SIMULATION VERTICAL SENSING OF THE WATER ENVIRONMENT HYDROPHYSICAL FIELDS

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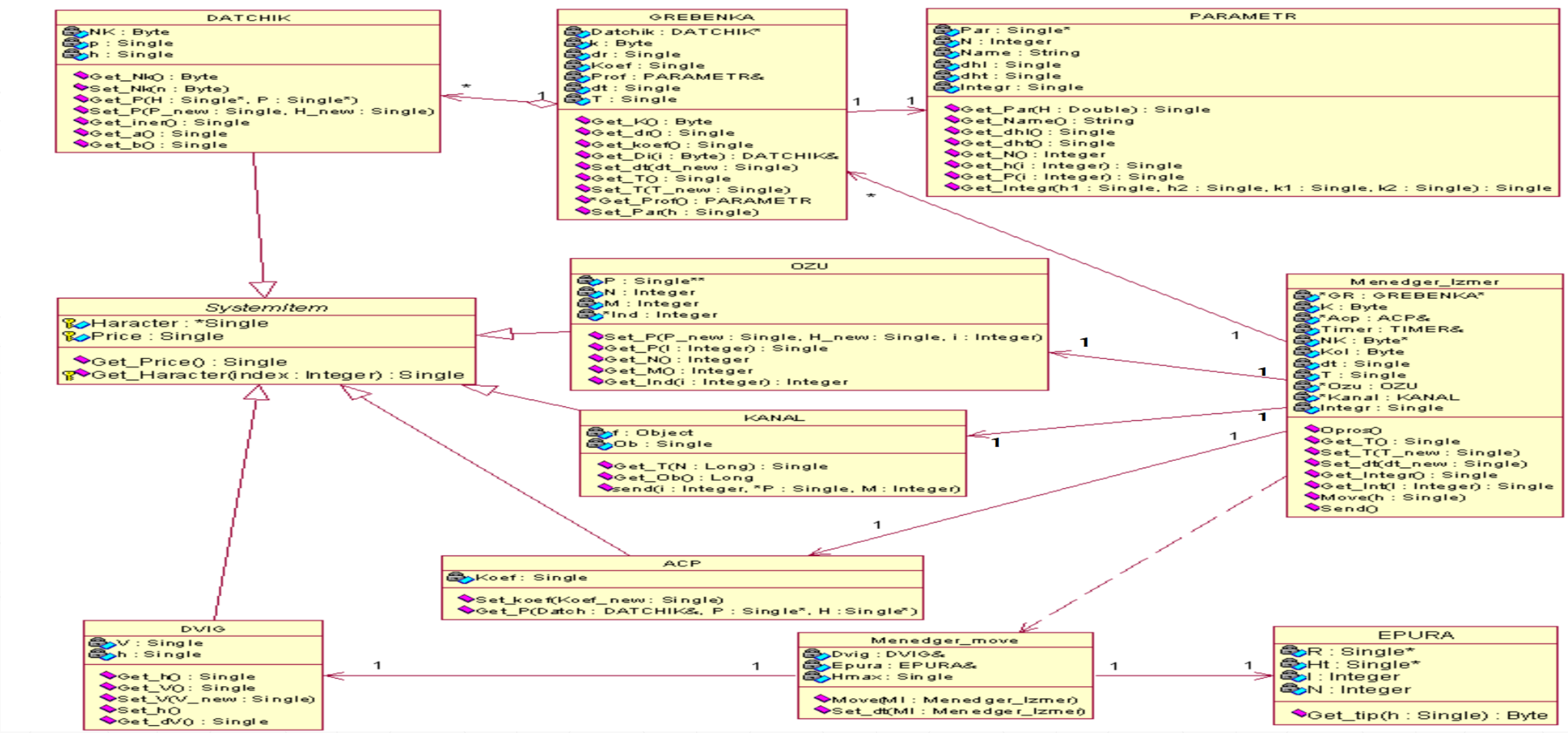
The problem relevance

- In modern Oceanography, the main research tools are automated systems for collecting, transmitting, processing, and storing observations. According to the methods of application, the systems are divided into vertical-sounding, horizontal-sounding and placed on underwater vehicles, buoys. However, for the most part, they are necessarily equipped with channels for measuring the main hydrophysical parameters – temperature, specific or relative electrical conductivity, speed and hydrophysical pressure.
- The most urgent task is not just to perform measurements, but to obtain information about changes in hydrophysical fields to areas of the water environment characterized by the presence of turbulent disturbances. Therefore, it is necessary that information and measurement systems allow measurements to be made with the required spatial and temporal resolution.

Problem statement

- The article “OBJECT-EVOLUTIONARY MODEL OF THE SYSTEM FOR MONITORING THE WATER ENVIRONMENT HYDROPHYSICAL FIELDS ” proposes an object evolutionary model of the measuring system for monitoring the hydrophysical parameters the aquatic environment, which includes all necessary elements for system’s realization and hierarchical transformation of information from the measured value to the intramachine information:
  - Movement Means;
  - Measuring Means;
  - Means Transformations;
  - RAM;
  - Communication Channel
- The purpose of this work is to develop a class diagram based on this model and an algorithm for simulating the vertical sensing process, which will allow us to develop the basics of structural and algorithmic organization of information and measurement monitoring systems.

Diagram of classes of information and measurement monitoring system



Research result

- To determine the optimal structure of the measurement system, it is necessary to: set a criterion for the effectiveness of the system; perform a simulation of the measurement process in order to obtain the values of the efficiency criterion; compare the characteristics of various system's structures.
- Simulation the measurement process consists of the following sequence of actions:
  - Step 1. Initialization of parameters all structural elements of the system
  - Step 2. Sensor polling cycle
  - Step 3. Moving sensors using the engine by depth is implemented by the Move function the Menedger_Move class
  - Step 4. Steps 2 and 3 are repeated until the specified sounding depth is reached.
  - Step 5. Determination of the experiment time and measurement error.

Conclusions

- Based on the object-evolutionary model the information-measuring system described in the article, a class diagram has been developed that contains a description all objects that determine the structure such a system.
- Additional control classes are proposed to describe the interaction objects and simulate the sensing process.
- An algorithm for imitation modeling vertical sounding of the aquatic environment is proposed.
- Thus, an interrelated description the information system has been obtained, which makes it possible to compare various configurations of monitoring systems.