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Asi@Connect

TEIN COOPERATION CENTER

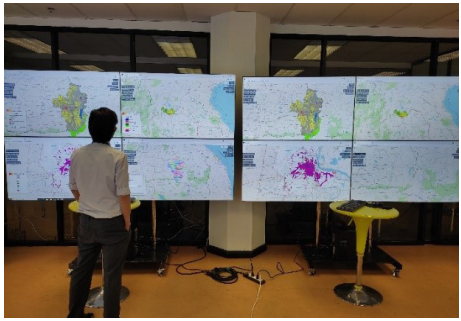
LandSage3 - Networked Collaborative Decision Support for Monitoring and Mitigation of Natural Disasters

NATURAL DISASTERS IN ASIA

According to the Asian Disaster Reduction Center, 5,634 disasters affecting an estimated 6.5 billion people were recorded in Asia between 1975 to 2020. Flooding and storms had an even far greater impact on its population than any other disaster events. In Southeast Asia, the Lower Mekong Basin intersecting Cambodia, Laos, Vietnam, and Thailand feeds over 65 million people but suffers severe impact from floods, landslides, and droughts. The Mekong River Commission estimated that the costs of damages and losses from floods alone reached up to USD$200 million per year between 2010 to 2014. As the frequency of extreme climate events continues to increase and as populations continue to rise, so too will we see an escalation in damage and related costs.

REVOLUTIONARY APPROACH TO DISASTER MANAGEMENT

Responding to these disasters requires a team of experts from a broad range of disciplines and a way to combine their data and expertise so that wise decisions can be made. LandSAGE3 is a project (landsage.info) to provide collaborative tools for the monitoring and mitigation of landslides, mudflows, and floods on CyberCANOEs. These are ultra-high resolution display walls driven by software called SAGE2 which allows users to combine large volumes of data in the form of visualization so decisions can be made quickly and confidently. CyberCANOEs and SAGE2 are two of National Science Foundation's premiere data visualization hardware and software platforms. Data visualization is the process of turning data into imagery to produce insight. In the age of data intensive science and engineering, visualization is crucial for revealing the meaning behind the data, and then communicating these findings to policy makers and everyday citizens.



LandSAGE decision support software running on two interconnected CyberCANOEs

LANDSAGE3 IMPLEMENTATION

After the **introductory meeting** in which the project leadership discussed plans and challenges, the following four main activities were conducted:

a) Technical training workshop: The LandSAGE3 developers obtained technical background for the development of LandSAGE decision support software. The training covered such topics as data visualization, CyberCANOE, SAGE2 and environmental factors related to floods and landslides. The trainees rated

the workshop benefits and their attention levels high. They felt they had improved understanding of the CyberCANOE and SAGE2, and improved knowledge of data visualization and environmental factors.

b) LandSAGE software development: A data and visualization-rich decision support tools enabling researchers in Cambodia, Laos, Vietnam, and Thailand to collaborate over Asi@Connect's networks on monitoring and mitigation of landslides and floods in the Lower Mekong Basin using a network of CyberCANOEs.

c) Testing workshop: The LandSAGE software was demonstrated to environmental and computer scientists from Cambodia, Laos, Vietnam, Thailand, Japan, and the United States to obtain insight into its usefulness and potential improvements. Participants provided several comments that drive the future development of the LandSAGE software.

d) CyberCANOE deployment: Four CyberCANOEs were then deployed to Institute of Technology of Cambodia, National University of Laos, FIMO Center at Vietnam National University and Mahidol University (TH).

Technical training workshop (online)

Testing workshop (online)

CHALLENGES

The COVID-19 pandemic posed serious threats to the project personnel and workshop participants. Consequently, most activities were converted to an online format which was deemed effective and did not affect the output, deliverables, and outcomes of the project.

IMPACT AND FUTURE WORK

The LandSAGE software has been released in open source so that the Asi@Connect community may take advantage of it for research and educational purposes.

The deployed CyberCANOEs increase Asi@Connect's bandwidth utilization because users will be joined in the collaborative environments to work on making sense of flood and landslide data.

In the **final project meeting**, the leadership discussed the future direction of LandSAGE3 which culminated in the successor project, LandSAGE4 – an Asi@Connect's 5th Call sub-granted project to develop further work in this area.

For more information

Asi@Connect : www.tein.asia

Disclaimer
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