Quality Assessment of Measuring the Coordinates of Airborne Objects with a Secondary Surveillance Radar

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Abstract. Based on a brief review of the place and role of Secondary Surveillance Radar (SSR) in the information support of airspace control and air traffic control systems, it is shown that the principle of constructing aircraft responders and SSRs as a whole predetermined the low quality of information support for the systems under consideration under the influence of intrasystem and deliberate interference. A brief description of the tasks solved by the considered information tools is given, as well as quality of information support integral indicator, the quality of which can be the probability of information support, which is defined as the product of the probability of detecting the airborne object of the requester, the probability of correctly receiving on-board information and the probability of combining flight and coordinate information. The effect of deliberate and unintended (impulse and fluctuation) interference on the quality of the assessment of measuring the range and azimuth of an air object by the considered information tool is evaluated. Based on the assessment of the influence of destabilizing factors, it is shown that in order to obtain higher accuracy in the range and azimuth measuring in the SSR, it is necessary to ensure a responder availability coefficient close to unity and high probabilities of detecting single pulses of response signals. It is shown that improving the quality of SSR information support can be achieved by searching for methods to reduce the influence of intentional and unintentional interference on the aircraft responder readiness coefficient, which is possible by changing the principle of service of request signals.

Keywords: Secondary Surveillance Radar, Primary Surveillance Radar, Request Signal, Aircraft Responder, Air Object.

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