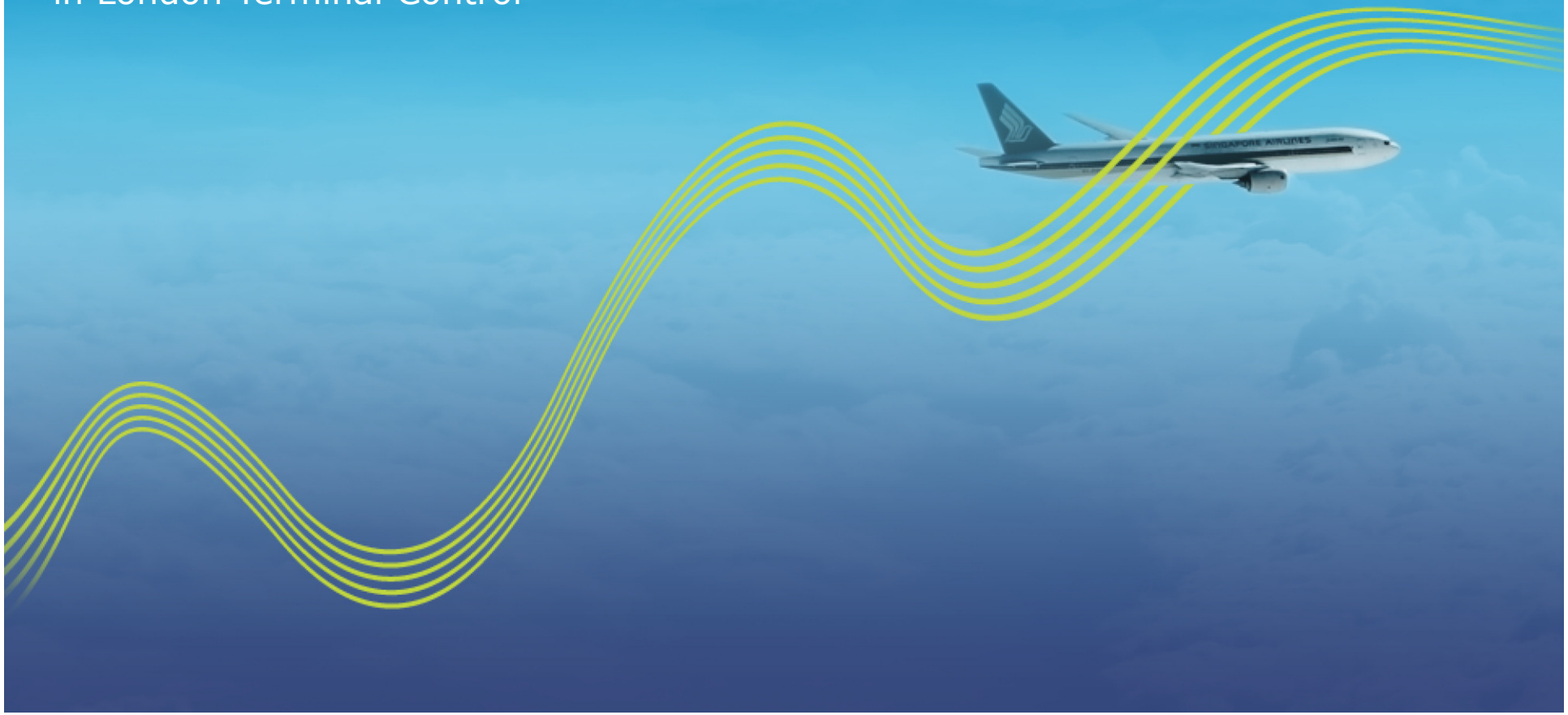
NATS

Performance
through Innovation

Swanwick Terminal Control

Strategies for Level Bust Reduction in London Terminal Control



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- Overview of London Terminal Control airspace.
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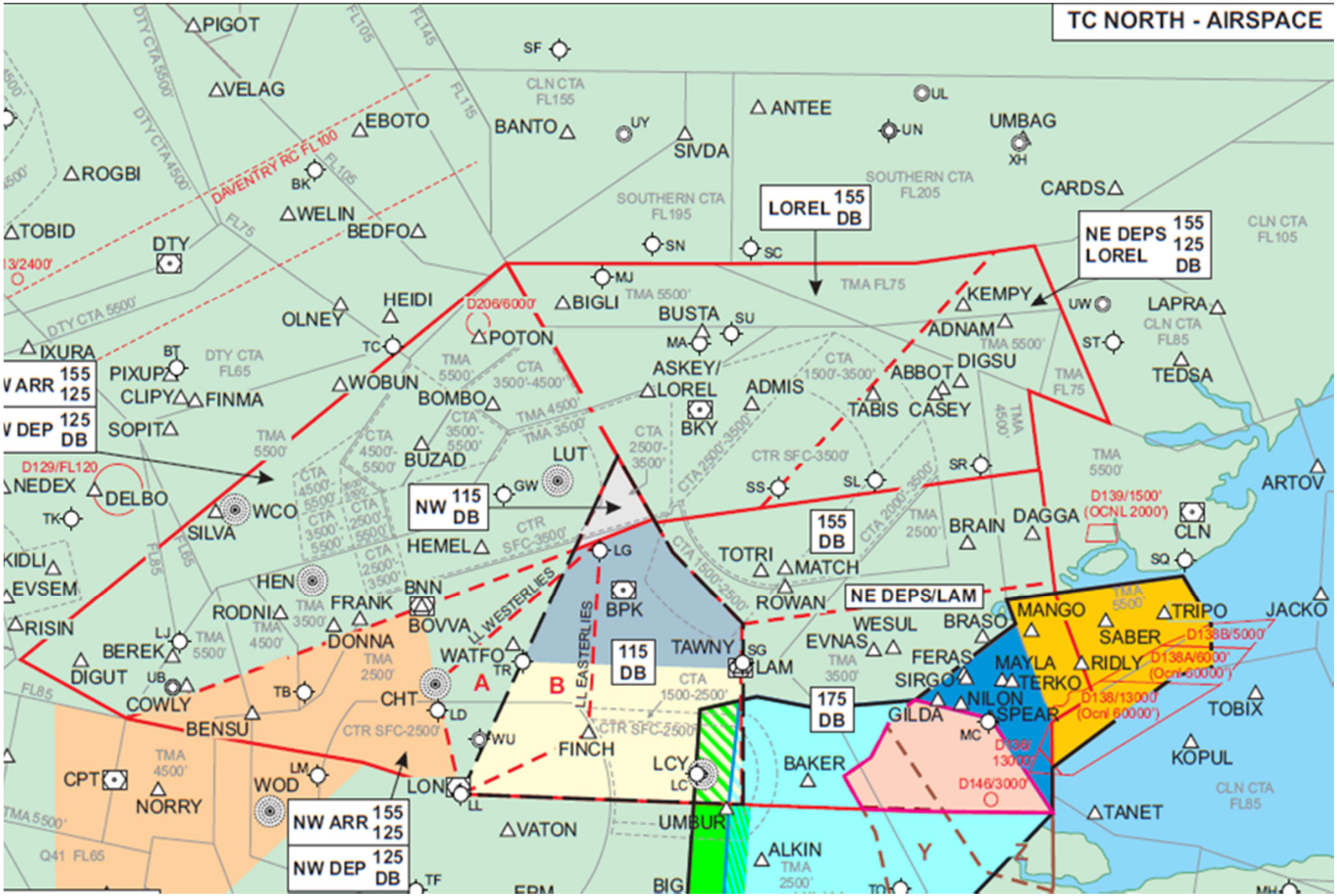
- Awareness for pilots and controllers
- De-confliction of routes.


TC NORTH - AIRSPACE
PIGOT
VELAG
EBOTO
BANTO
SIVDA
ANTEE
UMBAG
CARDS
ROGBI
WELIN
BEDFO
TOBID
DTY
DAVENTRY RC FL100
LOREL 155 DB
NE DEPS 155 125 LOREL DB
SOUTHERN CTA FL205
SOUTHERN CTA FL195
CLN CTA FL155
CLN CTA FL105
OLNEY
HEIDI
POTON
BIGLI
BUSTA
KEMPY
ADNAM
LAPRA
CLN CTA FL85
TEDSA
IXURA
PIXUP
CLIPY
FINMA
WOBUN
BOMBO
ASKEY/
LOREL
ADMIS
ABBOT
DIGSU
TABIS
CASEY
BKY
SOPIT
BUZAD
LUT
NEDEX
DELBO
WCO
SILVA
NW 115 DB
HEMEL
TOTRI
MATCH
155 DB
BRAIN
DAGGA
ARTOV
CLN
KIDLI
EVSEM
RISIN
HEN
BNN
FRANK
BOVVA
RODNI
DONNA
BEREK
DIGUT
COWLY
BENSU
WATFO
BPK
115 DB
TAWNY
LAM
ROWAN
NE DEPS/LAM
WESUL
BRASO
MANGO
TRIPO
JACKO
SABER
EVNAS
FERAS
SIRGO
MAYLA
TERKO
RIDLY
NILON
SPEAR
GILDA
175 DB
TOBIX
KOPUL
CHT
FINCH
LCY
BAKER
CPT
NORRY
WOD
LON
VATON
UMBUR
TANET
ALKIN
NW ARR 155 125
NW DEP 125 DB
LL WESTERLIES
LL EASTERLIES
A
B
Y
Z
D206/6000'
D129/FL120
D139/1500' (OCNL 2000')
D138B/5000'
D138A/6000' (Ocnl 6000')
D138/13000' (Ocnl 6000')
D146/3000'
CTR SFC-3500'
CTR SFC-2500'
TMA 5500'
TMA FL75
TMA 4500'
TMA 3500'
TMA 2500'
CTA 1500-2500'
CTA 2500'-3500'
CTA 3500'-4500'
CTA 4500'-5500'
DTY CTA 5500'
DTY CTA 4500'
DTY CTA FL65
Q41 FL65

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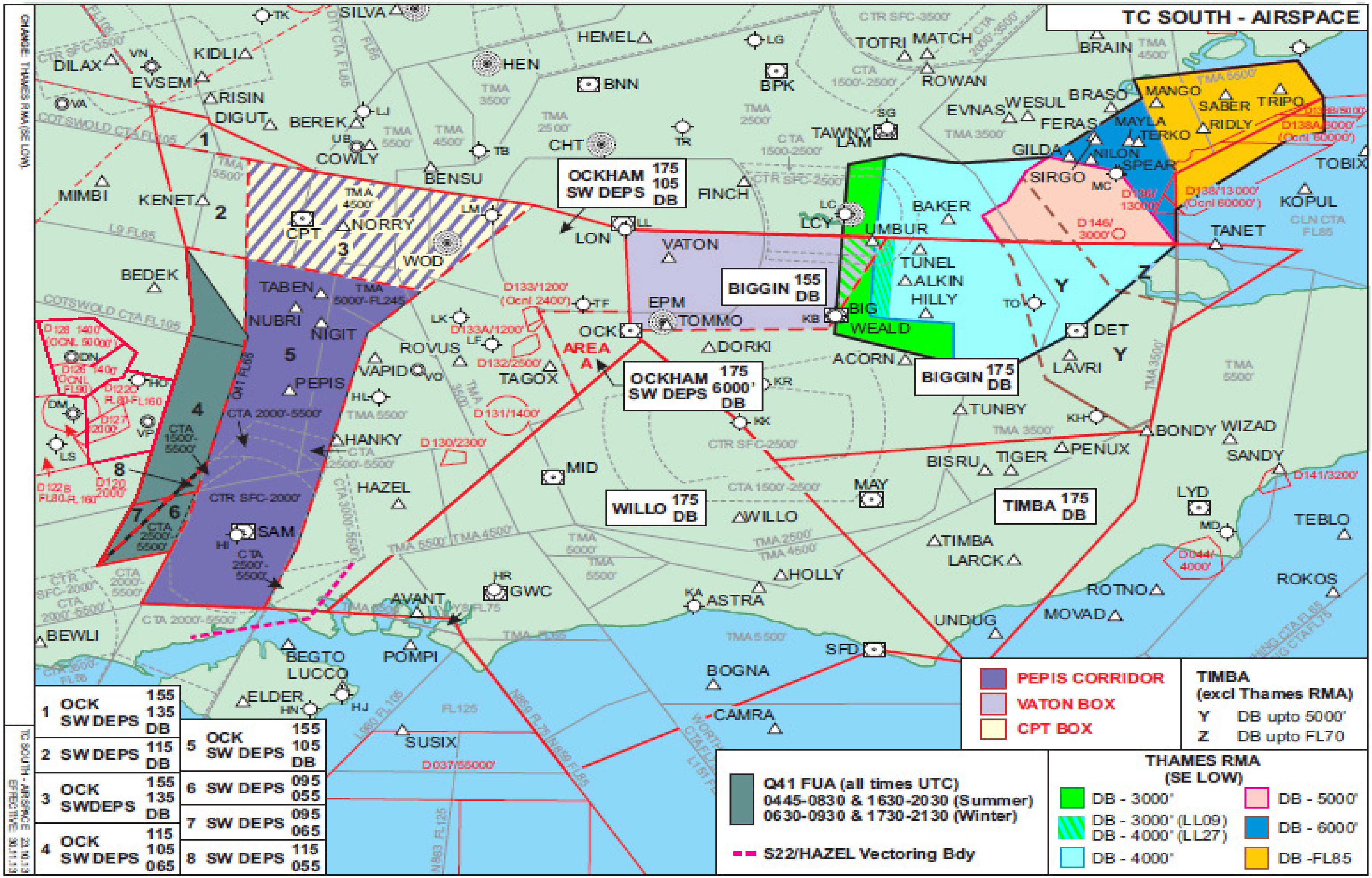


TC SOUTH - AIRSPACE
CHANGE: THAMES RMA (SE LOW)
TC SOUTH - AIRSPACE EFFECTIVE 23.10.13 30.11.13
SILVA
HEMEL
KIDLI
DILAX
EVSEM
RISIN
DIGUT
BEREK
COWLY
HEN
BNN
BPK
TOTRI
MATCH
ROWAN
BRAIN
EVNAS
WESUL
BRASO
FERAS
MANGO
SABER
TRIPO
MAYLA
RIDLY
TERKO
NILON
SPEAR
GILDA
SIRGO
TOBIX
KOPUL
TANET
TAWNY
LAM
CHT
BENSU
MIMBI
KENET
NORRY
CPT
WOD
BEDEK
TABEN
NUBRI
NIGIT
PEPIS
ROVUS
VAPID
HANKY
HAZEL
SAM
OCKHAM SW DEPS 175 105 DB
FINCH
LON
LCY
UMBUR
BAKER
VATON
BIGGIN 155 DB
EPM
TOMMO
OCK
AREA A
DORKI
TAGOX
TUNEL
ALKIN
HILLY
BIG
WEALD
ACORN
DET
LAVRI
OCKHAM SW DEPS 175 6000' DB
BIGGIN 175 DB
TUNBY
BONDY
WIZAD
SANDY
PENUX
BISRU
TIGER
MID
WILLO 175 DB
WILLO
MAY
TIMBA 175 DB
TIMBA
LARCK
LYD
TEBLO
ROKOS
HOLLY
ASTRA
ROTNO
MOVAD
UNDUG
GWC
AVANT
BEWLI
BEGTO
LUCCO
POMPI
ELDER
SFD
BOGNA
CAMRA
SUSIX
D133/1200' (Ocnl 2400')
D131/1400'
D130/2300'
D132/2500'
D133A/1200'
D146/ 3000'
D138/13000' (Ocnl 60000')
D138A/ 6000' (Ocnl 60000')
D141/3200'
D044/ 4000'
D037/55000'
CTA 2000'-5500'
CTR SFC-2000'
	OCK SW DEPS
1	OCK SW DEPS 155 135 DB
2	SW DEPS 115 DB
3	OCK SWDEPS 155 135 DB
4	OCK SW DEPS 115 105 065
5	OCK SW DEPS 155 105 DB
6	SW DEPS 095 055
7	SW DEPS 095 065
8	SW DEPS 115 055
PEPIS CORRIDOR
VATON BOX
CPT BOX
TIMBA (excl Thames RMA)
Y DB upto 5000'
Z DB upto FL70
Q41 FUA (all times UTC)
0445-0830 & 1630-2030 (Summer)
0630-0930 & 1730-2130 (Winter)
S22/HAZEL Vectoring Bdy
THAMES RMA (SE LOW)
DB - 3000'
DB - 3000' (LL09)
DB - 4000' (LL27)
DB - 4000'
DB - 5000'
DB - 6000'
DB -FL85

Mode S Parameters

December 2005 – Mode S data enabled for TC

Initial focus on Mode S derived Selected Flight Level (SFL) (Register 4,0)

Elementary data downlinked:

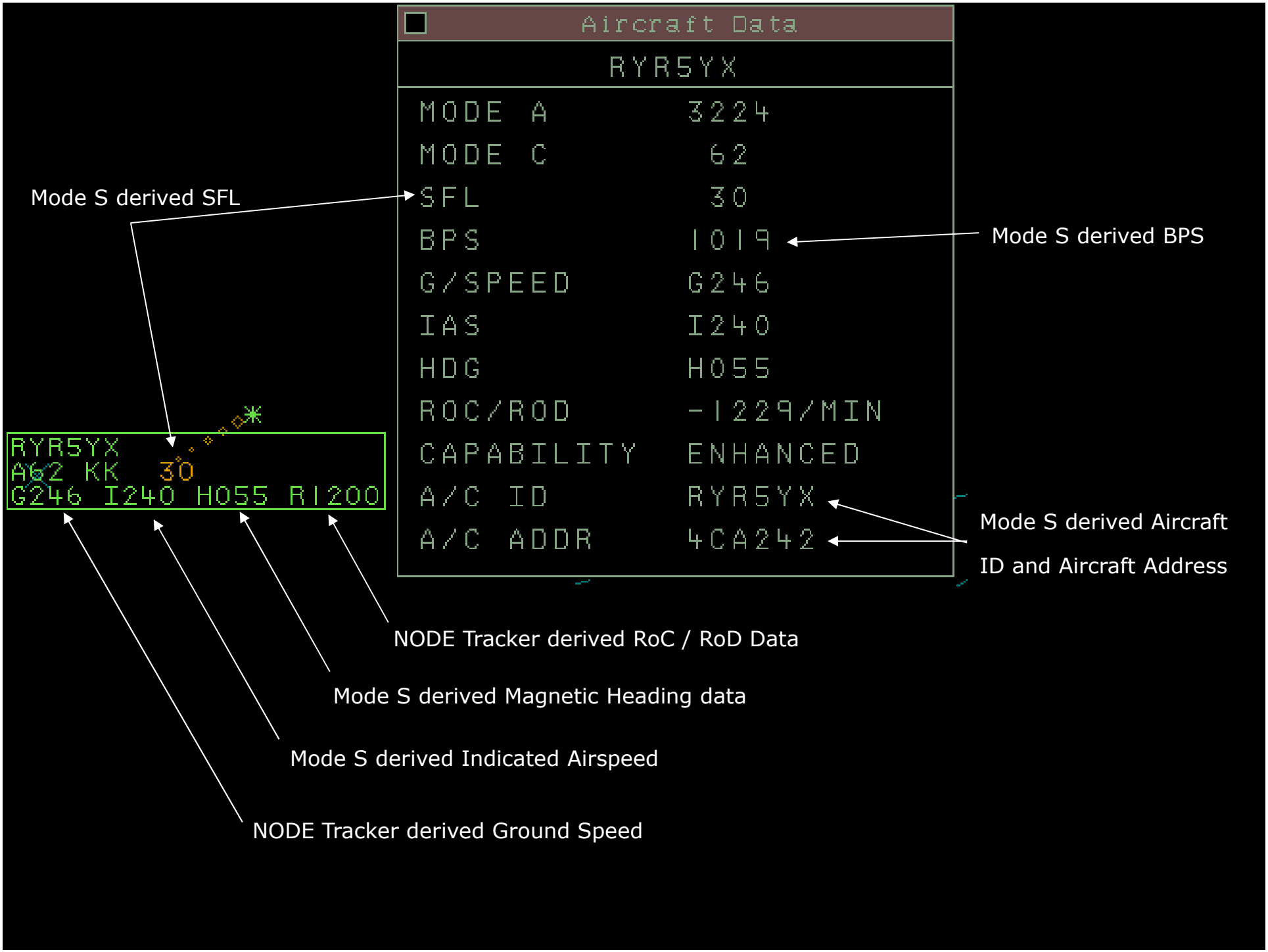
- Mode S Flight Identification (Register 2,0)
- Mode S Aircraft Address (Register 2,0)

Enhanced data downlinked:

- BPS (Register 4,0)
- Ground Speed (Register 5,0)
- Magnetic Heading (Register 6,0)
- Indicated Airspeed (Register 6,0)

Mode S
Parameters

- Standard TC operating configuration – Mode S SFL
- Options for displaying data


Aircraft Data
RYR5YX
MODE A 3224
MODE C 62
SFL 30
BPS 1019
G/SPEED G246
IAS I240
HDG H055
ROC/ROD -1229/MIN
CAPABILITY ENHANCED
A/C ID RYR5YX
A/C ADDR 4CA242
RYR5YX
A62 KK 30
G246 I240 H055 R1200
Mode S derived SFL
Mode S derived BPS
Mode S derived Aircraft ID and Aircraft Address
NODE Tracker derived RoC / RoD Data
Mode S derived Magnetic Heading data
Mode S derived Indicated Airspeed
NODE Tracker derived Ground Speed

BAT (barometric pressure setting advisory tool) ARR

- Introduced on a phased basis from 2010
- Provides an advisory to controllers for arrival aircraft beneath the transition level of a difference in the downlinked Mode S BPS vs London QNH
- Difference is greater 5hPa – eligible for BAT advisory
- Enhanced detection of level busts

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BAT DEP

- Introduced in 2013 for departures beneath the transition level
- Provide the earliest possible alert once aircraft are within CAS for advisory to controller
- Also uses error is greater 5hPa
- Detection of level busts

MODE S & STACK LISTS

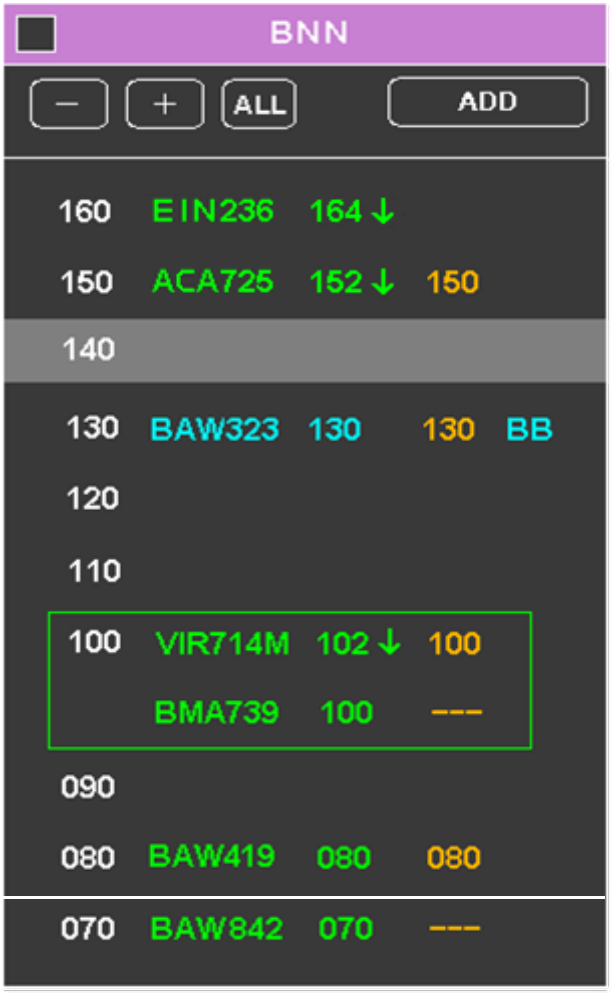
- Each hold has its own stack list which shows all aircraft holding there.

- The level occupancy is based on Mode C which an individual aircraft is at, as well as its selected MODE S level.

- Traffic displayed in accordance with MATS Part 1 level vacation rules. This can only be done if the Mode S Stack list reflects the same information as your strips, as your flight progress strips are your primary source of data.

- The line along the bottom indicates the divide between the levels available to TC Area and those available to TC Approach at the hold fix.

Vertical Stack List



Traffic displayed in accordance with MATS Part 1 level vacation rules

Traffic automatically “laddered”

Same level indication

Blocked levels

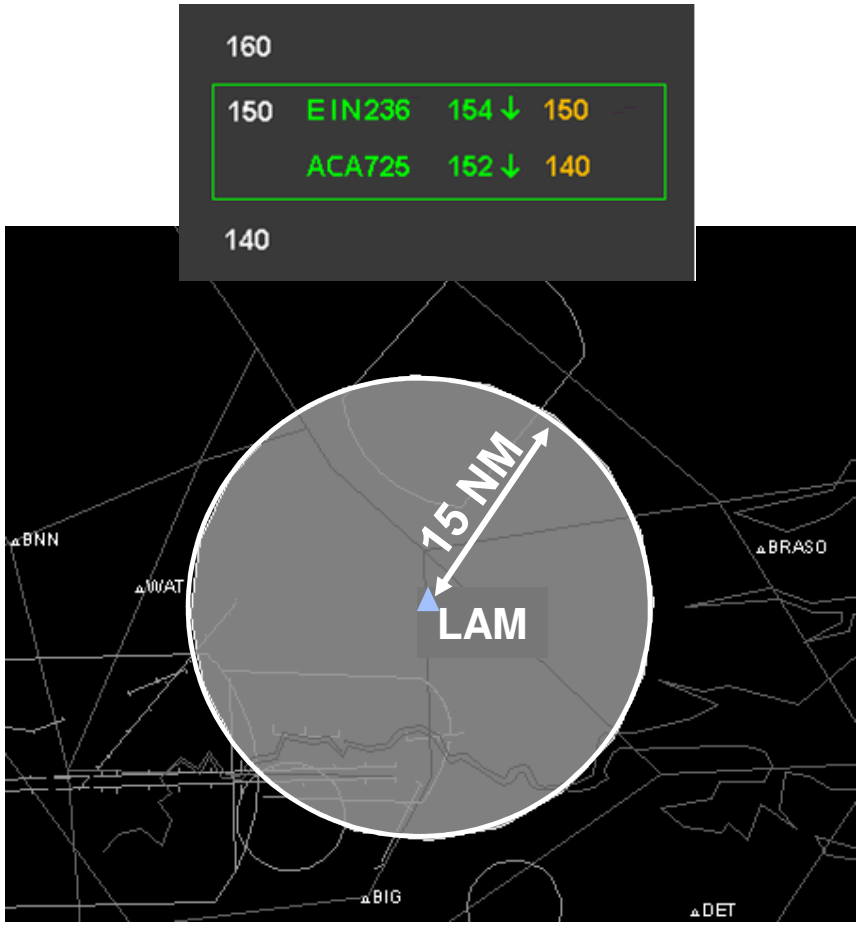
Manual addition of traffic

Min. stack indication

Same Level Indicator (SLI)

Two or more aircraft at the same VSL level within 15 NM of the stack beacon

Aircraft height ordered SLI is not an alert



STCA

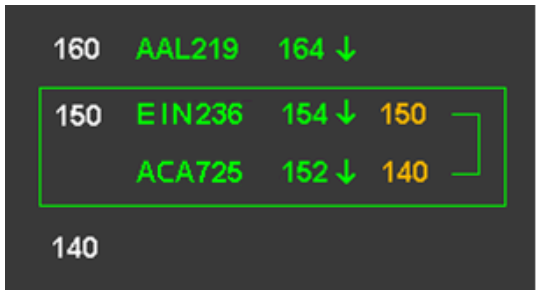
If an A/C in the VSL is subject to an STCA then all A/C in the conflict chain are force populated to the VSL for the duration of the conflict.

Presentation in VSL reflects the STCA display used in the target label

Aircraft are height ordered during STCA, regardless of distance from beacon

High Severity
(with a/c forced in showing route code)

Low Severity
(within 15 NM of beacon so SLI displayed)



Acknowledged
(aircraft remain height ordered until system detects conflict is resolved)

Vertical Displacement Tool (VDAT)

Deviations from SFL

- Aircraft must have passed through SFL by 300ft or more

Slow Rate of Descent

- If aircraft is at SFL, it has to have vacated that level by 400ft or more before becoming eligible for an alert
- Its vertical rate is then monitored – if a rate of 380ft or less is detected and sustained for 12 seconds then an alert will be generated

Future Airspace Strategy

CAA strategic framework for UK airspace

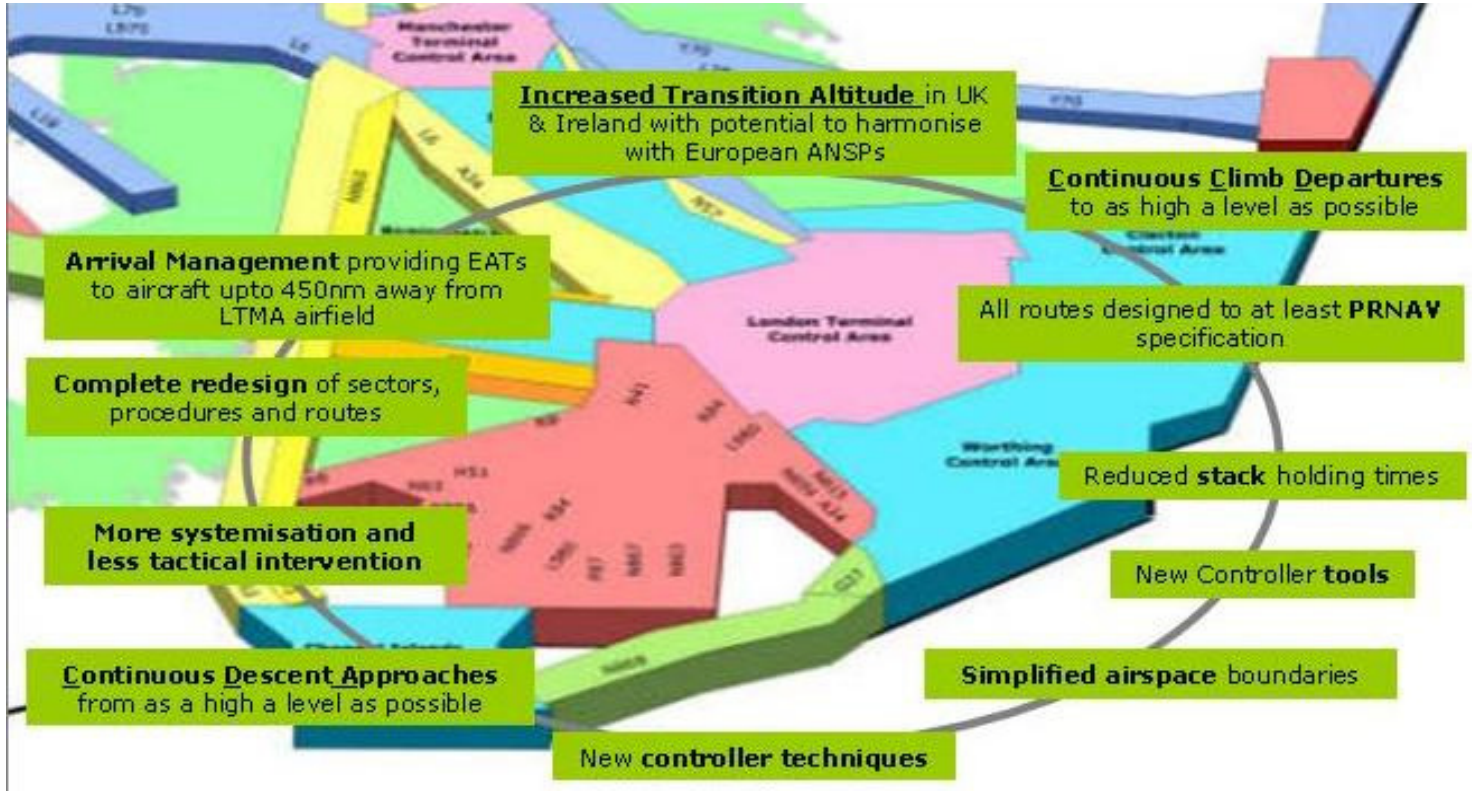
2 Major projects

- LAMP
- Transition Altitude

LAMP

London Airspace Management Programme.

- De-confliction of routes
- Less tactical intervention = Less chance of error
- More continuous climb



Transition Altitude

- Key Enabler for the LAMP Project
- Harmonisation throughout Europe
- Raising the transition altitude out of very congested airspace reduces the risk.

Increase Pilot and Controller Awareness.

- Lower Pressure NOTAM
- Visit the Business Aviation Community
- Identify Key Airports
- Briefing For controllers
- Consider Different Phraseology

Conclusions

Current NATS Strategies

- Technology
- Airspace design
- People