LEADING Change
Inspiring Progress

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Federated multidomain 5G test ranges in NATO countries

Speakers

Ted K. Woodward, Ph.D.

Technical Director, FutureG Office, U. S. Dept. of Defense

Mr. Antonio Calderón

CTO at NATO Communications & Information Agency (NCIA)

General Federico Juste

Deputy Commanding Officer of Spanish Cyberspace Joint Command

Mr. Jesús Abraham

Defence Innovation Head, Telefónica España

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NATO Digital Backbone Experimentation (DiBaX) 2024

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NATO DiBaX and its Objectives

NATO Allied Command Transformation (ACT) Led Event that:

1. Brings cutting edge next generation communications demonstration, testing and experimentation to operators in their environment to enable Multi-Domain Operations through the Digital Backbone
2. Uses multiple emerging and disruptive technologies to push exploitation by NATO and nations
3. Develops a digitally ready workforce
4. Shares Best Practices from NATO and nations
5. Aligned with capability development needs of the Digital Backbone
6. Complements other Innovation and Interoperability activities

DiBaX 2024 Objectives:

- Test Secure, interoperable, resilient information exchange with multinational military users
- Explore current abilities and limitations of connectivity to Unmanned Vehicles (UxV) through next generation communication networks
- Experiment on the performance of technologies to provide ubiquitous connectivity on sea and in the air
- Demonstrate technologies to improve support to NATO Deployable Systems
- Support Multi-Domain Operations Concept through wargaming
- To develop procedures and technologies to support NATO Energy Management (EnM) Concept

NATO ACT: NATO sponsor for DiBaX
Latvia: Host nation for primary DiBaX venue

Note: Remote participation in DiBaX included: USA (Institute of Electrical and Electronic Engineers (IEEE) Military Communications Conference (MILCOM)), Michigan Air National Guard (MI ANG), Italy, Spain, Norway and Sweden

From Left to Right: NATO ACT Warren Low, Latvia Minister for Defence Andris Sprūds, Latvia Prime Minister Evika Silina, Estonia Prime Minister Kristen Michal, NATO Capabilities HQ SACT Assistant of Staff Major General Hayrettin Koca, Principal Director FutureG Dr. Thomas Rondeau; LMT President Juris Binde

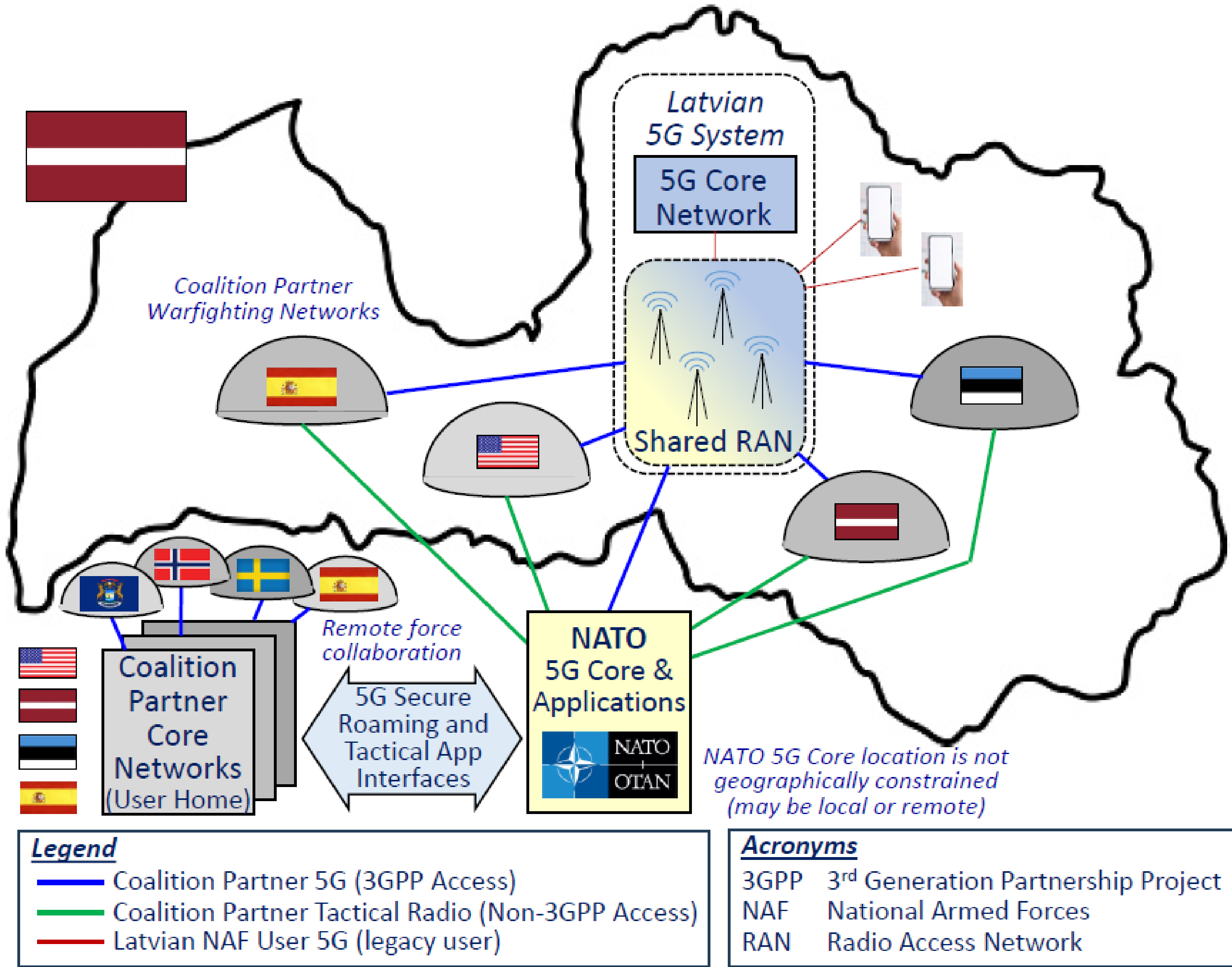LMT Unmanned Service Vessel (USV) (left) and Latvian Skrunda boat (right)

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NATO Digital Backbone Experimentation (DiBaX) 2024

DoD Contributions: SIR-5G

- **Objective:** Employ standard 5G capabilities to provide a scalable, interoperable, and resilient warfighting network for NATO

- **Contributions:** Integrated demonstration of 5G secure roaming, RAN Sharing with a commercial telecommunications provider, and internetworking between a 5G core and a heterogeneous group of tactical radios. These technologies enabled control of autonomous air/ground vehicles, automatic transition between 5G and tactical waveforms, and access to a common operational picture among six NATO allies during a mechanized assault by the Multinational Brigade (MNB).

- **Warfighter Impact:**

  - **Scalability**—Use host nation RAN Sharing with a NATO 5G core and secure roaming to maximize coverage and rapidly achieve shared situational awareness

  - **Interoperability**—Supports information exchange among NATO allies using their organic tactical radios and commercial 5G mobile devices

  - **Resilient Communications**—Provides the warfighter with options to employ the best waveform(s) (tactical, 5G, or both) for each phase of the mission

Legend
— Coalition Partner 5G (3GPP Access)
— Coalition Partner Tactical Radio (Non-3GPP Access)
— Latvian NAF User 5G (legacy user)

Acronyms
3GPP   3rd Generation Partnership Project
NAF   National Armed Forces
RAN   Radio Access Network

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NATO Digital Backbone Experimentation (DiBaX) 2024

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MILCOM Technology Demonstration Summary

On October 29, 2024, the FutureG Office co-hosted a technology demonstration with NATO ACT at the IEEE MILCOM in Washington, DC.

The demonstration connected a 5G mobile device at MILCOM into the exercise network of DiBaX simultaneously taking place at the Adazi Military Base in Latvia. The connection provided access to the exercise common operational picture and multiple video feeds from unmanned air and ground platforms.

Conference attendees witnessed a demonstration involving NATO forces leveraging 5G capabilities to conduct a nighttime simulated mechanized assault and casualty evacuation. The demonstration provided a clear and compelling operational use case for how 5G can provide scalable, interoperable, and resilient communications for NATO forces.

Principal Director FutureG Dr. Tom Rondeau briefing SIR-5G demo at IEEE MILCOM in Washington, D.C.

Director FutureG LtCol Ben Pimentel briefing SIR-5G demo at IEEE MILCOM in Washington, D.C.

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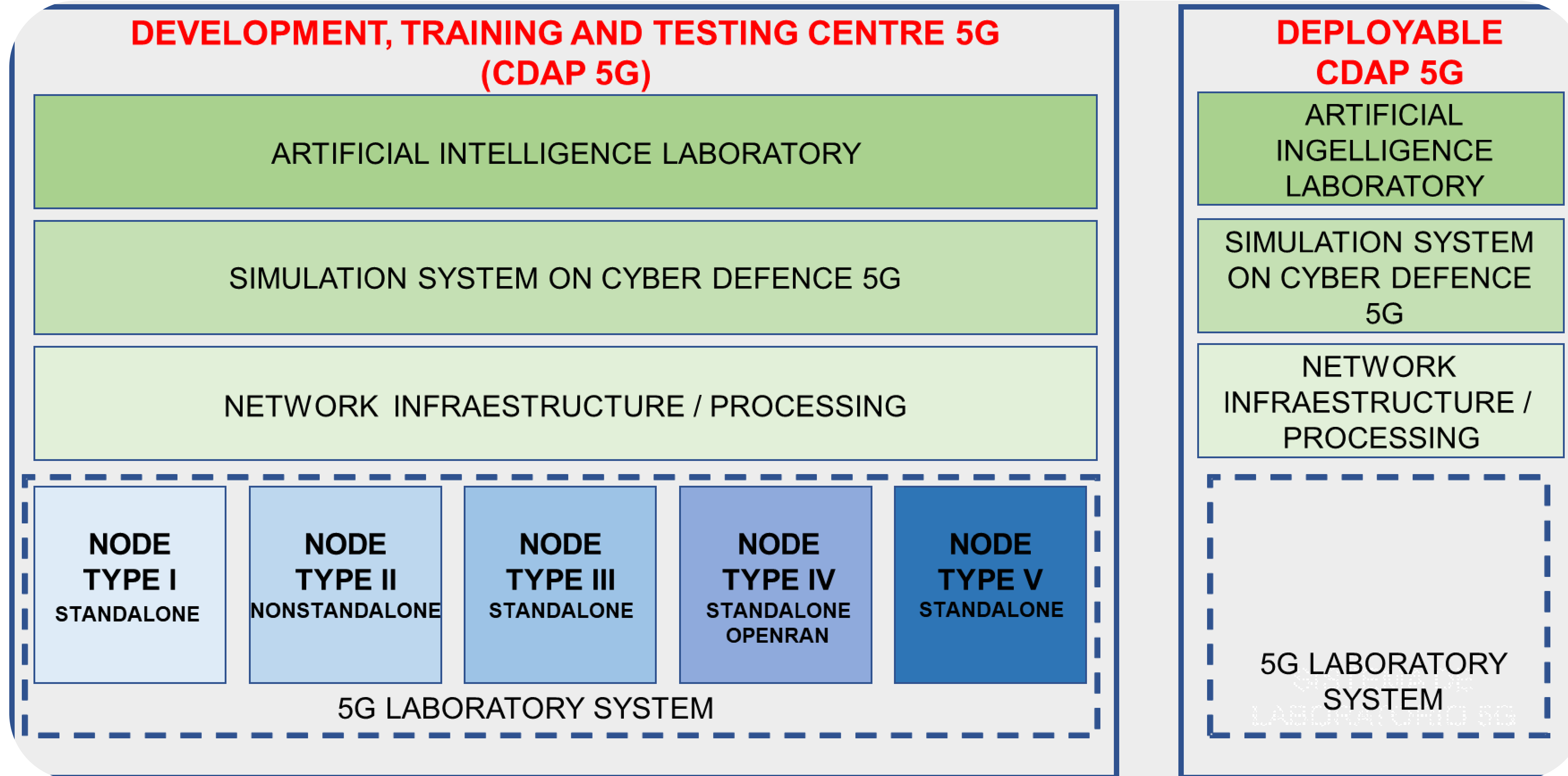
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SPANISH CIBERSPACE JOINT COMMAND & 5G

"It is not a question will the military use 5G technologies, but how will it do so, in particular, by tackling security challenges in order to prevent disastrous consequences."

Rear Admiral René Tas, Assistant Chief of Staff, HQ SACT, at the start of first Joint 5G Military Security Workshop (3FEB21)

SPANISH CIBERSPACE JOINT COMMAND & 5G

NEW CENTRE FOR MILITARY OPERATIONS ON CYBER DEFENCE WITH 5G TECHNOLOGY (CDAP 5G DEF)

DEVELOPMENT, TRAINING AND TESTING CENTRE 5G (CDAP 5G)

- ARTIFICIAL INTELLIGENCE LABORATORY
- SIMULATION SYSTEM ON CYBER DEFENCE 5G
- NETWORK INFRAESTRUCTURE / PROCESSING

| NODE TYPE I STANDALONE | NODE TYPE II NONSTANDALONE | NODE TYPE III STANDALONE | NODE TYPE IV STANDALONE OPENRAN | NODE TYPE V STANDALONE |

5G LABORATORY SYSTEM

DEPLOYABLE CDAP 5G

- ARTIFICIAL INGELLIGENCE LABORATORY
- SIMULATION SYSTEM ON CYBER DEFENCE 5G
- NETWORK INFRAESTRUCTURE / PROCESSING
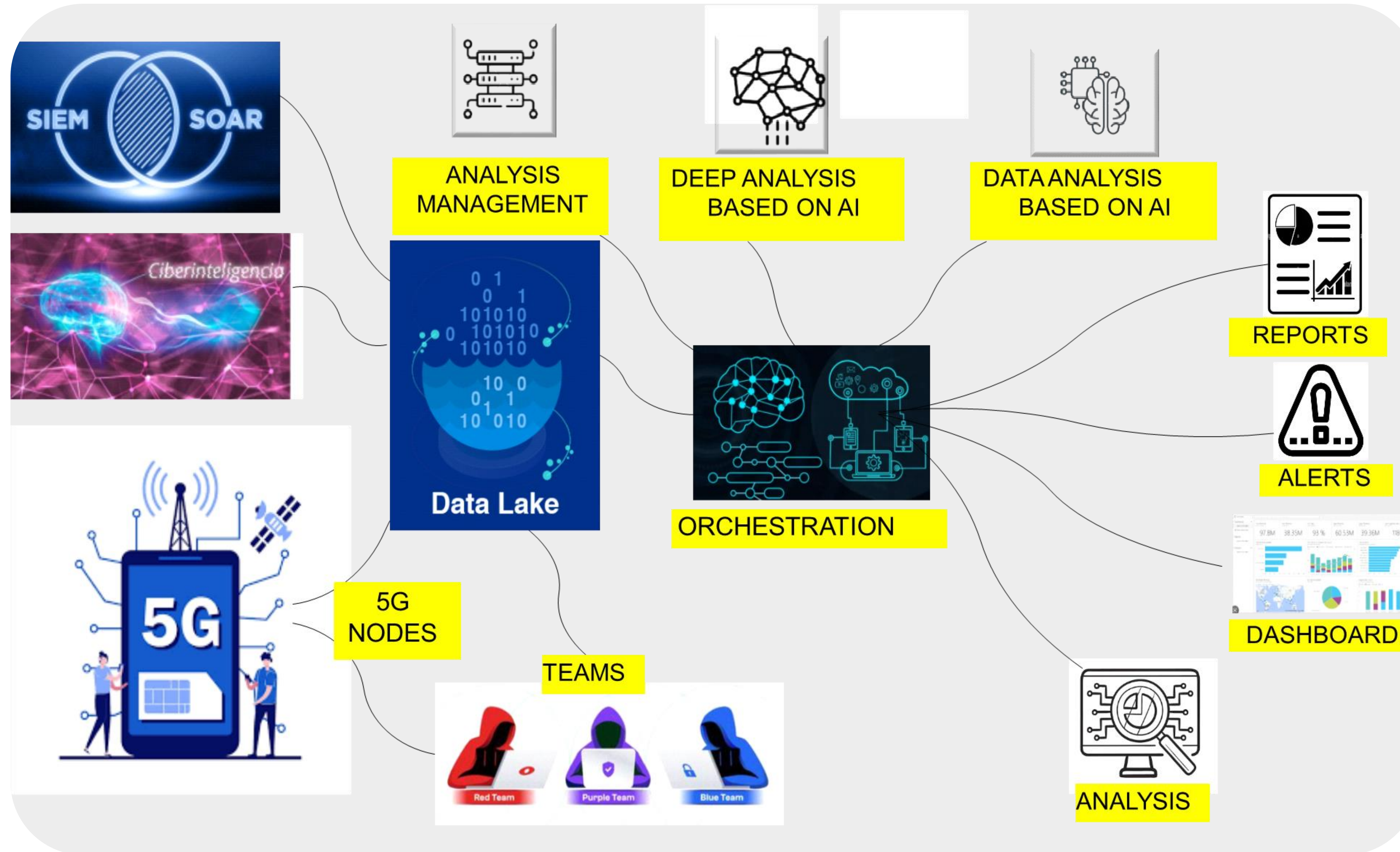
5G LABORATORY SYSTEM

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SPANISH CIBERSPACE JOINT COMMAND & 5G

NEW CENTRE FOR MILITARY OPERATIONS ON CYBER DEFENCE WITH 5G TECHNOLOGY (CDAP 5G DEF)

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SPANISH CIBERSPACE JOINT COMMAND & 5G

NEW CENTRE FOR MILITARY OPERATIONS ON CYBER DEFENCE WITH 5G TECHNOLOGY (CDAP 5G DEF)

5G USER DEVICES
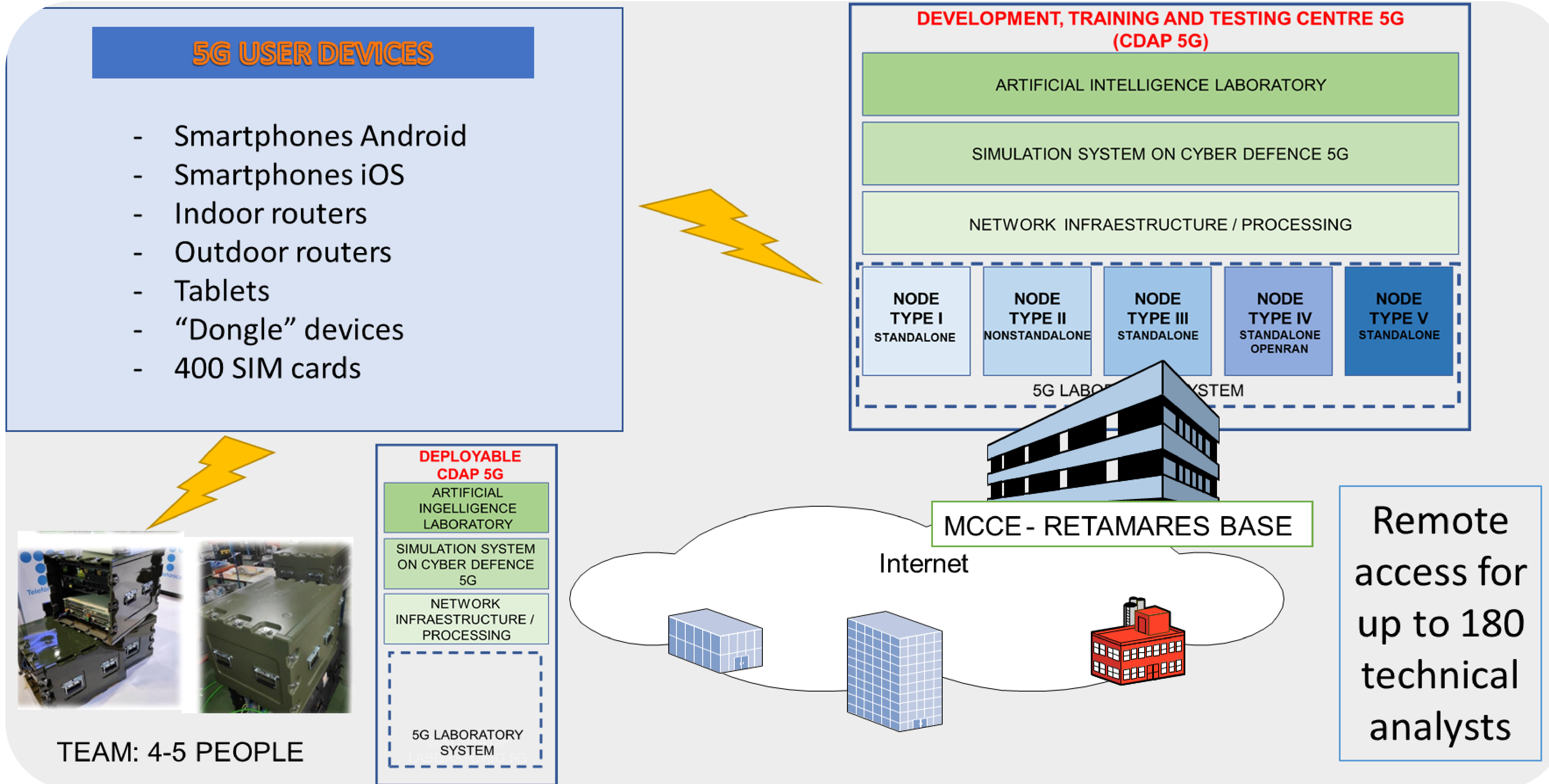
- Smartphones Android
- Smartphones iOS
- Indoor routers
- Outdoor routers
- Tablets
- "Dongle" devices
- 400 SIM cards

DEVELOPMENT, TRAINING AND TESTING CENTRE 5G (CDAP 5G)

ARTIFICIAL INTELLIGENCE LABORATORY

SIMULATION SYSTEM ON CYBER DEFENCE 5G

NETWORK INFRAESTRUCTURE / PROCESSING

| NODE TYPE I STANDALONE | NODE TYPE II NONSTANDALONE | NODE TYPE III STANDALONE | NODE TYPE IV STANDALONE OPENRAN | NODE TYPE V STANDALONE |

5G LABORATORY SYSTEM

DEPLOYABLE CDAP 5G

ARTIFICIAL INGELLIGENCE LABORATORY

SIMULATION SYSTEM ON CYBER DEFENCE 5G

NETWORK INFRAESTRUCTURE / PROCESSING

5G LABORATORY SYSTEM

TEAM: 4-5 PEOPLE

MCCE - RETAMARES BASE

Internet

Remote access for up to 180 technical analysts

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SPANISH CIBERSPACE JOINT COMMAND & 5G

FUTURE JOINT, DISTRIBUTED AND MULTI-DOMAIN NEXT GENERATION NETWORKS (5G) TEST SITES

- 5G network infrastructure deployed to perform **military Use Cases *Test, Evaluation, Validation and Verification*** in a controlled environment.

- Based on **deployments of private 5G networks in different platforms, locations and training fields** that will be interconnected by a high speed network, allowing joint, distributed and **Multi-Domain experiments.**

- Those private 5G nodes will be connected to the CENTRE FOR MILITARY OPERATIONS ON CYBER DEFENCE WITH 5G TECHNOLOGY, **to ensure ciberdefense of networks and devices connected**.

- State: Feasibility Study.

- Future: Connect through 5G CENTER with other UE and NATO 5G Test Sites and running multinational 5G scenarios.

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NATO Digital Foundry

MN5G

Multinational Collaboration on 5G (MN5G)

> **MN5G Aim:** *Effectively and efficiently exploiting the potential of 5G and beyond technologies in military applications*

Common interests & priorities:

- **Interoperability & Standardization**
- **Capability Development**
- **Security**
- **Spectrum**
- **Adopt NATO STANAG 5665 (mil 5G)**

Benefits:

- **Economies of scale & increased strength**
- **Influence & leadership**
- **Collaborative approach**
- **Synergies with other initiatives**
- **De-risking capability programmes**

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