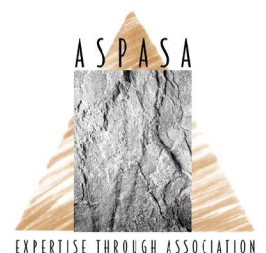# INSTITUTE OF QUARRYING

MOBILE ASSET MANAGEMENT

By

Willie Pieterse – Barloworld Equipment (Pty) Ltd

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ASPASA
EXPERTISE THROUGH ASSOCIATION

"Using available technology to manage mobile assets remotely in Southern Africa"

Author/Speaker:
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Willie obtained a Higher National Diploma (Mechanical Engineering) from the Pretoria
Technicon in 1972 and had joined Barloworld in 1970 for training as part of Diploma and then continued full time in January 1973.

Willie left Barlows and joined Grinaker Plant in 1978 where he worked as plant foreman in Swaziland and Pretoria on contracts.

He rejoined Barlows in July 1980 and served in a variety of areas before becoming Operations Manager for After Sales in Isando in 2000. Willie retired from Barloworld in April 2004 and went cattle farming between Heidelburg and Standerton.

He was requested by Barloworld Equipment to assist them with Technology opportunities in the Earth Moving Industry and is currently involved with mobile asset management technology.

Introduction:

Barloworld Equipment has for several years, offered owners of equipment "Customer Support Agreements" (CSAs). These agreements specify that Barloworld does regular servicing and/or total maintenance. Given the fact that machines are often used in remote areas across Southern Africa, having access to information about the whereabouts and up to date hour meter readings, is a tremendous advantage.

The hours are required as manufacturers recommend maintenance on earthmoving equipment based on the machine's hour meter reading. **Remote** management of these assets thus became a requirement, as productivity improvement and cost containment are nowadays essential to stay competitive.

Background

Startrack Communications Africa (part of the JCI group) – a satellite airtime service and solutions provider - acquired satellite bandwidth on the Inmarsat IOR (Indian Ocean Region) satellite in June 2000 to provide a satellite communications platform for remote and mobile asset management throughout Africa. Startrack's products and services are available through an appointed distributor network responsible for promoting and selling the MT2000 satellite communication platform. The MT2000 satellite terminal is developed and manufactured by Vistar, a Canadian Company.

Suretrack (now part of the Astrata group) is one of Startrack distributors and was approached by Barloworld Equipment Company (Isando) in April 2001. Barloworld's objective was to find (or develop) a solution that would enable remote, real time management of mobile earthmoving equipment.

Solution

The initial requirements for the solution included only GPS location and the hour meter reading of a machine. It was however quickly realized that the MT2000 has the capability of transmitting additional information and a specification was drawn up detailing basic machine monitoring requirements, and included:

- *Location*

- *Hour meter reading*

- *Engine overheating prompt*

- *Low engine oil level prompt*

- *Geo fencing*

- *Machine service requirement prompt*

- *Status of machine (engine running or switched off)*

- *Retrofit table to any make of machine*

- *SMS messaging for alarms*

- *Reports*

- *History of data*

During development of the SAMMS (Satellite Assisted Machine Management System) solution, consideration was given using GSM (cell phone) as opposed to satellite as the communication platform. However, due to earthmoving machines often working in areas where there is currently no cell phone coverage, satellite communication was opted for.

Satellite communication's drawback is that the MT2000 must have line of sight with the satellite. This means that no communication is possible if a machine moves in under a concrete or corrugated iron roof. Even though the MT2000 has a memory buffer for storing messages this was still a limitation.

Coverage of the satellite used
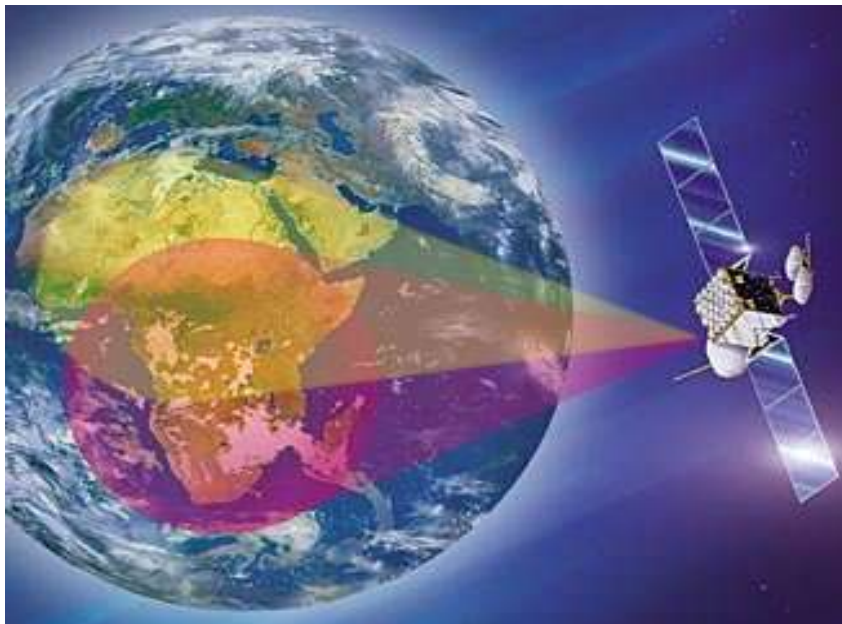
Africa Coverage

Figure 1: Startrack

The communication from the machine to a personal computer takes about a minute and happens as per diagram below.
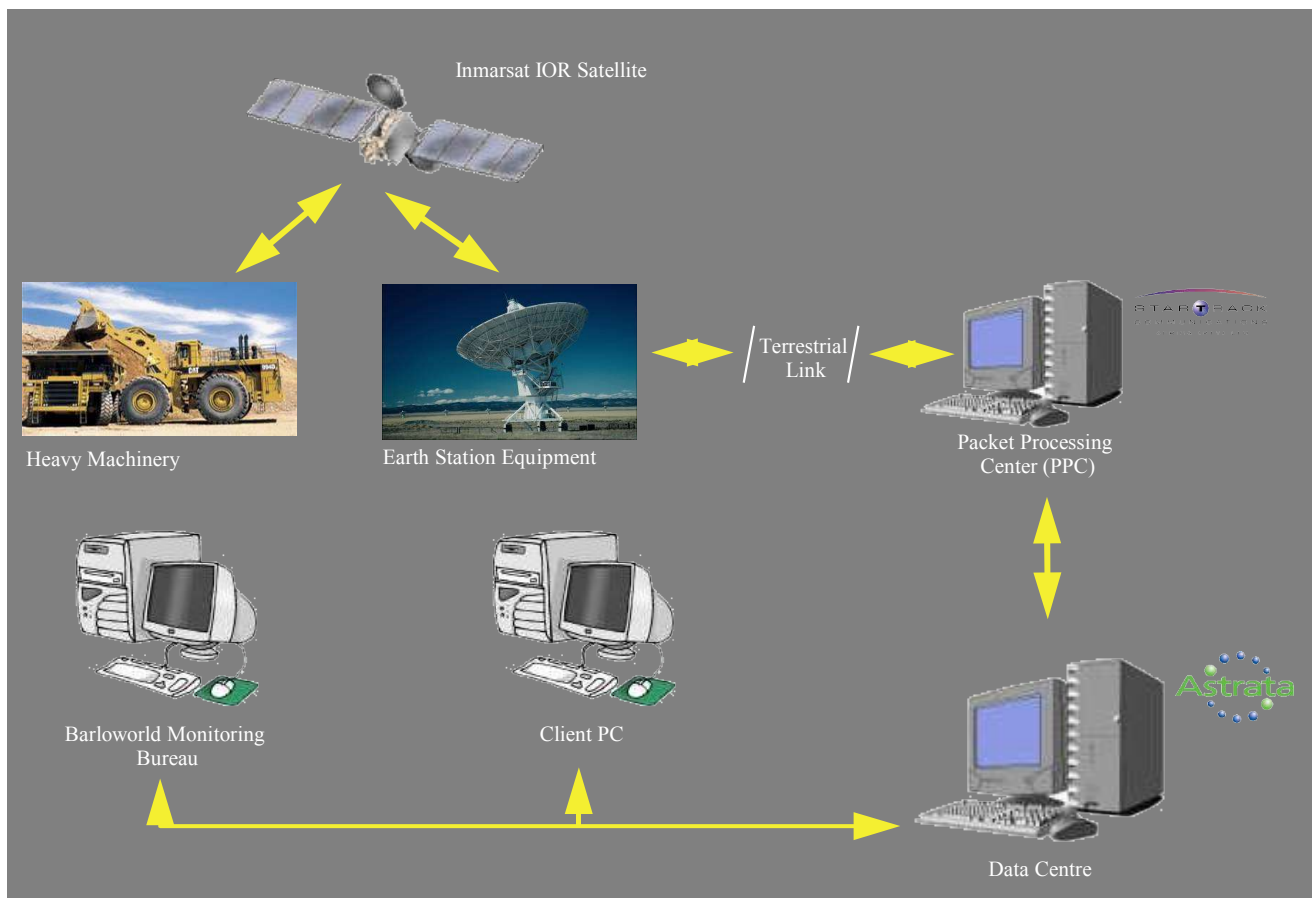

Figure 2: Data Transfer Value Chain

From the machine it goes to the satellite. This is a geo stationary satellite meaning that it does not orbit around but stays stationary relative to earth.

From the satellite the information is transmitted to the Earth Station, which is based in Perth, Australia. From there to the PPC (Packet Processing Center) also based in Australia. From the PPC data is transmitted via terrestrial networks to South Africa and finally the dedicated SAMMS server.

Customers have access to their specific machine's information, via the Internet, by using application specific software which connects them to the SAMMS Server via a dedicated IP address. The system is designed using existing security checks allowing users access to their machines only.

Conclusion

A pro active, real time, robust, low priced, remote asset management system that updates every ten minutes or whenever an event is logged. Users can access the information any time from anywhere in the world as it is available via the Internet.

Enhancements

Currently the MT2000 supports packet-based data transmissions of up to 38 bytes to and 11 bytes from the MT2000, but the supplier Vistar, plans to expand the message delivery capability to enable fast delivery of messages of up to 10K. According to TransCore, who recently acquired Vistar, the MT2000's simplicity and low-power consumption combined with the company's expansion of bandwidth between its MT2000 terminals and satellite network will give it a key advantage.

This is essential as continuous additional information from the machines is required from the SAMMS users. The following additional benefits are already available (or will be in the near future):

- *Two-way communication from PC to machine operator and back using SMS type messages. This involves an on board VDU (vehicle display unit).*

- *Updating machine hours (with VDU) when the machine moves in under a steel or concrete roof.*

- *Operator licensing and machine usage control*

- *Fuel tank level monitoring*

- *Operator time and attendance management*

- *Accurate machine break down and availability information*

- *Tyre pressure monitoring*

Future possible enhancements under consideration include:

- *On board oil condition monitoring*

- *Integration with SAP*

- *Integration with machine's on board computer*

'Mobile Asset Management'
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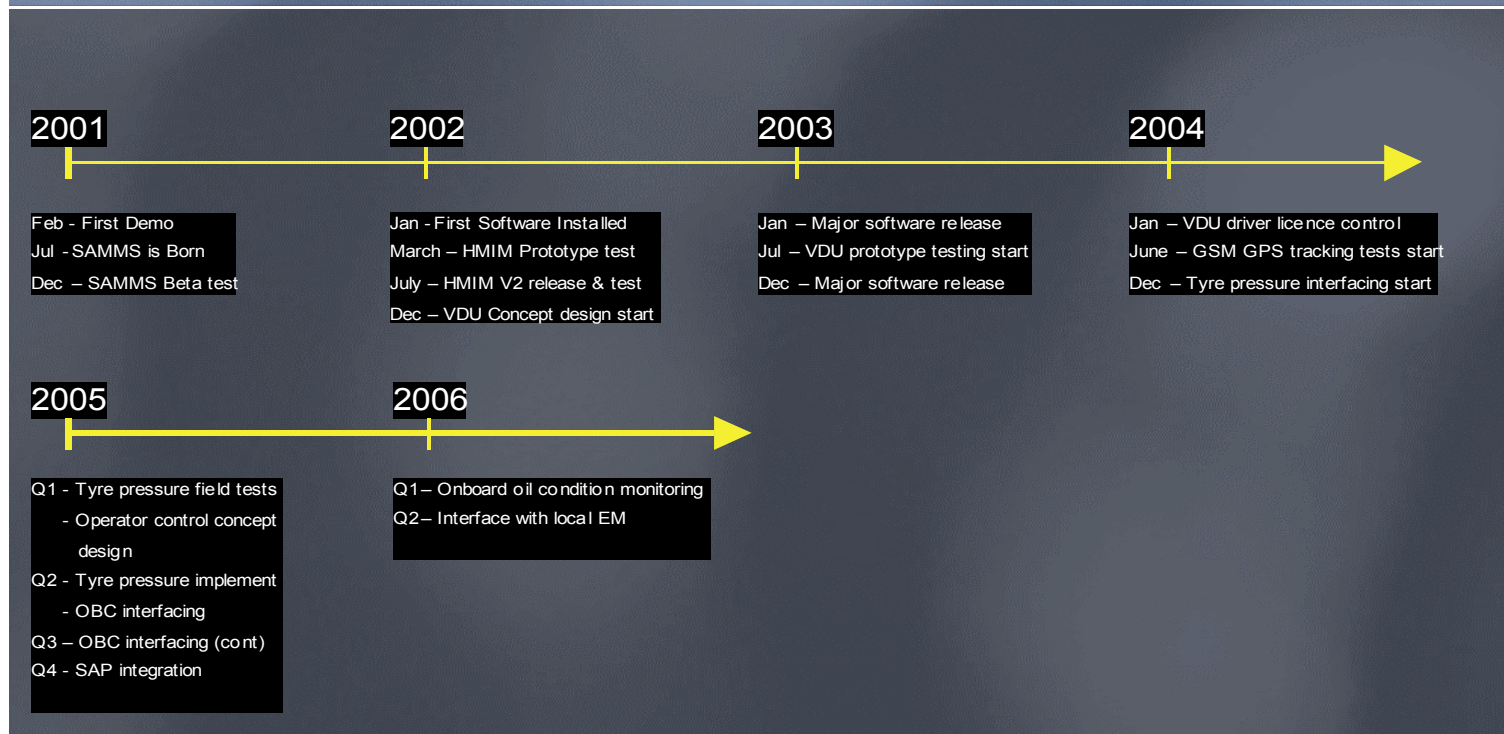
Figure 3: SAMMS Development Time Line