



## **IAgRE / NCPF Proposed Internet of Things Special Interest Group**

The Internet of Things (IoT) is a concept in the process of realisation, and now very much within the commercial gaze as a significant source of opportunities for enterprise and product, systems and services innovation in the agricultural sector\*. The widespread attention to its development through European and worldwide projects over the last decade has not clarified what the IoT is and what it has to offer. Unfortunately, a source of hype, throw away statements, buzz words and obscure implications concerning the growing number of objects connected via Internet Devices. Many of the numerous white papers and media communications provide generalised expressions of the potential the IoT, without any grounding, on real grassroots applications that exploit the integration of technologies that are considered to be the drivers of IoT.

In general the IoT concept means different things to different people, in different industries. However, by looking at the concept objectively, and with regard to its foundational imperatives, the wider potential of the IoT must be demonstrated for the benefits to be realised. This requires a framework to be derived, that presents a practical outlook on opportunities to our (global) sector. A special interest group is being proposed that seeks to deliver a global community and shared frameworks in a dynamic change-responsive way. More significantly it seeks to provide a platform for the agricultural community within the UK, EU and the Globe that seeks to provide a cohesive approach to IoT developments. The SIG would align support for practical business developments with radical attention to productivity, profit, entrepreneurship and global outreach. The Interest Group will be launched at a one day workshop designed to provide a precursory view on what the IoT might mean for Agriculture. It will also seek to define a set of initial guidelines on how the Interest Group can best serve the Agricultural Industries through exploiting the IoT concept in very practical terms. Initially, attention will be directed at:

- Process-based developments that can radically impact upon performance and profitability,
- Machine-to-machine (M2M) developments in relation to connectivity,
- Sensing, and embedded systems,
- Commercial-off-the-shelf products and services supporting IoT developments,
- Normative and emergent standards, supporting IoT developments,
- Open and big data developments.

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(Proposing to develop as a joint venture with IAgRE Special IoT Interest Group)

By developing the IoT Interest Group along the lines of the very successful Unmanned Aerial Systems (UAS), colloquially the Drones SIG, The National Centre for Precision Farming (NCPF) will seek to assist members in addressing IoT developments in relation to agriculture. This will be achieved by providing:

- A collective UK voice, in Europe and beyond, on IoT matters relating to agricultural development,
- An IoT strategy for engaging the food security challenge,
- Development of training events, product demonstrations and guidelines and engagement.

The SIG would facilitate a partnership between industry stakeholders and academe, ostensibly with industry stakeholders taking the lead in ensuring that practical and economic benefits can be gained from such an initiative.

To cover the cost of this initiative funding will be sought from UK sources and via membership fees, aligned to those currently charged for the NCPF Unmanned Aerial System Interest Group.

The essential benefits to be expected from this Interest Group include:

1. A forum for organisations and associations to address collectively issues concerning the adoption and development of IoT.
2. A forum for monitoring and responding to developments in the IoT.
3. A community for networking and developing partnerships for IoT in agricultural integration and collaborative projects.
4. A UK collective voice on issues concerning the use and development of IoT in agriculture and horticulture.
5. A sandbox for demonstrating IoT devices, toolkits and emerging products.
6. A platform for promoting and celebrating IoT innovation in agriculture and horticulture.
7. A platform for promoting IoT standards and services of benefit to agriculture and horticulture.
8. A platform for identifying employment and skills requirements, coupled with a role in the development of training initiatives for IoT in agriculture and horticulture, up to and including research studentships.
9. A role in influencing education, research and development in areas associated with IoT.
10. Supporting entrepreneurship to expose new metaphors in IoT to our Industries.

If you are interested in becoming a member or sponsor for the IoT Interest Group please contact Prof Anthony Furness, through IAgRE Secretariat ([secretary@iagre.org](mailto:secretary@iagre.org)), the NCPF ([ncpf@harper-adams.ac.uk](mailto:ncpf@harper-adams.ac.uk)), or LinkedIn, in order that interest can be assessed.

**\* To underpin the development of this Interest Group the NCPF will, over the coming weeks provide a web-based introduction to the Foundational Imperatives and other key concepts and technologies, as listed below, that contribute to the development of the IoT in agriculture and the associated opportunities for enterprise and product, systems and services innovation in the agricultural sector:**

1. **The IoT from Foundational imperatives**, providing a framework for viewing the capability that such a network presents when viewed in terms of foundational imperatives that in turn reveal revolutionary and radical impact potential.
2. **Technological Change, Employment and Skills Implications for IoT**, providing a view on the profound exponentiation aspects of technological change, particularly with respect to automation, and the implications for skills requirements, business development and employment within the agricultural sector.
3. **Engineering the Food security challenge**, exploiting the potential it offers for industrial enterprise and business development in agriculture and horticulture.
4. **Urban farming and outreach infrastructure** for integrated food production exploiting waste heat, water, solar energy and LED lighting and action spectra.
5. **Rural infrastructure for farming-aligned food production** exploiting environmentally acceptable architecture, particularly in areas of outstanding beauty and impact in relation to tourism.
6. **Connected Farm concept**, exploiting advanced network developments, M2M communications, cloud services and advanced SCADA systems, but also considering the human aspect in the concept and the skill sets for IoT integrated farming in the future.
7. **Automatic identification and data capture (AIDC)** systems and object-connected ICT for systems and service access purposes and data handling encompassing developments in radio frequency identification and wireless networks.
8. **Agricultural informatics and metrics**, exploiting developments in evidenced based and integrated informatics, closed, shared and open data systems, 'big data' and cloud-based computing services.
9. **Remote sensing and data integration** – satellite, UAV and ground-based mobile systems.
10. **Agricultural and horticultural robotics** and automation exploiting developments in GNSS positioning and navigation systems.
11. **Unmanned aerial system (UAS)**, exploiting developments for surveillance, sensing and actuation, material delivery, systems.
12. **Haptics (tactile stimulation), wearable technologies and the human-machine interface** in agriculture, exploiting developments in these areas.
13. **Standards and governance**, looking at the standardisation and governance arenas for assisting the global development of IoT in general and agriculture and food security in

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14. **Enterprise Resource Planning** integration with argi-industry management systems, and cloud based solutions.

The site will also provide information on events and developments relating to the IoT and its potential for agriculture and food security.

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