



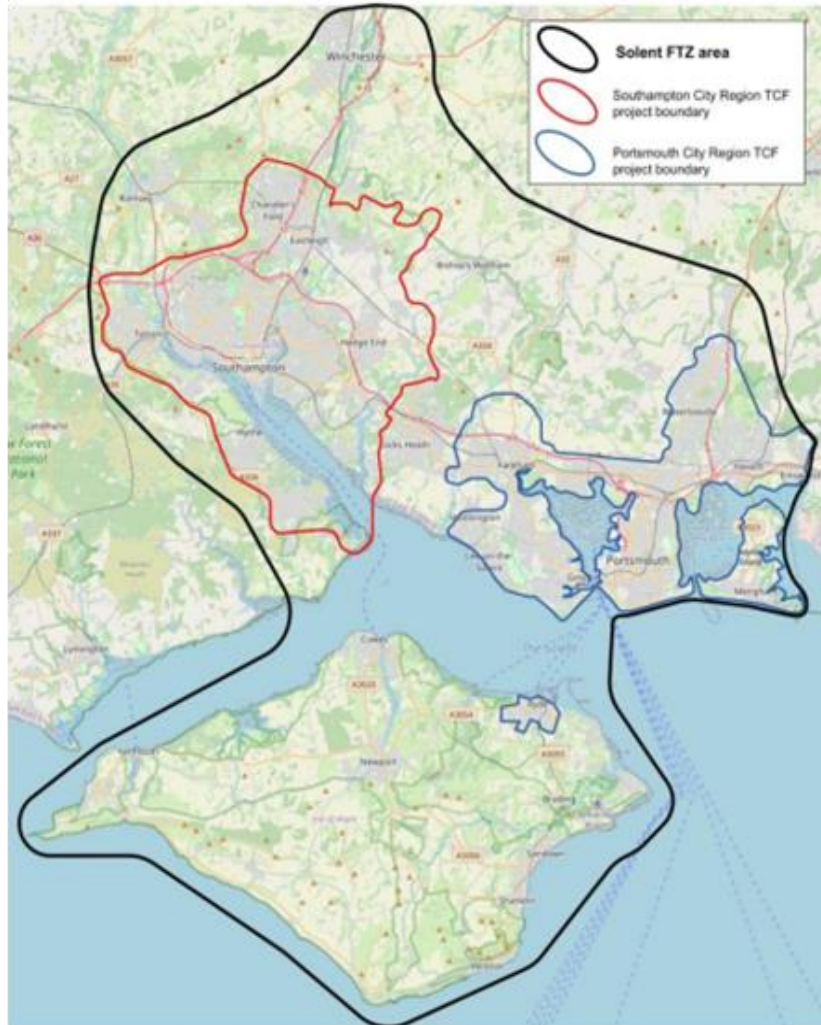
Solent
Transport
a partnership

Solent Future Transport Zone

Drones for Medical Logistics

November 2024

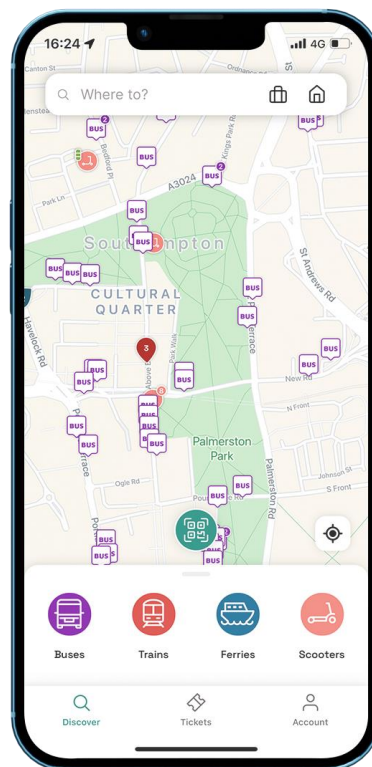
The Solent Future Transport Zone



- Solent Transport is a cooperative partnership and Joint Committee between the councils SCC, HCC, PCC and IOW
- The Future Transport Zone is a £28.8M DfT funded programme of trials and innovation projects across the Solent region
- Programme is funded until end December 2025



Solent Future Transport Zone



Department
for Transport



Aim

To research how drones could be used to make medical logistics in the Solent area more efficient for the NHS; aiming to improve health outcomes and the quality of residents' lives.



Department
for Transport



Isle of Wight
NHS Trust

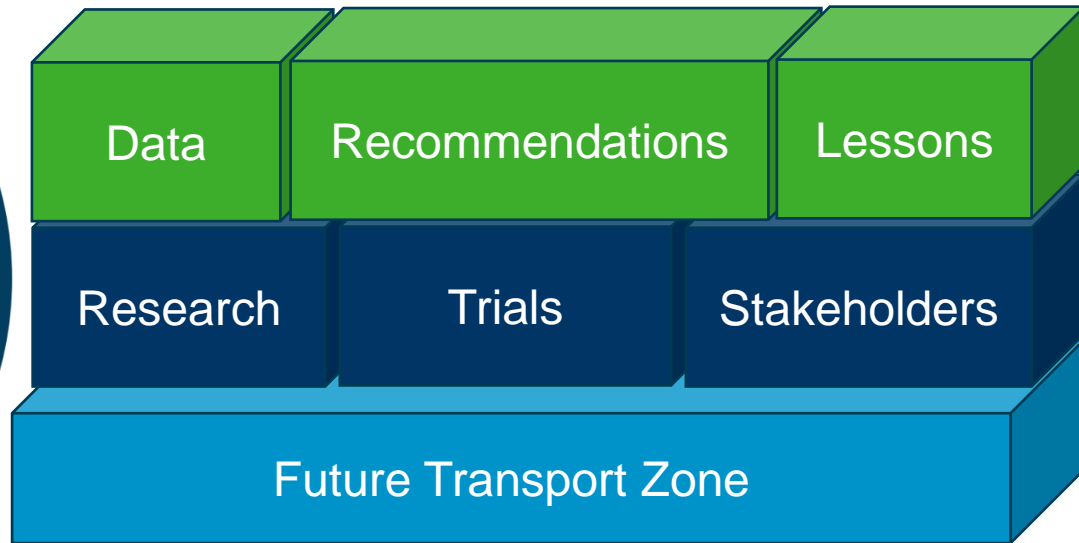


Portsmouth Hospitals
University
NHS Trust



Aim

To research how drones could be used to make medical logistics in the Solent area more efficient for the NHS; aiming to improve health outcomes and the quality of residents' lives.



Timeline

2020

Covid-19 Response Trial

Trialling rapid delivery of medical goods by drone to the Isle of Wight (IoW) during periods when ferries were unable to run. Achieved several UK 'firsts':

- First delivery of an NHS payload by drone.
- First point-to-point BVLOS flight of a fixed wing drone between two different airfields.
- One of the first BVLOS flights close to a highly populated urban area.
- First BVLOS flight using next generation "masterless" avionics.

2021

Medical Delivery Trials

- Multiple drone flights testing the practicalities of transporting medications via drone.
- Flew large drone cargo aircraft BVLOS within a designated TDA approved by the CAA.
- Researched the effects of vibration and temperature changes on chemotherapy.
- Researched multimodal logistics optimisation for ground and aerial NHS transport in the Solent area.
- Identified the need to investigate the integration of existing logistics infrastructure and required loading and unloading facilities.

2022

Llanbedr Trials

- Tested both crewed and uncrewed platforms in the same airspace using different operators and aircraft types.
- Developed and tested an air space booking system to aid strategic deconfliction
- Deployed ADSB sensor network.
- Drop-tested standard medical packaging according to the Vehicle Certification Agency's crash proof container guidelines.

2023

Research Trials and Flying Infrastructure

- Developing a drone taxonomy following global market evaluation.
- Continued medicine vibration and packaging drop testing
- Seeking approval from VCA for standardised medical drone logistics packaging.
- Research and discovery into the design of a gust proof drone (FTZ Airbridge project) designed to operate in the Solent year-round.
- Planning of sensor network to identify both cooperative and uncooperative aviation activity in the Solent area and quantify air risk.

2024

Live Flying Trials

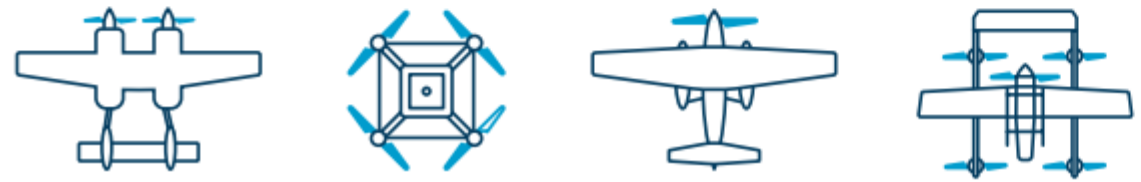
- Trial Airspace application.
- Installation of sensor network and data capture.
- Implement Solent Drones VLOS hub
- Open trial airspace to enable BVLOS flying
- Continue design of FTZ Airbridge

2025

Evaluation

- Conclude flying and research activities
- Evaluate all project activity and learnings
- Final Solent Future Transport Zone report

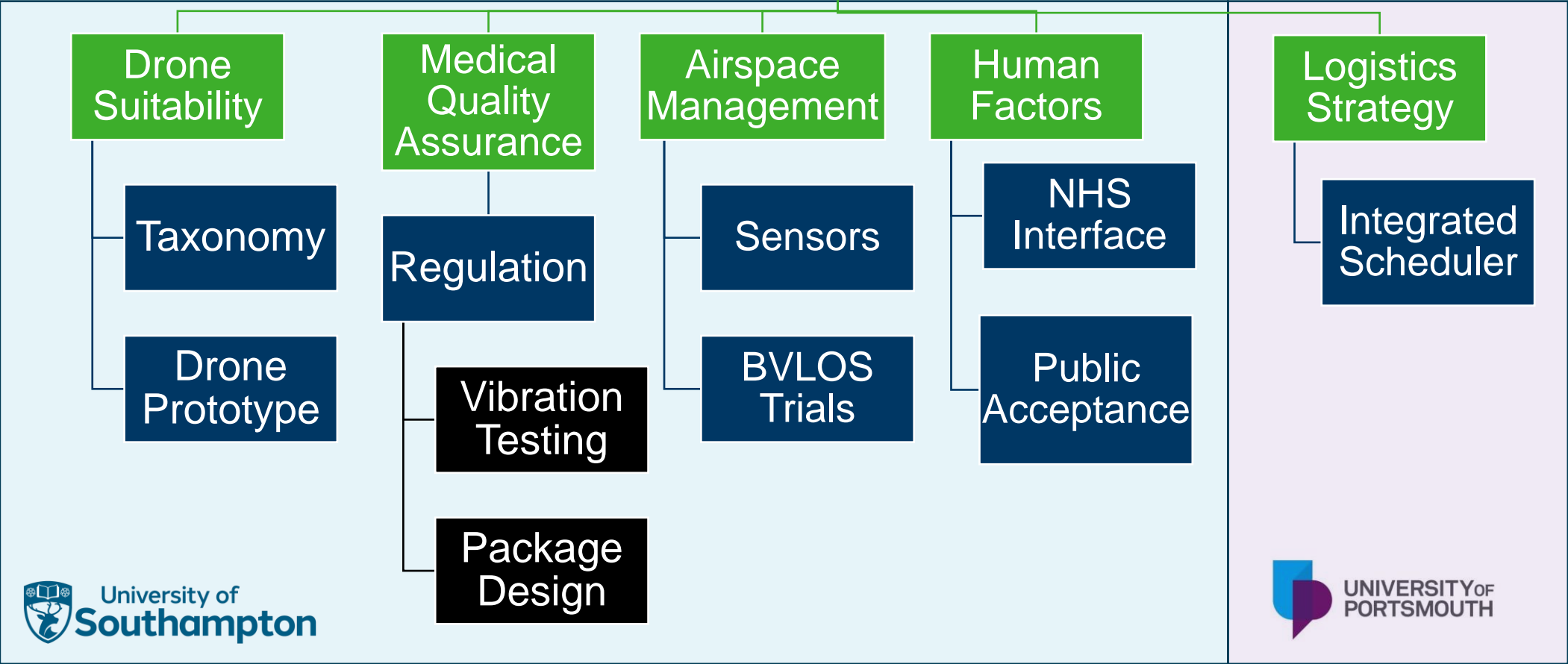
What next?

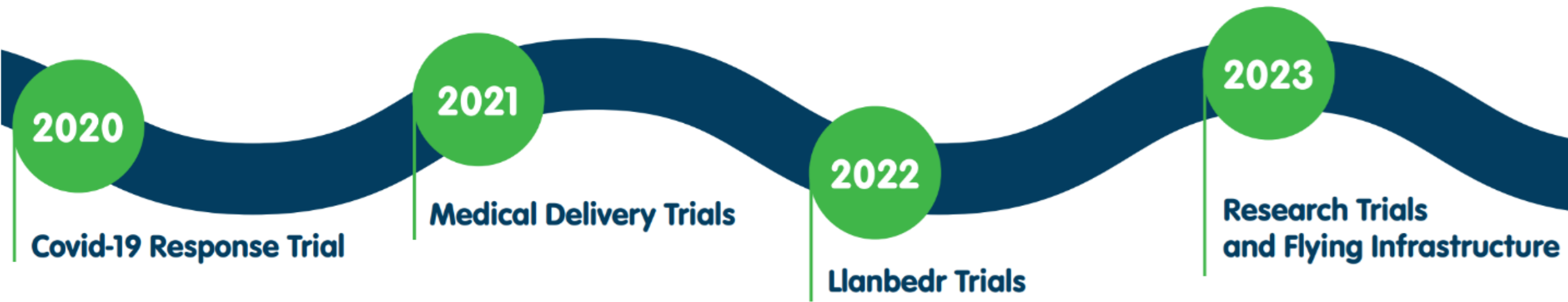


Core partners (as of 2023)



NHS Drone Logistics System





Key findings so far...

- Drones need to carry standard NHS containers
- Weather impacts “year-round” viability of drone service
- Legislation, regulation and airspace management protocols need to be adapted to facilitate routine drone medical logistics
- Cancer medicines maintain integrity despite vibration
- Public engagement tools essential for route permissions





2024

Trials

2025

Evaluation
Live Flying Trials

- Install network of low altitude airspace sensors
- Human factors research with the NHS
- BVLOS flights to test flight procedures and medical trials
- Continue to develop prototype drone with Soton UAV
- Evaluation, engagement and recommendations



Integrating drones and NHS logistics: flight or fantasy?

Solent FTZ Drones
for Medical Logistics



Aim

This research investigates the potential benefits and financial and practical realities of integrating drones into NHS logistics rounds taking patient diagnostic specimens from GP surgeries in the Solent area to the pathology analysis laboratories at Southampton General Hospital (SGH).



Methodology

- Worked with local NHS Trusts and SGH to analyse more than 70,000 business-as-usual delivery rounds to identify flows and round times.
- Looked at factors such as historic weather data, packaging requirements for transporting medical payloads, and air and ground risk around GP surgeries.
- Used this data to assess the potential benefits to the NHS of using drones in terms of improved service times and reduced transport related CO₂ emissions.



Figure 1. A render of a Mugin-5 Pro, 5m wing-span VTOL fixed-wing drone, with human for scale, capable of carrying industry approved packages.



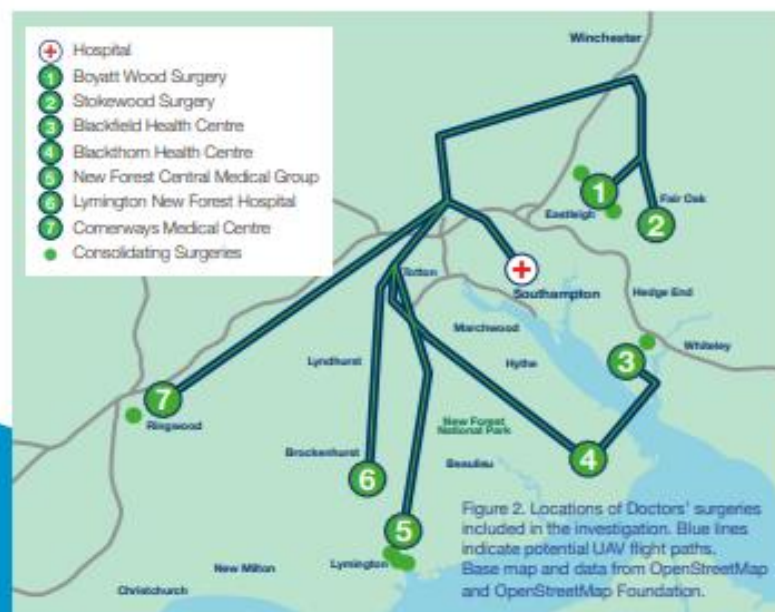
Key Findings

- Only 9 of 79 (12%) GP surgeries were found to be suitable for drone integration due to landing restrictions and risk to third parties.
- Deliveries could be serviced by 42 drone flights each week, with 10 taxi trips commissioned to cover periods where poor weather limited flying.
- Introducing drones reduced van costs by 23% but resulted in an overall system cost increase of £2,964 (+56%) per week.
- Travel times to drone served sites were cut by 72%, and savings were also made in terms of greenhouse gas emissions, pollutants and congestion (-317kg of CO₂ per week), and driven vehicle-kilometres reduced by 20%.

Recommendations

- The analysis shows there may be some benefit in making NHS deliveries **quicker and more reliable**, though further research is needed to understand what impact this would have on diagnosis times, treatment plans, and patient outcomes.
- There may be value in drones supporting NHS services, although it is likely that effective adoption will require integration **alongside road vehicles**.
- Whilst the increase in cost is likely to make the introduction of drone services financially challenging, the benefits in terms of **emissions and journey time savings** may offset some of the additional cost and warrant **further investigation**.

To read the full paper visit <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0264669>





Solent
Transport
a partnership