Report of safety investigation

GUNAY 2

Bureau d'enquêtes sur les évènements de mer

Safety Investigation Report

GROUNDING

OF THE CARGO VESSEL

GUNAY 2

ON 21 JANUARY 2009

ON PLANIER ISLAND, OFF MARSEILLE

Warning

This report has been drawn up according to the provisions of Clause III of Act No.2002-3 passed by the French government on 3rd January 2002 and to the decree of enforcement No.2004-85 passed on 26th January 2004 relating to technical investigations after marine casualties and terrestrial accidents or incidents and in compliance with the “Code for the Investigation of Marine Casualties and Accidents” laid out in Resolution MSC 255(84) adopted by the International Maritime Organization (IMO) ON 16 May 2008.

It sets out the conclusions reached by the investigators of the *BEA*mer on the circumstances and causes of the accident under investigation.

In compliance with the above mentioned provisions, the analysis of this incident has not been carried out in order to determine or apportion criminal responsibility nor to assess individual or collective liability. **Its sole purpose is to identify relevant safety issues and thereby prevent similar accidents in the future**. The use of this report for other purposes could therefore lead to erroneous interpretations.

CONTENTS

APPENDIX LIST

Abbreviation list

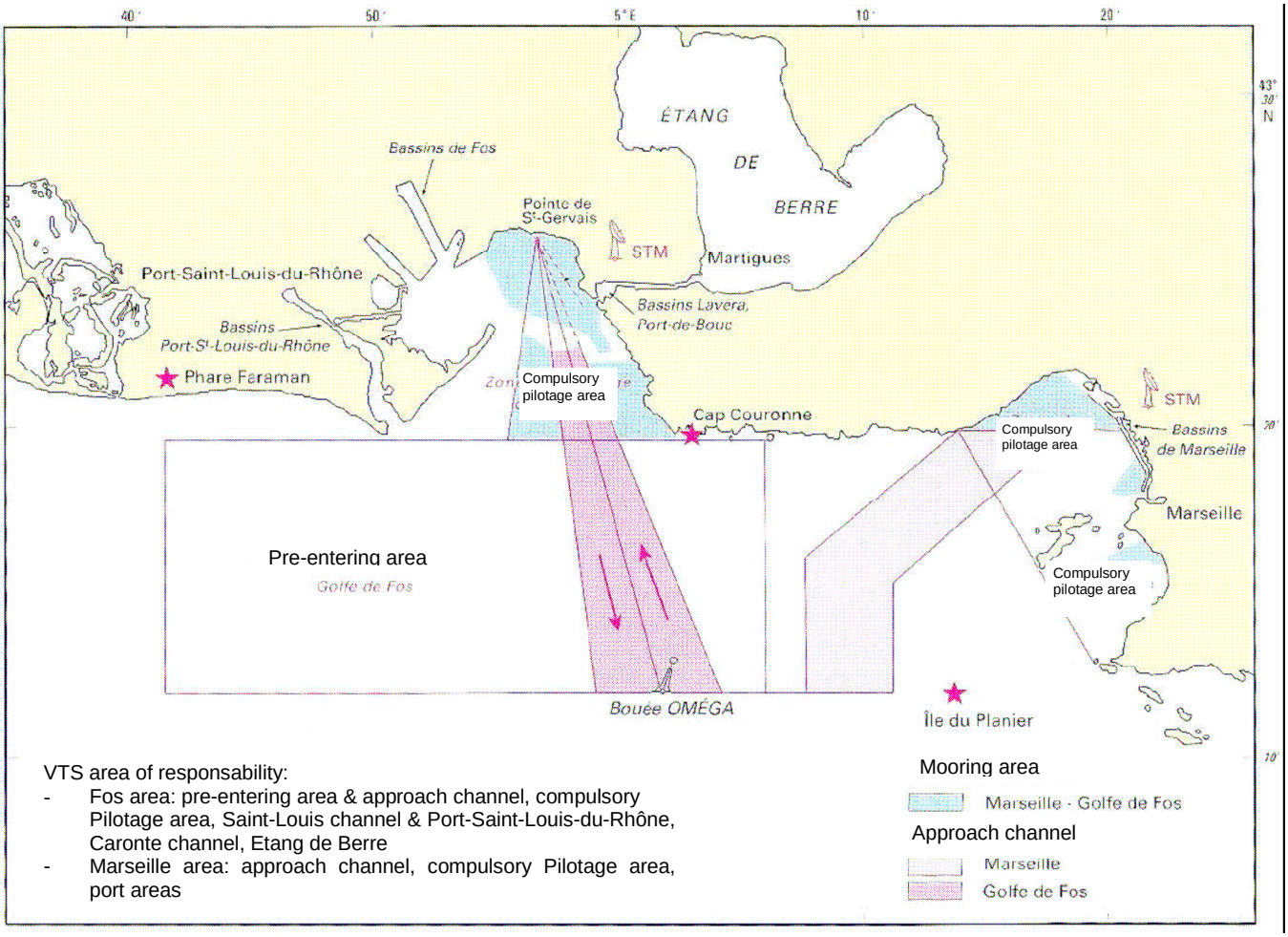
AB	:	Able Bodied Seaman
AIS	:	Automatic Identification System
***BEA*mer**	:	*Bureau d'enquêtes sur les évènements de mer* (MAIB French counterpart)
CROSS La Garde	:	La Garde MRCC
CSN	:	Vessel Security Centre
GPMM	:	*Grand Port Maritime de Marseille* (Marseille Port commercial denomination)
GPS	:	Global Positioning System
IACS	:	International Association of Classification Societies Ltd.
IMO	:	International Maritime Organisation
ISM Code	:	International Safety Management Code
Length PP	:	Length between perpendiculars
MAS	:	Maritime Approach Situation
MMSI	:	Maritime Mobile Service Identity
MOC	:	Maritime Operation Centre
MRCC	:	Maritime Rescue Coordination Centre
OOW	:	Officer Of the Watch
PSC	:	Port State Control
UTC	:	Universal Time Coordinated
HF, MF, VHF	:	High, Medium, Very High Frequency
VTS	:	Vessel Traffic Service

1 CIRCUMSTANCES

(UTC+1)

On 20 January 2009, at night with a good visibility, the Turkish cargo vessel *GUNAY 2* had grounded at 9 knots on Planier Island, 2 hours after she had disembarked the Pilot. At this time the wind was north-westerly, Beaufort 5 to 6, the sea was moderate. Very important damages can be noticed on the fore part of the vessel, no pollution had been observed. The vessel had been refloated then she had been towed to Marseille harbour after having got the advice of two evaluation teams and thanks to heavy maritime and airborne assets.

Planier Island is located at 8 miles in the South-south-west of Marseille road. It is out of the Fos and Marseille VTS operation area. It is however inside Cap Couronne Signal Station monitoring area (30 miles).



The vessel is now abandoned by her owner in Marseille harbour (afloat in dry dock n°10). She is monitored by the port officers (list and leaks of rain water).

2 BACKGROUND

GUNAY 2 was operated for regular rotations between France and Italy. During year 2008, she called in the following ports Port-de-Bouc (Caronte canal), Fos and Port-la-Nouvelle in France, Leghorn , Civitavecchia and Cagliari in Italy, Oristano in Sardinia.

Registered at Istambul, the vessel is owned by *Gunay Gemy ve Ticaret AS* which head office is in Istambul.

The owner who has two vessels, one of which has been decommissioned, was experiencing serious economical problems and important back-due pays were at the root of tensions with the crew and thus of the delay to sail out on 19-20 January. The negotiations before getting underway had been conducted by the *T & T Shipping* brokerage firm agent based at Port-la-Nouvelle.

3 VESSEL

GUNAY 2 had been built in 1984 at Izmir (Turkey).

Vessel details:

- **OMI Registration Number : 8218366 ;**
- **Call sign : TCCW3 ;**
- **Length overall : 84.99 m ;**
- **Breadth overall : 13.76 m ;**
- **Depth : 6.61 m ;**
- **Free-board : 1190 mm ;**
- **Gross tonnage : 1985 ;**
- **Deadweight : 3129 t.**

GUNAY 2 is a classical cargo vessel with the bridge aft, two holds and four derricks. The bridge is fitted out with a Garmin 152 GPS and a SAAB R4 AIS which are the only up-to-date equipments.

The Vessel had been successively classified by Bureau Veritas from January 1987 to September 1995 then by RINA until November 2008. She is now classified by *Turk Lloydu* (Turkey). This classification company is not a member of the IACS.

A minimum maintenance policy has led the vessel to be an under standard vessel according to Paris MOU and to ISM certification: her target factor is 48 (a special visit from the CSN is compulsory when the target factor is over or equal to 50). Since mid-September 1999 the vessel had been inspected 39 times and had been detained 8 times.

- draft forward : 5.20 m ;
- draft aft : 5.90 m ;
- load : 3080 t of corn ;
- fuel : 10 m^3 ;
- oil : 2 m^3.

4 CREWS

The complement was usually made of 12 crew members all of Turkish nationality :

- Master ;
- Chief officer ;
- Mate ;
- Communication officer/OOW ;
- Chief engineer officer ;
- Second engineer officer ;
- Bosun ;
- 2 deck AB ;
- 2 mechanics AB ;
- Cook.

On the arrival at Port-de-Bouc, the complement was made of 11 crew members (which is in accordance with the Minimum safe manning certificate) as the mate had been disembarked for medical reason during the previous call at Leghorn. When getting underway on 20 January, the complement was made of 10 crew members as the communication officer / OOW had also disembarked. For the voyage, it was planned that the watch would be done in two six hour shifts by the master and the chief officer.

The Master aged 48, had been aboard for six months. He holds a Captain 3000 certificate issued by the Turkish authorities. He had been sailing on this line for 4 years on board same displacement vessels as *GUNAY 2*.

The chief officer was 49 year old.

The Chief engineer officer was 35 year old. He holds 3000 kW chief engineer certificate issued by the Turkish authorities. When getting underway he had been on watch until 01.00 am.

The second engineer officer, on engineering watch at the time of the grounding was 28 year old.

The deck AB on watch when getting underway was 19 year old. It was his first posting at sea.

In December 2008 the crew members qualifications and the Minimum safe manning certificate were not in accordance with the regulations as it had been pointed out by a Port State Control in Leghorn on 9 December.

5 SPATIONAV

GUNAY 2 track had been recorded by SPATIONAV system, fed locally by radar and AIS detections at Cap Couronne Signal station.

SPATIONAV system prototype has been commissioned in 2004 for the Mediterranean coasts. The French Navy (Marine Nationale) contributes widely to the building up and the up dating of the Maritime Approaches Situation, through the operational network linking the coastal signal stations.

MAS is the snapshot of the coastal area global situation. MAS is fed by data coming from radars, merchant vessels AIS, TRAFIC 2000 from CROSS (English channel), port VTS and the European network SAFESEANET.

MAS, which is up-dated every single minute, is available for the Maritime Operation Centre (French Navy headquarters), coastal signal stations and MRCCs that have for their use a

global view of the situation in the coastal area and a picture of the local situation, enhanced by data from other local systems.

In addition a “vessel data file” for vessels about to get underway is typed in by signal station operators (AIS data are automatically inserted). A colour code is used in order to draw MAS users attention on vessels particular aspects such as hazardous material transportation, special monitoring, unusual or suspicious behaviour. An “ordinary” vessel appears in green. As this character is determined as soon as the vessel gets underway, it is of course temporary concerning the criteria linked to the vessel cinematic. The tracking is done with SPATIONAV data (cinematic data is updated providing the vessel AIS is working correctly)

The “vessel data file” does not currently include the route planning which is compulsory before getting underway (like the aircraft flight plan which is sent to the air control office).

MAS data is repeated in detailed messages send to the same addresses that SPATIONAV users. The lookout usual practice is to communicate systematically by phone with the MOC and the MRCC.

6 SEQUENCE OF EVENTS

Local time : UTC +1

On **Saturday 17 January 2009**, *GUNAY 2* arrival at Caronte berth in Port-de-Bouc. The pilot on duty for the vessel informed the harbour officer that the master would wish the French authorities assistance. This information had been transmitted by fax to Marseille CSN.

On **Monday 19 January 2009**, loading of the vessel. At **4.30 pm** the loading had ended, *GUNAY 2* was ready to get underway. But, after negotiations between the crew and the owner representative agent, the getting underway had been delayed until the day after.

Marseille CSN knew *GUNAY 2* master’s request, but did not plan any Paris MOU PSC visit before getting underway.

The voyage planning done in the evening by the chief officer, planned to leave Planier Island abeam to port at 2.5 miles.

On **20 January 2009**, shortly before getting underway the regulation checklist was passed without any failure detected aboard.

At **11.40 pm**, the pilot came aboard in preparation to getting underway bound to Leghorn.

On **21 January 2009**

At **00.20 am**, the pilot disembarked between Tasques buoy and Lavera buoy. *GUNAY 2* was headind 216°. The pilot had reported that the wind was north-westerly 15 to 20 knots, the visibility very good, the sea slight. The master and a deck AB were on the bridge at this time. According to the pilot's statement, the master had a standard behaviour.

Shortly after the pilot's disembarkment, VHF contact between Cap Couronne and *GUNAY 2*.

Around **01.30 am**, the master took into account Planier lighthouse and noticed that *GUNAY 2* was drifting towards the island. The vessel was under autopilot control and steering engine n°1 was on. The heading error alarm threshold was set at 17°.

Due to the weather conditions that he assessed as bad, the master had altered the autopilot setting.

Less than **30 minutes** before the grounding, while a course altering and a VHF contact were still possible, the SPATIONAV record was giving an evidence that *GUNAY 2* was not going to respect a minimum safe distance to pass off Planier Island in the south.

At **02.05 am**, a GPS fix was plotted on chart WGS84 n°1705.

At **02.12 am**, the master noticed that *GUNAY 2* was heading toward Planier Island. He disabled the autopilot control and took in charge the manual steering himself.

At **02.15 am**, the master, according to his statement, had put the helm to the right and had ordered to the man on engineering watch to reverse the engine.

At **02.19 am**, despite this manoeuvre, the vessel grounded at 9.1 knots, heading 107.5° (see SPATIONAV record appendix C) on the south-western part of Planier Island at position 43°11',87 N – 005°13',64 E.

From **02.30 am**, the engines had been shut down, and the crew had been investigating. A leak of water had been pointed out in the fore compartment. The master ordered to the six non-officer crew members to be ready to abandon ship then he had contacted GPMM and CROSS La Garde.

Around **03.00 am**, the master had contacted the maritime agent in order to inform the owner.

At **06.38 am**, then at **07.40 am**, arrival of two successive evaluation teams. The damages had been identified precisely and the appraisal of the feasibility of a stern towing of *GUNAY 2* had been done. The vessel had an important positive trim and some waves were submerging the quarterdeck. Two refloating attempts with 2 tugs had been undertaken during this day.

22 January 2009

At **06.38 am**, the vessel has been refloated and moored in dry dock n°10 in Marseille port. The flooding had been assessed to reach about 400 tonnes.

7 ANALYSIS

The method selected for this analysis is the method usually employed by *BEA*mer for all its investigations, in compliance with the "Code for the Investigation of Marine Casualties and Accidents" laid out in Resolution MSC 255(84) adopted by the International Maritime Organization (IMO).

The factors involved have been classed in the following categories :

- **natural factors ;**
- **material factors ;**
- **human factor ;**
- **other factors.**

In each of these categories, *BEA*mer investigators have listed the possible factors and tried to qualify them relatively to their characters :

- **certain, probable, hypothetical ;**
- **causal or aggravating ;**
- **circumstantial, inherent ;**

with the aim to reject, after examination, factors with no influence on the course of events and to retain only those that could, with a good probability, have a real influence on the course of facts. The investigators are aware that maybe they have not given an answer to all the issues raised by this accident. Their aim remains to avoid other accident of the same type; they have privileged with no *a priori* an inductive analysis of the factors which have a significant risk of recurrence due to their inherent character.

7.1 Natural factors

The weather analysis done by Météo France (see appendix D) states that the 20 to 25 knot north-westerly wind was stable. The sea state was the result of the crossing of the 1 to 1.20 m wind sea waves with a same height south-south-westerly residual swell. Eventually, the average waves of this crossed sea were 1.75 m high. However, some isolated waves could have topped at 3.50 m. No dangerous phenomenon had been detected.

The obvious false assessment of the wind direction stated by the master is probably due to the observation of the residual swell, which was amplified in the vicinity of the island by the shallow waters.

The drifting simulation done with the MOTHY software by Météo France (see appendix D) confirms that the leeway had a south-east axis which was favourable to GUNAY 2 as long as the set point was 107° as planned in the voyage planning, as it would have increased the distance with Planier Island.

In these conditions, no natural factor is retained as a contributing factor to the stranding.

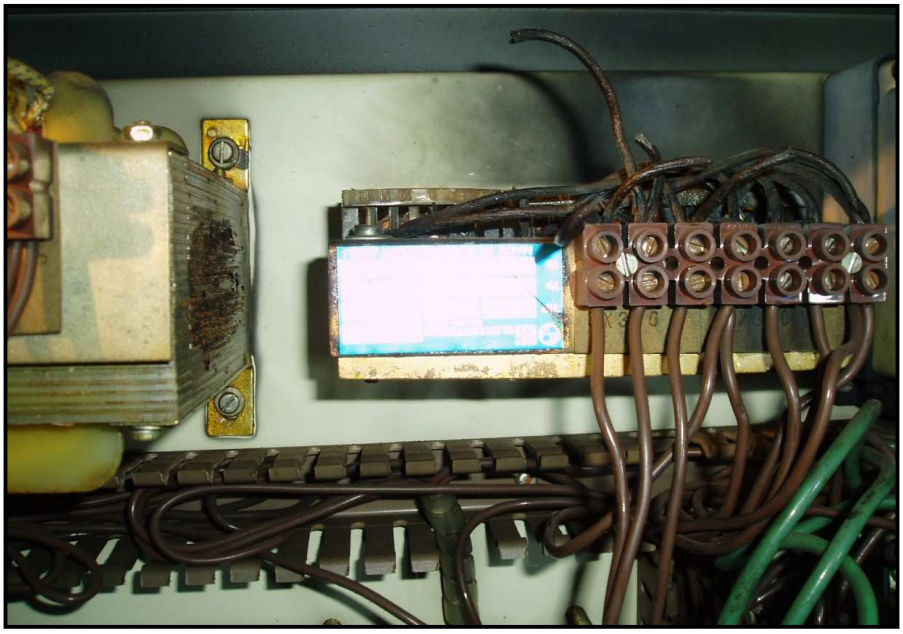
7.2 Material factors

7.2.1 Chart

The chart used for the passage, WGS84 n°1705 *"Cabo San Sebastian to Isles d'Hyères",* is not at an appropriate scale for coastal navigation. An order for charts more suitable for the usual type of navigation had been done by the master but it had not been honoured by the owner.

7.2.2 Dysfunction of the steering control device

The trials done before getting underway had not shown any deficiency. In addition, the chief engineer did not detect anything abnormal during his watch. Nevertheless, an overheating of the hydraulic pump n°1 engine main t ransformer and of the terminal block next to the main transformer (equipment box located in the steering gear room) had been noticed during the investigations done by CSN Marseille. This overheating could have been induced by the important stress undergone by the relays due to yawing in heavy seas during previous passages. Moreover, 3 wires connected to this terminal block (ins and outs of which remain undetermined) are cut.



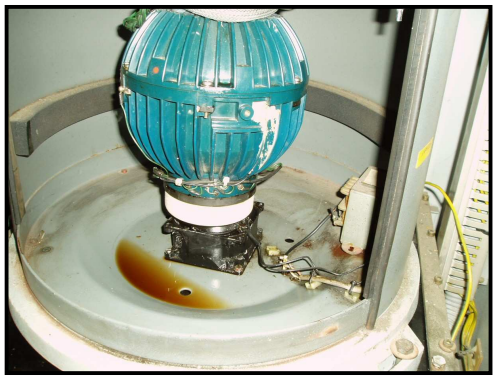
During the 7 minutes before the grounding (from 02.07am to 02.14am as shown on the monitoring display) the headings recorded by the VTS are :

104,2 – 108,5 – 115,1 – 103,1 – 106 – 109 – 108 – 104 – 103 – 109 – 112,7 – 105,3 – 102 – 108,6 – 107 – 108,1 – 112,1 – 104 – 103,4 – 104,3 – 108,5 – 105,8 – 103,3 – 108,4 – 106,2 – 104,1 – 103,6 – 107,8 – 107,5 – 106,9 – 104,3 – 105,4 – 105,6 – 103,8 – 101,5 – 104,9 – 107,5 (zero speed at 02.14 am).

The average heading is 106.3° and no yaw or loss of control that could be due to a failure of an element of the steering chain made up of the gyro compass, the autopilot and the steering gear can be pointed out.

7.2.3 The working of the gyrocompass

An oil leak had been detected in the cup located under the gyrocompass bowl. The last control of this equipment had been done in November 2005. Despite these anomalies, no kinematical element before the grounding gave evidence of a failure of the gyrocompass.



7.2.4 Setting of the control deviation alarm

The heading control deviation alarm is activated at 35° instead of 17° as it could be predicted in accordance with the setting done (test undertaken by CSN Marseille).

These material defects, observed or presumed, could all have been compensated by a good attendance to the watch and a proper lookout. They nevertheless constitute **potentially aggravating factors** of the human factors identified below.

7.3 Human factor

The terminology used by Reason's model (adopted on 25 Nov 19999 by resolution IMO 884 (21)) is well adapted to study human factors in the case of a stranding.

7.3.1 Hierarchy responsibilities

The deficiencies pointed out during last years controls, the back-due pays for the crew, the lack of food supply are of the owner's responsibility.

These deficiencies had caused a potentially dangerous situation. It is a **causal factor** of the accident.

7.3.2 Psychological criteria

When getting underway from Port-de-Bouc the crew's cohesion was affected by the following elements :

- Master's and chief officer's tiredness due to negotiation with the owner's representative,
- Crisis situation likely to trigger a conflict within the crew,
- 2 deck officers had been disembarked without any substitute, therefore a disruption in the navigational watch,
- a probably poor lifestyle as the food was bought by the crew with their own funds,
- a dim hope to get a back pay in Livorno…

These conditions are not helpful to have the concentration necessary to monitor the navigation by the rule book ; the plurality of these adverse conditions is the **underlying factor** of the deficiencies leading to the accident.

Therefore the master's incoherent behaviour and/or inadequate reactions in relation to his mission followed on quickly :

- incoherence between the fix and routes drawn on the chart and SPATIONAV record,
- objections to SPATIONAV record,
- vessel drifting compensation manoeuvre inefficient (whatever the cause and the drifting axis) and anyway not visible on SPATIONAV record (see appendix C),
- incoherence between master's and deck AB's statement, relative to the presence of the latter on the deck after the pilot's disembarkment (by claiming to have taken himself the manual steering before grounding, the master let suppose that the AB was not on the bridge).

If he was actually physically on the bridge during the fifteen miles before the stranding, the master, mostly concerned about the crisis situation was probably mentally "absent", all the more so he was very acquainted with this voyage and with the routine tasks he had to accomplish. This psychological state is the **main causal factor** of the grounding.

7.3.3 Procedures

The little merchant vessels practical consists in rounding the islands at the south edge of the monitoring area at a very short range (0.25 mile). In these conditions the detection of a vessel appearing to be running aground is uncertain, even for an observer with the assistance of SPATIONAV.

GUNAY 2, a regular visitor of French and Italian ports, had been subjected to numerous PSCs, particularly in Italy. This situation was well-known of the signal stations that keep in memory of regular visitor vessels as well as of the behaviour of their crews (generally staying aboard for long periods at sea).

For all that, *GUNAY 2*, was on the green list, that is to say she was a “standard” vessel.

As the phone call between signal stations and CROSS or MOC are a useful improver to SPATIONAV data, it would be necessary to make a better use of these information and to format it more accurately than with a simple colour code. Thus, depending on the vessel, the relevant authority would have more background information helping it to make a decision aiming to prevent an accident (for example, a VHF contact with a vessel to make sure of her intent and that the situation is under control).

In the case of *GUNAY 2* grounding, and taking into account the present state of procedures and of SPATIONAV operation rules, *BEA*mer do not point out any discrepancy in the maritime traffic monitoring.

8 EXECUTIVE SUMMARY

- Owner inefficient ;
- Minimum safe manning disregarded ;
- Master’s psychological state incompatible with an appropriate watch keeping ;
- Lack of VHF call from a signal station towards a vessel during the 10 minutes before her grounding.

9 RECOMMENDATIONS

The *BEA*mer recommends :

To *GPMM* and to *Préfecture Maritime de la Méditerranée* :

9.1 To clarify VTS Marseille-Fos mode of operation (regulations, procedures and operators) ;

9.2 To consider the whole radar coverage area as part of the VTS responsibility area, the lanes being a sub area compulsory for only particular vessels.

To SPATIONAV operators

9.3 To use SPATIONAV capacities to detect any abnormal behaviour likely to lead to a risky situation.

9.4 To study the possibility to incorporate in SPATIONAV the merchant vessels initial route planning data.

To the administration :

9.5 To regulate, in the framework of the Maritime Approaches Situation monitoring, the tasks of the various operators and their respective area of responsibility : *GPMM*, signal stations, *CROSS* and MOC (*Préfecture Maritime*).

9.6 When aware of a situation, to systematically control the vessel aboard whom the current international standards (IWO convention n°1 63 about the seafarers welfare) are not enforced.

APPENDIX LIST

A. Enquiry decision

B. Vessel

C. Chart

D. Weather conditions analysis by Météo France

Appendix A

Enquiry decision

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

Bureau d'enquêtes sur
les événements de mer

Paris, le 03 MARS 2009
N/réf. : BEAmer

000002

BEA mer

DÉCISION

Le Ministre l'Ecologie, de l'Energie, du Développement durable et de l'Aménagement du territoire;

Vu la loi n° 2002-3 du 3 janvier 2002 relative aux enquêtes techniques après événements de mer ;

Vu le décret n° 2004-85 du 26 janvier 2004 relatif aux enquêtes techniques après événement de mer, accident ou incident de transport terrestre ;

Vu le décret du 09 septembre 2008 portant délégation de signature (Bureau d'enquêtes sur les événements de mer) ;

Vu le décret du 09 juin 2008 portant nomination du Directeur du Bureau d'enquêtes sur les événements de mer ;

Vu le SITREP établi le 21 janvier 2009 par le CROSS La Garde ;

DECIDE

Article 1 : En application de l'article 14 de la loi sus-visée, une enquête technique est ouverte concernant l'échouement du cargo *GUNAY 2* survenu le 21 janvier 2009 sur l'île du Planier au large de Marseille, immatriculé sous le N° 8218366 IMO et battant pavillon Turque.

Article 2 : Elle aura pour but de rechercher les causes et de tirer les enseignements que ces événements comportent pour la sécurité maritime, et sera menée dans le respect des textes applicables, notamment le titre III de la loi sus-visée et la résolution MSC.255 (84) de l'Organisation Maritime Internationale.

Pour le Ministre et par délégation
Le Directeur du BEAmer p.i.
Germain VERLET

Ministère de l'Écologie,
de l'Energie,
du Développement durable,
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Appendix B

Vessel file


GUNAY-2


GÜNAY-2
İSTANBUL

Lloyd's MIU
The premier source of maritime information

Gunay 2

IMO: 8218366
Flag: Turkey
Reg. Owner: Gunay Gemi Sanayi ve Ticaret A.S.
Type: General Cargo
Status: Live

Vessel Incidents

Inspections showing deficiencies, date, place, name, beneficial owner, and Port State Control authority (MOU)
Inspections: 39
Detentions: 8
Casualties: 1

Date	Country	Place	Vessel Name At Time	Registered Owner At Time	Beneficial Owner At Time	Detained	MOU
9 Dec 2008	Italy	Leghorn	Gunay 2	Gunay G.	Gunay G.		Paris
	Deficiencies:						
	Load lines - Freeboard marks: Not as required						
	MARPOL annex I - SOPEP: Incorrect						
	MARPOL annex I - Oil record book: Not properly filled						
	Safety of navigation - Nautical publications: Not up to date						
	ISM related deficiencies - Documentation: Not according SMS						
	MARPOL annex V - Garbage management plan: Not as required						
	Crew certificates - Manning specified by the minimum safe manning doc: Not as required						
	ISM related deficiencies - Reports of non-conf., accidents & hazardous occur.: Not according SMS						
	Fire safety measures - Fire fighting equipment and appliances: Not properly mantained						
	Fire safety measures - Fire fighting equipment and appliances: Not as required						
	Ship's certificates and documents - Continuous synopsis record: Entries missing						
7 Nov 2008	Italy	Oristano	Gunay 2	Gunay G.	Gunay G.		Paris
	Deficiencies:						
	Mooring arrangements (ILO 147) - Ropes and wires: Not properly mantained						
	Load lines - Windows, side scuttles: Not properly mantained						
	Working spaces and accident prevention - Other (working space ILO): Other						
	Fire safety measures - Jacketed high pressure lines: Not as required						
6 Oct 2008	France	La Nouvelle	Gunay 2	Gunay G.	Gunay G.		Paris
	Deficiencies:						
	Life saving appliances - Lifeboats: Missing equipment						
	Food and catering - Cold room temperature: Not as required						
4 Sep 2008	Italy	Leghorn	Gunay 2	Gunay G.	Gunay G.	Detained	Paris
	Deficiencies:						
	Safety of navigation - International code of signals and IAMSAR manual: Missing						
	Safety of navigation - Navigation bridge visibility: Not as required						
	Safety of navigation - Other (navigation): Other						
	Safety of navigation - Magnetic compass: Not as required						
	MARPOL annex I - SOPEP: Not updated						
	MARPOL annex I - 15 PPM Alarm arrangmts.: Not as required						
	Safety of navigation - Nautical publications: Not up to date						
	MARPOL annex V - Garbage record book: Not as required						
	ISM related deficiencies - Documentation: Not according SMS						
	Ship's certificates and documents - Cargo ship safety radio (including exemption): Not properly filled						
	Crew certificates - Manning specified by the minimum safe manning doc: Not as required						
	Working spaces and accident prevention - Other (working space ILO): Other						
	ISM related deficiencies - Resources and personnel: Not according SMS						
	ISM related deficiencies - Resources and personnel: Not according SMS						
	Operational deficiencies - Operation of GMDSS equipment: Lack of familiarity						
	Structural safety - Steering gear: Not as required						
	Malta	Valletta	Gunay 2	Gunay G.	Gunay G.	Detained	Paris
	Deficiencies:						

							Load lines - Ventilators, air pipes, casings: Not as required Safety of navigation - Charts: Expired MARPOL annex I - SOPEP: Missing entries Safety of navigation - Nautical publications: Expired Safety of navigation - Nautical publications: Missing Life saving appliances - Lifebuoys: Not ready for use Ship's certificates and documents - Safety management certificate (SMC/ ISM): Not properly filled Propulsion & aux. - Other (machinery): Other Ship's certificates and documents - Minimum safe manning document: Not properly filled
11 Dec 2007							Food and catering - Provisions quantity: Insufficient Life saving appliances - Radio life-saving appliances: Inoperative Life saving appliances - Radio life-saving appliances: Batteries expired Life saving appliances - Radio life-saving appliances: Inoperative Fire safety measures - Fire detection: Missing Fire safety measures - Fire detection: Inoperative Life saving appliances - Lifejackets: Not ready for use Accident prevention (ILO147) - Protection machines/parts: Missing equipment Crew certificates - Certificates for master and officers: Expired Crew certificates - Certificates for master and officers: Not as required Crew certificates - Certificate for rating for watchkeeping: Expired Accident prevention (ILO147) - Personal equipment: Missing equipment
14 Mar 2007	France	Marseilles	Gunay 2	Gunay G.	Gunay G.		Paris
28 Sep 2006	France	Marseilles	Gunay 2	Gunay G.	Gunay G.		Paris Deficiencies: Ship's certificates and documents - Cargo ship safety (including exemption): Not properly filled
31 May 2006	Italy	Imperia	Gunay 2	Gunay G.	Gunay G.		Paris Deficiencies: Ship's certificates and documents - Safety management certificate (SMC/ ISM): Not properly filled
3 Dec 2005	Italy	Oristano	Gunay 2	Gunay G.	Gunay G.		Paris Deficiencies: Structural safety - Steering gear: Not properly mantained
	Spain	Cartagena(ESP)	Gunay 2	Gunay G.	Gunay G.		Paris Deficiencies: Safety of navigation - Radar: Insufficient Safety of navigation - Radar: Insufficient Safety of navigation - Other (navigation): Other Safety of navigation - Charts: Expired
28 Oct 2005							MARPOL annex I - Oil record book: Not properly filled Radiocommunications - MF radio installation: Not as required Radiocommunications - Satellite EPIRB 406MHz/1.6GHz: Wrong location Radiocommunications - Satellite EPIRB 406MHz/1.6GHz: Not as required ISM related deficiencies - Development of plans for shipboard operations: Missing Ship's certificates and documents - Safety management certificate (SMC/ ISM): Not properly filled Ship's certificates and documents - Prevention of pollution by oil (IOPP): Not properly filled Structural safety - Emergency lighting,batteries and switches: Damaged
8 Apr 2005	Italy	Leghorn	Gunay 2	Gunay G.	Gunay G.		Paris
18 Feb 2005	Italy	Siracusa	Gunay 2	Gunay G.	Gunay G.		Other Sources
18 Feb 2005	Italy	Siracusa	Gunay 2	Gunay G.	Gunay G.		Other Sources
15 Feb 2005	Italy	Siracusa	Gunay 2	Gunay G.	Gunay G.	Detained	Other Sources
	Italy	Siracusa	Gunay 2	Gunay G.	Gunay G.	Detained	Other Sources
14 Feb 2005							Deficiencies: Alarm signals - Fire alarm: Inoperative Propulsion & aux. - Propulsion main engine: Not as required MARPOL annex I - Retention of oil on board: Not as required MARPOL annex I - 15 PPM Alarm arrangmts.: Inoperative ISM related deficiencies - Maintenance of the ship and equipment: Not according SMS Ship's certificates and documents - Minimum safe manning document: Not properly filled Accommodation - Sanitary facilities: Not properly mantained Working spaces and accident prevention - Other (working space ILO): Other Fire safety measures - Fire pumps: Inoperative Structural safety - Signs, indications: Not as required Ship's certificates and documents - Cargo gear record book: Entries missing Accommodation - Sleeping room: Dirty Fire safety measures - Fire-dampers: Inoperative Accommodation - Other (crew and accommodation): Other Food and catering - Water, pipes, tanks: Not as required

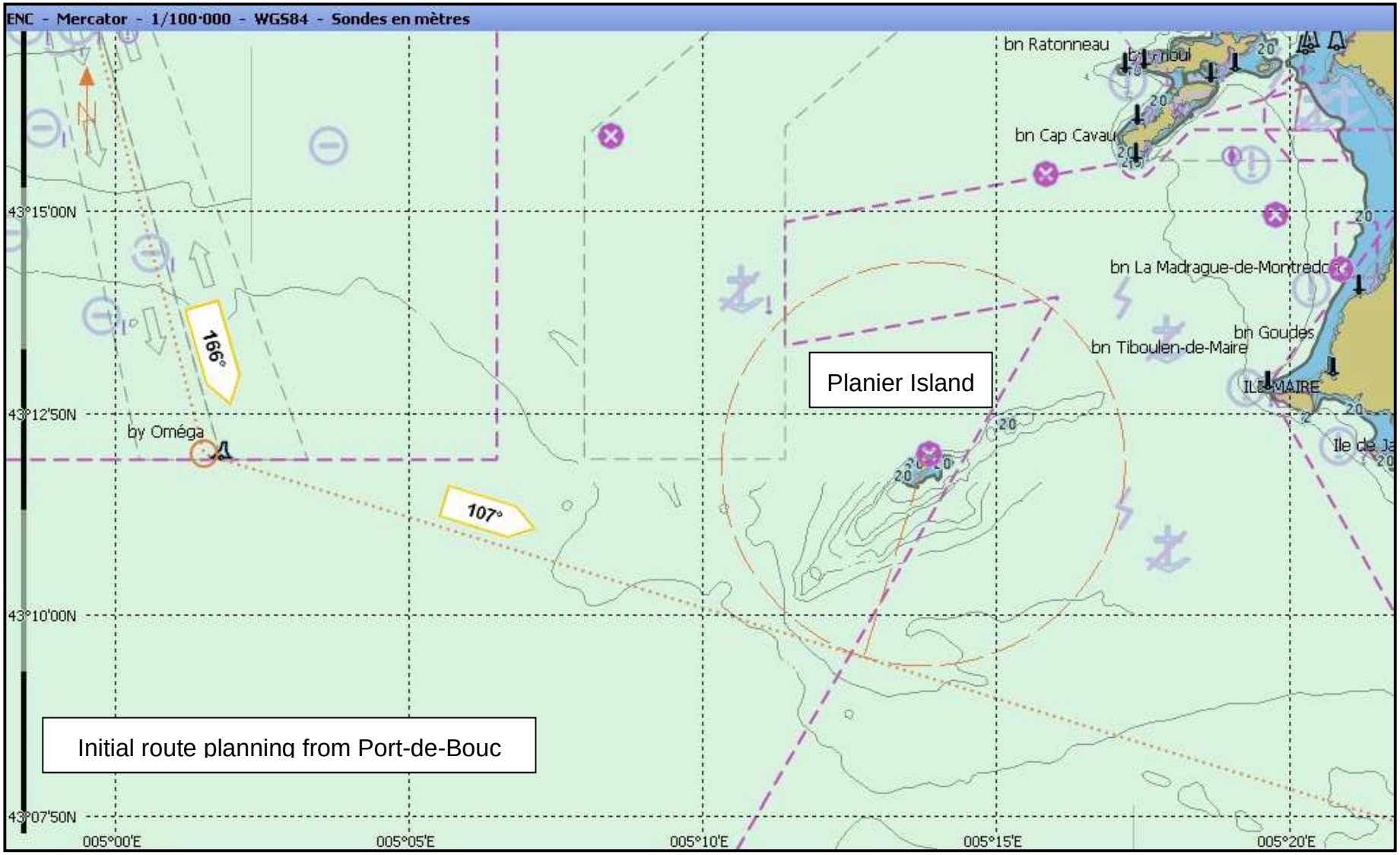
	Structural safety - Gangway, accommodation-ladder: Not properly mantained Load lines - Doors: Not properly mantained						
6 Aug 2004	Spain	Palma(Maj)	Gunay 2	Gunay G.	Gunay G.		Paris
	France	Port de Bouc	Gunay 2	Gunay G.	Gunay G.		Paris
16 Jun 2004	Deficiencies: Mooring arrangements (ILO 147) - Winches & capstans: Not properly mantained Fire safety measures - Fire fighting equipment and appliances: Expired						
	Italy	Imperia	Gunay 2	Gunay G.	Gunay G.		Paris
11 Jun 2004	Deficiencies: Accommodation - Medical equipment: Missing manual Life saving appliances - Radio life-saving appliances: Missing Mooring arrangements (ILO 147) - Winches & capstans: Not properly mantained						
19 Dec 2003	Italy	Oristano	Gunay 2	Gunay G.	Gunay G.		Paris
	Italy	Leghorn	Gunay 2	Gunay G.	Gunay G.		Paris
7 Oct 2003	Deficiencies: Accommodation - Sanitary facilities: Dirty Fire safety measures - Fire fighting equipment and appliances: Not as required Radiocommunications - Radio log (diary): Not up to date						
27 Aug 2003	Italy	Oristano	Gunay 2	Gunay G.	Gunay G.		Paris
22 Jul 2003	Italy	Naples	Gunay 2	Gunay G.	Gunay G.		Other Sources
	Italy	Naples	Gunay 2	Gunay G.	Gunay G.	Detained	Other Sources
	Deficiencies: Working spaces and accident prevention - Electrical: Unsafe Fire safety measures - Fire doors: Malfunctioning Fire safety measures - Means of escape: Not as required Fire safety measures - Fire-dampers: Inoperative Ship's certificates and documents - Minimum safe manning document: Not properly filled Life saving appliances - Lifeboats: Not properly mantained Life saving appliances - Lifeboats: Not properly stowed Fire safety measures - Fire pumps: Inoperative ISM related deficiencies - Resources and personnel: Insufficient doc. Fire safety measures - International shore-connection: Inoperative Structural safety - Signs, indications: Missing						
26 Jun 2003	Alarm signals - Fire alarm: Inoperative Load lines - Freeboard marks: Not properly marked Load lines - Ventilators, air pipes, casings: Cracked Operational deficiencies - Fire control plan: Not readable Life saving appliances - Lifebuoys: Not properly marked Life saving appliances - Lifebuoys: Not as required ISM related deficiencies - Maintenance of the ship and equipment: Incomplete Crew certificates - Certificate for rating for watchkeeping: Not as required Crew certificates - Certificates for radio personnel: Missing Crew certificates - Certificates for radio personnel: Missing Life saving appliances - Lifeboat inventory: Incomplete Fire safety measures - Fire fighting equipment and appliances: Inoperative Fire safety measures - Ventilation: Not as required Structural safety - Emergency lighting,batteries and switches: Missing Structural safety - Emergency lighting,batteries and switches: Not properly mantained Structural safety - Emergency lighting,batteries and switches: Inoperative						
27 May 2003	France	St. Louis du Rhone	Gunay 2	Gunay G.	Gunay G.		Paris
3 Apr 2003	Italy	Pozzallo	Gunay 2	Gunay G.	Gunay G.		Paris
2 Dec 2002	Spain	Escombreras	Gunay 2	Gunay G.	Gunay G.		Other Sources
2 Dec 2002	Spain	Cartagena(ESP)	Gunay 2	Gunay G.	Gunay G.		Other Sources
2 Dec 2002	Spain	Cartagena(ESP)	Gunay 2	Gunay G.	Gunay G.	Detained	Other Sources
2 Dec 2002	Spain	Cartagena(ESP)	Gunay 2	Gunay G.	Gunay G.		Paris
26 Nov 2002	Spain	Escombreras	Gunay 2	Gunay G.	Gunay G.	Detained	Other Sources
	Spain	Cartagena(ESP)	Gunay 2	Gunay G.	Gunay G.	Detained	Paris
26 Nov	Deficiencies: Safety of navigation - Charts: Not specified Structural safety - Steering gear: Not specified						

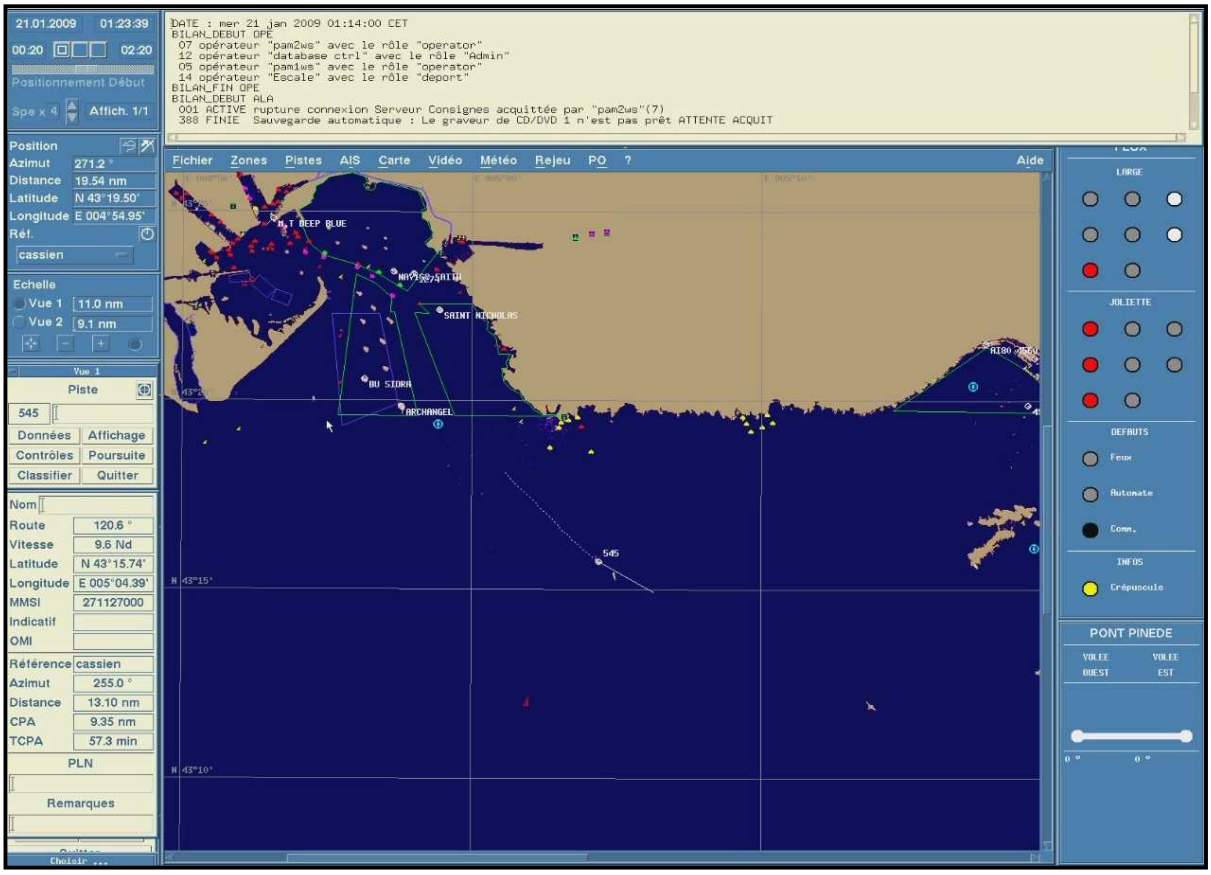
2002	Structural safety - Steering gear: Not specified Mooring arrangements (ILO 147) - Anchoring devices: Not specified Fire safety measures - Fire pumps: Not specified Fire safety measures - Fire pumps: Not specified Structural safety - Signs, indications: Not specified					
14 Jun 2002	Italy	Vibo Valentia	Gunay 2	Gunay G.	Gunay G.	Paris
18 Jan 2002	Italy	Palermo	Gunay 2	Gunay G.	Gunay G.	Paris
26 Jun 2001	Italy	Vibo Valentia	Gunay 2	Gunay G.	Gunay G.	Paris
19 Apr 2001	Italy	Naples	Gunay 2	Gunay G.	Gunay G.	Paris
20 Mar 2001	Italy	Crotone	Gunay 2	Gunay G.	Gunay G.	Paris
12 Jul 2000	Italy	Reggio di Calabria	Gunay 2	Gunay G.	Gunay G.	Paris
18 Apr 2000	Italy	Vibo Valentia	Gunay 2	Gunay G.	Gunay G.	Paris
14 Sep 1999	Italy	Leghorn	Gunay 2	Gunay G.	Gunay G.	Paris

Please Note: All inspection records are supplied by one of the following MOU's:
Black Sea
Indian Ocean
Paris
Tokyo
United States Coastguard
None of the above bodies will accept responsibility for any error or inconsistency in the data supplied.

Appendix C

Chart


ENC - Mercator - 1/100·000 - WGS84 - Sondes en mètres
bn Ratonneau
bn Cap Cavau
bn La Madrague-de-Montredo
bn Goudes
bn Tiboulen-de-Maire
ILE MAIRE
166°
107°
by Oméga
Planier Island
Initial route planning from Port-de-Bouc
43°15'00N
43°12'50N
43°10'00N
43°07'50N
005°00'E
005°05'E
005°10'E
005°15'E
005°20'E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Positionnement Début
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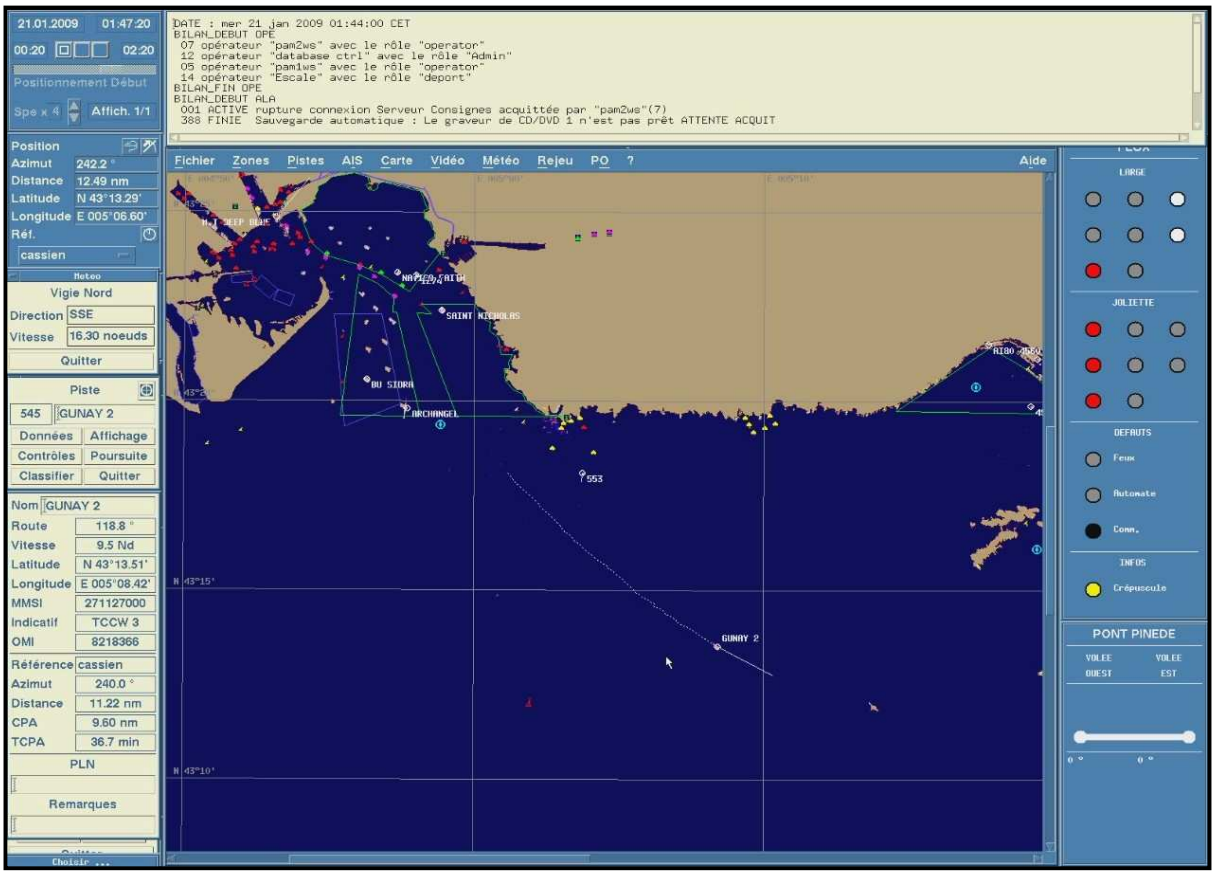
Position
Azimut 271.2 °
Distance 19.54 nm
Latitude N 43°19.50'
Longitude E 004°54.95'
Réf.
cassien
Echelle
Vue 1 11.0 nm
Vue 2 9.1 nm
Vue 1
Piste
545
Données Affichage
Contrôles Poursuite
Classifier Quitter
Nom
Route 120.6 °
Vitesse 9.6 Nd
Latitude N 43°15.74'
Longitude E 005°04.39'
MMSI 271127000
Indicatif
OMI
Référence cassien
Azimut 255.0 °
Distance 13.10 nm
CPA 9.35 nm
TCPA 57.3 min
PLN
Remarques
Choisir ...
DATE : mer 21 jan 2009 01:14:00 CET
BILAN_DEBUT OPE
07 opérateur "pam2ws" avec le rôle "operator"
12 opérateur "database ctrl" avec le rôle "Admin"
05 opérateur "pam1ws" avec le rôle "operator"
14 opérateur "Escale" avec le rôle "deport"
BILAN_FIN OPE
BILAN_DEBUT ALA
001 ACTIVE rupture connexion Serveur Consignes acquittée par "pam2ws"(7)
388 FINIE Sauvegarde automatique : Le graveur de CD/DVD 1 n'est pas prêt ATTENTE ACQUIT
Fichier Zones Pistes AIS Carte Vidéo Météo Rejeu PO ? Aide
M.T BEEP BLUE
SAINT NICOLAS
BU SIORA
ARCHANGEL
545
LARGE
JOLIETTE
DEFAUTS
Feux
Automate
Comm.
INFOS
Crépuscule
PONT PINEDE
VOLEE OUEST
VOLEE EST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Distance 12.49 nm
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Longitude E 005°06.60'
Réf.
cassien
Meteo
Vigie Nord
Direction SSE
Vitesse 16.30 noeuds
Quitter
Piste
545 GUNAY 2
Données Affichage
Contrôles Poursuite
Classifier Quitter
Nom GUNAY 2
Route 118.8 °
Vitesse 9.5 Nd
Latitude N 43°13.51'
Longitude E 005°08.42'
MMSI 271127000
Indicatif TCCW 3
OMI 8218366
Référence cassien
Azimut 240.0 °
Distance 11.22 nm
CPA 9.60 nm
TCPA 36.7 min
PLN
Remarques
Choisir ...
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BILAN_DEBUT OPE
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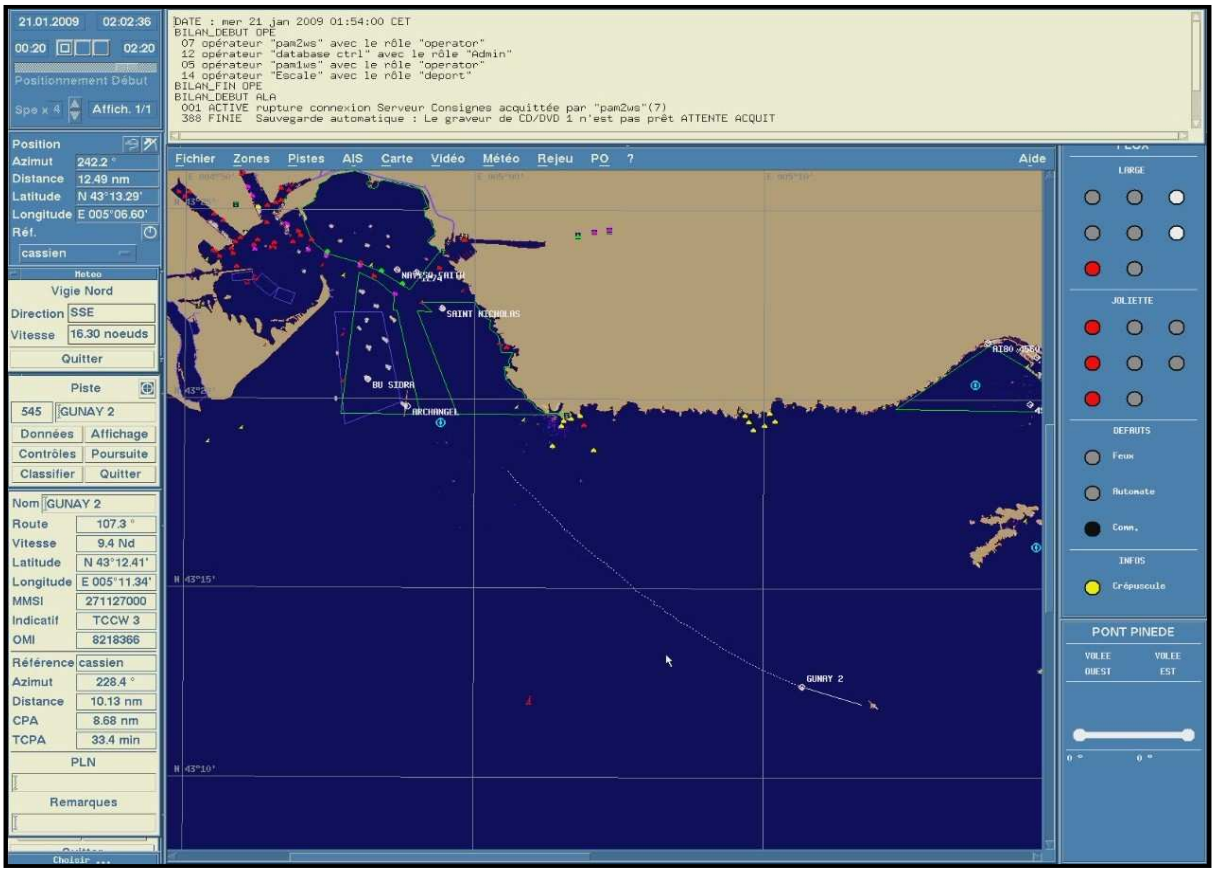
12 opérateur "database ctrl" avec le rôle "Admin"
05 opérateur "pam1ws" avec le rôle "operator"
14 opérateur "Escale" avec le rôle "deport"
BILAN_FIN OPE
BILAN_DEBUT ALA
001 ACTIVE rupture connexion Serveur Consignes acquittée par "pam2ws"(7)
388 FINIE Sauvegarde automatique : Le graveur de CD/DVD 1 n'est pas prêt ATTENTE ACQUIT
Fichier Zones Pistes AIS Carte Vidéo Météo Rejeu PO ? Aide
SAINT NICOLAS
BU SIORA
ARCHANGEL
553
GUNAY 2
LARGE
JOLIETTE
DEFAUTS
Feux
Automate
Comm.
INFOS
Crépuscule
PONT PINEDE
VOLEE OUEST
VOLEE EST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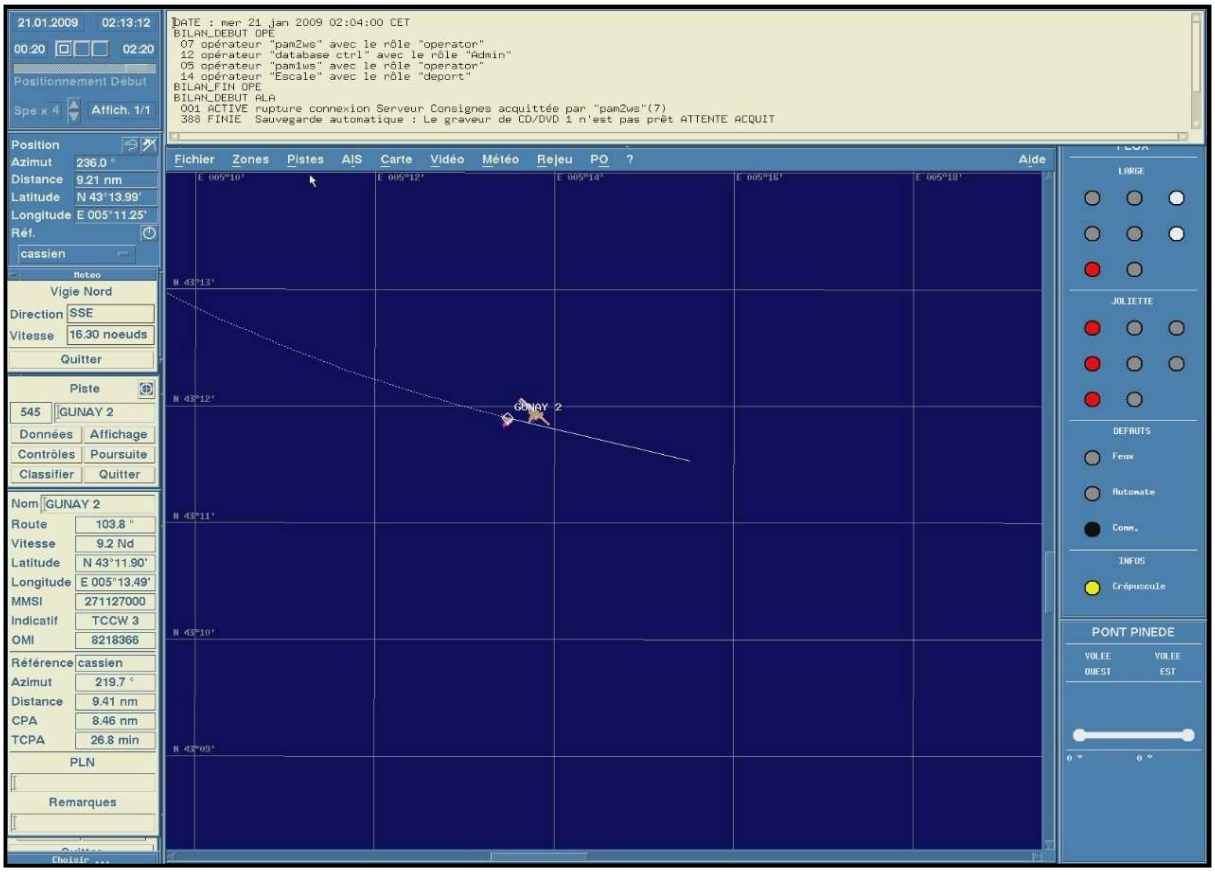
Longitude E 005°06.60'
Réf.
cassien
Meteo
Vigie Nord
Direction SSE
Vitesse 16.30 noeuds
Quitter
Piste
545 GUNAY 2
Données Affichage
Contrôles Poursuite
Classifier Quitter
Nom GUNAY 2
Route 107.3 °
Vitesse 9.4 Nd
Latitude N 43°12.41'
Longitude E 005°11.34'
MMSI 271127000
Indicatif TCCW 3
OMI 8218366
Référence cassien
Azimut 228.4 °
Distance 10.13 nm
CPA 8.68 nm
TCPA 33.4 min
PLN
Remarques
DATE : mer 21 jan 2009 01:54:00 CET
BILAN_DEBUT OPE
07 opérateur "pam2ws" avec le rôle "operator"
12 opérateur "database ctrl" avec le rôle "Admin"
05 opérateur "pam1ws" avec le rôle "operator"
14 opérateur "Escale" avec le rôle "deport"
BILAN_FIN OPE
BILAN_DEBUT ALA
001 ACTIVE rupture connexion Serveur Consignes acquittée par "pam2ws"(7)
388 FINIE Sauvegarde automatique : Le graveur de CD/DVD 1 n'est pas prêt ATTENTE ACQUIT
Fichier Zones Pistes AIS Carte Vidéo Météo Rejeu PO ? Aide
SAINT NICOLAS
BU SIDRA
ARCHANGEL
GUNAY 2
LARGE
JOLIETTE
DEFAUTS
Feux
Automate
Conn.
INFOS
Crépuscule
PONT PINEDE
VOLEE OUEST
VOLEE EST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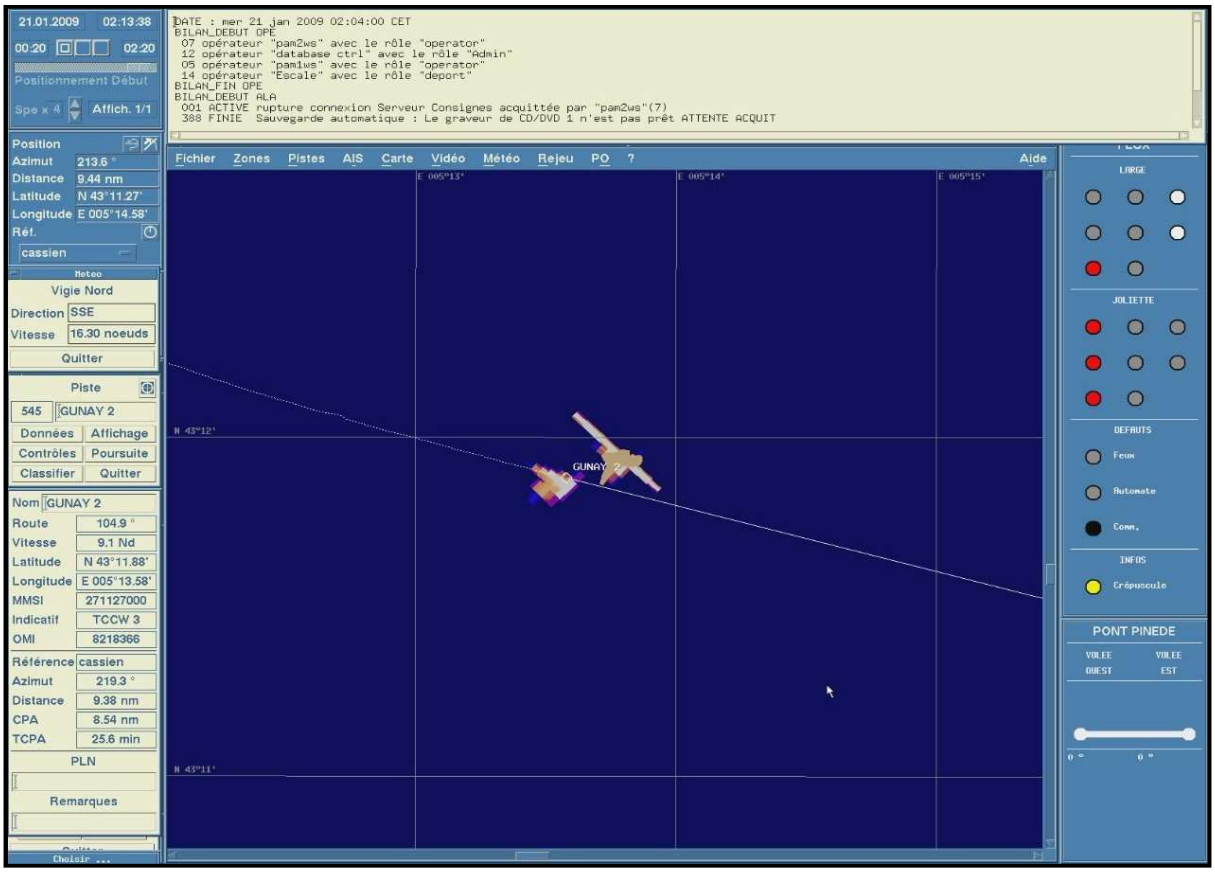
Distance 9.21 nm
Latitude N 43°13.99'
Longitude E 005°11.25'
Réf.
cassien
Meteo
Vigie Nord
Direction SSE
Vitesse 16.30 noeuds
Quitter
Piste
545 GUNAY 2
Données Affichage
Contrôles Poursuite
Classifier Quitter
Nom GUNAY 2
Route 103.8 °
Vitesse 9.2 Nd
Latitude N 43°11.90'
Longitude E 005°13.49'
MMSI 271127000
Indicatif TCCW 3
OMI 8218366
Référence cassien
Azimut 219.7 °
Distance 9.41 nm
CPA 8.46 nm
TCPA 26.8 min
PLN
Remarques
DATE : mer 21 jan 2009 02:04:00 CET
BILAN_DEBUT OPE
07 opérateur "pam2ws" avec le rôle "operator"
12 opérateur "database ctrl" avec le rôle "Admin"
05 opérateur "pam1ws" avec le rôle "operator"
14 opérateur "Escale" avec le rôle "deport"
BILAN_FIN OPE
BILAN_DEBUT ALA
001 ACTIVE rupture connexion Serveur Consignes acquittée par "pam2ws"(7)
388 FINIE Sauvegarde automatique : Le graveur de CD/DVD 1 n'est pas prêt ATTENTE ACQUIT
Fichier Zones Pistes AIS Carte Vidéo Météo Rejeu PO ? Aide
GUNAY 2
LARGE
JOLIETTE
DEFAUTS
Feux
Automate
Conn.
INFOS
Crépuscule
PONT PINEDE
VOLEE OUEST
VOLEE EST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Affich. 1/1
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Longitude E 005°14.58'
Réf.
cassien
Meteo
Vigie Nord
Direction SSE
Vitesse 16.30 noeuds
Quitter
Piste
545 GUNAY 2
Données Affichage
Contrôles Poursuite
Classifier Quitter
Nom GUNAY 2
Route 104.9 °
Vitesse 9.1 Nd
Latitude N 43°11.88'
Longitude E 005°13.58'
MMSI 271127000
Indicatif TCCW 3
OMI 8218366
Référence cassien
Azimut 219.3 °
Distance 9.38 nm
CPA 8.54 nm
TCPA 25.6 min
PLN
Remarques
DATE : mer 21 jan 2009 02:04:00 CET
BILAN_DEBUT OPE
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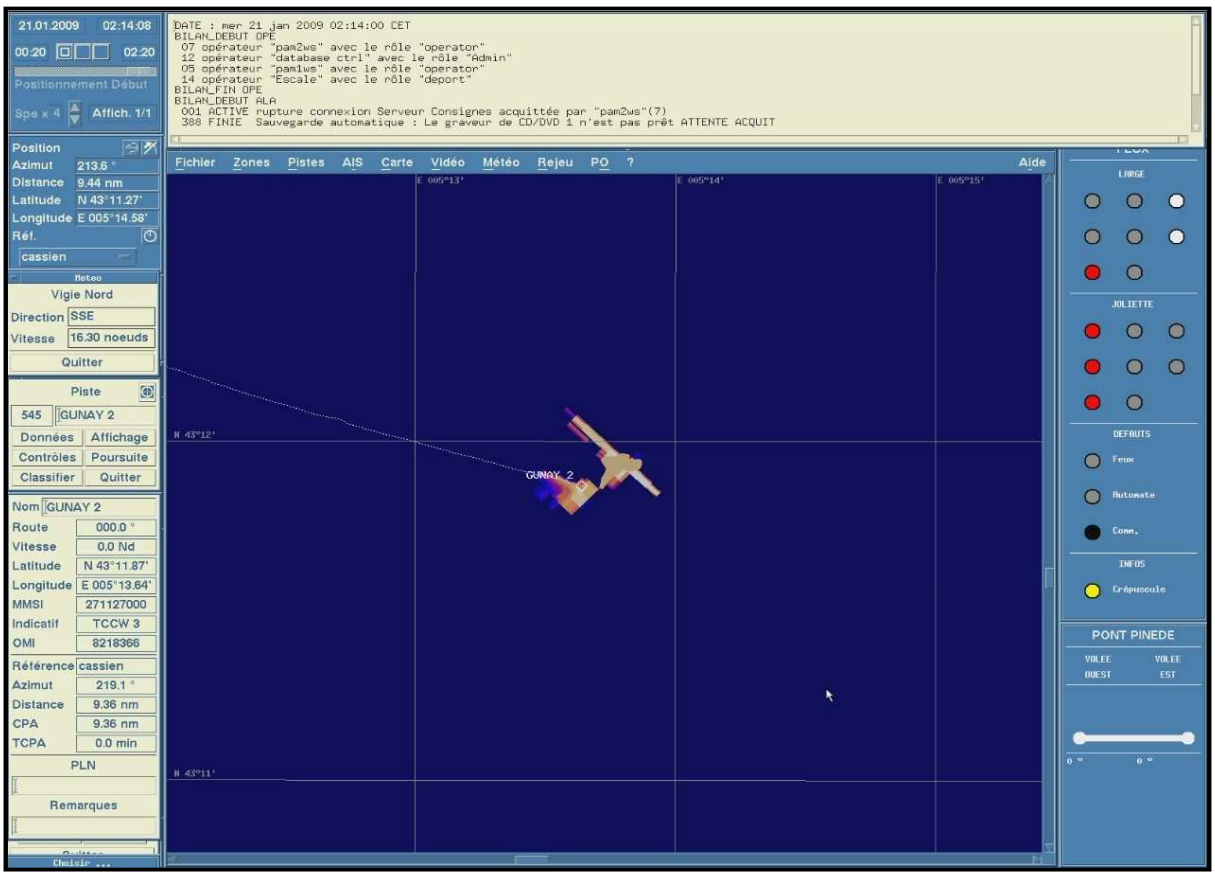
12 opérateur "database ctrl" avec le rôle "Admin"
05 opérateur "pam1ws" avec le rôle "operator"
14 opérateur "Escale" avec le rôle "deport"
BILAN_FIN OPE
BILAN_DEBUT ALA
001 ACTIVE rupture connexion Serveur Consignes acquittée par "pam2ws"(7)
388 FINIE Sauvegarde automatique : Le graveur de CD/DVD 1 n'est pas prêt ATTENTE ACQUIT
Fichier Zones Pistes AIS Carte Vidéo Météo Rejeu PO ? Aide
E 005°13'
E 005°14'
E 005°15'
N 43°12'
N 43°11'
GUNAY 2
LARGE
JOLIETTE
DEFAUTS
Feux
Automate
Comm.
INFOS
Crépuscule
PONT PINEDE
VOLEE OUEST
VOLEE EST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Positionnement Début
Affich. 1/1
Position
Azimut 213.6 °
Distance 9.44 nm
Latitude N 43°11.27'
Longitude E 005°14.58'
Réf.
cassien
Meteo
Vigie Nord
Direction SSE
Vitesse 16.30 noeuds
Quitter
Piste
545 GUNAY 2
Données Affichage
Contrôles Poursuite
Classifier Quitter
Nom GUNAY 2
Route 000.0 °
Vitesse 0.0 Nd
Latitude N 43°11.87'
Longitude E 005°13.64'
MMSI 271127000
Indicatif TCCW 3
OMI 8218366
Référence cassien
Azimut 219.1 °
Distance 9.36 nm
CPA 9.36 nm
TCPA 0.0 min
PLN
Remarques
DATE : mer 21 jan 2009 02:14:00 CET
BILAN_DEBUT OPE
07 opérateur "pam2ws" avec le rôle "operator"
12 opérateur "database ctrl" avec le rôle "Admin"
05 opérateur "pam1ws" avec le rôle "operator"
14 opérateur "Escale" avec le rôle "deport"
BILAN_FIN OPE
BILAN_DEBUT ALA
001 ACTIVE rupture connexion Serveur Consignes acquittée par "pam2ws"(7)
388 FINIE Sauvegarde automatique : Le graveur de CD/DVD 1 n'est pas prêt ATTENTE ACQUIT
Fichier Zones Pistes AIS Carte Vidéo Météo Rejeu PO ? Aide
E 005°13'
E 005°14'
E 005°15'
N 43°12'
N 43°11'
GUNAY 2
LARGE
JOLIETTE
DEFAUTS
Feux
Automate
Comm.
INFOS
Crépuscule
PONT PINEDE
VOLEE OUEST
VOLEE EST

Appendix D

Weather conditions analysis by Météo France

Adverse weather at sea attestation

To : BEAmer
Analysis area : Provence

Foreword : Due to the variability of meteorological elements in space and time and to the technical limitations in observation and analysis fields, the proposed analysis is the most probable one.

MESSAGE :

A 997 hPa low on Lion Gulf on Tuesday 20 January at 06.00am UTC moves quickly eastward before getting stationary tonight over Genoa gulf. This depression will generate a moderate to fresh north-westerly wind overnight and tomorrow.

Wind : (maritime observations and digital models).

North-westerly 20 to 25 knots(Beaufort 5 to 6), stable (direction and strength) during the period.

Sea state : (maritime observations and digital models).

The moderate sea state (significant wave height [H1/3] = 1.25 to 2.50 m) was the result of the crossing of the [H1/3] = 1 to 1.20 m wind sea waves with a [H1/3] = 1.10 to 1.30 m south residual swell veering progressively south-south-westerly on Wednesday morning. Eventually, the waves of this crossed sea were 1.75 m high. However, some isolated waves could have topped at 3.50 m. The sea state remained moderate overnight on 20 January. [H1/3] figure close to 1.70 to 1.80 m, the highest waves could have topped at 3.50 m (Hmax = [H1/3]x2).

Visibility and significant weather :

The sky remained not much cloudy during the period and the visibility very good (over 10 miles).

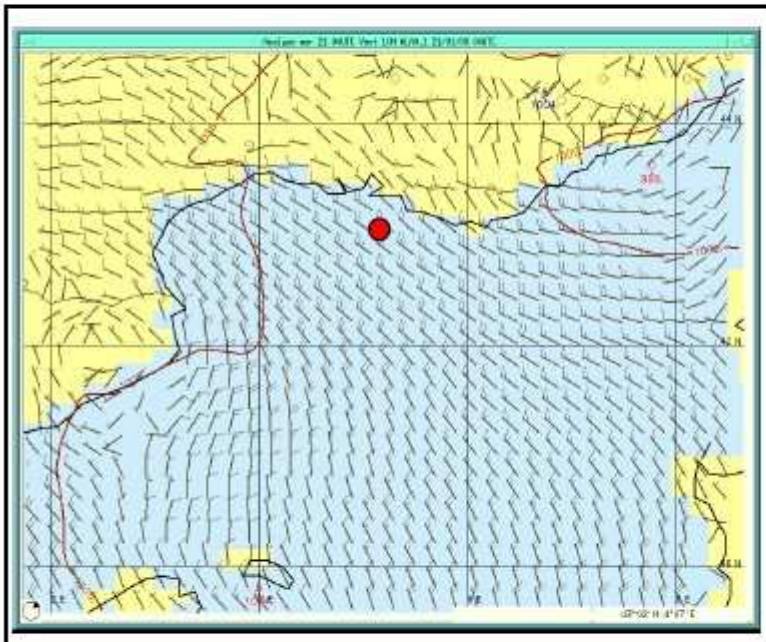
Additional information and expert summary

The onsite observations are coherent with digital models data. The security warnings are in accordance with the analysed data and for the record there were no special warning issued during the period and for the area of the study.

Consequently as a meteorologist expert, my opinion based on the elements of this report is as follow :

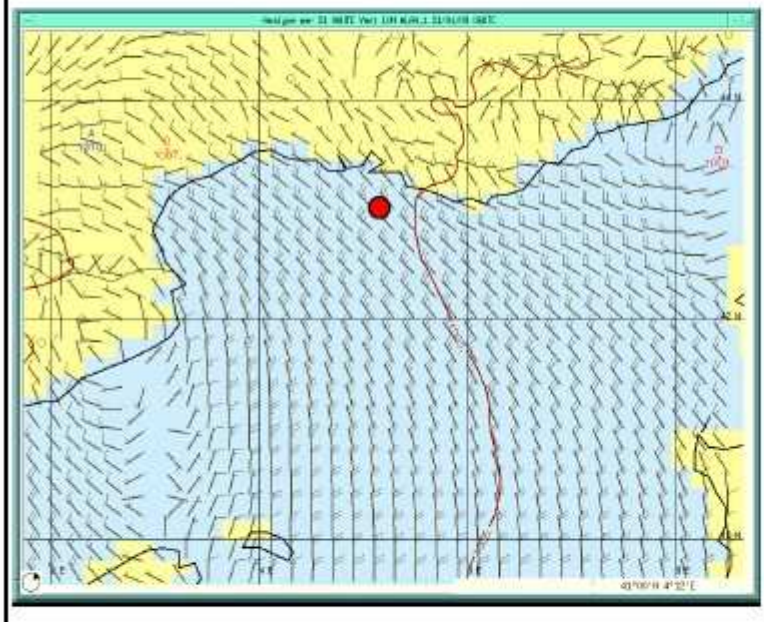
The analysis of the weather conditions indicates in the area and the period mentioned in this report : a stable North-westerly 20 to 25 knots(Beaufort 5 to 6) wind; Moderate sea state with significant waves height of 1.75 m. This moderate sea state was the result of the crossing of the [H1/3] = 1 to 1.20 m wind sea waves with a same height south-south-westerly residual swell. This crossed sea could have resulted in pyramid shaped waves higher than the theoretic maximum height (Hmax = H1/3 x 2) topping at about 3.50 m. The visibility was very good and no dangerous phenomenon had been observed.

Documents annexes – VENTS



Analyse
de la pression
au niveau de la mer
et des vents moyens
à 10 mètres
(Modèle Aladin 0.1)

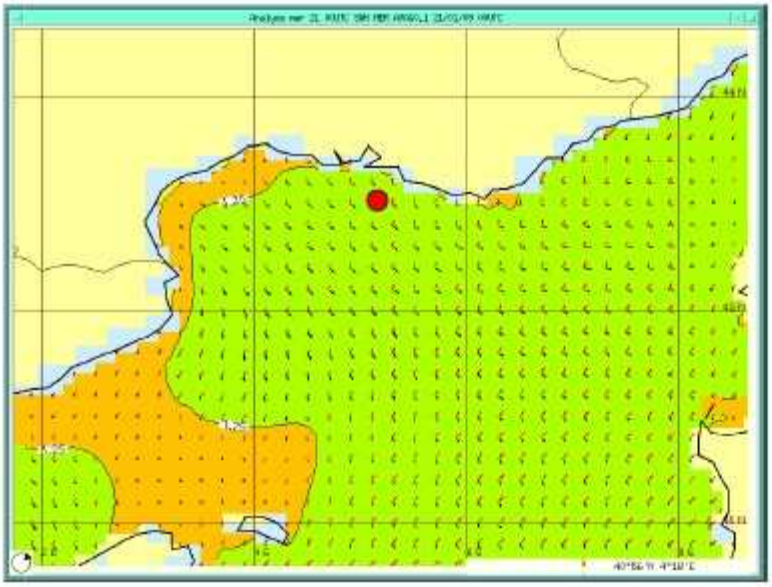
le 21/01/2009 à 00 h UTC



Prévision
de la pression
au niveau de la mer
et des vents moyens
à 10 mètres
(Modèle Aladin 0.1)

le 21/01/2009 à 06 h UTC

Documents annexes – MER

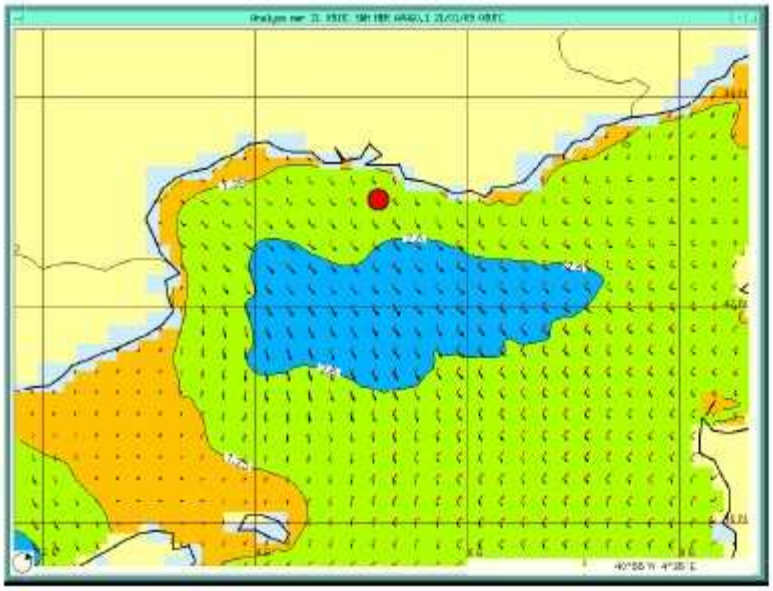


Mer totale

Analyse de l'état de la mer totale issue du modèle AVAG 0.1* du

21/01/2009 à 00h UTC

[(Toutes hauteurs significatives (H1/3)]



Mer totale

Analyse de l'état de la mer totale issue du modèle AVAG 0.1* du

21/01/2009 à 03h UTC

[(Toutes hauteurs significatives (H1/3)]

Légende

MER TOTALE	Plages de couleur orange : H1/3 = 0.5 à 1.25 m ➔ Mer « peu agitée » Plages de couleur verte : H1/3 = 1.25 à 2.50 m ➔ Mer « agitée » Plages de couleur bleue claire : H1/3 = 2.50 à 4 m ➔ Mer « forte »
MER DU VENT	Flèches de directions en couleur noire
HOULE	Flèches de directions en couleur rouge

** : AVAG0.1 modèle de prévision de l'état de la mer « mailles fines » (Météo France)*

METEO FRANCE
Toujours en temps d'avance

Direction de la Prévision
Division Marine & Océanographie

Données météo relevées sur la zone d'étude dans la nuit du mardi 20 au mercredi 21 janvier 2009 :

Date	Heure (UTC)	Latitude (N)	Longitude (E)	Direction du vent en °	Force du vent en nds	Visibilité en m
20/01/09	18h00	43,44	5,23	300	6,2	60000
	19h00	43,10	5,30	300	18,6	/
	19h00	43,10	5,40	310	20,6	/
	19h00	43,44	5,23	300	6,2	60000
	20h00	43,44	5,23	290	4,2	60000
	21h00	43,44	5,23	300	8,2	60000
	22h00	43,44	5,23	310	8,2	60000
	23h00	43,44	5,23	320	8,2	60000
21/01/09	00h00	43,44	5,23	340	2,0	60000
	01h00	43,44	5,23	290	6,2	55000
	02h00	43,44	5,23	300	8,2	60000
	03h00	43,44	5,23	310	8,2	60000
	04h00	43,44	5,23	300	4,2	60000
	05h00	43,10	5,40	300	31,8	/
	05h00	43,10	5,30	310	25,8	/
	05h00	43,44	5,23	130	2,0	60000
	06h00	43,30	5,20	300	29,8	/
	06h00	43,44	5,23	310	4,2	60000

Les modèles sont très bien calés avec les observations ainsi que les vents issus de données « satellite ».
Nous utilisons, pour cette étude, les modèles à mailles fines « Aladin 0.1 » ainsi que « Avag 0.1 ».

Merchant vessel drift

Synopsis

The backward drift simulation had been performed from position 43°12 N - 005°14 E (Planier Island off Marseille) on 21 January at 01.19 am UTC.
The model used is Météo-France model MOTHY[1]. The model takes into account the wind currents and the general circulation currents. The latter come from a monthly current climatology elaborated with the Mercator[2] model.
The simulation had been performed with winds elaborated by Météo-France model ALADIN[3] : these winds are the best picture of the weather conditions encountered during the period of drifting.

Météo-France model MOTHY

In this version the drift of a floating object (rectangle parallelepiped[4] having the cargo vessel size, with various hypotheses on the percentage of immersion (from 20% to 100%)). The figures on the chart, represent these various percentages of immersion. We have observed, during previous drifting simulation of this kind, that the most often observed values for a cargo vessel were in the 60 to 90% range of values.

Results interpretation

The simulation shows that the cargo vessel had been drifting south-easterly during the period of time before the accident.

Charts

On the following charts of backward drift simulation, the initial position is shown by a red star. The predicted tracks are drawn in grey.

References :
[1] http://www.meteorologie.eu.org/mothy
[2] http://www.mercator-ocean.fr/
[3] http://www.cnrm.meteo.fr/aladinp/
[4] Daniel P, G. Jan, F. Cabioc'h, Y. Landau & E. Loiseau, 2002 : Drift modeling of cargo container, Spill Science & technology Bulletin Vol. 7(5-6), pp. 279-288.

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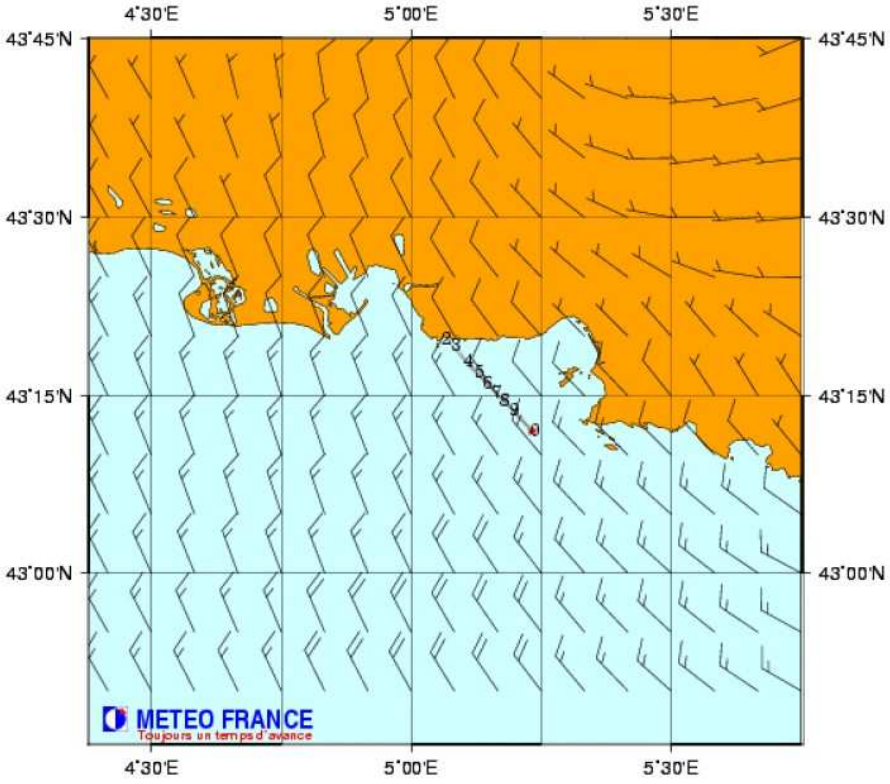
MOTHY/ALADIN REBOURS Prévision pour le 20/01/2009 à 06 utc



Cargo

Position initiale :
le 21/01/2009 à 01h19 utc
Latitude : 43° 12,0'
Longitude : 5° 14,0'

2 : immersion 20%
3 : immersion 30%
4 : immersion 40%
5 : immersion 50%
6 : immersion 60%
7 : immersion 70%
8 : immersion 80%
9 : immersion 90%
0 : immersion 100%

Golfe du Lion

Résolution: 1 (minute)

Système géodésique: WGS 84

Ministère de l'Ecologie, de l'Energie, du Développement Durable et de la Mer

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