STATUS OF GLOBAL VOS AUTOMATION AS AT DECEMBER 2010

Background

The VOSP-III meeting in London in 2003, noted the importance of enhancing the automation of all aspects of shipboard procedures, from observation to message transmission, using readily available software and hardware. The VOS Panel Chair was tasked with collating information on global VOS automation for presentation at subsequent VOS Panel sessions.

The first VOS Automation report was compiled in 2003 based on data as at 31 December 2002. The report has been updated annually since 2004, with details of national VOS automation being extracted from national SOT Annual Reports. This report is based on input from national SOT Annual Reports for 2010.

Present Status

Information on the status of automation by country is presented in two categories:

- Status of VOS Automated Observing Systems (AWS) - Table 1
- Status of VOS using (non-AWS) Electronic Logbook Software - Table 2

AWS

The number and type of fully automated shipboard weather observing systems is slowly increasing, as countries install AWS systems on suitable ships. However, numbers dipped in 2009 when 38 Russian ships were removed from the table following confirmation that these systems were no longer operational. At the end of 2010, there were some 241 operational AWS systems, an increase of 12 systems since 2009. Four countries indicated plans to expand their ship AWS networks in 2011, by proposing to add 22 new AWS.

E-Logbook Software

There are three main types of Electronic Logbook Software – OBSJMA, developed by the JMA, SEAS developed by NOAA and TurboWin developed by KNMI. Between 2003 and 2008, most countries reported an increase in the use of Electronic Logbook Software, but numbers have remained mostly stable over the last couple of years, as countries have now issued the software to the maximum number of ships possible.

The total number of global VOS using electronic logbooks dipped in 2007 when Denmark withdrew from VOS, and the USA changed their reporting methodology to count only the ships which use SEAS or TurboWin for VOS. Prior to 2007, the USA numbers had included the ships which used SEAS strictly for XBT transmissions only.

A total of 2073 ships were listed as using Electronic Logbook Software at the end of 2010. The increase in the 2010 numbers was mostly due to the inclusion of 61 ships from Poland, the first time this country had indicated the use of TurboWin software.

Challenges

Challenges with respect to installing Automated systems on board VOS ships continue to include:

(i) Funding restraints
(ii) Problems in finding 'long term' ships – the length of charter is often insufficient to justify AWS installation
(iii) Difficulties siting equipment for best exposure
(iv) Volatility of ship routes
(v) Lack of warning of withdrawal of ships and potential loss of AWS equipment

Input of Non-Synoptic AWS and Manual Observations to GTS

There are now many types of VOS AWS installations in operation. These vary from basic AWS eg a SVPB buoy transmitting from the deck of a ship; to complex systems with many sensors, which log data and transmit it in real time. Some AWS transmit at intervals of one minute, some hourly and some three hourly, and the communications method varies from coastal cellular communications to satellite communications. Many AWS are proprietary systems which report raw data back to the NMS for processing and insertion on to the GTS for global consumption.

In the past, NMS set up routines to generate GTS bulletins containing ship observations at three hourly intervals, because these captured reports made at the main and intermediate synoptic times. Today, many AWS make hourly reports and as the global models can ingest hourly data, it is important to ensure that arrangements are in place to insert the hourly AWS data onto GTS in 'non-synoptic' hour bulletins. Eg NZKL SNVE01

In addition to the hourly reporting by AWS systems, some manual reporting ships are choosing to make their observations at non-standard reporting times eg 0100, 0700 UTC because these times fit their work schedules better. These manual non-synoptic observations must also be disseminated in 'non-synoptic' hour bulletins.

Recommendations

1. That NMS operating VOS AWS ensure that all observations, including hourly observations are inserted onto the GTS for global dissemination, using the correct Bulletin Header Data Designator $T_1T_2A_1A_2$ii starting with SNV…

2. That NMS receiving non-synoptic observations from manual reporting ships ensure that these observations are inserted onto the GTS for global dissemination, using the correct Bulletin Header Data Designator $T_1T_2A_1A_2$ii starting with SNV…

Point for discussion

- With some AWS now reporting minute data, investigations need to be undertaken to determine whether NMS and modelling centres can ingest minute data, and if so how this data should be disseminated. One suggestion is that minute data be identified by encoding the exact UTC hour and minute in group 9GGgg of the FM13-XII SHIP code or the relevant BUFR descriptor.

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Chair, JCOMM VOS Panel
28 March 2011

Table 1 : Status of VOS Automated Observing Systems (AWS)

Country	Type of AWS (as at 31/12/2010)	Method of Comms	Manual Entry Facility	Number of Ships with AWS at 31/12/2002	Number of Ships with AWS at 31/12/2004	Number of Ships with AWS at 31/12/2005	Number of Ships with AWS at 31/12/2006	Number of Ships with AWS at 31/12/2007	Number of Ships with AWS at 31/12/2008	Number of Ships with AWS at 31/12/2009	Number of Ships with AWS at 31/12/2010	Plans for 2011
Australia	Vaisala Milos 500 AWS	Inmarsat C (Data Mode)	Yes	9	11	10	8	9	9	8	8	
	Other	-									1	
Canada	AVOS – AXYS Technologies	Inmarsat C	Yes	13	14	14	39	41	45	35	18	5 -7 new AVOS
		Iridium	Yes					1	1	17	35	
Denmark	BATOS	Inmarsat C (Data Mode)	Yes	-	-	-	2	See EUMETNET				
EUMETNET	BATOS	Inmarsat C (Data Mode)	Yes					5	5	6	8	3 BATOS
	BAROS	Iridium SBD	No					0	4	9	13	7 BAROS
France	BATOS	Inmarsat C (Data Mode)	Yes	19	30	39	45	48	54	56	58	
	Mini BATOS	Inmarsat C (Data Mode)	No		1	2	3	3	1	-	-	
	MINOS	Argos	No		6	7	8	8	7	8	7	
	BAROS	Iridium	No					1	-	-	-	
Germany	Vaisala Milos 500 AWS	Meteosat	Yes	23	21	21	17	18	17	16	17	
	Ships' own data logger	Inmarsat Iridium	Yes							2	2	
Ireland	Vaisala Milos AWS	Meteosat	No	1	1	1	(1)	(1)	1	-	-	
	BATOS	Iridium	No							1	2	
Japan	Integrated System for Marine Met Observation (Koshin Denki Kogyo Co)	Inmarsat (4) MTSAT(2)	Some	13	12	13	9	9	9	9	6	
		Inmarsat C	Some				4	5	5	6	6	
	Weather Observation System (Nippon)	Inmarsat C	Yes				1	1	1	1	1	
	Shipboard Oceanographic & Atmospheric Radiation (Brookhaven)	Inmarsat	No				3	1	1	-	-	
		Inmarsat F	No				-	1	1	-	-	
	Ogasawara Keiki Seisakusho Co (Japan)											
	JRCS MFG. Co. Ltd											

	(Japan)											
New Zealand	Sutron 9000RTU mSTAR-SHIP	MTSAT GPRS Cell	Yes No	1	1	1	1	1 1	1 1	1 1	1 1	
Norway	AWS	VSAT	some	-	-	17	17	18	16	15	(15)	
Russia	GM6	Inmarsat C	Yes	-	38	(38)	(38)	(38)	(38)	0	(0)	
South Africa	Vaisala Milos 520	Inmarsat C	Yes	-	-	1	(1)	1	1	1	1	3
Spain	Vaisala MAWS 410	Inmarsat C	Yes	1	1	(1)	1	1	1	1	1	
United Kingdom	Automet MINOS –GP MINOS-GPW BATOS AVOS MILOS/MAWS Metpod Metocean Deck Buoy	Inmarsat Argos Argos Inmarsat C (Data Mode) Inmarsat Iridium Iridium Iridium	No No No Yes Yes Yes No No	1 - - -	1 - - -	1 1 1 -	1 2 2 1	1 6 3 1	0 5 1 3 1 - 1 2	- 5 1 2 0 0 1 2	- 5 1 5 0 0 0 -	
United States	SEAS-AutoImet NOAA SCS (Science Computing System) Type 1 NOAA SCS Type 2 Other ship owned AWS systems Type 3	Inmarsat Email Email ?	Yes No Yes	-	3 -	(3) -	0 -	3 -	16* -	2 23	9 8 12	Plan to upgrade Type 2 to AutoImet
TOTAL				**81**	**140**	**171**	**204**	**226**	**245**	**229**	**241**	**22 new AWS planned for 2011**

Numbers in brackets not confirmed. * 2008 number corrected in 2009 – different from 2008 Annual Report

Table 2 : Status of VOS using (non-AWS) Electronic Logbook Software

Country	Electronic Logbook type	Number of Ships at 31/12/2002	Number of Ships at 31/12/2004	Number of Ships at 31/12/2005	Number of Ships at 31/12/2006	Number of Ships at 31/12/2007	Number of Ships at 31/12/2008	Number of Ships at 31/12/2009	Number of Ships at 31/12/2010
Australia	TurboWin	33	41	50	51	64	61	58	57
Canada	TurboWin								2
Croatia	TurboWin	3	4	3	7	(7)	(7)	(7)	(7)
Denmark	TurboWin	-	-	-	32	0	Finished		
France	TurboWin	-	7	6	7	10	4	4	2
Germany	TurboWin	315	412	556	600	709	730	780	800
Greece	TurboWin	2	0	0	0	1	3	1	4
Hong Kong	TurboWin	-	-	1	2	2	2	2	3
India	TurboWin	-	21	28	33	(33)	(33)	(33)	(33)
Ireland	TurboWin	-	-	-	-	-	-	-	2
Japan	OBSJMA	-	49	61	70	74	95	102	100
Netherlands	TurboWin	200	259	198	195	193	195	185	172
New Zealand	TurboWin	0	12	15	22	20	19	22	24
Poland	TurboWin								61
Singapore	TurboWin	-	-	2	3	1	1	1	(1)
South Africa	TurboWin	5	5	8	(8)	8	14	14	19
Sweden	TurboWin	-	-	-	-	-	1	1	3
United Kingdom	TurboWin	82	104	147	241	261	286	272	276
United States	SEAS TurboWin	353	439	447	622	129	344	524 3	507 -
TOTAL		**993**	**1353**	**1522**	**1893**	**1512**	**1795**	**2009**	**2073**

Numbers in brackets not confirmed.