



Instituto de Ciências da Terra
Institute of Earth Sciences

Enhancing visibility and impact of Earth Sciences

Increasing levels of response to Societal Challenges



A joint project of the Universities





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Outline

ICT High level strategic agenda

Structure, operation and management of ICT

Budget strategy

Highlights of the ICT

SWOT analysis



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The ICT high level strategic agenda

- ❑ To **raise the level of research in Earth Sciences in Portugal**, by adding competences hitherto dispersed, creating project teams with critical mass and scientific credibility.
- ❑ To **increase internationalization of the area of Earth Sciences**, by participating in international projects and networks, therefore contributing to the success of the European Research Area.
- ❑ To **respond to Societal Challenges**:
 - ICT will be a **key pillar of the innovation and competitiveness strategies** of the two major regions of Portugal, the Alentejo and the North, by focusing on the **study, exploration and exploitation of natural resources, and developing partnerships with companies and institutional bodies**;
 - Enhancing Post-graduate (PhD and Post-Doc) **training of new researchers**;
 - Setting up an “**International PhD Program on Earth Sciences**” with universities of Spain (Un. Pol. Madrid), France (Nancy) and Latino-America (namely Brazil) – already in preparation).
- ❑ **In the medium term become an international reference in the domain of Earth Sciences.**

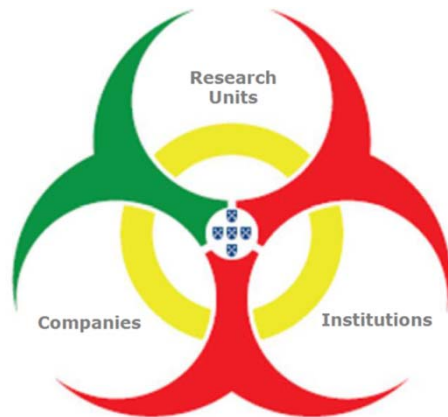


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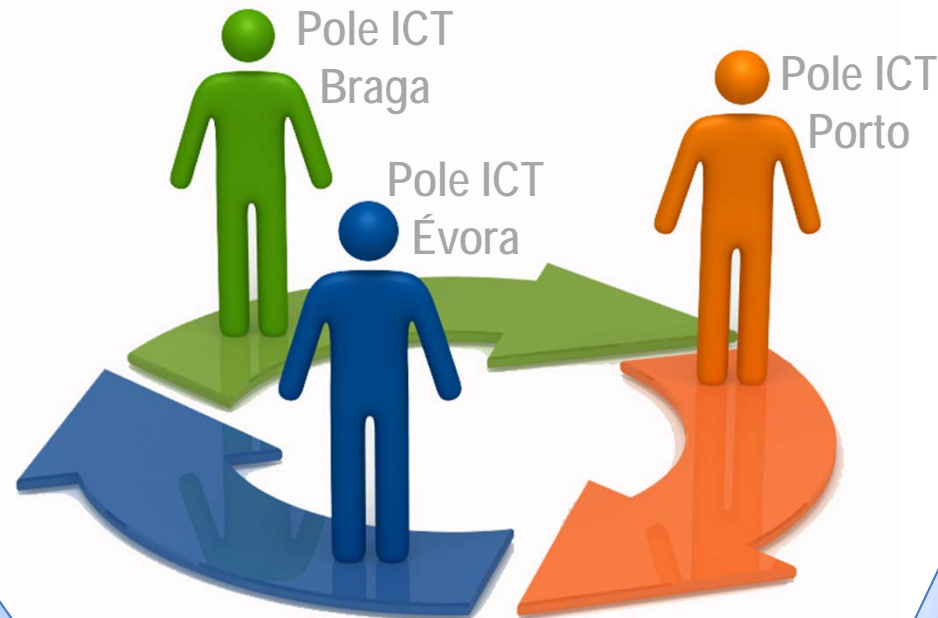
Structure, operation and management of ICT



The Institute of Earth Sciences is a single
Research Unit that spans on 3 poles



Portugal



European
Research Area

ICT develops collaborations and projects with R&D
units, companies and institutions in Portugal and
across the European Research Area, and beyond



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Structure, operation and management of ICT

Governance

General Management

General Coordinator

Steering Committee

Pole Management

Évora
Pole Coordinator

Porto
Pole Coordinator

Braga
Pole Coordinator

Annual Assembly of ICT

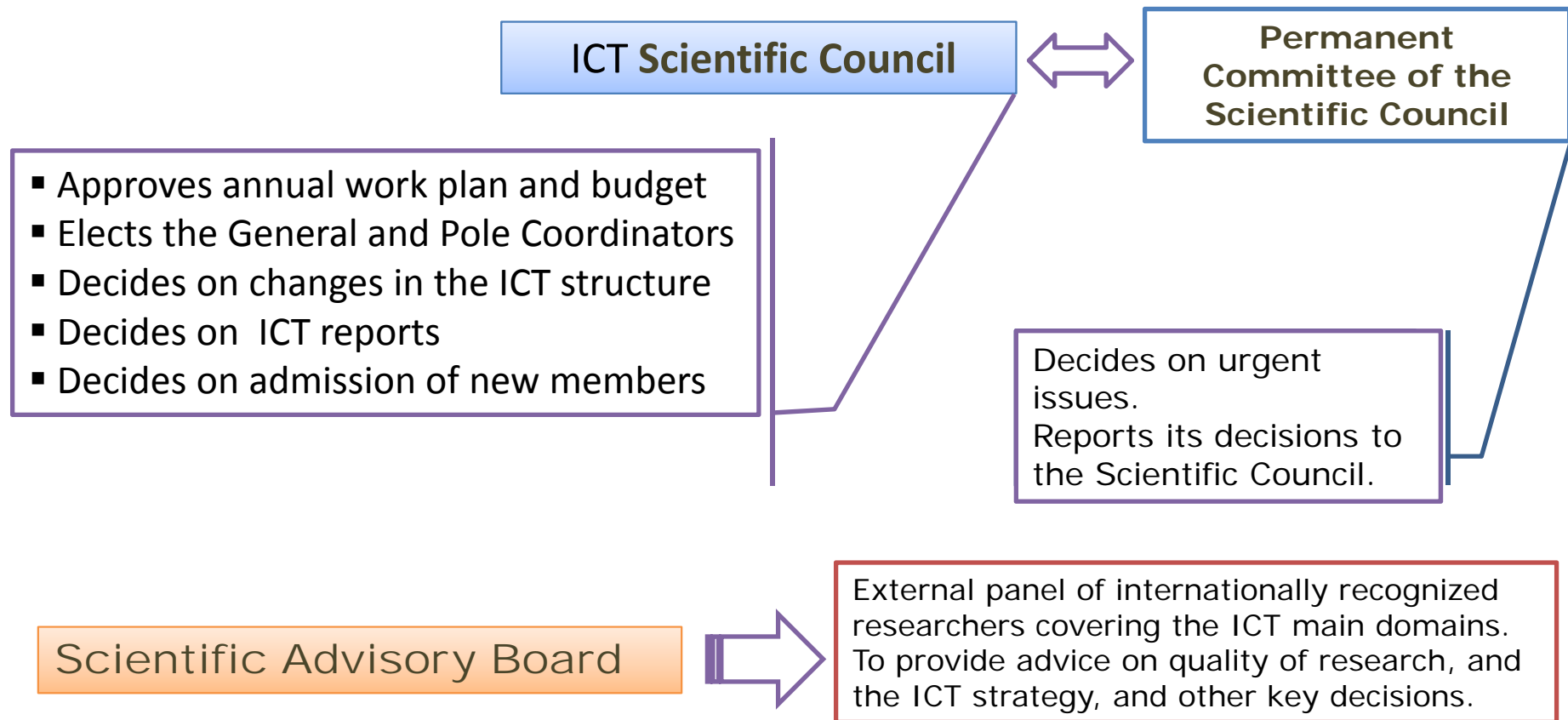
Highlights of Research outputs, Seminars, Envisaged new projects, etc



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Governance

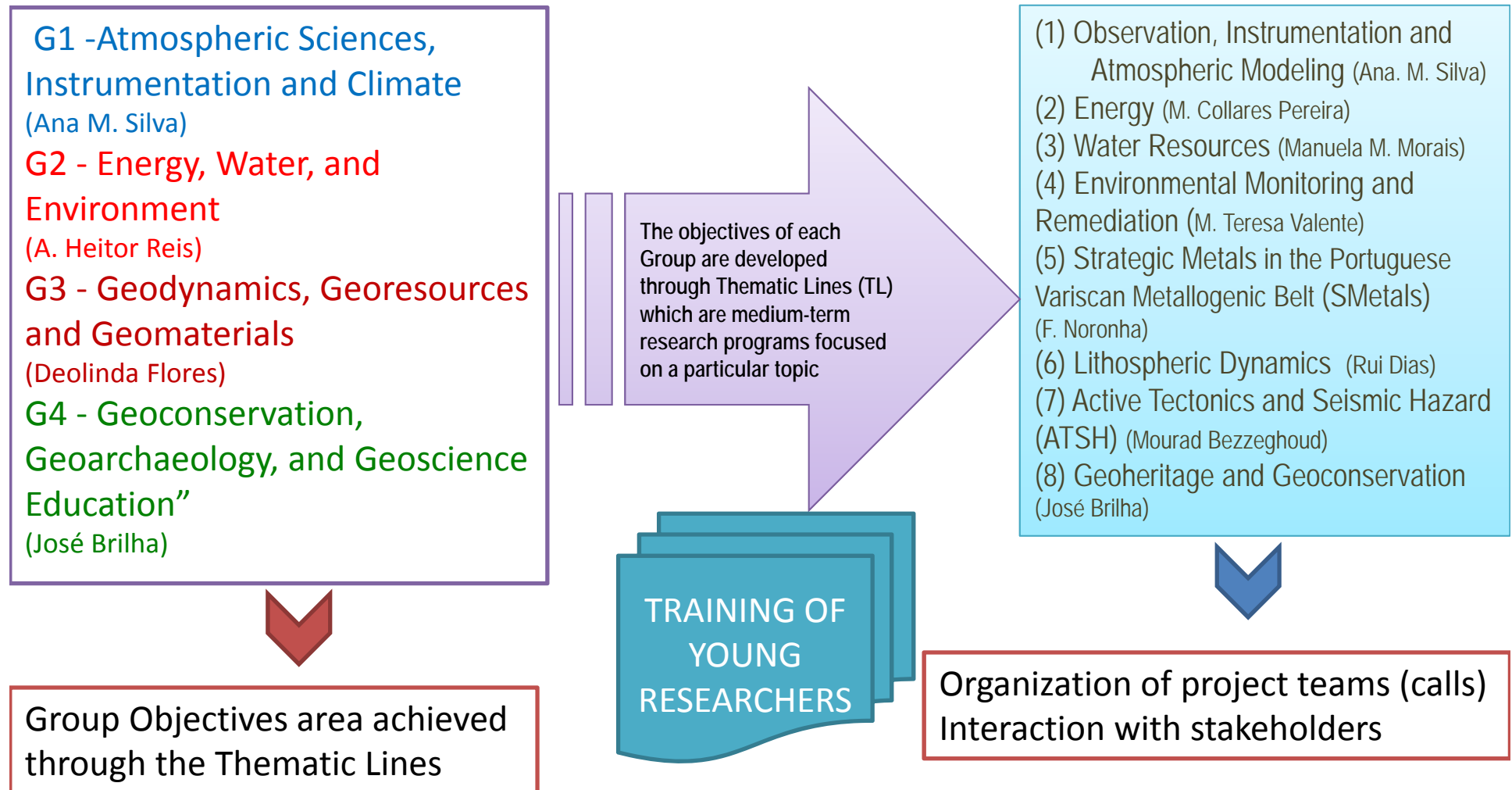




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Structure, operation and management of ICT

Organization of research





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European
Research Area

Polar Research
(Antarctica)

D. Bortoli (ICT)
Monitoring
of Atmospheric
Tracers in Antarctica
(Italian station)



A. Correia (ICT)
Goelectric
assessment of
permafrost depth.
(Bulgarian and
Spanish stations)

Structure, operation and management of ICT

ICT International Networking

AERONET - AErosol RObotic NETwork

EARLINET - European Aerosol Research LIdar NETwork

SPALINET - Spanish and Portuguese Aerosol LIdar NETwork

STRAT - STRucture of the ATmosphere Network

ACTRIS - Aerosols Clouds and TRace gases Research InfraStructure Network

COST (European Cooperation in Science and Technology)

EU-SOLARIS, STAGE- STE, SFERA 2 (solar thermal electricity)

PVCROPS, REELCOOP (solar energy)

READE - Portuguese-Brazilian Network of Remediation and Rehabilitation of Degraded Environments (ICT is the Portuguese coordinator).

RIDESMINS - RED IBEROAMERICANA PARA EL DESARROLLO DE LA MINERÍA SOSTENIBLE,

Red RECNET (Reciclar Ciudad; Repensar la transformación de las Ciudades)

REALP – Environmental network of Portuguese-speaking countries

HWB - Hydrogeologists Without Borders

ALHSUD - Asociación LatinoAmericana de Hidrología Subterránea para el Desarrollo

NETWORK ROCKS FOR CROPS – international cooperation in Agrogeology

Cluster for Geosciences (C4G)- Portuguese Infrastructure member of EPOS

Cluster “Portugal Mineral Resources” : Portugal 2020 Framework

ProGEO – European Association for the Conservation of the Geological Heritage

UNESCO Global Geoparks Network

INTERNATIONAL SEABED AUTHORITY – ICT member P. Madureira



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Structure, operation and management of ICT

ICT members have already
started working together

Preparation of the “**International PhD Program on Earth Sciences**”, project of the 3 ICT host Universities. Some Spanish (U. Compl. Madrid; U. Extremadura; U Granada) and a French University U. Lorraine), together with some Latino-America Universities are sought to participate

Joint submission of **applications to networked infrastructures**: *Cluster for Geosciences (C4G)- National Infrastructures, Medyna network.*

Preparation of **applications to European calls**, and to **calls of the Regional Programs** (to start in early 2015)

Joint publication of research outputs



ALQueva hydro-meteorological Experiment, April to June 2014, coordinated by ICT member Rui Salgado, with participation of ICT members together with national researchers from 12 institutions, and international researchers from 6 countries.



The **IX National Geology Congress**, and **2nd Geology Congress of Portuguese Speaking Countries**, Porto18 – 24 July 2014, Chaired by ICT member Deolinda Flores.



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ICT Funding targets

- The EU funded Regional Programs **Alentejo 2020** and **Norte 2020**
- **Horizon2020** – European projects
- **Contracts with companies and institutions**
- **FCT (Portugal):**
 - R&D National projects
 - Core funding – According to the rating obtained by ICT
 - Strategic Funding - based on the ICT strategic programme and its evaluation by the review panel.



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Priorities of Regional Programmes to be targeted by ICT

Alentejo 2020 and Norte 2020

- Endogenous resources (ornamental rocks, and minerals);
- Renewables (solar), and energetic efficiency;
- Water management;
- Sustainable environment and biodiversity;
- Natural and built heritage (geoconservation; geoarchaeology);
- Development of Centres of Competence (smart specialization);
- Promotion of synergies between SME and research centres;
- Scientific and technological training.



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Priorities of Horizon 2020 to be targeted by ICT

EXCELLENT SCIENCE

- Promoting the active involvement by researchers from under-represented European regions.
- Stimulating innovation by means of cross-fertilization of knowledge
- Exploiting the innovation potential of research infrastructures
- **Twinning** and networking measures (Associations to be established with recognized centres of excellence in Europe (Fraunhofer Inst.; Georessources Univ. Lorraine); Others under consideration)



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Priorities of Horizon 2020 to be targeted by ICT

SOCIETAL CHALLENGES

- *Fighting and adapting to climate change;*
- *Competitive and environmentally safe technologies for CO2 capture, transport and storage;*
- *Protecting the environment, sustainably management of natural resources, water, biodiversity and ecosystems;*
- *Management and use of water resources and water services;*
- *Management and supply of non-energy and non-agricultural raw materials;*
- *Unlock the potential of efficient and renewable heating-cooling systems;*
- *Develop efficient, reliable and cost-competitive solar energy systems;*
- *Develop geothermal, hydro, marine and other renewable energy options;*
- *Cultural heritage and European identity.*



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Structure, operation and management of ICT

Current main international projects



European
Research Area

International
Projects and
Collaborations

SAFEPORT: *Smart Planning of Worldwide Harbour Protection –NATO (ICT: 70 k€)*

Participation in “Solar Energy” European projects (ICT: 3 M€ up to 2016)

MEDYNA - *Maghreb-EU research staff exchange on geodynamics, geohazards, and applied geology in North-West Africa UNESCO (ICT: ~ 50k€ /year)*

IGCP Project 601, *Seismotectonics and seismic hazards in Africa, (2011 - 2014). UNESCO (ICT: ~ 50k€ /year)*

SUSMIN (1st ERA-MIN joint call)- *Tools for sustainable gold mining in EU (2014-16) (ICT: 200k€/3 years)*

FAME – Flexible /Mobile Economic Processing Technologies (2015-18) (ICT: 267k€)

COAL - MGT *Ecological Management of Coal Waste Piles (2012-15) (ICT: 170k€/3y)*



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Current main contracts with industry



European
Research Area
and beyond

HIDROGEST SA. (Spain),

ALEA RESOURCES, S.A. (2014 – ongoing),

VOTORANTIM METALS (Brazil) “Remediation of contaminated environments by metals (since 2012)8 ~200 k€)

Contracts on water quality (118 k€, 2013-14)

Contracts for Petrographic monitoring of feed coals (53k€/year)

Contracts on “Aggregates petrography (50k€/year)



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Budget strategy

Current national projects and contracts

FCT ~ 12 ongoing Projects

MATAGRO - Monitoring of Atmospheric Tracers in Antarctica (193 k€/3 years)

IMPROVE – “Improvement of performance of aggregates in the inhibition of alkali-aggregate reactions in concrete” (200 k€/3 years)

Aerosol and cloud studies – (172 k€/year)

Experimental solar plant (0.5 M€/year for next 6 years)

Protocols for post-graduation proposes with SME and services

-Beralit Tin & Wolfram Portugal SARL, Galp Energia, BRGM (French Geological Survey) Empresa Nacional de Hidrocarbonetos (Mozambique)

-Junior exploration companies operating in Portugal (Mineralia, Klondike Gold Corporation, Redcorp, MedGold)



Main
National Projects
and Contracts



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Budget strategy

New projects (submitted or in preparation)



- **NEWORE** -2nd ERA-MIN Joint Call Sustainable Supply of Raw Materials in Europe (submitted)
- **KIC REMATE** - KIC proposal on Raw Materials (R\$ 2M in total)
- **Valorization of the Iberian Pyrite Belt** (Joint project ICT/EDMA/LNEG)
- **MINERVA** – “Mineral resources in the variscan belt”- H2020 (in prep)
- “**Solar energy projects** (~3M€ in total) - 5 projects H2020 (in prep).
- **European Multidisciplinary Seafloor and Water Column Observatory**
– **EMSO-PT** Europ. Multidisciplinary Seafloor/Water Column Observatory (Nat. Infrast.)
- “**Science and Technology for Environmental Sustainability of Semiarid**” Int. Project (R\$ 2M in total)
- 5 contracts with industry on “water quality” (in prep.)
- **ALOP system** (ALqueva Observation and Prediction system): Alentejo 2020, involving 6 ResearchUnits, 5 Companies farms, several municipalities
- **Geoheritage: science for the benefit of society** (submitted to H2020-ISSI-2014-1, network of 11 European countries)



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ICT Highlights

- Integrated coverage of the main Earth Sciences fields;
- Multidisciplinary project teams applying to National and European calls
- ICT is a pillar of regional strategies of over 50% of mainland Portugal
- High international networking
- “International PhD Program on Earth Sciences”
- Ratio PhD Student/PhD ~ 1



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Unique features of ICT

“Live Science” Centre (in Estremoz) a facility that promotes outreach with schools, and general public (directed by a ICT member R. Dias);

Geoconservation and Geoarchaeology as innovative work domains

Integrates coherently “solar energy” as an environmental resource, alongside traditional Earth resources;

ICT is the only Portuguese R&D centre, and is among the very few in Europe, working on:

Atmospheric Electricity.

Multidisciplinary studies of hydrothermal fluids.

Applied petrography (organic matter and aggregates).

Natural (polen) and anthropic particles (fly ash) in aerosols.

ASM studies in crystalline rocks.



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SWOT analysis

WEAKNESSES

Current low level of public funding
Some outdated equipment
Geographic dispersion of facilities
Reduced number of staff
Range of publication per researcher
High charge of teaching duties

STRENGTHS

Multidisciplinary, and territory coverage
Pillar of National and Regional Strategies
Strengthens links into the E. S. community
Contributes to advanced training in E. S.
High international networking
Unique features at the national level
Motivated team and increasing collaboration

OPPORTUNITIES

Set up a leading national institute of E.S.
Synergies with regional programs 2014-20
Increase international networking
Become an attractor in the ES field
International Advanced Training
Public awareness of role of E.S.

SWOT

THREATS

Level of funding in the next 3 years
Low level of success in the applications
Individualism
Instability of scientific policies
Adverse economic evolution
Evaluation rating

REACTION AND DECISION- MAKING

- integration across disciplines
- integration across institutions
- promote open access
- create culture of services
- engage stakeholders
- raise societal awareness
- empower the community to join ICT projects



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Aims of ICT

■ Become a leading unit in

- ⊕ Solar energy
- ⊕ Strategic metals

■ Become a key international partner in

- ⊕ Aerosol Research and Atmospheric Electricity
- ⊕ Environmental studies
- ⊕ Seismic risk
- ⊕ Geoheritage and Geoconservation



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Thanks for the attention!