



M P A
S I N G A P O R E

Test-Bedding Project on the Use of Enhanced Racon (eRACON) in Singapore

Maritime and Port Authority of Singapore

10th Co-operation Forum

2-3 October 2017



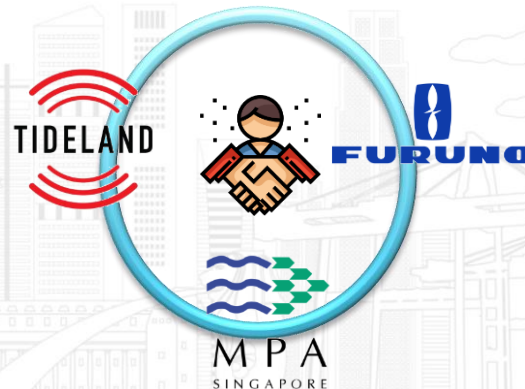
Scope

- The Project
- Concept
- Test Bedding
- Benefits
- Timeline

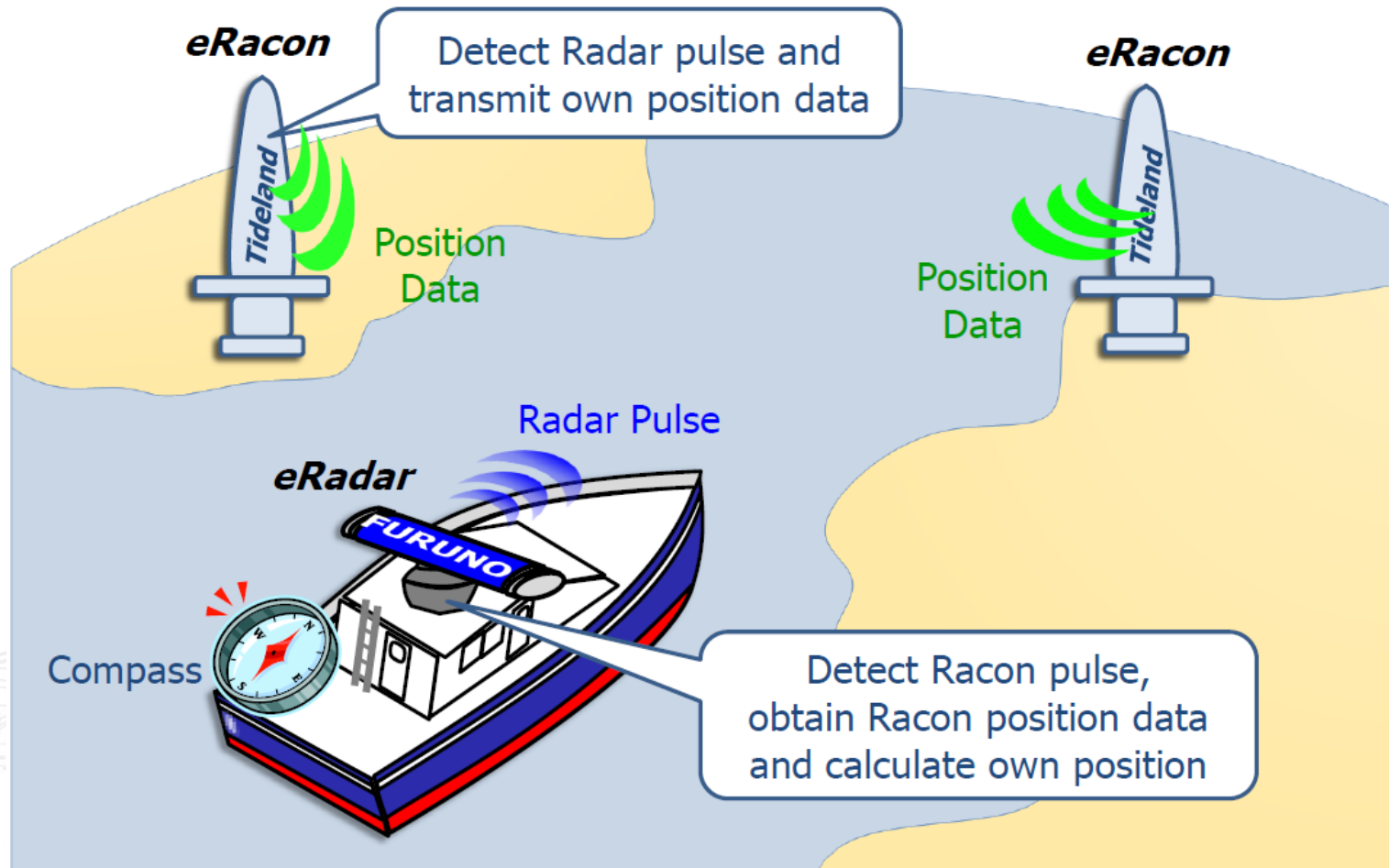


The Project

- Proposal for a complementary terrestrial based real-time position fixing system for maritime navigation.
- Exploring use of modified RAdar BeaCON (RACON) to encode digital data for RACON identification and positioning.
- Utilising a modified eRadar to detect and demodulate the signal, the receiver can calculate and provide accurate positioning for the vessel in Singapore port waters.



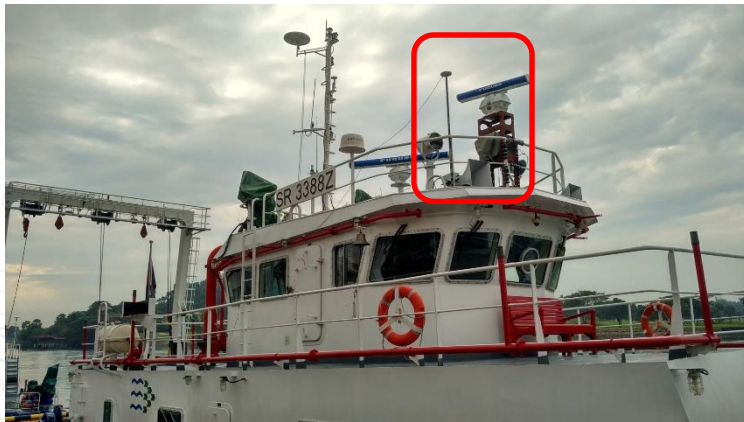
Concept



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Test Bedding

- 1st and 2nd Sea trials completed in October 2015 and August 2017, respectively
- Evaluate the eRacon system in a busy channel under real world conditions



FURUNO Enhanced Ship Radar antenna



**Tideland Signal
Enhanced Racon**

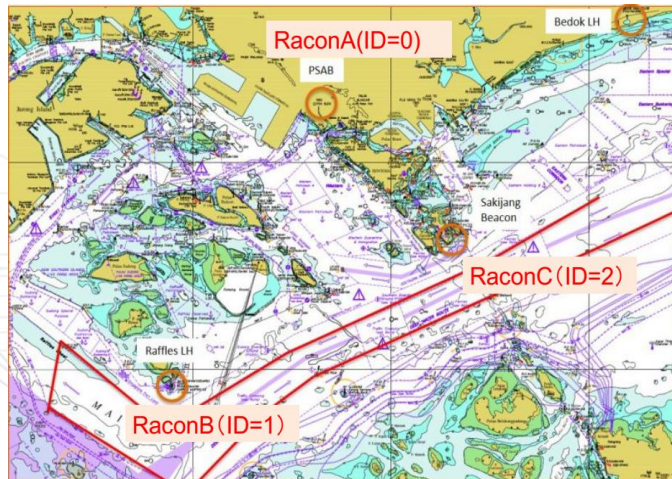


**Maritime & Port Authority of Singapore
MV Panduan for Trials**

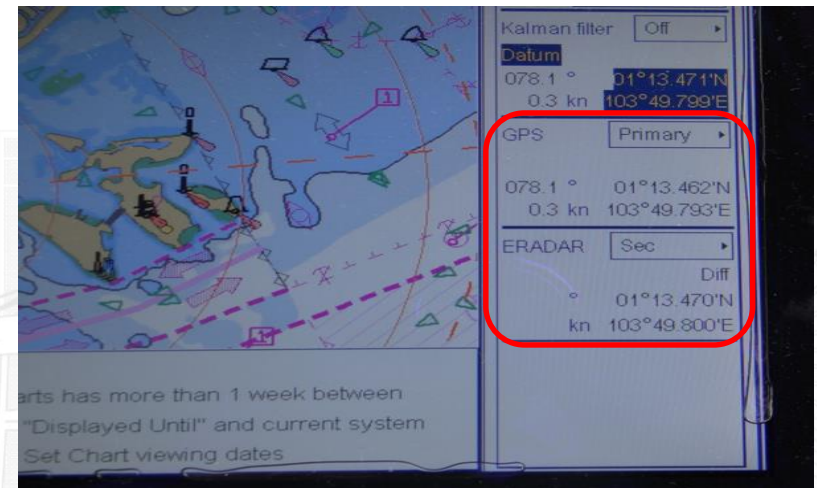
Test Bedding

- Position of vessel is displayed in real-time on a modified ECDIS
- Positioning accuracies achieved:

	1 st Trial (Oct 2015)	2 nd Trial (Aug 2017)
Berth	7.7m	2.5m
Static	14m	12m
Dynamic	27m	26m



2nd Trial – Aug 2017



GPS and eRADAR positioning

Benefits

- Terrestrial based navigation system to complement the GPS/DGPS in instances of failure and intentional spoofing/jamming of signals.
- Provide real-time, accurate and reliable positioning information
- Ease of implementation. Existing RACON and RADAR can be upgraded to eRACON and eRADAR respectively.
- Integration to ECDIS (Presently working with IALA & IHO)
- Cost effective solution compared to additional subscription satellite based positioning system
- Good signal range (Suitable for coastal and port areas)

Timeline

Concept

1st Meeting between MPA, Furuno and Tideland in Singapore

Discussions on e-Racon Demonstration (Specifications, requirements and details)

eNAV18

March 2016

Furuno presented 1st Demonstration Result at eNAV18

April 2016

Meeting to be held in Singapore :
1. eNAV18 presentation, feedback
2. Roadmap

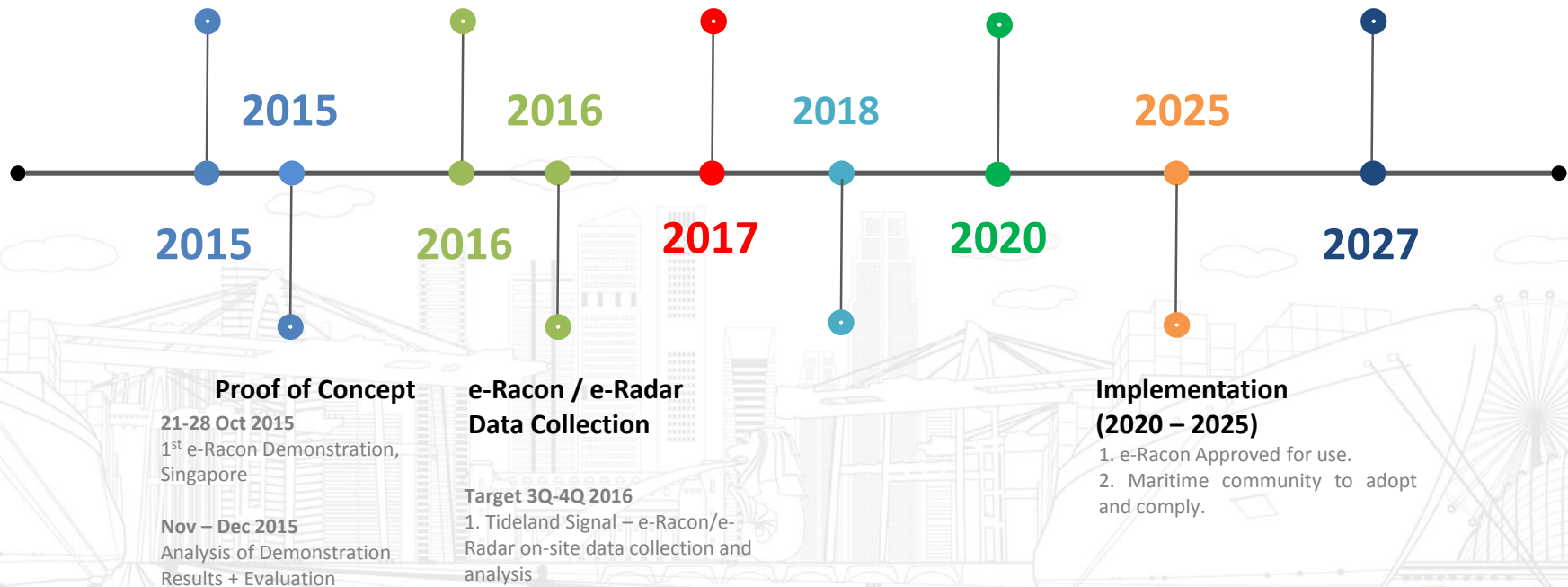
2nd Demo

Development of Standards & Specs. (2018 – 2020)

1. Propose Standards and Specifications
2. Submission of Standards and Specifications to IALA / relevant organizations for approval / recommendations
3. IEC Testing of equipment and certification

Support & Enhancements

1. Initiatives to provide support to end user / authorities
2. Recommend enhancements to existing e-Racon system





For Information

The presentation
by Starling will be
required of the
meeting