

RV Belgica: damage, repairs and refit



Lieven Naudts

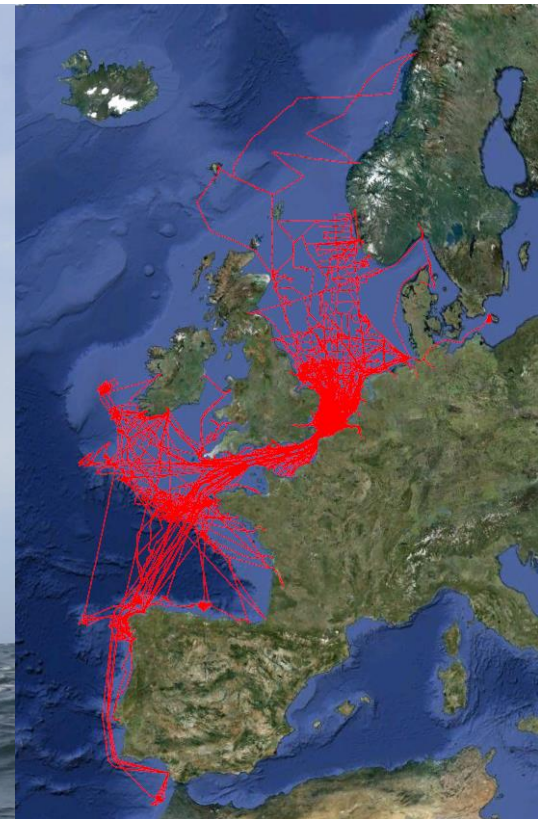
Royal Belgian Institute of Natural Sciences (RBINS) - Operational Directorate Natural Environment (OD Nature)



Overview

1. Introduction
2. Obsolescence & refit
3. Flooding & damage
4. Replacement
5. Outlook

Introduction



Introduction

Characteristics

Built:	1984 in Temse (B) – 32 years
Prize:	440 M BEF (11 M€)
Length:	51 m
Beam:	10 m
Draft:	4.6 m
Gross Tonnage:	765 t
Berths Crew + Scientists:	15 + 16
Operating cost:	2.8 M€/y incl. VAT





Introduction Management

**Owned by the Belgian Federal State
Responsibility of Belgian Science Policy**

**Convention Belgica
Ministry of Science Policy – Ministry of Defence**

- **BELSPO – RBINS – OD Nature**
 - control of total budget (crew, maintenance, fuel etc.)
 - yearly scientific programming
 - detailed weekly campaign programming
 - scientific instrumentation
 - POC between scientists & crew
- **Defence – Marine component**
 - logistical and operational aspects
 - crew
 - maintenance contract
 - home port: Zeebrugge





Introduction

Activities

- **More than 32 years the Belgian research vessel**
 - Multidisciplinary vessel!

Monitoring for (inter)national obligations (70% of ship time)

- Programs paid by dotation or contracts foreseen by law
 - MSFD, WFD, ICES, OSPAR, econ. activities, etc.

Science (28% of ship time)

- Programs paid by regional, federal or EC research funds

Education (2% of ship time)

- sometimes related to the above programs

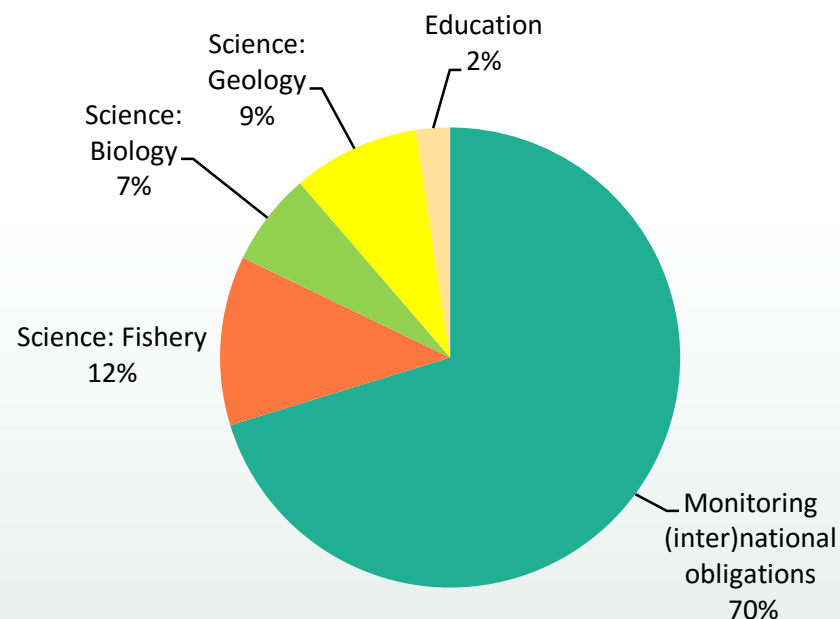
Rapid Response activities (occasionally)

- Disaster relief

European Infrastructure (occasionally)

- EC-FP 7 Eurofleets, ship-time exchange

Ship time - distributed by financial control



Ship time RV Belgica is provided for free to all Belgian institutes and universities by the Belgian Federal Government – Science Policy (BELSPO-RBINS-OD Nature).

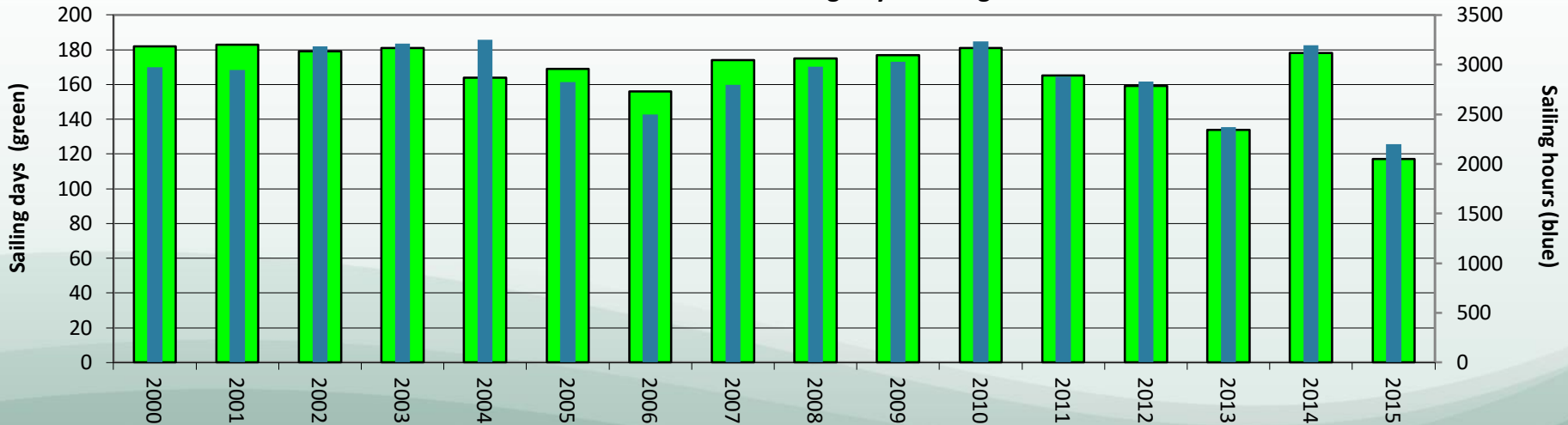


Introduction

Activities

- **More than 32 years the Belgian research vessel**
 - 175 scientific sailing days (105 nights) on average per year (ca. 92% available ship time is used)
 - 2850 scientific sailing hours on average per year
 - 910 scientific campaigns (ca. 30 per year)
 - > 30 scientific programs per year
 - > 300 different scientists come onboard yearly; 1800 scientific (wo)man days yearly
- **Request of ship time is stable, but the technical availability of the ship isn't!**

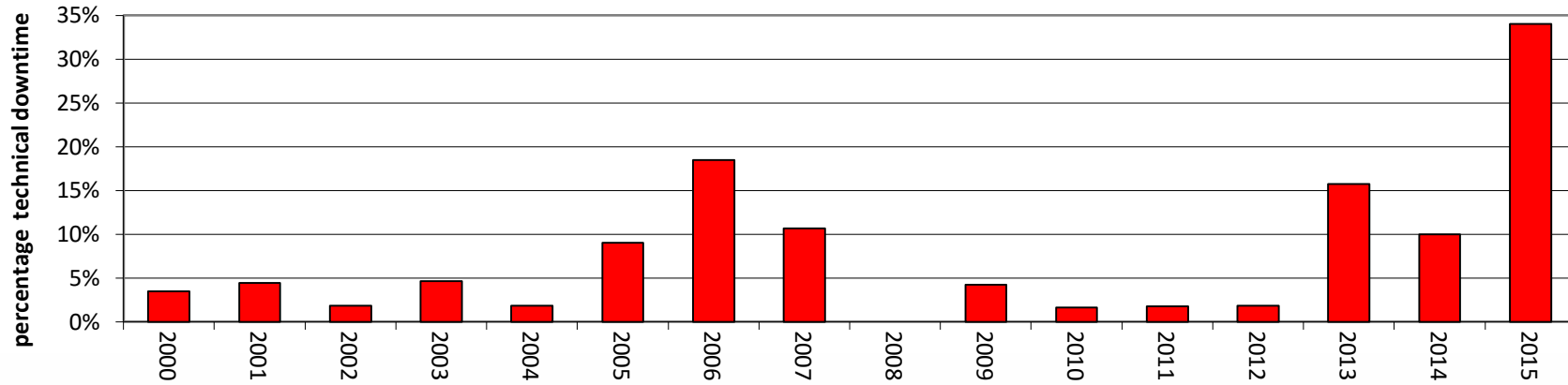
Overview scientific sailing days RV Belgica



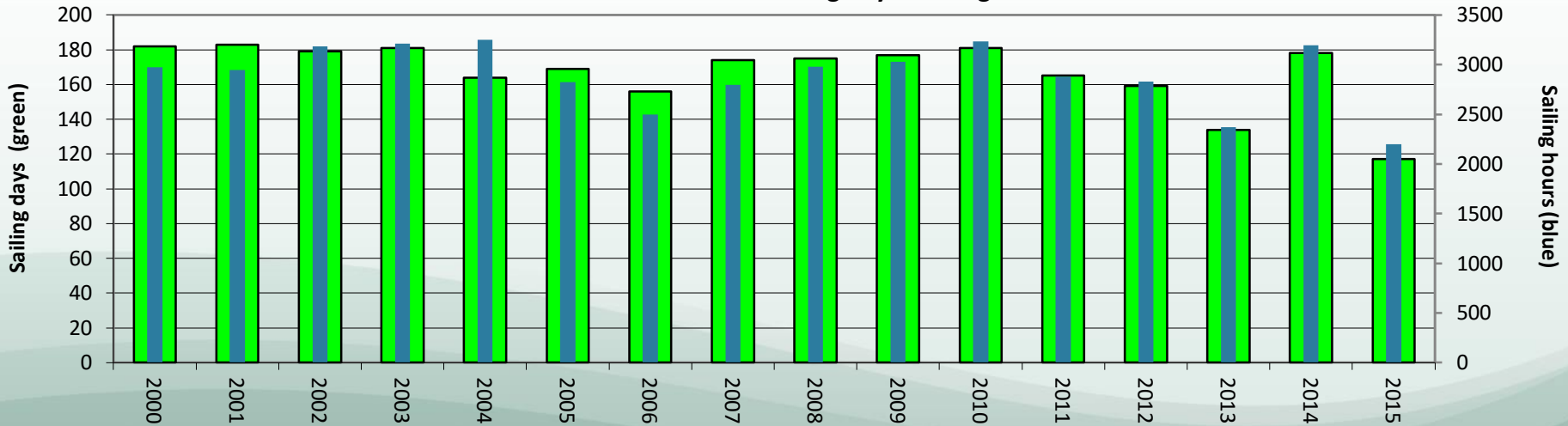


Introduction Activities

Technical downtime



Overview scientific sailing days RV Belgica

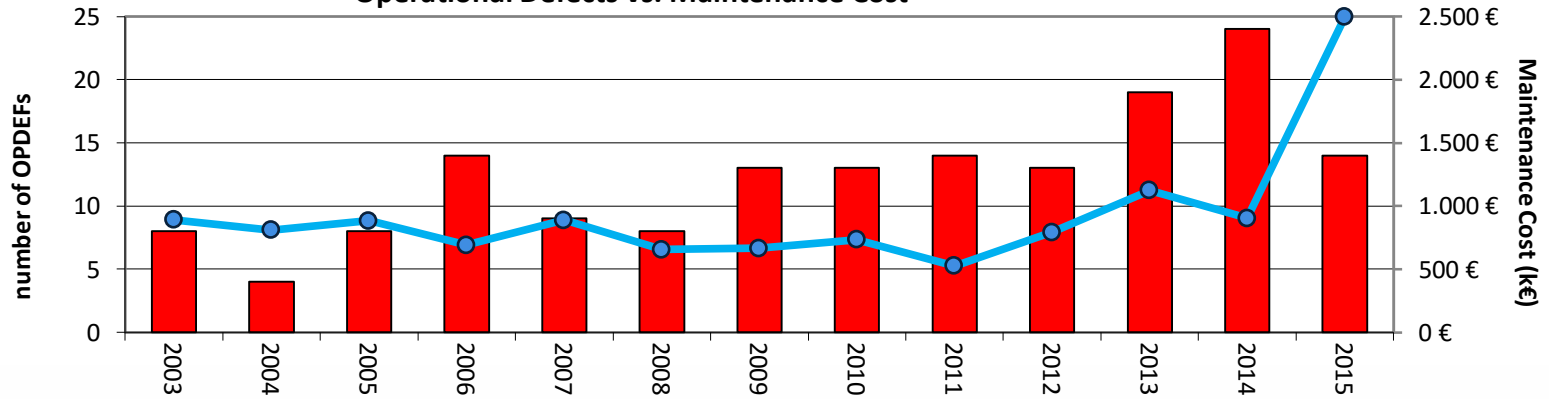




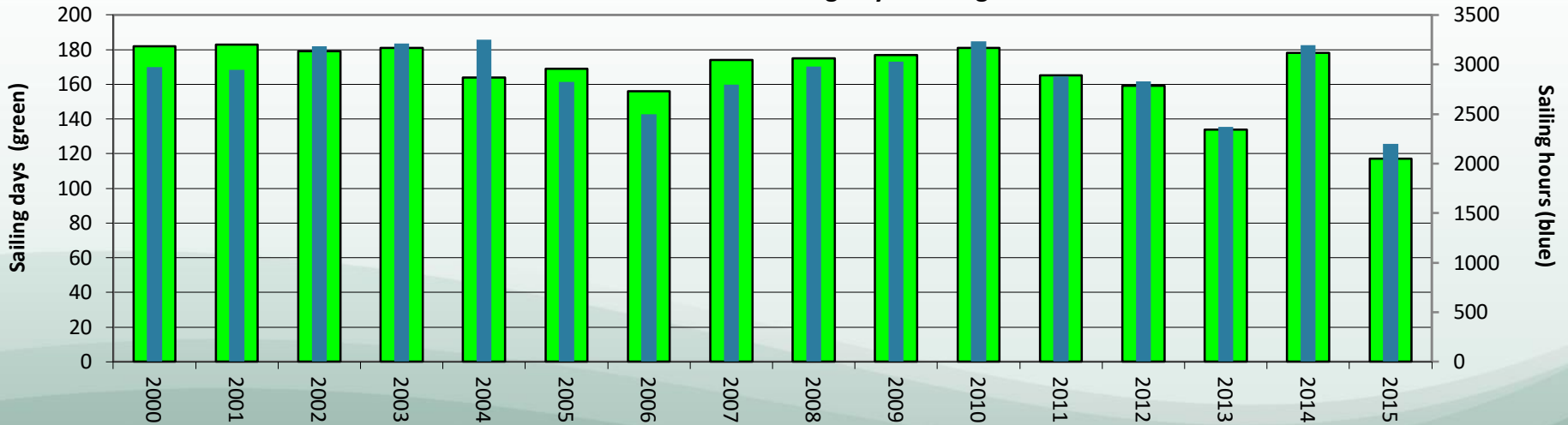
Introduction

Activities

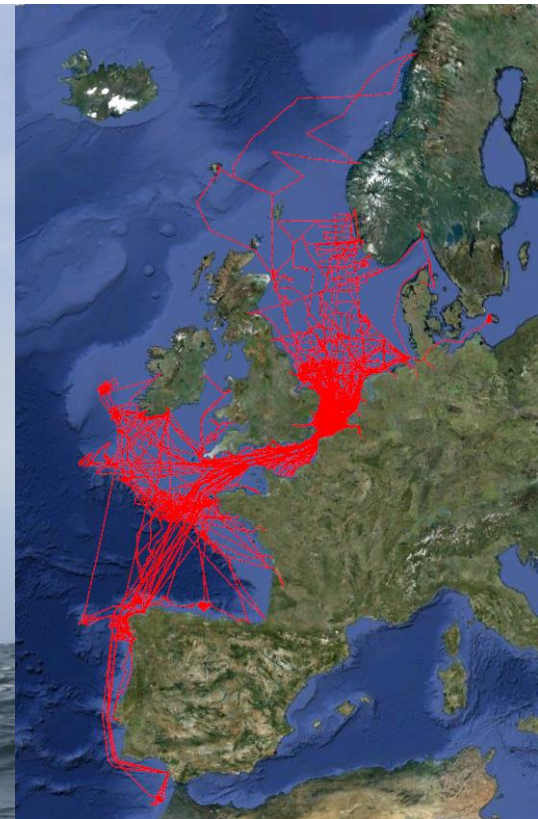
Operational Defects vs. Maintenance Cost



Overview scientific sailing days RV Belgica



Obsolescence & refit



Obsolescence & refit

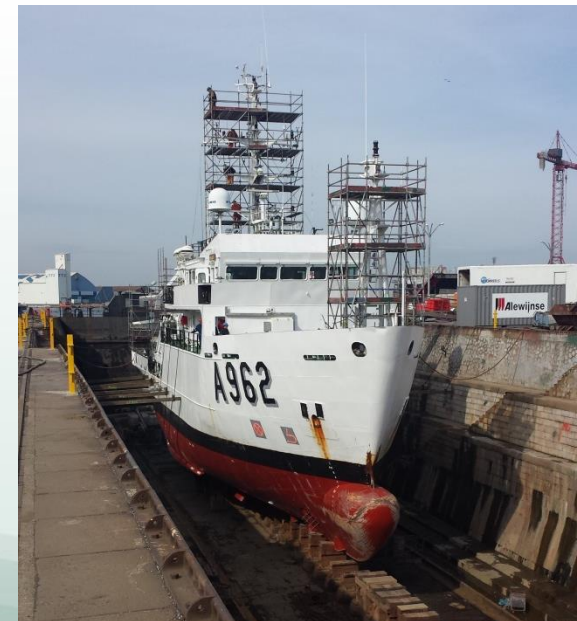
- **More than 32 years the Belgian research vessel**
 - RV Belgica was built for 25 years and didn't receive a mid-life refit
 - **Obsolescence is a major problem!**
 - Systems are old, not trustworthy and even dangerous
 - System parts are no longer available or the provider/factory just doesn't exist anymore
 - System replacement is the only possible solution (= expensive)
 - After the 6 weeks/25 days of ship time lost in 2013, Defence introduced an obsolescence maintenance approach



Obsolescence & refit

- **More than 32 years the Belgian research vessel**
 - RV Belgica was built for 25 years and didn't receive a mid-life refit: **Obsolescence is a major problem!**
- **Obsolescence maintenance:**
 - Requiring extra funds and extra long maintenance period: **no obsolescence budget in 2014 (-2015)**
 - No obsolescence maintenance & budget would have lead to a **sailing prohibition from 2016** (cfr. Navy)
 - In **2015** Cabinet Science Policy agreed on the needed **extra funds (1019 k€)**; added to current contract.
 - In **2016** an extra long **maintenance period of 5 months** is foreseen
 - In 2016 the planned ship time is limited to 115 days (+15R), instead of 175 days (+10R)

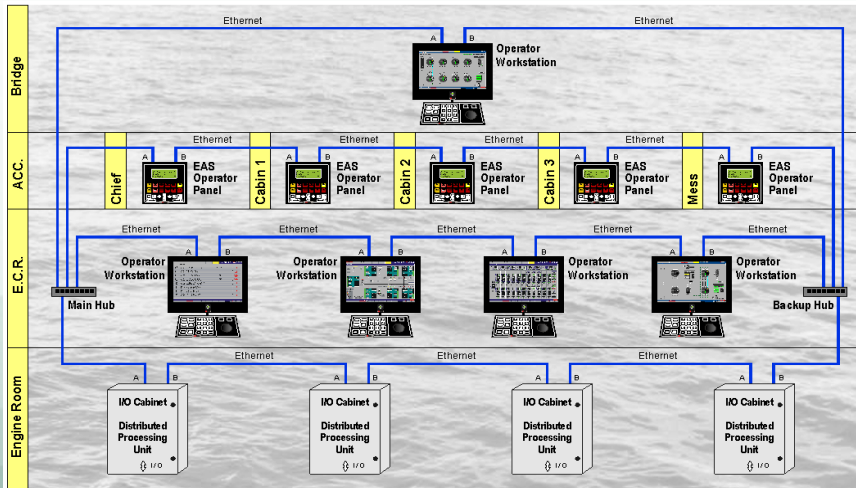
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
January	Vacation	Zeebrugge	MT		RESERVE/MT	Zeebrugge	RESERVE/MT	AOE	Zeebrugge	OD Nature	INBO	Zeebrugge	ILVO	Zeebrugge																		
February																																
March																																
April																																
May	OBsolescence MAINTENANCE																															
June	OBsolescence MAINTENANCE																															
July	OBsolescence MAINTENANCE																															
August	OBsolescence MAINTENANCE																															
September																																
October																																
November																																
December																																



Obsolescence & refit

- **More than 32 years the Belgian research vessel**
 - RV Belgica was built for 25 years and didn't receive a mid-life refit: **Obsolescence is a major problem!**
 - Obsolescence maintenance:
 - Will foresee in a new platform management system (alarm systems, propulsion management & sync., etc.)
 - Will address (hidden) corrosion of pipes & vents, complete new kitchen, etc.
 - Already addressed hydraulic systems 1 & 2, purifiers, trawling winch, ship's crane within standard maintenance budgets & periods

Obsolescence maintenance is not a major refit and it is designed to keep the RV Belgica in a safe and good working order for a maximum period of 4 years, but...



Obsolescence & refit

- **More than 32 years the Belgian research vessel**
 - RV Belgica was built for 25 years and didn't receive a mid-life refit: **Obsolescence is a major problem!**
 - Obsolescence maintenance:
 - Will foresee in a new platform management system (alarm systems, propulsion management & sync., etc.)
 - Will address (hidden) corrosion of pipes & vents, complete new kitchen, etc.
 - Already addressed hydraulic systems 1 & 2, purifiers, trawling winch, ship's crane within standard maintenance budgets & periods

Obsolescence maintenance is not a major refit and it is designed to keep the RV Belgica in a safe and good working order for a maximum period of 4 years, but...

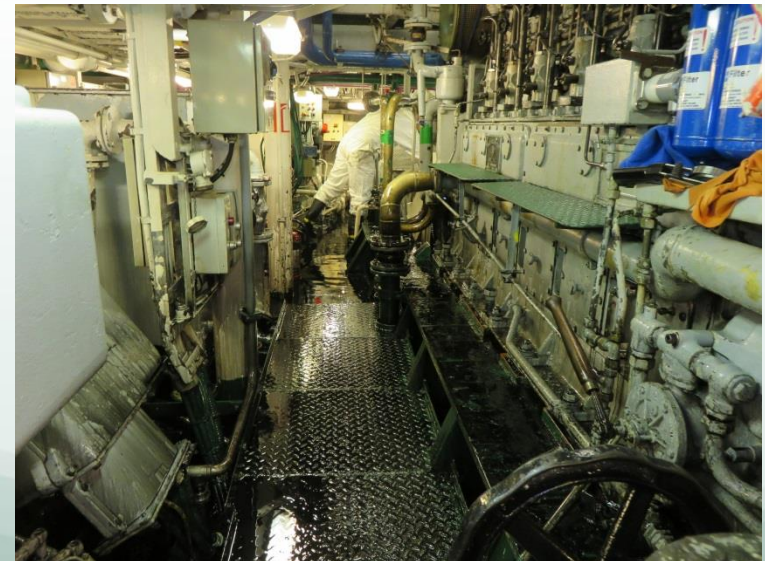


Flooding & damage



Flooding & damages

- Sunday 190715: Flooding of engine room (0.8-1.2 m): affecting main engine, generators, pumps, electrical cabling, etc.
- Intervention by Navy services on Sun & Mon prevented the ship of sinking (during weekend & vacation), but...





Flooding & damages

- Sunday 190715: Flooding of engine room (0.8-1.2 m): affecting main engine, generators, pumps, electrical cabling, etc.
- Intervention by Navy services on Sun & Mon prevented the ship of sinking (during weekend & vacation), but...
- Ship needed to be dead towed to dry dock and back for the repair of the ship's hull



Flooding & damages

- Sunday 190715: Flooding of engine room (0.8-1.2 m): affecting main engine, generators, pumps, electrical cabling, etc.
- Intervention by Navy services on Sun & Mon prevented the ship of sinking (during weekend & vacation), but...
- Ship needed to be dead towed to dry dock and back for the repair of the ship's hull
- Analyses show that the hole is the result of biological corrosion mediated by sulfur reducing bacteria
- Final cost was 1.5 M€ incl. VAT and ship yard fee, of which 100 K€ was refused by the expert – 2.3 M€ was estimated
- CASCO insurers paid an advance of 900 k€
 - CASCO insurers are still investigating the VAT obligation of RV Belgica
 - Renewal CASCO insurance 2016 after an increase of the fee by 32%



Flooding & damages

- Sunday 190715: Flooding of engine room (0.8-1.2 m): affecting main engine, generators, pumps, electrical cabling, etc.
- Intervention by Navy services on Sun & Mon prevented the ship of sinking (during weekend & vacation), but...
- Ship needed to be dead towed to dry dock and back for the repair of the ship's hull
- Analyses show that the hole is the result of biological corrosion mediated by sulfur reducing bacteria
- Final cost was 1.5 M€ incl. VAT and ship yard fee, of which 100 K€ was refused by the expert – 2.3 M€ was estimated
- CASCO insurers paid an advance of 900 k€
 - CASCO insurers are still investigating the VAT obligation of RV Belgica
 - Renewal CASCO insurance 2016 after an increase of the fee by 32%
- Maintenance advanced rather well, replacing/maintaining cabling, compressors, motors, main engine, GenSets, etc.
 - Preservation measures didn't really help, but were costly (cfr. were advised by CASCO expert)!





Flooding & damages

- 53 planned scientific days lost; 17 programs affected (mainly seasonal monitoring – no recuperation)
 - Makeshift solutions using other vessels were problematic (cfr. cost, availability, capabilities, berths, etc.)
 - Campaigns were restarted from the 7th of Dec

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
January	Vacation	Vacation	Zeebrugge	MAINTENANCE					Zeebrugge	MAINTENANCE					Zeebrugge	MAINTENANCE			MT	Zeebrugge	OD Nature		INBO		Zeebrugge						
February	Zeebrugge	5 CSS DGMR MSC	2 KD OL SP YVP	MT	Zeebrugge	3 DVDE MP RM	MT	Zeebrugge	ILVO			Zeebrugge	4 EV	Zeebrugge	5 ES KP JH	MT	MT	Zeebrugge	INBO		OD Nature		1 KP ¹ MF VVL JH	ES							
March	Zeebrugge	ILVO		CSS	Zeebrugge	ILVO		OD Nature (CSS)		Zeebrugge	OD Nature			Zeebrugge	RCMG		Zeebrugge	UB													
April	AOE	INBO	Zeebrugge	VACATION					Zeebrugge	OD Nature			Zeebrugge	ILVO			Zeebrugge	DGMR		MSC											
May	Vacation	Zeebrugge	MT	CSS		OD Nature		Zeebrugge	MT	VUB (LabMET)			La Coruna		RCMG																
June	RCMG (LabMET)			Brest			CSS		OD Nature		DGMR	MSC	*1	MT	Zeebrugge	CSS		OD Nature		DGMR	MSC	Zeebrugge	OD Nature								
July	OD Nature	MT	NAVY DAYS		MT	OD Nature		Zeebrugge	OD Nature			Zeebrugge	Vacation	Vacation	MAINTENANCE		Zeebrugge	MAINTENANCE													
August	Zeebrugge	MAINTENANCE			VACATION			Zeebrugge	MAINTENANCE			MT	Zeebrugge	OD Nature		INBO	TW	ILVO		Great Yarmouth											
September	ILVO		Zeebrugge	SMB		OD Nature		Transit		Temse		ILVO			Zeebrugge	MT	ILVO		Zeebrugge	ILVO											
October	CSS	Zeebrugge	MT	ILVO		OD Nature		Zeebrugge	DGMR			MSC	OD Nature		Zeebrugge	SMB		OD Nature		Zeebrugge	INBO		MT		Zeebrugge						
November	VACATION			Zeebrugge	Ulg		29 Stud	MT	Vacation	MT	Zeebrugge	ILVO			Zeebrugge	CSS		OD Nature		INBO	Zeebrugge										
December	MOST + DCC			Zeebrugge	OD Nature			INBO		Zeebrugge	RESERVE			Zeebrugge	VACATION			Zeebrugge	VACATION												



Replacement





Replacement

2005 Concept note replacement

2006 Questionnaire scientific teams

2007 Initiation feasibility study

2008 Scientific working groups – scientific needs

2009 Finalizing feasibility study (= only option RV Belgica needs to be replaced by a new ship)

- Preliminary design and specification were created

2010 No Federal Government

2011 No Federal Government

2012 Initiation preliminary design study (Preparation note Council of Ministers)



Replacement

2013-2014 Financial study

- Best solution: build new ship and exploitation cfr. current RV Belgica
- chartering/rent of other ships is 17-36% more expensive over 10 year; ship availability not guaranteed
- Build: 54.5 M€ incl. VAT/ 4.3 M€ per year (300d)
- No or limited financial input from private sector/foreign partners/FPS's for build of new ship
- Foreign or private cooperation possible cfr. ship time exchange and use (new ship needed)
- Support letters Belgian universities, scientific institutes and private companies

2014 First setup of **technical part tender document** (in cooperation with Defence)

2014-2016 Update **Scientific needs**

2015 **Working group** RV Belgica replacement with cabinet of Science policy (cfr. new government)

2016 **Working groups** with Defense for **technical specifications-purchase & exploitation** (NewRV)

ASAP New ship: **agreement** by Council of Ministers! **Delivery of new ship will take 3.5-4 years!**

2016 – 2019 Develop cooperation with European & Belgian colleagues (IFREMER, VLIZ, etc.)

2016 – 2019 Tendering for preliminary design & final design & build; build of new ship

The flooding of 190715 didn't change this process, it only emphasized the need for the replacement!

Replacement

Built:	2019-2020
Prize:	54, 5 M€ incl. VAT
Length:	> 65 m
Beam:	> 15 m
Draft:	Max. 4.8 m
Berths Crew + Scientists:	15 + 24
Days (24h) at sea:	300/y
Operating cost:	4,3 M€/y incl. VAT





Outlook



Outlook

RV Belgica & replacement

- Successful obsolescence maintenance in 2016; to have a reliable and safe ship for the coming 3-4 years
- Get a final agreement on the build of a new ship – start tendering (2016)
- Get building contract (2017) & building the ship (2018-2019)
- Delivery of the new ship (2019-2020)



Thank you!



Please visit: odnature.naturalsciences.be/belgica (new website, Facebook, Twitter, etc.)