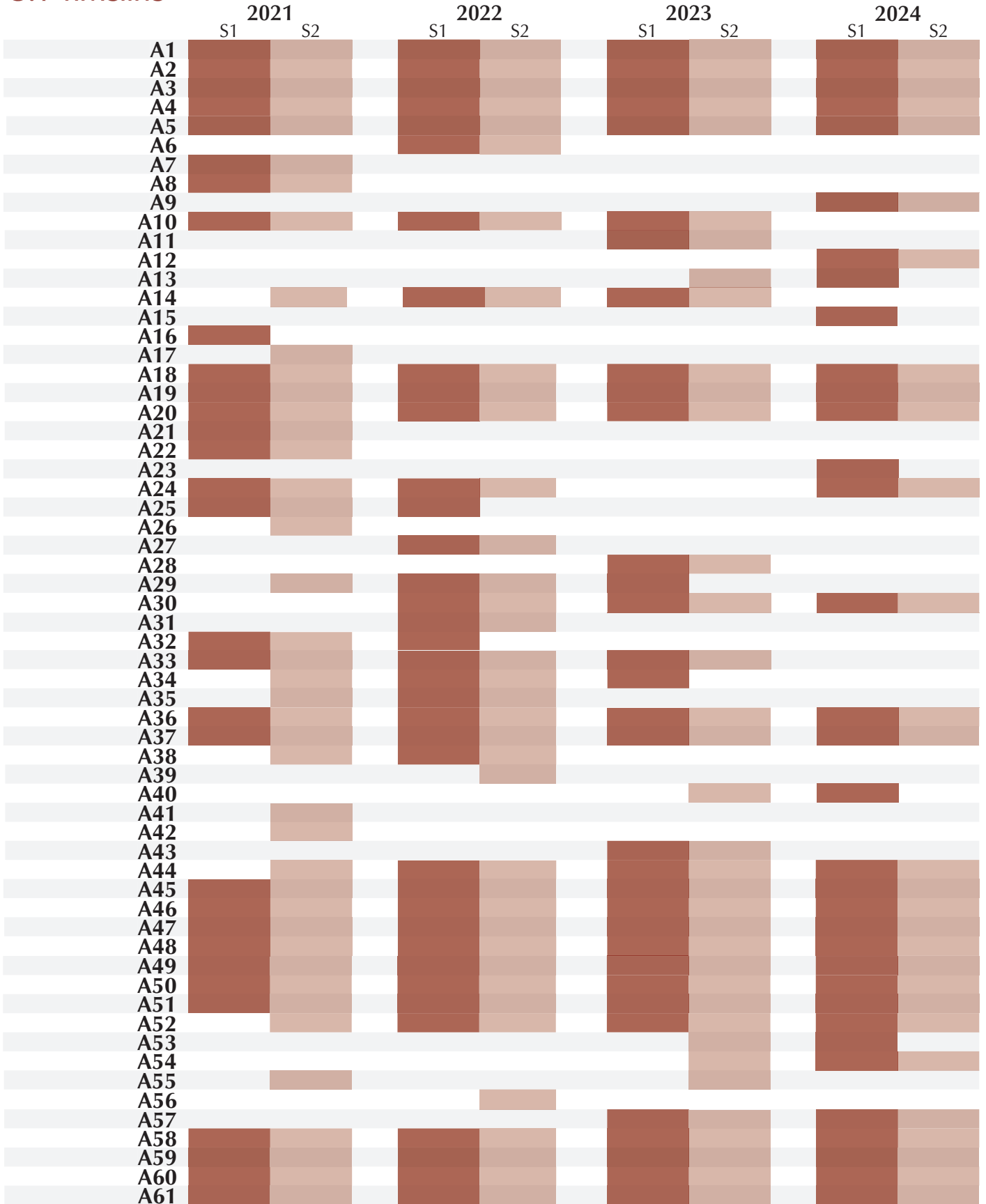
5. Technician in Experimental Archaeology.

This lab was implemented at the end of 2020 and needs technical personnel to be operational. The activity of this lab will have direct impact in the increase of the Experimental Traceology (CET), the Lithoteque (LITHO) and Comparative Anatomy Collection (COAC) as well as the development of the Cognitive Archaeology Research Line.

chapter **5**

Timeline and monitoring

5.1 Timeline



5.2. Monitoring indicators

INDICATOR		Goal
Number of SCI publications per scientist (four-year average)	3	Increase by 10%
Ratio of Q1 and Q2/ total SCI (four-year average)	0.5	0.6
Number of applications in calls for incorporation of human resources (four-year average)	23	25
Number of people hired in calls for incorporation of human resources (four-year average)	5	7
Number of competitive projects applied annually (four-year average)	23	25
Number of competitive projects awarded annually (four-year average)	9	10
Increase in % of competitive financing (four-year average)	30%	35%
Number of scientific and infrastructure network projects (four-year average)	3	3
% of the ICTS that is open to competitive call	22%	35%
Access requests that result in publications annually (four-year average)	100	110
International projects related to access requests (four-year average)	15	18
PhD directed by staff (average for the four-year period)	20	25
Internship staff at the Center (average for the four-year period)	18	20
Number of outreach activities organized by the CENIEH annually (four-year period)	6	7
Number of followers of CENIEH in social networks	15.650	Increase 5%
Number of outreach activities adapted to remote modality	No	Half of the calendar activities
Number of outreach activities adapted to the hearing-impaired	No	Half of the calendar activities



Junta de
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