Paper ID: 20271
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SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Joint session on Dual Use (civil and military) Aspects of Telecommunications and GNSS (7)

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MITIGATING AIS SPOOFING AND ENVIRONMENTAL DESTRUCTION BY VESSELS IN THE ARCTIC THROUGH OPEN-SOURCED SITUATIONAL AWARENESS AND COMMUNITY MONITORING

Abstract

The drastic climactically driven change in Arctic ice coverage now underway, is allowing the increasing operation by shipping, tourism, and resource extraction actors. With these new vectors come the prospect of environmental degradation of delicate and pristine ecosystems. Vessel operators seeking to illegally dump wastes and harvest mineral and biological resources, possess the technological means to defeat, or "spoof", the automatic identification and location system (AIS) required onboard sea going ships. The ability for operators to avoid AIS detection and tracking in order to engage in illegal acts deleterious to the natural environment has damaging and wide ranging sociopolitical results that are directly felt by native and local populations. The coastal environment of the horn of Africa, long ravaged by ships both poaching and dumping toxic waste, is illustrative of what can take place in remote areas that are increasingly accessible to international vessels. Effects such as the depletion of natural resources and damage to traditional ways of life have often led to a new industry in such areas, especially piracy. To avoid the potentiality of such a future for the Arctic, new methods are needed. Presented in this paper are novel ways in which individuals and communities in the far north can use combinations of tools such as mobile devices, new AIS pico and cube satellite networks, and Google Earth, augmented with higher resolution SAR imagery layers, for the purpose of verifying AIS reporting accuracy and identifying potential spoofing and its associated illegal actions. By using the described methodology of an ad-hoc network of such newly combined and empowered sensor and data imagery resources, legal chain of responsibility can be established and criminal damage to the Arctic can be mitigated as a result. The conclusions drawn in this paper, through an examination of substantive technical material, show novel ways in which individuals and communities in the Arctic can employ new mobile technology and satellite based sensing to limit the harmful effects of increased arctic shipping and associated illegal activity based on AIS spoofing.