CASE STUDY

SECUREARX USAGE SCENARIO

Introduction

SecureARX modem is a satellite modem designed in accordance with high security standards, with frequency hopping and EPM (Electronic protective measures) features. This device is fully compatible with NATO STANAG 4606 standard and has been specially developed to be used against jamming effects. It provides secure satellite communication with TRANSEC, NETSEC and COMSEC. SecureARX provides critical communication support at various stages of operations by providing protection against electronic interference.

The General Structure of the SecureARX System is shown in Figure 1.

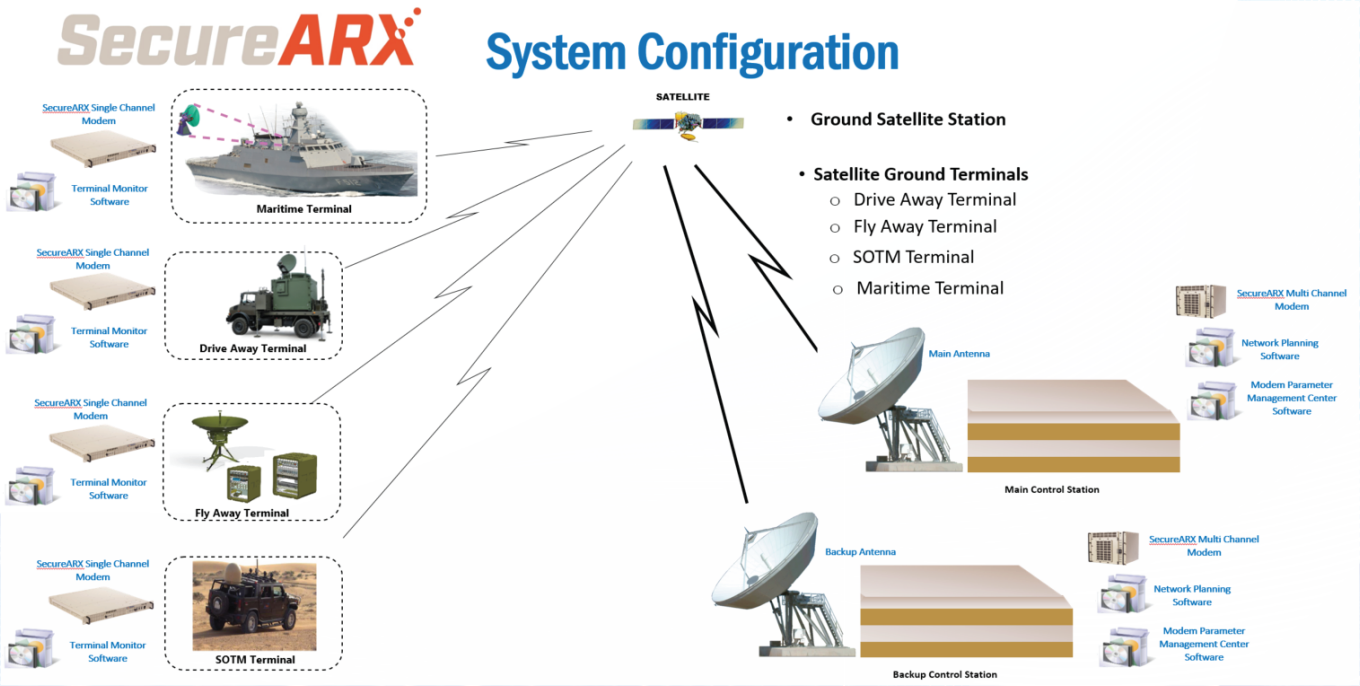

Figure 1 General Structure of SecureARX System

Technical Features and Advantages

Frequency Hopping Communication

Frequency hopping communication technology makes jamming attempts and communication monitoring by the enemy more difficult. Thanks to this technology, communication is established by frequency hopping thousands of times per second, and in a jamming operation against a satellite, frequency hopping maximizes security.

EPM Compatibility
EPM (Electronic Protective Measures) compatibility ensures that modems are resistant to electronic disruptive measures. Thanks to EPM algorithms, it reduces disruptive effects and increases communication security.

Security Features
Equipped with powerful encryption algorithms including TRANSEC, NETSEC and COMSEC, SecureARX modem maximizes data security. It has military-level security certificates and provides protection at international security standards.

Data Rates and Protocols
SecureARX Modem supports various data rates up to 32 Mbps and is compatible with different communication protocols. It supports Mesh and Star topologies. This provides flexibility according to operational needs and enables easy integration into various military communication networks.

Usage Scenarios

Scenario 1: Military Convoy Communication

Actors

- **Convoy Commander:** He is the leader responsible for the operational management of the convoy. He ensures the coordination of the vehicles in the convoy by establishing secure communication via SecureARX.
- **Vehicle Operators:** They are operators who communicate via the SecureARX modem found in every vehicle. They ensure the functionality of the modems and the security of communication.
- **Command Center:** It is the center that carries out the general monitoring of the operation and is in constant communication with the convoy.

Scenario Steps

1. Start of Mission
While the convoy is moving near enemy lines, SecureARX modems in all vehicles are activated and communication security is ensured. Before the mission, the modems are tested for connection and made operationally ready.

2. Modem Activation
SecureARX modems using frequency hopping communication are activated and a secure connection is established between vehicles. The operational communication network is protected against enemy communications monitoring attempts.

3. Real Time Communication
The convoy commander ensures that orders are delivered quickly by establishing uninterrupted communication with each vehicle. At the same time, information from the command center is transferred to vehicle operators in real time. Thanks to the mesh topology, vehicles also communicate with each other in real time.

4. Communication Security
SecureARX uses cryptographic methods to prevent interception attempts by the enemy.

5. End of Mission
Once the convoy reaches its destination safely, the SecureARX modems are shut down in an orderly manner. Operational reports are transmitted to the command center, completing the mission successfully.

Scenario 2: Naval Operations

Actors

- **Fleet Commander:** The leader who is responsible for management of the fleet and communication of ships.
- **Ship Operators:** Technical managers of SecureARX modems on ships.
- **Naval Supreme Command:** The center that gives directions to the fleet and analyzes operational data.

Scenario Steps

1. Start of Mission
During a maritime operation, the connections of SecureARX modems on all ships are checked and activated. During this process, pre-planned communication protocols between ships are activated.

2. Frequency Hopping Communication
The frequency-hopping communication technology of SecureARX modems provides resiliance against electronic jamming. Data communication between ships is carried out securely.

3. Commander Communication
The fleet commander coordinates the operation with strategic orders to the ships. The commander's instructions are delivered to the ship operators in coordination with the naval supreme command.

4. Communication Security
SecureARX modems protect the communication network against enemy interception with crypto encryption and security algorithms.

5. End of Mission
After the operation is completed, all modems are turned off and security measures are reviewed. Mission reports are submitted to the naval supreme command by the fleet commander.

Scenario 3: Air Operations

Actors

- **Pilot:** The person who operates the aircraft and manages data transfer via the SecureARX modem.
- **Ground Control Station:** The team that analyzes the data coming from the aircraft in real time and gives instructions.
- **Intelligence Analysts:** Experts who support operational decisions by analyzing the collected intelligence.

Scenario Steps

1. Start of Mission
The SecureARX modem on the aircraft that will go on an intelligence gathering mission is pre-tested and activated before the flight. The communication protocol determined for the operation is synchronized between the pilot and the ground control station.

2. Data Transmission
The aircraft securely transmits the images and data it obtains to the ground control station via satellite in real time. During data transfer, high encryption layers are kept active to prevent enemy interception. Frequency-hopping technology of SecureARX modems provides resiliance against electronic jamming of satellite.

3. Data Analysis
The ground control station contributes to operational decisions by quickly analyzing data from the aircraft. The data obtained is evaluated in detail by intelligence analysts.

4. End of Mission
When the mission is over, the SecureARX modems are turned off to secure the communication network. Data collected by the aircraft is transferred to the ground control station for archiving and analysis.

Scenario 4: NATO Exercise

Actors

- **Exercise Command Center:** The central command team that manages the NATO exercise and coordinates all units.
- **Participating Units:** Military vehicles, ships, aircraft and headquarters of NATO member countries in the field.
- **Communication Operators:** Expert teams that manage SecureARX modems and ensure communication security.

Scenario Steps

1. Mission Preparation
A large-scale exercise is organized to increase cooperation among NATO countries. Before the exercise, tests are conducted to ensure that SecureARX modems work in harmony with all systems and adjustments are completed in accordance with NATO standards. Communication protocols are updated in line with the exercise scenario.

2. Modem Activation
SecureARX modems are activated in frequency hopping mode to resist electronic jamming. The communication network is prepared for the integration of all units in the field.

3. Multi-Platform Integration
SecureARX modems provide uninterrupted communication between units on land, in the air and at sea. Different communication standards from NATO member countries are quickly adapted with help of to the flexible structure of the modems. With mesh topology, the platforms provide direct real-time communication with each other.

4. Electronic Jamming Tests
During the exercise, enemy electronic satellite jamming simulations are carried out and the durability of SecureARX modems is tested. These tests are critical to assessing the security level of the NATO exercise.

5. Mission Evaluation
After the exercise, the performance of SecureARX modems is reported and suggestions for improving the system are presented. The contributions to the NATO communications infrastructure are analyzed and reports are sent to the relevant units.

Implementation and Integration

Integration of SecureARX modems into military communication systems provides ease of use and operational flexibility. The modems has user-friendly interfaces, enabling fast and effective use across different military platforms (manpack, ship, aircraft, ground vehicle). This integration supports the secure sharing of critical operational data and timely strategic decision-making.