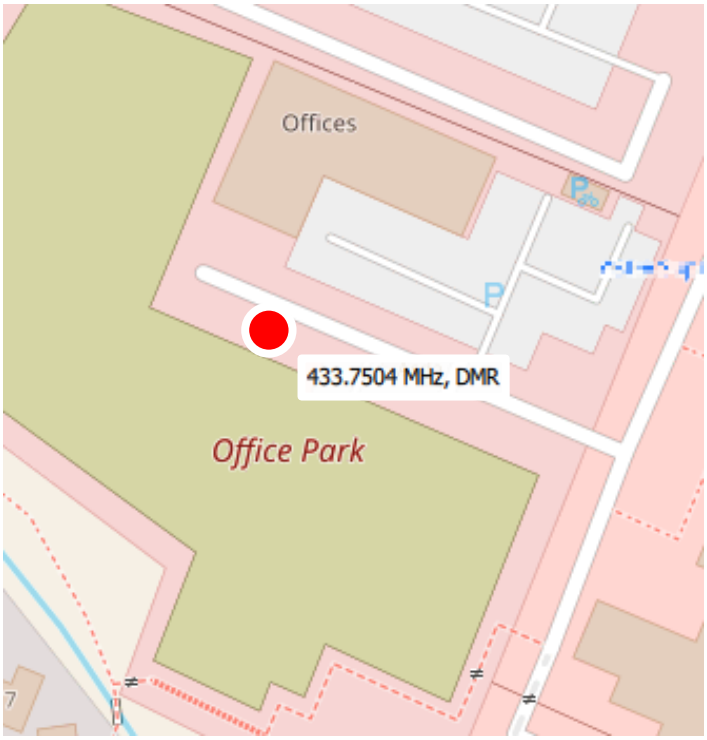
CASE STUDY 1011 v1.0
Exploitation of DMR Text-Message Location Reports

INTRODUCTION

A recent **go2signals** Case-Study ('1002') explored the prosecution of Motorola DMR Location Services, which employ the Motorola-proprietary 'Location Request & Response Protocol' (LRRP). Meanwhile, Case-Study 1003 'Prosecution of DMR Networks' captured **go2signals** techniques to successfully intercept & decode DMR-derived text-messages carrying alphanumeric characters as free-form messages.

Alinco DJ-MD5 DMR HT
showing GPS-lock

Certain other manufacturers' models of DMR Handheld Transceivers (HTs) & Mobile Units (MUs) also include an integrated GPS receiver, often 'hidden from view' inside the HT/MU, or using a separate UHF 'stub' antenna adjacent to the HT's main V/UHF TX/RX antenna.



go2signals intercepting DMR text-message location report
& plotting to map

Using an Alinco DJ-MD5 DMR HT with integrated GPS, this brief, supplementary Case-study explores how some DMR transceiver models can transmit their current GPS-derived location via short-duration text-messaging, & how an in-range CEMA Team using **go2signals V24.2** (or above) can exploit these emissions in real & near-real time.

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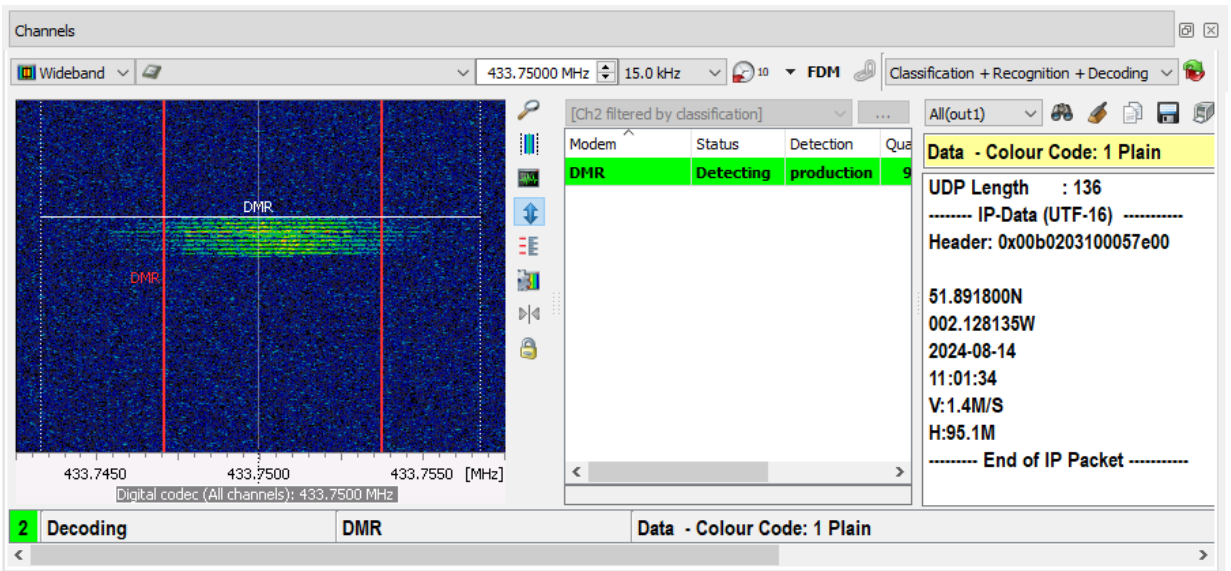
DMR TEXT-MESSAGE WITH 'LOCATION-REPORT' PAYLOAD

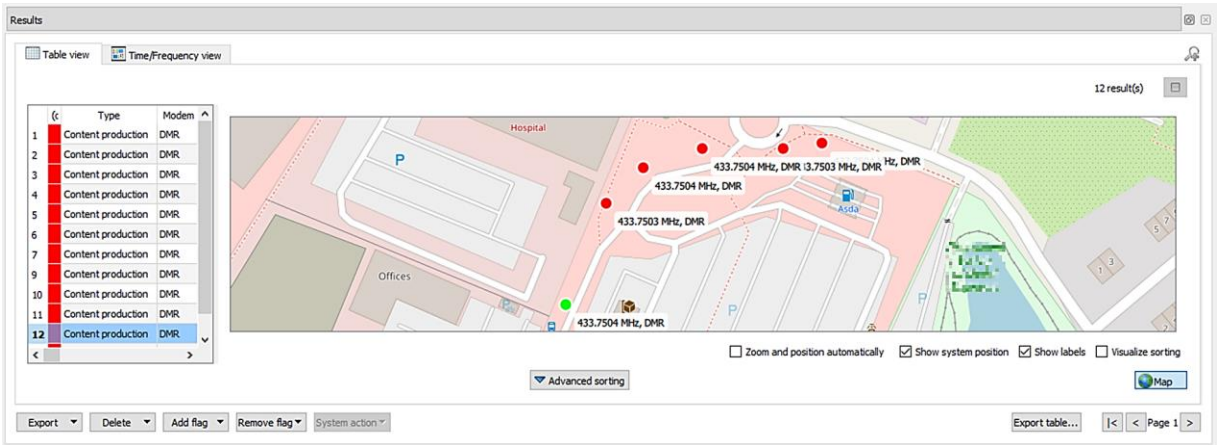
The **go2signals** Production-Channel screenshot (below) shows a DMR text-message of 1150 mS duration. This short-duration emission has been automatically classified, recognized & decoded in real-time.

The decoded location-report (capturing the HT's GPS-derived latitude & longitude in decimal-degrees with a time-stamp) is imported as a 'Content-production' result into the **go2signals** ResultViewer database for plotting-to-map, target-tracking &, as appropriate, export to 3rd-party ISR capabilities.



PLOTTING & TRACKING THE LOCATION-REPORT PAYLOADS

In this operational example, the **go2signals** ResultViewer screenshot (below) shows the plotting & tracking by the CEMA Team of the DMR HT's consecutive, text-messaged location-reports whilst the HT User is on-the-move & in-transit to a new location.



Each Content-production result & any recordings of related voice-intercepts are archived & exported by the CEMA Team for *post-facto* data analytics & development at their Fusion & Analysis Cell.

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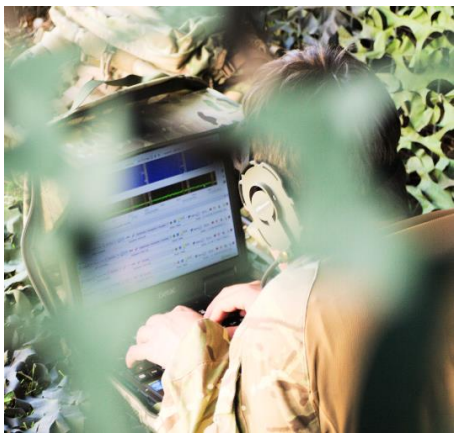
OPERATIONAL NOTES – NETWORK SPECIFICS

The use by DMR HTs & MUs of text-messaging to send GPS-derived location reports will vary depending upon a variety of factors including (but not limited to) manufacturer/model-specific implementation & a network-manager's setup & configuration of their users' fleet of DMR transceivers.

For example, one user-specific DMR fleet may be setup to automatically transmit each HT's location via text-message upon each activation of the HT's Push-To-Talk (PTT) switch, whereas another, entirely separate DMR fleet may be setup to enable each User to transmit their location via text-message only manually at pre-determined time-periods or on an ad-hoc basis.



An important role of the deployed CEMA Team using **go2signals** & Fusion Cell is to develop their understanding of if & how a specific target DMR network is employing automatic &/or manual location reports via text messaging.

UDP-HEADERS & PORT NUMBERS

Manufacturers of DMR HTs/MUs which employ location reporting via text-message most often use Internet-Protocol (IP) UDP Registered Port Number 4007, which carries each HT's or MU's GPS-derived & text-messaged location report.

Port	Use
4001	Location Service (LRRP) – GPS-derived & reported from HT/MU
4005	Automatic Registration Service (ARS)
4007	**Text Messaging Service (TMS)**
4008	Telemetry I/O Service (TLM)
4009	Over The Air Programming (OTAP)
4013	Job Ticketing Service (JTS)

Examples of DMR 'Data Services' registered port numbers

ONLINE OPERATIONS WORKSHOPS

Remote (online) Ops Workshops & Training Modules are available for those **go2signals** user-groups who may wish to further explore the exploitation of DMR text-messaged location reports. Please contact us for further information & scheduling.

FURTHER INFORMATION

For further information relating to the exploitation of DMR text-messaged location reports, please contact *sales@procitec.com*

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