

The BOUSSOLE project technical reports; report #7-9, issue 1.

BOUSSOLE buoy deployment & maintenance log.

September 22, 2007 – January 20, 2008

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BOUSSOLE project

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Foreword

This report is part of the technical report series that is being established by the **BOUSSOLE** project.

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This day the upper part of the buoy was removed from the BOUSSOLE site and brought at LOV. Léo Gimenez and other two divers of his company went on site with a private boat to dismantle the buoy and to fix it to the helicopter. At 12:30 the helicopter arrived in Villefranche, where 6 people from the LOV were attending to recover the buoy at the Rochambeau field and to bring it into the CCI local. The operation was completed without any problem. ...	13
The arms of the buoy were dismantled on site and stocked on the <i>Thethy II</i> , on that day working at DYFAMED site for the MOOSE project and gently made available for support to divers.	13
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1. SCOPE OF DOCUMENT

The BOUSSOLE buoy deployment and maintenance log is a record of all events that occur from the deployment to the recovery of one of the two upper sections of the buoy.

The aim is to keep track of all maintenance operations, such as instruments cleaning or rotations, instruments malfunctions, incidents with the buoy structure, if any, biofouling development and so on.

This information is crucial to a subsequent correct interpretation of the data.

Keeping track of these events also allows their analysis in view of the permanent improvement of protocols.

The present report concerns "buoy deployment 6", from September 22 of 2007 to January 20 of 2008.

2. DESCRIPTION OF OPERATIONS

UPPER SECTION PREPARATION (2007-07)

The Buoy equipped with all usual and new instruments (HyperSpectral from Satlantic as well as a new strain gauge) in the CCI local in Villefranche-Sur-Mer, and again the preparation was without any surprise thanks to the experience of the previous deployments. Copper sheets and pieces were again fixed wherever possible to avoid biofouling arising (see pictures).







MOORING DEPLOYMENT

Saturday 22nd September 2007

The upper structure to be deployed was brought to the Rochambeau field at 07am with the help of about 8 people from the LOV. The 4 arms were assembled and connected to the buoy, the helicopter was called to get the buoy and bring it to the BOUSSOLE site at 09:30am.

As usual the go/return trip lasted about one hour. The recovered upper part was dismantled to bring it into the CCI local.



BOUSSOLE buoy deployment and maintenance log, September 22, 2007 to January 20, 2008.



BOUSSOLE buoy deployment and maintenance log, September 22, 2007 to January 20, 2008.





At this date, buoy is equipped with

- DACNet #011
- New Stan's rads set (OCI #035, 040, 047, 109, OCR #035 and 038), MVDS 053, OCP 040(4m) and OCP 041(9m)
- Hyper spectral units HOCR #241(4m), 242(9m), 279(Es), bio shutters 85 (9m) and 86(4m), STOR-X #032
- HS4 #H4070403
- Strain-100 #001
- Transmissometers C-Star #1057PR (4m) and #1058PR(9m)
- Fluorometer #726 (4m) and #727 (9m)
- ARGOS beacon #003 (prog id#26021)
- CTD #37SI 46113-5325
- Strain gauge GAROS #OML-CSCB40K

Sunday 07th October 2007

This day is part of the BOUSSOLE 68 mission. During this cruise, the greatest part of the allocated ship time was used to troubleshoot the problem of the newly deployed BOUSSOLE buoy. Indeed, since its deployment on September 22 and 23, 2007, the system did not start up properly and was just emitting a few ARGOS messages that were all incomplete. 2 diving operations were needed to fix the problem:

The first was achieved on October 07 by divers from the ex SAMAR company (Léo Gimenez and colleagues) on their own 12 meters ship that joined the Tethys-2 at 10:30 am. On that day, the DACNet was brought on the ship deck, and the MicroDrive was replaced by a new one, recently sent (and configured, ready to use) by Satlantic. Divers also lowered the buoy by 1.2 meter, fixed the ancient emergency ARGOS beacon, connected the strain gauge to strain-100 cable, and fixed a security strap between the upper and the lower parts of the buoy. Furthermore, the ARGOS beacon that is on the head of the buoy was also exchanged.

Nevertheless, the system did not start up after these first diving operations, so that a second one was organized on October 09, 2007 (see comments below).

At this date, buoy is equipped with

- **DACNet #02 with a brand new 3GB MicroDrive**
- **ARGOS beacon #17052 (the white one)**

Tuesday 9th October 2007

This day is also part of the BOUSSOLE 68 mission.. During this day, the battery and the CLC of the newly deployed system were replaced by the previous battery and CLC, the one that were recovered on September 23, 2007. Just 45 minutes after this operation, a connection to the buoy from the ship was possible, and the system started again its data acquisition and daily ARGOS messages were again received at the lab.

Thursday 18th October 2007

The buoy sent constant values ARGOS daily messages just the day after the repair (on 10th October 2007). An emergency cruise was so organized on a rental ship (from ABYS Company in Antibes). 2 ex SAMAR divers (Philippe and a young colleague) went onboard and removed the DACNet to exchange again the MicroDrive. After this intervention, the buoy started up again.

Tuesday 6th November 2007

This day is part of the BOUSSOLE 69 mission. The buoy has been working properly from the last intervention, apart 2 minor problems:

- ARGOS daily messages stopped again from October 27th 2007, but this usual bug was fixed by cleaning the electronic contacts of the beacon and/or by exchanging few times the beacon itself

- The Transmittance value coming from the newly acquired CSTAR transmissiometers are above 100%. Divers tried to exchange the 2 OCPs, but had to renounce as too strong currents prevented them to operate safely.

At this date, the buoy is equipped again with the ARGOS beacon #003 (prog id 26021), the most recent one.

Friday 30th November 2007

This day divers from the private company Mare Nostrum went at the BOUSSOLE site for cleaning the buoy system. The photovoltaic plate of one of the solar panel was missing.



Tuesday 18th December 2007

This day is part of the BOUSSOLE 70 mission. As the three previous cruise days, weather conditions did not allow any operation at sea. Nonetheless, we went at sea to verify the general state of the buoy and to attempt a connection with it. The connection, attempted at 15:15 UTC, was unsuccessful.

Thursday 10th January 2008

This day a boat (Kelly) from a private company in Antibes (ABYS) was rent to go at the BOUSSOLE site. The mission was organized to perform the operation previewed, but not made, during the last cruise (#70): exchanging of both 4m and 9m OCPs and replacement of

one solar panel. Five persons were on board: Grigor Obolensky, Vincenzo Vellucci, Lèo Gimenez and other two divers of his company. The boat left the port of Antibes at 09:30 and reached the BOUSSOLE site at 11:30. The buoy was not visible so we tried to locate it by making spirals around the point without success. A derive test indicated strong surface current.

Sunday 17th January 2008

This day a helicopter survey at the BOUSSOLE site was performed to verify the general condition of the buoy which was last seen on December 18th. The helicopter, rent from a private company in Carros, left at 12:00 and arrived on site about 25 minutes later. The buoy appeared in bad conditions: all photovoltaic plates of the solar panels were missing and the main aluminium tubes of the upper structure were curved (see pictures). A detailed inspection of the photos taken, revealed that one of the tubes was cut, so we decided to remove the upper structure of the buoy as soon as possible.



Sunday 20th January 2008

This day the upper part of the buoy was removed from the BOUSSOLE site and brought at LOV. Léo Gimenez and other two divers of his company went on site with a private boat to dismantle the buoy and to fix it to the helicopter. At 12:30 the helicopter arrived in Villefranche, where 6 people from the LOV were attending to recover the buoy at the Rochambeau field and to bring it into the CCI local. The operation was completed without any problem.

The arms of the buoy were dismantled on site and stocked on the *Thethy II*, on that day working at DYFAMED site for the MOOSE project and gently made available for support to divers.

Quantitative summary

The deployment lasted 121 days, among which 35 days were without data acquisition, for problems with Battery and DACNET.

3. INSTRUMENT SCHEDULE

1 minute acquisition every 15 minutes

4. ANY PROBLEMS ENCOUNTERED

- 1- Malfunctioning of the CLC and Battery.
- 2- Malfunctioning of the DACNET.
- 3- Malfunctioning of the ARGOS beacons.
- 4- Crash of one solar panel.
- 5- Buoy accident with a ship.

5. LESSONS LEARNED

- 1- Once recovered the buoy after an accident, run a dark measurement cycle to verify if repair and/or recalibration are needed.
- 2- Ship the old equipment as soon as possible after the new buoy deployment for repair/calibration. Avoid using recovered instruments as spares. Maybe this can be only done with other components (DACNET, STORX, CLC, JUNCTION BOX).

6. ACKNOWLEDGEMENTS

The BOUSSOLE project has been set up thanks to the work of numerous people, and thanks to the support and funding of several Agencies and Institutions. The latter are listed in the foreword of this report. Specifically, the following contracts are acknowledged : the French Space Agency CNES provided funds through the TAOB and TOSCA scientific committees, ESA through ESTEC contract N°14393/00/NL/DC, including CCNs #1, #2 and #3, ESRIN through contract N° 17286/03/I-OL, and NASA through a "Letter of Agreement". Funding has been also obtained from the French CSOA committee and the "Observatoire Océanologique de Villefranche".

The crews and Captains of the following ships are also warmly thanked for their help at sea : the Castor-02 vessel from the Fosevel Marine company (buoy/mooring operations), the INSU R/V Téthys-II and Georges Petit (regular monthly cruises), the GG-IX from the Samar company and the Nika-III (on-demand short operations on site). Pilots and crew members of the Valair and Commerçair helicopter companies are also thanked for their willingness in

accomplishing for us unusual survey missions above the BOUSSOLE site. Emmanuel Bosc, Maria Vlachou, Guillaume Lecomte, who have occasionally provided some help in collecting data, are also thanked for their help.

The French institute IFREMER and the Norwegian Marintek company are also thanked for their help and fairness in the engineering studies that were ordered to them after the major failure of the buoy in spring of 2002.

The data that are collected for several years near the BOUSSOLE site by the French weather forecast Agency, "Meteo France", and which are provided in real time on the internet, have been of great help in the day-to-day management of the monthly cruises.

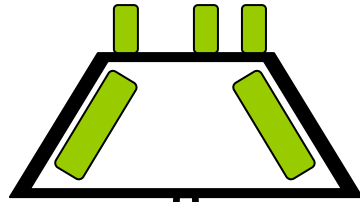
Two companies have largely contributed to the BOUSSOLE project, namely the ACRI-in/Genimar company, Sophia Antipolis, France (buoy conception) and Satlantic Inc., Halifax, NS Canada (buoy centralized acquisition system and radiometers); their help is specifically acknowledged here.

7. APPENDIX

The following page contains the schema of the buoy and the list of the calibration files.

- SATLANTIC
- HOBILABS
- WETLABS
- SEABIRD
- GARROS

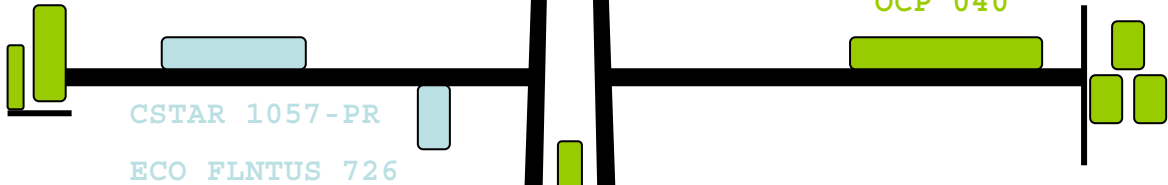
MVD (OCI) 095
 ARGOS 003 (26021)
 Es (HOI) 279
 Junction Box SJB 004
 MVDS 053



Ed (OCI) 040
 Eu (OCI) 035
 Lu (OCR) 035

Lu (HOI) 241
 bio shutter 86

OCP 040



CSTAR 1057-PR
 ECO FLNTUS 726

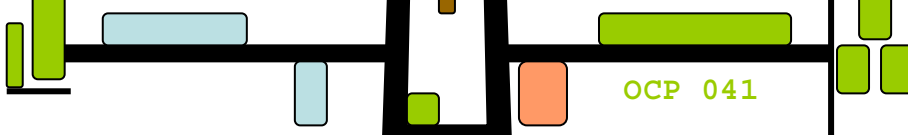
STOR-X 032
 CLC 004
 DACNet (mSM) 011
 Battery ?
 Strain-100 001

Lu (HOI) 242
 bio shutter 85

CSTAR 1058-PR
 ECO FLNTUS 727

CTD 37SI 46113-5325

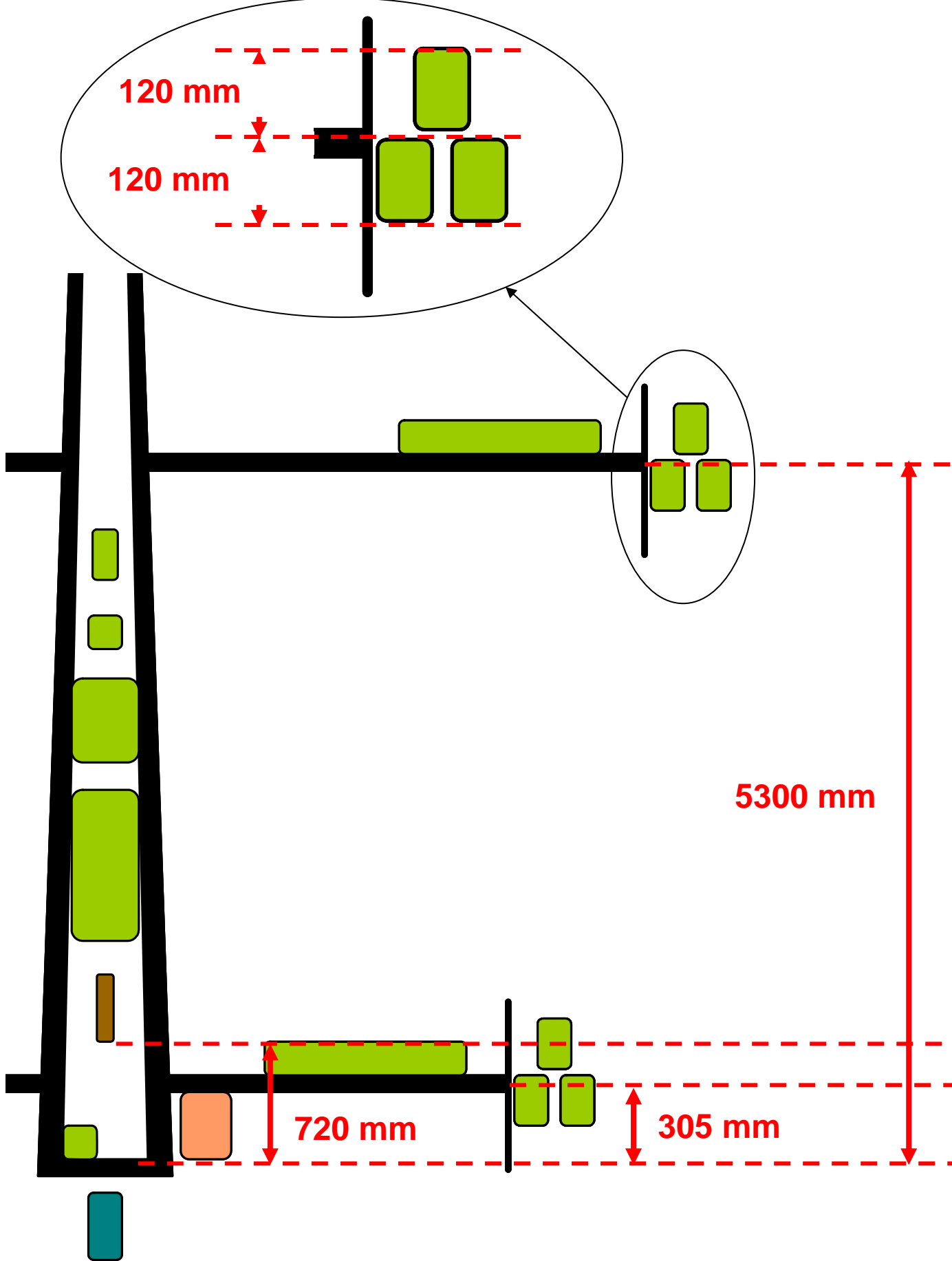
Ed (OCI) 047
 Eu (OCI) 109
 Lu (OCR) 038

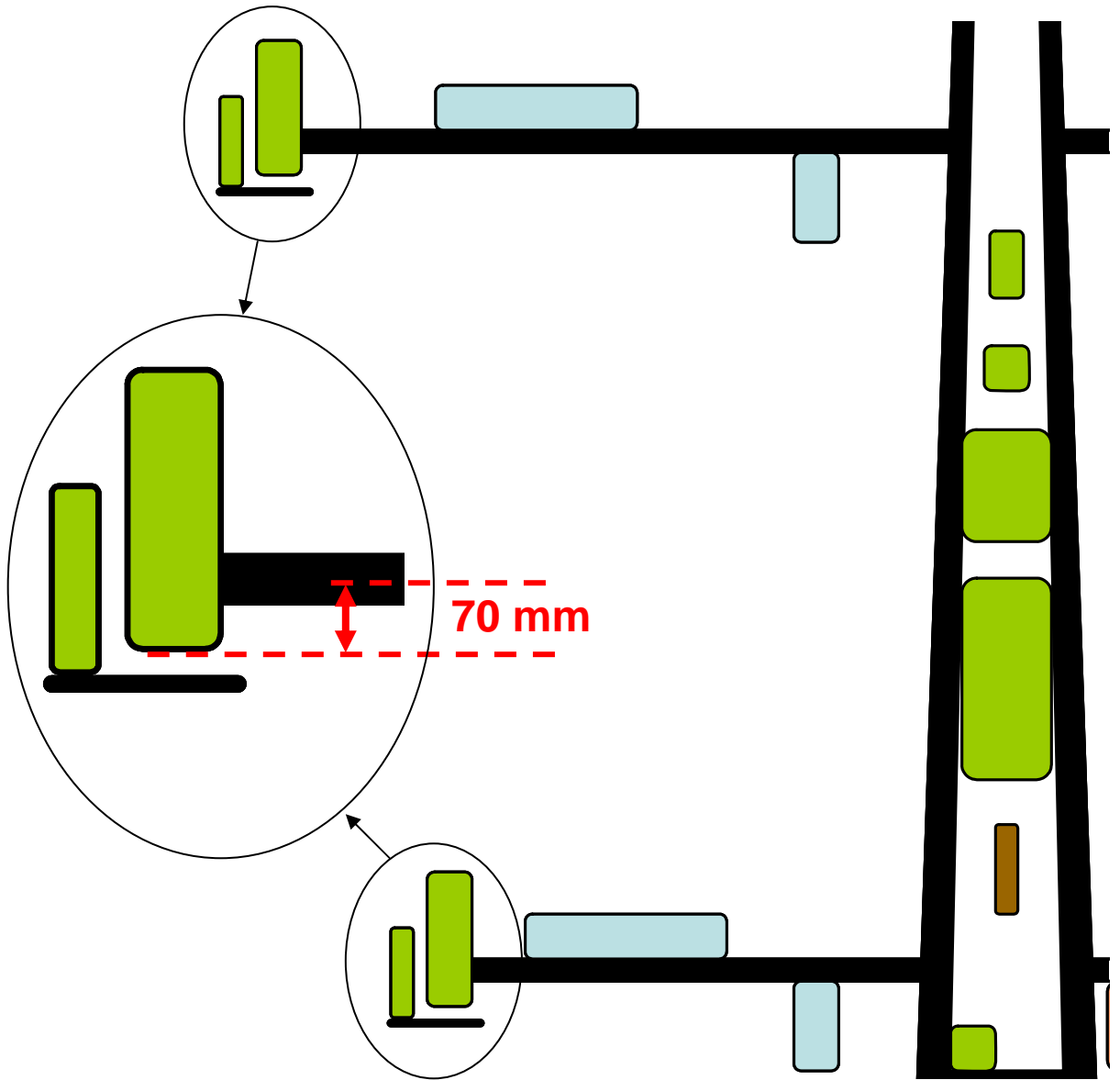


OCP 041

HS4 H4070403
 GAROS OML CSCB40K

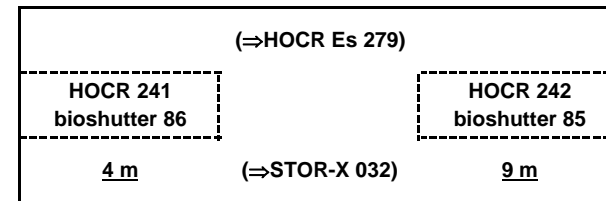
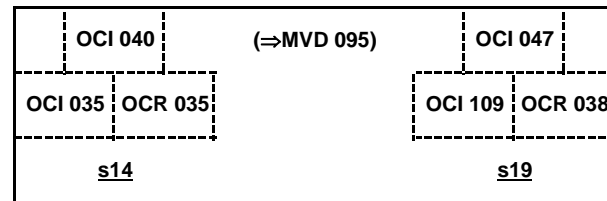
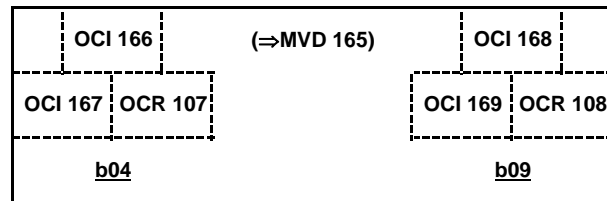
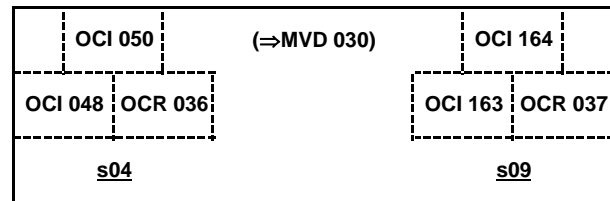




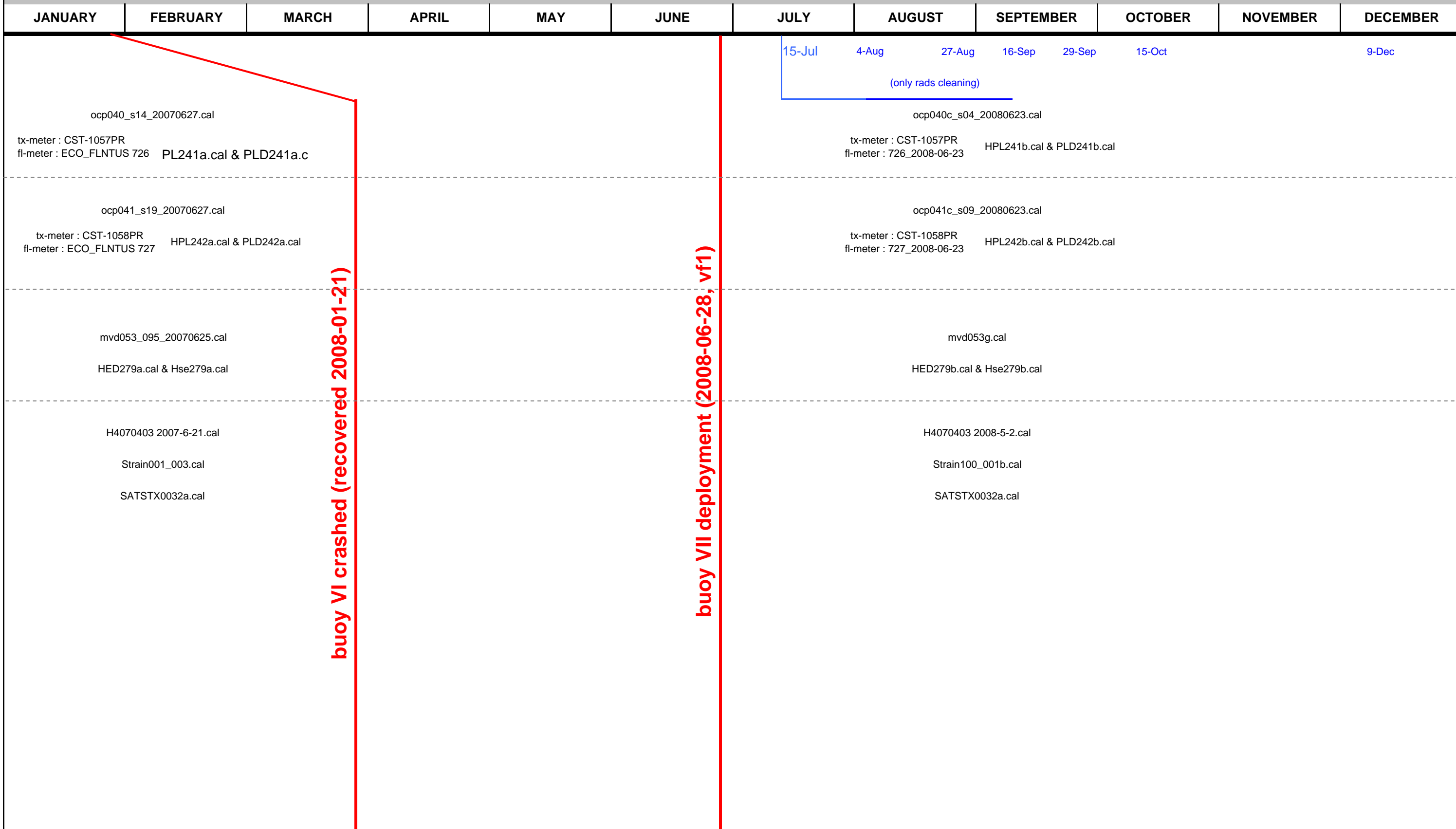


2007

2007																	
JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER						
15-Jan <small>(only rads cleaning)</small>	31-Jan <small>(only rads cleaning)</small>	12-Dec <small>(only rads cleaning)</small>	5-Mar	16-Mar	10-Apr	16-Apr	7-May	19-May & 25-May <small>(only rads cleaning)</small>	10-Jun	21-Jun	6-Jul	23-Jul	6-Aug	3-Sep	8-Oct <small>(only rads cleaning)</small>	5-Nov	30-Nov
4 m		buoy IV lost (2007-02-12) and buoy V deployment (2007-02-22, vf2)		ocp038_b04_20051123.cal		ocp036_s04_20061130.cal		ocp040_s14_20070627.cal		tx-meter : CST-746PR fl-meter : 175265		tx-meter : CST-626PR fl-meter : ECO_FLNTUS 608		tx-meter : CST-1057PR fl-meter : ECO_FLNTUS 726		HPL241a.cal & PLD241a.cal	
9 m				ocp039_b09_20051123.cal		ocp037_s09_20061130.cal		ocp041_s19_20070627.cal		tx-meter : CST-747PR fl-meter : 175266		tx-meter : CST-847PR fl-meter : ECO_FLNTUS 609		tx-meter : CST-1058PR fl-meter : ECO_FLNTUS 727		HPL242a.cal & PLD242a.cal	
MVD				mvd009_165_20051129.cal		mvd062_030_20060921.cal		mvd053_095_20070625.cal		HED279a.cal & Hse279a.cal							
				H2021045 2005-12-13.cal		H2031247 2006-8-2.cal		H4070403 2007-6-21.cal		Strain001_003.cal		SATSTX0032a.cal					



2008



buoy VI crashed (recovered 2008-01-21)

buoy VII deployment (2008-06-28, vf1)

