

# **OBJECT-EVOLUTIONARY MODEL OF THE SYSTEM FOR MONITORING THE WATER ENVIRONMENT HYDROPHYSICAL FIELDS**

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# The problem relevance

- The world ocean has a huge impact on the planet life. The development and rational use the resources and spaces of the world's oceans are the most important priorities public policy, not only at present, but also in the future. The relevance of these problems is increasing due to the increasing role the world ocean as the most promising area of economic activity.
  - In this regard, there is a task constantly tracking the state water basins, monitoring and analyzing their main parameters. The main characteristics of water environments are quite heterogeneous in depth, dynamic and have a probabilistic character. The the water environment experimental reseach is associated with the implementation of expensive expeditions, the main costs which relate to the research stage. In this situation, the task of developing a computerized system for monitoring inhomogeneities of hydrophysical fields in the water environment is urgent, since they are the ones that introduce to the dynamics and instability.
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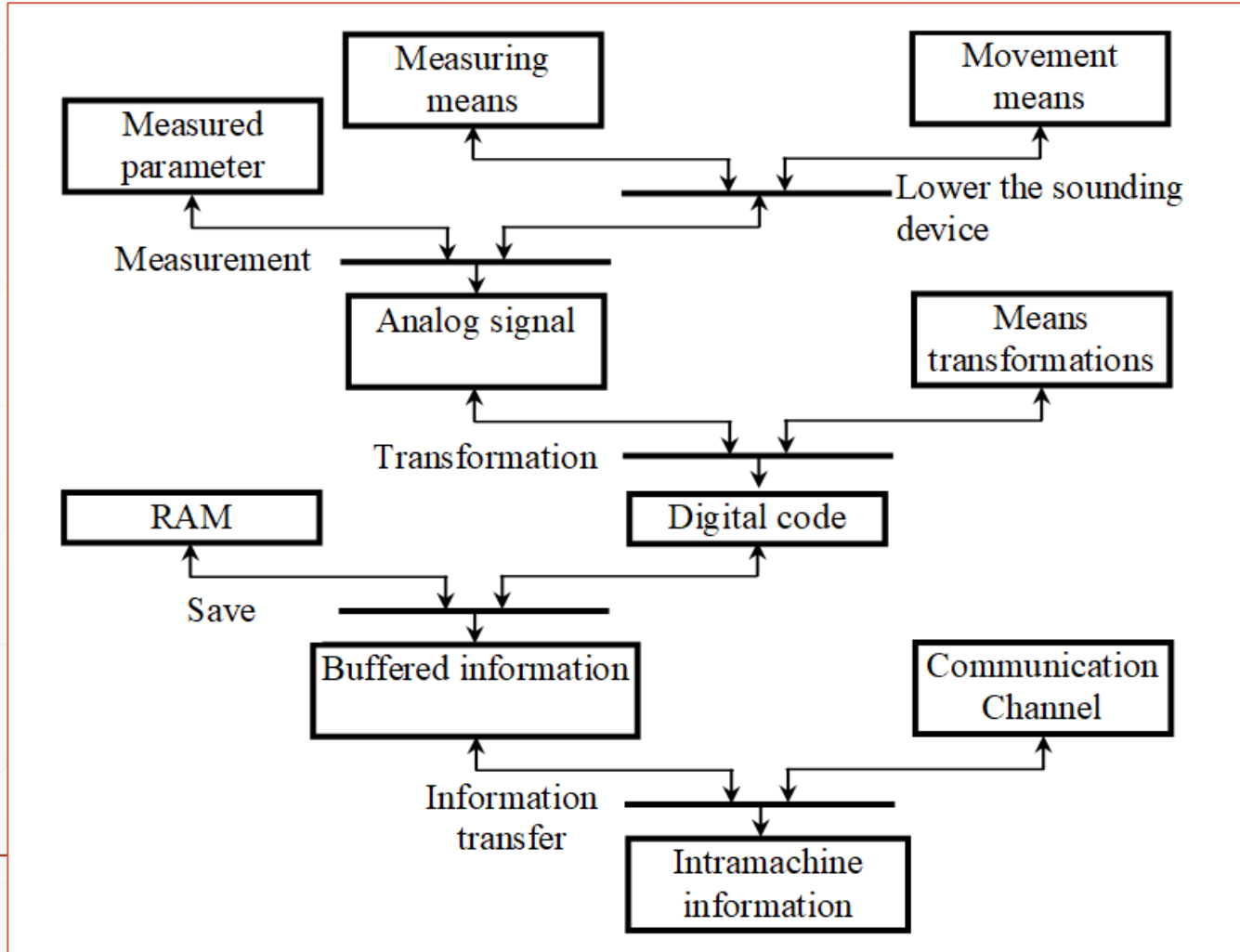
# Problem statement

- The main part the monitoring system configuration includes:
    - inertia-free measuring channels (speed, pressure, electrical conductivity);
    - analog-to-digital Converter;
    - cable-rope or radio channel;
    - computer complex of the system onboard part.
  - The equipment of the system variation part includes:
    - the most inertial measurement channels. as a rule, these are temperature channels for which it is possible to vary their number and time constants;
    - analog multiplexer whose number of inputs is determined by the selected number all measurement channels;
    - RAM that determines the intermediate buffer amount for storing transmitted information blocks;
    - a controlled motor providing regulation the speed of sensing.
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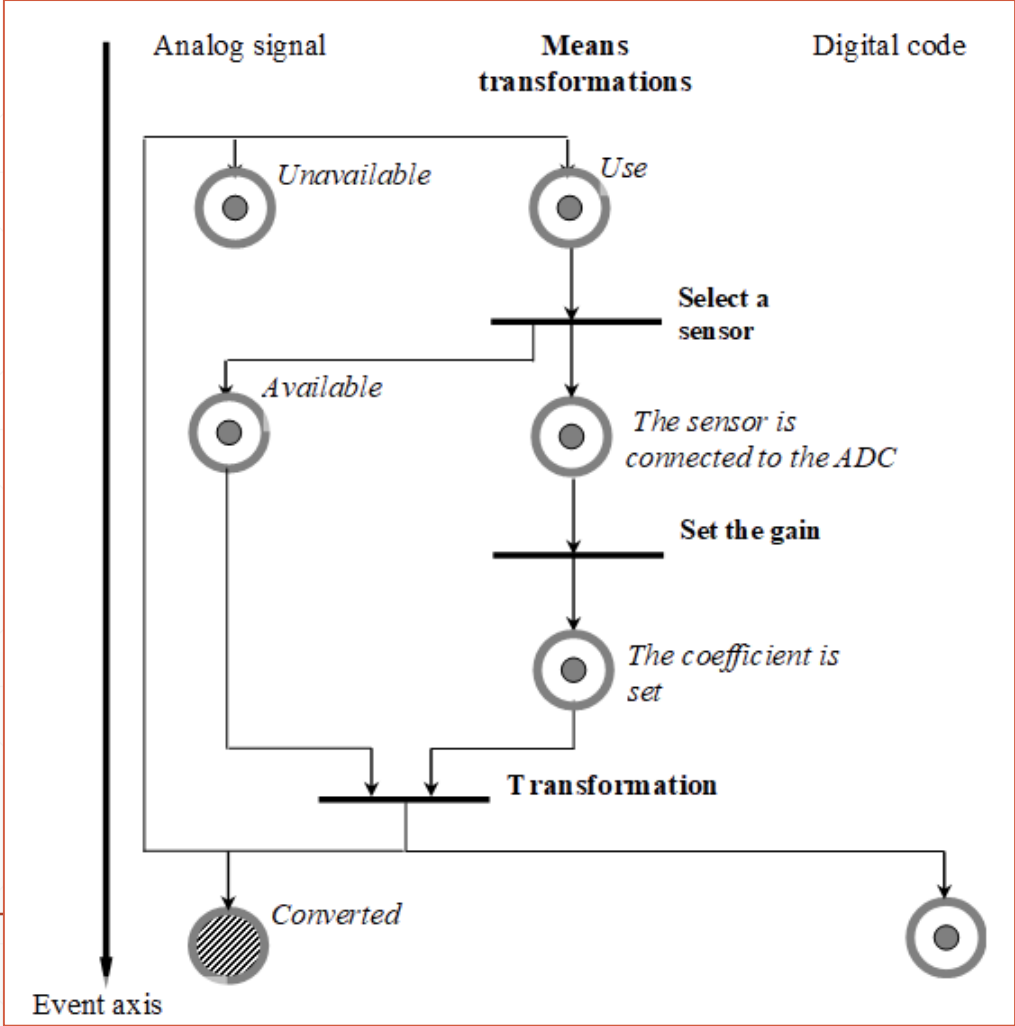
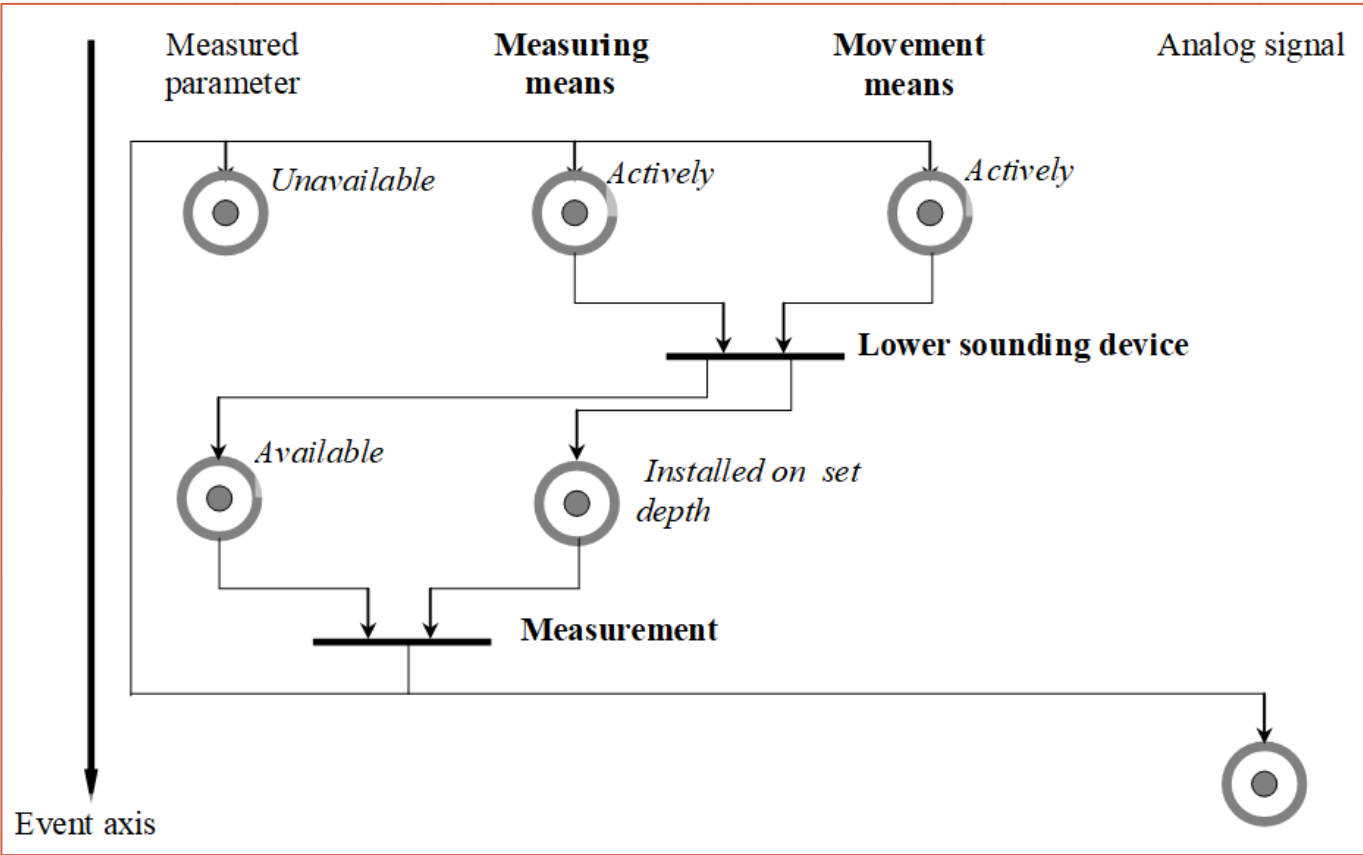
# Research result

- To develop the model, the decomposition of process monitoring the water environment hydrophysical parameters was performed.
  - The monitoring process involves providing vertical sensing of the water environment to a certain specified depth. As a result of which the required hydrophysical parameters are measured, converted to digital form, transmitted via a communication channel to a computing device. Then the received information processed and forming new records in the experiment database.
  - Vertical sensing - lowering of measuring devices-is performed at a constant or variable speed using a motor. Measurement of hydrophysical parameters is performed by analog sensors connected via an analog multiplexer to an analog-to-digital Converter to obtain a digital code. Before data is transmitted, it is buffered in the RAM.
  - Transmitters and a communication channel are involved in data transmission. Processing of information arrays and creating records in the database is implemented using a software module on a computing device.
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# Model evolution of information and measurement system objects



# Models of the interaction



# Conclusions

- 1. The monitoring system's structural elements are highlighted, the parameters of which affect the performance the measurement process with the specified accuracy and speed;
  - 2. We have developed an object model and a model the objects' evolution of the information measuring system for monitoring inhomogeneities of the water environment hydrophysical fields, the "trunk" of which is the process of converting information from a physical measured value to a data file;
  - 3. On the basis of these models, models actions and behavior of object instances are formed that allow to describe the functioning the system with help the object-oriented design language ;
  - 4. Developed class diagram, object model, software implementation allowed to define the structure information-measuring monitoring system inhomogeneities of the aquatic environmen hydrophysical parameters.
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