

Национальная
технологическая инициатива

Пространство возможного

NTI PROJECT

Technological platform for simulation
of unmanned surface vehicle

Directions 'innovative shipbuilding',
'e-navigation', 'marinet' roadmap

Full project title: «Development of technological
platform for research in USV technologies using
computer simulation in virtual environment»

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- Crew size is decreasing
- Large modern ships can be controlled by one man on watch
- Information sources: GNSS+ECDIS, ARPA, AIS
- Control systems: Autopilot, Track Control System, Dynamic Positioning
- Information environment: VTS, e-Navigation
- Aerial and road unmanned vehicles
- International projects on unmanned surface vehicles
- National Technology Initiative (NTI) and «MariNET»



- USVs are being developed and tested right now

- Testing of unmanned ships in a real environment is risky. Serious losses may occur due to technological failures and human errors

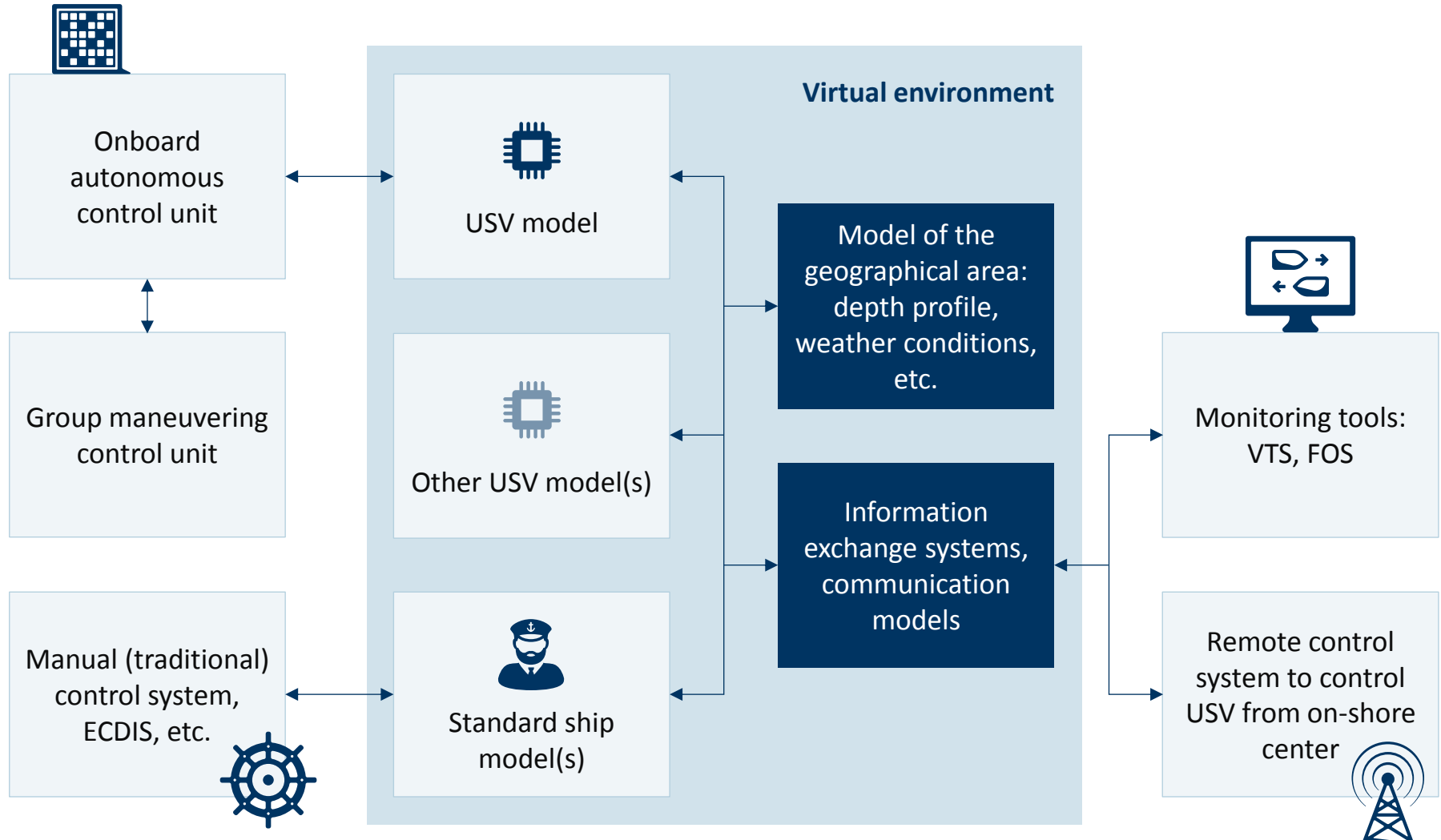
- Today, new control and automation systems (e.g. autopilots) are tested and partially validated using virtual ship simulators. Newbuilt ship projects, towing procedures and port design are also usually tested using computer simulation

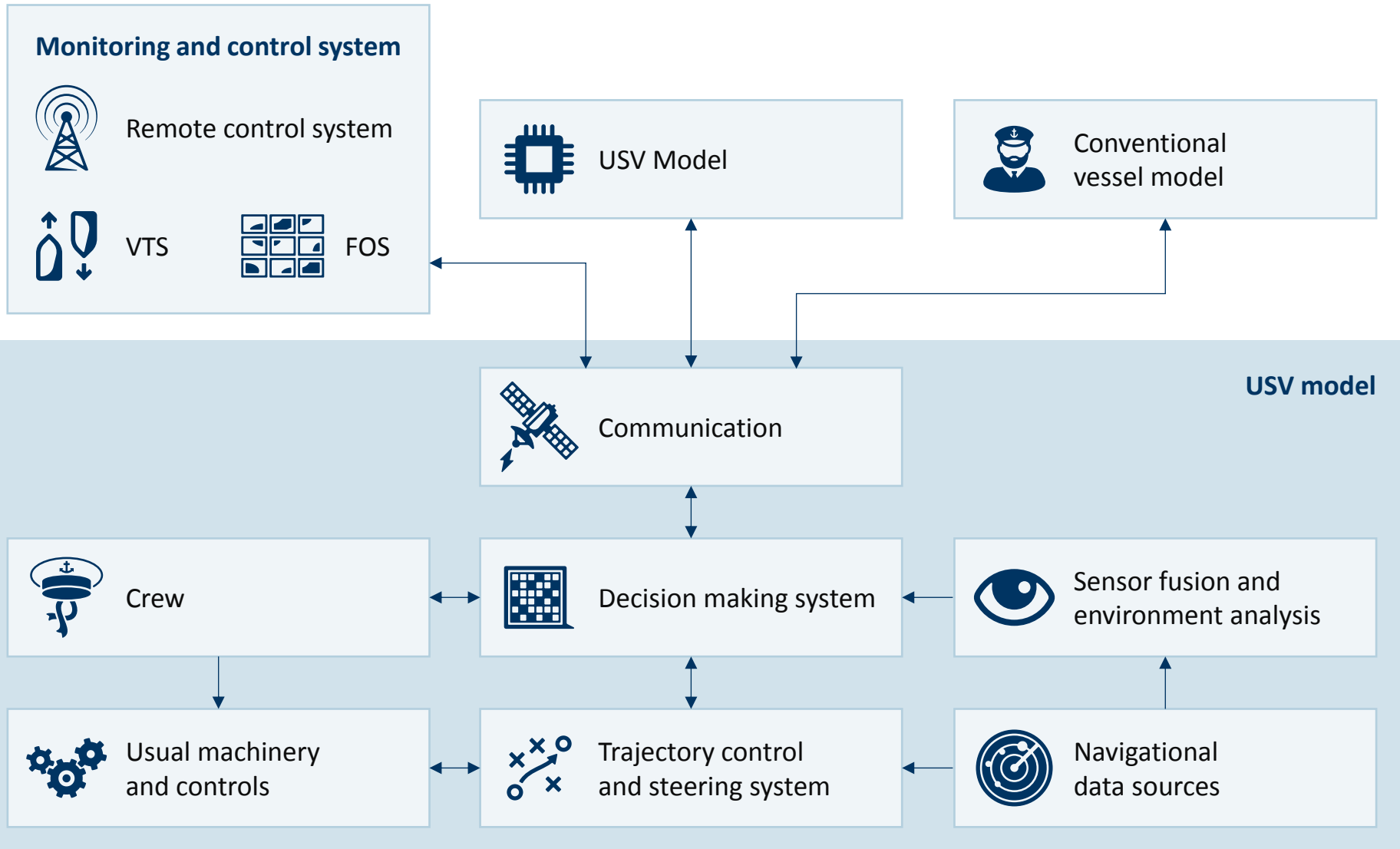
- One of the most important aspects of ship handling and control is interaction between the vessel and other ships, as well as VTS and other traffic stakeholders

- Therefore, it is essential to test autonomous ship control technologies in a safe and fully controllable environment, including:
 - autonomous maneuvering
 - remote control procedures
 - group maneuvering and collision avoidance
 - traffic control in ports and other highly occupied waterways

- Develop Software and test bench for USV technologies applications
- Define a typical USV architecture and simulated models of all major subsystems
- Develop and test recommended patterns for USV maneuvers
- Prepare recommendations of trial procedures and commercial exploitation
- Recommend changes in regulations









Transas



Moscow Aviation Institute



Admiral Makarov State
University of Maritime
and Inland Shipping

1

USV modeling environment and USV model used by:

- engineers and researchers during development of USV components and control systems
- USV operators during their training

Effectiveness: decrease costs of development and training at least by 2–3 times.

2

Results of typical maneuvers simulation and exploitation recommendations used by:

- engineers and researchers during USV specification development
- QA services and classification societies during USV acceptance tests
- USV operators for usage plans and training programs

Effectiveness: decrease costs of development, acceptance tests and sea trials at least by 2-3 times.

3

Recommendations on changes in regulations used by:

- authorities during regulations preparation and enforcement
- engineers and researchers during USV specification development
- investors during risk assessment

Effectiveness: decrease of uncertainty in assessing legal risks to a level acceptable for commercial investment (for example, fully automated collision avoidance system is illegal at the moment, and therefore such investments are very risky).

Users who already confirmed their interest in project's results: Krylov State Research Centre, Admiral Nevelskoy Maritime State University, Admiral Ushakov Maritime State University

- The market of USVs, its components, service and classification is now developing fast. **Tools for research, development, testing and classification of USVs and its components will be necessary for all players in this new market.**

- After project completion the platform will allow to enter the market of large **maritime autonomous surface vehicles.**

- According to the MariNET roadmap, **unmanned vehicles development, being a part of innovative shipbuilding and e-Navigation program, have a significant export potential.**
Indirect effect: national access to USVs market, use of USVs in national shipping companies due to faster development of related standards and regulations.

- **The project will lead to the development of technological platform, which will be used for commercial systems, which will bring immediate economical effect.**

Thank you for your attention

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