

Apian Northumbria NHS Aerial Delivery Network ACP-2022-031 summary

Project outline

Apian, in conjunction with the Northumbria Healthcare NHS Foundation Trust, conducted feasibility trials using Uncrewed Air Systems (UAS) between hospitals in Northumbria. The distribution of medical payloads included pathology samples for analysis, chemotherapy drugs and urgent medical supplies (such as medical devices for patient monitoring). The hospitals were located at Wansbeck, Alnwick and Berwick upon Tweed.

The project evaluated the potential of transporting time-sensitive small and medium-weight healthcare items using UAS Beyond Visual Line of Sight (BVLOS) delivery operations during the period 13th February to 12th May 2023.

Northumbria Healthcare covers a large, predominantly rural geography across Northumberland and North Tyneside. Using UAS could significantly reduce delivery times, improve efficiencies, cut carbon emissions and improve patient health outcomes. The trial has collected valuable logistical data to assess the impact on patient experience, staff resources and environmental benefits (please see Northumbria Dashboard [below](#)).

This trial was a critical step towards the integration and not segregation of UAS to support the NHS to build capability into existing, pressured supply chains. This trial was funded by Apian and not the NHS.

This report summarises the achievements made by the project and identifies improvement opportunities. More information on the details of the trial can be found on our website [here](#).

Project outcomes

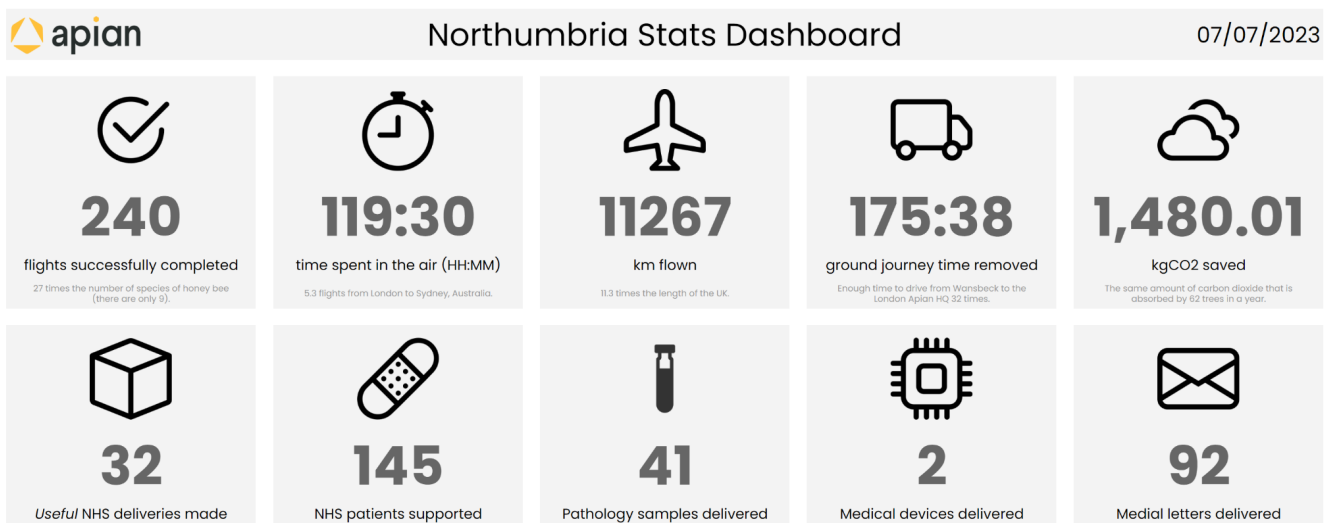
Healthcare

- Enabled patients and staff in the oncology day units and the wards to have their blood diagnostic results being turned around on the same day
- Delivered the first patient pathology samples in Northumberland by UAS
- Conducted the UK's first Beyond Visual Line of Sight flight of blood packs, for research, in collaboration with NHS Blood and Transplant
- Flew the UK's first medical device by UAS
- Provided patients with oxygen saturation when the medical devices required repair/diagnostics by providing a replacement device within the hour
- Provided a more frequent delivery mechanism and an alternative delivery mechanism to augment existing ground transportation
- Integrated Northumbria's first UAS delivery dashboard to track deliveries in real time

- Enabled a digital chain of custody to trace deliveries in real time
- Integrated a multimodal delivery system with NHS staff and UAS operators
- The delivery service inspired other departments within the hospitals to request their products to be delivered on-demand
- Cold-chain validation were conducted for both room and fridge products with the selected thermal bag carrier (in partnership with Versapak), UAS, route and time of year

Aviation

- Flew the UK's longest UAS delivery flight (80km)
- Successfully trialled and tested procedures with emergency services, the military and Newcastle Airport to allow flexible use of airspace.



Improvement opportunities

Healthcare

- Validation of the stability of the UAS flight, including transport bags and aircraft for temperature, vibration and any other tests, should, where possible, be conducted prior to flying to maximise data collection of real-world flights. It is important to note that not all validation will be able to be completed in advance. Further validation tests are required to test the coldchain and vibration across a variety of weather seasons and aircraft platforms.
- Apian created a real-time departure and arrivals board as an initial integration platform in this stage. For future stages, Apian's healthcare logistics platform will be built and integrated directly into the clinical environment, enabling the seamless ordering, scheduling and tracking of medical products. This will enable healthcare teams to track deliveries in real time, providing more visibility for staff and allowing care pathways to be activated based on clinical needs rather than logistical constraints.
- There were complexities in coordinating outbound and inbound deliveries due to the landing sites not being situated on the hospital estate. As a result of the take-off and landing pads (TOLP) being a five-minute drive to the hospital, medical products were required to be packaged

60 minutes prior to the schedule. Future projects should operate from the hospital estates to reduce workloads for healthcare staff

Aviation

- A multi-operator approach should be adopted to enable different use cases to be met and to enable the right aircraft to be used for each clinical product.
- Multiple Uncrewed Aircraft (UA) operations were required due to the requirement of frequent deliveries throughout the day to enable on-demand deliveries to be realised.
- These feasibility flights routed over the sea where possible, to minimise the impact on the General Aviation community. Direct flights are required from point to point to reduce delivery times when compared to ground transportation. In addition, there were multiple packages that were unable to be flown due to the weather conditions as a result of the flight path being routed over the sea.

Aviation Stakeholder Feedback

- See Annex A

Annex A: Summary of engagement and TDA access requests while operating.

A summary of the number of communications received from the aviation industry throughout the 90 day trial can be seen below.

Category	Number of enquiries	Number requesting entry into TDA	No of entry approved	Examples
GA*	4	0	0	<ul style="list-style-type: none"> Request for more TDA information
GA (other - inspections)	2	1	1	<ul style="list-style-type: none"> Gas line inspection
UAS/RPAS operator	1	1	1	<ul style="list-style-type: none"> Requested TDA access to complete a drone inspection of a bridge.
Military	3	1	1	<ul style="list-style-type: none"> Training flights requiring access to the TDA
Emergency operators (HEMS/NPAS)	8	3	3	
Total	18	6	6	

*Those that made enquiries (where additional information was required but entry was not being requested) have been included in any further stakeholder engagement in association with the project.