Enclosure 2 To
ACP-2016-18 Stage 4b
Formal Proposal Submission

Cotswold Airport (Kemble) Airspace Change Proposal for a Defined Instrument Approach Procedure (IAP)

Stage 6 –

RNP ARCH AFISO Training Manual - DRAFT

References:

A. Step 4a Options Appraisal (Final)

B. Step 4b Formal ACP-2016-18 Submission (with Annexes) [link to be inserted once on portal]

C. Annex G to Reference B.

1. INTRODUCTION

1.1 Cotswold Airport developed Required Navigation Performance (RNP) Approaches (RNP ARCH) with a minima defined as Localiser Performance with Vertical Guidance (LPV). It is currently the most accurate supported by a Space Based Augmentation System (SBAS) which in Europe is provided by EGNOS. This is the new terminology replacing GPS Approach, GNSS Approach or PBN Approaches to describe SBAS based Instrument Approach Procedures (IAP)s.

1.2 To support both approval and subsequent implementation (Stages 5 and 6 of CAP1616), this training document provides assurance to both the Airport and CAA, that our AFISOs will be trained, assessed and audited as competent to provide an appropriate ATS function for the RNP ARCH. This document will be incorporated into the Cotswold Airport MAFIS, as supporting document to the Aerodrome Manual SMS.

2. AFISO RNP ARCH TRAINING OBJECTIVES

2.1 The following table contained the high-level training objectives for incorporation into standard AFISO training, as a discrete RNP ARCH training section.

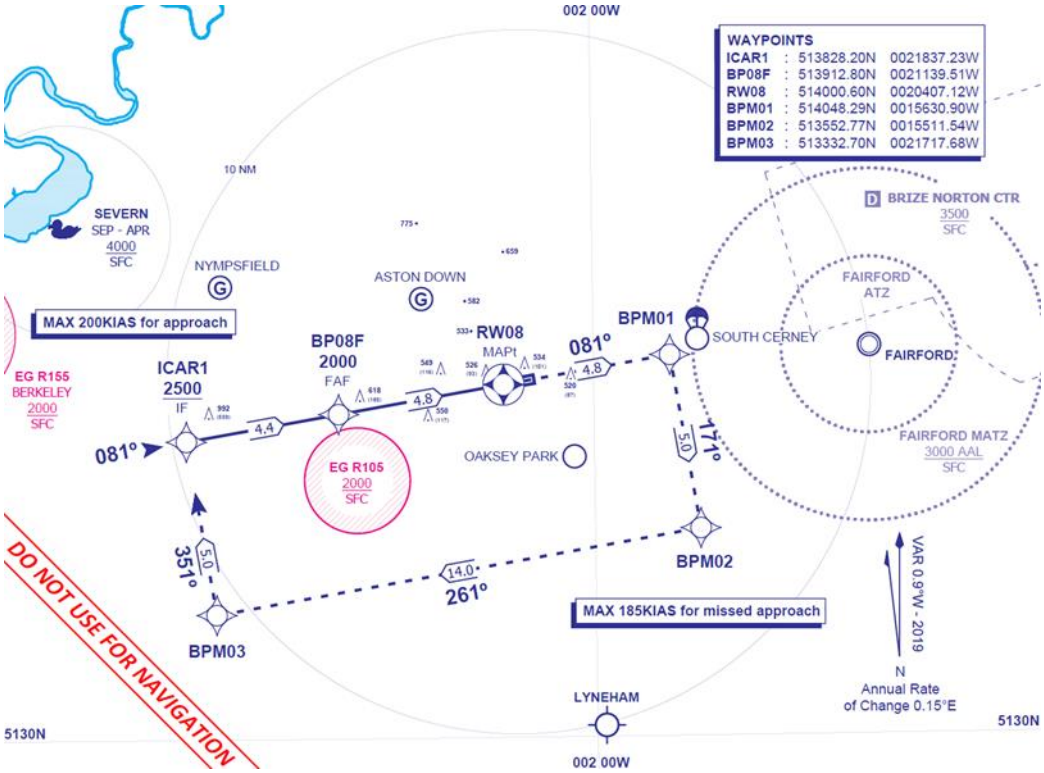
Objective Number	Training Objective Statement
1	Have a thorough understanding of both IAP's
2	Have a thorough understanding of the PPR slot system for both IFR and VFR arrivals and where necessary deconflict
3	Create a safe environment for an IAP by clearing the visual circuit, remaining within the remit of the FISO Licence, and maintain runway safeguarding
4	Have a thorough knowledge of the phraseology to be used for an IAP
5	Pass timely and relevant traffic information to IFR/VFR traffic whilst adhering to CAP797 regulations
6	Obtain and pass as accurate a weather report as is possible by suitable means to IAP traffic
7	Have a thorough knowledge of the IAP Monitoring Safety Report Form

3. THE RNP ARCH INSTRUMENT APPROACH PROCEDURES (IAPs)

There will be IAP's for both runway 26L and 08R. Each procedure is shown below, noting they are not symmetrical. RNP ARCH RWY08 is a straight in approach and RNP ARCH RWY26 is a T-Bar approach. This asymmetry is a product of airspace design to provide the highest degrees of safety through geographical separation from known traffic concentration

areas, controlled airspace, and Standard Terminal Arrival Routes (STARS) and Standard Instrument Departures (SIDs).

3.1 **RNP ARCH RWY08:**



Airspace Chart - RNP ARCH RWY08

3.1.1 In order to mitigate as much as possible the impact to the Nympsfield gliding site, the approach procedure has been designed using a straight-in structure aligned with the runway centreline and a single initial waypoint (ICAR1) acting as Initial Approach Fix (IAF) and Intermediate Fix (IF).

3.1.2 The intermediate segment has to be intercepted at a minimum altitude of 2500 ft AMSL and it intercepts the final segment at an altitude of 2000 ft AMSL. The length of the segment has considered maximum track change of 110º at the IAF/IF and the 2 NM straight segment prior to the FAF.

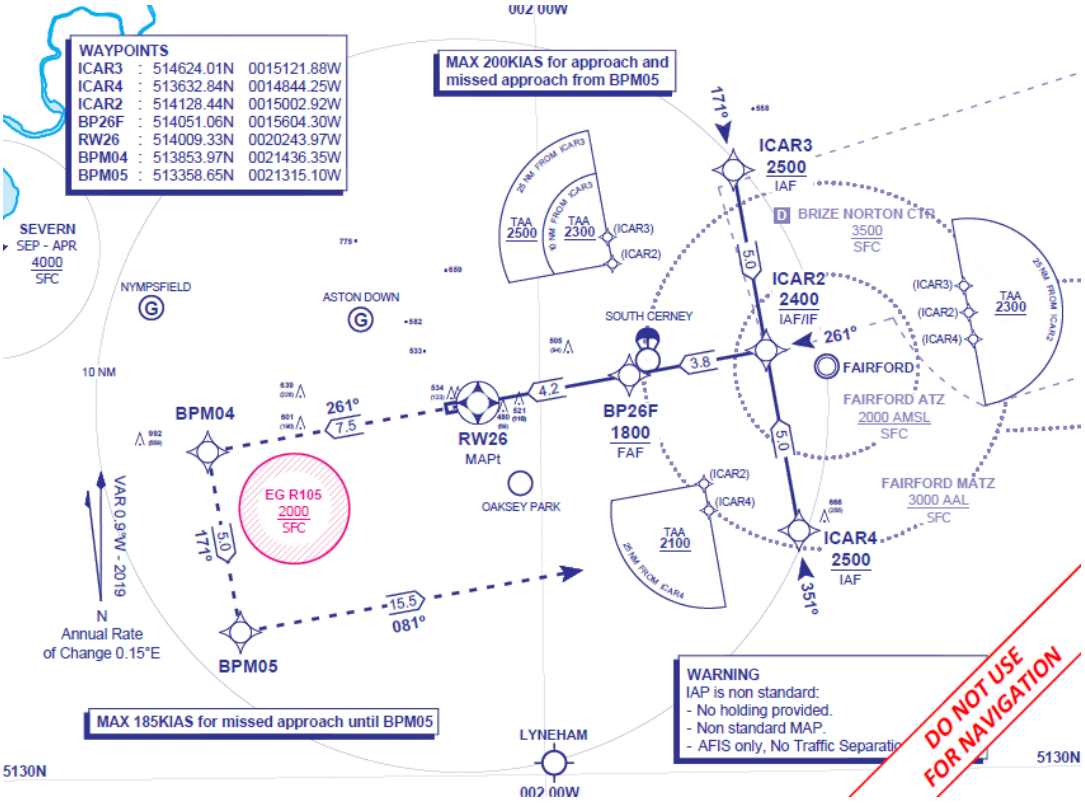
3.1.3 The final approach segment (FAS) is designed with a descent gradient (GPA) of 3.0º (5.24%) and a standard Threshold Crossing Height (TCH) of 50 ft (15.24 m), which is harmonized with the current APAPI. The Final Approach Fix (FAF) is set at 2000 ft AMSL, which means a total FAS length of 4.8 NM for the given GPA and TCH. Despite Approved Procedure Design Organisation[1] (APDO) calculations of a computed Obstacle Clearance Height (OCH) or 254ft, the OCH is set at 500ft to meet CAP1122 requirements. Both IAPs have a common Runway Visual Rage (RVR) of 2700m, thereby visual must be achieved by 2700m and/or 500ft OCH to continue the final approach. It is very unlikely that the RVR will be the overriding minima, the 500ft OCH is almost certainly deciding factor for operational minima of the approach.

[1] Pildo Labs Wessex.

3.1.4 The Missed Approach Point (MAPt) is placed over Threshold (THR) 08. The missed approach consists of an initial straight-in segment (aligned with final and RWY centreline) in order to gain altitude with the aircraft stabilised. At 4.8 NM from the MAPt two consecutive 90º right turns (respecting the MSD consumed by each manoeuvre) redirect the aircraft towards the south-west. Another 90º right turn joins the missed approach with the initial approach waypoint (the ICAR1 IAF). No holding patterns are proposed, since we only have one aircraft booked to each IAP slot and therefore no ATM sequencing is required, the pilot can simply fly the aircraft back to the IAF (should slot timings allow) to restart the approach.

3.1.5 The draft plate for RNP ARCH RWY08 is at Annex A.

3.2 **RNP ARCH RWY26:**



Airspace Chart - RNP ARCH RWY26

3.2.1 The approach towards THR26 is designed using a T-bar structure layout, which has been decided based on the outcomes of the consultation process launched by Cotswold airport (Kemble). Northern and southern initial approach segments (5 NM) can be intercepted at minimum altitude of 2500 ft AMSL.

3.2.2 They connect with the intermediate segment (minimum altitude of the IF is 2400 ft AMSL), which allows intercepting the final segment at an altitude of 1800 ft AMSL. The length of the intermediate segment has taken into account maximum track change of 90º at the IAF/IF and the 2 NM straight segment prior to the FAF. It is the shortest feasible distance in order to avoid interfering as much as possible with RAF Fairford and RAF Brize Norton.

3.2.3 The final approach segment (FAS) is designed with a descent gradient (GPA) of 3.0º (5.24%) and a standard TCH of 50 ft (15.24 m), which is harmonized with the current APAPI.

FAF is set at 1800 ft AMSL, which means a total FAS length of 4.2 NM for the given GPA and TCH. Despite APDO calculations of a computed OCH or 254ft, the OCH is set at 500ft to meet CAP1122 requirements. Both IAPs have a common RVR of 2700m, thereby visual must be achieved by 2700m and/or 500ft OCH to continue the final approach.

3.2.4 The MAPt (LNAV) is placed over THR26. The missed approach consists of an initial straight-in segment (aligned with final and RWY centreline) in order to gain altitude with the aircraft stabilised. At 7.5 NM from the MAPt (to avoid overflying the restricted area EG R105 below 2000 ft AMSL) two consecutive 90º right turns redirect the aircraft towards the north-east, joining the missed approach with the initial approach waypoint (ICAR4). No holding patterns are proposed, since we only have one aircraft booked to each IAP slot and therefore no ATM sequencing is required, the pilot can simply fly the aircraft back to the IAF (should slot timings allow) to restart the approach.

3.2.5 The draft plate for RNP ARCH RWY26 is at Annex B.

4 IAP OPERATIONAL AVAILABILITY

4.1 The IAP is designed for CAT A to D aircraft. It was designed for:

a. Corporate/business jets ranging in size from a Pilatus PC12 to Gulfstream 650 sized aircraft, including those used by members of the Royal household.

b. Commercial helicopter operators, such as the Queens Helicopter Flight.

c. Commercial Air Transport (CAT) airliner aircraft currently arriving for maintenance, storage, or end of life recycling. These range from Boeing 737 to 747 and Airbus A340.

4.2 At present, there are no plans to expand availability to GA or for IAP RNP training.

4.3 The IAP will only be available to aircraft that have pre-booked using a PPR slot system, one aircraft at a time, with a minimum of 30 mins timed separation, removing the requirement for a hold. Slots are only available during AFIS hours meaning there will be a maximum of 5 IAP slots per day, which fit around known flying school lesson times. The IAP Slots and timings are at Annex C.

4.4 Each slot will last for 1hr in total, including early arrival buffer (15mins) and overrun buffer (15 mins). In reality, the IAP slot will be closed once the aircraft has landed or diverted. The time from allocated slot time to completion is 30mins, which allows one missed approach. Pilots will be advised the slot start time and must adhered to the timings. Occasionally an IFR FPL received via AFPEX is the only notification of an inbound movement. The ETA off the FPL should be used as a slot time for an IAP.

4.5 IAP timings are critical and this is made clear in the Pilot Briefing Note for the IAP, as when the IAP PPR has been booked, the period of that IAP PPR cannot be also booked by VFR PPRs, see Section 6.

5 WEATHER REPORTS

5.1 The majority of Cotswold Airport's FISO's will comply with CAP746, Chapter 1 and anticipated amendments to MET Observer qualification[2]. Aircraft making an IAP rely on a weather report to judge whether it is suitable to commence an approach. Our own observations, that of the aircrew and the proximity of RAF Brize Norton (METAR) allow for cloud base reporting for OCH.

5.2 The RVR has been designed to include line of sight with Kemble Church at 2700m, which allow accurate RVR reporting, albeit at ground level. All weather reports must be pre-fixed with "Unofficial Observation". Pilot based reports may also be obtained and used and must be prefixed with "pilot report at (time)". The authority of executing a missed approach or diversion due to either OCH or RVR Minima not been sufficient remains with the Pilot in Command (PIC), AFISOs should pass unofficial MET observations for the PIC to make a decision (normally with corroboration from RAF Brize Norton/Bristol METARs) and in-cockpit observation.

5.3 Changes in runway surface condition should be passed to inbound IAP traffic as soon as possible, additional runway inspections may be required in inclement weather.

6 IFR/VFR DECONFLICTION

6.1 We have successfully managed, or made unavailable, the visual circuit for CAT aircraft arrivals, events and aerobatic practices for over 10 years and can therefore apply this procedure when an IAP slot is booked and aircraft confirmed prior the commencing at the IAF. This is why the DOC has been increased to 25Nm and FL40, to allow time for the crew to contract Kemble Information and receive any updates prior to starting at the IAF. The visual circuit needs to be clear of traffic before an IAP can commence and should be done by 10 mins prior to slot start, once the IAP aircraft have confirmed their intent to establish on the approach when reaching the IAF.

6.2 This can be achieved by: circuit traffic either landing or departing the circuit; joining traffic can be warned of an imminent IAP and that the visual circuit is closed; aircraft holding off ideally need to hold off to the north outside the ATZ or south (around Lyneham) to avoid the inbound track and MAP although as FISO's we cannot insist on this. Traffic for departure can also be advised of inbound IAP traffic and held until the IAP aircraft has landed.

6.3 An estimated time for joining or departure may be given based on the slot times. Any booked IAP slots need to be displayed on the releasable RedAtlas to warn resident flying schools, although this information will also be passed from Ops. VFR PPRs will not be available for the duration of a booked IAP slot.

6.4 A tighter rein on VFR traffic, both resident and visitors, will be required, especially resident landaways when returning. VFR arrival PPR's will need to give a time and be warned of any booked IAP slots. As a PPR only airport, any VFR traffic without PPR may need to be turned away. Traffic information to both IAP and VFR transit traffic should be passed when a possible confliction exists. The decision to continue or break off the approach rests with the pilot.

[2] The CAP 746 is due to be updated in early summer to include the specifications for what is known as Basic Observer Competence. At time of publication, discussions over the CAP 746 amendment suggest 3/5 FISOs qualified by virtue of pilot qualifications.

7 RUNWAY SAFEGUARDING

7.1 Unlike ground based IAP aids there is no need to protect signals from such equipment for RNP approaches. Standard runway safeguarding rules apply for aircraft or vehicles crossing against landing traffic. The runway should be available for a landing when an IAP aircraft reports at the FAF and crossing lights turned to RED to reduce pilot and FISO workload during an approach. Prior to a pre-booked IAP, extra attention should be afforded to ensure the runway is free of bird/wildlife activity.

8 EMERGENCIES

8.1 An aircraft with an emergency should be afforded top priority over an IAP. While an AFISO is unable to issue instructions to aircraft in the air, details and position of the emergency aircraft should be passed to aircraft on an IAP and their intentions requested (i.e. sufficient time to continue with the approach or execute the MAP).

9 PHRASEOLOGY

9.1 At present CAP413 SI updates for RNP approach phraseology guidance, particularly for AFISO units, has yet to be published, although it is expected in time for implementation of the IAP and this Training.

9.2 The important thing to remember is we are an AFISU and must not create the impression we are an ATC unit. We cannot “clear” an aircraft to perform an approach but need to advise the pilot if there is conflicting traffic. AFISO’s are unable to allocate levels or altitudes but may pass a reminder of the Sector Safety Altitude. Pilot reports at the IAF and FAF can be requested followed by a “Land at your discretion”. Similarly, when sterilising the visual circuit, careful use of phraseology is required which is best achieved by advising an aircraft that the visual circuit is closed due to inbound instrument traffic. This is based on the authority of the Aerodrome Manager and under conditions of our aerodrome licence. Giving a reason why and where possible the length of delay will help the aircraft being refused entry into the circuit in their planning should they need to divert. Until publication of an amended CAP413, our draft RNP ARCH phraseology is at Annex D.

10 IAP RECORDS

10.1 In order to meet the requirements of the CAP1616 Stage 7 Post Implementation Review (PIR), All IAP’s are to be recorded on a specific IAP Safety Monitoring Report (Annex E). One report is to be completed for each approach flown. This is in addition to IAP PPR slot booking on RedAtlas and the normal watch log. Although an additional workload, it is vitally important to gather this data, which then forms part of a wider assessment for PIR review.

10.2 As described above, it is essential to monitor and assess any incidents or problems that may arise in the new procedure thus allowing for investigation and corrective actions to be taken. Positive comments on whether the procedure was faultless can also be recorded. RedAtlas data specific reports are also to be retained and be available for future CAA Audits.

10.3 There will be an IAP folder to hold these documents, which will be a controlled document within the VCR.

Annexes:

A. RNP ARCH RWY08R

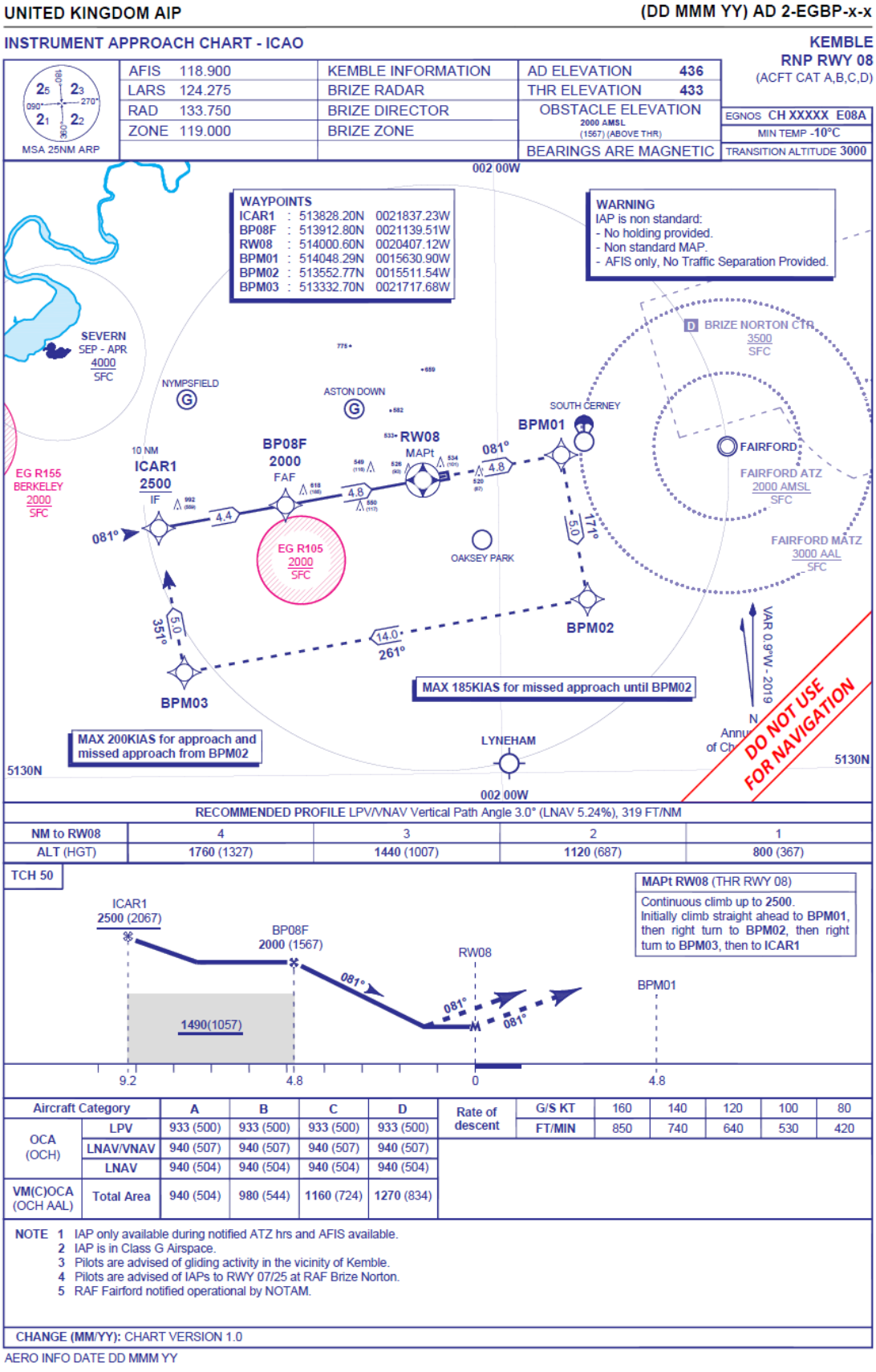
B. RNP ARCH RWY26L

C. IAP Slot Timings (to be built into RedAtlas)

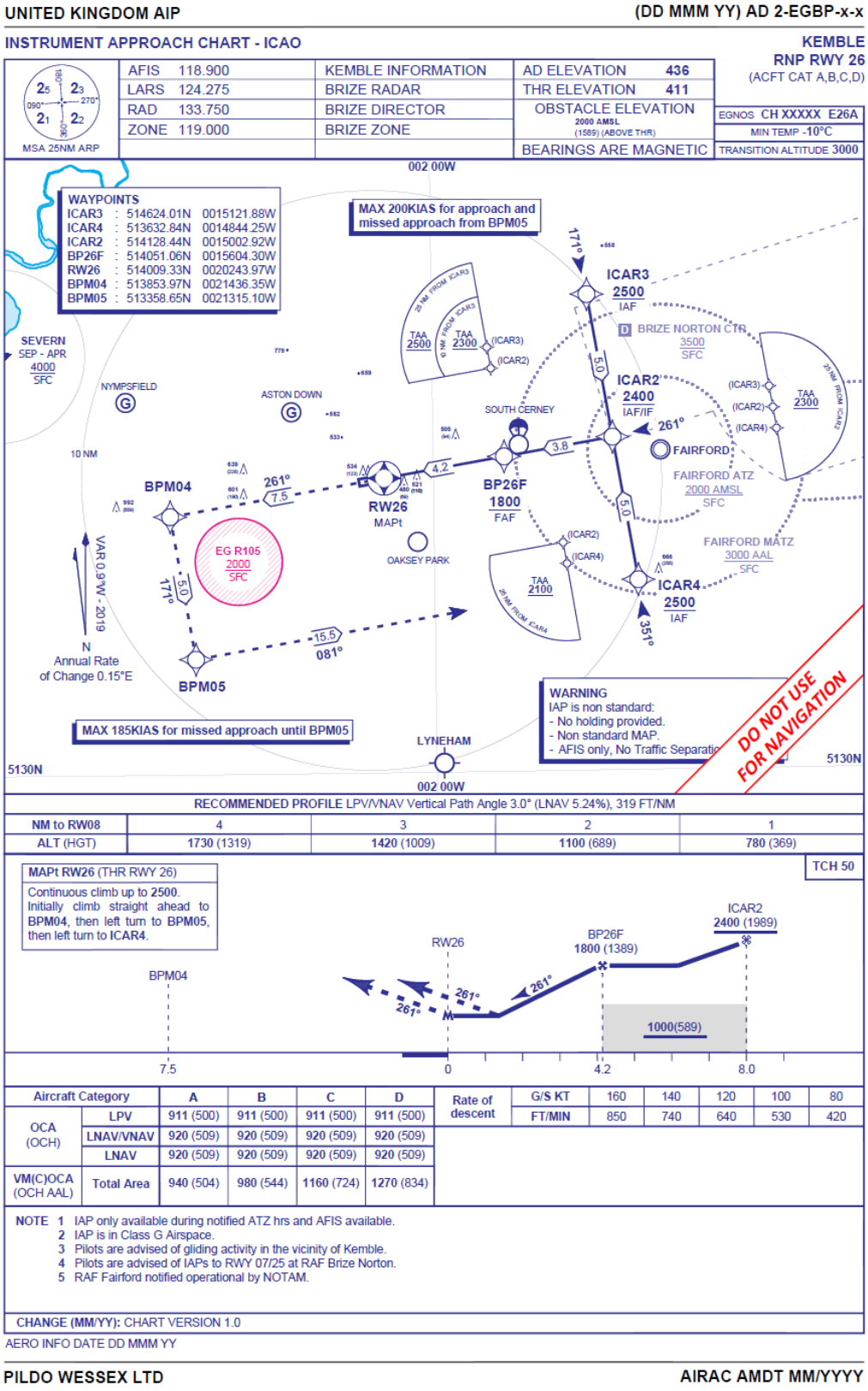
D. Proposed IAP AFISO Phraseology

E. IAP Safety Monitoring Report

ANNEX A – RNP ARCH RWY08R [to be replaced post AIRAC publication]



ANNEX B – RNP ARCH RWY26L [to be replaced post AIRAC publication]



ANNEX C – IAP PPR SLOT TIMINGS

To be added once ACP has been approved. See Annex F to the Stage 4b Formal Proposal Submission

ANNEX D – FISO RNP Phraseology [to be updated once CAP413 revision or SI is published]

Below are example calls, using RNP phraseology for FISOs:

IAP Aircraft Inbound	
	(A/c callsign) Kemble Information, Basic Service, no Air Traffic Control Service Available.
	Kemble Information (a/c callsign) request RNP approach to RWY (as designated), via ICAR1, ICAR3 or ICAR4 (as appropriate)
	(A/c callsign) Kemble Information there is conflicting circuit traffic, will advise when traffic has landed/departed or, (A/c callsign) Kemble Information report Initial Approach Fix (Waypoint Identification) Runway (designator) QNH/QFE xxxx Sector Safety Altitude xxxx ft"
	(A/c callsign) Initial Approach Fix (ICAR3, ICAR4 or ICAR1)
	(A/c callsign) report final approach fix (or if required, report established on Final Approach track or report (number) miles from Final Approach Fix
	(a/c callsign), Final Approach Fix
	(A/c callsign) runway (designator) land at your discretion surface wind xxx degrees, xx knots
	"(A/c callsign) Roger, runway (designator) landing"

IAP Aircraft Missed Approach	
	(A/c callsign) going around, leaving the ATZ, executing MAP
	(A/c callsign) request your intentions, or traffic is (details i.e. 5 PA-28 holding 5 miles south of Kemble at 1000ft QFE)
	(A/c callsign) traffic copied, request further RNP approach Rwy (designator) or (A/c callsign) diverting to XXXX or (A/c callsign) joining Downwind.

Traffic Information for IAP Aircraft	
	(A/c callsign) traffic is a (type) (details, i.e. PA-28 transiting northbound, last reported 4Nm east at 1500ft on QNH)
	(A/c callsign) roger, looking" or "(A/c callsign) roger, breaking off approach

Non IAP Inbound Traffic	
	Kemble Information (a/c callsign) 10Nm to the south, request airfield information and joining instructions
	(A/c callsign) Kemble Information visual circuit is closed, traffic is a (Type, eg CAT D B747) on an RNP instrument approach to Runway (designator), expect joining after the (Type) has landed in approximatley 10 mins. Sugget you remain 5NM south.
	(a/c callsign) roger

IAP and Visual Circuit Traffic	
	(A/c callsign) the visual circuit will be unavailable in 5 mins due to inbound Instrument Approach traffic, request your intentions ?
	(A/c callsign) intentions are to land. Or (A/c callsign) intentions are to depart to cicruit to the south
	(a/c callsign) roger.

Non IAP Departing Traffic	
	Kemble Information (a/c callsign) PA-28 at Woodside, 2 POB, request airfield information and taxi instruction for a flight to the south for approximatley 1 hour.
	(A/c callsign) Kemble Information taxi to north apron for checks and call when ready, expect to hold, traffic is a (Type) on an RNP Instrument approach to Runway (designator), expect departure after the (Type) has landed or Hold your position, traffic is a (Type) on an RNP Instrument approach to Runway (designator), expect departure after the (Type) has landed
	(a/c callsign) taxi north apron and report check complete, expecting to hold. Ack a/c on instrument approach. Or Hold position (a/c callsign)

RNP SiS (GPS) Failure	
	(A/c callsign) GNSS reported unreliable" or "GNSS may not be available due to… *A RAIM (Receiver Autonomous Integrity Monitoring) alert indicates to the pilot that the GNSS system is unavailable either due to insufficient satellites in view or a fault in the system; in these cases the pilot will break off the approach. Following a RAIM indication, pilots shall inform the controller of the event together with their intentions.*
	(A/c callsign) unable RNAV approach, loss of RAIM or (A/c callsign) loss of RAIM, going around
	(A/c callsign) roger, request intentions

ANNEX E - COTSWOLD AIRPORT - IAP SAFETY MONITORING REPORT

IAP SAFETY MONITORING REPORT	
SUBJECT	**ACTIVITY**
Date / Slot Time	
Aircraft Type	
Callsign / Registration	
Runway in use AGL on/off	
Unofficial Weather Report Runway Condition e.g. Dry/Wet etc	
Visual Circuit Traffic Details i.e. Traffic held on the ground or asked to land	
Joining Traffic Details i.e. Traffic refused joining or traffic required to depart the circuit	
Any other relevant notes i.e. Failure of PPR system ATZ sterilisation problems General process failures MAP executed Safe landing or Diversion MOR raised Any other comments Loss of SiS	
Completed By	
Signed	
Management Comments	
Name	
Signed	