

Double Layer Security Model for Identification Friend or Foe

Authors : Buse T. Aydın, Enver Ozdemir

Abstract : In this study, a double layer authentication scheme between the aircraft and the Air Traffic Control (ATC) tower is designed to prevent any unauthorized aircraft from introducing themselves as friends. The method is a combination of classical cryptographic methods and new generation physical layers. The first layer has employed the embedded key of the aircraft. The embedded key is assumed to be installed during the construction of the utility. The other layer is a physical attribute (flight path, distance, etc.) between the aircraft and the ATC tower. We create a mathematical model so that two layers' information is employed and an aircraft is authenticated as a friend or foe according to the accuracy of the results of the model. The results of the aircraft are compared with the results of the ATC tower and if the values found by the aircraft and ATC tower match within a certain error margin, we mark the aircraft as a friend. In this method, even if the embedded key is captured by the enemy aircraft, without the information of the second layer, the enemy can easily be determined. Overall, in this work, we present a more reliable system by adding a physical layer in the authentication process.

Keywords : ADS-B, communication with physical layer security, cryptography, identification friend or foe

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020