Management of a research vessel – the case of a small institute in a small country

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29.11.2022







Former research vessels in Estonia in the 1970s – 1990s

Research vessels in Estonia



Salme

- Built in 1974
- Owned by TalTech since 2006
- Reconstructed in 2009
- GRT 223 t
- Length 31 m
- Draught 2.5 m
- Area Baltic Sea
- Crew up to 6
- Scientists up to 12
- 2 labs + seminar room
- Equipment: crane, cable winch, winches, A-frame etc.
- Main governmental task conducting offshore monitoring (a part of the national environmental monitoring program)
- Last refit conducted in 2019 (intermediate docking in 2021)
- Seaworthiness certificate valid until 07.08.2024
- Several options under discussion regarding a future RV in Estonia



Scientific equipment and laboratories



Delivery of data in near real time











Days at sea and budget

Marine research and monitoring activities

- National monitoring program ca 30 days
- Research projects ca 15-20 days
- Applied tasks for authorities and companies ca 10-20 days
- International contracts (mostly Latvian monitoring) ca 15-25 days

Budget

- In practice, the vessel has been at sea from 70 to 115 days a year (max was in 2014)
- Budget ca 350 000 EUR per year
- If more than 90 days at sea, the budget is larger, up to 400 000 EUR per year; if less, some part has to be paid from the budget (Department, University)
- Expenses are covered mostly from the projects (part of TalTech budget)
- Responsibility to secure funding mostly lies on one research group

Governmental support via project funding, e.g., project money was applied for the last refit from Environmental Investment Centre (up to 80% was covered), and monitoring tasks are agreed upon via the public procurement process



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SWOT analysis

The following ownership/management options were analysed:

- M1 TalTech
- M2 Estonian universities and marine research institutes
- M3 Private company
- M4 International consortium

The following financial schemes were analysed:

- F1 Fully covered by the users
- F2 Mixed financing scheme, where the expenses in the harbour are covered by the government and users pay for expenses at sea
- F3 Fully covered from the state budget



SWOT analysis (Estonian universities)

Strengths	Weaknesses
 The ability to invest in a larger and more competitive research vessel than alone 	 In the case of large investment needs, excessively influenced by the budgetary resources of one country
Flexibility to use the research vessel to the maximum extent	Expensive maintenance and refit costs
for the needs of Estonian universities/institutes by making	Liability for damage claims or insurance deductibles in case of
joint decisions about the equipment to be purchased and installed on the vessel	breakage of ship parts is the responsibility of the Estonian state only
 Investments in new equipment and developments can be shared between members of the research vessel consortium 	 Estonia does not have enough ship hours in total for the ship to be in use in sufficient volume
 Sharing of claims or insurance deductibles between consortium members 	 In the case of Estonia, the home port would be Tallinn. The response time to strategic points in the Baltic Sea is longer than for
 Promotes cooperation between Estonian universities Sharing skills and knowledge at the Estonian level 	a regionally shared ship, making the possible purchase of ship hours
 The optimal life of the research vessel and the balance of 	 Sharing of skills/knowledge limited to Estonia
administrative costs	 Setting and achieving common regional goals is more difficult than
• Estonia's stronger position on the international scientific	in the case of an internationally divided ship
scene through the achievement of common goals and a	• A lower probability of the ship's availability in unforeseen situations
unified image	in case of sudden need, but still sufficient within the borders of
	Estonia
	Nore administration activities
	Nore compromises in design activities, more complex process

SWOT analysis (Estonian universities)

Opportunities	Threats
 To balance the budget of the research vessel through the sale of free ship-hours to foreign countries Organize joint practice lessons for students Strengthen Estonia's reputation as a country that pays great attention to marine research Can design and buy a ship that fits ideal for Estonian needs To attract more foreign doctoral students to Estonia Better coordinate activities related to maritime surveillance in Estonia, create a cooperation model To establish a center of excellence for Baltic Sea marine monitoring research 	 Due to the longer location-based response time, in the event of an accident or technical failure, the risk of losing data or, in worse cases, devices People in the same fields risk doing the same investigations in different places and not sharing data Some important cooperation project or opportunity may be missed abroad In the event of a serious ship breakdown and a simultaneous lack of funds, the risk that the ship will be stopped for a longer period of time and endangers the achievement of research objectives or the money obtained from the sale of ship hours In the event that other Baltic Sea countries decide to acquire a research vessel separately from Estonia, because Estonia has one, the Estonian state isolates itself from cooperation projects of other countries



SWOT analysis (mixed financing)

	Strengths		Weaknesses
•	The ideas are realized because the current costs fit within the groups' operating costs	•	Presupposes the organization of a competition for the duration of the use of the vessel
	State tasks are completed without problems (moderate additional costs for non-participants)	•	Does not motivate the ship's crew to work hard/maintain the ship, as fixed costs are covered -
	The crew's salary is insured		the owner needs to implement performance
•	More accurate pricing due to fuel price fluctuations		metrics
	Opportunities		Threats
•	A higher proportion of ship hours and priority order in booking for the bearer of fixed costs When selling ship hours out of the circle of	•	No risks were identified for this funding scheme



SWOT analysis (SUMMARY)

	M1	M2	M3	M4
	TalTech	Estonian universities	Private company	Baltic Sea consortium
	Risks -4	Risks -2	Risks +5	Risks 0
	Procurement -	5 Procurement -3	Procurement 0	Procurement +5
F 1	Administration +2	2 Administration 0	Administration +4	Administration +4
Users	Research range (Research range+2	Research range 0	Research range +5
05015	National objectives +2	National objectives+5	National objectives 0	National objectives +2
	Eurofleets/TNA (Eurofleets/TNA +2	Eurofleets/TNA -3	Eurofleets/TNA +5
	Total Score -0.83	Total Score +0.67	Total Score +1.00	Total Score+3.50
	Risks -4	Risks -3	Risks +4	Risks +1
	Procurement -	5 Procurement -3	Procurement 0	Procurement +5
	Administration +3	Administration +1	Administration +4	Administration +4
F2	Research range (Research range +2	Research range +1	Research range +5
Mixed	National objectives +2	National objectives +5	National objectives +1	National objectives +3
	Eurofleets/TNA (Eurofleets/TNA +2	Eurofleets/TNA -3	Eurofleets/TNA +5
	Total Score -0.67	Total Score +0.67	Total Score +1.17	Total Score+3.83
	Risks -	5 Risks -4	Risks +5	Risks 0
	Procurement -	5 Procurement -3	Procurement 0	Procurement +5
50	Administration +4	Administration +2	Administration +5	Administration +4
F3	Research range (Research range +3	Research range +3	Research range +5
Government	National objectives +2	National objectives +5	National objectives +3	National objectives +2
	Eurofleets/TNA (Eurofleets/TNA +2	Eurofleets/TNA 0	Eurofleets/TNA +5
	Total Score -0.67	Total Score +0.87	Total Score +2.67	Total Score +3.50

SWOT analysis (SUMMARY)

	M1	M2	M3	M4
	TalTech	Estonian universities	Private company	Baltic Sea consortium
	Risks -4	Risks -2	Risks +5	Risks 0
	Procurement -5	Procurement -3	Procurement 0	Procurement +5
F1	Administration +2	Administration 0	Administration +4	Administration +4
llsers	Research range 0	Research range +2	Research range 0	Research range +5
03013	National objectives +2	National objectives +5	National objectives 0	National objectives +2
	Eurofleets/TNA 0	Eurofleets/TNA +2	Eurofleets/TNA -3	Eurofleets/TNA +5
	Total Score -0.83	Total Score +0.67	Total Score +1.00	Total Score +3.50
	Risks -4	Risks -3	Risks +4	Risks +1
	Procurement -5	Procurement -3	Procurement 0	Procurement +5
	Administration +3	Administration +1	Administration +4	Administration +4
F2	Research range 0	Research range +2	Research range +1	Research range +5
Mixed	National objectives +2	National objectives +5	National objectives +1	National objectives +3
	Eurofleets/TNA 0	Eurofleets/TNA +2	Eurofleets/TNA -3	Eurofleets/TNA +5
	Total Score -0.67	Total Score +0.67	Total Score +1.17	Total Score +3.83
	Risks -5	Risks -4	Risks +5	Risks 0
	Procurement -5	Procurement -3	Procurement 0	Procurement +5
	Administration +4	Administration +2	Administration +5	Administration +4
F3	Research range 0	Research range +3	Research range +3	Research range +5
Government	National objectives +2	National objectives +5	National objectives +3	National objectives +2
	Eurofleets/TNA 0	Eurofleets/TNA +2	Eurofleets/TNA 0	Eurofleets/TNA +5
	Total Score -0.67	Total Score+0.87	Total Score +2.67	Total Score +3.50

New Baltic Sea Research Vessel (designed within the Eurofleets2 project)

The intended operation area for this 35 m monohull vessel is the Baltic Sea, including the shallow coastal areas. The vessel is adapted to the use by oceanographic institutes, agencies, Universities, and the design is defined by:

- flexibility for various missions,
- good integration of latest technologies,
- very good sea keeping and good manoeuvrability,
- robust and low-maintenance construction,
- low consumption,
- very good comfort at sea.







Requirements for BRV35

The vessel has to be able to conduct multi-disciplinary research. A scenario of usage of the vessel could be specified as follows:

- Offshore and coastal hydrography and oceanographic missions (including environmental monitoring) – 40% of time,
- Biological surveys (including bird watching) 5%,
- Geological surveys 10%,
- Operating submarine systems 5%,
- Service of buoys and other systems in off-shore areas 5%,
- Transit 10%,
- Harbours 259





Main parameters of BRV35

The vessel is designed for autonomy of 12 days at sea (1200 nautical miles at speed 10 knots). The main particulars are:

- Length overall 35.0 m
- Length between perpendiculars 32.2 m
- Beam overall 8.2 m
- Design draught 2.50 m
- Depth at main deck 4.00 m
- Design speed 12 knots





New multi-purpose vesssel

Tasks:

- Deployment of navigational buoys
- Research and monitoring
- Rescue operations (oil and HNS)

It is in the budget plan, but final decision not made yet







New multi-purpose vesssel - requirements

Research requirements (agreed what could be included considering all other tasks):

- 90 days at sea
- Laboratory space 45-50 m2, one lab inside the vessel, one as a container
- Number of researchers 8
- RIB
- Sonar
- Winches (including cable)
- Room for rosette/water sampling
- A-frame for towed instruments
- Dynamical positioning
- Endurance 10 days
- Area Baltic Sea



Future options

The preferred ownership/management option is M4 – International consortium. Challanges and questions to consider:

- Consortium of Baltic Sea institutes (flag?)
- Consortium of Baltic Sea research vessel operators with their vessels of different sizes, capabilities, etc

It is not financially feasible to build a research vessel for Estonian use only (100-120 days at sea is too low number)

National fleet

- A multi-purpose vessel will be part of national fleet
- Vessels/boats available depending on the task
- Coordination (scheduling system) has to be agreed

Questions?

