SMART SYSTEMS 2014 SUMMIT Evening Session 1 October London, Institute of Directors

Evening Session: AN INSPIRATIONAL INTRODUCTION TO SMART SYSTEMS
18:00 Registration

18:10 Justin Hayward, Director, Cambridge Investment Research
Introduction

18:15 Rasmus Blom, Group Director, Grundfos Connect
Energy-water nexus: challenges for established businesses to support the industrial internet

18:30 David Cairns of Finavon, Managing Director, Prismtech
The Internet of Things and the Enterprise: are you to disrupt or be disrupted?

18:45 Usman Haque, Entrepreneur, Umbrellium
In Praise of Messy Cities

19:00 Pilgrim Beart, Founder Director, AlertMe
Building the smart city

19:15 Panel with speakers and moderator Peter Drake, Managing Director, Intelligent Networks

19:30 – 20:00 Summit Networking

19:45 Pre-dinner drinks reception
20:00 Dinner Roundtable*
Role of big business, innovators, consumers, government:
Leadership | Creating market advantage | IoT/Industrial Internet interoperability

21:45 Day 1 Evening Close

*Invited dining guests who have confirmed.

This Smart Systems Summit Conference is organised by CIR Strategy in association with AlertMe, Hitachi Europe & Sentec. It is part of the CIR Conferences Series, which has run since 2007. The next Smart Homes Conference Session & Dinner 2014 takes place on 3 November 2014 Cambridge at King's College: http://www.hvm-uk.com/smarthomes2014 or 01223 303500. Cambridge Investment Research would like to thank media partners & outlets Cullen Associates, Clean Capital Network, SEHTA, SH&BA, Cambridge Network, Cambridge Wireless, Connected Cambridge & Connected Oxford.

SMART SYSTEMS 2014 SUMMIT BUSINESS CONFERENCE DAY 2 OCTOBER LONDON IOD

09:30 Registration

Session 1: SMART BUILDINGS & HOMES

10:00 Justin Hayward, Director, Cambridge Investment Research, Why Smart Systems?

10:05 Alan South, Commercial Director, Solar Century plc, Chairman's Opener

10:10 Stan Boland, CEO, Neul – IOT: the city-wide network

10:20 Russell Haggar, CEO, Xsilon Ltd – Connected Living needs... Connectivity

10:30 Dr Richard Curry, Director, SEHTA – eHealth: Home is where the Care is

10:45 Chris Wright, CTO, Moixa Technology, Localised smart energy systems in homes

10:55 Nick Coutts, Founder & CEO Genesys & CIR Senior Advisor – Innovation networks for smart systems

11:10 Panel with speakers and moderator Stephen Pattenden **of IOT-BAY & SH&BA**

11:30 Morning coffee & showcase of products and services

Session 2: SENSORS, DEVICES, OBJECTS & THE INDUSTRIAL INTERNET

12:00 Alex Mateo – Industry Manager for Smart Cities Libelium – Enabling the Internet of Things: Sensors and Cloud

12:15 Paul Green, Founder, Iotic Labs – A revolutionary system for the IoT

12:30 Colin Howlett, Sentec – How do you monetise smart systems?

Panel with speakers and moderator Dr John Riley, Secretary General – Digital Policy Alliance

13:00 - 14:00 Lunch networking & exhibition of products & services

Session 3: SMART AUTOMOTIVE & TRANSPORT SYSTEMS & DERIVED APPLICATIONS

14:00 Hugo Spowers, Founder & Chief executive, Riversimple – If it's not sustainable, it's not smart

14:15 Dr Alistair Duke, BT – Creating an Internet of Things ecosystem for Transport

14:30 Moeen Khawaja, Founder Thingful- Unlocking IoT data value

14:45 Dr Caroline Hargrove – Technical Director, Mclaren Technologies – Complex decision insight F1 style

15:00 Panel with Tony Rooke, Smart Cities & Innovation, Infosys

15:30 Coffee networking & expo of products & services

Session 4: CITIES & URBAN INFRASTRUCTURE

16:00 Dan Byles MP, Chair of All-party group for Smart Cities at the House of Commons - Update

16:15 Professor Robin Leatherbarrow, Pro-VC, Liverpool John Moores - Sensor City Liverpool's Enterprise Zone

16:35 Douglas Cheung, Smart Cities Group, Hitachi Europe – Smart Energy Systems for Communities

16:50 Pilgrim Beart, Founder, AlertMe, Keynote: UK energy management innovation in global markets

Panel with Peter Sharratt, Sustainable Strategy Director – SBP (spin out of Deloitte) - followed by Chairman Alan South's summary

17:30 Close of Conference

This Smart Systems Summit Conference is organised by CIR Strategy in association with AlertMe, Hitachi Europe & Sentec. It is part of the CIR Conferences Series, which has run since 2007. The next Smart Homes Conference Session & Dinner 2014 takes place on 3 November 2014 Cambridge at King's College: http://www.hvm-uk.com/smarthomes2014 or 01223 303500 Cambridge Investment Research would like to thank media partners & outlets Cullen Associates, Clean Capital Network, SEHTA, SH&BA, Basck, Cambridge Network, Cambridge Wireless, Connected Cambridge & Connected Oxford.

SMART SYSTEMS 2014 SUMMIT - Summary notes by Laura-Lucia Richter

Introduction by Justin Hayward

Thank you all for attending, welcome, thanks to sponsors.
Not well known: Cambridge Investment Research is open for business as a consultancy. CIR has the science of consultancy through its routes to value, opportunity prioritization and service design methods.
CIR is not a conference organizer.

Human endeavour: can handle massive data – Skewes Number $10^{10^{10^{34}}}$ - the highest number ever used for a definite purpose in mathematics – for prime number theory. 10^{80} protons in the universe – Skewes Number is like the number of ways to swap 2 any 2 protons – unimaginable. Big Data may come with Smart Systems – 100s of laptops worth or more – but it may also be less. But we can handle it, whatever, if we plan well.

Day 1 Session 1: Smart Systems Keynotes

We are not spectators of data, we are producers and users.
There is a context for the data collection process.
What technology companies sell is not what makes a city what it is.
There has been smart parking in Japan for at least 20 years.
Messy does not mean Dirty.
We don't know the boundaries. Problems affect nodes randomly: "no solution" to this messiness.
A physical object search engine can provide a way through it, just as Google did with data.
If I can combine data sources: hire bike, bike-rack availability; traffic sensors tell me the traffic on the optional routes.
There is an entitlement framework for the data sets. Let us give back the data to the data owners and they release it to the extent they wish to.
Pragmatism: who is measuring? What do they want to find out?
Data is calibrated to proximity to the person asking.

How does IoT affect the value of data? (Nick Coutts CIR asked)

Even if it is free, there is a relationship.
Indirect value, e.g. of a conference – data and knowledge production.
No central respository of data, nodes.
IoT may change the organizational structure of corporations and governments – exciting!
Comment on devolution conversation going on.

What of protection of privacy?
All can be visible as we've noted with surveillance.
Most participants have private levels of data and some public. If you agree to give a certain level, you may see a certain level of others'.
Government data was already paid for by the people/citizens, so there are search entitlements that follow.
Data – you determine who is allowed it according to rights, obligations, preferences, etc.

There is no standard way to do everything, that would be suboptimal or even sinister.
The Web is not all things to all people.
Panel noted the founding by large players of the IIC.
IoT won't work in all mission critical areas and situations.
Market forces the only thing that can drive towards consolidation of domains of solutions, imperfectly.

How crucial is geospatial data to the IoT?

Latitude-longitude-height is not good enough for buildings.
With geo-location, if we know the person and they are in a shop, we can deduce perhaps that they are shopping.

It is not about the technology, e.g. bootstrapping Apple and Google, IoT, it is about the people.
It is hard to make it simple, to make a good user experience.
No home is an island.
There is no average city or human.
Idea: each person or home is a unique demographic segment!
There is soon a big inflexion point where things take off.
The commercial model you get worked out (soon or a long time) after a big technology innovation.
Examples: broadband packaged free box modem etc with the service contact.
Smartphones, free with the contract, unless you want more memory or some add on.
These were commercial innovations in business model, not new technology.
There is going to be more of the intelligent, autonomous stuff. Device volumes exponentiate, but the number of people remains constant or growing very slowly by comparison.
There has to be a reason for connecting the first thing up: e.g. a lamppost or a light, or a dog, or a child, even.
In the case of lampposts it was saving the council and local taxpayer money.
Once the number of nodes on the network increases, we know that the benefits exponentiate (or at least grow as a power law!)
There can be huge amounts of wheel reinvention.
You work on what you are good at, your competence; there should be no "DIY" otherwise no ecosystem emerges.

What is the "boundary" of the industrial internet?
No Boundary Proposal given!

Sharing: new information consumers did not know they wanted.

Are "open systems" a political stance?
We're still building closed systems, walled gardens. You can have open standards. We'll talk about this in Smart Homes 2014 on 3 November 2014 and going ahead.

IoT has privacy issues on steroids.
Governments face the question: "since we can do our own energy , IoT etc, why should we pay this amount of tax now?"

Your health and condition at 85 depends and is correlated with your health at 45. This has implications for health policy and reducing costs.

Industrial IoT as a "sale of service": like offering light, heat, thrust etc.

We should allow diversity of use of data and IoT.

Glasgow was given positive comment as an emergent Smart City.

Day 2 Session 1: Smart Buildings & Homes
Smart systems are about connectedness

Stan Boland, CEO, Neul IoT: the city-wide network:
- IoT implies a huge amount of connections
  - number of connections per customer could be millions
  - everything with current going through it, needs to be connected
- We need a WAN Internet of things air interface
  - Two approaches to achieve this: MNOs and Shared use of spectrum (what they do!)
- Modules have service life ~20 years on 50c batteries
- Communal waste management (bins), pest control management as initial applications

- Traffic management, metering to come
- WAN emerging fast for IoT connectivity and the UK as epicenter for this

Russell Haggar, CEO Xsilion Ltd: connected living needs… connectivity:
- IoT: Connected devices refer to more than consumer electronics
  - we have to connect EVERY thing
- Connected living needs: low cost, low power, ubiquity, turn-key setup…
- Appliances are positioned for *usability*
  - network has to follow the user (i.e. has to work everywhere)
- **Connected Living:**
  - EHealth (in bath)
  - Energy-Smart Homes (in garage)
  - Micro generation monitoring (on roof)
  - Home automation
  - Intelligent lighting
  - Assisted living
  - Smart appliances
- Hanadu developed by Xsilon to plug the gap in a home
  - Home energy management example:
    - High active heating: uses ZigBee radios

Dr Richard Curry, Director, SEHTA -eHealth: Home is where the Care is
- Are homes care related? Lots of small-scale trials using ICT to deliver care services
  - but assisted living, cannot replace care service
- Link between smart homes and assisted living:
  - both want to improve quality of life and use communication infrastructure
- A connected home: security, environment function, household appliances, emergency call - all information can come from a "home hub"
  - Important is the communication to someone outside e.g. other smart homes, services, network
- How does an assisted living service look like? (in centrum: individual)
  - Saftey and security monitoring (e.g. gas left on, bath overflow, door unlocked)
  - Electronic assistive technology - here relation to smart home (environmental controls, control of beds, doors opening/closing)
  - Example 1: Warm Neighbourhoods AroundMe Service
    - relatives are reassured whether the assisted person are "up and about" and can intervene if needed, they feel more secure/free themselves
  - Example 2: Innovage
    - One of the main strengths: smart home capability and research base
    - Questions is: How do we make a business case? Do we have the policy making machinery that can cope? Who would/could implement any programme? - (Housing associations?)

Chris Wright, CTO Moixa Technology: localised smart energy systems in homes

- maslow stores the energy from solar panel
  - generate energy during the day- use it at night
  - installed with micro renewables (but this is optional as it is not always feasible, e.g. if people just rent their home)
  - always connected to main grid
  - smart storage & control
  - smart DC LED lighting and DC power
- devices at edge communicate via wifi among each other to cloud
  - plus wind output data, local substation live data,
- goal: more storage in homes (than mountains with lakes)
- UK is about 5 years behind Germany
  - What is needed is a product that you can roll out at the speed of an electronic product (i.e. very quickly)
- data flow from wall socket to city scale (desk, building, city)
- Example Brunel University
- local flows, low cost
- want coordinated grid support
- hierarchy of network benefits:
  - user (enable TOD price benefits, DR)
  - utility (assured shift and peak energy reduction)
  - ESCO
  - DNO
  - dostr generators
  - transmission network
  - central generators
  - government, CO2, FIT, society

Nick Coutts, Founder & CEO Genesys & CIR Senior Advisor – Innovation networks for smart systems
- Barriers to Smart System:
  - Technical, Political, Organisational, Financial, Emotional
  - To reduce barriers, need to focus on **smart service design** !
    - Avoid giving away the service to sell the system
    - Marketing of services is different and needs service design component

Panel discussion:
- In past, you had point solutions and niche markets.
- Recently: WIFI - everybody can connect (it is very reliable, will work for sure, standards high)
- How get over interoperability aspect (especially over time)?
  - On average, the load on washing machine is about 50W (not hugely significant- technology needs to be really cheap, easy etc in order to make it worth shifting the load)
  - Only few of the appliances are actually suitable for shifting load
  - And fridges etc are already so well/efficient equipped, that connecting them to the system does not really make much sense/has not much potential

Session 2: Sensors, Devices, Objects & The Industrial Internet Smart Buildings & Homes
Claire Weiller' s notes for talk 1 and 2 (talk 3 cancelled)
Steve Dawson, VP Sentec – How monetise a smart system?

- Monetise: Create value, then share it.
- Smart System: enables more satisfying outcomes through decisions taken based on insight gained from data collected from remote sensors
- In long run, open systems will create the solutions, NOT closed systems (silo solutions)
- Value is defined very broadly
- Smart systems dont need to be complex/complicated systems
- Value does NOT come from creating a perfect model of the world/perfect sensors (value does not equal accuracy)
  - Value of data is what we can extract out
- Complexity = choices
  - Systems enabling more satisfying outcomes through decisions taken based on insight gained from data collected from remote sensors.
- Value chain is long - we need standards and collaboration
  - Many opportunities and possible business models
  - Improve the OPEX as consumer of smart system
  - But always CAPEX involved as well - complex issue
    - e.g. smart meter roll out challenge is that there are so many people involved that it is not clear how to share the benefits
- Build value, value will reside in open sysstem, sell real benefits, focus on simple solutions, look for opportunities in value chain, expect diverse business models, encourage emerging standards, build piece by piece

Session 3: Smart Automotive & Transport Systems & Derived Applications
Hugo Spowers, Founder & Chief executive, Riversimple – If it's not sustainable, it's not smart
- What does a smart system (!) look like
- Hurdles do NOT lie on technology side, but on side of people: inertia and unwillingness to adopt/change
- Profit motive of today's businesses had fallen out of the original path
- "sustainability" used to refer to balance sheet, this has changed! other balance sheets matter now
- Respond this change at system level !
  - Evaluate options at system level
  - 3 levels of change: specific actions to slow damage, shift of consciousness
- Sell mobility as service rather than car as a product
  - Performance contracts !
  - Reverses financial drivers : manufacturer is rewarded for resource efficiency
  - Design, specification and performance of car are improved at each stage of value chain
    - Manufacturer pays for fuel for whole life of vehicle—> incentive to improve performance
    - This can be seen as competitive advantage
- Sale of service generates profitability at low volumes
- Be architects of future not its victims!

Dr Alistair Duke, BT – Creating an Internet of Things ecosystem for Transport
- Aims:
  - Build critical mass of easily accessible transport data
  - Create community of app developers creating innovative transport applications
  - Explore new business models & opportunities
- portal.stride-project.com
- Data Representation:
  - EEML, CAP are the XML based data representation in the hub
  - location, time, data

- …
- Example 1: Driver Assist
  - Gives instructions on optimum driving to reduce CO2 impact, delivered via smart phone (no additional connection to car needed)
- Example 2: JUMPA - Journey Planning & Prediction
- Example 3: Driver Behaviour Application
  - Monitors behaviour, location updates, trunk road speeds, … (i.e. multidirectional communication)
- Example 4: Travel Dashboard (DEMO)
- Key project outcomes: information hub deployed with 30+ sets of homogenised data etc
- Also involved in MKSMART (Milton Keynes)

Moeen Khawaja, Founder Thingful- Unlocking IoT data value
- Core to every IoT business model is data (!) - now seen as asset class
- To make data valuable and meaningful, you need to know where it is, who created it, how good it is, how it compares, how to act upon it, how to monetise it
- Unlocking the value: data needs to be shared
- The monetisation model for IoT is different from the monetisation model of the web because the nature of IoT and how it is consumed is fundamentally different
- IoT manufacturers/infrastructures have weak recurring revenue business models and will need to be part of a data consent and release chain - in the long run may be totally dis-intermediated like ISPs were from content based transactions
- Share "data slices"
- Privacy concerns need to be taken seriously

Dr Caroline Hargrove – Technical Director, Mclaren Technologies – Complex decision insight F1 style
- Data availability increases -> need better insight
- They develop analytics and simulation tools
- Industrial complex systems
- Case study: air traffic control (good example as a lot of data is available and a lot of decisions need to be made)
- Amazing that intra-day plans did not iterate or change from the "first thing in the morning plan", even with vast amounts of new data in real time! This latter is what we do in F1.
- Challenge is also: once you have the data, you need to make use of it!

Panel
- Context of data makes information - context is VERY different, otherwise it can mean different things to different people
  - Driver behaviour is more important than demographics
- Ownership issues are essential
  - Need to ensure that data belongs to driver to avoid lock-in (e.g. insurance)
  - Make sharing possible

Session 4: Cities & Urban Infrastructure
Dan Byles MP, Chair of All-party group for Smart Cities at the House of Commons – Update (No slides)
- Why should communities look at smart cities?
- To provide better services: better data and better information means better targeting
- Better targeting increases efficiency
- Need to fundamentally change how we think and work
- Being smart city is a means to the end: e.g. living standards etc - it comes back to the people!
- Really exciting opportunities lie in infrastructure!
- see more at Claire's notes?

Professor Robin Leatherbarrow, Pro-VC, Liverpool John Moores - Sensor City Liverpool
See Claire's notes:

Liverpool has a new University Enterprise Zone (UEZ) called Sensor City.
£15m funding to get it fully operational in April 2017
Only academic speaking in the business summit.

Douglas Cheung, Smart Cities Group, Hitachi Europe – Smart Energy Systems for Communities
- 4 years ago the smart energy group was founded
- Social innovation business
- VIDEO: **social-innovation.com**
- Social infrastructure+IT systems
• Energy, urban development, transport, healthcare, water and resources, logistics, manufacturing and construction, finance
- IT infrastructure is essential to coordinate the different layers of city management and services
- Small scale demonstration projects
- Example 1: Jump Smart Maui Project (Smart energy, smart cars)
• Help Maui reach 40% renewables target (in 2013 already 30% renewables): Hitachi brought EV batteries, chargers etc
- Example 2: Manchester: heat pumps connected to ICT platform
- Example 3: ETI Smart Systems and Heat Programme (SSHP)

Pilgrim Beart, Founder, AlertMe, Keynote: UK energy management innovation in global markets
- Founded AlertMe 8 Years ago to deliver simple solutions for normal consumers to control things in their home
- Company grows fast: scales up!
- Messy standards, many players
- Real world is hard to deal with (different to smart phone apps - 3rd parties write apps for it, all happens in virtual platform)
  • IoT tries to do the same, but in real world.
  • All these things are out there in your house
- IoT is building itself, bottom-up, emergently
  • IoT is very complex, can't design it top-down like for example phone networks
- Services want to commoditise products and vice versa
  • But bigger market is better for both
- Very important is interoperability, though!!!
  • Individual engineers often dont choose interoperability
  • They choose short term, easy solution
  • If they all close the same, interoperability would happen
- A well-designed platform releases potential to add value in software
  • Synthetic devices
  • Sensor fusion
    - Need model which takes several unreliable sensors and combines them such that they yield a reliable system (e.g. home security)
- Scaling up is big challenge!!