



PNG Security Conference 2020

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GLOBAL TECHNOLOGY TRANSFORMATION – AI, AUTOMATION AND ROBOTICS IN MINING AND OTHER INDUSTRIES

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PRESIDENT, PNG CHAMBER OF MINES AND PETROLEUM



Who We Are



- A non-profit, peak industry association that advocates for PNG's resource industry.
- Chamber provides the interface between Government and the industry on key policies and legislations that impact the industry and the country.

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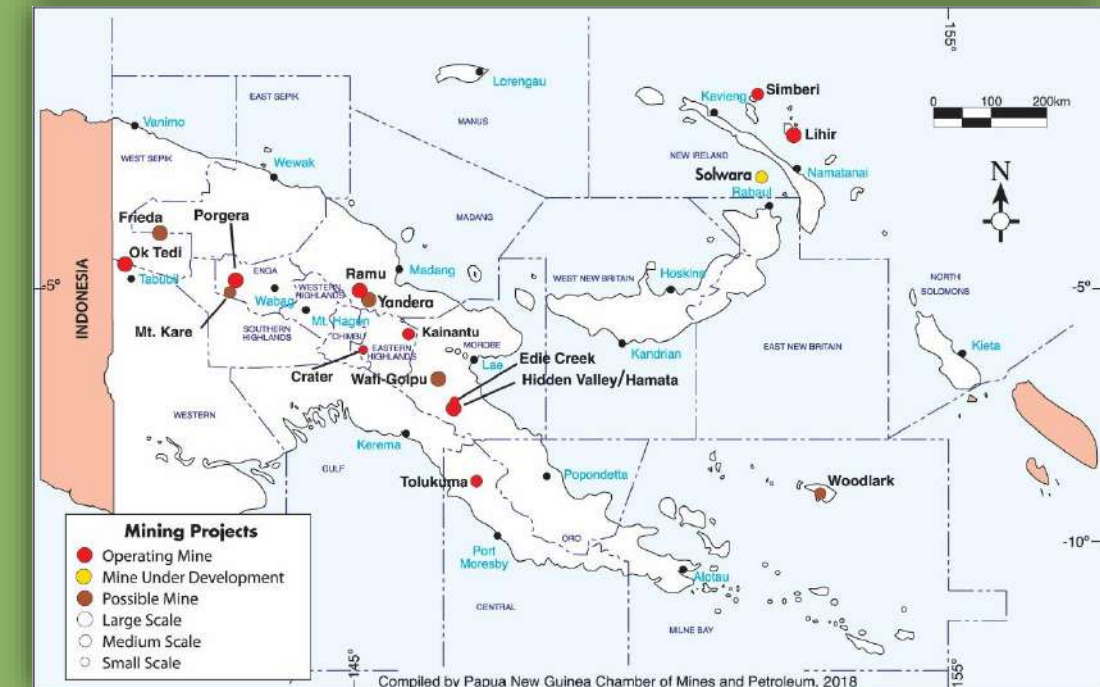
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MINING AND PETROLEUM GROWING PNG'S FUTURE

Mining and Petroleum Industry in PNG

- Papua New Guinea has:
 - some of the world's biggest mines and oil and gas
 - well-established mining and petroleum regime
- PNG's has some of the highest prospectivity anywhere in the world according to the 1st PNG Geosciences Conference held on February 25 this year in Port Moresby



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Resource Projects Embracing Technological Changes

- Industry is fast transiting into the digital and technological space to improve production efficiency, and capability.
- Use of remote-controlled dozers, and autonomous mining equipment significantly impacts projects productivity but removes humans from hazardous environment.
- Resource projects partnering with global tech houses to find options on how to improve safety and operation capability to suit PNG's tough operating environment.
- CCTV and drone usage is increasingly being used to strengthen security, and conduct surveying and mapping



Drone Surveying/Mapping

In an open-pit mine, a drone survey refers to the use of a drone (or UAV –unmanned aerial vehicle) equipped with a downward-facing RGB camera to capture images of a site from different vantage points.

In Porgera, drones are used for:

- Stockpile Management
- Mine monitoring and operation planning
- Hazard identification and mitigation
- Assessments & inspections before and after blasts/mining
- Infrastructure updating
- Security



Drone Surveying/Mapping

Areas drone surveys have improved efficiencies.

Safety

- Hazard control for areas not accessible by foot
- Limit Interactions with working machineries
- Hazard identifications and monitoring

Production

Minimal production delays in:

- ore mined by area
- Daily/Weekly Mine planning
- Dump Inspections/Monitoring
- EOM reconciliations in total material movement
- Stockpile Management
- Projects –new developments

Security

- Reduces security risks of interactions with outsiders

Drone Survey Results

Drone Dump Survey



Drone Stockpile Survey



Drone Mining Survey



Porgera Joint Venture Image

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Drone Surveying/Mapping

Wafi Golpu

Drones are being used for:

- Resettlement purposes to survey and collect data
- Mapping - making it easier to generate maps



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Drone Surveying/Mapping

Other projects using drones include:

Ok Tedi

- The company is also using drones for mine surveying, engineering, roads and civil, etc.
- The need to ensure adequate onsite storage has become essential due to the growth in data.

Oil Search

- Use of drones for security investigation and planning. Also used on project development and monitoring.
- Increase in investigation of the application in security, projects and logistics



UAV – Security Investigation. Image: Oil Search Ltd

Closed-Circuit Television (CCTV)

Ok Tedi:

- CCTV cameras are used in the Tabubil mine town, the Mine, and the Mill Gold Room, mainly for security purposes.
- CCTV cameras being set up in its mill and its dredging site in Bige.

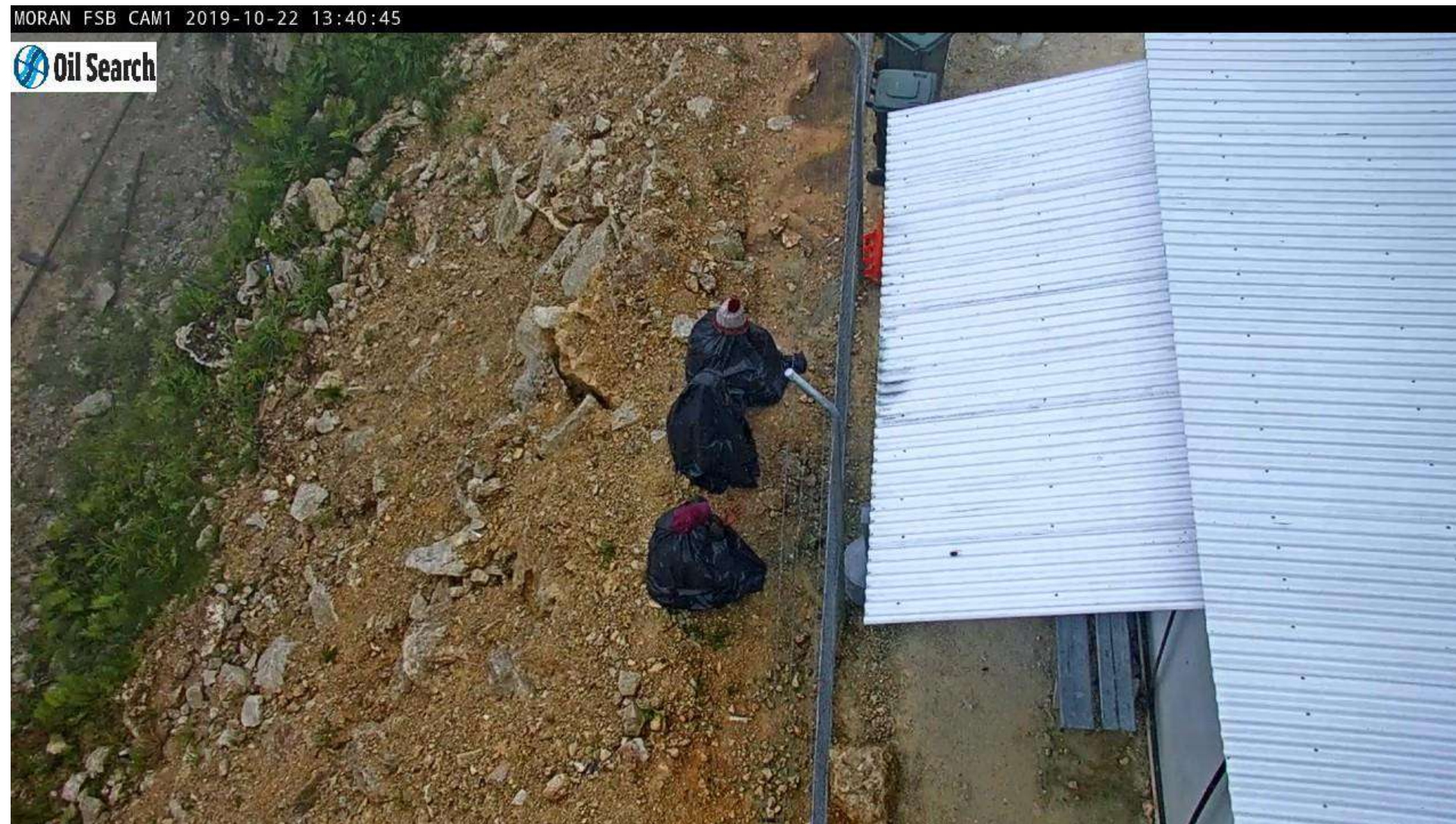
The mine's security have a dedicated monitoring room showing screens with the various cameras.



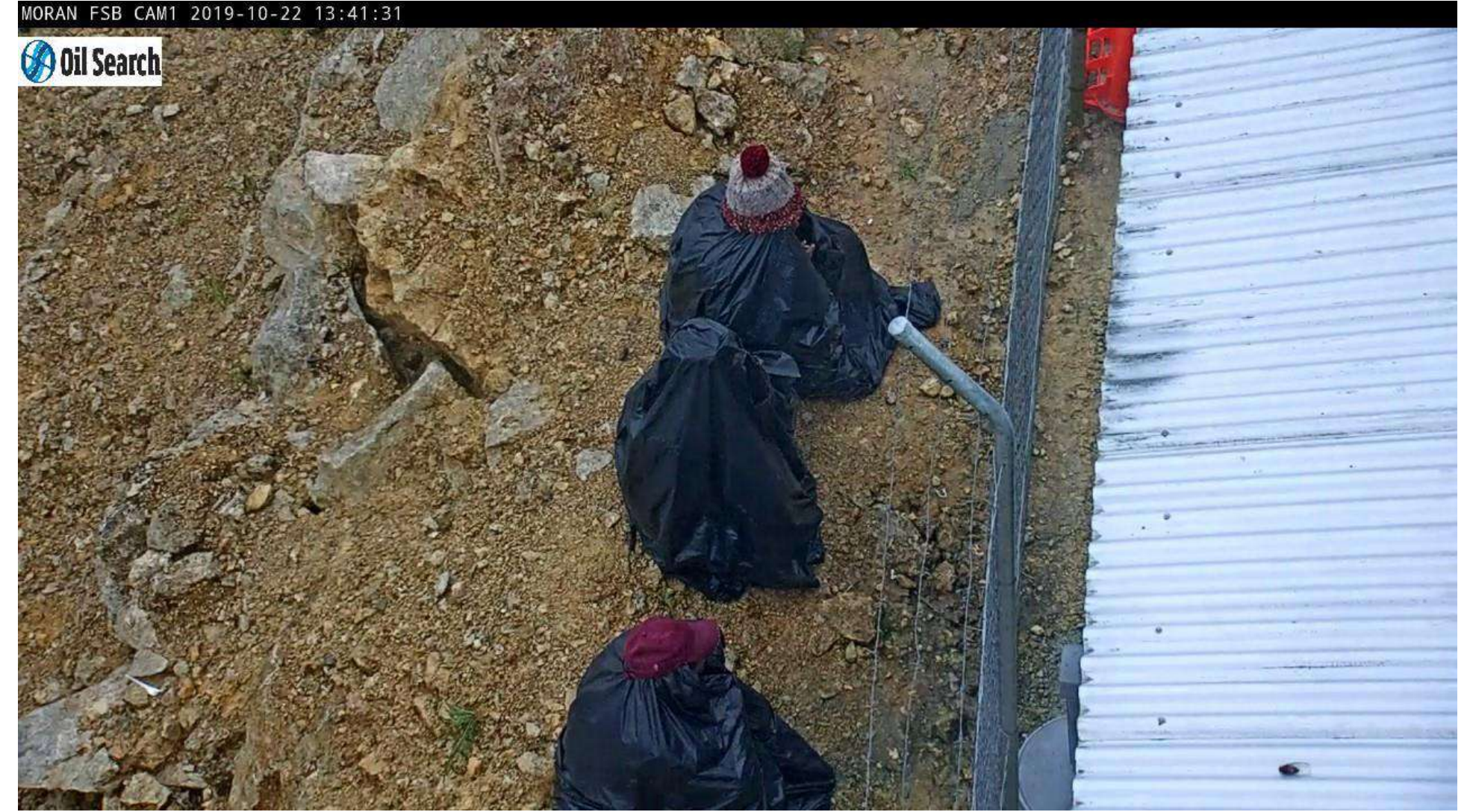
Ok Tedi Image

Closed-Circuit Television (CCTV)

Take a closer look – CCTV Needs Help



CCTV Monitoring - Rubbish Bags?



Oil Search

- CCTV usage is extensive and remote locations now covered.
- Extremely effective

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Closed-Circuit Television (CCTV)

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 Oil Search



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Other Technologies

Acoustic Resonance Technology

ExxonMobil PNG was the first amongst other operations in the world to use the Acoustic Resonance Technology (ART)

- ART measures the wall thickness and geometry of a pipeline.
- The tool has a specified velocity that it needs to travel at for it to obtain sufficient quality data



EMPNG Maintenance crew launching the PIG at the Kopi Scraper Station in Hela Province. ExxonMobil Image

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Other Technologies

Operator Performance Analytics (OPA)

Ok Tedi

First fully-integrated Operator Performance Analytics system to improve safety and productivity of operators.

- Majority of the operators are from the mine preferred area.
- The objective is to make them more accountable towards equipment health
- OPA improves operator safety awareness and machine health resulting in higher performance and productivity.

OPERATOR PERFORMANCE ANALYTICS (OPA)
A new pathway to improve safety and productivity

Improving operator performance through field and training data analysis

Individual operator performance analysis

Know your strengths and areas for improvement

Targeted training specific to your needs

OK TEDI MINING

IMMERSIVE TECHNOLOGIES
EXPECT RESULTS

The graphic features a central image of a smiling male operator in a yellow hard hat and safety glasses. To the right, four circular icons with text describe the system's benefits. Below the main image, there are smaller images showing a mining truck and a person operating a simulator. The bottom of the graphic includes the logos for Ok Tedi Mining and Immersive Technologies.

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TOTAL R&D for Near-term application **METIS (Multiphysics Exploration Technologies Integrated System)** **Industrial Pilot**



- **Objectives:**

- Acquiring 3D High Density seismic data in hard-to-access onshore areas...
- ... while ensuring high quality image, low HSE & environmental footprint, at acceptable cost

- **Four technical cornerstones:**

- **Optimizing** survey design
- **Automating** operations from the air
- **Real-Time** Processing & Interpretation
- **Eco-Friendly** materials

- **Phase I pilot in Papua New Guinea – Q4 2017**
- **Early de-risking** of the project's fundamentals
- Successful and paving the way for an **accelerated project's development**



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Training and Development

Newcrest Lihir

Louis Wanpis - first Papua New Guinean to become a certified Unmanned Aerial Vehicle (UAV) or drone pilot.

In 2019, Wanpis and five employees conducted an Australian and PNG CASA-certified course to fly drones.

Synchronised images used to make aerial maps.

Surveyors use the images for production and planning needs



Wanpis with his drone. *Newcrest Mining Image*

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THANK YOU



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