Trial Plan Northumbria Stage 2 ACP-2023-015

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1. Introduction

This document forms part of the Airspace Change Process (ACP) as defined in the Civil Aviation Publication (CAP) 1616. Apian, the change sponsor, is seeking to establish a Trial Temporary Danger Area (TDA) complex during notified periods to enable the safe beyond visual line of sight (BVLOS) uncrewed aircraft systems (UAS) operations in Northumberland in partnership with the Northumbria Healthcare NHS Foundation Trust.

Apian is a medical logistics company, focused on the use of UAS to deliver faster, smarter and greener healthcare. Founded by a team of NHS doctors and ex-Googlers, Apian is building products and platforms that connect the healthcare industry with the UAS industry to improve patients' health outcomes and staff well-being.

Following Apian's successful Stage 1 trial in Northumberland (ACP-2022-031), we are now looking to complete a further trial, Northumbria Stage 2. A summary of the lessons learnt from the first stage can be found here.

For Stage 2, Apian in conjunction with the Northumbria Healthcare NHS Foundation Trust, is looking to develop the learnings taken from Stage 1, and increase the amount of deliveries to patients and clinicians within the Northumberland region. These feasibility flights will be between specific hospitals, GP surgeries, care homes and pharmacies for the distribution of regular and time critical medical payloads such as, prescription medication, medical implants, medical devices, pharmaceutical products, blood packs, medical and consumable supplies, maintenance spares and medical documentation.

The aim of this trial plan is to provide details of what we would like to achieve from this project and how we can make improvements following our learnings from ACP-2022-031. It will allow stakeholders the chance to look at the proposed trial TDA details and to ensure that everyone has a full understanding of what, if any, effect it may have on them and to provide them with the opportunity to comment.

The feasibility flights will be conducted by UAS operator Zipline. Zipline designs, manufactures and operates the world's largest automated on-demand delivery system with a fleet of proprietary, fully-electric, and highly-automated UAS. More information about Zipline can be found in Annex B.

This document forms part of the ACP engagement activity and will be sent to stakeholders for comment (please see Annex C for a full list of identified stakeholders). Details of ACP-2023-015, including all supporting documents, can be found on the CAA's online Airspace Change Portal. Further details of our proposed trial TDA, which we are requesting from 12th February 2024 - 12th August 2024 can be found in Annex B .

2. Trial Overview

2.1. Improving healthcare services

Northumbria Healthcare NHS Foundation Trust is the most rural Trust in the NHS with more than a third of their patients living rurally in either a village or fringe town. This geographic context presents significant challenges to providing care to a population of over 520,000 across Northumberland and North Tyneside local authorities. In addition to adding substantial miles travelled, it creates one of England's most complex health contexts to operate in. Despite these challenges, Northumbria Healthcare NHS Foundation Trust provides CQC-rated 'outstanding' care, as it continuously works to improve the inequalities and complex health and social needs of its location.

Apian has been requested by the Trust to conduct an evaluation project using UAS to transform their clinical services and lead to improved care to their local patients and population (please see Annex D for the letter of support). This would ensure essential services are provided in a more time critical manner to those who need them the most, and that issues created over the course of the pandemic such as dealing with the backlog of care are tackled as quickly as possible.

See Annex A for a table that highlights the medical items that Apian intends to transport, the issues with the current means of delivery and the potential benefits foreseen by the use of UAS in the delivery chain.

2.2. Objectives

The primary objective for the trial is to research the impact UAS can have as a delivery mechanism and transform Northumbria's clinical services, therefore leading to improved care to their local patients and population.

The trial will be launching a UAS delivery service to hospitals, GPs and care homes capable of enabling medical products to be received in the hands of a clinician/patient upon ordering at any point during the day.

The following additional objectives are outlined as;

2.2.1. Healthcare

- To improve access to care for patients in primary care, secondary care and social care
- To integrate a seamless end-to-end temperature-validated delivery service for the most sensitive items (including pharmacy products, vaccines and blood products)
- To supplement existing road transportation with UAS to provide faster, more cost-effective and reduced carbon options
- To reduce wastage associated with stock/inventory for the trial by illustrating the benefits of regional as well as local stockholdings, whilst optimising the associated logistics for Northumbria Healthcare NHS Trust
- To reduce overstocking of products in hospitals, GPs and care homes
- To gather data and simulate how UAS could help drive the NHS towards its net zero targets

2.2.2. Aviation

- To support the integration of BVLOS UAS operations using technology and procedures to remove the need for segregated airspace, in line with the Airspace Modernisation Strategy
- Utilise a hub and spoke delivery system with multiple UAS operations
- Safely operate BVLOS within controlled and uncontrolled airspace

- Create innovative air design to support departure and recovery routes inside controlled airspace
- Safely operate multiple BVLOS UAS within one TDA, using an operator's UTM system for real-time tracking of (and deconfliction) of multiple UAS
- Collate and analyse flight data (including timing and routes) to inform planning of future operations and refine airspace utilisation
- Analyse impact of 24/7 UAS operations and scaled operations into the airspace, including the introduction of night time and overnight operations
- Further development of dangerous goods procedures for UAS operations at scale
- Introduce increased flight volumes per day in a given service area / community
- Support the Aviation 2050 Net Zero targets with fully-electric UAS services that have zero tailpipe emissions

3. Trial Planning and Preparation

CAA guidance for UAS operations in UK airspace is set out in CAP 722, which states the criteria for BVLOS UAS operation. One of the requirements is the presence of a detect and avoid capability that has been accepted as at least equivalent to the ability of pilot see and avoid, and ensures compliance with the Rules of the Air.

The UAS operator, Zipline, has a proprietary detect and avoid system that has been approved for integration with their Part 135 Operations in the USA by the Federal Aviation Authority (FAA).

In this trial phase of operations in the UK, Zipline will seek BVLOS accommodation through the temporary establishment of segregated airspace. Simultaneously, Zipline intends to seek UK CAA guidance on compliantly deploying detect and avoid technology to remove the need for segregated airspace, in line with the Airspace Modernisation Strategy.

The most appropriate way to implement such segregated airspace is in the form of a TDA.

As such, Apian (as sponsor) has undertaken an airspace change request under CAP 1616. During the Assessment Meeting for this ACP with the CAA, it was agreed that a trial TDA would be the most suitable airspace to safely accommodate the flights.

Apian, in collaboration with the UAS operator Zipline, will follow the CAP1616 process for completing a temporary airspace change and as such is conducting stakeholder engagement from 28th July to 22nd September 2023. Stakeholder engagement material can be found in Annex B. Feedback from this process will be submitted as part of the formal CAA submission for the proposed trial TDA.

Apian and Zipline are being supported and guided by Newcastle International ATC regarding operations in close proximity to Newcastle airport. Details of agreed temporary operating instructions will form part of the formal submission.

Apian and Zipline will continue to engage with aviation stakeholders who may require immediate access to the trial TDA for Emergency Services or Military Operators on short notice operational taskings, such as the Air Ambulance, National Police Air Service, Maritime Coastguard Agency and Military.

Approval from the CAA for authorisation to operate in the trial TDA by Zipline must be obtained before the commencement of operations. This will not be included as part of the Trial Plan.

Apian and Zipline would like stakeholders to be aware that they are supportive of the UK's DfT and CAA Airspace Modernisation Strategy, and do not see Temporary Danger Areas as a long term solution but rather a stepping stone to integrated operations within the airspace.

Annex A: NHS challenges to be addressed and potential benefits of the trial

Stage 2 aims to build upon the learnings and data derived from Stage 1 to scale up the operations to provide a sustainable service for the patients and staff within the region. The expansion proposed in this statement of need moves us towards a "North of England Air Grid", which will enable more communities to receive on-demand deliveries, whilst also bringing care closer to homes. The repertoire of use cases will increase to include:

1. Medical implants;
2. Medical devices and associated spares;
3. Medical and Consumable supplies;
4. Pharmaceutical products (including prescription medicines);
5. Blood packs;
6. MRO (Maintenance, Repair and Operations);
7. Emergency deliveries of all the above.

The table below highlights the medical payloads that Apian intends to transport, the issues with the current means of delivery and the potential benefits foreseen by the use of UAS in the delivery chain.

1. Medical implants delivery	
Problem	Northumbria Healthcare provides elective surgeries across a number of its main sites. There is an ongoing focus to provide these procedures to patients close to their homes, ensuring that the surgical theatres in Wansbeck General Hospital and Hexham General Hospital are optimised. It is expensive to stock each hospital with a range of implants, as there are different requirements for types and sizes of implants for each patient's operations. This may lead to high-value items being wasted due to expiry dates if the products are not being used. The lack of flexibility in logistics can also lead to delays in surgeries with valuable operating theatre & staff time being wasted.
Solution	The use of UAs would enable the Trust to move to a centralised stock model for the region as a rapid, just-in-time logistics solution would enable this new supply chain model. This would reduce overstocking

	and wastage, as well as enable more personalised care for patients by providing more flexible patient care. Initially, the UAS service will deliver from Northumbria Healthcare Manufacturing and Innovation Hub to Wansbeck General Hospital and Hexham General Hospital.
2. Medical devices delivery	
Problem	Medical engineering is a vital service that provides maintenance, repair and replacement of medical devices and equipment necessary to enable hospital, community and ambulatory care. Devices must be provided in a timely manner to prevent delays in activating clinical care. If there are low stock or device faults within healthcare facilities, clinicians are unable to accurately determine the clinical impression of their patients and often end up spending valuable clinical time finding a replacement device. Some of the devices are used for providing observations and diagnosis of patients, including blood pressure pumps and oxygen saturation monitor probes. Other devices such as ventilators and syringe pump drivers are required for patients who are undergoing surgery or receiving medications. These devices are critical to the care pathways and the challenges are especially highlighted for outlier sites.
Solution	The use of UAS would allow for a rapid and reliable delivery timescale to immediately correct for this. This would enable spare parts and devices to be sent out and distributed more dynamically. Using an on-demand delivery would also enable fewer devices to be procured and minimise the total maintenance costs incurred by the Trust, while at the same time improving the traceability and regularity of servicing the equipment within the Trust. Initially, the service will deliver from Northumbria Healthcare Manufacturing and Innovation Hub to Wansbeck General Hospital, Hexham General Hospital and Haltwhistle War Memorial Hospital. Other sites may include GPs for district nurses to collect and pick up the items for their patients in the community.
3. Primary distributor of products to Haltwhistle War Memorial Hospital	

Problem	Haltwhistle War Memorial Hospital is one of the two outlier hospitals for the Trust given the distance away from the main supplies stores. This hospital currently receives one daily van delivery on weekdays which includes products such as pharmacy items, post, laundry, frozen food, mail and general consumables. Patient specimens and posts are also picked up and sent back to the main pathology laboratories. The existing logistics solution (van deliveries) which are at fixed intervals are unable to respond adequately when an urgent request is made, leading to clinical staff spending time on organising deliveries rather than patient care with the Trust using out-of-hours taxi services at an additional cost to the NHS. This leads to overstocking to ensure products do not run out and wastage of compounds is inevitable.
Solution	The use of UAS would allow for a rapid, just-in-time logistics solution to alleviate the limitations of the existing supply chain. The service will be delivered from Northumbria Healthcare Manufacturing and Innovation Hub to Haltwhistle War Memorial Hospital.
4. Deliveries to the community (GPs, care homes and pharmacies)	
Problem	GPs provide essential immunisation services to their population. The current supply chain means that a fridge is required at the practice to store the vaccines at fridge temperature. If the fridge is broken, this may jeopardise the cold chain of these vaccines and lead to waste. Care homes provide a 24/7 service to their residents. There are challenges to receiving prescription medicines for their patients, especially for those who are on palliative care and require anticipatory medications such as pain medications (opioids) during out-of-hours and on the weekends. During these times, if a resident is unwell, the care home providers must call an out-of-hours GP. The GP may then prescribe medications which can be dispensed from a local pharmacy. The care home providers will send a member of staff to pick this up as there are no drivers available during those hours. Occasionally, the resident may have to wait up to 48 hours to receive the medication due to the pharmacy store being closed on a weekend.

Solution	UAS would transform community care as healthcare professionals are able to provide better patient care to those who are most in need. By centralising the stock, a 24/7 service could be provided from one location, which would significantly reduce valuable staff time in conducting unnecessary and laborious administrative tasks. This would free up both clinical spaces and time for more patient care.

5. Additional areas of need

In addition, there are other time-sensitive items, such as blood units, convalescent plasma, pharmaceutical products, vaccines, personal protective equipment, test kits, testing reagents, tracheostomy tubes, stroke kits and emergency equipment that could be transported between the hospital sites using UAS. UAS would also add significant flexibility to the logistics service by rapidly responding to urgent issues as they arise and mobilising quickly rather than following set runs. They would also resolve the issue of often empty vans being moved around the Trust in anticipation of picking up urgent items.

Further non-clinical opportunities lie with maintenance, repairs & operations, and facilities maintenance, where there are opportunities to better leverage the stock holdings held in one location that can be used in another to reduce wastage.

Alongside these specific needs, the trial for Northumbria Healthcare has the potential to expand on other, more limited, trials of UAS in support of frontline NHS services and build a wider set of use cases and proofs of concept. Northumbria and Apian have had conversations with other Trusts in which cross-regional services could benefit from the use of uncrewed aircraft.

The NHS and Apian would like to thank the aviation authorities and local stakeholders thus far for their continued support.

Stakeholder material ACP-2023-015

The following provides detailed information for aviation stakeholders to gain a better understanding of our project. Stakeholders are asked to provide feedback on our proposed trial TDA by the 22nd of September 2023, in order for it to be included in our submission to the CAA. Details of how to provide feedback can be seen in section 3.4.

1. UAS Operator

Zipline is a robotics and instant logistics company that designs, manufactures, and operates proprietary highly-automated UAS to deliver products on-demand.

More than two billion people on Earth lack easy and reliable access to the products they need because of last-mile transportation challenges. Zipline— the world's first and only national scale on-demand UAS delivery service—was built to solve that problem. In the past 3 years, Zipline has distributed over 11.5 million vaccine doses, including 3 million COVID-19 vaccines in Ghana and Nigeria. Zipline now serves more than 4,000 health facilities worldwide, working with global partners such as Pfizer and Gavi, The Vaccine Alliance, and within the U.S., with partners currently including Intermountain Health, Multicare Health System, and expanding to Michigan Medicine among others. As of July 2023, Zipline has flown over 75.5 million kilometres and completed more than 700,000 commercial deliveries worldwide.

Zipline operates from secure, centrally located distribution centres (known as Hubs or "Nests") which house a fleet of proprietary uncrewed aircraft (UA) (known as "Zips"), ground equipment, and professional-quality storage facilities. Trained fulfilment operators confirm, process, and package each order. Once an order is placed by a customer, Zipline's trained flight operators then load the package and launch the Zip. From each distribution centre, Zipline can serve hundreds of delivery sites across a 7,000-square mile (20,000-square kilometre) service area daily.

Zips are custom-designed to deliver light cargo. A Zip's fixed-wing design enhances speed, range, and reliability even during adverse weather conditions like rain and wind. Once airborne, a Zip flies in primarily Class G and segregated airspace at or below 400 feet (122 m) AGL or as authorised by the CAA. The Zip follows an optimal, predetermined route to a preapproved delivery site. During flight, the Zip continuously reports its position to regulators, air navigation service providers, and other airspace stakeholders using a proprietary uncrewed traffic management (UTM) solution. At the destination, the Zip

descends to no lower than 60 feet (18 m) and releases the package to a designated delivery zone via a small parachute. In this manner, Zipline provides unmatched on-demand access, with most deliveries taking less than 30 minutes.

By using an industry-leading Path Planner software, Zips fly routes that maximise safety and efficiency while minimising air and ground risk. At all times, Zips adhere to the regulatory parameters established by the country's civil aviation authority (CAA) and other government stakeholders. Zipline's extraordinary global impact is made possible by its teams of local professionals who belong to the communities they serve. True to our core beliefs, all of Zipline's operations in the United Kingdom from fulfilment and flight operations to country leadership will eventually be 100% managed and conducted by UK citizens. Investing fully in the communities we serve not only creates dozens of well-paying full-time jobs and limitless training and employment opportunities for the people of the United Kingdom; it also ensures that Zipline's mission of providing every human on Earth with instant access to goods of all types is not only attained, but sustained for generations to come.

Figure B-1: Zip Sparrow UA in operations

Table B-1 - UAS specification	
Manufacturer	Zipline International Inc
Model	Zip Sparrow UAS
Type	Fixed-wing
Dimensions:	Wingspan: 10 feet 10 inches (3.3 m) Length: 6 feet 2 inches (1.88 m)

	Height: 2 feet (0.61 m)
Max speed	95.2 kts VNE
Cruise speed	50-56 kts
Area of operations	80-100 km radius from logistics hub
Typical operating height	At or below 400ft (122m) AGL unless otherwise approved by UK CAA. See below in Table B-2.
Max takeoff weight:	< 25kg
Max flight time duration	120 mins
Typical flight time duration	30-45 minutes
Fuel Type	Electric; lithium-ion battery with endurance of 2 hours and maximum capacity of 1740 Whr (rated capacity 1250 Whr according to UN38.3 labelling)

2. Routing overview

2.1. Distribution centre

The hub location for operations will be in the vicinity of the Northumbria Healthcare Manufacturing and Innovation Hub at Seaton Delaval (up to 5km from this site).

2.2. Hospital delivery sites

There are three hospitals that will be involved in the feasibility flight trial. These are:

- Wansbeck General Hospital, Woodhorn Lane, Ashington, NE63 9JJ
- Hexham General Hospital, Corbridge Rd, Hexham NE46 1QJ
- Haltwhistle War Memorial Hospital, Haltwhistl, NE49 9AJ

2.3. GP surgeries, care homes and pharmacies delivery sites

Figure B.2 displays a number of GP surgeries, care homes and pharmacies who have expressed interest in participating in the Stage 2 feasibility flights.

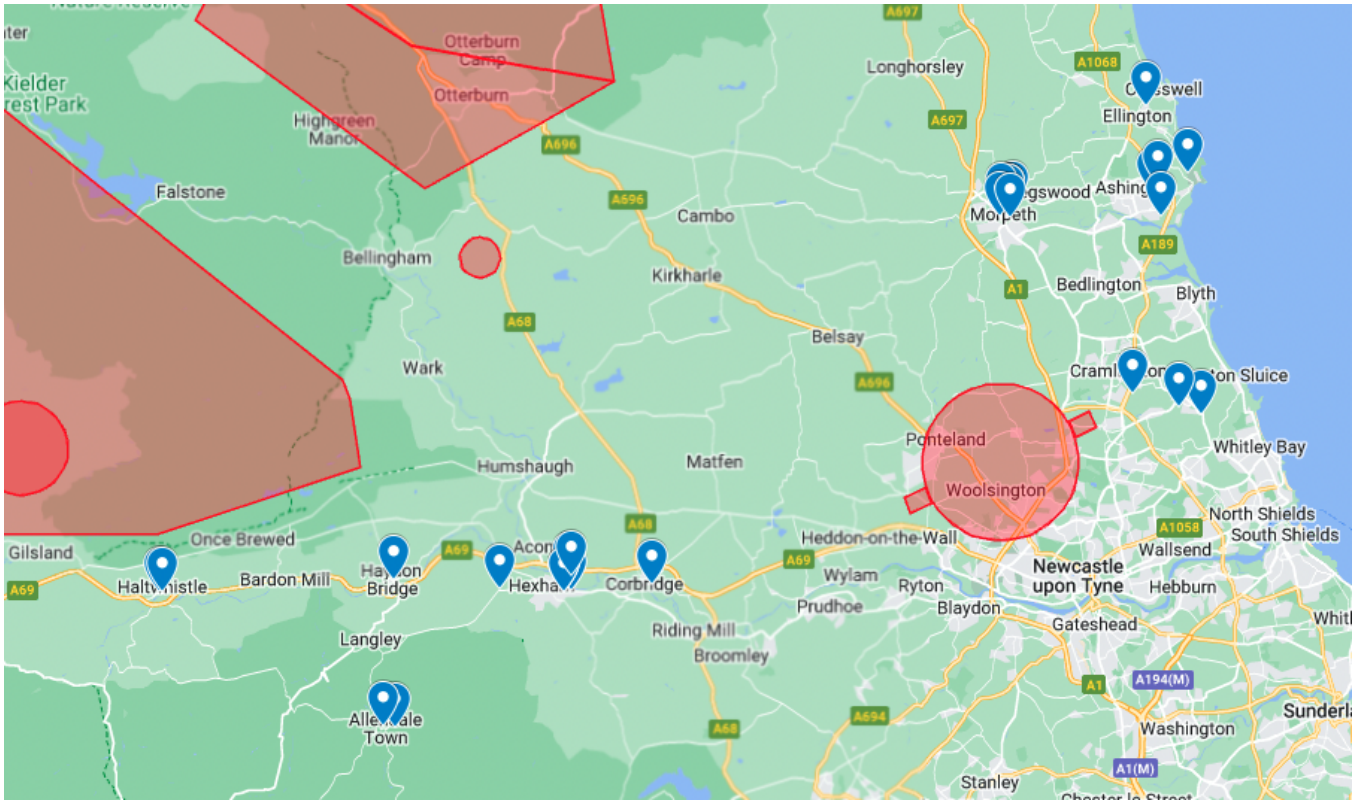

Figure B.2: Potential Stage 2 delivery sites

The names of the organisations displayed in figure B.2 are;

- Alexandra Park
- Allendale Health Centre
- Ashington Grange
- Burn and Brae Medical Group
- Corbridge Health Centre
- Cygnet Hospital Hexham
- East Riding Care Home
- Elm Bank Care Home
- Flexible Support Options Limited (Pengarth)
- Gas House Lane Surgery
- Haltwhistle Medical Group
- Haltwhistle War Memorial Hospital
- Haydon Bridge & Allendale Medical Practice
- Hexham General Hospital
- Hexham Primary Care CTR
- Holywell House Care Centre
- Lowgate Care Home

- Morpeth NHS Centre
- Morpeth The Mount
- Northlands Care Home (Northumberland)
- Northumbria Specialist Emergency Care Hospital
- Royal Mail Ashington Delivery Office
- Royal Mail Group Ltd Bridge End, Hexham
- Royal Mail Morpeth Delivery Office
- Stonehaven Residential Care Home
- Thornley Leazes Care
- Wansbeck General Hospital

3. Airspace change proposal

3.1. Current UK regulations require the use of segregated airspace within which to safely conduct the proposed BVLOS UAS operations. The proposed trial TDA complex has been designed in segments to allow activation of specific areas for individual flights as appropriate. These segments can be seen in figure B.3.

3.2. TDA structure

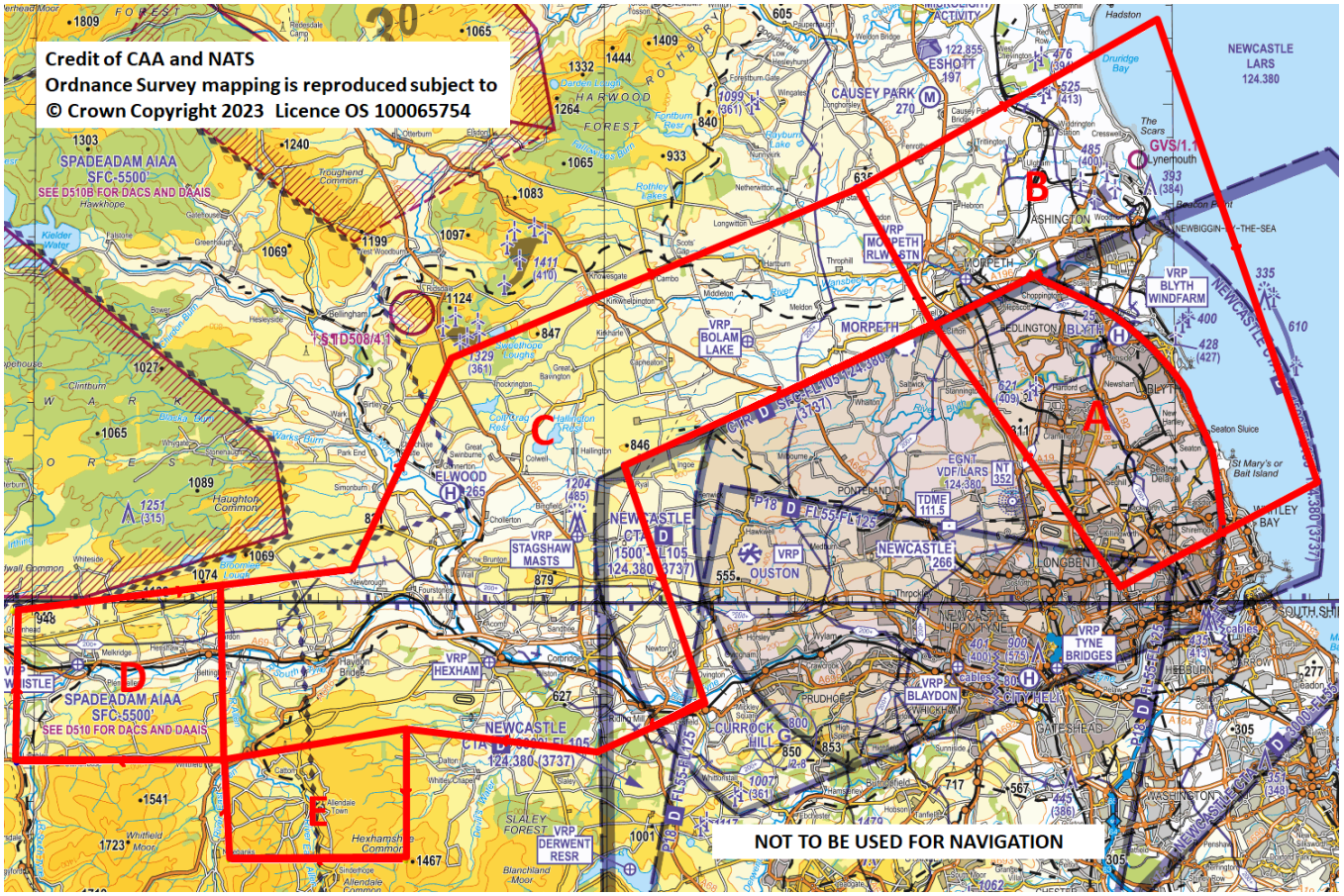

Figure B.3 Proposed Stage 2 TDA

The proposed TDA structure which will provide segregated airspace between the delivery sites is illustrated above, within the area bounded in red, and is described in more detail below;

As part of the TDA (defined as TDA A) is within Newcastle Airport's Control Zone, the management and procedures of that airspace will form part of the submission. On-going discussions with the CAA on the appropriate airspace designation, may require this section to be a Temporary Reserved Area or Segregated Area. Stakeholders will be informed of any changes as soon as possible, it should be noted that this will not change the area being proposed.

3.3. TDA Area(s)

Table B-2 below shows the potential coordinates and vertical limits of the TDA Area(s).

Table B-2 - TDA Areas	
Area A Lateral Limits	Area A Vertical Limits
An area bounded by lines joining: 55°08'26"N 001°42'46"W 55°09'55"N 001°37'17"W an arc following the eastern edge of the Newcastle CTR to 55°2'04"N 001°27'31"W 55°0'24"N 001°32'56"W 55°8'26"N 001°42'46"W	Upper Limit: 1000ft AMSL (~600ft AGL) Lower Limit: SFC
Area B Lateral Limits	Area B Vertical Limits
An area bounded by lines joining: 55°08'26"N 001°42'46"W 55°12'31"N 001°46'41"W 55°17'30"N 001°30'47"W 55°03'37"N 001°22'30"W 55°02'04"N 001°27'31"W an arc following the eastern edge of the	Upper Limit: 1300ft AMSL (~600ft AGL) Lower Limit: SFC

Newcastle CTR to 55°09'55"N 001°37'17"W 55°08'26"N 001°42'46"W	
Area C Lateral Limits	Area C Vertical Limits
An area bounded by lines joining: 54°55'15"N 002°20'07"W 55°00'26"N 002°20'12"W 55°00'56"N 002°13'15"W 55°07'24"N 002°07'58"W 55°12'31"N 001°46'41"W 55°08'26"N 001°42'46"W 55°04'09"N 001°58'57"W 54°57'08"N 001°54'55"W 54°55'32"N 002°00'24"W 54°56'18"N 002°10'32"W 54°55'15"N 002°20'07"W	Upper Limit: 1750ft* AMSL (~600ft AGL) Lower Limit: SFC *excluding class D airspace
Area D Lateral Limits	Area D Vertical Limits
An area bounded by lines joining: 54°59'40"N 002°31'00"W 55°00'26"N 002°20'12"W 54°55'15"N 002°20'07"W 54°55'08"N 002°30'51"W 54°59'40"N 002°31'00"W	Upper Limit: 2000ft AMSL (~600ft AGL) Lower Limit: SFC
Area E Lateral Limits	Area E Vertical Limits
An area bounded by lines joining: 54°52'15"N 002°19'47"W 54°55'15"N 002°20'07"W 54°56'18"N 002°10'32"W 54°52'13"N 002°10'31"W 54°52'15"N 002°19'47"W	Upper Limit: 2300ft AMSL (~600ft AGL) Lower Limit: SFC

AMSL values estimated over SRTM 30m orthometric heights

3.4. Airspace utilisation

Table B-3 and Table B-4 show the likely activation periods for the TDA complex and the predicted frequency of flights. These figures have been calculated using the NHS

requirements for the distribution of medical payloads listed in Annex A. More details will be provided when available.

Table B-3 – Likely TDA activation periods and predicted frequency of flights			
Day	Time (Local)	Max total number of flights* between 8am to 6pm	Max total number of flights* between 6pm - 8am
Monday - Sunday	24 hours	74	6

*A flight is defined as departing the hub location, delivering to the selected delivery site (UAS does not land) and returning to the hub location.

Table B-4 - Likely frequency of flights to each delivery site	
Healthcare establishment	Estimated number of deliveries per day**
Hospitals	8-10
GPs, Care Homes, Pharmacy	1-2

**it should be noted that max total flights per day will be 80

3.5. Measures to minimise the impact on other airspace users

The proposed trial TDA complex will be activated during times of operations, but will be deactivated when not in use in line with the flexible use of airspace principles. The TDA design has outlined a number of specific areas, which will only be activated when flights are due to take place within those areas. Proven procedures will be adopted to ensure that the airspace is activated and notified as and when required. Apian will promulgate all TDA activation times and contact details of the Flight Operations Team by NOTAM at least 24 hours before planned use.

Due to the heights of the proposed TDA complex (600 ft AGL above the tallest known feature), a Danger Area Crossing Service (DACS) will not be provided. However, it is anticipated that a Danger Area Activity Information Service (DAAIS) will be provided, confirmation of details will be shared with stakeholders when available.

As outlined in our Stakeholder engagement plan, which can be found on the ACP Portal, Apian is aware of a number of aviation stakeholders that may require approval to enter the

TDA once activated (e.g emergency services). Apian and Zipline will engage with those relevant aviation stakeholders separately to this document, and will work with those stakeholders to ensure a comprehensive and robust airspace deconfliction procedure is produced and will secure their written approval before operating.

3.6. Noise Impact

Under CAP1616, as sponsors, we must explain how we have considered and assessed the likely noise impact of our proposal.

UAS datasets: The fixed-wing design requires the UA to maintain constant forward movement and nominal cruise speed between 50-56 kts, thereby significantly reducing time spent directly overflying people or property and preventing it from loitering over a fixed point.

Noise exposure assessments have been conducted in current operational approvals by Zipline in conjunction with third parties in the United States. This analysis takes into account different phases of the flight - (i.e., the launch and climb, en route, delivery, and the descent and recovery).

A high level summary of the estimated level of noise exposure during the UA phases of flight from previous reports can be found in table B-5.

Table B-5: Summary of estimated level of noise exposure from previous operations[1]	
Phases of Flight	Average Annual DNLs (day-night levels) sound in dB
Launch and climb *Note: Launch and climb includes launch from the Hub or "Nests" and climb to en route altitude*	45-65 dB
En route *Note: En route includes flight of the UA to and from the Hub at en route altitude.*	Under 20 dB

[1] Final Environmental Assessment and Finding of No Significant Impact/Record of Decision Zipline International Inc. Drone Package Delivery Operations in Pea Ridge, Arkansas and Surrounding Area

Delivery *Note: Delivery includes a unique delivery flight pattern, with orientation dependent upon wind direction and the delivery site.*	under 46 dB
Descent and recovery *Note: Descent and recovery includes inbound descent from en route flight and recovery at the Hub.*	45-65 dB

As part of this stakeholder engagement, Apian will be conducting local community engagement with those who reside in close proximity to the delivery and hub location for feedback. This will form part of the ACP submission.

Crewed aviation; This trial does not impact traffic distribution below 7000 ft, therefore we do not expect any change in the patterns of conventional traffic as a result of this trial.

3.7. Dangerous Goods

Apian and Zipline will ensure any payloads that are considered dangerous goods for carriage by air has the required approval from the CAA. Dangerous goods will not be carried without approval.

3.8. How to provide feedback

Apian welcomes comments and feedback from all interested parties. All comments received regarding this proposal will be taken into consideration before a final design is submitted to the CAA. All the details of this airspace change proposal are available on the CAA's Airspace Change Portal. Feedback on the proposed TDA, or requests for further information should be sent to Apian Aviation team at airspace@apian.aero

A feedback form is provided and a word document is attached to the email containing this material for your use if you wish. Responses regarding the proposed TDA submission must be received by 22nd September 2023.

Name	
Email	
Representing	
Address (including postcode if possible)	
Feedback:	

3.9. Post engagement

A copy of this material has been uploaded to the CAA Airspace Change Portal. Apian will produce an engagement summary report which will be presented to the CAA as part of the sponsor application. This will include details of how the engagement was conducted, all the feedback provided from the stakeholders and how the feedback has influenced the final airspace design. Redacted versions of that report will be uploaded to the CAA Airspace Change Portal following submission. Once the CAA has made a decision on the final airspace design, Apian will advise all stakeholders of the outcome.

While the TDA complex is in operation, Apian will monitor any feedback received on the CAA Airspace Change Portal or received directly by email or phone and collate the feedback and provide regular updates to the CAA when the TDA is activated and after it has been deactivated.

Annex C: List of identified stakeholders to be contacted as part of this stakeholder engagement

2Excel (Pollution Patrol)
Aircraft Owners and Pilots Association (AOPA)
Airspace4All
Association of Remotely Piloted Aircraft Systems UK (ARPAS-UK)
Atheys Moor flying school
BAE Systems
Borders Gliding Club
Bristow (SAR)
British Airline Pilots Association (BALPA)
British Balloon and Airship Club
British Business and General Aviation Association (BBGA)
British Gliding Association (BGA)
British Hang Gliding and Paragliding Association (BHPA)
British Helicopter Association (BHA)
British Microlight Aircraft Association (BMAA)
British Model Flying Association (BMFA)
British Skydiving
Drone Major
East of Scotland Microlights
Eshott airfield
Eccles Newton Farm Airstrip
English Heritage
Fishburn airfield
General Aviation Alliance (GAA)
Great North Air Ambulance Service (GNAAS)
Hawker Hunter Aviation
Heliair (Pipeline)
Helicentre (Pipeline)
Helicopter Club of Great Britain (HCGB)

HM Coastguard and search and rescue offices
HMP Northumberland
Iprosurv
Light Aircraft Association (LAA)
Ministry of Defence - Defence Airspace and Air Traffic Management (MoD DAATM)
National Grid (Powerline)
National Police Air Service
National Trust
NATS (Enroute)
NATS (NSL - Airports)
Newcastle International Airport
North Sunderland harbour
Northumberland County Council
Northumberland Estates
Northumbria gliding club
Northumbria Healthcare NHS Foundation Trust
PDG Helicopters (Network Rail)
Region Airspace Users Working Group (North-West)
RSPB
UK Airprox Board

Individuals who provided feedback to Apian's previous stakeholder engagement ACP-2022-031, or those who have reached out to Apian directly will also be included in the stakeholder engagement communications. These contacts will be included in the formal submission to the UK CAA.

Annex D: Letter of support from Northumbria NHS Foundation Trust

NHS
Northumbria Healthcare
NHS Foundation Trust

North Tyneside General Hospital
Trust Management
Rake Lane
North Shields
Tyne & Wear
NE29 8NH

Tel: 0191 293 2730

26 June 2023

To whom it may concern

Support from Northumbria Healthcare NHS Foundation Trust for trialling the use of Uncrewed Aerial Vehicles (UAVs)

As the Director of Innovation for Northumbria Healthcare NHS Foundation Trust, I have a duty of care to improve the health outcomes of our patients whilst redesigning our services for the future. After successfully trialling a faster and more reliable delivery service with electric UAVs, we are looking to expand the service to more use cases, locations and volumes of delivery to help bring on-demand delivery across our Trust.

Northumbria Healthcare NHS Foundation Trust provides CQC-rated 'outstanding' care to a population of over 520,000 across Northumberland and North Tyneside local authorities. We operate in one of England's most complex health and geographic contexts with significant health inequality, frailty and deprivation across a rural population. Reliable and timely logistics are critical in delivering a safe and effective service for both patients and staff. The use of UAVs in these clinical settings will support a transformation for these logistics services, lead to improved care for our patients, aid our efforts to tackle the backlog of care caused by the pandemic, as well as help centralise products to drive efficiency in our supply chain.

Our principal areas of focus for this trial are medical implants, medical devices, medical & surgical products and prescription medications (including chemotherapy drugs). Northumbria Healthcare provides a range of clinical services, including elective surgeries, community and ambulatory care across a number of its sites. There is an ongoing focus to provide these services to patients close to their homes, ensuring district nurses receive patient medical devices in a timely manner to activate clinical pathways, as well as optimising the theatres in the hospitals to help discharge patients quicker. Medical implants, devices, prescription medications and other medical products are stocked in premium clinical spaces of the operating departments to prevent stockouts due to lead times from supply chain providers. We believe that using UAVs for our chemotherapy supply chain has the potential to alleviate some of these pressures and provide a better service for our patients.

We also support a UAV service for other items, such as blood units, convalescent plasma, pharmaceutical products, vaccines, personal protective equipment, test kits, testing reagents, tracheostomy tubes, stroke kits and emergency equipment for resuscitations that could be transported between sites in the region.

The NHS in England is estimated to have produced 25 million tonnes of CO2 equivalent in 2019. As with all organisations, the reduction of carbon footprints is a key climate priority and the NHS has committed to being the world's first net zero national health service by 2040. An environmentally friendly and cost effective delivery model in the health service is clearly required and alternatives, such as UAVs, needs to be trialled and actively considered.

Northumbria Healthcare NHS Foundation Trust is grateful to the Civil Aviation Authority and the aviation community for supporting these NHS trials. Please do not hesitate to get in touch for further information.

Yours sincerely

ANDREW EDMUNDS
Director of Innovation