SOT ANNUAL REPORT FOR 2006

REPORT ON THE EUMETNET ASAP

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1. Introduction

Reducing the gap between the number of launches on board of the ships and the number of timely received messages on the GTS remains a key issue of the programme. Basically, the received data are of good quality and important for the forecast models. However, the high loss rate of >20% results both in missing data at the Met Services and higher operational costs. Reducing the loss rate is an issue of training the operators on board and improving the data transmission to the receiving Met Service (before transmitting to the GTS).

Figure 1 shows a density plot of the ASAP soundings from the period of July to December 2006, demonstrating the distribution of soundings on a grid of 2x2° mesh size. The colour scale ranges from blue (one sounding) to red (more than 16 soundings). The red regions are along the routine sailing routes of the commercial vessels. Further, the red regions are off Mauretania (operating area of the Spanish hospital ship Esperanza del Mar) and in the eastern Mediterranean (operating area of the German research vessel FS Meteor in autumn 2006).

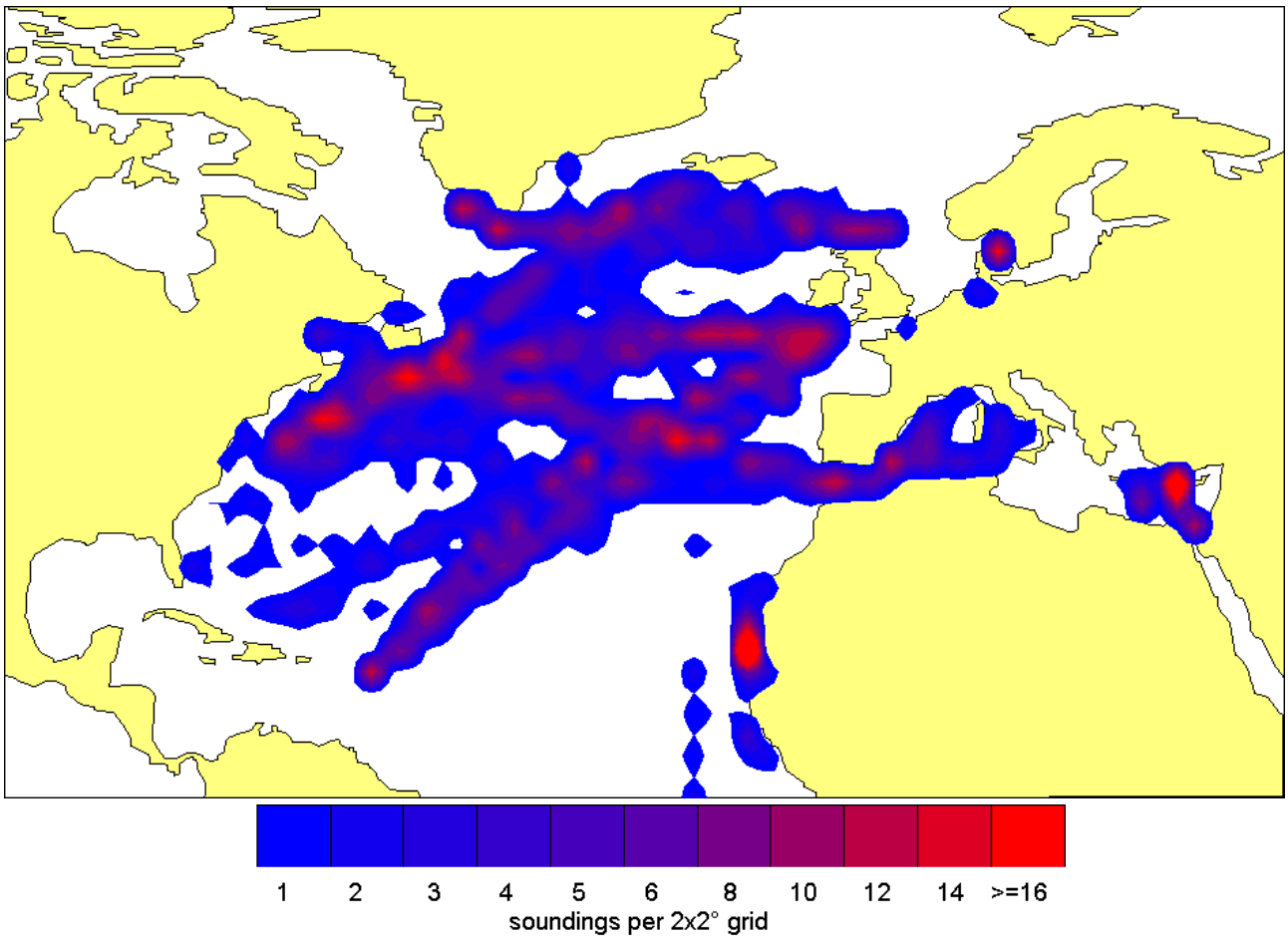

Figure 1: Distributions of the soundings from July to December 2006.

The E-ASAP is part of the EUMETNET Programme EUCOS (EUMETNET Composite Observing System). The monitoring results presented in this report are taken from both the operational EUCOS monitoring at the United Kingdom Met Office and the E-ASAP monitoring at the Deutscher Wetterdienst, Germany.

2. European ASAP systems

In 2006, sixteen European ASAP systems were in operation, after one of the three French ASAP ships was removed from the fleet in January 2006. Table 1 shows the names and operating Met Services of these systems.

Security concerns were raised from different parties regarding the public availability of true ship positions on the Internet, based on said meteorological messages. Tracking the position is possible because the call sign of the ship is part of the message. It was decided to replace the call sign of the ship by the station name of the ASAP system. The size of the station name is limited to seven characters. The Following format was introduced:

Character(s)	Content
1, 2	AS (fixed data type, i.e., ‘Aerology’ and ‘Ship’)
3, 4	ISO alpha-2 country code (‘EU’ for EUMETNET)
5, 6	Sequential number
7	Optional additional identifier

Following this format, all E-ASAP and integrated National ASAP systems were renamed to ASEU01-ASEU05, ASDE01-ASDE04, and ASGB01, respectively.

Table 1: European ASAP systems in 2006

No	Name	Call sign	ASAP station	Operator	Country
01	SL Performance	KRPD	ASEU01	E-ASAP	EUMETNET
02	SL Achiever	WPKD	ASEU01	E-ASAP	EUMETNET
03	Endurance	ZCBE7	ASEU01	E-ASAP	EUMETNET
04	Power	ZCBF3	ASEU01	E-ASAP	EUMETNET
05	Melfi Italia II	V2BD9	ASEU01	E-ASAP	EUMETNET
06	Atlantic Compass	KHRH/SKUN	ASDE01	E(DE)-ASAP	EUMETNET/Germany
07	FS Meteor	DBBH	ASDE01	E(DE)-ASAP	EUMETNET/Germany
08	SL Motivator	WAAH	ASDE01	E(DE)-ASAP	EUMETNET/Germany
09	Hornbay	ELML7	ASDE01	E(DE)-ASAP	EUMETNET/Germany
10	Mississauga Express	ZCBP6	ASGB01	E(UK)-ASAP	EUMETNET/UK
11	Fort Saint Pierre	FQFM	(see left)	Météo-France	France
12	Fort Saint Louis	FQFL	(see left)	Météo-France	France
13	Arina Arctica, Nuka Arctica, Naja Arctica, Irena Arctica, Mary Arctica[(1)]	OVYA2, OXYH2, OXVH2, OXTS2, OXGN2	(see left)	DMI	Denmark
14				DMI	Denmark
15	Skogafoss	V2XM	(see left)	Vedurstofa Isl.	Iceland
16	Esperanza del Mar	EBUQ	(see left)	INM	Spain

(1) The 2 Danish ASAP systems are shifted between five ships.

The most important change in the ASAP fleet, was the decommission of the French ASAP system on board of the Potomac in January 2006.

3. Monitoring

The monitoring results for 2006 are shown in Table 2. For every ASAP system, the following parameters are shown:

- Number of launches on board of the ships;
- Number of soundings received on the GTS;
- Number of timely received soundings (HH+120);
- Number of received soundings with burst heights <100 hPa;
- Number of received soundings with burst heights <50 hPa.

Details of the satellite transmission were not monitored. All ASAP systems under E-ASAP management were configured to transmit via LES Goonhilly to the United Kingdom Met Office for distribution on the GTS. Between November to December 2006, several messages were lost due to the unexpected closing of Goonhilly. All transmissions from ships under the E-ASAP management have been changed to the LES Aussaguel until the problem with Goonhilly is resolved.

Table 2: Monitoring results for the European ASAP systems in 2006

Ship	**No. of Launches on board**		**No. of received soundings**			
	Total (including aborted)	**Successful**	**GTS**	**GTS HH+120**	**GTS <100 hPa**	**GTS <50 hPa**
SL Performance	430	352	305	289	269	231
SL Achiever	422	364	330	324	248	227
Endurance	266	253	235	240	202	175
Power	235	223	212	210	156	137
Melfi Italia II	418	382	375	360	299	284
Atlantic Compass	325	307	277	237	244	239
FS Meteor	286	277	243	202	230	206
SL Motivator	440	380	359	307	300	269
Hornbay	385	374	293	276	276	260
Mississauga Express	378	325	265	250	216	200
Fort Saint Pierre	305	274	271	259	227	203
Fort Saint Louis	310	272	265	260	214	191
Arctica, unit 1	586	547	508	470	416	397
Arctica, unit 2						
Skogafoss	195		168	143	152	146
Esperanza del Mar	Not submitted		191	162	162	149
Total			4297	3989	3611	3314

The difference between the performed launches on board of the ships and timely received soundings on the GTS HH+120 is mainly due to following reasons:

- Launch loss: Burst of the balloon or crash of the sonde at launch due to strong winds, turbulences, etc. [approximately 10-15% of all launches];
- Sounding loss: Failures in the sounding systems (e. g., telemetry error) or operating errors [approximately 5-10% of all launches];
- Transmission loss: Late or failing satellite communication [approximately 5-10% of all launches].

On the *SL Performance* and *Mississauga Express*, the loss rate was >25%. This is related to individual cases both in hard- and software failures over certain periods.

It has to be noted that the number of successful balloon launches also depend on the master of the ship. Some highly motivated masters allow course changes to bring the ship in the optimum position for the launch (depending on the wind conditions). This is a valuable concession particularly on big ships.

Tables 3 and 4 show the numbers of achieved burst height levels for 100 hPa and 50 hPa.

Table 3: Number of soundings with burst heights <100 hPa.

Ship	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SL Performance	26	20	18	26	27	40	15	30	10	19	24	14
SL Achiever	28	15	20	19	27	34	21	22	24	8	19	11
Endurance	9	19	17	28	18	29	19	15	8	19	11	10
Power	15	4	10	25	11	11	13	9	6	9	24	19
Melfi Italia II	15	15	11	23	38	28	29	38	29	27	32	14
Atlantic Compass	32	5	30	19	29	25	13	20	3	35	16	17
FS Meteor	0	8	21	13	25	47	16	5	14	13	36	32
SL Motivator	31	17	34	5	22	32	38	41	10	28	27	15
Hornbay	21	8	24	33	13	10	40	39	28	35	9	16
Mississauga Express	20	22	28	23	30	22	24	17	7	9	12	2
Fort Saint Pierre	15	16	19	20	23	23	16	15	15	20	23	22
Fort Saint Louis	13	19	13	16	17	17	19	22	23	17	21	17
Arctica	0	2	1	19	23	20	24	15	18	16	11	1
Arctica	22	30	16	13	27	27	23	25	21	18	23	21
Skogafoss	12	2	15	1	23	13	14	14	15	18	9	16
Esperanza del Mar	15	1	13	14	18	15	16	18	0	21	15	16
Total	274	203	290	297	371	393	340	345	231	312	312	243

Table 4: Number of soundings with burst heights <50 hPa.

Ship	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SL Performance	25	19	13	13	21	39	15	28	10	18	18	12
SL Achiever	27	12	19	12	24	32	21	22	21	7	19	11
Endurance	9	19	16	22	17	29	17	14	6	16	6	4
Power	13	4	8	23	9	11	12	8	4	8	20	17
Melfi Italia II	12	13	11	25	33	28	29	38	27	27	30	11
Atlantic Compass	31	5	29	18	29	23	13	20	3	33	18	17
FS Meteor	0	8	19	11	25	45	16	5	14	10	33	20
SL Motivator	30	15	31	3	18	28	35	35	9	28	25	12
Hornbay	15	8	21	33	13	10	39	34	28	34	9	16
Mississauga Express	20	19	28	17	29	21	21	17	7	8	11	2

Ship	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fort Saint Pierre	10	15	17	20	20	19	16	13	14	16	23	20
Fort Saint Louis	11	16	12	16	16	13	15	22	22	14	18	16
Arctica	0	2	1	19	22	18	24	17	18	13	12	0
Arctica	19	30	15	12	23	26	20	25	21	17	22	21
Skogafoss	12	2	14	1	22	12	14	15	14	18	9	13
Esperanza del Mar	13	1	9	13	16	15	16	17	0	21	12	16
Total	247	188	263	258	337	369	323	330	218	288	285	208

4. Summary

The efficiency (Messages on the GTS / Launches) differs from ship to ship and from crew to crew. The loss rates are usually not consistent over the year, but are related to individual cases. This is partially due to the lack of skill of the operators on board. The combination of sounding and transmission system is complex. Several internal errors were not detected by the operators in time.

Transmission from the ship to the GTS is also unstable. This does not only include the satellite transmission from the ship to the receiving Land Earth Station, but also the forwarding and processing to and at the relevant Met Service. Different requirements regarding the data format (e. g., GTS header or no header) led to delays or denials of data at the automatic processing systems before transmitting to the GTS. Particularly the closing of Goonhilly demonstrated the vulnerability of satellite communication.

Experience shows that excellent transmission performance is achieved on those ships, where the crew sends the data manually via the ships e-mail system. But most crews are reluctant to return to manual transmission, as they are used to finish the work after successfully launching the balloon.

Improving the transmission from the ship to the GTS remains a key parameter to increase the efficiency and reduce the costs of the ASAP soundings.