*

TCAS II on Helicopters?

"Can it be done?"

Capt Derek Whatling

Eastern Hemisphere Flight Safety Officer

Bristow Helicopters

Rockwell Collins

Rockwell Collins

Bristow
Eastern Hemisphere

Scope

- History - why we got here
- TCAS I or TCAS II?
- How do we operate?
- The route to the STC
- The trial proper
- The results

Rockwell Collins

Bristow Eastern Hemisphere

Why did we get here?

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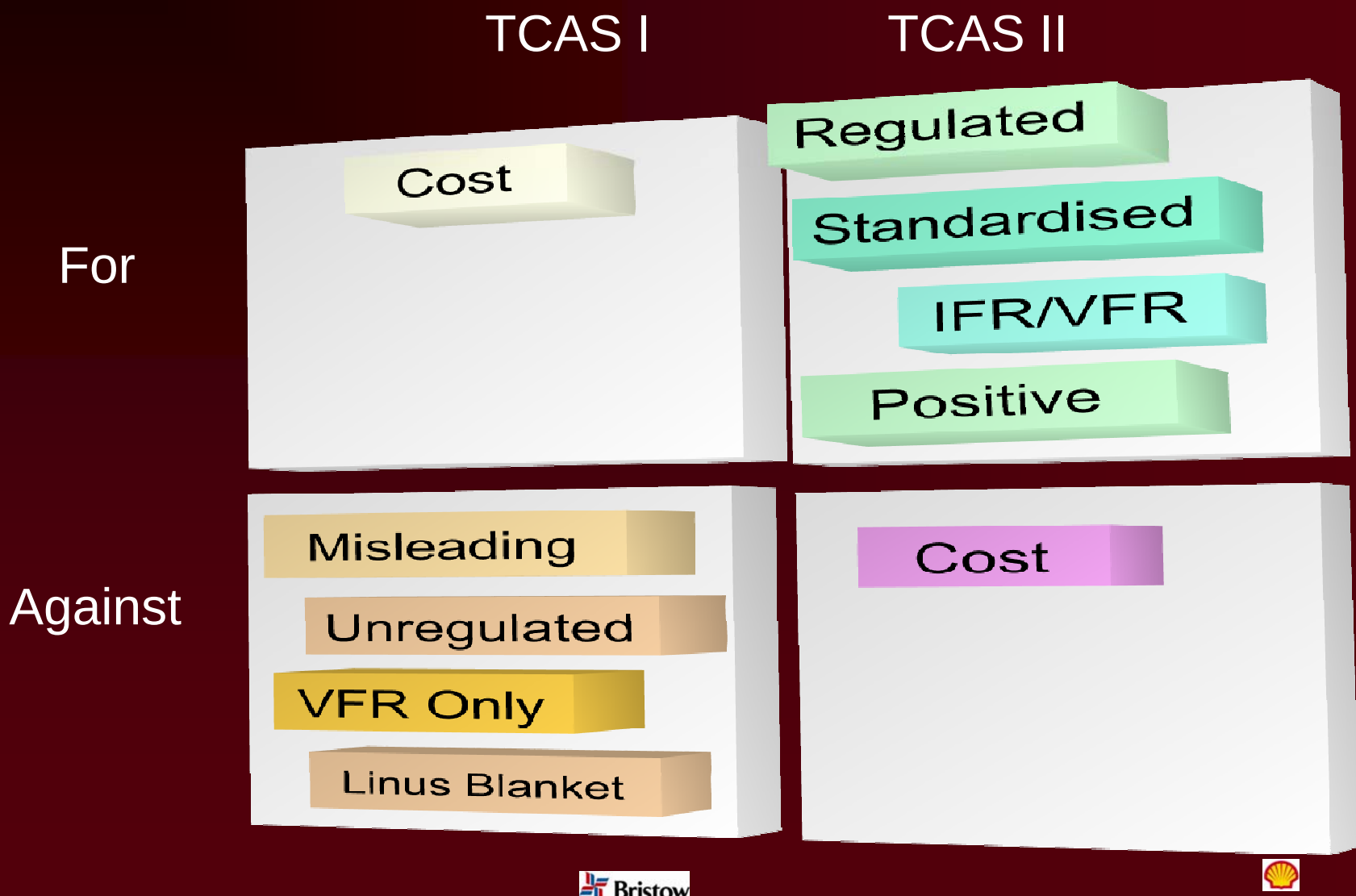
TCAS I or TCAS II?



How do we operate?

(To where and with what)

In simple terms, just like the A319 which brought me here today!!!

JACK-UP DRILLING UNIT

SEMI-SUB DRILLING UNIT

PRODUCTION PLATFORM

ACCOMMODATION FLOTEL

FPSO and TANKER

CRANE BARGE

AS332L (SUPER PUMA)

- Normal cruise speed 120 knots
- Seating up to 19 passengers & 2 crew
- 2 engines
- Standard range 490NM
- 29 in EH fleet

SIKORSKY S76

- Normal cruise speed 140 knots
- Seating up to 12 passengers & 2 crew
- 2 engines
- Standard range 335NM
- 36 in EH fleet

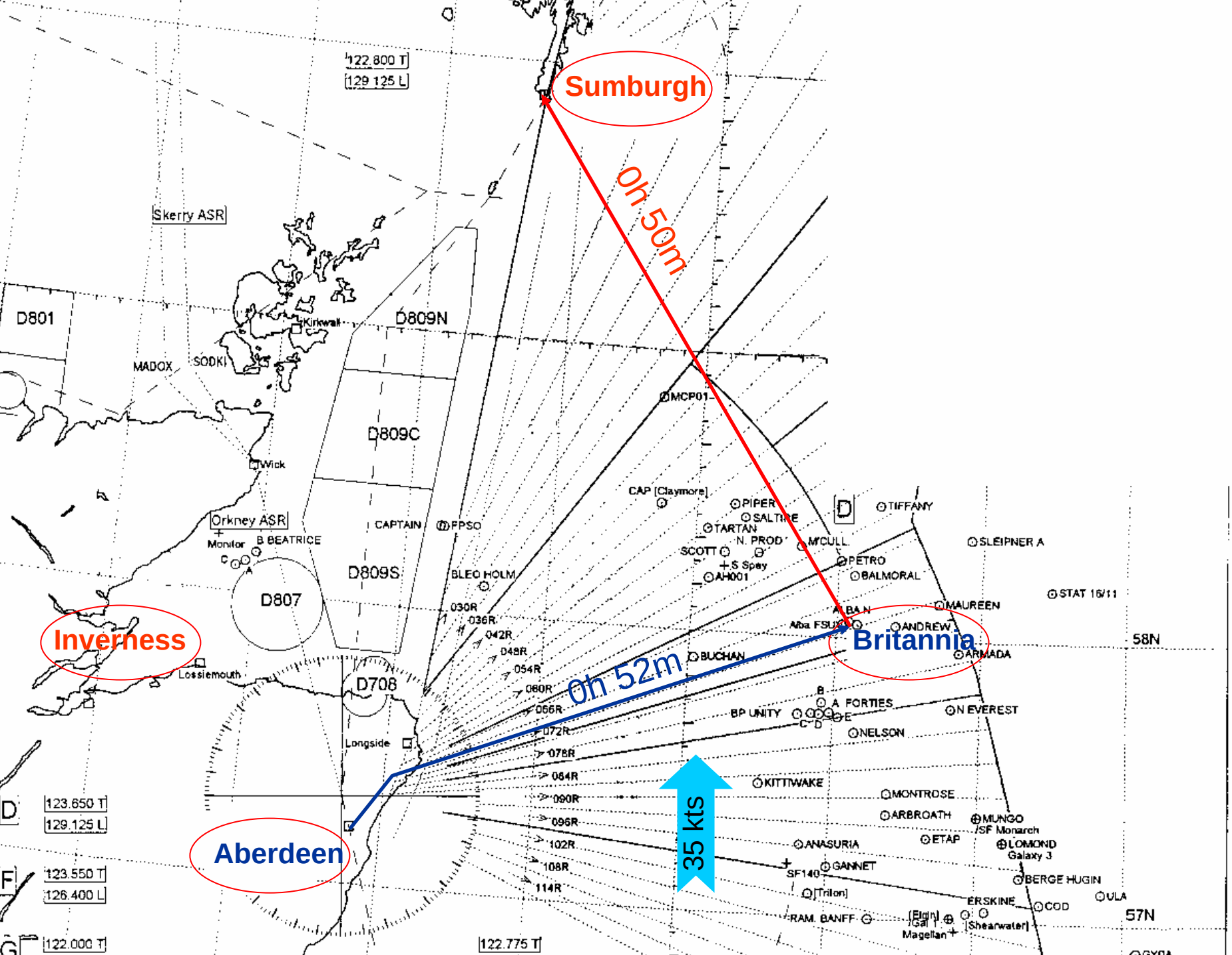
EC225

Cruise speed – 150Kts

Seating – 19 passengers + 2 Crew

Range – 400nm with full IFR reserves

Flight BHL62A to the Britannia


Sumburgh
0h 50m
Britannia
0h 52m
Inverness
Aberdeen
35 kts
122.800 T
129.125 L
Skerry ASR
D801
D809N
D809C
D809S
D807
D708
MADOX
SODKI
Kirkwall
Wick
Orkney ASR
Monitor
B BEATRICE
CAPTAIN
FPSO
BLEO HOLM
Lossiemouth
Longside
MCP01
CAP [Claymore]
PIPER
SALTIRE
TARTAN
N. PROD
SCOTT
S Spey
AH001
M'CULL
PETRO
BALMORAL
TIFFANY
SLEIPNER A
STAT 16/11
MAUREEN
ANDREW
ARMADA
Alba FSU
BUCHAN
030R
036R
042R
048R
054R
060R
066R
072R
078R
084R
090R
096R
102R
108R
114R
A FORTIES
BP UNITY
N EVEREST
NELSON
KITTIWAKE
MONTROSE
ARBROATH
MUNGO
SF Monarch
ETAP
LOMOND
Galaxy 3
ANASURIA
GANNET
SF140
[Triton]
BERGE HUGIN
ULA
ERSKINE
COD
RAM. BANFF
[Elgin]
Gal
Magellan
[Shearwater]
58N
57N
123.650 T
129.125 L
123.550 T
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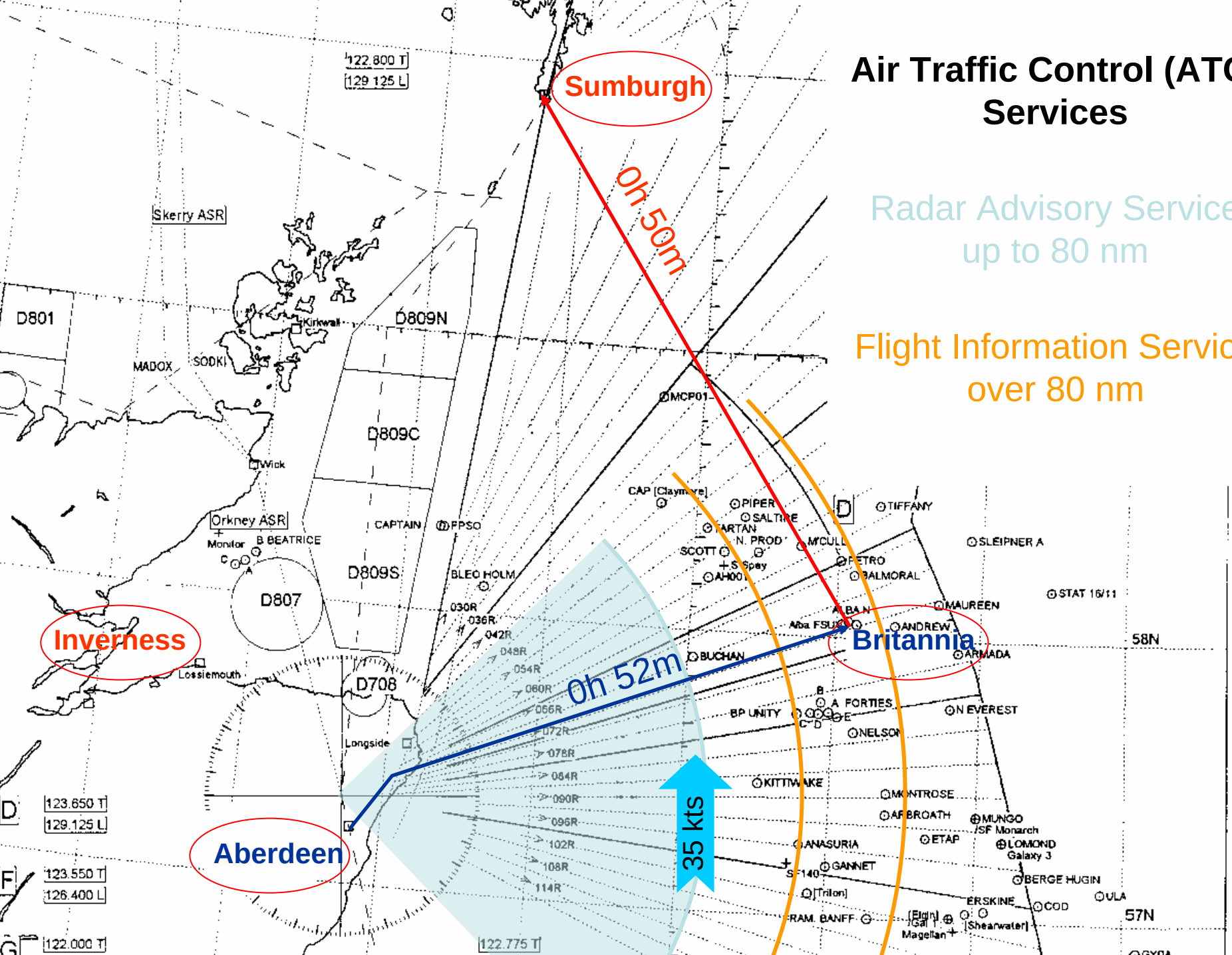
Sumburgh
0h 50m
Inverness
Britannia
0h 52m
Aberdeen
35 kts
Air Traffic Control (ATC) Services
Radar Advisory Service up to 80 nm
Flight Information Service over 80 nm
Skerry ASR
Orkney ASR
D801
D809N
D809C
D809S
D807
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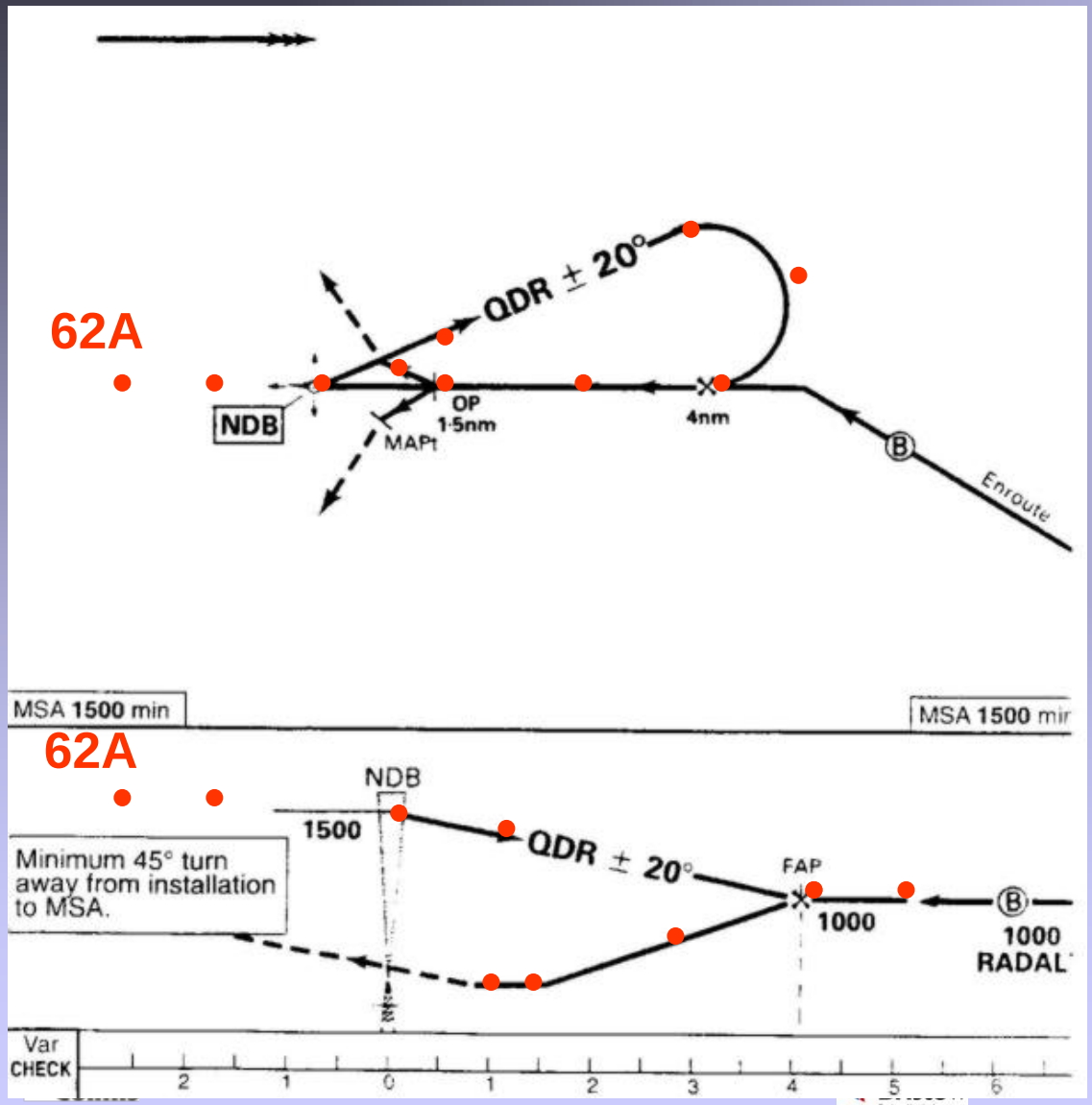
‘Airborne Radar Approach’



- Overhead the beacon
- Initial descent and then turn
- Final descent
- Offset turn
- Decision point

‘Airborne Radar Approach’

Minima – 200ft & 3/4 nm

Sumburgh

Inverness

Aberdeen

0h 27m

35 kts

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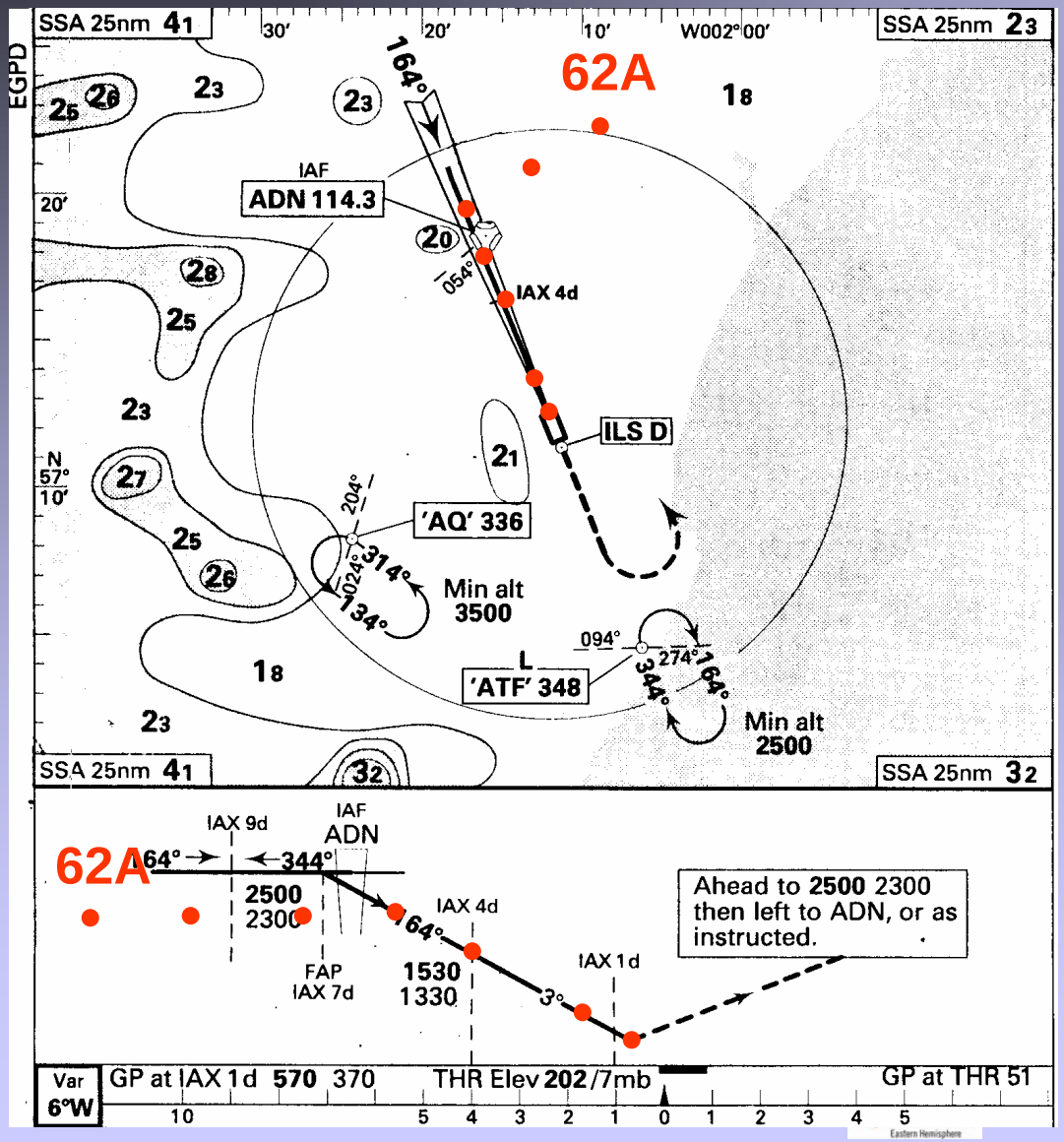
ILS (Instrument Landing System)



- Radar vectors
- Intercept localiser
- Intercept glideslope
- Double check height
- Decision height

ILS (Instrument Landing System)

Minima – 200ft & 500m

Questions so far?

To summarise….

- N Sea ‘heavy’ helicopters;
  - Plan and Fly IFR
    - SIDs
    - En Route ATS
    - STARs
  - Carry ‘charter’ passengers;
    - Trajectories are similar to FW operations

Thus TCAS II rather than TCAS I *<u>is</u>* appropriate

The route to the STC

- c2001
  - BALPA HSG raised the question; why not fit TCAS to helicopters – refined later to ‘TCAS II’ because of operational limitations of TCAS I.
    - Discovered ACJ OPS 3.398
      - Minimum closure rate blo F100 480Kts
      - Minimum ROCD 1500fpm
- 2002/3
  - Discussions, research and yet more discussions confirmed that ‘it MUST be TCAS II’ and serious doubt on the JAR OPS 3 statement.
- 2004
  - More ‘formal’ proposals made to manufacturers for a possible ‘joint’ trial. Rockwell Collins offered loan of equipment and engineering expertise.
  - Formed unofficial ‘team of three’ to progress the project ‘in the shadows’.
    - Self – Co-ordination
    - Capt Mark Prior – Test Pilot.
    - Mr Grant Ireland – Design Office Manager.

The route to the STC (2)

- 2005
  - Discussions with Shell Aircraft to sponsor the design costs – agreed June.
  - Formal presentation to Airline Senior Management for approval to proceed – given.
  - Briefing/Discussions with Eurocontrol.
  - Briefing/Discussions with UK IFF/SSR Policy Board.
  - Training of crews discussed – plan agreed.
  - Visit from Rockwell Collins aerial expert, advice given and accepted by our design office.
  - Application for STC to EASA 15 Nov.

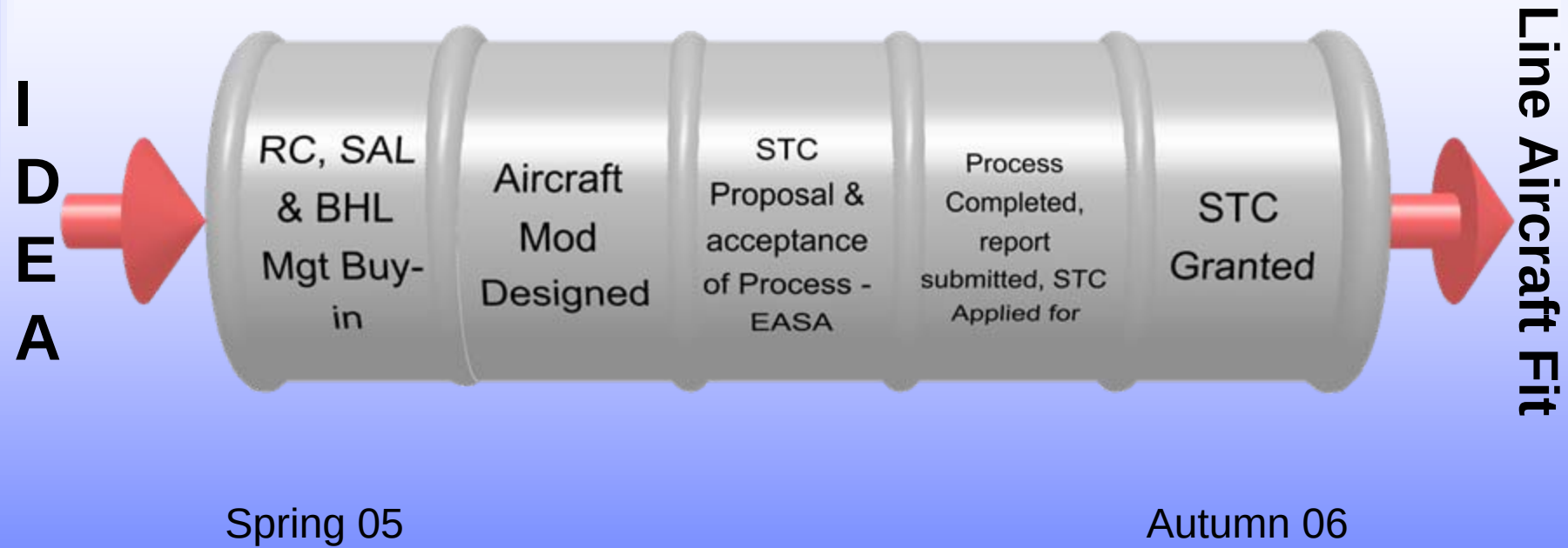
The route to the STC (3)

- 2006
  - EASA certification passed to UKCAA 23 Jan.
  - Aircraft nominated (G-TIGE). Work to be completed during ‘D’ check mid-January to end February.
  - Due engineering pressures, aircraft emerges with only approx 50% of work complete.
  - Further work requires removal from the ‘line’ – difficult!
  - Application for ‘Permit to Fly’ under test conditions specified in STC application made 9 April.
  - 16 May. ‘Permit to Fly’ arrives from UKCAA.
  - May - Test points for airflow interference upper Æ vs tail rotor flown – satis.

The route to the STC (4)

- 2006
  - What is left?
    - Ground Tests (by 16 Jun)
    - Crew Training (if ground tests satis) (by mid Jul)
    - Complete Agreed Flight Test Schedule (by end Jun)
    - Apply for/receive STC from EASA (Mid Jul/Mid Sep)
  - Confidence factor of Timeframes?
    - Depends on aircraft availability and UKCAA engineers.
    - 75%

To Summarise



The Route to the STC (5)

G-TIGE paint stripped, cleaned and awaiting transfer to the maintenance hangar.

The Route to the STC (6)

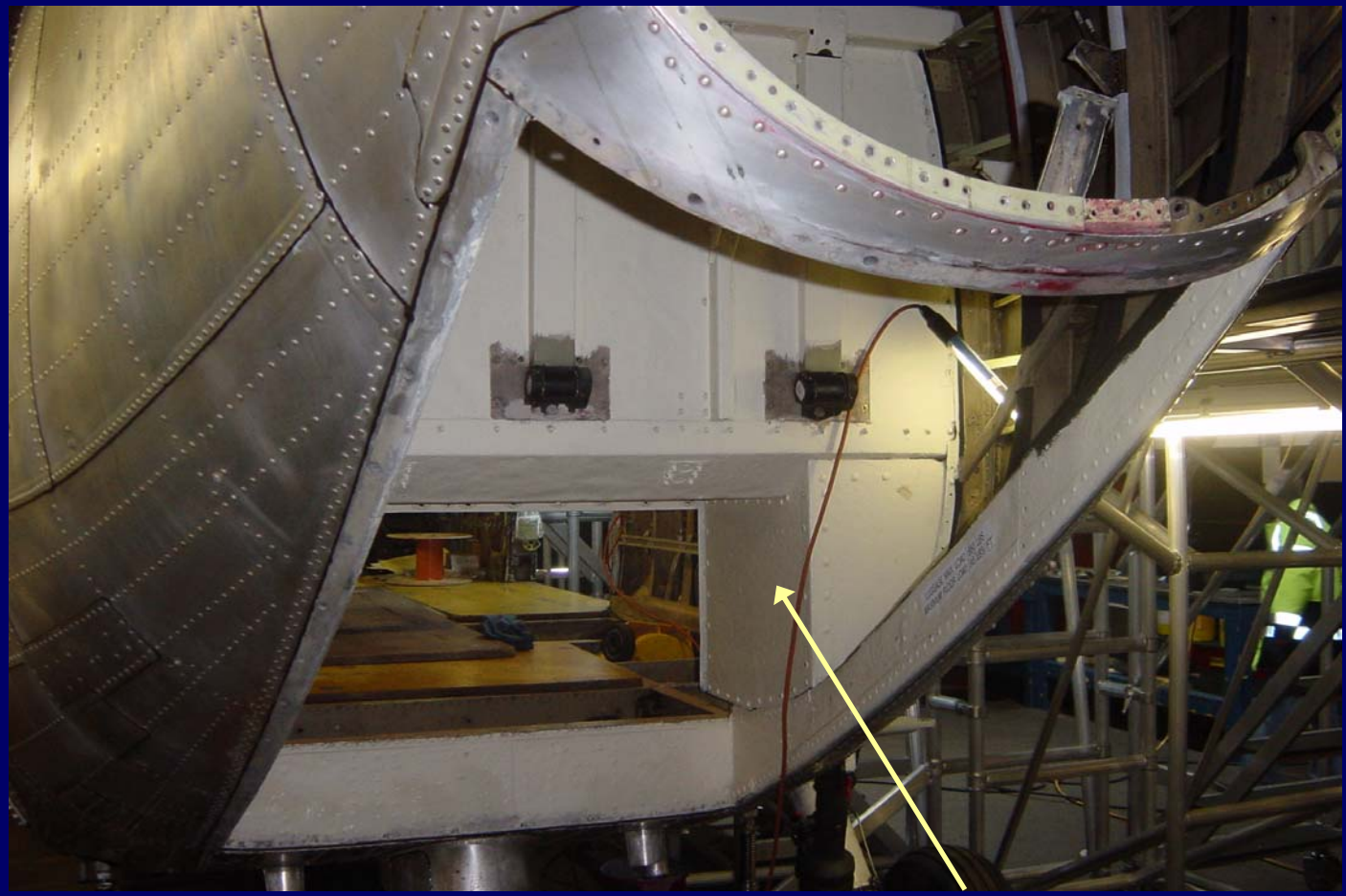
The ‘D’ check

Yes, there is an aircraft in there somewhere!

The Route to the STC (7)

Senior avionics engineer working on the mode ‘S’ txpndr/TCAS interface panel during the ‘D’ check.

The Route to the STC (8)



Baggage bay location of TCAS Computer.

The Route to the STC (9)

Installation of feeders for upper Æ

The Route to the STC (10)

Upper Æ

The Route to the STC (11)

Lower Æ

The Route to the STC (12)

The business end!

Rockwell Collins

Bristow
Eastern Hemisphere

Questions so far?

The Trial Proper

- Flight Test Schedule BHL/FTD/332/06/02 is part of the EASA agreed certification to clear carriage and correct functioning of the Rockwell Collins TCAS System.
- The modification is classified as a ‘Major Change’ and iaw Part 21A101 the change is ‘Non-Significant’
- Basis of Certification – CS29.

The Trial Proper (2)

- Flight Test plan strongly influenced by UKCAA Paper 92011 – Report on UK Operational Trial of TCAS II (Mr Dave Howson)
  - Will answer all the points raised in the conclusions of Mr K Carpenter's paper 'Fitting ACAS to helicopters' dated 2003.
  - Will, for the first time, provide a practical answer to the question – *'Will TCAS II work on helicopters?'*

So then, will it work?

To be honest – I think it will (But then, I'm just a pilot!)

Rockwell Collins

Bristow Eastern Hemisphere

And if it does?

It should be fitted on ‘heavy’ helicopters in ‘airline’ service under the same rules as for Turboprop Aeroplanes – The same *‘net safety benefit’* would be realised.

Thank You for your time.

Rockwell Collins

Bristow Eastern Hemisphere