Optalert

- *Web performance*
- *Rapid application development*
- *Real-time business intelligence*

Optalert Adopts InterSystems Software to Prevent Fatigue-Related Industrial Accidents

Fatigue is a major cause of industrial accidents, especially in road transport and mining. According to Australian Government figures, over half of major crash insurance claims are fatigue related, and almost two-thirds of truck haulage accidents in the surface mining industry are directly related to operator fatigue.

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– Rob Chapman, Manager of Operations and Development, Optalert

Australian-based Optalert, a world leader in fatigue management technology, has developed a breakthrough application which is used by many of the world's largest mining and transport companies. The system tracks operator eye and eyelid movements to detect fatigue before the individual is aware of it. In addition to immediately alerting the operator, it generates large amounts of data that need to be stored for reporting and ongoing research.

The Optalert system is based on the use of infrared light to detect eye and eyelid movement. Drivers wear a pair of Optalert Glasses that are styled like sunglasses. Infrared emitters and receivers are mounted in the frame, along with a miniature computer that digitises the data and transmits it to the Optalert Vehicle System.

The Optalert Vehicle System monitors the incoming data, and visually and audibly alerts a driver showing signs of fatigue. "Optalert is the only scientifically validated system that is able to predict drowsiness before the driver even realises it," said Rob Chapman, Manager of Operations and Development at Optalert.

An optional service, Optalert eReports generates a variety of reports from the recorded data that can be used for risk management and other purposes. Using Optalert helps organisations protect their workers, improve risk management, and comply with duty of care and chain of responsibility requirements.

Optalert's technology has been developed from 14 years of research by Dr Murray Johns, Founding Director of the Sleep Disorders Unit at Epworth Hospital, Melbourne, Australia, and the Founding Director and Chief Scientist of Optalert. The company's products were first launched in 2006.

The challenge the company faced with the continuing development of their reporting application was the amount of data collected by the system. To record raw data about eye movements, in addition to warnings and events such as the vehicle engine being turned on or off, the storage requirement is currently around 2MB per user per hour. This will increase with the future recording of additional information such as cabin temperature or altitude.

High-Performance Database to Process BI Queries in Real Time

"There is an awful lot of data that could be put forward to management to refine operating protocols. How often do drivers take rest stops? How effective are the rosters? Companies all implement standard fatigue protocols, but they don't take into account the individuality of the drivers," said Chapman. "We needed to provide a reporting system to give them that information."

The system Optalert originally used to analyse the data was based on Microsoft Access, but it was clear that it was inadequate to meet the growing amounts of data and increasing complexity of analysis.

Once the decision was made to deliver its software as a service, it was apparent that Optalert needed a high-performance database that could handle huge amounts of data and generate reports quickly. It also needed to process business intelligence queries in real time, without the overheads of data mining or extraction to a data warehouse, and allow development staff to make changes and add new features as easily as possible.

"We needed a proven, Web-enabled database management system that could handle multidimensional XML data, with high-quality reporting and email scheduling," said Chapman. It also needed to be fast, flexible, scalable, robust and secure. "We are a private company with private investors. We can't afford to get it wrong or we are out of business."

Following a review of competing database solutions, a test of a software-as-a-service architecture developed for the transport and freight industry, and discussions with existing InterSystems customers, Optalert selected InterSystems CACHÉ® to manage the huge amount of data generated by its clients around the world.

Global Web-based System to Aggregate Fatigue Management Data

Having determined that the CACHÉ high-performance object database was the only solution that met all of its requirements, Optalert set about re-engineering its business model based on the capabilities offered by the new technology platform to become a Software-as-a-Service company.

CACHÉ allowed Optalert to create a global Web-based system to aggregate fatigue management data for reporting and research and to deliver an in-the-cloud service tailored to meet the varying requirements of its mining and transport industry clients.

"The adoption of InterSystems technology has allowed us to change the business model of Optalert to become a Software-as-a-Service company," said Chapman. "We have gone from just selling a piece of equipment to selling a service which assists clients with fatigue management."

Optalert's new business model will allow the company to lower the cost of a basic fatigue management solution and expand its customer base while generating additional revenues from value-added services.

"CACHÉ allowed us to create a subscription-based system and vary the reporting depth to suit different clients. Some only require monthly general summary reports, while others require trending, comparisons between locations, and other detailed information," said Chapman.

New WebReport System Developed in Just 80 Days

CACHÉ's rapid development environment enabled Optalert and development partner Integrated Software Systems (ISS) to create the new Optalert eReports web based application in just 80 days from project start to first customer use. The ease and speed of development and flexibility provided by CACHÉ allowed Optalert to make ongoing enhancements without incurring large development costs.

Whereas data was originally transferred from the Optalert Vehicle System via a USB stick, the company is now implementing real-time wireless data transfers with CACHÉ. This will not only allow analysis and monitoring of fatigue management data in real time, it will also avoid the bottlenecks that can occur when many trucks all finish a shift at the same time.

Looking ahead, Optalert hope to implement a business intelligence capability using InterSystems DeepSee™. This will provide real-time insight into all the data recorded over several years for all customers, contributing to future service improvements and value-added revenue opportunities.

With live data feeds to and from vehicles, this will open the possibility of generating a real-time alert in a particular set of circumstances that suggest a driver might be becoming fatigued even though it is not indicated by the system's built-in algorithms.

The first step towards this will be the use of DeepSee real-time business intelligence software to create real-time dashboards so Optalert can monitor clients' overall performance. The company then plans to deliver dashboards directly to clients so their control room operators can see alerts relating to individual drivers and then check via radio that all is well in the cab.

"We are a small company but we intend to be big and we believe that InterSystems will help us get there," said Chapman.

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InterSystems CACHÉ®