ACP-2020-090

TDA connecting the Isles of Scilly and Cornwall for Operations of Cargo UAVs - NHS Logistics support in response to COVID-19 requirements

Letter of Agreement (LOA)

This Letter of Agreement (LOA) outlines the terms of agreement between the parties listed below with regards to the operations of ULTRA UAS within the Temporary Danger Area derived from this ACP-2020-090

AGREEMENT BETWEEN:

- Windracers Limited,
- Newquay Air Traffic,
- Land's End Airport,
- Perranporth Airport,
- St. Mary's Airport,
- Culdrose RNAS.

SCOPE

This letter is to be regarded as an airspace management and coordination plan for the operations to be completed as part of the Scillies Airbridge project being undertaken by Windracers Ltd. These operations will consist of up to two return flights per day Monday-Friday over a period of 4-6 weeks between Perranporth Airfield and St Mary's in the Isles of Scilly.

OPERATIONS

Crew composition

The role of Remote Pilot-in-command (RPIC) is appointed to either a GCS Operator or Safety Pilot depending on the flight phase, aircraft location and system status.

In normal operations, the role of RPIC should be performed by the GCS Operator from take-off to landing and only transferred to the UAS Pilot with the aircraft within VLOS conditions, for taxiing or handling unexpected circumstances or to carry out manoeuvres that would not be feasible or safe using the autopilot.

Operational Rules

ULTRA UAS operations are carried out under two operational rule set:

Visual Line-of-Sight (VLOS)

Visual Line of Sight (VLOS) operations are those where the Safety Pilot is able to see the aircraft and the surrounding airspace at all times while it is airborne. This is in order to carry out collision avoidance manoeuvres when needed.

The current VLOS exemption issued by the CAA allows ULTRA to fly within 1500 m of the UAS Pilot at a height of 1000 ft AGL.

Beyond Visual Line-of-Sight (BVLOS)
Beyond Visual Line of Sight (BVLOS) are flight operations where the aircraft is required to fly at a distance or height where it is no longer within the visual detection threshold of the UAS Pilot.

Current BVLOS exemptions issued by the CAA allow ULTRA to fly within specific segments of segregated airspace at an altitude of up to 7000 ft AMSL.

Route
The proposed route is carried out almost entirely within the TDA resulting from ACP-2020-090, with the exception of operations within VLOS at Perranporth Airfield and within the ATZ of St. Mary's.

The proposed TDA is a segmented volume of airspace, describing a passage going out from Perranporth Airfield about 7 km away from the coast and turning SW into the main section of the TDA. This section travels parallel to the North boundary of the Culdrose AIAA and Land's End Traffic Corridor (LETC). This section is broken into three segments to allow a more flexible and practical Air Traffic Service. At a point near 21 nm from Land's End VOR, another segment of the TDA enters the LETC and links the main corridor with St Mary's ATZ.

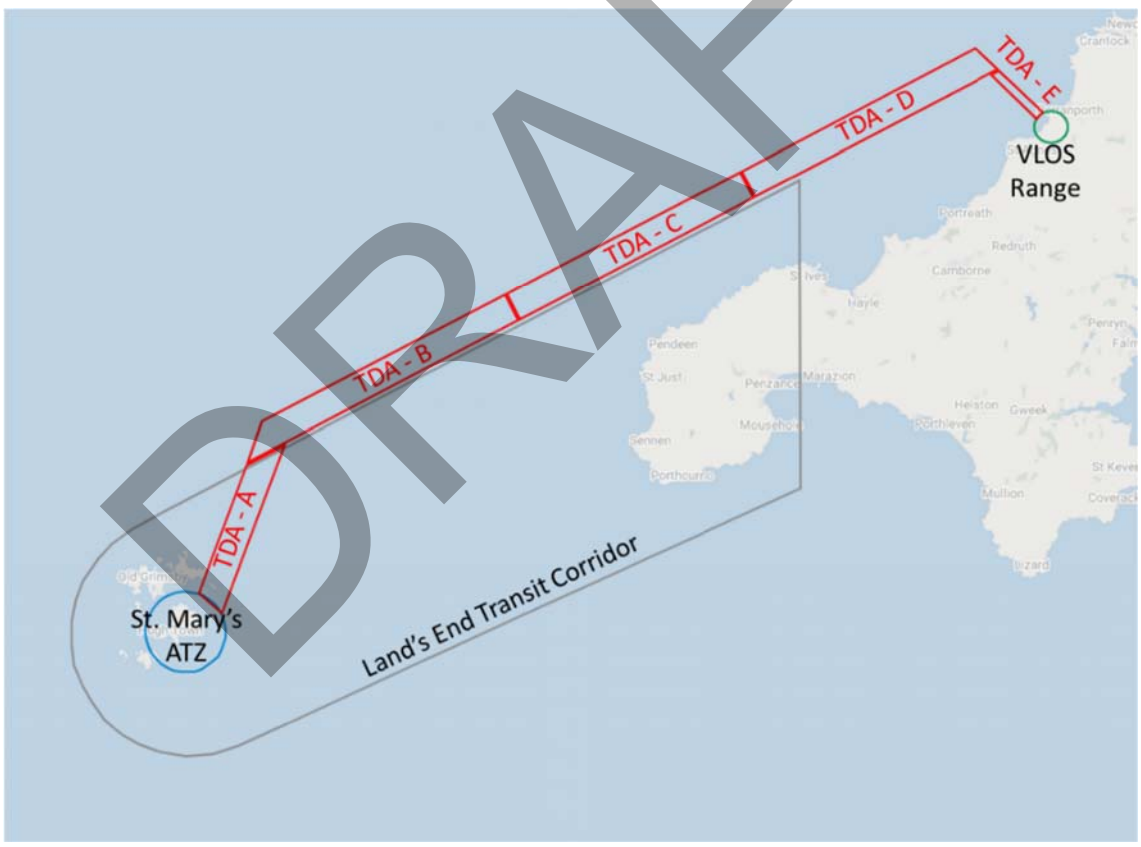

Figure 1 TDA Layout showing locations of segments A, B, C and D

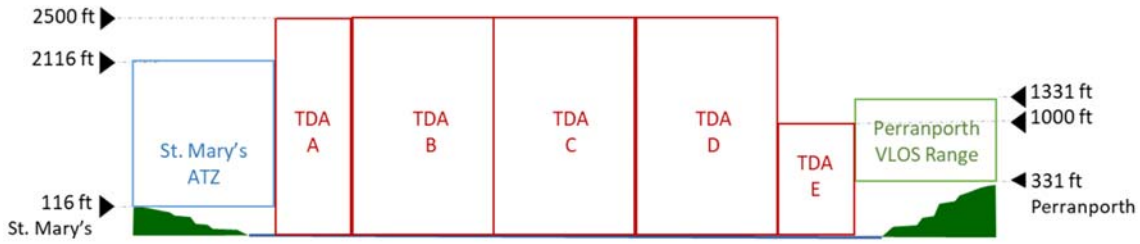

Figure 2 TDA Vertical Design

The UAV route between both aerodromes is to be flown at 2000 ft AMSL except for the climb and descent legs (departure and approaches) flown at ST. Mary's ATZ, the UAV VLOS range at Perranporth and the segment E of the TDA. Transit through this last segment will be flown at 800 ft AMSL.

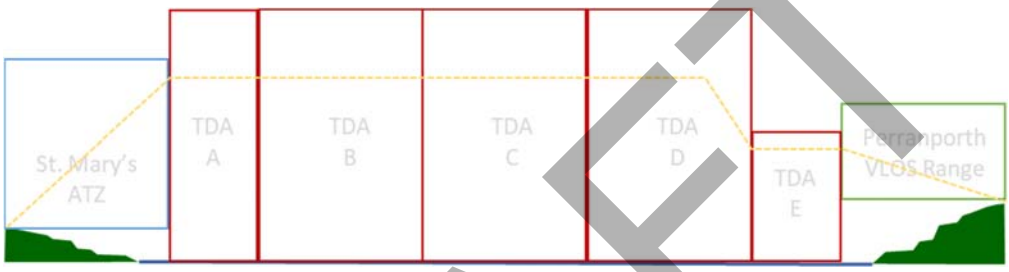

Figure 3 Vertical Mission Profile

Handover

During this mission, ULTRA UAS will be controlled by two teams, one based in Perranporth and the other in St Mary's.

Control hand-over will be done in the vicinity of the boundary between Segments B and C of the TDA. This will depend on RPIC workload and current clearances. This should not affect the handling of traffic from the perspective of the Air Traffic Services. Both UAS crews will be in coordination with each other and the necessary ATSUs throughout the mission.

Platform

ULTRA (Unmanned Low-cost Transport Aircraft) is a large cargo UAS designed to provide a solution to a multitude of operational requirements that involve the transport of critical supplies to isolated areas. The system has been designed and built by the Faculty of Engineering and the Environment at the University of Southampton (UoS) as part of an agreement with Windracers Ltd.

The aircraft is designed with multiple redundancy of critical sub-systems, and features ADSB and Mode S Secondary Surveillance Radar (SSR) transponder. With a 10m wingspan, bright red colour scheme, and navigation lights, the aircraft is also visually conspicuous.

Figure 4 ULTRA UAS

Failsafe Mechanisms

Should a communications failure occur in flight, failsafe RTL commands will be pre-programmed to the aircraft. These RTL points, shown in figure 5, would be triggered in the event that both ground stations lose connection to the aircraft. Upon losing connection to the aircraft, a pan call would be made by the UAS crew in command to Newquay or Scillies ATC, who would then share the status and location of the aircraft with the other ATSUs.

Figure 5 RTL points of radius 220m (not to scale)

SCHEDULE

The intended operations will be carried out in the period between the 15th of March and the 23rd of April, excluding the Easter period between the 2nd to the 7th of April. Regular flights will be scheduled up to five days per week Monday to Friday during this period.

During the initial one-week period, the TDA will be activated for up to two hours per day, to allow one return flight. During this period the impact of the operations on other stakeholders will be assessed, with the view to increase the TDA activation to four hours per day, allowing two flights. The intention is to reconvene with the stakeholders included in this agreement after the first week of operations, to better determine the impact of the operations and continue to improve the operational procedures.

The TDA will always be activated via NOTAM at least 24 hours in advance of the planned operations, which will only be carried out during opening hours of Newquay, Perranporth, Land's End and St. Mary's Airports.

COORDINATION & DECONFLICTION

The main principle of this coordination plan is that ULTRA UAS will give always give priority to manned traffic. The provisions detailed in this section will allow ULTRA UAS to stay aware of other manned traffic and ensure that other airspace users are not hindered due to the UAS operations.

Segmentation of the TDA will be used as the primary means of deconflicting with and minimising impact on other aircraft. The segments are sized so that ULTRA UAS can quickly vacate any segment at short notice, allowing other traffic to pass unimpeded. Any manned aircraft requiring crossing the TDA will be able to do so via the use of the DAAIS/DACS provided by Newquay Air Traffic for segments B-E and Scillies Tower for segment A.

Regular position reports to Newquay Air Traffic, Land's End Tower and Scillies Tower, along with electronic conspicuity tracking will ensure that ATSUs and other airspace users are aware of the location and intentions of ULTRA UAS at all times throughout the mission. Upon receiving information about other traffic in the area, ULTRA UAS will be commanded to hold within or vacate the TDA segment currently used, whichever provides separation. In this way, aircraft will not be kept waiting or have to alter their route to avoid the TDA, as long as they make the required radio calls and state their intentions.

To supplement this information, some examples of how the deconfliction procedures would work can be found in appendix A.

AIR TRAFFIC SERVICES

Scillies air traffic will provide a DAAIS/DACS for segment A of the TDA, and Newquay air traffic will provide a DAAIS/DACS for segments B-E.

Perranporth radio will also provide a basic service for ULTRA UAS crew and other airspace users during the hours of operations.

OTHER CONDITIONS

Weather

ULTRA UAS operations are subject to operational limits due to weather. Operations can only take place if both the starting and destination airports are in VMC at take-off and reduction of visibility is not forecasted. The following limits also apply:

Take-off/landing maximum crosswind component	20 kts
En-route maximum wind speed	40 kts
Maximum precipitation	2.5 mm/hr

EMERGENCY PROCEDURES:

Emergency procedures (EPs) have been designed to assess the performance of the system after a failure or critical condition has been discovered, resume control of the aircraft and attempt a recovery in the safest possible manner.

If the situation results in an airport recovery being unsafe, the ULTRA UAS crew will ditch the aircraft in either RTL location (whichever is closer) after checking for maritime activity using Automatic Identification System (AIS). At this point the UAS crew would launch the Emergency Response Plan.

Appendix A

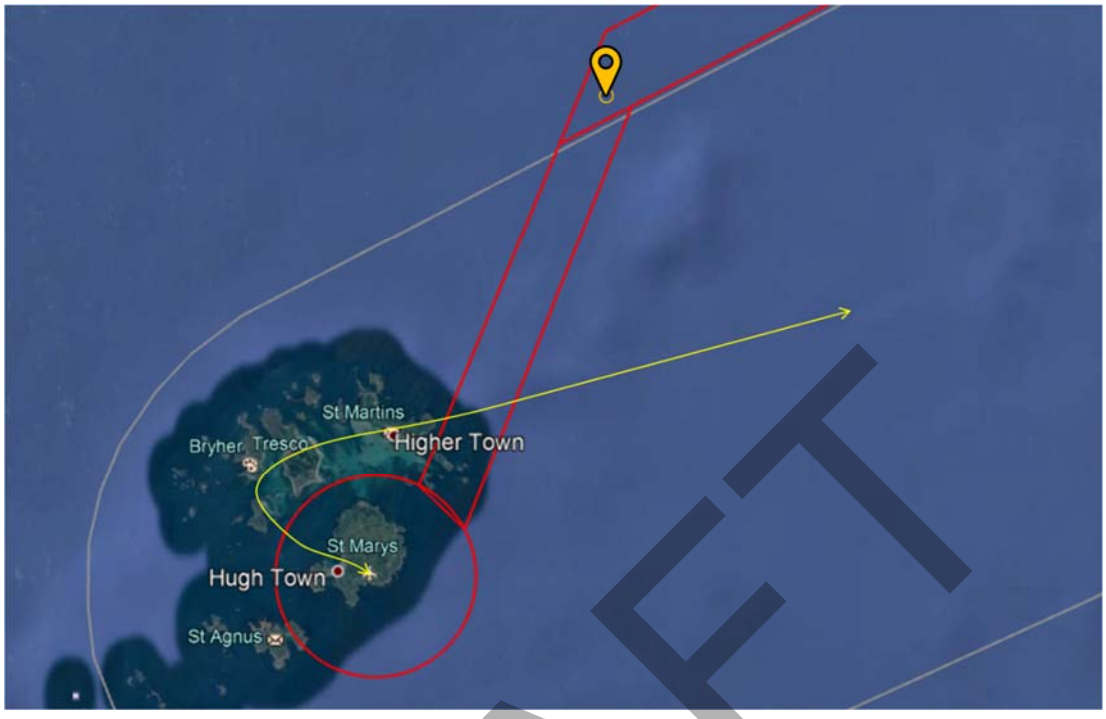

Figure 6 Manned traffic coming to land at St Mary's on RWY 14 or taking off RWY 32. UAS will hold at TDA segment B at 2000ft until manned traffic is on the ground or outbound 20 nm DME Land's End.

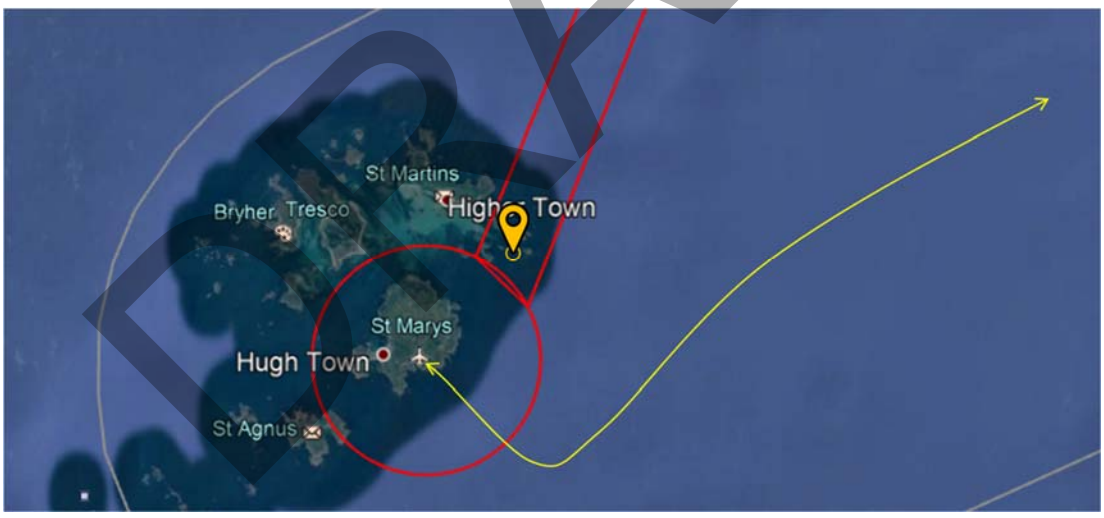

Figure 7 Manned traffic coming to land at St Mary's on RWY 32 or taking off RWY 14. UAS to hold at TDA segment A outside the ATZ at 2000 ft until manned traffic is on the ground or outbound 20 nm DME Land's End.

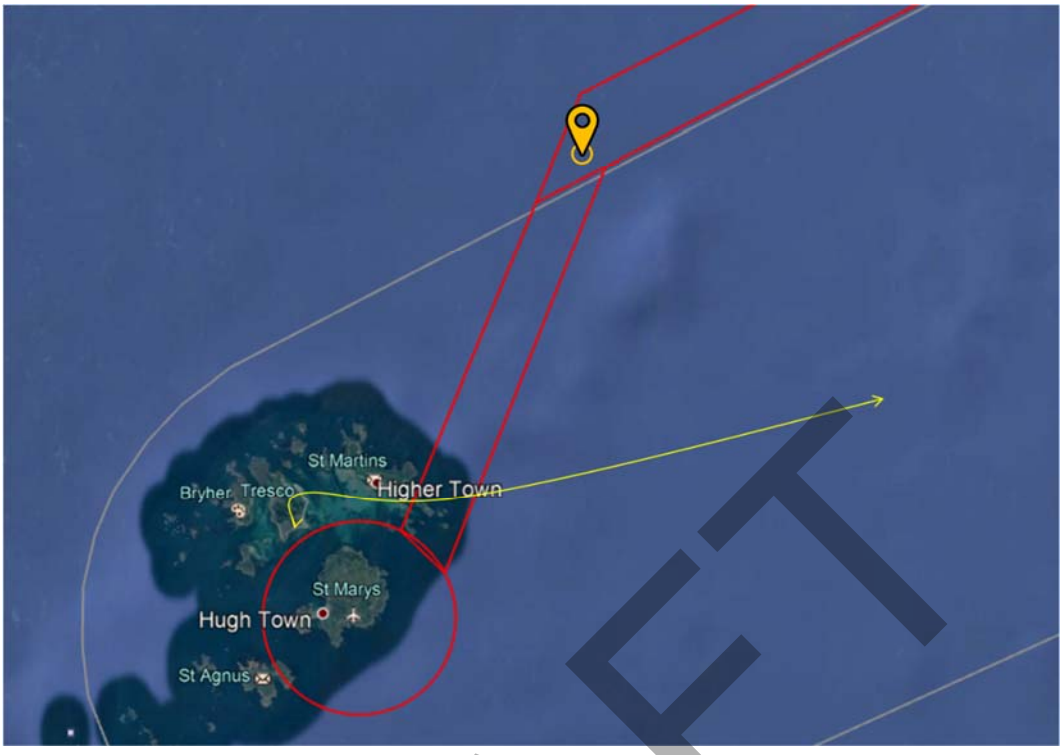

Figure 8 Helicopter arriving or departing Tresco. UAS to hold TDA Segment B at 2000 ft until traffic is on the ground or 20 nm DME Land's End

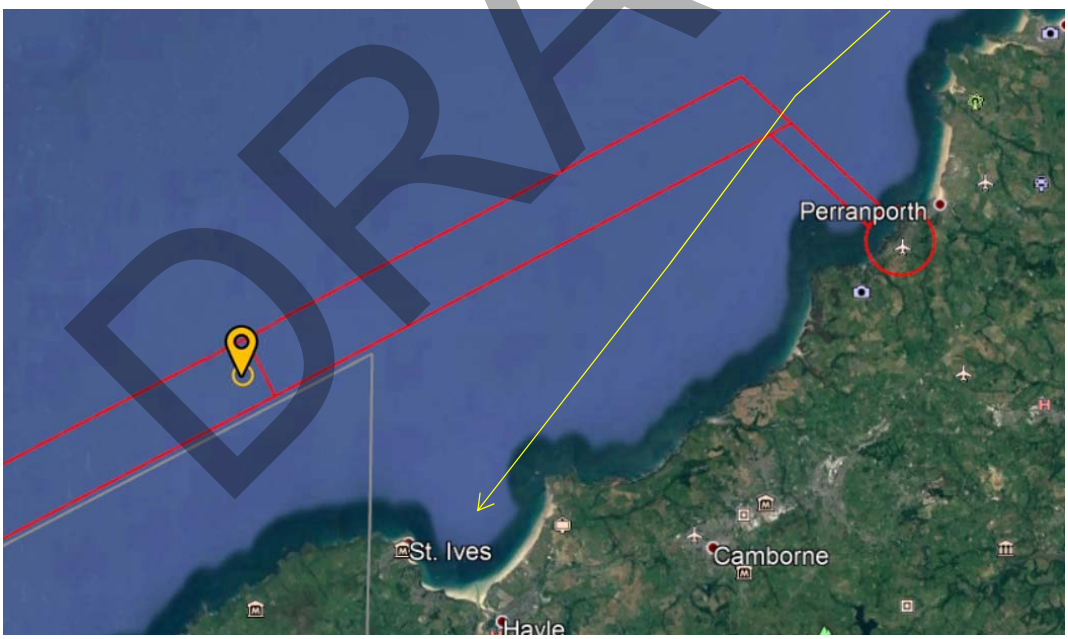

Figure 9 Search and Rescue helicopter leaves Newquay to conduct emergency operations near St. Ives. ULTRA UAS crew to hold in segment C until safe to continue into Perranporth. Newquay Air Traffic provides information to both traffics.

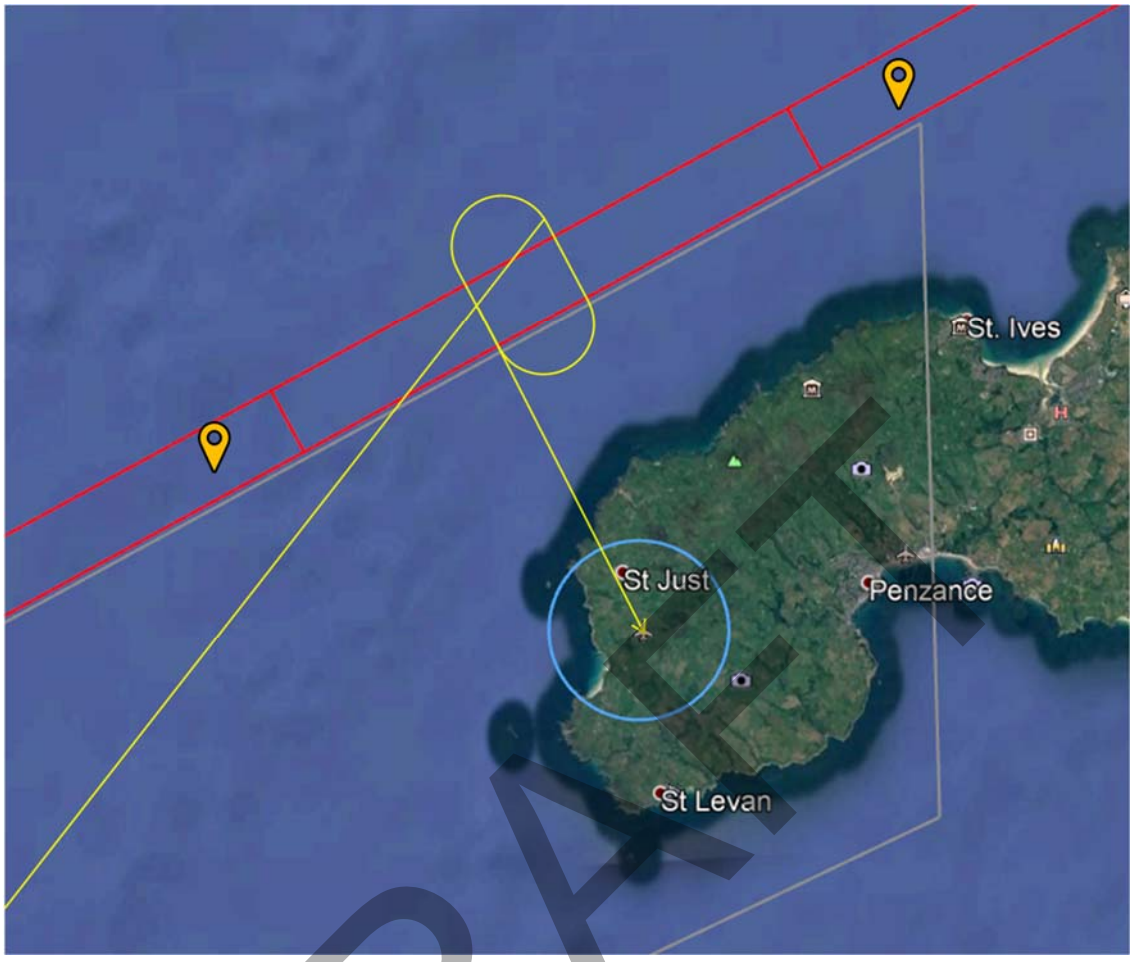

Figure 10 Aircraft landing at Land's End requires instrument approach runway 16, and requires to manoeuvre within TDA segment C. ULTRA UAS crew to hold in segment B or D until safe to continue into segment C. Land's End Tower will provide information to both.