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AN INERTIAL GUIDANCE BASED LOCALIZATION TECHNOLOGY FOR AEROCRAFT DATA
LOGGER RECOVERY

Abstract

Data logger recovery has attracted more and more attention in these years. In fact, data logger can record the various parameters of aircraft which are quite important for mastering the states, analyzing the malfunctions and finally ameliorating the design. The one of difficulties for data logger recovery lies in the localization technology. At present, Global Positioning System (GPS) is widely adopted for the recovery of data logger. However, rigid demands on position and velocity are required by this localization method. Additional information will also be expended for tracking the data logger. Therefore, the autonomy and the reliability of this localization method are limited. An inertial guidance based localization technology is proposed for the recovery of data logger in this paper. Firstly, the popular satellite positioning technology and inertial guidance technology are investigated by taking into account the cost, technical difficulties, volume and other aspects. Then, the composition and principle of an innovative data logger recovery system is briefly introduced. GPS and BeiDou Navigation Satellite System (BDS) are employed at the same time in order to extend the time of receiving satellite signal and improve the reliability of this innovative recovery system. Inertial guidance is added as a supplementary means to further increase the autonomy and accuracy of localization. The attitude and the velocity information of data logger received from GPS and BDS are used as initial data of the inertial guidance module. Then a cosine-strapdown algorithm is employed to calculate the attitude and the velocity information of data logger in real time. The whole calculation process depends no longer on the outside information and the system autonomy is obviously improved.