VOITH

Schlepperkonzept der Zukunft mit Voith-Schneider Propellern (VSP)

Dirk Juergens

Voith Schneider Propeller (VSP)

Voith Schneider Propeller (VSP) für Offshore Anwendungen

VSP für optimierte Schiffsformen

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Further References

Offshore Construction + Repair Vessel Giant

Voith Schneider Propeller

Experimental vessel 1928

Schneider 1894 - 1975

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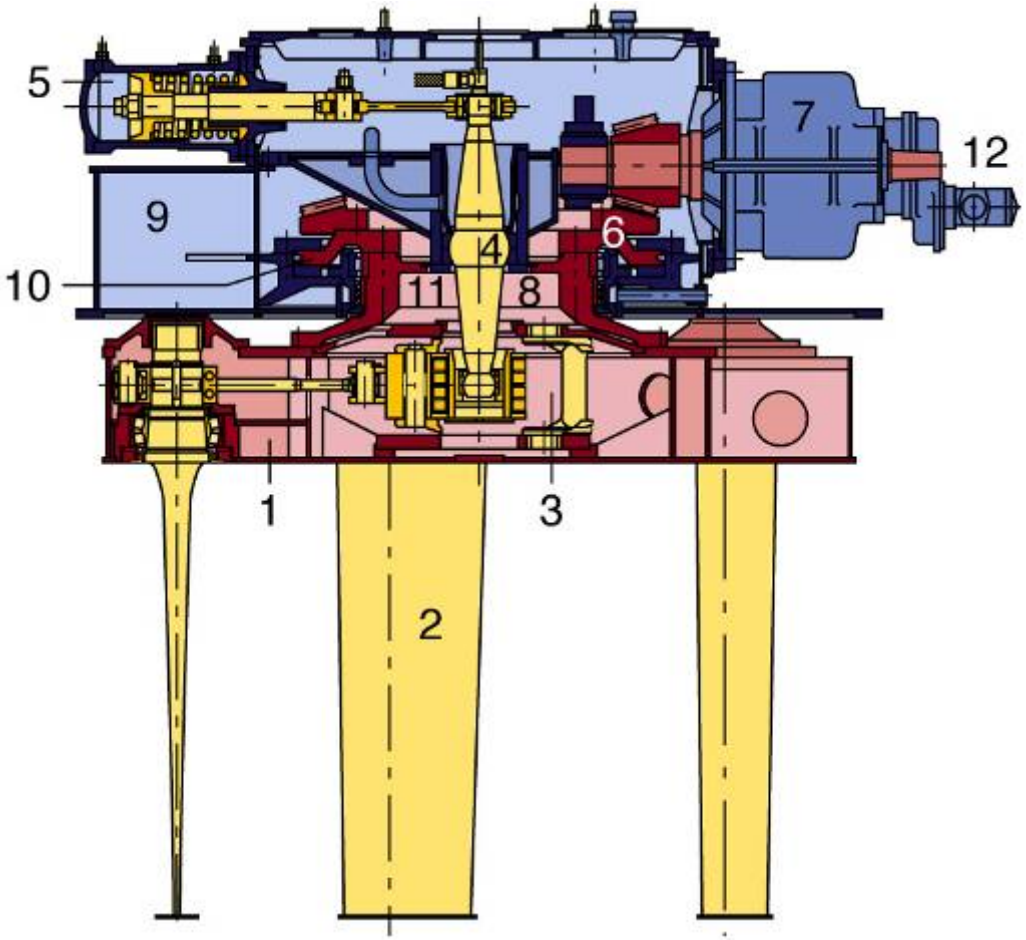
Voith Schneider Propeller

1 rotor casing
2 blade
3 cinematic
4 control rod
5 servomotor
6 bevel gear
7 reduction gear
8 driving sleeve
9 propeller housing
10 thrust plate
11 roller bearing
12 gear pump



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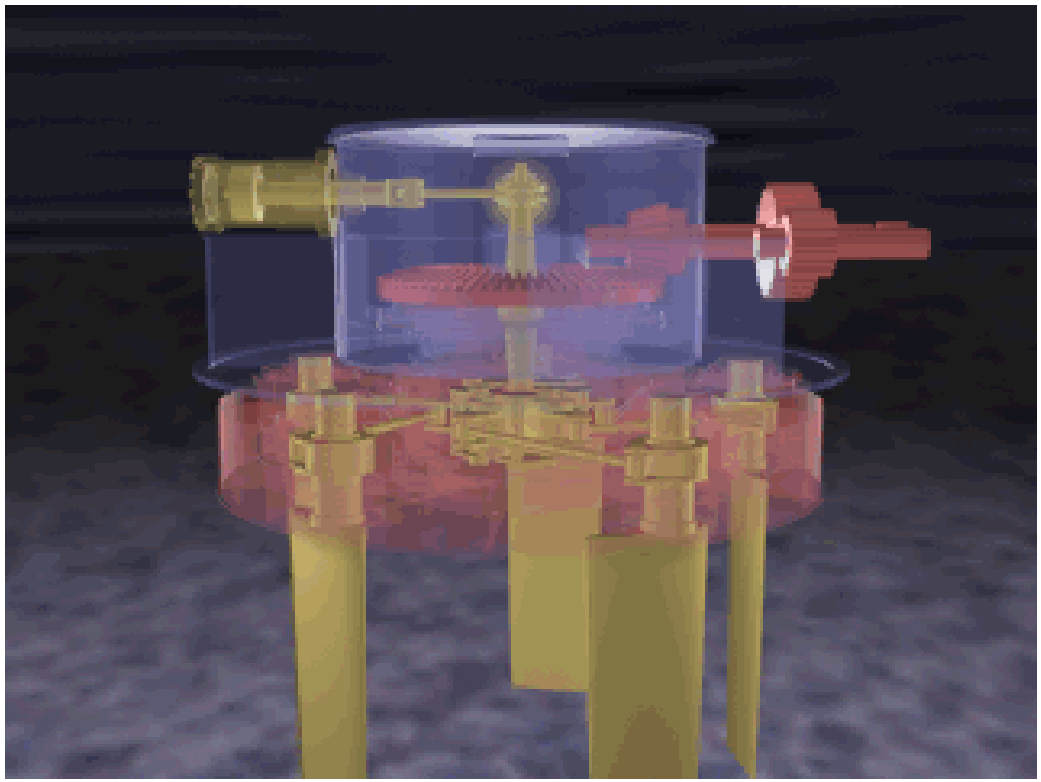
VOITH SCHNEIDER PROPELLER (VSP)



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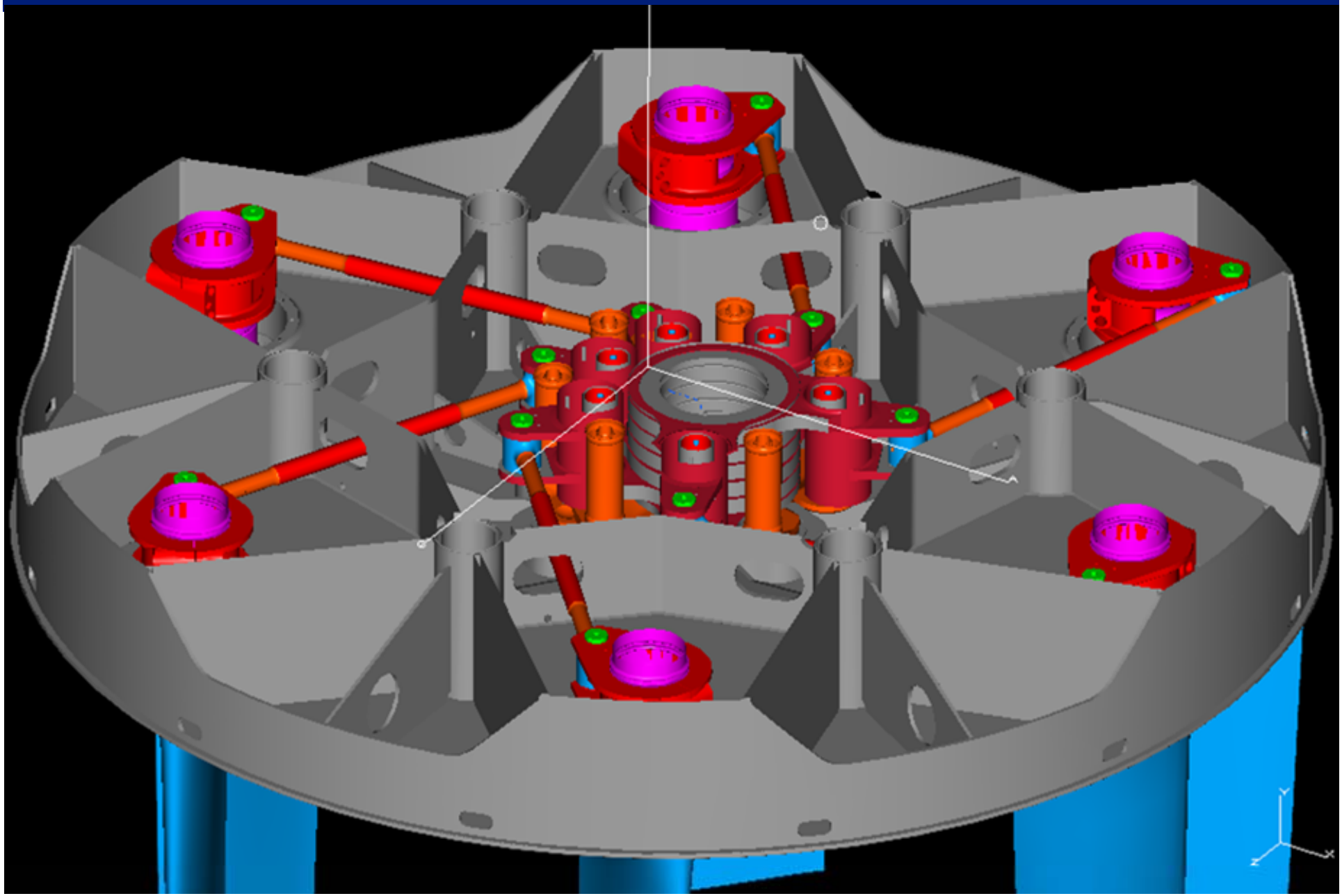

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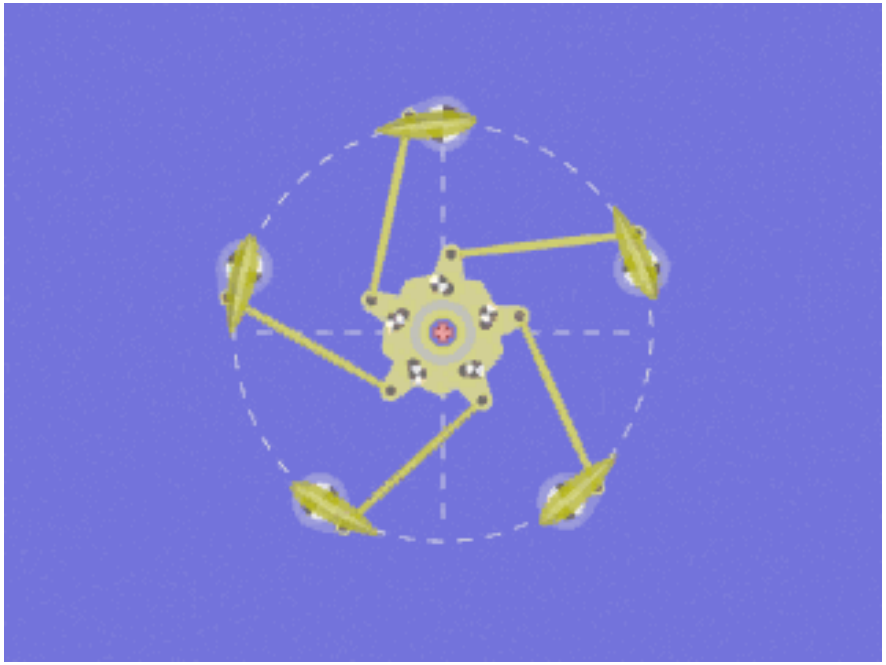
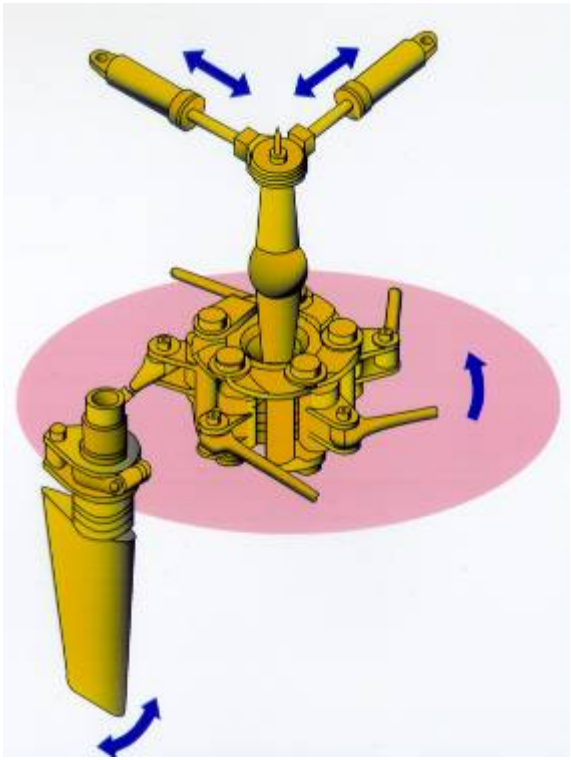
CYCLOIDAL PROPULSOR

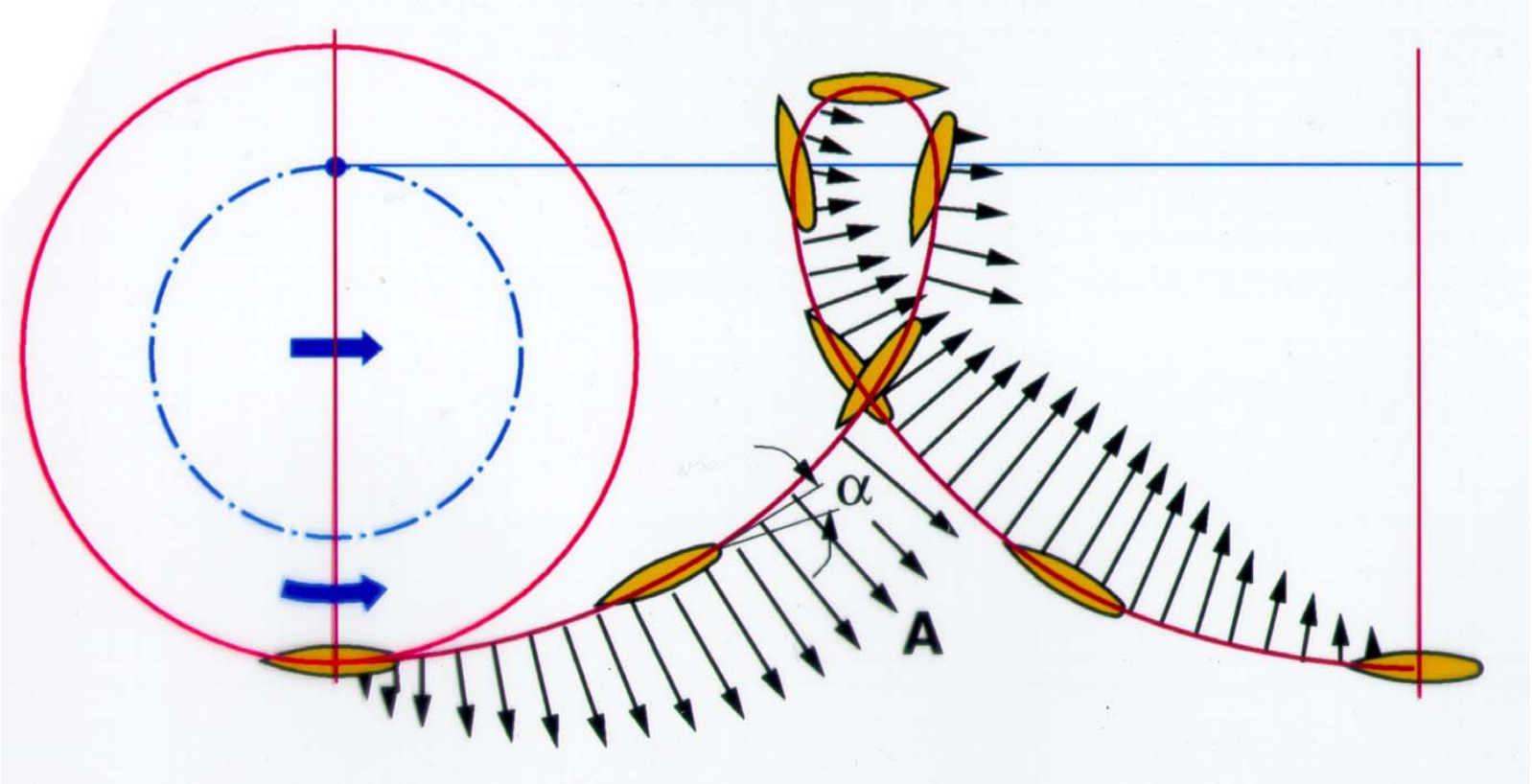
KINEMATICAL PRINCIPLE
¡VSP !!





CYCLOIDAL PROPULSOR

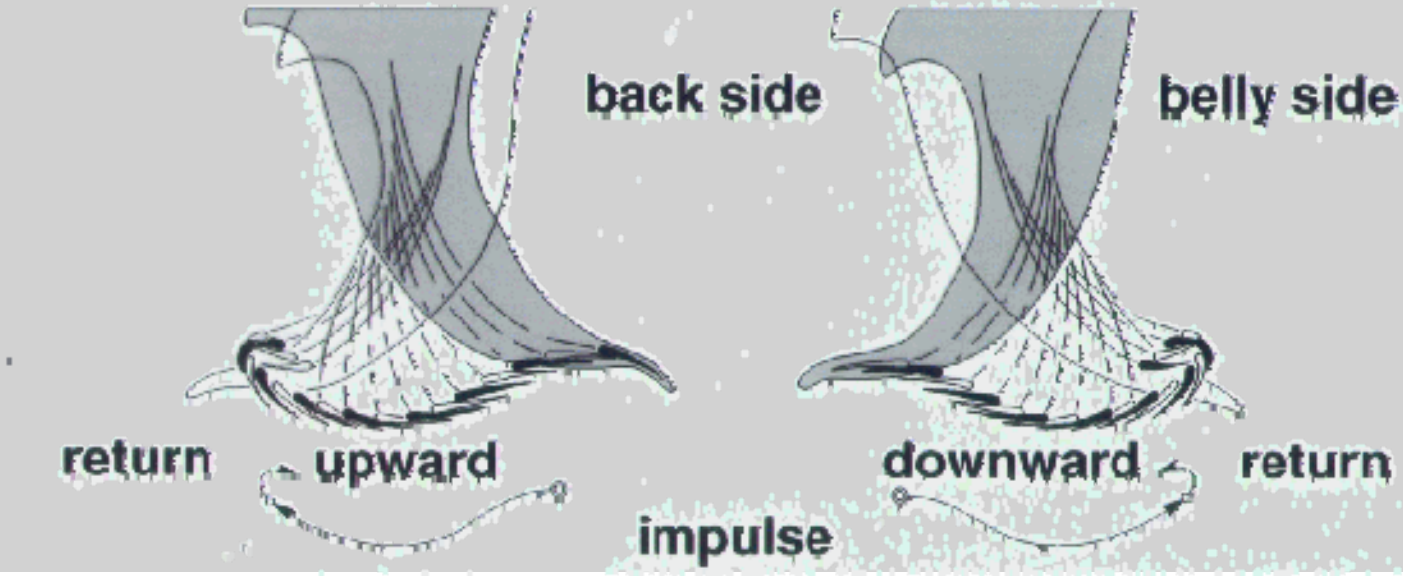
Weg der Flügel durchs Wasser



Cycloidal Propulsion

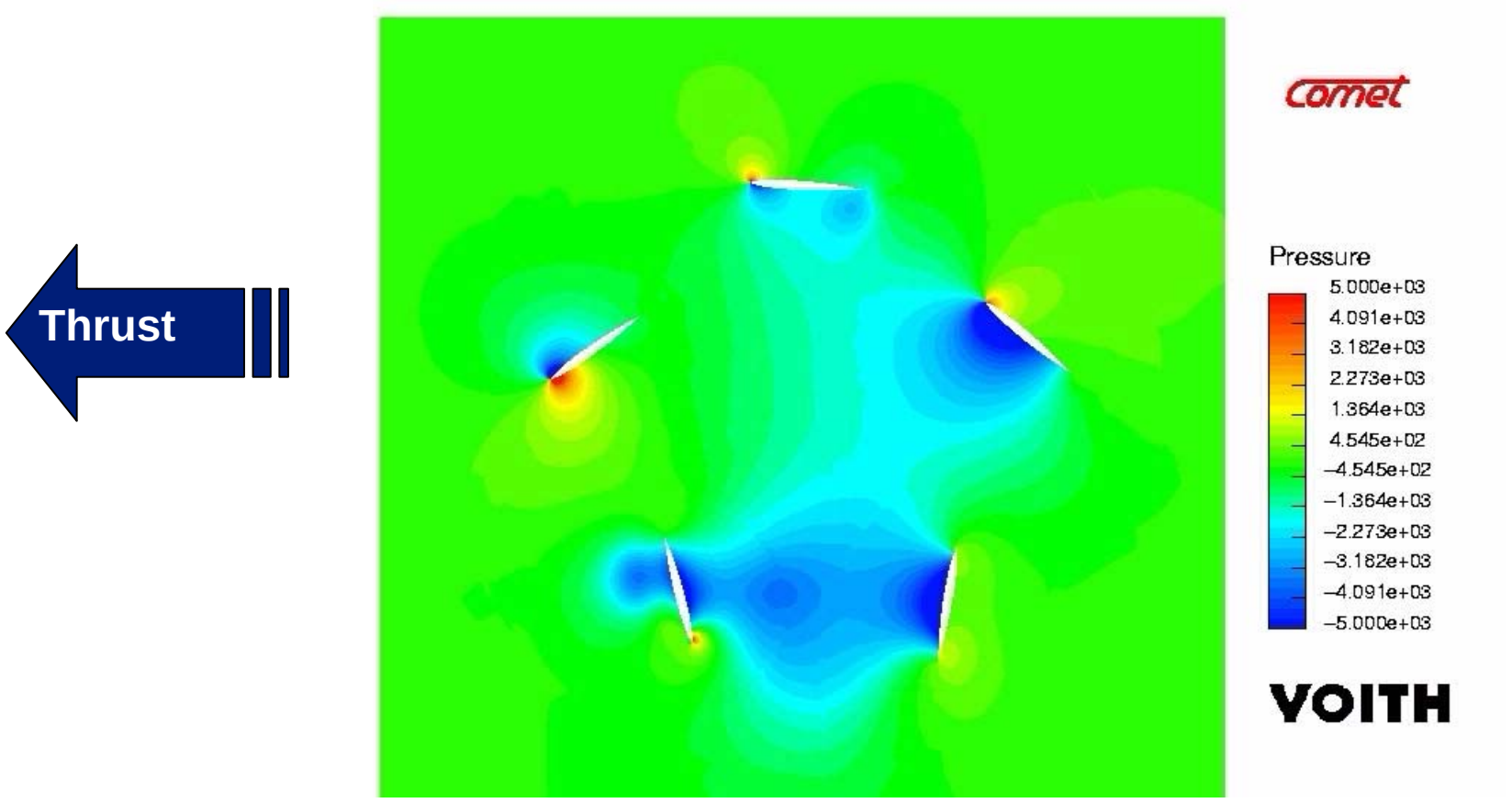
Kopie der Natur

Steering and propulsion combined
Control of thrust direction and magnitude steppless
Blades not twisted, zero thrust
Slow rotating, quiet, robust



Research and Development

CFD-Calculation results



Blade - Rotor - Channel

Voith Water Tractor (VWT)
= VSP + Optimales Schiffskonzept

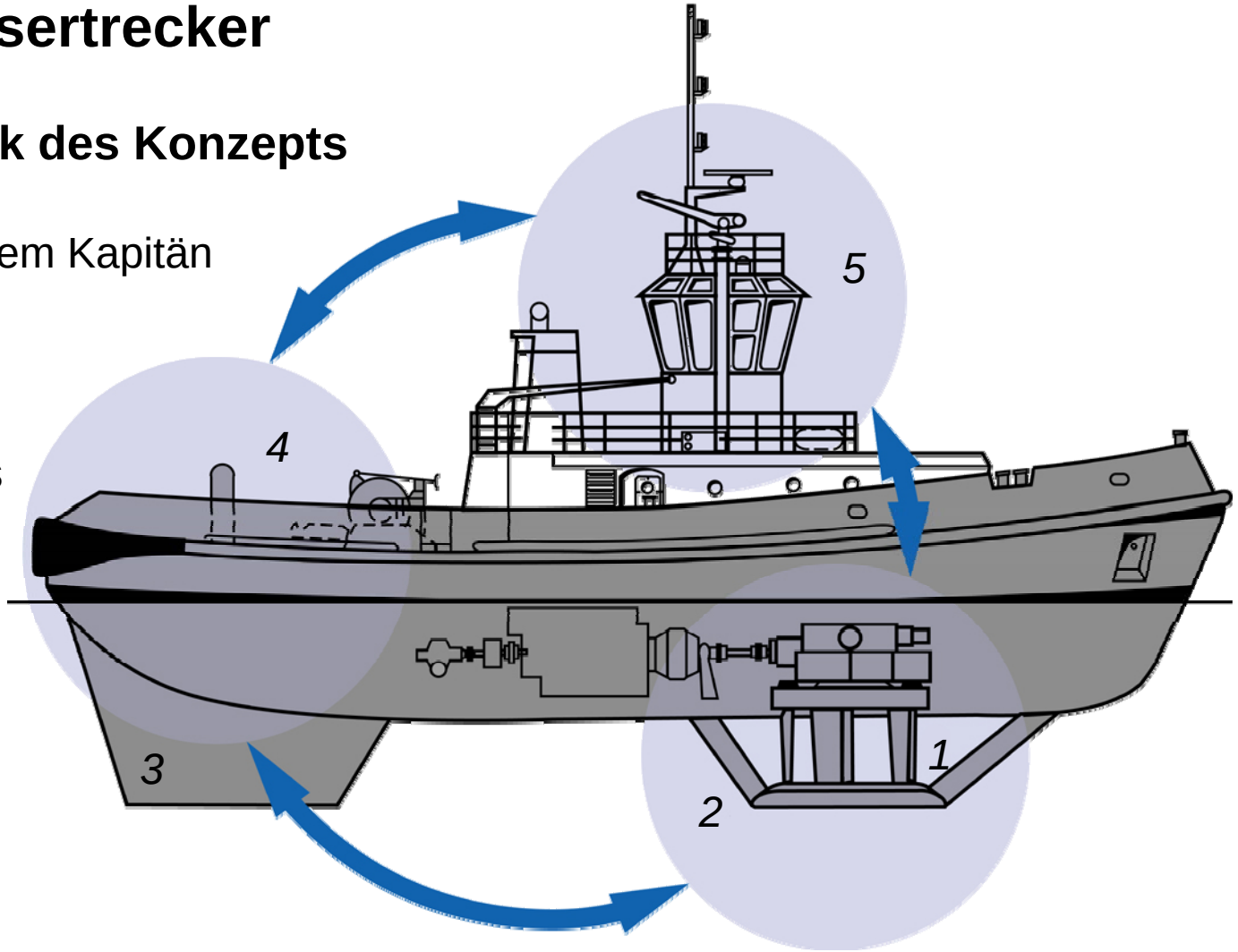
1952: Wolfgang Baer erfand
den Voith Wassertrecker (VWT)

880 VWTs in 120 Häfen bisher

Voith Wassertrecker

Charaktersitk des Konzepts

1 VSP unter dem Kapitän
2 Schubplatte
3 Finne
4 Winde
5 Brückenhaus



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Einer der ersten Voith Wassertrecker „Stier“

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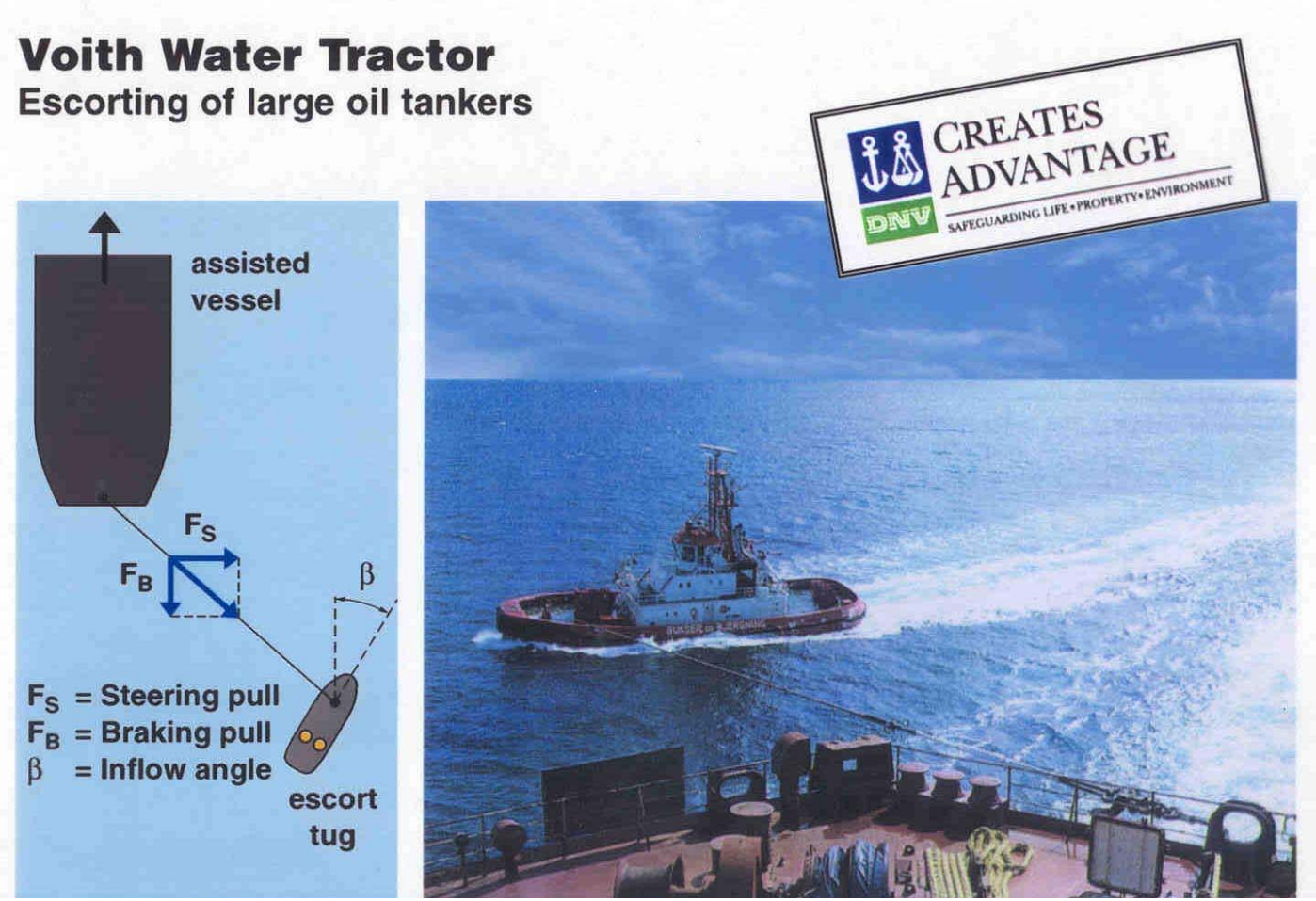
Voith Water Tractor



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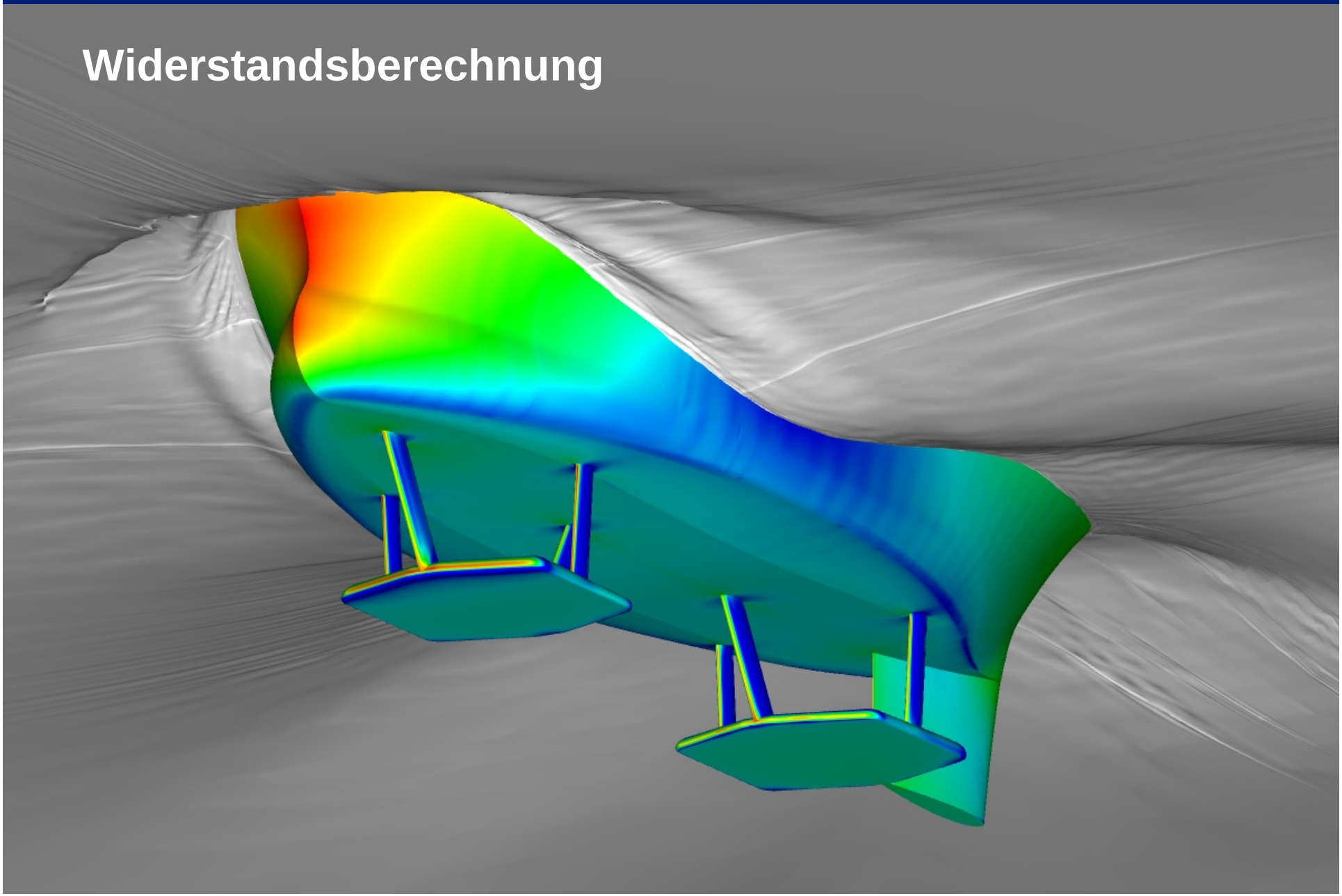
EVERGREEN
EVERGREEN
EVERGREEN
EVERGREEN
UNIGLORY
ST CONTESSA
IMO 9191890
BOXER

VOITH

VOITH

VOITH

Widerstandsberechnung



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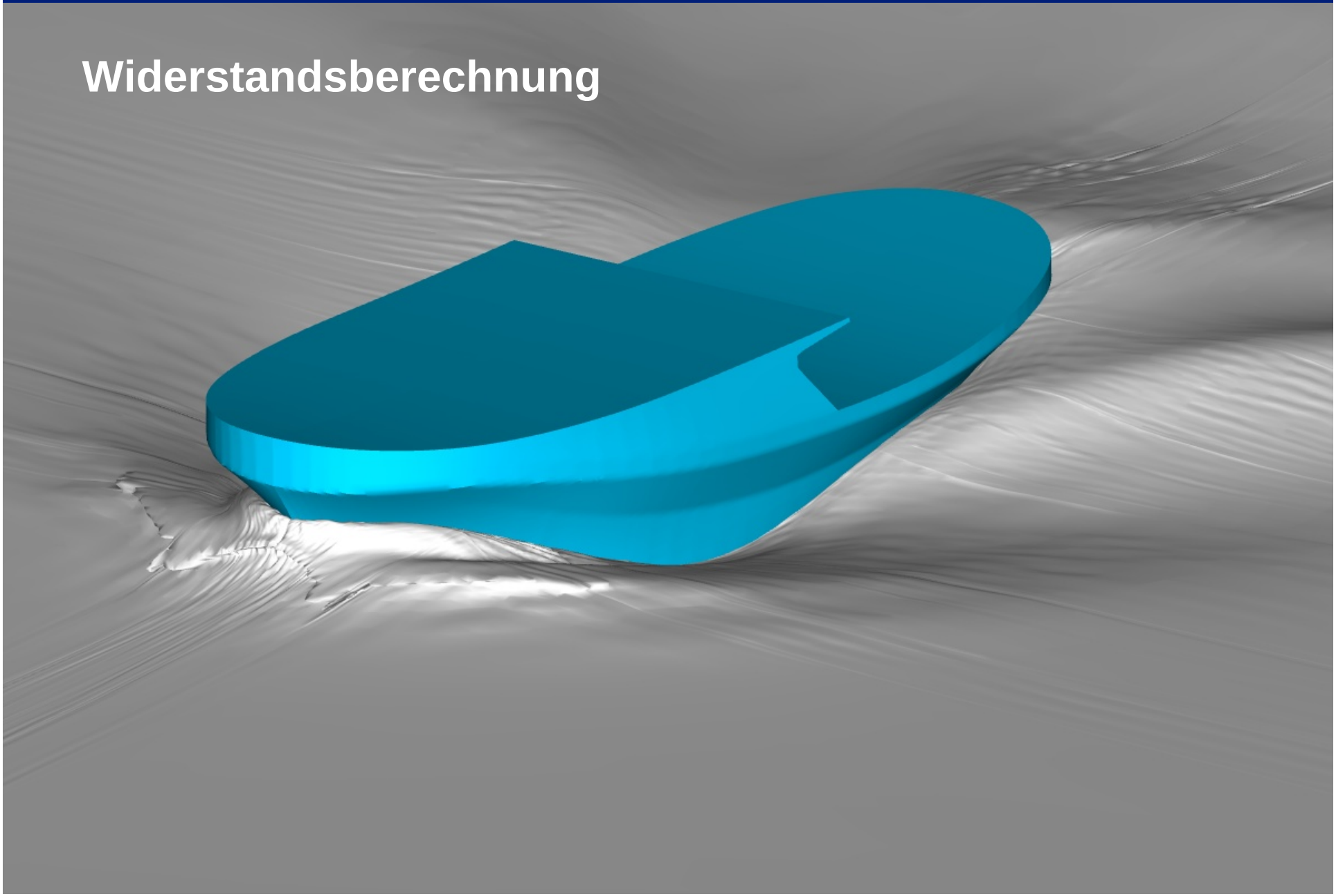
Widerstandsberechnung



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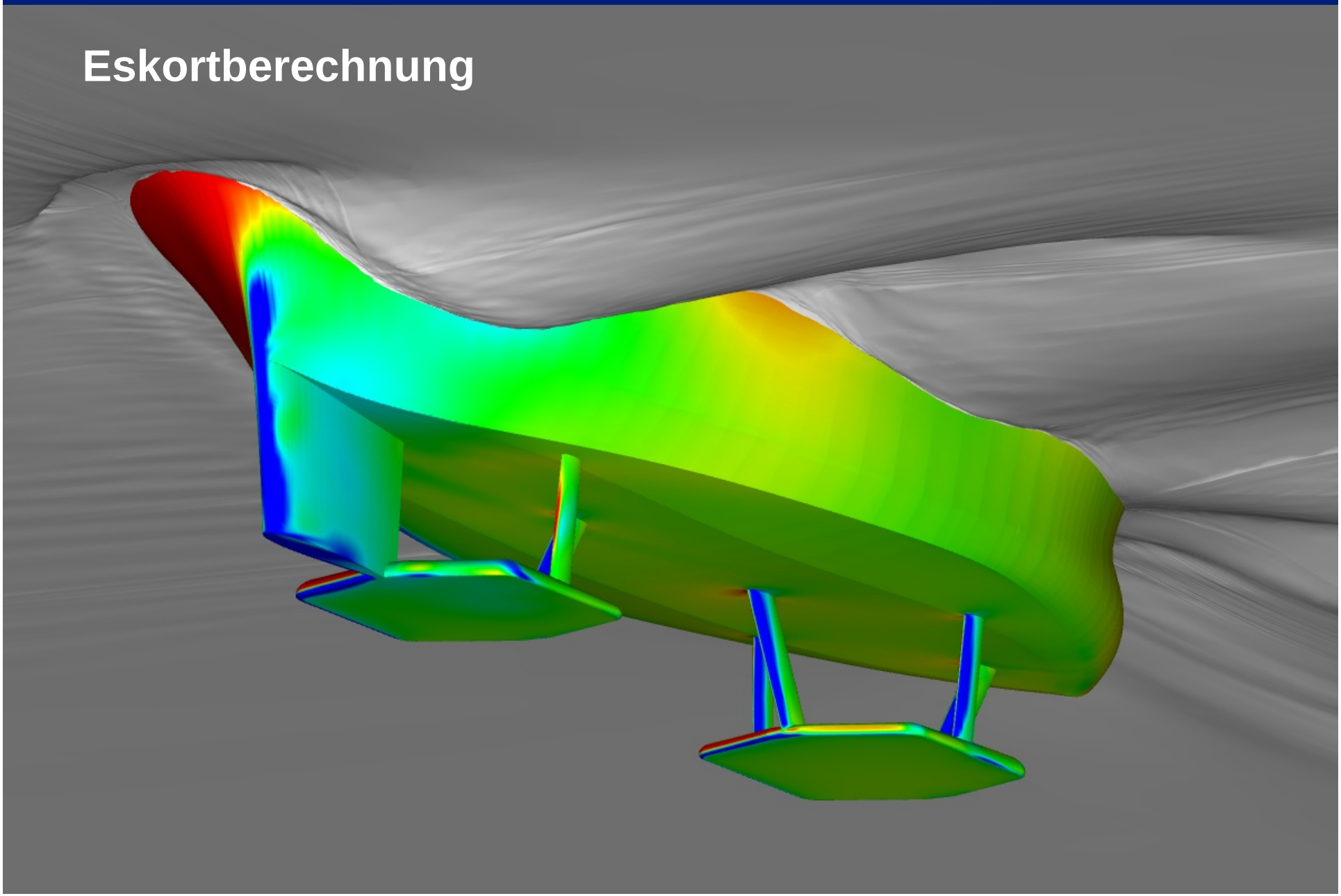
Eskortberechnung



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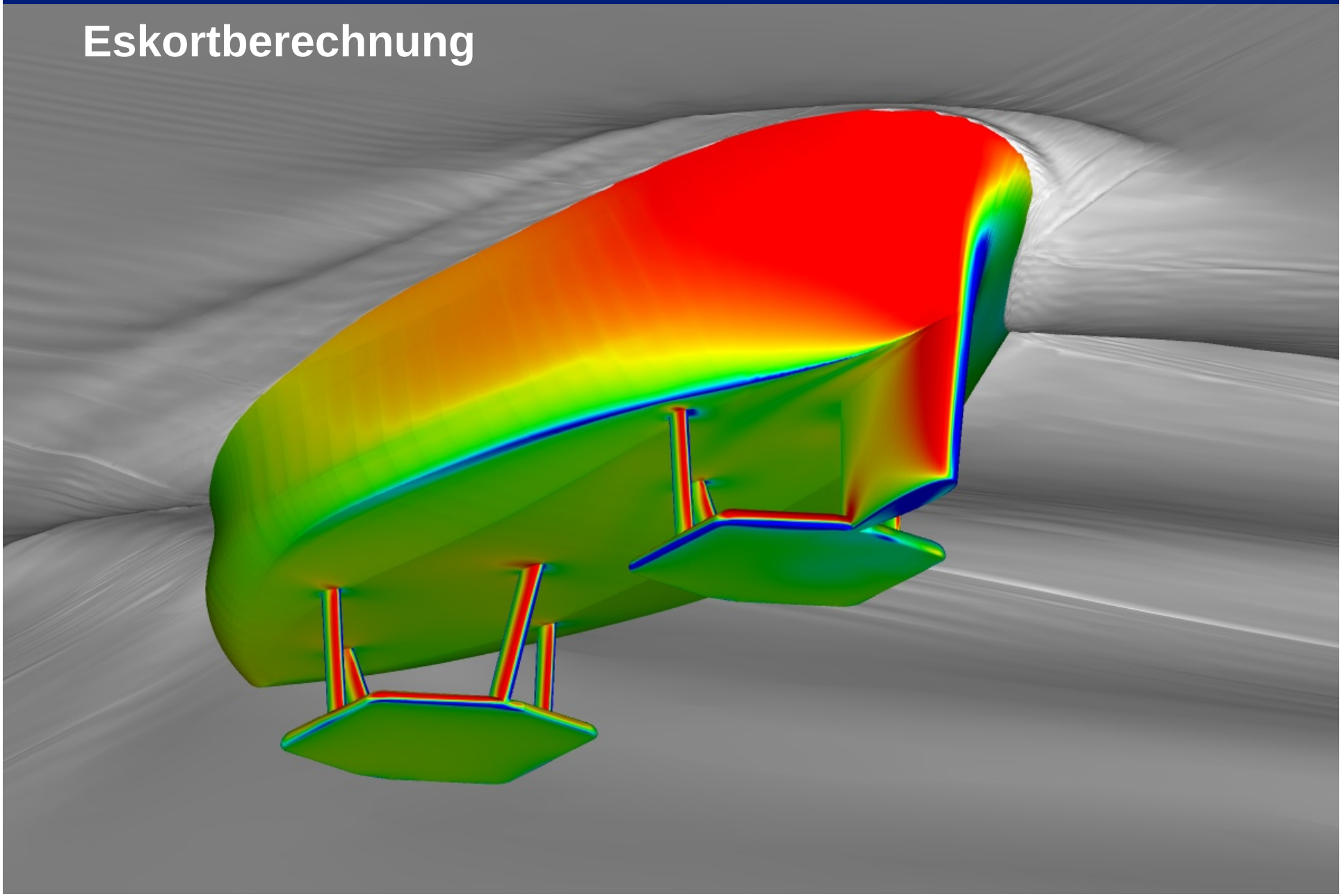
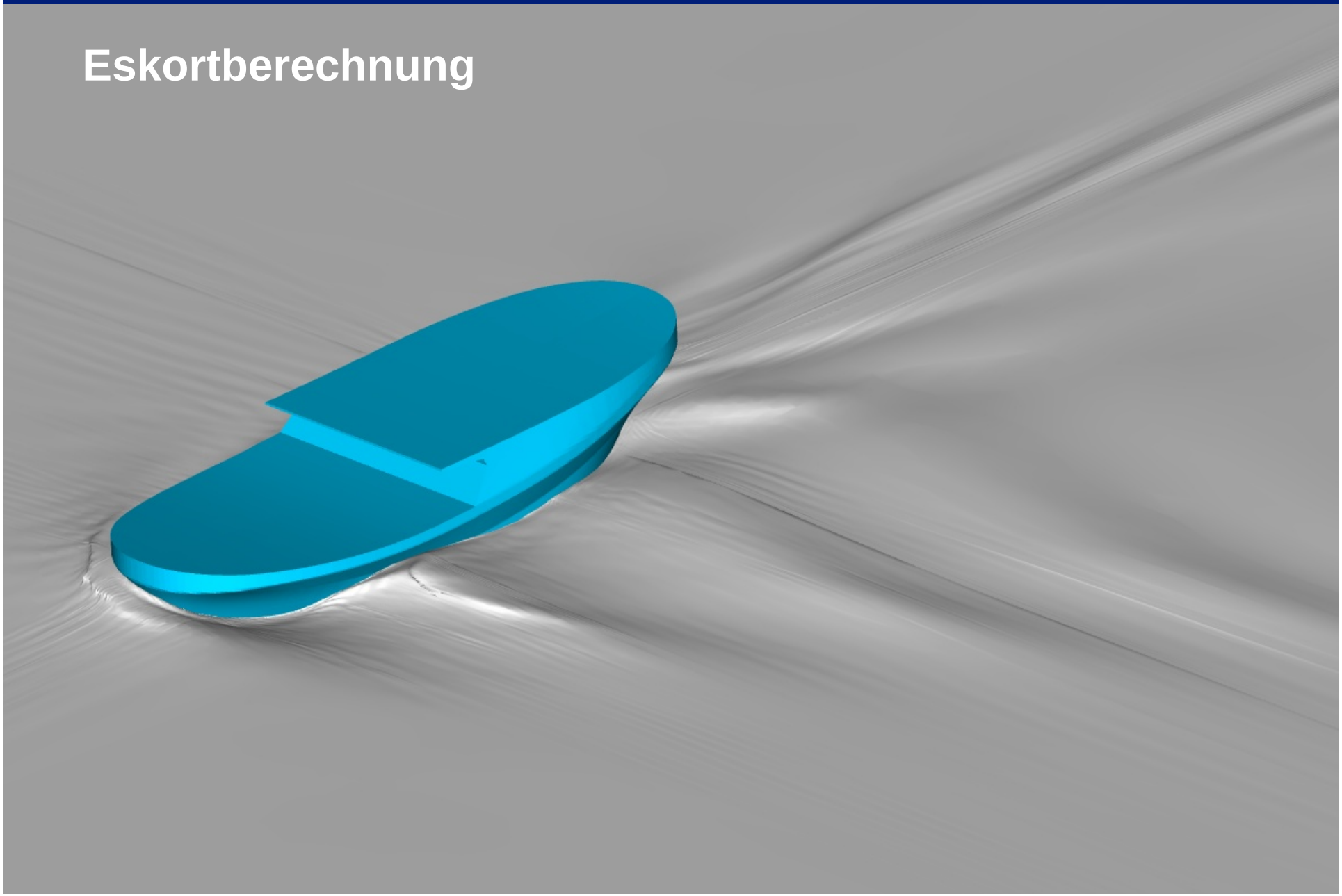


Eskortberechnung



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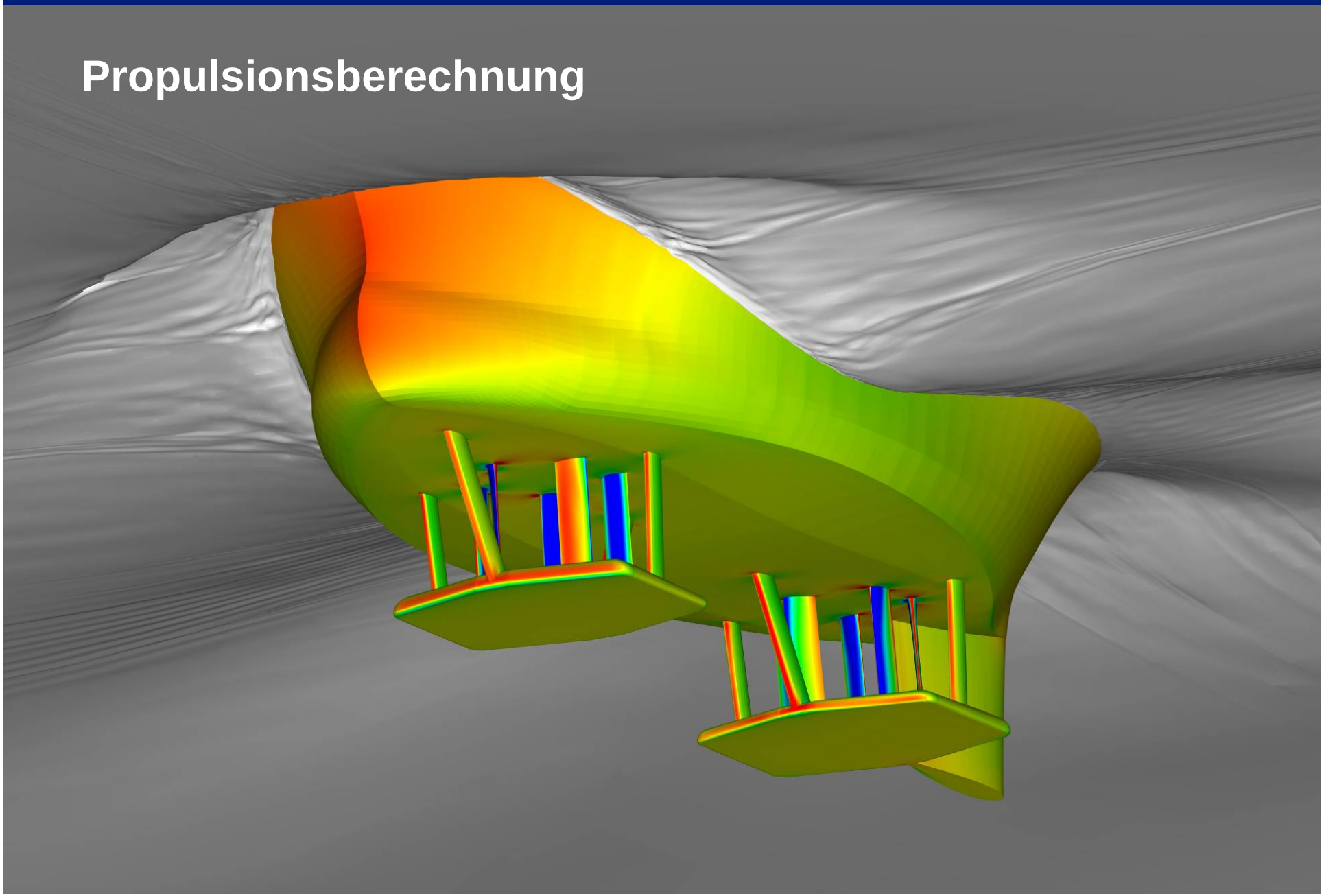
Propulsionsberechnung



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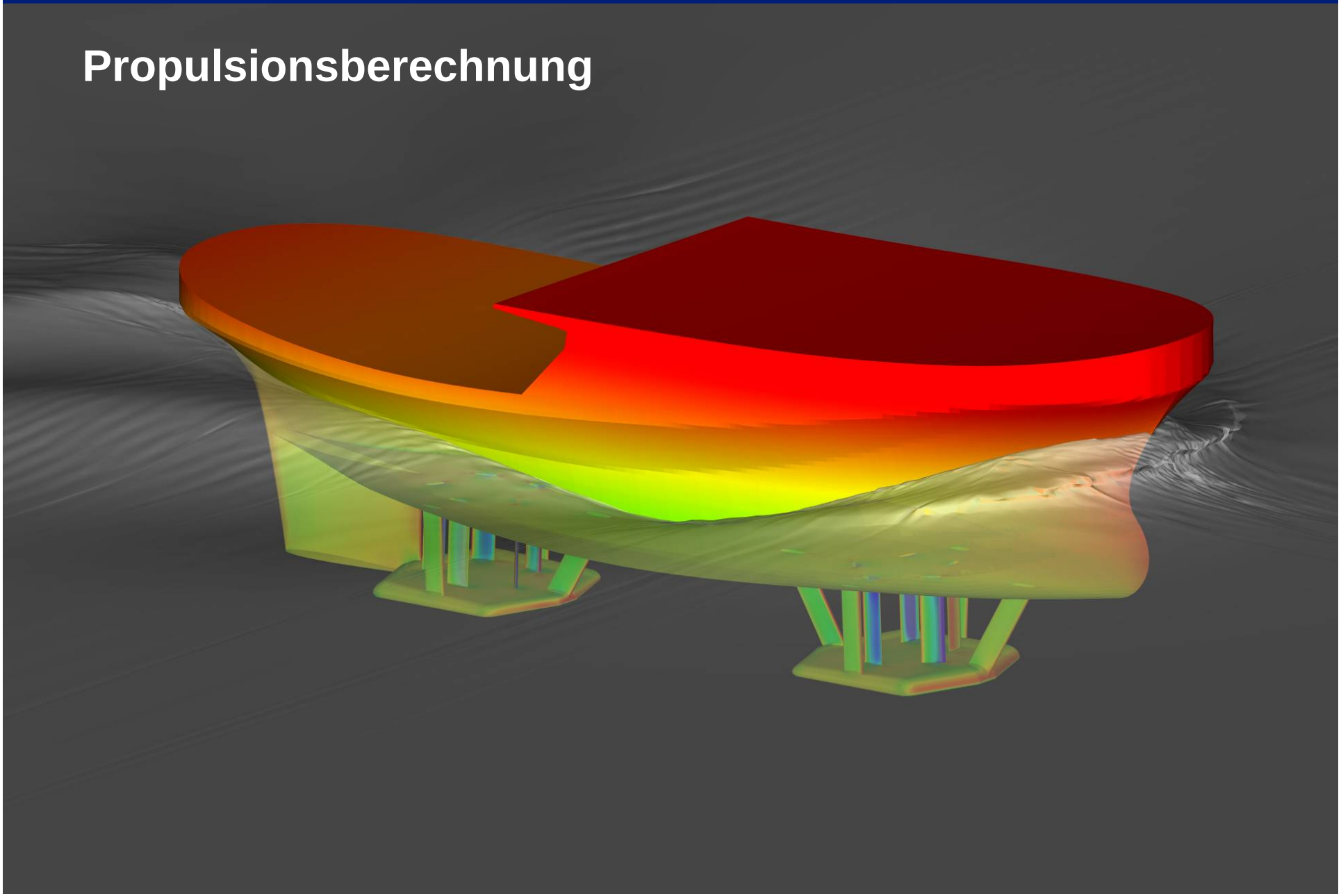
Propulsionsberechnung



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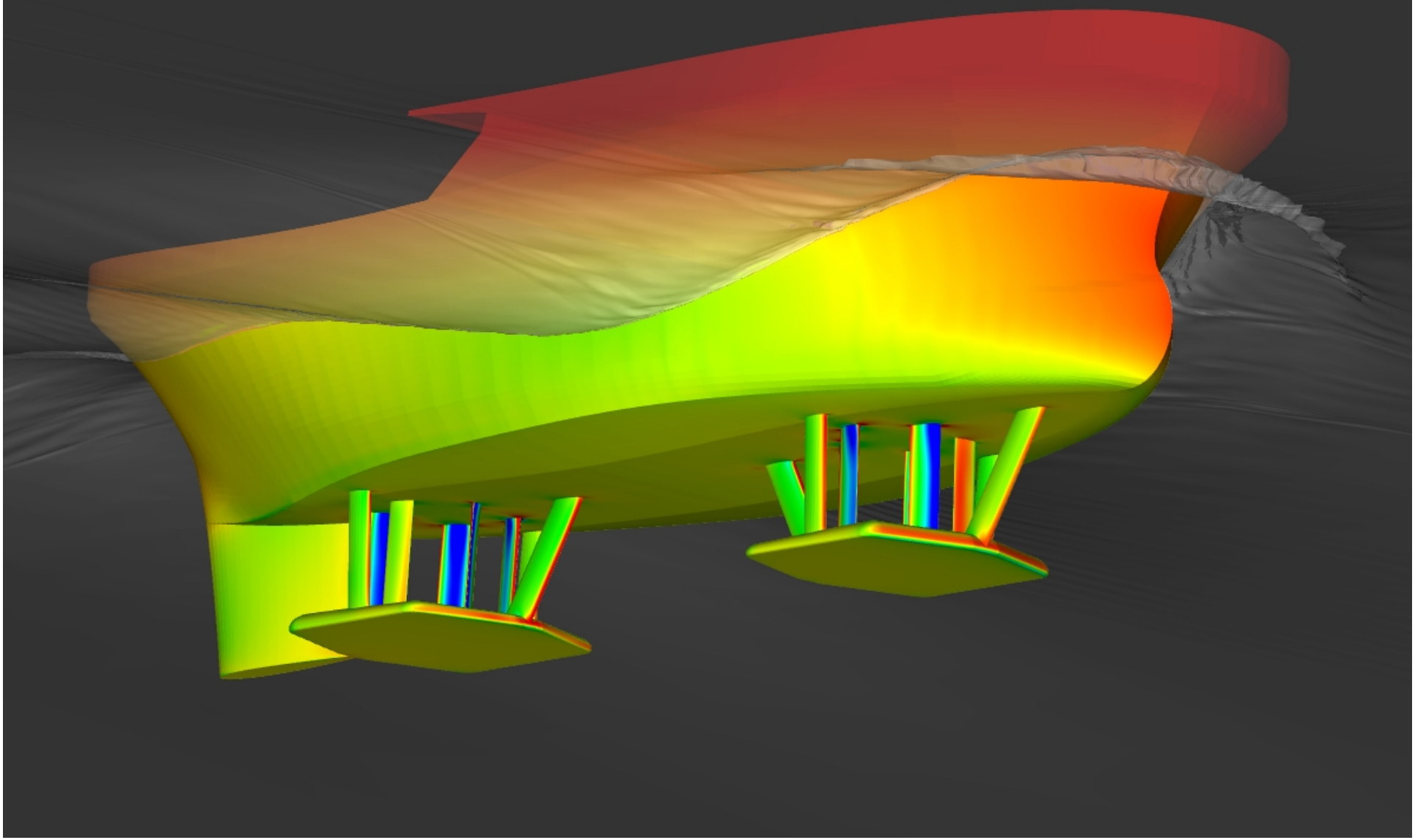
Propulsionsberechnung



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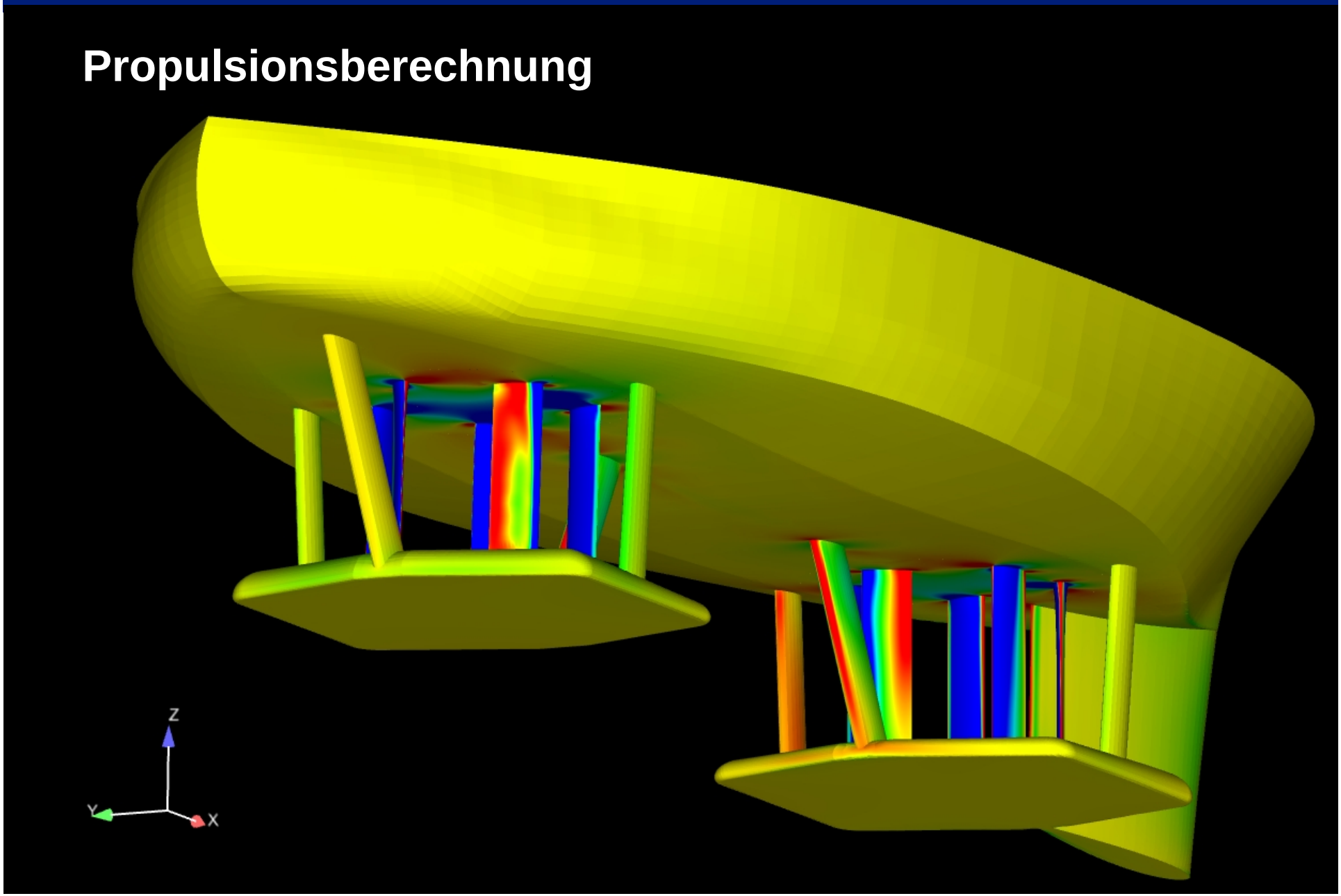
Propulsionsberechnung



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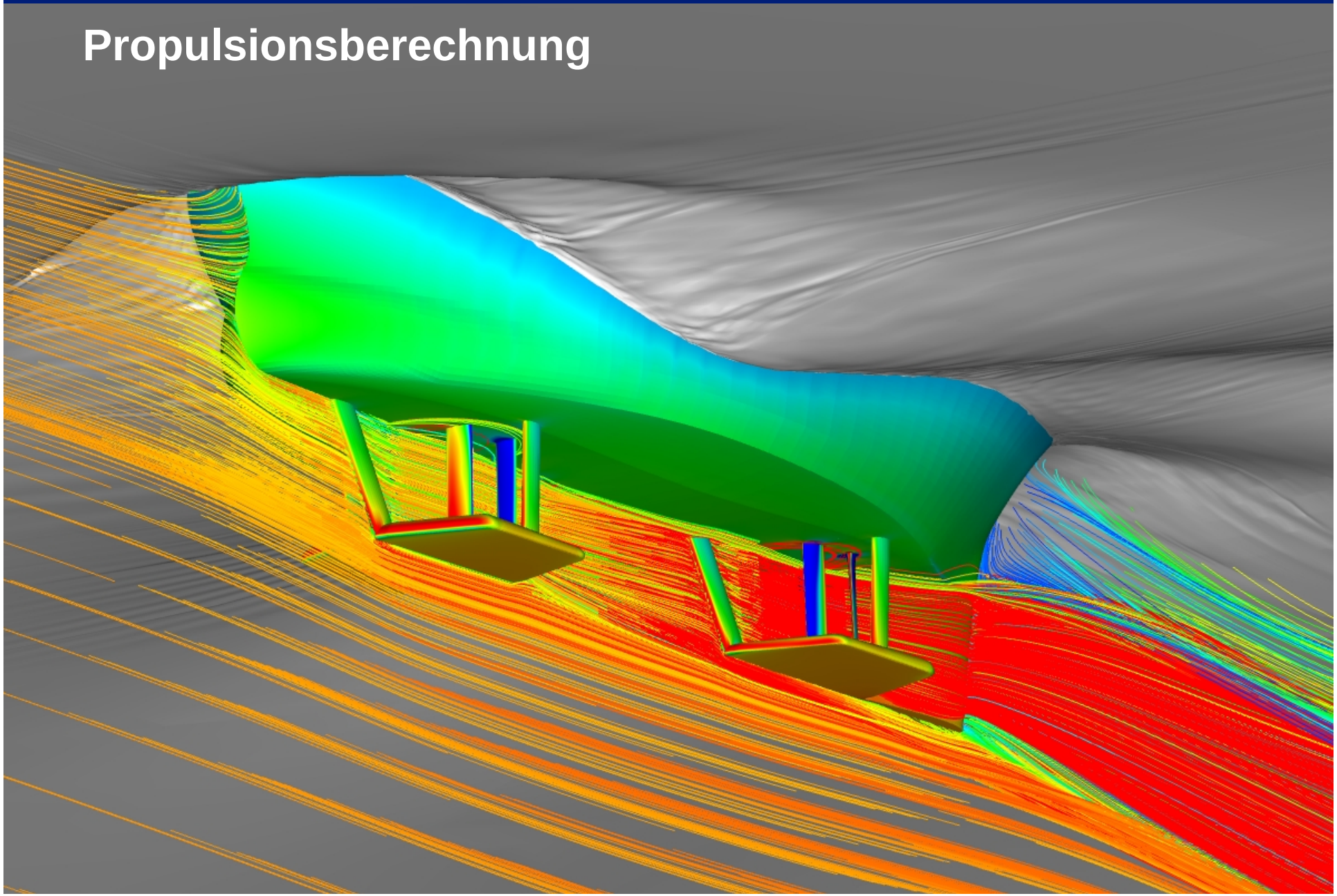
Propulsionsberechnung



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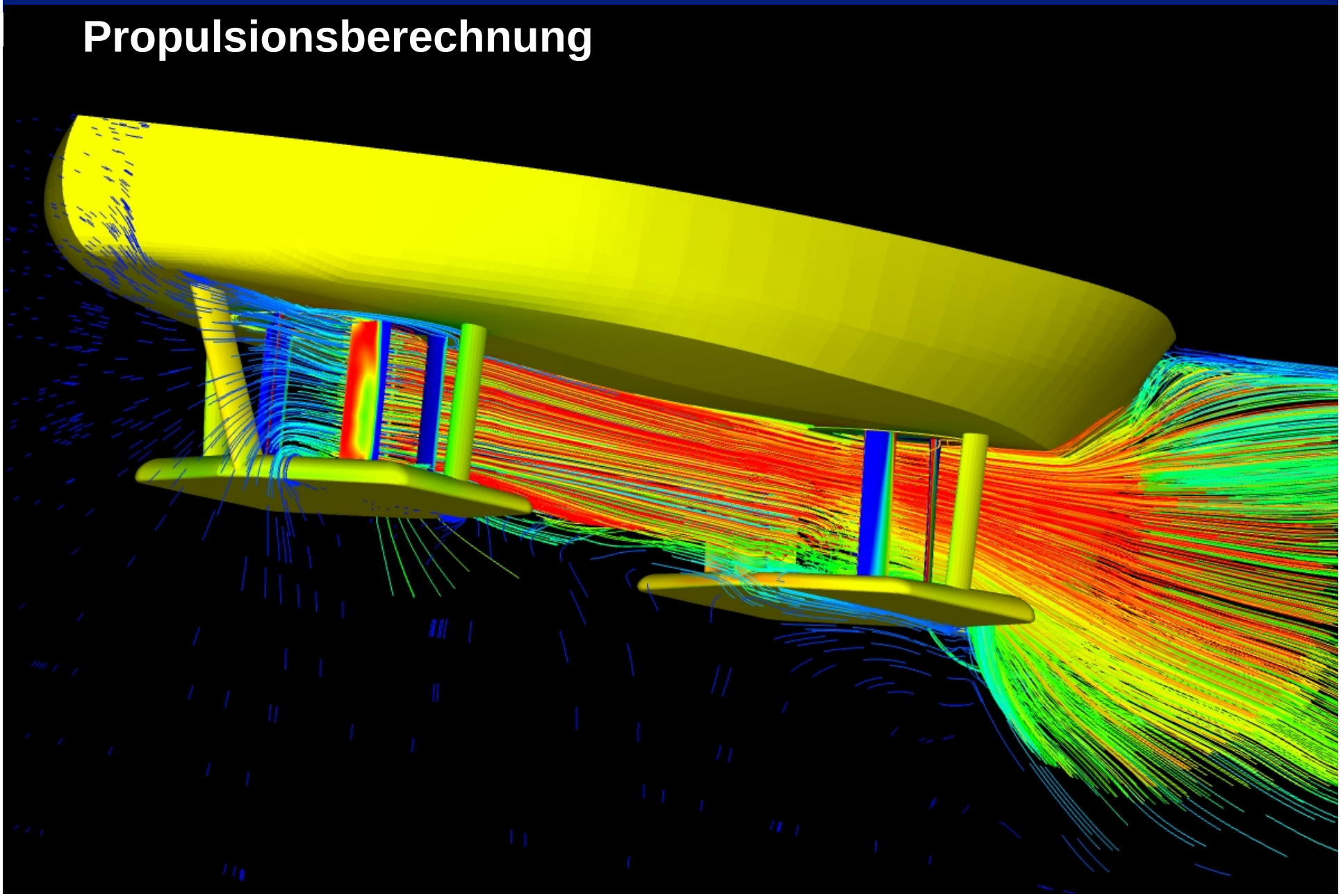
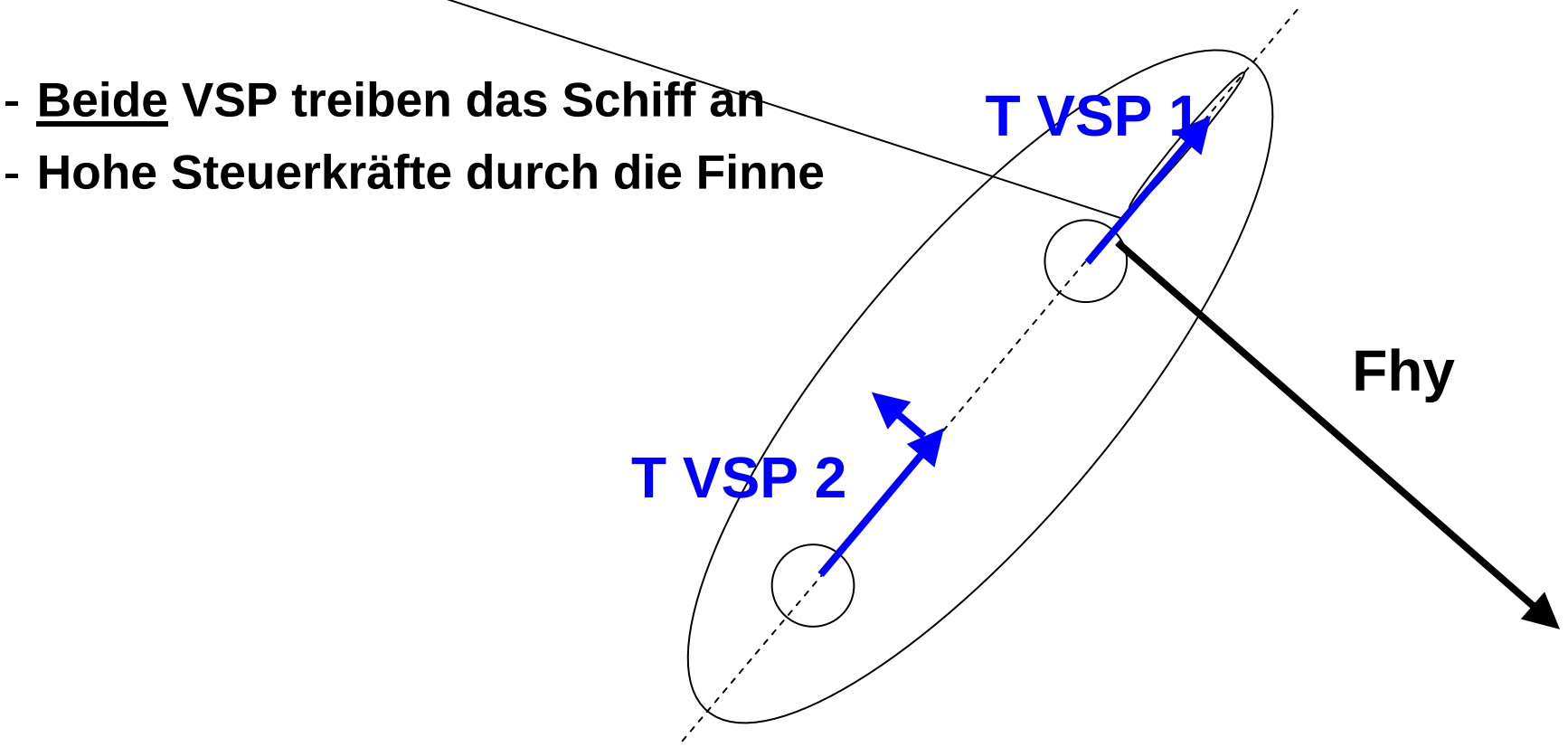
Propulsionsberechnung



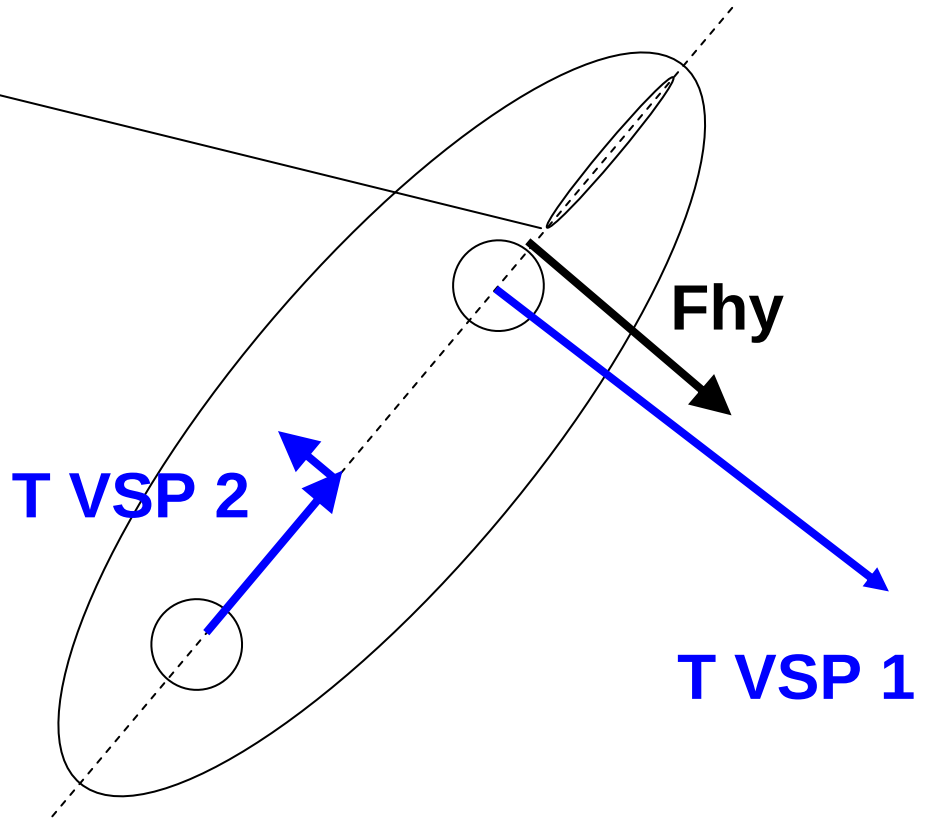
V = 10 kn

- **<u>Beide</u> VSP treiben das Schiff an**
- **Hohe Steuerkräfte durch die Finne**



V = 6 kn

- **<u>Nur ein</u> VSP treibt das Schiff an**
- **Hohe Steuerkräfte durch den ersten VSP und die Finne**



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Model test

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Model test - Propulsion

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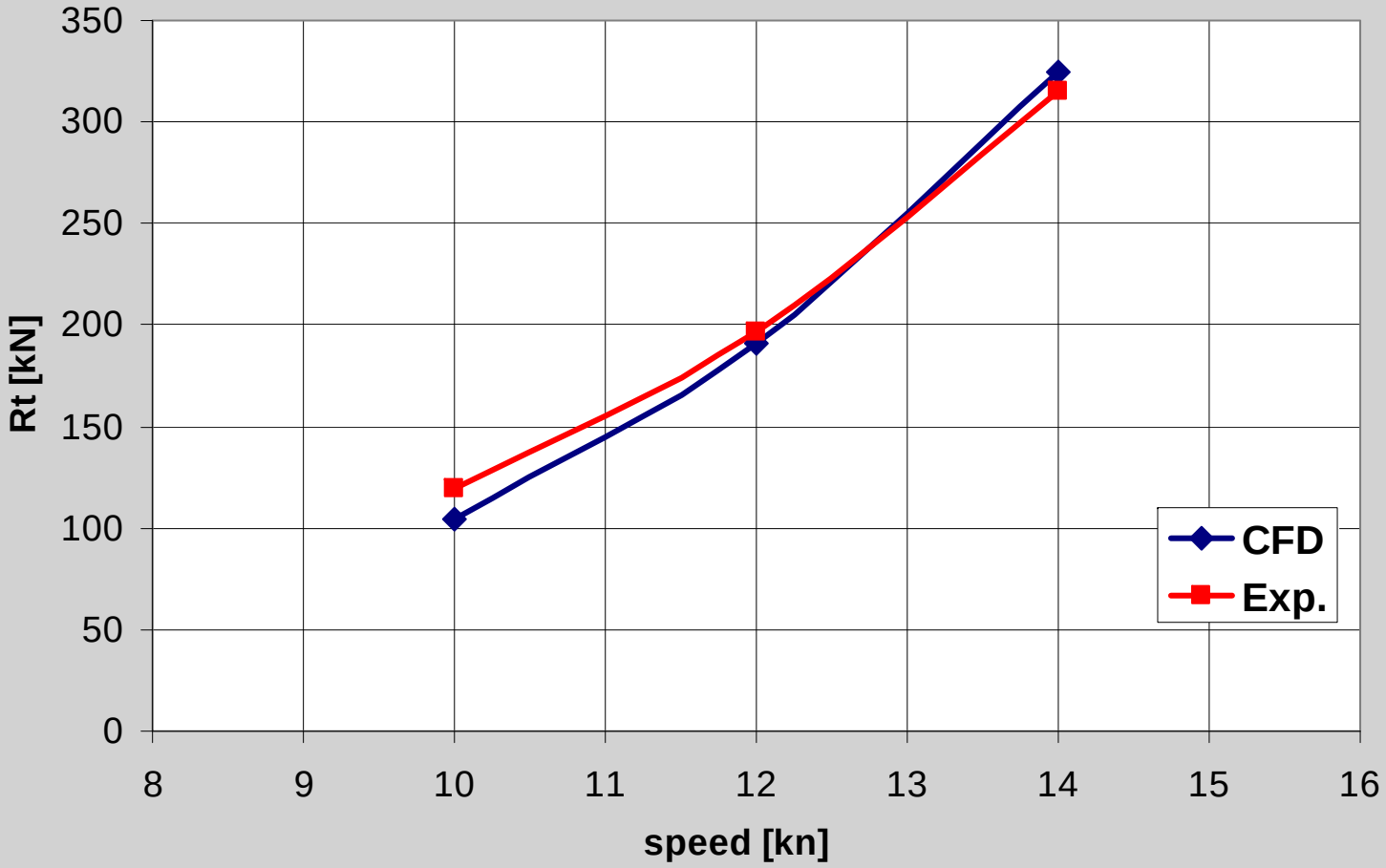
Berechneter und gemessener Widerstand



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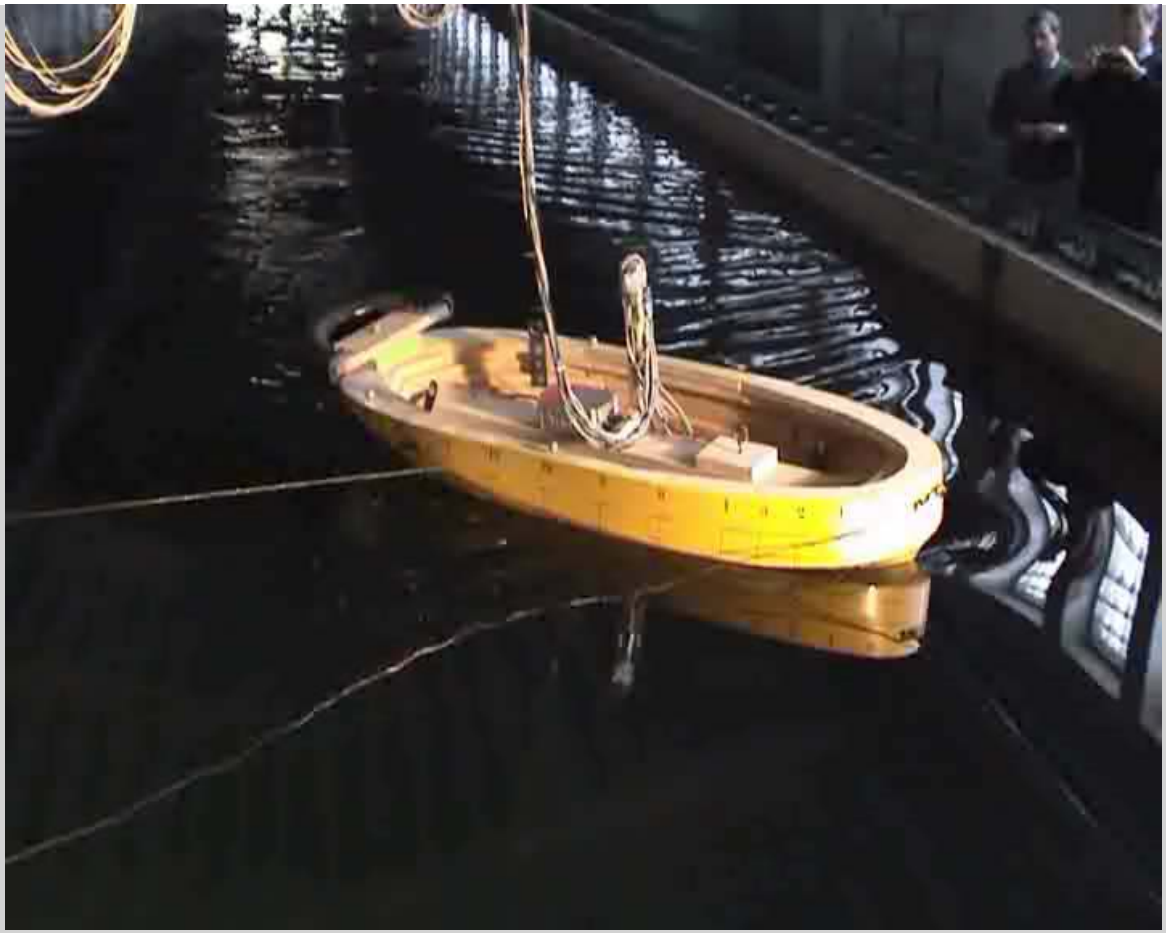

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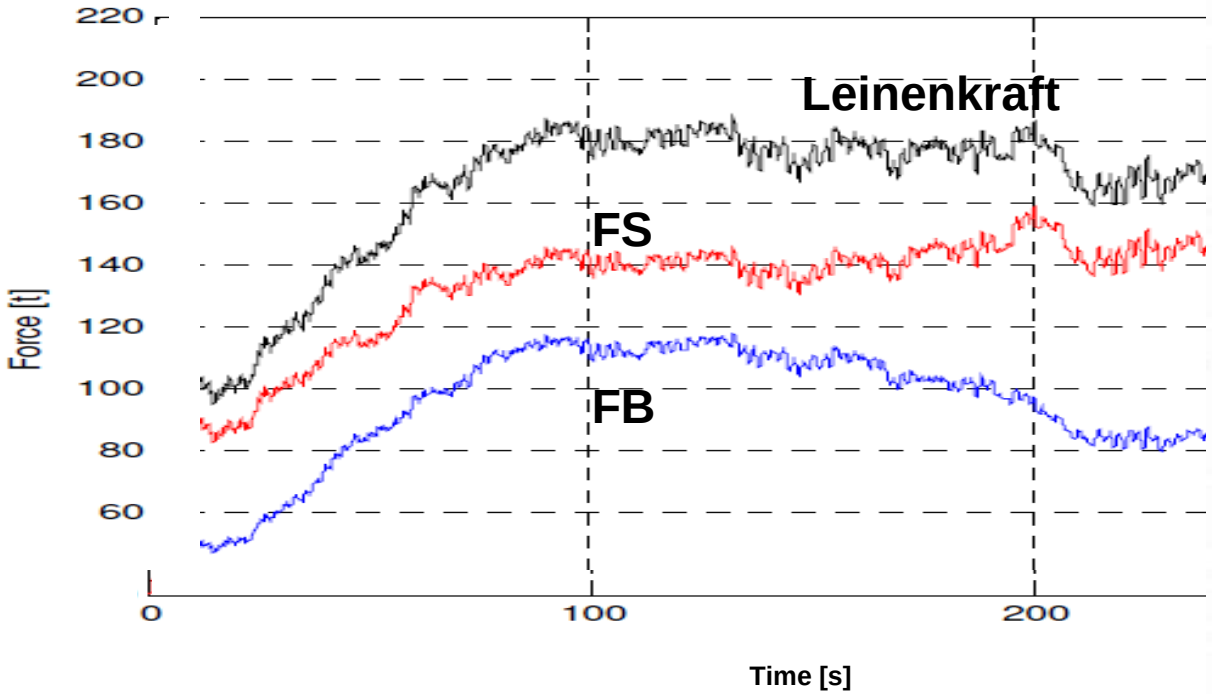
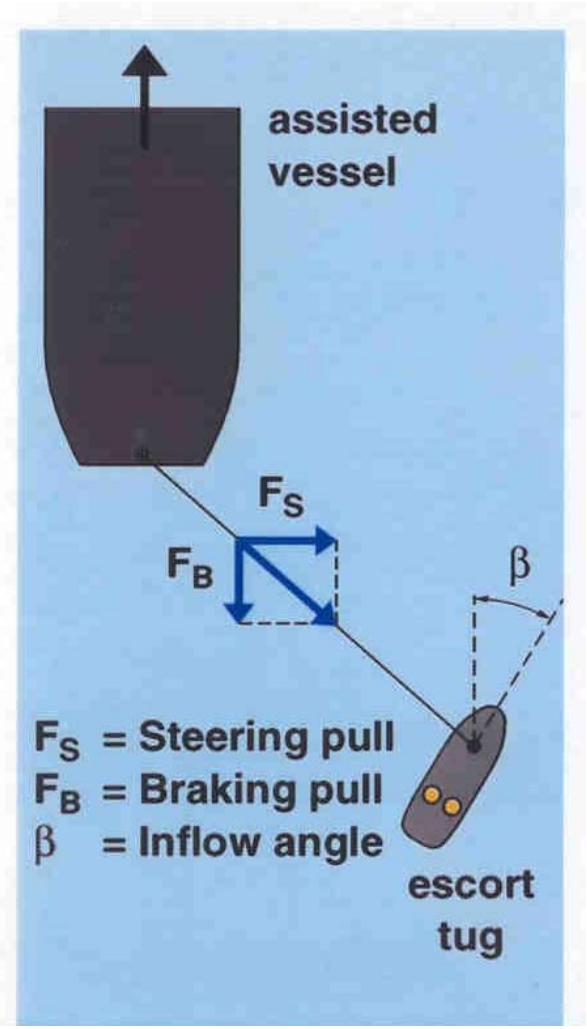
Escort forces, V = 10 kn, VSP rpm = 75 1/min, 11SK029225

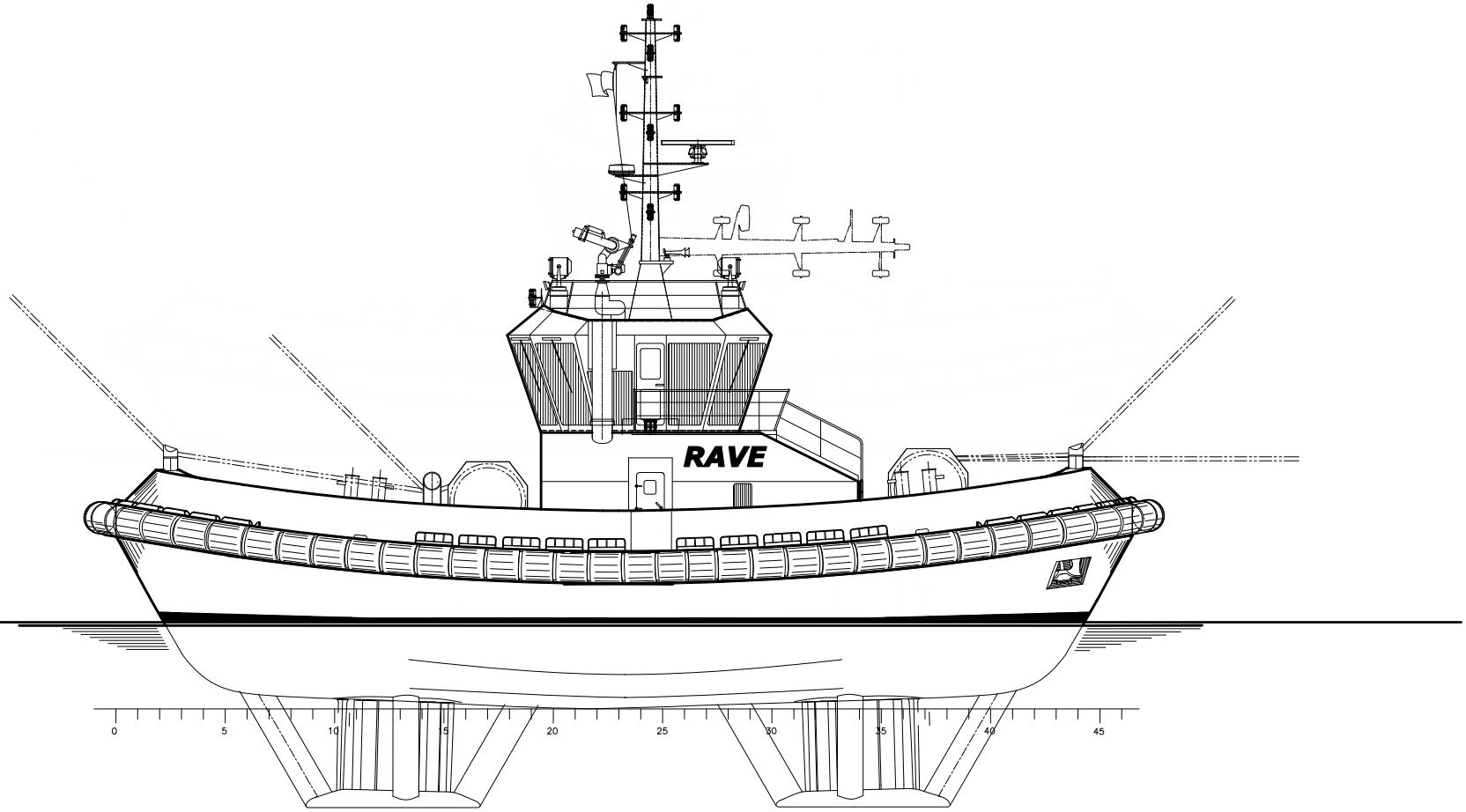




Prognose der Steuerkraft mit dem optimierten Schiffskörper: Fs = 160 t!

RAVE Design Options

Kompaktklasse (Hafenschlepper)
L = 24-26 m,
BP = 40-50 t

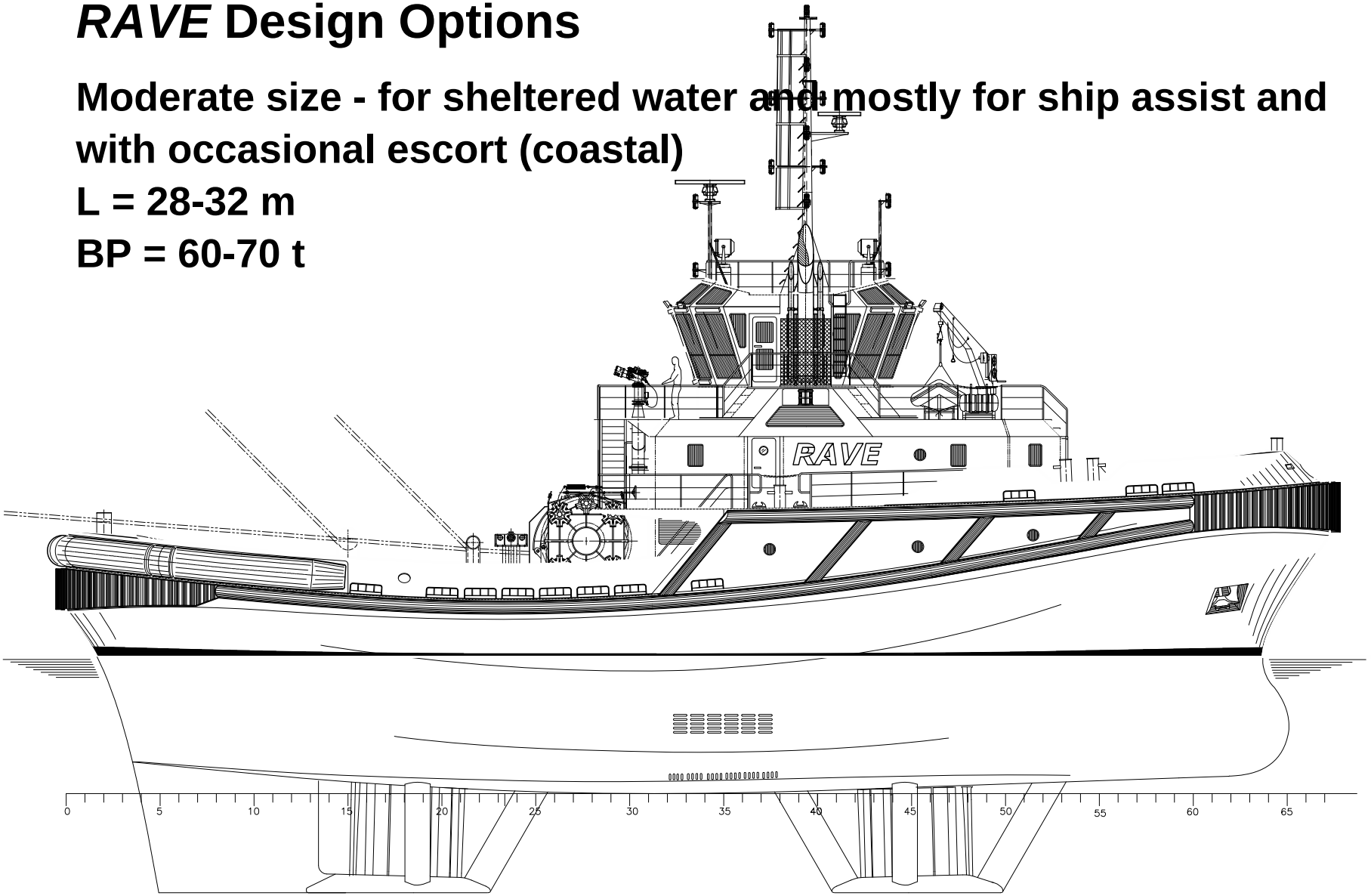


RAVE Design Options

Moderate size - for sheltered water and mostly for ship assist and with occasional escort (coastal)

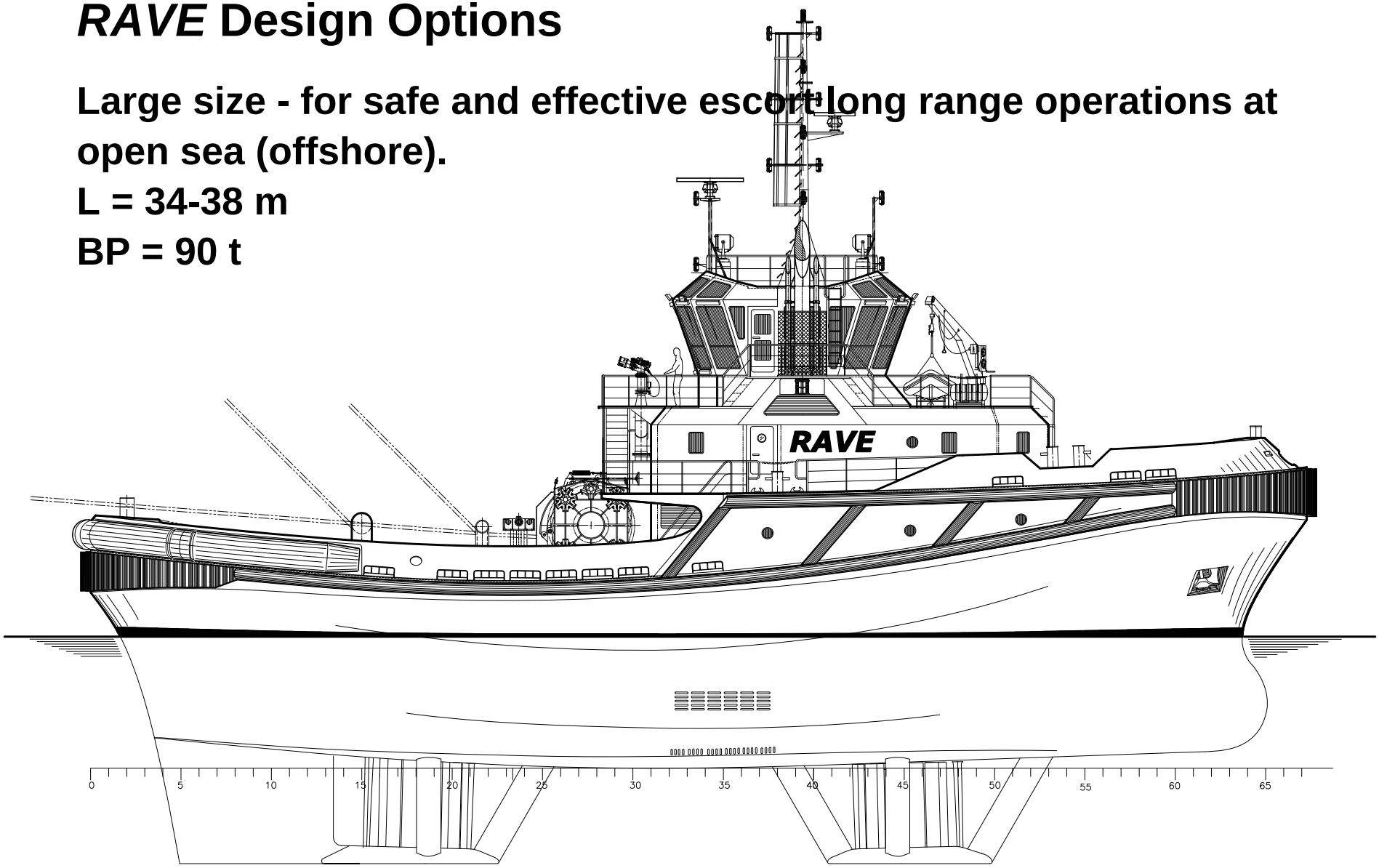
L = 28-32 m

BP = 60-70 t



RAVE Design Options

Large size - for safe and effective escort, long range operations at open sea (offshore).
L = 34-38 m
BP = 90 t

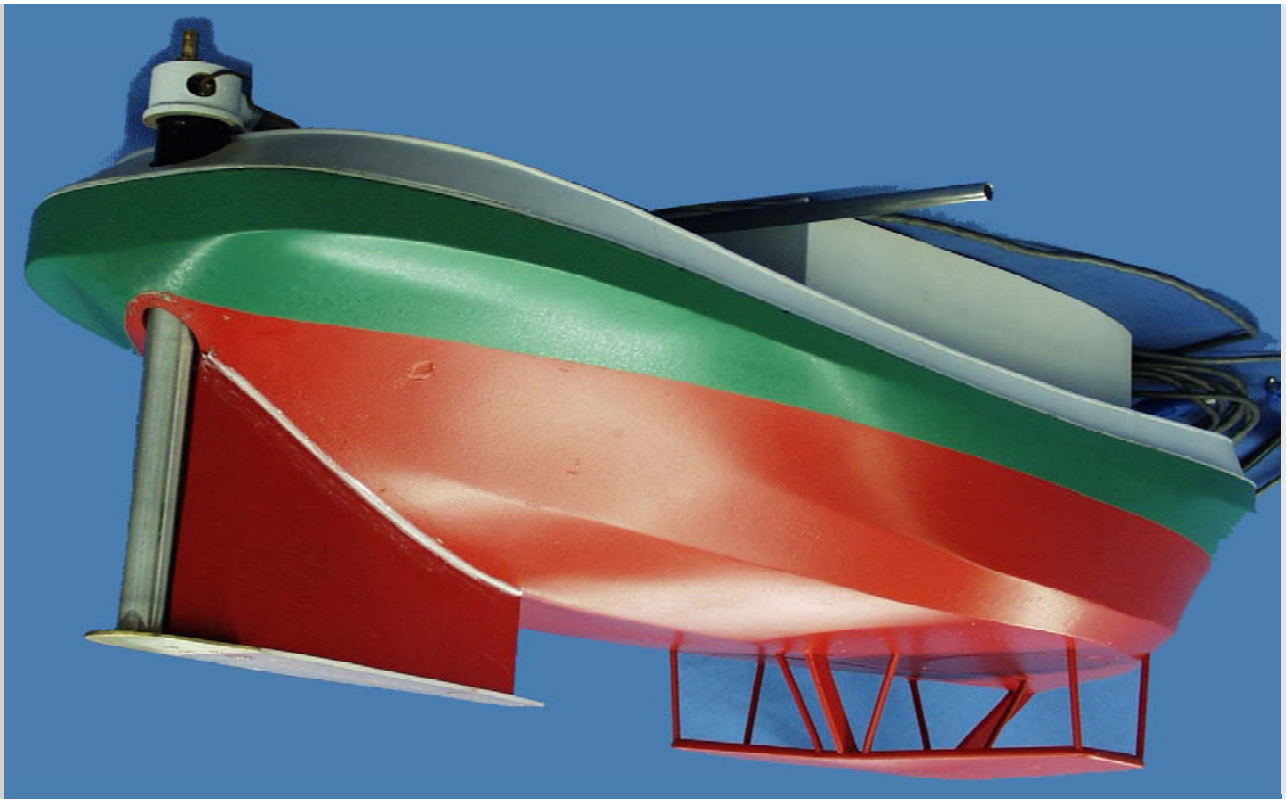


Spezielle Eigenschaften des RAVE (optional)

- Voith Turbo Fin (VTF)

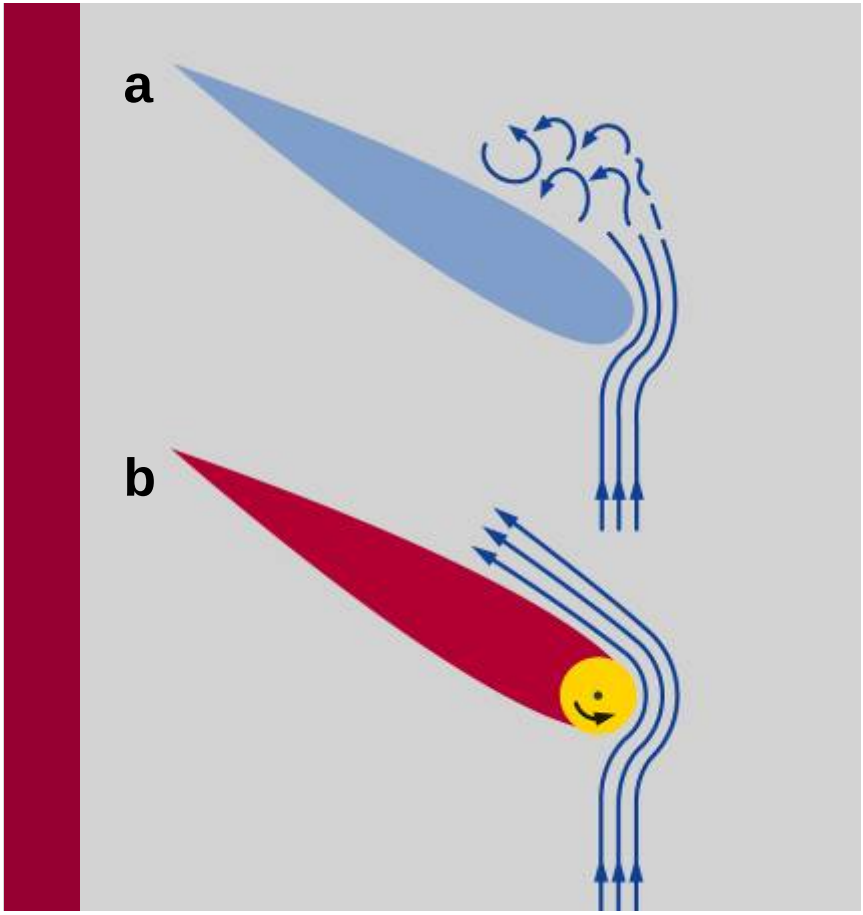
- Voith Roll Stabilization (VRS)

Forschung und Entwicklung
Voith Turbo Fin (VTF) – Modellversuche VTF



VSP_2a.avi

Forschung und Entwicklung
Voith Turbo Fin (VTF) – Stromlinien



Strömung um die Finne:

a VTF nicht rotierend

b VTF rotierend

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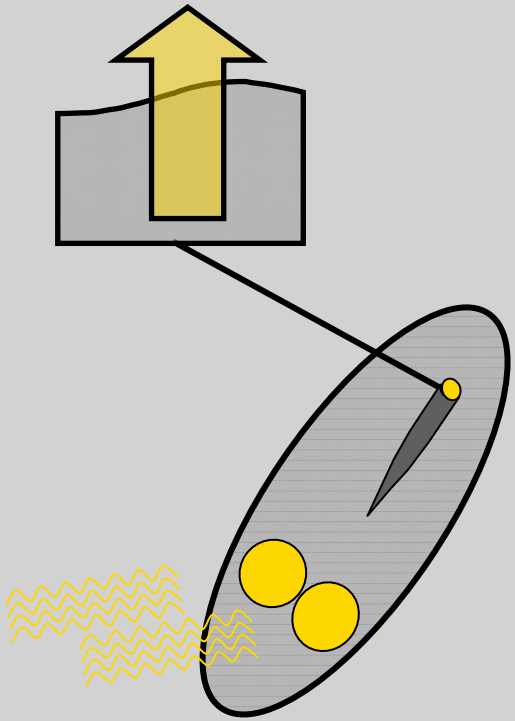
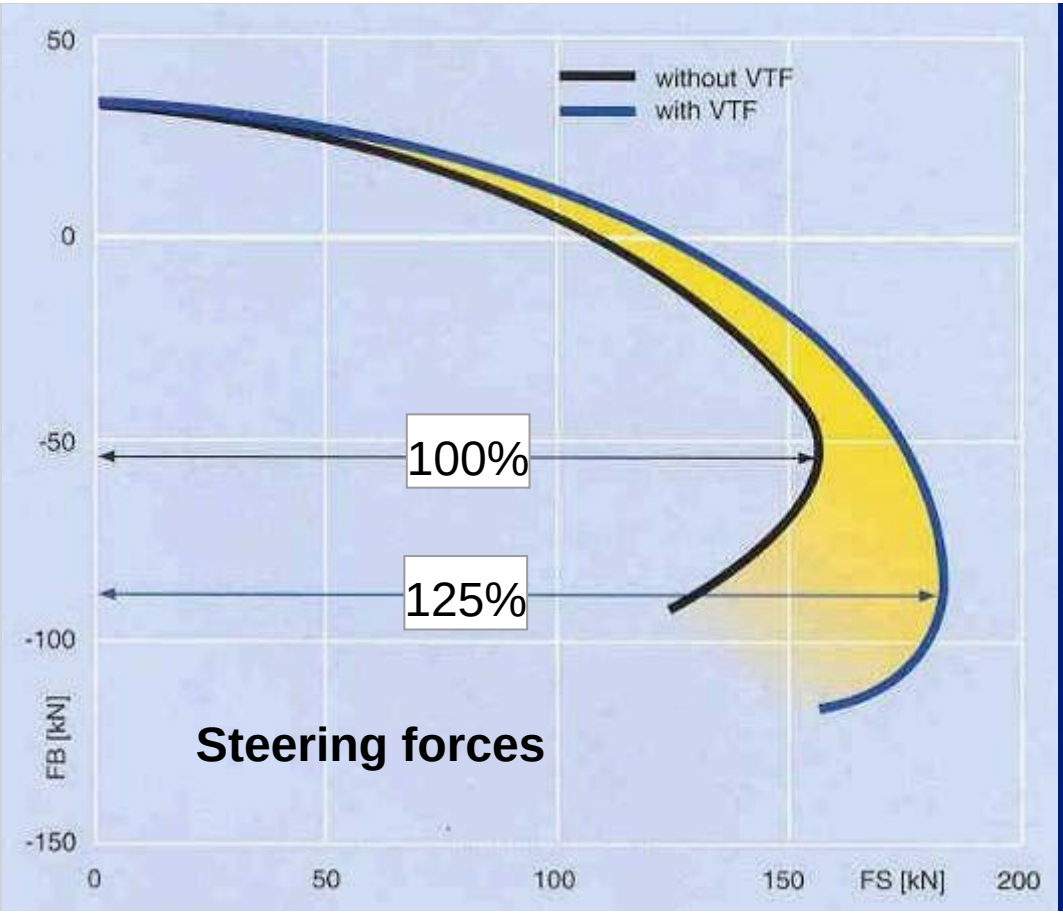
Forschung und Entwicklung
Voith Turbo Fin (VTF) – Modellversuche





Installation der Voith Turbo Fin (VTF)

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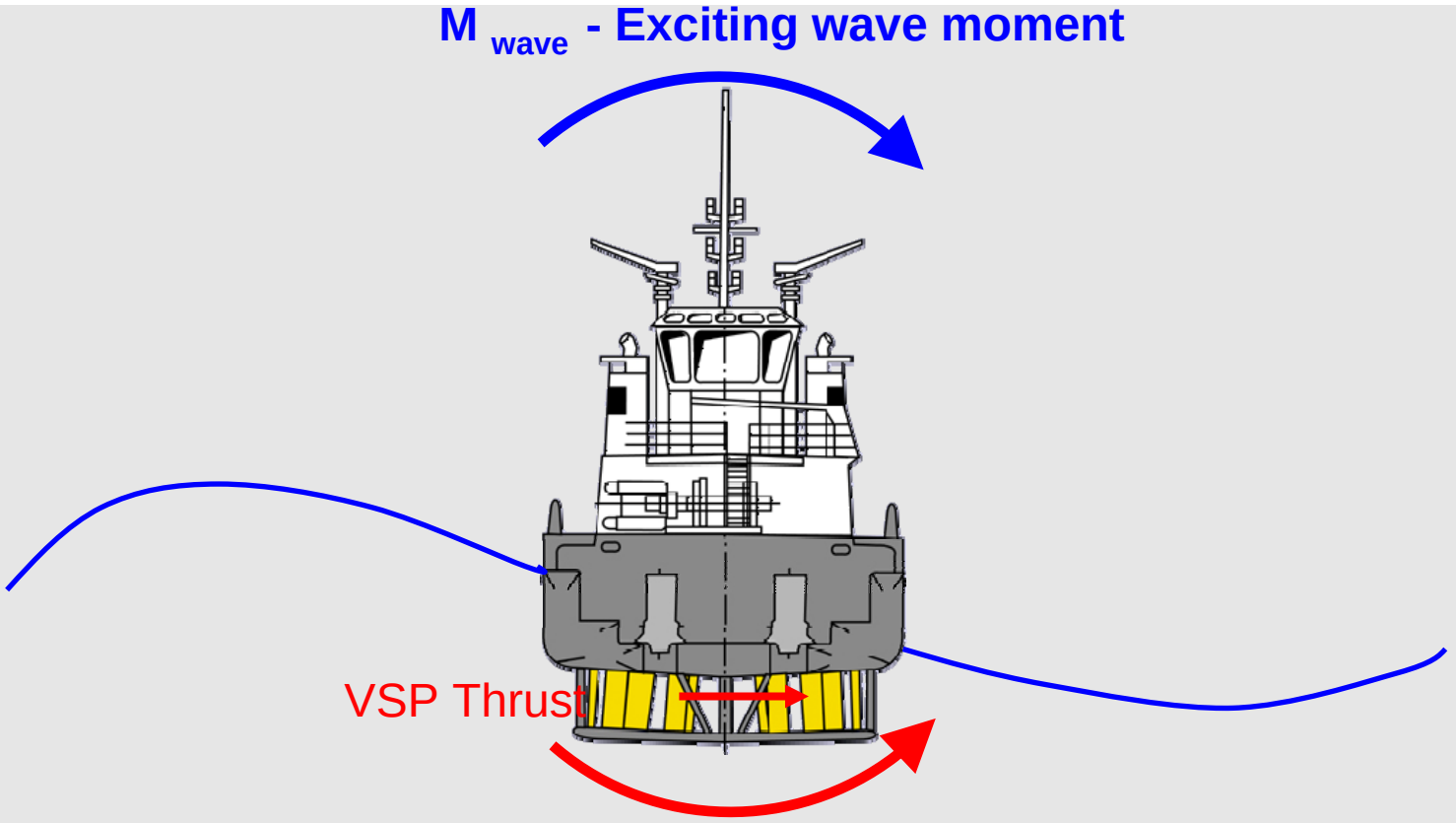
Voith Turbo Fin (VTF) – Schiff im Trockendock

Voith Roll Stabilization (VRS)



Vs = 5 kn, hs = 1.5 m; Roll Reduzierung = 69 %

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Voith Roll Stabilization (VRS)

Rave-Tug im Simulator

Zusammenfassung

- RAVE ist ein neuer Schleppertyp
- RAVE ist besonders günstig für:
  - Enge nautische Gebiete
  - Hohe Steuerkräfte für alle Geschwindigkeiten
  - Hohe Seitenkräfte
  - Sehr gutes Verhalten im Seegang
- Verbesserte Einsatzcharakteristik durch:
  - Voith Rollstabilisierung (VRS)
  - Voith Turbo Fin (VTF)
- RAVE kann im Simulator getestet werden

Danke für die Aufmerksamkeit!


VOITH
Engineered reliability.