
UCL Research Project 611: Investigation of a Wireless Based Passive Radar System for Marine Surveillance

Notice to all Shipowners, Certifying Authorities, Shipbuilders, Shiprepairers, Ship Masters, Surveyors and Consultants

This MIN expires 15 January 2011

Summary

This study has considered the feasibility of providing maritime radar surveillance services using a passive system based on WiMAX transmissions. The study was based on the three main strands of work below:

Marine Surveillance Requirements Assessment

WiMAX Radar Technical Performance Assessment

Cost/Benefit

1. Introduction/Background

1.1 Conventional active radar is widely used for marine surveillance both on shore and on vessels. Although performance of these systems is generally good there are both coverage and cost limitations. Coverage is limited by site and equipment availability as well as some technical limitations causing blind areas. Equipment procurement and deployment costs can be high and current spectrum management legislation may mean significant increases in licensing costs of active systems in the near future.

Passive radar is a complementary radio frequency (RF) sensing technique which could potentially expand coverage while introducing significant cost savings. Passive radar can be defined as a sensor system relying on opportunistic transmissions to enable target detection using a receiver and appropriate signal processing software. This technique therefore eliminates costs associated with the transmitter, including licensing fees, and could potentially be deployed where no active systems exist.

1.2 UCL has been carrying out research into passive radar for several years. These systems can be based on a number of potential transmission sources such as High Frequency (HF) and digital radio. More recently the rapid roll out of wireless technology has created a large and increasing new base of passive radar transmission sources to be exploited

2. Conclusions/Recommendations

2.1 The main conclusion of this study is that passive systems show sufficient promise for maritime surveillance applications to warrant further investigation. Recommendations for further study are as follows:

A more detailed analysis and simulation of passive radar performance taking into account interference, clutter and propagation issues.

Examination of the possibility of using other transmitters of opportunity such as FM and DAB which are already widely deployed.

A field campaign of experimental measurements using a passive receiver system to verify marine target detection capability. This could be carried out at an existing VTS radar site.

Build of a prototype system for longer term trials alongside existing active VTS radar systems.

3. Project Output

3.1 A full report and executive summary can be downloaded from the MCA website:

Full Report: <http://www.mcga.gov.uk/c4mca/mcga07-home/aboutus/mcga-aboutus-whatwedo/mcga-aboutus-research2/navsafetyfinalreports.htm>

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