

NEPEAN
Power

TM





**Real Time Risk Management System For
Underground Coal Mines**

The Problem



Underground coal mines remain inherently high risk environments and have always been notoriously hard to control.



was Developed by



- Started as a CSIRO research project
- Sponsorship by JCOAL, ACARP

Objectives of the Project

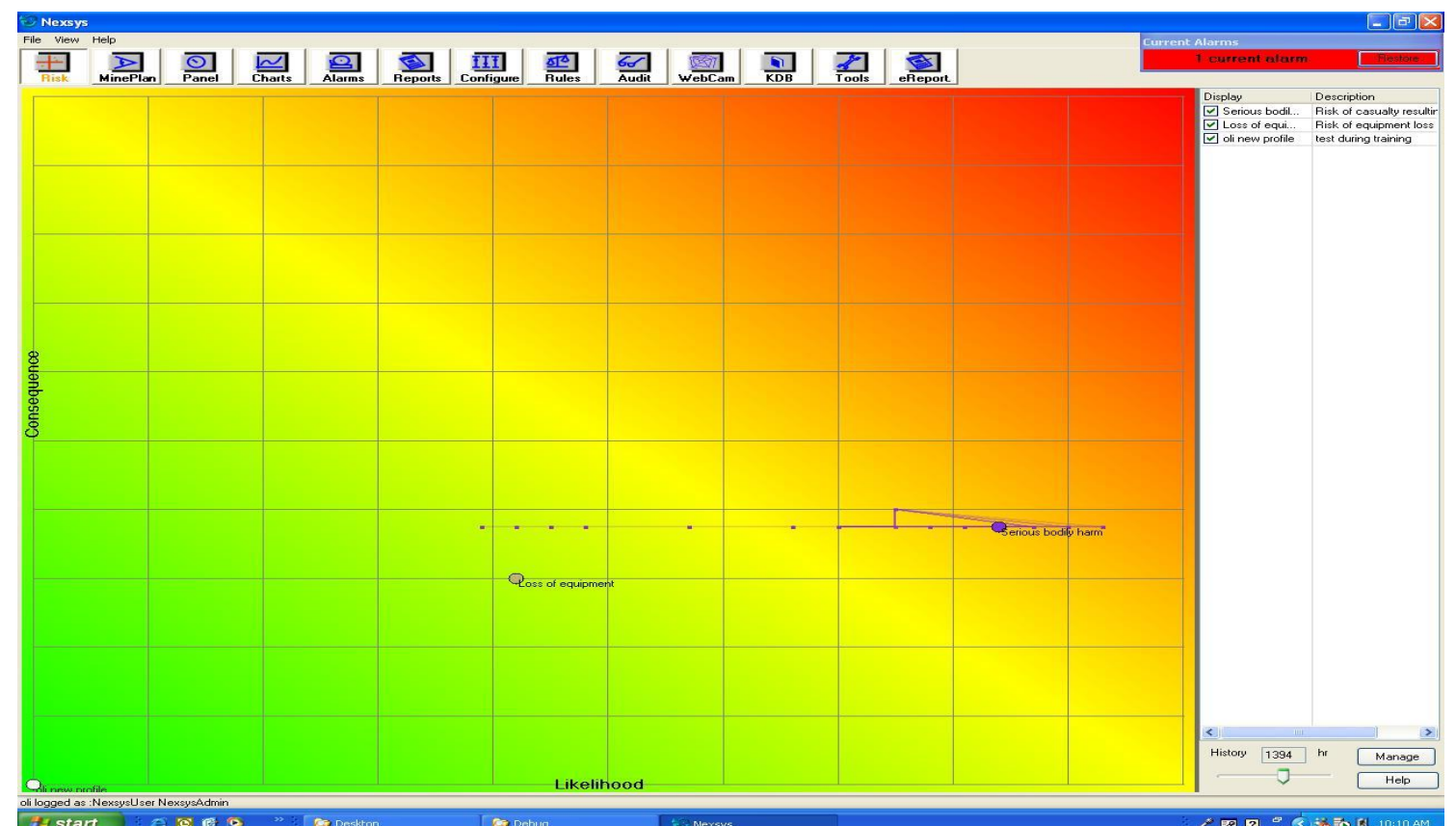


(Now the Features of the Product)

- Deliver step change capability in critical monitoring, data integration, decision support and personnel safety;
- Provide real time hazard analysis and risk profiling;
 - Develop “knowledge management” capability;
 - Development of an intrinsically safe communications backbone using broad-band, high speed Ethernet protocols and fibre-optic data highways; and
 - Able to be used as part of normal day-to-day activity.



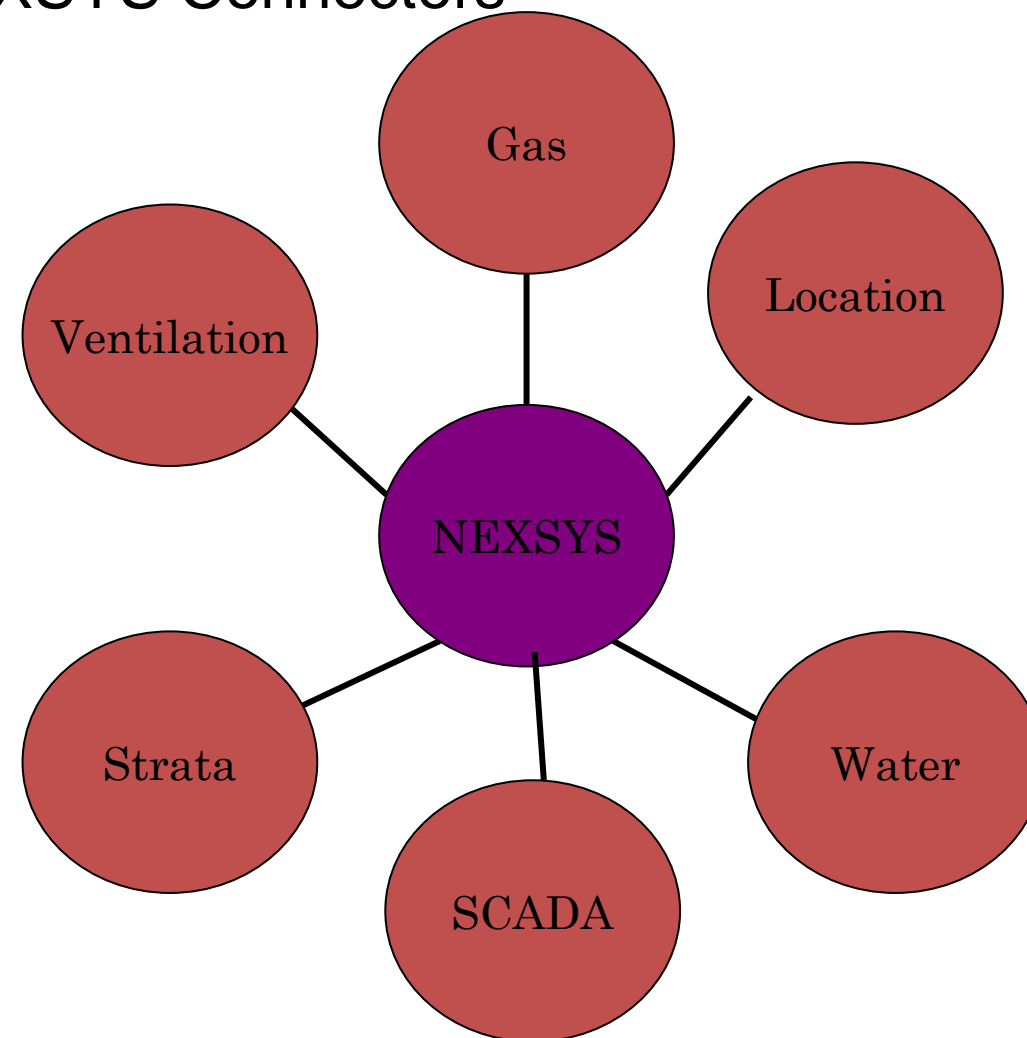
- Two Projects



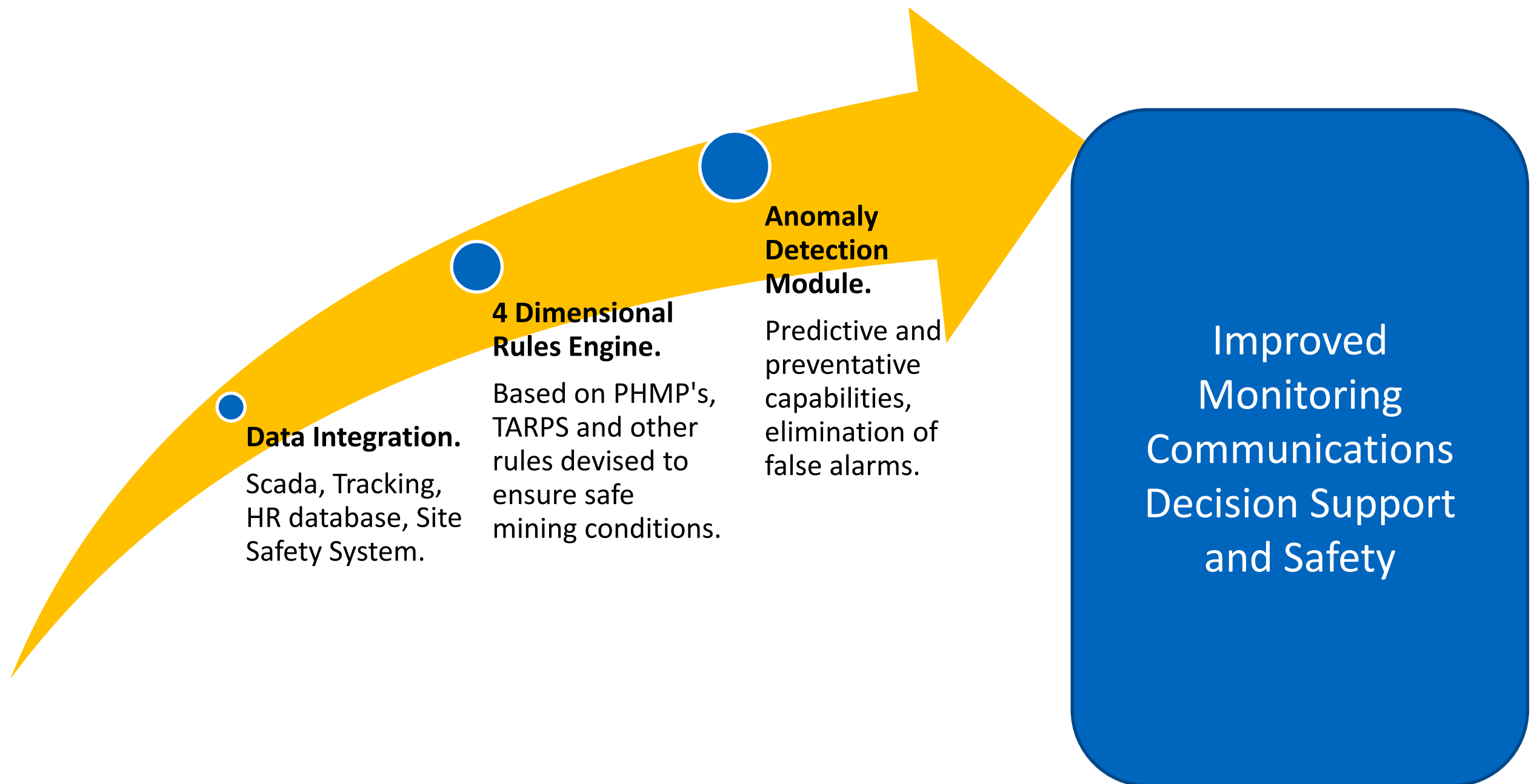
MODULES



— NEXSYS Connectors



What Does NEXSYS Do?



How Does NEXSYS Do It?



Nexsys™ Server – the main component of the Nexsys™ software that monitors and processes the available data and services

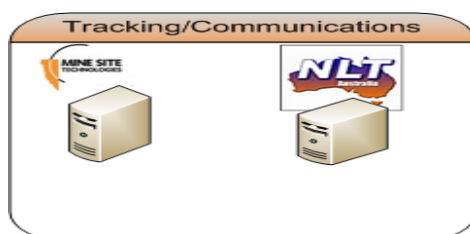
Nexsys™ Client – software component enabling users access to the Nexsys™ main software component (Server) either locally or remotely over the network and enables users access to the Nexsys system,

WebNexsys – read-only web version of the Nexsys™ Client that can be accessed from an internet browser,

Nexsys™ MLS (Man Locating System) – software component providing connection to personnel and equipment tracking and paging systems.



Sensor Networks



Ventilation



Machine Monitoring

Sensor Databases

20,000 bits / sec



Citect 1



Citect 2



Safe Gas

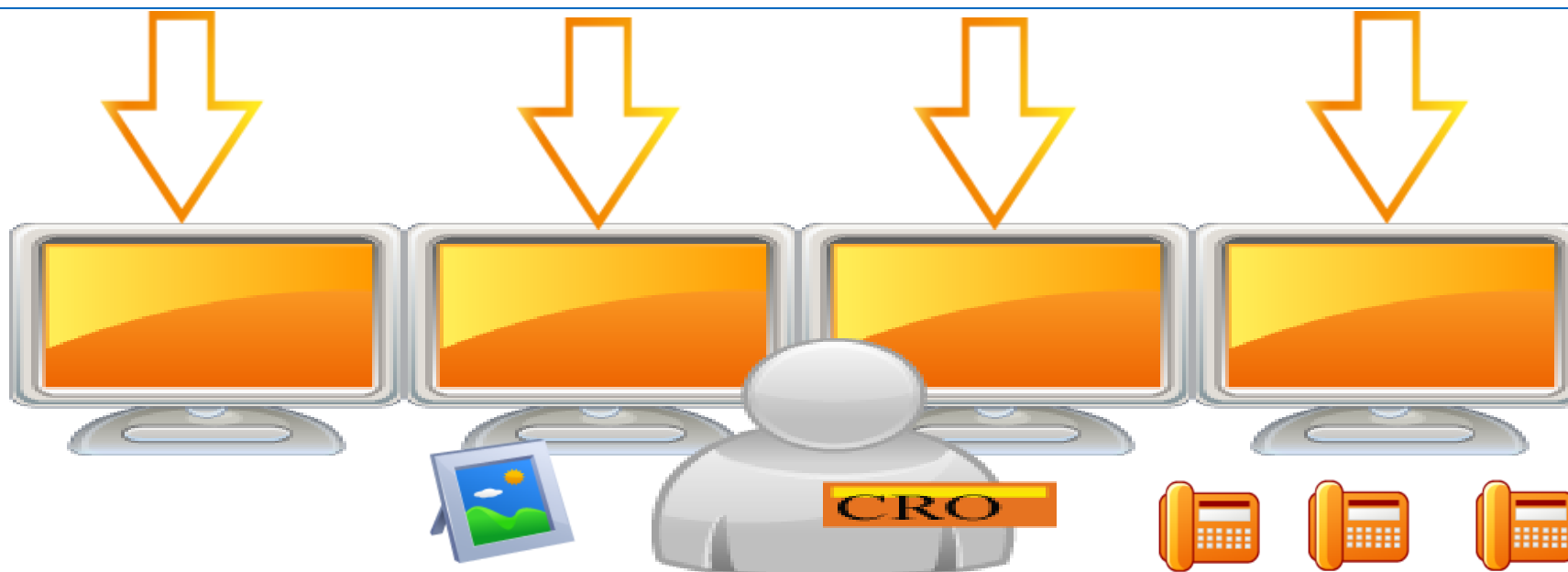


Tracking



Security

Alarm Data Spread
across many screens



Sensor Databases

20,000 bits / sec



Citect 1



Citect 2



Safe Gas



Tracking



Security



20,000 bits / sec



NEXSYS

HR Training Data

Diesel Particulates

Manual Monitoring

Procedures / Manuals

Real Time Mine Plans

TARP's /PHMP

All Mine Data

RULES Engine

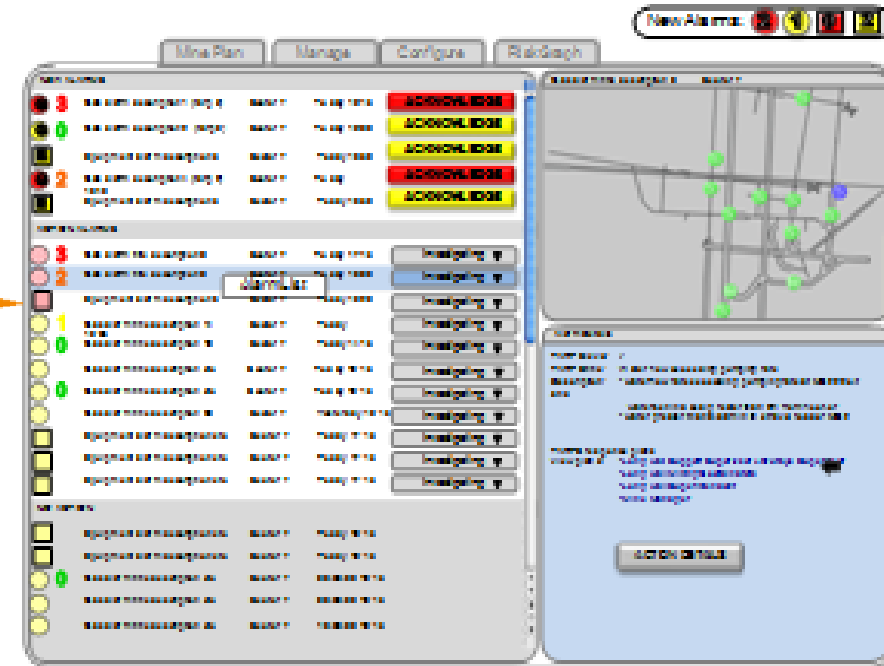
Work Flow

ADM

Reporting Engine



NEXSYS





Nexsys



- ✓ **Pit to Port Capability**
- ✓ **Multi Site Capability**
- ✓ **Single Site Platform**
- ✓ **Specific Tasks within the Mine**

Pit to Port Capability



NEXSYS – Hub
SERVER 1



NEXSYS



NEXSYS – Enterprise
SERVER 4
(Replication of Data)

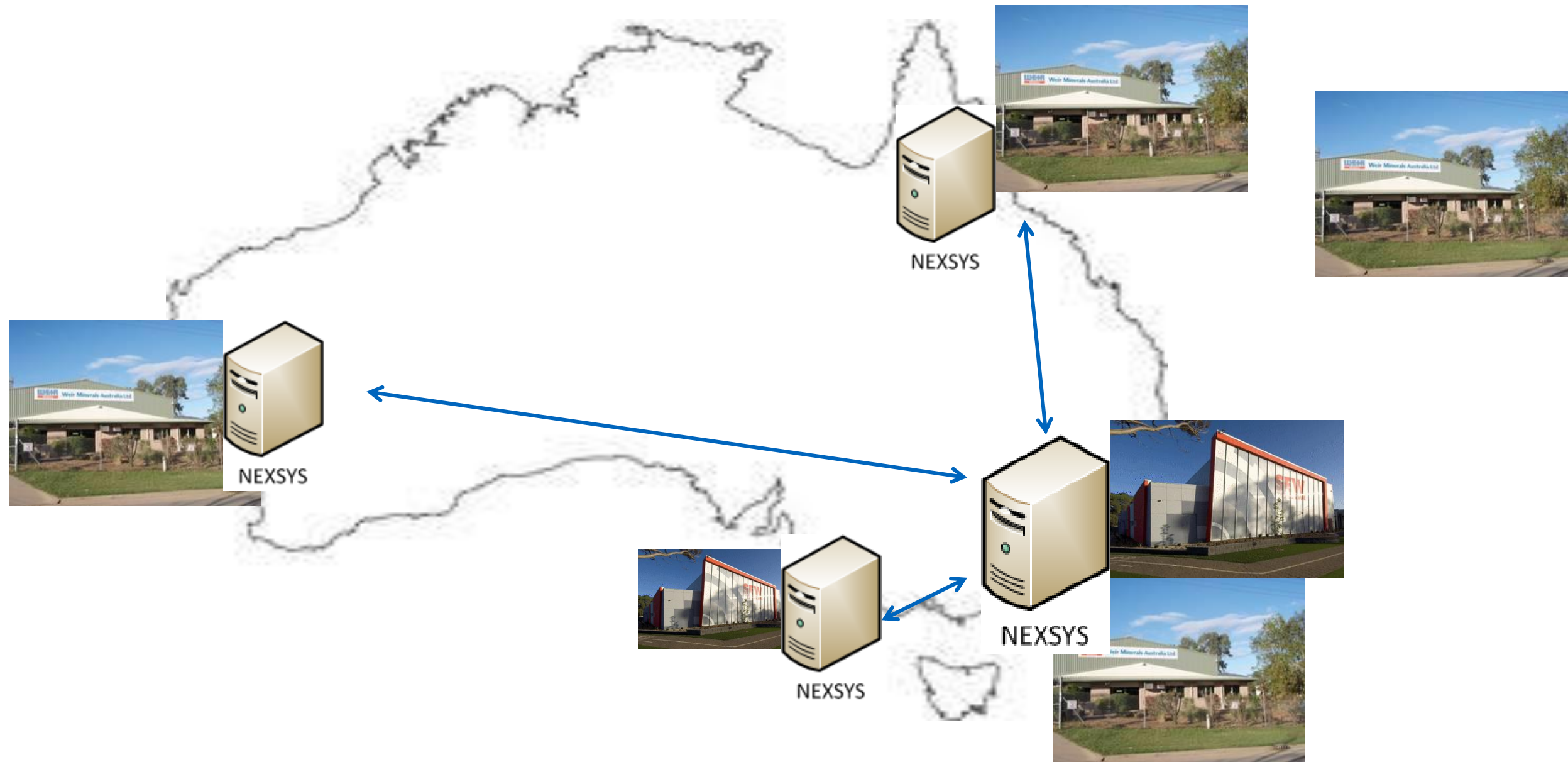


NEXSYS – Transport
SERVER 2



NEXSYS – Port
SERVER 3

Company Wide Capability



Whole of Mine Platform



New Alarms: 2 1 0 2






Mine Plan

Manage












Configure

Risk Graph






NEW ALARMS

 3	Gas alarm description 1 (tarp 3)	Sector 7	Today 19:15	ACKNOWLEDGE
 0	Gas alarm description 2 (tarp 0)	Sector 7	Today 19:00	ACKNOWLEDGE
	Equipment alarm description 3	Sector 7	Today 18:50	ACKNOWLEDGE
 2	Gas alarm description 4 (tarp 2)	Sector 7	Today 18:49	ACKNOWLEDGE
	Equipment alarm description 5	Sector 7	Today 18:30	ACKNOWLEDGE

ACTION ALARMS

 3	Gas alarm title description 8	Sector 7	Today 17:15	Investigating ▼
 2	Gas alarm title description 9	Sector 7	Today 16:08	Investigating ▼
	Equipment alarm description 6	Sector 7	Today 18:29	Investigating ▼
 1	Gas alarm title description 14	Sector 7	Today 10:05	Investigating ▼
 0	Gas alarm title description 18	Sector 7	Today 14:15	Investigating ▼
	Gas alarm title description etc	Sector 7	Today 19:15	Investigating ▼
 0	Gas alarm title description etc	Sector 7	Today 19:15	Investigating ▼
	Gas alarm title description 20	Sector 7	Yesterday 18:15	Investigating ▼
	Equipment alarm description etc	Sector 7	Today 17:15	Investigating ▼
	Equipment alarm description etc	Sector 7	Today 17:15	Investigating ▼
	Equipment alarm description etc	Sector 7	Today 17:15	Investigating ▼

NO ACTION

	Equipment alarm description etc	Sector 7	Today 19:15
	Equipment alarm description etc	Sector 7	Today 19:15
 0	Gas alarm title description etc	Sector 7	09/09/09 19:15
	Gas alarm title description etc	Sector 7	09/09/09 19:15
	Gas alarm title description etc	Sector 7	10/09/09 19:15

Gas alarm title description 9 Sector 7



Alarm Details

TARPS level: **2**
TARPS title: Water flow exceeding pumping rate
Description: - water flow rate exceeding pumping rate at MG2 22 c/t and water behind seal greater than 2m from floor, or
- water greater than 0/50m in the travel road of MG2

TARPS response plans

view plans: - [Longwall Support Supervisor + Outbye Supervisor](#)
- [Longwall Mining Coordinators](#)
- [Longwall Superintendent](#)
- [Mine Manager](#)

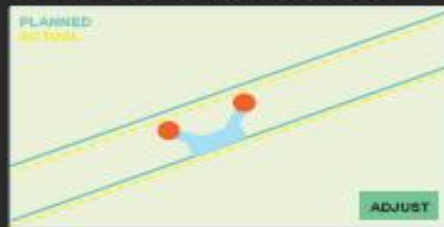
ACTION DETAILS

Specific Tasks within the Mine

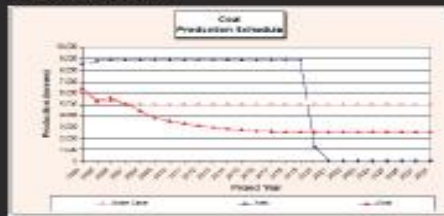


Integrated Longwall Control

GLIDE SLOPE INDICATION



SELECTABLE DATA GRAPH (TYPICAL ONLY)



TRAFFIC LIGHT

MACHINE STATUS	Red
ENVIRONMENTAL	Yellow
STRATA	Green
LASC / HORIZON	Blue








Specific Tasks within the Mine




Automated PHMP's

Nexsys

ALARM STATUS     

ACTIVE READ

ALARMS	PHMPs	TARPs	ACTIONS/RESPONSES	RELATED DATA
NEW ALARMS ACKNOWLEDGED ALARMS  Sealed Goaf Trigger Time Date: 0200:02 27/07/11 Alarm #: 0000553 Trigger Loc: LR seal <input type="radio"/> Flammable Mixture < 60% (6 - 8% O) <input type="radio"/> Raw CO level > 30ppm but < 60ppm <input type="radio"/> Graham's Ratio 0.4 - 0.5 <input type="radio"/> Manual Acknowledge <input checked="" type="checkbox"/> Suppress <input type="checkbox"/> End <input type="checkbox"/> Reason: <input type="text"/>	6.9 - Spontaneous Combustion Management Plan	100329 Sealed Goaf TARP	LEVEL 1 CRO VIEW: ACTIONS 1. Inform UM of Alarm immediately. <input type="checkbox"/> 2. Review and plot Coward triangle trends 4 hourly. Hours to next: - 00:35 <input type="checkbox"/> 3. Confirm the actions required by the UM have been taken. <input type="checkbox"/> 4. Report status to VO & MME when reasonably practical. <input type="checkbox"/> Preview Level 2 CRO Actions: ▼	COMMUNICATIONS/TEXTs Communications: <input type="button" value="Drafts"/> <input type="button" value="Sent"/> <input type="button" value="Pending"/> <input type="button" value="Acknowledged"/> Notes: <input type="button" value="View/Edit CRO's Notes"/> Other Miner's TARPs: <input type="button" value="Dep"/> <input type="button" value="UM"/> <input type="button" value="VO"/> <input type="button" value="MME"/> <input type="button" value="IMT"/> GRAPHICAL Mine Map: <input type="button" value="ALARM focused"/> <input type="button" value="Overview"/> Plotting: <input type="button" value="Coward triangle trends"/>
SUPPRESSED ALARMS RECENTLY ENDED ALARMS				

COMMUNICATIONS/TEXTs

Alarm #: 0000553 Trigger Time | Date: 0200:02 | 27/07/11 Detail: SCMP: LEVEL 1 ALARM: SEALED GOAF TARP: LR SEAL: FLAM MIX < 60% (6 - 8% O)

ACTION 1. Inform UM of Alarm immediately.

UM Name: William Guilizzoni Phone: 0417 844 390 ☐ NLT ☐ DAC ☐
Email: w.guilizonni@peabody.com

Message to UM

RESPONSE 1. From UM:

Acknowledgement: ☐ Phone ☐ NLT ☐ DAC ☐ Email ☐

Message from UM

CROs NOTES:

ACTION 1. Confirmed...

Are we doing anything new?



- Upstream Petroleum
 - Critical shortage of expertise
 - Deepwater submerged facilities
- Defence – Battlefield management
 - Safety is one clear driver
 - Increased information flow also leads to better tactical and strategic decisions
- Aerospace
 - Very specialised equipment
 - Limited Accessibility

Advanced thinking



- Incorporating and integrating technologies within a single system
 - Intelligent sensors
 - Real-time data collection and management
 - Advanced data and application integration
 - Alarm management and escalation
 - Robust communications networks; and
 - Geospatial and document management

Benefits



- Fewer personnel exposed to hazardous situations
- Better reaction to tactical production issues and emergency situations
- More efficient and reliable operations
- Better production throughput; and
- More collaborative strategic decisions made in real time

Thank You From



NEPEAN
Power

TM



Any Questions?????