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# The Enhancement of Target Localization Using Ship-Borne Electro-Optical Stabilized Platform

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**Abstract :** Electro-optical (EO) stabilized platforms have been widely used for surveillance and reconnaissance on various types of vehicles, from surface ships to unmanned air vehicles (UAVs). EO stabilized platforms usually consist of an assembly of structure, bearings, and motors called gimbals in which a gyroscope is installed. EO elements such as a CCD camera and IR camera, are mounted to a gimbal, which has a range of motion in elevation and azimuth and can designate and track a target. In addition, a laser range finder (LRF) can be added to the gimbal in order to acquire the precise slant range from the platform to the target. Recently, a versatile functionality of target localization is needed in order to cooperate with the weapon systems that are mounted on the same platform. The target information, such as its location or velocity, needed to be more accurate. The accuracy of the target information depends on diverse component errors and alignment errors of each component. Specially, the type of moving platform can affect the accuracy of the target information. In the case of flying platforms, or UAVs, the target location error can be increased with altitude so it is important to measure altitude as precisely as possible. In the case of surface ships, target location error can be increased with obliqueness of the elevation angle of the gimbal since the altitude of the EO stabilized platform is supposed to be relatively low. The farther the slant ranges from the surface ship to the target, the more extreme the obliqueness of the elevation angle. This can hamper the precise acquisition of the target information. So far, there have been many studies on EO stabilized platforms of flying vehicles. However, few researchers have focused on ship-borne EO stabilized platforms of the surface ship. In this paper, we deal with a target localization method when an EO stabilized platform is located on the mast of a surface ship. Especially, we need to overcome the limitation caused by the obliqueness of the elevation angle of the gimbal. We introduce a well-known approach for target localization using Unscented Kalman Filter (UKF) and present the problem definition showing the above-mentioned limitation. Finally, we want to show the effectiveness of the approach that will be demonstrated through computer simulations.

**Keywords :** target localization, ship-borne electro-optical stabilized platform, unscented kalman filter
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