Aims

- to show and discuss how planning of hydrographic surveying can be and has been risk-based by using AIS-data
- to address obstacles to and possibilities with such a risk-based approach
Questions to be answered

- Where to conduct Hydrographic surveys in order to reduce the grounding risk as much as possible?
- How to use Automatic Information System (AIS)-information in such a risk-based approach?
- What possible pitfalls are there by using AIS-information?

Shipping in the Baltic Sea

- 2000 vessels (with AIS-transponders) any time
- Tendency of larger and then primarily wider vessels
- Oil transport is increasing rapidly
- Navigation, communication and manoeuvring are more markedly dependent upon technical systems offshore and onshore
- Archipelagos and dense traffic make navigation in some areas difficult
- Fragile area with a unique mix of marine, freshwater and other species specially adapted to its brackish conditions
- Has been classified as Particularly Sensitive Sea Area
Automatic Identification System

- Originally developed to provide mariners with more information than can be obtained via radar
- By using two VHF radio channels, information about vessels and voyages is transmitted in short data packets at clearly defined and synchronised intervals as messages
- The message consists of static, dynamic and voyage-related information

<table>
<thead>
<tr>
<th>Static information</th>
<th>Dynamic information</th>
<th>Voyage related information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maritime Mobile Service Identity</td>
<td>Ship's position with accuracy indication and integrity status</td>
<td>Ship’s draught</td>
</tr>
<tr>
<td>Call sign and name</td>
<td>Position Time stamp in UTC</td>
<td>Hazardous cargo (type)</td>
</tr>
<tr>
<td>IMO Number</td>
<td>Course over ground (COG)</td>
<td>Destination and Estimated Time of Arrival (ETA)</td>
</tr>
<tr>
<td>Length and beam</td>
<td>Speed over ground (SOG)</td>
<td>Route plan (waypoints)</td>
</tr>
<tr>
<td>Type of ship</td>
<td>Heading</td>
<td>Number of persons onboard</td>
</tr>
<tr>
<td>Location of position fixing antenna</td>
<td>Rate of turn (ROT)</td>
<td></td>
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<tr>
<td>Height over keel</td>
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</tbody>
</table>
Risk related parameters and AIS-information

- **Probability parameters**
  - Under keel clearance
  - Hull design
  - Speed
  - Number of passages

- Ship's draught
- Type of ship
- Speed over ground
- AIS-statistics

- **Consequence parameters**
  - Impact on crew/passengers
  - Loss of income
  - Loss of goodwill

- Vessel damage
- Costs
  - Impact on the environment

- Type of ship
- Number of persons onboard

- Type of ship
- Length and beam
- Hazardous cargo
Present and planned surveys (S44) and ship tracks of tankers during one week in July 2007 in the Bornholm Gat between Denmark and Sweden.
Pitfalls

- Future needs of surveying might be different than present and historical traffic imply
- Draught data has to be changed by the mariner
- Estimating risk levels by combining various parameters of importance for both grounding probabilities and consequences is not an easy task

Conclusions

• AIS-data can be used in order to consider the grounding risk as a basis for planning of Hydrographic surveying in Swedish waters

• AIS has so far contributed to the planning of surveying but further development is looked for. Uncertainty in addressing the future grounding risk can cause either costs for grounding accidents or costs for a non-optimal priority of Hydrographic surveying.

• There are pitfalls related to the utilisation of historic tracks for future traffic estimation, input of draught data and estimation of risk level by balancing different parameters.

Thank You for the attention!