



Harvesting Our Ocean
Wealth Conference
Cork, 10th July 2015

Imagine the future

- Founded in July 2009
 - To develop and deliver high resolution optical imaging and measurement technologies for subsea operations
 - Provide hardware & software systems for subsea optical “machine vision”
- Core technologies target IRM, Construction, Exploration & Production in subsea operations markets.
- Based in Kildare, Ireland with a US office in Boston, MA & UK office in Aberdeen, Scotland.
- ISO9001 Certified

Markets: All subsea operations

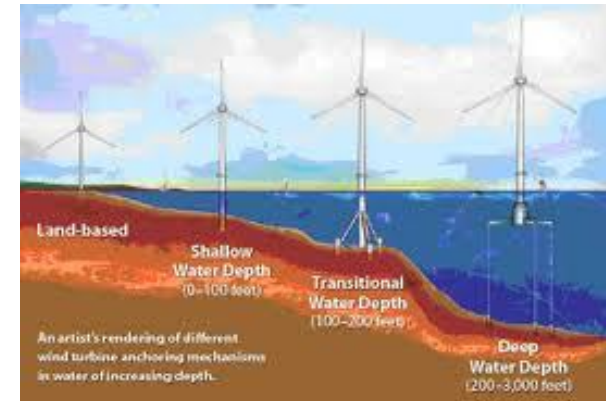
Oil & Gas



Oceanography



Renewable



Defence & Security



Subsea cables



Where we started

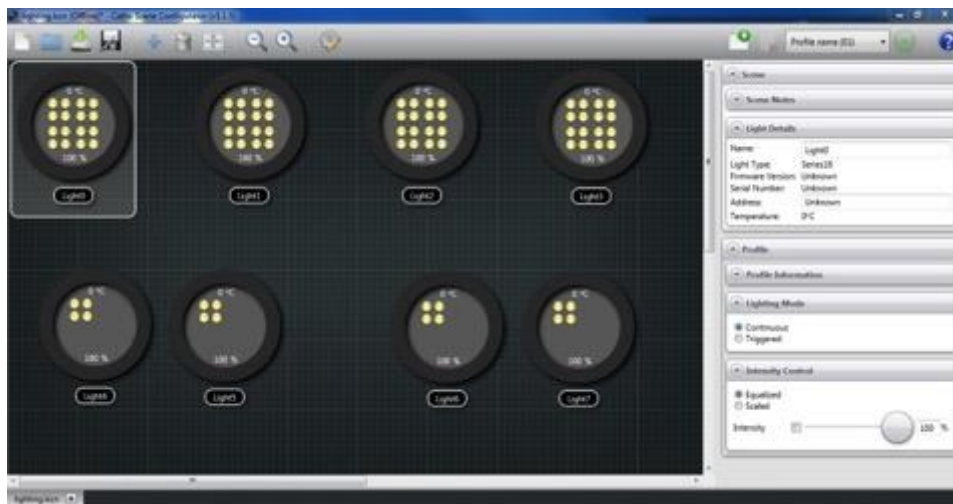
APHOS 4 – 7,000 lumens



APHOS 16 – 28,000 lumens



Specifications: [DC](#) [AC](#) [S16](#) [Permanent](#) [UV](#)



Lighting Control

Serial: RS485 or RS232:

Voltage: 0 – 5V or 0 – 10V

Triac: AC rectified (phase dimming)

GUI: [G](#)raphic [U](#)ser [I](#)nterface

****Continuous and pulsed option****

50,000 lumen pulsed light Q4

Much more than pictures....

M12 R100/R150

- HD Video
- 1080p/30fps



M12 R200/250

- HD Video 1080p/30fps
- UHD Stills (on demand)
- Internal Storage 512GB

[Links to Camera subsea images](#)

M12 A1000

- UHD Stills @ 5 fps
- Internal Storage 512GB
- 4096 x 3072



Camera API control

- RS485, RS232, Ethernet
- Live control GUI
- Camera Profile Configuration GUI
- Lighting/Laser/Camera Sync

2015 Camera Roadmap

- HD video Streaming over ethernet for simple ROV integration

Our challenge



Cathx Hardware €200,000



1000 Vehicles

€200,000,000 Market



**ROV and support operations
Market > €10Bn annually**

***This is for a simplification for
illustration only.***

The Industry Challenge

- Offshore subsea operations require a vessel to support underwater vehicles.
 - Vessel cost is typically €100,000 to €300,000 per day
 - Simple underwater machines need a ship and a pilot
 - Ship and ROV utilisation is key to profitability but no Automation
- Risks, costs and exposure are increasing
 - Aged assets & environmental obligations and new legislation driving change
 - Subsea production requires new thinking
 - Operations are moving to deeper water



- Cathx reduce ship days and allow accurate measurement and data management from Underwater Vehicles and fixed observation points
 - Increase accuracy and reliability of inspection and measurement data
 - Reduce costs considerably during vehicle operations
 - Enable automation and data management by visual inspection software tools
 - Provide visualisation and immediate access to data globally

Who decides what equipment ?

Oil & Gas Operators and Companies



Drivers

*Access to subsea data in real time.
Precision data and analytics*

*Real time data from field reduces
vessel costs and risk*

Subsea Service Companies



Drivers

*Generates efficiency on ship usage for
contracts.*

*Applications reduce cost and increase
earning potential of asset*

Vehicle Manufacturers



Drivers

*Flexibility, performance at
competitive costs.*

Scalable to their customer needs.

Our Business

- *Part I – We allow the work to be performed in under 50% of the time*
- 1. Hardware Systems for ROV & AUV and other applications
LED Lighting, Cameras and Lasers – 4 knots instead of 1 knot
- 2. Software Solutions – we replace video **with DATA and Measurement**
 - Advanced data capture (telemetry & meta data) & Measurement
 - Subsea Survey Automation & Visualisation

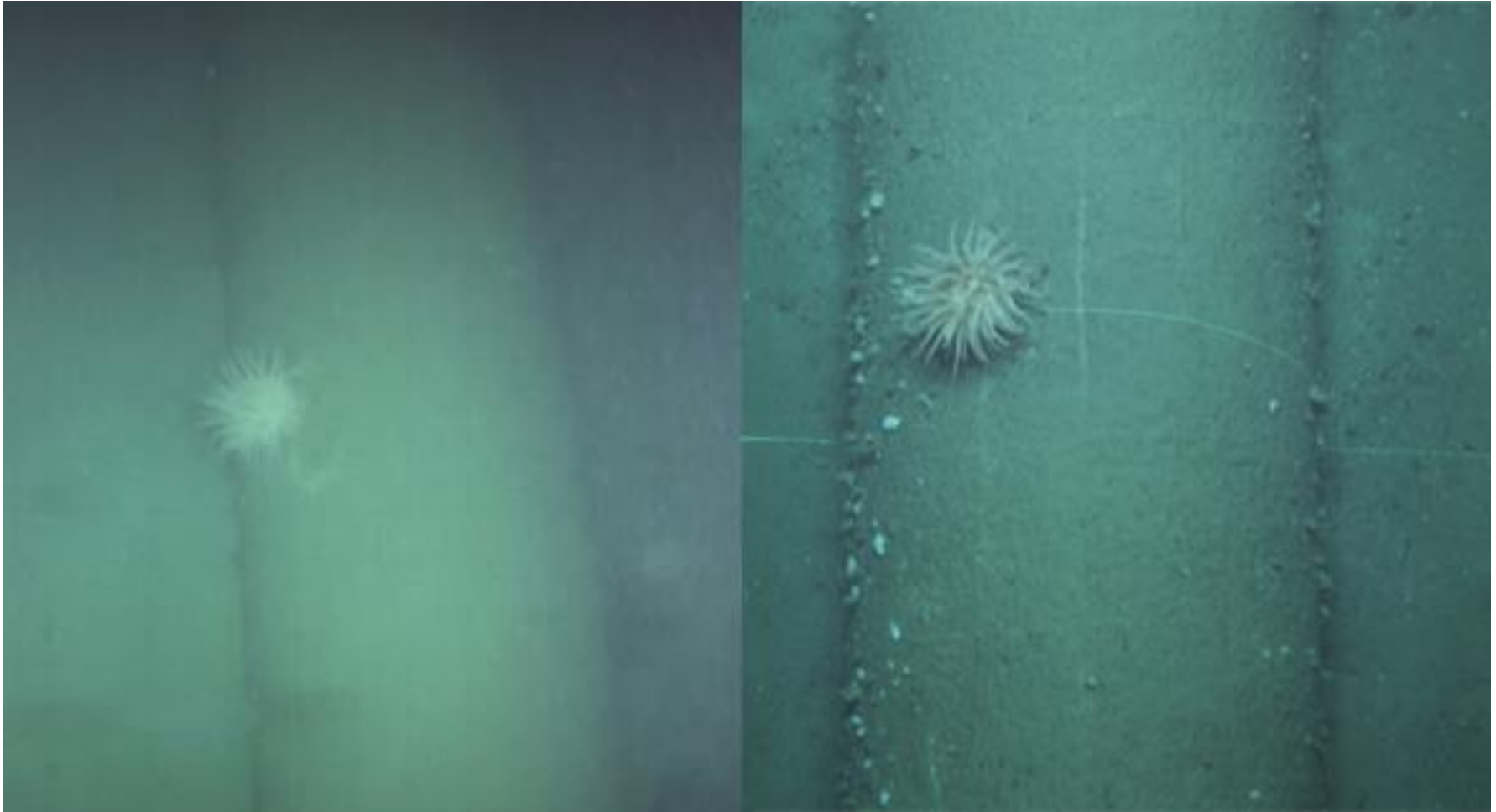
- *And part II – Data as a Service*

3. Software components:
 - Survey Automation
 - Survey Image & Data management
 - Survey Data Integration with IMS, GIS
 - Real time processing and visualisation

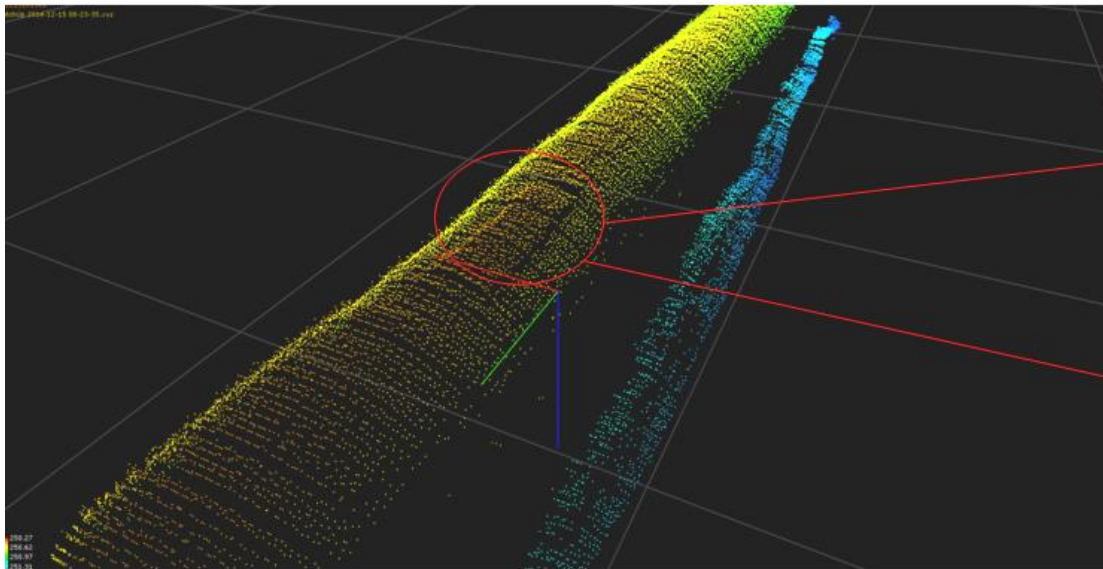
Deliver ship time efficiency at a reduced cost
Deliver High Quality Data
Data Management systems
Analytics and real time precision information



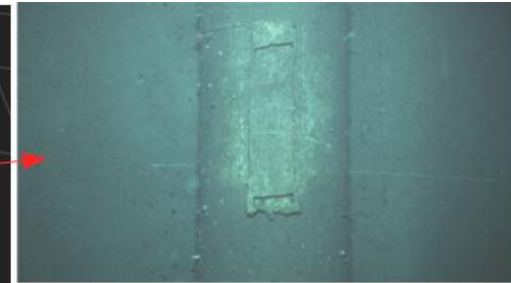
Video vs Ultra High Definition images



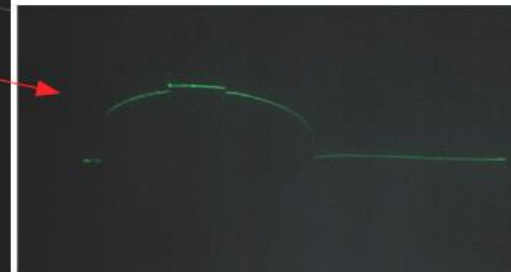
Successful operations-2014



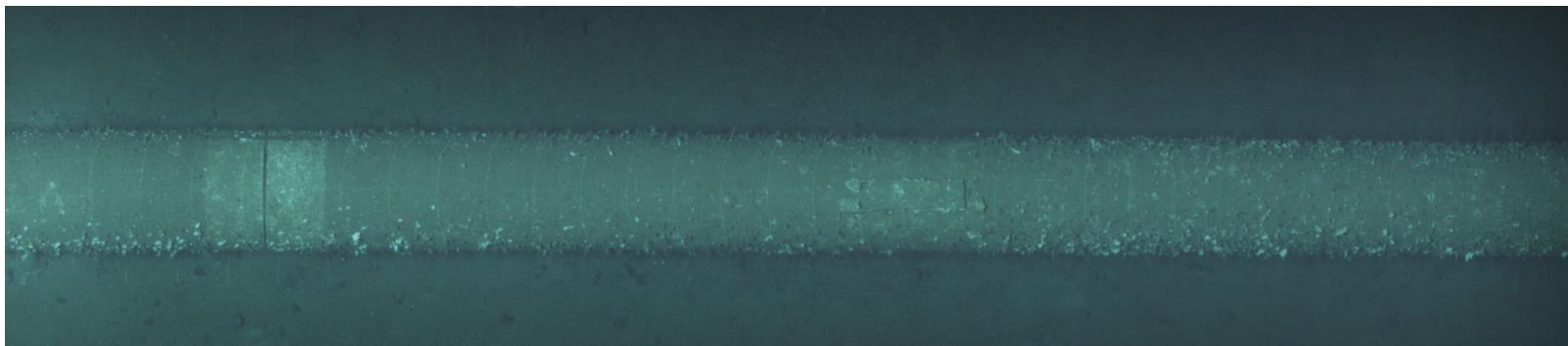
**3D Point Cloud at mm resolution to measure height – non contact
mm measurement 5 knots**



UHD Still

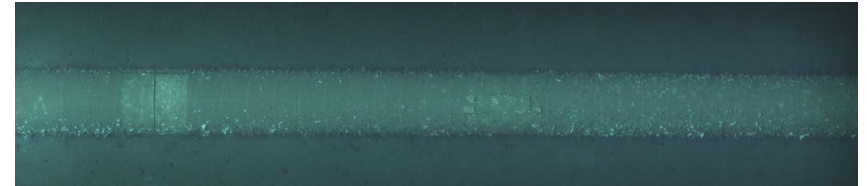
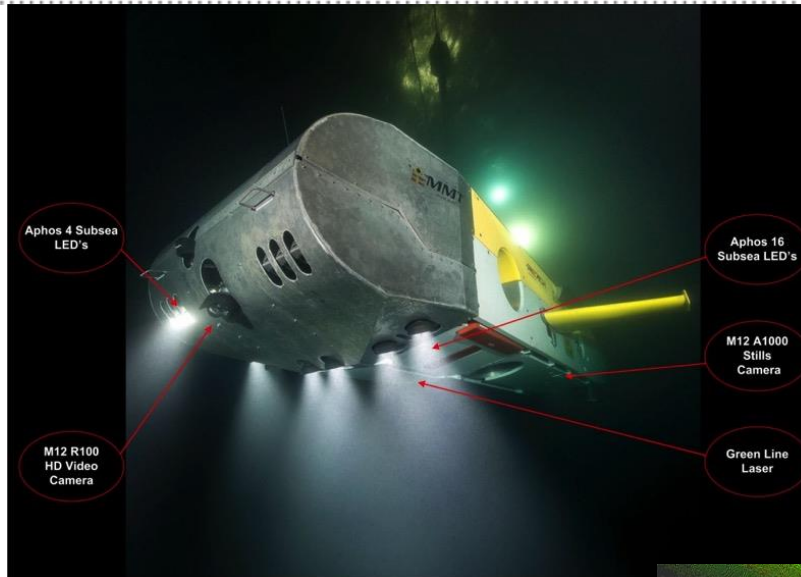


**Pipeline Laser
Profiles**

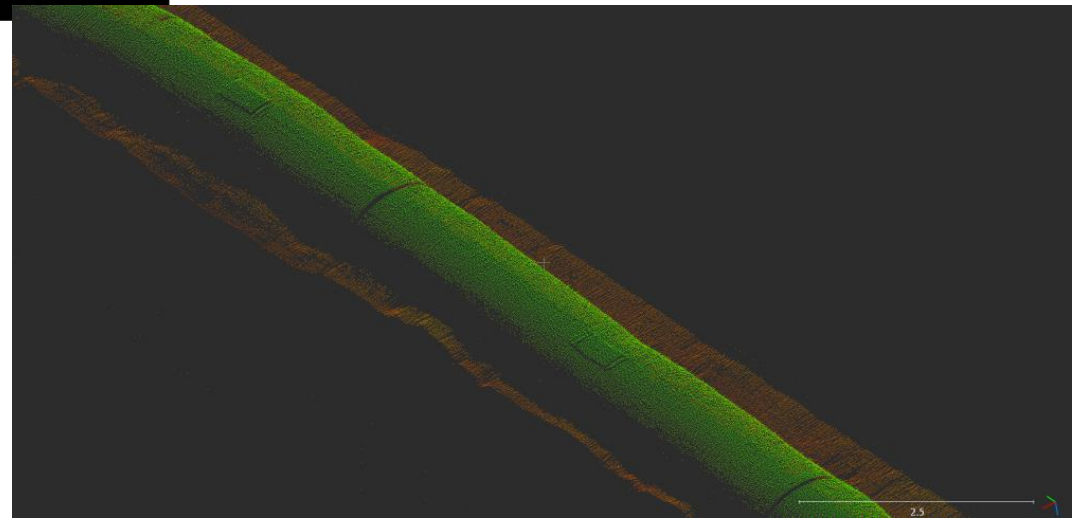


**High Resolution Pipeline Mosaic Creation- build a “map” of the asset using feature alignment
Reduces data volume to under 10% of Video**

Cathx System on MMT ROV



3D Point Cloud of Pipeline:
Vessel operational time can be reduced to under 50% of current time and we can concurrently measure to mm precision



Automated Event Detection

Core components

Template library

- + Identify known objects & anomalies and build templates
 - e.g. Pipeline Events: Clamps, Joints, anodes etc.
 - Anomalies - Cracks, leaks, Freespan, Ovality

Event Detection Algorithms

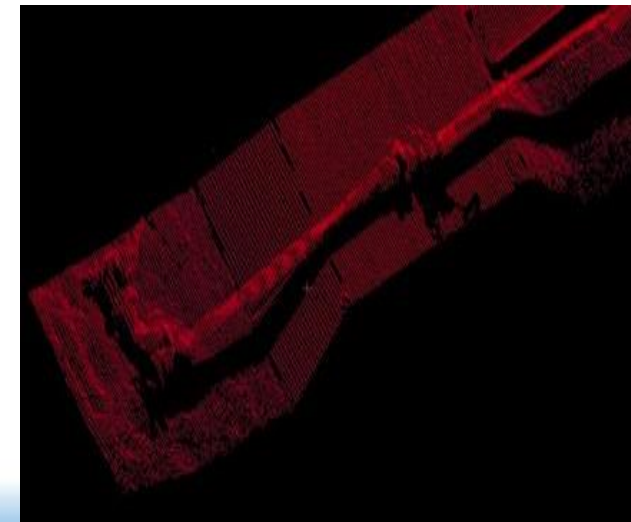
- + Measurement & geometric analysis using laser xyz
- + Shape detection using still images
- + Comparative algorithms
 - Identification & classification using Object template library above
 - YOY or Survey to Survey comparisons for degradation

Dataset

- + Still Images, xyz data, Measurement data, Objects & Anomalies found



[Video of Object Detection](#)



- *Volume*

- Traditional ROV systems capture >**100TB** Video / month per vessel
- Moving to overlapped Stills & Laser PCD reduces this to **10-20TB**/mth
- Automated Event Detection reduces the critical data to <**4TB** /mth

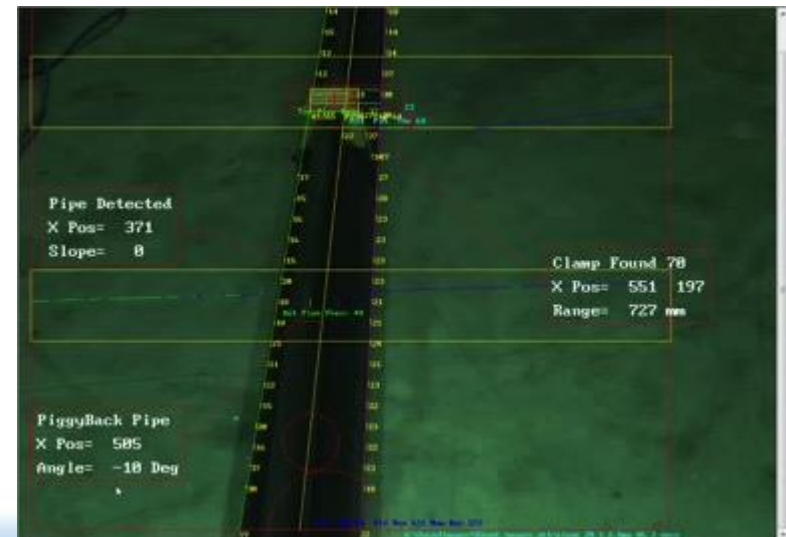
Software Solutions – we replace video **with DATA and Measurement**

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- Subsea Survey Automation & Visualisation

- *Software solutions– Data*

Software components:

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- Survey Data Integration with IMS, GIS
- Real time processing and visualisation
- Analytics



Who pays for data?

Oil & Gas Operators and Companies



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