



Communications: Systems, Integration and Security

Efficient, secure and resilient comms



Accelerating Innovation

A proving ground for cutting-edge R&D

As one of six innovation themes, our R&D in Communications: Systems, Integration and Security is advancing the efficiency, security and resilience of communications.

Our areas of expertise include:

- ▶ **Advanced private 4G and 5G networks**
Design and deployment of private 4G and 5G to modernise the grid.
- ▶ **Retrofit and installation challenges**
Addressing technical grid integration challenges of distributed energy resources.
- ▶ **Resilient and efficient wide area communications**
New communication architectures for future smart grid solutions.
- ▶ **Virtualisation and containerisation**
Identifying virtualisation challenges of the grid and validating its containerised services.
- ▶ **Novel sensor network architectures**
Integrating appropriate low power wireless IoT sensor networks with the power grid.
- ▶ **Incident response**
Threat assessment and analysis and sharing best practice incident response guidelines.
- ▶ **Regulatory policy and standards shaping**
Engaging with regulators and policymakers on spectrum policy and security needs.
- ▶ **Communications security and validation**
Designing and validating communications security solutions for smart grid distribution networks.



Next Generation Communications

From strategy to commercial deployment

PNDC supports technology developers, system integrators and end-users from definition to delivery, through towards full commercial deployment and impact assessment.



Cyber Security

- ▶ In-depth analysis of “state of the art” for cyber security in utilities, investigating security challenges of the IT/OT platform and OT cyber security for distributed assets.
- ▶ Security across organisational and operational boundaries.
- ▶ Cyber security scenarios, grid vulnerability analysis, operational resilience and incident response.



4G and 5G Networks in Utilities

- ▶ Resilience and redundancy in private and public mobile networks.
- ▶ Investigating overlapping coverage, response times of devices roaming from one PLMN to another and EM interference on communications networks.
- ▶ Spectrum policy and improving connectivity for hard to reach areas, including validating bandwidth and latency performance of different protocols.



Secure Industry IoT Technologies for Smart Grids

- ▶ Communications for remote outstations using IoT technologies.
- ▶ End to end security with the challenges of low cost devices.
- ▶ IoT edge computing.



Smart Grid Communication Technologies

- ▶ Teleprotection over MPLS technologies and microwave packet radio.
- ▶ Global satellite machine-to-machine (M2M) communications.
- ▶ Virtualisation and containerisation of the smart grid.

GET IN TOUCH

Find out more about our work or talk to us about opportunities for collaboration, including PNDC membership.

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PNDC is one of the multi-award-winning University of Strathclyde's industry-facing innovation centres. The University of Strathclyde is a charitable body, registered in Scotland, number SC015263.