Optimization of the Quality of Information Support for Consumers of Cooperative Surveillance Systems

Ivan Obod, Iryna Svyd, Oleksandr Maltsev, Oleksandr Vorgul, Galyna Maistrenko, and Ganna Zavolodko

Abstract The paper discusses the place and the role of cooperative airspace surveillance systems in the information support of airspace use and air traffic control systems. A brief description of the signals used in the considering systems is given. Based on the presentation of cooperative surveillance systems as two-channel data transmission systems, the statistical interpretation of consumer data transmission is considered and it is shown that the probability of information support can be an integral quality indicator of consumers information support in the considered systems. That is defined as the product of the probability of detecting the request signals by the aircraft responder, aircraft responder availability factor, probability of detection of an air object by the requester, the probability of correct reception of on-board information and the probability of combining the flight and coordinate information. The variants for optimization each of the components of these probabilities are considered. The optimization issues of measurement parameters of signals in cooperative observation systems, which determine the probability of combining flight and coordinate information, are also considered.

Keywords Traffic control · Cooperative surveillance systems · Secondary surveillance radar · Automatic dependent surveillance · Multilateration · Wide area multilateration · Air object

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I. Obod · I. Svyd (✉) · O. Maltsev · O. Vorgul · G. Maistrenko
Kharkiv National University of Radio Electronics, Nauky Ave. 14, 61166 Kharkiv, Ukraine
e-mail: iryna.svyd@nure.ua

G. Zavolodko
National Technical University "KhPI", Kyrpychova Str. 2, 61002 Kharkiv, Ukraine

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threshold in accordance with rule (36). Likewise, for the optimal estimate (30) to be achieved, the likelihood ratio value must be sent from the detector to the measuring device.

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