

SPHERE

Sensor Platform for HHealthcare in a Residential Environment

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Background – the SPHERE capability

- SPHERE, £12M EPSRC “Interdisciplinary Research Collaboration”.
 - October 2013 – October 2018
 - Director Prof Ian Craddock.
 - Approx 30 post doctoral staff, 10 PhD students, 20 academics in Engineering, 20 clinical and clinical research collaborators plus collaborators at 7 partner Universities. Total = ~100 people.
 - Opening paragraph of the proposal:
“The aim is to impact a *range* of healthcare needs simultaneously by employing data-fusion and pattern-recognition from a common platform of largely non-medical/environmental networked sensors in a **home environment**”
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SPHERE Design Phase

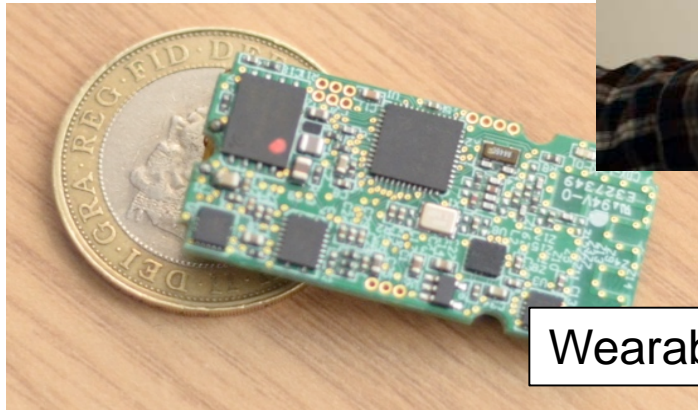






SPHERE Technology: Wearable and Env. Sensors

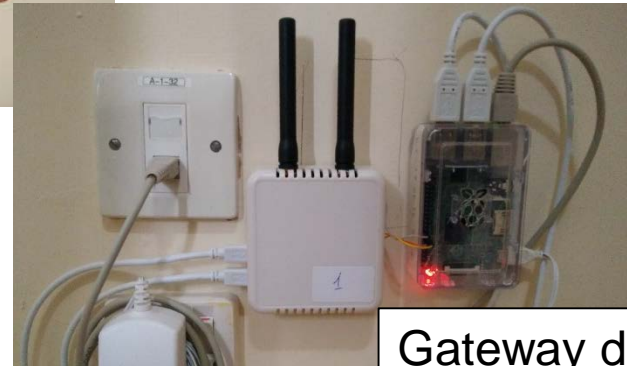
- **Bespoke wireless sensors**



Wearable



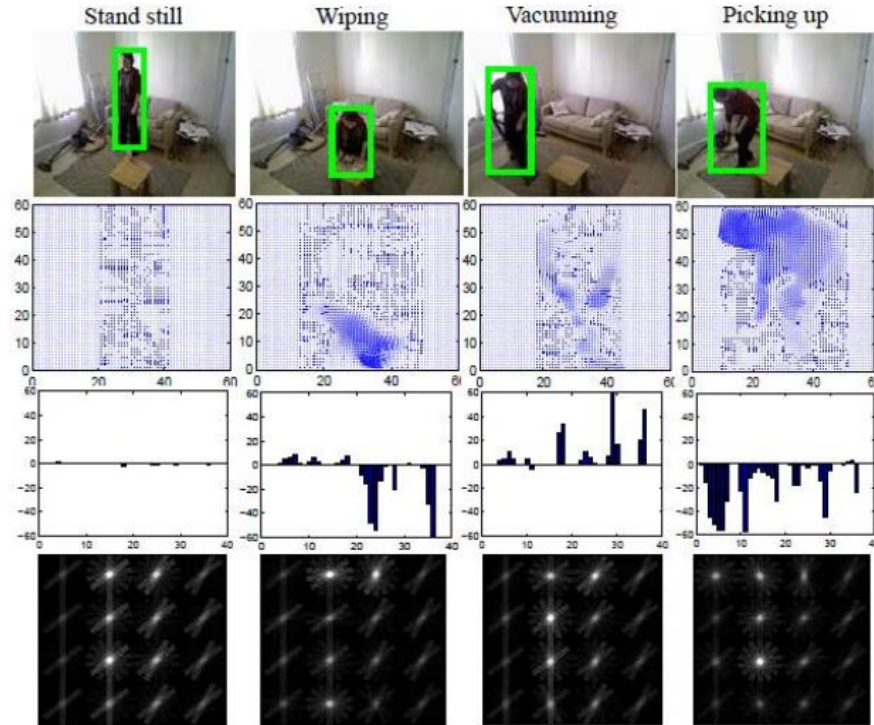
Environmental Sensor

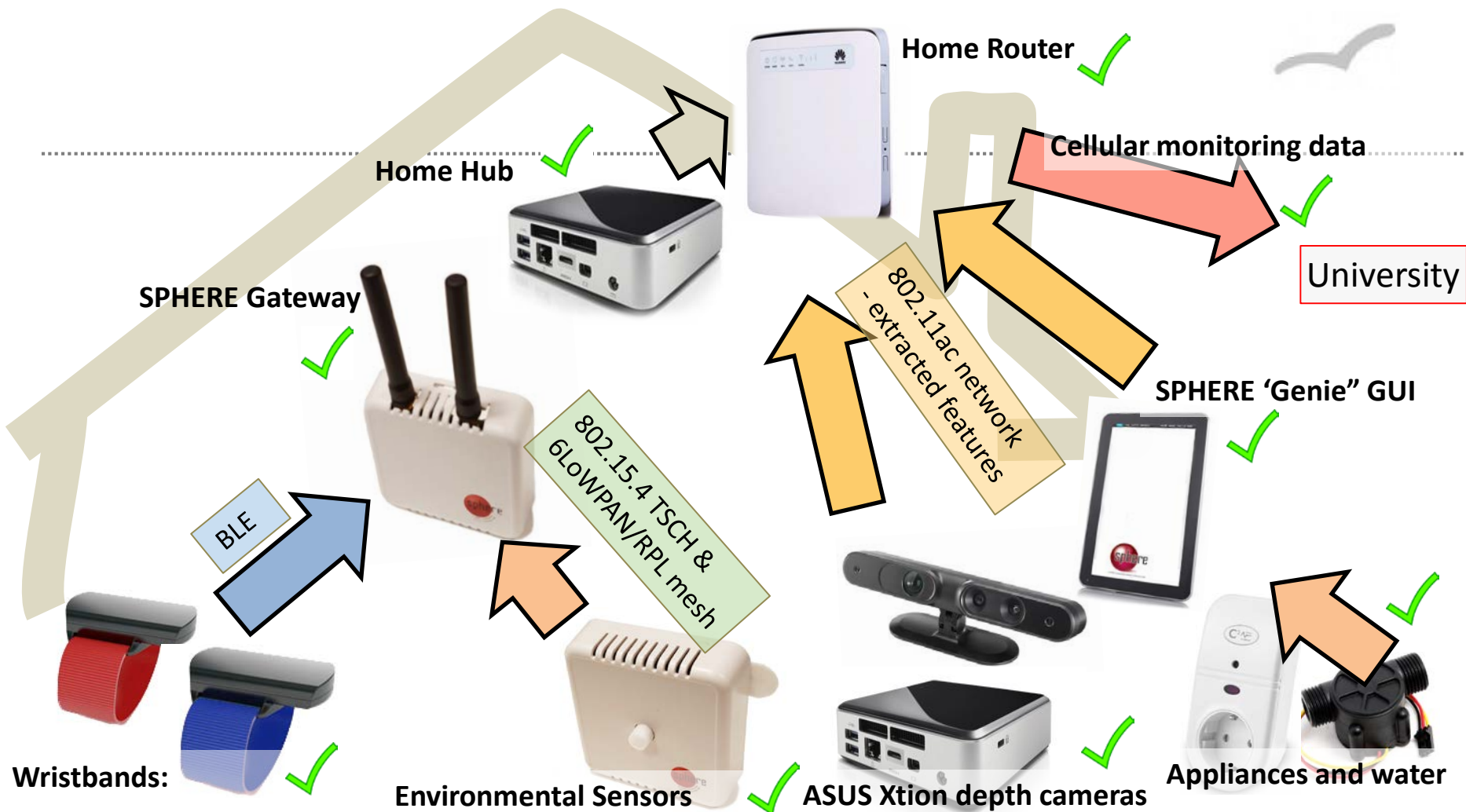


Gateway device

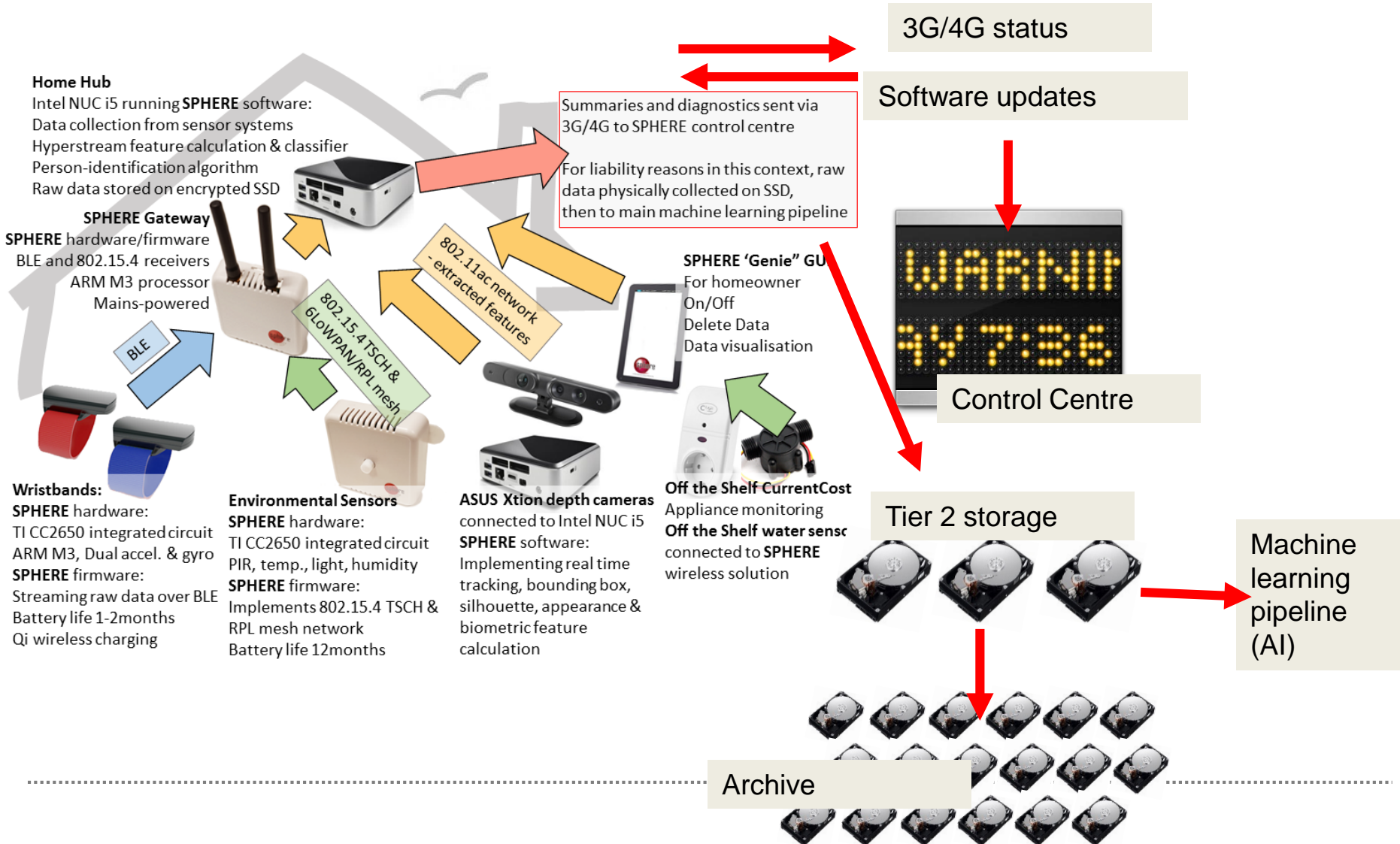
SPHERE Technology: Video

- Video, including tracking, re-id, pipeline





- Procurement / Manufacturing ✓
- Consenting / Installation process ✓
- Metadata capture on homes and participants ✓
- Ethics ✓



3G/4G status

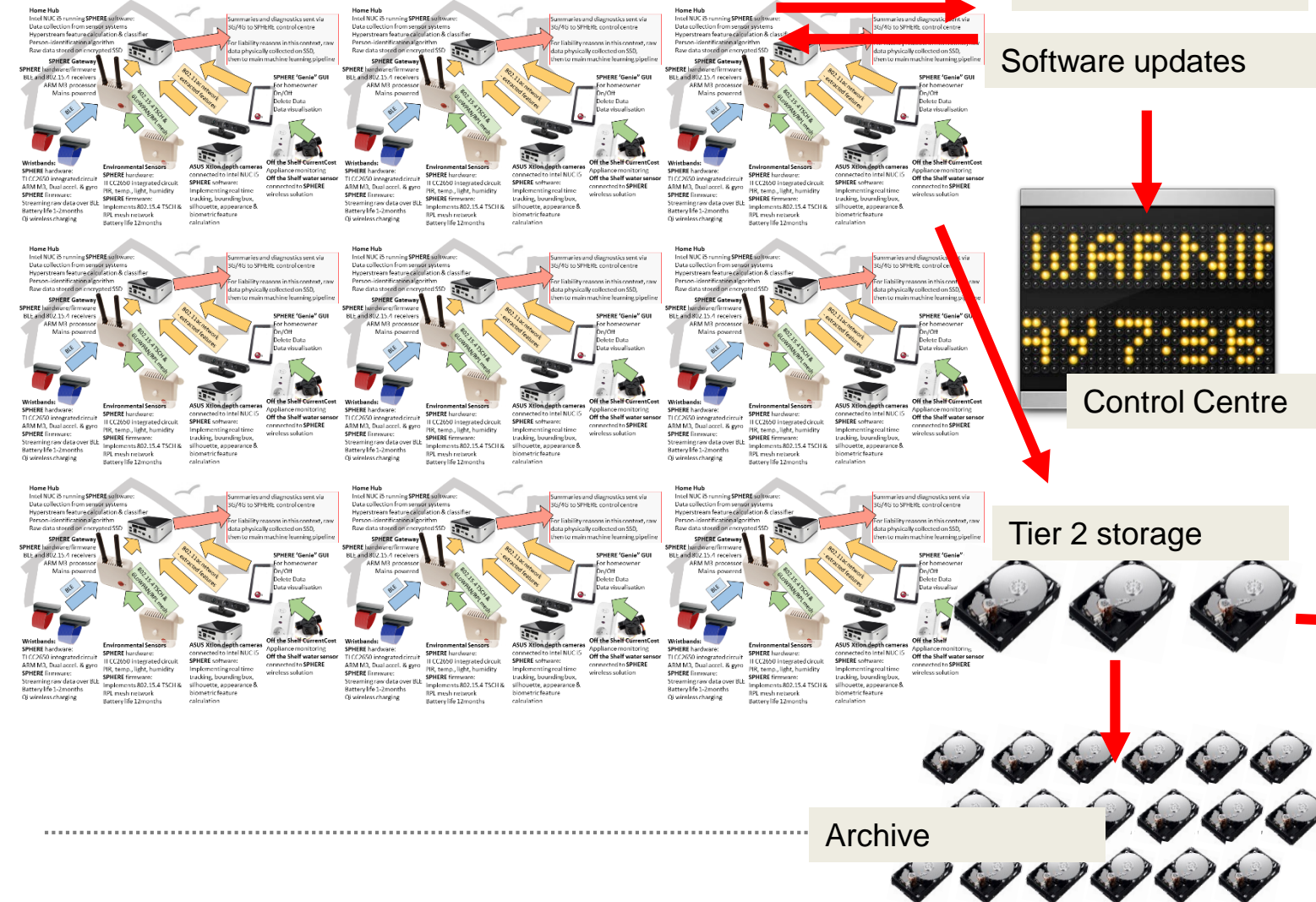
Software updates

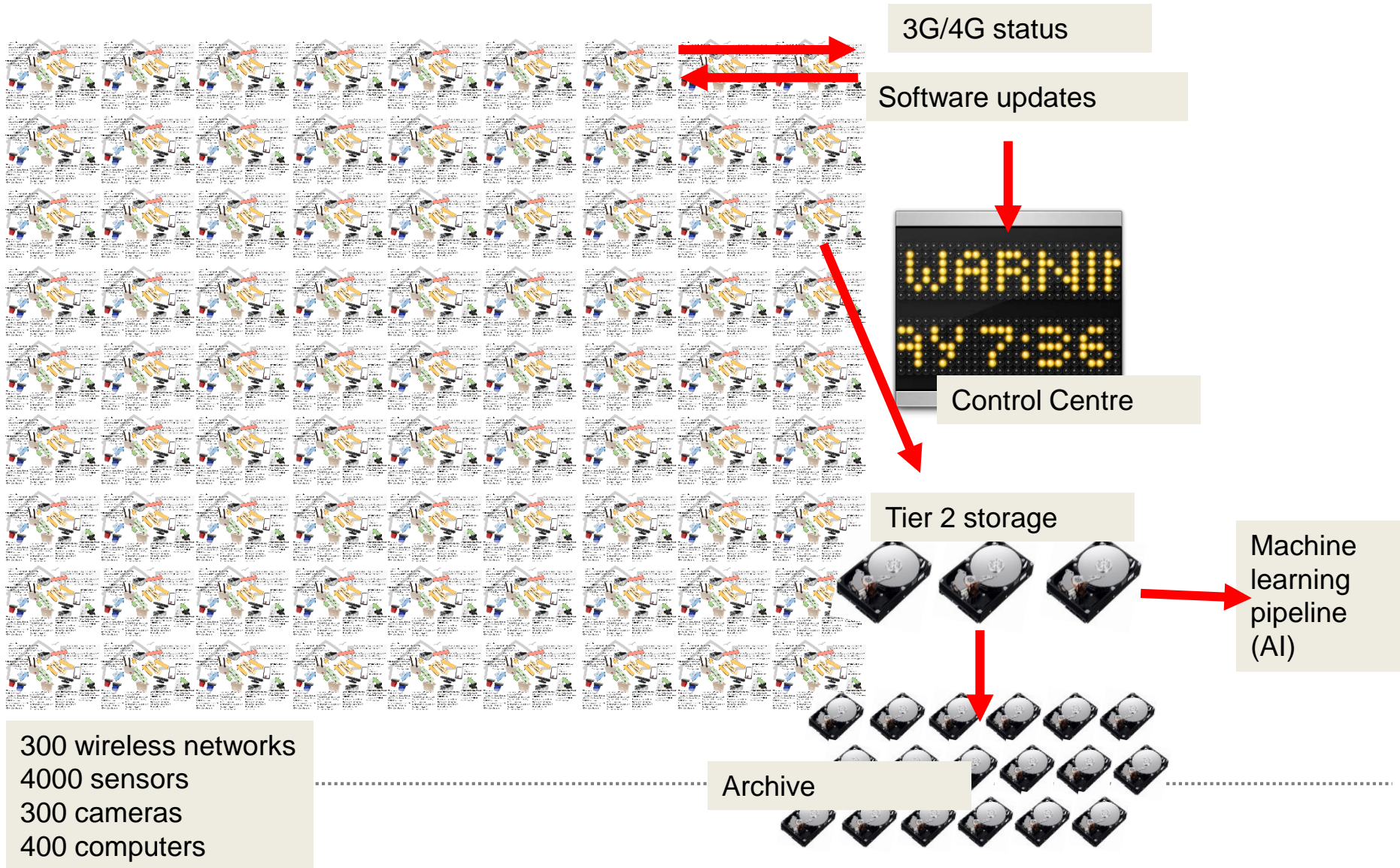
Control Centre

Tier 2 storage

Machine
learning
pipeline
(AI)

Archive





Pilot home #2 install



Current Status

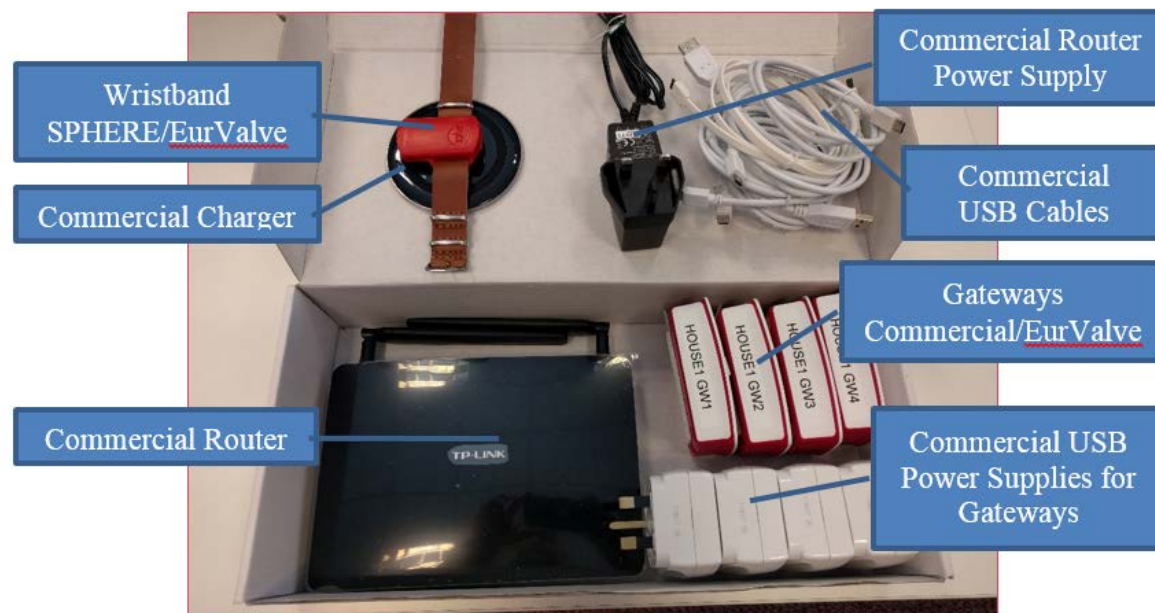
- SPHERE systems are being deployed across Bristol.
- Currently proof of concept with healthy households
 - Testing sensors and analytics
 - Testing consent/site survey/installation/maintenance process
 - Training technicians
 - Developing experimental and data management infrastructure
- First three clinical applications will start over next 12 months.

1 HemiSPHERE (SPHERE – funded)

- First clinical use of the SPHERE system.
- Cohort of 20-30 hip and knee replacement patients Sept – Dec 2017.
- Run by Dr Sabrina Grant at Southmead hospital.
- Comparing the assessment of recovery after surgery as captured by patient reported outcomes vs SPHERE system.
- NHS Ethics application built on SPHERE documentation and now finalised, approved internally with UoB, now with NHS Ethics Committee (expected decision late May 2017).

2 EurValve (H2020 funded)

- “Mini-SPHERE” study using wearable plus new access points to give indoor position.
- NHS Ethics application Q1 2017.
- Awaiting NHS Ethics approval.
- Cohort of 20-30 heart surgery patients from May 2017 in Sheffield.



3 CUBOiD (MRC funded)



- Application ranked first in panel and funded in full.
- PI Yoav Ben Schlomo with CoIs Ian Craddock, Liz Coulthard, Raul Santos Rodriguez.
- Full SPHERE system in a MCI/Dementia cohort in Bristol.
- Aim is to determine behavioural biomarkers of early stage Alzheimer's Disease.
- Project started April 2017.

Thank you!

