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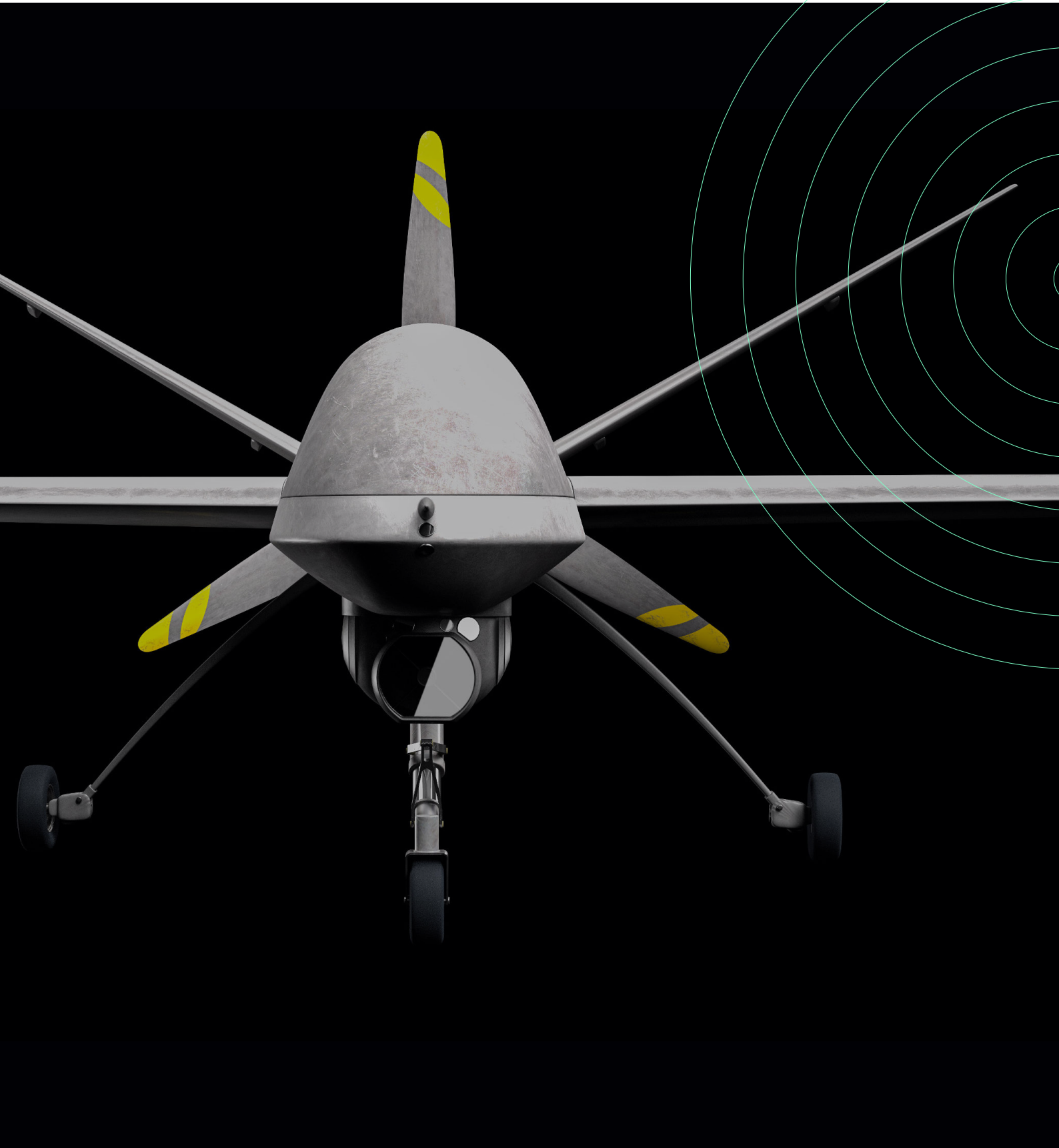
Verify and validate your UAV satcom connectivity with our Digital Twin



Digital Twin

Network emulation solutions for UAV connectivity validation

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Our Digital Twin enables end-to-end validation of your UAV satcom system without ever leaving the lab

The Digital Twin network emulator solutions are designed specifically for the Inmarsat BGAN satellite service. The solutions emulate a BGAN satellite link, radio access network and core network, right down to the RF link. By emulating the BGAN network you can validate end-to-end in a controlled environment and monitor the effects of a live BGAN network on your application, thus eliminating the need for line of sight and airtime, while at the same time enabling validation of any network scenarios.

Thorough validation is essential throughout terminal and application development and critical to final product quality delivered to end-users. Validation under live network conditions is unpredictable and can be both time consuming and costly. More importantly, some rarely occurrence network conditions might not even be obtainable for you to reproduce and validate sufficiently in the live network.

Use of an emulated network environment offers you complete control of the network conditions under which you wish to validate your terminal or applications' performance.

Full control of your validation

The Digital Twin network emulator solutions provide you with full control of your validation in an environment with specific BGAN network characteristics.

Off-Air validation

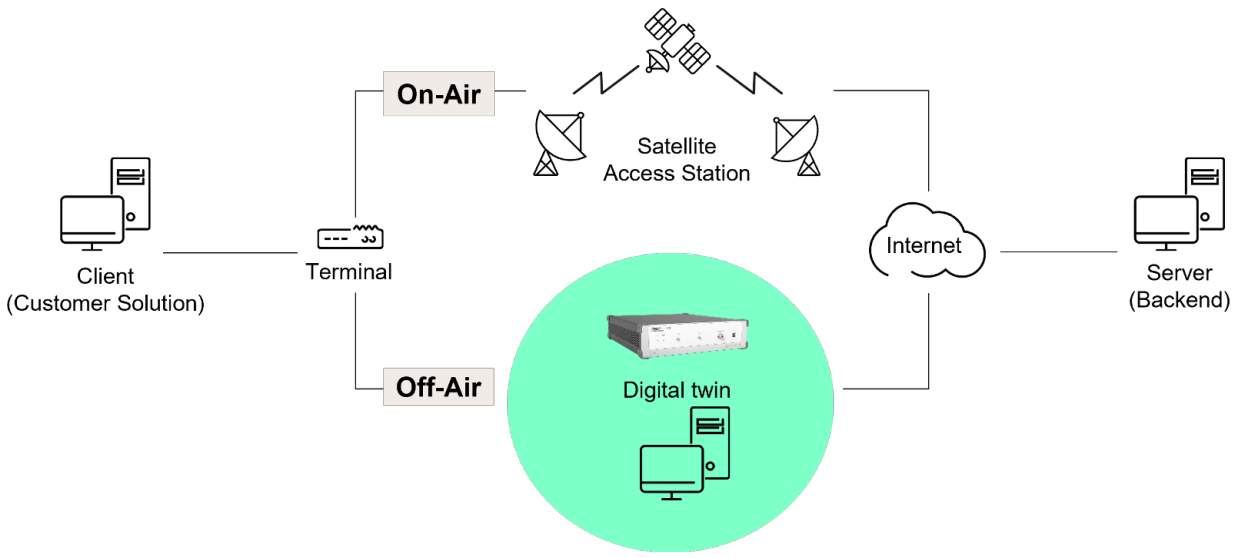
Validation Off-Air eliminates the need for line of sight and airtime while at the same time enabling validation of any network scenarios.

Optimized validation process

By eliminating the BGAN network you can validate the performance of your application in an emulated and controlled environment.

Benefits

- Reproduce any network scenario
- Repeatable end-to-end validation
- Inmarsat BGAN network specific testing
- Intuitive usage via the graphical user interface
- Improve stability and optimize for minimum airtime usage
- Validate, demo and document performance in any network scenario
- Reduce cost and time of validation efforts – no airtime or line of sight required



Why validate your UAV satcom connectivity?

Typical challenges

- Satellite network behaves differently to other networks as there are:
    - Increased connectivity link distortion due to the atmosphere and distance from the terminal up to the satellite
    - Variations in satellite connectivity bandwidth affecting throughput
    - Antenna performance variations based on flight attitude
- Challenges with establishing controlled and reproducible conditions for satellite connectivity testing
- Flight Termination System (FTS) Minimum Operational Performance Standard (MOPS) requirements

The Digital Twin lets you

- Validate, demo and document your application's performance in general
- Optimize video application codecs and compression algorithms for satellite connectivity
- Test performance of video applications in various satellite connectivity scenarios including flight attitude variations
- Enable End-to-End application mobility validation in laboratory
- Save costs and time in the application development and validation phases
- Secure enhanced reliability of application solutions
- Validate, demonstrate and document Flight Termination System (FTS) performance
- Enable Minimum Operational Performance Standard (MOPS) validation

Examples of critical validation scenarios

Mobility Validation

The Digital Twin can be used to test and validate application and terminal performance in scenarios where the terminal is mobile. The position information can be fed to the terminal using a GPS simulator, and the Digital Twin will automatically switch traffic, update location and apply proper channels. This way, it is possible to create and test any desired trajectory. The impact of e.g. moving between spot beams with different traffic characteristics can be evaluated, without the costs that are normally incurred by flying across spot beam and satellite boundaries on the live BGAN network.

Congestion Validation

The Digital Twin enables testing in areas with traffic congestion. This is used to verify that the terminal or application will provide a satisfactory user experience, even when it operates in a location with severe traffic load. Enabled through the user interface, our software will introduce latency and reduced allocation of bandwidth, caused by sharing bandwidth between multiple users on the satellite beam. Significant cost is saved compared to the travel cost and time needed to establish a traditional test set-up in a loaded spotbeam which may be thousands of kilometres away.

Validate your UAV satcom connectivity in the lab with digital twin solutions

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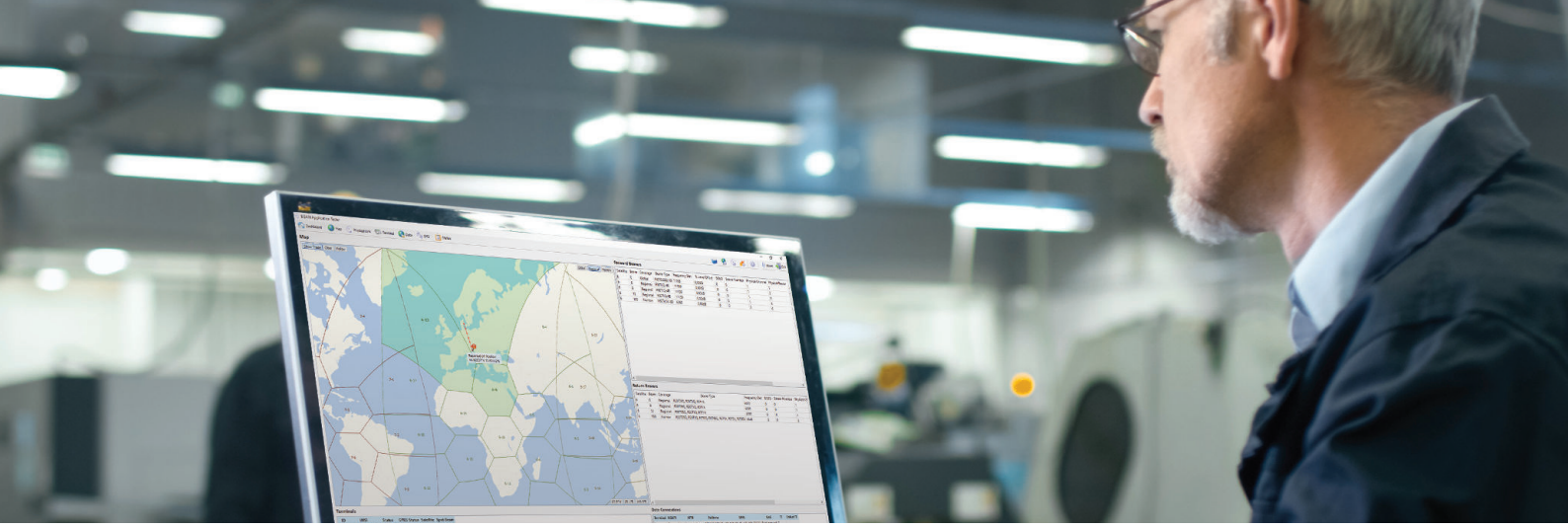


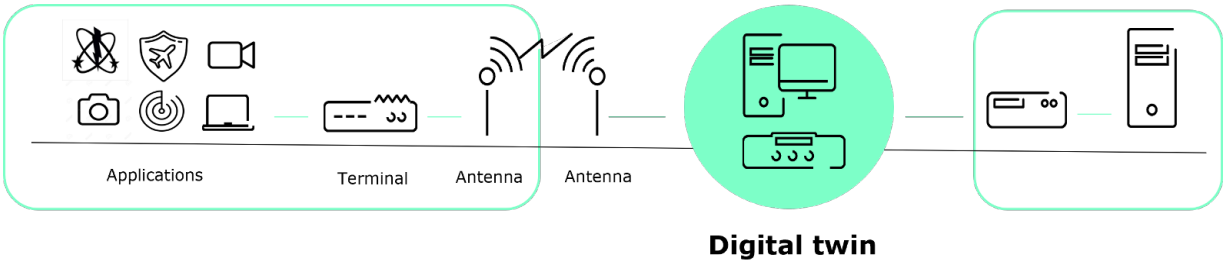
Digital Twin Technical Description

The Digital Twin network emulator solutions include a one box solution to which monitor, keyboard and mouse are connected for the user to operate the emulator. The emulator is connected either via coax RF cable or via antenna and RF shield box, to the terminal, and application level traffic is routed to an application server or the internet.

In the emulated environment, an application is able to connect to and operate a terminal as if it was connected to the live network.

The emulator solutions provide a graphical user interface designed to simplify operation. The user interface can be used to simulate a wide range of scenarios such as service rejection, which may affect the performance of the terminal, as well as the total BGAN solution or application, when deployed in the field.

Find more information on our Digital Twin emulator solutions at gatehousesatcom.com



Features

Supported Terminal Classes

- Land-Portable (Class 1, 2, 3)
- Land-Mobile (Class 10, 11, 12)
- Maritime (Class (5), 8, 9, 14)
- Aeronautical (Class 4, 6, 7, 15, 16)

Air-Interface

- Ciphering
- Idle Data Connection (RAB) Release
- Network impairments
- User data plane load impairment
- Spot beam map

Services

- Background IP
- Streaming IP
- Multiple Access Points
- Short Message Service (SMS)

User Interface

- Graphical User Interface

Logs & Traces

- High level logging

Operation

- Manual testing

Other

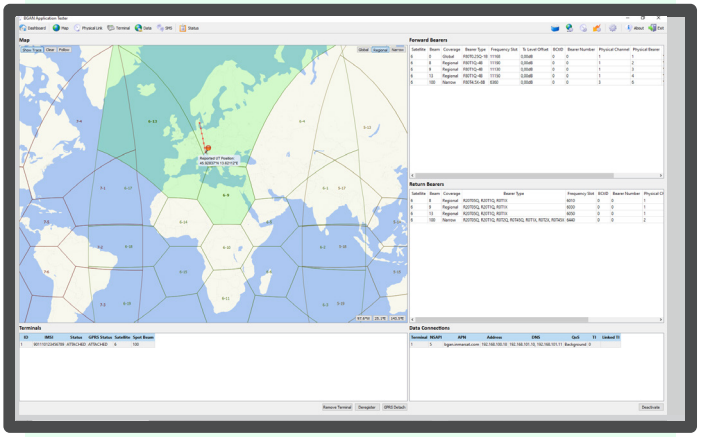
- BGAN test SIM-Card

You get

- Digital Twin software
- Remote software updates
- Test sim card
- License key
- BMCP (optional)
- RF coupler
- Antenna cable
- Training, installation, support

You already have

- BGAN terminal
- Router
- GPS simulator
- Tool for generating data
- PCs
- Application + Server



Get in touch

Get in touch to find out more about our Digital Twin emulation solutions.

Reach out to Technical Sales Manager Ole Madsen at oma@gatehouse.com or have a look at our web site at gatehousesatcom.com

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