CX-CMCS INFORMATION SHEET

COMPUTER MODELLING OF COMPLEX SYSTEMS

VISION

The basic strategic objective of the CX-CMCS project is to transform the Scientific Computing Laboratory (http://scl.phy.bg.ac.yu/) into a centre of excellence, i.e. to decisively increase the quality of research conducted at SCL, and make it a preferred West Balkan research partner for EU institutions working in the fields of simulation of complex systems and of GRID technology.

SCL is a unit of the Institute of Physics in Belgrade. The Institute contributes more than 10% of the total scientific output of Serbia and constantly ranks among the best R&D institutions in the region. SCL currently has 17 staff members, and participates in several international and national projects, including FP6 projects CX-CMCS, SEE-GRID, SEE-GRID-2, EGEE-II, and Cost action P10 (Physics of Risk). SCL defines the current state of the art in high performance computing in the West Balkan region with its PARADOX cluster.

CX-CMCS aims to reinforce the research capacity of the SCL by: hiring young researchers; providing training and mobility for the research staff; upgrading the computing infrastructure. The success of this endeavour will be measured through a benchmarking exercise to be performed in the project's last year. Our networking partners (4 from EU and 3 from Serbia) have been carefully selected to provide the skills and expertise necessary to reinforce the research potential of SCL through training and joint research. The proposed equipment upgrade will make it possible to tackle even the most complex GRID applications allowing SCL to become a key regional player in deployment and use of this emerging technology. The CX-CMCS International Advisory Board will help SCL develop a long term strategy and facilitate its integration into ERA.

CX-CMCS aims to be a living example that it is possible to bridge the "digital divide" between countries and regions having high tech ICT technologies and those that do not.

SCIENTIFIC COMPUTING LABORATORY

http://scl.phy.bg.ac.yu/

COMPUTER MODELLING OF COMPLEX SYSTEMS

PLANNED IMPACTS

- **Impact on technology –** Maintain and extend SCL infrastructure representing the current state of the art of computing and communication facilities in the West Balkan region; Implement latest GRID-related technologies.

- **Impact on research** – Improve research environment, human and computing capacities making it possible to study complex systems characterized with very large data sets and requiring extensive computing power. This will allow: comprehensive survey of near-Earth objects and estimation of catastrophic impacts, modelling the formation of Earth-like planets around other stars; study of the large-scale topology of the Internet, study of granular systems, efficient simulations in High Energy Physics.

- **Social impact** – The brain-drain of tens of thousands of young professionals with key skills is a phenomenon of paramount social impact on a region that has until recently endured a decade of wars, social instability and economic hardship. Of those that left, many were educated in the physical sciences and engineering and their continued education in the USA coincided with the emergence of robust new research fields as well as with the birth of several new technologies. Today, West Balkan (and EU) RTD has the potential of tapping into this extremely important human resource. The key precondition for alleviating the consequences of brain-drain is in identifying of high quality research centres to serve as brain-gain focal points.

- **Impact on national RTD policy** – Develop a set of recommendations for policy makers at national and local levels for fostering growth of research excellence in a rapidly changing high-tech environment.

- **Contribution to EU policies –** In particular those addressing the issue of bridging the "digital divide" between countries and regions.

- **Dissemination and exploitation of results – I**mprove EU-wide visibility and future participation in ERA; Maintain leading position of SCL in Serbian research; Promote modelling of complex systems using high performance computing resources in fundamental and applied research; Enhance interest of general public in S&T by showing examples of how scientific computing research can benefit every day life; Provide relevant data and recommendations regarding scientific computing to policy makers at national and local levels.

- **Impact on related national and international research activities –** SCL is active in two overlapping research fields: investigation of complex systems and development and deployment of GRID-based technologies. As a result of its expertise in both fields SCL is a prominent participant in several international and national projects. It is the driving force of the Academic and Educational Grid Initiative of Serbia (AEGIS), and the instigator of the ARETE initiative (Advancing Research Excellence and Technological Efficiency).