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Annual Finance Report 2021

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Director General Foreword.

The year of 2021 was the second year in which the world was suffering from the consequences of the Sars-Cov-2 pandemic. And we can expect that also the year of 2022 will be a year having the Sars-Cov-2 pandemic very present. We will surely all remember these years. At INL, we have handled, and will continue to handle, the Covid-situation with clarity and efficiency, always having the safety of INLers as our priority, but also serving the society at full steam and continuing to, what we do the best, deliver our knowledge and competences to the society by breaking new grounds expanding our knowledge space.

But now, when writing this foreword, the world is facing another un-anticipated difficult situation in Ukraine. It has already have had severe and terrible consequences for many people and the world is starting to understand the financial consequences.

During the last year we have continued to embrace the realization of the INL 2030 Strategic Vision. The Clusterisation process have continued with enhanced activities related to innovation and communication plans, we have been very successful when it comes to capturing projects and we have continued to publish high impact research articles and our IP portfolio has increased considerable. The NanoSafety Research, the Engineering support groups and the increased utilization of user

facilities at INL have had a great development during 2021. Our activities related to Covid-detection led to a successful license deal with a large global company putting our technology in the market. Likewise, our activities and engagement for bringing together actors in the Energy sector was successful. Discussions have recently been launched for the creation of an Iberian Renewable Energy Center with the possibility of having it integrated with INL. Further, a series of very important activities during 2021 was the successful hosting of several high-level events at INL such as the Green Battery Value Chain Summit and the large bi-annual EuroNanoForum conference, this time for the first time in history, being fully digital, and consequently allowing thousands of participants to be present and be connected.

Also, during 2021, we have created a series of internal new processes and committees, such as the ICR Review Board and Recruitment & Selection Committee, as well as launching the HRS4R (Human Resources Strategy for Researchers) certification process. Further, outstanding efforts have been made to secure a seamless and continuous operation related to health and safety actions, signage and safety-guarding of our workplaces, Finance, legal service, site management, HR-functions, IP support, IT-operations, communication & conferencing and lastly but not least, the Covid-10 Commission activities.

Director General Foreword.

We also became a member of EIT KIC InnoEnergy, the BEPA (Batteries European Partnership Association), and HER (Hydrogen Europe Research) associations, among others. And we also became an Observer in the WIPO – World Intellectual Property Organization and in the Codex Commission of the Food and Agriculture Organization (FAO).

Our activities at INL during the year of 2022 will surely contain a multitude of important activities, such as the re-instated annual INL Summit in June, this year coined as /transitions/, and an Open day in September as well as a plurality of other events at INL. For the years to come, the launch of the green deal and the digital agenda by the EU Commission will lead to significant enhancements when it comes to the combination of a strong digitalization of society with a connected and increased sustainability focus, highlighting that we are at a tipping point. The consequent needs, for all of us, are evident. We need to walk the talk and change our lifestyles, stop to consume the resources of Earth, and take actions for reducing carbon emission. These developments will immensely transform society. The large Euro Recovery and Resilience plan contains a multitude of various sustainability initiatives and possibilities for stimulating the economy with immense opportunities for disruptive green innovations based on breakthrough technologies and game changing discoveries that can both

scale up Europe's startups and SMEs into a new generation of world leading companies as well as transforming established industry for a greener future.

Our work at INL will always be based on our drive, ambition, and eagerness to work for a purpose with a great meaning, larger than our-selves. And provide value to society and be rewarded by the recognition from society. The support from our Council and their kind appreciation of all our activities – and to all of us INLers, has also been highly important and stimulating.

Finally, I am very grateful to all of you INLers for your passion and hard work, making INL to continuously develop and generate new knowledge to the benefit of society. And also, a big Thank You to all our partners and friends worldwide. Your kind efforts and help are immensely valuable.

All the best
Lars Montelius

Activities Report

Clusters

Precise Personalised HealthTech

Foodture

Clean Energy

Sustainable Environment

SDNS – Smart Digital NanoSystems

AMC –Advanced Materials and Computing

RTI Programmes

Key Actions 2021

Scientific Highlights from 2021

Breaking new grounds to expand our knowledge space



Clusters

INL aims to foster the use of nanotechnology to address today's grand challenges, aligned with the Sustainable Development Goals as identified by the United Nations. The Vision of INL is to be a recognized, leading, global nanotechnology innovation hub. To implement this INL 2030 Strategic Vision and the global Mission of "Exploring Interfaces," the scientific driving forces are clustered into six main areas based on identified societal challenges to support an ecosystem of research, technology, and innovation of interdisciplinary nanotechnology applications.

These Research, Technology, and Innovation (RTI) Clusters are Precise Personalised HealthTech, Foodture, Clean Energy, Sustainable Environment, SDNS – Smart Digital NanoSystems, and AMC – Advanced Materials and Computing.

The RTI Clusters provide the compass directing the research, technology, and innovation activities. Each of the six Clusters has a map of competencies and capabilities stemming from the Research Groups. The identified societal challenges and technology trends are evaluated based on these maps. The ideas emerging from the Clusters define strategic RTI Missions and align INL efforts to these missions. Therefore, the Clusters play a key role in aggregating sufficient critical mass for these disciplines to jointly make a difference and have the disruptive impact that INL aims for.

Below is a brief description of each Cluster, including the motivation and drivers:

Precise Personalised HealthTech

The two main health challenges of today's world's growing population are the three primary diseases accounting for EU mortality: cancer, cardiovascular, and infectious diseases, and the increase in the elderly population based on the rise in overall life expectancy.

The Cluster addresses these challenges in society and, based on the interdisciplinary teams and the health and engineering competencies at INL, explore new healthcare technologies combining both biological understanding (on diagnostics, therapeutics, theranostics, drug delivery, and biomarkers) with engineering capabilities (in sensors, microfluidics, fluid mechanics, electronics, nuclear magnetic resonance, integration, photonics, imaging, and microscopy).

Therefore the aim of this Cluster is (a) to contribute to citizens' wellbeing and health using nanobiotechnologies, (b) to engineer new systems/strategies/devices for early and accurate diagnosis of diseases, (c) to develop new therapeutic approaches for effective personalized treatment of diseases with fewer side effects, and (d) to promote a cost-effective and accessible healthcare system for all.

Foodture

The increase in world population has implications for the food supply and the conventional production methods; consequently, developing new efficient technologies is a preeminent necessity.

Therefore, this Cluster aims to apply nanotechnologies for building a sustainable future food system that can secure healthier, tastier, authentic, and safer foods, optimizing and monitoring the processes throughout the different parts of the whole food value chain.

The Cluster connects the INL scientific community with IT innovators, the financial sector, companies, consumers associations, and stakeholders throughout the food chain to promote open innovation to face the food system's future.

Clean Energy

Today's most used energy sources are based on resources that will not be naturally renewed at the pace at which these are currently being consumed.

Therefore, there is an urgent need to develop new materials and technologies to enable society to convert to renewable energy sources.

This Cluster aims to improve the performance of energy applications while at the same time reducing their cost to address the energy challenge, which has an indirect impact on the developments addressing all other societal challenges.

The Cluster moves towards this aim by attaining an advanced fundamental understanding of micro-and nano-structured energy materials, developing and designing novel materials for energy applications, and by creating and prototyping new energy devices.

Sustainable Environment

Less than 1% of the water on Earth is non-saline and available for human consumption, and the UN 2018 last report concludes that about 6 billion people will suffer from water scarcity by 2050.

On the other hand, the increasing pollution of our air and waters caused by human activities accounts for the most important causes of worldwide mortalities.

All together have motivated this Cluster to develop programs towards environmental sustainability being the main drivers the implementation of a circular economy and an improved land use both facilitated by digitalization and the reduction and/or adaption to the impact of climate change.

An overall driver for this Cluster is ensuring human safety by reducing the risks associated with environmental contamination, including the potential risks generated by the developed nano solutions.

AMC –Advanced Materials and Computing

INL has an excellent science base which can be turned into a competitive advantage towards emerging technologies, having collaborations between advanced multi-disciplinary science and cutting-edge engineering. The overall aim of this Cluster is to reach beyond the forefront of knowledge by highly exploratory research, focusing on areas where INL has the suited facilities, knowledge, and ecosystems developed for exploratory research, exploring novel properties, both experimentally and theoretically, of new low-dimensional and bio-inspired materials as well as combinations and structures of materials paving the way to: (1) design and study new instrumentation and methods enabling novel material/structure tailored with atomic precision, (2) explore new paradigms in computing technologies, such as neuromorphic computing based on spintronic devices and/or brain-inspired photonics, and quantum computing based on photon Qubits, (3) develop quantum technologies for quantum sensing, -imaging, -medicine, and new materials and surfaces exhibiting non-trivial electronic or plasmonic properties, providing disruptive technology toolsets for the future.

SDNS – Smart Digital NanoSystems

A digital society is a reality that exists already and makes part of our daily lives. But the digital transformation is an ongoing process that is far from being finished.

New and emerging paradigms like the Internet of Things (IoT), Industry 5.0, Digital Health, and Smart Cities rely on an unprecedented convergence between hardware and software that, at a physical level, is made possible by new disruptive devices (sensors, actuators, nanoelectronic components, photonic components) and new system architectures (ultra-low-power electronics, novel computation paradigms, reconfigurable circuits that take profit of multi-functional devices).

INL is uniquely suited for the task of exploring and developing this new generation of hardware that will drive, shape, and enable the transformation of fundamental aspects of the daily lives of citizens, the transformation towards a more sustainable and efficient industry, novel approaches to environmental monitoring and more personalized healthcare, among many others. INL's value proposition towards the development of

disruptive ICT enabling hardware technologies results from the convergence of two main assets under the same roof: (a) state-of-the-art corporate units that are fundamental to develop and produce these novel devices: a 1000 m² cleanroom with quick prototyping capability as well as small series production on 200 mm wafers using CMOS-compatible processes, an advanced microscopy facility which includes a set of high-end TEM instruments, a photonics facility, and a new engineering unit that expedites and smoothens the deployment of these technologies into real world applications, and (b) excellent research in nano-science with a strong focus on beyond-CMOS nanotechnologies in fields that include 2D materials, spintronics, photonics, MEMS, as well as combinations of these (and others) in complex hybrid systems. The aim of this Cluster is to pursue scientific excellence and explore the outcome of this research developing and deploying full solutions tailored to the needs of external partners.

RTI Programmes

Clusters focus on the fourteen programs described below. These programs, derived directly from the RTI Missions, are in alignment with the strategic research agenda of our research groups, with support from key co-operative teams: the Business Strategic Relations

(BSR), the Corporate Communication and Marketing (CCM), the IP Exploitation & Knowledge Transfer (IP&KT), the Corporate Lab Facilities, and the RTI Office. The 6 Clusters and 14 Missions are shown in Image 1 and described below.

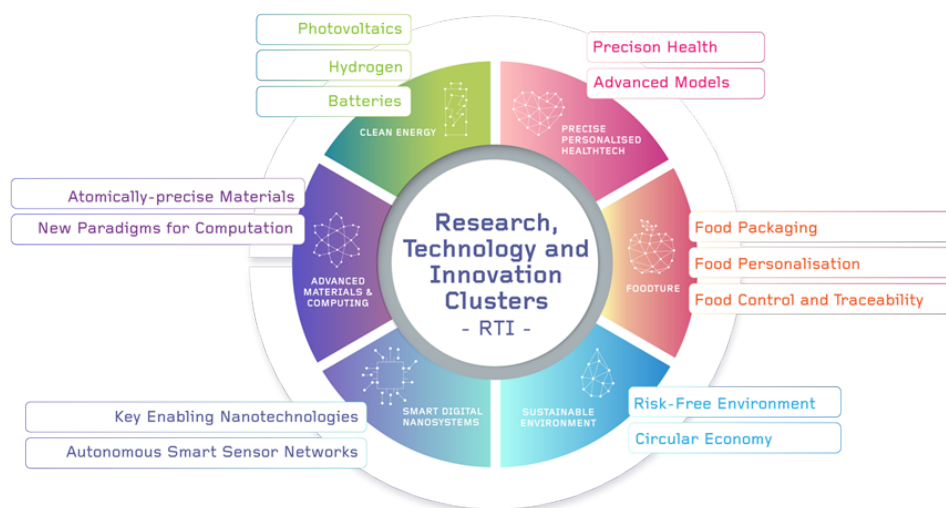


Image 1: INL's six RTI Clusters with the respective Programmes

Precision Health: Develop nano-enabled medical technologies that allow prevention, earlier diagnosis and personalised treatment of diseases with less side effects for sustainable precision medicine. The new technologies must show at least an improved performance of 25% over existing solutions in preclinical testing.

Advanced Models: Engineer smart multi-functional advanced disease models and organ-on-a-chip systems for the evaluation of disease biomarkers and therapy testing for the pharmaceutical industry. The new models must mimic the in vivo functions in 3D co-cultures, and allow multi-omics evaluation.

Photovoltaics | Batteries | Hydrogen: Develop solutions for low-carbon renewable and recyclable energy technologies that incorporate nanomaterials and micro/nanofabrication, to enhance their performance, cost-effectiveness, sustainability, stability, and/or breadth of applications. Solutions provided will range from proof-of-concept up to prototype devices for energy conversion (photovoltaics and hydrogen technologies), and energy storage (rechargeable batteries and hydrogen).

Risk-free Environment: Enable a risk-free environment by developing and deploying integrated and digital-based solutions for a comprehensive monitoring and selective elimination of air and water pollutants. These solutions will impact on the Management of critical resources, and on the mitigation of risks associated with harmful events related to pollution, global market, and climate change effects.

Circular Economy: Promote climate neutrality by facilitating a circular economy with nano-enabled solutions that will help to increase in 10% the recycling of raw materials and in 30% the reuse of wastewater in irrigation, industry and households significantly helping to alleviate the water scarcity in countries with moderate to high levels of water stress.

Food Packaging: Figure out a high-performance food packaging solution, 100% biodegradable, able to communicate with consumers. The solution will be 50% more efficient extending the shelf-life and reducing food wastes than the current systems based on petrol.

Food Personalisation: Develop a set of technologies to engineer the bioactivity and structure of food ingredients to produce functional foods fully personalized. The solution aims to reach one out of ten targeted people by 2030.

Food Control and Traceability: Develop miniaturized, faster and yet reliable analytical tools that will allow analysis for safety, authenticity and quality to be used by all the actors along the food value chain reducing the time of analysis from days to hours. By 2030, 8 to 10 analytical applications will be complete and qualified in operational environment.

Atomically Precise Materials: Understand low-dimensional materials, 1D and 2D van der Waals heterostructures, and point defects, assembling them with atomic-scale precision. Explore their electronic, optical, and magnetic quantum properties in the development of at least three prototype proof-of-concept devices for applications, e.g., in memory storage and sensing. Use designs (can be bio-inspired) that enable quantum-enhanced, better-than-classical performance.

New Paradigms for Computing: Develop next-generation computational technologies: neuromorphic and quantum computation. Demonstrate components for neuromorphic devices. Demonstrate single-electron qubits and integrated photonic chips for quantum computation. The capabilities developed should be scalable, and enable energy-efficient devices with performance of sub-pico Joule per operation. Develop new algorithms for quantum simulation, computation and resource benchmarking, demonstrating them on real quantum computers and devices.

Key Enabling Nanotechnologies: Develop a set of technologies exploring fundamental mechanisms that exist at the nanoscale with promising functional properties to address a large variety of societal challenges: Graphene, MEMS, Photonics, and Spintronics. The aim is to establish a research agenda and a development roadmap for the core set of technologies relevant for the next generation of information and communication technologies: this includes measuring, transmitting, receiving, transporting, and processing data at high-speeds and power consumption significantly beyond current State of the art.

Autonomous Smart Sensor Networks & System-Level Integration: Develop until 2030 a modular technology platform that enables the production of wireless and autonomous sensor networks that are capable to operate in a multitude of environments over a large scale range: inside the body, as wearables, within machines, monitoring large infrastructures and disperse over large geographical areas. Such sensors must be installed in a minimum invasive way (integrated, no cables), capable of operating with virtually no maintenance costs over 10 years and with minimal environmental impact (no replaceable batteries), measuring physical quantities (pressure, temperature, magnetic fields, etc..) with specs beyond state-of-the-art (lower noise level, higher resolution) at a minimum measurement rate of at least 1 measurement/minute relying 100% on the energy harvested from the environment where they are inserted.

These developed missions interrelate with each other to address the four main RTI Institutional Goals of INL show in image 2.



Image 2: The four main RTI Institutional Goals of INL

Key Actions 2021

Several key actions have been taken to implement the strategy defined. One of these actions in 2021 was to review and discuss the Strategic Research Agendas from each Group. These define the research lines aimed for, in alignment with the cluster mission plans.

In 2021, the Missions went full speed ahead. Several high level events and key markers set the stage for the dissemination of our efforts, including the Green Battery Value Chain Summit held in June as well as the INL Battery Summit in March.

The organisation and successful implementation of the major European conference related to nanotechnology and nanosciences, the EuroNanoForum 2021, also brought the commitment of the European Commission towards a strong investment and support to Nanotechnology and Advanced Materials, as crucial elements of Europe's recovery and resilience.

During 2021, INL also hosted the EIT Strategy to power Europe's largest innovation network, to mark the launch of the EIT's new strategy as part of Horizon Europe together with the European Institute of Innovation and Technology (EIT), in collaboration with the Portuguese Presidency of the Council of the European Union.

Additionally, INL performed several actions to reinforce networks and collaborations. A whitepaper on the aim Towards a New Food System was prepared, describing the focused areas for research and innovation activities to transform the food system, such as: a sustainable agriculture and aquaculture; alternative proteins and dietary shift; circular food systems; healthy, targeted

and personalised nutrition; safer and authentic foods; and the digitalization of the food system. We also became a member of EIT KIC InnovEnergy, the BEPA (Batteries European Partnership Association), and HER (Hydrogen Europe Research) associations, among others. And we also became an Observer in the WIPO – World Intellectual Property Organization and in the Codex Commission of the Food and Agriculture Organization (FAO).

A crucial point in 2021 were the Green Agendas for Business Innovation of the Recovery and Resilience Plan (PRR), which were created after the serious impacts caused by the pandemic. The European Council created the Next Generation EU, a temporary recovery instrument, from which the Recovery and Resilience Mechanism is developed and with an execution period until 2026, and that will allow implementing a set of reforms and investments to build sustained economic growth. It will be financed by total resources of €16.6 billion, distributed by around €14 billion in grants and €2.7 billion in loans. There were 144 candidacies involving almost 2,000 entities, including companies, business associations, research centers, and others, with investment intentions of around 14 billion euros. From these, 64 Agendas were selected, and INL - International Iberian Nanotechnology Laboratory had a 100% success rate participating in 17 proposals. The agendas in which INL is participating are divided into the following areas: Agrifood & Sea Economy (4), Health (3), Construction & Habitat (3), Transverse energy (1), Hydrogen (1), Transport, Mobility & Logistics (1), Automobile (1), Lithium (1), Footwear, Textiles, and Clothing (1), and Microelectronics (1). All will have access to the next stage for the submission of applications for funding

consisting of final proposals of the Mobilising Agendas and the Green Agendas and PRRs.

Several other workshops, conferences, and events were held online with the effort to continue our dissemination of the presence of nanotechnology in various sectors and the importance of academia, RTOs, and industrial collaborations. A four-half day online training in 'Net-zero climate emissions: The role of nanotechnologies for advanced energy generation, conversion, and storage' was held with the purpose to provide industry and academia with the technological and scientific pathways required for the deployment of sustainable cost-effective large-scale energy storage and conversion powered by renewable energies. It sought to promote closer interaction between academia and industry while fomenting future collaborations.

Taking place in a hybrid format, the Total Nano-Safe Hybrid Conference was held in 2021, with the aim to strengthen research and innovation potential in nanosafety.

Microscopy at the Frontiers of Science – a biannual event organized by INL AEMIS facility, included the latest breakthroughs and unique developments in the field, nanoscale studies of biological samples and functional materials under realistic or near realistic conditions. Here, the INL facility managers and collaborators discussed how dynamical processes can be studied down to the atomic scale while taking into account the electron beam effects and how time and spatial resolutions in complex media can be extended using technical developments or artificial intelligence.

During the TrustEat Summer School, participants had the opportunity to learn about the theoretical and practical basics of Blockchain and how it can be applied to the agri-food sector, as well tutoring, career advice and networking activities.

A "Sciencepreneurs" Workshop was dedicated to the specific know-how needed to run a company from the business to the legal perspective, including an overview of Intellectual property matters. This is an event series created by INL which will continue on in 2022.

The New European Bauhaus, a creative and interdisciplinary initiative that convenes a space of encounter to design future ways of living, situated at the crossroads between art, culture, social inclusion, science, and technology, brought the initiative to set-up a cross-sectoral task force to shape the New European Bauhaus initiative and the future of Circularity in a sustainable and inclusive way, as INL became a Bauhaus partner.

The PITCCH project also kicked off, creating the first Open Innovation network with a European coverage that aims to facilitate the establishment of structured collaborations between big corporations as technology seekers and SMEs as technology providers and in this way accelerate the market uptake of advanced technologies through different sectors. In the PITCCH network, Technology Centres act as intermediaries between the companies or as facilitators of the development of SMEs/startups' solutions providing services to the companies.

European Researchers' Night - the annual celebration of innovative research taking place simultaneously in more

than 30 countries and 300 cities throughout Europe, also took place in Altice Forum Braga, with more than 1150 visitors that night.



Internally INL grew significantly in efforts related to our people, in terms of the Gender Equality Plan and the INL Respectful Workplace Policy.

To finish off the year, INL held a Strategic Digital Retreat engaging INLers in various leading management positions from the all units of the organization. Having as the main and overall objective to discuss, refine and define the next steps in the INL 2030 Go Global Strategy, the reflection points focused on six important topics: 1) Operational sustainability, 2) The role of a researcher at INL, 3) Commissioned activities, 4) Work Evolution & INL People, 5) Internationalization and 6) Scientific & Corporate Social Responsibility with regards to the role of INL in the green transition.

INL Key Numbers

Bibliometrics



Image 3: Bibliometric evolution of INL in terms of publications, citations, and h-index

With the safety measures that had to be implemented in 2020 and 2021, the laboratory time spent by the researchers at INL reduced significantly. Although the effect of this absence is slightly reflected in 2021, the scientific publications and citations kept the increasing curve as seen in previous years. The h-index, a measure of the scientific productivity and citation impact overall, increased 12 points each year.

In 2021, online events continued heavily, some of them with a small hybrid presence, as a result of the pandemic circumstances. INL researchers participated in total 135 conferences and events, with contributions ranging from posters, oral talks to invited and plenary keynote speaking.

Granted projects from national and European funding also kept a healthy income, with new funding acquired in 2021, as can be seen in Image 4. The significant increase in the Clean Energy and Sustainable Environment clusters reflects the Green Deal call and other initiatives towards sustainability, climate actions, and a circular economy, in which INL has been a strong participant.

New Public Funding per year per Cluster

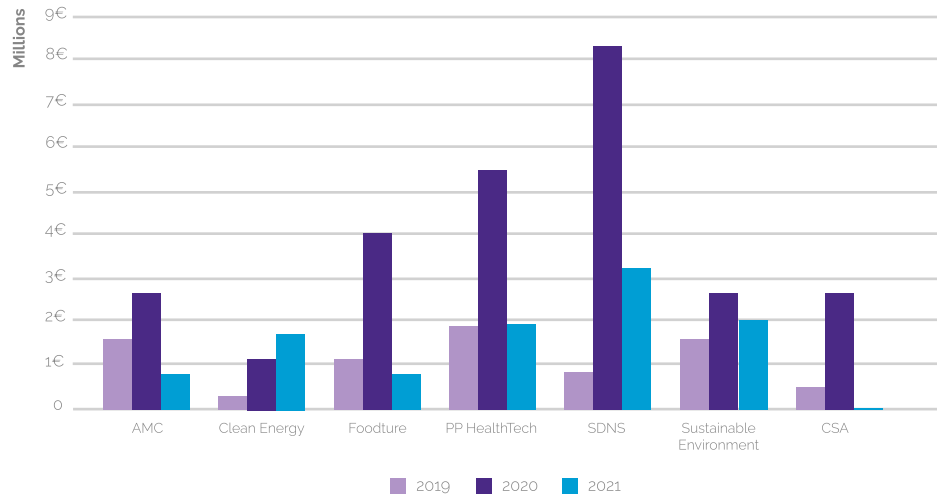


Image 4: New public funding per year per Cluster

INL's success rate in European funding proved to be higher than the average at European level. The graph in Image 5 below shows the distribution by Cluster over the years, from various public funding sources.

Funding Distribution by Cluster from different sources

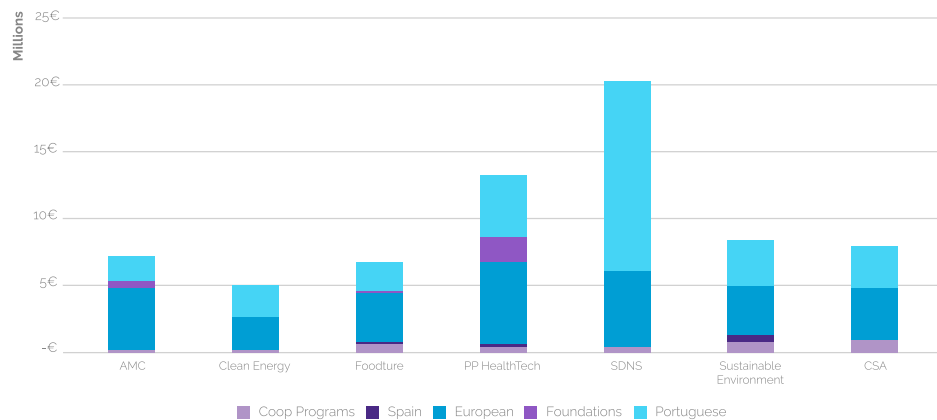


Image 5: Funding distribution by Cluster since 2011

Through each Cluster, INL develops new technologies which follow a pipeline of progress, with new ones coming in at low TRL (Technology Readiness Level) and others which keep progressing towards a product demonstrated in the relevant applications. Each step in this pipeline needs significant funding, coupled with the Coordination and Support Actions (CSA) that enable this growth. The chart below shows the evolution of funding throughout the years for the different levels of TRL.

Funding Evolution at different Technology Readiness Levels (TRL)

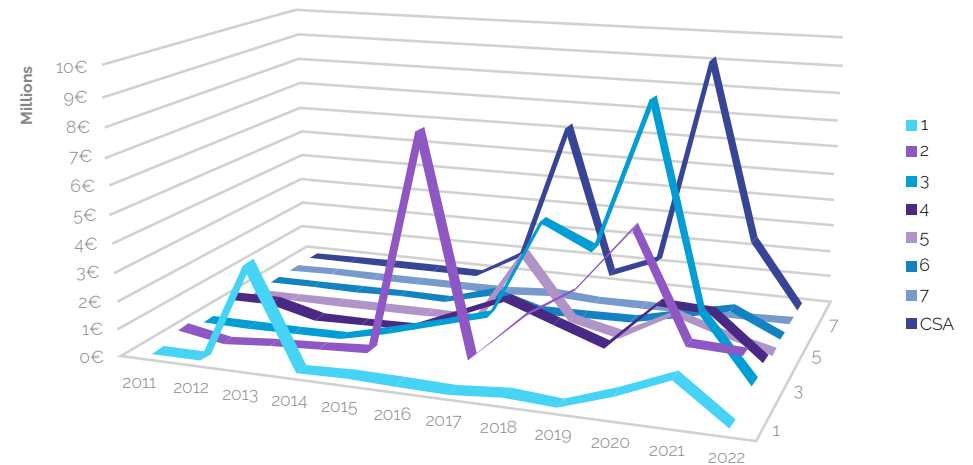


Image 6: Funding evolution by Technology Readiness Level

As can be observed in Image 5, many of our technologies are at levels 2 and 3, needing a significant push to really move a technology towards higher TRLs, for the demonstration and validation at intended environments. With the proper support in this area, considerable growth can be expected in the innovation that rises from our technologies.

Several of our IP gave fruit to three new spin-outs back in 2020, for a total of four INL startups. Currently these are: Kinalysis, Neoxenica, Suevia Foods (2BNanoFood), and RubyNanoMed. During 2021, some of these received distinguishable awards.

For example, the ALBA Project, from the INL spin-out startup Suevia Foods, was the winner of the “Prémio Inovação” 7th Edition, in the “Food, Nutrition and Health” Category, promoted by Crédito Agrícola, a Portuguese organization from the banking sector.

RubyNanoMed, INL's first spin-out whose main product is the RubyChip, develops a non-invasive, easy-to-use liquid biopsy chip used to anticipate the appearance of metastase. In 2021, it was distinguished at the 'The Best & Biggest of Technological Portugal' Awards by 'Exame Informática', and the spin-out became one of 65 European SMEs that will receive €7 million to accelerate the development of unique solutions in areas such as healthcare and biotechnology through the support of the EIC Accelerator program from the European Innovation Council.

With the demanding need for means to ease the pandemic situation, a remarkable achievement occurred in 2021 for INL. In partnership with ALS Life Sciences Portugal, INL launched an 'in Vitro' diagnostic kit for covid-19 that allowed results to be obtained in around 45 minutes. The SARSCoV-2 RT-LAMP kit, developed in a record time, has high levels of sensitivity (96%) and specificity (98%) and allows to carry out the tests in a fraction of the cost and time required by conventional PCR tests, ensuring similar quality in diagnosis. The result is achieved in about 45 minutes, but this time can be reduced to 25 minutes if a fluorescence detection device is used in the laboratory. This new kit uses RT-LAMP technology (rapid molecular nucleic acid amplification test) and stands out for being faster than the real-time PCR

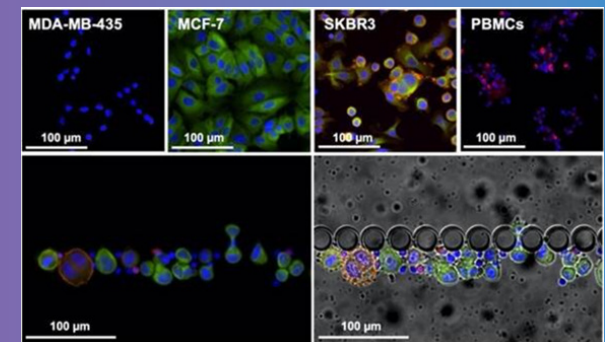
alternative and simpler in the process implementation, dispensing the use of a complex laboratory apparatus, as it is carried out at constant temperature. In addition, the kit offers the possibility of visual interpretation of results by changing the colour. Designed for the global market, the kit can have a huge impact in healthcare units, regions or countries where the available technology is low-grade and the teams of technicians or health professionals have lower levels of training.

Summarized below are other science and innovation highlights from 2021, including initiatives that consolidated with project outcomes that serve as a seed for future innovation. Although these examples are presented by Cluster, their execution required competences from several clusters, emphasizing on the value added when we follow INL's main mission of Exploring Interfaces.

Scientific Highlights from 2021

Liquid Biopsy non-invasive Chip

Breast cancer is the most prevalent type of cancer worldwide. By late 2020, there were 7.8 million women alive who had been diagnosed with breast cancer during the previous 5 years. Clinical Management and technological advancements allow most primary and early-stage breast cancers to be treated, either by surgery alone or surgery and complementary therapy, achieving an overall 5-year survival rate of 90%. Nevertheless, when cancer spreads and metastasis occurs, the 5-year survival rate drops to 26%. Existing targeted therapies have significantly improved patient outcomes; still, designing these personalized treatments relies on accurate and comprehensive assessment of cancer alterations during time, which cannot only depend on invasive tumour biopsies.



Liquid biopsy is a great alternative, since it is a minimally invasive and painless method to provide continuous, reliable and real-time information on the tumour progression through the molecular analysis of circulating biomarkers. Circulating tumour cells (CTCs) present the same phenotype and genotype as the active tumour from where they originate and, as such, their continuous analysis can provide information about the disease in real-time, allowing a more accurate prognosis and being an ideal approach for early detection of metastasis.

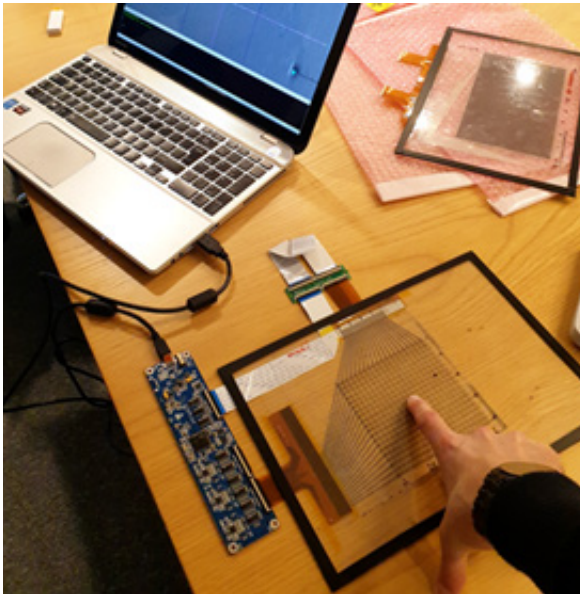
In a study by researchers from INL, IMM, together with the oncology department of the Hospital de Santa Maria in Lisbon, and INL's spin-off company RUBYnanomed, they used a novel microfluidic device, the RUBYchip™, to isolate and enumerate CTCs from metastatic breast cancer patients. They assessed their HER2 expression in a comparative study with the current gold standard technology and demonstrated relevance of monitoring Circulating Tumor Cells (CTCs) and their subtype to predict treatment resistance in metastatic breast cancer. The technology developed at INL for CTC isolation and now transferred to RUBYnanomed demonstrated superior efficiency and sensitivity for the isolation and classification of CTCs compared to existing clinical tools. We expect this technology will help the sub-classification of metastatic breast cancer patients and update their treatment.

Efficacy of covalent organic frameworks proven in capturing pharmaceutical pollutants from river waters in real-life conditions



INL researchers have proven, for the first time, that it is possible to use covalent organic frameworks (COFs) to adsorb a wide range of pharmaceutical pollutants from an estuary of river Tagus in Portugal, using real water samples in a collaboration with the University of Lisbon (Portugal).

According to the abstract of the scientific paper published in Chemosphere (Elsevier) under the title Study on the efficiency of a covalent organic framework as adsorbent for the screening of pharmaceuticals in estuary waters, of the 23 pharmaceuticals found present in the water samples from the Tagus river estuary using state-of-the-art solid-phase extraction (SPE), 22 were also detected (adsorbed and recovered for analysis) using a COF as the adsorbent material with adsorption efficiency of over 80% for nearly all compounds. Some compounds, such as antibacterial antibiotics sulfamethoxazole and sulfapyridine, were found at much higher concentrations when using the COF as compared to the SPE. All in all, many pharmaceuticals were found in levels exceeding the precautionary maximum concentration established by the World Health Organization (WHO) (10 ng/L), indicating that a revision of the monitoring programs for priority substances should be implemented.



INL research proves a suitable way to using graphene in commercial electronic devices

Graphene can be considered one of the most promising materials ever discovered. However, commercial applications for this innovative one-atom-thick material are still lagging and the promise is taking long years to be delivered. This may soon change because a group of INL researchers found an innovative way to produce environmentally friendly graphene inks suitable for the fabrication of commercial touch screen sensors.

An environmentally friendly graphene ink by liquid-phase exfoliation was developed, devising an optimized approach (underpinning on shear-mixing and tip sonication techniques) that allowed avoiding the use of toxic solvents while retaining control on the properties of the material. The graphene ink was used to fabricate flexible electrodes with high electrical conductivity and optical transparency. The electrodes served to assemble a working touch-screen prototype with high SNR (14 dB) and multi-touch functionality. Their results illustrate a potential pathway towards the integration of graphene materials in commercial electronic devices.

The electrodes feature a low sheet resistance ($290 \Omega^{-1}$) and high optical transmittance (78%), which allowed the realization of a working prototype of a multi-touch screen sensor with high performance.

Exotic magnetic states in miniature dimensions

Led by scientists at Empa, INL - International Iberian Nanotechnology Laboratory and an international team of researchers from Switzerland, Portugal, Germany, and Spain have succeeded in building carbon-based quantum spin chains, where they captured the emergence of one of the cornerstone models of quantum magnetism first proposed by the 2016 Nobel laureate F. D. M. Haldane in 1983.

Published in the journal Nature, the results of the team could have widespread implications in the understanding of low-dimensional quantum magnetism and may contribute toward the emerging field of quantum computing. (S Mishra, G Catarina, F Wu, R Ortiz, D Jacob, K Eimre, J Ma, CA Pignedoli, X Feng, P Ruffieux, J Fernández-Rossier, R Fasel; Observation of fractional edge excitations in nanographene spin chains; Nature (2021), DOI: 10.1038/s41586-021-03842-3)



Artistic rendering of a triangulene quantum spin chain adsorbed on a gold surface and probed with the sharp tip of a scanning tunneling microscope. While each triangulene unit has a total spin of 1, quantum correlations in the chain lead to spin fractionalization, such that the terminal triangulene units exhibit a spin of 1/2. Image: Empa

We are all used to the idea that simpler units in nature interact to form complex structures. Take, for example, the hierarchy of life, where atoms combine to form molecules, molecules combine to form cells, cells combine to form tissues, and so on, ultimately leading to the formation of complex organisms such as humans. In the quantum world, however, this process may play in reverse, where interactions between two complex objects lead to the emergence of simpler species.

Quantum magic: sawing quantum magnets in half. All elementary particles have a 'spin', a fundamental property that governs their interaction with magnetic fields. Spins are quantized, which means they can only assume discrete values. Electrons have the smallest possible spin that can take two discrete values, while the next simplest systems are those whose spin takes three discrete values – these are dubbed spin $\frac{1}{2}$ and spin 1, respectively. In the 1980s, it was predicted that a one-dimensional chain of interacting spin 1 units should be 'fractionalized', such that the terminal units of the chain behave, counterintuitively, like spin $\frac{1}{2}$ objects. Therefore, much like magicians who seem to saw a person in two halves and pull them apart, quantum correlations in the chain divide a spin 1 in two spin $\frac{1}{2}$ entities.

One-dimensional magnetic chains assembled from molecules. Testing this prediction in a laboratory has been challenging for various reasons, chief among them being that conventional materials are not one-dimensional.

While indirect evidence of spin fractionalization has been seen in crystals of organometallic chains containing transition metal ions, a direct observation of the phenomenon has remained elusive.

Now, an international team of researchers has found a remarkable route to accomplish this feat. Combining organic chemistry and ultra-high vacuum surface science, the team fabricated chains of a triangular polycyclic aromatic hydrocarbon with spin 1, known as triangulene. Using a scanning tunneling microscope the team then probed magnetic excitations of these spin chains on a gold surface. They found that beyond a certain length, the terminal triangulene units of the chains exhibited Kondo resonances – which are a characteristic spectroscopic fingerprint of spin $\frac{1}{2}$ quantum objects in contact with a metal surface.

From chains to networks – and to quantum computers? The researchers are convinced that easily and directly accessible molecular spin systems exhibiting strongly correlated behaviour of electrons will become a fertile playground for developing and testing new theoretical concepts. In addition to exploring linear spin chains, scientists are also focusing on two-dimensional networks of quantum magnets. Such spin networks are a promising material platform for quantum computation.

Breaking new grounds to expand our knowledge space

The past two years have been full of many challenges, including the logistics to be able to perform research. It was the driving force for a dramatic transformation on how INL works digitally. It pushed teams to work under new environments, it forced quick coordination on an ever changing scenario with partial teams at home while mirror teams at work, and it allowed time for researchers to organize their data, propose new ideas for projects, publish their work, and even propel their ideas towards innovation.

In the coming years, INL will focus on bringing more of these highlights towards innovation, through coordinated alignment of group strategies, by exploring interfaces between the various clusters, by continuing the digital transformation, and by breaking new grounds to expand our knowledge space.

Financial Report

CFO Message:

Financial Highlights

INL at a glance

Subsequent Events & General Risk
Assessment

Proposal to earnings allocation



Financial Report

CFO Message

INL's Financial Report is part of the organization's commitment to cultivating close ties with its stakeholders and is designed to enhance transparency and improve financial communication and understanding.

It aims to explain the strategy, detail the past year's crucial initiatives in complete openness, and outline financial sustainability goals.

The Finance department is fully involved in INL's strategy, and despite the continuous turmoil caused by the pandemic in 2021, Finance & accounting, PFMO, and the Procurement units are more determined than ever in building trust-based relationships with all INL's stakeholders and convinced of the importance of sustainable financial performances for the INL future.

The work of the Finance teams continues to evolve to support INL as it faces new challenges while remaining a lever for strategic decision-making and is aligned with the interests of all stakeholders by implementing a long-term, sustainable financial strategy.

All the best
Gustavo M. S. Rocha

Financial Highlights

In 2021, despite below budget, INL achieved the highest income on its history – growing the total revenue by 15% and delivering operational results, including the investment subsidy, before depreciation above EUR 1.5M. The RTD-funded programs have increased by 28.2%, and the commissioned research by 15.4%, bringing the average funding rate to 63%.

Keep expanding INL's commissioned research and reinforcing the RTD portfolio with fully funded finance schemes; hence, enhancing INL's average funding rate is critical for long-term self-sustainability and achieving the laboratory's strategic aspirations.

However, INL has increased operational expenses by 11%, facing the inflation escalation and supply chain challenges caused by the Covid-19 outbreak and the Ukraine war. INL energy costs are under contract until the end of 2022, and the increment of the expenses for the years ahead will be assessed and reflected in the next budget cycle.

Meanwhile, we continue to focus on improving our funding rate, our portfolio of European projects, growing our commissioned research, and taking steps to mitigate the supply chain bottlenecks and the forecasted escalation of inflation expected for the upcoming years.

INL at a glance

Despite being below budget, 2021's total operating costs increased by 11% compared with 2020, mainly caused by the projects' execution and operating activities increment. The improvement in the funding rate and the average personnel allocation to projects ratio mitigated the increase in expenses caused by the supply chain bottlenecks and the consequent escalation tendency of the inflation rate caused by the COVID 19's outbreak. The annual expenses for 2021, including depreciation costs, amounted to EUR 22.5M, representing an increase of 5.5% compared to 2020 but still 14.4% below budget.

EUR '000

Financial Performance	2018	2019	2020	2021
Income	13 612	17 382	15 975	18 393
Member State Contributions	7 000	7 000	7 070	7 141
External grant funding	5 182	7 621	6 767	8 800
Revenue from exchange transactions	1 416	2 757	2 119	2 444
Other revenue	13	4	20	8
Expenditure	(15 277)	(17 540)	(15 986)	(17 746)
Personnel Costs	(9 654)	(11 337)	(10 528)	(11 083)
Consumables	(2 148)	(2 803)	(2 286)	(2 422)
Services and Other Recurrent Expenses	(2 336)	(2 277)	(2 294)	(3 150)
Maintenance	(1 139)	(1 121)	(878)	(1 091)
Operating Margin	(1 665)	(157)	(11)	647
Investment Subsidy	391	1 313	799	900
Depreciations	(5 176)	(5 265)	(5 360)	(4 772)
Net Profit & Loss	(6 450)	(4 110)	(4 572)	(3 224)
Financial Ratios	2018	2019	2020	2021
Total Assets	76 706	74 307	70 714	68 216
Equity	44 833	40 723	36 152	32 927
Debt to Equity ratio	71%	82%	96%	107%
Operating Margin	(1 665)	(157)	(11)	647
Funded Expenses ratio	43%	59%	56%	63%

In 2021, due to the increment of the average funding rate, the increment of the commissioned research, and the increment of RTD Programs, INL operational margin before the investment subsidy achieved a positive balance of €647K.

However, the operational balance is not enough to mitigate the historical depreciation costs causing year losses of €3.2M.

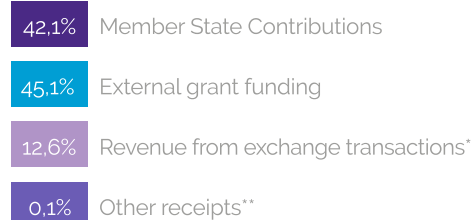
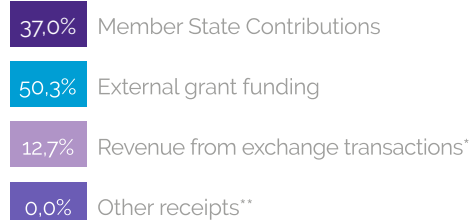
€ 19.3 million

Income in 2021



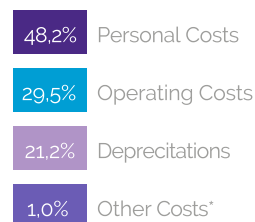
€ 16.8 million

Income in 2020



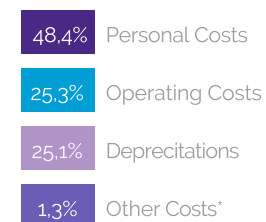
€ 22.5 million

Expenditure in 2021



€ 21.3 million

Expenditure in 2020



* Includes income from services to private and public institutions, training courses and conference fees.

** Includes interest earned and extraordinary incomes.

INL budget execution 2021

EUR '000				
TOTAL Budget Execution 2021	Budget	Execution	Var. Value	Var. %
Income	20 941	18 393	(2 548)	-12%
Services & Industrial RTD	1 967	2 452	485	24.7%
RTD Programmes	11 833	8 800	(3 033)	-25.6%
Member States Contributions	7 141	7 141	-	0.0%
Expenditure	(20 686)	(17 746)	(2 940)	-14%
Personnel Costs	(12 281)	(11 083)	(1 198)	-9.8%
Consumables	(3 893)	(2 422)	(1 471)	-37.8%
Services and Other Recurrent Expenses	(3 296)	(3 150)	(146)	-4.4%
Maintenance	(1 216)	(1 091)	(125)	-10.3%
Operating Margin	255	647	392	154%
Investment Subsidy	700	900	200	28.6%
Depreciations	(5 617)	(4 772)	(845)	-15.0%
Net Profit & Loss	(4 662)	(3 224)	(1 437)	-31%

The delays in execution caused by the Covid 19's logistic bottlenecks and confinement impacted the performance of RTD programs delaying new hiring and reducing the consumables and funded services expenses. As these expenses and the income of RTD Projects are correlated, the variances concerning the budget offset each other. The Provision for Autodesk's software license infringement claim has impacted the budget execution of the infrastructure area by approximately € 750k.

EUR '000				
Budget Execution 2021 by Area	Budget	Execution	Var. Value	Var. %
Support Functions				
Expenditure	3 643	3 160	(483)	-13.3%
Personnel Costs	2 376	2 259	(118)	-5.0%
Consumables	9	7	(3)	-27.3%
Services and Other Recurrent Expenses	1 251	885	(366)	-29.3%
Maintenance	7	10	3	47.1%
Research Groups				
Expenditure	12 411	9 316	(3 096)	-24.9%
Personnel Costs	8 515	7 495	(1 021)	-12.0%
Consumables	2 438	967	(1 470)	-60.3%
Services and Other Recurrent Expenses	1 333	819	(514)	-38.6%
Maintenance	126	35	(91)	-72.0%
Corporate Labs				
Expenditure	2 089	2 047	(41)	-2.0%
Personnel Costs	825	775	(49)	-6.0%
Consumables	482	533	52	10.7%
Services and Other Recurrent Expenses	11	72	61	548.2%
Maintenance	771	667	(105)	-13.6%
Infrastructure				
Expenditure	2 543	3 223	680	26.7%
Personnel Costs	565	555	(11)	-1.9%
Consumables	964	915	(50)	-5.1%
Services and Other Recurrent Expenses	701	1 374	673	96.0%
Maintenance	312	379	67	21.5%

€ 17.75 million

Expenses by Area in 2021



- 11,5% Corporate Labs
- 18,2% Infrastructure
- 52,5% Research Groups
- 17,8% Support Functions

* Excluding depreciations

€ 19.3 million

Income Sources in 2021



- 37,0% Member States Contributions
- 1,3% Interreg
- 15,6% EU Programmes
- 1,6% Foundations and Associations
- 31,8% PT Programmes
- 12,7% Revenue from Exchange Transactions

Subsequent Events & General Risk Assessment

INL management works to identify and mitigate operational risks that threaten the medium-term plans and strategic risks that could compromise INL's long-term goals and strategy.

Factors that may affect future results include, but are not limited to:

The COVID-19 pandemic has impacted INL activities to varying degrees.

The pandemic has presented several challenges for our activities, including, among others, impacts due to travel limitations and mobility restrictions; supply chain interruptions; disruptions to project execution, including difficulties or delays in access to needed supplies; challenges operating in a virtual work environment; and other challenges presented by disruptions to our everyday operations in response to the pandemic, as well as uncertainties regarding the duration and severity of the pandemic and its impacts, and government or regulatory actions to contain the virus.

At INL, the Administration has been following developments related to the Covid-19 pandemic, carefully following the position of the competent international entities, namely the World Health Organization and the Portuguese General Directorate of Health.

The invasion of Ukraine by Russian forces on February 24th, 2022, constitutes a far-reaching event that will also leave

clear traces on the global economy. The commodities and financial markets immediately felt the impacts. Still, the consequences for the global economy, especially concerning energy costs and supply chains, are yet to be assessed. On INL, the energy costs are under contract until the end of 2022, and the increment of the expenses for the years ahead will be captured in the next budget cycle.

Autodesk - Software license infringement dispute. Autodesk is a software provider that, among other software products, licenses AutoCAD software, which INL has used since at least, 2012 until the present date.

The licenses INL has obtained from Autodesk (since 2012) were registered as academic licenses. In November 2021, Autodesk informed INL that from 2015 until that date, INL had used academic licenses for Autodesk's software without being entitled to do so. Consequently, Autodesk initiated a software infringement claim.

In March 2022, INL reached an agreement to invest EUR 1.113.080,00 in Autodesk's products and licenses for the next three years. The investment will settle the Software license infringement claim, and Autodesk will issue a "statement of compliance" confirming the closure of the claim.

The investment was provisioned in 2021 and reported accordingly.

INL equity has been impacted annually by the continuous tendency of annual losses caused by the incapacity of the operational activity to offset the

annual depreciation costs. This tendency in the medium and long term may compromise INL's capacity to apply for funded projects because of the minimum financial ratios required for the programs arising from the European Commission.

Despite the complexity of quantifying the effects of the invasion of Ukraine and the Covid-19 pandemic, INL Management has been implementing all measures that we consider appropriate to mitigate its consequences, in line with the recommendation of the competent entities and in the best interest of our stakeholders.

Therefore, INL management confirms that the risk assessment of the invasion of Ukraine by Russian forces, the Covid-19 pandemic, and Autodesk's software license infringement claim, when due, are reflected in the financial statements.

Based on the assumption of continuity, the Entity evaluated the information at its disposal and its future expectations, considering the ability to continue with its activity. In this sense, Management is convinced that the reasonableness of considering the principle of operational continuity underlying the preparation of the financial statements for the year 2022 is not in question.

Proposal to earnings allocation

INL's Director-General proposes registering to retained earnings the Loss of the year of EUR 3,224,327.

Braga, March 31st, 2022

The Director-General,



Financials Statements

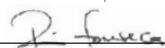


Statement of Financial Performance

Statement of Financial Performance	Notes	12/31/2021	12/31/2020
Revenue			
Revenue from exchange transactions	3	2 444 489	2 118 676
Transfers from other government entities	4	16 841 518	14 635 654
Other revenue	5	7 825	20 003
Finance Revenue	6	-	6
Total Revenue		19 293 831	16 774 339
Expenses			
Wages, salaries and employee benefits	7	(10 864 603)	(10 323 648)
Supplies and consumables used	8	(6 293 152)	(5 055 277)
Depreciation and amortization expense	9	(4 771 957)	(5 360 276)
Cost of goods sold and consumed	10	(352 091)	(339 851)
Other expenses	11	(215 394)	(230 704)
Finance costs	12	(20 962)	(36 326)
Total Expenses		(22 518 159)	(21 346 082)
Surplus/(deficit) for the period		(3 224 327)	(4 571 744)

The notes are an integral part of the statement of financial performance for the period ended on December 31st.

Official Bookkeeper



Chief Financial Officer



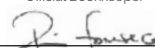

Director General

Statement of financial position

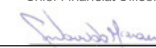
	Notes	12/31/2021	12/31/2020
ASSETS			
Current Assets			
Cash and cash equivalents	17	140 386	236 772
Receivables from exchange transactions	13	399 710	505 466
Prepayments	14	17 525	45 091
Receivables from non-exchange transactions	4, 15	6 758 457	6 058 437
Other current assets	16	377 294	199 599
Total current assets		7 693 372	7 045 366
Non Current Assets			
Investments in associates	18	40 000	35 000
Infrastructure, plant and equipment	19	7 148 732	8 905 379
Land and buildings	19	53 226 819	54 610 440
Intangible assets	20	106 851	117 832
Total non-current assets		60 522 402	63 668 652
Total Assets		68 215 774	70 714 018
LIABILITIES			
Current Liabilities			
Payables	21	974 392	687 297
Prepayments	22	57 090	57 190
Short-term borrowings	23	25 235 082	19 972 500
Other current liabilities	4, 24	9 021 902	7 845 394
Total current liabilities		35 288 466	28 562 382
Non Current Liabilities			
Long-term borrowings	23	-	4 500 000
Other non-current liabilities	4	-	1 500 000
Total non-current liabilities		-	6 000 000
Total Liabilities		35 288 466	34 562 382
Net Assets		32 927 309	36 151 636
NET ASSETS/EQUITY			
Capital contributed by Other government entities	25	30 000 000	30 000 000
Accumulated surpluses/(deficits)	26	6 151 636	10 723 379
Net surplus/deficit (-) for the period	26	(3 224 327)	(4 571 744)
Total net assets/Equity		32 927 309	36 151 636
Total net assets and liabilities		68 215 774	70 714 018

The notes are an integral part of the statement of financial position for the period ended on December 31st.

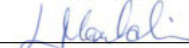
Official Bookkeeper



Chief Financial Officer



Director General




Cash Flow Statement by Nature for the Period at Ended December 31st 2021

Statement of Cash Flows	Notes	12/31/2021	12/31/2020
CASH FLOWS FROM OPERATING ACTIVITIES			
Surplus/(deficit) for the period	26	(3 224 327)	(4 571 744)
Non-Cash Movements			
Deduction of depreciation, amortisation and Impairments	9	4 771 957	5 360 276
Deduction of Non-Cash changes in Net Assets	16	(76 080)	48 242
(Increase)/Decrease in Receivable from non-exchange transactions	15	(700 020)	(1 116 452)
(Increase)/Decrease in Receivable from exchange transactions	13	105 755	47 653
(Increase)/Decrease in Prepayments	14	27 566	(15 311)
(Increase)/Decrease in Other Current/ Non-Current Assets	16	(101 615)	504 189
Increase/(Decrease) in Accounts Payable	21	287 095	(845 202)
Increase/(Decrease) in Accruals	24	949 396	3 628
Increase/(Decrease) in Deferred Revenue	24	4 249	49 892
Increase/(Decrease) in Employees Benefits	24	182 513	53 965
Increase/(Decrease) in Prepayments liabilities	22	(100)	(113)
Increase/(Decrease) in Other Liabilities	24	(1 459 650)	4 443 649
Net Cash Flows from Operating Activities		766 739	3 962 672
CASH FLOWS FROM INVESTING ACTIVITIES			
Purchase/(Sale) of Investments	18	(5 000)	-
(Addition)/Disposal of PP&E and Intangible	19, 20	(1 620 707)	(1 111 995)
Net Cash Flows from Investing Activities		(1 625 707)	(1 111 995)
CASH FLOWS FROM FINANCING ACTIVITIES			
Allocation of Current Year Cash Surplus			
Increase/(Decrease) in Borrowings	23	762 582	(2 727 500)
Net Cash Flows from Financing Activities		762 582	(2 727 500)
Net increase/(decrease) in cash and cash equivalents		(96 386)	123 177
Cash and cash equivalents at beginning of period	17	236 772	113 595
Cash and cash equivalents at the end of period	17	140 386	236 772

The notes are an integral part of the cash flow statement for the period ended on December 31st.

Official Bookkeeper



Chief Financial Officer



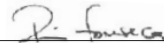
Director General



STATEMENT OF CHANGES ON NET ASSETS/EQUITY FOR THE YEAR ENDED DECEMBER 31, 2021

	Attributable to owners of the controlling equity					Total	Minority interest	Total net assets/equity
	Notes	Contributed Capital	Other Reserves	Translation Reserve	Accumulated Surpluses/(Deficits)			
Balance at December 31, 2020 brought forward	25, 26	30 000 000	-	-	6 151 636	36 151 636	36 151 636	
Changes in net assets/equity for 2021								
Loss on property revaluation						-		
Gain on revaluation of investments						-		
Exchange differences on translating foreign operations						-		
Net revenue recognized directly in net assets/equity		-	-	-	-	-		
Surplus/Deficit for the period					(3 224 327)	(3 224 327)		
Total recognized revenue and expense for the period		-	-	-	(3 224 327)	(3 224 327)	(3 224 327)	
Balance at December 31st, 2021		30 000 000	-	-	2 927 309	32 927 309	32 927 309	

The notes are an integral part of the statement of changes on net assets/equity for the period ended on December 31st, 2021.

Official Bookkeeper


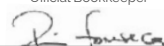
Chief Financial Officer

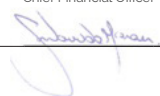

Director General


STATEMENT OF CHANGES ON NET ASSETS/EQUITY FOR THE YEAR ENDED DECEMBER 31, 2020

	Attributable to owners of the controlling equity					Total	Minority interest	Total net assets/equity
	Notes	Contributed Capital	Other Reserves	Translation Reserve	Accumulated Surpluses/(Deficits)			
Balance at December 31, 2019 brought forward	26, 27	30 000 000	-	-	10 723 379	40 723 379	40 723 379	
Changes in net assets/equity for 2020								
Loss on property revaluation						-		
Gain on revaluation of investments						-		
Exchange differences on translating foreign operations						-		
Net revenue recognized directly in net assets/equity		-	-	-	-	-		
Surplus/Deficit for the period					(4 571 744)	(4 571 744)		
Total recognized revenue and expense for the period		-	-	-	(4 571 744)	(4 571 744)	(4 571 744)	
Balance at December 31st, 2020		30 000 000	-	-	6 151 636	36 151 636	36 151 636	

The notes are an integral part of the statement of changes on net assets/equity for the period ended on December 31st, 2020.

Official Bookkeeper


Chief Financial Officer


Director General


INTERNATIONAL IBERIAN NANOTECHNOLOGY LABORATORY

Fiscal Number: 508633346

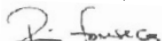
Year : 2021

Currency: EUR

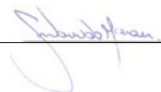
Statement of comparison of budget and actual amounts for the year ended December 31st 2021

	Approved Budget	Actual on comparable basis	Performance Difference	Var. %
Revenue				
Services and Industrial RTD	1 967 146	2 452 313	485 167	24.7%
RTD Programmes	11 833 321	8 800 152	(3 033 169)	-25.6%
Member States Contributions	7 141 400	7 141 000	(400)	-0.0%
Total Income	20 941 867	18 393 465	(2 548 402)	-12.2%
Expenses				
Personnel Costs	(12 281 421)	(11 083 111)	(1 198 310)	-9.8%
Consumables	(3 892 743)	(2 421 890)	(1 470 853)	-37.8%
Services and Other Recurrent Expenses	(3 296 268)	(3 149 927)	(146 340)	-4.4%
Maintenance	(1 215 958)	(1 091 273)	(124 685)	-10.3%
Total Expenses	(20 686 389)	(17 746 201)	(2 940 187)	-14.2%
Operating Margin	255 479	647 264	391 785	153.4%
Investment Subsidy	700 000	900 366	200 366	28.6%
Depreciations	(5 616 612)	(4 771 957)	(844 655)	-15.0%
Surplus/(deficit) for the period	(4 661 133)	(3 224 327)	(1 436 806)	-30.8%

Official Bookkeeper



Chief Financial Officer



Director General



Note: INL prepares its budget on an accrual basis. As such, the budget and the financial statements are already on the same basis and further adjustments are not required to align the financial statements to the budget. INL has chosen to present the comparison separately in the financial statements.

When comparing the actual total revenue and expenditure amounts, as presented above, to the statement of financial performance, it will be noted that the total lines do not agree exactly with the total lines in the statement of financial performance. These differences are because INL has decided to separate the operating activity in the budget statement, which means that incomes related to investment subsidies and costs related to depreciations were included after the operational result. Nonetheless, of course, the surplus/deficit for the period is the same in both statements.

Audit Report





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INTERNATIONAL IBERIAN NANOTECHNOLOGY LABORATORY INL

Audit Certificate 2021

Opinion of the External Auditor
on the 2021 Financial Statements

The aim of the audit is to cooperate with the audited organization in order to reach its objectives, while contributing to compliance with principles of regularity, transparency, and sound financial management and fulfilling audit requirements defined by the organization's regulations, in accordance with International Audit Standards.

The Tribunal de Cuentas of Spain (TCE), headed by its President, provides external audit services to International Organizations, working independently of its role as the Supreme Audit Institution of Spain. The President and the TCE are independent of the Spanish Government and assess the proper and efficient spending of public funds and accountability to the Spanish Parliament. The TCE audits the accounts of all public sector bodies as well as political parties; collaborates in works related to its role as an active member of the International Organization of Supreme Audit Institutions (INTOSAI) and the European Organization of Supreme Audit Institutions (EUROSAI) and takes part in audit works within European Union projects and beyond.

To the INL Council:

Opinion

We have audited the Financial Statements (FS) of the Iberian Nanotechnology Laboratory (INL) for the year ended 31 December 2021. These comprise the Statement of Financial Position, the Statement of Financial Performance, the Statement of Cash Flow, the Statement of Changes in Net Assets, the Statement of Comparison of Budget and Actual Amounts and the related notes, including a summary of significant accounting policies. These FS have been prepared following the Organization's accounting policies.

In our opinion, the accompanying FS present fairly, in all material respects, the financial position of the INL as at 31 December 2021, and its financial performance for the year then ended, in accordance with International Public Sector Accounting Standards (IPSAS).

Basis for Opinion

We conducted the audit in accordance with International Standards on Auditing (ISAs) of the International Federation of Accountants (IFAC) as adopted and expanded by the International Organization of Supreme Audit Institutions (INTOSAI) and issued as INTOSAI Framework for Professional Pronouncements (including the International Standards for Supreme Audit Institutions-ISSAI). A specific section below in this audit report describes the auditor's responsibilities under the ISSAI.

We are independent of the auditee in accordance with the ethical requirements that are relevant to our audit of the Financial Statements and we have fulfilled our other ethical responsibilities in accordance with these requirements. Audit Standards of the TCE (TCE AS) include the relevant ethical requirements for TCE staff carrying out audit tasks, subject to the Code of Conduct of the Spanish Public Employee --Chapter VI of the Basic Statute of the Public Employee, Royal Legislative Decree 5/2015-- and shall act also in accordance with the Code of Ethics (ISSAI 130) adopted by INTOSAI.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our unmodified opinion.

Information Other than the Financial Statements and Auditor's Report Thereon

The INL Director General is responsible for the other information comprising a Foreword, an Activities Report and a Financial Report.

Our opinion on the FS does not cover the other information and we do not express any form of assurance thereon.

In connection with our audit of the FS, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with

the FS or appears to be materially misstated, according to our knowledge obtained in the audit. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of Director General and those charged with Governance for the Financial Statements

The Director General is responsible for the preparation and fair presentation of the FS in accordance with the IPSAS and for such internal control as he determines necessary to enable the preparation of FS that are free from material misstatement, whether due to fraud or error.

In preparing the FS, the Director General is responsible for assessing the organization's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Entity or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Organization's financial reporting process.

Auditor's Responsibility for the Audit of the Financial Statements

Our responsibility is to express an opinion on the FS based on our audit in accordance with Article 25 of INL's Statute and related Articles 21 and 36 of INL's Financial Rules.

To express such an opinion, we must obtain reasonable assurance about whether the FS as a whole are free from material misstatements, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with ISSAI will always detect any existing material misstatements. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these FS.

As part of an audit in accordance with ISSAI, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement in the Financial Statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as

fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Organization's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Organization to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the Financial Statements, including the disclosures, and whether the Financial Statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with management regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.



Report on Other Legal and Regulatory Requirements

According to the terms of the audit engagement, in addition to the auditor's responsibilities under the ISAs we have tested the compliance of the INL's activities in 2021 respect to the relevant regulatory framework.

In our opinion, the transactions of the INL that have come to our notice or that we have tested as part of our audit have, in all significant respects, been in accordance with the INL's Financial Rules and its Council regulations, except for the issues described in the long form report released along with this audit certificate, in accordance with Article 21.5 of the INL's Financial Rules.

Madrid, 26 May, 2022

Enriqueta Chicano Jávega
President of the Tribunal de Cuentas of Spain
External Auditor

