



## Why-Because Analysis of the Accident off Sochi to Armavia Flight 967

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The results of the Why-Because Analysis performed by the authors on the CFIT accident to Armavia Flight 967 off Sochi, Russia on 3 May 2006 are contained in the accompanying document Incident Analysis, which is automatically generated by Causalis's YBT2 software from manual data inputs.

The labels on the nodes of the WB-Graph are identical to the numbers and labels appearing in the Factor List, and the labels identical to those appearing in the Time Line. The Actors appearing in the Factor List are identical to the Actors appearing in the Time Line. These identities are assured by the YBT2 software with which the Incident Analysis has been prepared.

The Factor List has been generated directly from the BEA translation of the MAK report, supplemented by details from the graphical appendices to the MAK report, which we have translated in-house. This includes our translation of cockpit voice items along with their time line during the final moments of the flight, which are annotated on a track map in a graphical appendix. Factors supplemental to those taken directly from the MAK report have been introduced in order to make the resulting WB-Graph cognitively more coherent; this is a standard procedure in Why-Because Analyses to aid visual interpretation.

This report assumes a technical understanding of Why-Because Analysis, especially the notions of *necessary causal factor*, the *Counterfactual Test* which is used to establish whether one factor is a necessary causal factor of another, and the *Causal Completeness Test* to determine whether a nominally sufficient set of necessary causal factors has been enumerated for a given factor.

Because the pilots are no longer alive and may not be asked, many of the nodes describing their cognitive states are denoted as "assumptions" in the WB-Graph. However, many of them may be inferred as

- the only plausible explanations for the phenomena for which they are shown as necessary causal factors in the WB-Graph, and
- following plausibly from the factors which are shown as their necessary causal factors in the WB-Graph

There is one exception, Node 184, *F/O wants wings level*, which is established as fact through the F/O's remark to that effect in the cockpit voice recording. This analysis assumes throughout that the crew were mentally stable and attempting to achieve the progressively required states of flight.

The WB-Analysis shows three main areas of cohering causal factors:

1. The initial interaction with the AP leading to node 89, *CRW did not expect AC behavior they experienced*. It is apparent from the Why-Because Analysis that in this phase a complicated series of interactions with the automation took place, which is complex to analyse and, we judge, would have been cognitively complex to experience. The result of this complex interaction was that the crew felt the need to turn off the autopilot, and did so. However, this turned out to be a situation in which they would have been best served had they suppressed their uncertainty and maintained their reliance on the autopilot in GO-AROUND mode.
2. Their reaction to this situation, which was to turn off the AP, leaving the Flight Director as the sole indication of how they were to achieve their desired flight state, supplemented by primary flight data (combined on the PFD), namely instantaneous attitude, altitude and airspeed, and the consequences of this.

In this situation, there is a major question to explain why the captain made a forward stick input in a condition of shallow pitch angle, when the Flight Director indicated climb, and the crew were trying to gain altitude. The only plausible explanation of this phenomenon under the mental-stability assumption is that there was an indication that the aircraft was already climbing. This would have been an illusion. Such an illusion could be generated in the captain as the Flight Director reduced its indicated pitch-up angle from 8 degrees to 4 degrees, suggesting by its relative motion that the aircraft was pitching up (the illusion), but in fact in response to the *reduced altitude target* from the inadvertently entered 3,200 ft (node 72) to 2,048 ft (node 100). The question of how node 72 itself arose, *CRW inadvertently select 3,200 ft target altitude* is not addressed in the MAK report. The BEA states this was accomplished “for no particular reason” (BEA commentary in the Appendix). We judge, rather, that this means that neither the MAK nor the BEA could find a reason. It is possible that such a reason lies in the three-fold function of the Altitude Selector Knob, which has a turning motion to set altitude as well as pulled to engage Open Climb mode and pushed for Climb Mode (Managed). It is possible that the crew inadvertently twisted this Knob as they pulled to engage Open Climb mode, and this twist entered inadvertently a higher altitude than desired as Open Climb mode was engaged.

The crew did not succeed in following the Flight Director commands in this brief phase. The result of their actions was to put the aircraft on a descending trajectory.

3. The EGPWS warning was thereby triggered (node 187). At this point, a potentially complex series of cognitive interactions seems to have taken place in a very brief time interval. SOP for an EGPWS warning is a Memory Item, and consists of *Autopilot off* (the autopilot was already off), *full-back stick*, *wings level*, *TOGA thrust* (FCOM 3.02.34 P 15). At this point, the Pilot Monitoring called for wings level and appeared to make side stick inputs to make this happen, although he was not the

Pilot Flying. In this situation, there are dual flight control inputs, which according to the aircraft's logic are summed in order to generate one coherent flight control input. However, there is no tactile feedback to the sidestick which indicates that there is a contrary command, as there would be on mechanically-interconnected flight control columns. It is against SOP for the Pilot Monitoring (PM) to make control inputs of this nature, except in circumstances in which he/she must assure the safety of flight, which in the case of an EGPWS warning is indeed such a situation. However, the PM did not press the takeover button to assure single-sidestick input.

In this situation, the EGPWS warning suppressed the aural "DUAL INPUT" warning by design. The only indication to the Pilot Flying that the PM was making flight control inputs would have been the green flashing warning light on the glareshield. In an emergency situation, as they were in, the meaning of this flashing light may well not have registered on the Pilot Flying. Furthermore, he would not have experienced the aircraft behavior that he was thinking to command, but rather a somewhat different behavior caused in part by the dual sidestick inputs and their addition in the flight control logic. This sequence may well have resulted in further cognitive confusion in an emergency situation in which clarity of thought and action was called for, in a very short time frame (some few seconds).

For reasons of visual clarity, we have suppressed in the WB-Graph the design of the various pieces of equipment as causal factors, even though the design of each piece of equipment is obviously a necessary causal factor in the (desired, as well as undesired) effects of its use. Some comments are therefore appropriate here on the overall potential contribution of design. The pieces of equipment that played a leading role in the interaction with the pilots in the Why-Because Analysis are

- Autopilot (AP)
- Flight Director (FD)
- Enhanced Ground Proximity Warning System (EGPWS)
- Sidesticks
- EGPWS/Sidestick Warnings interaction (a part of the ECAM design)

Of these pieces of equipment:

- An FD is an almost-universal piece of equipment on all high-performance jet aircraft, with an essentially uniform functional behavior across all similar aircraft.
- An EGPWS is similarly an almost-universal piece of equipment on all high-performance jet aircraft, mandated by regulation, whose behavior is internationally standardised. The original design was developed by Honeywell engineers.
- The autopilot functional behavior and sidestick functional behavior are an Airbus design. Its design, and its functional behavior during this accident sequence, is specific to this aircraft type and related designs from the same manufacturer.
- The sidestick DUAL INPUT warning, and its necessity, are specific to this aircraft type



and related designs from the same manufacturer. Hence the design of the warning prioritisation mechanism is also specific to this aircraft type and related designs from the same manufacturer.

Analysis Topic: ***Sochi - MAK/BEA***  
Analyst: ***Bernd Sieker***  
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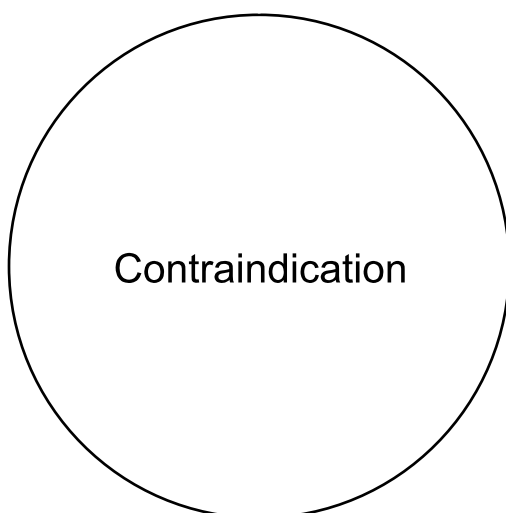
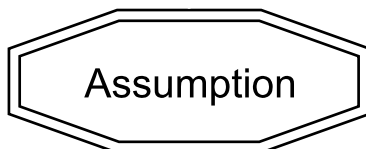
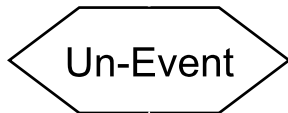
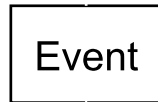
# INCIDENT ANALYSIS

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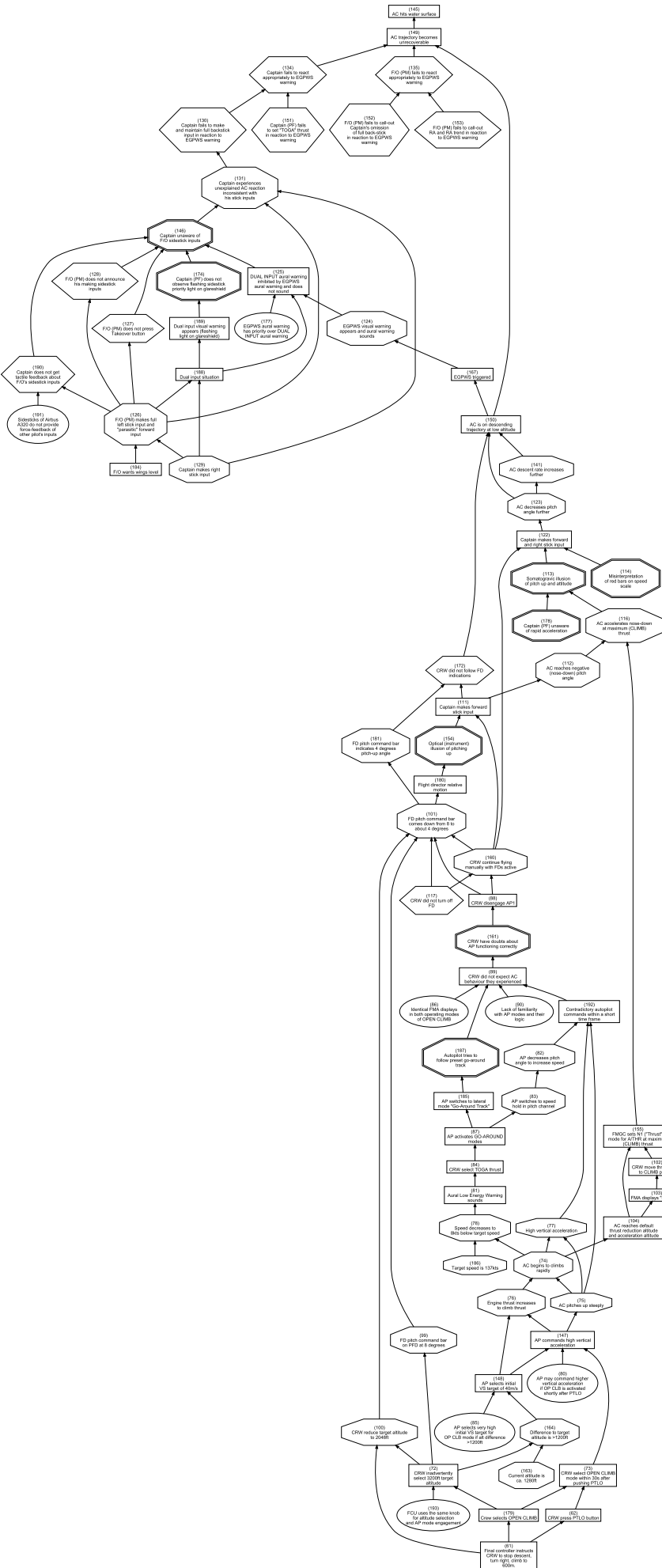
## Incident description:

Airbus A320 Accident near Sochi According to the official MAK report, in the translation of the BEA.

## ***Legend of Factorshapes***



## Why-Because Graph



# Timeline of Events

		Lat NAV	Lat LOC	Lat GA TRK	Lat HDG-TRK	Vert SRS	Vert CLB	Vert DES	Vert SOFT ALT	Vert G/S	Vert OP CLB	Vert OP DES	Vert V/S	ATHR: V/M	ATHR: THR	AP1	AP2	FD	FLAPS 0	FLAPS 1	FLAPS 2	FLAPS 3	FLAPS FULL	L/G
Sochi Approach Controller gives incomplete weather forecast	03.05.2006 21:16:07	X						X						X		X	X	X						
CRW decide to return to Yerevan	21:16:10	X						X						X		X	X	X						
Captain advises Tbilisi Regional Center West controller of return decision	21:16:14	X						X						X		X	X	X						
Tbilisi Regional Center West controller clears flight for turnaround	21:16:34	X						X						X		X	X	X						
Captain advises Sochi approach controller of return decision	21:17:00	X						X						X		X	X	X						
CRW asks Sochi approach controller for updated weather	21:26:31	X						X						X		X	X	X						
CRW tell Sochi approach controller that they have Deputies on board	21:28:00	X						X						X		X	X	X						
Sochi approach controller advises CRW of weather conditions close to, but within the limit	21:30:49	X						X						X		X	X	X						
Captain decides to fly back to Sochi	21:31:00	X						X						X		X	X	X						
Captain requests heading to BANUT for flight back to Sochi from Tbilisi Regional Center North	21:31:04	X						X						X		X	X	X						
Tbilisi North clears RNV 967 for heading to BANUT	21:31:10	X						X						X		X	X	X						
Captain informs Sochi approach controller of return decision	21:31:17	X						X						X		X	X	X						
CRW contact Tbilisi West to announce their flight	21:37:20	X						X						X		X	X	X						
Tbilisi West advises the CRW of weather conditions in Sochi	21:40:29	X						X						X		X	X	X						
Tbilisi West requests endurance and alternate from RNV 967	21:40:44	X						X						X		X	X	X						
CRW advises of endurance and alternates	21:40:48	X						X						X		X	X	X						
CRW prepare for possible go-around procedure	21:41:00	X						X						X		X	X	X						
Captains informs F/O about approach procedures	21:47:28	X						X						X		X	X	X						
Begin of descent	21:52:32	X						X						X		X	X	X						
Captain complains about AP DESCENT mode allegedly not descending	21:54:20	X						X						X		X	X	X						
Captain switches AP vertical mode to OPEN DESCENT	21:54:26	X								X				X		X	X	X						
Captain complains about AP not remaining in MANAGED mode.	21:55:31	X						X						X		X	X	X						
AP2 disengaged, AP1 engaged	21:55:48	X								X			X	X		X		X						
Strela clears RNV 967 for descent to 4800m	21:58:40	X								X			X	X	X		X	X						
Strela clears RNV 967 for descent to 3600m	21:59:18	X								X			X	X	X		X	X						
Sochi approach controller clears RNV 967 to continue descent to GUKIN	22:00:46	X								X			X	X	X		X	X						
CRW continue descent in OPEN DESCENT mode to target altitude of 1800m	22:01:00	X								X			X	X	X		X	X						
Sochi approach controller advises CRW of too high altitude	22:01:25	X								X			X	X	X		X	X						
Sochi approach controller advises CRW again of too high altitude	22:02:19	X								X			X	X	X		X	X						
CRW sets aerodrome pressure for Sochi	22:03:05	X								X			X	X	X		X	X						
Holding controller clears flight for descent to 600m and turn to final	22:03:29	X								X			X	X	X		X	X						
CRW turn to final	22:03:56			X									X	X		X		X						
Captain remarks about precipitation	22:04:18			X									X	X		X		X						
AP disengaged for 14 seconds	22:05:04												X				X	X						
AC overshoots runway heading	22:05:35			X									X	X		X		X						



		Lat NAV	Lat LOC	Lat GA TRK	Lat HDG-TRK	Vert SRS	Vert CLB	Vert DES	Vert SOFT ALT	Vert G/S	Vert OP CLB	Vert OP DES	Vert V/S	ATHR: V/M	ATHR: THR	AP1	AP2	FD	FLAPS 0	FLAPS 1	FLAPS 2	FLAPS 3	FLAPS FULL	L/G
CRW set HDG 090 to compensate for overshoot	22:05:40				X								X	X		X			X					
Holding controller advises CRW to turn to HDG 090 to compensate	22:05:50				X								X	X		X			X					
CRW select OPEN DESCENT mode to target alt 620m	22:06:34				X							X	X			X			X					
weather conditions measured: 4000m visibility, cloud ceiling 160m	22:07:00	X										X			X	X			X					
CRW select APPROACH CONTROL mode	22:07:02	X										X	X			X			X					
CRW start approach check list		X										X	X			X			X					
Holding controller gives less favourable weather report	22:07:35	X										X	X			X			X					
Holding controller instructs CRW to proceed at 600m without descent		X										X	X			X			X					
CRW discusses weather report and controller actions for three minutes	22:07:40	X										X	X			X			X					
CRW select Localizer Capture (LOC*) mode	22:07:48		X									X	X			X			X					
AP switches to LOC TRACK	22:08:14		X									X	X			X			X					
Captain decides to extend flaps to CONF 1	22:08:31		X									X	X			X			X	X				
Slats extended 18 degrees	22:08:50		X									X	X			X				X				
weather conditions measured: 4000m visibility, cloud ceiling 190m	22:09:00	X										X			X	X			X					
Flaps extended in CONF 2	22:09:20		X									X	X			X					X			
Holding controller advises CRW to contact Tower and gives weather data above minima	22:09:33		X									X	X			X					X			
CRW extend landing gear	22:09:46		X									X	X			X					X			X
AP 2 engaged	22:09:54		X									X	X			X	X				X			X
Final controller takes over control of AC	22:09:59		X									X	X			X	X				X			X
CRW select Glideslope Capture (G/S*) mode	22:10:27		X						X				X			X	X				X			X
Glideslope Track (G/S) mode engaged	22:10:42		X						X				X			X	X				X			X
CRW set Flaps to CONF 3	22:11:08		X						X				X			X	X					X		X
CRW increase selected speed to 137kts	22:11:16		X						X				X			X	X				X			X
CRW set flaps to CONF FULL	22:11:21		X								X		X			X	X					X	X	
CRW begin landing checklist	22:11:25		X						X				X			X	X					X	X	
Final controller instructs CRW to stop descent, turn right, climb to 600m.	22:11:40		X						X				X			X	X					X	X	
CRW press PTLO button	22:11:48		X						X				X			X	X					X	X	
AP vertical mode switches to V/S		X											X	X		X	X					X	X	
Pitch angle increases to 6 degrees		X											X	X		X	X					X	X	
AP2 disengages		X											X			X						X	X	
AP lateral mode switches to HDG					X								X	X		X						X	X	
Rudder pedal is moved to -1.4 degrees					X								X	X		X						X	X	
Captain fails to call for FLAPS retraction during Go-Around manoeuvre	22:11:50				X								X	X		X						X	X	
CRW set new heading 172 on FCU selector	22:11:52				X								X	X		X						X	X	
AC turns right					X								X	X		X						X	X	
Final controller repeats instructions for right climbing turn	22:11:53				X								X	X		X						X	X	
CRW inadvertently select 3200ft target altitude	22:11:57				X								X	X		X						X	X	
Current altitude is ca. 1280ft					X								X	X		X						X	X	
Difference to target altitude is >1200ft					X								X	X		X						X	X	
CRW select OPEN CLIMB mode within 30s after pushing PTLO	22:11:58				X					X			X			X						X	X	
Crew selects OPEN CLIMB				X						X			X			X						X	X	
Target speed is 137kts				X						X			X			X						X	X	
Autopilot moves rudder to +2.3 degrees	22:12:00				X								X	X		X						X	X	
AC begins to climbs rapidly					X					X			X			X						X	X	

		Lat NAV	Lat LOC	Lat GA TRK	Lat HDG-TRK	Vert SRS	Vert CLB	Vert DES	Vert: SOFT ALT	Vert: G/S	Vert: OP CLB	Vert: OP DES	Vert: V/S	ATHR: V/M	ATHR: THR	AP1	AP2	FD	FLAPS 0	FLAPS 1	FLAPS 2	FLAPS 3	FLAPS FULL	L/G
AC pitches up steeply				X						X			X	X	X								X	X
Engine thrust increases to climb thrust				X						X			X	X	X								X	X
CRW did not expect AC behaviour they experienced			X		X										X	X							X	X
AP commands high vertical acceleration			X							X					X	X							X	X
AP selects initial VS target of 40m/s			X							X					X	X							X	X
Aural Low Energy Warning sounds	22:12:04			X						X			X	X	X								X	X
AP decreases pitch angle to increase speed				X									X	X	X								X	X
AP switches to speed hold in pitch channel				X	X										X								X	X
Contradictory autopilot commands within a short time frame																								
High vertical acceleration	22:12:06			X						X			X	X	X								X	X
Speed decreases to 8kts below target speed				X						X			X	X	X								X	X
CRW select TOGA thrust	22:12:07			X						X					X								X	X
AP activates GO-AROUND modes			X		X										X								X	X
CRW disengage AP1			X		X												X						X	X
CRW make a short -2.3 degrees pedal input			X		X												X						X	X
CRW continue flying manually with FDs active			X							X				X	X		X						X	X
CRW have doubts about AP functioning correctly			X							X				X	X								X	X
CRW did not follow FD indications			X							X				X	X								X	X
AP switches to lateral mode "Go-Around Track"			X		X									X	X								X	X
Autopilot tries to follow preset go-around track																								
Captain makes forward (nose-down) and left stick input	22:12:08		X		X												X						X	X
AC decreases pitch angle to 4 degrees			X		X												X						X	X
AC reduces bank angle to 7 degrees			X		X												X						X	X
IAS increases to 140 kts			X		X												X						X	X
RoC decreases to 1-2 m/s			X		X												X						X	X
F/O fails to announce low pitch angle			X		X									X			X	X						X
Captain makes -9 degree right sidestick input	22:12:19		X		X												X						X	X
AC performs stabilised right turn at 20 degrees bank angle			X		X												X						X	X
FD pitch command bar on PFD at 8 degrees			X		X												X						X	X
FD command bars disagree with manual control			X		X									X			X						X	X
CRW reduce target altitude to 2048ft	22:12:20		X		X												X						X	X
FD pitch command bar comes down from 8 to about 4 degrees			X		X												X						X	X
Optical (instrument) illusion of pitching up			X							X				X			X							X
Flight director relative motion			X		X									X			X						X	X
FD pitch command bar indicates 4 degrees pitch-up angle																								
CRW move thrust levers to CLIMB position	22:12:24		X		X									X			X						X	X
FMA displays "LVR CLB"			X		X									X			X						X	X
AC reaches default thrust reduction altitude and acceleration altitude			X		X									X			X						X	X
FMGS sets OPEN CLIMB mode and target speed 202kts			X							X				X			X						X	X
Somatogravic illusion of pitch up and attitude			X							X				X			X						X	X
FMGC sets N1 ("Thrust") mode for A/THR at maximum (CLIMB) thrust			X							X				X			X						X	X
Captain (PF) unaware of rapid acceleration			X							X				X			X						X	X
AC in stabilised climbing right turn	22:12:26		X							X				X			X						X	X
Final controller advises CRW to call Sochi holding controller	22:12:28		X							X				X			X						X	X
Misinterpretation of red bars on speed scale			X							X				X			X						X	X
Captain makes forward and right stick inputs	22:12:30		X							X				X			X						X	X
AC decreases pitch to 1.4 degrees			X							X				X			X						X	X
AC increases bank angle to 30 degrees			X							X				X			X						X	X

		Lat NAV	Lat LOC	Lat GA TRK	Lat HDG-TRK	Vert SRS	Vert CLB	Vert DES	Vert: SOFT ALT	Vert: G/S	Vert: OP CLB	Vert: OP DES	Vert: V/S	A/THR: V/M	A/THR: THR	AP1	AP2	FD	FLAPS 0	FLAPS 1	FLAPS 2	FLAPS 3	FLAPS FULL	L/G
Captain makes forward stick input	22:12:34			X						X				X				X					X	X
AC reaches negative (nose-down) pitch angle				X						X				X				X					X	X
AC accelerates nose-down at maximum (CLIMB) thrust				X						X				X				X			X		X	
CRW did not turn off FD				X						X				X				X				X		X
F/O fails to announce descent rate				X	X									X				X	X					X
AC is on descending trajectory at low altitude				X						X				X				X					X	X
A/THR remains in N1 mode at full climb thrust				X						X				X				X					X	X
Captain orders F/O to retract flaps	22:12:37			X						X				X				X					X	X
Flaps start retracting to CONF 2				X						X				X				X		X				X
AC reaches VFE for CONF FULL				X						X				X				X		X				X
Controller advises about new approach procedure	22:12:40			X						X				X				X	X					X
MASTER WARNING / CRC warning for overspeed activates	22:12:41			X						X				X				X		X				X
Flaps start retracting to CONF 1	22:12:45			X						X				X				X	X					X
Captain makes forward and right stick input				X						X				X				X	X					X
AC decreases pitch angle further				X						X				X				X	X					X
AC descent rate increases further				X						X								X	X					X
EGPWS visual warning appears and aural warning sounds	22:12:47			X						X				X				X	X					X
DUAL INPUT aural warning inhibited by EGPWS aural warning and does not sound				X						X				X				X	X					X
F/O (PM) makes full left stick input and "parasitic" forward input				X						X				X				X	X					X
F/O (PM) does not press Takeover button				X						X				X				X	X					X
F/O (PM) does not announce his making sidestick inputs				X						X				X				X	X					X
Captain makes right stick input				X						X				X				X	X					X
Captain fails to react appropriately to EGPWS warning				X						X				X				X	X					X
F/O (PM) fails to react appropriately to EGPWS warning				X						X				X				X	X					X
Captain unaware of F/O sidestick inputs				X						X				X				X	X					X
EGPWS triggered				X						X				X				X	X					X
Captain (PF) does not observe flashing sidestick priority light on glareshield				X						X				X				X	X					X
F/O wants wings level																								
Dual input situation																								
Dual input visual warning appears (flashing light on glareshield)																								
Captain does not get tactile feedback about F/O's sidestick inputs																								
Captain fails to make and maintain full backstick input in reaction to EGPWS warning	22:12:48			X						X				X				X	X					X
Captain experiences unexplained AC reaction inconsistent with his stick inputs				X						X				X				X	X					X
Captain (PF) fails to set "TOGA" thrust in reaction to EGPWS warning				X						X								X	X					X
AP/FD vertical mode change to VS	22:12:49			X						X				X				X	X					X
A/THR system reduces thrust to prevent overspeed				X						X				X				X	X					X
F/O (PM) fails to call-out Captain's omission of full backstick in reaction to EGPWS warning				X						X								X	X					X
Preset vertical speed becomes 25.4m/s				X						X				X				X	X					X
A/THR mode changes to speed hold (V/M)				X						X				X				X	X					X
IAS reaches VFE + 4kts				X						X				X				X	X					X
F/O (PM) fails to call-out RA and RA trend in reaction to EGPWS warning	22:12:50			X						X				X				X	X					X
CRW move thrust levers to idle and back to CL	22:12:51			X						X				X				X	X					X
A/THR disengages				X						X								X	X					X

		Lat NAV	Lat LOC	Lat GA TRK	Lat HDG-TRK	Vert SRS	Vert CLB	Vert DES	Vert SOFT ALT	Vert G/S	Vert OP CLB	Vert OP DES	Vert V/S	A/THR: V/M	A/THR: THR	AP1	AP2	FD	FLAPS 0	FLAPS 1	FLAPS 2	FLAPS 3	FLAPS FULL	L/G
AC trajectory becomes unrecoverable	22:12:58			X							X							X	X				X	
High-lift devices retract to CONF 0	22:13:01			X							X							X	X				X	
-6 degrees pedal input				X							X							X	X				X	
AC bank angle reduces				X							X							X	X				X	
AC hits water surface	22:13:03			X							X							X	X				X	

## ***Factor List - Overview***

- 1 Sochi Approach Controller gives incomplete weather forecast
- 2 CRW decide to return to Yerevan
- 3 Captain advises Tbilisi Regional Center West controller of return decision
- 4 CRW asks Sochi approach controller for updated weather
- 5 Captain advises Sochi approach controller of return decision
- 6 Tbilisi Regional Center West controller clears flight for turnaround
- 7 CRW tell Sochi approach controller that they have Deputies on board
- 8 Sochi approach controller advises CRW of weather conditions close to, but within the limit
- 9 Captain decides to fly back to Sochi
- 10 Captain requests heading to BANUT for flight back to Sochi from Tbilisi Regional Center North
- 11 Tbilisi North clears RNV 967 for heading to BANUT
- 12 Captain informs Sochi approach controller of return decision
- 13 CRW contact Tbilisi West to announce their flight
- 14 Tbilisi West advises the CRW of weather conditions in Sochi
- 15 Tbilisi West requests endurance and alternate from RNV 967
- 16 CRW advises of endurance and alternates
- 17 CRW prepare for possible go-around procedure
- 18 Captains informs F/O about approach procedures
- 19 Begin of descent
- 20 Captain complains about AP DESCENT mode allegedly not descending
- 21 Captain switches AP vertical mode to OPEN DESCENT
- 22 Captain complains about AP not remaining in MANAGED mode.
- 23 AP2 disengaged, AP1 engaged
- 24 Strela clears RNV 967 for descent to 4800m
- 25 Strela clears RNV 967 for descent to 3600m
- 26 Sochi approach controller clears RNV 967 to continue descent to GUKIN
- 27 CRW continue descent in OPEN DESCENT mode to target altitude of 1800m
- 28 weather conditions measured: 4000m visibility, cloud ceiling 160m
- 29 weather conditions measured: 4000m visibility, cloud ceiling 190m
- 30 Sochi approach controller advises CRW of too high altitude
- 31 Sochi approach controller advises CRW again of too high altitude
- 32 CRW sets aerodrome pressure for Sochi
- 33 Holding controller clears flight for descent to 600m and turn to final
- 34 CRW turn to final
- 35 Captain remarks about precipitation
- 36 AP disengaged for 14 seconds
- 37 AC overshoots runway heading
- 38 CRW set HDG 090 to compensate for overshoot
- 39 Holding controller advises CRW to turn to HDG 090 to compensate
- 40 CRW select OPEN DESCENT mode to target alt 620m
- 41 CRW select APPROACH CONTROL mode
- 42 CRW start approach check list
- 43 Holding controller gives less favourable weather report
- 44 CRW discusses weather report and controller actions for three minutes
- 45 Holding controller instructs CRW to proceed at 600m without descent
- 46 CRW select Localizer Capture (LOC\*) mode
- 47 AP switches to LOC TRACK
- 48 Captain decides to extend flaps to CONF 1
- 49 Slats extended 18 degrees
- 50 Flaps extended in CONF 2
- 51 Holding controller advises CRW to contact Tower and gives weather data above minima

52 CRW extend landing gear  
53 AP 2 engaged  
54 Final controller takes over control of AC  
55 CRW select Glideslope Capture (G/S\*) mode  
56 Glideslope Track (G/S) mode engaged  
57 CRW set Flaps to CONF 3  
58 CRW increase selected speed to 137kts  
59 CRW set flaps to CONF FULL  
60 CRW begin landing checklist  
61 Final controller instructs CRW to stop descent, turn right, climb to 600m.  
62 CRW press PTLO button  
63 AP vertical mode switches to V/S  
64 Pitch angle increases to 6 degrees  
65 AP2 disengages  
66 AP lateral mode switches to HDG  
67 Rudder pedal is moved to -1.4 degrees  
68 CRW set new heading 172 on FCU selector  
69 AC turns right  
70 Autopilot moves rudder to +2.3 degrees  
71 Final controller repeats instructions for right climbing turn  
72 CRW inadvertently select 3200ft target altitude  
73 CRW select OPEN CLIMB mode within 30s after pushing PTLO  
74 AC begins to climb rapidly  
75 AC pitches up steeply  
76 Engine thrust increases to climb thrust  
77 High vertical acceleration  
78 Speed decreases to 8kts below target speed  
80 AP may command higher vertical acceleration if OP CLB is activated shortly after PTLO  
81 Aural Low Energy Warning sounds  
82 AP decreases pitch angle to increase speed  
83 AP switches to speed hold in pitch channel  
84 CRW select TOGA thrust  
85 AP selects very high initial VS target for OP CLB mode if alt difference >1200ft  
86 Identical FMA displays in both operating modes of OPEN CLIMB  
87 AP activates GO-AROUND modes  
88 CRW disengage AP1  
89 CRW did not expect AC behaviour they experienced  
90 Lack of familiarity with AP modes and their logic  
91 Captain makes forward (nose-down) and left stick input  
92 AC decreases pitch angle to 4 degrees  
93 AC reduces bank angle to 7 degrees  
94 IAS increases to 140 kts  
95 CRW make a short -2.3 degrees pedal input  
96 RoC decreases to 1-2 m/s  
97 Captain makes -9 degrees right sidestick input  
98 AC performs stabilised right turn at 20 degrees bank angle  
99 FD pitch command bar on PFD at 8 degrees  
100 CRW reduce target altitude to 2048ft  
101 FD pitch command bar comes down from 8 to about 4 degrees  
102 CRW move thrust levers to CLIMB position  
103 FMA displays "LVR CLB"  
104 AC reaches default thrust reduction altitude and acceleration altitude  
105 FMGS sets OPEN CLIMB mode and target speed 202kts  
106 AC in stabilised climbing right turn  
107 Final controller advises CRW to call Sochi holding controller

108 Captain makes forward and right stick inputs  
109 AC decreases pitch to 1.4 degrees  
110 AC increases bank angle to 30 degrees  
111 Captain makes forward stick input  
112 AC reaches negative (nose-down) pitch angle  
113 Somatogravic illusion of pitch up and attitude  
114 Misinterpretation of red bars on speed scale  
115 Captain orders F/O to retract flaps  
116 AC accelerates nose-down at maximum (CLIMB) thrust  
117 CRW did not turn off FD  
119 Flaps start retracting to CONF 2  
120 MASTER WARNING / CRC warning for overspeed activates  
121 Flaps start retracting to CONF 1  
122 Captain makes forward and right stick input  
123 AC decreases pitch angle further  
124 EGPWS visual warning appears and aural warning sounds  
125 DUAL INPUT aural warning inhibited by EGPWS aural warning and does not sound  
126 F/O (PM) makes full left stick input and "parasitic" forward input  
127 F/O (PM) does not press Takeover button  
128 F/O (PM) does not announce his making sidestick inputs  
129 Captain makes right stick input  
130 Captain fails to make and maintain full backstick input in reaction to EGPWS warning  
131 Captain experiences unexplained AC reaction inconsistent with his stick inputs  
132 F/O fails to announce low pitch angle  
133 F/O fails to announce descent rate  
134 Captain fails to react appropriately to EGPWS warning  
135 F/O (PM) fails to react appropriately to EGPWS warning  
136 Controller advises about new approach procedure  
137 AP/FD vertical mode change to VS  
138 A/THR system reduces thrust to prevent overspeed  
139 CRW move thrust levers to idle and back to CL  
140 A/THR disengages  
141 AC descent rate increases further  
142 High-lift devices retract to CONF 0  
143 -6 degrees pedal input  
144 AC bank angle reduces  
145 AC hits water surface  
146 Captain unaware of F/O sidestick inputs  
147 AP commands high vertical acceleration  
148 AP selects initial VS target of 40m/s  
149 AC trajectory becomes unrecoverable  
150 AC is on descending trajectory at low altitude  
151 Captain (PF) fails to set "TOGA" thrust in reaction to EGPWS warning  
152 F/O (PM) fails to call-out Captain's omission of full back-stick in reaction to EGPWS warning  
153 F/O (PM) fails to call-out RA and RA trend in reaction to EGPWS warning  
154 Optical (instrument) illusion of pitching up  
155 FMGC sets N1 ("Thrust") mode for A/THR at maximum (CLIMB) thrust  
156 Preset vertical speed becomes 25.4m/s  
157 A/THR mode changes to speed hold (V/M)  
158 IAS reaches VFE + 4kts  
159 FD command bars disagree with manual control  
160 CRW continue flying manually with FDs active  
161 CRW have doubts about AP functioning correctly  
163 Current altitude is ca. 1280ft  
164 Difference to target altitude is >1200ft

165 SOP requires F/O to call out omissions of Captain's actions to EGPWS reactions  
166 SOP requires Captain to set TOGA set  
167 EGPWS triggered  
168 AC reaches VFE for CONF FULL  
170 FCOM recommends FD disengagement if not following FD  
171 A/THR remains in N1 mode at full climb thrust  
172 CRW did not follow FD indications  
173 SOP requires use of Takeover button and Call-out if using Sidestick as PNF  
174 Captain (PF) does not observe flashing sidestick priority light on glareshield  
175 Captain fails to call for FLAPS retraction during Go-Around manoeuvre  
176 SOP requires PF to make and maintain full backstick deflection  
177 EGPWS aural warning has priority over DUAL INPUT aural warning  
178 Captain (PF) unaware of rapid acceleration  
179 Crew selects OPEN CLIMB  
180 Flight director relative motion  
181 FD pitch command bar indicates 4 degrees pitch-up angle  
182 DUAL INPUT aural warning inhibition by EGPWS aural warning is not mentioned in FCOM  
183 Captain relies on DUAL INPUT aural warning to alert him to cross-controlling  
184 F/O wants wings level  
185 AP switches to lateral mode "Go-Around Track"  
186 Target speed is 137kts  
187 Autopilot tries to follow preset go-around track  
188 Dual input situation  
189 Dual input visual warning appears (flashing light on glareshield)  
190 Captain does not get tactile feedback about F/O's sidestick inputs  
191 Sidesticks of Airbus A320 do not provide force-feedback of other pilot's inputs  
192 Contradictory autopilot commands within a short time frame  
193 FCU uses the same knob for altitude selection and AP mode engagement



## ***Factor List - Details***

### **1 Sochi Approach Controller gives incomplete weather forecast**

Type of Factor: Event  
Date/Time: 03.05.2006 21:16:07  
Actors involved: Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
Lateral AP Mode: NAV or APP NAV (MAN)  
High-lift devices completely retracted  
Annotation: The trend "AT TIMES" was omitted.

### **2 CRW decide to return to Yerevan**

Type of Factor: Event  
Date/Time: 03.05.2006 21:16:10  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted

### **3 Captain advises Tbilisi Regional Center West controller of return decision**

Type of Factor: Event  
Date/Time: 03.05.2006 21:16:14  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted

### **4 CRW asks Sochi approach controller for updated weather**

Type of Factor: Event  
Date/Time: 03.05.2006 21:26:31  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted

### **5 Captain advises Sochi approach controller of return decision**

Type of Factor: Event  
Date/Time: 03.05.2006 21:17:00  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted

### **6 Tbilisi Regional Center West controller clears flight for turnaround**

Type of Factor: Event  
Date/Time: 03.05.2006 21:16:34  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted

- 7 CRW tell Sochi approach controller that they have Deputies on board**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:28:00  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted  
Annotation: This was untrue. Might have been used to encourage the Sochi controller to give them a more favourable weather forecast
- 8 Sochi approach controller advises CRW of weather conditions close to, but within the limit**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:30:49  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted
- 9 Captain decides to fly back to Sochi**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:31:00  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted
- 10 Captain requests heading to BANUT for flight back to Sochi from Tbilisi Regional Center North**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:31:04  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted
- 11 Tbilisi North clears RNV 967 for heading to BANUT**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:31:10  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted
- 12 Captain informs Sochi approach controller of return decision**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:31:17  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted

- 13 CRW contact Tbilisi West to announce their flight**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:37:20  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted
- 14 Tbilisi West advises the CRW of weather conditions in Sochi**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:40:29  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted  
Annotation: Gives the same data as Sochi controller at 21:30:49
- 15 Tbilisi West requests endurance and alternate from RNV 967**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:40:44  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted
- 16 CRW advises of endurance and alternates**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:40:48  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted  
Annotation: Endurance 2.5 hours, alternates Rostov and Yerevan
- 17 CRW prepare for possible go-around procedure**  
Type of Factor: Process  
Date/Time: 03.05.2006 21:41:00  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted
- 18 Captains informs F/O about approach procedures**  
Type of Factor: Process  
Date/Time: 03.05.2006 21:47:28  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Altitude Cruise (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted

- 19 Begin of descent**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:52:32  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Descent (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted  
Annotation: CRW sets target altitude 21950 ft
- 20 Captain complains about AP DESCENT mode allegedly not descending**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:54:20  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Descent (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted
- 21 Captain switches AP vertical mode to OPEN DESCENT**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:54:26  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 2 active  
High-lift devices completely retracted  
Annotation: Descent rate increases to 10-12m/s,
- 22 Captain complains about AP not remaining in MANAGED mode.**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:55:31  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Descent (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 2 active  
High-lift devices completely retracted
- 23 AP2 disengaged, AP1 engaged**  
Type of Factor: Process  
Date/Time: 03.05.2006 21:55:48  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted  
Annotation: Briefly A/THR in speed mode, after that in N1 mode
- 24 Strela clears RNV 967 for descent to 4800m**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:58:40  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted

- 25 Strela clears RNV 967 for descent to 3600m**  
Type of Factor: Event  
Date/Time: 03.05.2006 21:59:18  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted
- 26 Sochi approach controller clears RNV 967 to continue descent to GUKIN**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:00:46  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted  
Vertical AP Mode: Open Descent (SEL)
- 27 CRW continue descent in OPEN DESCENT mode to target altitude of 1800m**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:01:00  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted
- 28 weather conditions measured: 4000m visibility, cloud ceiling 160m**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:07:00  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted
- 29 weather conditions measured: 4000m visibility, cloud ceiling 190m**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:09:00  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted
- 30 Sochi approach controller advises CRW of too high altitude**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:01:25  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted  
Annotation: Instructions to continue descent to 1800m to GUKIN

- 31 Sochi approach controller advises CRW again of too high altitude**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:02:19  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted  
Annotation: ("if able expedite descent!")
- 32 CRW sets aerodrome pressure for Sochi**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:03:05  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted  
Annotation: At 3680m
- 33 Holding controller clears flight for descent to 600m and turn to final**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:03:29  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices completely retracted
- 34 CRW turn to final**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:03:56  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Autothrust Mode: Speed/Mach  
Vertical AP Mode: Vertical Speed (SEL)  
Autopilot 1 active  
High-lift devices completely retracted
- 35 Captain remarks about precipitation**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:04:18  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted
- 36 AP disengaged for 14 seconds**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:05:04  
Actors involved: Autothrust Mode: Speed/Mach  
Flight Directors active  
High-lift devices completely retracted

**37 AC overshoots runway heading**

Type of Factor: Event  
Date/Time: 03.05.2006 22:05:35  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted

**38 CRW set HDG 090 to compensate for overshoot**

Type of Factor: Event  
Date/Time: 03.05.2006 22:05:40  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted

**39 Holding controller advises CRW to turn to HDG 090 to compensate**

Type of Factor: Event  
Date/Time: 03.05.2006 22:05:50  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted

**40 CRW select OPEN DESCENT mode to target alt 620m**

Type of Factor: Event  
Date/Time: 03.05.2006 22:06:34  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Autothrust Mode: Speed/Mach  
Vertical AP Mode: Open Descent (SEL)  
Autopilot 1 active  
High-lift devices completely retracted

**41 CRW select APPROACH CONTROL mode**

Type of Factor: Event  
Date/Time: 03.05.2006 22:07:02  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted

Annotation: There is no autopilot mode called "APPROACH CONTROL". It is not clear what is meant here.

**42 CRW start approach check list**

Type of Factor: Event  
Date/Time: 03.05.2006 22:07:02  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted

- 43 Holding controller gives less favourable weather report**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:07:35  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted
- 44 CRW discusses weather report and controller actions for three minutes**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:07:40  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted  
Annotation: Including use of expletives, even between checklist items
- 45 Holding controller instructs CRW to proceed at 600m without descent**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:07:35  
Actors involved: Lateral AP Mode: NAV or APP NAV (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted
- 46 CRW select Localizer Capture (LOC\*) mode**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:07:48  
Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted  
Annotation: Localizer Capture mode to align with localizer
- 47 AP switches to LOC TRACK**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:08:14  
Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices completely retracted  
Annotation: Localizer Track, meaning AC is and remains aligned with the localizer.  
Altitude 600m
- 48 Captain decides to extend flaps to CONF 1**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:08:31  
Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration 1  
High-lift devices completely retracted



**49 Slats extended 18 degrees**

Type of Factor: Event

Date/Time: 03.05.2006 22:08:50

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration 1

**50 Flaps extended in CONF 2**

Type of Factor: Event

Date/Time: 03.05.2006 22:09:20

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration 2

**51 Holding controller advises CRW to contact Tower and gives weather data above minima**

Type of Factor: Event

Date/Time: 03.05.2006 22:09:33

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration 2

**52 CRW extend landing gear**

Type of Factor: Event

Date/Time: 03.05.2006 22:09:46

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration 2  
Landing gear extended

**53 AP 2 engaged**

Type of Factor: Event

Date/Time: 03.05.2006 22:09:54

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
Autopilot 2 active  
High-lift devices in configuration 2  
Landing gear extended

Annotation: AP1 and AP2 now both active

**54 Final controller takes over control of AC**

Type of Factor: Event

Date/Time: 03.05.2006 22:09:59

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Open Descent (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
Autopilot 2 active  
High-lift devices in configuration 2  
Landing gear extended

**55 CRW select Glideslope Capture (G/S\*) mode**

Type of Factor: Event

Date/Time: 03.05.2006 22:10:27

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Glideslope Capture or Track (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
Autopilot 2 active  
High-lift devices in configuration 2  
Landing gear extended

**56 Glideslope Track (G/S) mode engaged**

Type of Factor: Event

Date/Time: 03.05.2006 22:10:42

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Glideslope Capture or Track (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
Autopilot 2 active  
High-lift devices in configuration 2  
Landing gear extended

Annotation: AC is and remains on glide slope

**57 CRW set Flaps to CONF 3**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:08

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Glideslope Capture or Track (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
Autopilot 2 active  
High-lift devices in configuration 3  
Landing gear extended

**58 CRW increase selected speed to 137kts**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:16

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Glideslope Capture or Track (MAN)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
Autopilot 2 active  
High-lift devices in configuration 3  
Landing gear extended

**59 CRW set flaps to CONF FULL**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:21

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)

Vertical AP Mode: Open Descent (SEL)

Autothrust Mode: Speed/Mach

Autopilot 1 active

Autopilot 2 active

High-lift devices in configuration FULL (4)

Landing gear extended

Annotation: Target speed and actual speed match, 137kts

AC stabilised on glide slope, ready for landing

**60 CRW begin landing checklist**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:25

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)

Vertical AP Mode: Glideslope Capture or Track (MAN)

Autothrust Mode: Speed/Mach

Autopilot 1 active

Autopilot 2 active

High-lift devices in configuration FULL (4)

Landing gear extended

**61 Final controller instructs CRW to stop descent, turn right, climb to 600m.**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:40

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)

Vertical AP Mode: Glideslope Capture or Track (MAN)

Autothrust Mode: Speed/Mach

Autopilot 1 active

Autopilot 2 active

High-lift devices in configuration FULL (4)

Landing gear extended

Annotation: altitude 390m, 7km from RWY edge.

Thrust levers at CL (autothrust active)

No explicit go-around instruction

**62 CRW press PTLO button**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:48

Actors involved: Autothrust Mode: Speed/Mach

Lateral AP Mode: Localizer Capture or Track (MAN)

Vertical AP Mode: Glideslope Capture or Track (MAN)

Autopilot 1 active

Autopilot 2 active

High-lift devices in configuration FULL (4)

Landing gear extended

Annotation: "Push to level off"

**63 AP vertical mode switches to V/S**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:48

Actors involved: Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Lateral AP Mode: Localizer Capture or Track (MAN)  
Autopilot 1 active  
Autopilot 2 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**64 Pitch angle increases to 6 degrees**

Type of Factor: Process

Date/Time: 03.05.2006 22:11:48

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Autothrust Mode: Speed/Mach  
Vertical AP Mode: Vertical Speed (SEL)  
Autopilot 1 active  
Autopilot 2 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**65 AP2 disengages**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:48

Actors involved: Lateral AP Mode: Localizer Capture or Track (MAN)  
Vertical AP Mode: Vertical Speed (SEL)  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**66 AP lateral mode switches to HDG**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:48

Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

Annotation: preset heading 62, equal to current heading

**67 Rudder pedal is moved to -1.4 degrees**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:48

Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

Annotation: A320 does not require rudder pedal inputs during normal flight

**68 CRW set new heading 172 on FCU selector**

Type of Factor: Event  
Date/Time: 03.05.2006 22:11:52  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**69 AC turns right**

Type of Factor: Process  
Date/Time: 03.05.2006 22:11:52  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: max bank angle 25 degrees  
constant altitude 1114ft

**70 Autopilot moves rudder to +2.3 degrees**

Type of Factor: Event  
Date/Time: 03.05.2006 22:12:00  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: Autopilot move rudder against pedal travel

**71 Final controller repeats instructions for right climbing turn**

Type of Factor: Event  
Date/Time: 03.05.2006 22:11:53  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**72 CRW inadvertently select 3200ft target altitude**

Type of Factor: Event  
Date/Time: 03.05.2006 22:11:57  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: Previously was, should have remained, and will be changed again to, 2048ft.  
cf. MAK/BEA report, p42

**73 CRW select OPEN CLIMB mode within 30s after pushing PTLO**

Type of Factor: Event

Date/Time: 03.05.2006 22:11:58

Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**74 AC begins to climbs rapidly**

Type of Factor: Process

Date/Time: 03.05.2006 22:12:00

Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

Annotation: Vertical speed up to 12m/s

**75 AC pitches up steeply**

Type of Factor: Process

Date/Time: 03.05.2006 22:12:00

Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

Annotation: up to 21 degrees, at 10.7 degrees AoA

**76 Engine thrust increases to climb thrust**

Type of Factor: Process

Date/Time: 03.05.2006 22:12:00

Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

Annotation: Maximum power in normal flight.

**77 High vertical acceleration**

Type of Factor: Process

Date/Time: 03.05.2006 22:12:06

Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

Annotation: up to 1.27g

**78 Speed decreases to 8kts below target speed**

Type of Factor: Process  
Date/Time: 03.05.2006 22:12:06  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: Target speed 137kts

**80 AP may command higher vertical acceleration if OP CLB is activated shortly after PTLO**

Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: Design decision

**81 Aural Low Energy Warning sounds**

Type of Factor: Event  
Date/Time: 03.05.2006 22:12:04  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: "SPEED SPEED SPEED!"

**82 AP decreases pitch angle to increase speed**

Type of Factor: Process  
Date/Time: 03.05.2006 22:12:04  
Actors involved: Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Lateral AP Mode: Heading/Track (SEL)  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**83 AP switches to speed hold in pitch channel**

Type of Factor: Process  
Date/Time: 03.05.2006 22:12:04  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Autothrust Mode: N1  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: SRS mode, "Speed Reference System"

**84 CRW select TOGA thrust**

Type of Factor: Event  
Date/Time: 03.05.2006 22:12:07  
Actors involved: Autopilot 1 active  
Vertical AP Mode: Open Climb (SEL)  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Lateral AP Mode: Heading/Track (SEL)

- 85 AP selects very high initial VS target for OP CLB mode if alt difference >1200ft**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: After reaching 95% rpm of maximum (CLIMB) thrust:  
Design decision
- 86 Identical FMA displays in both operating modes of OPEN CLIMB**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: Design decision
- 87 AP activates GO-AROUND modes**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:07  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Autothrust Mode: N1  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: TOGA thrust  
A/THR inactive/armed
- 88 CRW disengage AP1**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:07  
Actors involved: Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: From now on manual flying in FD mode  
Bank angle 25  
Pitch angle 21  
AoA 10.2  
RoC 11m/s
- 89 CRW did not expect AC behaviour they experienced**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:00  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Autopilot 1 active
- 90 Lack of familiarity with AP modes and their logic**  
Type of Factor: State  
Date/Time:  
Actors involved: High-lift devices in configuration FULL (4)  
Landing gear extended



- 91 Captain makes forward (nose-down) and left stick input**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:08  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 92 AC decreases pitch angle to 4 degrees**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:08  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 93 AC reduces bank angle to 7 degrees**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:08  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 94 IAS increases to 140 kts**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:08  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 95 CRW make a short -2.3 degrees pedal input**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:07  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: Aircraft does not require rudder pedal inputs in normal flight.
- 96 RoC decreases to 1-2 m/s**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:08  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended

- 97 Captain makes -9 degree right sidestick input**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:19  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 98 AC perfoms stabilised right turn at 20 degrees bank angle**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:19  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: 20 degree is minimum bank angle for Sochi GA procedure  
pitch angle 3  
RoC 2.5m/s
- 99 FD pitch command bar on PFD at 8 degrees**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:19  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 100 CRW reduce target altitude to 2048ft**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:20  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: About equal to instructed altitude of 600m
- 101 FD pitch command bar comes down from 8 to about 4 degrees**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:20  
Actors involved: Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 102 CRW move thrust levers to CLIMB position**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:24  
Actors involved: Autothrust Mode: N1  
Flight Directors active  
Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended

**103 FMA displays "LVR CLB"**

Type of Factor: Event

Date/Time: 03.05.2006 22:12:24

Actors involved: Autothrust Mode: N1

Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)

Flight Directors active

Lateral AP Mode: Go-Around Track (MAN)

High-lift devices in configuration FULL (4)

Landing gear extended

**104 AC reaches default thrust reduction altitude and acceleration altitude**

Type of Factor: Event

Date/Time: 03.05.2006 22:12:24

Actors involved: Autothrust Mode: N1

Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)

Flight Directors active

Lateral AP Mode: Go-Around Track (MAN)

High-lift devices in configuration FULL (4)

Landing gear extended

Annotation: 1500ft + 40ft aerodrome elevation

**105 FMGS sets OPEN CLIMB mode and target speed 202kts**

Type of Factor: Event

Date/Time: 03.05.2006 22:12:24

Actors involved: Autothrust Mode: N1

Flight Directors active

Vertical AP Mode: Open Climb (SEL)

Lateral AP Mode: Go-Around Track (MAN)

High-lift devices in configuration FULL (4)

Landing gear extended

**106 AC in stabilised climbing right turn**

Type of Factor: Process

Date/Time: 03.05.2006 22:12:26

Actors involved: Vertical AP Mode: Open Climb (SEL)

Autothrust Mode: N1

Flight Directors active

Lateral AP Mode: Go-Around Track (MAN)

High-lift devices in configuration FULL (4)

Landing gear extended

Annotation: IAS 163kts  
bank angle 20  
pitch angle 3  
RoC 2.5m/s

**107 Final controller advises CRW to call Sochi holding controller**

Type of Factor: Event

Date/Time: 03.05.2006 22:12:28

Actors involved: Vertical AP Mode: Open Climb (SEL)

Autothrust Mode: N1

Flight Directors active

Lateral AP Mode: Go-Around Track (MAN)

High-lift devices in configuration FULL (4)

Landing gear extended

- 108 Captain makes forward and right stick inputs**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:30  
Actors involved: Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 109 AC decreases pitch to 1.4 degrees**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:30  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 110 AC increases bank angle to 30 degrees**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:30  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 111 Captain makes forward stick input**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:34  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 112 AC reaches negative (nose-down) pitch angle**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:34  
Actors involved: Vertical AP Mode: Open Climb (SEL)  
Lateral AP Mode: Go-Around Track (MAN)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**113 Somatogravic illusion of pitch up and attitude**

Type of Factor: Assumption

Date/Time: 03.05.2006 22:12:24

Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**114 Misinterpretation of red bars on speed scale**

Type of Factor: Assumption

Date/Time: 03.05.2006 22:12:28

Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended

**115 Captain orders F/O to retract flaps**

Type of Factor: Event

Date/Time: 03.05.2006 22:12:37

Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
Landing gear extended  
High-lift devices in configuration FULL (4)

**116 AC accelerates nose-down at maximum (CLIMB) thrust**

Type of Factor: Process

Date/Time: 03.05.2006 22:12:34

Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 3  
Landing gear extended

**117 CRW did not turn off FD**

Type of Factor: UnEvent

Date/Time: 03.05.2006 22:12:34

Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 3  
Landing gear extended

Annotation: MAK report maintains that turning off FD would be required by FCOM. It does not mention where in FCOM, nor does it mention specifically under which conditions it should be turned off.

Turning off the FDs would have set A/THR to V/M for 202kts (GREEN DOT speed)

- 119 Flaps start retracting to CONF 2**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:37  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 2  
Landing gear extended
- 120 MASTER WARNING / CRC warning for overspeed activates**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:41  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 2  
Landing gear extended  
Annotation: Exceeding of allowed maximum speed for configuration  
altitude 1626ft,  
IAS 186kts  
pitch angle -5  
bank angle +33
- 121 Flaps start retracting to CONF 1**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:45  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Annotation: Due to high IAS, flaps are retracted completely, only slats stay extended
- 122 Captain makes forward and right stick input**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:45  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 123 AC decreases pitch angle further**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:45  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Annotation: IAS >210kts

- 124 EGPWS visual warning appears and aural warning sounds**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Annotation: alt 1358ft  
IAS 211kts  
pitch angle -12  
RoD 21m/s  
bank angle 38
- 125 DUAL INPUT aural warning inhibited by EGPWS aural warning and does not sound**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 126 F/O (PM) makes full left stick input and "parasitic" forward input**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Annotation: Presumably to counter Captain's right stick input.  
Supported by F/O remarks on CVR: "Wings level!"
- 127 F/O (PM) does not press Takeover button**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 128 F/O (PM) does not announce his making sidestick inputs**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended

- 129 Captain makes right stick input**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 130 Captain fails to make and maintain full backstick input in reaction to EGPWS warning**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:48  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Annotation: Captain only makes two half-backstick inputs.  
Full input required by Emergency Procedure, FCOM 3.02.34, P15
- 131 Captain experiences unexplained AC reaction inconsistent with his stick inputs**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:48  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 132 F/O fails to announce low pitch angle**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:08  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)
- 133 F/O fails to announce descent rate**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:34  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)



- 134 Captain fails to react appropriately to EGPWS warning**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 135 F/O (PM) fails to react appropriately to EGPWS warning**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 136 Controller advises about new approach procedure**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:40  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 137 AP/FD vertical mode change to VS**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:49  
Actors involved: Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration 1  
Landing gear extended  
Annotation: target speed 25.4m/s  
A/THR mode ->V/M
- 138 A/THR system reduces thrust to prevent overspeed**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:49  
Actors involved: Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
Autothrust Mode: Speed/Mach  
Lateral AP Mode: Go-Around Track (MAN)  
High-lift devices in configuration 1  
Landing gear extended

- 139 CRW move thrust levers to idle and back to CL**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:51  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
Autothrust Mode: Speed/Mach  
High-lift devices in configuration 1  
Landing gear extended
- 140 A/THR disengages**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:51  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 141 AC descent rate increases further**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:45  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Annotation: alt 933ft  
RoD now 29m/s
- 142 High-lift devices retract to CONF 0**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:13:01  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
High-lift devices completely retracted  
Landing gear extended
- 143 -6 degrees pedal input**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:13:01  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
High-lift devices completely retracted  
Landing gear extended
- 144 AC bank angle reduces**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:13:01  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
High-lift devices completely retracted  
Landing gear extended  
Annotation: RoD -22m/s,  
pitch angle -7,  
bank angle ~0.

- 145 AC hits water surface**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:13:03  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
High-lift devices completely retracted  
Landing gear extended  
Annotation: RoD -22 m/s  
pitch angle -4.5  
bank angle 9.5  
slats still moving at 18 degrees  
LG extended
- 146 Captain unaware of F/O sidestick inputs**  
Type of Factor: Assumption  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended
- 147 AP commands high vertical acceleration**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:00  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
Landing gear extended  
High-lift devices in configuration FULL (4)
- 148 AP selects initial VS target of 40m/s**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:00  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 149 AC trajectory becomes unrecoverable**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:58  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
High-lift devices completely retracted  
Landing gear extended

- 150 AC is on descending trajectory at low altitude**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:34  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Autothrust Mode: N1  
Annotation: ALT: 1358ft,  
V/S: 21 m/s,  
pitch angle: -12 degree1.5
- 151 Captain (PF) fails to set "TOGA" thrust in reaction to EGPWS warning**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:48  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
Landing gear extended  
High-lift devices in configuration 1  
Annotation: Required by Emergency Procedure, FCOM 3.02.34, P15.  
The Emergency procedure for reaction to EGPWS warnings is a memory item, that should be performed without delay and without referring to paper
- 152 F/O (PM) fails to call-out Captain's omission of full back-stick in reaction to EGPWS warning**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:49  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
Landing gear extended  
High-lift devices in configuration 1  
Annotation: Not explicitly in FCOM.  
Found in informal document at airbusdriver.net
- 153 F/O (PM) fails to call-out RA and RA trend in reaction to EGPWS warning**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:50  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
Landing gear extended  
Autothrust Mode: Speed/Mach  
High-lift devices in configuration 1  
Annotation: Not explicitly in FCOM.  
Found in informal document at airbusdriver.net
- 154 Optical (instrument) illusion of pitching up**  
Type of Factor: Assumption  
Date/Time: 03.05.2006 22:12:20  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
Autothrust Mode: N1  
Landing gear extended

**155 FMGC sets N1 ("Thrust") mode for A/THR at maximum (CLIMB) thrust**

Type of Factor: Event  
Date/Time: 03.05.2006 22:12:24  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
Landing gear extended  
High-lift devices in configuration FULL (4)

**156 Preset vertical speed becomes 25.4m/s**

Type of Factor: Event  
Date/Time: 03.05.2006 22:12:49  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Flight Directors active  
Autothrust Mode: Speed/Mach  
Landing gear extended  
High-lift devices in configuration 1

**157 A/THR mode changes to speed hold (V/M)**

Type of Factor: Event  
Date/Time: 03.05.2006 22:12:49  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: Speed/Mach  
Flight Directors active  
Landing gear extended  
High-lift devices in configuration 1

**158 IAS reaches VFE + 4kts**

Type of Factor: Process  
Date/Time: 03.05.2006 22:12:49  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
Landing gear extended  
High-lift devices in configuration 1

**159 FD command bars disagree with manual control**

Type of Factor: Process  
Date/Time: 03.05.2006 22:12:19  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Flight Directors active  
Autothrust Mode: N1  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)

- 160 CRW continue flying manually with FDs active**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:07  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 161 CRW have doubts about AP functioning correctly**  
Type of Factor: Assumption  
Date/Time: 03.05.2006 22:12:07  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Annotation: Assumption from Crew behaviour, see MAK/BEA report, p
- 163 Current altitude is ca. 1280ft**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:11:57  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 164 Difference to target altitude is >1200ft**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:11:57  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
Vertical AP Mode: Vertical Speed (SEL)  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 165 SOP requires F/O to call out omissions of Captain's actions to EGPWS reactions**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: Only found in unofficial callout-file from airbusdriver.net
- 166 SOP requires Captain to set TOGA set**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: FCOM 3.02.34, P15

- 167 EGPWS triggered**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Annotation: As per design at RA 1358ft, V/S: -21 m/s (4130 ft/min).  
FCOM 1.34.70, P3
- 168 AC reaches VFE for CONF FULL**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:37  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 2  
Landing gear extended
- 170 FCOM recommends FD disengagement if not following FD**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: Where in the FCOM?
- 171 A/THR remains in N1 mode at full climb thrust**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:34  
Actors involved: High-lift devices in configuration FULL (4)  
Landing gear extended  
Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
Annotation: Turning FD off would have put A/THR in speed hold mode for 202kts
- 172 CRW did not follow FD indications**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:07  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 173 SOP requires use of Takeover button and Call-out if using Sidestick as PNF**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: Where in FCOM?

- 174 Captain (PF) does not observe flashing sidestick priority light on glareshield**  
Type of Factor: Assumption  
Date/Time: 03.05.2006 22:12:47  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration 1  
Landing gear extended  
Annotation: Sidestick Input Indicators on Glareshield:  
- Individual lights on Captain's and F/O's side  
- Red: respective side is inactive, other side has priority (RED indicates: DON'T MAKE INPUTS!)  
- Green steady: respective side has priority (STEADY GREEN indicates: I can make unimpaired inputs)  
- Green flashing: both sides are making inputs, neither has priority (GREEN indicates: I can make inputs, Flashing indicates: CAUTION!)  
- Both off: No pilot or only one pilot making inputs without explicit priority (FCOM 1.27.40, P4f)
- 175 Captain fails to call for FLAPS retraction during Go-Around manoeuvre**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:11:50  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Vertical Speed (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 176 SOP requires PF to make and maintain full backstick deflection**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: FCOM 3.02.34, P15
- 177 EGPWS aural warning has priority over DUAL INPUT aural warning**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: Design decision, not mentioned in FCOM.
- 178 Captain (PF) unaware of rapid acceleration**  
Type of Factor: Assumption  
Date/Time: 03.05.2006 22:12:24  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 179 Crew selects OPEN CLIMB**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:11:58  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Open Climb (SEL)  
Autothrust Mode: Speed/Mach  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended



- 180 Flight director relative motion**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:20  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Autothrust Mode: N1  
Flight Directors active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 181 FD pitch command bar indicates 4 degrees pitch-up angle**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:12:20  
Actors involved:
- 182 DUAL INPUT aural warning inhibition by EGPWS aural warning is not mentioned in FCOM**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: FCOM states that DUAL input warning is not inhibited in any specific flight phase. (FCOM 1.27.40, P12)  
Although this does not mean it cannot be inhibited in a certain system state, independent of flight phase, the absence of any indication about inhibition may be significant.
- 183 Captain relies on DUAL INPUT aural warning to alert him to cross-controlling**  
Type of Factor: Assumption  
Date/Time:  
Actors involved:
- 184 F/O wants wings level**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:47  
Actors involved:  
Annotation: F/O announces "Wings Level" on CVR
- 185 AP switches to lateral mode "Go-Around Track"**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:07  
Actors involved: Lateral AP Mode: Go-Around Track (MAN)  
Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)  
Autothrust Mode: N1  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended
- 186 Target speed is 137kts**  
Type of Factor: Process  
Date/Time: 03.05.2006 22:11:58  
Actors involved: Lateral AP Mode: Heading/Track (SEL)  
Vertical AP Mode: Open Climb (SEL)  
Autopilot 1 active  
High-lift devices in configuration FULL (4)  
Landing gear extended  
Autothrust Mode: Speed/Mach
- 187 Autopilot tries to follow preset go-around track**  
Type of Factor: Assumption  
Date/Time: 03.05.2006 22:12:07  
Actors involved:

- 188 Dual input situation**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:47  
Actors involved:
- 189 Dual input visual warning appears (flashing light on glareshield)**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:47  
Actors involved:
- 190 Captain does not get tactile feedback about F/O's sidestick inputs**  
Type of Factor: UnEvent  
Date/Time: 03.05.2006 22:12:47  
Actors involved:
- 191 Sidesticks of Airbus A320 do not provide force-feedback of other pilot's inputs**  
Type of Factor: State  
Date/Time:  
Actors involved:
- 192 Contradictory autopilot commands within a short time frame**  
Type of Factor: Event  
Date/Time: 03.05.2006 22:12:04  
Actors involved:
- 193 FCU uses the same knob for altitude selection and AP mode engagement**  
Type of Factor: State  
Date/Time:  
Actors involved:  
Annotation: Design decision

## ***Actor List***

Lat: NAV	Lateral AP Mode: NAV or APP NAV (MAN)
Lat: LOC	Lateral AP Mode: Localizer Capture or Track (MAN)
Lat: GA TRK	Lateral AP Mode: Go-Around Track (MAN)
Lat: HDG-TRK	Lateral AP Mode: Heading/Track (SEL)
Vert: SRS	Vertical AP Mode: Speed Reference System (T.O and G.A.) (MAN)
Vert: CLB	Vertical AP Mode: CLIMB (MAN)
Vert: DES	Vertical AP Mode: Descent (MAN)
Vert: SOFT ALT	Vertical AP Mode: Altitude Cruise (MAN)
Vert: G/S	Vertical AP Mode: Glideslope Capture or Track (MAN)
Vert: OP CLB	Vertical AP Mode: Open Climb (SEL)
Vert: OP DES	Vertical AP Mode: Open Descent (SEL)
Vert: V/S	Vertical AP Mode: Vertical Speed (SEL)
A/THR: V/M	Autothrust Mode: Speed/Mach
A/THR: THR	Autothrust Mode: N1
AP1	Autopilot 1 active
AP2	Autopilot 2 active
FD	Flight Directors active
FLAPS 0	High-lift devices completely retracted
FLAPS 1	High-lift devices in configuration 1
FLAPS 2	High-lift devices in configuration 2
FLAPS 3	High-lift devices in configuration 3
FLAPS FULL	High-lift devices in configuration FULL (4)
L/G	Landing gear extended

# Appendix: MAK Report, Translation of Appendices

Translation by Jörn and Natalia Stuphorn

## MAK Report, Appendix 1      Trajectory of aircraft A320 EK-32009, met with an accident on 3 May 2006 in the Sochi area.

Notes: The phrase “dobroj notschi” translated literally means “Good night” but is used for greeting.  
All times UTC.

20:59:51 Crew: Control - Armavia 967 - we reach traverse Tunis 300.  
21:00:07 Crew: Tblisi Control - RNV-967 - Good night 2000er - Traverse “Tunis” at 340°  
21:16:07 Controller: RNV-967, well, Weather forecasts for the next 2 hours: 150 to 1500  
21:16:17 Crew: Roger, 150, 967.  
21:16:57 Controller: State your intention RNV-967  
21:17:00 Crew: Now, what is our intention - we revert to Erevan  
21:26:37 Crew: Sochi “Подход” (Approach controller) - Armavia 967 - is it possible to make a factual gauging?  
21:30:49 Controller: Armavia 967 - Visibility 3600 - cloud base 170 within 30 minutes. Weather at the lower limit but improving.  
21:31:14 Crew: 967 - we revert again, this means we fly in direction of Sochi.  
21:58:29 Crew: Rostov Control - Armavia 967 - Good Night, Banut, Heading 220  
22:00:44 Crew: Sochi “Подход” (Approach)- Armavia 967 - Good Night again - On GUKIN descending to 3600  
22:03:29 Crew: Sochi “Крыг” (Holding controller) - Armavia 967 - Good Night - On GUKIN descending to 1800 - We have information for landing - Pressure 1016  
22:03:53 Crew: Pressure 1016, descending to 600 meters, We make 4° - Armavia 967  
22:09:50 Crew: Sochi “Посадка” (Landing controller) - Armavia 967 - Good Night, Direct approach, runway 06.  
22:10:53 Controller: Armavia 967 - reduce 10 on course, visibility 4000 fog - effective cloud base 190 meters - cleared to land.

**MAK Report, Appendix 2****Flight parameters of aircraft A-320  
EK-32009, 3 May 2006 (complete flight)**

1. Hзад	<i>blue</i>	selected altitude
2. Hб	<i>red</i>	barometrical altitude
3.	<i>black</i>	Descent
4.	<i>lgtblue</i>	Vertical speed mode
5.	<i>blue</i>	Altitude mode
6. Vзад	<i>black</i>	selected velocity
7. Vпр	<i>blue</i>	displayed velocity
8.	<i>blue</i>	Autopilot #2 active
9.	<i>red</i>	Autopilot #1 active
10. РУД1	<i>red</i>	Position Thrustlever Engine #1
11. РУД2	<i>blue</i>	Position Thrustlever Engine #2
12. Ивд1	<i>blue</i>	N2 (rpm highpressure) Engine #1
13. Ивд2	<i>black</i>	N2 (rpm highpressure) Engine #2
14.	<i>red</i>	AT engaged
15.	<i>blue</i>	AT active
16.	<i>lgt-blue</i>	AT Mode V/M
17.	<i>blue</i>	AT Mode N1
18. Танг	<i>black</i>	Angle of Pitch
19. Крен	<i>red</i>	Angle of Roll
20.	<i>black</i>	LOC track mode active
21.	<i>blue</i>	Flight on glideslope
22. Курс	<i>red</i>	gyromagnetic heading
23. Курс.зад	<i>black</i>	selected heading
24. Vuзад	<i>purple</i>	selected vertical velocity
25.	<i>black</i>	HDG mode active
26.	<i>blue</i>	NAV mode active
27.	<i>blue</i>	Landing gear in retracted position
28.	<i>lgt-blue</i>	Landing gear in extended position
29. d3K	<i>red</i>	Position Flaps

**MAK Report, Appendix 3****Flight parameters of aircraft A-320  
EK-32009, 3 May 2006 (complete flight)**

1.	<i>lgtblue</i>	barometrical altitude
2.	<i>purple</i>	Altitude mode
3.	<i>red</i>	[...] speed mode
4.	<i>blue</i>	Climb
5.	<i>lgtblue</i>	Altitude settings
6.	<i>black</i>	Pitch take off
7.	<i>blue</i>	Decrease
8.	<i>blue</i>	LOC capture mode
9.	<i>purple</i>	Approach
10.	<i>red</i>	selected altitude
11.	<i>blue</i>	displayed velocity
12.	<i>red</i>	selected velocity
13.	<i>red</i>	Auto speed control
14.	<i>red</i>	selected vertical velocity
15.	<i>lgtblue</i>	Autopilot #2 active
16.	<i>blue</i>	Autopilot #1 active
17.	<i>red</i>	selected heading
18.	<i>red</i>	HDG mode active
19.	<i>black</i>	NAV mode active
20.	<i>blue</i>	AT Mode V/M
21.	<i>red</i>	AT Mode N1

**MAK Report, Appendix 4****Flight parameters of aircraft A-320  
EK-32009, 3 May 2006 (complete flight)**

1.	<i>black</i>	Flight on glideslope
2.	<i>blue</i>	Altitude settings
3.	<i>blue</i>	vertical speed mode
4.	<i>blue</i>	Autopilot #1 active
5.	<i>blue</i>	Autopilot #2 active
6. PB.л	<i>blue</i>	Position Elevator left (PF)
7. PB.пр	<i>blue</i>	Position Elevator right (F/O)
8.	<i>red</i>	AT active
9.	<i>blue</i>	AT engaged
10.	<i>purple</i>	AT Mode N1
11.	<i>black</i>	AT Mode V/M
12. РУД1	<i>blue</i>	Position Thrustlever Engine #1
13. РУД2	<i>black</i>	Position Thrustlever Engine #2
14. ИВД1	<i>blue</i>	N2 (rpm highpressure) Engine #1
15. ИВД2	<i>black</i>	N2 (rpm highpressure) Engine #2
16. Крен	<i>red</i>	Angle of Roll
17. РУСкр л	<i>black</i>	Steering-Stick left - Position Roll
18. РУСкр пр	<i>blue</i>	Steering-Stick right - Position Roll
19. Танг	<i>red</i>	Angle of Pitch
20. РУСТг л	<i>black</i>	Steering-Stick left - Position Pitch
21. РУСТг пр	<i>blue</i>	Steering-Stick right - Position Pitch
22. Курс		gyromagnetic heading
23.	<i>black</i>	HDG mode active
24.	<i>purple</i>	Central Fire Alarm (ЦО) left
25. Нг	<i>red</i>	geometrical altitude
26.	<i>red</i>	EGPWS triggered
27. Хзк-пк	<i>purple</i>	Position Flaps-Lever
28. Vпр	<i>purple</i>	displayed velocity

Note: CVR transcript not translated because of bad readability and redundancy with App. 9 and 10

**MAK Report, Appendix 5****Flight parameters of aircraft A-320  
EK-32009, 3 May 2006**

1.	<i>lgtblue</i>	not readable
2.	<i>blue</i>	Landing Gear Selector in position "Landing gear extended"
3.	<i>blue</i>	AT active
4.	<i>blue</i>	AT engaged
5.	<i>purple</i>	AT Mode V/M
6.	<i>blue</i>	AT Mode N1
7.	<i>lgtblue</i>	Autopilot #2 active
8.	<i>blue</i>	Autopilot #1 active
9.	<i>red</i>	EGPWS triggered
10.	<i>red</i>	not readable
11.	<i>red</i>	Central Fire Alarm (ЦО)
12.	<i>red</i>	Central Fire Alarm (ЦО) left
13.	<i>blue</i>	Working Mode FMGC Longitudinal Channel
14.	<i>blue</i>	AP Mode vertical
15.	<i>black</i>	AP Mode horizontal
16. dПК	<i>blue</i>	Position Slats
17. Хзк-пк	<i>purple</i>	Position Flaps-Lever
18. Стаб	<i>blue</i>	Position Stabiliser
19. Vпр	<i>red</i>	displayed velocity
20. Vзад	<i>red</i>	selected velocity
21. Hг	<i>blue</i>	geometrical altitude
22. Hзад	<i>blue</i>	selected altitude
23. Hб	<i>black</i>	barometrical altitude
24. Vyзад	<i>black</i>	selected vertical velocity
25. Vy	<i>blue</i>	calculated vertical velocity

**MAK Report, Appendix 6****Flight parameters of aircraft A-320  
EK-32009, 3 May 2006**

1.	<i>lgtblue</i>	Altitude settings
2.	<i>blue</i>	vertical speed mode
3. РУД1	<i>black</i>	Position Thrustlever Engine #1
4. РУД2	<i>blue</i>	Position Thrustlever Engine #2
1.	<i>lgtblue</i>	HDG mode active
5. Курс	<i>blue</i>	gyromagnetical heading
6. Vy	<i>blue</i>	calculated vertical velocity
7. Крен	<i>red</i>	Angle of Roll
8. РУСкп л	<i>blue</i>	Steering-Stick left - Position Roll
9. РУСкп пр	<i>black</i>	Steering-Stick right - Position Roll
10. Танг	<i>red</i>	Angle of Pitch
11.	<i>blue</i>	Autopilot #1 active
12.	<i>blue</i>	Autopilot #2 active
13. РУСтг л	<i>purple</i>	Steering-Stick left - Position Pitch
14. РУСтг пр	<i>blue</i>	Steering-Stick right - Position Pitch
15. Hг	<i>red</i>	geometrical altitude
16.	<i>blue</i>	Central Fire Alarm (ЦО) left
17.	<i>blue</i>	Flight on Glideslope
18. Vпр	<i>black</i>	displayed velocity
19.	<i>red</i>	EGPWS triggered
20.		ENGINE PAGE SELECTED
21.		WHEEL PAGE SELECTED
22.		CRUISE PAGE SELECTED
23.		ARC MODE CAPT
24.		20 NM CAPT
25.		ARC MODE F/O
26.		10 NM F/O
27.		CPT RADAR/EGPWS OPERATING MODE: W/S AND TURBULENCE
28.		F/O RADAR/EGPWS OPERATING MODE: W/S AND TURBULENCE

**MAK Report, Appendix 7****Flight parameters of aircraft A-320  
EK-32009, 3 May 2006**

1.	Hr	<i>purple</i>	geometrical altitude
2.		<i>lgtblue</i>	Altitude settings
3.		<i>blue</i>	vertical speed mode
4.	Танг	<i>blue</i>	Angle of Pitch
5.	Alf м1	<i>blue</i>	local Angle of Attack +1
6.	Alf ист1	<i>red</i>	real Angle of Attack 1
7.	PВ.пр	<i>blue</i>	Position Elevator right (F/O)
8.	PВ.л	<i>black</i>	Position Elevator left (PF)
9.		<i>blue</i>	Autopilot #1 active
10.		<i>lgtblue</i>	Autopilot #2 active
29.	РУСТг	<i>purple</i>	effective Steering-Stick Position Pitch
30.		<i>blue</i>	Flight on glideslope
31.	РУСТг л	<i>blue</i>	Steering-Stick left Position Pitch
32.	РУСТг пр	<i>lgtblue</i>	Steering-Stick right Position Pitch
33.	Nx	<i>lgtblue</i>	longitudinal Acceleration Force
34.	Ny	<i>red</i>	vertical Acceleration Force
35.	Vпр	<i>red</i>	displayed velocity
36.		<i>red</i>	EGPWS triggerd
37.	GLS1	<i>blue</i>	Glideslope Dev ILS1
38.	GLS2	<i>blue</i>	Glideslope Dev ILS2
39.	Бг	<i>purple</i>	vertical deviation from glideslope

**MAK Report, Appendix 8****Flight parameters of aircraft A-320  
EK-32009,3 May 2006**

1.	Ек	<i>black</i>	heading deviation from glideslope
2.	Ветер V	<i>blue</i>	Windspeed
3.	Снос	<i>black</i>	Angle of Dislocation DISS (Doppler measurement system in nose)
4.	Ветер FI	<i>blue</i>	Angle of Wind
5.	Nz	<i>blue</i>	lateral Acceleration Force
6.	dЭ пр	<i>blue</i>	Deviation right Aileron
7.	dЭ л	<i>blue</i>	Deviation left Aileron
8.	РУСкр	<i>black</i>	effective Steering-Stick - Position Roll
9.	РУСкр л	<i>lgtblue</i>	Steering-Stick left - Position Roll
10.	РУСкр пр	<i>black</i>	Steering-Stick right - Position Roll
11.	dPH	<i>lgtblue</i>	Deviation Rudder of direction
12.	Хн	<i>blue</i>	Pedal Position
13.		<i>blue</i>	Autopilot #1 active
14.		<i>lgtblue</i>	Autopilot #2 active
15.	Hr	<i>blue</i>	geometrical altitude
16.		<i>blue</i>	Flight on glideslope
17.	Курс зад	<i>red</i>	selected heading
18.	Курс	<i>red</i>	gyromagnetic heading
19.	Крен	<i>lgtblue</i>	Angle of Roll
20.	ТрPH	<i>blue</i>	Trimposition Rudder of direction



## MAK Report, Appendix 9

## Trajectory of aircraft A320 EK-32009, Approach to Sochi, 3 May 2006

22:00:46 П2 (F/O) Sochi "Подход" (approach control), Armavia 967, Good night again. On GUKIN descend to 3600.

22:00:53 Д (Control) Armavia 967, Sochi "Подход" (approach control), Good night. Continue with descend on GUKIN 1800, magnetic 190, distance 43.

22:01:38 Д (Control) Runway 06 (ВПП-06), wind 130 degrees, 2 m/s, visibility 4km, main cloud base 1800, pressure "seven six two" or "one zero one six" hPa. Weak rainstorm, fog, compact cumulus rainclouds visual at 800, plus 11, duepoint plus 11. Montains partially covered.

22:02:12 KBC (PF) Thank you, 967, and RP (ПП) transfer to the commander we shall start our approach.

22:02:19 Д (Control) Armavia 967, we see you passing TABAN. If possible increase descend or you will miss 4th (final approach trajectory).

22:02:30 П2 (F/O) Roger 967, Thank you.

22:03:13 Д (Control) Armavia 967, magnetic 220, distance 43, contact „Krug“ (holding control), 119.7

22:03:29 П2 (F/O) Sochi "Круг" (holding control), Armavia 967, Good night, on GUKIN descending 1800, we have landing information, pressure 1016.

22:03:41 Д (Control) Armavia 976 (*possible typo in report, 967*)  
Sochi "Круг" (holding control), Good night, magnetic 227, distance 45, landing direction 60, pressure 1016, descend to 600 meters, begin 4th (final approach).  
Pressure 1016, Descending to 600m, begin final approach, Armavia 967

22:03:54 П2 (F/O) Switch on landing lights.

22:04:18 KBC (PF) Is this snow or rain?

22:04:32 П2 (F/O) Fixed locator, understood?!

22:05:48 KBC (PF) Armavia 967: You are left from landing approach, to reach the approach you can take 090.

22:05:50 Д (Control) Armavia 967, take heading 090, thank you.

22:05:57 П2 (F/O) Armavia 967, Approach on Echolon, Pressure 1016, Descending to 600m on final.

22:06:32 П2 (F/O) Armavia 967, Roger, proceed with approach.

22:06:39 Д (Control) Armavia 967, Distances: lower cloud base 160m, visibility 4000, proceed 600m without descend.

22:07:35 Д (Control) Without descend 600m, Armavia 967

22:07:47 П2 (F/O) RNV-967: Contact "Посадкой" (landing control), 4000 to 190, 121.2

22:09:33 Д (Control)

## MAK Report, Appendix 10

## Trajectory of aircraft A320 EK-32009, Approach to Sochi, 3 May 2006

22:07:35 Д (Control) Armavia 967, Distances: lower cloud base 160m, visibility 4000, proceed 600m without descend.

22:07:47 П2 (F/O) Without descend 600m, Armavia 967

22:07:49 KBC (PF) It's a madhouse, that's what it is.

22:07:53 KBC (PF) (unintelligible) LOC STAR

22:07:55 П2 (F/O) MDA CHECK

22:07:56 KBC (PF) SET

22:07:57 П2 (F/O) ENGINE MOD SELECTOR

22:08:02 П2 (F/O) NORMAL APPROACH CHECK LIST COMPLETED

22:08:05 П2 (F/O) Ara (Vorname F/O), shall we say, that it suits us? Landing, Grischa (Vorname PF)?

22:08:08 KBC (PF) How, suits us? It is below the minimum.

22:08:10 П2 (F/O) (unintelligible) 10m.

22:08:31 KBC (PF) Let's deploy FLAPS 1 (unintelligible)

22:08:34 П2 (F/O) SPEED CHECK FLAPS 1

22:08:39 П2 (F/O) CLEAR STATUS?

22:08:40 KBC (PF) CLEAR

22:09:15 KBC (PF) make FLAPS 2

22:09:16 П2 (F/O) SPEED CHECK FLAPS 2

22:09:31 П2 (F/O) 9 and 1 on ILS

22:09:33 Д (Control) RNV967, contact "Посадка" (landing control), 4000 to 190, 121.2

22:09:39 П2 (F/O) 121.2, 967, Thank you.

22:09:44 KBC (PF) Go, GEAR DOWN.

22:09:48 П2 (F/O) GEAR DOWN, APROACH pressed?

22:09:52 П2 (F/O) Sochi "Посадка" (landing control), Armavia 967, Good Night. direct on course 06

22:09:59	Д (Control)	Good Night Armavia 967, Sochi "Посадка", distance 14, on course, CU (See You?) 13 km, come to the glideslope.
22:10:12	KBC (PF)	Have you simply understood him? We have come to landing approach, have lost time, he has given us once again 190. He tries to squirm out of his failure.
22:10:19	П2 (F/O)	But I don't understand, what he will gain here (unintelligible)
22:10:23	KBC (PF)	Sometimes you win ... [ <i>sometimes you loose</i> is left out] ... what bullshit (unintelligible) at times 190 at times 160, understand, what I say.
22:10:28	П2 (F/O)	He only gets, that we get a coronary.
22:10:23	KBC (PF)	Now it is below the minimum. A word, something will happen and 150 will be measured.
22:10:38	П2 (F/O)	GLIDE SLOPE STAR
22:10:46	П2 (F/O)	Armavia 967 - eh - on glideslope, chassis extended, ready for landing.
22:10:54	Д (Control)	Armavia 967, distance 10, on course, visibility 4000, fog, compact clouds 190m Landing permission granted
22:11:03	П2 (F/O)	Landing on runway 06 permitted, Armavia 967
22:11:07	KBC (PF)	make FLAPS 3
22:11:08	П2 (F/O)	SPEED CHECK FLAPS 3
22:11:11	П2 (F/O)	Give a little bit, sitting almost on VLS
22:11:20	KBC (PF)	and FLAPS FULL
22:11:21	П2 (F/O)	SPEED CHECK FLAPS FULL
22:11:25	KBC (PF)	go, LANDING CHECK LIST
22:11:31	П2 (F/O)	CABIN CREW
22:11:32	П2 (F/O)	ATHR
22:11:34	П2 (F/O)	BRAKES
22:11:36	KBC (PF)	REALISED FOUR GREEN
22:11:37	П2 (F/O)	ECAM MEMO
22:11:39	KBC (PF)	LANDING NO BLUE
22:11:40	Д (Control)	RNV967, abort descend, clouds 100m, right turn to 600m.
22:11:49	П2 (F/O)	Making right turn to 600m, 967
22:11:52	Sound	TRIPLE CLICK
22:11:53	Д (Control)	RNV967, Right turn to 600m, contact "Kpyr" (holding control), 119.7
22:12:00	П2 (F/O)	Right climb to 600, 119.7, 967
22:12:04	Sound	SPEED, SPEED, SPEED
22:12:08	Sound	Autopilot disengaged
22:12:15	KBC (PF)	600 gauge the altitude
22:12:19	П2 (F/O)	But what, isn't it 600?
22:12:20	KBC (PF)	Gauge 600
22:12:24	П2 (F/O)	2100
22:12:27	П2 (F/O)	Enough, enough
22:12:28	Д (Control)	Arm, Armavia 967, contact "Kpyr" (holding control), 119.7
22:12:32	П2 (F/O)	967, Roger
22:12:36	П2 (F/O)	Sochi "Kpyr", Armavia 967
22:12:37	Э (Crew)	FLAPS
22:12:40	Д (Control)	Armavia 967, Sochi "Kpyr", after exit on 2. circle, take heading 210°, take 600m and follow 600m. Prepare for landing on runway 02. There lower cloud base 460, 360m, visibility above 4-x (km)
22:12:41	Sound	OVERSPEED WARNING
22:12:47	П2 (F/O)	Level off
22:12:48	Sound	PULL UP (repeated 10 times)
22:12:50	П2 (F/O)	Level off
22:12:55	П2 (F/O)	Level off the roll
22:12:56	Э (Crew)	What's happening?
22:12:58	Э (Crew)	(unintelligible)
22:12:59	П2 (F/O)	Grischa, Brother! The Slats! Level off the roll!