

Fusion Method of Primary Surveillance Radar Data and IFF systems Data

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Abstract—In this article, based on the Bayesian approach, the Primary Surveillance Radar (PSR) and Identification Friend or Foe (IFF) systems data fusion model is proposed and investigated for the case, where the uncertainty volume of PSR and IFF systems are the same, as well as for the case, where the uncertainty volume of IFF systems significantly exceeds the PSR uncertainty volume and several air object are in the IFF systems uncertainty volume. It is shown that for the second case, the identification process has three phases: the detection and measurement of air object (AO) coordinates, AO selection and AO binding to target designation, which includes fusing the AO coordinates determined by the PSR and IFF systems, followed by identification of the detected AO. Each of the phases can be random in nature and can be described by numerical parameters: the probability of measuring the trait by which it will be selected; the probability of selection, which characterizes the ability of IFF systems to classify AOs as "Friend" and "Foe" according to a measured score; the likelihood of correctly linking the "Friend and Foe" score to target designation.

Keywords—air object (AO); Primary Surveillance Radar (PSR); IFF; Information Security; aircraft responder (AR).

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