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E-SURFMAR

Task Team on Shipborne AWS

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Background

- **Task Team was established on request of PB-OBS (Nov 2007) as subgroup of E-SURFMARs VOS-TAG**
- **Main purpose was to define and agree specifications for AWS for use on observing ships recruited by E-SURFMAR participants**
- **Task Team has considered various advantages and disadvantages of different AWS arrangements**
- **Based on the considerations the Task Team has made recommendations where appropriate**

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Meetings of the Task Team

- **TT-AWS-1, Initial Meeting (at VOS-TAG-5, DeBilt, 11 April 2008)**
- **AWS Installation workshop**
  - **onboard Container Vessel Montreal Express, Hamburg, 30 November 2008**
  - **onboard Survey Vessel Wega, Hamburg, 1 December 2008**
- **TT-AWS-2 (Hamburg, 1-2 December 2008)**
- **TT-AWS-3 (at VOS-TAG-6, Geneva, 14 May 2009)**

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Definitions

- **Autonomous AWS**
  - **typically measures a reduced set of parameters**
  - **generally considered as 'plug and play' system**
    (independent of the host ships systems - except power supply)
- **Integrated AWS**
  - **typically measures a variety of parameters**
  - **typically requires integration with the ships systems**
    (power supply, navigational data, ...)
- **Recommendation: autonomous AWS**

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Considerations

- **Ease of installation**
  - **AWS require technical support for**
    - **installation**
    - **maintenance**
- **Cost effectiveness of the observations**
  - **number of observations received**
  - **quality of observations**
  - **costs are caused by**
    - **equipment**
    - **installation**
    - **data transmission**
    - **maintenance**

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Parameters - system

- **Station identifier**
  - **identification of the reporting station**
  - **Recommendation: a repeating unique masked callsign shall be used**
- **Position**
  - **location of the station at the time the weather report was computed**
  - **Recommendation: position shall be derived from navigational data**
- **Timestamp**
  - **point of time at which the report was computed**
  - **Recommendation: clock of the AWS shall be set to UTC timezone and synchronised to an accurate external clock, such as GPS**

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Parameters - to be measured

- **Minimum set of parameters (based on importance and ease of installation)**
  - **pressure**
  - **air temperature**
  - **humidity**
- **Further parameters**
  - **Wind (possibly Heading needed for true wind calculation)**
  - **SST**
  - **...**
- **Visual Observations**
  - **require input terminal**
  - **require sophisticated help system**
  - **Recommendation: visual observations should be an optional feature for integrated systems, but are not required for autonomous systems**

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Parameters - navigational data (NMEA 0183)

- **$--RMC,hhmmss.ss,A,yyyy.yy,a,xxxxx.xx,a,s.s,c.c,ddmmyy,x.x,a,a*hh<CR><LF>**
  - **recommended to be used to derive**
    - **time and date (UTC)**
    - **position (latitude and longitude)**
    - **speed over ground**
    - **course over ground**

- **$--HDT,x.x,T*hh<CR><LF>**
  - **recommended to be used to derive**
    - **heading of station (if needed for calculation of true wind)**

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Parameters - other

- **Other parameters to be considered**
  - **environment**
    - **protection (IPxx)**
    - **temperature**
    - **humidity**
    - **shock**
    - **electrostatic sensitivity (ESD)**
    - **...**
  - **power supply**
    - **voltage**
    - **power consumption**
    - **stand-alone or from station**
    - **...**
  - **size and weight**
  - **...**

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Data Handling

- **Data Display**
  - **typically requires cabling to ships bridge**
  - **typically highly appreciated by ships crew**
  - **Recommendation: a data display should be considered as part of the system**
- **Data Storage**
  - **adds extra complexity to AWSas backup if data transmission fails**
  - **as backup if data transmission fails**
  - **Recommendation: data storage is not required for autonomous systems**
- **Data Output**
  - **weather report (typically hourly)**
  - **permanent output (for onboard systems, such as data display, proprietary NMEA recommended)**

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Data Transmission

- **Data to be transmitted**
  - **identifier**
  - **timestamp**
  - **position**
  - **acquired and calculated parameters**
  - **extra data (meta data, housekeeping data, ...)**

- **Data Format**
  - **standard format**
    - **can be routed directly into GTS, but does not allow extra data**
  - **raw data format**
    - **allows transmission of extra data, but needs to be preprocessed before routed into GTS**
  - **Recommendation: a raw data format with extra data should be used**

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Data Transmission

- **Transmitter**
  - **various techniques available**
  - **Recommendation: bi-directional communication should be considered**

- **"Port mode"**
  - **facility to enable / disable the transmission of weather reports**
  - **can be combined with a facility to define areas of interest in which more or less reports than usual are generated and transmitted**
  - **Recommendation: a facility to allow more or less reports to be computed and transmitted should be included in the system**

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Modes of Operation

- **Normal Operation Mode**
  - **AWS computes and transmitts reports an a regular basis**
- **Service / Diagnostic Mode**
  - **Mode for maintenance, not accessible by normal crewmember**
  - **Recommendation: the system should have a service mode that allows**
    - **parameters of the system (callsign, height, ...) to be edited**
    - **components of the system to be setup, enabled, disabled, ...**
    - **data handling to be managed (port mode, transmission, ...)**
    - **access to raw sensor data (debugging)**
    - **access to system parameters (housekeeping)**
    - **...**

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Discussion