San Diego State University (SDSU) a global leader in visual communication, has conducted successful disaster- response exercises using a unique Australian invention, The GPAC System™. The exercises demonstrated how technology could be used for enhanced integration and communication between entities planning and managing response to emergencies.

Emergencies are sudden, urgent, usually unexpected events requiring immediate action. Natural disasters such as tsunamis, earthquakes, hurricanes, floods or bush fires can devastate large areas in minutes. Australian bush fires/storms are particularly fierce due to the eucalyptus oil in gum leaves and can turn, jump roads or fire breaks, and accelerate faster than a man can run.

In order to be able to make informed decisions and to contain and mitigate damage, fast, accurate information is needed.

The research being conducted by Michael Hennig, SDSU Visualization Lab Manager and Research Associate will be particularly valuable to Fire Fighters as it enables the rapid distribution of real time images and sensor data to an Operations Center and those on the ground.

Using the GPAC System™ located at the SDSU Visualization lab as the integration platform, Michael redistributed video streams from robotic and Unmanned Aerial Vehicles (UAV) to various locations to demonstrate the simplicity and speed of the integration platform. This research highlights the capability of the GPAC System™ for real time disaster management by easily and efficiently relaying real time data and video to large and dispersed audiences. In an emergency situation such as a bush storm, immediate access to critical fire data, enables faster and more effective allocation of resources and could save lives.

The UAV video concept was field tested during a demonstration by RP Flight Systems to the San Diego Border Patrol Search and Rescue (BORSTAR) teams based at Brown Field in San Diego, California. During that demonstration, the UAV video stream was sent to a mobile Command & Control vehicle via a 2.4Ghz transmitter and receiver system, then stored by the GPAC System™. The video stream was also split across to an EVDO-based (cellular network) video teleconferencing system. In this distribution design the original video feed was not disrupted at the Command & Control vehicle source.

In related exercises, using a wireless camera system attached to an off-the-shelf robot (Robopd), Michael demonstrated programmed surveillance in a Lab environment. Like the UAV network architecture, the video feed was split and viewed via the GPAC System™ remotely via the internet and locally through the Command and Control vehicle monitor.

This process was achieved quickly and cost effectively by using the GPAC System™ to integrate commercial off the shelf technology and linking to technologies such as the UAV, BORSTAR Command and Control van, and robot.

Rapid decision making is supported as the technology consolidates available data from numerous sensor and camera networks, making it available for analysis and sharing via the Internet. Data can be quickly fed to local emergency services crew for evacuation and allocation of resources.

Increased situational awareness, early threat detection and quick response to disaster sites is an achievable outcome. Through these exercises the team at the SDSU Visualisation Lab have demonstrated that reliable visual communication dramatically improves integration and response time for first responders.

RP Flight Systems is a Texas-based company with extensive operations in providing UAV support for search-and-rescue and fire operations. RP Flight Systems have purpose built aircraft, designed expressly for aerial video and still photography uses including thermal imaging cameras, digital still, streaming video or both.

Border Patrol Search, Trauma, and Rescue (BORSTAR) Teams are highly specialized units capable of responding to emergency search and rescue situations anywhere in the United States. These teams are made up of Border Patrol Agents who volunteer to go beyond their regular duties and undergo a highly specialized regimen consisting of training in physical fitness and training in various other disciplines, including medical skills, technical rescue, navigation, communication, swift water rescue, and air operations.

San Diego State University (SDSU)

SDSU's Center for Homeland Security also has been instrumental in developing new techniques for attaining, processing and distributing high-resolution imagery in support of relief efforts after the 2004 tsunami in Banda Aceh, Indonesia and during and after Hurrican Katrina, US. The Vizualisation Centre is a rapid prototyping project focussed on sharing of information and collaborative visualizations to first responder and security needs globally. The Center acts as a sensor hub for data fusion of remote sensing and environmental monitoring and generates global geospatial data sets in response to natural or man made disasters, as well as training and mitigation of the disasters before they occur.

ETCorp

ET Corporation is the world leader in wide area security automation. Its product the GPAC System™ is an innovative web based plug and play automation operating system which greatly simplifies the process of automating core business processes involving physical input and output data from sensors, cameras and devices. End users have diverse applications including automation, security, homeland security and network centric warfare, but have in common the need to deploy, manage and use networks of sensors,

cameras and devices. Unlike other proprietary systems, ETCorp’s GPAC System® is practical, easy to deploy and quickly scalable for personal, local, regional, national and international use.