and structured data. Since readmission rates have remained nearly constant for the past few years, such efforts are not just timely, but they are also critical in helping improve quality of service while reducing associated healthcare costs.

Economic Impact: A study reported in 2009 that 19.6% of Medicare fee-for-service beneficiaries who had been discharged from a hospital were readmitted to the hospital within 30 days, 34.0% within 90 days, and more than half (56.1%) within one year of discharge. MedPAC also reported that readmissions, within 30 days accounted for $15 billion of Medicare spending. Medicare is the payer for about half of these readmissions. Current data shows that COPD accounts for about 22% of readmissions, hence taking this into account together with the 76% of preventable readmissions yields a 16.7% of potential readmissions reduction or potentially over $4 billion of annual savings. This new decision support system is well positioned to help quantify these savings. Hospitals and clinics can integrate the developed system with their current medical information systems to leverage clinical data and provide meaningful clinical decision support. This should result in improved care and reduced hospital readmissions. The system can be further expanded to include other diseases such as Congestive Heart Failure (CHF) that would further reduce the overall hospital readmissions and thereby provides much higher savings. While this technology will have significant economic impacts through cost savings associated with reduction in COPD hospital readmissions, the greater potential economic impact could be realized as the solution is expanded to include other diseases and chronic medical conditions.

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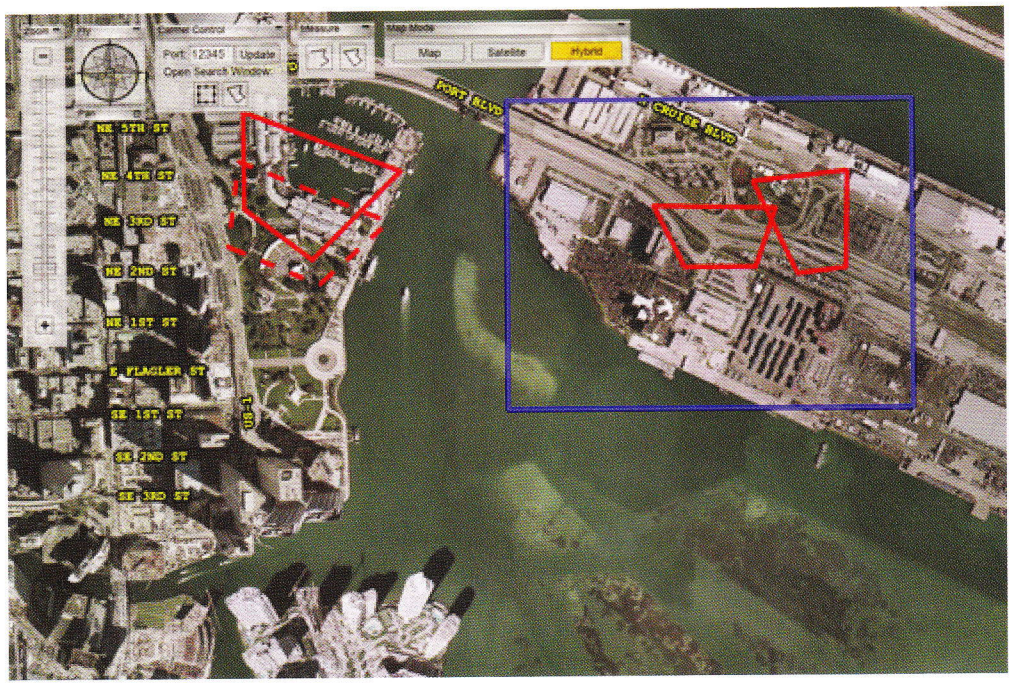
TerraFly Maps Enable Monitoring of Airborne Cameras

TerraFly is a technology and tool for the visualization and querying of geospatial data. It provides users with the experience of virtual "flight" over maps comprised of aerial and satellite imagery overlaid with geo-referenced data. The data drilling and querying component of the system allows the users to easily explore geospatial data, create geospatial queries, and get instant answers supported by high-performance multidimensional search mechanisms. TerraFly's server farm ingests, geo-locates, cleanses, mosaics, and cross-references 40TB of basemap data and user-specific data streams. The interface allows rapid deployment of interactive Web applications. It is accessible from anywhere via any standard Web browser, with no client software to install.

Although video surveillance recording is the state of the practice, the video collected is normally used only after the fact - it cannot easily be accessed in real time, does not have accurate geolocation capabilities, and cannot be easily integrated with other forms of critical information. This state-of-the-practice lack of situational awareness will be overcome by the Context Aware Rich Media Extensible Middleware technology (CARMEL) TerraFly system. This system integrates cutting-edge CARMEL technology from IBM Research Haifa (http://www.haifa.ibm.com) with the TerraFly Geospatial System at CAKE. The CARMEL-TerraFly system provides geographically anchored streaming services, delivered via IBM's state-of-the-art technology and accessible via TerraFly's intuitive spatio-temporal interface. This integrated system offers innovative situational awareness technology, while helping expand the Center's international influence and connections. By combining IBM Haifa's Geographic Information Systems (GIS) and streaming technology research, CARMEL is a geographically anchored, video-on-demand streaming infrastructure that provides: 1) scalable, end-to-end low-delay and resilient streaming technologies; 2) on-demand bandwidth

adaptation (transcoding); 3) highly accurate geographical searches; 4) real-time, geo-located notification; and, 5) high performance, service-oriented, architecture-enabled technologies.

The novel CARMEL-TerraFly technology is transforming public safety assurance systems. It is also making possible more timely responses to situations by providing geographically anchored streaming services. These can be combined with and accessed via the intuitive TerraFly user interface. Users are able to select a geographic area of interest, retrieve multimedia data from sensors in the area, and view streaming video of moving objects in real time (e.g., vehicles, people, animals, etc.). Users are also able to set temporal and geographic constraints to view the path traversed by a specific moving object or group of objects.



CARMEL-TerraFly user interface. The map shows the Port of Miami with moving traces of areas videotaped by airborne cameras. Solid trapezoids are ground projections synchronized with playback and dotted trapezoids are real-time projections of camera views. The blue rectangle allows selection of video fragments at times and locations of interest.

There are numerous potential applications for this advanced technology, particularly for command and control operations such as homeland security, law enforcement, and disaster response. For example, using the CARMEL-TerraFly system, law enforcement could be alerted to a situation such as a hit-and-run accident. Officers would be able to quickly pin-point the geographic location, view streaming media of the current location to quickly assess the situation, and, through the use of additional sensors, track the offender's vehicle.

Economic Impact: The potential economic impact of CARMEL-TerraFly is substantial because it can be a cost-effective public safety tool. It reduces law enforcement costs, increases effective-

ness of situational evaluations and responses, and contributes generally to the economic improvements of municipalities and regions. Litigation costs should also be decreased as more timely and accurate evidence becomes available for use in and out of the courtroom. In addition, the system could improve the effectiveness of situational evaluations and subsequent responses by providing tools for better resource allocation, thus improving the safety of responders and the public, ultimately saving lives and property. Finally, use of this system could ultimately reduce crime, which, in turn, would lower the cost of doing business and contribute to local and national economic improvement. CARMEL-TerraFly is the subject of an NSF SBIR Phase II project awarded to NOA, Inc., DBA TerraFly. IBM and NOA, Inc. have entered into an agreement concerning the project and are currently in the process of strategizing how best to propose the CARMEL-TerraFly System to government agencies in addition to the current CARMEL clientele. To support this, IBM and NOA Inc. have already produced a showcase video (please see: http://cake.fiu.edu/Carmel-TerraFly-video/). Our estimate is that this project will be producing $5 million in annual revenues by 2017 and will have beneficial consequences to consumers in the range of $50 million per year.

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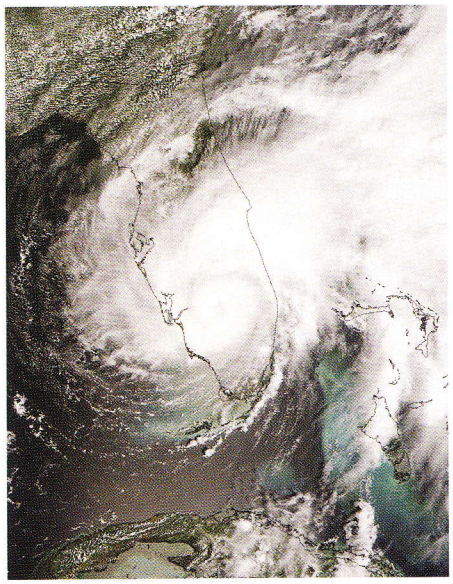
Business Continuity Information Network: Faster Community Driven Disaster Recovery



Technology used during the storm Fay, which impacted Florida.

In coastal areas throughout the United States, information sharing is critical for community resilience and protection of economic interests. Studies indicate that following hurricanes, approximately 40% of companies fail within 36 months when they were closed for 3 or more days. Years of meteorological data have demonstrated that South Florida is particularly prone to extensive damage from hurricanes. There are a myriad of toolkits, checklists, and other business continuity tools available that address how to prepare businesses for disaster. None of these stand-alone tools provide a means for business users to connect with local governments to monitor ongoing situations before, during, and after natural disasters.

The Business Community Information Network (BCIN), at CAKE, provides a platform for public and private sector communities to work in a coordinated fashion, providing the right information to the right person at the right time in the right format. Florida International University, its public and private sector partners, including Office Depot, Wal-Mart, IBM, the Greater Miami Chamber of Commerce, and county and city government agencies, have developed BCIN; a unique information sharing web-based software that provides a means for