

## Goals of the e-ASIA Joint Research Program "Informational system for management of flood and land slide disaster areas using a distributed heterogeneous robotic team"

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East Asia is a vulnerable to natural disasters region. There are more than 30 types of dangerous natural phenomena, and floods are among the most frequent and costly phenomena in terms of human and economic loss. Therefore, it is highly important to develop experimentally tested scientific frameworks and technological solutions in order to deal with such disasters. Science and robotic technologies can play a key role in disaster risk assessment and prevention, and the role of these technologies increases yearly together with successes of robotic research and development around the world.

The project "Informational system for management of flood and land slide disaster areas using a distributed heterogeneous robotic team" is supported by e-ASIA Joint Research Program. Our joint project includes research teams from Russia, Thailand, and Japan. For Japanese team this project is supported by JST. Each team contributes its unique experience and special expertise of the past and the on-going research activities. Specifically, the Japanese team has long experience and significant achievements in mobile robotics and robotized urban search and rescue field, including design of control strategies for heterogeneous robotic teams, graphical user interfaces and Geological Information Systems (GIS). The Russian team has an expertise in developing specialized robot simulators in ROS/Gazebo programming environment, advanced mobile vehicles, path planning algorithms, and simultaneous localization and mapping technologies. The Thailand team has a strong expertise in UAV/UGV/USVs development, teleoperation systems for various types of robots and heterogeneous robotic teams.

While modern technologies can collect global data for natural hazards assessment and disaster prediction with remote sensing, GIS and satellites, our research aims at the development of an information system that will use these technologies in combination with various types of robots to support real-time disaster management. Our collaborative research goal is to develop and verify an operational framework for disaster site management with the help of distributed heterogeneous UAVs/UGVs/UUVs/USVs teams. In this framework, robotic teams will construct a large collaborative

thematic map of a disaster site, which will help human rescue teams to speed up the process of extracting survivors from a disaster site and evaluating dangers of construction collapse and environment pollution, while increasing the safety of human rescuers and survivors.

In this paper summary and goals of the e-ASIA Joint Research Program "Informational system for management of flood and land slide disaster areas using a distributed heterogeneous robotic team" are presented.