

Airbus Erroneous Radio Altitudes

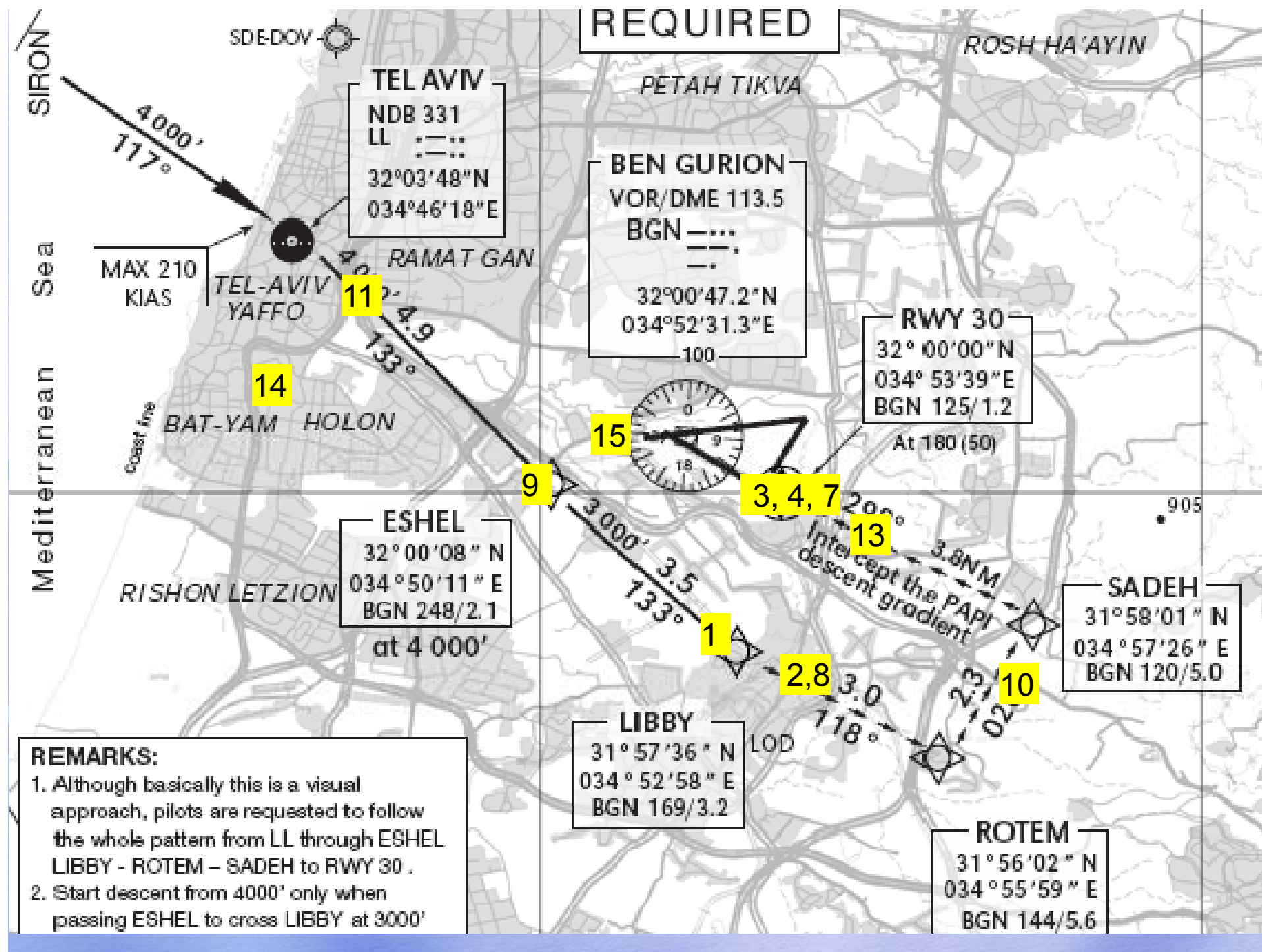


	Date	Model	Phase of Flight	Altitude	Display / Messages/ Warning
1.	18.8.2010	A320-232	During approach	3000 ft	low read out & Too Low Gear Alert
2.	22.8.2010	A320-232	During approach	2500 ft	Both RA's fluctuating down to 1500 ft + TAWS alerts
3.	23.8.2010	A320-232	RWY 30	200 ft	"Retard" + Nav RA degraded
4.	059.2010.	A320-232	RWY 30	200 ft	"Retard" + Nav RA degraded
5.	069.2010.	A320-232	After landing		Nav RA degraded
6.	13.9.2010.	A320-232	After landing		Nav RA degraded
7.	7.10.2010	A320-232	During Final RWY 30	170 ft	"Retard"
8.	24.10.2010	A320-232	During approach	2500 ft	"NAV RA2 fault"



	Date	Model	Phase of Flight	Altitude	Display / Messages/ Warning
9.	2610.2010.	A320-232	Right of RWY 30	4000 ft	terrain + Pull Up
10.	2401.2011.	A340-300	Visual RWY 30, during base turn		RA2 showed 50ft, RA1 showed 2400ft, & "LDG not down"
11.	2601.2011.	A320-232	Right of RWY 30	5000 ft	"LDG not down"
12.	13.2.2011	A320-232	After landing		Nav RA degraded
13.	15.2.2011	A330-200	PURLA 1C, RWY12	800 ft	"too low terrain"
14.	.2222011.	A320-232	RWY 30 takeoff	4000 ft	3000ft & low gear and pull up
15.	23.2.2011	A330-200	SID RWY 30, during climb	500 ft	"LDG not down"







- All the faulty readouts were received from pilots of Airbus aeroplanes equipped with Thales ERT 530/540 radar altimeter .
- None of the complaints were receive from pilots of Boeing aeroplanes, although some of Boeing aeroplanes are also equipped with the same radar altimeter.
- The faulty readouts were received during different phases of the flight (height and places)
- Some of the faulty readouts were received during the final phase of the landing at a height of about 200 feet, followed by a “RETARD” massage that was heard in the cockpit.
- The "**Retrd**" massage advises the crew to put the auto-throttle in the idle position. In auto-land mode, the Airbus computer will automatically decrease the engine's power to idle





- Turkish Airlines Flight 1951 (Boeing 737-800) was a passenger flight which crashed during landing to Amsterdam Schipol Airport on 25 February 2009, killing nine passengers and crew including all three pilots.
- The investigation found that the crash was caused primarily by the aircraft's automated reaction which was triggered by a faulty radio altimeter. This caused the autothrottle to decrease the engine power to idle during approach.
- about 2,000 ft (610 m) above ground, the left-hand (captain's) radio altimeter suddenly changed from 1,950 feet (590 m) to read -8 feet (-2.4 m) altitude, although the right-hand (co-pilots) radio altimeter functioned correctly.
- The autothrottle reverted to "retard" mode, which is designed to automatically decrease thrust shortly before touching down on the runway at 27 feet (8.2 m) above runway height.
- The crew did not recover the aircraft before it stalled and crashed.





THALES

COMPONENT MAINTENANCE MANUAL

ERT-530 / ERT-540

P/N 9599-607-14942

9599-607-14942

3. Equipment Specifications

Figure 4 lists the specifications for the ERT-530 R/A.

CHARACTERISTIC	SPECIFICATION
Related documents	
ARINC Characteristic	707, 429, 600, 604, (Bite)
Environmental category	DO-155, DO-160B, DO-178A
TSC (Certification)	2C 87
QAC	56
ETSO	2C 87
Form Factor	3 MCU (ARINC 600)
Weight (on QAC plate)	4375 g \pm 50 g (P/N: 9599-607-14942) (before Sb No. 38) 3840 g \pm 50 g (P/N: 9599-607-14942 (from SBs 38))
Mounting and cooling	Per ARINC 600
Length	360 mm (14.172")
Width	94 mm (3.701")
Height	194 mm (3.701")
Electrical AC Voltage requirements	115 V ac \pm 10 %, 380 Hz to 420 Hz
Cooling	ARINC 600
Power requirements	< 20 W
Aircraft Installation Delay (AID)	40, 57, or 80 ft \pm 1.5 ft or \pm 2 % of height
Operational characteristics Center Frequency	4300 MHz
Transmitter Frequency band	4200 MHz to 4400 MHz
Transmitter Power	about 70 mW
Transmission	FM / CW
ΔF	123 MHz
Altitude range	0 to 5000 ft
Altitude accuracy (DO 155)	\pm (1.5 ft or \pm 2 % of height) from - 20 ft to 5000 ft when over flying smooth terrain. \pm (1.5 ft or \pm 5% of height) from 0 ft to 5000 ft when over flying rough terrain.
Altitude range (DO 155)	From - 20 ft to 5000 ft over terrain with a reflection coefficient higher than - 17 dB (- 23 dB up to 2500 ft).



- Airbus analyzed the QAR recording of the aeroplanes.
- Analysis has shown several occurrences of Radio Altimeters providing erroneous Radio Altitudes with valid status, affecting successively side 1 and 2 Radio altimeters.
- This kind of behaviour has never been reported to Airbus.
- Airbus recommends looking for EMI interference.





- After an investigation the CAAI found that military radar was developed and tested near Ben-Gurion airport. The records of the testing of the radar coincided with the interference.
- Although the radar was supposed to transmit in a different frequency than the radar altimeter's frequency, a spectrum measurement showed that the radar transmitted also some power in the frequency of the aeroplane's radar altimeter.
- Upon CAAI demand, the radar was removed from the airport area. Since the removal of the radar no complaints were received by any pilot regarding faulty readouts of radar altimeters.
- The CAAI did not receive any detailed information and the investigation of the radar is not finished yet.

