Developing an existing product for the future.

Tymor Marine Ltd

April 2019

About us.

Three focus areas
- Engineering
- Marine Consultancy
- Technology

Three offices
- Aberdeen
- Glasgow
- Lafayette

14 staff and contractors.

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What we want to do.

Autonomous vessels:
- Need to measure stability
- Need to detect change in stability

Existing product - MOSIS

▪ Measures stability of ships and offshore units while in service at discrete intervals

Future product - Autonomous MOSIS

▪ Measures stability of ships and offshore units continuously while in service

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Requirements identified.

- Areas/subjects where we suspected off-the-shelf solutions existed

- Areas where existing solution might be adapted to our needs

- Areas where new approaches might be required – or research applied to problem

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Suspected off-the-shelf solutions existed.

Marine automation/data systems

- Identify most common information highway/network systems used

- Output a package that defines how and where to connect and how to identify and stream data packages from the system – for example streaming data from tank gauge

Data capture and storage

- Capture and store real-time continuous (say, 2 Hz) data on a suitable medium for 20 channels for 3 hours in short term re-writable memory and transfer to long term memory with 30 days capacity

- Output recommendations for storage media and format with any off-the-shelf systems preferred

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Adapt existing solution.

Data filtering for comparison of means

Algorithms that reliably identify when signal stability returns to a time series signal after a disturbance.

That is, reliable detection of the changed mean and variance.

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New approaches required.

Data filtering to isolate characteristics

Signals have the same order of magnitude as noise across the frequency band of interest.

- Improve frequency resolution beyond classical limits
- Work out wave direction based on ship motion and speed
- Isolate 'natural' responses from forced responses
- Assess when isolation is effective so 'good' estimates are retained
- Force impulse response to identify 'natural' response or use identified impulses
- Classic problem of auto-tuning comprehensive motion model of a ship over long time periods based on response

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Support from CENSIS and DataLab.

Identify off-the-shelf products

- For example, identify most common information highway/network systems used

Identified projects that are on same track

- Avoid re-inventing the wheel
- Share knowledge and resources

Identify suitable researchers

- University specialists in branches of signal processing with possible transference to our project/problems

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