go2signals

PROCITEC®
HOUSE OF SIGNALS

CASE STUDY 401 V2.1
GO2MONITOR-ALERT IN MARITIME SECURITY OPERATIONS

INTRODUCTION

Maritime Security Operations (MSO) are defined as the actions of naval forces to combat sea-based terrorism and other illegal activities such as hijacking, piracy, human & drug trafficking.

This Case Study explores the use of the go2MONITOR-ALERT Electronic Surveillance (ES) software-application to automatically detect, classify & report satellite telephone ('satphone') activations, digital-speech ‚walkie-talkies', maritime distress beacons and other priority 'Signals-Of-Interest' (SOIs) encountered during MSOs.

The capability is designed for use in Offshore Patrol Vessels (OPVs) & Fast Patrol Boats (FPBs) to enable ES-derived Indications & Warnings (I&W) for real-time Situational Awareness (SA) in the maritime & littoral space. The capability can be considered a force-multiplier for proximity-detection & threat-warning of detected SOIs being transmitted from persons aboard Vessels-Of-Interest (VOI) or ashore at close-proximity to the OPV or FPB.

OPV mainmast showing V/UHF communications & intercept antennas

Project DORNHAI Field-Trials – target emitters deployed offshore

PROJECT DORNHAI

At customer-request, Project DORNHAI is PROCITEC's capability development initiative to enable go2MONITOR-derived "no warrant required" Indications & Warnings in the maritime & littoral space for FPBs, OPVs & other Minor War Vessels (MWVs).

The DORNHAI Phase-2 Field Trial was completed successfully in the Baltic Sea in 2020. Range-testing was achieved by the automatic intercept of target satphone uplinks & Point-To-Point V/UHF digital-speech emissions (& other lawful Signals-Of-Opportunity). With only a low-sensitivity wideband receiver & an intercept antenna elevation of just 4.5 Meters, satphone uplink activations were nevertheless automatically detected & classified at operationally viable ranges, delivering credible results for development of real-time I&W for SA during Maritime Security Operations.

These positive operational outcomes & resultant customer-feedback led to our development of go2MONITOR-ALERT.

THE NEED

Adversarial & criminal use of satellite telephones & Push-To-Talk (PTT) digital-speech handheld 'walkie-talkies' is increasing in the maritime & littoral space around the globe.

Patrol Vessels can enhance their Situational Awareness by using go2MONITOR-ALERT to deliver Electronic-Surveillance derived Indications & Warnings of these satphone & digital-speech activations.

Vessel-Of-Interest at-speed – (East African littoral)

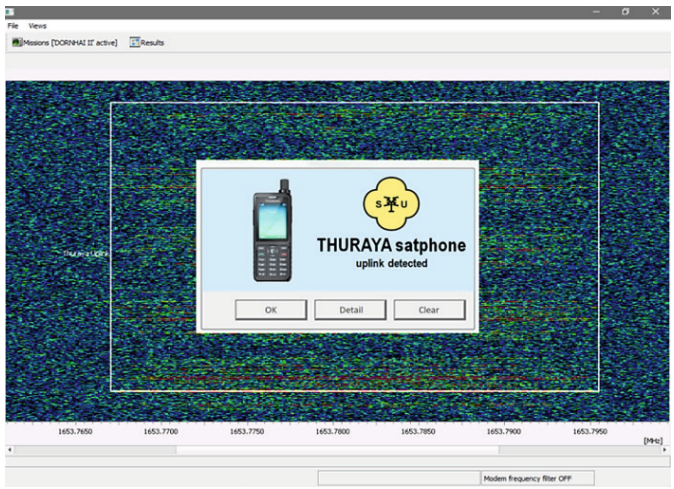
THE CAPABILITY

Using 3rd-party low-Cost low-SWaP wideband receivers & operating fully automatically from the OPV or FPB, the go2MONITOR-ALERT software package processes the radio-spectrum and reports digital & analogue signal protocols encountered therein, including (but not limited to) satphone activations, digital-speech ‚walkie-talkies', emergency locator-beacons (e.g. COSPAS-SARSAT), &, optionally, aircraft voice/data downlinks.

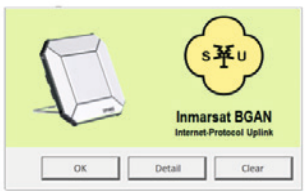
THE KIT

The image above shows the DORNHAI trial/prototype system dismounted from its host patrol boat.

The DORNHAI app is running live on a Getac B300 fully rugged & water-resistant notebook with sunlight-readable display (the 3rd-party proprietary Low-SWaP wideband receiver is located behind the notebook's lid & powered via USB).



DORNHAI GUI showing alert on detected Thuraya satphone activation / other alert examples (below)



INTERCEPT RANGES

OPV & FPB-borne go2MONITOR-ALERT intercept ranges will vary, depending on a number of factors including (but not limited to) ambient weather conditions, sea-state, signal-type & frequency, host-sensor/receiver sensitivity & intercept-antenna height.

For example, a satphone handset's uplink activation can be automatically detected, classified & reported ('prosecuted') at operationally viable ranges, whilst digital Professional Mobile Radio (PMR) emissions can be prosecuted at ranges >10 nautical miles (i.e. Over-The-Horizon) from the OPV or FPB.

In the absence of surface-search RADAR, any Over-The-Horizon detection of the go2MONITOR-ALERT Mission-Plan's tasked SOIs would act as a 'first warner' of activity to the OPV's on-watch team or FPB crew during deployed operations.

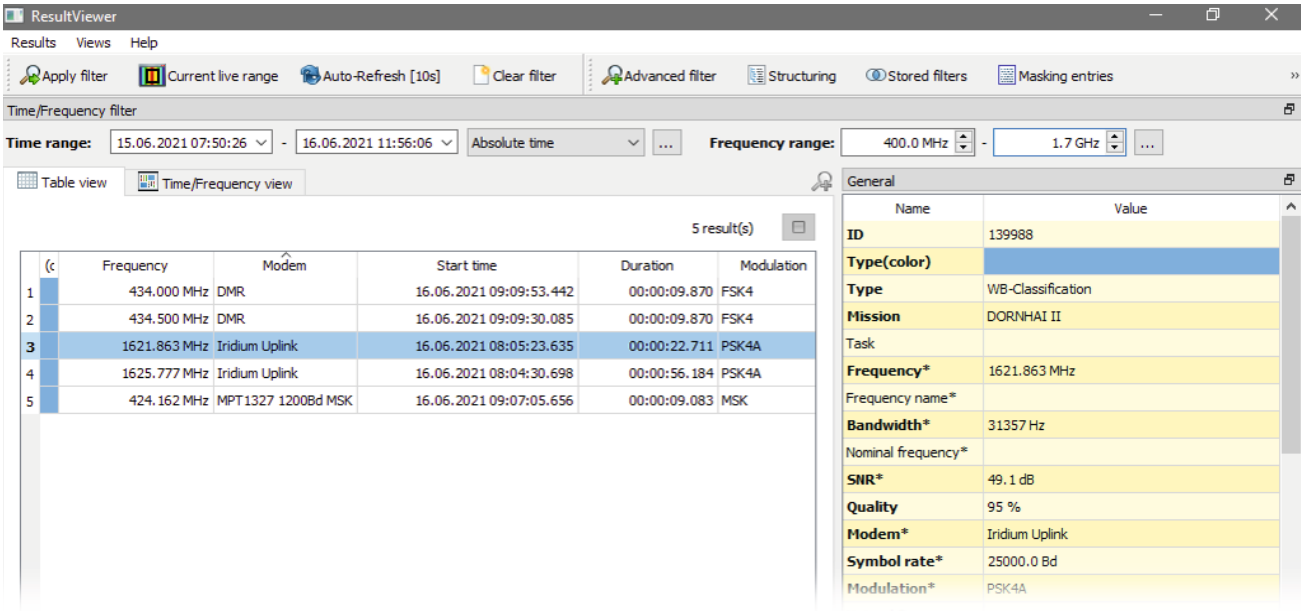
Mainmast with antennas on Offshore Patrol Vessel

OPV at-anchor (Indian Ocean)

RESULTS DATABASE

The optional 'ResultViewer' smart-database archives all detected signals' classification results for 'post facto' offline Traffic & Network Analysis by the ship's company or real-echelon analysis cells.

These results can be managed locally or exported via physical media or wireless means to rear-echelon units for further analysis & processing.



The optional 'ResultViewer' database showing classification results of recently encountered emissions & detail of an Iridium SOI

MISSION PLANNING

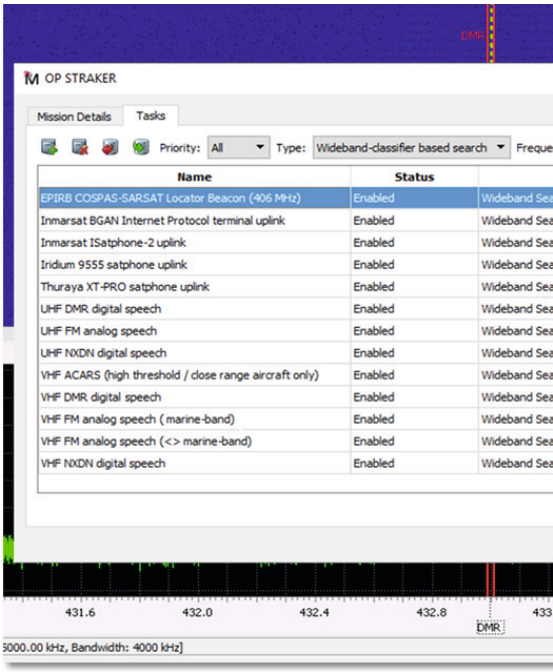
The go2MONITOR-ALERT Mission Plan contains the list of Signals-Of-Interest for a given operation.

A generic, ops-agnostic Mission Plan is supplied with the go2MONITOR-ALERT software application. This 'DORNHAI' Mission Plan includes recognizers for satellite telephone & digital speech protocols, aircraft voice & data links, & Emergency Position-Indicating Radio-Beacons (EPIRBs).

Alternate Mission Plans can be created & edited offline by remote communications surveillance specialists, then distributed wirelessly to the deployed platforms to suit the OPV's revised operational objectives.

In this example (R), the 'OP STRAKER' Mission Plan includes mission-specific, prioritized Tasks for the automatic detection, classification & alerting of EPIRBs, analogue & digital-speech emissions (including satphones), & close-proximity aircraft data downlinks.

(maritime Automatic Identification System [AIS] emissions have been intentionally excluded in this operational example).



Example Mission Plan showing mission-specific Signals-Of-Interest

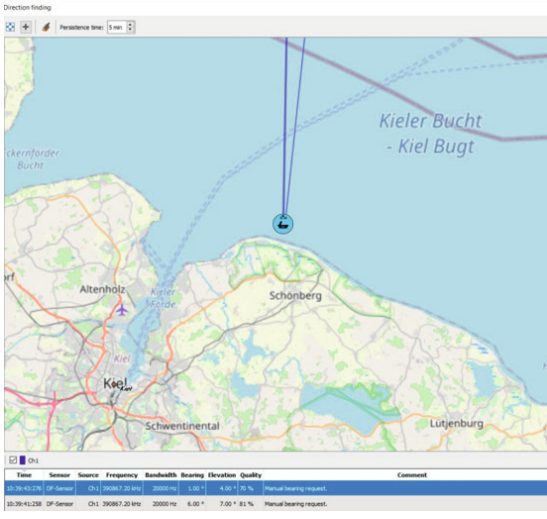
"NO WARRANT REQUIRED"

Using PROCITEC-proprietary techniques, the go2MONITOR-ALERT capability processes only the detected signals' 'external parameters' and does not demodulated & process the signals' digital ('internal') content. Subject to an individual Maritime Security Unit's policies, go2MONITOR-ALERT can therefore be deployed as a "no warrant required" capability for lawful use by general-service personnel.

DIRECTION-FINDING

The go2MONITOR-ALERT capability enables real-time automatic 'tip-off' of all detected & recognized signals for cross-cue to co-located 3rd-party Direction-Finding (DF) systems (optionally using STANAG 4658 'CESMO' reporting format).

The screenshot (L) shows automatically-derived DF results from an FPB-borne ES system plotted to the platform's go2MONITOR-ALERT mapping engine as Lines-Of-Bearing relative to the FPB's heading.

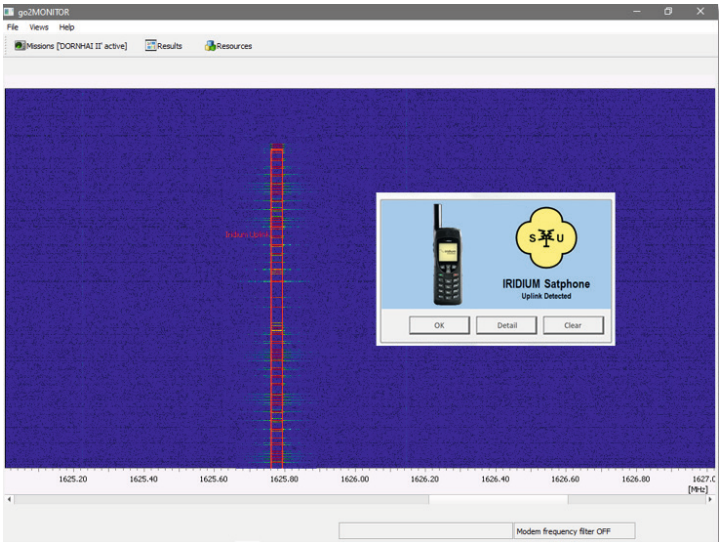


go2MONITOR-ALERT Prototype Direction-Finding GUI

OPERATIONAL SCENARIO (1)

An OPV is closing on a Vessel-Of-Interest (VOI). Subject to the VOI's positive response to the OPV's request for information via VHF marine-band radio, the OPV may not action a 'Visit, Board, Search & Seizure' (VBSS) operation to examine the ship's cargo for drugs, weapons & passengers which are not recorded on the ship's manifest. However, despite repeated calls from the OPV, the VOI does not respond either by radio or visual means.

Immediately after the OPV's unanswered calls to the VOI, the OPV's bridge-located go2MONITOR-ALERT system detects an 'IRIDIUM' satphone handset activation by a Person-Of-Interest (POI) aboard the VOI, suggesting to the OPV's Ops-Team that the POI is probably attempting to inform or seek direction from a remote associate.



go2MONITOR-ALERT auto-detecting, classifying & reporting an IRIDIUM Uplink activation

ALERT TO INFORM

The OPV Boarding Team's go2MONITOR-ALERT ES-derived Indications & Warnings that a satphone call has been made (or attempted) prior to boarding the VOI delivers valuable Situational Awareness that the VOI could be adversarial & potentially hostile, enabling the Team to review & revise their imminent boarding tactics.

Boarding Teams in FPBs deployed from a host OPV

OPERATIONAL SCENARIO (2)

Potential adversaries in a specific Area-Of-Interest (AOI) are known to use encrypted VHF Digital Mobile Radio (DMR) Handheld Transceivers for short-to-medium-range Line-Of-Sight calling between their deployed Fast-Patrol Boats (FPBs).

Whilst patrolling in international waters, an OPV-borne go2MONITOR-ALERT system automatically detects & reports new activations of DMR emissions at relatively high signal-strength, giving the first indication that potentially adversarial FPBs may be approaching from Over-The-Horizon.

FURTHER INFORMATION

For further information relating to go2MONITOR-ALERT in Maritime Security Operations, please contact sales@procitec.de

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