Optimizing the Request Signals Detection of Aircraft Secondary Radar System Transponders

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***Abstract*—In the presented work, based on the Neyman-Pearson criterion, the optimal structure for detecting request signals in an aircraft responder of the SSR (IFF) system is synthesized, in which the optimization of the detection of signaling information is carried out not only in time, but also in the spatial parameters of the received request signals, and also takes into account the relative throughput of the aircraft responder. It is shown that the interchannel fusion of the results of detection of the component pulses of the request signal is more preferable in comparison with the existing algorithm for merging the results of the detection of the request signal, since it allows to improve the quality of detection of the request signals and somewhat reduce the dependence of the probability of detecting the request signal on the relative throughput of the aircraft responder.**

Keywords—Secondary Surveillance Radar (SSR), Identification Friend or Foe (IFF), Aircraft Transponder (AT), Request Signal (RS).

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