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**missim – the only 4-in-1 Solution  
for Self-Protection System  
Confidence Testing**

## 1. Pre-mission Tests of Self-Protection Systems

In recent years, self-protection systems have become widely used on aircraft and ships, and even begun to find their way onto tanks. Self-protection systems, like all Electronic Warfare (EW) systems, are complex and often operated in harsh environments. Furthermore, the systems' least replaceable units are spread widely over the host platform and are usually connected by long harnesses. Platform operation as well as the maintenance of the host platform can cause system degradations or failures.

Self-protection systems do have a built-in self-test that detects and reports the majority of system failures. However, there are failures that cannot be detected by the built-in test. These range from small frequency bands with high attenuation in cases of damaged cables, to contaminated radomes and stop-band attenuation degradations of the optical filter in a missile warner, as well as other failures that dramatically reduce the system's protection capability. Although the different systems' built-in tests provide diverse levels of test coverage, these tests cannot cover the entire path from threat to alert to countermeasure.

It is therefore important to test self-protection systems regularly and frequently. One test of an airborne self-protection system after every e.g. 200 flight hours is definitely insufficient for early recognition of failures and degradations. Frequent testing means testing all sensors of the platform before the start of every mission.

A simple go/no-go test will already improve the level of confidence in the system's protection capabilities. Such a test covers just a part of what can be tested with a pre-mission test, however. Over time, EW system sensors lose a degree of sensitivity, thereby minimising the protection capability. A sensitivity check at least once a week is thus a highly beneficial supplementary test that, with suitable test equipment, will not consume much time and is practicable at the flight line.

The practical execution of pre-mission tests has to be easy and convenient, as the results will otherwise be degraded by test execution errors or even omission. Most people performing such tests, at e.g. the flight line, have to execute a lot of different tasks in a short amount of time, and are not EW experts – the test definition and operation concept must take this fact into consideration. The test device has to be light, compact and should not require a complicated setup. The output power of all 4 threat types (missile, laser, radar and Hostile Fire Indication [HFI]) has to be carefully controlled and the device has to be calibrated. As simulation from a fixed distance causes additional work, is prone to errors and can sometimes simply be impossible (i.e. larger aircraft with sensors underneath and high up), an automatic distance compensation is of utmost importance. The RUAG product "missim" meets the requirements for such a pre-mission test.

missim – fast and easy to use, enabling testing anytime and anywhere with high confidence. And the only test device on the market that is able to simulate all 4 threat types.

On request, RUAG Aviation can provide additional information such as an assessment of different test concepts. RUAG is also prepared to jointly evaluate potential test concepts for your airborne, naval and land-based self-protection systems.

## 2. missim – one Tester for all your Self-Protection Suites

A world innovation: the only 4-in-1 test solution for all self-protection sensors, missim simulates radar, laser, guided missile and even Hostile Fire Indication (HFI) signatures.

Featuring an extensive pre-programmed generic threat library, missim can simulate a broad range of threats without further adjustment. Even in the field, an intuitive software makes missim easily programmable for more advanced or specialised simulations, utilising up to 255 scenarios per emitter. missim can be used within a distance from 1 m (3 ft.) up to 20 m (66 ft.) from self-protection systems' sensors, thanks to its advanced automatic power-density compensation technology.

Extremely compact dimensions and low weight (1.6 kg / 3.6 lbs.) make missim easy to deploy in demanding and fast-changing circumstances. Meeting all military and environmental standards, missim is free from ITAR restrictions, is NSN Stock listed and produces an extremely low logistical footprint – well below the average in its category.

- Usable for air, ground and sea applications
- Fast and reliable go/no-go test. The sensor sensitivity is also indicated (no additional or platform-specific equipment required)
- System independent and can be used to test nearly all systems – simplify your logistics by using just one tester instead of many different models
- Emitters and simple or even highly complex scenarios are fully programmable via an easy-to-use PC-based software
- Two operation modes are defined in the missim programming:
  - **Expert mode**  
Fully flexible; allows the usage of all test scenarios programmed onto missim, full control
  - **Pre-mission user mode**  
Reduces the required user interaction to a minimum, for reproducible testing with minimum training effort
- Non-hazardous and safe operation
- Modular: choose the emitter combinations (4-in-1, 3-in-1, 2-in-1 or 1 emitter only) you require
- Suitable for military as well as civil applications



missim is controlled by 4 push buttons and has a 2.7" display. The display allows menu navigation and provides important status information.

The menu offers three main menu points:

- **Simulation**  
This menu point lets the user select a test scenario and execute it.
- **Settings**  
Here, missim settings can be defined, such as activation of the pre-mission mode and definition of the auto-shutdown time.
- **Options**  
Enables the user to start the built-in self-test and review the error and warning pages. Also includes the system information pages, and allows the user to erase the complete programming in line with the required procedures.

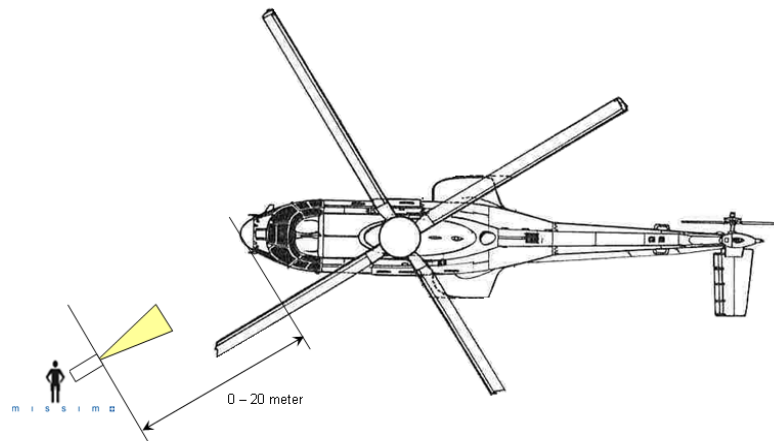
The status information line in the display indicates the following:

- Whether or not missim is emitting
- Battery status and indication that the external power supply is connected
- Error and warning status

### 3. Performance Data

<b>Wideband-Radar</b>	Frequency coverage	1.5 – 18 GHz (adjustable in 1 MHz steps) & 36 GHz
	Modulation	Pulse: PRI 5 $\mu$ s – 100 ms, PW 0.05 – 50 $\mu$ s CW: in 1.5 – 18 GHz band
	Complex Modulation	FM (time, pulse, pulse group controlled) AM (time controlled) Combinations of AM and FM possible Sweep mode
<b>Radar</b>	Frequency coverage	12 & 36 GHz
	Modulation	PRI: 5 $\mu$ s – 100 ms PW: 0.05 – 100 $\mu$ s or CW (12 GHz)
<b>Laser</b>	Spectrum	525 / 905 / 1550 nm
	Laser class	1 , 2, 3R (eye safe at 25 cm / 10" distance)
	Modulation	PRI: 18 $\mu$ s – 2 s PW: 1 $\mu$ s – 10 ms (525 nm) 10 ns – 100 ns (others)
<b>Missile</b>	Spectrum	UV-C (solar blind)
	Profile programming	Max 1000 data point 1 – 100 ms step width Power resolution 0.1 dB
	Eye-safe	Yes, Class 2
<b>Hostile Fire Indication (HFI)</b>	Spectrum	UV-C (solar blind)
	Profile Programming	3 different calibre ammunition selectable Scalable firing distance between 200 and 1000 m
	Eye-safe	Yes, Class 2
<b>Application Range</b>	With distance compensation	0 – 20 m (0 – 22 yd)
<b>Programming</b>	Emitters (radar, missile, laser, Hostile Fire Indication [HFI])	up to 255 each
	Scenarios	up to 255
<b>Operation Time</b>	Charge time less than 8 hours	Minimum one day of typical flight line usage with one battery charge
<b>Environmental</b>		MIL-STD 810F MIL-STD 461E (EMI/EMC) EN 61000-6-2, Class B (ESD)
<b>Physical</b>	Dimensions	14 x 19 x 20 cm (5.5" x 7.5" x 7.9")
	Weight	1.1 – 1.6 kg (2.4 – 3.5 lbs)





#### 4. missim is the universal Test Device for most EW Systems

missim is a system independent test tool compatible with the majority of EW solutions on the market, including the following:

- F-5, F/A-18, C-130, NH-90, IDAS/CIDAS, CAMPS, AMPS, etc.
- AAR-47, AAR-54, AAR-57, AAR-60 (MILDS), MAW-200/300, etc.
- LWS-20, LWS-300 COLDS, ATLAS-2Q(B), LSU, Aselsan LWR, LWR 1223, RALM, SPS 65 etc.
- APR-39, ALR-67 (V2)/(V3), ALR-2000, RWS-300/310/500, TWE RWR and other Thales RWRs, Indra RWRs, Selex Galileo RWR Sky Guardian 2000 & Seer, SPS 65 etc.

If your sensor or suite has not yet been tested with missim, RUAG Aviation will help verify that they are compatible with missim. With compatibility established, missim is undoubtedly the right tool for achieving the level of confidence you desire.

missim can be used to test essentially all suites and sensors, thus offering a unique advantage: missim can be the only tester necessary for your aircraft, ships and land vehicles, and for any configuration of sensors on these platforms. This dramatically reduces your logistics effort, spare part pool and the effort for including ground support equipment into your processes and documentation. It will also have a positive impact on training effort. Consider the handling effort of 6 or 8 different testers, compared to the effort needed for one single device. A shortage of testers for one platform at one base can be a logistics nightmare when many different products are used; with missim you can use any missim available in your inventory. Thanks to fast on-site reprogramming of the test scenarios, missim will be usable for that platform in line with the respective centrally defined test principles.

Take missim with you and use it anywhere - its handy size and low weight mean missim can also be stored on board your platform. The transport case is ruggedized and qualified acc IP67, field proven and ideal for storing your missim.

#### 5. Programming Tool

missim comes with a generic threat library and does not necessarily need to be programmed.

For implementing your specific emitters and test sequences, each missim comes with an easy-to-use PC software (SW). With it, you can program different emitters (up to 255 each for radar, missile, laser and Hostile Fire Indication [HFI]) as well as scenarios (255), and define a multitude of parameters.

In the emitter library you define the different emitters with all their aspects. The scenario definition menu allows defining simple or complex test scenarios, incorporating any emitters from the emitter library – emitters can be activated sequentially or in parallel. You may then group the scenarios into different projects. This is especially helpful if, for example, you are testing different kinds of platforms or even different self-protection solutions per platform using missim.

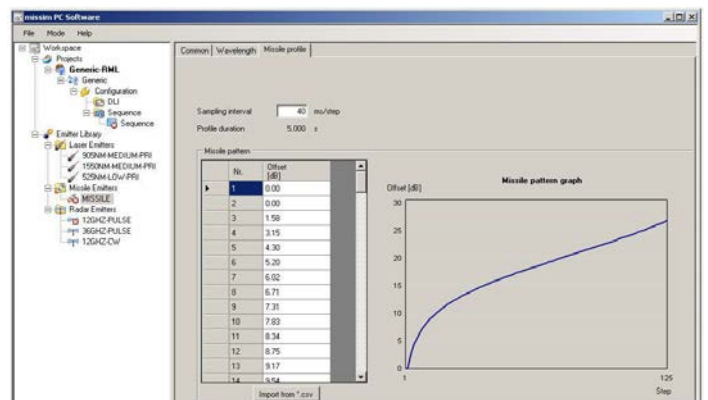
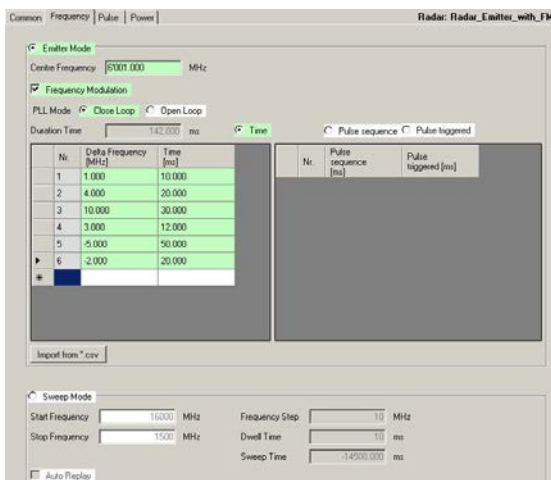
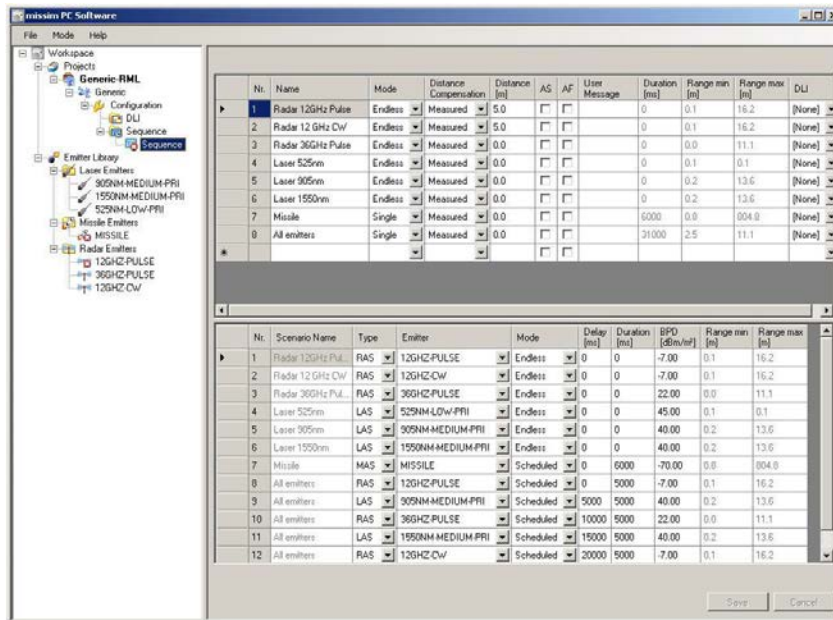
missim can be programmed everywhere – even “in the field”. The software generates a compact programming file that can be distributed quickly over your secure data communication channels. At the different sites using missim, the various missims can be programmed with just a few mouse clicks, using the programmer module of the software and taking approximately one minute per missim.

The missim software is not license-specific and can be installed on as many computers as needed. Freely implement your scheme of test principles and procedures: define the test concepts and test scenarios at a central EW organisation and execute these at any location worldwide.

If necessary, the memory of missim can be erased and sanitized within seconds, to prevent your customized scenarios from falling into the wrong hands.

The user-friendly GUI-based programming tool runs on Windows-based computers (Windows XP, Vista and Windows 7) with at least one available USB port. Programming of missim is performed via a standard USB cable (included with missim).

The following pictures show a few GUI examples of the missim PC software – the Threat Library Builder main screen and two tabs being used for defining radar and missile emitters.



## 6. missim Emitter Configurations

missim is available in different configurations and can be ordered in the various emitter configurations, depending on your requirements for particular target platforms.

There are two different missim bodies: one for all emitter configurations with radar emitter (see picture on the right, right unit) and one for all configurations without radar emitter (see picture on the right, left unit).



missim is based on a modular design and can therefore be upgraded easily and affordably. An upgrade might be required due to the installation of additional sensor types on a platform, or due to a changed test philosophy resulting in the exchange of the radar module with the wideband-radar module. Such upgrades of your missim are performed at RUAG, and include a full calibration of missim.

## 7. Scope of Supply

### Included:

- missim with Lithium-Ion rechargeable battery
- PC software (Programming Tool)
- User manuals
- Power supply (100 – 240 VAC) and cable
- USB cable
- Transport case (dimensions 0.41 x 0.34 x 0.21 m)  
(16.1" x 13.4" x 8.3")

### Optional:

- Wired Remote Control (operate multiple missim from one computer)
- Tripod
- Spare battery modules
- Power supplies
- Other items (upon request)



### Colours:

The versions of missim that include the radar emitter are available in 3 different colours:

- Traffic white (RAL 9016)
- Yellow olive (RAL 6014)
- Melon yellow (RAL 1028)



All missim variants have a NATO Stock Number, are ITAR free and are not subject to US export control.

## 8. missim Training

The introduction of a new device or capability can be a complex and time consuming issue. While the operation of the device itself is not difficult, a certain amount of training is required. For a tool like missim with its outstanding flexibility, staff training is highly important. Training eases familiarisation and helps EW officers make the most of the functions (flight line and other pre-mission tests, depot-level tests and lab usage).

RUAG Aviation offers a comprehensive training program:

- **Training for EW Officers**  
Covers the usage of missim and its programming software. The training includes both a theoretical part and practical exercises.
- **Training for missim users**  
Covers usage of missim in theory and through practical exercises.

Besides our standard training courses, we are happy to customise dedicated training courses tailored to meet your specific requirements.

## 9. missim Recalibration

All missim emitters are finely calibrated in terms of their output power. Like all calibrated devices, missim requires regular recalibrations. Recalibration should be performed every 18 months to ensure the specification values.

Recalibration is performed at our facilities in Switzerland and includes the following:

- Incoming inspection and functional test
- Full calibration of all emitters in our own calibration chamber and an EMC lab
- A Calibration Report and Certificate of Conformance
- Outgoing inspection and shipment

The typical turnaround time (RUAG in/out) is 2 to 4 weeks.

RUAG also handles the complete repair and upgrades of your missim.

## 10. Contact us

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