REPORT BY THE TASK TEAM ON INSTRUMENTS STANDARDS (TT-IS)

(Submitted by Robert Luke, Chairperson, TT-IS)

Introduction

This report addresses the key issues assigned to the Team in its Terms of Reference and identifies the key areas where progress has been made since SOT IV. Taking into account work also undertaken by the ETMC and the new cross-cutting (ETMC-SOT) Task Team on Delayed Mode VOS Data (TT-DMVOS), the report invites the SOT to consider carefully how the project should develop in the future, so that it can help to raise the climate quality of data within VOS, and thereby contribute to the Global Climate Observing System (GCOS).

The following supporting documents are annexed to this report

Annex A: Task Team current Terms of Reference
Annex B: Instrument Standards Guidelines
Annex C: Instrument Standards Equipment Status Report
Annex D: Electronic Logbook Inter-Comparison Test and Results
Annex E: Electronic Logbook Manufacturers Responses
Annex F: Electronic Logbook Inter-Comparison Report
Annex G: Task Team Proposed Changes of ISO 10596
Annex H: Task Team ISO 10596 Recommendations
Annex I: Status of actions agreed at SOT IV

Reference: Proposed ISO 10596 (Ships and marine technology — Marine wind vane and anemometers)

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ANNEX A

Terms Of Reference

Task Team on Instrument Standards

Tasks:

1. Compile information on existing activities, procedures and practices within JCOMM relating to instrument testing, standardization and inter-calibration, as well as the standardization of observation practices and procedures.

2. Using guidance contained in existing guides including the WMO Guides on Instruments and Methods of Observation (WMO-No.8) communicate with manufactures regarding new technologies and recognized equipment problems.

3. Prepare a JCOMM Technical Report containing this information, to be made widely available through relevant web sites (JCOMM, JCOMMOPS, VOS, DBCP, SOOP, and SOT).

4. Provide guidance on testing and the inter-calibration of marine meteorological and oceanographic observing systems.

5. Liaise closely with WMO/CIMO, both in the compilation of the information and in assessing what additional work in this area might be required under JCOMM.

6. Liaise closely with IOC in the preparation of the wider compilation of existing instrumentation and observing practices standards in oceanographic observations in general, with a view to inputting an appropriate contribution from JCOMM.

7. Conduct an inter-comparison study of electronic logbooks.

8. Review all relevant JCOMM Publications to make sure they are kept up to date and comply with Quality Management terminology;

9. Work with the WMO Commission on Instruments and Methods of Observations for updating the WMO Guide No. 8 section dealing with ship-based observations.

Members:

Robert Luke (TT Chairman, United States)
Graeme Ball (SOT Chairman, Australia)
Julie Fletcher (VOSP Chairperson, New Zealand)
Gustavo Goni (SOOP Chairman, United States)
Rudolf Krockauer (ASAP Chairman, Germany)
Pierre Blouch (E-SURFMAR Program Manager, France)
Yvonne Cook (member in absentia due to transfer of assignments, Canada)
Henry Kleta (Germany)
Elizabeth Kent (United Kingdom)
Sarah North (United Kingdom)
Shawn Smith (United States)
Scott Woodruff (United States)
Derrick Snowden (United States)
Bruce Sumner (Associate Member, HMEI, Switzerland)

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ANNEX B

Instrument Standards Guidelines

1. VOS

a. WMO

1. Guide To Meteorological Instruments And Methods of Observation (WMO-No. 8)

   a. 7th Edition (Aug 08)
   http://www.wmo.int/pages/prog/www/IMOP/publications/CIMO-Guide/CIMO_Guide-7th_Edition-2008.html

   b. Approved changes from SOT-IV have been submitted to the JCOMM focal point on CIMO matters for endorsement and inclusion in next edition

b. NMS

1. Australia
   a. Port Meteorological Agents Guide
   b. TurboWin User Guide
   c. TurboWin Setup Manual

2. United Kingdom
   a. Marine Observers Handbook
   b. Port Met Officers Work Instruction
   c. UK Met O.740

3. United States of America
   a. Military Specification MIL-B-17089
   b. National Weather Service NWS G101 – SP004
   c. National Weather Service NWS G222 – SP002
   d. NWS Instruction 10-201 (Apr 05, 2004)
   http://www.nws.noaa.gov/directives/sym/pd01002001curr.pdf
   e. AmverSeas Users Manual (Sep 19, 2008)
   http://seas.amverseas.noaa.gov/seas/
   f. Observing Handbook No. 1 (Apr2004 - due for update 2009)
   http://www.vos.noaa.gov/ObsHB-508/ObservingHandbook1_2004_508_compliant.pdf

2. SOOP

a) IOC

1. Guide to IGOSS (now JCOMM) Data Archives and Exchange (BATHY and TESAC) - IOC Manual and Guides No.1
2. Guide to Operational Procedures for the Collection and Exchange of IGOSS (now JCOMM) Data - IOC Manual and Guides No.3
3. IGOSS (now JCOMM) Plan and Implementation Programme - IOC Technical Series No. 43
4. Best Guide And Principles Manual For The Ships Of Opportunity Program (SOOP) and Expendable Bathythermograph (XBT) Operations

b) NMS

1. Australia
   a. Devil XBT User Manual

3. ASAP

a. WMO

1. No guidance available at this time.

b. EUCOS

1. No guidance available at this time.

c. NMS

1. No guidance available at this time.

ANNEX C

Instrument Standards Equipment Status Report

A. VOS

a. Barometers

BAROMETERS				
National VOS	**Barometer**	**Barometer Type**	**Barometer Setting**	**Type of Correction Tables Used**
Australia	Vaisala PTB220	Digital	Station Level	Height
Australia		Precision Aneroid	Station Level	Pressure/Temperature, Drift & Height
Croatia	Barigo Fisher SUNDO	Ship's Aneroid Ship's Aneroid Ship's Aneroid	MSL MSL MSL	NIL NIL NIL
Ecuador		Aneroid	MSL	NIL
France	Vaisala PTB220	Digital	Station Level	NIL
Germany	Fuess	15PM	MSL	NIL
Greece	Belfort SUNDO Th. FRIEDRICH	Aneroid Ship's Aneroid Ship's Aneroid	Station Level Station Level Station Level	NIL NIL NIL
Hong Kong		Precision Aneroid Ship's Aneroid	MSL MSL	U.K. Met. O. 740 U.K. Met. O. 740
Iceland	Fuess Vaisala PA11	Ship's Aneroid Digital	MSL MSL	Air Pressure Dependent
Ireland		Ship's Aneroid Aneroid	MSL MSL	NIL NIL
Japan		Aneroid Digital	Station Level Station Level	Height Height
Netherlands	Fuess Vaisala PTB220	Aneroid Aneroid	MSL MSL	NIL NIL
New Zealand	Fuess	Aneroid Precision Aneroid	MSL Station Level	NIL Instrument & Height
Singapore	PAB MK2 M2236		MSL	U.K. Met. O. 740
South Africa	Fuess	Aneroid	MSL	NIL
United Kingdom	Negretti & Zambra PAB MK2 Vaisala PTB220	Precision Aneroid Barometer Digital	Station Level	NIL (for ships using TurboWin) U.K. Met. O. 740 (for ships not using TurboWin)
United States	Belfort Meteograf	Aneroid Digital	MSL MSL	NIL NIL
NOTES: 1) For Ships using TurboWin, the Height correction is applied by the software. 2) Information can also be found on VOS web site at: http://www.bom.gov.au/jcomm/vos/national_practices_pressure.html				

b. Barographs

BAROGRAPHS			
National VOS	**Barograph**	**Barograph Type**	**Barograph Setting**
Australia		Open Scale	Station Level
Croatia	KOMPAS	Open Scale	MSL
Ecuador		Micro-barograph	MSL
France	None		
Germany	Mueller 78A Lambrecht 290		MSL MSL
Greece	Belfort	Open Scale (4 Day)	Station Level
Hong Kong		Small Scale	MSL
Iceland	None		
Ireland		Open Scale (7 Day)	MSL
Japan		Open Scale (1 Day) Open Scale (7 Day)	Station Level Station Level
Netherlands	Fuess	Aneroid	MSL
New Zealand		Open Scale	MSL
Singapore		Open Scale MK3	MSL
South Africa	Mason		MSL
United Kingdom	Negretti & Zambra Fischer	Open Scale (7 Day) Open Scale (7 Day)	MSL MSL
United States	Belfort Meteograf	Open Scale (4 Day) Digital (1 year)	MSL MSL

c. Thermometers

VOS THERMOMETER TYPES and SETTINGS			
National VOS	**Thermometer**	**Thermometer Type**	**Thermometer Fluid**
Australia	AMA	Liquid-in-glass	Hg
Netherlands	Ship provided		
United Kingdom	Zeal 2C AMA	Liquid-in-glass Liquid-in-glass	Hg Hg
United States	Zeal P2505	Mason Hygrometer	Glycol

d. Sea Surface Temperature

VOS SEA SURFACE TEMPERATURE TYPES and SETTINGS			
National VOS	**Sensor**	**Sensor Type**	**Sensor Scale C/F**
Australia	Sea thermometer	Ship’s intake Bucket (UK)	C C
Netherlands		Bucket	Alcohol or Mercury Deg C
United Kingdom	Sea thermometer	Bucket Ship’s intake Hull contact sensor	C C C
United States		Ship's Intake	Either (ship Dependent)

e. Automated Systems

VOS AUTOMATED SYSTEMS			
National VOS	**Type of AWS (as of 31/12/2008)**	**Communication Method**	**Manual Entry Facility**
Australia	Vaisala Milos 500 AWS	Inmarsat C (Data Mode)	Yes
Canada	AVOS – AXYS Technologies	Inmarsat C Iridium	Yes
Denmark	BATOS	Inmarsat C (Data Mode)	Yes
EUMETNET	BATOS BAROS	Inmarsat C (Data Mode) Iridium SBD	Yes No
France	BATOS Mini BATOS MINOS BAROS	Inmarsat C (Data Mode) Inmarsat C (Data Mode) Argos Iridium	Yes No No No
Germany	Vaisala Milos 500 AWS	Meteosat	Some
Ireland	Vaisala Milos AWS	Meteosat	No
Japan	Koshin Denki Kogyo Co., Ltd (Japan) Ogasawara Keiki Seisakusho Co (Japan) Nippon Electric Instrument Inc. (Japan) Brookhaven National Laboratory (USA) JRCS MFG. Co. Ltd (Japan)	Inmarsat Inmarsat Inmarsat C Inmarsat C Inmarsat F	Some No Some Yes No
New Zealand	Sutron 9000RTU mSTAR-SHIP	MTSAT GPRS Cell	Yes No
Norway	AWS	-	some
Russia	GM6	Inmarsat C	Yes
South Africa	Vaisala Milos 520	Inmarsat C	Yes
Spain	Vaisala Milos	Inmarsat C	Yes
United Kingdom	Automet MINOS –GP MINOS-GPW BATOS AVOS Vaisala MAWS MetPod Metocean Deck Buoy	Inmarsat Argos Argos Inmarsat C (Data Reporting Mode) Inmarsat C Iridium Iridium Iridium	No No No Yes Yes Yes No No
United States	SEAS-AutoImet	SEAS	Some

B. SOOP

i. Expendable BathyThermograph (XBT)

XBT Probe	
National SOOP	**Equipment Type**
Australia	Sippican
United States	Sippican

ii. XBT Recorder System

XBT Recorder	
National SOOP	**Equipment Type**
Australia- BOM Australia- CSIRO	Devil XBT Devil XBT

iii. ThermoSalinoGraph (TSG)

Thermosalinograph (TSG)	
National SOOP	**Equipment Type**
United States	Seabird 21 TSG Seabird 38 Remote Temperature Sensor Seabird 45 MicroTSG

iv. Conductivity, Temperature, and Depth (CTD)

Conductivity, Temperature, and Depth (CTD)	
National SOOP	**Equipment Type**
United States	Seabird 19 Seabird 25 Seabird 911+

v. Expandable Conductivity, Temperature, and Depth (XCTD)

Expandable Conductivity, Temperature, and Depth (XCTD)	
National SOOP	**Equipment Type**
United States	Sippican TSK

vi. Acoustic Doppler Current Profile (ADCP)

Acoustic Doppler Current Profile (ADCP)	
National SOOP	**Equipment Type**
United States	RD Instruments

vii. Partial Pressure of CO_2 (pCO_2)

Partial Pressure of CO_2 (pCO_2)	
National SOOP	**Equipment Type**
Australia	CSIRO
United States	General Oceanics

viii. Moving Vessel Profiler

Moving Vessel Profiler	
National SOOP	**Equipment Type**
United States	Brooke
United States	Scripps

b. ASAP

ASAP TYPES and COMMUNICATIONS			
National ASAP	**CONTAINER**	**SOUNDING EQUIPMENT**	**SATELLITE TRANSCEIVER**
Denmark	10ft Container	MW12	
E-ASAP	10ft container 10ft container	MW21, version 2.17, Win2k MW21, version 2.17, WinNT	T&T 3026L/M T&T 3020-C
France	Deck launcher	MODEM SR2K	
Germany	20ft container 20ft container 20ft container 20ft container	MW21, version 1.26, WinNT MW21, version 2.17, Win2k MW21, version 2.17, WinNT MW21, version 2.17, WinNT	T&T 3020-C T&T 3020-C T&T 3020-C T&T 3020-C
Spain	10ft container	MW21, version 2.17, WinNT	T&T 3022?
Sweden	10ft container	MW21, version 2.17, Win2k	TT 3022D
United Kingdom	10ft Container & Deck launcher	MW21, version 2.17, Win2k	

ANNEX D

Electronic Logbook Inter-Comparison Test and Results

1. Objective

The objective of the inter-comparison was to compare the BBXX output from different types and versions of Electronic logbook software in common use, using identical test datasets.

The inter-comparison, as well as comparing the BBXX output, also checked the coding, computational algorithms, and the effectiveness of the in-built quality control mechanisms to reject 'bad' data.

2. Test Datasets

Three sets of metadata and associated test data were created, where each set formed a discrete observation (see *Annex 1*):

- Observation 1 is a straightforward, basic observation using 'estimated wind speed and direction' and MSL pressure.
- Observation 2 uses 'measured apparent wind speed and direction' and station level pressure.
- Observation 3 uses 'measured true wind speed and direction' and a MSL pressure below 1000.0hPa. It also contains some deliberate errors to test the inter-dependency of elements.

3. Instructions to Participants

The following instructions were provided to participants:

- Each Sample Observation has some associated metadata, which may or may not be required to be entered into the electronic logbook software before the entry of each observation.
- After configuring the electronic logbook software with the required metadata, enter each observation using the sample data.
- Sample Observation 3 contains some deliberate errors in the 'data' column. Compile the observation using the 'data' as supplied where possible. If or when the electronic logbook software rejects the data and requires valid data in order to proceed, enter the 'valid data' from column three. Please document each occasion when the software rejects the data and requires a different input to proceed.
- Produce a full coded observation output for each sample observation and copy this to a Word document, labelling the observation with the name of the electronic software used to produce it. Include comments relating to the entry of observation number 3.

4. E-Logbook types for Comparison

Sample Observations using the three main E-Logbook types were prepared as follows:

- TurboWin Version 2.12 by Julie Fletcher, MetService, New Zealand, *Annex 5*
- TurboWin Version 3.6 by Brian Sharp, Australian Bureau of Meteorology, *Annex 5*

- TurboWin Version 4.0 by Graeme Ball, Australian Bureau of Meteorology, *Annex 5*
- OBSJMA by Toshifumi Fujimoto, Japanese Meteorological Agency, *Annex 6*
- SEAS Version 6.57 by Robert Luke, NOAA, USA, *Annex 7*

For each test dataset, a manually coded observation was used as the control file.

5. Comparison of the Completed Observations

The three sample observations from the 5 E-Logbook types were compared and the discrepancies and variations noted.

A detailed comparison of observation one is in *Annex 2*, observation two in *Annex 3*, and observation three in *Annex 4*.

6. Overall Summary of E-Logbook Inter-comparison Results

In general, there was close agreement between the observations output by the 3 E-Logbook types (TurboWin, SEAS and OBSJMA). All E-Logbook software types have built in checks and balances, and sample observation number 3 tested the inter-dependency between various elements. All E-Logbook types required the wet bulb to be lower than or equal to dry bulb. All E-Logbook types recognized the relationship between present weather and cloud, between cloud amount, type and height, and between tendency code 4 and nil pressure change. In these cases, the E-Logbooks prompted the observer to amend the entry before the programme would move forward.

The significant variations between the 3 E-Logbook types are listed below:

- **Dewpoint** – Each of the 3 E-Logbook types produced a slightly different dewpoint result indicating the use of different background tables. TurboWin and OBSJMA produced dewpoint to one decimal place, while SEAS only produced dewpoint in whole numbers e.g. 2011/
- **Calculation of Apparent Wind Speed and Direction to True** – All 3 E-Logbook types produced the same True Wind Direction. The computed True Wind Speed varied by a couple of knots between the logbook types and between versions of TurboWin.
- **Wind Speed Unit** – OBSJMA and SEAS can only output wind speed in knots. TurboWin provides the option of knots or m/s.
- **Calculation of MSL Pressure** - Neither OBSJMA nor SEAS has the ability to calculate MSL pressure, so MSL pressure must be entered.
- **Inter-dependability** - Only OBSJMA recognized the relationship between Wind Speed and Wind Waves, requiring the observer to enter a higher wind wave to match the high wind speed. Only OBSJMA required ship speed to be entered, while SEAS and TurboWin allowed the non-entry of ship speed.

7. Recommendations

a. That all E-Logbook software report Dewpoint to one decimal place.

b. That the algorithm for calculating dewpoint be standardised between E-Logbooks.

c. That the coding of swell in TurboWin be revised to remove ambiguity and misunderstanding about the coding of the second swell. Presently, the drop-down list for the direction of second swell includes “no swell”, which can be interpreted to infer no second swell, but then codes dw2dw2 as 00 (calm) instead of // (no 2nd swell).

d. That TurboWin and SEAS software implement a QC check to correlate the reported wind speed with wind wave height.

e. That all E-Logbook software provides more information on screen to aid in the selection of correct code figures for Visibility (VV) and Height of base of lowest cloud (h) when the ranges and heights are at the boundaries of the levels. Refer to WMO manual on Codes (WMO No 306) FM13-XII Ext. SHIP. For VV refer to WMO code table 4377 and note that if the distance of visibility is between two of the distances given, the code figure for the smaller distance shall be reported. For h refer to WMO code table 1600 and note that a height exactly equal to one of the values at the ends of the ranges shall be coded in the higher range.

f. That SEAS and TurboWin prompt for the entry of ship speed if it is not entered.

Annex 1 **E-Logbook Comparison Raw Data Sets**

Observation 1	
Metadata	
Callsign	TEST1
Units of wind speed in final report i_w	Speed in knots
Precipitation Indicator i_R	No precipitation
Weather Group Indicator i_x	included
Wind Observation method	Estimated True Wind Speed & Direction
Barometer setting	MSL
Height of barometer above sea level	Not required
Method of taking Sea temperature	Bucket
Observed parameters	**Data**
UTC date YY	12th
UTC time GG	0000UTC
Latitude $L_aL_aL_a$	10.5 South
Longitude $L_oL_oL_oL_o$	24.7 West
Height of lowest cloud h	3000ft
Visibility VV	60km
Total Cloud N	3
Amount of low cloud N_h	1
Type of low cloud C_L	2
Type of medium cloud C_M	No cloud
Type of high cloud C_H	1
Wind Direction ***** dd	070 deg
Wind Speed ***** ff	08 knots
Dry Bulb Temp TTT	25.7 deg
Wet Bulb Temp $T_bT_bT_b$	21.9 deg
Sea temperature $T_wT_wT_w$*****	27.2 deg
MSL Pressure PPPP	1012.5 hPa
Pressure change characteristic a	Rising steadily /
Pressure change amount ppp	0.4 hPa
Present weather ww	State of the sky on the whole unchanged
Past weather W_1	No cloud
Past weather W_2	Cloud covering less than half the sky
Course of ship D_s	270 deg
Speed of ship v_s	15kts
Wind Wave period P_wP_w	6 seconds
Wind Wave Height H_wH_w	0.5 metre
Direction of Primary swell $d_{w1}d_{w1}$	230 deg
Direction of Secondary swell $d_{w2}d_{w2}$	No secondary swell
Primary swell period $P_{w1}P_{w1}$	6 seconds
Primary swell height H_{w1} H_{w1}	2.0 metres
Secondary swell period $P_{w2}P_{w2}$	No secondary swell
Secondary swell height H_{w2} H_{w2}	No secondary swell
*refer to metadata	

Observation 2	
Metadata	
Callsign	TEST2
Units of wind speed in final report i_w	Speed in knots
Precipitation Indicator i_R	No precipitation
Weather Group Indicator i_x	included
Wind Observation method	Measured Apparent Speed and Direction (off the bow clockwise)
Barometer setting	Station Level
Height of barometer above sea level	25 Metres
Method of taking Sea temperature	Engine room intake
Observed parameters	**Data**
UTC date YY	20th
UTC time GG	1200UTC
Latitude $L_aL_aL_a$	42.4 South
Longitude $L_oL_oL_oL_o$	168.5 East
Height of lowest cloud h	1000ft
Visibility VV	10km
Total Cloud N	8
Amount of low cloud N_h	7
Type of low cloud C_L	7
Type of medium cloud C_M	Not known
Type of high cloud C_H	Not known
Wind Direction ***** dd (apparent)	080 deg
Wind Speed ***** ff (apparent)	15 knots
Ship's ground course	340 deg
Ship's ground speed	20kts
Ship's heading	340 deg
Dry Bulb Temp TTT	12.5 deg
Wet Bulb Temp $T_bT_bT_b$	11.6 deg
Sea temperature $T_wT_wT_w$ *****	14.9 deg
Station Level Pressure PPPP *****	1000.6 hPa
Pressure change characteristic a	Falling steadily \
Pressure change amount ppp	1.5 hPa
Present weather ww	continuous light drizzle
Past weather W_1	Cloud covering more than half the sky
Past weather W_2	drizzle
Course of ship D_s	340 deg
Speed of ship v_s	20kts
Wind Wave period P_wP_w	4 seconds
Wind Wave Height H_wH_w	2.5 metre
Direction of Primary swell $d_{w1}d_{w1}$	250 deg
Direction of Secondary swell $d_{w2}d_{w2}$	150 deg
Primary swell period $P_{w1}P_{w1}$	5 seconds
Primary swell height $H_{w1}H_{w1}$	3.0 metres
Secondary swell period $P_{w2}P_{w2}$	8 seconds
Secondary swell height $H_{w2}H_{w2}$	2.0 metres
*refer to metadata	

Observation 3	
Metadata	

Callsign	TEST3	
Units of wind speed in final report i_w	Speed in m/s	
Precipitation Indicator i_R	No precipitation	
Weather Group Indicator i_x	included	
Wind Observation method	Measured True Wind Speed and Direction	
Barometer setting	MSL	
Height of barometer above sea level	Not required	
Method of taking Sea temperature	Not taken	
Observed parameters	**Data**	**Valid data to allow e-logbook entry to proceed**
UTC date YY	25th	
UTC time GG	1800UTC	
Latitude $L_aL_aL_a$	54.3 North	
Longitude $L_oL_oL_oL_o$	151.6 West	
Height of lowest cloud h	1500ft	Cloudless
Visibility VV	4km	
Total Cloud N	0	
Amount of low cloud N_h	2	0
Type of low cloud C_L	1	No cloud
Type of medium cloud C_M	No cloud	
Type of high cloud C_H	No cloud	
Wind Direction ***** dd	330 deg	
Wind Speed ***** ff	15 m/s	
Dry Bulb Temp TTT	-0.6 deg	2.5deg
Wet Bulb Temp $T_bT_bT_b$	2.5 deg	-0.6 deg
Sea temperature $T_wT_wT_w$	No data	
MSL Pressure PPPP	982.5 hPa	
Pressure change characteristic a	No change	
Pressure change amount ppp	0.5 hPa	0.0
Present weather ww	Intermittent light rain	Rain in the past hour, but not at the time of observation
Past weather W_1	Cloud covering less than half the sky	
Past weather W_2	rain	
Course of ship D_s	070 deg	
Speed of ship v_s	Not given	22kts
Wind Wave period P_wP_w	6 seconds	3 seconds
Wind Wave Height H_wH_w	0.5 metre	4.0 metres
Direction of Primary swell $d_{w1}d_{w1}$	130 deg	
Direction of Secondary swell $_{w2}d_{w2}$	No secondary swell	
Primary swell period $P_{w1}P_{w1}$	7 seconds	
Primary swell height $H_{w1}H_{w1}$	2.5 metres	
Secondary swell period $P_{w2}P_{w2}$	No second swell	
Secondary swell height $H_{w2}H_{w2}$	No second swell	
*refer to metadata		

Annex 2 TEST 1 – Resultant BBXX and detailed Comparison

Note: The name of the E-logbook type has been entered in the 'callsign' position for comparison purposes. MAN is the manually coded observation.

BBXX TW212 12003 99105 50247 41699 30708 10257 20199 40125 52004 70200 81201 22263 02272 20601 323// 40604 5//// 80219

BBXX TW36 12003 99105 50247 41699 30708 10257 20199 40125 52004 70200 81201 22263 02272 20601 323// 40604 5//// 80219

BBXX TW40 12003 99105 50247 41599 30708 10257 20199 40125 52004 70200 81201 22263 02272 20601 32300 40604 5//// 80219

BBXX SEAS 12003 99105 50247 41599 30708 10257 2020/ 40125 52004 70200 81201 22263 02272 20601 323// 40604 5//// 6//// 80219 ICE /////=

BBXX OBSJMA 12003 99105 50247 41599 30708 10257 20202 40125 52004 70200 81201 22263 02272 20601 323// 40604 80219

BBXX MAN 12003 99105 50247 41699 30708 10257 20199 40125 52004 70200 81201 22263 02272 20601 323// 40604 5//// 80219

Comparison of Observation TEST1

1. All versions of TurboWin produced essentially the same output, the only exception being the choice of the height range for the 'height of the lowest cloud'. TW 2.12., 3.6 and MAN = 6, TW 4.0, OBSJMA, SEAS = 5. This is due to observer interpretation and is not significant, but could be alleviated by improved on-screen instructions.
2. All Versions coded 'no secondary swell' as 323//, exception of TW 4.0 coded 32300. In the case of TW 4.0, the 'no swell' option was selected from the drop-down list under Swell 2 direction.
3. Manually coded Ob same as TurboWin outputs.
4. Dewpoint – JMA = 20.2, ALL TW & MAN 19.9, SEAS 20/
5. JMA required height of cloud to be entered in metres not feet, result as above.
6. SEAS same as JMA & TW except for dewpoint. Groups 6//// ICE ///// added automatically

TEST1 Summary

This was a basic Ob using estimated WSD and MSL pressure

- All E-logbooks (& manual Ob) produced almost identical Obs.
- All correct selection of iw figure, Quadrant, WSD, MSL pressure, SST method
- Dewpoint is main area of difference – TurboWin the same, OBSJMA similar, SEAS to whole numbers
- Insignificant difference in selection of height of lowest cloud
- Perhaps TurboWin requires an additional option of 'swell not determined', code // rather than just 'no swell', code 00, to prevent ambiguity.

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Annex 3 TEST 2 – Resultant BBXX and detailed Comparison

Note: The name of the E-logbook type has been entered in the 'callsign' position for comparison purposes. MAN is the manually coded observation.

BBXX TW212 20124 99424 31685 41497 81221 10125 20108 40036 57015 75152 877// 22284 00149 20405 32515 40506 50804 80116

BBXX TW36 20124 99424 31685 41497 81223 10125 20108 40036 57015 75152 877// 22284 00149 20405 32515 40506 50804 80116

BBXX TW40 20124 99424 31685 41396 81223 10125 20108 40036 57015 75152 877// 22284 00149 20405 32515 40506 50804 80116

BBXX SEAS 20124 99424 31685 41496 81222 10125 2011/ 40006 57015 75152 877// 22274 00149 20405 32515 40506 50804 6//// 80116 ICE /////=

BBXX OBSJMA 20124 99424 31685 41497 81223 10125 20109 40036 57015 75152 877// 22284 00149 20405 32515 40506 50804 80116

BBXX MAN 20124 99424 31685 41497 81223 10125 20108 40036 57015 75125 877// 22284 00149 20405 32515 40506 50804 80116

Comparison of Observation TEST2

1. Correction of apparent WSD to True WSD. Wind Speed in knots – TW2.12= 21, TW3.6 = 23, TW4.0 = 23, MAN = 23, OBSJMA = 23, SEAS = 22. Wind Direction in all versions = 120 deg.
2. TW requires Visibility in nautical miles, the example was in km. SEAS & TW4.0 Vis = 96, TW 2.12, TW 3.6, OBSJMA and MAN Vis= 97. Although the difference is not significant, it could be alleviated by improved on-screen instructions.
3. All versions (including manual) coded 4 for 'height of the lowest cloud', TW4.0 coded 3. Insignificant
4. Past weather all E-versions selected with highest number coded first (52), MAN (25) done chronologically (a NZ National variation)
5. Dew point - OBSJMA = 10.9, ALL TW & MAN 10.8, SEAS 11/
6. Calculation of MSL, all TW and MAN = 1003.6hPa, OBSJMA no correction function, so pressure calculated manually from tables and corrected reading (1003.6) entered in OBSJMA. SEAS have no correction function, so station level pressure (1000.6) entered in SEAS ob.
7. OBSJMA links present weather with visibility, warning that with 51, present weather, Visibility cannot exceed 10km.
8. Ship Course Ds was 8 for all TW, JMA and manual. SEAS coded 7 – not significant.

TEST2 Summary

This Ob required the calculation of True WSD and MSL Pressure

- All produced True wind direction of 120 deg
- True wind speed varied from 21 -23 Kts
- All TW and the manual Ob produced MSL pressure. Neither OBSJMA nor SEAS has the ability to calculate MSL pressure, but OBSJMA made the calculation manually and entered MSL pressure in the OB. SEAS coded the station level pressure.
- Dewpoint differences as in TEST1
- All used correct iw figure
- All coded correct SST method

Annex 4 TEST 3 – Resultant BBXX and detailed Comparison

Note: The name of the E-logbook type has been entered in the 'callsign' position for comparison purposes. MAN is the manually coded observation.

BBXX TW212 25181 99543 71516 41996 03315 10025 21072 49825 54000 72160 80000 2222/ 20601 313// 40705 5//// 81006

BBXX TW36 25181 99543 71516 41995 03315 10025 21072 49825 54000 72160 80000 2222/ 20601 313// 40705 5//// 81006

BBXX TW40 25181 99543 71516 41995 03315 10025 21072 49825 54000 72160 80000 22225 20601 313// 40705 5//// 81006

BBXX SEAS 25184 99543 71516 41996 03329 10025 2107/ 49825 54000 72160 80000 2221/ 0//// 20601 313// 40705 5//// 6//// 81006 ICE /////=

BBXX OBSJMA 25184 99543 71516 41996 03329 10025 21063 49825 54000 72160 80000 22225 20608 313// 40705 81006

BBXX MAN 25181 99543 71516 41996 03315 10025 21071 49825 54000 72106 80000 22225 20308 313// 40705 5//// 81006

Comparison of Observation TEST3

E-logbook type	iw	Qc Quadrant	H Height base lowest cld	Vis	N Total cloud	WS	Dry bulb	Dew point	appp	wwW1W2
Manual	1	7	9	96	0	15 m/s	10025	21071	4000	2106
TW 2.12	1	7	9	96	0	15m/s	10025	21072	4000	2160
TW 3.6	1	7	9	95	0	15m/s	10025	21072	4000	2160
TW 4.0	1	7	9	95	0	15m/s	10025	21072	4000	2160
OBSJMA	4	7	9	96	0	29 kts	10025	21063	4000	2160
SEAS	4	7	9	96	0	29 kts	10025	2107/	4000	2160

E-logbook type	Nh Total Low cloud	Vs vessel speed	Wet bulb	Wind waves						
Manual	0	5	81006	20308						
TW 2.12	0	/	81006	20601						
TW 3.6	0	/	81006	20601						
TW 4.0	0	5	81006	20601						
OBSJMA	0	5	81006	20608						
SEAS	0	/	81006	20601						

1. All the TW & SEAS entries accepted low wind wave with high WS. Manual Ob recognized the relationship between high WS and wind waves.
   OBSJMA recognized a relationship between high WS and wind wave height, but not period

2. All E-logbooks rejected Present weather of intermittent light rain with no Cloud, entering instead ‘rain in the past hour’ code 21.

3. Past weather all E-versions selected with highest number coded first (60), MAN (06) done chronologically (a NZ National variation)

4. All E-logbooks required wet bulb to be lower than/equal to dry bulb, and would not allow reversed entries to be entered.

5. Dewpoint - OBSJMA = -6.3, ALL TW = -7.2, MAN -7.1, SEAS -7/

6. OBSJMA and SEAS do not have the option of outputting wind speed in m/s. Entry was made in kts using the correct iw code figure.

7. TW and SEAS allowed non-entry of ship speed, although TW4.0 chose to enter the speed. OBSJMA required ship speed entry.

8. All TW, SEAS & OBSJMA required tendency 4 with 000 change.

9. All TW, SEAS & OBSJMA recognized total 0 cloud affects low cloud amount, cloud type, cloud height and present weather.

10. Only SEAS coded 0//// for no SST data, rest E-Logbooks omitted group.

11. All TW and SEAS code 5//// when there is no secondary swell group, OBSJMA omits the group.

12. All SEAS obs include groups 6//// ICE /////

TEST3 Summary

This Ob was designed to test the checks and balances within the E-logbook software concerning inter-dependability of parameters.

- OBSJMA and SEAS can only output wind speed in knots. TurboWin provides the option of knots or m/s
- Only OBSJMA recognized the relationship between high WS and wind waves
- All E-logbooks required wet bulb to be lower than/equal to dry bulb, and would not allow reversed entries to be entered
- Dewpoint differences as in TEST1 and TEST2
- All E-logbooks recognized the relationship between present weather and cloud and would not allow present weather ‘intermittent light rain’ to be coded with ‘no cloud’
- All E-logbooks recognized the relationship between cloud amount, low cloud amount, cloud type and cloud height
- All E-logbooks linked tendency code 4 with nil pressure change
- Only OBSJMA required ship speed to be entered, SEAS and TurboWin allowed non-entry of ship speed.

____

Annex 5 TurboWin TEST Observations

TurboWin TEST observations were submitted in March 2008.

TurboWin 2.12 – Julie Fletcher, MetService NZ

BBXX TEST1 12003 99105 50247 41699 30708 10257 20199 40125 52004 70200 81201 22263 02272 20601 323// 40604 5//// 80219

BBXX TEST2 20124 99424 31685 41497 81221 10125 20108 40036 57015 75152 877// 22284 00149 20405 32515 40506 50804 80116

BBXX TEST3 25181 99543 71516 41996 03315 10025 21072 49825 54000 72160 80000 2222/ 20601 313// 40705 5//// 81006

Notes on Inter-dependability in Ob 3

1. It does allow non-entry of ship speed vs
2. It does allow entry of long period (6 sec) and low wave height (0.5m) for wind waves even when 15m/s of actual wind is coded.
3. Does not allow 0.5hPa AP change with 'no change' characteristic (4) – had to code 0.0hPa to move forward
4. Does not allow warmer WB than DB – entries reversed
5. Does not allow 2/8 low cloud when total = 0, changed to 0/8 low cloud
6. Does not allow a cloud height if total = 0, 'cloudless' entered
7. Does not allow a low cloud type to be entered if no low cloud – 'no cloud' entered
8. Does not allow present weather Rain with 0 cloud – had to change ww to rain in past hour

Note - entry of Visibility in TW2.12 is in nautical miles not km.

TurboWin 3.6 – Brian Sharp, Australian Bureau of Meteorology

BBXX TEST1 12003 99105 50247 41699 30708 10257 20199 40125 52004 70200 81201 22263 02272 20601 323// 40604 5//// 80219

BBXX TEST2 20124 99424 31685 41497 81223 10125 20108 40036 57015 75152 877// 22284 00149 20405 32515 40506 50804 80116

BBXX TEST3 25181 99543 71516 41995 03315 10025 21072 49825 54000 72160 80000 2222/ 20601 313// 40705 5//// 81006

Prompts from TurboWin 3.6 re last observation

Air temperature must be greater than or equal to wet bulb

If cloud cover = cloudless Cl must be 0/8

If total cloud cover = cloudless then Ch Cm and Ch must be 0/8

If air pressure characteristics = steady amount of pressure tendency is zero.

TurboWin 4.0 – Graeme Ball, Australian Bureau of Meteorology

BBXX TEST1 12003 99105 50247 41599 30708 10257 20199 40125 52004 70200 81201 22263

02272 20601 32300 40604 5//// 80219

BBXX TEST2 20124 99424 31685 41396 81223 10125 20108 40036 57015 75152 877// 22284 00149 20405 32515 40506 50804 80116

BBXX TEST3 25181 99543 71516 41995 03315 10025 21072 49825 54000 72160 80000 22225 20601 313// 40705 5//// 81006

Notes on TEST3 during data entry
----
(1) Air temp must be >= wet bulb
(2) Speed of ship if left as unknown (default option) then accepted, but if set to 0 then ship must be stationary
(3) If total cloud cover = cloudless then Cl must be 0/8
(4) If total cloud cover = cloudless then height of base of lowest cloud must be cloudless

Notes on TEST3 prior final message generation
----
(1) If pressure tendency = steady then amount must be 0
(2) If total cloud cover = cloudless then Cl must be no clouds
(3) If total cloud cover = 0 then present weather cannot indicate drizzle at the time of observation

Additional notes
----
(1) Original wind wave data did not give rise to any error messages

Annex 6 OBSJMA TEST Observations

Submitted by Toshifumi Fujimoto, Japanese Meteorological Agency, March 2008

Observation 1 (OBSJMA)

BBXX TEST1 12003 99105 50247 41599 30708 10257 20202 40125 52004 70200 81201 22263 02272 20601 323// 40604 80219

(Note)
As the height of lowest cloud should be input in the unit of metre for OBSJMA, we input 914.4 m instead of 3000 ft.

Observation 2 (OBSJMA)

BBXX TEST2 20124 99424 31685 41497 81223 10125 20109 40036 57015 75152 877// 22284 00149 20405 32515 40506 50804 80116

(Note)
As the height of lowest cloud should be input in the unit of metre for OBSJMA, we input 304.8 m instead of 1000 ft.
As OBSJMA does not have a function of correcting station level pressure into MSL pressure automatically, we corrected the station level pressure, 1000.6 hPa, into the MSL pressure, 1003.6 hPa, manually using our height correction table.
OBSJMA warned, “Under the present weather, visibility can't be over 10km. (RxhVV, 7wwWW)”.

Observation 3 (OBSJMA)

BBXX TEST3 25184 99543 71516 41996 03329 10025 21063 49825 54000 72160 80000 22225 20608 313// 40705 81006

(Note)
As height of lowest cloud should be input in the unit of metre for OBSJMA, we input 457.2 m instead of 1500 ft (*).
As wind speed should be input in the unit of knots for OBSJMA, we input 29 knots instead of 15 m/s.
The warning messages of OBSJMA were as in the below table for entering the given values of Observation 3.
As OBSJMA made no warning for wind wave period, we did not change the value 6 seconds into 3 seconds.

Observed parameters	Data	Warning in inputting data	Warning in saving data
Height of lowest cloud h	457.2 m (*)		When total cloud cover is 0, enter '9' as the cloud height.(Nddff,RxhVV)
Amount of low cloud N_h	2		Total cloud cover can't be smaller than the amount of the lowest cloud.(Nddff,8nLMH)
Type of low cloud C_L	1		When total cloud cover is 0, 8nLMH should be '80000'.(Nddff,8nLMH)
Dry Bulb Temp TTT	-0.6 deg	Element (Wet bulb temperature) must be smaller than or equal to Element (Air temperature)	
Wet Bulb Temp $T_bT_bT_b$	2.5 deg	Element (Wet bulb temperature) must be smaller than or equal to Element (Air temperature)	
Pressure change amount ppp	0.5 hPa	If Element (Type of tendency) equal 4, Element (Amount of change) equal 0	
Present weather ww	Intermittent light rain		Present weather and type of CL clouds are inconsistent.(7wwWW,8nLMH) Present weather and type of CM clouds are inconsistent.(7wwWW,8nLMH) Total cloud cover can't be 0 under the present weather.(Nddff,7wwWW)
Speed of ship v_s	Not given		Ship's average speed must be entered.(222Dv)
Wind Wave period P_wP_w	6 seconds		No warning
Wind Wave Height H_wH_w	0.5 metre		Wind speed is too fast considering the wave height.(Nddff,2PwHw)

Annex 7 **SEAS TEST Observations**

Submitted by SEAS by Robert Luke, NOAA, USA, March 2008.

VOS Panel International E-Logbook Inter-comparison

<u>Electronic Logbook Types to be included in the Inter-comparison</u>
SEAS Version 6.57

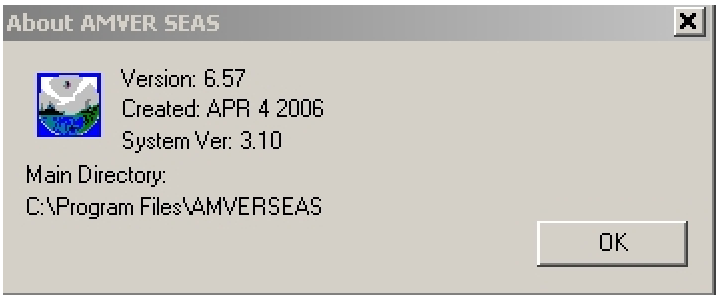

Figure 1 - SEAS VERSION DETAILS

<u>The Sample Observations</u>

Notes:

1. For all three observations, assumed Dry Bulb temperature was measured and not a computed value.

Observation 1
BBXX TEST1 12003 99105 50247 41599 30708 10257 2020/ 40125 52004 70200 81201 22263 02272 20601 323// 40604 5//// 6//// 80219 ICE /////=

Notes:
1. Past Weather 1(W_1) could not be encoded with a lower code value than Past Weather 2 (W_2). Data parameters switched and observation encoding accepted.

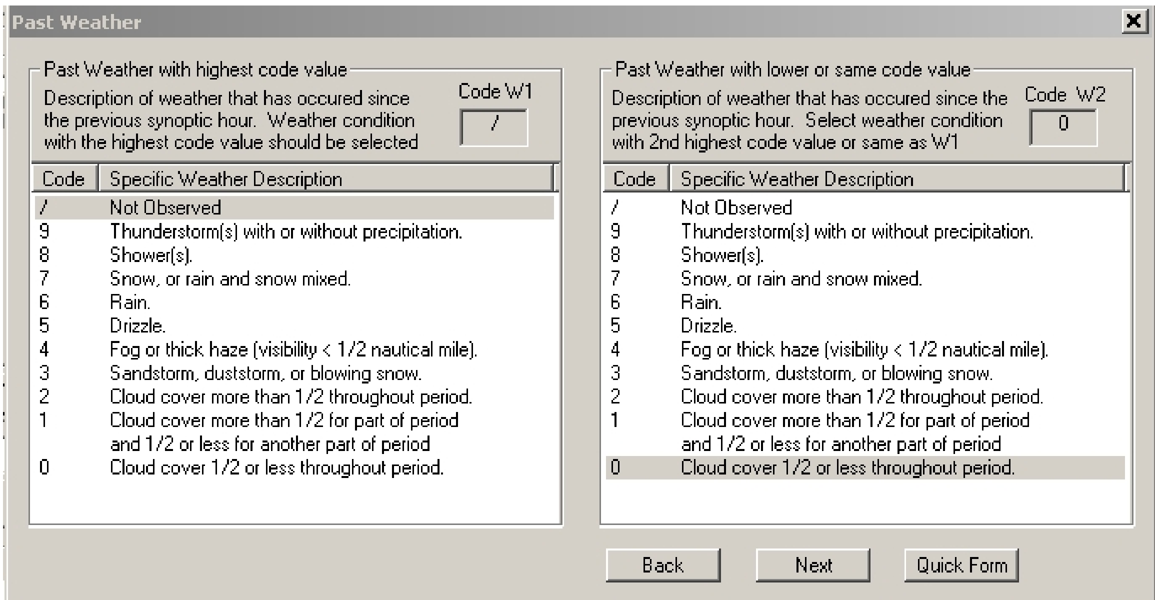

Figure 2 - Initial Past Weather Encoding

Figure 3 - past Weather Error Notice

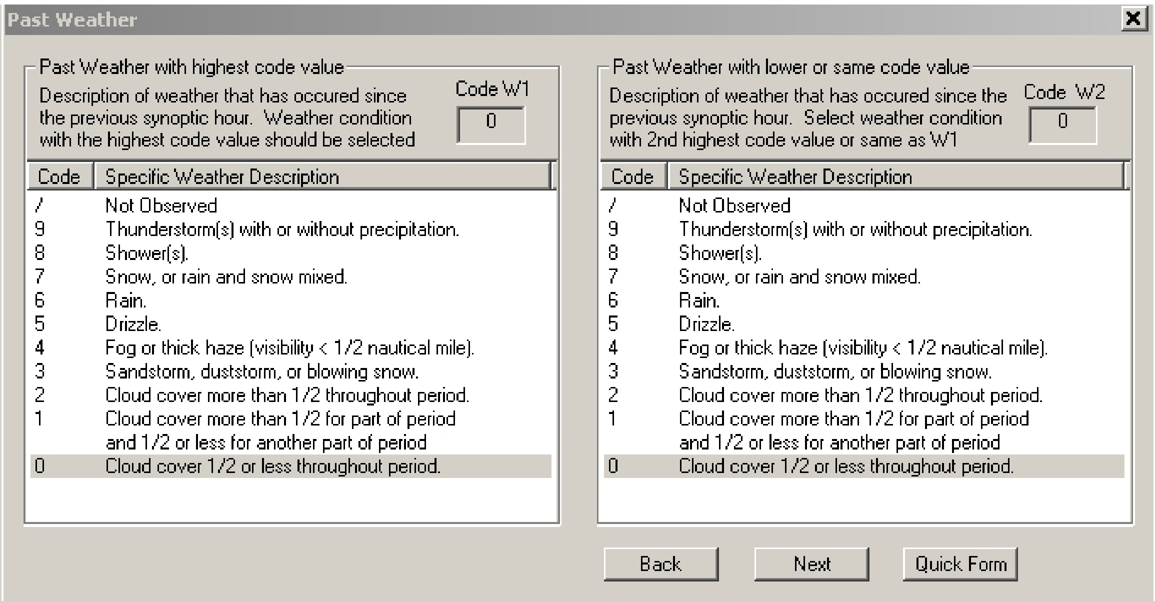

Figure 4- Correction to Past Weather parameters

Observation 2
BBXX TEST2 20124 99424 31685 41496 81222 10125 2011/ 40006 57015 75152 877// 22274 00149 20405 32515 40506 50804 6//// 80116 ICE /////=

Notes:

1. Height of lowest cloud could either be a code figure 3 or 4. Selected 4 due to prevailing visibility value.
2. Past Weather 1(W_1) could not be encoded with a lower code value than Past Weather 2 (W_2). Data parameters switched and observation encoding accepted.

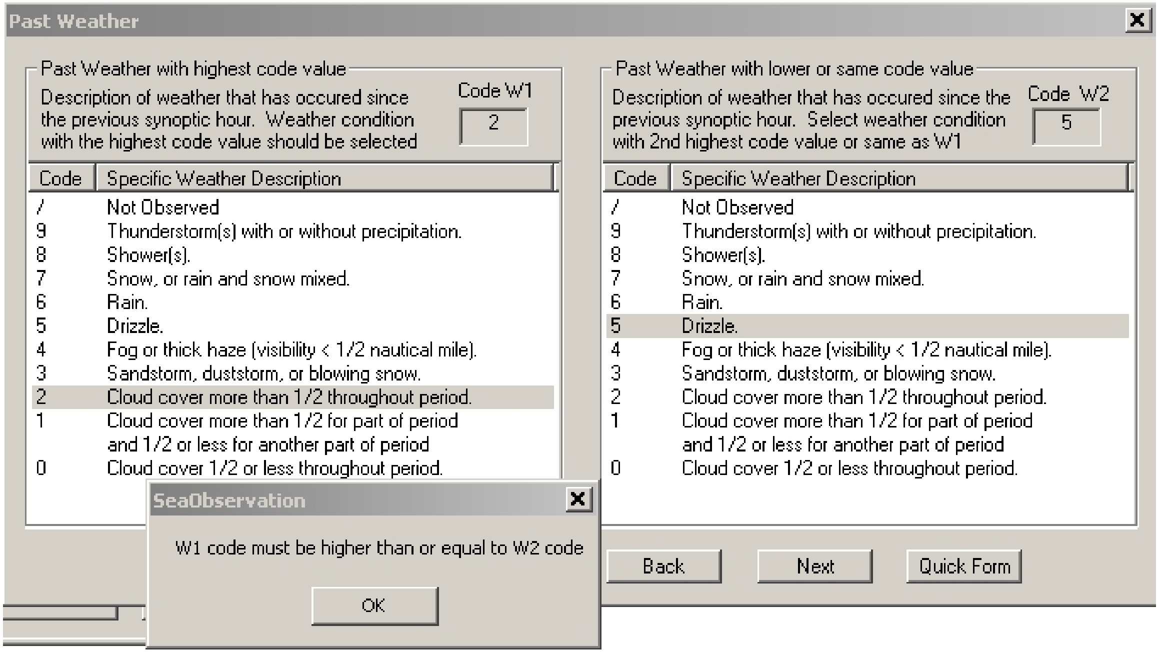

Figure 5 - TEST 2 past weather selection priority issue

Observation 3

BBXX TEST3 25184 99543 71516 41996 03329 10025 2107/ 49825 54000 72160 80000 2221/ 0//// 20601 313// 40705 5//// 6//// 81006 ICE /////=

Notes:

1. This is a corrected observation. Seas would not accept the values that were in error.
2. SEAS allow Observer to override QC if they feel data is truly correct. However, this is not set as default choice.

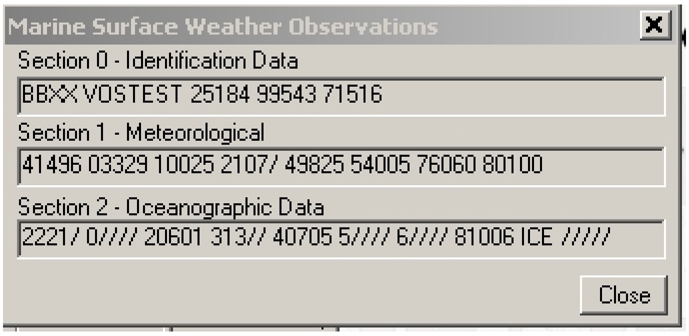

Figure 6 - Encoded observation with errors before QC Review

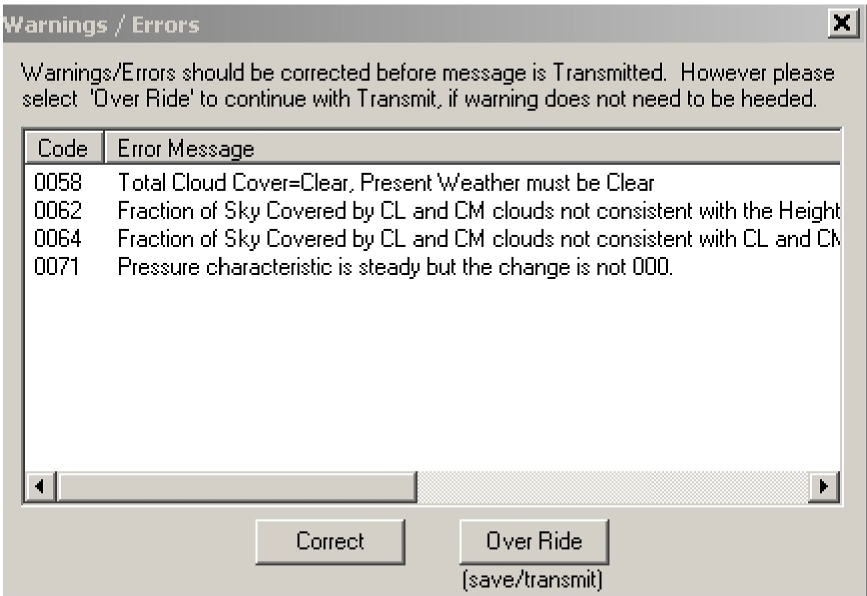

Figure 7 - TEST3 List of encoded errors

ANNEX E

E-Logbook Manufacturers Responses

10/09/08 KNMI - comments about correlation of Wind Speed, wave height and ship position – a warning may not always valid if ship in e.g. lee conditions

11/09/08 JMA – OBSJMA can calculate MSL manually. Position – can't check for position sequence, but checks for and rejects positions over land

12/09/08 NOAA – SEAS checks for position errors – compares successive positions and flags a huge distance to alert to position errors

12/09/08 Graeme Ball – no swell coding reply to KNMI. Requests information on how calm sea is coded in all E-logbooks.

12/09/08 KNMI – Likes Graeme Ball's suggested redesign of swell pages for TurboWin. Comments about 'no swell' 3 group = 30000. Climate community had in the past-advised KNMI that they wanted to see 40000 and 50000 to show zero period and zero height.

17/09/08 Sarah North - comments on KNMI's wind speed and wind wave correlation-warning message – re lee conditions etc.

17/09/08 Gustavo Goni – Says should be easy to get SEAS to report Dew point to 10ths. SEAS Wind Speed entry is in knots – he questions whether there should be a check box warning to show entry is in knots.

19/09/08 Sarah North - Do other countries use E-logbooks on rigs? Wants groups with no data (e.g. 5////) omitted to save communications costs

23/09/08 KNMI – Is adding a warning message re wind/wave correlation. Will be in TurboWin ver4.5

24/09/08 NOAA – Using SEAS and reporting zero swell or calm, SEAS outputs 3//// 4//// 5////.
SEAs can be used for fixed stations, but position needs to be entered at every Ob, and course and speed entered as stationary. Air Pressure can only be entered as MSL. WSD is at station height (like a ship); the actual observing height is contained in the SEAs setup data, which forms part of the SEAS archive. There is no specific 'land' setup, just a ship set up.

3, 10 and 29 Oct 2008 – JMA – OBSJMA used for ship data only (no land applications).
JMA omits groups 3, 4 and 5 in the case of no swell, or no observation of swell. A screen dump example of 'no swell' selected showed an output, which omitted groups 3, 4 and 5.

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ANNEX F

Electronic Logbook Inter-Comparison Report

1. Background

At SOT-IV, Geneva, April 2007, the ETMC recommended that the Task Team on Instrument Standards should compare the output from the different types of electronic logbook software and report on the findings. Refer SOT-IV Final Report Items I-2.1.13 and IV-3.5.7.

2. Objective

The objective of the inter-comparison was to compare the BBXX output from different types and versions of Electronic logbook software in common use, using identical test datasets.
The inter-comparison, as well as comparing the BBXX output, also checked the coding, computational algorithms, and the effectiveness of the in-built quality control mechanisms to reject 'bad' data.

3. The Inter-Comparison

In February 2008, three sets of metadata and associated raw observation data were created and sent to volunteers to use to compile observations using the various types of E-Logbook. The resultant coded BBXX observations were then compared and a report on the findings including summary and recommendations was produced on 14 August 2008. (*Annex D*).

4. Feedback from E-Logbook Manufacturers

The ‘E-Logbook Inter-Comparison Results’ report was sent to the three E-logbook manufacturers (KNMI for TurboWin, JMA for OBSJMA and NOAA for SEAS) and the members of TT on Instrument Standards, on 2 September 2008, seeking feedback on how the Recommendations might be implemented. The manufacturers’ responses are summarized in *Annex E*. Discussion centred on the recommendations made in the report, but widened to examine practices regarding the coding of swell and look at whether groups with no data could be omitted from transmission to save communications costs. A check was also made to find out whether the three E-logbook types checked for position errors, and it was found that both TurboWin and SEAs checks successive positions and queries the entry if the ship has moved an abnormal distance, while both TurboWin and OBSJMA query positions reported ‘over land’.

5. Swell Coding

In the feedback that followed the circulation of the Inter-Comparison Report, there was considerable discussion about the coding of swell, in particular the need to differentiate between swell not observed (i.e. no data) and no swell (calm sea). The Inter-Comparison revealed that the 3 E-logbook types coded these differently. For example, 'no swell' entered in SEAS, produces an output of 3//// 4//// 5////, while OBSJMA omits groups 3, 4 and 5 in the case of 'no swell' or 'no observation of swell'. TurboWin codes 3000 4//// 5////. There was also discussion about the need to transmit groups containing no data, with a strong plea to reduce the number of groups transmitted to save on communications costs.

In an effort to force consistency across all E-logbook types, and (1) considering the interpretation by some participants in the comparison regarding the coding for FM13 in the WMO Manual on Codes No.306, and (2) a desire to reduce transmission costs by omitting groups with no useful data, the Task Team proposes five recommendations regarding the coding of swell. These are described in full under **6.Recommendations No. 3** below.

6. Recommendations

The Task Team proposes that Recommendations numbers 1, 2, 4, 5 and 6 from the original report be accepted, and that Recommendation No.3 regarding swell be extended to cover all swell coding options as described below.

1. That all E-Logbook software report Dewpoint to one decimal place.

2. That the algorithm for calculating dewpoint be standardised between E-Logbooks.

3. Swell coding:

   (1) When swell 'not determined' = 3//// 4//// 5////. Recommendation is to omit the 3, 4 and 5 groups in the coded observation.

   (2) When 'no swell' i.e. calm sea = 30000 40000 50000. Recommendation is to code 30000 and omit the 4 and 5 groups in the coded observation. By inference, if the 3 group is reported as 30000 then the 4 and 5 groups **must** be 40000 and 50000 respectively, in which case they provide no useful additional information.

   (3a) When confused swell (plus confused height and period) = 399/// 4//// 5////. Recommendation is to omit the 5 group in the coded observation.

   (3b) When confused swell (height and period estimated) = 399// 4xxxx 5////. Recommendation is to omit the 5 group in the coded observation. Note: x = valid data

   (4) Coding of 1 swell = 3xx// 4xxxx 5////. Recommendation is to omit the 5 group in the coded observation. Note: x = valid data

   (5) Coding 2 swells = 3xxxx 4xxxx 5xxxx. Recommendation is to code all groups. Note: x = valid data

4. That TurboWin and SEAS software implement a QC check to correlate the reported wind speed with wind wave height.

5. That all E-Logbook software provide more on-screen information to aid in the selection of the correct code figures for Visibility (VV) and Height of base of lowest cloud (h) when the ranges and heights are at the boundaries of the levels. Refer to WMO manual on Codes (WMO No 306) FM13-XII Ext. SHIP. For VV refer to WMO code table 4377 and note that if the distance of visibility is between two of the distances given, the code figure for the smaller distance shall be reported. For h refer to WMO code table 1600 and note that a height exactly equal to one of the values at the ends of the ranges shall be coded in the higher range.

6. That SEAS and TurboWin prompt for the entry of ship speed if it is not entered.

ANNEX G

Changes for ISO 10596 recommended by the SOT Task Team on Instrument Standards, and the JCOMM focal point on CIMO matters

1. Background

Discussions were established between the SOT Task Team on Instrument Standards and Dr. Chung-Chu Teng (NOAA, National Data Buoy Center, USA), the JCOMM Focal Point on WMO Commission for Instruments and Methods of Observation (CIMO) matters (FP/CIMO) in order to coordinate efforts between SOT and ISO and contribute to the development of ISO standard 10596 for marine wind vanes and anemometers.

2. Objective

The objective of the SOT-TT and the efforts of the FP/CIMO were to ensure that the marine observing community and equipment quality standards were maintained as per the WMO No. 8 Publication.

3. The Inter-Comparison

In November 2008, the FP/CIMO and the SOT Task Team on Instrument Standards Chairperson (Robert Luke, NOAA, National Data Buoy Center) held discussions regarding the proposed ISO 10596 changes. Numerous items did not match with the WMO No. 8 even though the ISO 10596 used the WMO No. 8 as one of its main references.

The list of changes suggested by the FP/CIMO and the SOT Task Team on Instrument Standards were:

Initial Comment from FP/CIMO –

- ‘While this standard directly relates to marine applications it should not define different ISO test standard for anemometer and wind vane accuracy or performance. Any difference in testing should be directly related to the marine environment. If multiple ISO standards exist, some not as stringent as other, the consumer will not have a clear understanding of what quality sensor they are dealing with if it is stated that it was tested to ISO standards.”

Section 1- Scope

- Replace “velocity” with “speed”
- FP/CIMO Comment – “Wind velocity is a vector measurement indicating wind speed and direction. Care should be taken not to use speed, a scalar value, and velocity as interchangeable.”

Section 3 – Terms and definitions

- 3.1 should read “magnitude of straight-line moving distance of airflow per unit time on a horizontal plane passing through the anemometer.”
- 3.2 should read, “wind direction is the direction from where the wind is blowing from on a horizontal plane passing through the wind vane.”
- 3.3 If wind speed measurement range is defined, the wind direction measurement range should also be defined:

  “wind direction measurement range - range of measurable wind direction within the accuracy specified in this standard.”
- 3.4 should read "range of airflow temperature in which wind speed and wind direction can be measured within the accuracy specified in this standard."

- 3.5 should read, "the distance the air flows past a rotating type anemometer during the time it takes the rotor to reach (1-1/e) or 63% of the equilibrium speed after a step increase change in air speed."
- .3.6 should read "the amount by which a measurement made by a wind vane/anemometer exceeds or falls short of the true values of wind speed and direction."
- Add Time Constants definition of "the time required for a wind sensor to detect and report a ~63% of a step-function change of the input speed."
- Add Relative Wind Speed and direction "Wind Speed and direction as described above but without compensating for the actual course and speed of the ship."
- Add True Wind Speed and direction "Wind Speed and direction as described above but corrected for ships' own course and speed. "

Section 4 – Type

- FP/CIMO comment "The use of the term anemometer to strictly represent a device to measure wind speed becomes problematic with the introduction of ultrasonic anemometer since they measure both speed and direction without the use of a wind vane."
- 4.1.1 should read "A rotation anemometer whose axis of rotation is horizontal. The instrument has, either flat or helicoidally shaped blades. The axis of rotation has to be oriented parallel to the direction of the wind by an auxiliary wind vane."
- 4.1.2. should read "A rotation anemometer whose axis of rotation is vertical. Cup anemometers with wind vane usually consist of three or four hemispherical or conical cups mounted with their diametrical planes vertical and distributed symmetrically about the axis of rotation. A cup anemometer does not require the use of a wind vane for its correct orientation.
  A wind vane consists basically of an asymmetrically-shaped object mounted at its centre of gravity about a vertical axis of rotation."

- 4.2 should read "An anemometer which measures the effect of the local wind speed and wind direction on the propagation of ultra sonic waves in the air."

Section 5 – Composition

- FP/CIMO Comment "Two other issues should be addressed in composition. First, most meteorological applications measure the averages of wind speed and direction and provide data on wind gusts. Hence, a complete system should include a processing device that can produce averaged data between 2, 10 and 60 minutes and peak gust information. The second issue for measuring wind speed and direction on ships is distinguishing between relative and true wind. For meteorological purposes, true wind data is required. Hence, ship speed and direction must be corrected in the relative wind measurement."
- 5 should read "A wind vane/anemometer is composed of the wind vane/anemometer sensor (hereafter simply referred to as "sensor"), display, etc. The sensor shall have measurement functions for wind direction and wind speed, and the display shall be capable of indicating the measured wind direction and wind speed."

Section 6 – Functionality

- FP/CIMO Comment "This functionality description is centred on ships. What about other marine platforms for wind measurement."
- 6.2 should read, "The sensor shall have measurement functions for wind direction and wind speed, whose range and accuracy are specified 7.1 and 7.2 respectively, and the display shall be capable of indicating the measured wind direction and wind speed.
- 6.2 should read, **"**The wind vane/anemometer shall be capable of outputting analogue or digital signals, which can be distributed to the bridge and other necessary locations. Where digital signals are used, at least one of them shall satisfy IEC 61162-1.
- FP/CIMO Comment "There should be some discussion on sensor positioning for optimal wind speed and direction measurement. It is difficult to provide good wind sensor exposure on a ship to prevent local effects produced by the mast, superstructure, etc. Section 4.2.5.2 of

Chapter 4 of Part II of the CIMO Guide provides some guidelines for shipboard wind sensor positioning."

Section 7 – Performance and accuracy

- 7.1 Table 1 – Wind Speed Measurement range should be increased to 75 m/s to match WMO No. 8 requirements.
- 7.1 Table 1 – Wind direction Minimum measurement unit should be decreased to 01° to match WMO No. 8 requirements.
- 7.2 Table 2 – Wind Speed accuracy should use "speed" not "velocity."
- 7.3 a) should read, "At the minimum level of the wind speed measurement range, the propeller, or cup of an anemometer shall start and maintain rotation from any position."
- 7.3 b) should read "At the minimum level of the wind speed measurement range, the blades in windmill type, and tails in cup types of a wind vane shall remain parallel to the airflow.
- 7.4 FP/CIMO Comment "WMO standard is a 2 to 5 m distance constant - see CIMO Guide 8 Chapter 1 Part I."

Section 8 – Test

- ***8.1.1 a) - FP/CIMO Comment – "Should be replaced with ASTM International standard for determining the dynamic performance of a wind vane ASTM D5366-96."***
- 8.1.1 b) – FP/CIMO Comment – "Ultrasonic anemometers should be tested at indices less than 90 degrees apart. Sonic anemometers have the added complication of possible turbulence created around the transmitter/receiver posts at higher wind speeds. Typically, the accuracy generated at a wind speed of 2 m/s or less will not hold for higher wind speeds. Hence, should be performed at varying speeds at indices of 15 degrees or less. ISO procedure 16622 section 8.3.1 provides testing procedures for ultrasonic anemometers. Testing of ultrasonic anemometers should just be listed as complies with ISO 16622."
- 8.1.1 b) 2) should read "Align the direction of the wind tunnel air flow axis and the mark on the sensor indicating the direction of the bow.
- 8.1.2 FP/CIMO Comment – "Wind Speed testing should be performed according to ISO 16622 for ultrasonic anemometers and ISO 17713-1 for rotary /vane anemometers."
- 8.1.2 a) should read "Wind speeds to be measured shall be the lower limit of the measurement range, 5, 10, and 30 m/s, and the upper limit of the measurement range. However, the wind speed of the wind tunnel does not need to reflect these figures exactly; inspections can be conducted using approximate values."
- 8.1.2 b) should read "Indications of the wind speed of the wind tunnel and the anemometer shall be measured under stable wind speed in increments of 0,1 m/s. Tolerance below 10 m/s is ± 0,5 m/s and above 10 m/s is wind tunnel speed x 5%.
- 8.2.1 FP/CIMO Comment – "Should use ASTM International Standard D5366-96 for wind vane starting speed."
- 8.2.2 FP/CIMO Comment – "Should use section 8.1 of ISO 17713-1 for inspection of wind speed starting threshold."
- 8.2.2 a) should read "Use a wind tunnel meeting the requirements in 8.5.1 and set the wind speed at the lower limit of the measurement range of the anemometer."
- 8.2.2 b) should read "Hold the wind-receiving part of the anemometer at a given position, and then release. Confirm that it resumes rotation starting from several initial positions."
- 8.2.2. c) should read "The wind-receiving part of the anemometer (propeller, impeller, or cups) shall remain rotating from whichever position it starts rotation."
- 8.3 FP/CIMO Comment – "Should use section 8.3 of ISO 17713-1"
- 8.3 a) should read" The wind speed (m/s) of the wind tunnel specified in 8.5.1 shall be set at [approximately 10 m/s].
- 8.3 b) should read, "Hold the rotor of the anemometer in a stationary position and then release it. Record the elapsed time in seconds to reach 0.63% V (m/s). This is the time constant "S" of the anemometer. "
- 8.5.1 FP/CIMO Comment "Nearly impossible to generate test conditions that would determine measurement accuracy to Table 2 with this method."

- 8.5.2 should read "The equipment shall be capable of providing stable rotation to the rotating axis of an anemometer and shall allow reading of rotational speed."
- 8.5.3 b) should read "The wind direction inspection board shall bear a mark indicating the direction of the ship's bow, and shall be scaled from 0° to 359° from 0° clockwise."
- 8.5.3.c) should read "For a wind direction inspection board for anemometers that use ultrasonic waves, when setting the wind direction inspection board on the wind tunnel inspection table, the rotation angles of the wind direction inspection board shall be readable in increments of 1°."
- 8.5.3.d) Delete second paragraph.
- 8.6.1 a) FP/CIMO Comment – "When would anemometers be installed indoors? Is this for the display? Delete indoor parameters."
- 8.6.1.c) should read "Operating electrical range"
- 8.6.1 c) FP/CIMO Comment, "The lower value should be reduced to allow for low power applications (i.e. 3.3 V dc)."

Section 10 - Marking

- 10.2 should read, "A marker to align the base position of the wind direction (0°) with the direction of the bow of the ship shall be placed at an appropriate place on the sensor of the wind vane/anemometer."
- 11 FP/CIMO Comment "Site the wind sensor as far forward as high as practical. The top of the foremast is typically considered a good mounting site. The sensor should be mounted in a position at a distance of at least 10 mast diameters away from the mast. Rule of thumb is the sensor should be placed 10 times the diameter of an obstruction away from that obstruction. A 2004 study by the Royal Meteorological Society provides some additional guidelines for VOS ships. See the following link http://www.wmo.int/pages/prog/amp/mmop/
- documents/Jcomm-TR/J-TR-13-Marine-Climatology/REV1/joc1177.pdf."

Bibliography

- FP/CIMO Comment "The following standards should be used in the development of this standard and should be referenced in the bibliography:
  - ISO 16622:2002 - Meteorology - Sonic anemometer/thermometers - Acceptance test methods for mean wind measurements
  - ASTM D5366-96 (2002) e0, "Standard Test Method for Determining the Dynamic Performance of a Wind Vane."

ANNEX H
ISO 10596 Recommended Changes

In an effort to ensure continuity and quality of worldwide-fielded wind equipment, the SOT Task Team on Instrument Standards proposes the following recommendations.

4. Recommendations

The Task Team proposes that Recommendations listed below be accepted and implemented by the SOT:

1. That the WMO Secretariat contact the ISO TC 8/SC 6 group and request the following:

    a) These proposed changes be reviewed by TC 8/SC 6 for possible inclusion into the ISO 10596.
    b) Ensure that the changes to Section 7 are incorporated into ISO 10596 or proper response provided to the WMO Secretariat and SOT as to why the variance of WMO No. 8 Requirements cannot be implemented.
    c) A proper revision of ISO10596 is promulgated for review and publication within normal WMO/ISO channels.

2. That the SOT national focal points coordinate nationally with their ISO/TC or SC representative to ensure FP/CIMO Proposed changes are incorporated.

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ANNEX I

Status of Actions Agreed At SOT IV

Status of action items from SOT IV relating to TT on Instrument Standards

I-2.1.13 and IV-3.5.7	To conduct a comparison study of electronic logbooks (including algorithms, and documenting the calculation methods of dew point for historical purposes), with participation from both SOT and ETMC	TT/Instr	Done. Electronic Logbook comparison is complete. The dew point calculation information has been forwarded to ETMC for their review
I-6.3.2 and I-6.3.6	To continue the efforts of developing high quality best practices for the VOF with the goal of publishing them as a JCOMM Technical Report during the next intersessional period	TT/Instr; Secretariat (WMO)	Still under review.
I-6.3.7	To investigate how the different publications or technical documents dealing with best practices could be better integrated into fewer number of documents or into existing ones	TT/Instr	Inadvertently overlooked. Will begin collating information asap.

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