

Delivering Brainlike Surveillance To Meet Anti-Bioterrorism Needs (Excerpts From A White Paper Written For San Diego County)

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The best response to bioterrorism is immediate control of disease outbreaks, initiated by valid early warnings. Initiating valid warnings requires detecting unusual disease patterns or symptom clusters in a maize of continuously changing activity. Delivering valid early warnings using Brainlike technology requires linking with automated computer networks that send comprehensive disease or symptom data to central locations in real time. Several projects, identified in the excellent San Diego County bioterrorism preparedness plan ([see www.Co.San-Diego.CA.US/terrorism/bioplan.html](http://www.Co.San-Diego.CA.US/terrorism/bioplan.html)), are essential to meeting that requirement. They include automating the current disease reporting system, developing a new automated system for symptoms from local medical providers (syndromic surveillance), enhancing surveillance of flu-like illnesses (using information from providers and school absenteeism), automating the Enhanced Health Surveillance System (EHSS) to track disease trends, and developing an integrated electronic data storage system. As these projects evolve, Brainlike software will be able to deliver valid early warnings of unusual activity related to disease or symptom outbreaks. Brainlike methods are essential for distinguishing true outbreaks from the many false indications that could be misinterpreted as such, effectively and affordably.

Related Brainlike Applications

Products that monitor unusual computer network activity using Brainlike technology have already been delivered to identify subtle computer problems under dynamic operating conditions. Also, under a current contract with ARDA, NSA, and the Navy, Brainlike Surveillance is investigating the use of similar products to prevent sophisticated cyber attacks. More generally, whenever any variety of surface, sub-surface, and airborne sensors are supplying correlated activity information, Brainlike technology can detect subtle changes that would otherwise be undetectable, so that preventive action can be initiated immediately.

Anti-Bioterrorism Delivery Objectives

Several proof-of-concept surveillance studies have been completed in a variety of fields, and commercial products using Brainlike technology have been delivered. However, further proofs-of concept studies and integration efforts must be completed that are more focused on the needs of San Diego County. First, Brainlike technology feasibility will be demonstrated by using either San Diego datasets or suitable alternatives to show clear



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added value. This will occur during Phase I. During Phase II, Brainlike technology will be transformed into a general-purpose tool that San Diego County integrators could readily deploy to achieve superior monitoring sensitivity.

Phase I technical objectives include the following:

1. Pre-selecting a key monitoring application for feasibility evaluation. Among potential applications within the domain of this proposal, the company will select one for feasibility evaluation. Among those that will be considered, the selected application will show the best prospective return on investment, coupled with the best available resources for accurate feasibility evaluation. Essential resources will include (a) access to end-users with critical monitoring needs, and (b) access to data.
2. Determining feasibility study scope. The selected feasibility study format will depend on several factors, the nature of which will depend on the application of choice. The company intends to choose for study a relatively mature problem in terms of an understanding what could be measured and what action should be taken in the event of a warning. The company intends to seek a real-time dataset for added value analysis. Ideally, the dataset will be complete with known instances where alternative monitoring methods had produced too many false alarms, identified too few target events, or required too much effort to maintain under novel field conditions. In that case, the company could include in phase I an empirical assessment of added value.
3. Completing the feasibility analysis. Completing the analysis will include completing, distributing, and vetting an analysis report.
4. Delivering prototype software. During Phase I, the company intends to deliver simple code in prototype form that is suitable for preliminary analysis by San Diego County integrators.
5. Preparing a Phase II Completion Plan. The Phase II completion plan will include a detailed description of steps needed for delivering general-purpose software, and plans for completing those steps.

During phase II, the company proposes to deliver a software module in the following form.

- A real-time kernel algorithm that is configurable for receiving multiple sensor input values periodically, adapting continuously, and producing global as well as individual alert values in real time.
- Object-oriented source code and comprehensive source code documentation.
- Delivered code suitable for compact, efficient implementation on remote microprocessors.
- Delivered code suitable for simulation using historical data.
- Delivered code suitable for massively parallel, on-chip development and testing.
- Delivered code suitable for independent customer testing, evaluation, integration, and future development.
- An extensive analysis of customer needs that will ensure code delivery in a form that will maximize value to San Diego County.



To the extent that San Diego County requires assistance in product integration, the company is prepared to offer its integration services as well.

Prospective Partners

The company's product delivery model centers around creating and delivering Brainlike kernel technology to partners in a form that will allow them to integrate it into a variety of solutions, independently and with little added cost. While the company offers integration services on an as-needed basis, the company's product delivery model ensures that Brainlike technology will be delivered in a form that San Diego County will be able to use independently and affordably for many years to come.

The company is heavily involved in federal level homeland security activities. For example, the company attended the Interagency Homeland Air Security Capital Region Industry Day, hosted by the Department for Homeland Security. As a follow-up to that meeting, the company will be initiating a series of efforts along the lines of those highlighted in this white paper. Also, for several years the company president has been aggressively cultivating a relationship with epidemiologists at the Centers for Disease Control and Prevention (CDC). He has co-authored articles with surveillance leaders at CDC, and has presented a surveillance seminar there, focusing on how Brainlike surveillance can identify significant problems quickly, automatically, and at low cost. He is currently working out a plan with CDC leaders to crystallize that relationship into a product delivery agreement.

Since the day it was founded, Brainlike Surveillance. has been aggressively pursuing partnerships in the San Diego defense community. Prospective academic partners include UCSD and SDSU, where significant anti-terrorism research and development operations are underway. Regional industry prospects range in size from SAIC, Lockheed Martin, and Northrop Grumman to PSI, SYS Technologies, and Neptune Sciences. The company constantly interacts with leaders from these companies who specialize in surveillance. The company is also establishing partnerships with related departments at Spawar, San Diego, which has a substantial homeland security department and supports a major anti-terrorism testing facility at North Island. The company is leveraging these relationships into partnerships that will allow fast and seamless development, delivery, and integration of Brainlike surveillance solutions.

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