Implementation of Defence Use Case in the Norway Facility site

Dr. Pål Grønsund, Telenor Research, 5G-VINNI Coordinator

5GPPP/AIOTI Replicability Initiative, Online, 28th Jan 2021

(Horizon 2020 ICT-17 project)
5G-VINNI (5G Verticals INNovation Infrastructure)

- Build an open large scale 5G End-to-End facility that can
  - demonstrate that key 5G network KPIs can be met
  - be used by vertical industries to test use cases and validate 5G KPIs
- Consortium: 23 partners (operators, vendors, academics, SMEs)
- External Stakeholder Board (vertical industries)
Services offered by 5G-VINNI to Verticals for Experimentation (Main Facility Sites)

**Network Slice-as-a-Service (NSaaS)**
- eMBB network slice as a service
- uRLLC network slice as a service
- mIoT network slice as a service
- Customised network slice

**Value Added Services**
- Monitoring-as-a-Service
- Testing-as-a-Service
- Security-as-a-Service
- 3rd party VNF hosting
- Distributed data fabric
- Edge and Autonomous Edge
- Flexible backhaul for redundancy (e.g. Satellite)
- Interconnection with other 5G sites

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5G-VINNI Norway Facility site and relation to Verticals

<table>
<thead>
<tr>
<th>Vertical Customers Use Cases</th>
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<tbody>
<tr>
<td>Public Safety</td>
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<tr>
<td>eHealth</td>
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<tr>
<td>Factory 4.0</td>
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<tr>
<td>Media Entertainment</td>
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<tr>
<td>University Network</td>
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<td>Private Networks</td>
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<td>Media Broadcasting</td>
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<td>Aquaculture</td>
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<td>Smart Port</td>
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<td>Smart Cities</td>
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<td>Fixed Wireless Access</td>
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<td>5G Virtual Office</td>
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</tbody>
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Strategically selected sites:
- 3.6 GHz - 5G
- 26 GHz - 5G
- 2.1 GHz - 4G
- Satellite (GEO)

E2E Orchestration and Automation
(Slicing support, Automation, Assurance, Fulfilment)

Terminals | Base stations | Transport | Core network |
---|---|---|---|
5G-VINNI | Ericsson | Keysight | Cisco

Cloud / Virtualization
- Primary sites
- Edge sites
Why is 5G interesting for military use?

**Open Standards and Interoperability**
A new threat picture > Collaboration in the “Total Defence” is needed

**5G New Radio**
MIMO/Beamforming > Robust and reliable communication

**Network Slicing**
Dedicated Defence NW slice > Separation from commercial traffic

**Edge Computing**
Services can run autonomously in the “edge” of the network


Foto: Johan Ludvig Holst/ Forsvare
Defense use cases are highly demanding, with requirements also important for other verticals

- Dedicated Defense Slice (a.k.a. private network), full isolation.
- Voice and Push-To-Talk (PTT) with End-to-End encryption.
- Priority when required (e.g. disaster, war)
- Autonomous Mobile Edge
- Satellite backhaul for redundancy on certain sites
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Slices implemented with 5G StandAlone (SA) and Non-StandAlone (SA)

- Defence demo: [https://youtu.be/-QGzh_aoWzI](https://youtu.be/-QGzh_aoWzI) and [https://youtu.be/R5uvcx6Xy6o](https://youtu.be/R5uvcx6Xy6o)
- SA 5GC demo: [https://youtu.be/BGUuxt4zURE](https://youtu.be/BGUuxt4zURE)
- Orchestration demo: [https://youtu.be/pH2foKVLtte](https://youtu.be/pH2foKVLtte) and [https://youtu.be/Koe7GA4bbcc](https://youtu.be/Koe7GA4bbcc)
5G-VINNI Norway Facility site Architectural Framework
Implementation of the Dedicated Slice with the Norwegian Defence

Key features
- Fully isolated slice
- Priority when required
- Autonomous Mobile Edge
- 3rd party apps
- Satellite for redundancy / coverage on-demand

Diagram:
- Devices
- 5G/4G Radio
- Transport network
- Edge Cloud
- Transport network
- Central Cloud
- Internet
- Public Clouds
- Private Clouds

Clouds:
- Mobile Core
- Voice (IMS)
- Voice (IMS/OTT)
- Push-to-Talk (PTT)
- Hermod – P2P comm
- Security-as-a-Service
Please contact 5G-VINNI for further information, discussion and interest

• Web page: [http://www.5g-vinni.eu/](http://www.5g-vinni.eu/)
• Twitter: [@5gVinni](https://twitter.com/5gVinni)
• E-mail: 5G-VINNI-Contact@5g-ppp.eu
• Youtube channel

• norway-facility@5g-vinni.eu
• uk-facility@5g-vinni.eu
• spain-facility@5g-vinni.eu
• greece-facility@5g-vinni.eu
• portugal-facility@5g-vinni.eu
• germany-berlin-facility@5g-vinni.eu
• germany-munich-facility@5g-vinni.eu
• luxemburg-facility@5g-vinni.eu