Frequency Efficiency Evaluation of Query Airspace Surveillance Systems

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***Abstract*—In this work, there was carried out an evaluation of frequency efficiency of both the interrogation signal channel and the response signal channel in case of intra-system and intentional (correlated and uncorrelated), as well as fluctuation interference. The evaluation based on the representation of interrogation radar systems for observing airspace in the form of two-channel systems for transmitting information of interrogation signals and response signals. It is shown that the use of interrogation signals and response signals in the form of an interval-time and positional code leads to the need for a significant receiving path bandwidth expansion of both the aircraft transponder and the interrogating radar system as a whole. This caused by the requirements for obtaining sharp edges of the received signals, which is necessary for decoding them and leads to a significant decrease in the frequency efficiency of the considered information systems and, as a consequence, to a decrease in the noise immunity of both the request channel and the response channel of the considered information systems.**

Keywords—Airspace control systems; air traffic control; secondary surveillance radar; identification friend or foe; request signal.

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