



**NATS**

**Mode S in a P-RNAV environment**

## *Mode S SFL*

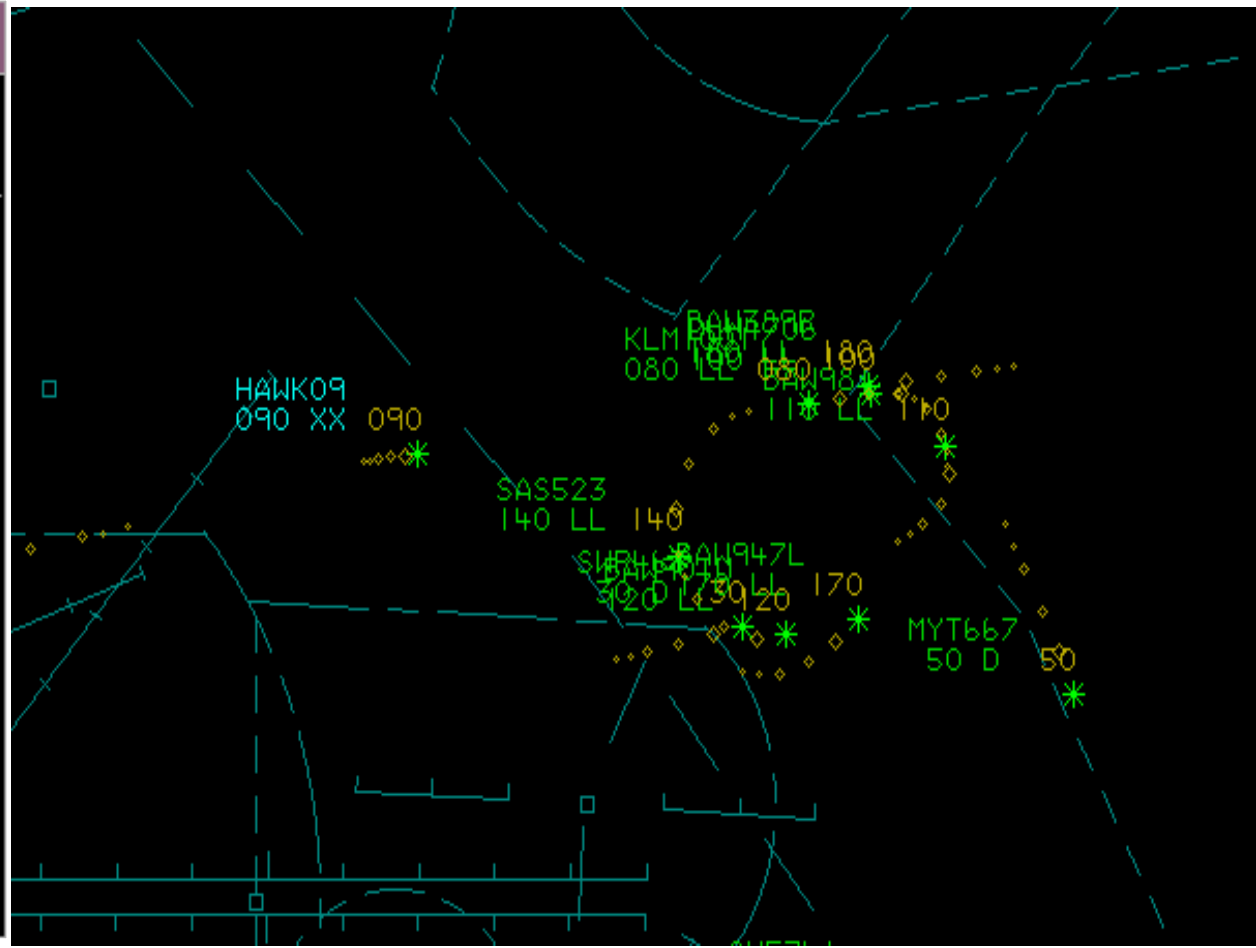
- Enhanced Mode S capability provides Down-Linked Airborne Parameters (DAPs) directly from the cockpit.
  - Magnetic Heading
  - Indicated Air Speed
  - Ground Speed
  - Selected Flight Level / Altitude (SFL)
  - Rate of Climb / Rate of Descent
- Selected Flight Level (SFL) is intent-based information. It is the Selected Altitude value entered in the Mode Control Panel (MCP)/Flight Control Unit (FCU). SFL information is displayed to controllers at the London Terminal Control Centre and the Manchester Area Control Centre

# LAM Stack with Mode S VSL

LAM

[-] [+] [ALL] [ADD]

180	BAW389R	180	180	
170	BAW947L	170	170	
160				
150				
140	SAS523	140	140	
130				
120	BAW901U	120	120	
110	BAW981	110	110	
100	DLH4706	100	100	
090	HAWK09	090	090	XX
080	KLM1001	080	080	
070				



## *Introduction of P-RNAV in the London Terminal Area*

- In response to the UK Government's Transport White Paper, P-RNAV procedures will be introduced on a large scale as part of the airspace development in the northern part of the London terminal area (TMA NE).
  - Airfields affected: Heathrow, Northolt, Stansted, Luton & London City
  - Timescale: March 2009\*
  - P-RNAV not mandated so airspace includes mix of conventional and P-RNAV profiles
- \*(subject to consultation with AO's & Airspace Change Process)

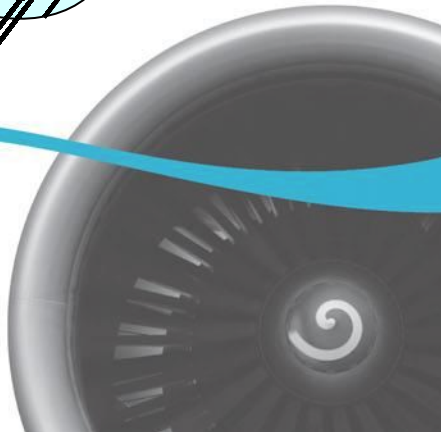
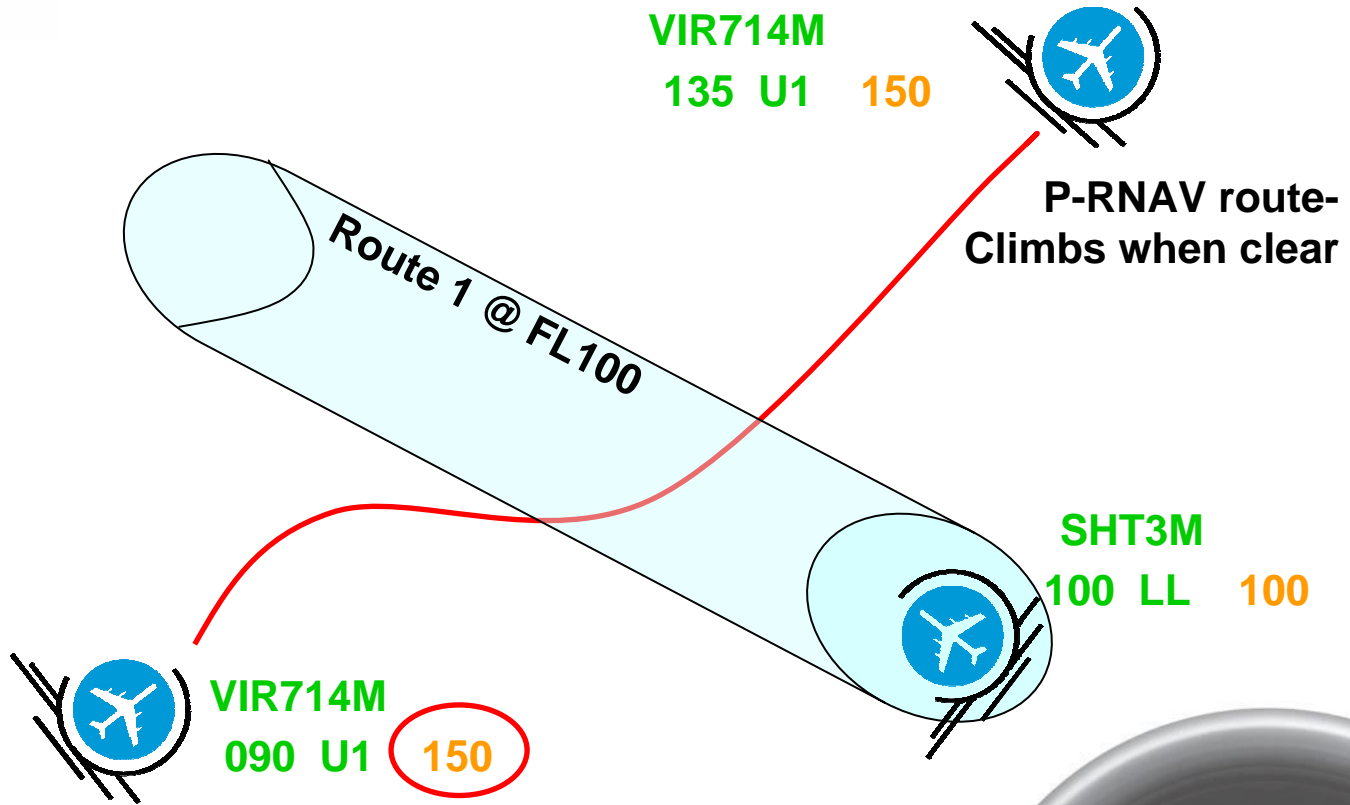
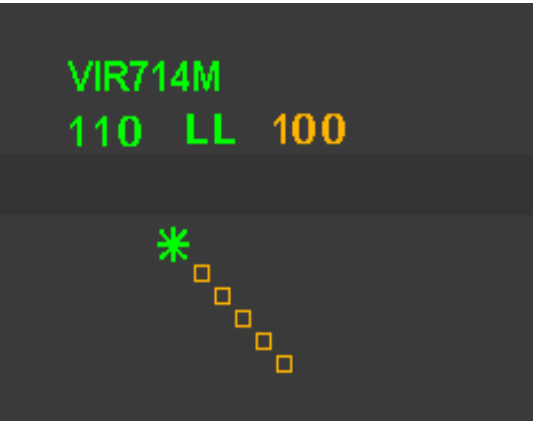
## *Procedures*

- SIDs, STARs, Holds and RNAV transitions to the FAF for Stansted, Luton, London City and Northolt. Some P-RNAV SIDs for Heathrow
- Designed to be flown using LNAV & VNAV where applicable

## *The issues*

- Depending on operator SOPs, the Mode S SFL could show the final level of a procedure and not the next 'hard' level and may be misleading
- Particular concern if routes are potentially in conflict
- Frequently will apply to more than one controller for the same pair
- ATC may intervene with possible consequences for the vertical profile
  - i.e. aircraft may not climb at subsequent points
  - Aircraft may be removed from the profile
- **Potential to erode confidence in, and effectiveness of, Mode S SFL**

# ?Mode S SFL -v- P-RNAV?



## *Possible solutions*

1. Procedural mitigation
  - Robust RTF procedures
  - Controller training
2. Change operator SOPs to fly the P-RNAV vertical profile through the MCP/FCU
  - Through mandate
  - Voluntary adoption
3. Selective modification of displayed SFL



## *Proposed solution*

- To identify and progress a solution which is within the remit of NATS and which doesn't involve influencing operator SOPS