

## Radio simulation in the Danish Signal Regiment

*Personnel training in the Danish Defence is an increasingly difficult task. Command support, with its ongoing implementation of increasingly complex new radios and communication systems, is no exception.*

*By Jens Fritze, Engineer, Staff and Signal Regiment.*

New equipment is constantly being implemented, and as a result, time for training is increasingly scarce. On top of this, state-of-the-art radios pose a range of technical and practical challenges. For example, the new digital Harris radios, which are currently being implemented, utilise frequencies and modulations not allowed in Denmark.



*The real 152 radio is compared to its simulated counterpart. The radio simulator is developed by IFAD TS, a training developed by IFAD TS, a training simulation software company based in Odense, Denmark.*

### High demands for security

Some radio systems connect via military satellites, while others employ encryptions, imposing high demands in terms of storage as well as user certification. Although not a novel solution, one way of tackling this issue is to use simulated systems. Today, simulation systems for training personnel are widely used within the Danish Defence, including flight, tank, Stinger and Forward Air Control simulators. In fact, the tactical training system in Oksbøl, Denmark covers complete training exercises and operations. The latest addition is the Signal Regiment's radio simulator, for use in radio communications exercises.



*Sample instruction station setup and a number of trainee stations in a classroom.*

## What does it do?

In addition to their radio communications equipment, several suppliers offer Computer-Based Training (CBT), which allows trainees to become familiar with the user interface, buttons and dials, menu navigation and interpreting the display. The radio simulator is an evolution, as it simulates not only the user interface, but the “on-air” connection as well.

The training empowers trainees to practise for the real objective, namely establishing radio connection. And this has a number of prerequisites. Correct frequency, equal modulation, loaded encryption key, simulated range must be within maximum ... and, last but not least: turning up the volume. The radio simulator comprises an instructor station, i.e. a PC with a screen and headset used to manage the simulation experience, and up to 20 trainee stations, consisting of PCs and touch-sensitive screens. In addition, each trainee is given a headset.



The touch-sensitive screen allows the user to interact with the radio simulator by pressing buttons and turning dials – a quite realistic experience.

*Harris radio simulation on a Windows PC.*

## SATCOM simulation

The instructor station and trainee stations are connected to the same network, allowing the instructor to introduce a scenario and assign a number of radio simulators to each trainee corresponding to the number of radios found in the vehicle or on foot.

The radios currently simulated are the 2061 radio, the Harris 117f and the 152 radio. Furthermore, the system is capable of simulating a real-life SOTAS box.

The latest simulation features include SATCOM simulation, allowing the simulation of TACSAT connections. These are useful, as NATO satellites offer only severely limited bandwidths in addition to requiring a six-week access period. For simulation purposes, satellite connections are always available and are not, as is currently the case, shared with command uses.

## What it doesn't do

As already mentioned, the new Harris radios (117f, 152 and 5800) are very advanced – an authentic situation matched by the simulator.

Even more complex than the radio is the way in which the signal is transferred between antennas, as an infinite number of physical factors affect the result (by comparison, consider the almost impossible job of predicting the weather).

Even the most advanced radio simulator in the world is but a shadow of the real thing, and consequently no honest substitute for hands-on experience.

It is important to note that the radio simulator is not intended as a substitute for actual radio training, but as an aid where beneficial. And the situations in which this type of training pays off have been clearly defined. The radio simulator can never fully duplicate every single technical detail of its authentic counterpart. Nor can it accurately simulate real situations, such as dirty connectors, damaged cables, improperly placed antennas and close-proximity radios causing interference. However, the radio simulator does have its fair share of benefits: in signal training, where the aim is to practice radio operation routines, there's no limit on the number of available frequencies. Radio simulators do not need to be locked away, key materials are unclassified, and complete radio sets are available at the click of a button. Lastly, the instructor always has a full view of the trainees' radio settings, which means that he or she is usually aware of any mistakes before the trainees are.



  
  
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## Where do we go from here?

Commissioned by the Danish Army Operational Command, Command Group CIS, the development of a radio simulator was not initiated due to requirement specifications, but rather as a development project to introduce contemporary methods in radio communications training. This meant that development of the system was initiated without an approved set of requirement specifications. If you are not sure what you want, how can you tell your supplier?

You can't. Instead of initiating a huge IT project for post-development presentation, and risking that users were actually looking for something else entirely, the development of the simulator is managed as an interactive project.

In short, the user builds his capacity for using the system in phases, and each phase of the system is confirmed and adjusted to match the user. The radio simulator is based on a system used by the Danish Navy.

The initial steps have been taken and experiences gained in simulating the use of army radios.

Now all that remains is to incorporate radio simulators into daily training programmes, a process guaranteed to effect change. Terrain simulation is a top priority, and simulations of radio models Harris 5800 and AN-PRC150 HF are on the agenda as well.

Also in the pipeline is connecting simulated radios and BMS training to provide a complete training package for command support.

Perspectives for improved simulation quality and training are eagerly anticipated, as the radio simulator only improves with use.

## More information

For further information please contact IFAD at +45 6311 0211 or [info@ifad.dk](mailto:info@ifad.dk).

More information about IFADs Radio Simulation (IRAS) is also available at: [www.ifad.dk](http://www.ifad.dk)