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007: ETA change is clue

Possible reasons for the Korean Air Lines Boeing 747 straying into Soviet airspace are becoming fewer as later information invalidates earlier theories.

The chances that incorrect computerised flightplan data was given to the KAL crew at Anchorage is now discounted. Copies of KE007's flightplan have been scrutinised and the computer generated flightplan was correct in all respects.

Both the USA and UK authorities believe that the 747 experienced no unserviceability with either the navigation or communications equipment "comms were normal until it was shot down". The flight reported all waypoints up to and including checkpoint Nippi at the correct ETA as shown on the flightplan. Thus it can be assumed that the INS was programmed correctly prior to departing Anchorage for Seoul.

But on handover from Anchorage Oceanic to Tokyo Oceanic, KE007 passed a revised ETA for the Tokyo FIR boundary, estimating four minutes later than planned.

This vital clue points to the most likely sequence of events, pending recovery and release of the 747's flight data and cockpit voice recorders by the Soviet Union.

On departure from Anchorage KE007 was routed via Jet 501 to the Bethel VOR, on a heading of 239°. *Flight* understands that most 747 crews would elect to fly this stage with the autopilot coupled in the heading reference mode to the VOR. At Bethel the 747 was to establish on route Romeo 20, flying 237° on an established airway, not a Great Circle route as stated in *Flight* last week. At the turning point the crew would switch the autopilot coupling mode from heading reference to Nav, linking in the INS.

But if the change was not made then the 747 would continue outbound from Bethel on 239°. Projecting this track, with allowances for the fore-

cast winds, matches almost exactly with the route of the 747 as tracked by Soviet radar. It is not known if the KAL crew failed to make the switch or if it malfunctioned. The UK CAA says this five-position rotary switch, located on the Automatic Flight Control panel, is "failsafe".

If this was the case then the 747 crew would have no immediately apparent reason to doubt their course. On a transatlantic route for instance, the latitude remains relatively constant compared with longitude changes. On Romeo 20 both readouts are changing constantly. The INS waypoint warning light would illuminate on time at each waypoint, with no off-track

KE007 HF transmissions

17:09GMT KE007 "Korean Air 007 over Nippi 1707, level 330, estimating Nokka 18.26, 132 [132,000lb fuel remaining], minus 49 [outside air temp], 320 diagonal 45 [wind velocity], requesting Selcal check." [Tokyo Oceanic transmits on Selcal]
KE007 "Check, Korean Air 007, Selcal OK".
18:15 KE007 "Korean Air 007 requesting 350 Tokyo "Roger, standby, call back"

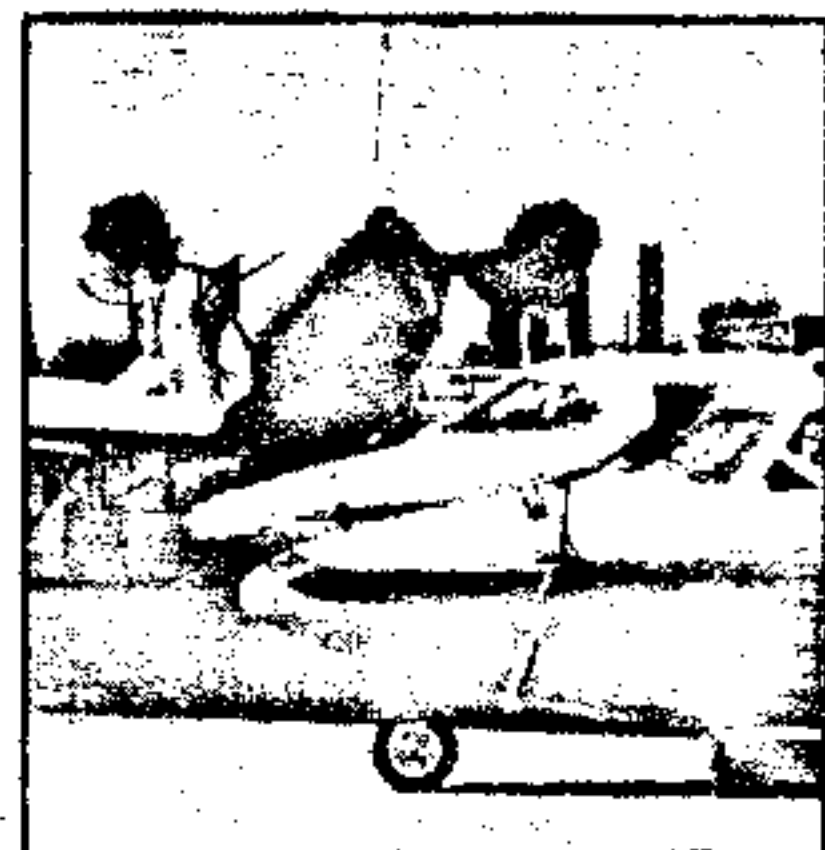
18:20 Tokyo "Korean Air 007, clearance, Tokyo ATC clears Korean Air 007, climb and maintain flight level 350"
KE007 "Roger, Korean Air 007 climb, maintain flight level 350, leaving 330 this time"
Tokyo "Roger"
18:23 KE007 "Tokyo Radio, Korean Air 007, level 350"
Tokyo "Korean Air 007, Tokyo Roger"
18:27 KE007 "KE007 [indistinct sounds]"

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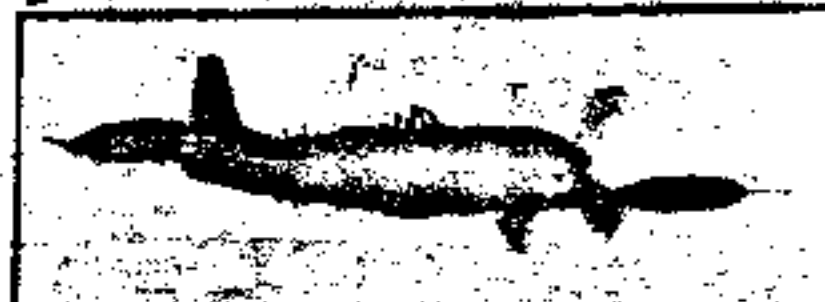
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warning since heading reference is still selected. The crew's HF position reports are made coincident with INS waypoints and there is no ground radar to cross check.

At Point Nippi (N57° 15' 1", E179° 44' 3") the 747 was due to change from Anchorage Oceanic to Tokyo Oceanic control. At this point a computation is made based on INS data to update the ETA for Tokyo FIR penetration. This, based on the actual position rather than where the 747 crew assumed they were, gave the four-minute discrepancy in ETA. The four minutes is the difference in flying time along Great Circle routes from where the crew thought they were - Nippi - from where they actually were, the same elapsed time along 239° from Bethel, and well inside Soviet airspace.