Analysis

GO2SIGNALS ANALYSIS SUITE

The complete toolbox for advanced signal analysis and decoder development

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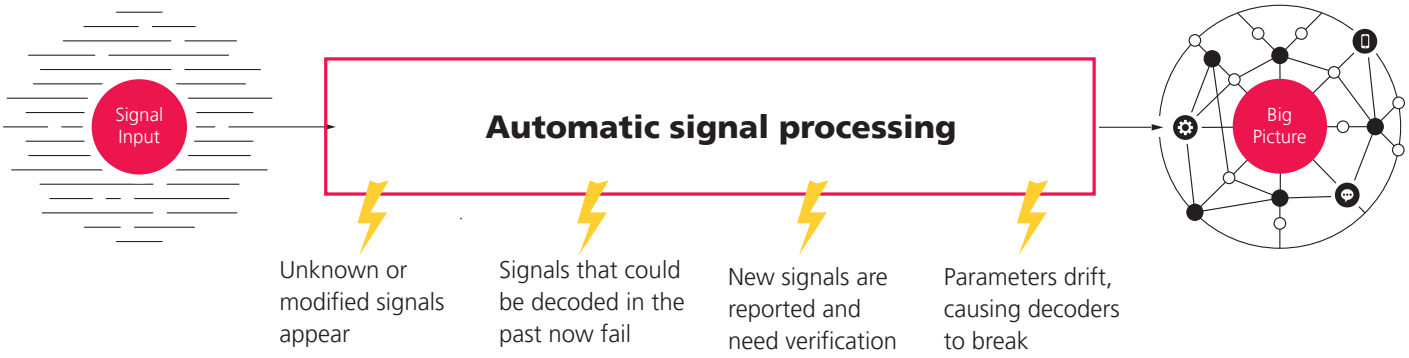
go2signals

THE CHALLENGE

In modern communication intelligence, automatic signal processing workflows are crucial to handling the ever-growing volume of signals. But what happens when this workflow is disrupted?



In these cases, automatic workflows no longer work.Operators must step in:

- Analyze the modulation to obtain a demodulated bitstream
- Write a detector and/ or develop a decoder
- Apply the new decoder in go2MONITOR for future automatic processing

This requires powerful and flexible tools – provided by **go2signals Analysis Suite.**

GO2SIGNALS ANALYSIS SUITE

WHY YOU NEED IT

The suite combines all essential products for modern signal analysis and decoder development in a single, integrated package:

- **go2signal-analyzer** – comprehensive modulation analysis and demodulation
- **go2modem-studio** – decoder development, modem creation and testing
- **go2generate** – generate communication signals for testing and training
- **go2key** – automatically extract ARC4 cipher keys for DMR decoders

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Together, they form a flexible, military-off-the-shelf solution to react to new or changing signals. Fast, easy, on-site, and even on the move.

ANALYSIS SUITE PRODUCTS

GO2MODEM-STUDIO	Create, edit and test modem definitions files and customer decoders to enhance detection and decoding capabilities in go2MONITOR
GOSIGNAL ANALYZER	Manual and automated modulation analysis in an outstanding user-friendly way. Easy and fast analysis of unknown signals.
GO2GENERATE	Generate and simulate modulated communication signals for testing and training.
GO2KEY[1]	Automatic key detection for ARC4 (e.g. Motorola Enhanced) of DMR radios

[1] Requires export approval prior to supply

GO2SIGNAL-ANALYZER

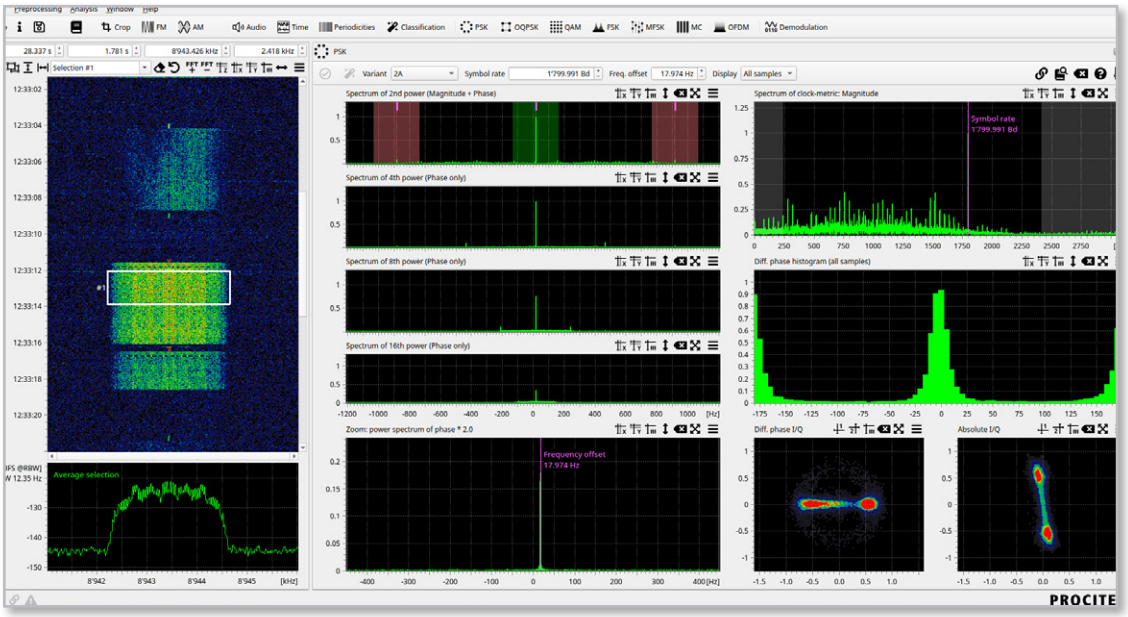
WHY YOU NEED IT

go2signal-analyzer is used when signals cannot be classified or decoded. Signal recordings are used for modulation analysis, and with known demodulator settings, demodulated bits will be the input for further detector/decoder development in **go2modem-studio**.

It allows analysts to study unknown modulations easier and faster – helping to identify signals quickly and accelerating the creation of decoders or detectors for go2MONITOR.

For manual signal analysis, it provides all essential processing and visualization functions. Results are shown in intuitive displays, allowing users to observe signal properties and determine modulation parameters efficiently.

- Quick analysis of unknown signals
- Analyzing "problem" signals for technical parameters
- Optimization of demodulator settings
- Identification of disturbances or parameter shifts



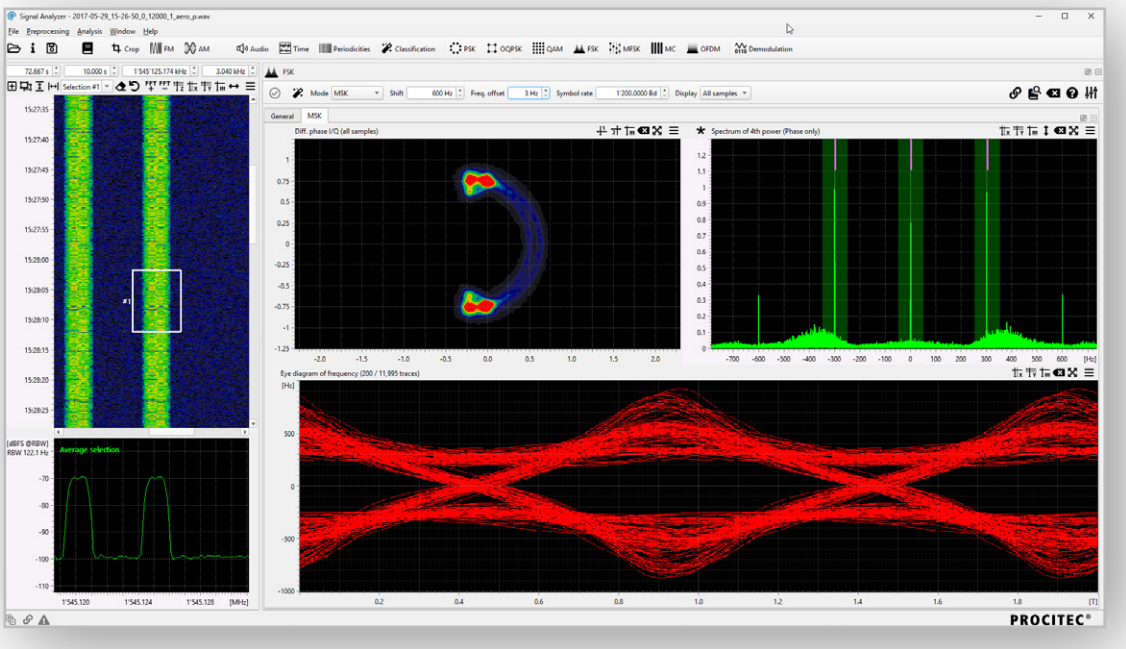
Template for PSK signal analysis

KEY FACTS

- Predefined analysis templates for fast and easy usage
- Automatic modulation classifier for fast and easy analysis
- Supports multiple file formats from many recording tools
- Simple selection of time and frequency range for analysis
- Wide set of analysis templates (Time, Classification, Periodicities, PSK, OQPSK, QAM, FSK/MSK, Multitone, Multi-Carrier, OFDM, etc.)
- Visualizations: waterfall, spectrum, histogram, constellation, autocorrelation, etc.
- Flexible Demodulation and bit recording
- Easy to use for both, beginners and experts

RESULTS

go2signal-analyzer delivers fast, precise modulation insights - helping analysts identify unknown signals and enabling decoder creation in **go2modem-studio**.



FSK template with specialized MSK measurement features

GO2MODEM-STUDIO

WHY YOU NEED IT

Once the signal has been characterized / analyzed, the next step is to create new decoders or adapt existing ones with **go2modem-studio**.

go2modem-studio consists of two applications: **Modem-Lab** for configuring demodulators and testing decoders, and **Decoder Development** for creating or adapting decoders using pyDDL, a Python based description language.

Used together, these tools form a seamless workflow – from the first detection of an unknown signal to the deployment of fully operational decoders in go2MONITOR.

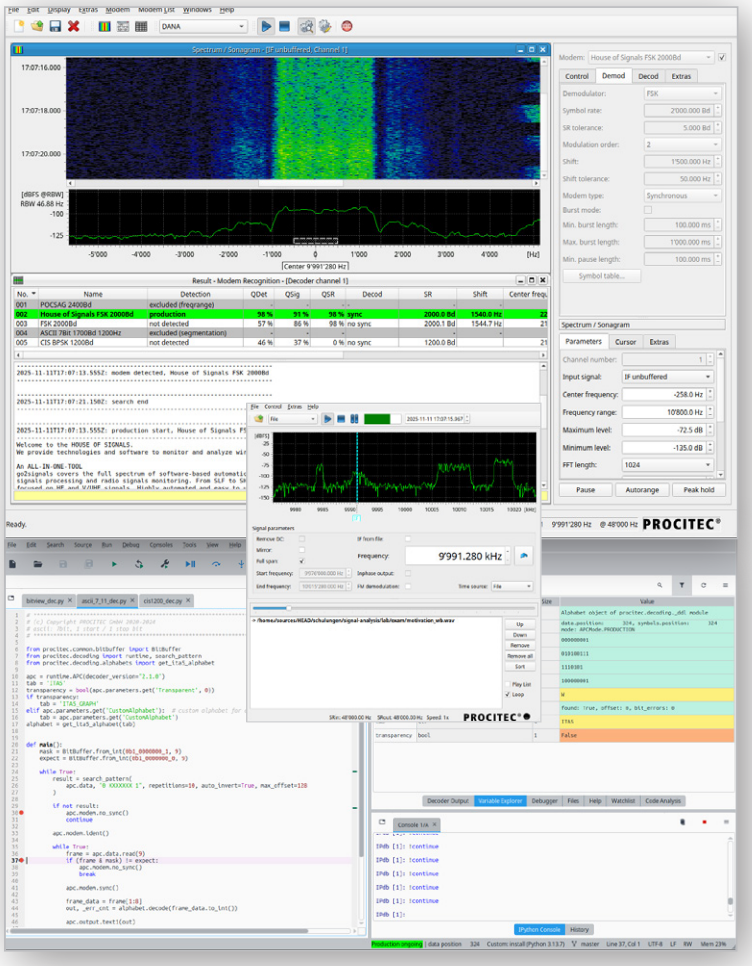
- Create new decoders yourself
- Modify existing ones quickly
- Test and validate
- Adapt go2MONITOR to your needs

KEY FACTS

- Setup and testing of new demodulators and decoders
- Create/modify decoders with the advanced Python Decoder Description Language (pyDDL)
- Rapid adaptation of go2signals standard products with own knowledge
- No need to share restricted signal knowledge to be implemented into the monitoring solution
- Wide range of universal demodulators and standard decoders as templates

RESULTS

go2modem-studio turns analysis into action: configure demodulators, design or adapt decoders, validate with professional debugging tools, and deploy to go2MONITOR – ensuring that automated information collection in go2MONITOR continues seamlessly.



go2modem-studio has two applications, Modem-Lab (above) and Decoder Development (below)

GO2MODEM-STUDIO

DECODER DEVELOPMENT (PYDDL)

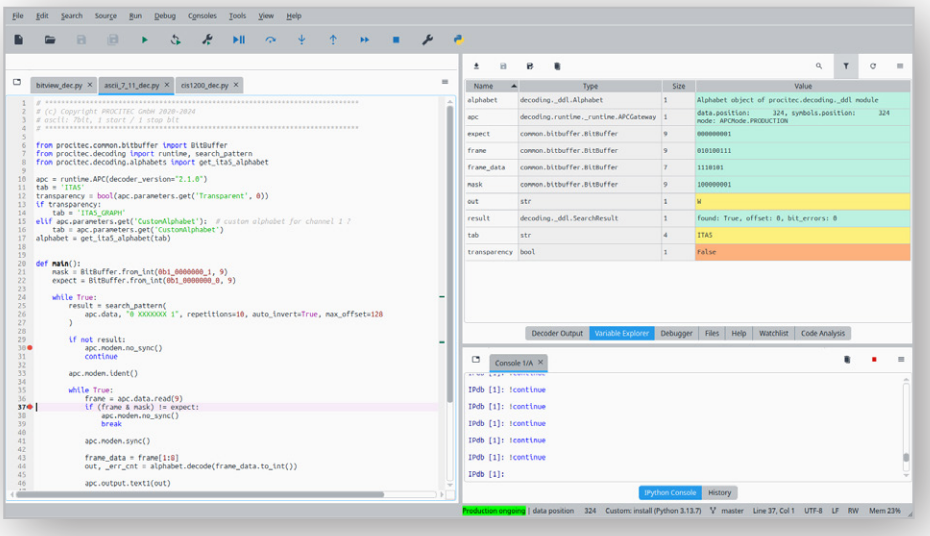
go2modem-studio includes the advanced pyDDL description language. Source code for many decoders is included, so you can easily adapt and extend them. Deploy ready-to-use modem descriptions and decoders to **go2MONITOR** to enable their use for manual and automatic monitoring.

Key Facts:

- Full Python ecosystem plus over 100 dedicated commands for pre-processing, searching, reading, transformation, and output formatting
- Start from a demodulated bitstream provided by a properly parameterized demodulator
- Apply even modern channel decoding methods in just a few steps
- Python reduces code size and error susceptibility – faster development
- Add customer functions and decoders as Python modules or by using DLLs written in C, C++
- Integrated IDE with debugging (based on Spyder) for efficient development
- Analysis, evaluation and manipulation of bit streams for the determination of coding characteristics
- Implicit bit stream analysis using decoder development pyDDL commands and features

Write and modify pyDDL scripts in Spyder with auto-completion, context-sensitive help, and syntax highlighting. The Python interpreter provides detailed error logs for efficient debugging.

- Test isolated decoder sections and verify intermediate results
- Step through source code line by line
- Monitor variables and buffers at each step
- Change variable values during execution
- Set breakpoints to pause continuous runs
- Run decoders independent of real-time baud rate (faster or slower)



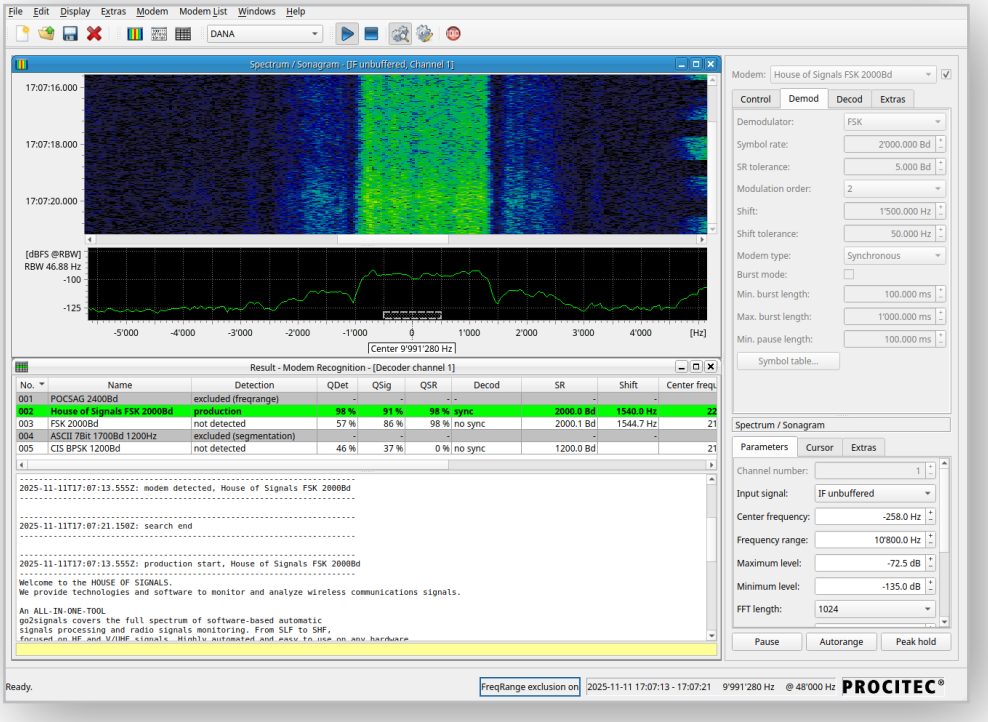
go2modem-studio's Decoder Development Application

MODEM-LAB

Save your modulation parameters and decoder as a Modem Descriptor File and test them for seamless use in **go2MONITOR**.

Key Facts:

- Large selection of freely configurable demodulators
- Any combination of demodulator and decoder can be applied
- Finetuning of parameters and decoding quality
- Comprehensive control of outputs and metadata
- Setup of special configurations and alphabets
- Test quality of decoders and modem recognition with lists of recordings



go2modem-studio's Modem-Lab Application

ANALYSIS SUITE

Technical Specifications Document
www.procitec.com/go2signals-specifications-analysis

DECODERLIST

List of all available Decorders
www.procitec.com/go2signals-decoderlist

GO2GENERATE

WHY YOU NEED IT

Realistic test and training scenarios are essential to prepare operators and systems for real-world conditions. With **go2generate**, you can simulate a wide range of signal environments, from simple modulations to highly complex multi-channel setups.

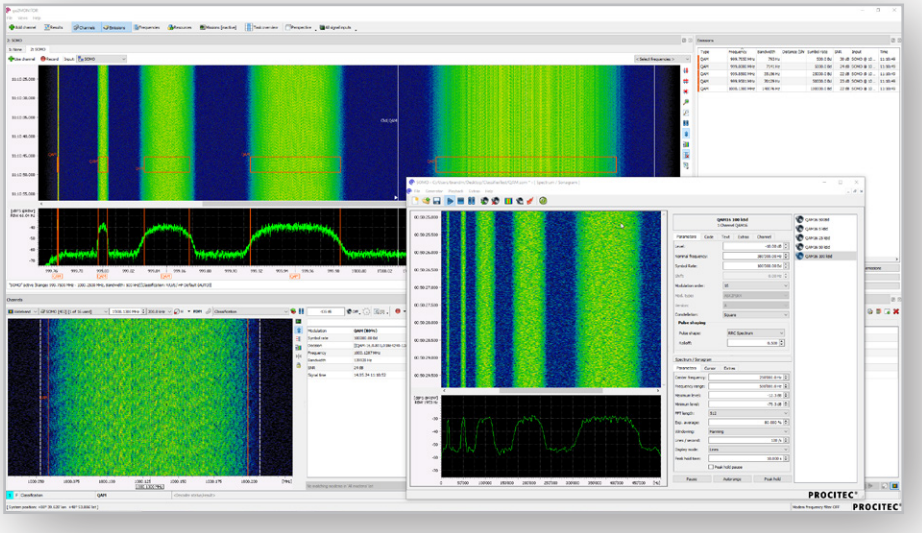
This makes it the perfect tool for operator training, system evaluation, and demodulator and decoder testing under controlled, repeatable conditions.

KEY FACTS

- Advanced signal generator (formerly SOMO)
- Wide range of parallel usable modulation generators
- Create complex scenarios with multiple signals in parallel
- Generate burst signals with burst shaping
- Up to 64 channels simultaneously
- Configurable modulation parameters
- Support for variable coding standards with editable text or binary patterns
- Bandwidth of 20/40 kHz live (Soundcard) or several MHz as recording or stream
- Adjustable noise level for realistic conditions
- HF channel simulation with multipath fading and noise

RESULTS

go2generate provides a powerful environment to train operators, simulate missions, and validate demodulators and decoders – ensuring readiness and reliability in the face of complex and evolving signal environments.



Using go2generate for testing and training with live streaming of complete signal scenarios

GO2KEY

WHY YOU NEED IT

Most modern mobile radios use encryption to protect their communications. For signal intelligence, this means that even if a transmission is detected and demodulated, the actual content often remains hidden.

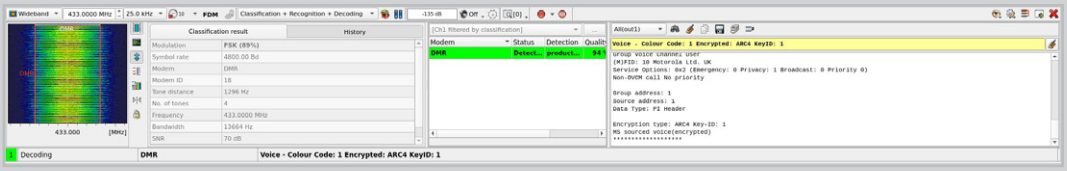
go2key solves this problem by automatically extracting ARC4 cipher keys from short signal samples. In combination with go2signals, these keys can be used directly in DMR decoders to decrypt conversations and data streams.

KEY FACTS

- Works with short signal samples
- Automatically finds ARC4 keys (e.g. Motorola Enhanced)
- Compatible with go2signals DMR decoders
- Keys can be reused for future transmissions
- Supports data records from go2signals decoders
- Uses multi-threading, decryption speed depends on computing power
- Requires export approval prior to supply

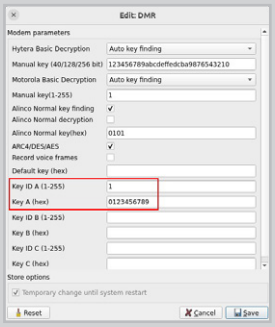
RESULTS

go2key provides the ARC4 decryption of DMR voice and data traffic

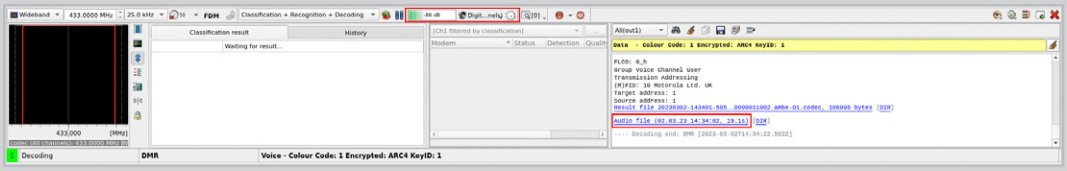


1. go2MONITOR production channel - DMR signal

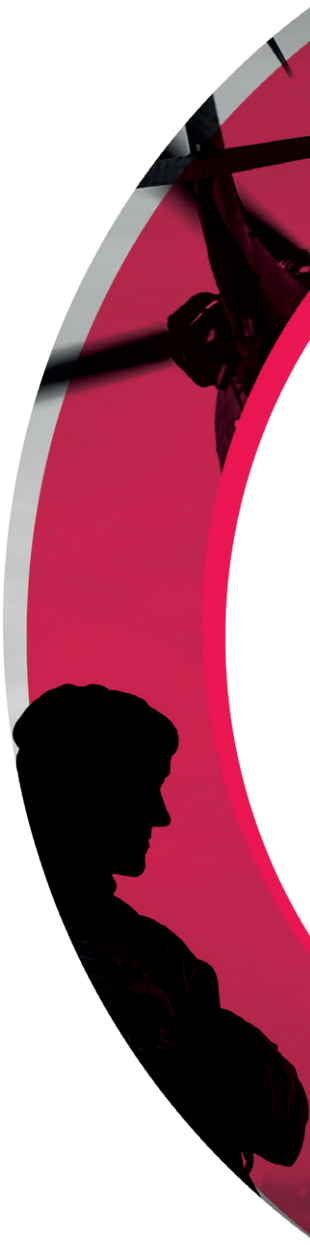
2. go2key with encryption key found



3. go2MONITOR decoder parameter editor with DMR, encryption key and key-id are parametrized



4. go2MONITOR production channel with decrypted audio results



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