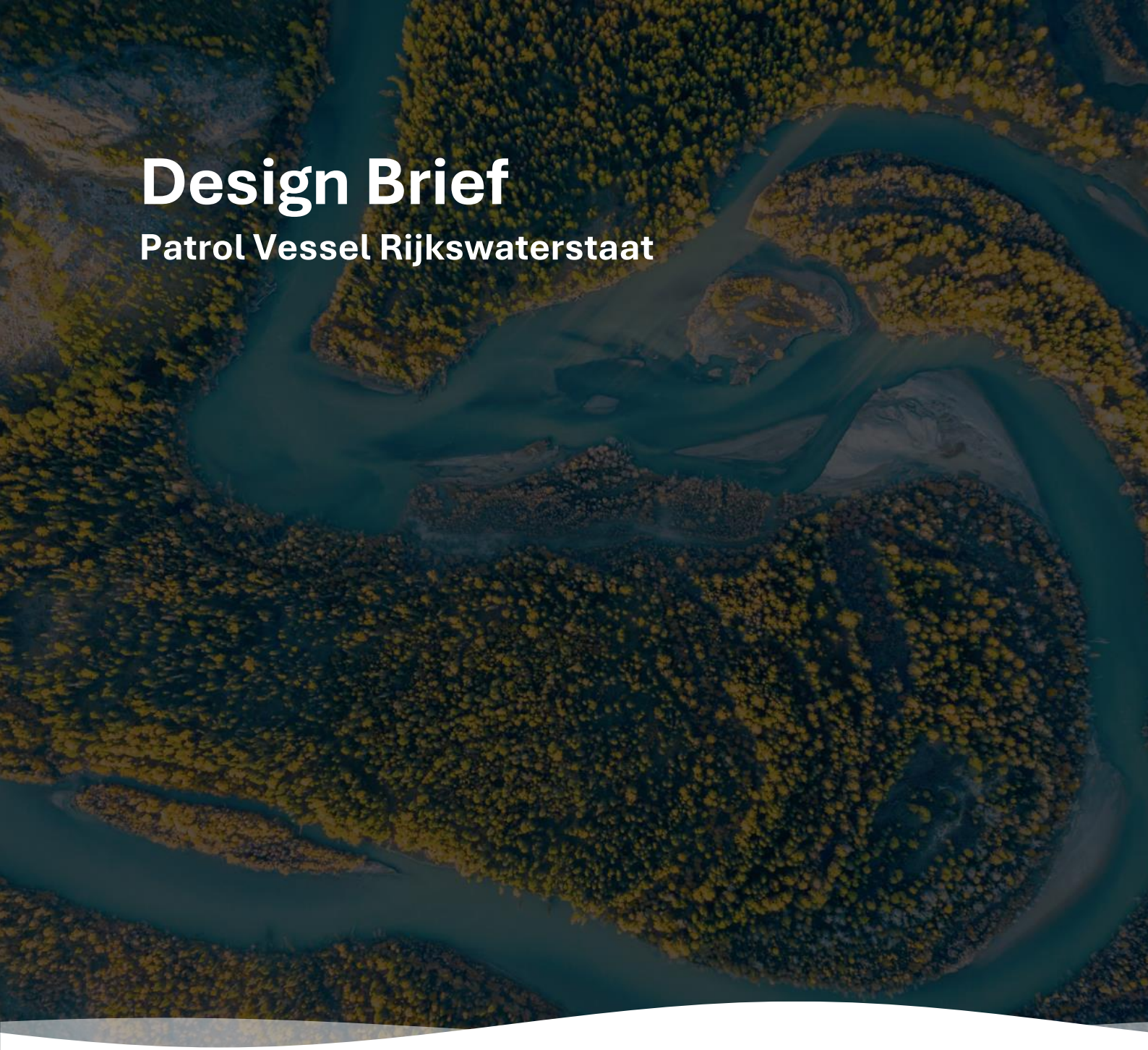

Design Brief

Patrol Vessel Rijkswaterstaat

Project title	Green Maritime Methanol 3.0 WP-3
Project no.	23.516
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GREEN MARITIME METHANOL

C-JOB
DEDICATED NAVAL ARCHITECTS

Rijkswaterstaat
Ministerie van Infrastructuur en Waterstaat

REVISION HISTORY

B	03/06/2025	UPDATE LOGO	JVD	DB	NDV
A	10/03/2025	UPDATED DESIGN REQUIERMENTS	JVD	DB	NDV
0	24/01/2025	FIRST ISSUE	SVL	JVD	NDV
Rev	**Date**	**Description**	**Aut.**	**Chk.**	**App.**

DESCRIPTION OF MODIFICATIONS

Rev	Description of modifications
0	Initial issue
A	The document was updated to reflect the updated requirements provided by Rijkswaterstaat
B	Updated report with GMM logo and project log update

DISCLAIMER

TABLE OF CONTENTS

1. INTRODUCTION

The purpose of this document is to ensure that all requirements and decisions with respect to the concept design are documented. Furthermore, the design brief is used to track the design requirements development, to document the design approach, and to document assumptions made during the design process.

Reference Documents

[1] RE: GMM3.0 WP3 Progress Meeting [Thu 06/03/2025 13:18]
[2] Mantelmeeuw - Bouwbestek

2. DESIGN PHILOSPHY

2.1. Goal

The primary goal of this design study is to develop two feasible concept designs of a high speed methanol driven patrol boat. To do so, eight initial concept designs will be developed. These eight designs will be the basis of a comparison study to identify the advantages and disadvantages of the different concepts. Thereafter, the two most feasible concepts are selected to be developed in more detail as to serve as the start of a basic design.

2.2. Description of the Design Problem

Design a high speed methanol driven patrol boat that can sail at 40 km/h (22 knots) for 12 hours. The range and power requirement of the vessel are a challenge due to the limit availability of methanol engines at this power range, and the required methanol tank size.

2.3. Design Requirements

Below in Table 2-1 a summary of the received client requirements is given, see Ref.[1]. According to the client the following 3 items are non-negotiable:

1. Length
2. Maximum speed
3. Range at maximum speed

Table 2-1: Summary of Client Requirements

	Value	Notes
Certificate	CBB with ADN addition	
Personnel	2 persons	Two separate seats for the officer and navigator
Passengers	Seats for 12 persons	Excluding personnel
Weather	Up to 7 Bft and seastate 4	Operational area is the “Westerschelde”
Length	19.00 - 19.95 m	Based on limitations “klein vaarbewijs”
Breadth	5.00 - 6.00 m	
Draught	1.30 - 2.00 m	
Air draft	Max. 6.00 m	
Maximum Speed	40 km/h	No certificate “snel vaartuig”
Range	12 hours at max. speed	
Engine Type	ScandiNAOS DI16	Other proven technologies can be applied.
Fuel	Methanol	
Accommodation	Toilet and small pantry	
Free deck space	Min. 8 m^2	Minimum required free deck space aft of the vessel
Crane	500 kg lifting capacity	See crane on vessel “Kokmeeuw”

Furthermore, jet propulsion is not allowed, and additional attention should be given to minimizing the wake of the vessel.

2.4. Elementary Design Principles

1. Both monohull and catamarans are under investigation
2. Methanol Fueled
3. Capable of inspecting carriers of flammable gasses/liquids (ADN notation)

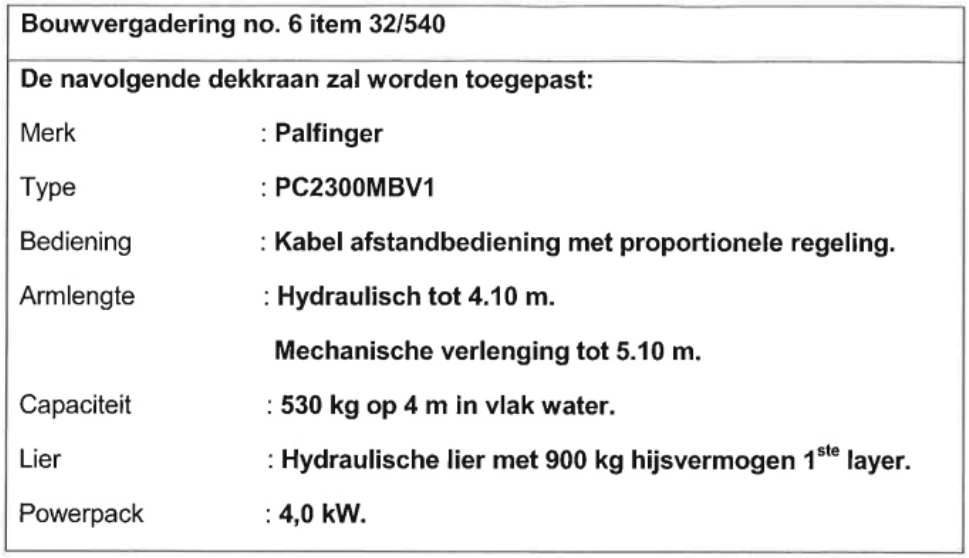
2.5. Design Assumptions

1. Three design variations are used to create eight initial concepts during the first phase of the project, see Table 2-2:
    - Hull Shape: Monohull and Catamaran
    - Resistance reduction: Planing and Foiling
    - Drive train design: two propellers and three propellers

Table 2-2: Eight Design Concepts

	2 propellers	3 propellers
Monohull	Planing	Planing
	Foiling	Foiling
Catamaran	Planing	~~Planing~~
	Foiling	~~Foiling~~

2. From the eight concepts, two concepts will be chosen to be detailed at a higher level during the second phase of the project.
3. Using a three propeller catamaran concept is deemed infeasible, removing two of the eight concepts, see the strike through items of Table 2-2.
4. ScandiNAOS engines will be used for the design. Other engines can be considered, but due to the scope and time available, the working principle of the ScandiNAOS engines is used to ensure the project stays within the budget.
5. The crane on the Kokmeeuw is equivalent to the Mantelmeeuw, as shown in Figure 2-1.



Bouwvergadering no. 6 item 32/540

De navolgende dekkraan zal worden toegepast:

Merk	: **Palfinger**
Type	: **PC2300MBV1**
Bediening	: **Kabel afstandbediening met proportionele regeling.**
Armlengte	: **Hydraulisch tot 4.10 m.**
	Mechanische verlenging tot 5.10 m.
Capaciteit	: **530 kg op 4 m in vlak water.**
Lier	: **Hydraulische lier met 900 kg hijsvermogen 1ste layer.**
Powerpack	: **4,0 kW.**

Figure 2-1: Crane specification Mantelmeeuw, as given in Ref.[2]

3. DESIGN RISKS

In this chapter design risks are identified to make the design team aware of the design risks, so they can avoid them. Furthermore, mitigating actions are proposed to minimize the design risk. All identified risks and mitigation actions are shown in the table below:

Table 3-1: Design risks

Risk	Consequence	Mitigation Action
Limited availability of space for methanol storage .	Reduced range.	
Low average available power from ScandiNAOS engines.	Reduced speed.	Either planning or foiling vessel to reduce resistance.
Deadweight capacity. The impact of additional weight is even higher for planing/foiling designs, since for every ton a ton of lift is to be generated.	Reduced speed.	Keep track of the deadweight capacity early on in the design.
Methanol as a fuel for a vessel that interacts with other vessels in close encounters.	Other vessels need to be taken into account when determining hazardous zones.	High ventilation rates to dilute any methanol outlets. Additionally underwater venting can be considered.
Client requirements may change due to concurrent design.	Weight might be added at a later stage due to added equipment/requirements.	Keep a relevant safety factor within the concept designs.

APPENDIX A. DESIGN AND PROJECT LOG

A.1. January 2025

- Project started, client requirements received.
- Design brief started, sections 2 and 3 set up.
- Reference study completed

A.2. March 2025

- The first three non-foiling concepts are delivered.
- Received speed – power predictions for the first three concepts from Marin.
- Organized a kick-off/brainstorm meeting with Flying-Fish.
- Received updated requirements from Rijkswaterstaat.

A.3. May 2025

- Reiterated three non-foiling concepts including weight calculations.
- Received updated speed-power predictions for the three reiterated concepts from Marin.
- Completed the design iteration and the respective reporting including comparison.