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Jeppesen Approach Chart (Military) 11-1 27 JUL 79

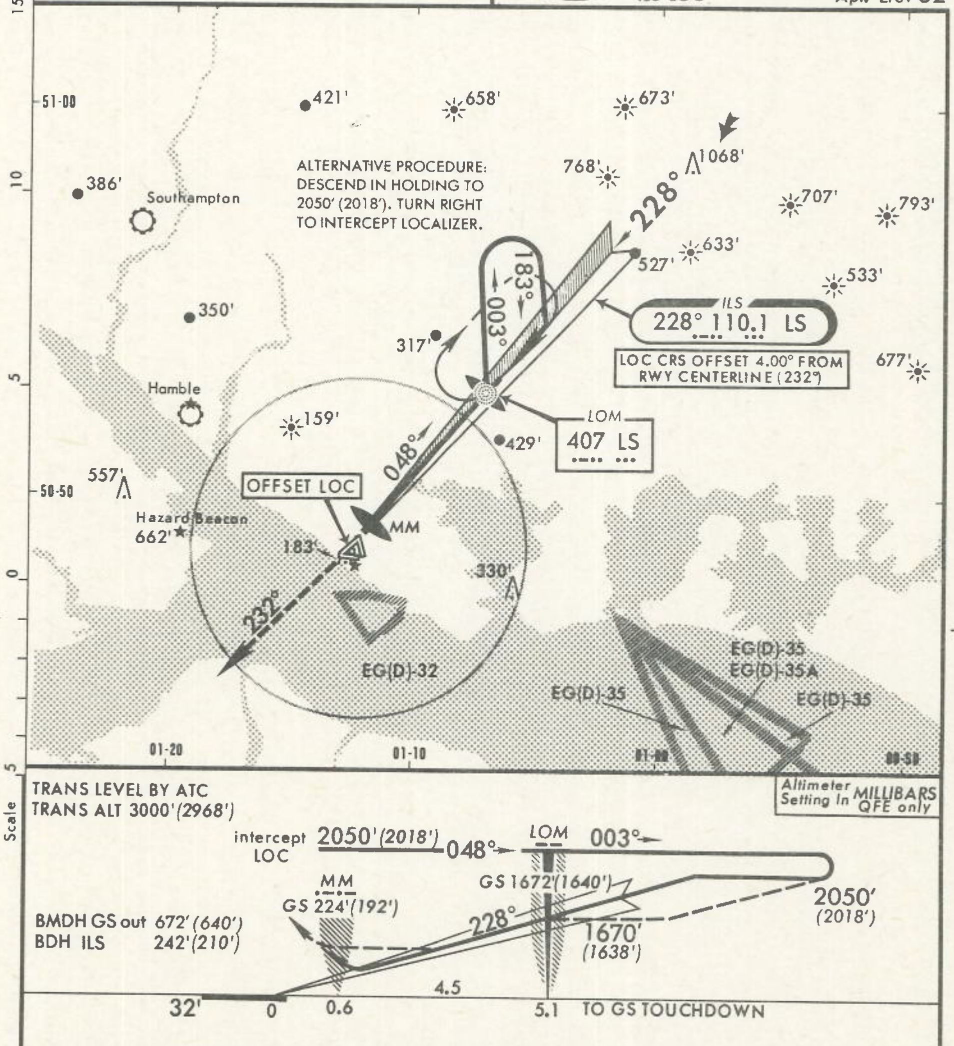
LEE-ON-SOLENT, U.K.

LEE-ON-SOLENT
ILS Rwy 23

		UHF/DF
SOLENT Approach (R)	133.55	282.7 (OP NOT CONT)
SOLENT Tower	135.7	239.0 (OP NOT CONT)

LOC 110.1 LS (OP NOT CONT)

Apt. Elev 32'



MISSED APPROACH: Climb on 232° to 3050'(3018') and as directed.

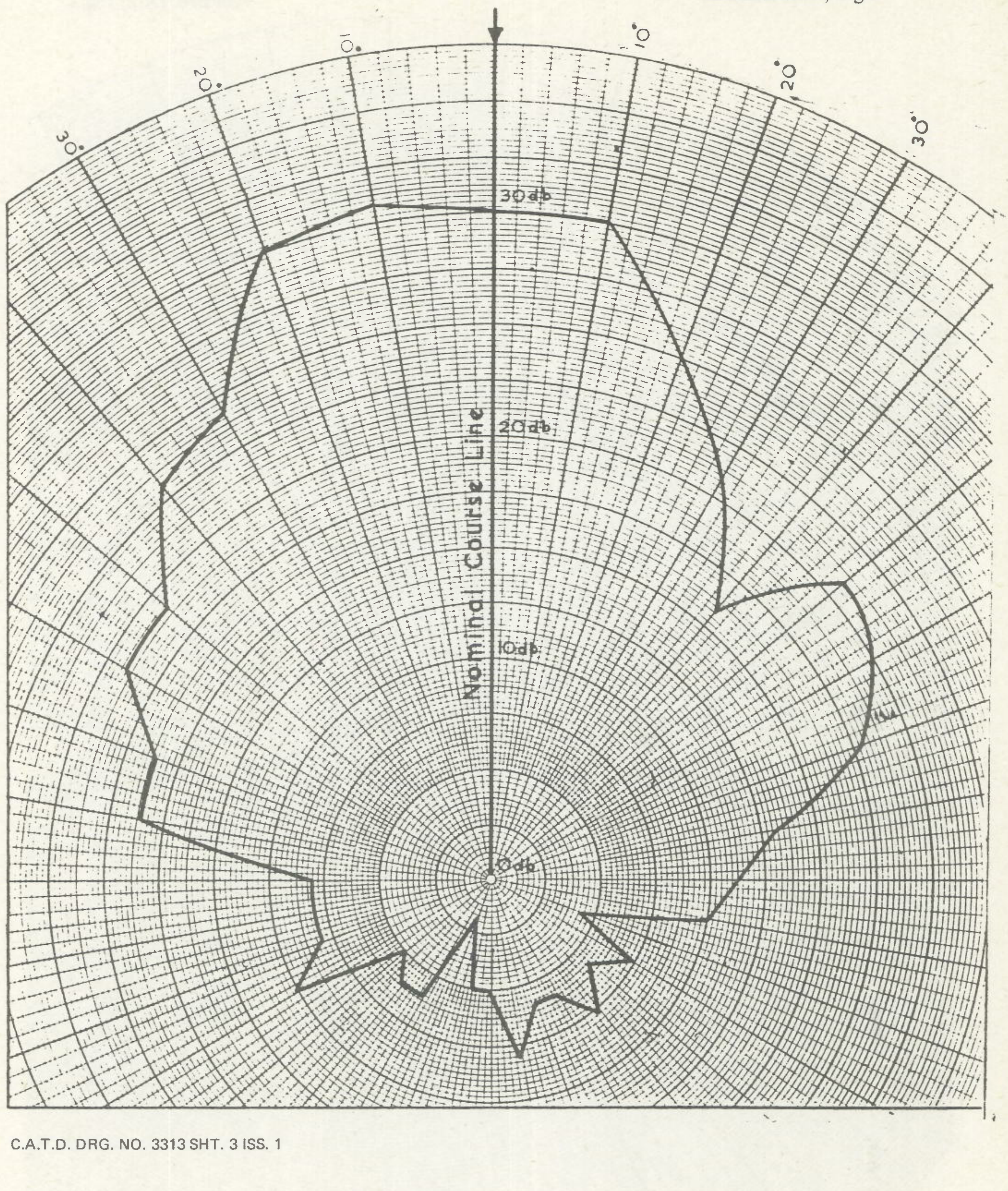
STRAIGHT-IN LANDING RWY 23

	ILS DH 282'(250') FULL	ILS DH 282'(250') MM out	LOC (GS out) MDA 640'(608') MM out	CIRCLE-TO-LAND MDA
A	[3] 1600m		[2] 1600m	740'(708') 1600m
B				
C				[1] 740'(708') 2400m
D			[2] 2000m	[1] 740'(708') 3200m

Gnd speed-Kts	70	90	100	120	140	160
GS 3.00°	377	484	538	646	753	861
LOM to MAP 4.5	3:51	3:00	2:42	2:15	1:56	1:41

[1] Acft over 160mt/352,740 lbs MLW: MDA 840' (808').
[2] UK auth 1500m.
[3] UK auth 1300m.

CHANGES: BMDH. Minimums. Approach freq.



C.A.T.D. DRG. NO. 3313 SHT. 3 ISS. 1

Bovingdon 10. 4. 56.
Prince G—AMKX
Height 1000 ft.
5 nm. Orbit

PYE MILITARY I.L.S. LOCALISER

AIR MEASUREMENT OF FIELD STRENGTH IN AZIMUTH

DB's above 20 microvolts into airborne receiver

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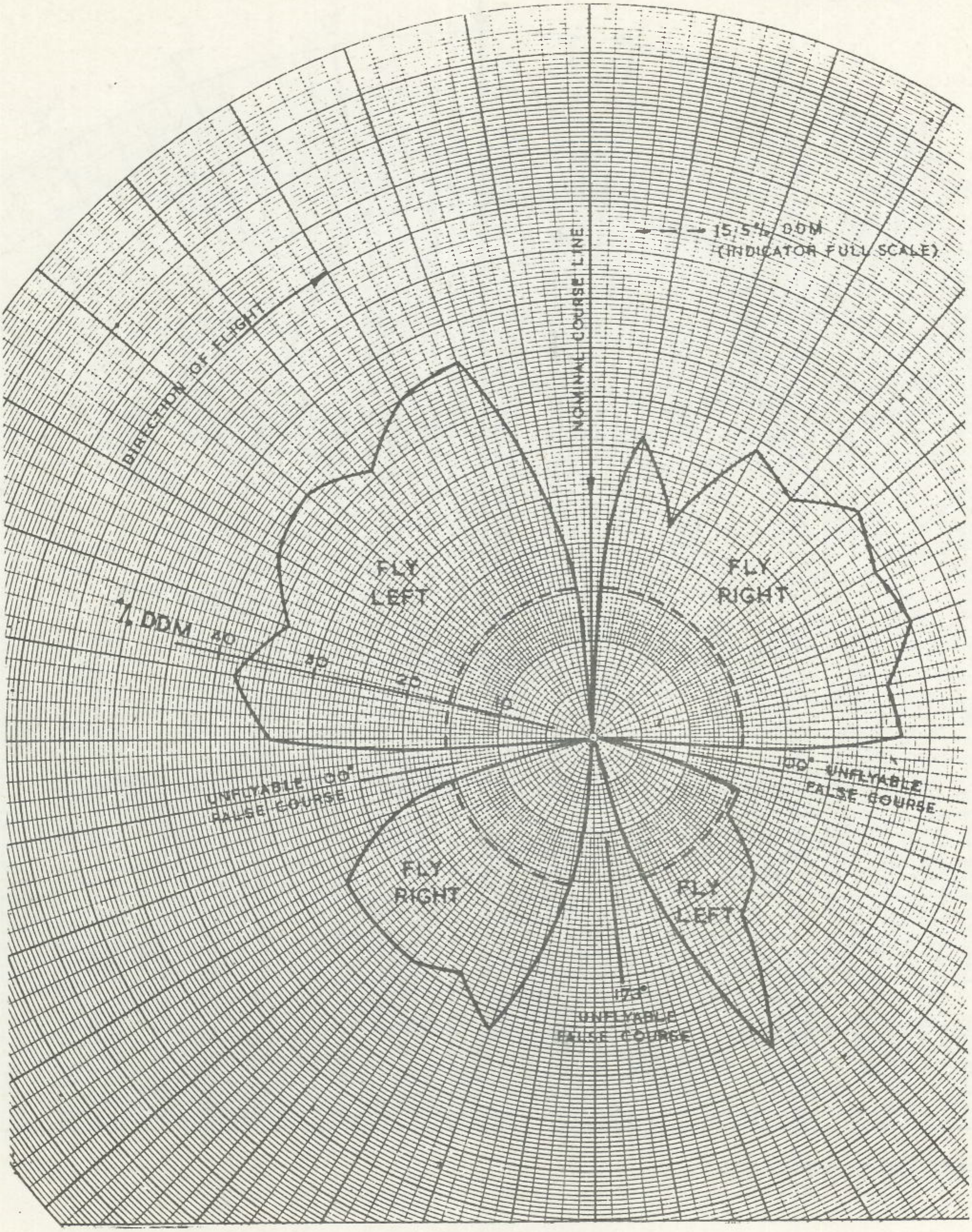

C.A.T.D. DRG. NO. 3313 SHT. 9 ISS. 1

Bovingdon 10. 4. 56.
Prince G–AMKX
Height 1000 ft
5 n mile orbit

AIR CHECK OF DDM'S AROUND COMPLETE ORBIT
BY C.A.F.U.

PYE MILITARY I.L.S. LOCALISER

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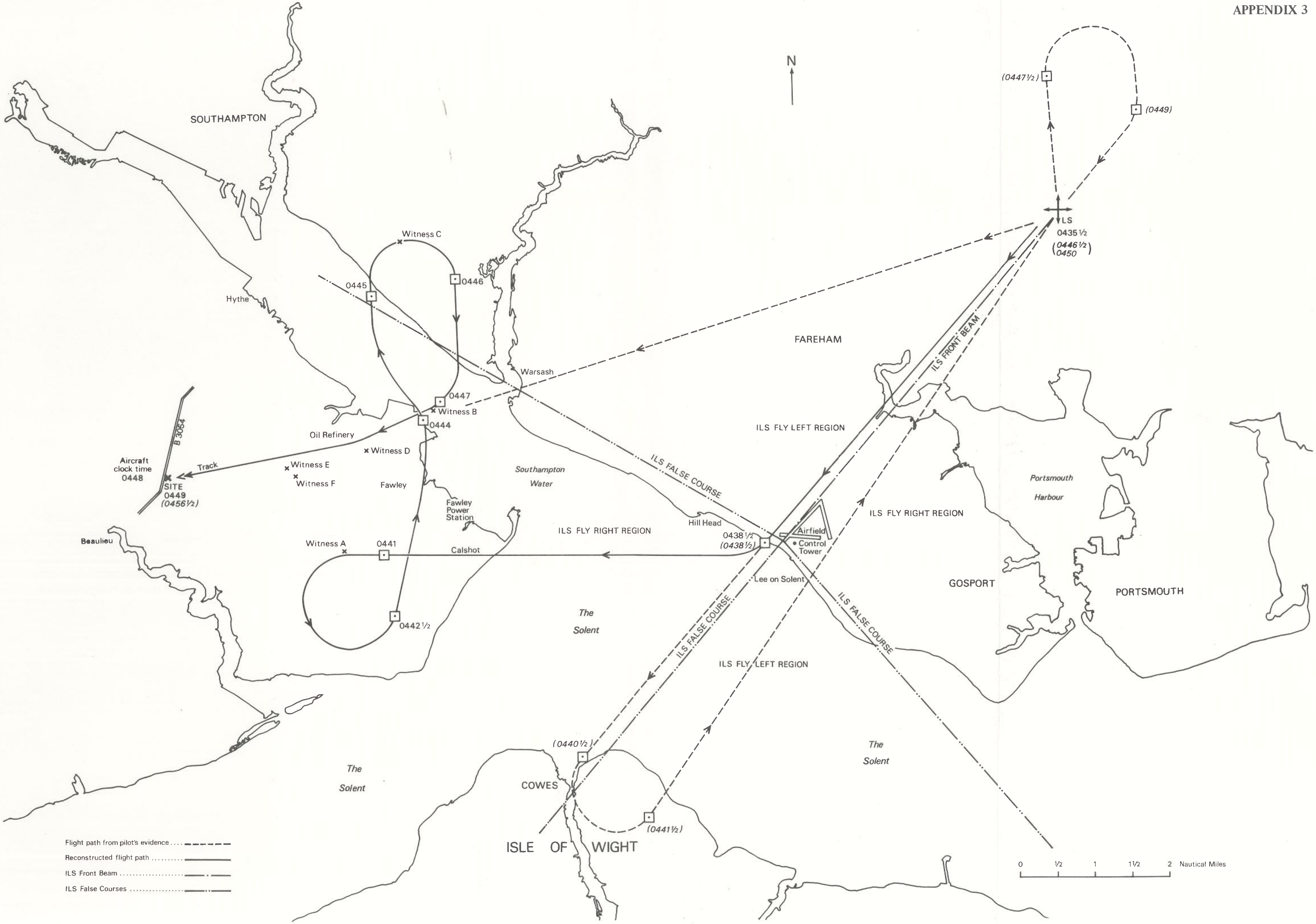
N
SOUTHAMPTON
Hythe
Witness C
0445
0446
Warsash
0447
Witness B
0444
Oil Refinery
Witness D
Witness E
Witness F
Fawley
Fawley Power Station
B 3054
Aircraft clock time 0448
Track
SITE 0449 (0456½)
Beaulieu
Witness A
0441
Calshot
0442½
Southampton Water
FAREHAM
ILS FRONT BEAM
ILS FLY LEFT REGION
ILS FALSE COURSE
ILS FLY RIGHT REGION
Hill Head
0438½ (0438½)
Airfield
Control Tower
Lee on Solent
GOSPORT
Portsmouth Harbour
PORTSMOUTH
(0447½)
(0449)
LS
0435½
(0446½ 0450)
The Solent
(0440½)
COWES
(0441½)
ISLE OF WIGHT
0 ½ 1 1½ 2 Nautical Miles
Flight path from pilot's evidence
Reconstructed flight path
ILS Front Beam
ILS False Courses

ASSESSMENT OF THE TIME SEQUENCE OF THE ACCIDENT

In the absence of a recording of the RTF at Lee-on-Solent it is not possible to deduce an accurate time history of the aircraft's flight from the moment it passed LS inbound on its first approach to its final crash position. Although the time of the accident can be determined fairly accurately from the aircraft's electric clock, which stopped on impact at 0448 hrs and which the commander said had been correctly set before leaving Manchester, all other material times are suspect. The only sources for this information were: the memory of the ATCO at Lee-on-Solent, who, believing the RTF recorder was in operation, was not concerned to record the times when messages were exchanged; and the memories of the two pilots, who also had only vague ideas of the time sequence.

In order to try to resolve this problem, calculations were made from the time of 0415 hrs, when the commander reported to London Control (transcript) ' – we have forty seven miles to run to Midhurst', ie a DME distance. As the aircraft was on Airway A.1, a fairly reliable fix can be determined. From this position a dead reckoning (DR) plot was made using probable ground speed. An appraisal of the sequence of events and their times taken from the plot which follows the flight path the commander believed he was flying, (shown in Appendix 3), is as follows:

0334 hrs	Airborne Manchester
0340.30 hrs	Congleton, through six for nine – RTF transcript(t)
0400.30 hrs	Honiley, flight level nine zero, estimating Woodley two four, Midhurst three four (t). (54 nm in 20 minutes = ground speed 162 knots)
0415.14 hrs	Aircraft report: forty-seven miles to run to Midhurst (t). (40 nm from Honiley in 15 minutes = 160 knots, checks ground speed).
0423 hrs	Cleared direct Lima Sierra, (t). Dead reckoning (DR) position Woodley. (8 minutes at 162 knots = 21 nm from 0415.14 hrs position. 34 miles to run to LS at 162 knots = 12½ minutes; ETA LS 0435.30 hrs).
0435.30 hrs	Estimated time over LS.

For the approach procedure, overshoot, etc, an indicated airspeed of 115 knots (from pilots' statements) has been used. This equals a true airspeed of 115 knots, which in the condition of very light upper winds has been taken as a ground speed of 115 knots.

0438.30 hrs	DR position on coast, slightly north of runway centre line, after overflight of aerodrome (6 nm from LS = 3 minutes).
0440.30 hrs	DR position at commencement of left turn following overshoot. (It is assumed the aircraft flew straight ahead for two minutes = 4 nm).

0441.30 hrs	DR position following 180°, rate one, turn.
0446.30 hrs	DR position LS. (Return to LS – 9½ nm = 5 minutes).
0449 hrs	Procedure turn completed, intercept localiser.
0450 hrs	DR position LS inbound.
0456.30 hrs	Crash site. (12½ nm from LS to crash site = 6½ minutes).

The commander could not remember the time from the completion of the turn, following the overshoot, back to LS. He estimated the time from passing LS on the final approach to the time of impact as between 2½ and 3½ minutes.

The co-pilot estimated the time from the completion of the turn, following the overshoot, and the subsequent passage over LS as 2½ minutes. He estimated the time from passing LS on the final approach to the time of impact as 2½ to 3 minutes.

EXTRACT FROM:

SLEEP AND BODY RHYTHM DISTURBANCE IN LONG-RANGE AVIATION

Captain Frank H Hawkins, M Phil, FRAeS
London, September 1978 ©

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3.2.4 Rhythm of Performance

Since body temperature and other physiological processes exhibit such a striking circadian rhythm it would seem more than likely that the function of the brain will also vary to a rhythm, as its operation must be supported by at least some of these processes.

Tests which have been carried out with a number of different tasks (fig 6) confirm that human performance does vary to a daily rhythm (Klein et al 1972; Higgins et al 1975) which follows rather closely the body temperature rhythm (Kleitman 1963; Kleitman et al 1938). A number of factors such as motivation, time-zone changes etc (fig. 7) can influence this rhythm (Klein et al 1976).

The range of oscillation, ie. the difference between the maximum and minimum performance scores, within a circadian cycle is also task dependent. It has been shown in a laboratory to be between 12% and 25% of the 24 hour mean (Klein et al 1976). In shift workers it was shown in certain cases to be as high as 30-50%. The amplitude of the cycle increases with more complex tasks and is flatter with easier tasks (Alluisi and Chiles 1967).

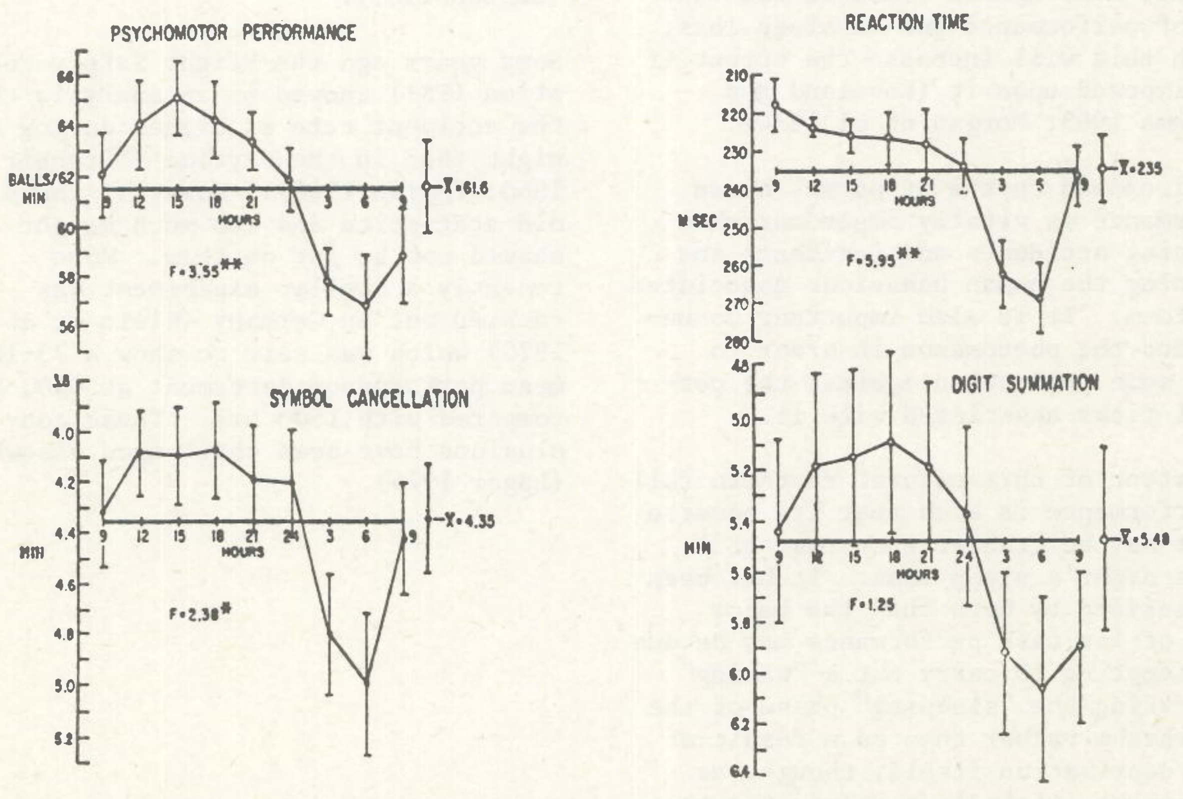

Fig.6 Human performance of various tasks varies during the day with a rhythm that tends to correspond with that of body temperature (fig.5). This variation is in addition to any effect from sleep deprivation (Klein et al 1972).

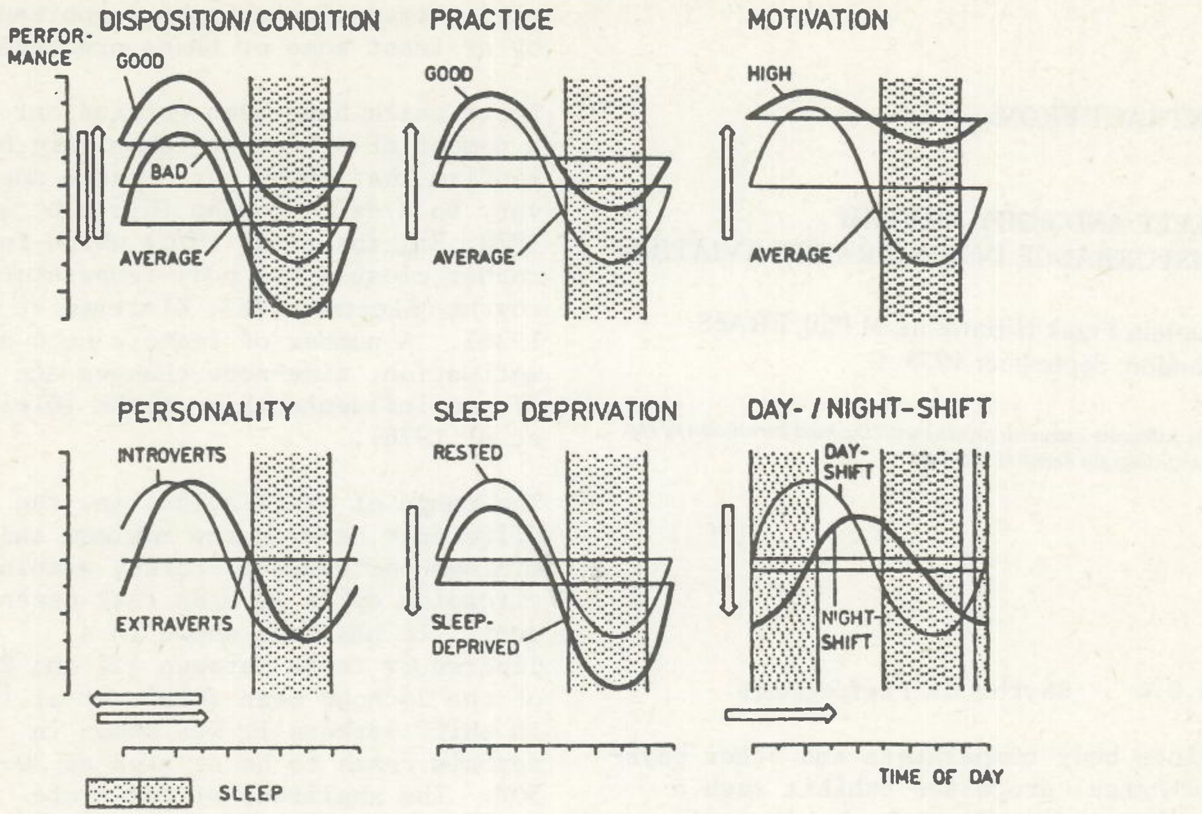

Fig.7 Behavioural performance rhythms can be modified through various factors (Klein et al 1976).

This time-of-day effect on human performance must not be confused with the loss of performance due to sleep loss, though this will increase the effect if superimposed upon it (Loveland and Williams 1963; Morgan et al 1974).

The circadian rhythm of normal human performance is vitally important when analysing accidents and incidents and examining the human behaviour associated with them. It is also important to understand the phenomenon in order to apply some protection against the potential risks associated with it.

The extent of this natural rhythmic fall in performance is such that its adverse effect may be greater than that of a single night's sleep loss. It has been hypothesised by Webb that the major cause of low task performance may be due to attempting to carry out a "waking" task during the "sleeping" phase of the body rhythm rather than as a result of sleep deprivation itself, though, as noted above, sleep loss aggravates the degradation. Some tasks may therefore be done worse during the first night without sleep than the following day, in spite of the increasing sleep deficit (Galton 1961).

Some years ago the Flight Safety Foundation (FSF) showed in an analysis that the accident rate is higher during the night than in the daytime (Kirchnir 1960; Taylor 1964). However, these are old statistics and too much weight should not be put on them. More recently a similar experiment was carried out in Germany (Klein et al 1970) which was said to show a 75-100% mean performance decrement at 0400 hrs compared with 1500 hrs. These conclusions have been challenged elsewhere (Lager 1974).

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