

Expertise Offering

Nimbus ICT Eco-System



The **Nimbus Centre** conducts research in cyber physical systems with a focus on digital platforms, cyber secure systems, future networks, advanced digital skills and the Internet of Things. Nimbus applies platform research and technology developments in a wide variety of domains including energy management, building automation, water and resource management, as well as agriculture and transportation.

Digital Platforms & Edge Computing

Architecture Design: Applying reference architectures to formalise the engineering process for CPS/IoT applications.

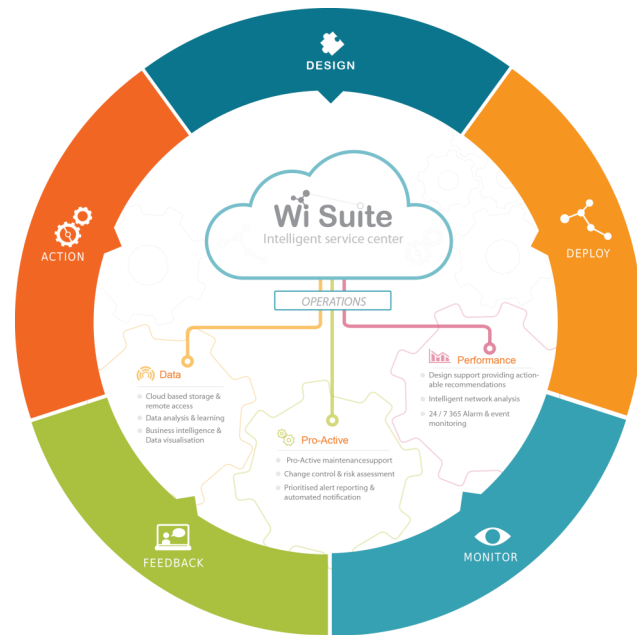
Lifecycle Management: Engineering and decision support tools for reliable embedded networks including propagation modelling, topology modelling, device selection, placement optimisation and fault detection.

Trusted Digital Value chains: Application of Blockchain and distributed ledger technology for secure trusted interaction between “things” using smart contracts.

Edge Computing Environments: provisioning and management approaches to support dynamic reconfiguration of IoT applications at the edge.

User Experience Design: User centred design approach, context driven human machine interface (HMI) development (web platforms, mobile, AR/VR) .

Future Networks QoX Provisioning: AI driven orchestration of the available resources is needed to achieve the desired reliability, dependability, QoS or QoE.



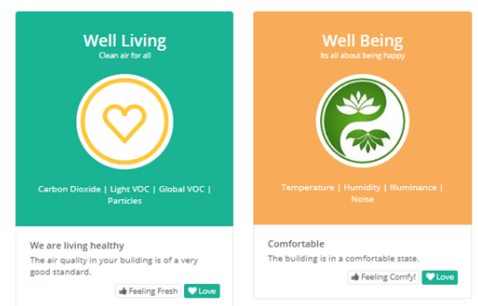
ICT Driven Energy Efficiency

Distributed Model Predictive Control (DMPC): Improve the robustness and reduce the complexity of control systems through the application of DMPC and game-based frameworks.

Secure Services for IoT Control: the use of robust control and estimation techniques to model, detect and mitigate attack scenarios for networked control systems that leverage IoT technology.

Open & Scalable Energy Mgt Platform: data integration, fusion, distribution, linking local monitoring and control functions with cloud based services. Context driven visualisation, user interaction and data management

Complex Event Processing: create low-latency cognitive loops through the identification of meaningful events (opportunities, threats, failures) and respond to them as quickly as possible.



To collaborate or request more information



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The **Nimbus Centre** is leading the EU H2020 DENiM project targeting energy efficient manufacturing and has actively participated in five H2020 projects. Significant experience in proposal development and EU project coordination across FP7 and H2020 programmes. We are currently developing proposals for Horizon Europe & Green Deal calls and looking to extend our partner portfolio with innovative industrial and academic partners to support these initiatives.

Potential Project Contributions

Experienced Partner Network



Digital Platforms

Architecture design and engineering; Smart systems integration; Open and scalable IoT platform for data integration, visualisation, fusion and distribution.



Cyber Secure Systems

Secure digital value chains: Distributed Ledger Technology for secure trusted interaction between "things". Secure Services for IoT-driven control.



Future Networks: Lifecycle Mgt, QoX provisioning for reliable, low latency wireless networks (WSN, LPWAN, 4G/5G).



Advanced Digital Skills: Educational approaches based on Communities of Practice, Supporting digital transformation through a new education and training framework.

Nimbus have established strategic partnerships with experienced industry (SME & LE) and research organisations across EU that can be leveraged areas include:

- **IoT Edge Computing\Analytics**
- **Blockchain\DLT**
- **Systems Integration**
- **Energy Analytics & Optimisation**
- **Social Science and Humanities**
- **Energy Service Companies**
- **End Users/Application Domain Experts**

Green Deal Call Priorities

LC-GD-4-1-2020: Building and renovating in an energy and resource efficient way

LC-GD-6-1-2020: Testing and demonstrating systemic innovations in support of Farm-to-Fork Strategy

LC-GD-10-02-2020: Behavioural, social and cultural change for the Green Deal

LC-GD-10-3-2020: Enabling citizens to act on climate change, for sustainable development and environmental protection

Sample Nimbus Projects



H2020 DENiM (Coordinator)

The Digital intelligence for collaborative ENergy management in Manufacturing (DENiM) project develops an interoperable digital intelligence platform enabling a collaborative approach to industrial energy management. DENiM provides an integrated toolchain to provision advanced digital services including secure edge connectivity leveraging IoT, data analytics, digital twin, energy modelling and automation culminating in the delivery of continuous energy impact assessment, together with energy control and optimisation across existing production facilities, processes and machines.



H2020 TOPAs (<https://www.topas-eeb.eu>)

TOPAs developed an open, IoT based platform of analytic tools to minimise the gap between the predicted and the actual energy usage in blocks of buildings. As scientific and technical manager, Nimbus led the research to develop novel approaches to distributed energy management to provide a scalable solution for bridging the gap between predicted and actual energy usage. This includes tools and services to support wireless sensor infrastructure design, distributed control and decision support tools based on UX design principles.



SEAI DigiBlocks (<https://www.nimbus.cit.ie/digiblocks/>)

DigiBlocks will provide a suite of tools that provides an integrated innovative solution for district energy management, which considers the interaction and integration between the district buildings, the users/citizens and the wider energy system. The DigiBlocks platform, tools, and pilots considered will illustrate Blockchain's potential both to upset current business models in the energy sector and to redefine stakeholder positions