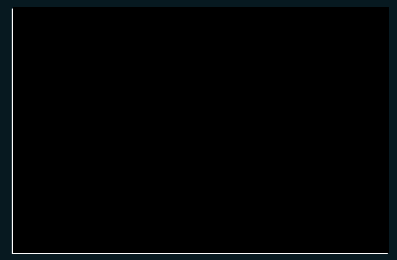
NATS

Bristol Airport ACP
Stage 2 ‘Develop & Assess’

Step 2A – Options development.
Aviation stakeholder engagement

25/26 February 2020

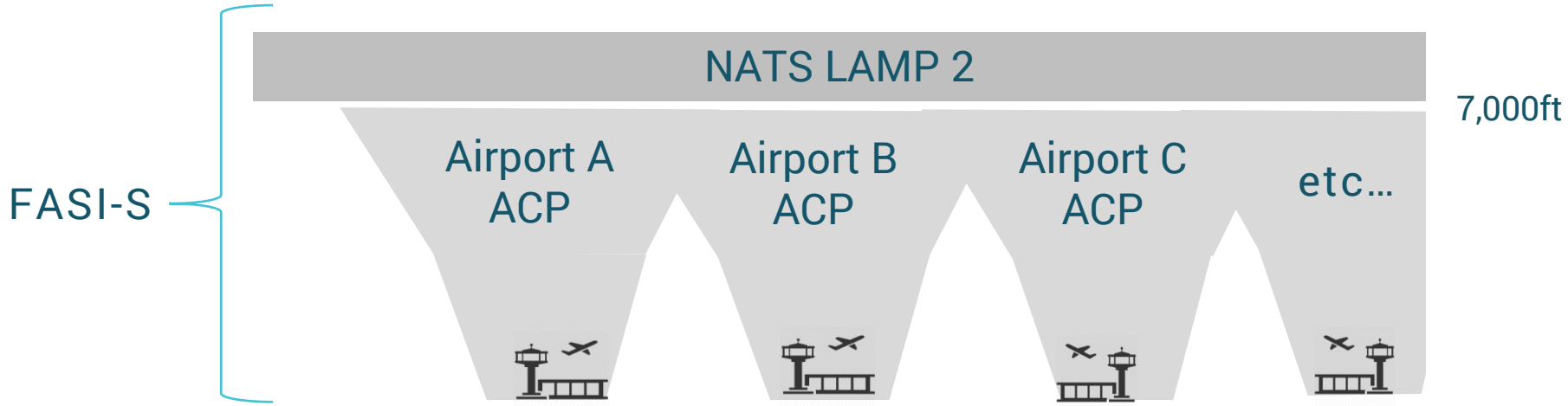


Airspace change specialist

Airspace design lead

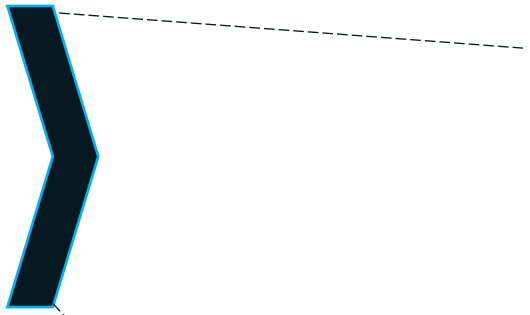
Airspace Modernisation

- The London Airspace Modernisation Project (LAMP) 2 is an Airspace Change Proposal (ACP) that aims to modernise the airspace network above and surrounding London.
- It is part of a wider programme called the Future Airspace Strategy Implementation South (FASI-S), which will modernise the whole network.
- ACPs below 7,000ft are led by individual airports.
- Deployment 1 West = LAMP ACP 1, Bristol ACP, Cardiff ACP, Exeter ACP (early 2023)



Airspace Change Process

Stage 1 Define
Step 1A: Assessment Requirement
Step 1B: Design Principles
Stage 2 Develop and Assess
Step 2A: Options Development
Step 2B: Options Appraisal
Stage 3 Consult
Step 3A: Consultation Preparation
Step 3B: Consultation Validation
Step 3C: Commence Consultation
Step 3D: Collate and Review Responses
Stage 4 Update and Submit
Step 4A: Update Design
Step 4B: Submit Proposal to CAA
Stage 5 Decide
Stage 6 Implement
Stage 7 PIR



1A: Statement of Need
1A: Assessment Meeting between Bristol/ Civil Aviation Authority (CAA)
1A: CAA determines whether Airspace Change Proposal (ACP) is appropriate
1B: Engagement between Bristol/ stakeholders
1B: Design Principles
1B: Document summarising how the Design Principles were developed and influenced

2A: Airspace Change Design Options
2A: Further engagement with stakeholders on Options
2A: Design Principle evaluation
2B: Initial Options Appraisal

FASI-S Bristol Stage 1 Define

- Statement of Need submitted to the CAA – October 2018
- Assessment Meeting held between Bristol Airport Limited and the CAA – February 2019
- Design Principle workshops held with aviation industry and local community stakeholders – September 2019
    - Stakeholder groups discussed a set of draft Design Principles with feedback recorded by an independent facilitator (additional/ alternative/ amended)
- Final Design Principles agreed by Bristol, formal document produced and submitted to the CAA – November 2019
- CAA approved Bristol's submission for Stage 1 Define gateway; permitting them to commence Stage 2 Design – January 2020

Design Principles

Category	Design Principle and Priority
Safety	DP1) Must maintain and where possible, enhance safety standards (A)
Policy	DP2) Must accord with the CAA's published Airspace Modernisation Strategy (CAP 1711) and any current or future plans associated with it (A)
Regulation	DP3) Must be compliant with all relevant laws and regulations (A)
Technical	DP4) Must maximise efficiency by using modern navigation technology (A)
Operational	DP5) Must provide sufficient capacity to support future demand (A)
Environmental	DP6) Should minimise fuel burn and CO_2 emissions per flight as far as possible (A)
Environmental	DP7) Should use noise-efficient operational practices to minimise the impact of aircraft noise on the local community and stakeholders (A)
Operational	DP8) Should maintain or enhance operational resilience of the Air Traffic Control network (B)
Technical	DP9) Should minimise impact on other airspace users
Technical	DP10) Should minimise controlled airspace (CAS) and impact on adjacent aerodrome and airfields (B)

Noise Mitigation Design Principle and Priority
DP11) Minimise the number of people newly overflown (C)
DP12) Maximise sharing through predictable respite routes (B)
DP13) Avoid overflying communities with multiple routes, including from other airports (C)
DP14) Maximise sharing through managed dispersal (C)
DP15) Minimise the total population overflown (B)

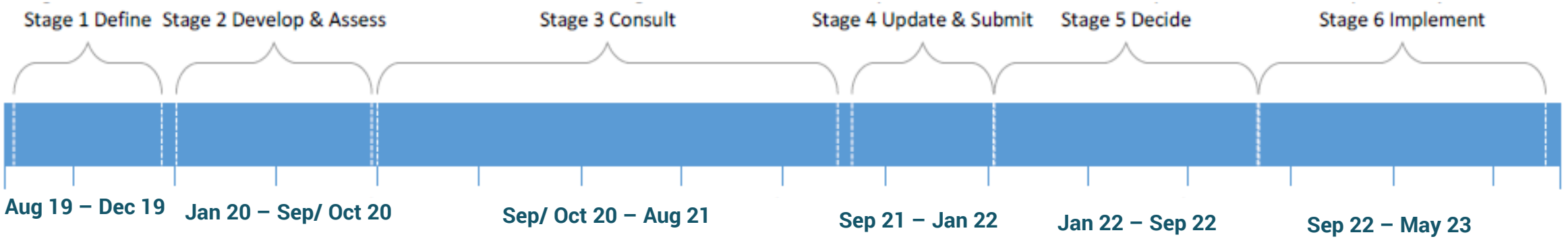
Bristol ACP High-Level Timeline

Stage 1 Define
Step 1A: Assessment Requirement
Step 1B: Design Principles

Stage 2 Develop and Assess
Step 2A: Options Development
Step 2B: Options Appraisal

Stage 3 Consult
Step 3A: Consultation Preparation
Step 3B: Consultation Validation
Step 3C: Commence Consultation
Step 3D: Collate and Review Responses

Stage 4 Update and Submit
Step 4A: Update Design
Step 4B: Submit Proposal to CAA



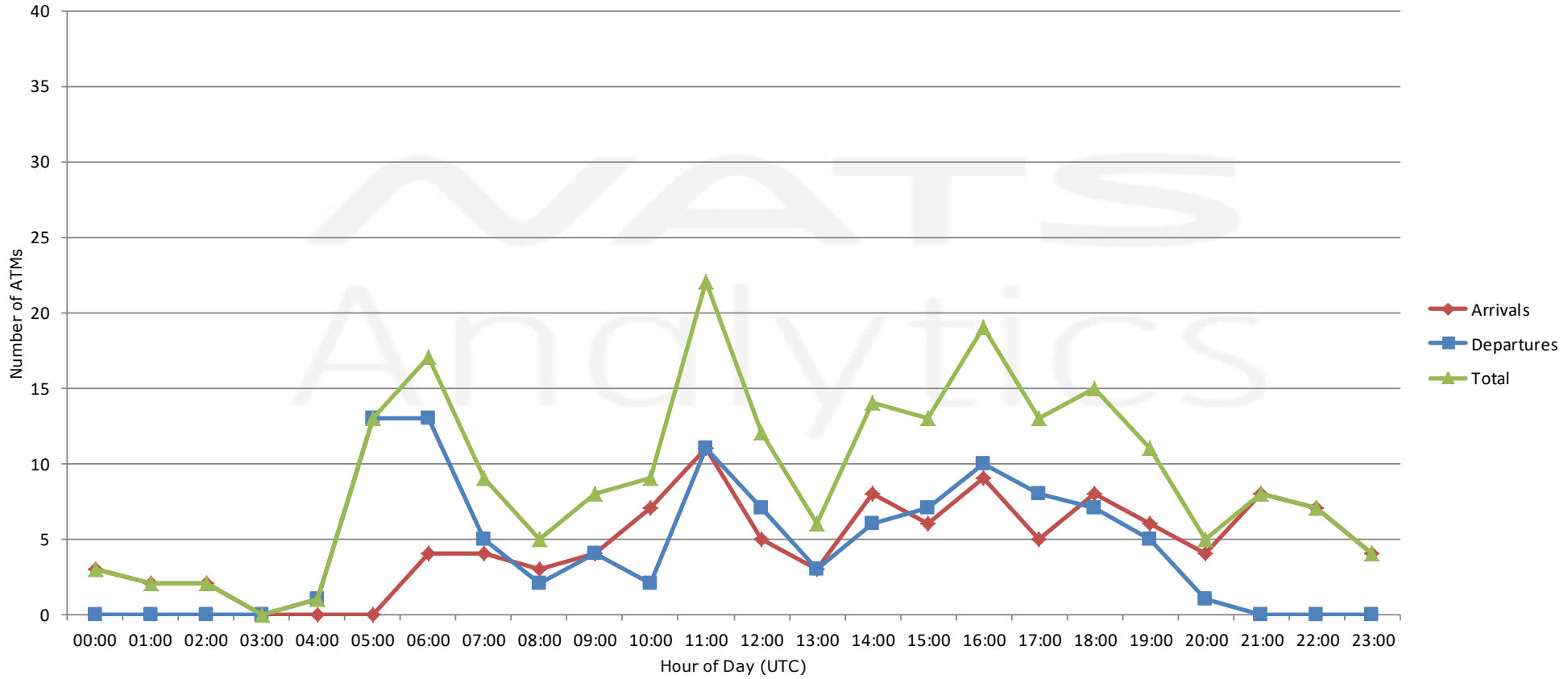
Next Steps: Design Principle Evaluation (Stage 2A)

- CAP1616 Stage 2A requires the change sponsor to develop a comprehensive set of Design Options that address the SoN
- The Design Options are tested with the stakeholders identified in Stage 1 and evaluated against the Design Principles
- This is a qualitative evaluation used to reduce the initial long-list of Design Options
- Design Options can be broken down into constituent components and evaluated i.e. arrival/ departure components
- Evaluation categories can be used to appraise the options e.g. numerical (1-5), textual (met/ partial/ not met)

Option Name: Airspace Design Option 1A			REJECT
Description of option: All proposed new CAS volumes to be Class A			
Design principle 1: Operational: Increase in predictable flight planning for operators and ATC flexibility to better manage busy flows (Priority C)			MET
Provides more predictable and optimal flight planning options for arrivals and departures.			
Design principle 2: Operational: Minimise resources needed to progress the proposal (Priority C)			MET
Class A CAS would cause no particular impact on resources.			
Design principle 3: Environmental: Avoid low-level changes and reduce CO_2 emissions where possible (Priority B)		PARTIAL	
The routes would provide a CO_2 reduction for relevant traffic flows, which would not change below 7,000ft. However, a new FL65 CAS base may cause some GA flights to reroute or fly lower than they do today.			
Design principle 4: Economic: Reduce flight plan mileage and associated fuel uplift/ burn (Priority C)			MET
The routes would provide a fuel burn benefit (cost saving).			
Design principle 5: Technical: Minimise negative impact on other airspace users (Priority C)	NOT MET		
Extensive Class A airspace would negatively impact and inhibit GA users to an extent which is likely to be unacceptable, as it excludes VFR traffic. Other design options (XX-1B or 1C) would allow VFR access to varying extents, hence this option not meeting this Design Principle.			
Design principle 6: Operational: Full ANSP agreement (Priority B)	NOT MET		
NATS does not intend to propose the introduction of additional low level Class A CAS in this region.			

Traffic distribution

Demand Profile for EGGD Peak S17 Schedule



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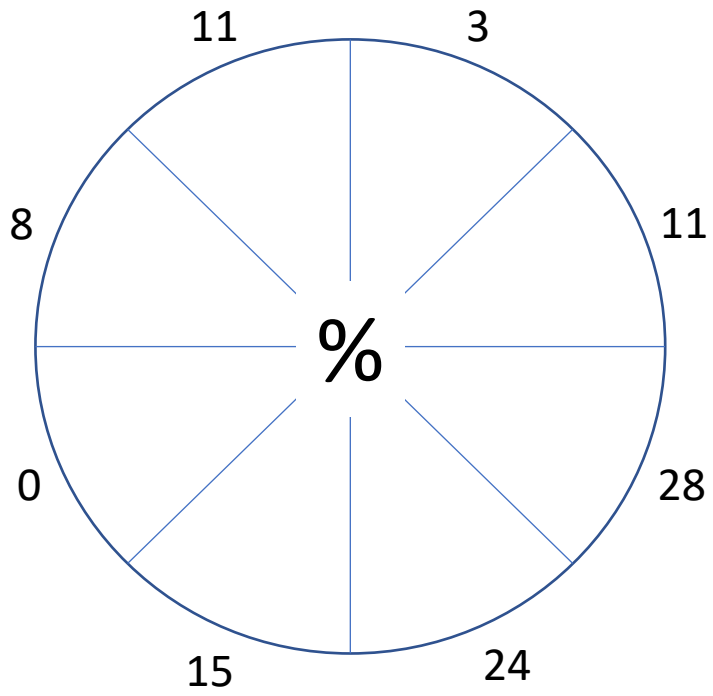
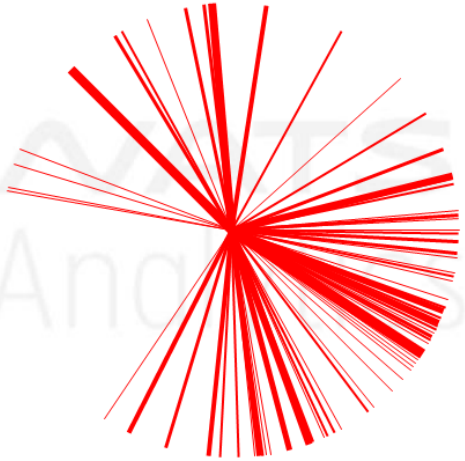
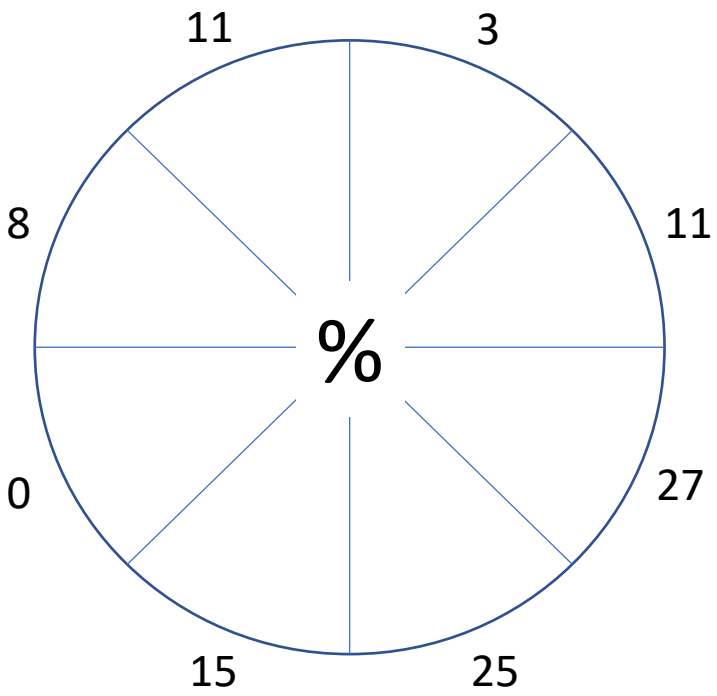
Arrivals	3	2	2	0	0	0	4	4	3	4	7	11	5	3	8	6	9	5	8	6	4	8	7	4	113
Departures	0	0	0	0	1	13	13	5	2	4	2	11	7	3	6	7	10	8	7	5	1	0	0	0	105
Total	3	2	2	0	1	13	17	9	5	8	9	22	12	6	14	13	19	13	15	11	5	8	7	4	218

ARRIVALS
(9,187)





DEPARTURES
(9,346)



Totals for 3 months: June to August 2019

Design inputs

- ACP Statement of Need (from Step 1A).
- Design Principles (from Step 1B).
- Bristol – LAMP Requirements.
- Operational issues identified from internal survey (2018).
- ACP contract ‘Scope of Services’.

- Airspace Modernisation Strategy (CAP1711).
- Airspace Change Process (CAP 1616).

Bristol ACP S-o-N: key points

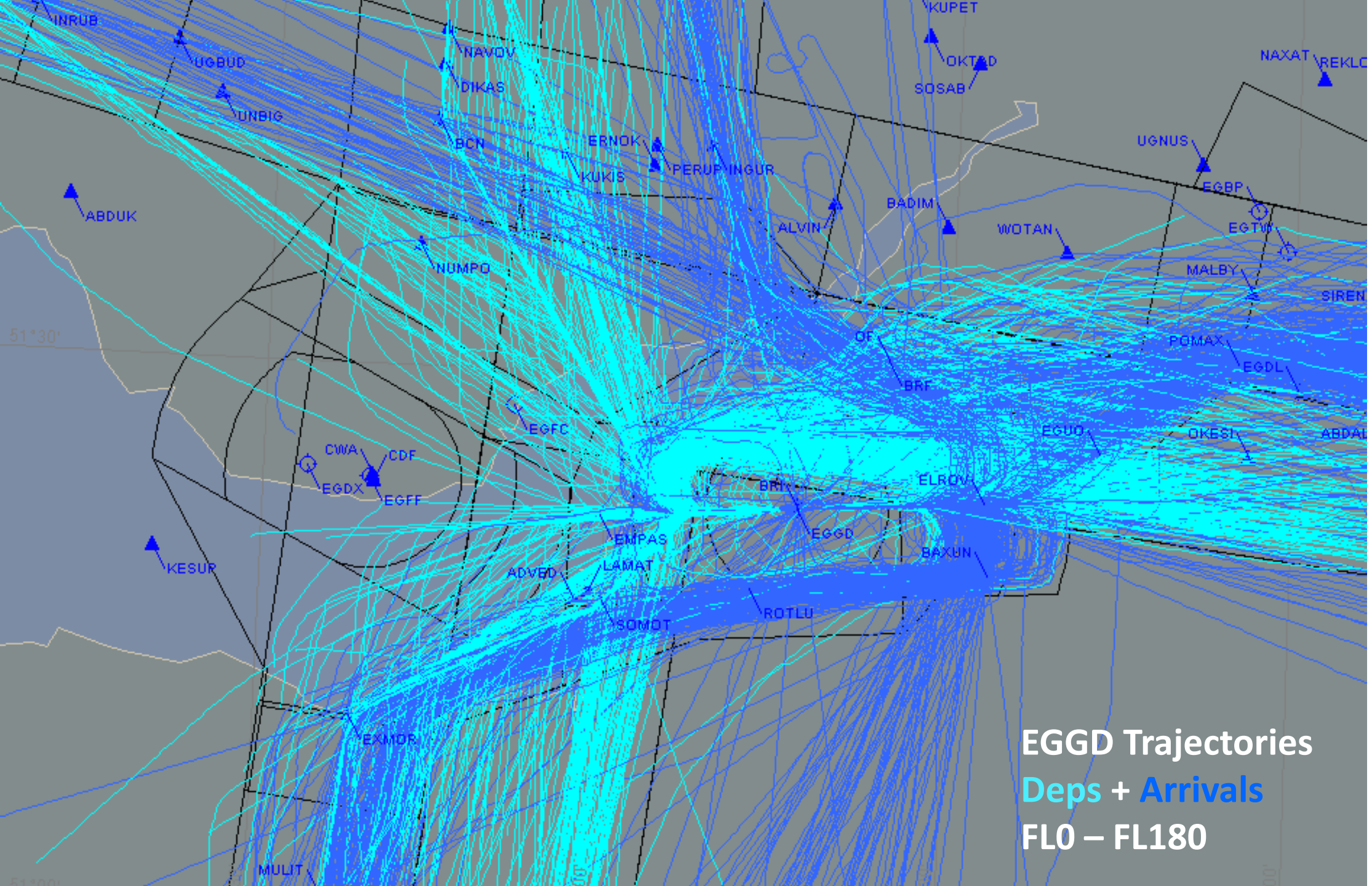
- LAMP addresses the network above 7000ft.
- Airport ACP up to 7000ft.
- Additional airspace capacity to enable future growth.
- Improved flight efficiency and environmental performance.
- Separated routes using satellite nav. standards.
- Re-designed SIDs & STARs to connect efficiently to network.
  - minimise flight paths over populated areas
  - reduce emissions by minimising additional track miles
  - CAS borders to support RNAV as default method of navigation

Operational issues from internal survey - 1

- Current BRI hold location causes operational difficulties (loss of traffic in O/H and label garbling).
- BRI hold capacity is stretched during peak periods.
- Airspace to the south hinders lateral separation on downwind legs; no ability for parallel tracks.
- Airspace to the North East set at levels when both Filton and Lyneham were open; relatively high base levels not complementary to continuous decent profiles and tactical vectoring.

Operational issues from internal survey - 2

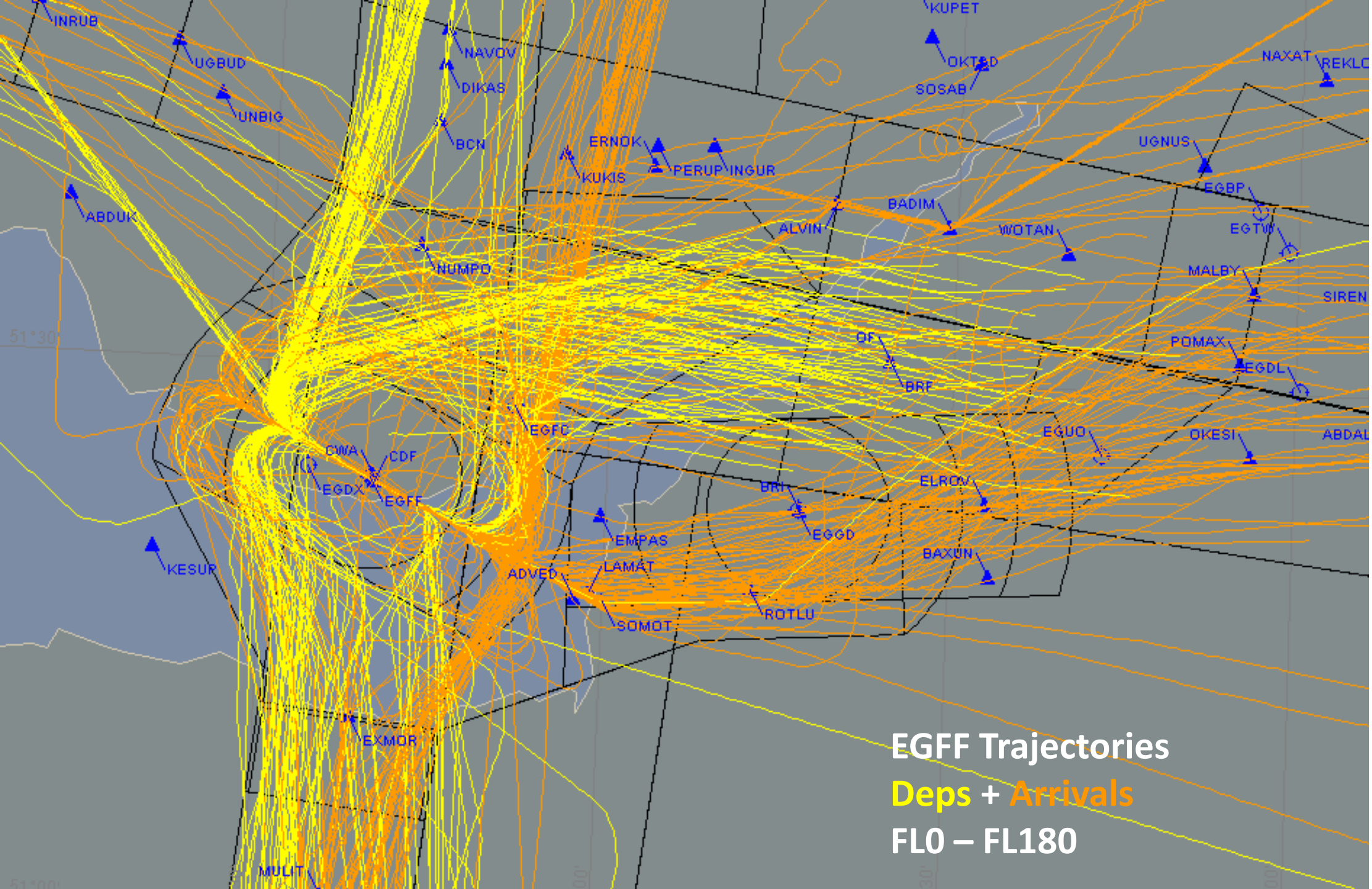
- Relatively late presentation of traffic from the west hinders proactive traffic planning. Downwind and base legs for Rwy 09 are problematic and not favourable for effective vectoring.
- Runway capacity - 2 minute departure separation does not accommodate growth aspirations.
- Current RNAV STARs are insufficient to meet growth and environmental aspirations.
- Current routes for arrivals and departures do not lend themselves towards a systemised approach of air traffic management and require high levels of tactical input.



EGGD Trajectories

Deps + Arrivals

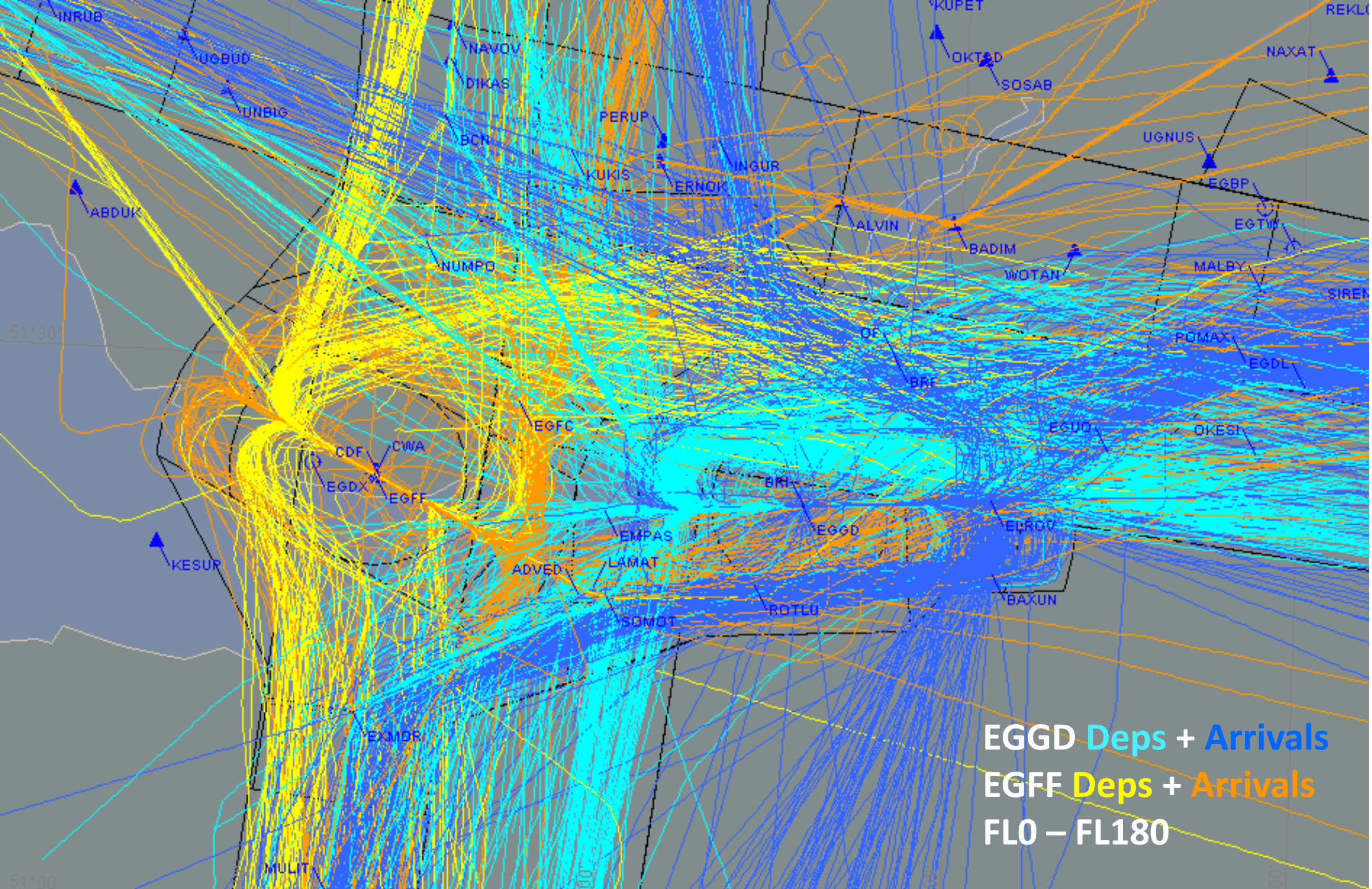
FL0 – FL180



EGFF Trajectories

Deps + Arrivals

FL0 – FL180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EGBP
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BADIM
WOTAN
MALBY
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BRF
POMAX
EGDL
EGFC
EGDQ
OKESI
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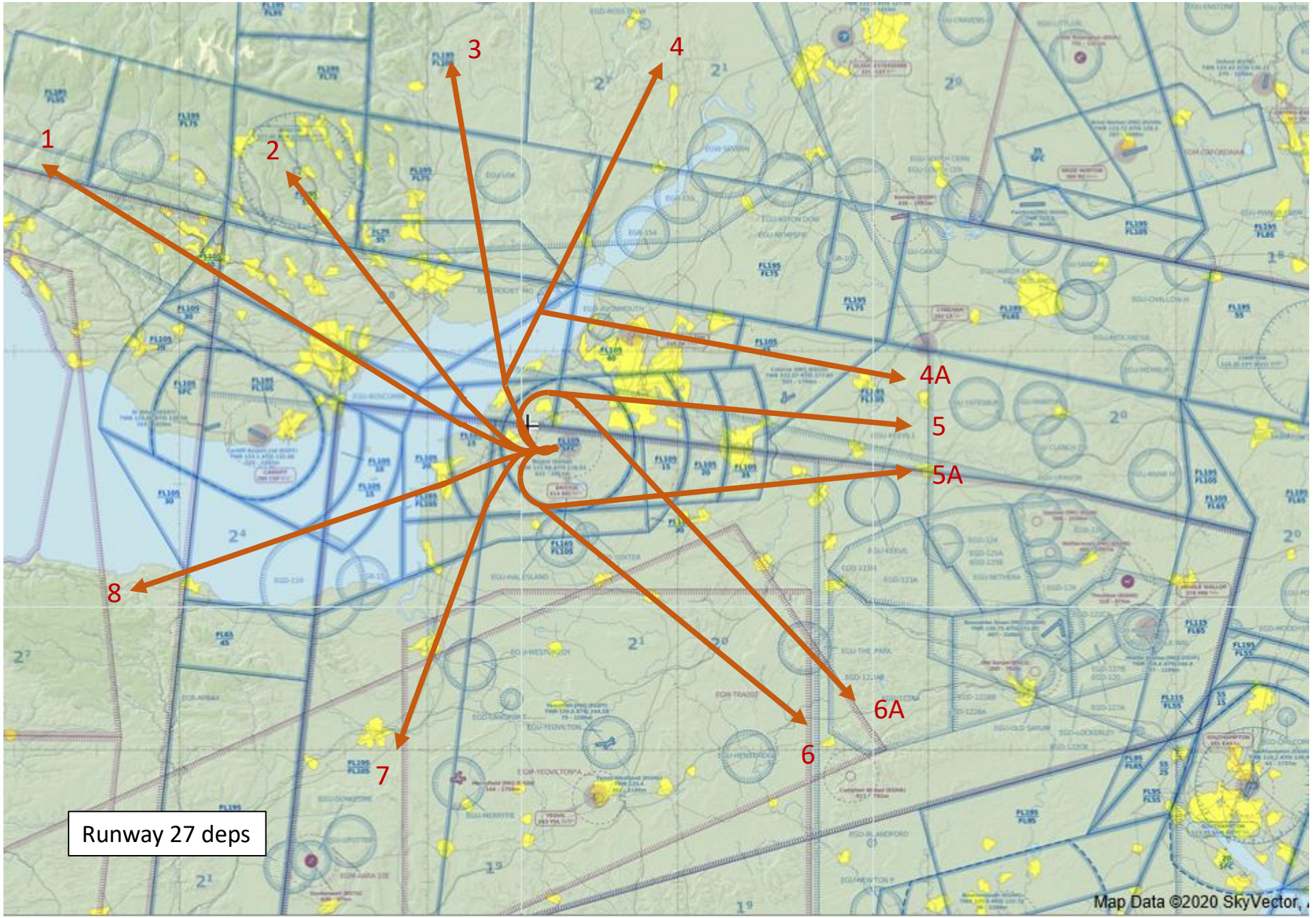
CWA
EGDX
EGFF
BRI
EGGD
ELROV
EMPAS
LAMAT
ADVED
ROTLU
SOMOT
BAXUN
KESUR
EXMOR
MULIT
EGGD Deps + Arrivals
EGFF Deps + Arrivals
FL0 – FL180

Development of design options

Jan 2020 to date…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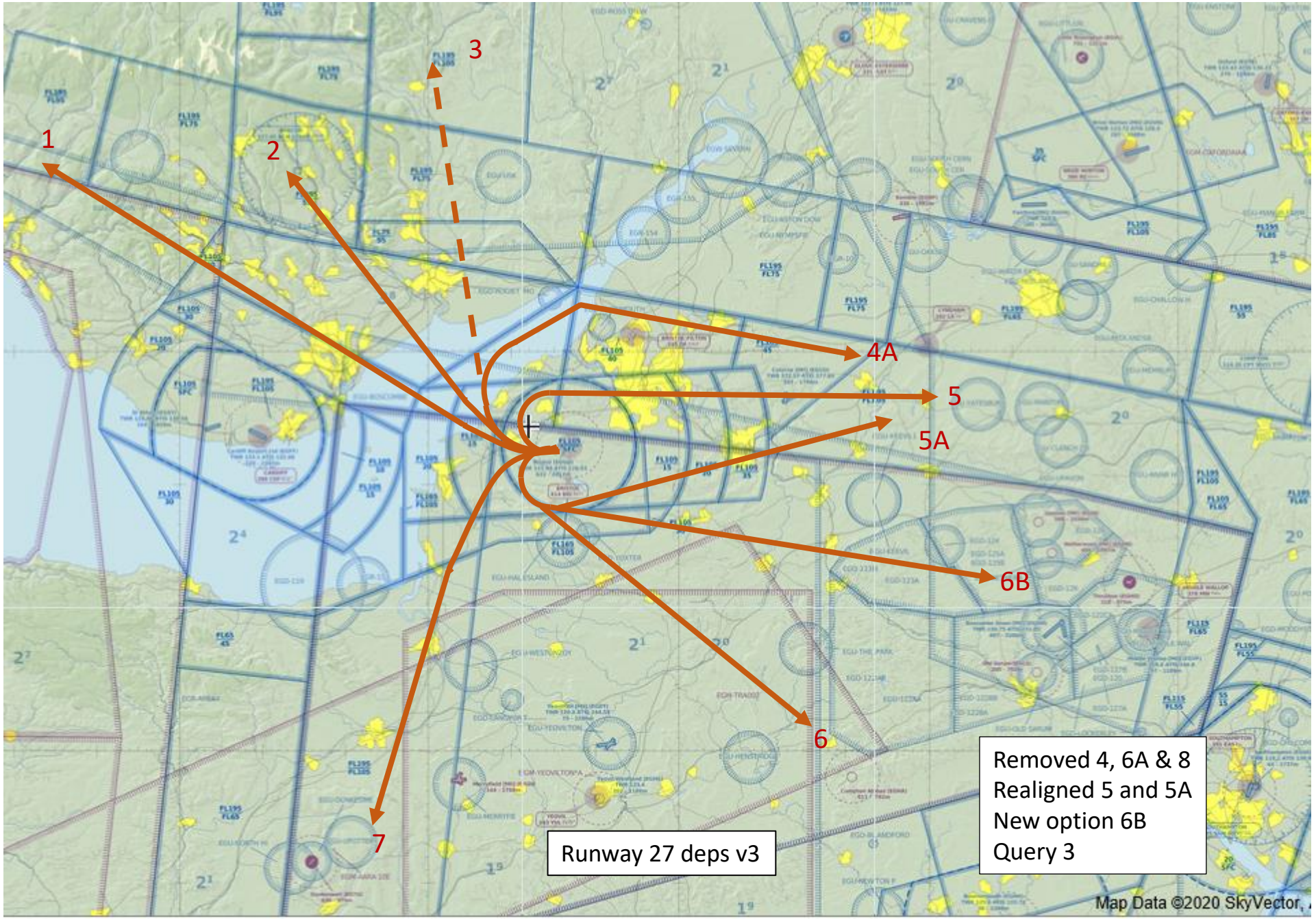
Runway 27 deps
Map Data ©2020 SkyVector,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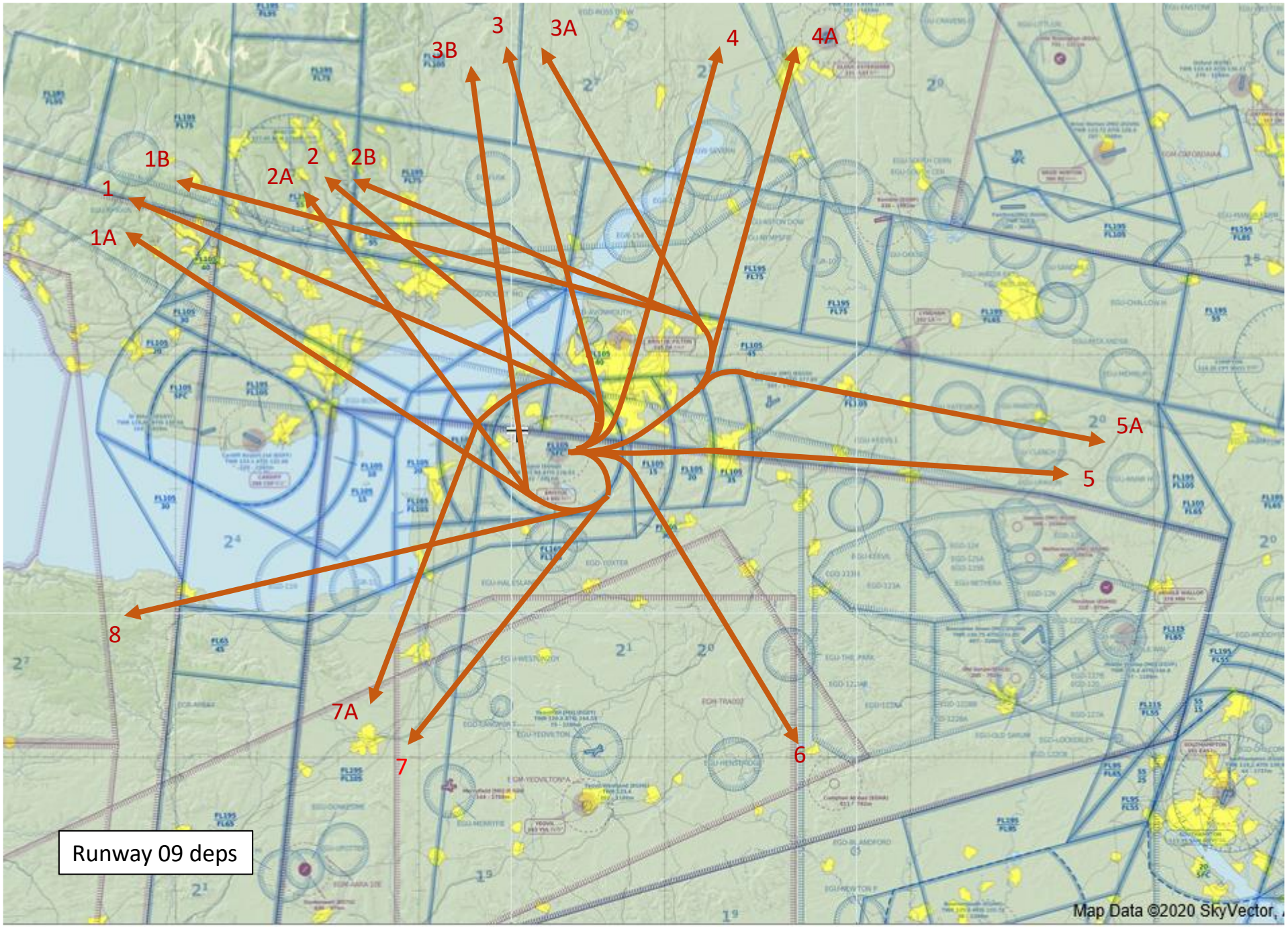
Removed 4, 6A & 8
Realigned 5 and 5A
New option 6B
Query 3
Map Data ©2020 SkyVector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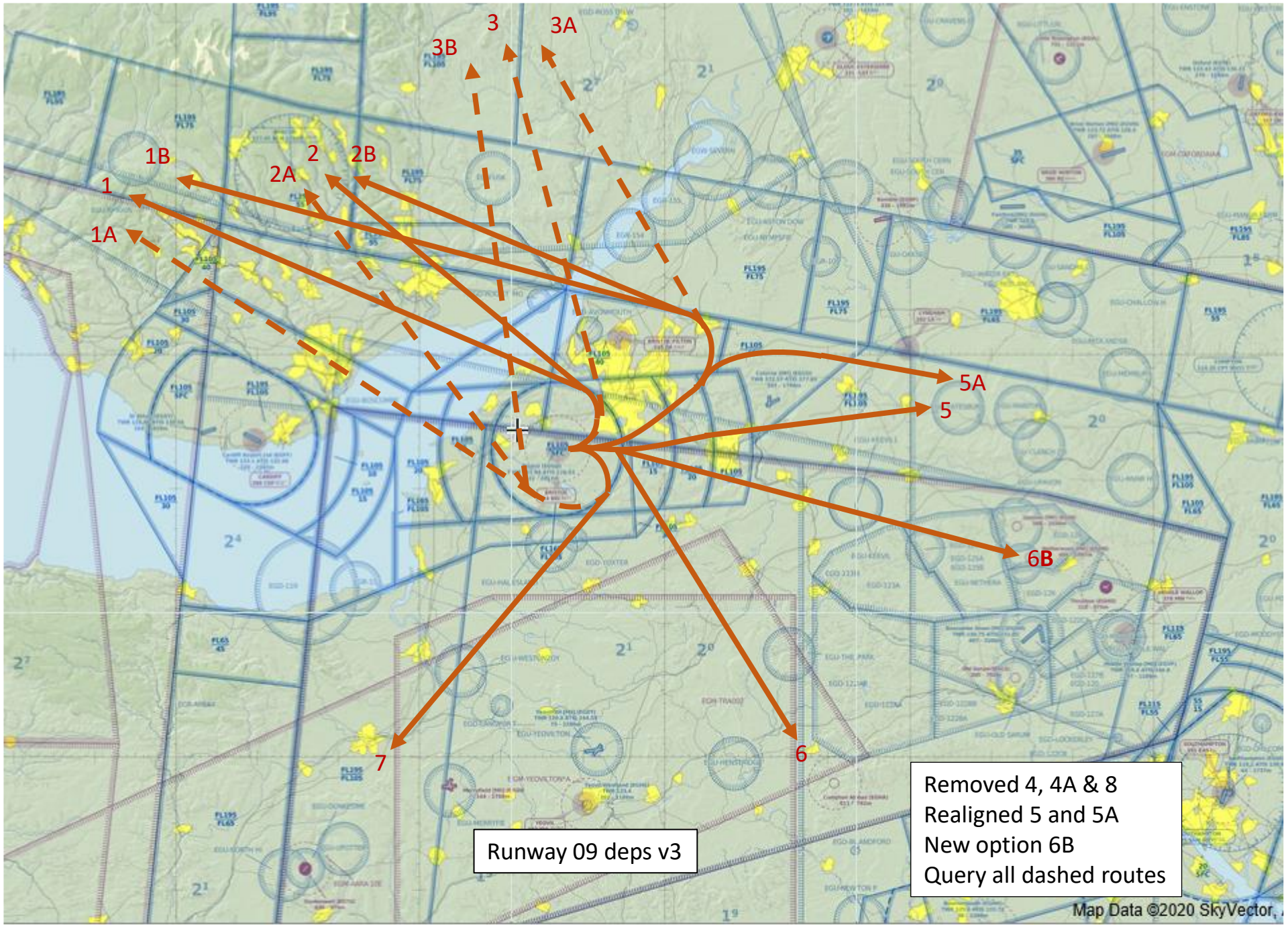
Map Data ©2020 SkyVector,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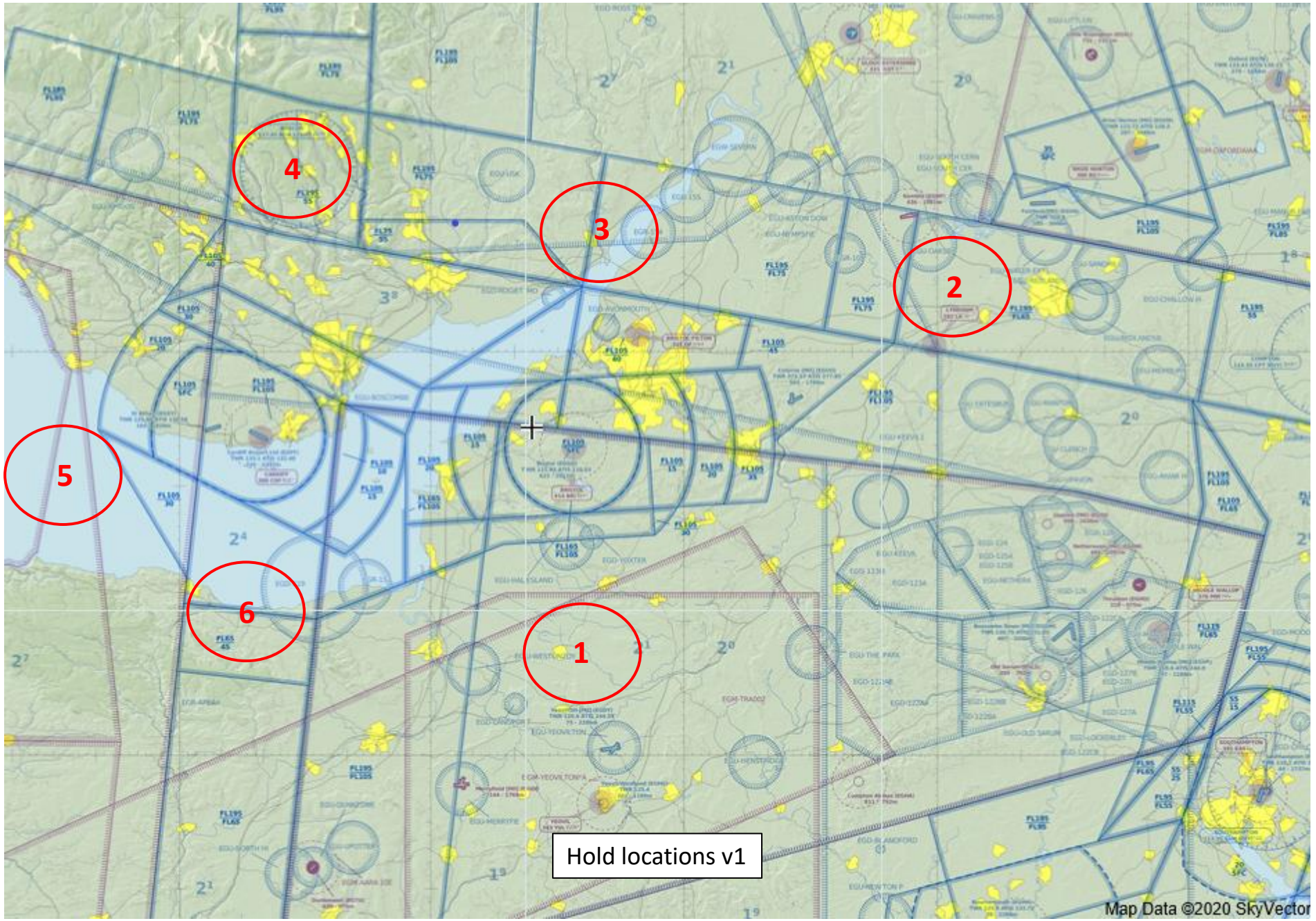
Runway 09 deps v3
Removed 4, 4A & 8
Realigned 5 and 5A
New option 6B
Query all dashed routes
Map Data ©2020 SkyVector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Hold locations v1
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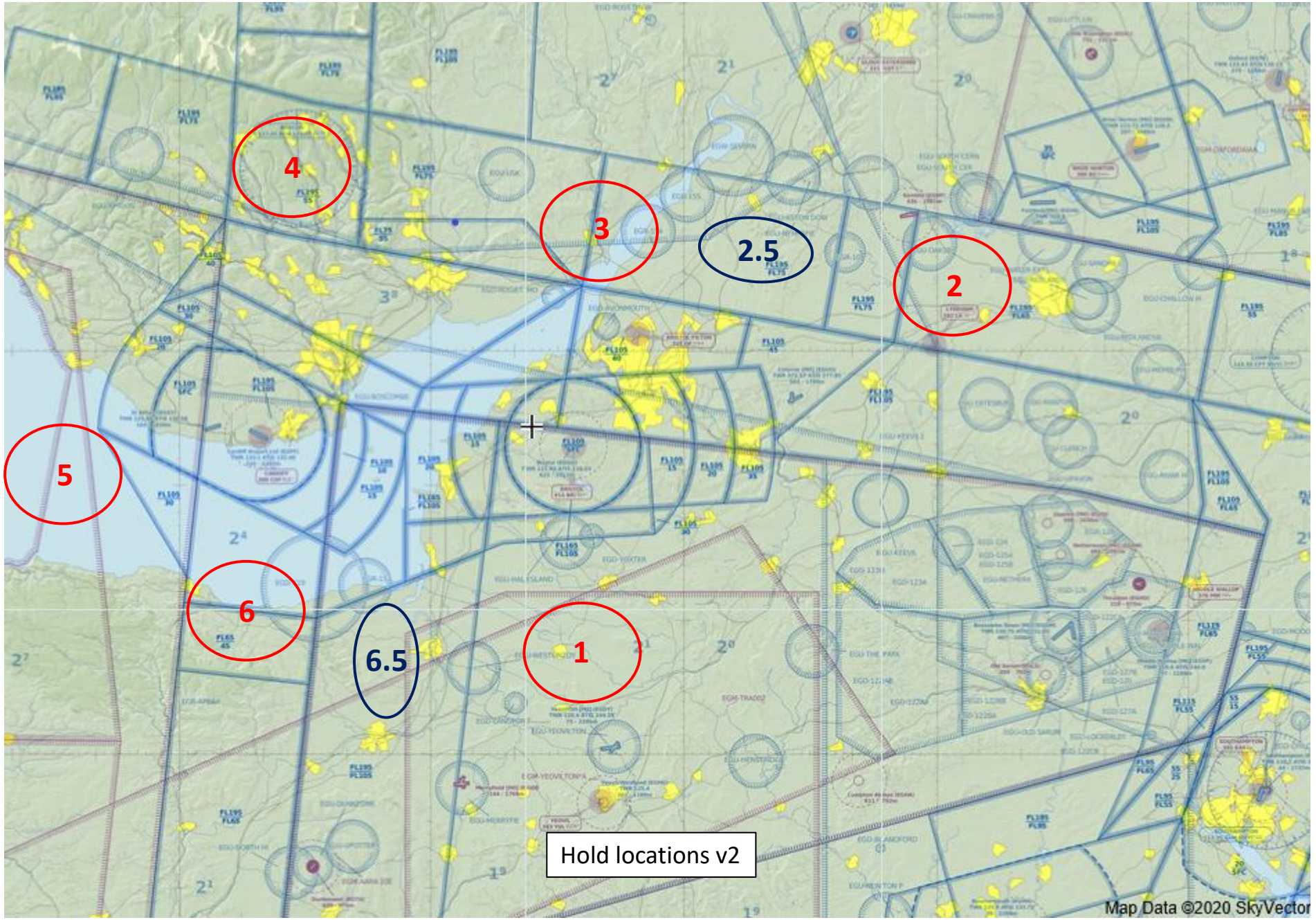
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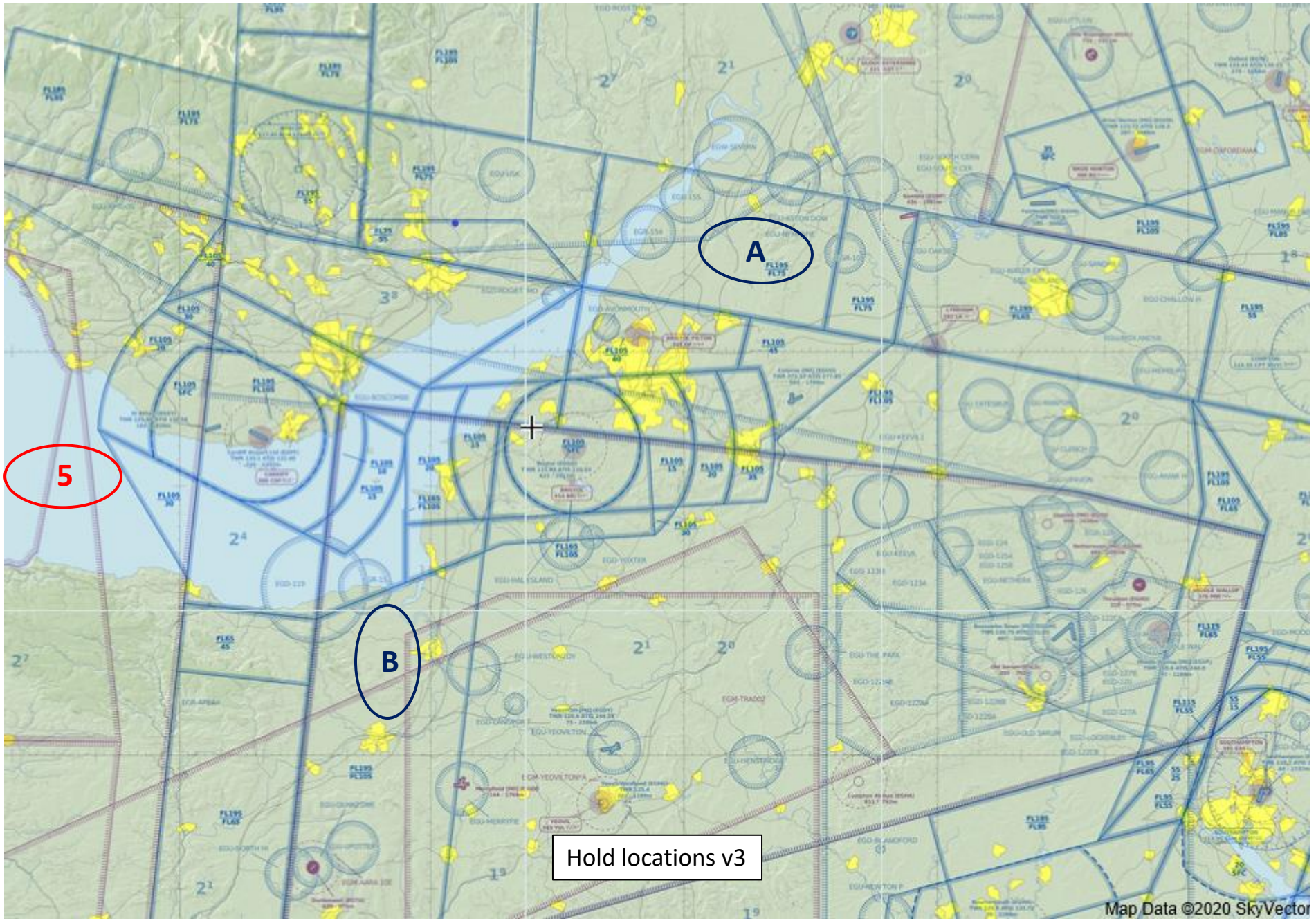
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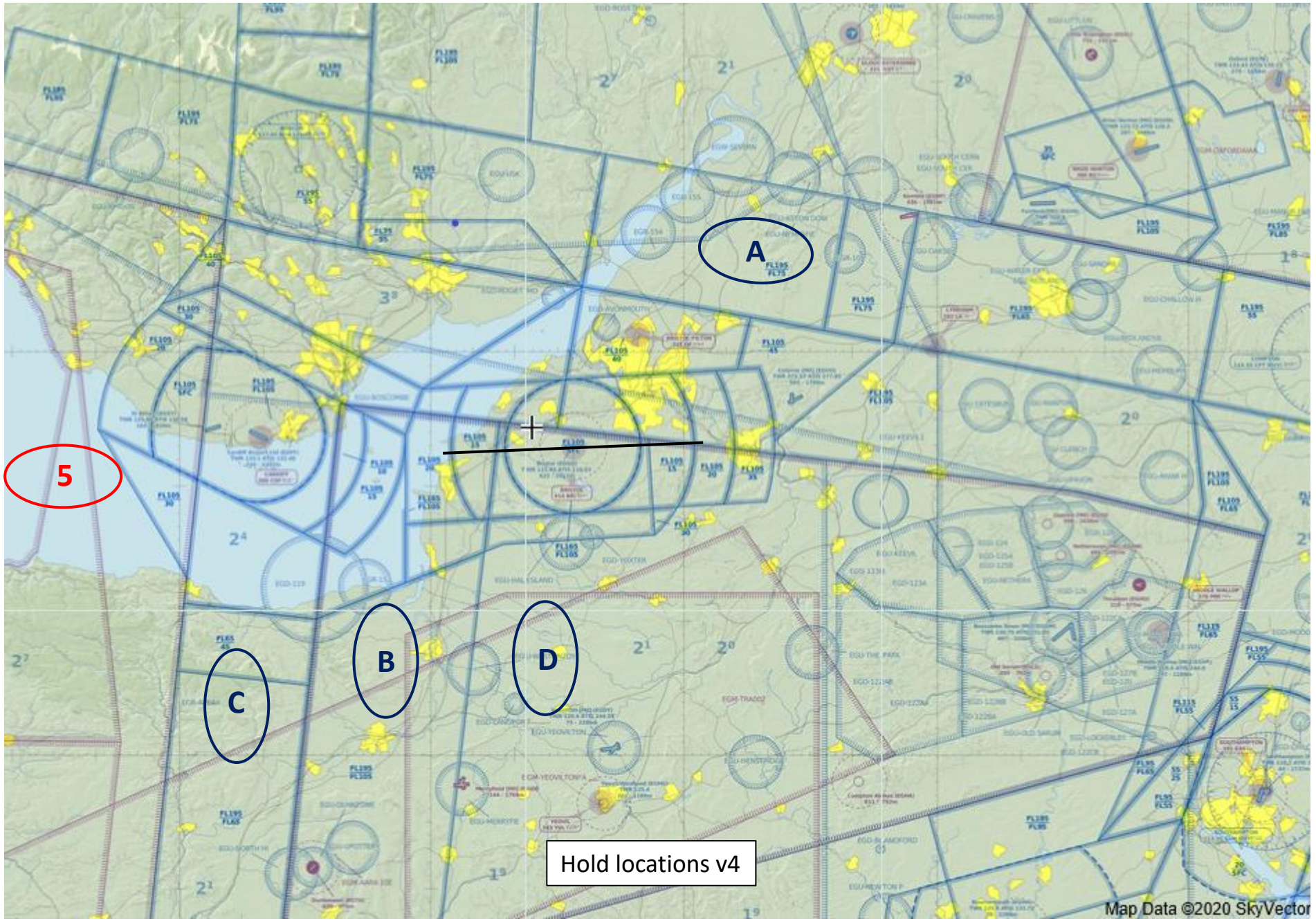
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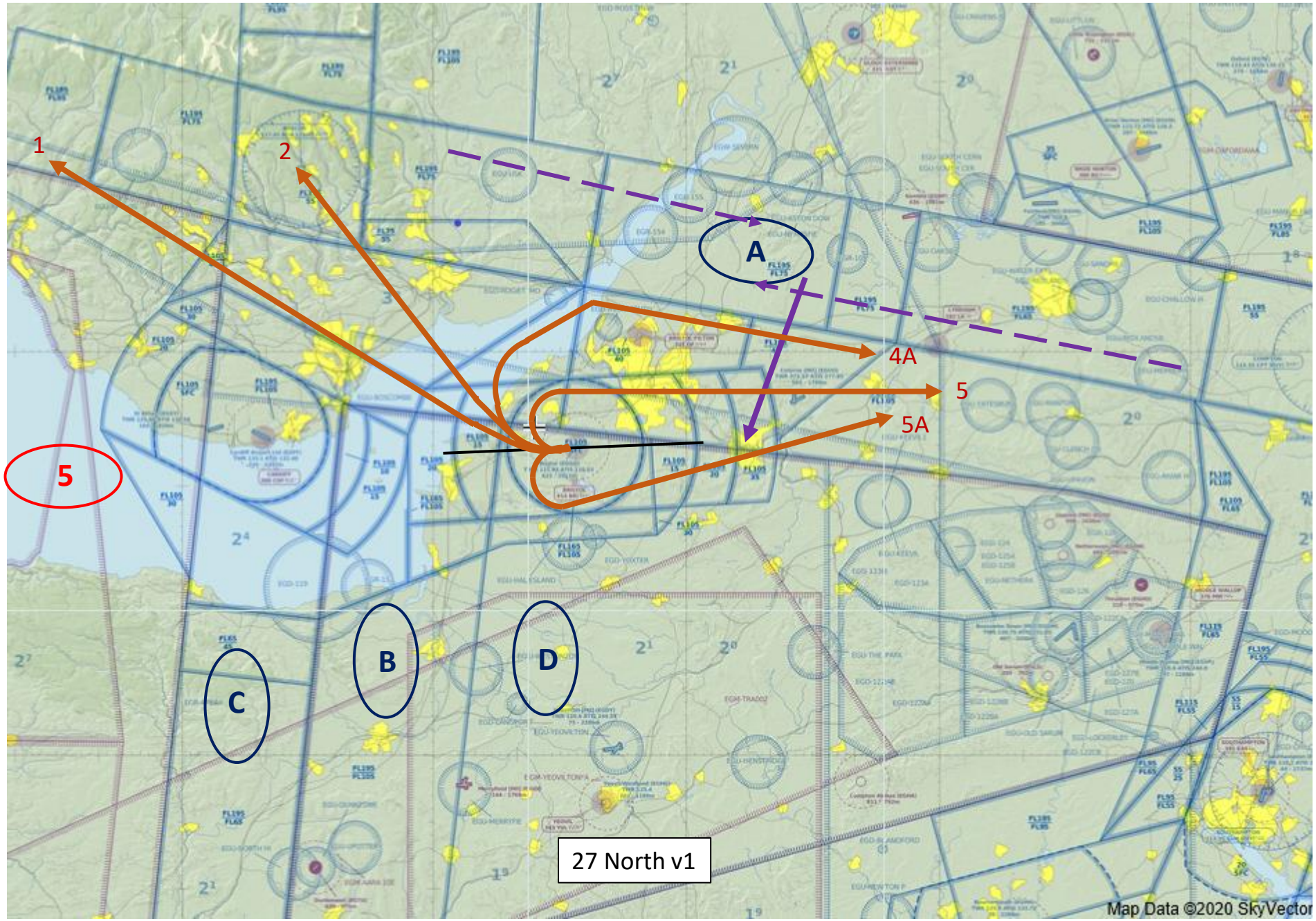
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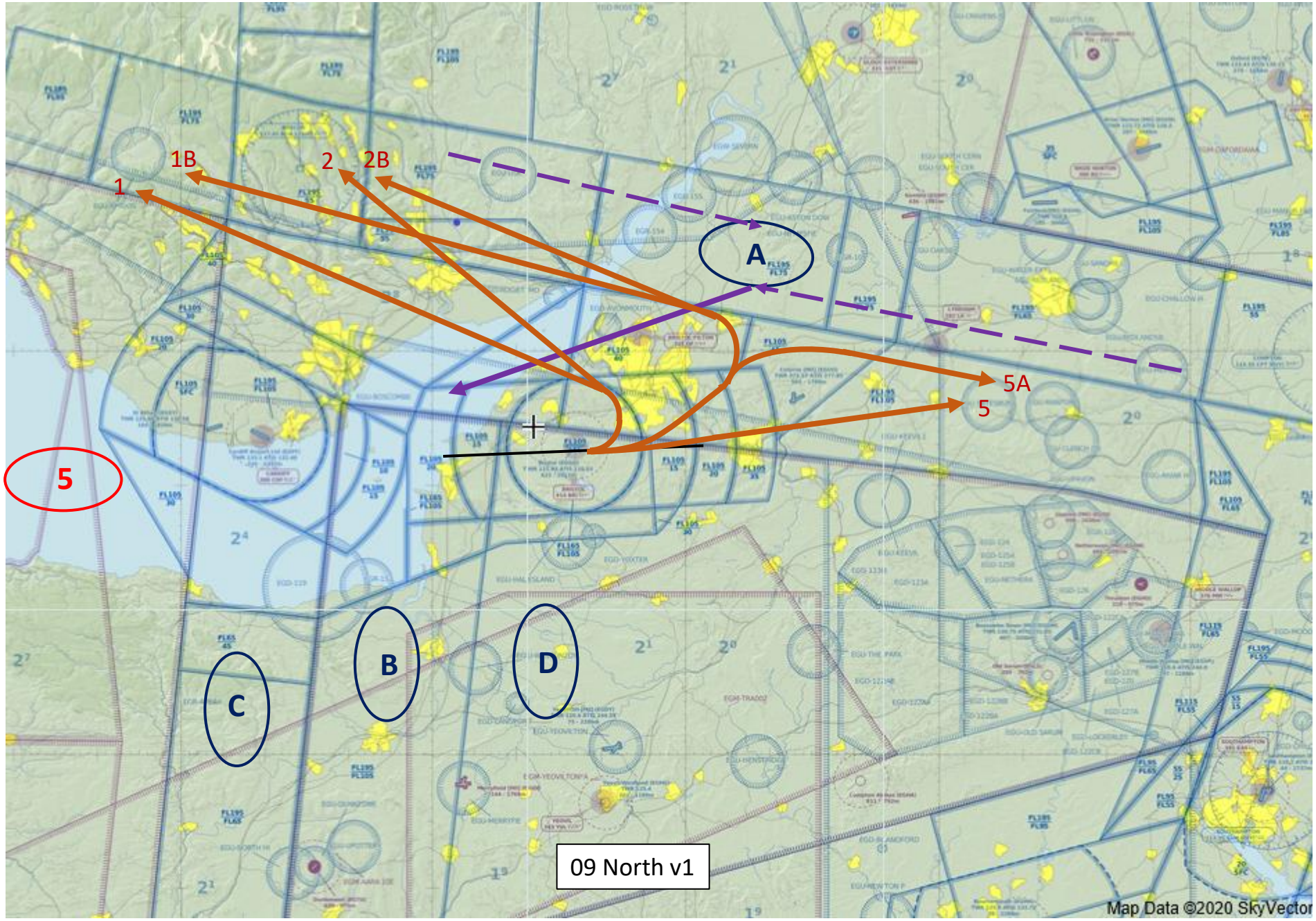
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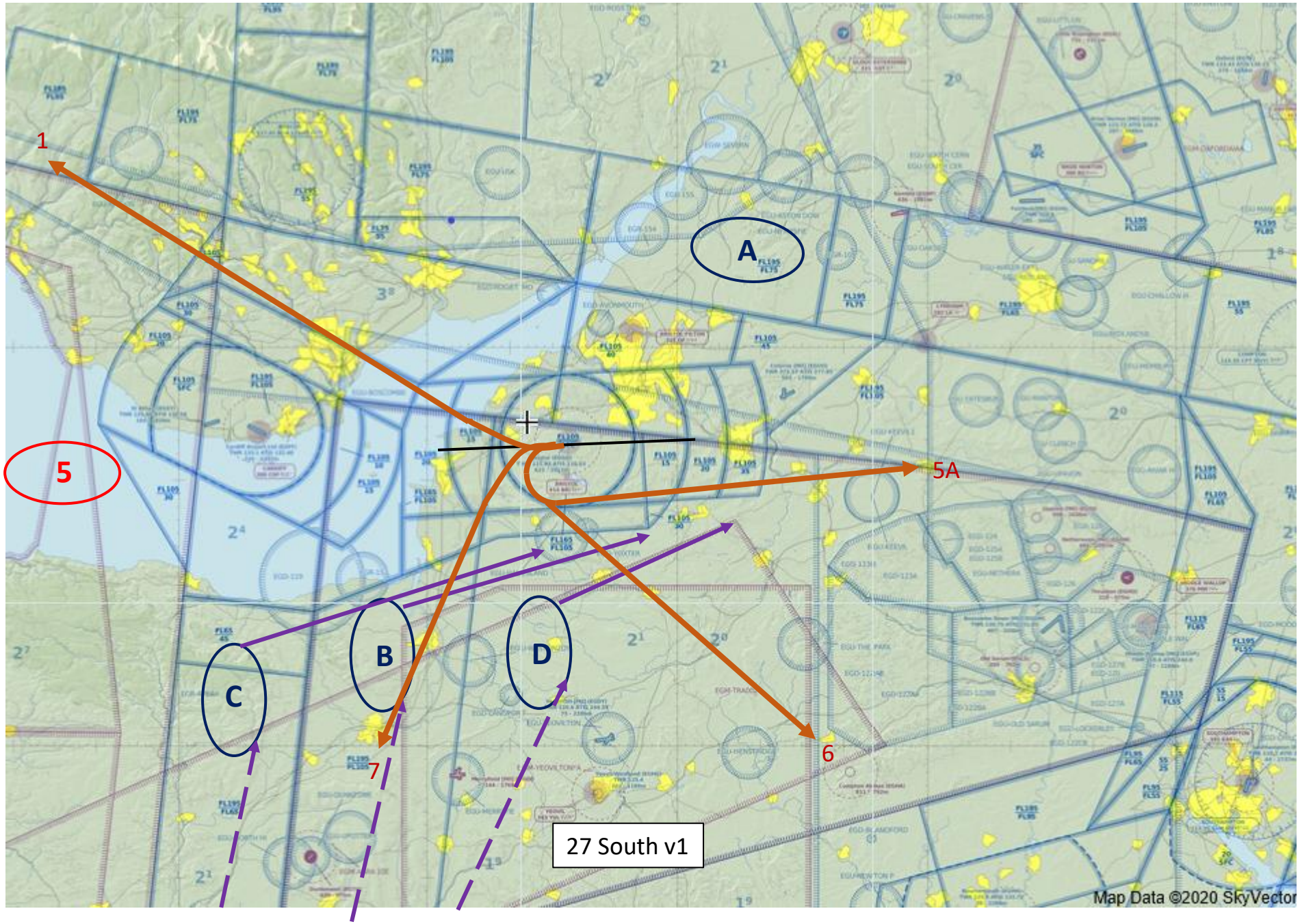
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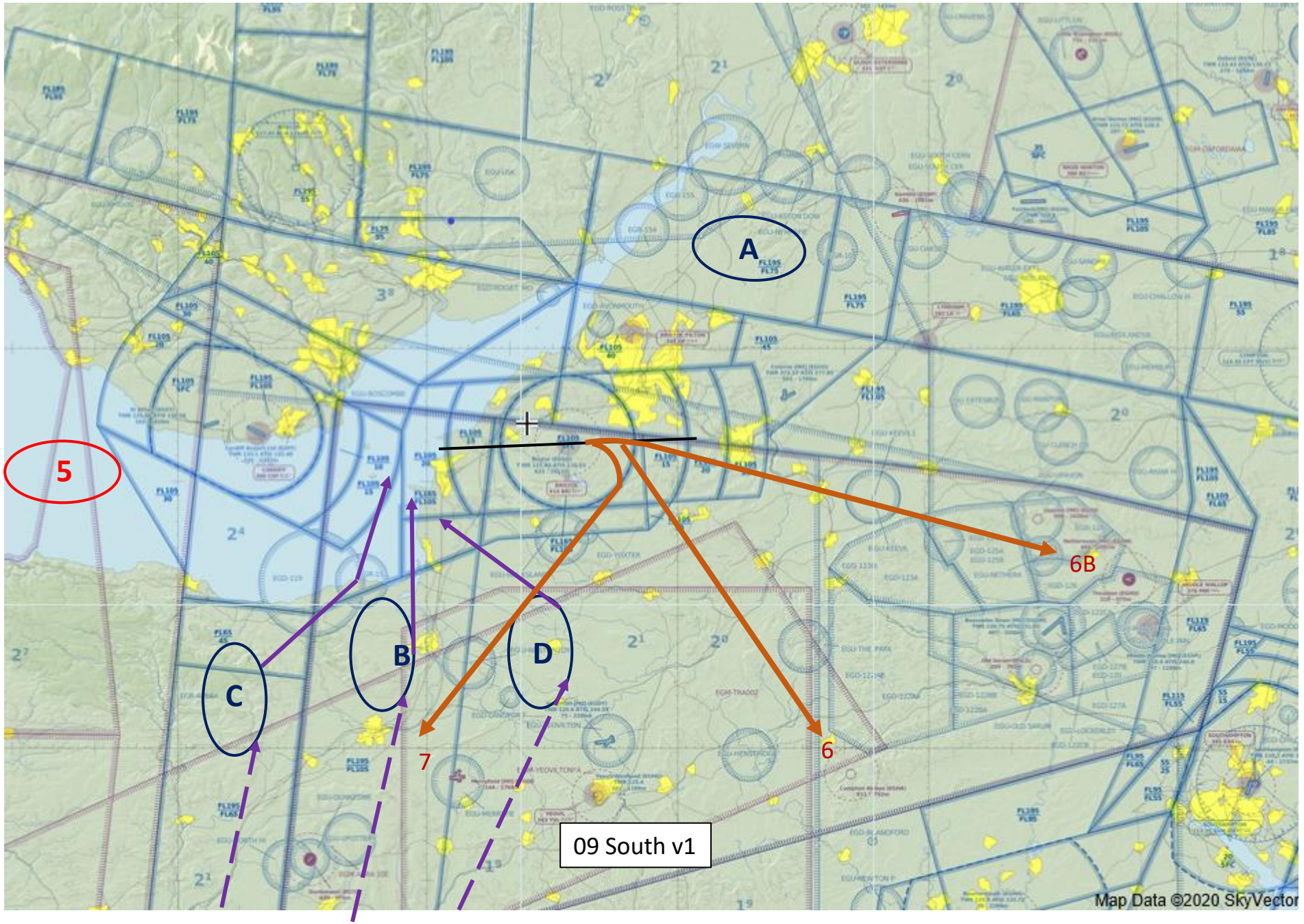
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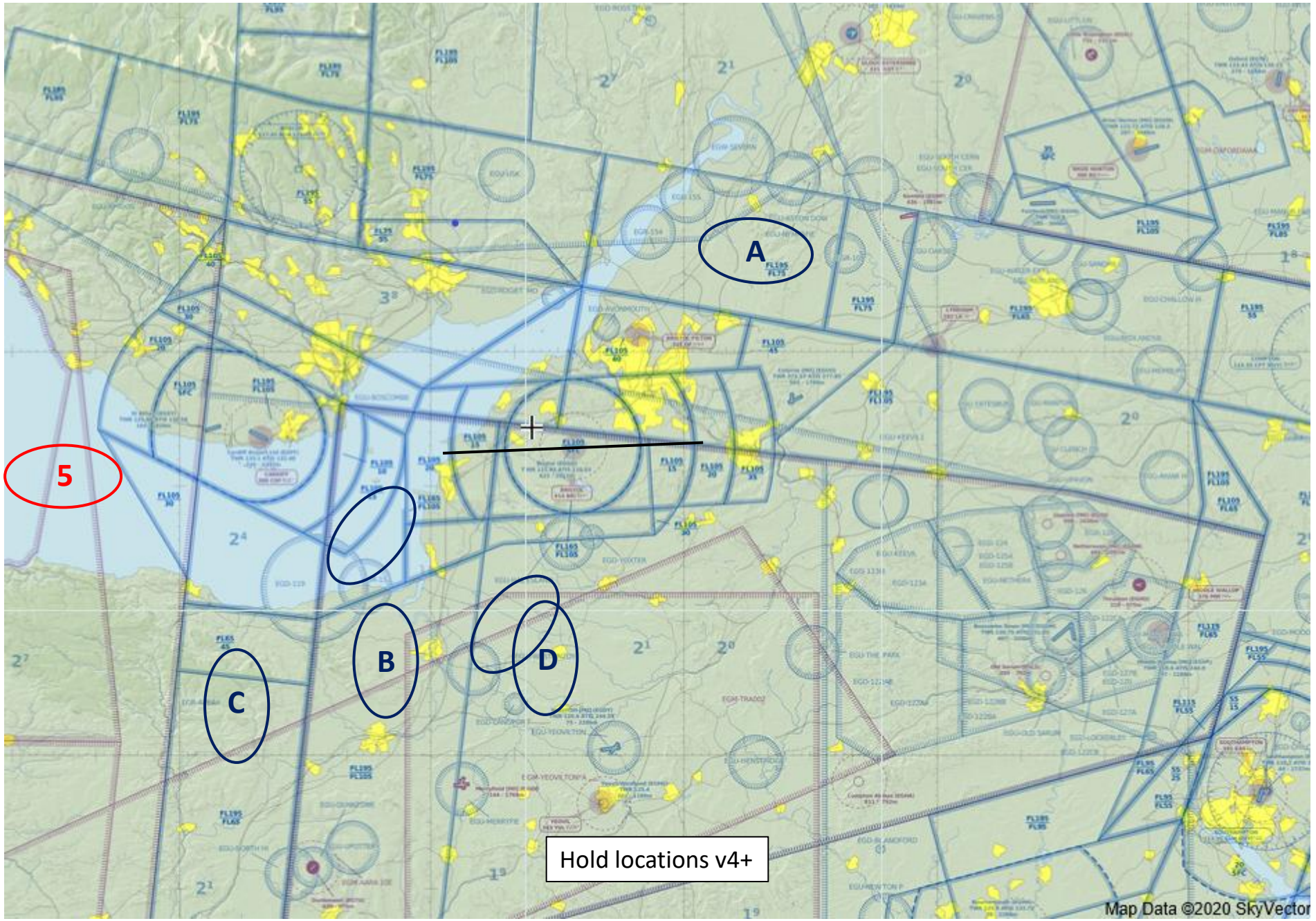
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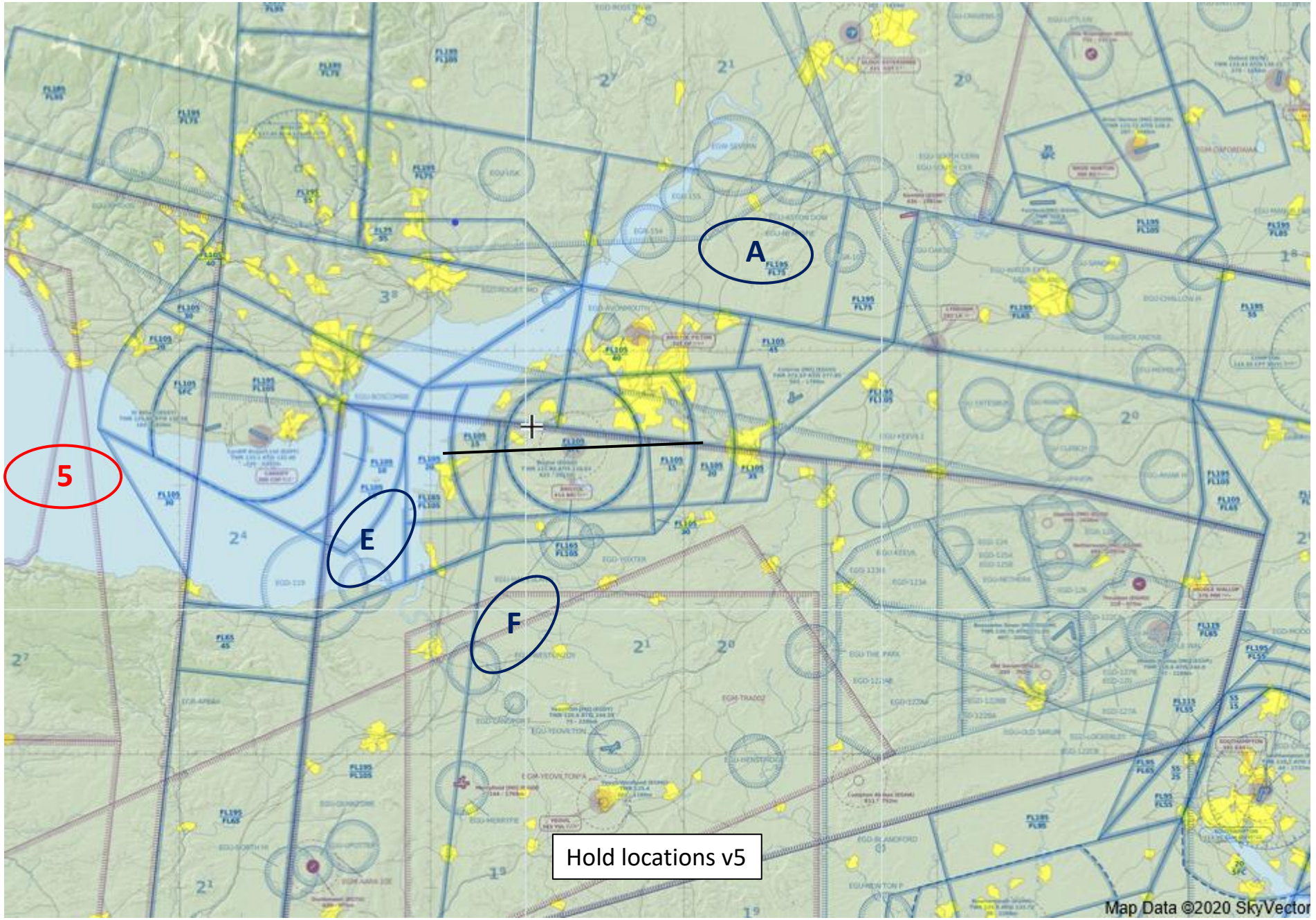
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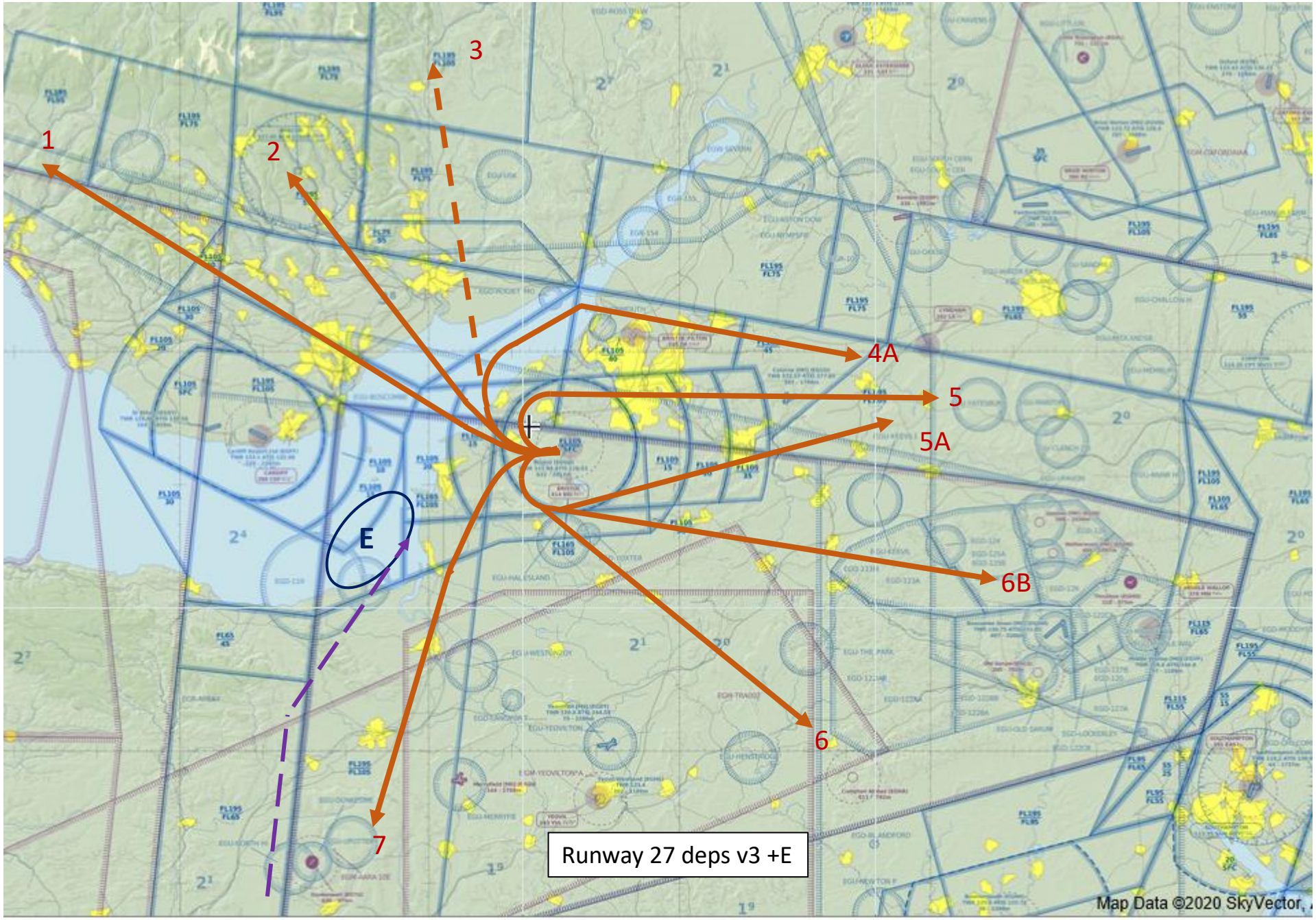
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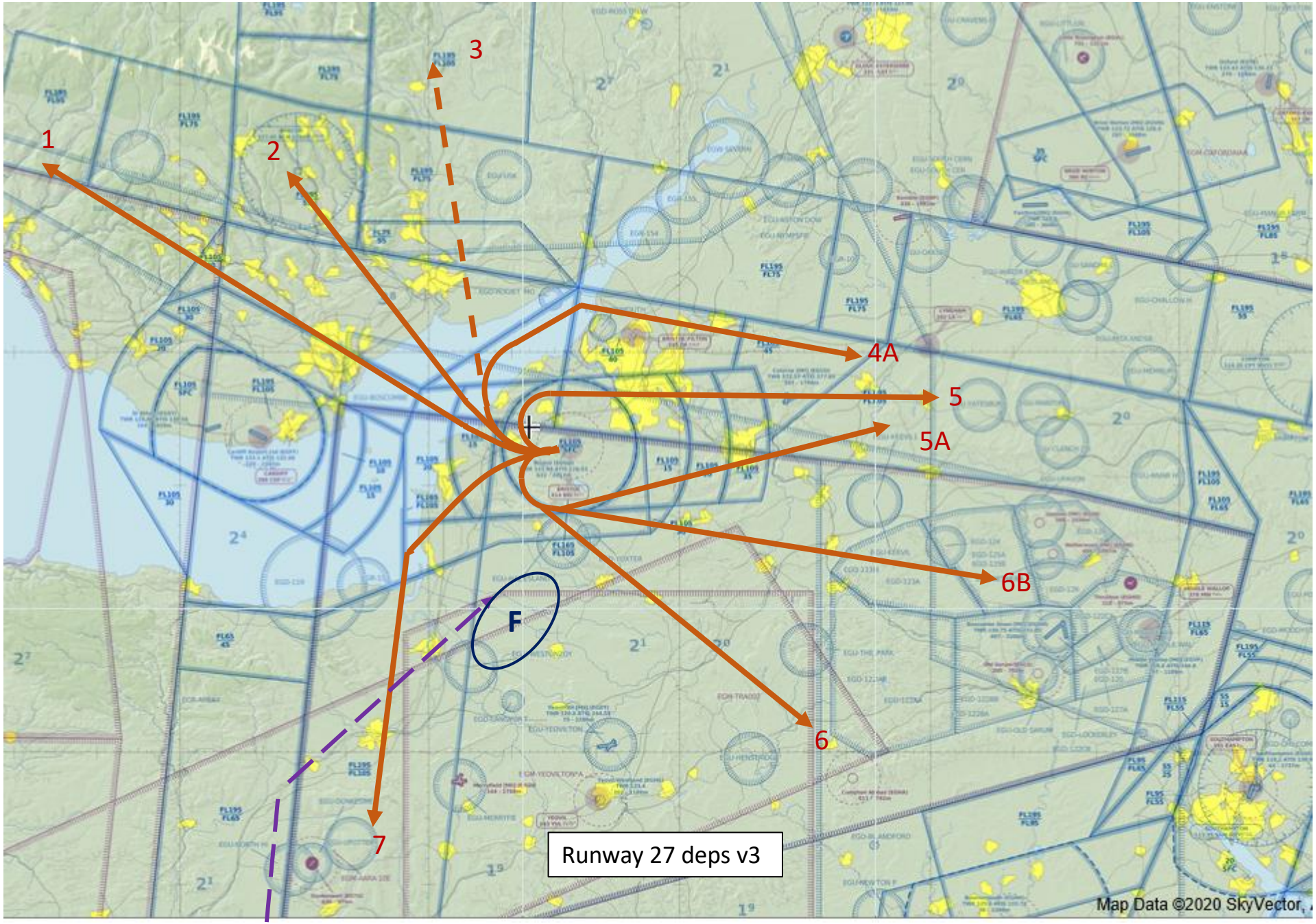
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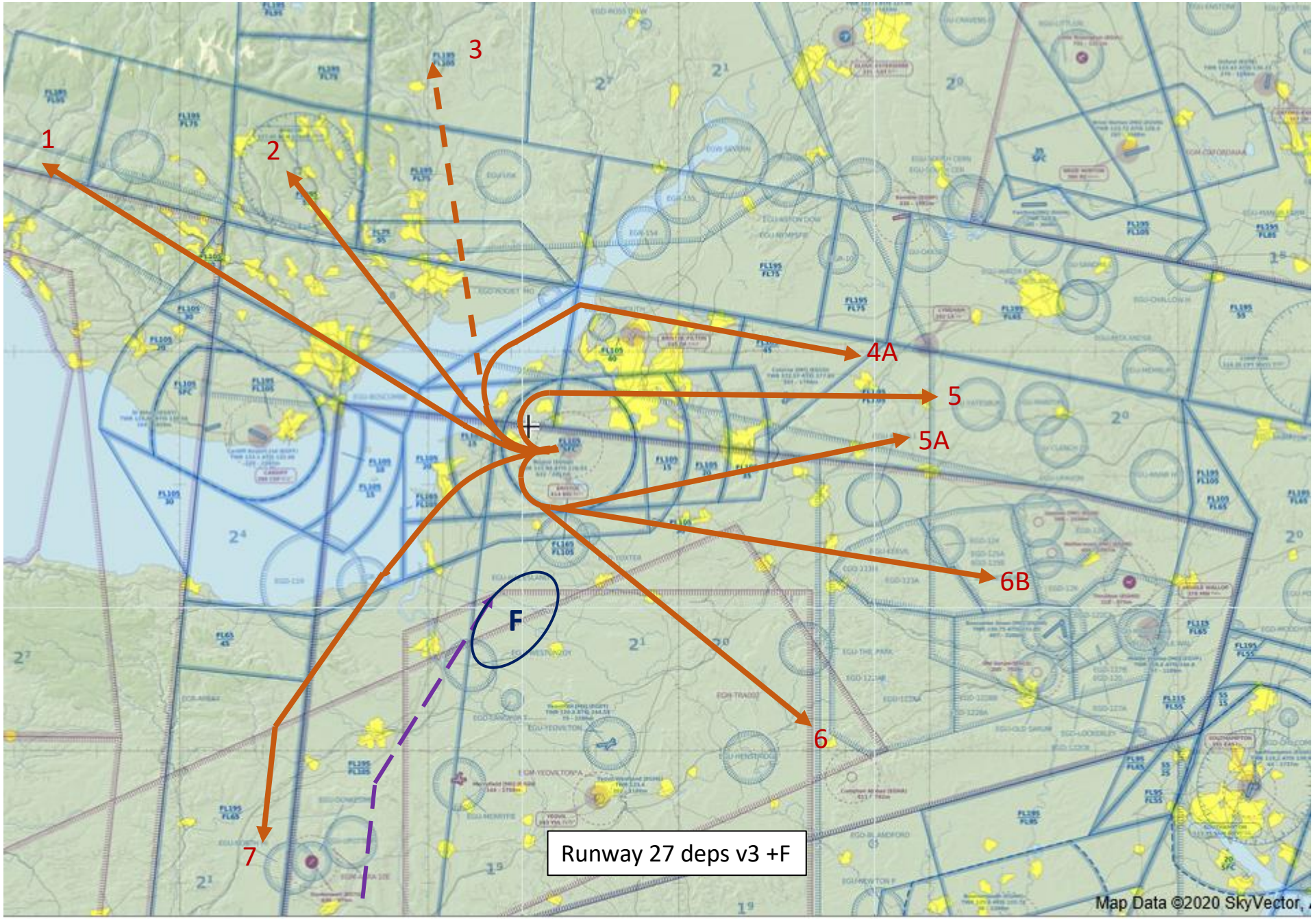
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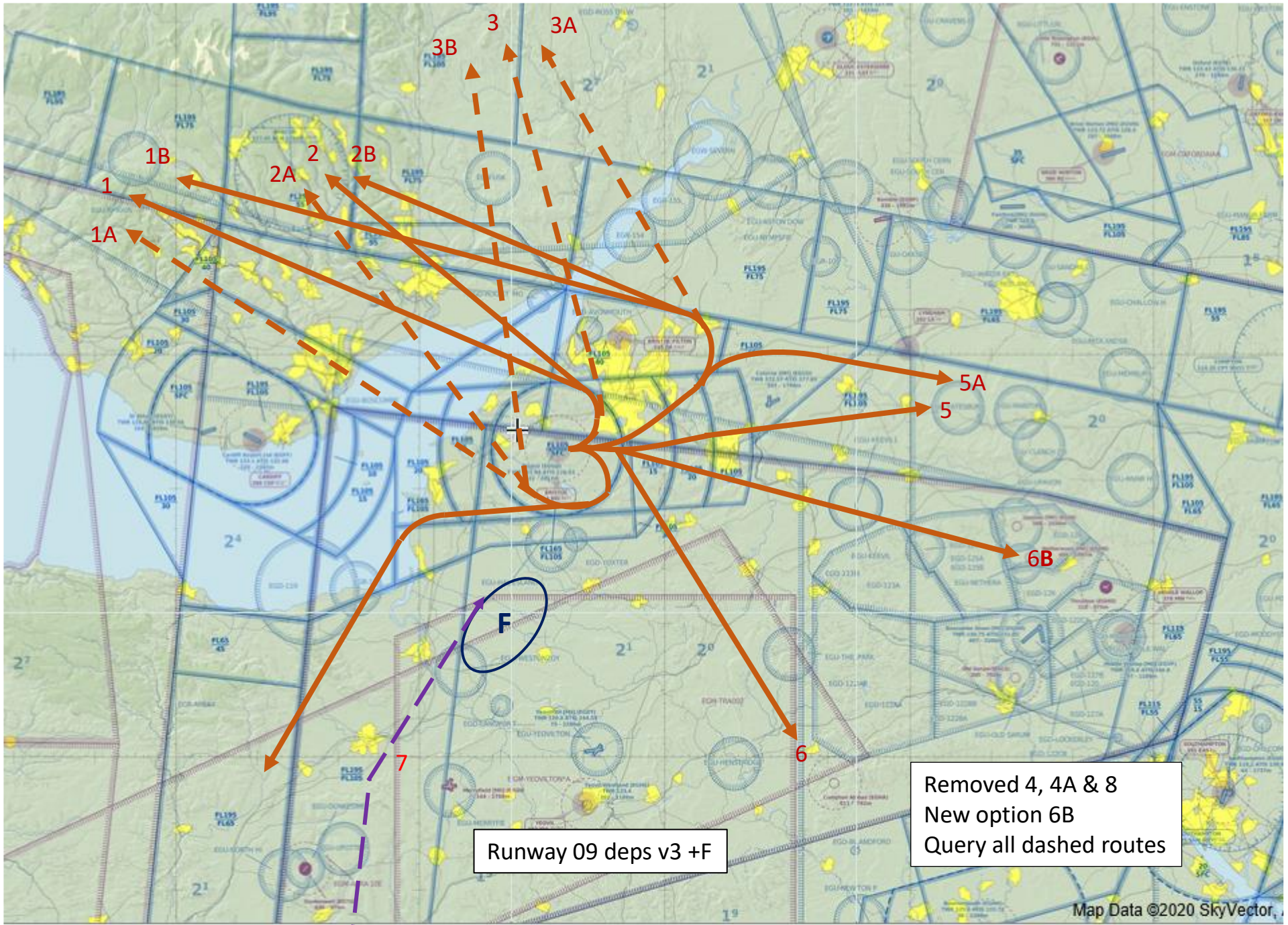
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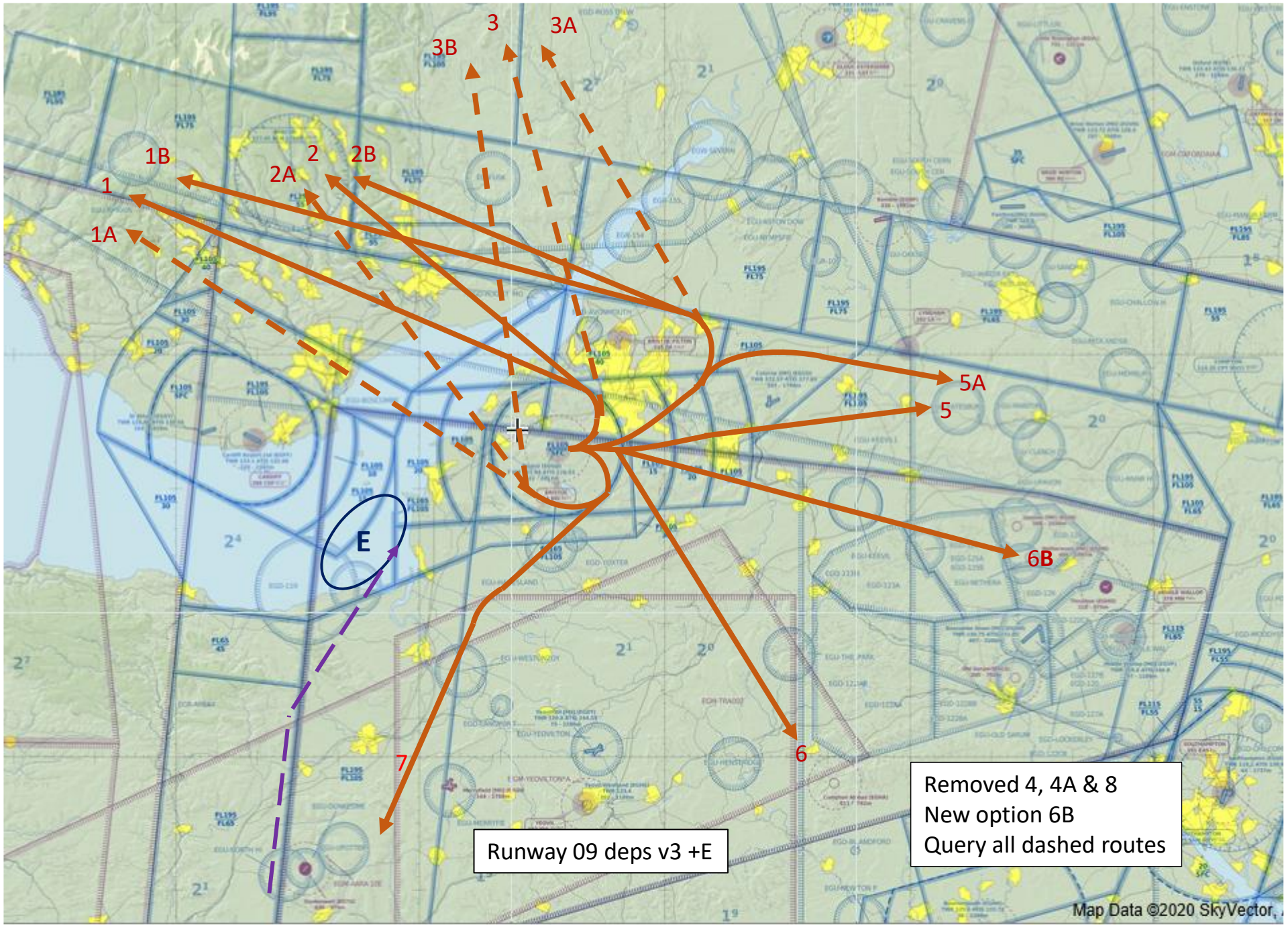
New option 6B
Query all dashed routes
Map Data ©2020 SkyVector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New option 6B
Query all dashed routes
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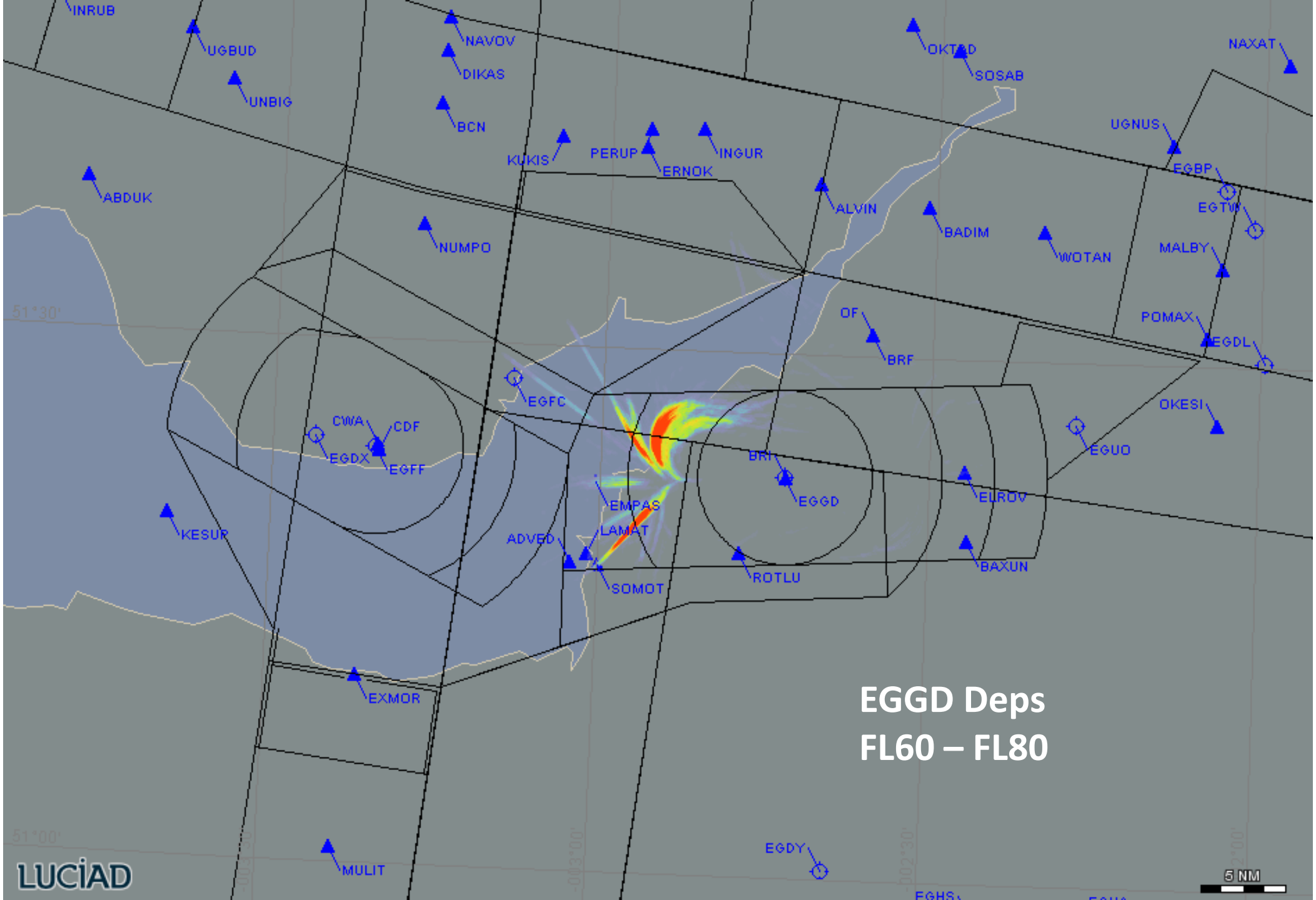
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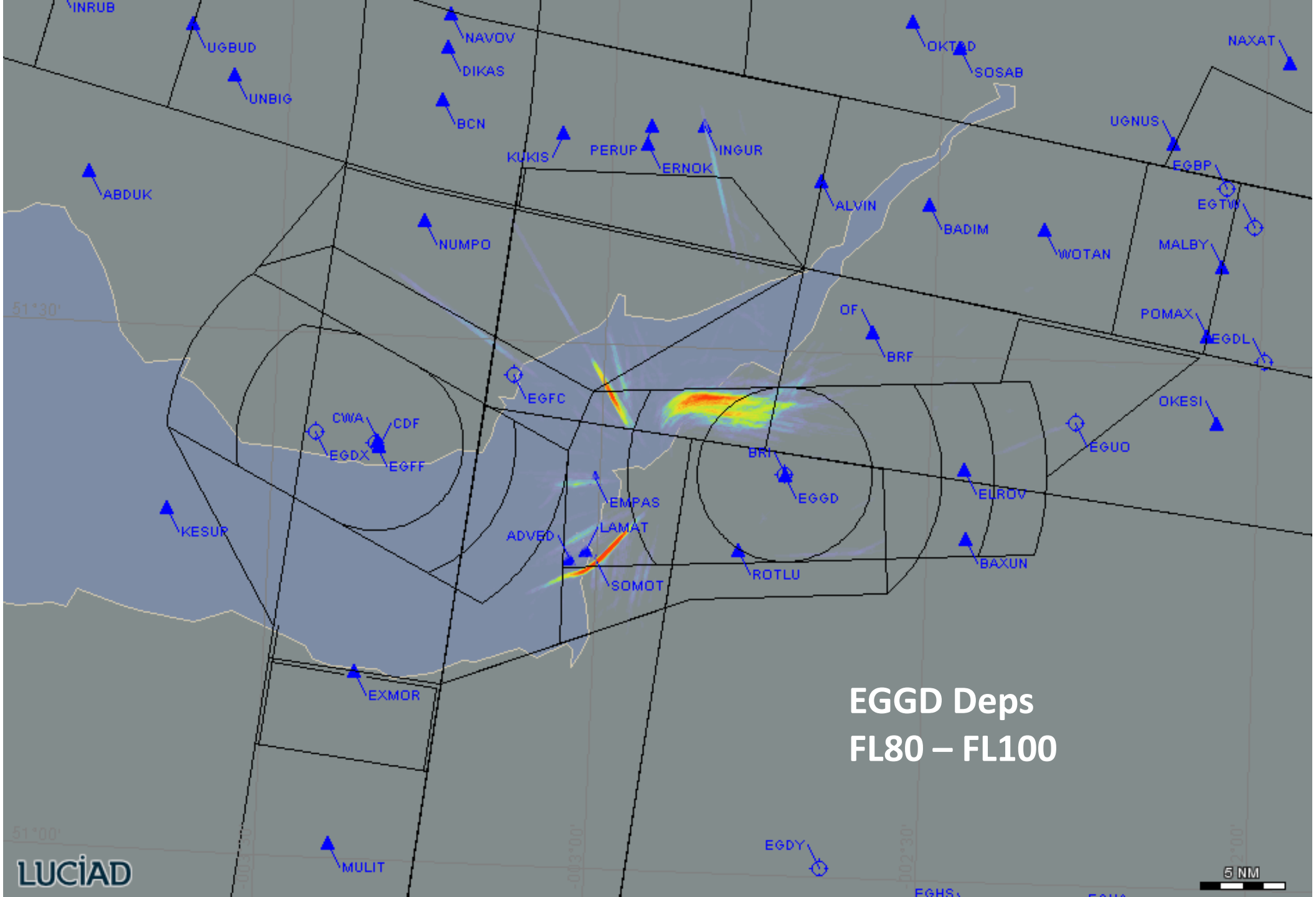
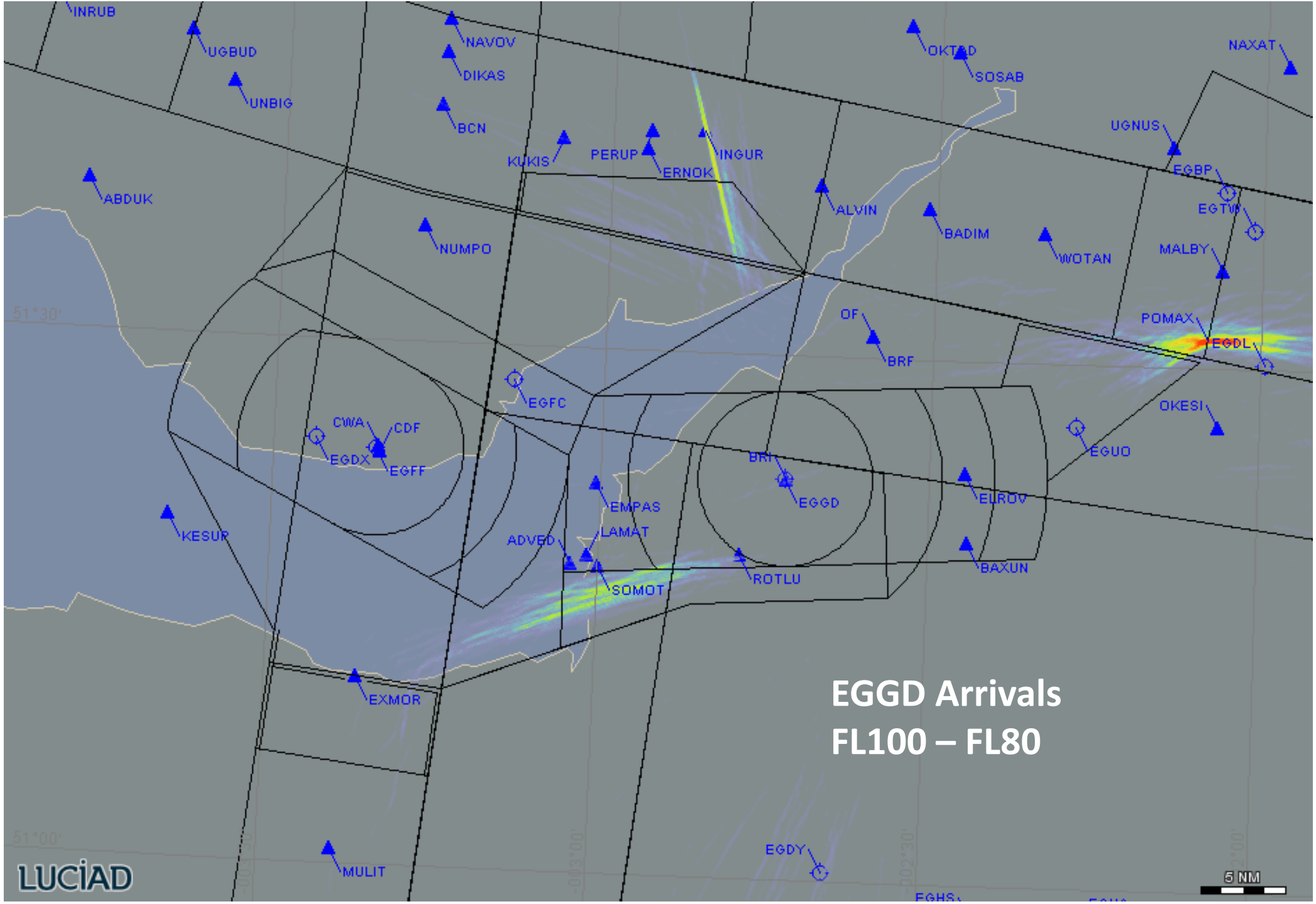


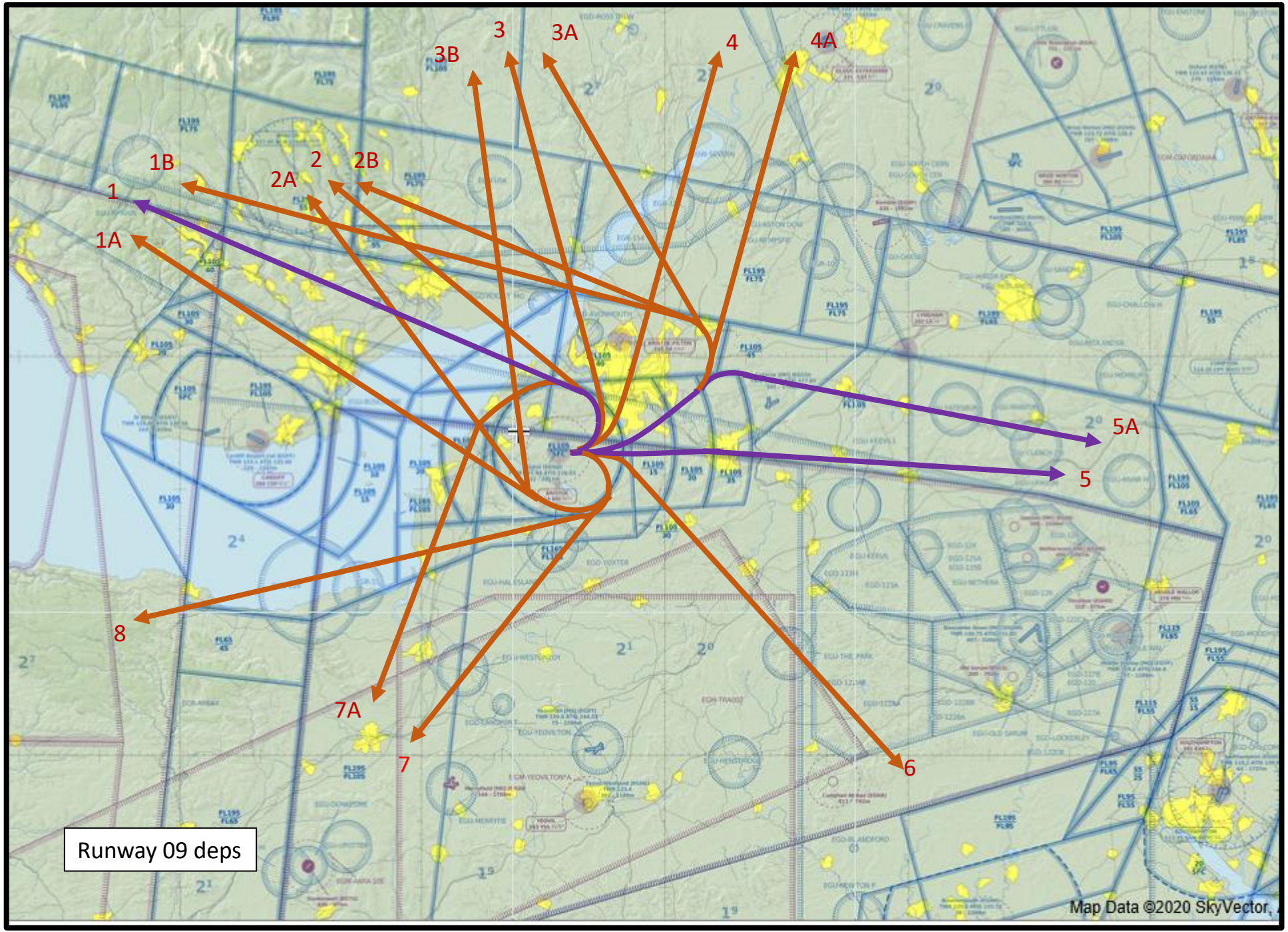
EGGD Deps
FL80 – FL100


INRUB
UGBUD
UNBIG
NAVOV
DIKAS
BCN
KUKIS
PERUP
ERNOK
INGUR
OKTAD
SOSAB
NAXAT
UGNUS
EGBP
EGTW
ABDUK
NUMPO
ALVIN
BADIM
WOTAN
MALBY
POMAX
EGDL
OF
BRF
EGFC
OKESI
EGUO
CWA
CDF
EGDX
EGFF
BRI
EGGD
ELROV
EMPAS
LAMAT
ADVED
KESUR
SOMOT
ROTLU
BAXUN
EXMOR
MULIT
EGDY
EGHS
51°30'
51°00'
EGGD Arrivals
FL100 – FL80
LUCiAD
5 NM

Initial procedure assessment

- 09 LTO (ground track? 7000ft @ 3.3% and 8% climb gradients?)
- 09 to East: level abeam KENET?

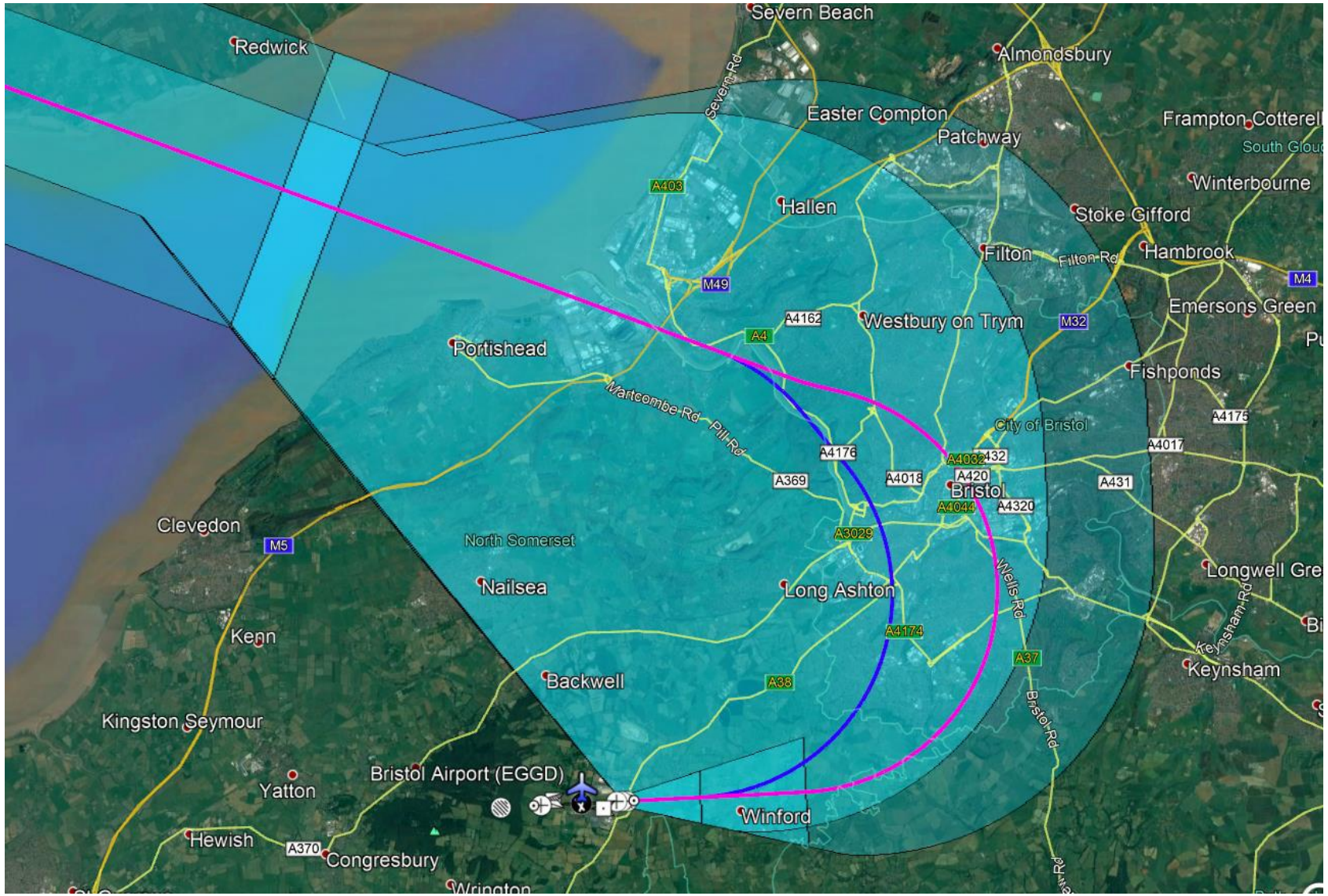
- All based on workshop 1 routes/ 500’ AGL initial turn/ 250kts IAS

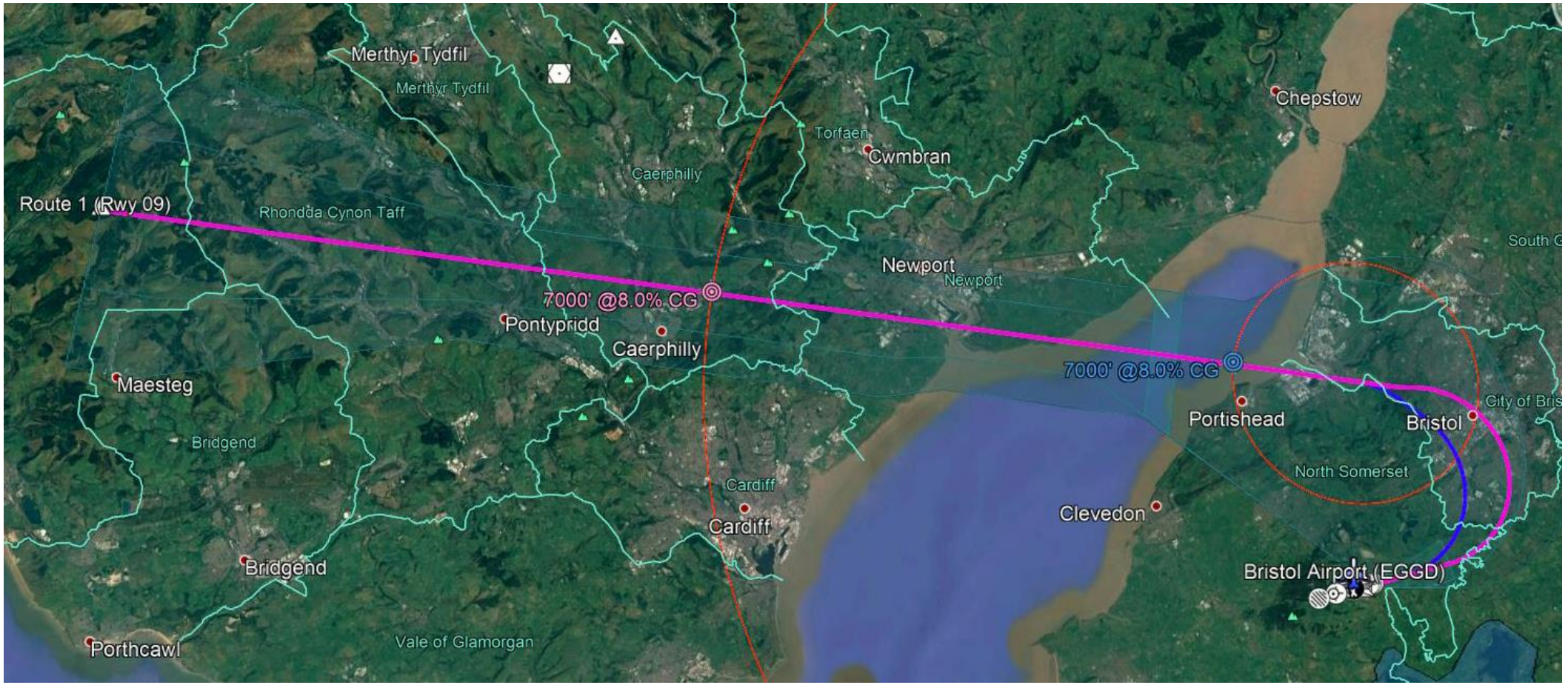

3B
3
3A
4
4A
1B
2
2B
2A
1
1A
5A
5
8
7A
7
6
Runway 09 deps
Map Data ©2020 SkyVector

09 LTO
Route 1

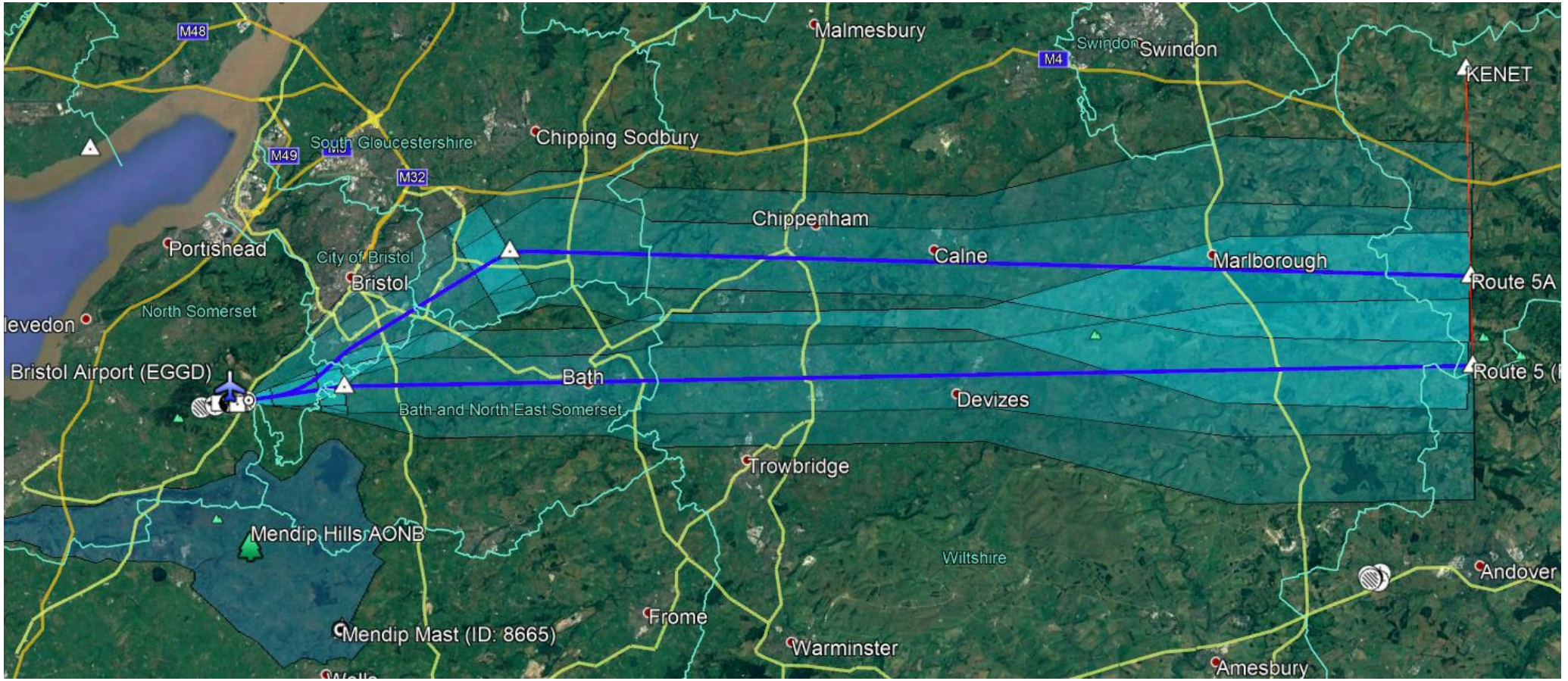
/ = 3.3%

/ = 8%



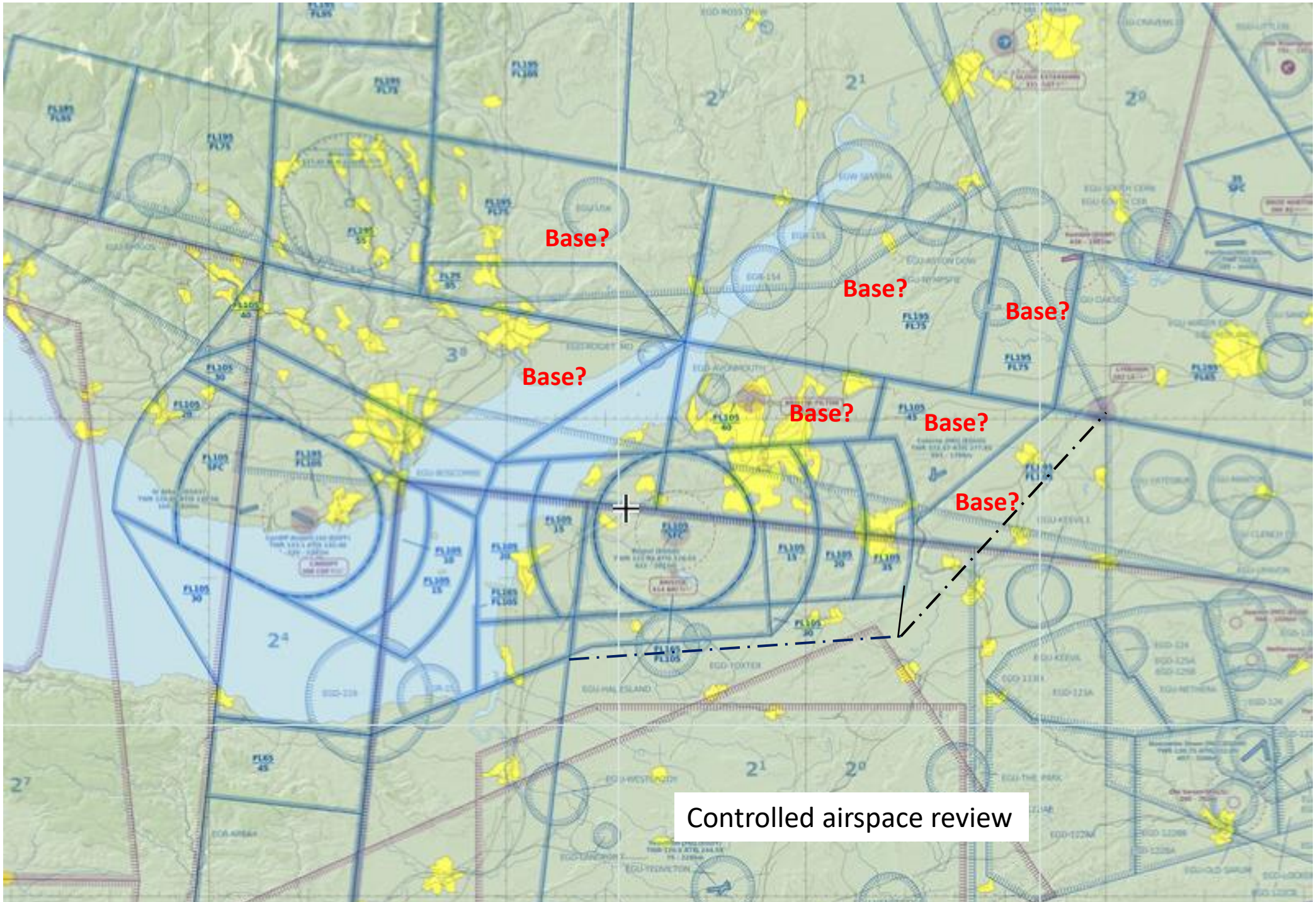


Route 1. 7000ft @ 3.3% and 8%

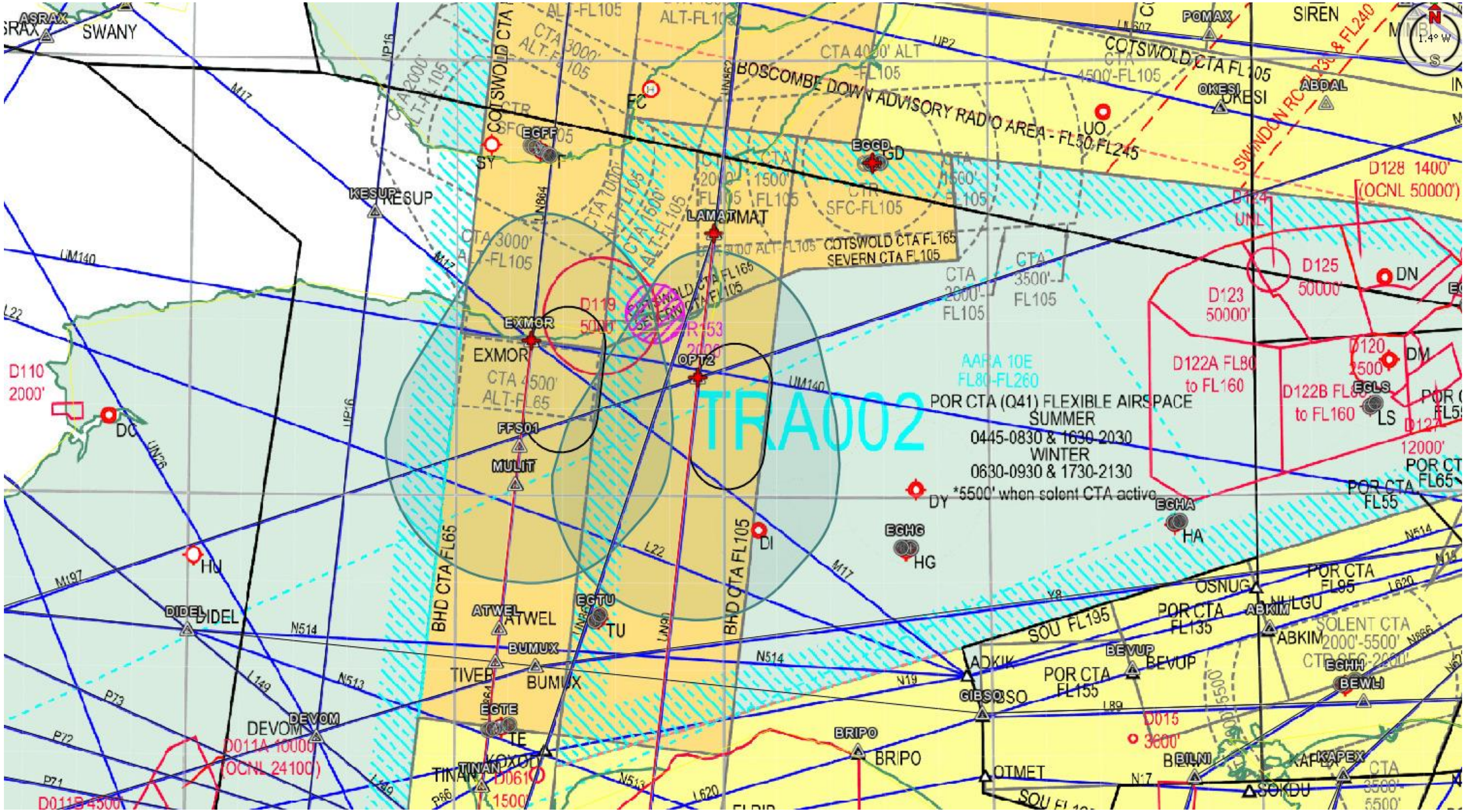


09 to abeam KENET

Route 5. 8% = 23,060’ abeam KENET
Route 5. 8.4% = 24,180’
Route 5A. 8% = 23,770’
Route 5A. 8.1% = 24,050’


Base?
Base?
Base?
Base?
Base?
Base?
Base?
Controlled airspace review

spares


TRA002
POR CTA (Q41) FLEXIBLE AIRSPACE
SUMMER
0445-0830 & 1630-2030
WINTER
0630-0930 & 1730-2130
*5500' when solent CTA active
AARA 10E
FL80-FL260
BOSCOMBE DOWN ADVISORY RADIO AREA - FL50-FL245
COTSWOLD CTA FL105
COTSWOLD CTA FL165
SEVERN CTA FL105
BHD CTA FL65
BHD CTA FL105
CTA 4500' ALT-FL65
CTA 3000' ALT-FL105
CTA 3500'-FL105
CTA 2000'-FL105
CTA 4500'-FL105
CTR SFC-FL105
D119 5000'
R153 2000'
D110 2000'
D123 50000'
D125 50000'
D128 1400' (OCNL 50000')
D124 UNL
D122A FL80 to FL160
D122B FL80 to FL160
D120 2500'
D127 12000'
D011A 10000' (OCNL 24100')
D015 3600'
POR CTA FL55
POR CTA FL65
POR CTA FL95
POR CTA FL135
POR CTA FL155
SOU FL195
SOLENT CTA 2000'-5500'
EXMOR
OPT2
LAMAT
FFS01
MULIT
ATWEL
DIDEL
BUMUX
DEVOM
TIVER
KESUP
SWANY
ASRAX
POMAX
SIREN
OKESI
ABDAL
OSNUG
ABKIM
ADKIK
GIBSO
BEVUP
BRIPO
OTMET
KAPEX
BEWLI
EGFF
EGGD
EGTU
EGTE
EGHG
EGHA
EGLS
EGHH
DY
DI
DC
HU
HG
HA
LS
DN
DM
UO
TU
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N514
N513
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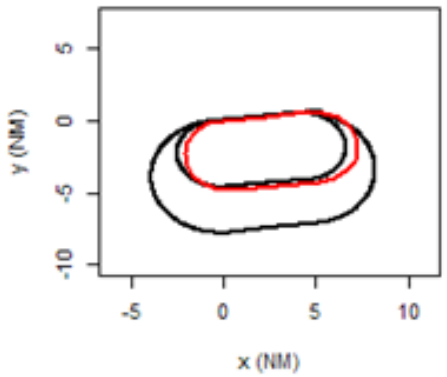
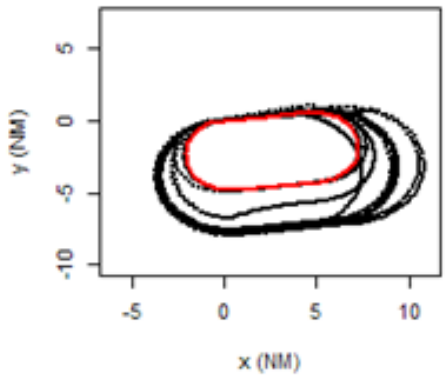
UM140
L149
P73
P72
P71
L620
N19
Y8

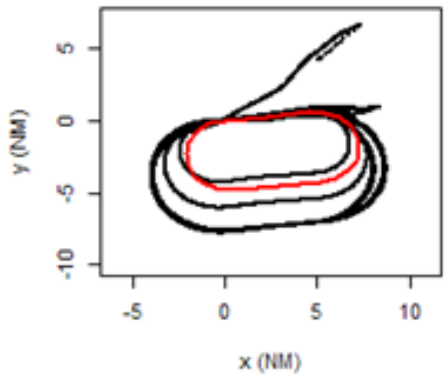
A320



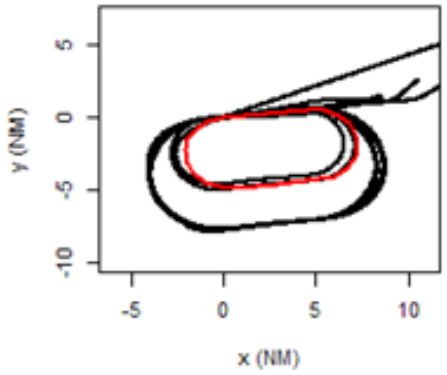
A340



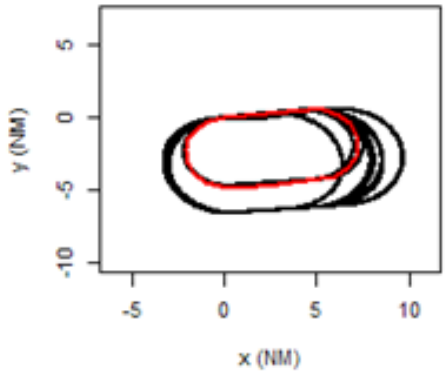
A350



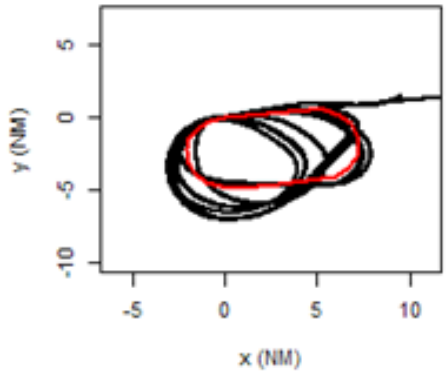
A388



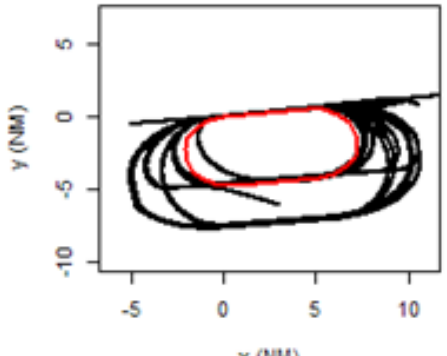
B747

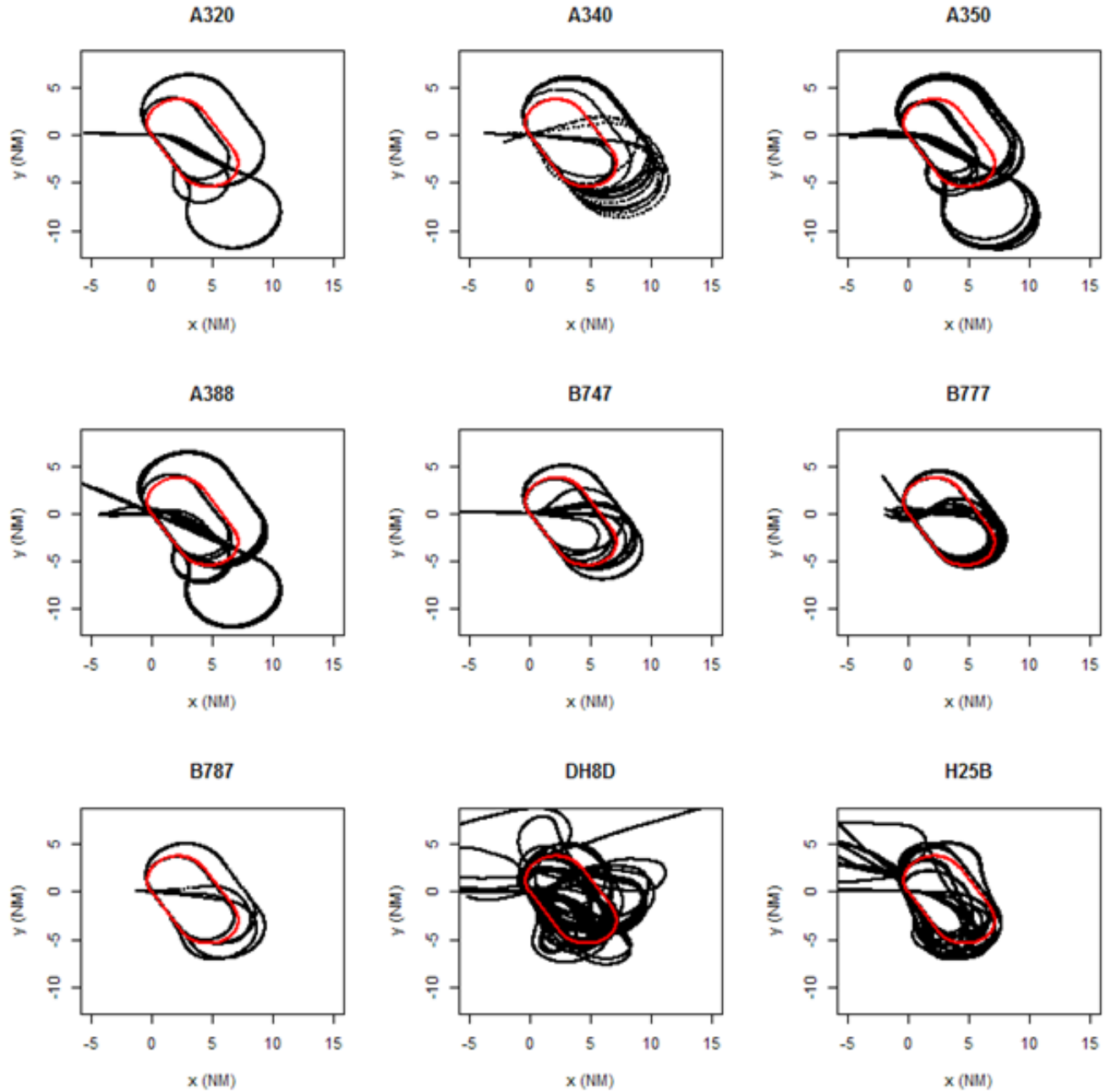


DH8D

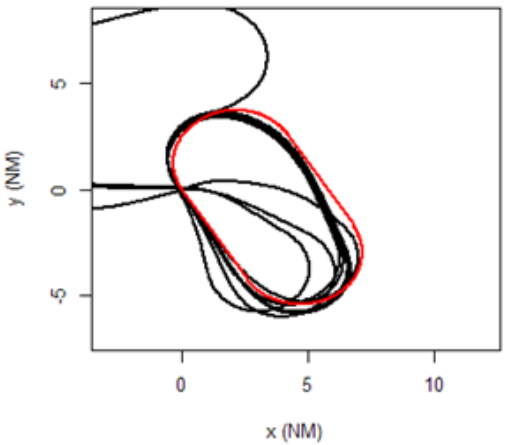


H25B

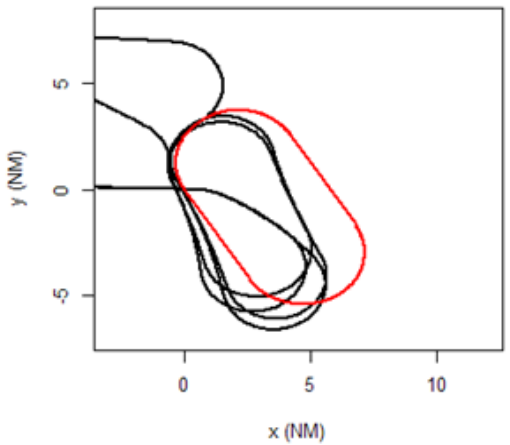



A320
A340
A350
A388
B747
B777
B787
DH8D
H25B
y (NM)
x (NM)
5
0
-5
-10
-5
0
5
10
15

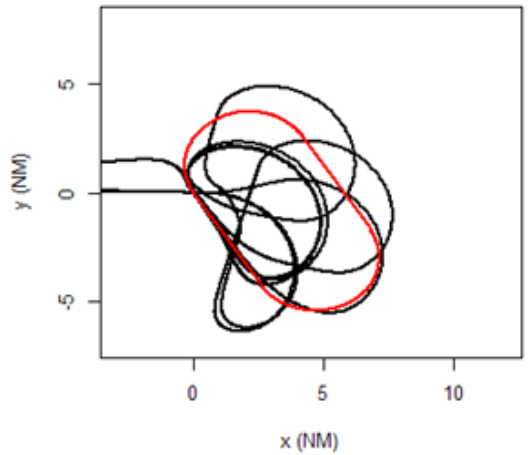
DH8D - Nil Wind



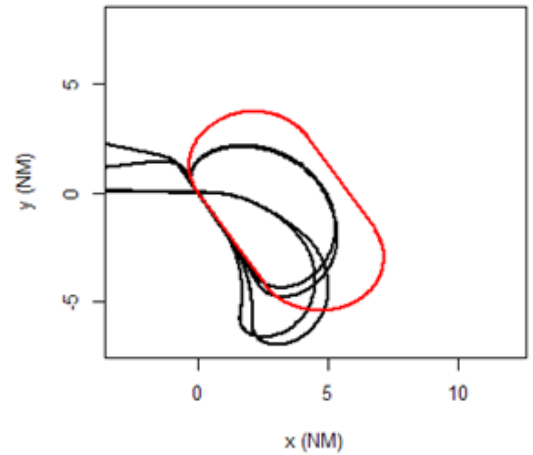
H25B - Nil Wind



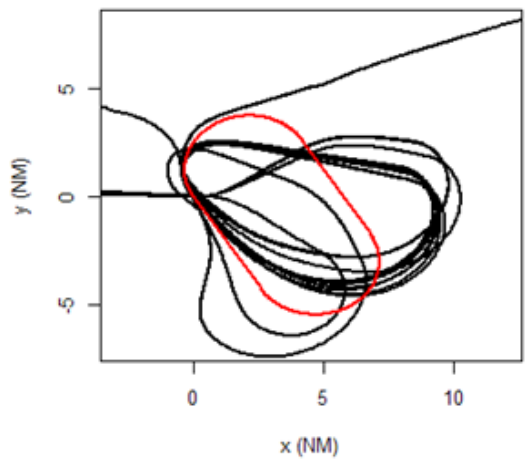
DH8D - 330/100



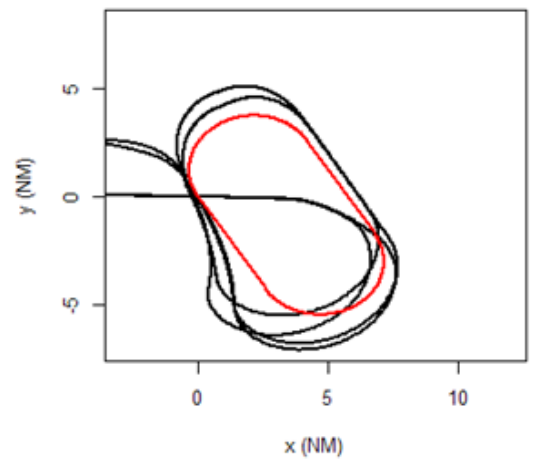
H25B - 330/100

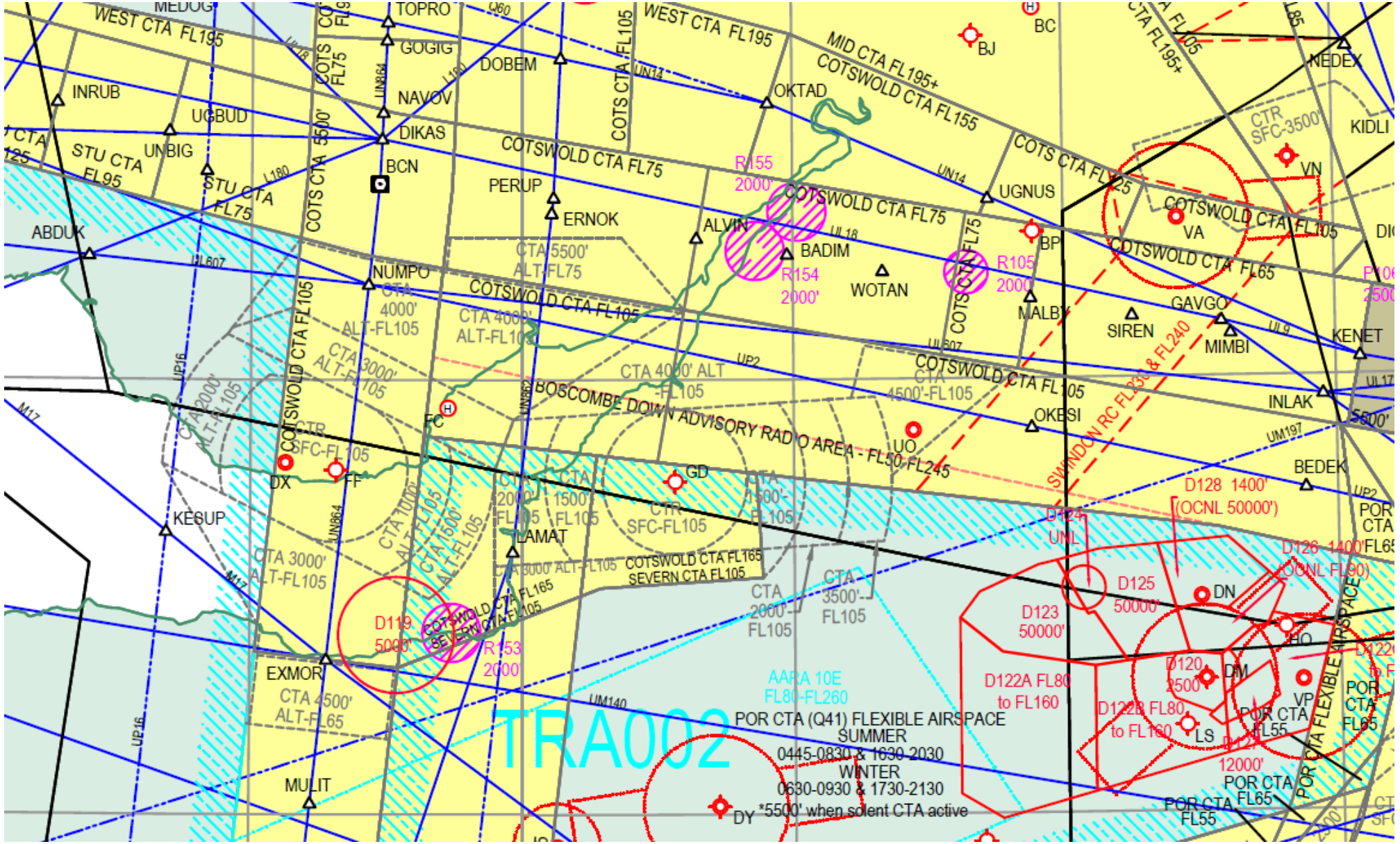


DH8D - 060/100



H25B - 060/100

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SWINDON RC FL230 & FL240
WEST CTA FL195
MID CTA FL195+
COTSWOLD CTA FL155
COTSWOLD CTA FL75
COTSWOLD CTA FL105
COTSWOLD CTA FL65
COTS CTA FL75
COTS CTA FL105
STU CTA FL95
STU CTA FL75
SEVERN CTA FL105
COTSWOLD CTA FL165
CTA 5500' ALT-FL75
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D119 5000'
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D122A FL80 to FL160
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D120 2500'
R153 2000'
R154 2000'
R155 2000'
R105 2000'
12000'
POR CTA FL65
POR CTA FL55
POR CTA FLEXIBLE AIRSPACE
MEDOG
TOPRO
GOGIG
DOBEM
NAVOV
DIKAS
BCN
PERUP
ERNOK
ALVIN
OKTAD
UGNUS
BADIM
WOTAN
MALBY
SIREN
GAVGO
MIMBI
KENET
INLAK
OKESI
BEDEK
NEDEX
KIDLI
VN
VA
BP
BJ
BC
INRUB
UGBUD
UNBIG
ABDUK
NUMPO
FC
FT
DX
GD
UO
LAMAT
KEGUP
EXMOR
MULIT
DN
DM
VP
LS
HO