

CERIC

Central European
Research Infrastructure
Consortium

Report

2016



ERIC established by the European
Commission Implementing Decision
392/2014/EU

Table of Contents

DIRECTOR'S FOREWORD

05

EXECUTIVE SUMMARY

06

1

EXCELLENT SCIENCE

Open Access
Scientific Publications
Scientific Highlights
Internal Research Projects

08

2

EDUCATION, INDUSTRIAL LIAISON, COMMUNICATION

Educational Activities
Industrial Liaison Activities
Communication and Dissemination

20

3

ERA/ERIC DEVELOPMENT

Contribution to the Progress of the
European Research Area (ERA)

24

4

OPEN FOR NEW MEMBERS

Enlargement Methodology
New Members - Poland and Hungary

30

5

MANAGEMENT AND FINANCE

Monitoring and Evaluation Framework
and Results for 2015
Methodology for Accounting In-kind
Contributions
Communication Guidelines
Notes to the Financial
Statements as at December 31, 2016

32

6

CERIC OVERVIEW

Mission and Vision
CERIC Partner Facilities,
Instruments and Techniques

48

ABBREVIATIONS

52

Providing Open Access to Excellent Researchers



Jana Kolar

CERIC Executive Director

A handwritten signature of Jana Kolar in black ink.

Dear Reader,

We present to you the third annual report of CERIC. Foremost, it describes our scientific achievements. From counting electrons on supported nanoparticles, to an archaeometric study of glazed pottery from Azerbaijan and improved drugs quality control, CERIC has supported science and created new knowledge to help in tackling some of the pressing challenges of our society. With publications in prestigious journals such as *Nature Materials* and *Nature Communications*, the scientific impact more than doubled over the last year. In our third year of operation, we have attracted users from 24 countries and five continents, testifying to the international attractiveness of the infrastructure.

While science is our main business, this report also highlights many other achievements, in the fields of education, communications, industrial liaison and development of the European Research Area.

These were made possible by the resources contributed in-kind by our Member Countries, which decided to pool them to best serve their national, as well as international scientific communities. An indispensable in-cash contribution came from the Italian government.

It is always people who make the difference, of course, and I would like to express my sincere thanks to the scientists from our Partner Facilities, and the central administration for their enthusiasm and dedication.

Executive Summary

Excellent Science

In 2016, CERIC* continued with its main mission of providing access to its research infrastructure and contributing to the advancement of science. Its call for open access attracted 119 proposals, requesting the use of 260 instruments, a 36% increase over the previous year. Proposals came from 24 countries and 5 continents. The scientific output has also increased dramatically since 2015, which is reflected in the 5-fold increase in the number of scientific publications. An increase is to be expected, since CERIC was established in 2014 and there is a significant time lag between experiments and the publications based on them. In addition to more publications, the average Impact Factor was 5.7, a more than twofold increase over the 2015 figure. In order to contribute to scientific and technological output, mutual learning and integration of the facilities, CERIC carried out a call for internal research projects, submitted jointly by at least two Partner Facilities. Following an international peer review, four projects were selected for funding. The three-year projects are implemented through joint co-funding of the involved parties (in-kind, €5.659.479), while the top-up is contributed from funds for strengthening CERIC, allocated by the Italian Ministry of Education, Universities and Research (MIUR, € 1.750.530).

Education, Industrial Liaison, Communication

The participation of CERIC in a number of outreach events across Europe in 2016 allowed the targeted scientific community to get acquainted with the open access opportunities offered by the Consortium. Networking with the main actors of the innovation system has been another continuous activity throughout the year, which has also been useful for exchanging IL&TT best practices with Partner Facilities and other research infrastructures. Following the principles of cooperation and co-working among actors in the PFs, an internal workshop involving the distributed PR & Communication Team of CERIC was organized as a preparatory step for the publication of the CERIC Communication Guidelines. In the field of education, CERIC contributed to the Hercules School by training 16 PhD and post-doc students on the research techniques available in CERIC, and successfully implemented a training programme for high schools, PaGES, funded by the Italian Region Friuli Venezia Giulia, which allowed students to have direct experience of the research environment and empowered them to make more conscious choices for their future career.

ERA/ERIC Development

CERIC, being an ERIC, is expected to provide added value in the development of the European Research Area (ERA) and this contribution is periodically evaluated. A dedicated chapter of the report therefore focuses on the many activities that contribute to a better functioning ERA. They are presented in terms of the six ERA priorities adopted by the European Council. First of all, it contributed to the development of more effective national research systems by supporting mutual learning among the involved facilities in the fields of research, technology, communication and industrial liaison. CERIC also contributed to transnational cooperation, mainly through the peer-reviewed calls for open access and the call for internal research projects, which pooled together resources from our partner countries. The publication of a new scheme allowing scientific users to obtain financial support related to publications in high-impact journals, contributed to fostering optimal transfer of scientific knowledge. CERIC also focused on the development of the ERIC legal framework, in particular by improving methods and procedures to help institutions better utilise in-kind contributions, and by better defining national procedures for the recognition of VAT exemption in ERICs.

Open for New Members

To allow transparent processing of requests for accession and membership, in 2016 the General Assembly of CERIC adopted the Methodology for Enlargement, which defines the steps to be taken in the application process, as well as the tasks and responsibilities of the CERIC bodies involved in the evaluation. In 2016, two new Members formally joined the Consortium, Poland and Hungary, after the unanimous approval of the CERIC General Assembly. The National Synchrotron Radiation Centre SOLARIS in Poland and the Hungarian Academy of Sciences (HAS) Centre for Energy Research (MTA EK) in Hungary are empowered formally to offer their scientific and technical resources through CERIC calls for open access.

Management and Finance

In 2016, CERIC published its Communication Guidelines, to ensure that the communication actions of both CERIC and its Partner Facilities in member states are in line with key strategic directions, that they use recommended tactical tools and that they share quality content with specific or general target audiences. Furthermore, in 2016 the General Assembly adopted the Monitoring and Evaluation Framework, which sets Key Performance Indicators, which will help CERIC management in periodically tracking and improving performance and achieving results, and will allow demonstration of the effectiveness, efficiency and accountability of the Consortium. Finally, the Methodology for Accounting In-kind Contributions, developed in 2015, was adopted by the General Assembly of CERIC and implemented for the collection of data for 2016, as shown in the Notes to the Financial Statements.

CERIC Overview

CERIC-ERIC is an integrated multidisciplinary research infrastructure for basic and applied research in all fields of materials, biomaterials and nanotechnology. Located in 7 countries of Central and South-eastern Europe (Austria, Czech Republic, Hungary, Italy, Poland, Romania and Slovenia), it is open to researchers from all over the world through a single open access point to state-of-the-art facilities and techniques based on the use of electrons, ions, neutrons and photons. Each Member Country contributes to CERIC a high-quality Partner Facility, which is available to researchers, depending on a positive review from the International Scientific and Technical Advisory Committee (ISTAC) of CERIC.

*For an overview of CERIC and its main goals and activities, see chapter 6 "CERIC Overview"

1

Excellent Science

Main Achievements

- 1** **Implementation of 2 calls for free open access** to which 119 proposals, requesting the use of 260 instruments, were submitted. This is a 36% increase over the previous year.
- 2** **Proposals came from 24 countries and 5 continents**
- 3** **A significant increase in the number of scientific publications and the average impact factor**
- 4** **The selection and award of three CERIC internal research projects**
 CEROP, Dyna Chiro and RENEWALS

Open Access

CERIC's main aim is to contribute to the creation of excellent science, both as an in-house activity and as a service to international users. This is achieved mainly by providing open access to its research facilities.

In 2016, CERIC organized two open access calls for proposals to the Consortium's research infrastructure; 119 proposals were received. Being multi-technique, these 119 proposals corresponded to 260 single instrument proposals (Figure 1), which is a 36% increase over 2015. There were 147 allocated requests, for a total of over 11,400 hours. The number of allocated experiments did not increase significantly (2%), since it is limited by the time offered to CERIC open access by the facilities (Figure 2).

The majority of applicants requested access to multiple facilities, which is still the distinguishing and the most appealing characteristic of CERIC. In both calls in 2016, there was an average request for more than two instruments per proposal.

Figure 1
Number of proposals and requested methods

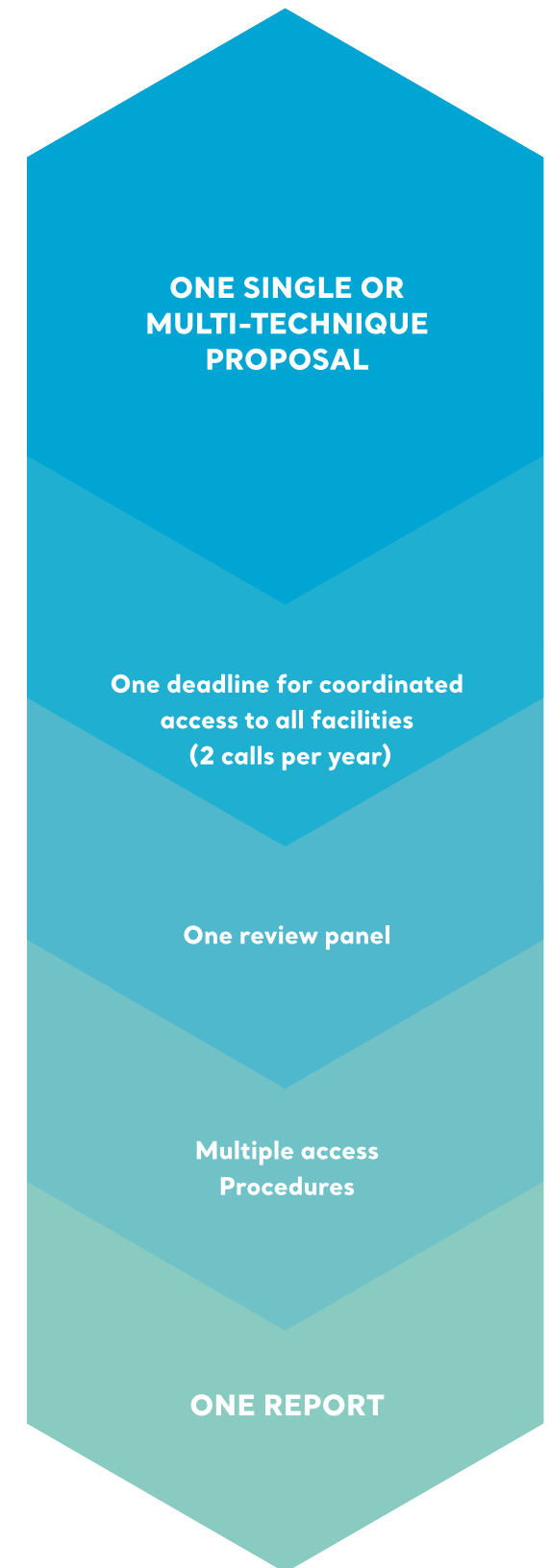
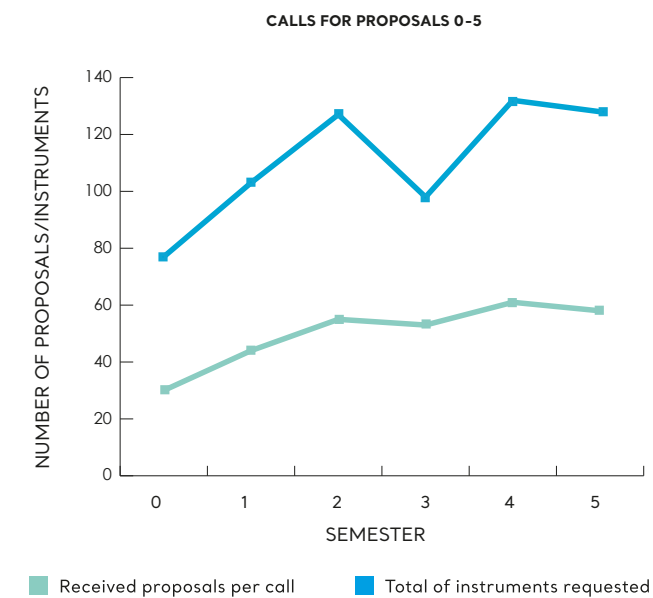
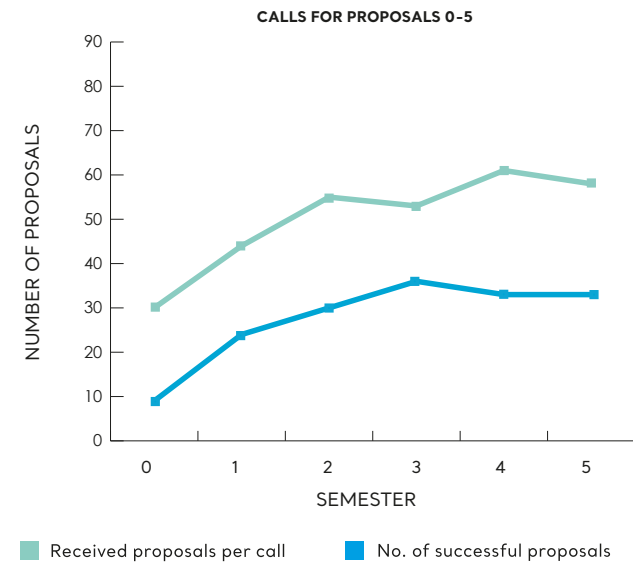
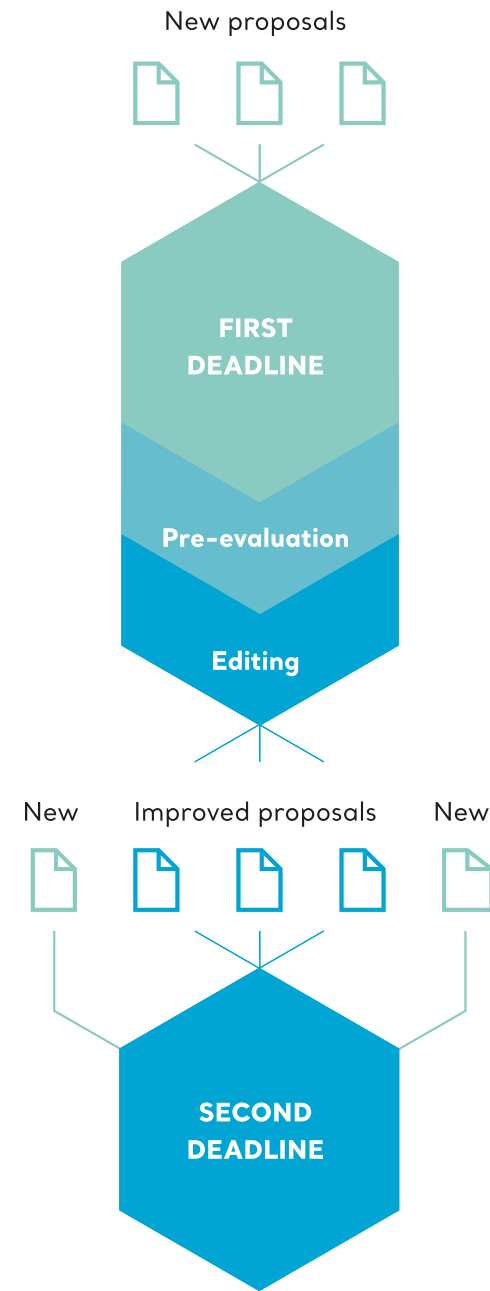
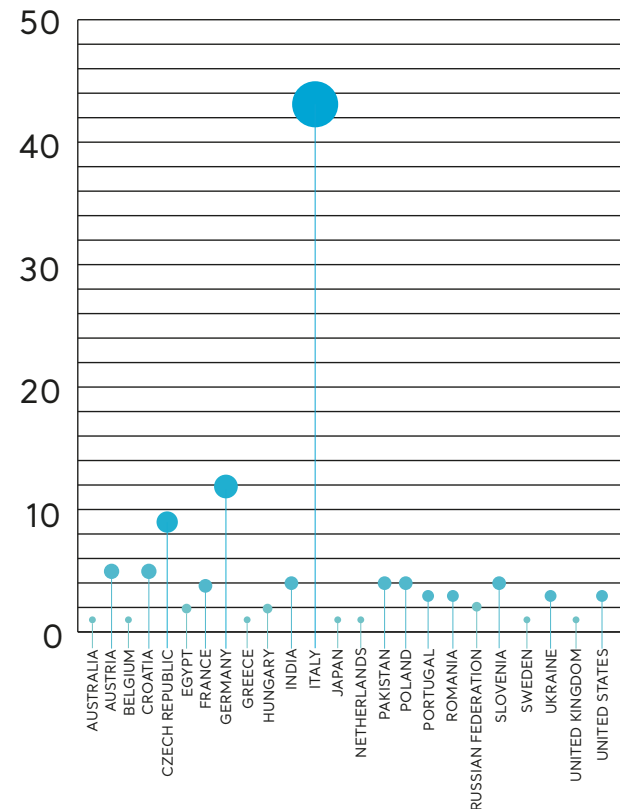


Figure 2
Number of received and successful proposals per call



CERIC remains a highly internationalised research infrastructure, with principal proposers from 24 countries and five continents, 16% of them from non-EU countries (Figure 3).

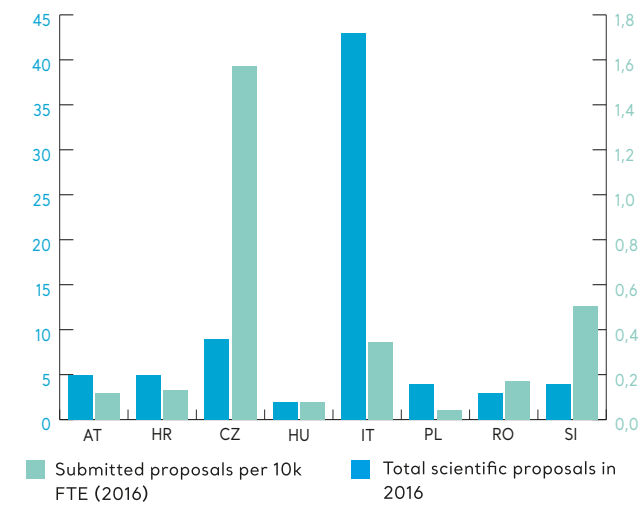
Figure 3
No. of proposals by country



- 2 calls for proposals
- 119 proposals received
- Research groups from 24 countries
- 147 allocated requests

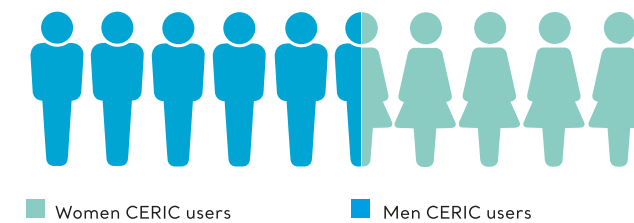
Nevertheless, the majority of submitted proposals (61%) came from CERIC member countries. This is to be expected, since CERIC is a recent addition to the European research infrastructure landscape and is still not well known beyond its member countries. The most active users (per full time employees in Research & Development in a country) are from the Czech Republic, followed by Slovenia and Italy.

Figure 4
Proposals per 10K full time employees in R&D in Member countries



As in 2015, one third of the principal investigators were female, while 45% of the researchers that went to the facilities to perform the measurements were female (Figure 5).

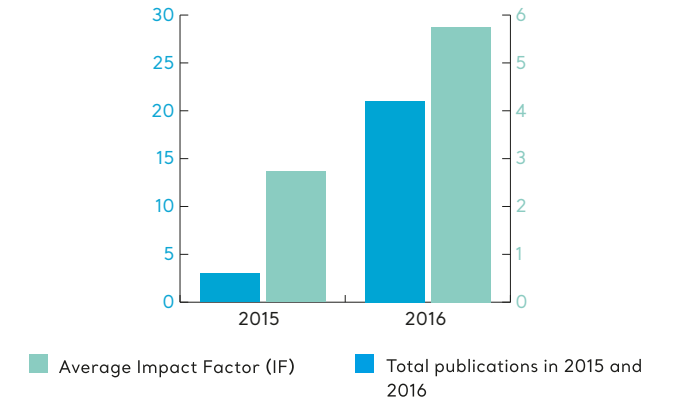
Figure 5
Gender distribution of CERIC users



Quality of the output

The first CERIC proposals were scheduled in late 2014. Taking into account the average period of 1 to 1.5 years from measurements to publication, as expected the scientific output in 2016 increased dramatically over 2015, which is reflected in the 5-fold increase in the number of scientific publications, while the average Impact Factor was 5.7, a more than twofold increase over the 2015 value (Figure 6).

Figure 6
Number of scientific publications in 2015 and 2016 and average Impact Factor



Scientific Publications

In 2016, the number of publications stemming from research conducted through the CERIC offer of open access substantially increased in comparison to the previous year, thus showing the effective results of the scientific activity carried out in the first two years of operation. Twenty journal articles were published, with a cumulative impact factor of 114.5 (versus 8.16 in 2015) and an average impact factor of 5.72 (versus 2.72 in 2015).

The following articles were published in 2016:

- (1) M. Monai, T. Montini, M. Melchionna, T. Duchoň, P. Kúš, N. Tsud, K.C. Prince, V. Matolín, R.J. Gorte, P. Fornasiero, *Phosphorus poisoning during wet oxidation of methane over Pd@CeO₂/graphite model catalysts*, Applied Catalysis B: Environmental, 2016, 197, 271-279
- (2) M. Fabian, E. Svab, K. Krezhov, *Network structure with mixed bond-angle linkages in MoO₃-ZnO-B₂O₃ glasses: Neutron diffraction and reverse Monte Carlo modeling*, Journal of Non-Crystalline Solids, 2016, 433, 6-13
- (3) Y. Lykhach, S.M. Kozlov, T. Skála, A. Tovt, V. Stetsovych, N. Tsud, F. Dvořák, V. Johánek, A. Neitzel, J. Mysliveček, S. Fabris, V. Matolín, K.M. Neyman, J. Libuda, *Counting electrons on supported nanoparticles*, Nature Materials, 2016, 15(3), 284-288
- (4) F. Dvořák, M. Farnesi Camellone, A. Tovt, N.D. Tran, F.R. Negreiros, M. Vorokhta, T. Skála, I. Matolínová, J. Mysliveček, V. Matolín, S. Fabris, *Creating single-atom Pt-ceria catalysts by surface step decoration*, Nature Communications, 2016, 7
- (5) A. Viani, K. Sotiriadis, A. Len, P. Šašeka, R. Ševčíka, *Assessment of firing conditions in old fired-clay bricks: The contribution of X-ray powder diffraction with the Rietveld method and small angle neutron scattering*, Materials Characterization, 2016, 116, 33-43
- (6) K. Ševčíková, L. Szabová, M. Kettner, P. Homola, N. Tsud, S. Fabris, V. Matolín, V. Nehasil, *Experimental and Theoretical Study on the Electronic Interaction between Rh Adatoms and CeO_x Substrate in Dependence on a Degree of Cerium Oxide Reduction*, J. Phys. Chem. C, 2016, 120(10), 5468-5476

(7) A. Sanna, A.V. Fedorov, N.I. Verbitskiy, J. Fink, C. Krellner, L. Petaccia, A. Chikina, D Yu Usachov, A. Gruneis, G. Profeta, *First-principles and angle-resolved photoemission study of lithium doped metallic black phosphorous*, 2D Materials, 2016, 3(2), 20531

(8) M. Schüler, Y. Pavlyukh, P. Bolognesi, L. Avaldi, J. Berakdar, *Electron pair escape from fullerene cage via collective modes*, Scientific Reports, 2016, 6

(9) I. Tanabe, M. Gomez, W.C. Coley, D. Le, E.M. Echeverria, G. Stecklein, V. Kandyba, S. Balijepalli, V. Klee, A. E. Nguyen, E. Preciado, I. Lu, S. Bobek, D. Barroso, D. Martinez-Ta, A. Barinov, T.S. Rahman, P.A. Dowben, P.A. Crowell, L. Bartels, *Band structure characterization of WS₂ grown by chemical vapour deposition*, Applied Physics Letters, 2016, 108, 252103

(10) G. Tromba, S. Pacilè, Y.I. Nesterets, F. Brun, C. Dullin, D. Dreossi, S.C. Mayo, A.W. Stevenson, K.M. Pavlov, M.J. Kitchen, D. Thompson, J.M.C. Brown, D. Lockie, M. Tonutti, F. Stacul, F. Zanconati, A. Accardo, T.E. Gureyev, *Phase-contrast clinical breast CT: Optimization of imaging setups and reconstruction workflows*, Lecture Notes in Computer Science, 2016, 9699, 625-634

(11) S. Bercha, G. Mali, I. Khalakhan, T. Skála, K.C. Prince, V. Matolín, N. Tsud, *Histidine adsorption on nanostructured cerium oxide*, Journal of Electron Spectroscopy and Related Phenomena, 2016, 212, 28-33

(12) J. Mysliveček, V. Matolín, I. Matolínová, *Heteroepitaxy of Cerium Oxide Thin Films on Cu(111)*, Materials, 2016, 8(9), 6346-6359

(13) B. Rossi, V. Venuti, F. D'Amico, A. Gessini, A. Mele, C. Punta, L. Melone, V. Crupi, D. Majolino, C. Masciovecchio, *Guest-matrix interactions affect the solvation of cyclodextrin-based polymeric hydrogels: a UV Raman scattering study*, Soft Matter, 2016, 12, 8861-8868

(14) T. Skála, V. Matolín, *Growth of cerium tungstate epitaxial layers: influence of temperature*, Surface and Interface Analysis, 2016, 48 (2), 111-114

(15) V. Stetsovych, T. Skála, G. Beran, F. Dvořák, D. Mazur, N. Tsud, K. Mašek, J. Mysliveček, V. Matolín, *Two-dimensional, high valence-doped ceria: Ce₆WO₁₂(100)/W(110)*, Applied Surface Science, 2016, 372, 152-157

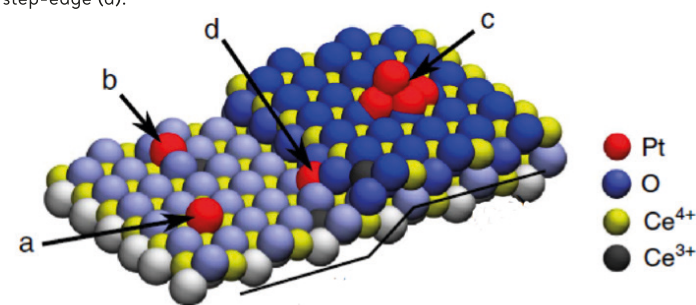
(16) V. Crupi, Z. Kasztovszky, F. Kahlilli, M.F. La Russa, A. Macchia, D. Majolino, B. Rossi, N. Rovella, S.A. Ruffolo, V. Venuti, *Evaluation of complementary methodologies applied to a preliminary archaeometric study of glazed pottery from Agsu (Azerbaijan)*, Int. J. Conserv. Sci., 2016, 7, Special Issue 2, 901-912

Scientific Highlights

New design strategies towards more effective catalysts¹

An efficient catalytic process is crucial for several applications, such as energy production in fuel cells and catalytic converters in cars. Precious noble-metals such as platinum play a key role in the catalysis and their use must be optimized to reduce costs and maximize their potential. Single-atom catalysts maximize the utilisation of supported precious metals by exposing every single metal atom to reactants. Although this concept is widely known, preserving the stability of single atoms on a support material under working conditions (e.g. high temperature) is still a major challenge.

Figure 7
Location of the Platinum atoms (red) on the Ceria substrate. They were found adsorbed on the surface (a), replacing oxygen (b), as Pt₆ cluster on the top of a monolayer (c) and, most stable, as PtO₄ in the step-edge (d).



Filip Dvořák and **Matteo Farnesi Camellone** and their colleagues from Charles University in Prague, CNR-IOM DEMOCRITOS in Trieste, and SISSA in Trieste, combined the CERIC highly sensitive photoelectron spectroscopy with scanning tunnelling microscopy and density functional theory calculations, to explore the physics and chemistry behind the exceptional activity of ceria-based catalysts with an atomic dispersion of ionic platinum. Dvorak's and Camellone's study shows that monoatomic step-edges, which are the most pervasive defects on solid surfaces such as the support material ceria, provide specific structural and electronic environments for the selective formation of uniform, thermally and chemically stable Pt²⁺ ions. Moreover, they found that the platinum ions are stabilized as platinum oxide (PtO₄), which can provide additional reactivity in oxidation reactions. Experimentally controlling the engineering and decoration of the steps, as in the present study, may bring a more effective use of precious metals in catalytic processes, and less expensive and more environment-friendly energy production.

¹ F. Dvořák, M. Farnesi Camellone, A. Tovt, N. D. Tran, F. R. Negreiros, M. Vorokhta, T. Skála, I. Matolínová, J. Mysliveček, V. Matolín, S. Fabris, Creating single-atom Pt-ceria catalysts by surface step decoration, *Nature Communications*, DOI:10.1038/ncomms10801



"With our study we explored the physical and chemical processes behind ceria-based catalysts, and experimented new designs allowing to make a more effective use of precious metals in the production of energy"

Scientists apply a new method for drugs quality control, purer medicines and better health²

A stressful lifestyle results in many cardio-vascular diseases, which are currently among the main causes of death. A way of overcoming this problem is to study, design and produce the purest medications possible in order to reduce their side effects.

However, manufacturing pure drugs is very expensive and there are limited methodologies for proving effective purity, indicating impurities of pharmaceuticals below the detection limit. A team of scientists led by **Aden Hodzic**, scientific and technology transfer officer at CERIC-ERIC, applied a novel approach to better testing and controlling the purity of medicines and their structure by simultaneously analysing the thermal behaviour, purity and structural properties of the active pharmaceutical ingredients (APIs). The international team of researchers combined both Small- and Wide-Angle X-ray Scattering (SWAXS) techniques with Differential Scanning Calorimetry (DSC), with the goal of conducting API purity quality control of pentoxifylline, a synthetic drug used for the treatment of peripheral vascular diseases, the management of cerebrovascular insufficiency, sickle cell disease and diabetic neuropathy. SWAXS gives information about the structure of the analysed material, i.e., API polymorphism, while DSC deals with the thermodynamic and calorimetric properties indicating thermal drug transition, which again gives information about drug purity.

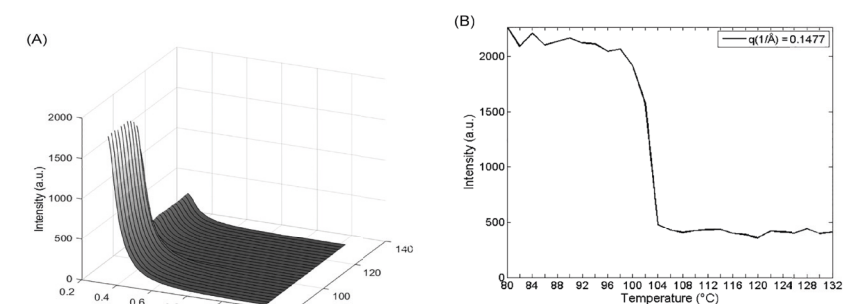


Figure 8
SAXS heating scans spectra of pentoxifylline in the temperature range of 80 to 140°C: a SAXS heating scan, b) SAXS scattered intensity versus temperature. (SAXS exposure time one minute per frame, which corresponds to two°C per frame).

The idea of combining these techniques in a single analytical tool for simultaneous analysis of these aspects of the material was demonstrated to be very effective for ensuring complete and reliable quality control of medicaments before their commercialisation. Indeed, strict testing to ensure the absence of destructive impurities is highly relevant for any further pharmaceutical procedure. The effectiveness of the experimental method, highlighting both the thermodynamic and the structural changes of APIs related to purity when metabolized, will guarantee better medicines for us and for our health. The research was the result of scientific collaboration between CERIC-ERIC, the Graz University of Technology, the Research Centre for Pharmaceutical Engineering, the Institute of Pharmaceutical Sciences at the University of Graz and the company GL-Pharma. SWAXS and DCS are also available in CERIC laboratories at the Austrian beamline installed at Elettra in Trieste, Italy.

² A. Hodzic, M. Kriechbaum, S. Schrank, F. Reiter, Monitoring of Pentoxifylline Thermal Behavior by Novel Simultaneous Laboratory Small and Wide X-Ray Scattering (SWAXS) and Differential Scanning Calorimetry (DSC), *PLOS One*, 2016, 11 (7)



"The multi-technique approach we applied has demonstrated to be very effective for ensuring a reliable quality control of medicals before their commercialisation"

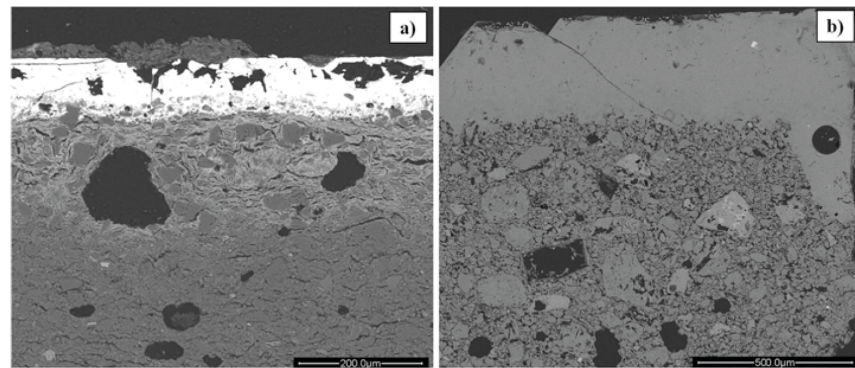
Study of ancient glazed pottery from Azerbaijan confirms the need for a multi-technique approach in cultural heritage research³

The combination of several techniques is fundamental to analysing different aspects of archaeological findings. An interesting example showing the importance of applying a multi-technique approach in this field is that of the latest research conducted by the research group to which the CERIC user **Valentina Venuti** belongs, which focused on eight archaeological pottery fragments from the medieval ruins of the Agsu archaeological site in Azerbaijan.



"We perform structural characterisation of samples of historical and artistic value, at the micro-, meso- and macro-scale, adopting and combining non-invasive and microdestructive techniques, using both neutron and electron sources"

Figure 9
SEM micromorphological details of glaze and ceramic body



The group applied a combination of complementary techniques: optical microscopy (OM), scanning electron microscopy – energy dispersive spectroscopy (SEM-EDS) and prompt gamma activation analysis (PGAA, at the Hungarian CERIC partner facility – the Budapest Neutron Centre), to define the raw materials and pigments used for the production and decoration of the samples, and X-ray diffraction (XRD) to assess their firing temperature. The data obtained suggest the presence of various production technologies and raw materials (quartz, plagioclase, feldspar and hematite in one group of samples, quartz and plagioclase in the second one), probably due to the site position at the crossroads of commercial routes. Moreover, XRD analysis suggested that the original calcareous clay of both groups of samples was fired at temperatures higher than 850°C. Only for one group of samples it was possible to hypothesize Chinese production and provenance. However, more samples (both pottery fragments and local clays) need to be studied in order to confirm this hypothesis.

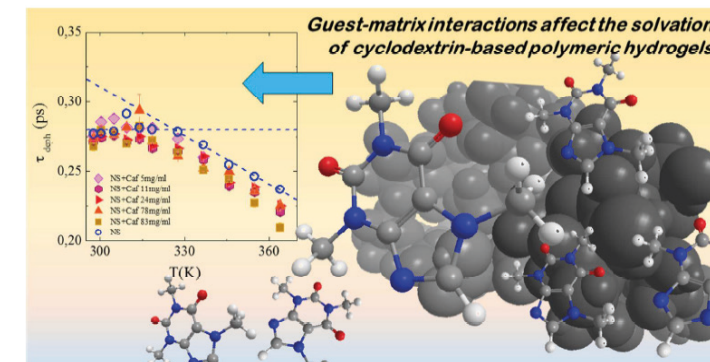
The work, which can overall be considered a milestone for future archaeometric studies in this area, is a first step towards further sampling campaigns involving both archaeological and geological specimens needed for reconstructing the provenance of artefacts.

³V. Crupi, Z. Kasztovszky, F. Khalililil, M. F. La Russa, A. Macchia, D. Majolino, B. Rossi, N. Rovella, S. A. Ruffolo and V. Venuti, Evaluation of complementary methodologies applied to a preliminary archaeometric study of glazed pottery from Agsu (Azerbaijan), *International Journal of Conservation Science*, Vol. 7, Special issue 2, 2016:901-912

Scientists test caffeine as a model system for developing and designing new hydrogels for biomedicine, cosmetics and environmental control⁴

Hydrogels are a special class of materials that have a specific three-dimensional structure, with internal spaces that can host guest molecules or water solutions containing active molecules. This structure allows hydrogels to absorb large amounts of water without losing their elasticity. Hydrogels, made of biopolymers such as sugar chains, can be used as superabsorbers for cosmetics and medical purposes, such as wound-dressing, and even as scaffold for tissue engineering. They have recently attracted some interest as model systems for "smart" hydrogels that are able to react with their environment (e.g., human skin) in a programmed and intelligent manner or for drug delivery.

In this context, a working group around **Barbara Rossi** from the Italian CERIC facility, together with her co-workers from the University of Messina and Politecnico di Milano, have developed a hydrogel based on natural cyclodextrin – a particular derivative of glucose – that acts as a nano-sponge. They recently published a study that investigates the mechanisms of entrapment, diffusion and release of guest molecules, such as pharmaceutical active ingredients, on



these nano-sponges. They used the caffeine molecule as a model drug. They used UV resonant Raman-Spectroscopy to analyse the structure of the model under different conditions. This method uses highly intensive ultra-violet light to monitor vibrations of the carbon atoms backbone within the nano-sponges. These vibrations are influenced by various factors, e.g., water uptake, drug loading and temperature.

For Raman spectroscopy, the CERIC IUVS instrument based at Elettra was used. Nano-sponges were loaded with various concentrations of caffeine at different temperatures. During measurements, they discovered that caffeine significantly changes the temperature-dependent properties of the nano-sponges. This has shown for the first time that caffeine is not simply loaded into the structure of this special kind of hydrogel, but it actively changes the structure and the properties of the hydrogel. Furthermore, the molecular insights provided by UV-Raman spectroscopy for the first time allowed the description and quantification of the caffeine induced structural changes within this type of nano-sponge. This valuable knowledge will enable further development of dextrin-based hydrogels and will help in the design of new strategies to control the loading, diffusion and release rates of bioactive molecules inside hydrogels for future drug delivery applications.



"These results corroborate the usefulness of UV Raman scattering experiments to monitor, at molecular level, the diffusion of bio-active molecules inside hydrogels for future drug delivery applications"

Figure 10
The effect of guest-matrix interactions on the solvation of cyclodextrin-based polymeric hydrogels is studied by UV Raman experiments

⁴B. Rossi, V. Venuti, F. D'Amico, A. Gessini, A. Mele, C. Punta, L. Melone, V. Crupi, D. Majolino and C. Masciovecchio, Guest-matrix interactions affect the solvation of cyclodextrinbased polymeric hydrogels: an UV Raman scattering study in *Soft Matter*, 2016, DOI: 10.1039/C6SM01647B

Internal Research Projects

Among the objectives of CERIC is integration of national multidisciplinary analytical, synthesis and sample preparation capabilities of Partner Facilities, operating mainly in the Central European Area, into a unique EU-level Distributed Research Infrastructure. To this end, CERIC published a Call for Research Grants in 2016, aimed at funding excellent investigators and their research teams to pursue high level and groundbreaking research in science and engineering. This research is expected to lead to advances at the frontiers of knowledge by using and eventually improving the research infrastructures in the CERIC Partner Facilities, taking best advantage of CERIC and contributing to its improvement.

The eligibility criteria were that projects had a multi-technique and multidisciplinary approach within the area covered by CERIC and involved more than one of the CERIC Partner Facilities. A specific requirement was the potential of the projects to build a base for successful proposals for Horizon2020 and/or for the use of structural funds for the construction/upgrade and international success of the CERIC facilities.

CERIC received 16 applications in response to the Call closed on the 7th of March. Proposals covered a wide range of scientific areas: Structural and Molecular Biology, Catalysis, Device Development, Functional Materials, Surfaces and Thin Films, Chemical Processes and Kinetics, Biochemistry and Biophysics, Instrumentation and Development Methods.

The CERIC General Assembly unanimously approved the ranking list of the winning projects evaluated by peer-review, by the CERIC ISTAC and by independent international evaluators.

First Call for Research Grants published in 2016 to integrate CERIC Partner Facilities by funding top-level multi-technique and multidisciplinary research in science and engineering

16 applications received, covering a wide range of scientific areas.

3 projects funded in 2016, and one in 2017, with unanimous approval of the CERIC General Assembly. MIUR contributed with € 1.750.530, and the partners with in-kind contributions of € 5.659.479

Three projects started at the end of 2016, while one will start in 2017:

CEROP

Deciphering single-atom catalysis in Pt/ceria systems via advancing the CERIC operando methods
PI: **Josef Mysliveček**

CEROP aims at extending knowledge about heterogeneous catalysis by applying operando and experimental methods for yielding information on catalyst interactions with realistic gaseous or liquid environments. The project will combine the CERIC techniques available at the Surface Physics Laboratory in Prague with the beamlines in Trieste, SAXS and XAS (contributed by the Austrian and the Italian CERIC Partner Facilities respectively).



Dyna Chiro

Spectroscopy and Dynamics of Chiral Systems
PI: **Kevin Prince**

Dyna Chiro aims to probe the dynamic behaviour of chiral molecules with chiral sensitivity. Furthermore, it aims to study the chiral behaviour of topological insulators. The research will exploit various sources of radiation, and develop and consolidate new methodologies. Circular dichroism in photoemission, a synchrotron radiation technique, will be applied in both cases. The team will work together to plan and implement new, cutting-edge instrumentation for a planned refurbished beamline at the Polish facility Solaris and an upgraded one at the Italian facility Elettra.



Renewals

Graphene for Water in Life Sciences
PI: **Maya Kiskinova**

RENEWALS aims at developing methodology for exploiting the cytotoxic effects of NPs in cells in a natural liquid environment and with the required spectral and lateral resolution. The goal will be achieved through fabrication of graphene-liquid cells (GLCs) using the CERIC Austrian facility and complementary characterisation with atomic force, photon and electron microscopes at Elettra in Trieste (IT), Charles University in Prague (CZ) and the National Institute of Materials Physics in Magurele (RO).

Projects are funded in the amount of up to 150.000 EUR/12 months, for a 3-year period. Funding will be available and allocated by CERIC-ERIC each fiscal year, subject to a positive outcome of the yearly progress evaluation made by CERIC in consultation with the ISTAC.



2

Education, Industrial Liaison, Communication

Main Achievements

- 1 Educational projects**
 Successful implementation of the training programme for high schools (PaGES), funded by the Italian Region Friuli Venezia Giulia.
- 2 Training**
 of PhD and post-doc students.
- 3 Participation in events**
 for increasing the visibility of CERIC and of its opportunities for research and development.

Educational Activities

PaGES Project

The PaGES project took high school pupils from the Italian Region Friuli Venezia Giulia step by step through the stages of a scientific experiment, from planning, managing, executing and evaluating a research project, to disseminating the results.

Pupils actively participated in the process of shaping a research idea into an actual experiment, and finally presented the projects' outcomes to the student community in their schools.

The project contributed to enhanced collaboration among schools in the region, to the development of the skills of participants and helped them making more conscious choices about their future studies and career.

The project was funded by the Italian Region Friuli Venezia Giulia, within the programme "Regional plan for the building up of the formative offer for the academic year 2015/2016", in the section "Special projects".



Pupils from the Liceo Scientifico Duca degli Abruzzi, partner in the PaGES project

Hercules School 2016

CERIC contributed to the HERCULES School by training 16 PhD and post-doc students visiting the Italian Representing Entity of CERIC-ERIC, Elettra Sincrotrone Trieste, on the potentials and capabilities of the techniques available in the Consortium.

Prof. Janez Plavec, director of the Slovenian Partner Facility in CERIC, presented the Slovenian NMR and case studies showing the research that can be performed with the techniques offered. The training programme was complemented by two full days of hands-on training at the Free Electron Laser FERMI, at the Nano Innovation Laboratory and at five Elettra beamlines (BACH, BadElph, DXRL, Nanospectroscopy, SAXS, TWINMIC).



Prof. Janez Plavec presents the Slovenian NMR at the Hercules School 2016

Industrial Liaison Activities

The CERIC management adopted the approach towards the development of CERIC's strategy for Industrial Liaison & Technology Transfer (IL&TT), which will be implemented throughout the H2020 ACCELERATE project, from 2017 onwards.

During 2016, CERIC increased its activity of establishing collaboration and supporting industrial partners for the implementation of joint projects aiming in particular at the development of advanced materials with an impact in the medical and health field. Within this framework, a number of Non-Disclosure Agreements (NDAs) was signed with various companies.

A significant result stemming from the scientific collaboration with industry was the development and new application of a simultaneous multi-technique for quality control of pharmaceutical products. The work was published in the open accesses PLOS ONE journal: A. Hodzic, M. Kriechbaum, S. Schrank, F. Reiter, *Monitoring of Pentoxifylline Thermal Behaviour by Novel Simultaneous Laboratory Small and Wide X-Ray Scattering (SWAXS) and Differential Scanning Calorimetry (DSC)*, Plos One, 2016 (read more on page 15).

CERIC also continued the exchange of IL&TT best practices among its partners, with the goal of enhancing innovation by both building stronger IL&TT units and strengthening the network.

In addition, CERIC IL&TT has become part of the European Research Infrastructure Village, which is built by user facilities such as CERIC, ESRF and HZG, and is open to additional partners. The basic concept is to present these complementary user facilities in a team for strengthening the network and increasing the visibility of the research infrastructures' environment among the industrial community, both in Europe and worldwide.

Networking with the main actors of the innovation system was also a continuous activity throughout 2016, mainly through participation in a number of international meetings and events:

Re-Industrialisation of Europe (REinEU)

Bratislava - Slovakia
26-28 October 2016

NanoInnovation Conference & Exhibition

Rome - Italy,
20-23 September 2016

Italian-Czech Economic Forum

Prague - Czech Republic
15 November 2016

Macro-Regional Innovation Week

Trieste - Italy,
29 September 2016

The approach towards an IL&TT strategy was adopted and will be further developed in the years 2017-2020

Communication and Dissemination

Communication Workshop

The 2nd CERIC Internal Workshop on Communication, held in September 2016, gathered the distributed PR & Communication team of CERIC, with the goal of collecting further suggestions for the development of guidelines, taking into account the specific needs of both CERIC and each facility, and sharing best practices (read more on page 33).

All key strategic, verbal and visual elements of the Communication Guidelines were presented, including proposed messages, tools and channels for future communication activities, and the first outline of the working plan for the next 3 years was also presented. The feedback of the participants was crucial for completing the final document, which was officially approved in October 2016 by the General Assembly of CERIC.



CERIC communication team, from both the seat and the PFs

Outreach Events

CERIC is still a young institution and little known to researchers from public and private institutions. To overcome this barrier, CERIC was presented at a number of events across Europe, such as:

First International Workshop of Materials Physics to promote Romanian research

Magurele - Romania, 23-25 May 2016

Polish-Italian workshop on Science and Technology with synchrotron radiation

Warsaw - Poland, 21 September 2016

ISSRNS 2016

Ustron - Poland, 13-18 June 2016

Czech-Italian Economic Forum

Prague - Czech Republic, 15 November 2016

NESY Symposium

at the TU Graz addressing the Austrian User Community.
Graz - Austria, September 2016

Conference Smaller and Faster: Infrared and Terahertz Spectral-Imaging at the Nanoscale with Synchrotron Radiation and FEL sources

Trieste - Italy, 1-2 December 2016

European Materials Research Society - E-MRS Fall Meeting and Exhibit

Warsaw - Poland, 19-22 September 2016

International symposium: Frontiers on wonderful world of nucleic acids

Zgornji Brnik - Slovenia, 16 December 2016

3

ERA/ERIC Development

CERIC is an ERIC, which is a specific legal form to facilitate the establishment and operation of research infrastructures of European interest. In addition to providing effective access to research infrastructure, all ERICs should represent added-value in the development of the European Research Area (ERA)¹. To this end, the Commission's implementing decision on setting up CERIC (2014/392/EU) states that CERIC's impact on ERA should be periodically evaluated. This chapter summarizes CERIC's contribution to the development of ERA in 2016, and activities aimed at the development of the ERIC legal form.

Main Achievements

- 1 **Alignment of activities**
through joint transnational research and coordinated investments in RIs.
- 2 **Synergic use of funds**
In addition to a coordinated investment of national and/or ESIF funds between Members, the European Commission is contributing to the development of CERIC by funding the H2020 project ACCELERATE, accepted for funding in 2016.
- 3 **Stimulating open access publications**
through a financial support scheme
- 4 **Outreach activities**
targeting countries with no large-scale research infrastructures with the capabilities of CERIC-ERIC.
- 5 **Contribution to the development of the ERIC legal framework**
For example, development of methods and procedures for entities working with in-kind contributions and development of national procedures for the recognition of VAT exemption to ERICs.

¹Council Regulation (EC) No 723/2009 of 25 June 2009

Contribution to the Progress of the European Research Area (ERA)

Context

In order better to describe CERIC's contribution to ERA, the concept of ERA and ERIC Regulation will first be briefly introduced.

European Research Area (ERA)

The Treaty on the Functioning of the European Union² defines research and technological development as an area of shared competence between Member States and the European Union (Article 4 TFEU), with the objective of the EU strengthening its scientific and technological bases by achieving a European Research Area (ERA) and encouraging it to become more competitive (Article 179 TFEU). This political agreement is practically implemented through:

- Support to research and innovation activities within the Framework Programme, and
- Policy coordination addressed by ERA activities.

To describe the ERA, a definition based on the Treaty and Council Conclusions³ is usually considered, whereby ERA is *a unified research area open to the world based on the Internal Market, in which researchers, scientific knowledge and technology circulate freely and through which the Union and its Member States strengthen their scientific and technological bases, their competitiveness and their capacity collectively to address grand challenges*⁴.

Policy coordination leading to a functional ERA is organized along six ERA priorities:

- More effective national research systems;
- Optimal transnational co-operation and competition (on common research agendas, grand challenges and infrastructures);
- An open labour market for researchers (facilitating mobility, supporting training and ensuring attractive careers);
- Gender equality and gender mainstreaming in research;
- Optimal circulation and transfer of scientific knowledge.
- International cooperation⁵.

Progress in 2016

In order to prepare for the periodic evaluation of CERIC's contribution to ERA, its activities in relation to the relevant ERA priorities are presented.

²Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union, 2012/C 326/01

³Council conclusions on the European Research Area Roadmap 2015-2020

⁴Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions - A Reinforced European Research Area Partnership for Excellence and Growth - COM/2012/0392

⁵Council conclusions on the European Research Area Roadmap 2015-2020

More effective national research systems

CERIC is expected to increase the effectiveness of national research systems through its contribution to scientific excellence (see chapter 1), and also by improving quality and capability in education and technology, and in attracting higher socioeconomic returns. In this respect, the particular added value of CERIC lies in mutual learning and exchange of good practices among countries in Central Europe, while attracting excellent researchers from the world. The following activities were undertaken in 2016 to facilitate this:

- CERIC organizes dedicated workshops for the staff of its Representing Entities and Partner Facilities on various topics. Following the workshop on technology transfer in 2015, a two-day event in 2016 focused on communication issues (read more on page 23).
- CERIC, as an advanced partner, joined the Teaming Horizon 2020 proposal with its Romanian Representing Entity. Although favourably evaluated, the score obtained did not suffice for funding, given the budgetary resources available for the call.
- Because of particular expertise on the issues of spreading excellence, closing the innovation divide and widening participation in Horizon 2020 calls, the executive director of CERIC had a number of invited talks on the topic in 2016, emphasizing the added value of CERIC and, more broadly, research infrastructures. Examples are the keynote speech at the conference of the Slovakian Presidency of the Council of the EU, *Spreading Excellence and Crossing the Innovation Divide* (Brussels – Belgium, 25 November 2016), and an invited speech at the Public Hearing organized by the European Conservatives and Reformists group in the European Parliament on the topic of *Closing the Success Gap in the R&I Framework Programmes* (Brussels – Belgium, 12 September 2016).

Optimal transnational cooperation and competition

CERIC, being a distributed research infrastructure is based on transnational cooperation among its Members (countries). It also enables transnational access, based on international peer-review, aligned with the principles of the Charter for Access to Research Infrastructures⁶. Both core activities contribute to transnational cooperation and competition.

Cooperation among Members is demonstrated through the prioritisation of CERIC in national roadmaps (Table 1) and related investments on the national level, whether from national or ESIF funds.

	National ERA Action Plan	Year of publication of the RI Roadmap	CERIC included in the national RI Roadmap
AT	Yes	2014	Yes (Elettra)
CZ	Yes	2016	Yes
HU	Not yet available	Not yet available	Not yet available
IT	Yes	2014	Yes
PL	Not yet available	2014	Yes (Solaris)
RO	Yes	2008	No
SI	Yes	2017	Yes

Table 1 - National prioritisation of CERIC in 2016

⁶European Commission, European Charter for Access to Research Infrastructures. Principles and Guidelines for Access and Related Services, https://ec.europa.eu/research/infrastructures/pdf/2016_charterforaccessto-ris.pdf

Apart from CERIC Member Countries that had published their research infrastructure roadmaps before or in the same year in which CERIC was established (June 2014), i.e., Austria, Poland and Romania, all other Members have included CERIC among their funding priorities in their roadmaps. Only Hungary has not yet published its roadmap.

Ordinary activities of CERIC (open access) are covered through national funds, while investments into infrastructures of European interest are often the subject of a targeted call, which in some CERIC countries may be co-funded through European Structural and Investment Funds - ESIF. In fact, several of the RIs in CERIC open access were co-funded with ESIF funds.

In addition to coordinated investment of national and/or ESIF funds among Members, the European Commission contributes to the development of CERIC by funding the project ACCELERATE, submitted to the INFRADEV call within Horizon 2020 in 2016, showing that the various funds available within Europe are invested in synergy.

The synergic use of various funds by CERIC was presented by CERIC's Executive Director, Jana Kolar, at the *Symposium on Funding Instruments for Developing Research Infrastructures* in Madrid, Spain (19 April 2016), and by the CERIC Deputy Director, Ornella De Giacomo, at the conference *European Week of Regions and Cities* (Brussels, 10-13 October 2016).

In addition to the coordination of investments, CERIC contributed to cross-border cooperation and mobility within Europe through:

- **Peer reviewed calls for open access to CERIC research infrastructures**, supporting the proposals submitted by 477 researchers.
- **International co-publications** with countries inside and outside the ERA. In 2016, 42% of all publications were co-published with researchers from ERA countries and another 14% of publications were co-published with researchers from non-ERA countries.
- **Call for internal CERIC projects**. International peer review selected three projects for funding, involving at least two CERIC Partner Facilities. The projects, implemented through joint co-funding between the involved parties, contribute to cross-border collaboration in Europe and, at the same time, integration of national capabilities of CERIC Members into a unique, EU-level Distributed Research Infrastructure.
- **Development of a joint action with the CEI** (Central European Initiative) and in synergy with the H2020 ACCELERATE project, to be realized in 2017 for outreach to new user communities in Central-Eastern Europe.

CERIC transnational projects also contribute to transnational cooperation. In 2016, the following projects have been selected for funding:

Horizon 2020 ACCELERATE project

In August 2016, the H2020-InfraDev project ACCELERATE was selected to receive funding from the beginning of 2017 to the end of 2020. The project, with CERIC as coordinator, aims at supporting the long-term sustainability of large scale research infrastructures (RIs) through the development of policies and legal and administrative tools for more effective management and operation of RIs, with special focus on ERICs, and CERIC in particular. To help secure RIs' sustainability, the project develops frameworks to improve the offer of tailored services to private and public entities, ensuring outreach to new scientific and industrial communities worldwide and defining common protocols for monitoring and assessing RIs' socio-economic impact. Finally, a major focus on capacity building will develop the competences of staff of current and future RIs'.

Horizon 2020 E-RIHS project

The European Commission selected for funding the H2020-Infradev project E-RIHS, which officially started in January 2017. CERIC is one of 20 partners involved. Based on its three-year experience as an established ERIC, it will give advice and provide support in the preparatory phase of E-RIHS, the European Research Infrastructure for Heritage Science, one of six new projects that entered the ESFRI Roadmap in 2016. During the first two years, project partners will address governance, financial, legal and logistical aspects. This will lead to a business plan for applying to become an ERIC, or another suitable legal form, by 2019. The last year will be devoted to negotiations with stakeholders, further strategic planning and to start up activities for entering the transition phase. The final goal is to launch E-RIHS as a stand-alone Research Infrastructure in 2021.

CEI CONTACT project

The Committee of National Coordinators (CNC) selected the project CONTACT – CERIC-CEI Open Access Training, for a Central European Initiative (CEI) contribution. The project officially started on January 1st, 2017.

Its main aim is to raise awareness in the scientific community of the peer-reviewed open access process to large-scale research infrastructures (RIs). To this purpose, CERIC will cooperate with CEI to enlarge its user base in non-EU CEI countries (Albania, Belarus, Bosnia and Herzegovina, Macedonia, Moldova, Montenegro, Serbia, Ukraine), by introducing researchers to the scientific opportunities available in CERIC, and by training them in writing successful proposals to get free open access to top-class EU RIs. The workshop organized within the project will be co-financed by the H2020 project ACCELERATE.

An open labour market for researchers

This ERA priority focuses on the development of a genuine European labour market. CERIC contributed to this priority with the following activities:

- The use of transparent, open and merit-based recruitment is an essential step towards the European labour market. In 2016, 100% of new positions at CERIC (9 scientific and 3 in administration) were published internationally, using either Euraxess, or EurActiv, as appropriate.
- The development of human resources for Research Infrastructures was presented by Jana Kolar at the conference *Long-term Sustainability of RIs. Exploring RIs Full Potential* (Brussels, 25 November 2016)

Optimal circulation and transfer of scientific knowledge

Research and innovation benefit from scientists, research institutions, businesses and citizens accessing, sharing and using existing scientific knowledge and having the possibility to express timely expectations or concerns on such activities. In 2016, CERIC contributed to the objective by:

- Publication of a scheme offering financial support for publications in open access journals.
- An approach to the design of policies that will ensure that CERIC research will contribute to Open Innovation, has been defined within the ACCELERATE project, co-funded through Horizon 2020. The concept behind CERIC's innovation management plan, which will enable

innovations stemming from CERIC-funded research to be recognized and deployed, were presented by Jana Kolar and Fabio Mazzolini at the ICRI 2016 conference in Cape Town. Dr. Kolar also had an invited talk on Innovation in EC programmes, showing the principles at the basis of innovation management in public-public partnerships (P2Ps) at the PLATFORM Conference in Ljubljana (6-7 October 2016).

- An approach to the design of policies that will enable open access to data, has been defined within the ACCELERATE project, co-funded through Horizon 2020.

Gender equality and gender mainstreaming

As a recently established institution, CERIC started monitoring, which will enable us to set targets. In 2016, one third of principal investigators were female, while their share among users was 45%. Among the employees of CERIC, 60% were female in 2016.

International cooperation

In 2016, CERIC users came from five continents, demonstrating the international character of the infrastructure.

Contribution to the development of the ERIC legal framework

The ERIC legal framework was established in 2009. ERICs established so far are faced with several implementation difficulties related to issues such as VAT exemption, mobility of personnel, in-kind contributions etc. In 2016, CERIC undertook a number of activities, which contribute to the implementation of the ERIC structure, namely:

- Active participation in **ERIC Network Meetings**, which bring together representatives from ERICs, national governments and the EC, as well as RIs planning on applying for ERIC status, to share best practices and common issues experienced by ERICs. CERIC's Deputy Director Fabio Mazzolini took part in the core team that prepared a Memorandum of Understanding on further development of the Network.
- **CERIC-MIUR Workshop on in-kind contributions in ERICs** (Rome, 19 December 2016). In a project funded by the Italian Ministry of Universities and Research (MIUR), CERIC, in collaboration with MIUR, organized a workshop for Italian representatives of RIs and ERICs, focused on the definition and assessment of in-kind contributions. The experience of CERIC was used as an example to show how aspects related to VAT exemption and accountancy are dealt with, also comparing this with the cases of other European RIs.
- The development of advanced methodologies for the definition and assessment of in-kind contributions, VAT exemption, accountancy and international mobility to a more Europe wide approach, in cooperation with other European RIs, is also part of the H2020 project ACCELERATE.
- To intensify the development of the ERIC framework, CERIC and SHARE ERICs signed a Memorandum of Understanding on 25th October 2016, in Trieste, which further links research infrastructures and provides a solid basis for strengthening relations among regions in the fields of research and innovation.

4

Open for New Members

CERIC-ERIC is open to the accession of new Members (Member States, Third Countries and Intergovernmental Organisations) that have at their disposal excellent analytical facilities or sample preparation capabilities that can be used to develop and/or make available appropriate scientific and technical expertise and resources, and that apply the open-access policy. Enlargement would allow advancing the main goals of CERIC, to contribute to European top-level research and technological development, and to foster the integration of national multidisciplinary analytical, synthesis and sample preparation facilities into a unique infrastructure, open to researchers on a world scale.

Main Achievements

1 Adoption of the Enlargement Methodology

2 Two new members
Poland, with Synchrotron Solaris, and Hungary with the Hungarian Academy of Sciences - Centre for Energy Research.

Enlargement Methodology

To allow transparent processing of requests for membership, a Methodology for Enlargement was approved by the General Assembly in October 2016. The Strategy envisages that enlargement may either take place in response to an application or be motivated by a need of the Consortium. In both cases, the process starts with a strategic discussion in the GA to weigh the potential benefits against the drawbacks of the application.

The scheme below presents the application process:

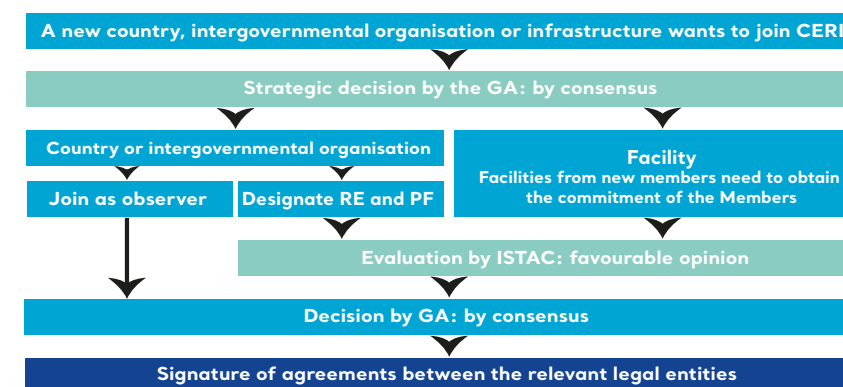


Figure 11 - Schematic representation of the procedure for expansion of CERIC

New Members - Poland and Hungary

Since its establishment, CERIC has received applications from new facilities from Member Countries (University of Nova Gorica, Institute Jožef Stefan, both from Slovenia) and facilities from non-Members, without the support of their countries. Among the latter, an observer facility from Croatia has been part of the CERIC open access calls since call zero. Additional requests have been received from facilities in Latvia and Bulgaria.

In 2016, CERIC was enlarged through the official entry of two new members, Poland and Hungary, which formally joined in March and October, respectively. The applications of the Polish Ministry of Science and Higher Education and of the Hungarian National Research, Development and Innovation (NRDI) Office to become members were unanimously approved by the General Assembly of CERIC. With this decision, the National Synchrotron Radiation Centre SOLARIS in Krakow and the Hungarian Academy of Sciences (HAS) Centre for Energy Research (MTA EK) in Budapest are empowered formally to offer their scientific and technical resources through the CERIC calls for open access, to CERIC international users selected by peer review.

The Polish Ministry has designated **Prof. Marek Stankiewicz**, Director of SOLARIS, and **Mr. Michał Rybiński**, Chief Expert in the Department of Innovation and Development of the Ministry of Science and Higher Education, as the Polish delegates to the CERIC-ERIC General Assembly, in compliance with art. 11 of the CERIC Statute.

Mr. István Szabó – Head of Department at the NRDI Office, and **Mr. Ákos Horváth**, Director General of the HAS Centre for Energy Research, have been appointed governmental and scientific delegates, respectively, of Hungary in the CERIC General Assembly.

The expertise and techniques of the Polish and Hungarian facilities will integrate with the human and instrumental resources available in the other CERIC partners, giving the scientific community the opportunity to perform excellent multi-technique research in a multidisciplinary and multinational environment.

5

Management and Finance

Main Achievements

- 1 **Set-up of a common framework** for impact evaluation.
- 2 **Implementation of the accounting methodology** for defining the values involved in the CERIC-ERIC activities, and for detailing in-kind contributions, for the evaluation and accounting of in-kind contributions of the host country and members and of the resources for CERIC distributed institutional activities.
- 3 **Financial and in-kind annual account** for 2016 and estimation of the auditable values to be included in the Annual CERIC Account.
- 4 **Publication of the Communication Guidelines** for the period 2017-2020

Monitoring and Evaluation Framework and Results for 2015

Public resources are the main source of funding for CERIC. In March 2016, therefore, the General Assembly of CERIC adopted the Monitoring and Evaluation Framework, which will be used both internally, as a management tool helping to improve performance and achieve results, and externally, to demonstrate the effectiveness, efficiency and accountability of CERIC.

Key Performance Indicators (KPIs) have been defined, in compliance with the objectives of CERIC as deduced from its Statute.

Periodic evaluation will be undertaken to quantify the performance, impact and added value of CERIC. The first annual monitoring report was presented to and approved by the GA of CERIC in October 2016, comprising the results of 2015, and setting a baseline for the following reports.

Throughout the annual report of CERIC (i.e. this document) the performance and results for 2016 are highlighted through data collected taking into account the indicators identified in the monitoring and evaluation framework.

Methodology for Accounting In-kind Contributions

The methodology developed in 2015 by the CERIC management for the evaluation of in-kind contributions, was finally approved and adopted by the General Assembly of CERIC in June 2016.

By implementing the methodology of the collection of data from the Seat and the PFs for 2016, it has been possible to evaluate:

- The overall ordinary and project-related scientific and technical activities of the PFs, as well as those developed within CERIC integrated activities as a subset of the PFs' overall ones.
- The values of the resources used and/or acquired in developing the ordinary activities of the PFs, those for common S&T activities and projects involving other PFs, and those for the support of common operational activities of CERIC.

Data shown in the Notes to the Financial Statements as at December 31, 2016, take into account the guidelines as specified in the methodology.

Communication Guidelines

In 2016, CERIC Communication Guidelines for the period 2017-2020 were published to ensure that communication actions of both CERIC and its PFs are in line with the key strategic directions, that they use recommended tactical tools and that they share quality content with target audiences. They will be treated as a work-in-progress, incorporating on a regular basis the subsequent communication needs of CERIC, while taking into account developments in the communication industry.

The Guidelines define CERIC key verbal statements, values and key concepts, and provide advice on how to combine verbal and visual elements in building the corporate identity. Furthermore, they define key partners involved in communication activities, target audiences to be addressed, and channels and tools to be used in both online and offline communication. Emphasis is then placed on concrete activities, such as media relations, publications, live presentations or on-line presence, and on recommendations for the best use and development of dynamic, interactive digital communication.

The document will be used by partners and contractors as a list of tasks to follow in order to develop dynamic communication, while maintaining strategic coherence. One of the first fields of application will be the new CERIC corporate identity and website, that will be developed in 2017.

Notes to the Financial Statements as at December 31, 2016

Accounting Criteria

The present annual financial statements have been compiled in conformity with the international accounting standards IAS/IFRS in force on 31 December 2016, issued by the International Accounting Standards Board (IASB) and adapted by the European Commission within the meaning of the Regulation (EC) No 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards, as well as with the related interpretations by the IFRS Interpretations Committee (IFRIC).

The decision voluntarily to adopt an accounting system that can be connected to international principles has taken into account the process of harmonisation started some time ago within the EU Commission, not yet completed, managed by the ARC (Accounting Regulatory Committee) and by the EFRAG (European Financing Reporting Advisory Group).

CERIC-ERIC is set up as an international organisation and should therefore be able to relate to its members in different countries in a common language. This should be adopted in all matters and at all levels and thus also in the model of presentation of economic-financial matters, which support the annual accounts and budgets.

The use of the International Accounting Standards, taking into account the specific character and scopes of CERIC-ERIC, adequately conformed to the legal characteristics of the Entity and to its functions and scope, can allow the development of well-defined best practices, whose impact on the financial aspects is measurable and effective. The use of international accounting standards, in fact, allows information on the financial statements to be presented in a common way for users/stakeholders of different nationalities.

In this way it is possible to ensure that:

- the information is relevant, reliable, comparable and understandable;
- the terminology used is common, appropriate and explanatory among Members and for similar international organisations outside Europe;
- the financial statements are auditable by International Standard of Audit by auditors from different nations;
- a host country change - and thus any site change - is not relevant for the comparability of information and models, books, records of the accounting system;
- the accounting system is able to present the in-kind contribution model, to provide analytical accounting for projects and separate accounting for economic activities.

The objective of the annual financial statements is to provide information on the assets and liabilities, the profit or loss and changes in the financial structure of the Consortium, useful to a wide range of users.

The financial statements are prepared within a general purpose framework.

The financial statements have been compiled in accordance with the principles of clarity and transparency and provide a correct and exhaustive framework of information on property relations as well as economic and financial relations implemented by the Consortium carrying out its activities.

It has been compiled taking into account international accounting standards, where applicable and integrated in order to be consistent with the legal and effective structure of CERIC.

Of the various options allowed by IAS 1, the Consortium has chosen to present the layout of the balance sheet distinguishing between current and non-current items and the layout of the profit and loss account classifying the expenses by nature.

In its drawing-up, the following principles have been observed:

- The items have been evaluated prudently, taking into account the perspective of the continuity of the activities as well as the economic function of an asset or liability;
- Only incomes and expenditures related to the financial year have been accounted, independently of the day of encashment or payment;
- The risks and losses related to the financial year have been accounted for, even if known after the end of the financial year.

These Notes have been compiled with the objective of clarifying, completing and analysing the information contained in the balance sheet and in the profit and loss account, in addition to providing information on the applied evaluation criteria, on movements that have taken place, and changes in various assets and liabilities.

The explanatory notes are integral part of the following documents, to present these financial statements and provide descriptive and schematic information with particular reference to the property aspects, as well as economic and financial aspects of the overall management.

The financial statements comprise the following parts:

- Balance sheet
- Profit and loss account
- Explanatory notes
- Management report

Cash flow statement

It was not considered necessary to enclose the cash flow statement as it is not mandatory and as it does not provide information of particular interest to the consortium, at least at this initial stage of the life of the consortium itself

Evaluation Criteria

The financial statements have been compiled in accordance with the principles of clarity and transparency and provide a correct and exhaustive framework of information on property relations, as well as economic and financial relations implemented by the Consortium in carrying out its activities. They have been compiled taking into account international accounting standards, where applicable, and conforming to the legal characteristics of a not profit institution and to the specific scopes of CERIC.

Balance sheet

Items in the balance sheet are classified/distinguished into current/non-current.

Assets

Assets have been classified as current assets when:

- they have been realized during the normal operating cycle of the institution;
- they are cash or equivalent complement not restricted in its use.

Assets realizable within the operating cycle have been classified as current, regardless of whether they have been actually realized within 12 months from the balance sheet date.

Non-current assets include tangible assets (computers and other minor electronic tools), intangible assets (licenses and in general all assets not related to the operating cycle and realizable after 12 months from the balance sheet date).

Liabilities

Liabilities have been considered current liabilities when:

- a) they are extinct in the course of the normal operating cycle of the institution;
- b) extinction is due within 12 months from the balance sheet date.

Other liabilities, i.e., those not related to the operating cycle and all other institutional liabilities, are classified as current if their extinction is due within 12 months from the balance sheet date. Otherwise, they are recognized as non-current liabilities.

Deferred incomes and accrual expenses

This item includes the amount of funds received for the year 2016 and not yet fully used by 31.12.2016 for the purposes for which they were intended. They will therefore be used in coming years, for the same purposes. This item represents the carry-over for balances of the subsequent year to that under review. In this regard, the Consortium is obliged to operate in future years in fulfillment of the mandate required by the Ministry of Education, University and Scientific Research, who assigned the financial funds (FOE) under which CERIC activities were carried out in 2016.

Cash flow statement

It was not considered necessary to enclose the cash flow statement as it is not mandatory and as it does not provide information of particular interest to the consortium, at least at this initial stage of the life of the consortium itself.

In-kind contributions

Contributions in-kind will be included in the financial statements on the basis of the details contained in the document entitled " Methodology for Defining the Values Involved in CERIC-ERIC Activities, and to Detail In-kind Contributions", under the conditions specified therein and only as a result of auditing carried out by local auditors, that will be compared with the auditors of CERIC.

Profit and loss account

The drawing-up of the profit and loss account is regulated by IAS 1 integrated and conformed to be consistent with the legal characteristics and scopes of CERIC.

Incomes

Incomes are increases of benefits connected to the administrative year.

Costs/Expenses

Costs/expenses are decreases of economic benefits of the administrative year. As required by IAS 1, the analysis of costs has been explained in the overview of profit and loss account using a classification based on their nature.

In-kind Contributions

In-kind non-monetary contributions, based on IAS 20, will be distinguished (when realized) between:

- 1) those strictly related to the cost of the production factors (exhausting their utilities during the ordinary cycle).
- 2) those strictly related to cover investments (in intangible and tangible assets).

Assets

Non-current Assets

Tangible Assets

Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
7.299,46	7.489,88	190,42

The following flow chart shows the change in individual items, summarized in the present note.

Description	Property	Technical furniture	Electronic office machines	Mobile phone	Total
Balance as at 31/12/2015	0	0	6.094,97	1.204,49	7.299,46
Acquisitions during the year	0	315,57	1.133,25	556,32	2.005,14
Depreciation for the year	0	23,66	1.467,76	323,30	1.814,72
Balance as at 31/12/2016	0	291,91	5.760,46	1.437,51	7.489,88

Intangible assets

Balance as at 31/12/2015	Balance as at 31/12/2016	Difference
1.118,75	891,48	-227,27

Historical costs at 31/12/2015 are as follows:

Description	Balance as at 31/12/2015	Operating increments	Operating decreases	Depreciation for the year	Value on 31/12/2016
Concessions, licenses, trademarks	1.118,75	65,50	0	292,77	891,48
Total	1.118,75	65,50	0	292,77	891,48

Current Assets

Short-term credits

The balance is divided according to the deadlines of the credits:

Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
13.335,96	18.610,33	5.274,37

The composition of the amount as at 31/12/2016 is as follows:

Description	Within 12 months	Over 12 months	Over 5 years	Total
Receivable from MIUR	6.323,46	0	0	6.323,46
Advances to suppliers	5.078,20	0	0	5.078,20
Other receivables	277,24			277,24
Tax advances	6.898,00	0	0	6.898,00
Credit notes to be received	33,43	0	0	33,43
Total	18.610,33	0	0	18.610,33

The balance sheet item "Receivables from MIUR" represents a credit for a contribution of Italian Ministry related to costs incurred and reported by CERIC and in relation to a project based on training, dissemination and support to the establishment and management of European Research Infrastructure Consortiums (ERICs).

The balance sheet item "Tax advances" represent taxes paid in advance to the Italian tax authorities. These taxes are linked to personnel costs, following the Italian fiscal legislation.

Cash and Cash Equivalents

The balance represents the cash at the bank and in hand at the end of the financial year. It represents liquid assets and cash equivalents at the end of the year.

Cash deposited at the bank Unicredit Banca Spa.

Description	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Bank deposits	338.631,92	1.907.039,24	1.568.407,32

In this context, the Consortium has a deposit at the Institute Unicredit, Agency of Trieste, where it has opened a current account for financial management. A sum of € 1.500.000,00 was delivered to this account by the Ministry of Education, University and Scientific Research through the RE Elettra Sincrotrone Trieste in January 2016 (€ 1.000.000,00), and July 2016 (€ 500.000,00), as advance payment of the financial contribution to support the Consortium' starting activities for the year reviewed.

In December 2016, CERIC-ERIC received from the EU the first prefinancing installment of the advance payment for the project H2020 – ACCELERATE, in an amount of € 1.035.292,80. The second prefinancing installment of the advance payment has been received in January 2017 for an amount of € 572.155,45. In the same month, in order to fulfil the initial obligation of CERIC acting as project coordinator, part of this prefinancing (€ 489.689,10) was promptly distributed among the different partners of the project.

Prepayments and accrued income

Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
151,34	8.019,36	7.868,02

These items measure incomes and expenses whose competence is advanced or delayed with respect to cash or documentary; they disregard the date of payment or collection of related income and expenses common to two or more years and distributable upon time. This amount represents prepaid expenses related to costs for annual insurances, to be referred, on accrual basis, to 2017.

Equity and liabilities

Equity

Capital and other permanent contributions from Members

Reserves

Accumulated profits

No values are entered for these items

Non-current liabilities

Other long-term debts and liabilities

Advance payments received for externally funded projects

The item "Advance payments for project externally funded" includes the prefinancing installment related to the Project ACCELERATE, funded by the EU (€ 545.603,70) which represents the difference between the total amount received (€ 1.035.292,80) and the amount due to the other project partners (€ 489.689,10). This project has a duration of 48 months and will finish in December 2020. CERIC is acting as coordinator. The advance payment received is related to the implementation of the activities described in the project, and it might be returned only if CERIC does not carry out the project, or if CERIC is not complying with the contractual obligations towards the EU.

Description	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Advances	0,00	545.603,70	545.603,70

Pensions fund and other benefits for compensation employment

Severance indemnities for employees.

Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
6.958,83	21.446,65	14.487,82

The item is made up as follows:

Description	Initial value 31/12/2015	Plan balance 2016	Substitutive tax	Paid to investments units	Severances paid during the year	End value 31/12/2016
Severance indemnities employees	6.958,83	20.316,25	17,75	1.512,63	4.298,05	21.446,65

The severance set aside figure represents the actual debt of the Consortium 31/12/2016 to employees in force at that date.

As at 31/12/2016, no advances have been required by employees.

Current liabilities

Other short-term debts and liabilities

Debts

The composition of the amounts above mentioned is as follows:

Description	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Advances	15.000,00	15.000,00	-
Account payables	46.893,38	81.240,58	34.347,20
Tax liabilities	12.044,88	61.123,32	49.078,44
Payables to social security institutions	15.211,45	33.570,27	18.358,82
Payables for projects	-	489.689,10	489.689,10

Balance at 31/12/2015	Balance at 31/12/2016	Variation
89.149,71	680.623,27	591.473,56

Debts are valued at their nominal value.

The item "Advances" includes prefinancing related to the project PaGES2 - Planning, Management and Implementation of a scientific experiment in an international research infrastructure – funded by the Italian Region Friuli Venezia Giulia – (Euro 15.000,00), as second edition of the project PAGES presented in 2015. The project PaGES2 has a duration of 1 year.

The amount of the advance payment accounted at the end of 2015 was referred to the first edition of the Project PAGES, completed and carried in the revenues during the year 2016.

The item "account payables" (€ 81.240,58) includes debts to third parties, mainly related to services purchased and not paid within the end of the year. This item appears on the company's balance sheet as a current liability, since the expectation is that the liability will be fulfilled in less than a year.

The item "Tax payables" includes liabilities for specific taxes and is composed of withholding taxes for employees and associates and collaborators of € 37.285,32. The amount € 23.838,00 represents annual taxes due by the Consortium related to costs of personnel following the Italian fiscal legislation. With reference to this amount, an advance payment was paid for the total amount of 6.898,00, as represented within the short term credits..

"Payables due to social security institutions" include the amount of social security contributions relat

ing to employees , accrued but not paid as at 31 December 2016, for an amount of € 33.570,27.

The item "payables for projects" includes the amount of funds that CERIC will transfer to the partners of the project Accelerate in relation to the first advance payment received by the EC in December 2016, CERIC acting as coordinator.

"Other payables" include remaining debts, which by nature cannot be described above, including amounts due by CERIC to staff for all liabilities accrued to them, in accordance with current legislation and Personnel Regulations, including the value of accrued vacation pay at the reporting date in accordance with the provisions of accounting Standard 19. This account at 31/12/2016 was as follows:

Description	Amount
Payables to employees for holidays and leave not taken	10.573,77
Payables to bodies	11.130,96
Other debts of a different nature	4.454,08
Total	26.158,81

The item "payables to bodies" is related to the fee due by the Consortium to an internal auditor.

Debts are evaluated at their nominal value. "Debts to providers" are stated net of possible trade discounts.

Description	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Other payables	32.187,40	26.158,81	6.028,59

Deferred income and accrued expenses

These items are related to the period and are calculated on an accrual basis.

For the accounting of the contribution provided by Italy, the indirect method has been chosen and the stated amount is representative of the portion attributable to future financial years.

Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
232.017,86	668.217,86	436.200,00

The item breaks down as follows:

Description	Amount
Deferred income	668.217,86
Accrued expenses	0,00

The balance sheet item "Deferred income" measures the portion of the contribution funded by the Italian MIUR for the financial year 2016 for the activities of the CERIC statutory seat, deferred to 2017.

The amount of € 668.217,86 is derived as follows:

Category	Carry over of 2015	Italian Contribution (FOE 2016)	Costs chargeable to FOE 2016	Carry over for 2017
Deferred items	232.017,86	1.500.000,00	(1.063.800,00)	668.217,86
Revenues/costs	-	1.500.000,00	1.063.800,00	-

Income statement

Revenues

Revenue items identify the portion of the contribution for the financial year allocated by MIUR for the Consortium' starting activities to cover the expenses of management, and by the Italian Region Friuli Venezia Giulia:

Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
425.858,45	1.085.607,46	659.749,01

The composition of the amount at 31/12/2016 is as follows:

Category	31/12/2015	31/12/2016	Variation
MIUR - Ordinary contribution	425.858,45	1.063.800,00	637.941,55
MIUR contribution for activity of dissemination and training	-	6.323,46	6.323,46
FVG Region - project PaGES	-	15.000,00	15.000,00
Other incomes	-	484,00	484,00
Total	425.858,45	1.085.607,46	659.749,01

Contributions for operating expenses

The amount of the Italian contribution (FOE) for the activities of the statutory seat of the Consortium is equal to € 1.063.800,00.

This amount of € 1.063.800,00 covered the costs for personnel, bodies, consultancies, other costs of the seat not externally funded by specific projects.

Costs

Operating costs

Costs for raw materials, supplies, consumables and goods

This category includes costs incurred for the supply of consumables. The increase in the year is a direct result of the increased activities of the Consortium.

Category	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Costs for raw materials, supplies, consumables and goods	5.957,86	7.055,73	1.097,87

Service costs

It has been decided to divide the item service costs, to facilitate the clarity of the budget, in the following categories of expenses:

Category	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Legal, fiscal and administrative consultancy	62.616,30	118.258,61	55.642,31
Administrative collaborators	64.375,00	28.781,87	38.593,13
Consulting and salaries processing	15.979,91	4.099,43	11.880,48
Scientific and technical collaborators	-	53.314,29	53.314,29
Social security contributions of collaborators	12.549,34	8.962,18	3.587,16
Health contribution for collaborators	306,52	438,83	132,31
ISTAC remunerations	11.571,49	21.620,11	10.048,62
Travel costs for employees, collaborators, and bodies	26.061,77	84.139,05	58.077,28
Expenses for corporate meetings	15.024,32	5.560,89	9.463,43
Insurances	-	5.721,93	5.721,93
Representation costs	1.670,10	2.339,40	669,30
Mobile phones	7.171,63	8.704,32	1.532,69
Annual software licenses	151,36	257,25	105,89
Workshops, seminars and publications	467,19	4.774,84	4.307,65
Canteen expenses	2.780,30	6.727,50	3.947,20
Bank charges	710,03	689,48	20,55
Postal charges	82,80	163,24	80,44
Other costs	171,00	30.923,78	30.752,78
Total	221.689,06	382.477,00	160.787,94

The item "other costs" includes mainly costs related to a contract for temporary employment for € 25.153,24.

Personnel costs

Personnel expenses: breakdown

Category	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Wages and salaries	95.475,61	299.574,80	204.099,19
Social security charges	24.631,44	83.085,32	58.453,88
Severance indemnities	6.958,83	20.298,50	13.339,67
Allowances to be paid	3.806,70	10.573,77	6.767,07
Director	13.848,51	131.818,03	117.969,52
Auditors	29.166,66	122.364,73	93.198,07
Total	173.887,75	667.715,15	493.827,40

Use of third party materials or property

Category	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Guest house	9.540,03	0,00	-9.540,03
Total	9.540,03	0,00	-9.540,03

The absence of cost for this category is due to the fact that a contract for a guesthouse has been closed out in the second part of the year 2015.

Other operating costs

Other operating costs: breakdown

Category	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Membership fees	5.000,00	2.000,00	-3.000,00
Rouding	27,65	67,81	40,16
Other taxes	345,42	314,22	-31,20
Other expenditures	1.724,01	207,38	-1.516,63
Total	7.097,08	2.589,41	-4.507,67

Depreciation of tangible and intangible assets

In relation to depreciation, it is calculated on the basis of the useful life of the asset and its use in production.

For the first year of use, the percentages applied have been reduced to half rate.

Intangible assets

Description	Rate	Amount
Concessions and licences	20%	292,77
Total amortisation of intangible assets		292,77

Tangible assets

Description	Rate	Amount
Office machinery	20%	1.467,76
Equipment	15%	23,66
Telephony and mobile telephony	20%	323,30
Total amortisation of fixed assets		1.814,72
Total amount (intangible and tangible)		2.107,49

Taxation

Current tax	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
IRAP	6.897,57	23.838,00	16.940,43
Total	6.897,57	23.838,00	16.940,43

The annual tax is calculated on the amount of salaries paid to the employees, the amount of fees paid to the collaborators, and the cost of the contract for temporary employment.

The Consortium, in the context of purchases realized and within the limits following from the Statute, may use VAT exemptions granted on the basis of Article 143(1)(g) and Article 151(1)(b) of Council Directive 2006/112/EC, and in accordance with Articles 50 and 51 of Implementing Regulation (EU) No. 282/2011 of the Council, and on the basis of Article 12 of Directive 2008/118 /EC.

Financial costs and revenues

In the financial management, accrued interest income on the bank account of the Consortium is stated as of 31.12.2016.

Interest on current account and rounding

The item represents the remuneration of deposits of the Consortium on current account n°000103334723 opened at Unicredit Banca.

Category	Balance as at 31/12/2015	Balance as at 31/12/2016	Variation
Interest on current account	276,94	108,58	-168,36
Rebates and rounding	24,68	66,74	42,06
Total	301,62	175,32	-126,30

Additional disclosures on in-kind resources (with reference to Directive 2013/34/EU)

In relation to in-kind contributions, which statutorily constitute a particularly significant element, in terms of resources and organisation that can be used by the Consortium, it should be noted that it was not possible to acquire all the accounting values for the year 2016 according to the principles of consistency and auditability on the basis of the "Methodology for Defining the Values Involved in the Ceric-Eric Activities, and to Detail In-kind Contributions" developed in late 2015.

However, it needs to be noted that, even before the set-up of the Consortium, some of the concerned PFs manifested themselves through this particular mode of contribution, which then allowed the immediate and consistent start of the activities.

These values were quantified, albeit with the limitations set forth above, by the various PFs and are shown in the tables below in order to provide supplementary information, which enable a better understanding of the relevance of the total resources used by CERIC in the whole financial year of 2016.

In-kind Contributions - Budget Data for 2016

Tab. 1a

Total costs of the overall ordinary scientific/technical activities of the partner facilities (PFs) in 2016								
PF	Recurrent costs							Total
	Personnel	Travel & accommodation	Consumables	Services	Utilities	Overheads	Technical devaluation & maintenance, lease /rent costs of equipment & spaces	
AT	401.818,00	4.328,00	-	132.732,00	-	347.211,05	37.000,00	923.089,05
HR	164.832,00	-	58.557,07	5.076,33	75.153,34	-	52.235,93	355.854,67
CZ	205.400,00	16.240,00	234.148,00	10.000,00	-	152.518,00	616.725,00	1.235.031,00
HU	918.306,00	2.439,12	16.506,00	57.794,00	1.792.812,00	217.626,00	-	3.005.483,12
IT	8.299.142,84	-	234.201,28	10.409.140,33	-	-	3.603.075,63	22.545.560,08
PL	770.708,00	40.660,00	153.117,00	263.403,00	328.023,00	170.390,00	6.384.799,00	8.111.100,00
RO	481.952,00	36.888,00	62.519,00	29.300,00	-	30.191,00	300.713,00	941.563,00
SI	207.790,20	1.947,32	8.248,66	56.058,34	27.444,38	77.864,35	1.441.578,00	1.820.931,25
Total	11.449.949,04	102.502,44	767.297,01	10.963.504,00	2.223.432,72	995.800,40	12.436.126,56	38.938.612,17

Tab. 1b

Total costs of the ordinary scientific/technical activities of the partner facilities in 2016 - COMMITTED IN-KIND								
PF	Recurrent costs							Total
	Personnel costs	Travel & accommodation	Consumables	Services	Utilities	Overheads	Technical devaluation & maintenance, lease/rent costs of equipment & spaces	
AT	43.510,00	737,00	-	13.273,00	-	37.596,83	5.250,00	100.366,83
HR	30.544,80	-	3.580,42	310,39	4.595,18	-	3.191,61	42.222,40
CZ	205.400,00	16.240,00	117.074,00	20.000,00	-	76.259,00	217.900,00	652.873,00
HU	127.136,79	2.439,12	-	-	-	-	-	129.575,91
IT	529.022,67	13.662,85	-	195.000,17	-	1.880.318,51*	1.712.366,64	4.330.370,84
PL	-	5.211,00	-	-	-	-	-	5.211,00
RO	16.117,00	2.660,00	12.504,00	5.860,00	-	6.038,00	61.782,00	104.961,00
SI	41.558,04	1.947,32	1.672,12	30.623,58	7.031,04	18.037,77	392.752,81	493.622,68
Total	993.289,30	42.897,29	134.830,54	265.067,14	11.626,22	2.018.250,11	2.393.243,06	5.859.203,66

*Support of CERIC user beamtime

Tab. 2

Values of equipment and spaces available to PFs		
Partner facility	Present value (estimated)	Historical cost
Austria	4.600.000,00	4.600.000,00
Croatia	63.362,66	9.000.000,00
Czech Republic	1.099.455,00	2.437.274,00
Hungary	38.740,00	737.652,00
Italy	950.033,64	18.093.467,56
Poland	32.800.613,00	42.999.471,00
Romania	1.212.518,00	5.139.682,00
Slovenia	1.302.664,21	6.228.951,31
Total	42.067.386,51	89.236.497,86

Tab. 3

Total free access to external users selected through CERIC peer review in 2016		
Partner Facility	Hours	Instrument/Equipment
Austria	624 264 144 96	SAXS DXRL LSLTUG SXFTUG
Croatia	176	Accelerator facility with beamlines
Czech Republic	1798 132 1320 224	NAPXPS FESEM MSB XPS/XPD
Hungary	240 120 48	SANS MTEST RAD
Italy	3184	
Poland*	-	
Romania	136 413	EPRESR HRTEM
Slovenia	48 216 1116	800 MHz (David) 600 MHz (Lara) 600 MHz (Magic)

*SOLARIS (PL) did not participate in open access calls in 2016

Financial input of Partner Facilities

Tab. 4a

Financial input Partner Facilities received in the year 2016	
Austrian PF	923.090,00
Croatian PF*	17.460,00
Czech PF	418.807,00
Hungarian PF	873.074,00
Italian PF*	4.030.000,00
Polish	2.660.139,00
Romanian PF	5.097.792,00
Slovenian PF*	40.000,00
Total	14.060.362,00

*Including only the funds received due to participation in CERIC/International Research Infrastructures

Tab. 4b

Financial input Partner Facilities received in the year 2016 due to participation in CERIC/International Research Infrastructures	
Austrian PF	0,00
Croatian PF	17.460,00
Czech PF	386.407,00
Hungarian PF	0,00
Italian PF	4.030.000,00
Polish PF	2.624.642,00
Romanian PF	0,00
Slovenian PF	40.000,00
Total	7.098.509,00

6

CERIC Overview

The mission and main purpose of CERIC, in line with the ERIC Regulation (EC No 723/2009), is to establish and operate a multidisciplinary distributed research infrastructure on a non-economic basis.

Mission

CERIC is a research infrastructure integrating and providing open access to the best facilities in Central and Eastern Europe to help science and industry advance in all fields of materials, biomaterials and nanotechnology. It enables the delivery of innovative solutions to societal challenges in the fields of energy, health, food, cultural heritage and more.

Vision

CERIC co-creates the European Research Area by enabling the best global researchers to realize their ideas in a multicultural research environment with a world-wide reach. By expanding insight into materials at the nano-scale, CERIC contributes to solving contemporary societal challenges.



CERIC is an integrated multidisciplinary research infrastructure for basic and applied research in the fields of materials, biomaterials and nanotechnology. It integrates leading national research institutes into a unique international infrastructure, having its statutory seat in Trieste – Italy, and its nodes distributed in Austria, Croatia, Czech Republic, Hungary, Poland, Romania and Slovenia (Serbia is currently pending full membership). In each country, a Partner Facility (PF) ensures access and outreach to all national scientific communities and to users from all over the world, who compete for free access to nearly 50 techniques available through a single entry point and based on the use of electrons, ions, neutrons and photons for the analysis and synthesis of materials. This new innovative service is also open to commercial users under market-based conditions.

The governing structure involves ministerial representatives of the Member Countries, as well as the directors of the Partner Facilities. CERIC management and research activities are distributed in the participating countries and cover administration, communication, technology transfer and project management. A common support system allows the distributed staff to operate in an integrated way for transnational and cooperative projects and joint ventures. Each Member Country contributes to CERIC by making available and supporting a high-quality Partner Facility, which is continuously improved by being exposed to international users competing for access through peer-review evaluation and selection, based on excellence, of their proposals. The Partner Facilities are strongly complementary to each other and act as a whole as an international agency providing support to the best researchers and research projects, contributing access to advanced analytical and synthesis facilities. CERIC's international, pan-European approach, in line with ERIC Regulation EC No 723/2009, avoids duplication and fragmentation in the research system and increases the integration and competitiveness of the European Research Area (ERA), speeding up East-West alignment in the ERA.

CERIC Partner Facilities, Instruments and Techniques



Abbreviations

BoD	Board of Directors
CERIC	Central European Research Infrastructure Consortium
ERA	European Research Area
ERIC	European Research Infrastructure Consortium, a legal framework created by the European Commission to allow the operation of Research Infrastructures of Pan-European interest.
FOE	Fondo Ordinario per il finanziamento degli Enti e istituzioni di ricerca (Ordinary Fund for the Financing of Research Entities and Institutions)
GA	General Assembly
IL&TT	Industrial Liaison and Technology Transfer
IR	Internal Regulations
ISTAC	International Scientific and Technical Evaluation Committee
MIUR	Italian Ministry of Education, University and Research
PI	Principal Investigator
PF	Partner Facility
RE	Representing Entity
RI	Research Infrastructure
R&D	Research & Development
S&T	Science & Technology

Light scattering at the TU Graz and Elettra

Graz and Trieste
www.portal.tugraz.at

Ion beams at the Ruđer Bošković Institute

Zagreb
www.irb.hr

Surface analysis at the Charles University

Prague and Trieste
<http://physics.mff.cuni.cz>

Neutrons at the Budapest Neutron Centre

Budapest
www.bnc.hu

Synchrotron and laser light at Elettra

Trieste
www.elettra.eu

Synchrotron light at Solaris

Krakow
www.synchrotron.uj.edu.pl

Electron microscopy and EPR at the National Institute of Material Physics

Magurele
<http://lab50.infm.ro>

NMR at the National Institute of Chemistry

Ljubljana
www.nmr.ki.si

CERIC-ERIC

S.S. 14 - km 163,5 in AREA Science Park 34149
Basovizza, Trieste - Italy

info@ceric-eric.eu

www.ceric-eric.eu

LinkedIn: www.linkedin.com/company/ceric-eric

Twitter: @CERICnews