An Roinn Caiteachais Phoiblí Bonneagair
Athchóiriúcháin Seirbhíse Poiblí agus Digitiúcháin
Department of Public Expenditure Infrastructure
Public Service Reform and Digitalisation

Druid

CASE STUDY

NATIONAL MULTI-OPERATOR PPDR NETWORK

FOR FIRST RESPONDERS

Critical Infrastructure for Ireland's Emergency Services and Civil Defence.

OVERVIEW

The Office of the Government Chief Information Officer (OGCIO) in Ireland, in partnership with mobile core network software provider Druid Software, has established a national roaming arrangement across all three major commercial mobile network operators; Eir, Three Ireland and Vodafone, to provide a Public Protection and Disaster Relief (PPDR) network.

Designed for mission-critical communications used by frontline public safety agencies, this multi-operator framework ensures that first responders automatically connect to whichever participating mobile network offers coverage. Built on Druid Software's Raemis™ core platform, the system bridges dedicated private cellular networks with national commercial cellular infrastructure, delivering seamless broadband connectivity for voice, video, mapping and operational data.

The Irish Government's Perspective

Frank Feighan
Irish Minister of State with responsibility for Public Procurement, Digitalisation and eGovernment



> *This roaming arrangement is the result of sustained engagements by the OGCIO [Office of the Government Chief Information Officer], all three mobile network operators and the mobile Core partner Druid Software. This agreement will enable emergency services mobile devices to benefit from access to every mobile network in the country improving coverage, resilience, and service continuity.*

1. Strategic Background & Operational Triggers

When responding to major incidents or sudden loss of communications, first responders (police, fire, ambulance, Civil Defence and health services) lacked a unified, high-speed mobile network which resulted in operational hurdles:

- **Legacy Radio Limitations:** For over two decades, emergency services depended on TETRA (Terrestrial Trunked Radio) narrowband networks. While effective for basic voice and short messaging, TETRA lacks the bandwidth required to stream live video or support high bandwidth real-time data.
- **Single-Carrier Vulnerability**: Relying on a single commercial mobile operator left responders vulnerable to local coverage blackspots, carrier congestion during major incidents and single-network outages.
- **Transition to Broadband:** Modern public safety operations require migration to high-speed 4G/5G mobile broadband while aligning with the EU Critical Communications System (EUCCS).

Alignment with the European Critical Communications System (EUCCS):

Under the direction of the European Commission (DG HOME), European Union member states are actively executing a coordinated mandate to transition critical public safety communications from fragmented legacy radios to standard 4G/5G mobile broadband networks.

A primary European directive driving Ireland's national roadmap is the EUCCS initiative (led by DG HOME). EUCCS aims to deliver cross-border operational interoperability across member states. Under this mandate, first responders must be able to seamlessly roam crossborder to member networks while retaining secure access to their home agency's Mission-Critical Services (MCX) push-to-talk, video and data applications.

2. Challenges

Public safety agencies faced specific operational constraints under legacy setups:

- **Coverage Gaps & Single-Point Failure:** Single-operator SIMs led to lost signal in remote areas or during local tower outages.
- **High Bandwidth Demands:** Field teams needed to transmit real-time telemetry, drone video feeds, and high-resolution mapping, which legacy PMR/TETRA radios cannot handle.
- **Multi-Agency Interoperability:** Coordinating police, fire, ambulance and Civil Defence required a unified, resilient network architecture that works across all carrier footprints.



Backhaul Challenge

When you deploy a localised mobile network to cover an emergency site or blackspot, the onsite small cells (the eNodeB/gNodeBs) handle the critical devices. If all connectivity to the outside world is completely severed (no fiber, no satellite, no commercial cellular backhaul), those small cells running a standalone local core can keep emergency crews talking and sharing data within that local coverage. However, to connect those frontline responders back to central command, access national databases, stream live video to regional dispatchers or manage group talkgroups across the entire country, that "bubble" must backhaul to regional or national HQs.



EU Interoperability Challenge

Transitioning to mission-critical mobile broadband requires compliance with European directives for the European Critical Communication System (EUCCS). While legacy TETRA networks provided standardised voice interoperability across borders, they could not match the capabilities of cellular technology to enable real-time video sharing, spatial mapping and diagnostic data. But this increased capability makes cross-border authentication, specialised priority traffic steering and localised session survivability complex to execute.



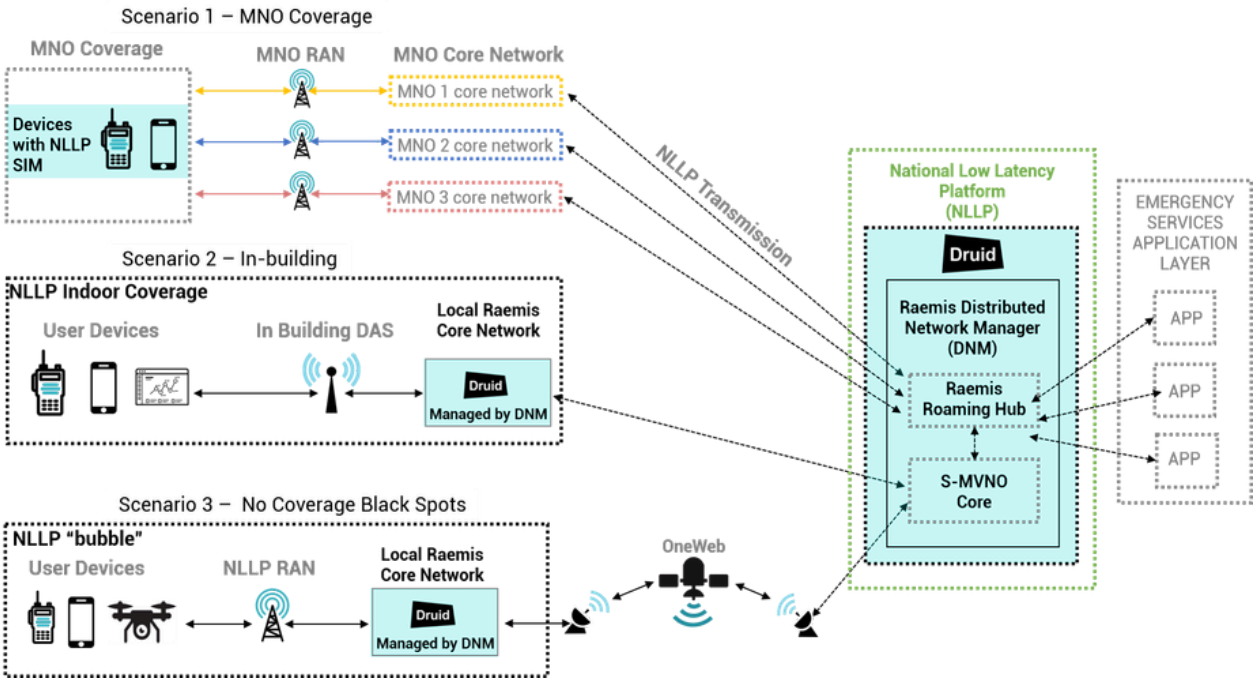
Carrier Dependency Challenge

Attempting to deploy broadband PPDR directly on commercial cellular networks without an independent, vendor-agnostic private core creates heavy reliance on single-carrier infrastructure. This leaves public safety agencies without direct governance over SIM management, network configuration or specialised priority traffic steering, while exposing operations to vendor lock-in and commercial network outages.

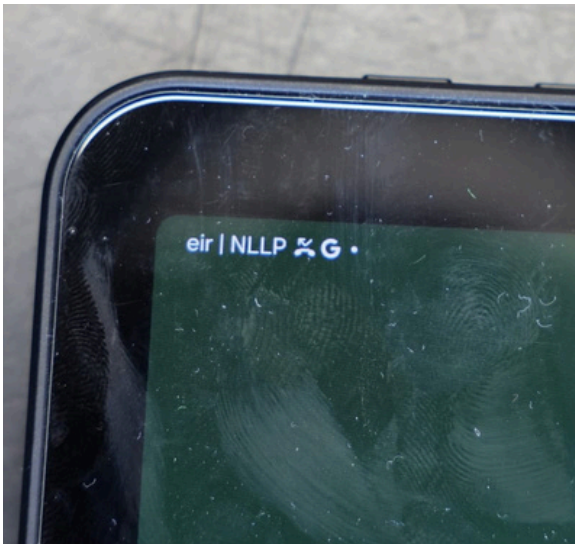
3. Network Overview

The OGCIO engineered a hybrid multi-operator and deployable edge architecture powered by Druid's Raemis™ platform, which connects critical devices to the The National Low Latency Platform (NLLP). The NLLP is Ireland's secure, high-speed digital network and computing infrastructure designed to connect government bodies, boost rural connectivity and power next-generation emergency services. NLLP uses the Raemis platform in a few ways:

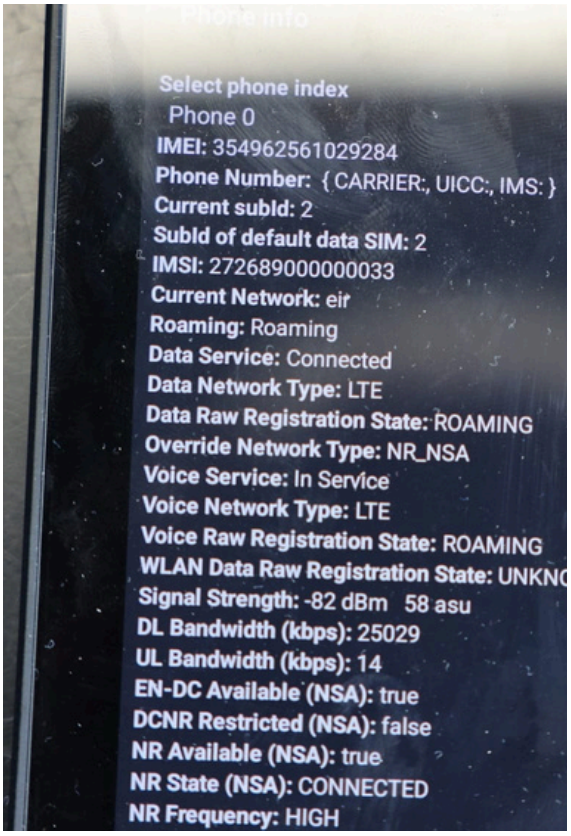
1. **MNO Roaming:** The Raemis Roaming Gateway is being used to connect NLLP devices on MNO coverage to the NLLP. Work will soon be completed on Rx interface implemention which will enable dedicated Quality of Service (QoS) across the MNO networks to prioritise voice, video and mission-critical data streams for NLLP devices.
2. **In-building:** To provide in-building coverage wtih Distributed Antennae Systems (DAS) on N77 spectrum with a local Raemis Core.
3. **No Coverage Black Spots**: For deployments in remote sites where first responders will deploy NLLP RAN and local Raemis core as there is no commercial MNO coverage available. The platform overcomes backhaul constraints by integrating OneWeb LEO satellite links directly into the local Druid Raemis™ core network, bridging isolated local bubbles back to national dispatch and central databases.



- **EU Interoperability**: By utilising a sovereign, 3GPP-standardised private core running over the NLLP, the architecture delivers high-throughput MCX data while complying with EUCCS directives for secure cross-border authentication, standardised talkgroup management and priority traffic steering.



A device connected to both:
***NLLP** (the sovereign government core network) and **eir,** one of the three underlying commercial mobile network operators hosting the radio connection.*



National roaming in action: Frontline NLLP SIM attached to eir (Roaming: Active, 5G NSA: Connected), anchored back to the NLLP Home Raemis private core.

- **No Dependancy on Carriers:** Operating a state-owned core network connected to commercial carriers via roaming protocols eliminates single-carrier lock-in while providing resilient, multi-operator national roaming across eir, Vodafone and Three.
- **Central & Edge Private Core:** Powered by Druid's Raemis™ platform, hosting centralized MCX applications with edge nodes capable of running local survivable cores.
- **Multi-Operator National Roaming:** Emergency SIM cards dynamically roam across eir, Three Ireland and Vodafone networks, automatically selecting the strongest signal.
- **Tactical Satellite "Bubble" Connectivity:** Low Earth Orbit (LEO) satellite links (via OneWeb) combined with deployable LTE/5G nodes deliver localized coverage "bubbles." This architecture achieved sub-160ms return latency back to the Dublin core, matching legacy TETRA standards over satellite.
- **Vehicle & Maritime High-Power Amplifiers:** In-car vehicle setups and Rigid Inflatable Boats (RIBs) fitted with high-power RF amplifiers significantly extend cellular broadband range far out into maritime areas.
- **Airborne LTE/5G Relays:** Aerial platforms (manned aircraft/drones) fitted with low-power eNodeBs/gNodeBs create airborne coverage bubbles, streaming live video directly to ground command vehicles.
- **Rx Interface Integration:** Creates a dedicated bearer between the Home NLLP core and the commercial MNO networks, enabling dynamic, real-time Quality of Service (QoS) orchestration and priority preemption so mission-critical emergency traffic is prioritized over standard consumer data during network congestion.

4. Outcomes



Jack Chambers

Minister for Public Expenditure, Infrastructure, Public Service Reform and Digitalisation

> *This new national roaming arrangement will help ensure that emergency personnel can maintain access to critical information and communications services, regardless of which mobile network is available at a particular location. "It is a practical improvement that will strengthen resilience, support public safety and help prepare Ireland's emergency services for the next generation of critical communication technologies*

Operational Impact Summary

- **Uninterrupted National Coverage:** Dynamic multi-operator roaming provides seamless network failover across urban, rural, and border regions.
- **Extended Coastal & Offshore Range:** High-power vehicle and vessel amplification pushes high-speed data coverage significantly farther out to sea, transforming maritime search and rescue (SAR) capabilities.
- **Sub-Second Inter-Agency Coordination:** Integrated Mission-Critical Push-To-Talk (MCX) enables fire, police, ambulance, and Civil Defence to dynamically bridge talkgroups, exchange photos, and share real-time location data.
- **Rapid Emergency Response:** Deployable satellite-backed LTE nodes allow emergency teams to drop a functional cellular "bubble" anywhere within minutes, from isolated offshore islands to isolated health centers.

5. Use Cases & Strategic Roadmap

Phase 1: National Multi-Operator Framework & Core Setup (Completed)

- Established national roaming agreement across eir, Three Ireland, and Vodafone.
- Deployed Druid Raemis™ central core for MCX applications and SIM provisioning.

Phase 2: Tactical Field Trials & Search and Rescue Integration (Active)

- Operational trials in Westport and Clew Bay demonstrating satellite-backed LTE bubbles, aerial drone/plane video feeds, and extended maritime RIB communications.



Click to see Private Network for Public Safety: Live demo at Westport

- Deployment of stationary bubbles at local health centers (e.g HSE public health nurse connectivity on islands).
- Multi-agency live search and rescue drills integrating police, fire, ambulance and Civil Defence in tactical command vehicles.

Phase 3: Nationwide Rollout & Pan-European Alignment

- Transition of all national PPDR agencies to unified Broadband PPDR (BB-PPDR) handsets.
- Integration with the European Critical Communication System (EUCCS) for cross-border emergency operations across EU member states.

EU Critical Communication System (EUCCS)

The EUCCS connects national critical communication systems, bringing together different first responders – police, firefighters, emergency medical services and other civil protection organisations across Member States. The System covers all EU and Schengen associated countries.

For more information on EUCCS see: https://home-affairs.ec.europa.eu/news/new-eu-critical-communication-system-first-responders-2026-09-30_en

About Druid

Druid Software is a global leader in private 5G and 4G/LTE cellular core network software. Founded in Ireland in 2000, Druid's Raemis™ platform is a mature, 3GPP-compliant core designed specifically for mission-critical enterprise environments.

For more information see https://druidsoftware.com/public-safety-networks