Helping Ports to identify vessels at high risk of carrying invasive species through data.
The PortShield™ venture team

• Safinah - The leading independent coating consultants working with the marine industry world-wide. Originator of the concept for PortShield and the assessment of associated risk-mitigation factors.

• AkzoNobel – A Leading marine coating company, but in this instance providing only the global fouling challenge data layer on which the risk assessment is built.
Two complementary approaches to Invasive species risk management in marine Dive inspections

- Single Vessel - targeted,
- High-resolution,
- Species specific,
- Highly skilled and complex work

High level down-selection

- All vessels
- Low species resolution
- Identifies vessels which are likely candidates for inspection or cleaning

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PortShield is based on a traditional risk assessment model calculated on a large scale.

Hazard \times \text{Likelihood} = \text{Risk}

Fouling Challenge \times \text{Fouling Control Factors} = \text{Hull Invasive Species Risk}
Fouling Challenge was built by combining Billions of data points

- Vessel position (AIS)
- Fouling occurrence
- Global environmental
- Vessel attribute

Master Database

- 24,500 vessels
- 2009-2013 (5 years)
- Every 15 minutes
- 8 Env. parameters
- 3.6 Billion data records
- ~ 2.2 TB
- 1,200 variables analysed for impact on biofouling prediction

Ensemble of 9 Neural Networks released on data to build predictive models

Machine Learning algorithms
Relative cumulative challenge index established to compare vessels
Vessels can be indexed based on a population of vessels

**Global Challenge Index GCI**
Relative description of Challenge of a vessel compared to all other vessels in the global fleet

**Port Challenge Index PCI**
Relative description of Challenge of a vessel compared to all other vessels who have entered a port
Challenge Index is modified with Fouling Control Factors to generate Risk

Challenge Index (Global or Port)
The challenge experienced based on the operational profile of a vessel

<table>
<thead>
<tr>
<th>Environmental data</th>
<th>Location data</th>
<th>Speed</th>
<th>Activity</th>
<th>Port calls</th>
<th>Environmental similarity</th>
<th>Transport stress</th>
</tr>
</thead>
</table>

AkzoNobel

Safinah

ICMCF Melbourne June 2018
Waving a ‘red flag’ to bring attention to riskier vessels

<table>
<thead>
<tr>
<th>STATUS</th>
<th>IMO #</th>
<th>VESSEL NAME</th>
<th>ETA</th>
<th>PCI</th>
<th>HIS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>8928392</td>
<td>Bel Ami</td>
<td>10AM</td>
<td>92</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>1898787</td>
<td>Rix Leopard</td>
<td>12PM</td>
<td>92</td>
<td>-</td>
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<tr>
<td></td>
<td>1893729</td>
<td>Esvagt Castor</td>
<td>1PM</td>
<td>94</td>
<td>92</td>
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<tr>
<td></td>
<td>3865289</td>
<td>Paragon B391</td>
<td>1PM</td>
<td>98</td>
<td>-</td>
</tr>
</tbody>
</table>

No FCF data entered
Waving a ‘red flag’ to bring attention to riskier vessels

Vessel Profile: Bel Ami

Vessel Type: Cargo
IMO No.: 8928392
Berthing Location: In transit
Location Area: Mediterranean Sea
Latitude/Longitude: N37° 2’ 51”/ E19° 49’ 38”

Estimated Length of Stay: 5 days
Anchorage: In transit

Last 5 port calls as detected by AIS:

<table>
<thead>
<tr>
<th>DATE</th>
<th>PORT</th>
<th>STAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/07/17</td>
<td>Goa, India</td>
<td>3d 8h</td>
</tr>
<tr>
<td>30/06/17</td>
<td>Dubai, UAE</td>
<td>8h</td>
</tr>
<tr>
<td>17/6/17</td>
<td>Athens, Greece</td>
<td>1d 7h</td>
</tr>
<tr>
<td>11/6/17</td>
<td>Napoli, Italy</td>
<td>14h</td>
</tr>
<tr>
<td>10/6/17</td>
<td>Istanbul, Turkey</td>
<td>14h</td>
</tr>
</tbody>
</table>
Simple system to help ports and authorities focus on riskier vessels

• New venture team from Safinah and AkzoNobel

• A service offered by Safinah, powered by AkzoNobel

• Global, regional and port indexes can help gain insight into risk and help direct risk mitigation strategy
Contact

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