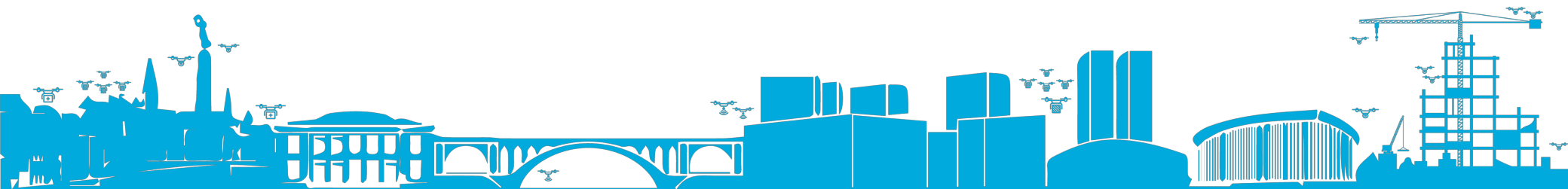


# Technical Standardisation in Smart ICT with Digital Trust - IoT

PCOG Meeting

30<sup>th</sup> Nov. 2018



# PCOG Meeting

## Background

**October 2017** - PhD Candidate – UAVs in the context of IoT

### Academic Background

- ❖ B.Sc. in Mechatronics Engineering - German University in Cairo, Egypt
- ❖ Pre-Masters in Autonomous Systems, Advanced Mechatronics and Robotics
- ❖ M.Sc. in Space Science and Technology - Luleå University of Technology, Sweden
- ❖ M.Sc. in Space Techniques and Instrumentation - Université Paul Sabatier, France

### Relevant Work Experience

- ❖ German Aerospace Centre (Space Agency) - Master Thesis:  
*Collision Avoidance and Simple Path Planning for Autonomous Robotic Exploration.*
- ❖ Teaching Assistant
- ❖ Tech Start-ups
- ❖ Presidential Leadership Program & Egypt 2020

# PCOG Meeting

## Research Overview

### Introduction

- ❖ The number of Unmanned Aerial Vehicles (UAVs) is growing exponentially – 620,000 by 2022<sup>1 2</sup>
- ❖ UAVs in Internet-of-Things (IoT) as devices connected in the ubiquitous network.
- ❖ This shed the light on a vast array of applications.<sup>3</sup>

### Open Issues

- ❖ Lack of regulations and technical standards.<sup>1</sup>
- ❖ As UAV numbers increase, their safe operation and management in cities becomes a challenge.

### State-of-the-art

- ❖ Dedicated UAS Traffic Management (UTM)<sup>4</sup>
  - ❖ NASA UTM
  - ❖ Europe U-Space

### Hypothesis

- ❖ UTM with distributed decision making will allow for:
  - ❖ better scalability
  - ❖ better resilience
  - ❖ UAV clusters to autonomously communicate and make local on-the-fly routing decisions.

<sup>1</sup> Stöcker, C., Bennett, R., Nex, F., Gerke, M., & Zevenbergen, J. (2017). Review of the Current State of UAV Regulations. Remote Sensing,9(12), 459.

<sup>2</sup> <https://www.gartner.com/doc/3557717>

<sup>3</sup> <https://www.interactanalysis.com/commercial-uavs-report-2017/>

<sup>4</sup> Schalk, L. M. (2017). Communication links for Unmanned Aircraft Systems in very low level airspace. 2017 Integrated Communications, Navigation and Surveillance Conference (ICNS).

# PCOG Meeting

## Research Activities



### Activities:

- ❖ Extended Abstract – 17<sup>th</sup> Annual STS Conference Graz 2018 - [On Standardised UAV Localisation and Tracking Systems in Smart Cities](#)
- ❖ Poster Presentation – Partnership Day 2018
- ❖ AFR application – PhD description, methodology and expected deliverables - [Project DESTINATION](#)
- ❖ Survey Paper on UAV and future of IoT

### On Standardised UAV Localisation and Tracking Systems in Smart Cities

Nader S. Labib<sup>1</sup>, Matthias R. Brust<sup>1</sup>, Grégoire Danoy<sup>1</sup>, Johnatan Pecero<sup>2</sup>, Jean-Philippe Humbert<sup>3</sup>, Pascal Bouvry<sup>1</sup>

<sup>1</sup> University of Luxembourg  
<sup>2</sup> ANEC <sup>3</sup> ILNAS

**Extended Abstract** - In the near future, more than two thirds of the worlds population is expected to be living in cities and hence, with the aim of being proactive and finding innovative and sustainable solutions, governments have made smart cities one of their priority areas of research. Smart cities are sustainable, inclusive and prosperous greener cities that foster enabling smart Information and Communication Technologies (smart ICT) like Internet-of-Things (IoT), cloud computing and big data to facilitate services such as mobility, governance, utility and energy management.

#### Article

### UAVs and the Future of Internet-of-Things: A Survey on Opportunities, Challenges and Future Prospective

Nader SAMIR <sup>1,†</sup>, Grégoire DANOY <sup>2,†</sup>, Matthias R. BRUST <sup>1,†</sup> and Pascal BOUVRY <sup>1,2</sup>

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<sup>†</sup> These authors contributed equally to this work.

Academic Editor: name

Version September 5, 2018 submitted to Sensors

- 1 Abstract Intro IoT - In the recent years, Unmanned Aerial Vehicles' (UAVs) technology developed  
2 rapidly and their applications expanded beyond military to more commercial ones ranging  
3 from mapping and surveillance to disaster management, delivery and other more demanding  
4 applications that require UAVs to operate in heterogeneous swarms, in shared low altitude airspace,  
5 Beyond-Visual-Line-Of-Sight (BVLOS). As UAVs heavily depend on sensors and embedded systems  
6 and thanks to their mobility, agility and customizability of payload, UAVs quickly found their way  
7 to Internet-of-Things (IoT) as a promising component of this ubiquitous network. In this paper,  
8 we discuss the role of UAVs in the future of IoT by exploring, firstly, their role in assisting the  
9 IoT infrastructure as communication nodes, aerial-base-stations and gateways; Secondly, from a  
10 data-centric view as wireless mobile IoT sensors and actuators. Additionally, we probe the potential  
11 opportunities, technical, regulatory and ethical challenges facing UAVs in IoT; and finally, we discuss  
12 current efforts and future work addressing their safe management and integration in low altitude  
13 airspace.

# PCOG Meeting

## Technical Standardisation Activities

### Activities

- ❖ Delegate at ISO TC 20/SC 16 – UAS
- ❖ Delegate at ISO JTC 1/SC 41 – Internet-of-Things
- ❖ Delegate at ISO JTC1/SC 27 – IT Security Techniques

### Participation:

- ❖ Debriefing meeting ISO JTC 1/SC 38 – October 2017
- ❖ World Standards Day – October 2017
- ❖ Debriefing meeting ISO JTC 1/SC 41 – November 2017
- ❖ Delegates meeting ISO JTC 1/SC 41 – December 2017
- ❖ Smart Cities Standardization – December 2017
- ❖ Delegates meeting ISO JTC 1/SC 41 – January 2018
- ❖ Delegates meeting ISO JTC 1/SC 41 – March 2018
- ❖ Delegates meeting ISO JTC 1/SC 41 – June 2018
- ❖ World Standards Day – October 2018
- ❖ Delegates meeting ISO JTC 1/SC 41 – November 2018
- ❖ Others

### Standards Review:

- ❖ ISO/IEC ED1 21823-1 - Interoperability for Internet-of-Things Systems (framework)
- ❖ ISO/IEC TR 22417:2017 for IoT Use Cases
- ❖ ISO/IEC DIS 30141 – Internet-of-Things Reference Architecture (IoT RA)
- ❖ Others



ISO/IEC 30141

Edition 1.0 2018-08

## INTERNATIONAL STANDARD

Internet of Things (IoT) – Reference architecture

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 35.020

ISBN 978-2-8322-5972-6

Warning! Make sure that you obtained this publication from an authorized distributor.

# PCOG Meeting

## White Paper – Data Protection and Privacy

### Main goal:

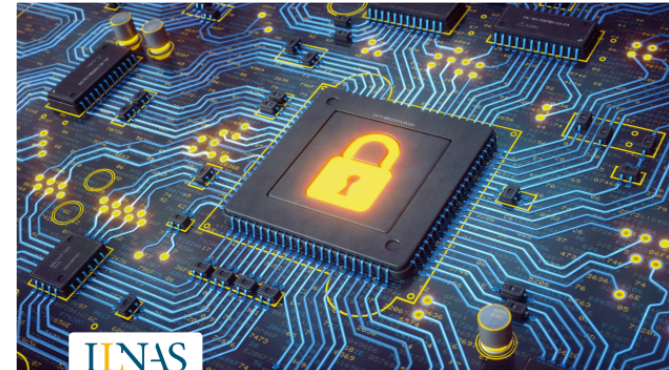
- ❖ Foster collaboration between research and standardization in ICT, to lead a transition towards an interconnected, sustainable and resource-efficient economy in Luxembourg.

### Key Objectives:

- ❖ Adopt technical standards in research.
- ❖ Align research goals in DPP with market needs to make a contribution through NSB.
- ❖ Analyse and understand gaps between research and standardization to develop a more defined roadmap for the future.

### Activities:

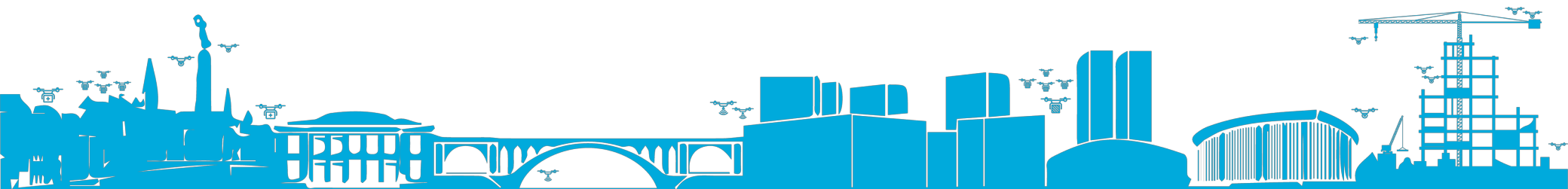
- ❖ Co-author: IoT sections in chapters 1,3,5 & 6
- ❖ Brainstorming Sessions
- ❖ Working Group meetings
- ❖ Reports (biweekly & monthly) – until March 2018



### White Paper DATA PROTECTION AND PRIVACY FOR SMART ICT



# THANK YOU





# STANDARDIZATION IN SMART ICT

-Digital Trust-

MORE



11  
TEAM MEMBERS



2  
PARTNERS



3  
RESEARCH PROJECTS



5  
PUBLICATIONS





## Project Goals

### RESEARCH PILLARS

The joint program focuses on these three main pillars:



#### INTERNET OF THINGS (IOT)

The objective is to investigate the use of UAV drones in the context of homogeneous and heterogeneous drone fleets...



#### CLOUD COMPUTING

The objective is to provide tools for analyzing and comparing prices offered by different Cloud providers...



#### BIG DATA

One goal is standardization of annotated clinical data in the context of international biomedical research...

## THE TEAM

We are an international team of thinkers, researchers and engineers who constantly take on new technological challenges to unlock new opportunities that benefit the economy and global society

[Meet the team](#)



## PARTNERS



“FOSTERING THE COLLABORATION BETWEEN RESEARCH AND  
STANDARDIZATION IN THE FIELD OF ICT IS KEY IN ORDER TO LEAD THE  
TRANSITION TOWARDS AN INTERCONNECTED, SUSTAINABLE AND RESOURCE  
EFFICIENT ECONOMY FOR LUXEMBOURG.”

Francine Closener, Secretary of State of the Economy

📍 Maison du Nombre, 6 Avenue de la Fonte, L-4364 Esch-sur-Alzette

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