From the EPOS Conception to the EPOS Implementation Phase

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The EPOS vision is ambitious and challenging: creating a distributed pan-European infrastructure for solid Earth science to provide virtual access to data and services as well as physical access to facilities, such as experimental and natural laboratories (a geoscience lab or a volcano, for instance). EPOS succeeded in convincing the stakeholders that the initiative was neither overambitious nor unmanageable. Somehow, we corroborated the A. C. Clarke statement: "If an elderly but distinguished scientist says that something is possible, he is almost certainly right; but if he says that it is impossible, he is very probably wrong!"

Indeed, the successful EPOS preparatory phase allowed the definition and the realization of the EPOS mission: integrating the diverse and advanced European Research Infrastructures for solid Earth science relying on new e-science opportunities to monitor and unravel the dynamic and complex Earth System. To achieve this mission the EPOS architecture has been designed by engaging different stakeholders, including national governments from 22 countries and IT scientists.

Immediately after the end of the EPOS Preparatory Phase, the EPOS Implementation Phase started, with two key objectives: the legal establishment of the EPOS European Research Infrastructure Consortium (EPOS-ERIC) and the implementation of thematic and integrated core services (TCS and ICS, respectively) through the EPOS IP project, which started on October 1st 2015. The establishment of the EPOS-ERIC is advancing guided by the decisions of the Board of Governmental Representatives (BGR). The legal seat of the EPOS-ERIC will be hosted in Rome (Italy) while the central hub of the integrated core services will be in charge of UK, France and Denmark. These are the two essential components of EPOS-ERIC. The EPOS-ERIC Interim Office is working with the BGR to submit the step 1 of the ERIC to the European Commission at the beginning of 2017.

The EPOS IP project has the overarching goal to implement the TCS and ICS through the functional architecture designed during the Preparatory Phase. The EPOS architecture is centered on an e-infrastructure governed by the EPOS-ERIC through its Executive Coordination Office (ECO): the Integrated Core Services Central hub (ICS-C). The architectural design already allows for the integration of data, metadata and services within each TCS and with the ICS-C as well as for the identification of the requirements necessary to design
the access to computational resources (ICS-D). The latter will be used by any or all of the TCS via the ICS. The EPOS participation to the European Open Science Cloud initiative is of relevance for these goals.

EPOS is nowadays a well-known research infrastructure in the geosciences and its vision and mission have been broadly communicated to the diverse stakeholders; however, are we sure that the EPOS contents and impacts have been largely recognized?

This is one of the major challenges for the EPOS Implementation phase. The EPOS data and service provision is now well defined: it has been outlined by engaging the communities participating to the ten TCS, which are not limited to the 46 EPOS IP project beneficiaries. Each TCS has declared a priority list of data, data-products, services and software (DDSS) elements to be implemented in EPOS IP. This priority list now contains 299 DDSS elements. This is an essential step for technical implementation in order to foster quality control, standardization and interoperability. Moreover, the development of the ICS prototype is underway and its construction will start in the forthcoming months. The availability of the DDSS master table is also essential for the legal, governance and financial implementation. Indeed, the detailed knowledge of the EPOS provision will allow the update and refinement of the EPOS Data Policy following the general principles agreed with the BGR and included in the ERIC statutes. The TCS structure has been also revised in order to provide an effective governance framework: Consortium Agreements will be signed to establish the TCS governance, while Service Contracts will be signed by Service Providers with EPOS-ERIC in order to guarantee the DDSS provision. Finally, TCS cost assessment has been undertaken by identifying direct costs for the EPOS Service Providers. According to these recent achievements, the EPOS Architecture has been updated to make it coherent with the technical, governance and financial implementation.

The EPOS data and services provision guarantees an impact on scientific excellence since it will allow the Earth sciences to open new horizons in our understanding of the planet and in contributing to prepare society for geo-hazards. Indeed, EPOS is directly contributing to the Earth observation system providing data and services to foster scientific, technological and ICT innovation for successfully addressing global grand challenges in Earth sciences. The volume of data and breadth of physical and chemical involved processes demand new integrated approaches to collaboration and scientific research. Considerable progresses in e-science now make this integrated approach possible. Accessible data and products through dedicated services and software will bring novel cross-fertilization of ideas leading to innovative research that is the key to progress in science.

Once the integrated services to be delivered by EPOS are fully
operational, the new research infrastructure will also enhance access to research outcomes. By linking data to publications, the infrastructure will provide better data traceability; by creating new data products, it will encourage scientists to share their research in ways that bring new applications for society.

The way ahead EPOS is effectively planned to move toward construction and operation of the new research infrastructure. Activities are progressing well following the roadmap adopted in the EPOS Implementation Phase. EPOS counts on the support and the effective contributions by the European solid Earth community to succeed in its grand challenge.