

PROCITEC®

CASE STUDY 202

Capability Development For Release Jan 2020

Prosecution of UHF SATPHONE Uplinks for Tactical I&W

INTRODUCTION

This Case Study describes the method by which the **go2MONITOR** Wideband Classifier will automatically detect, classify and recognise UHF Satellite Telephone ('SatPhone') Uplinks in real-time to derive Tactical Indications & Warnings (I&W) for deployed Communications Surveillance and Command Teams.

This Tactical I&W capability is designed to enable quick-reaction Situational Awareness (SA), but also when protocol-specific 'black box' capabilities are not available, in-range or permitted for mission-specific use.

The capability enables Tactical Electronic Surveillance-derived cross-cue, proximity detection and threat-warning at ranges from Close-Quarter to beyond 500 metres.

Conceived at customer-request and currently under-development at **PROCITEC** HQ, this capability will be available to appropriate customers as a **go2MONITOR** licensed SW plug-in from January 2020.



Person-Of-Interest using Thuraya XT-PRO

Prototype go2MONITOR SATPHONE Classifier auto-recognising Iridium-GO Uplink

TACTICAL REPORTING

The Case Study describes **go2MONITOR**-derived tactical reporting in real-time from static, semi-static or mobile assets to enhance Situational Awareness for Surveillance and Interdiction Operations (SASIO).

Real-time reporting by the deployed Team of go2MONITOR's automatically detected & recognised SATPHONE Uplink is achieved either via the Team's tactical voice/data net, or automatic cross-cue from go2MONITOR to the Team's 3rd-party reporting, Direction Finding & Geolocation systems:

"SATPHONE UPLINK DETECTED TYPE THURAYA X-RAY TANGO PAPA UNIFORM-LIMA CHANNEL 267, NO VISUAL..."

CAPABILITY DEVELOPMENT

To enable Field-Trials in the vicinity of **PROCITEC** HQ, a mobile asset was fitted with a UHF whip-antenna, low-cost/low-SWaP Wideband Receiver, and a Laptop PC running **go2MONITOR**.

The intercept-platform was deployed to an RF-quiet location in the Black Forest, southern Germany. A range of SatPhones and Terminals (including Inmarsat BGAN I.P., Inmarsat IsatPhone-2, Iridium-9555 and Thuraya XT-Pro) were deployed and activated by the 'Person-Of-Interest' at various ranges from the intercept-platform.



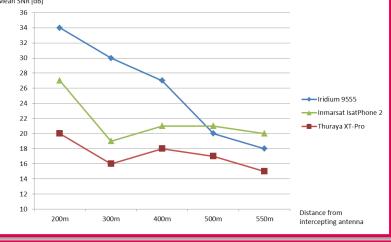
FIELD-TRIALS: SATPHONE DESCRIPTORS & INTERCEPT RANGES

Mean SNR [dB]

Co-ordinating with the 'Person-Of-Interest' (POI) via UHF-dPMR, the Intercept Team commenced development of each SatPhone protocol's **go2MONITOR** Modem Description File (MDF) as the POI transited between preplanned waypoints.

The table shows the actual Measured Free-Space Path Loss for the Iridium-9555, Inmarsat IsatPhone-2 and Thuraya XT-Pro at waypoint ranges up to and including 550 metres from the intercept-platform.

A range of 550 m delivers a 360° coverage-area of 950,000 m² (assuming free-space with no clutter).



Field Trials: Measured Free-Space Path Loss ('FSPL')
note: exemplary measurements will vary dependent upon factors including sensor-hardware & operating environment

RESULTANT GO2MONITOR MODEM DESCRIPTION FILES

The preliminary Modem Description Files were imported into the **go2MONITOR** Wideband Classifier, delivering very favourable automatic detection, classification and recognition results when each SatPhone protocol was activated.





The image (left) illustrates coverage approximation for a range of 550 m at a sub-tropical land/littoral Area-Of-Interest (AOI) using the field-trial's low-cost/low-SWaP Wideband Receiver and roof-mounted UHF whip-antenna.

Intercept range (and thus coverage-area) will be proportionately increased by use of a higher-specification Wideband Receiver or ES sensor with higher-sensitivity RF front-end, and incorporating an elevated antenna with gain.

...BUT SATPHONES TRANSMIT VERTICALLY..!

Yes, they do! Handheld SatPhones incorporate Quadrifilar Helix Antennas (QHA) to derive circular ('helical') polarization in the L-Band to transmit 'vertically' to their host satellite (with intended conical propagation characteristics, particularly for SatPhones using Low-Earth Orbit satellite constellations - Inmarsat and Thuraya incorporate Geostationary Earth Orbit (GEO) satellites, whereas Iridium incorporates Low Earth Orbit (LEO) satellite constellations).

However, due to the inherent inefficiency of the QHA antenna, unintended RF energy is also radiated horizontally away from the antenna.

It is this horizontally radiated RF energy which is detected by the Wideband Receiver or Sensor, and automatically classified & recognised by the Sensor's integrated **go2MONITOR** application.



QHA highlighted

...WHAT ABOUT CALL OR SMS CONTENT?

The highly cost-efficient **go2MONITOR** SATPHONE Auto-Recognition capability has been designed specifically to enable real-time Tactical Indications & Warnings of the activation and use of close-proximity SatPhone Handset Uplinks by potential adversaries and Persons-Of-Interest.

It is not the intent of the **PROCITEC** Development Team to extract call-content (which is very often encrypted) or prosecute the C-Band Downlink from the satellite to enable extraction. Manufacturers of these necessarily bulky & expensive, single-protocol SatPhone exploitation systems have developed their capabilities to suit distinct and alternate Use-Cases to this Case Study.

This Case Study and capability development initiative relates directly to the needs of our Customers, who wish to derive real-time, multi-protocol Tactical I&W for SA from generic (i.e. not SatPhone-protocol-specific) Electronic Surveillance and Direction-Finding Systems.

Unlike many single-protocol-specific 'boxes', this **PROCITEC** -proprietary 'Tactical I&W' capability enables certain protocol-specific SatPhone Uplink activations to be detected and prosecuted even if the activated SatPhone Uplink cannot connect to or register with its network's selected satellite.

FURTHER INFORMATION

For further information relating to the Prosecution of SatPhone Uplinks for Tactical I&W, please contact sales@procitec.de

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