Status of Global VOS Automation as at December 2009

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 2009.

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

The number and type of fully automated shipboard weather observing systems is slowly increasing, as countries install AWS systems on suitable ships. At the end of 2009, there were some 229 operational AWS systems. This number is lower than the 2008 total because the Russian ships were removed from the table following confirmation that these systems are no longer operational. Five countries indicated plans to expand their ship AWS networks in 2010.

There are three main types of Electronic Logbook Software – OBSJMA, developed by the JMA, SEAS developed by NOAA and TurboWin developed by KNMI. Since 2003, most countries have reported an increase in the use of Electronic Logbook Software. 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. At the end of 2009, more than 2000 ships were using Electronic Logbook 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

Ship AWS data on 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 are reporting hourly and because the global models can ingest hourly data, it is important to make arrangements to insert the hourly AWS data onto GTS in 'non-synoptic' hour bulletins. Eg NZKL SNVE01

Recommendation

- 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 $T_1T_2A_1A_2ii$ 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.

Julie Fletcher
Chair, JCOMM VOS Panel
12 May 2010

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

Country	Type of AWS (as at 31/12/2009)	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	Plans for 2010
Australia	Vaisala Milos 500 AWS	Inmarsat C (Data Mode)	Yes	9	11	10	8	9	9	8	
Canada	AVOS – AXYS Technologies	Inmarsat C	Yes	13	14	14	39	41	45	35	20 retrofits of existing Inmarsat + 8 to 10 new AVOS with Iridium
		Iridium						1	1	17	
Denmark	BATOS	Inmarsat C (Data Mode)	Yes	-	-	-	2	See EUMETNET			
EUMETNET	BATOS	Inmarsat C (Data Mode)	Yes					5	5	6	3 BATOS
	BAROS	Iridium SBD	No					0	4	9	7 BAROS
France	BATOS	Inmarsat C (Data Mode)	Yes	19	30	39	45	48	54	56	7 BATOS
	Mini BATOS	Inmarsat C (Data Mode)	No		1	2	3	3	1	-	
	MINOS	Argos	No		6	7	8	8	7	8	
	BAROS	Iridium	No					1	-	-	
Germany	Vaisala Milos 500 AWS	Meteosat	Yes	23	21	21	17	18	17	16	
	Ships' own data logger	Inmarsat Iridium	Yes							2	
Ireland	Vaisala Milos AWS	Meteosat	No	1	1	1	1 **	1**	1	-	
	BATOS	Iridium	No							1	
Japan	Koshin Denki Kogyo Co., Ltd (Japan)	Inmarsat	Some	13	12	13	9	9	9	9	
	Ogasawara Keiki Seisakusho Co (Japan)	Inmarsat	No				3	1	1	-	
	Nippon Electric Instrument Inc. (Japan)	Inmarsat C	Some				4	5	5	6	
	Brookhaven National Laboratory (USA)	Inmarsat C	Yes				1	1	1	1	
	JRCS MFG. Co. Ltd (Japan)	Inmarsat F	No					1	1	-	
New Zealand	Sutron 9000RTU	MTSAT	Yes	1	1	1	1	1	1	1	1 mSTAR-SHIP
	mSTAR-SHIP	GPRS Cell	No					1	1	1	
Norway	AWS	VSAT	some	-	-	17	17	18	16	15	

Russia	GM6	Inmarsat C	Yes	-	38	38 *	38 *	38*	38*	0	
South Africa	Vaisala Milos 520	Inmarsat C	Yes	-	-	1	1 **	1	1	1	
Spain	Vaisala MAWS 4.0	Inmarsat C	Yes	1	1	1 *	1	1	1	1	
United Kingdom	Automet	Inmarsat	No	1	1	1	1	1	0	-	1 MINOS-GP for installation or spares
	MINOS –GP	Argos	No	-	-	1	2	6	5	5	
	MINOS-GPW	Argos	No	-	-	1	2		1	1	
	BATOS	Inmarsat C (Data Mode)	Yes	-	-	-	1	3	3	2	
	AVOS	Inmarsat	Yes					1	1	0	1 MAWS
	MILOS/MAWS	Iridium	Yes						-	0	
	Metpod	Iridium	No						1	1	2 Buoys on deck
	Metocean Deck Buoy	Iridium	No						2	2	
United States	NOAA SCS (Science Computing System) Type 1	Iridium	No	-	-	-	-	-	-	23	
	SEAS-AutoImet (NOAA SCS Type 2 & 3)	Iridium	Yes	-	3	3 *	0	3	16***	2	
TOTAL				**81**	**140**	**171**	**204**	**226**	**245**	**229**	**32 AWS planned for 2010**

***** Data from 31/12/2004 ** Data from 31/12/2005 *** 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
Australia	TurboWin	33	41	50	51	64	61	58
Croatia	TurboWin	3	4	3	7	7**	7**	7**
Denmark	TurboWin	-	-	-	32	0	Finished	
France	TurboWin	-	7	6	7	10	4	4
Germany	TurboWin	315	412	556	600	709	730	780
Greece	TurboWin	2	0	0	0	1	3	1
Hong Kong	TurboWin	-	-	1	2	2	2	2
India	TurboWin	-	21	28	33	33**	33**	33**
Japan	OBSJMA	-	49	61	70	74	95	102
Netherlands	TurboWin	200	259	198	195	193	195	185
New Zealand	TurboWin	0	12	15	22	20	19	22
Singapore	TurboWin	-	-	2	3	1	1	1
South Africa	TurboWin	5	5	8	8*	8	14	14
Sweden	TurboWin	-	-	-	-	-	1	1
United Kingdom	TurboWin	82	104	147	241	261	286	272
United States	SEAS TurboWin	353	439	447	622	129	344	524 3
TOTAL		**993**	**1353**	**1522**	**1893**	**1512**	**1795**	**2009**

* Data from 31/12/2005 ** Data from 31/12/2006