



Source: Google Earth 10/09/2019

# Implementation of a New Online Sensor for Flotation Interface Detection

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AusIMM - 13 September 2019

# Context

## Why focus on mining sensors?

- Declining ore grades and increasingly variable feed
- Increasingly transient workforce and decline of site specialists
- Lack of mineral processing-specific instrumentation
- Without the “eyes” and declining “knowhow” to control mineral processes, control is reactive
- Quality control, real-time process improvement and value chain optimisation is therefore not possible
- Digitisation in mining is now seen as a key priority for all operations

# Commentary from Austmine 2019

"Mining is still low on the digital maturity curve" - Bain & Company

"Minerals is seen as an old-world industry" – Oz Minerals

"Greatest benefit to Australian mining in the near term will come from grass-roots integration and the application of data analytics" – METS Ignited

**Autonomous systems**

**Machine-learning algorithms**

**Digital disruption**

**Continuous control loops**

**Humanistic design**

**Dynamic optimisation**

**Interoperability**



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# Clarity Advanced Control

*Enabling real-time process improvement through the development, implementation and commercialisation of emergent advanced instrumentation and control strategies*



Develop

Implement

Commercialise

*Bridging the implementation gap of new technologies and industry solutions*

# Our Objective

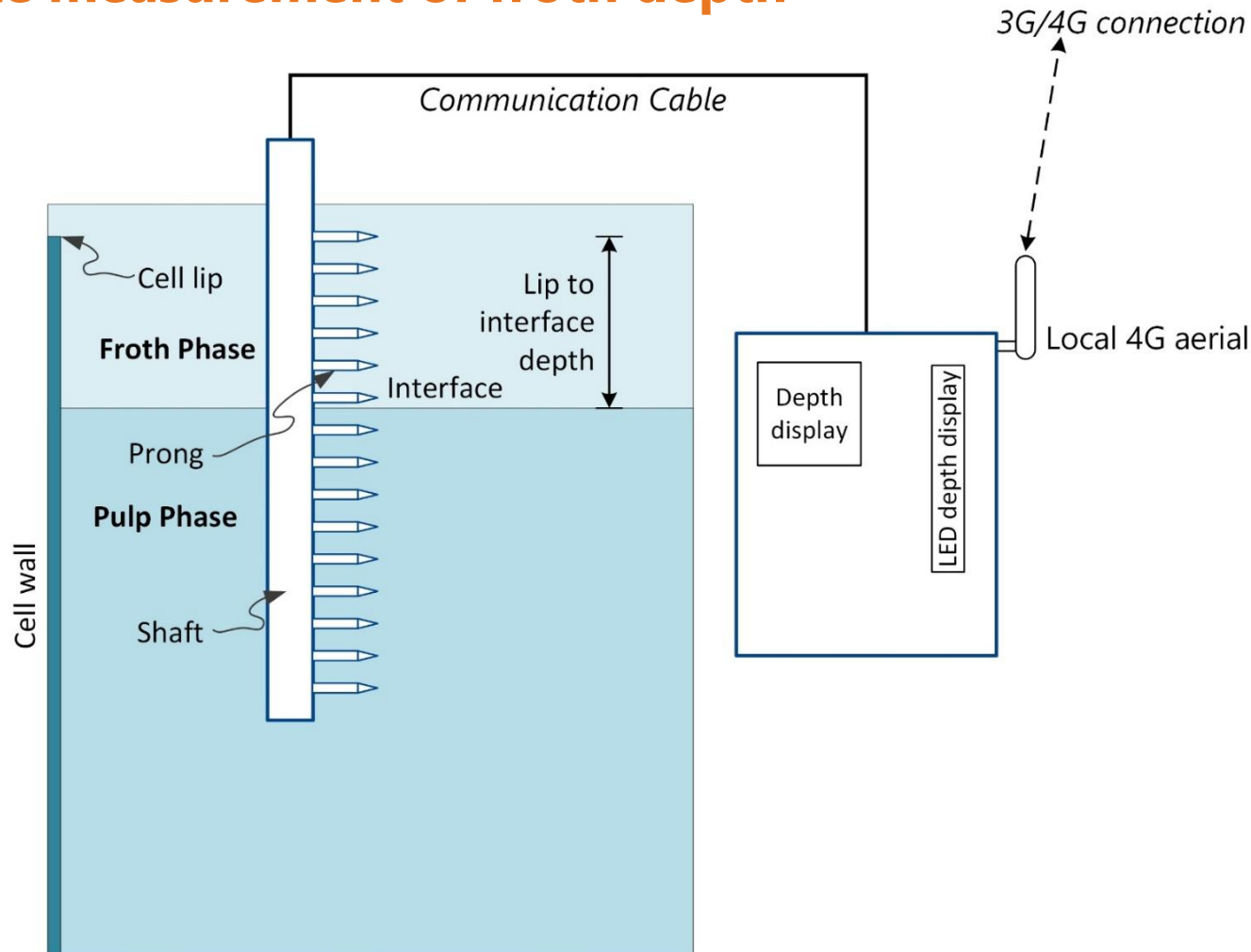
*To develop, **integrate** and commercialise  
the next generation of mineral processing **specific**  
instrumentation*

- Industry-implementable products (Mineral Processing)
- Automation futures
- Scalable solutions for small- to mid-tier producers
- Understand end-user needs and drivers
- Leverage IIoT, Industry 4.0 and cognitive embedded systems

*Intelligent and timely process insight rather than 'Big Data'*

# CSIRO InterFloat™ - Pulp/Froth Interface Detection

Accurate measurement of froth depth



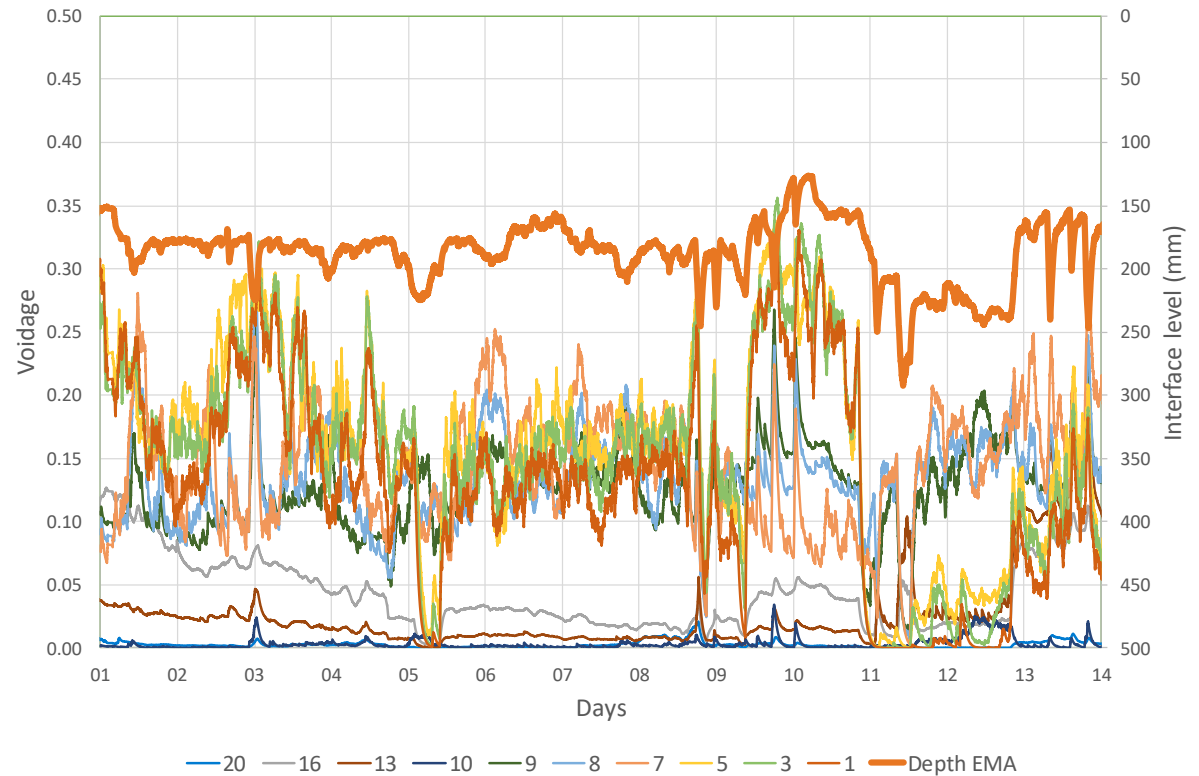
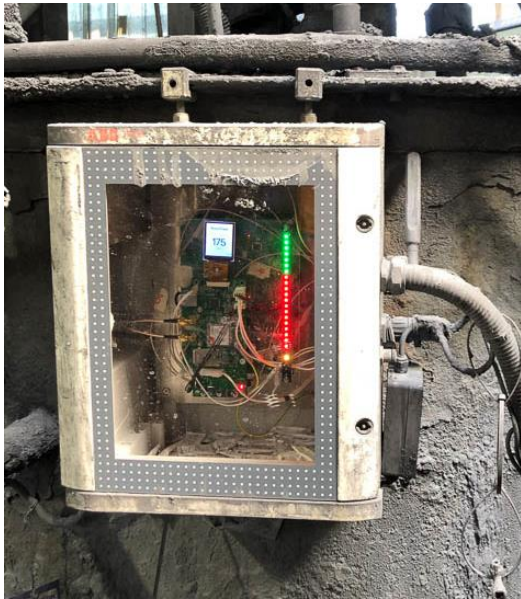
# On-Site Implementation

## Froth Level Detector Mk 1b

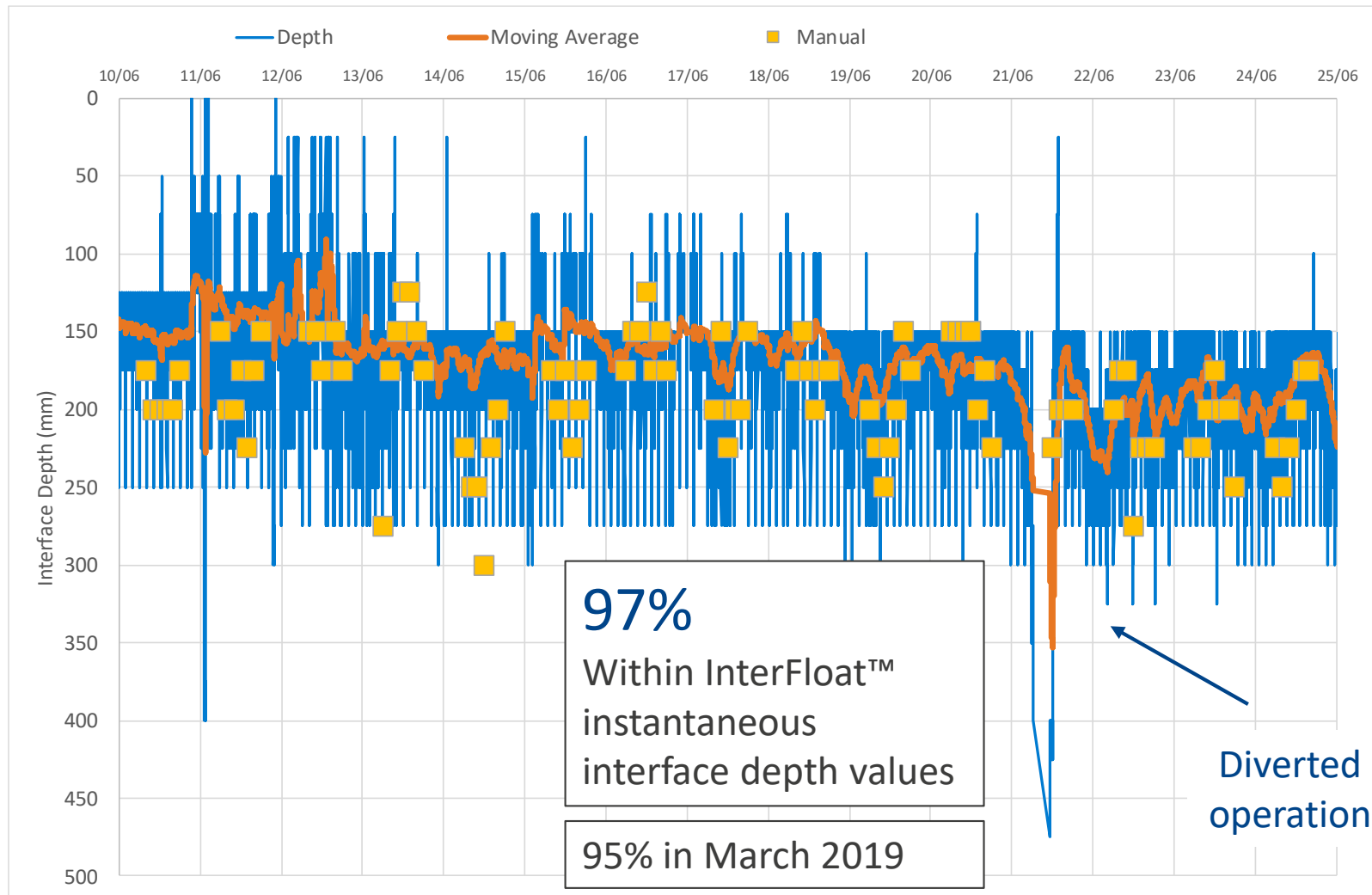


# CSIRO InterFloat™ - Sensor Processing

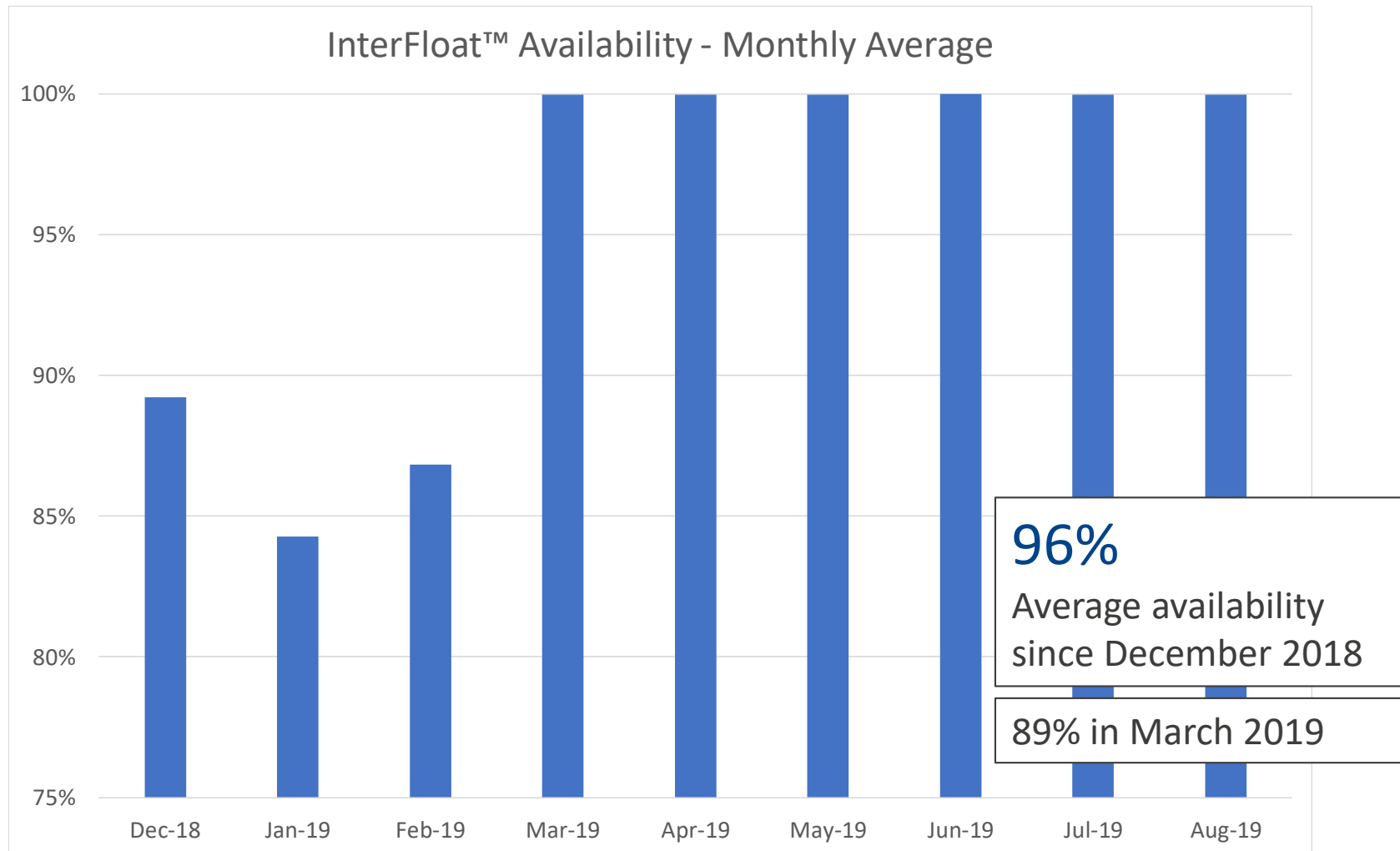
## Froth Level Detector Mk 1b



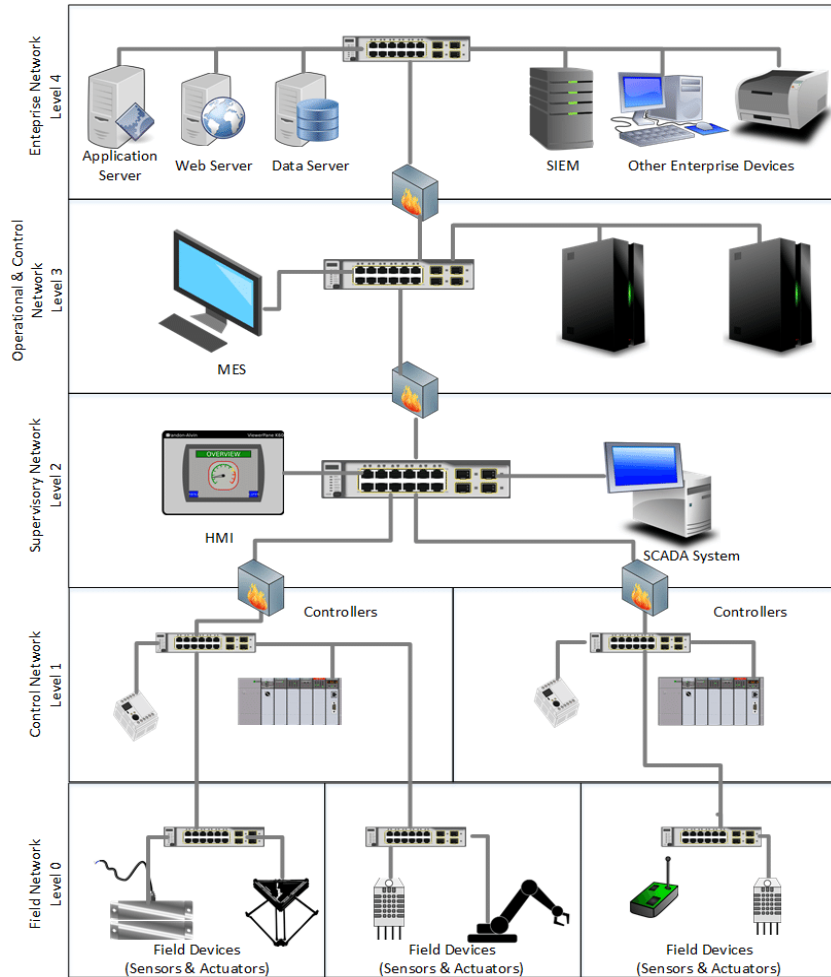
# CSIRO InterFloat™ - Data Validation



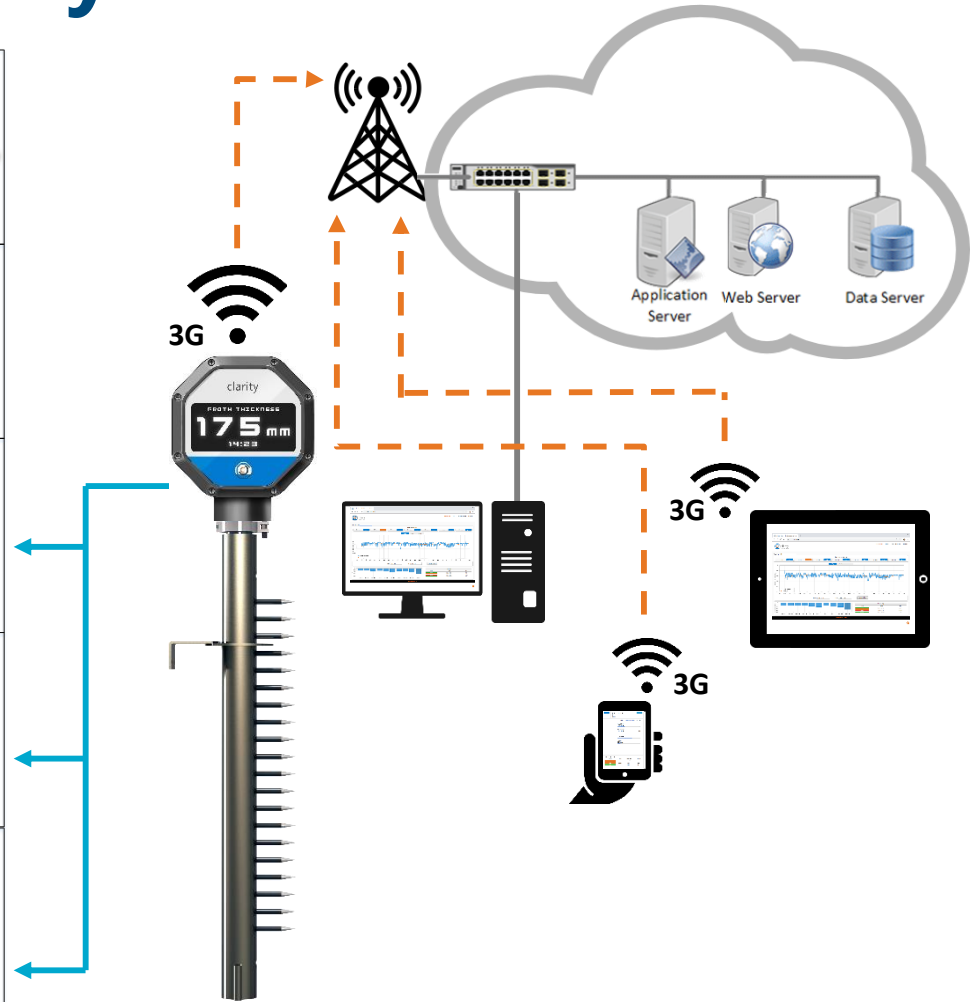
# CSIRO InterFloat™ - Up-Time



# Intelligent Connectivity



<https://www.mdpi.com/2076-3417/8/12/2460/htm>



# CSIRO InterFloat™ - IoT Dashboard

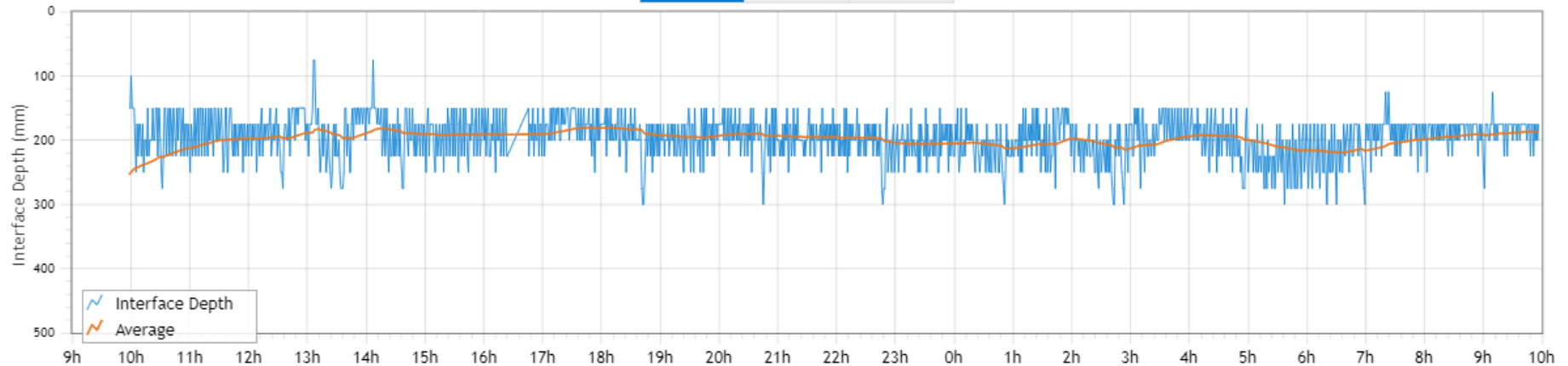


# CSIRO InterFloat™ - IoT Dashboard

Flotation Cell

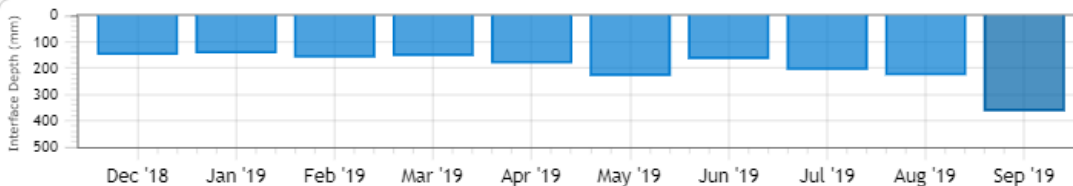
## Interface Depth

175 mm  187 mm  75 mm  300 mm  201 mm  356 mm  189 mm



Start: 11/09/2019

End: 11/09/2019



## Event log

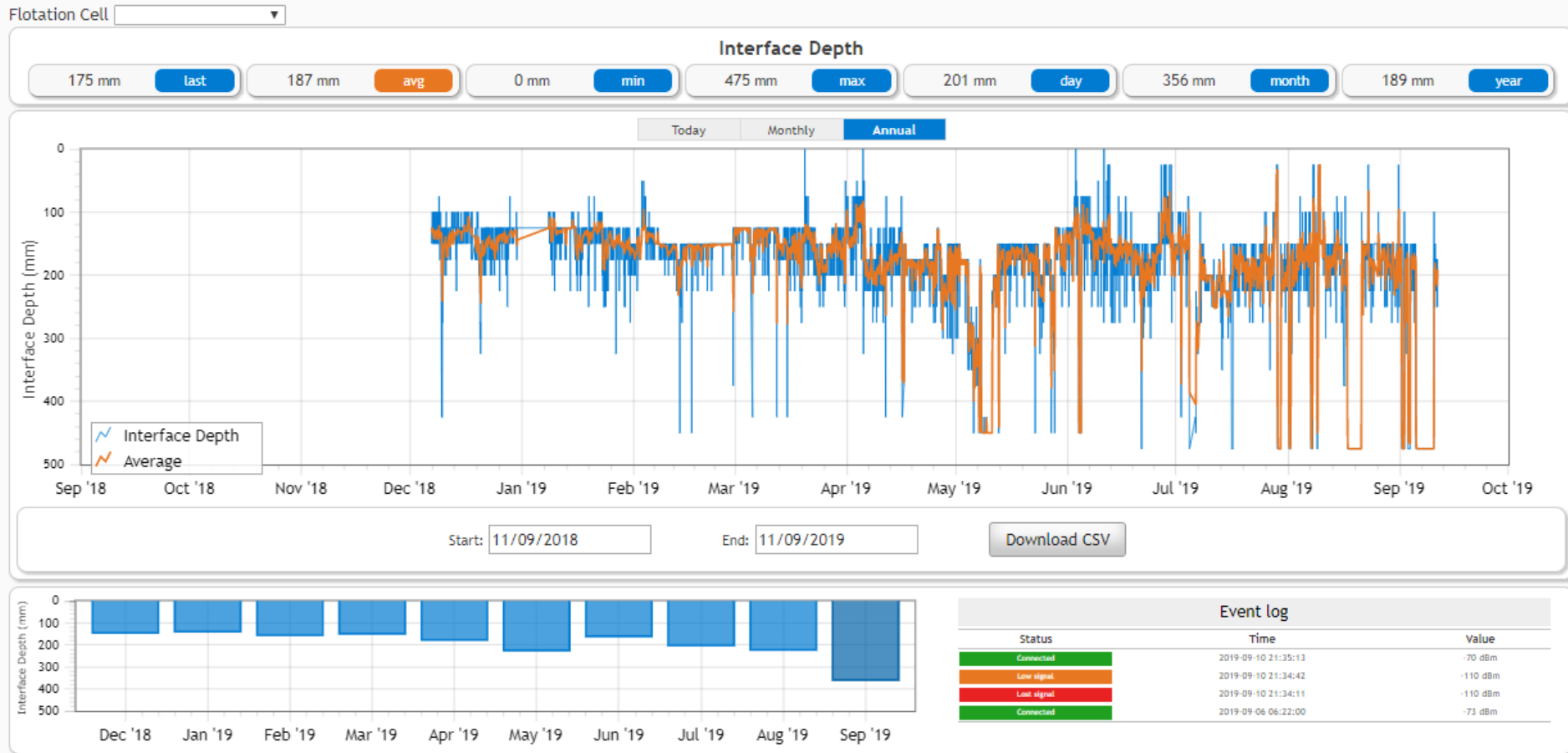
Status	Time	Value
Connected	2019-09-10 21:35:13	-70 dBm
Low signal	2019-09-10 21:34:42	-110 dBm
Low signal	2019-09-10 21:34:11	-110 dBm
Connected	2019-09-06 06:22:00	-73 dBm



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# CSIRO InterFloat™ - IoT Dashboard



# On-Site Testing

## Froth Level Detector Mk 1c



# On-Site Testing

## Froth Level Detector Mk 1c



# Opportunities

- Showcase 'edge sensing'
- Remotely monitor with trending for virtually any sensor
- Ongoing support
  - From design, fabrication, set-up to validation
  - Leases/subscriptions
- Potential for collaboration
  - Supplementary funding sources
  - Work co-operatively with sites

**What would your site like to monitor in real time  
that would make a real difference to your operations?**

# Thank you

Clarity Advanced Control

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