A new wave of space-sourced information services for Marine Spatial Planning

Graham Stickler
Natural Resources Defense Council and High Seas Alliance,
“Marine spatial planning is a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that usually have been specified through a political process”

UNESCO
Automatic Identification System (AIS)

- Designed as a Collision Avoidance and Safety System under SOLAS
- Installed on more than 130,000 vessels
- AIS technology is increasingly being deployed on
  - Smaller vessels
  - Aids-To-Navigation (AtoN)
  - Search and Rescue (SAR) transponders

AIS Transponders emit VHF signal
- Automated
- Dynamic
- Short range (50 nm)

Source: USCG Navigation Center
Automatic Identification System (AIS)

Satellite AIS has shifted the detection of signals into space, extending the range of the system and creating new applications.
2016 Performance Metrics

6-8 million AIS position reports daily

> 50,000 Unique vessels detected daily from space

< 30 Minute Avg. global latency

6 year archive
Sample S-AIS Application Areas

Surveillance and Security

Search and Rescue

Fishing Tracking / IUUF

Environmental Monitoring
Specific Applications

Traffic Analysis

Pollution

Regulatory Compliance

Route Analysis

MMSI: 891212312
Name: Peregrine Falcon

MMSI: 891212376
Name: Millenium Falcon

MMSI: 989889981
Name: Seaborne Falcon

MMSI: UNKNOWN
Name: UNKNOWN

MMSI: 129012659
Name: Maltese Falcon
Global LEO Constellation
IOC 2017
66 Operational Satellites
15 year life

60 million+ Satellite AIS position reports daily
140,000+ unique vessels detected every day

Less than 1 minute avg. global revisit
Less than 1 minute customer data latency
Quest for Knowledge

AIS Data

Vessel-centric Data

Movement Information

Derived Data

Knowledge

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Cloud-based vessel movement information services for Marine Spatial Planning
Voyage of Life™ of the MS Silver Star2: 2010-08-27 - present
Emissions

- **Phase 1**
  - Available online; one report per IMO#
  - Uses eE’s ship characteristics data

- **Phase 2**
  - MRV Emissions Verifiers service – allows verifiers to cross-check ship owner submissions
  - Available online – PDF/CSV
  - Verifiers can add in updated ship engine characteristics

- **Phase 3**
  - Quarterly report on the state of the commercial global shipping fleet
  - operating speeds, fuel consumption and emissions, utilization and productivity, supply capacity and demand

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Incident Report

Projected Vessel Positions at 1345 UTC

MANHATTAN as of August 31, 2014 15:45 UTC

- MMSI: 366990540
- Callsign: WBP350
- Vessel Type: Passenger
- ETA: August 31, 2014 17:30 UTC
- Speed (knots): 11.1
- Heading: 90°
- Rate of Turn: -130.17°
# Tubbataha Reef Maritime Traffic Report

## Traffic around the Tubbataha Reef conservation area

<table>
<thead>
<tr>
<th></th>
<th>Within 20 NM</th>
<th>Within 30 NM</th>
<th>Within 40 NM</th>
<th>Within 50 NM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo</td>
<td>178</td>
<td>265</td>
<td>350</td>
<td>480</td>
</tr>
<tr>
<td>Fishing</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Passenger</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Tanker</td>
<td>105</td>
<td>138</td>
<td>187</td>
<td>208</td>
</tr>
<tr>
<td>Other</td>
<td>97</td>
<td>130</td>
<td>150</td>
<td>192</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>184</td>
<td>337</td>
<td>674</td>
<td>937</td>
</tr>
</tbody>
</table>

### North-South Traffic

<table>
<thead>
<tr>
<th></th>
<th>20 NM</th>
<th>30 NM</th>
<th>40 NM</th>
<th>50 NM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo</td>
<td>2,100</td>
<td>2,470</td>
<td>2,725</td>
<td>2,682</td>
</tr>
<tr>
<td>Fishing</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Passenger</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Tanker</td>
<td>198</td>
<td>237</td>
<td>270</td>
<td>295</td>
</tr>
<tr>
<td>Other</td>
<td>524</td>
<td>625</td>
<td>649</td>
<td>735</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,427</td>
<td>3,337</td>
<td>3,682</td>
<td>3,917</td>
</tr>
</tbody>
</table>

### Total Traffic

<table>
<thead>
<tr>
<th></th>
<th>20 NM</th>
<th>30 NM</th>
<th>40 NM</th>
<th>50 NM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo</td>
<td>2,125</td>
<td>2,645</td>
<td>3,922</td>
<td>3,552</td>
</tr>
<tr>
<td>Fishing</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Passenger</td>
<td>6</td>
<td>6</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Tanker</td>
<td>188</td>
<td>349</td>
<td>397</td>
<td>442</td>
</tr>
<tr>
<td>Other</td>
<td>191</td>
<td>709</td>
<td>778</td>
<td>845</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3,111</td>
<td>3,710</td>
<td>4,186</td>
<td>4,453</td>
</tr>
</tbody>
</table>

Note: "Total Traffic" represents the union of east-west and north-south traffic and, therefore, won’t necessarily equal the sum of east-west and north-south traffic.

## Cargo traffic in and around the Tubbataha Reef conservation area

### Cargo traffic in and around the Tubbataha Reef conservation area (Oct 2012 - Sept 2013)

<table>
<thead>
<tr>
<th>Cargo Traffic</th>
<th>Within 20 NM</th>
<th>Within 30 NM</th>
<th>Within 40 NM</th>
<th>Within 50 NM</th>
</tr>
</thead>
<tbody>
<tr>
<td>East-West</td>
<td>171</td>
<td>209</td>
<td>250</td>
<td>490</td>
</tr>
<tr>
<td>North-South</td>
<td>3,552</td>
<td>3,922</td>
<td>3,552</td>
<td>3,552</td>
</tr>
<tr>
<td><strong>Total Traffic</strong></td>
<td>3,723</td>
<td>4,131</td>
<td>3,800</td>
<td>4,490</td>
</tr>
</tbody>
</table>

### Transit routes

- **Original**
- **Option 1**
- **Option 2**

- 71.3 NM
- 73.6 NM
- 76.5 NM
Movement and Behavioural Analysis

- 2014-08-1 18:43 Z
- 400km off the Argentinean coast
- Korean Trawler (MMSI 440528000)
- Panama Reefer (MMSI 352349000)
- Faster trawler approaches slow moving reefer
- Maintain a distance of less than 15m for 15 minutes
- Maintain a speed of less then 1 kt for 15 minutes
- Confidence 1.0
Information sharing
Thank You!
graham.stickler@exactearth.com

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