

Design Concepts of Complex Information Processing Systems with Data from Many Different-Type Sources Located at One or Several Mobile Platforms

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Abstract—This study deals with design concepts of a complex information processing system with data from many different-type sources located at one or several mobile platforms. Approaches to the selection of CIPS structure and its hardware implementation were proposed. Optimization criteria were discussed for solving the main functional tasks of the system engaged in data acquisition and integration from information sources, target distribution and the delivery of target designation to users on shipboard.

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A range of tasks solved by the ship automatic control systems (ACS) is sufficiently large. The tasks of data reception and processing from numerous different-type sources are most important for all combat information and control systems.

The complex information processing systems (CIPS) under consideration tackles the problems related to the provision of acquisition and processing of different-type and different-accuracy information supplied from the sources with different periodicity for the purpose of its identification, integration, and the generation of data of target designation for the integrated complexes and systems [1].

CIPS is an automatic control system that is implemented on the basis of applying the information technologies in the form of successively linked information functions and tasks that are executed in automatic or interactive (with participation of an operator) mode [2].

In terms of its functional tasks CIPS can be represented by the following basic functional subsystems:

- subsystem of external data exchange;
- subsystem of data acquisition and processing from sources for generating the information model of the situation in the zone of responsibility;
- subsystem of target distribution and the delivery of target designation data to users;
- subsystem of the display and input of control commands.

The crucial requirement to CIPS is the solution of functional tasks in real time (soft mode). That is why the selection and validation of the software and hardware structure for its implementation are important in creating CIPS [3].

The system in question is integrated and intended for solving the tasks that involve the use of information from many sources located at one mobile platform (ship). In addition such system provides for the use of information from several distributed in space remote sources (aerial or ship-borne).

FUNCTIONAL BLOCK DIAGRAM OF CIPS

The functional block diagram of CIPS is presented in Fig. 1.

The functional subsystem of external data exchange consists of the following items:

- subsystem of the interface with information sources (IS);
- subsystem of the interface with data users (blocks of interface with target handling complexes (HC) and external systems—data users).

The information sources can be both intrinsic sources and self-contained sources (such as other ships of the group, remote aerial sources, etc.).