I.1 INTERNATIONAL COLLABORATION

The project will include important international collaboration in the area of open source GIS development, testing and applications. The development of new software tools will be coordinated with a multidisciplinary international team of GRASS5 developers which includes software engineers, geographers, geologists, DBMS experts from more than 10 countries. The collaboration has a typical open source form through the GRASS developers list and online discussions of software development issues. We plan more intensive collaboration including exchange visits with the current leader and coordinator of the GRASS5 development Markus Neteler from the Institute of Physical Geography and Landscape Ecology, Schneiderberg 50 30167 Hannover, Germany and with Dr. Jaroslav Hofierka from Geomodel s.k., Slovakia.

The Institute of Physical Geography and Landscape Ecology has been involved in open source GIS since 1995 and coordinating the GRASS development since 1998. The intensified collaboration will focus on the development and effective application of new tools for open source GIS, especially in the area of modeling of dynamic landscape processes, which is also a focus at the Institute of Physical Geography and Landscape Ecology (Prof. Dr. Th. Mosimann). Results of the collaborative effort will be published in scientific papers, and software tools will be integrated into GRASS GIS. Due to the fundamental idea of open source software the results can be used anywhere in the world to support protection of the environment and conservation of natural resources without financial limitations. The educational aspects of the collaboration will be enhanced by planned participation of Dr. H. Mitasova in an intense GIS graduate course at the Institute which is currently in application process at Deutsche Forschungsgemeinschaft (German NSF).

The previous collaboration with Dr. Jaroslav Hofierka and Geomodel s.k. has been extremely useful and productive and resulted in significant contributions to open source GIS infrastructure as well as to efficient solutions for environmental projects. The collaboration provided a substantial help in solution of the projects funded by the Slovak as well as European Union funds. The development of new computational, visualization and interactive tools will be highly valuable for the current efforts as well as for the planned projects. The previous research projects were solved in close collaboration with the experts at the Institute of Geography, Slovak Academy of Sciences (Dr. Marcel Suri) and Slovak State Geological Survey (Peter Paudits) as well as other private and state organizations. Some of the most important results related to the planned collaboration with the NCSU team could be summarized as follows:

- Creation of the national digital elevation model of Slovakia with pixel resolution of 50 m from topographic maps at scale 1:50 000 using the methods developed by Dr. Mitasova and Dr. Mitas. These data were successfully applied in hydrological regionalization of small basins in Slovakia, national assessment of soil erosion, regional Agenda 21, and other projects.
- Identification of the appropriate radioactive fuel disposal site and possible environmental risks in Slovakia. At present the experience from the project is being enhanced in 3D modeling of the effects of possible accidents on the oil transport pipelines and related infrastructure.

- Dynamic modeling of spatial redistribution of radionuclides influenced by overland flow by application of physically based models LISEM and ERDEP on a catchment close to the Nuclear Power Plant in Mochovce, Slovakia
- The tools for 3D and 4D interpolation are being tested for computation and validation of the time series of the national digital datasets of rainfall data.

The planned future collaboration will be focused on the development of new open source software tools for spatio–temporal modeling of landscape processes, identification and minimization of environmental risks, and proposals of future landscape scenarios. These tools will be extremely useful in identification and minimization of various environmental risks neglected during a previous political system in Slovakia for more than 40 years.

The collaborations will include visits of testing sites in the US, Germany and Slovakia as well as participations in seminars and workshops organized at the collaborating institutes and NCSU.