No walls factory floor IIOT use cases task force

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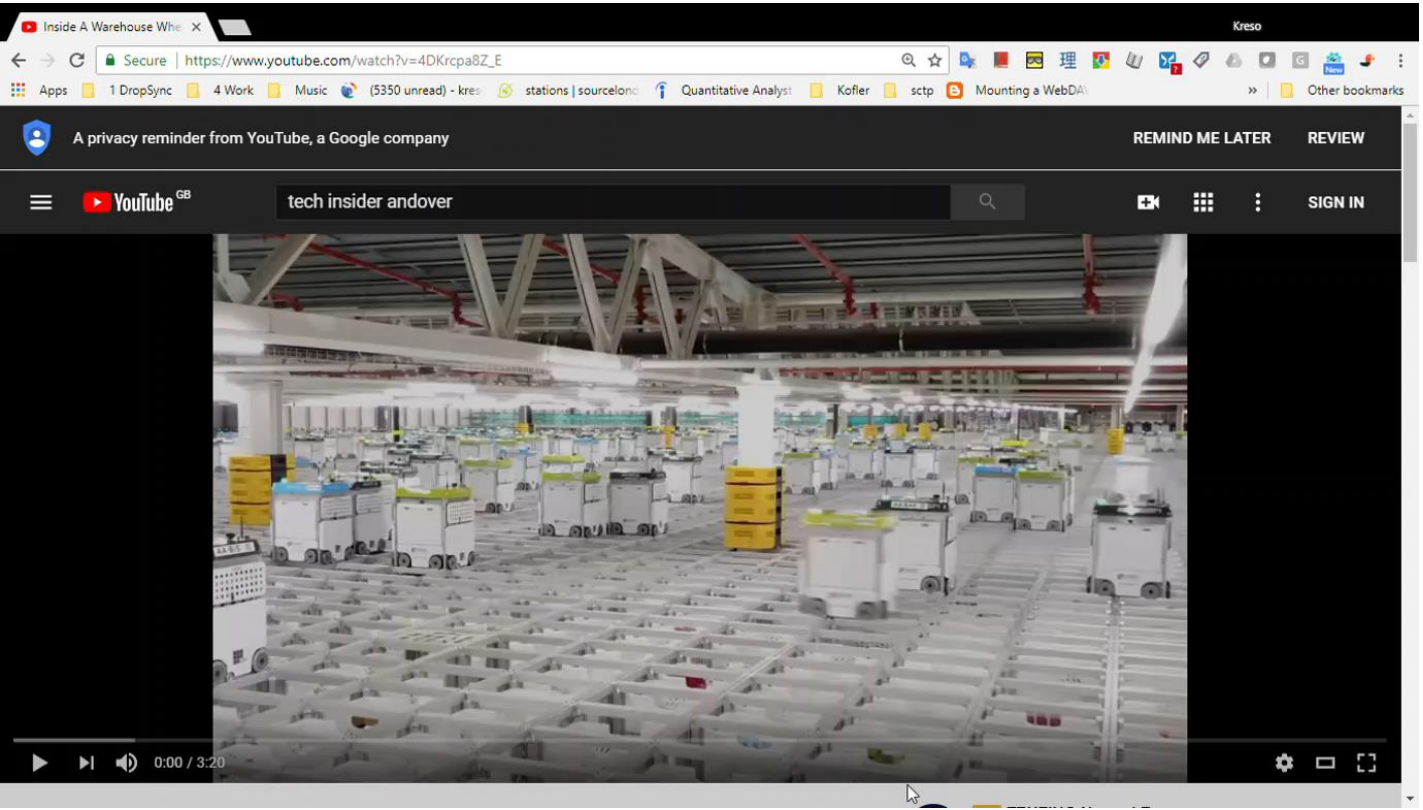
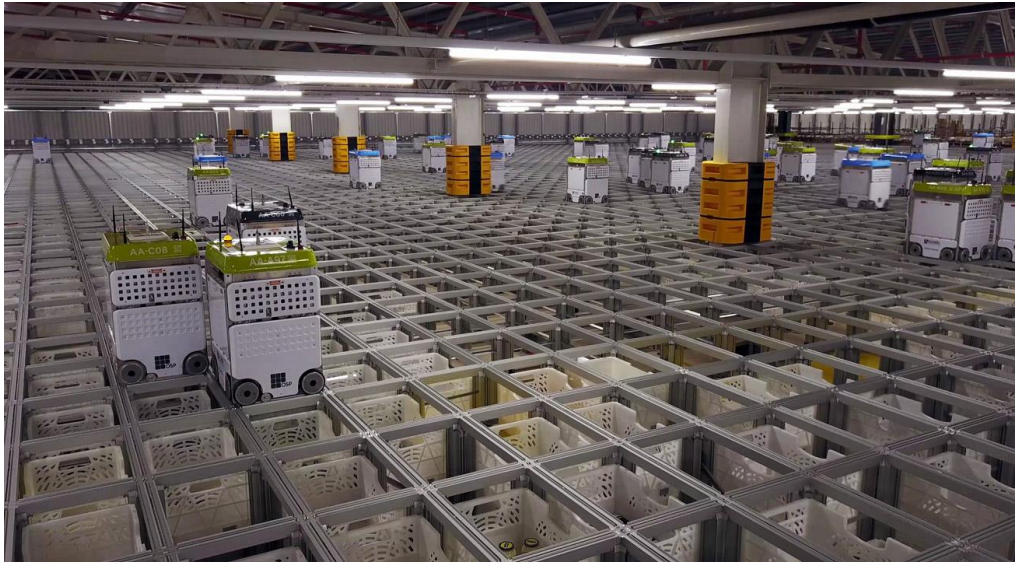
Ocado example



Ocado example

- **A successful example from the UK**
- Cambridge consultants (owned by Altran) **and Ocado (online grocery shop)**
  - "Transforming warehouse automation with another world-first in radio design"



- "Roaming the warehouse on a grid above millions of grocery items, Ocado's robots can assemble a typical 50-item order in five minutes."
- "The end result is a breakthrough in radio design – the most densely packed cellular network in the world. It's also scalable, with the capacity to handle up to 20 times the number of current movements."

Checklist

Real	√
Lucrative	√
As simple as possible	√
Not already realised	X
In the space of:	logistics

Indoor	√
Indoor & outdoor	X
Municipal	X
Nation wide	X

- Use cases should be:
  1. Real – no proof of concept. A real use case, which upon capturing requirements on private network, can be tested and deployed
  2. Lucrative – the effort expanded must be justified by the price of private network
  3. As simple as possible – more complicated use cases can be captured in an iterative process
  4. **Not already realised**
     Note: Ocado use case is already realised, but SCF would benefit from:
     - interference and throughput measurements
     - understanding basic mitigation (possibly non-standardised) technologies
  5. In the space of (not exhaustive):
     - agriculture
     - consumer electronics
     - retail
     - **logistics**
     - manufacturing

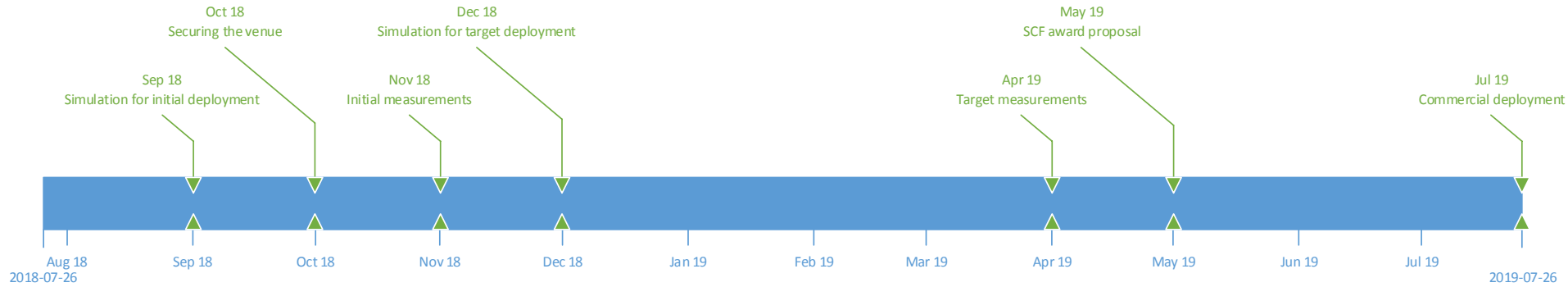
Requirements

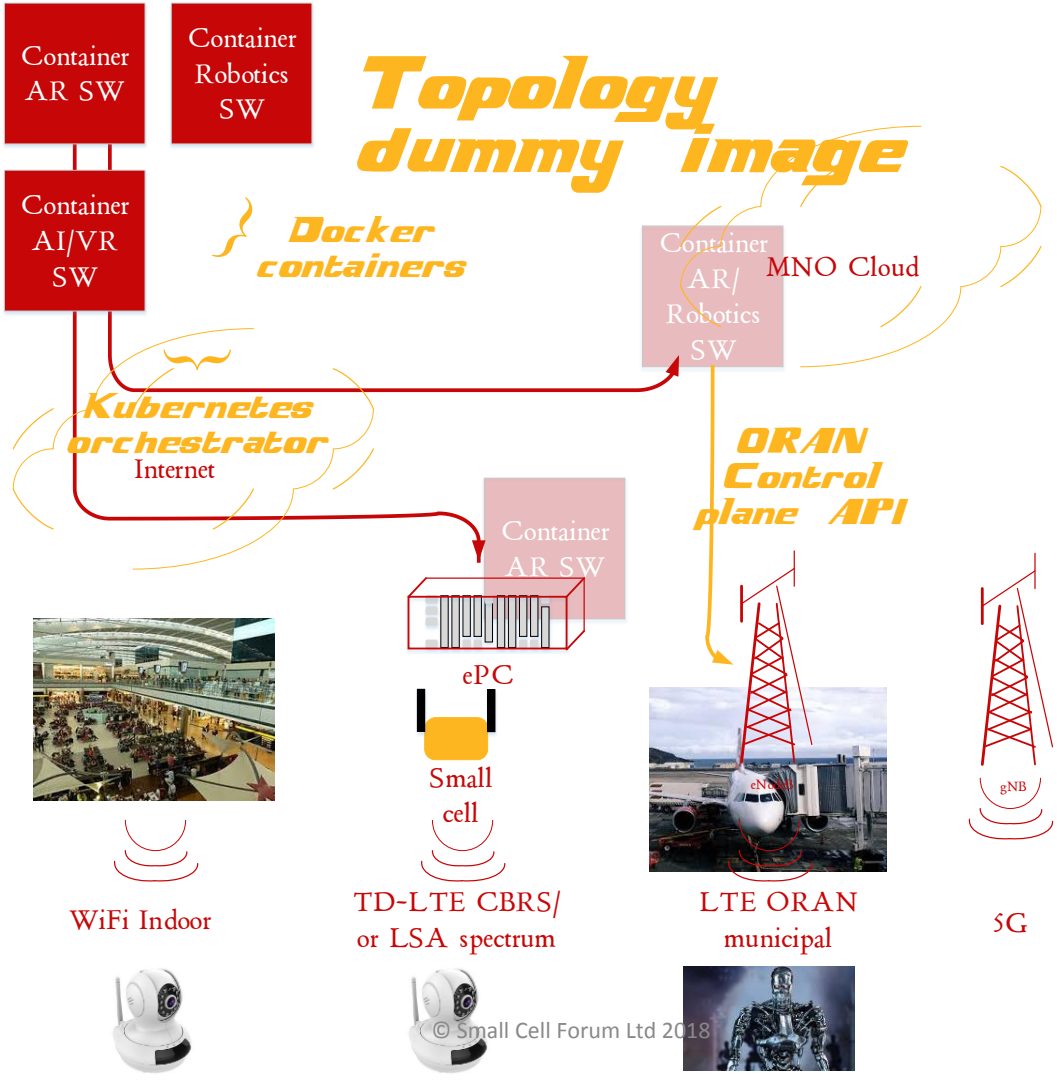
- Venue
  - Size and material:
    not too big: it would require too many radio nodes
    not too small: interference pattern must not be dominated completely by reflected signals
    80m x 80m x 5m
    microwave reflection by metal in construction should be significant
    preferable there will be a small section in the venue where radio-environment can be controlled – to quickly gauge the radio equipment
  - Meeting room
  - Internet
  - Power feeds
  - Floorplan
  - Technical support

Requirements

- Simulation
  - Note: simulation can be just a paper exercise
  1. Determine initial and target bandwidth per square foot from the floor to radio heads
  2. Determine initial (static) and target velocities of UEs on the floor
  3. Along the test programme determine the best steps how to achieve the target
- Test programme
  - Initial bandwidth and static UEs
    - Bandwidth density, number of UEs, radio link latency, interference, jitter
  - Target bandwidth and UE velocities
    - Dependency of all variables on UE velocities, and UE pose and antenna pattern
  - Best steps to achieve the target
    - Changes in PHY (e.g. shortTTI, or FEC)
    - Changes in MAC (e.g. scheduler)

Timeline





Participants