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The Energy Shift: How is Mining's Appetite for Renewables Changing?

Simon Rigling - May 2021

ENERGYANDMINES
AFRICAVIRTUALSUMMIT
MAY 4-6, 2021
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The drivers…

- Environmental, Social & Governance (ESG) concerns
- Energy security & availability
- Price volatility of fossil fuels
- Levelised Cost of Energy (LCOE)
- Lower ore grades > energy use
- Access to ethical capital

Current trends in resource monitoring

Fulcrum3D Sodar – wind monitoring

Fulcrum3D Met Station - solar monitoring

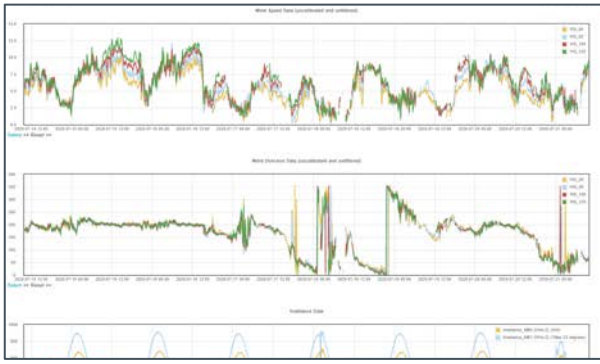
Fulcrum3D CloudCAM – solar forecasting

Wind Mast – traditional wind monitoring

All-in-one Monitoring – wind & solar

- Wind and solar resource monitoring installed on over 200 projects
- Wind & Solar Forecasting
- Data Management – secure, reliable and easy to access
- Australian designed and manufactured
- In-house team of engineers, energy sector professionals, data scientists and technicians

Data Management



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Clients we support

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risen solar technology · WSP · PALISADE · AECOM · entura Hydro Tasmania · Downer · EDL · apa · barlovento · juwi Energy is here · agl · FMG Fortescue · Shell ENERGY · WIRSOL · adani · Genex Power · BayWa r.e. renewable energy · STERLING & WILSON · GOLDWIND · Vestas · res · RioTinto · PacificHydro · acciona · lendlease · UGL · DNV·GL · WIND PROSPECT · tilt renewables · NEOEN · Edify · aggreko

Global footprint

Monitoring over 12GW of Wind & Solar globally

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WIND RESOURCE ASSESSMENT TECHNOLOGY	Sodar	Lidar (Doppler)	Met Mast
Bankable energy assessments	✓	✓	✓
Unit cost	$	$$$	$$$$
Insurance risk	Low	Low	High
Requires siting permit	No	No	Yes
Susceptibility to mechanical failure & lightning strikes	Low	Medium	High
Hub height temperature, pressure & humidity	×	×	✓
Wind data availability at 200m above ground	✓	✓	×
Wind speed & wind shear data at multiple heights	✓	✓	×
Measures swept area of blades	✓	✓	×
Low power use	✓	×	✓
Cost includes power supply	✓	×	✓
Cost of maintenance	$	$	$$$
Ease of deployment & redeployment	Easy	Easy	Difficult
Cost of deployment & redeployment	$	$	$$$$
Optimised for complex terrain	✓	×	N/A
Data correction required for complex terrain	Rarely	Yes	N/A
Raw data captured for full traceability & upgraded processing	✓	×	✓

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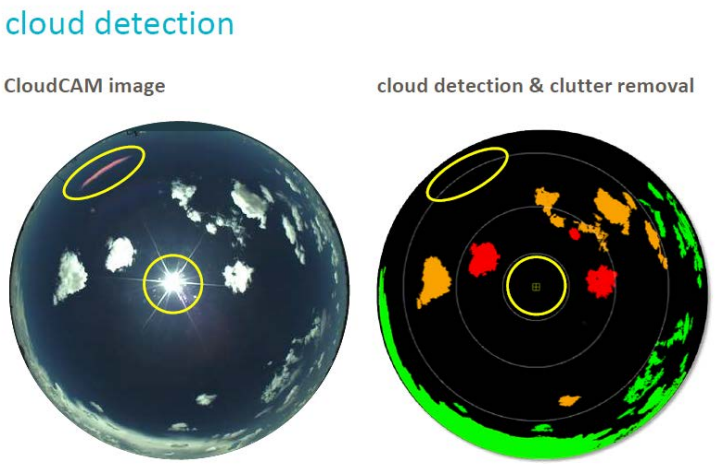
CloudCAM

Detect, Track & Predict Cloud Movement

CloudCAM plays an important role in ensuring effecting integration of Solar PV especially in off-grid PV and diesel mini-grids commonly found on remote mine sites.

Through predicting cloud shading and solar power output across the entire solar farm a CloudCAM offers the following advantages:

- Higher penetrations of solar without disrupting existing generators, increasing fuel savings
- Ramp rate control which reduces the rate of change in output to acceptable levels
- Reduction of unnecessary cycling of energy storage (BESS) improving lifetime
- Reduction of energy storage capacity required to maintain acceptable operations for the same solar power penetration



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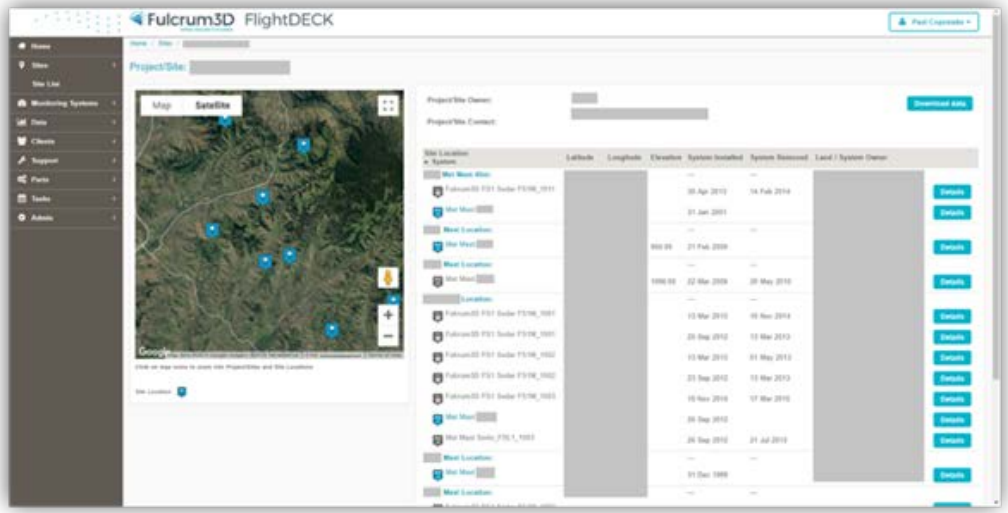
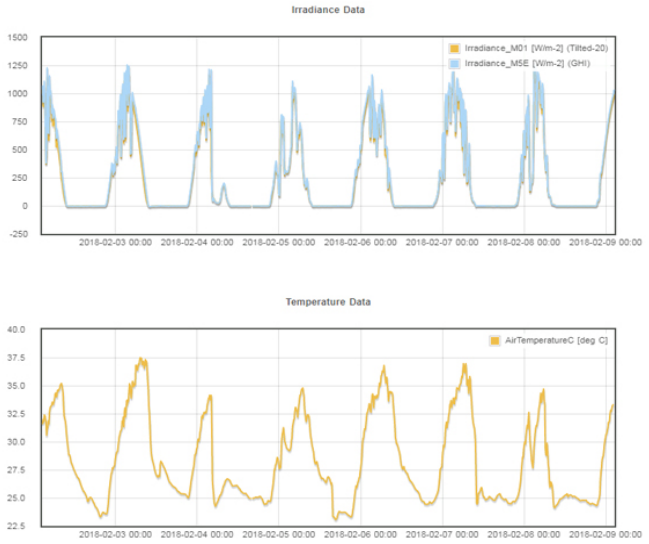
DataVOLT + FlightDECK – Data Acquisition





Live data access on the fly

FlightDECK provides you with secure access to all data collected by Fulcrum3D monitoring systems

- Collects, stores and verifies client data for secure download over the web
- Allows users to manage their equipment locations and configurations
- Data can be made available via machine-scripted download

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What should Mines consider at the very start of a project to optimize project performance & economics?

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What should Mines consider at the very start of a project to optimize project performance & economics?

- **Resource Assessment Timeframes** ⟹ **Typically > 12 months**
  - Early deployment of resource monitoring – get started NOW!
  - Fulcrum3D can deploy a Sodar within 6-8 weeks of order

- **Data, Data, Data!**
  - Good baseline data is crucial for plant design and operational performance
  - Fulcrum3D Sodar has been independently verified for use in formal wind energy assessments by DNV-GL
  - Monitoring is required to understand your resource and how it will integrate with energy storage and/or spinning reserve such as diesel generators

Thank you!

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