The Adaptable Monitoring Package

James Joslin, Paul Murphy, Mitchell Scott, Paul Gibbs, Chris Bassett, and Brian Polagye

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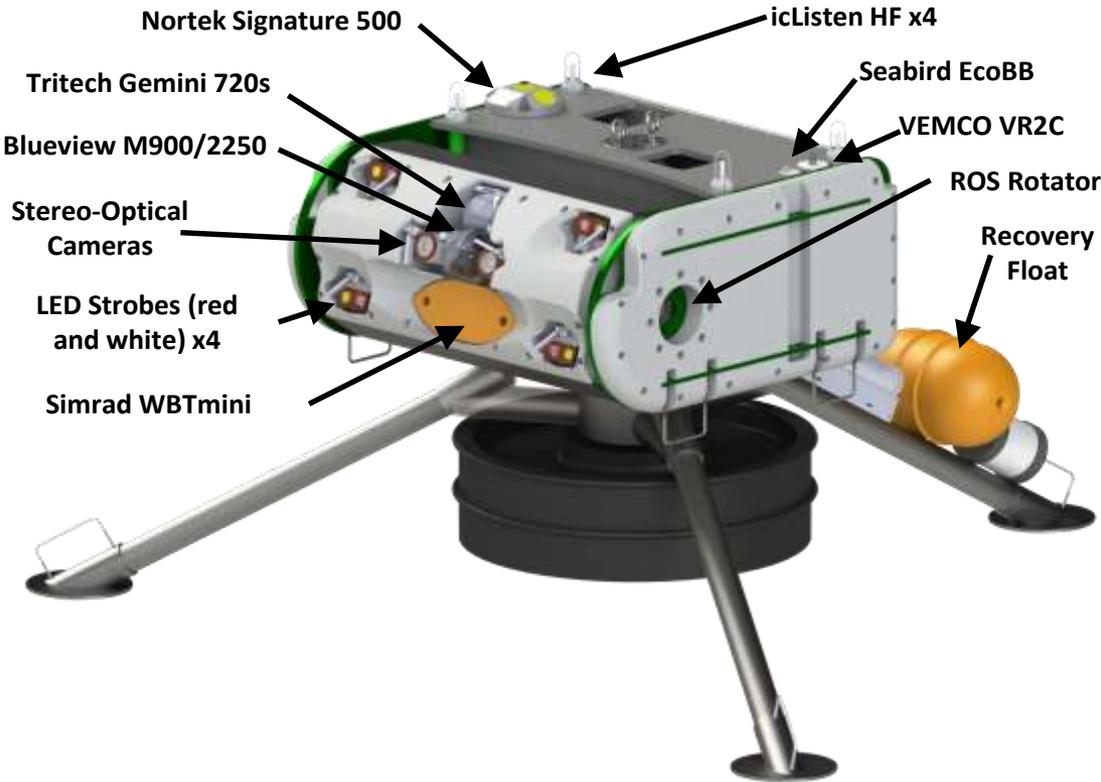International Forum on MRE Environmental R&D

Project motivation

Challenges to environmental monitoring…

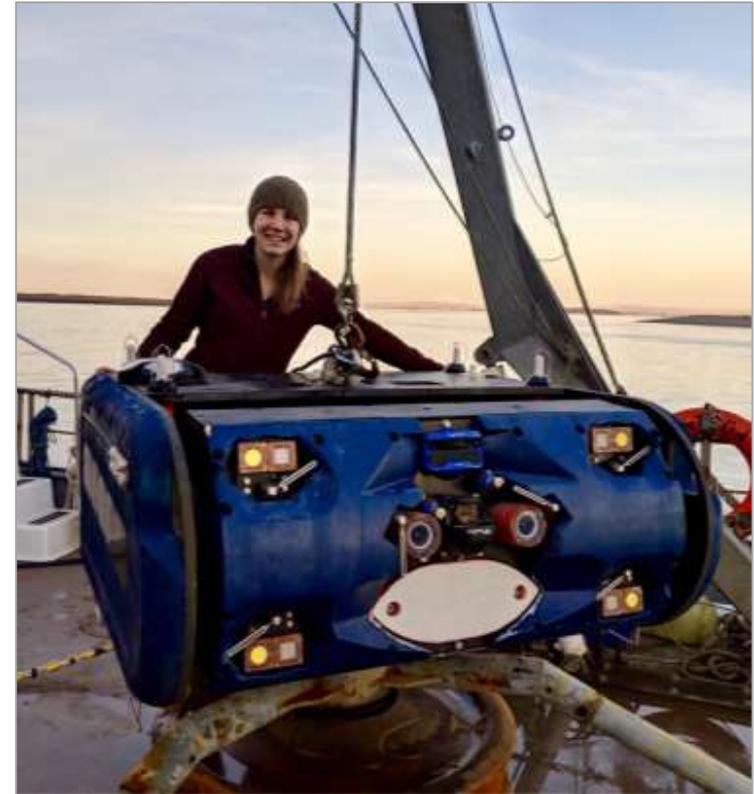- High-energy environment
- Requires many sensors
- Events are rare

Monitoring directives…

- Avoid biasing marine life
- Detect rare events
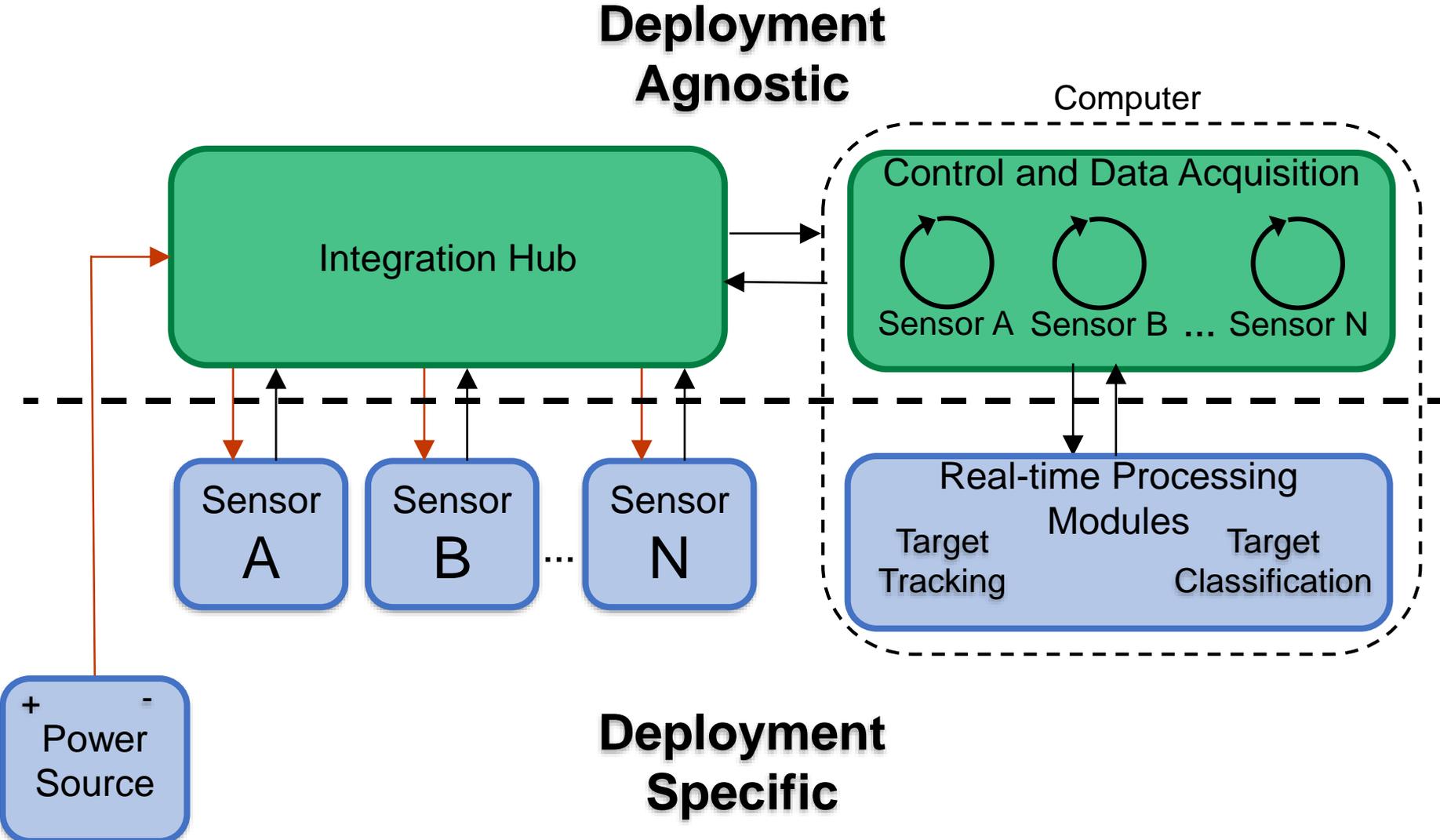- Do not accrue a data mortgage

The Adaptable Monitoring Package

Nortek Signature 500

Tritech Gemini 720s

Blueview M900/2250

Stereo-Optical Cameras

LED Strobes (red and white) x4

Simrad WBTmini

icListen HF x4

Seabird EcoBB

VEMCO VR2C

ROS Rotator

Recovery Float

AMP rendering with Instruments

AMP before deployment (Emma for scale)

System Architecture

Deployment Agnostic

Computer

Integration Hub

Control and Data Acquisition

Sensor A   Sensor B   ...   Sensor N

Sensor A   Sensor B   ...   Sensor N

Real-time Processing Modules

Target Tracking   Target Classification

+   -
Power Source

Deployment Specific

PMEC

AMP (2017)

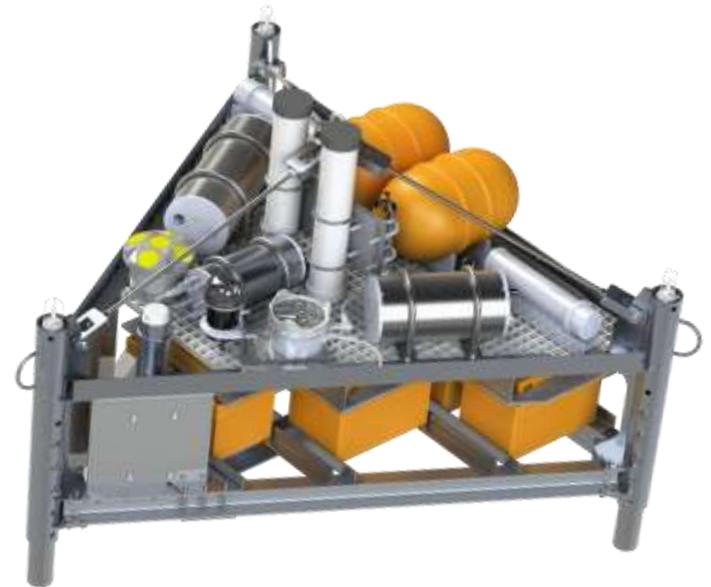*Pacific Northwest National Laboratory*

Power Source	Cabled
Test Duration	2.5 months (94% operational time)
Real-time Processing	Multibeam sonar target detection and tracking

AutoAMP (2017)
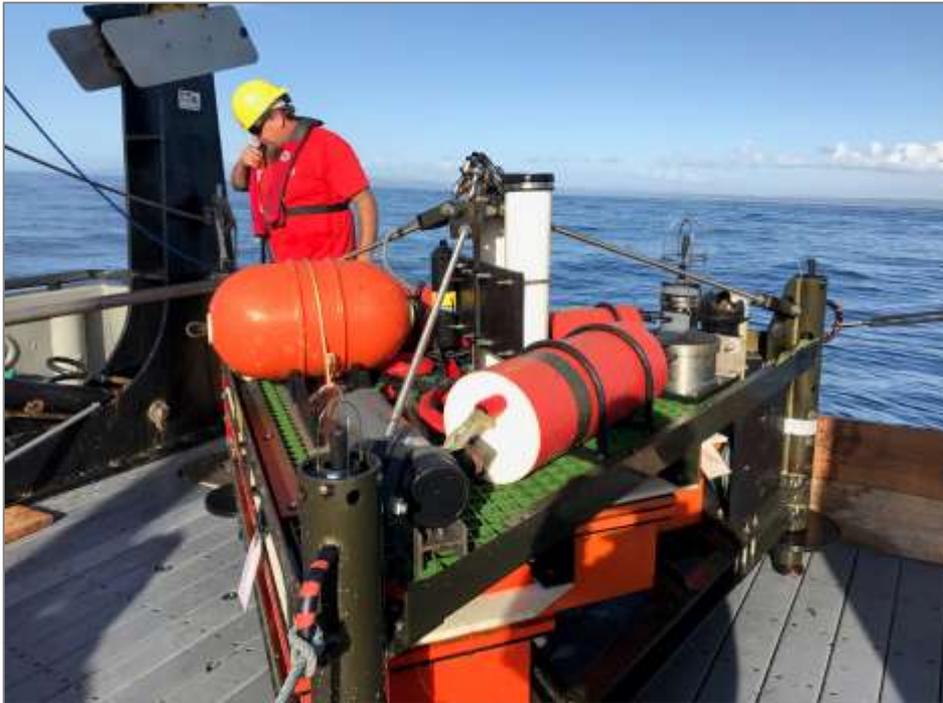
PacWave Test Site

Power Source	Batteries
Test Duration	1.5 months
Real-time Processing	Fish tag detector

WAMP (2018-2019)

US Navy Wave Energy Test Site

Fred. Olsen Lifesaver WEC

AMP Sensors
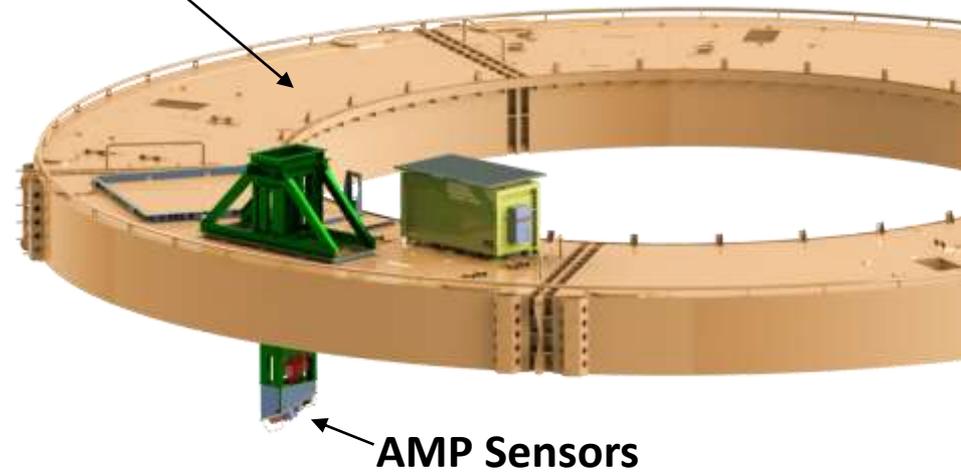
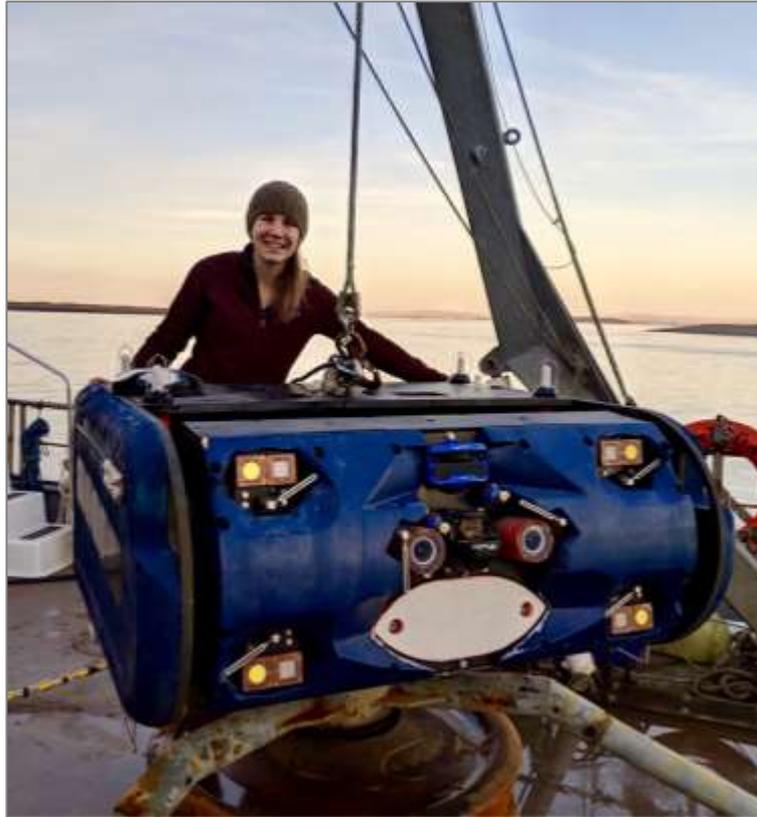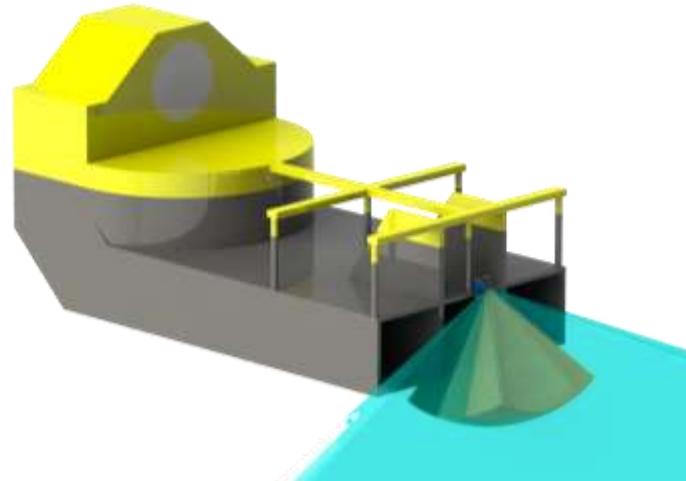| Power Source	Wave energy converter
Test Duration	3.5 months (82% operational time)
Real-time Processing	Multibeam sonar target detection and tracking

3GAMP (2019)

Pacific Northwest National Laboratory

Power Source	Cabled
Test Duration	4 months (96% operational time)
Real-time Processing	Multibeam sonar target detection, tracking, and classification

Ongoing Developments

US Navy Wave Energy Test Site

| Power Source	Wave energy converter
Test Duration	12 month target
Real-time Processing	Multibeam sonar target detection and classification + optical target detection and classification

Ongoing Developments

Puget Sound

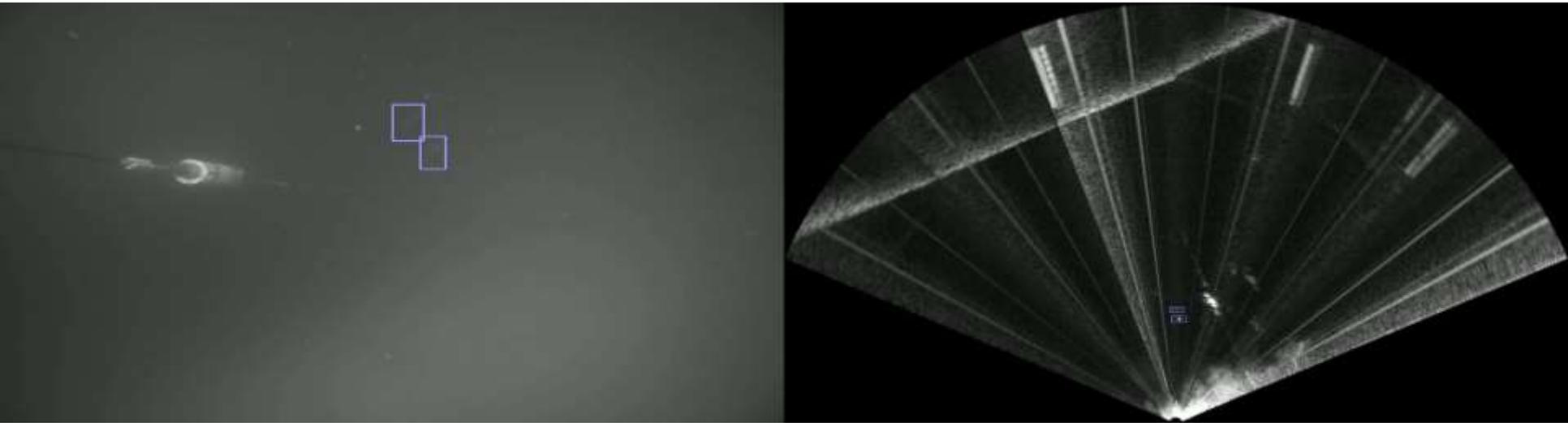| Power Source	Cabled, tidal turbine
Test Duration	6 + month target
Real-time Processing	Multibeam sonar target detection and classification + optical target detection and classification + ???

Data Examples – See YouTube Channel for more!
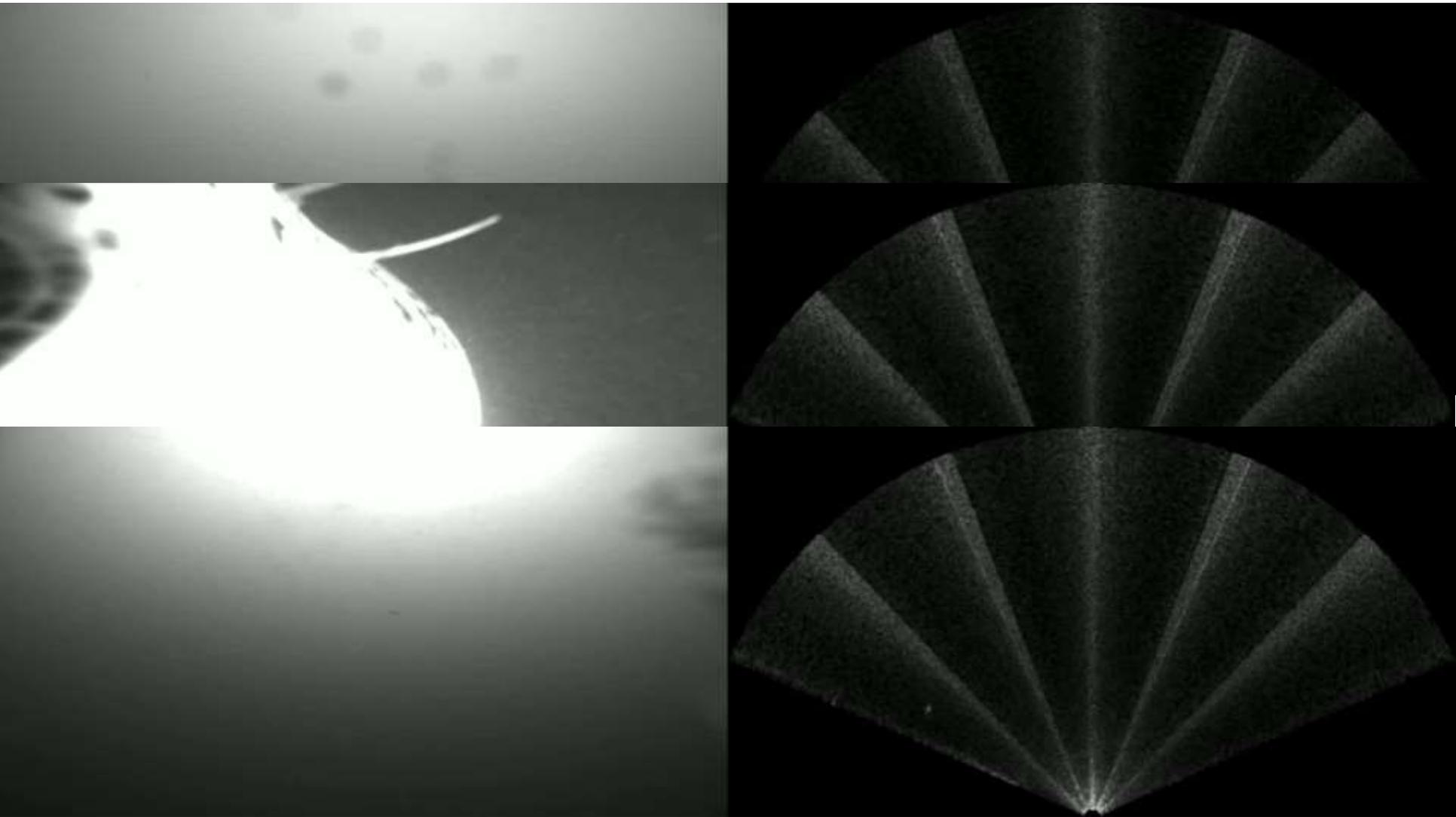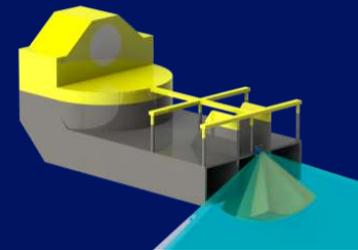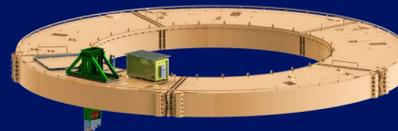

Sample data from 3GAMP

PMEC

Data Examples – See YouTube Channel for more!

Sample data from WAMP

PMEC

Lessons Learned

Integrated platform offer new and exciting capabilities…

but don't underestimate the complexity of sensor integration,

and consider data collection objectives early and often.

Acknowledgements

Brian Polagye, Chris Bassett, Paul Murphy, Emma Cotter, Paul Gibbs, Rob Cavagnaro, Corey Crisp, Mitchell Scott, Andy Stewart + many more!