

MINISTRY OF TRANSPORT OF THE REPUBLIC OF KAZAKHSTAN
AVIATION ACCIDENT INVESTIGATION COMMISSION

PRELIMINARY REPORT
BASED ON THE RESULTS OF THE INVESTIGATION OF THE AVIATION ACCIDENT

Type of aviation event:	Catastrophe
Aircraft type:	Embraer ERJ 190-100 IGW
State and registration identification marks:	4K-AZ 65
Owner:	Azerbaijan Airlines CJSC («Azerbaijan Airlines»)
Operator:	Azerbaijan Airlines CJSC («Azerbaijan Airlines»)
Flight number	J2-8243
Flight route	Baku - Grozny
Event location:	Kazakhstan, Mangistau region, Tupkaragan district village of Sayyna Shapagatova, coordinates: 43°53'02"N, 51°00'45"E
Date and time	12/25/2024, 11:28 local time (06:28 UTC) day

In accordance with the Standards and Recommended Practices of the International Civil Aviation Organization, this report is issued for the sole purpose of preventing future aviation accidents and incidents.

The investigation conducted within the framework of this report does not intend to establish the share of anyone's guilt.
or responsibility.

The criminal aspects of this event are presented in a separate criminal case.

This Preliminary Report is issued pending the completion of the investigation into the aviation accident. incidents in accordance with Standard 7.4. of Annex 13 to the Convention on the International Civil Aviation Organization (ICAO) and paragraph 77 of the Rules for the Submission of Data and investigation of aviation accidents and incidents in civil and experimental of the Republic of Kazakhstan, approved by the Minister of Investment and Development Republic of Kazakhstan dated July 27, 2017 No. 505. The preliminary report contains currently submitted to the aviation accident investigation committee (hereinafter referred to as the Commission) factual information.

The information presented in this report is preliminary and may be clarified and supplemented based on the results of research and study of all materials.

Upon completion of the work, a Final Report on the results will be prepared. aviation accident investigation.

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List of abbreviations used in this report

AIP	- Aeronautical information collection
JSC	- Joint-stock company
AP	- Aviation accident
ASK	- Emergency rescue team
v. d.	- East longitude
VP	- Second pilot
VS	- Aircraft
GA	- Civil aviation
DHW	- Civil aircraft
hPa	г Hectopascal
Fuel and lubricants	- Fuels and lubricants
GC PVD	- Main Air Traffic Planning Centre
DP	- Control center
DPT	- Department of Transport Police
Emergency	- Department of Emergency Situations
Internal coordination engine	- Interaction Manager
JSC	- Closed joint-stock company
ICAO	- International Civil Aviation Organization
ITS	- Engineering and technical staff
KBC	- Aircraft commander
MAC	- Interstate Aviation Committee
Ministry of Internal Affairs of the Republic of Kazakhstan	- Ministry of Internal Affairs of the Republic of Kazakhstan
MHz	г Megahertz
MO RK	- Ministry of Defense of the Republic of Kazakhstan
MT RK	- Ministry of Transport of the Republic of Kazakhstan
Ministry of Emergency Situations of the Republic of Kazakhstan	- Ministry of Health of the Republic of Kazakhstan
OVD	- Air traffic services
OOO	- Limited Liability Company
PPP	- Instrument Flight Rules
PTE	- Periodic maintenance
RGP	- Republican state enterprise

RD	- Taxiway
RI	- Speech informant
RK	- Republic of Kazakhstan
RP	- Flight Director
n. sh.	- North latitude
PAGE	- Mean aerodynamic chord
SNEE	- Since the beginning of operation
SAVE	- Fire and emergency rescue service flight support
THAT	- Maintenance
VHF	- Ultrashort waves
URAPI	- Aviation Accident Investigation Directorate and incidents
ATPL	- Airline Transport Pilot's Certificate
CENIPA	- Center for Investigation and Prevention of Aviation Accidents incidents in Brazil
CVR	- Flight voice recorder
DME	- Omnidirectional rangefinder radio beacon
ICE	- Engine operating parameters indication system and failure warnings
FDR	- Flight data recorder
IN	- Flight level
GPS	- Global Positioning System
NDB	- Non-directional radio beacon
KNOWN	- Notification to flight crew
PSI	- Unit of pressure measurement
QFE	- Atmospheric pressure of the aerodrome at the runway threshold level
QNH	- Atmospheric pressure reduced to mean sea level
RVR	- Runway visual range
RW	- Runway
UTC	- Coordinated Universal Time

General information

25.12.2025, at 11:28 local time (06:28 UTC)¹, during the day, while landing on

An aviation accident occurred on runway 11 of the Aktau airfield involving an Embraer 190-100 IGW2 4K-AZ65 aircraft, owned by Azerbaijan Airlines CJSC.

The aircraft was operating a scheduled passenger flight J2-8243 en route Baku (UBBB)

- Grozny (URMG). After two unsuccessful attempts to land at the Grozny airfield,

the crew decided to return to Baku. During the return process at 05:13:32, the following were lost:

the aircraft's main control systems. Then, at 05.42, the crew decided to proceed to

Aktau alternate airfield, for an emergency landing. There were 5 crew members³ and 62 passengers on board the aircraft. As a result of the accident, the aircraft commander,

The second pilot, senior flight attendant and 35 passengers (38 in total) died (including 6 citizens)

Kazakhstan, 25 – Azerbaijan, 7 – Russia), 2 flight attendants and 27 passengers received

bodily injuries of varying degrees. As a result of collision with the earth's surface,

The plane was destroyed and partially burned.

The aviation accident occurred at a distance of about 5 km northwest of the end Runway 11 of Aktau airfield (approximately 25 km northwest of Aktau).

As a result of the aviation accident, the aircraft was completely destroyed and partially burned.

in case of a ground fire.

The notification about the AP was received by URAPI at 06:28 on 25.12.2024 from the State Center for the Prevention of Cruelty to the Environment of the RGP "Kazaeronavigatsia".

The investigation of the AP is being conducted by the Commission appointed by the order of the Minister of Transport RK dated 26.12.2024 No. 433.

In accordance with Standard 4.1 of Annex 13 to the Convention on the International civil aviation organizations and paragraph 8 of the Rules for the submission of data and investigation aviation accidents and incidents in civil and experimental aviation of the Republic of Kazakhstan, approved by the Minister of Investment and Development of the Republic Kazakhstan from July 27, 2017 No. 505 notifications of the aviation accident were directed to the following stakeholders:

State Agency of Civil Aviation (Republic of Azerbaijan) –

the competent authority for investigating accidents of the state of registration and the air operator vessels;

¹ Further in the text, unless otherwise stated, UTC time is given.

² Further in the text E-190

³ 2 flight crew members and 3 cabin crew members

CENIPA (Federative Republic of Brazil) – Competent Investigation Authority

AP of the state of designer and the state of manufacture of the aircraft;

The Interstate Aviation Committee is a regional organization for investigation by the AP, the authorized body for investigation of the Russian Federation – the state that provided information and experts upon request, and whose citizens died or received bodily injuries as a result of the accident, and the Kyrgyz Republic, whose citizens received bodily injuries as a result of the accident;

International Civil Aviation Organization (ICAO) (Montreal, Canada) – specialized agency of the United Nations that establishes international standards necessary to ensure safety, security and efficiency of air traffic, and coordinates international cooperation in all areas related to civil aviation.

Republic of Azerbaijan, Russian Federation, Federal Republic of Brazil has appointed Plenipotentiaries and their advisers to participate in investigation.

The International Civil Aviation Organization (ICAO) has appointed an accredited observer.

Representatives of the developer and manufacturer are taking part in the investigation aircraft (Embraer SA, Empresa Brasileira de Aeronautica SA) and the airline CJSC Azerbaijan Airlines.

Initial actions at the scene of the accident (evacuation of passengers, fire extinguishing, security places of the AP) were carried out by employees of the Ministry of Emergency Situations of the Republic of Kazakhstan, JSC "Aktau International Airport",

JSC "Kazaviaspas", Ministry of Internal Affairs of the Republic of Kazakhstan.

Investigation started - 12/26/2024

The preliminary investigation is being conducted by the Main Transport Prosecutor's Office Prosecutor General's Office of the Republic of Kazakhstan.

1. Factual information

1.1 Flight history

On December 25, 2024, in accordance with the flight assignment No. 2024/20343, the flight was planned J2-8243 on the route Baku - Grozny, on the aircraft Embraer 190-100 IGW4 registration number 4K-AZ65, owned by CJSC "Azerbaijan Hava Yollari" "Azerbaijan Airlines", operator - CJSC "Azerbaijan Airlines".

The crew consists of the aircraft commander, second pilot, senior The flight attendants and two flight attendants underwent a pre-flight medical examination in the medical unit Heydar Aliyev International Airport in Baku (hereinafter referred to as GYD) at 02:38.

Pre-flight preparation for the take-off was carried out by the commander and crew in full volume.

Before takeoff, the aircraft was serviced by technical personnel. SILK WAY TECHNICS in the volume of "DEPARTURE CHECK" at 03:00 and accepted by the crew at 03:20.

According to the data obtained from the consolidated load sheet (LOADSHEET) of the aircraft, fueled with 7720 kg (7550 kg at takeoff), takeoff weight from Baku airport was 41976 kg, with a center of gravity of 19.79% of the maximum allowable radius of attack, which did not exceed established limits (with a maximum weight of 51,800 kg and a range of center of gravity 9.48 – 26.57%). The front cargo compartment load was 435 kg, in the rear cargo compartment there was no download.

Passengers: 60 adults, 2 children.

According to the radio exchange extract, at 03:47:40 the crew requested permission to tow and launch from the taxi controller (Baku Ground). At 03:51 the crew requested permission to taxi. At 03:54, clearance was received for takeoff from runway 34. Actual wind direction and speed (320 degrees/16 knots) on the runway. At 03:56 the crew took off from the Baku airfield. The estimated The flight level was planned to be FL300. The crew took the actual flight level of FL300. The flight The route was flown at the calculated flight level in normal mode.

04:12 The aircraft left the airspace of the Republic of Azerbaijan and the crew contacted the Rostov-Control Department.

04:13 Rostov-Control dispatcher gave instructions to the crew after flying over the MKL point Proceed directly to point REMKA and calculate the standard arrival scheme REMKA1R.

Note: Below are excerpts from the extract of different time intervals radio traffic, according to CVR data.

⁴ Further in the text E-190

The full version of the transcript of the negotiations with the exact sequence is not provided.

04:25:59	ÿ Azerbaijan eight two four three ready for descent	
04:26:13	ÿ Ready for descent and for information we lost both GPS, request REPKA one V arrival	
04:26:50 Rostov Control 127.9	Azerbaijan eight two four three, expect REMKA one X-ray	
04:36:50	ÿ Grozny Tower Azerbaijan eight two four three good morning, reaching flight level one three zero, lost both GPS, request vectoring for NDB approach	
04:37:04 Grozny	Azerbaijan eight two four three Grozny Tower good morning, identified, ÿÿÿÿÿ expect NDB Victor approach RW two six via REMKA one X-ray descent to height one thousand one hundred meters, QFE one zero zero five hpa	
04:37:04 ÿÿ TERRAIN TERRAIN, PULL UP, PULL UP, PULL UP		
At 04:37:18, a time shift of 4 minutes 32 seconds is recorded in FDR		
Further times are given in UTC time taking into account the time offset.		
04:39:56	ÿ Azerbaijan eight two four three could you repeat please, will you vector us for NDB approach	
04:40:25 ÿÿÿÿÿÿ Azerbaijan eight two four three vectoring for NDB VICTOR approach Runway ÿÿÿÿÿ two six, continue present heading until advise		
04:49:12 Grozny Tower	Azerbaijan eight two four three ÿÿÿÿÿ zero seven one, distance one eight km? Turn right heading two five zero, Cleared NDB VICTOR approach Runway two six	
04:49:13 RI	According to CVR data, the TERRAIN alarm is currently triggered TERRAIN PULL UP PULL UP	
04:50:12 ÿ Advise our distance from NDB please Azerbaijan eight two four three		
04:50:18 Grozny Tower	Azerbaijan eight two four three distance one four kilometers	
wind calm, runway two Tower six,	Azerbaijan eight two four three distance one two km approaching glide path, 04:50:51 ÿÿÿÿÿÿ cleared to land	
04:51:46 Grozny Tower	Azerbaijan eight two four three for information. Runway lights are switched on	
04:53:19	ÿ Azerbaijan eight two four three going around, non stabilized approach....	
	lost LNAV heading? (cockpit voice)	
04:53:24 ÿÿÿÿÿÿ Azerbaijan eight two four three Go around as published Tower		
04:53:28 ÿ Request vectoring for go around Azerbaijan eight two four three, lost GPS		
hundred meters Tower	Azerbaijan eight two four three continue present heading climb height nine 04:53:35 ÿÿÿÿÿÿ	
04:54:34 Grozny Tower	Azerbaijan eight two four three report present heading	
04:55:23	ÿ Azerbaijan eight two four three could you provide vectoring for another hand approach?	
04:55:37	ÿ Azerbaijan eight two four three turn right heading zero eight zero	
04:55:49 ÿÿÿÿÿ Azerbaijan eight two four three confirm you need RNAV GNSS approach		

	Tower	
04:55:54	Confirm we need	NO GNSS approach , lost both GPS
04:56:02	Grozny	Azerbaijan eight two four three roger, expect RNAV GNSS approach yyyyy Runway two six
04:56:08	y No, we	lost both GPS, we cannot perform RNAV approach, request vectoring for NDB VICTOR approach Azerbaijan eight two four three
two six	Tower	Azerbaijan eight two four three roger, expect NDB VICTOR approach 04:56:18 yyyyyyy runway
04:58:07	Grozny Tower	Azerbaijan eight two four three maintain aaa height nine hundred meters
05:00:00	y Azerbaijan	eight two four three aaa advise please how long will maintain present heading?
05:00:13	yyyyyy Tower	Azerbaijan eight two four three one minute
05:01:30	yyyyyy Azerbaijan	eight two four three for your information radio contact lost, yyyyy continue present heading, aaaa and report your distance 05:01:45 y
Present heading	zero eight zero,	distance from airport...
05:01:54	y ...30 miles,	but lost GPS, this information may be inaccurate
05:02:13	E Grozny,	Azerbaijan eighty-two forty-three...
05:02:24	Grozny Azerbaijan	eighty-two forty-three yes I confirm, but this one according to the Tower I don't see you at the control room
05:02:30	Uh, so we're	heading eighty degrees, altitude nine hundred. meters.
05:02:37	Grozny Azerbaijan	eighty-two forty-three Understood, execute the left Tower orbit, gain thousand five... Five hundred meters.
05:04:53	E Grozny,	eighty-two forty-three. What course to take?
three thousand three	hundred	Azerbaijan eighty-two forty-three in the fourth minute, 05:04:58 Grozny meteorological visibility meters, cloudiness Tower solid, lower edge two hundred and forty meters, haze
05:06:00	E Requesting further	vectoring, we are following on course one hundred eighty
05:06:03	Grozny Azerbaijan Tower	eighty two forty three, Maintain current course
05:06:27	E And now we'll go in,	yes, I'm just asking what kind of chassis I need there Is this all about releasing everything and getting ready for everything?
05:06:37	E How was Grozny	received?
05:06:39	Grozny Eighty-two	forty-three I understand you
	Tower	
05:07:01	Grozny Azerbaijan	eighty two forty three Azimuth zero seventy two Tower distance twenty six km, right course two four zero, approach NDB VICTOR cleared, runway twenty six
05:07:22	Grozny Azerbaijan Tower	eighty two forty three right course two four zero
05:07:29	Grozny Azerbaijan Tower	eighty two forty three descend six hundred meters
		Azerbaijan eighty two forty three resume your own 05:08:04 Grozny Tower navigation, descend five hundred meters
05:09:16	E Azerbaijan	eighty-two forty-three took five hundred meters, please look at the distance, when to continue the descent 05:09:36 Grozny Azerbaijan eighty-two forty-three, according to them, according to my data you have the Tower height three hundred thirty meters

05:09:45	E	According to our height is five hundred meters, Azerbaijan eighty-two forty three
05:09:58	Grozny Azerbaijan	eighty two forty three, removal twelve Tower kilometers, approaching the glide path, wind calm, runway twenty-six cleared for landing. Runway lights on
05:11:42	E	Azerbaijan eighty two forty three following Baku
05:11:50	Grozny Azerbaijan	eighty-two forty-three with the course, with the current course Vyshka gain nine hundred meters
05:12:21	Grozny Tower	Azerbaijan eighty-two forty-three, initially dial flight level eight zero, and tell me, can you proceed directly to point PINTA?
05:12:40	E	Azerbaijan eighty two forty three, both GPS lost, needed vectoring
05:12:49	Grozny Azerbaijan	eighty-two forty-three you understand, right course three Tower six zero

05:13:30 according to data received from the FDR, the aircraft was climbing, crossing the altitude of 3500 feet above sea level according to the QNH pressure of Grozny airfield.

The aircraft was in a right bank of 26 degrees, pitch of 12.3 degrees in the mode control via the HDG side channel (set course 360 degrees, current course 325 degrees).

Actual indicated airspeed 225 knots, vertical rate of climb 3808 feet per minute.

Autopilot control mode AUTO PILOT ENGAGED, AUTO THROTTLE ENGAGED.

The N1 mode of both operating engines was 81.9%. The global GPS 1 and GPS 2 positioning systems did not receive signals from satellites. The DME rangefinder did not received signals from ground stations. The pressure in the 1st hydraulic system was 3100 PSI.

The pressure in the 2nd hydraulic system was 3100 PSI. The pressure in the 3rd hydraulic system was 3000 PSI. Landing gear retracted, wing mechanization retracted. No other aircraft systems failures according to data, received from FDR was not registered.



Fig. 1. Reconstruction of the flight before the occurrence of the exceptional situation

05:13:31 According to the recordings received from the CVR, a sonic boom is recorded, the sound system was triggered autopilot disconnection alarm (AI "AUTO PILOT"), automatic throttle (AI "Throttle").

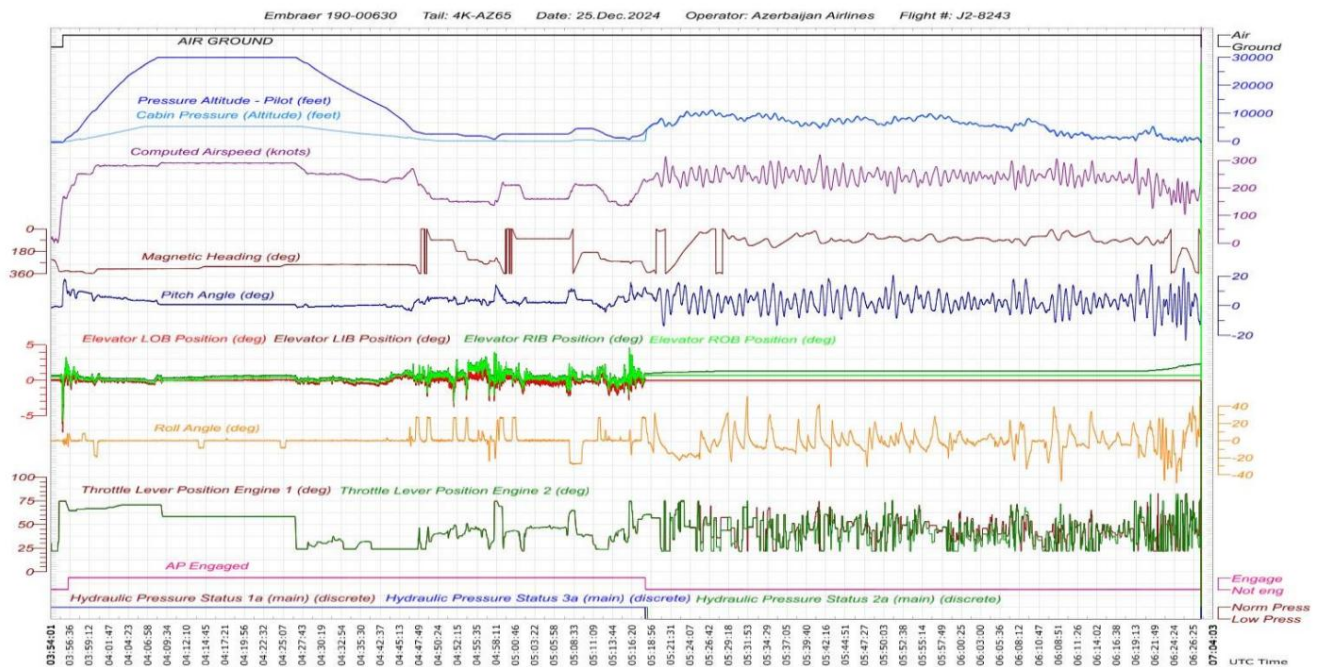


Fig. 2. Flight parameters 12/25/2024

Note: From 04:37:18 to 06:07:57 the recorded FDR time is ahead of UTC time for 4 minutes 32 seconds.

05:13:34 The pressure in the 3rd hydraulic system dropped to 0 PSI. The fluid level in the 3rd hydraulic system dropped to 0%. Position of control rudders (ELEVATOR, AILERON, RUDDER) are fixed in the zero position and remain in this position until the end of the flight.

05:13:36 failure of aircraft pitch trim system (AP) recorded
PITCH TRIM NOT ENGAGED, MACH TRIM NOT CAPABLE).

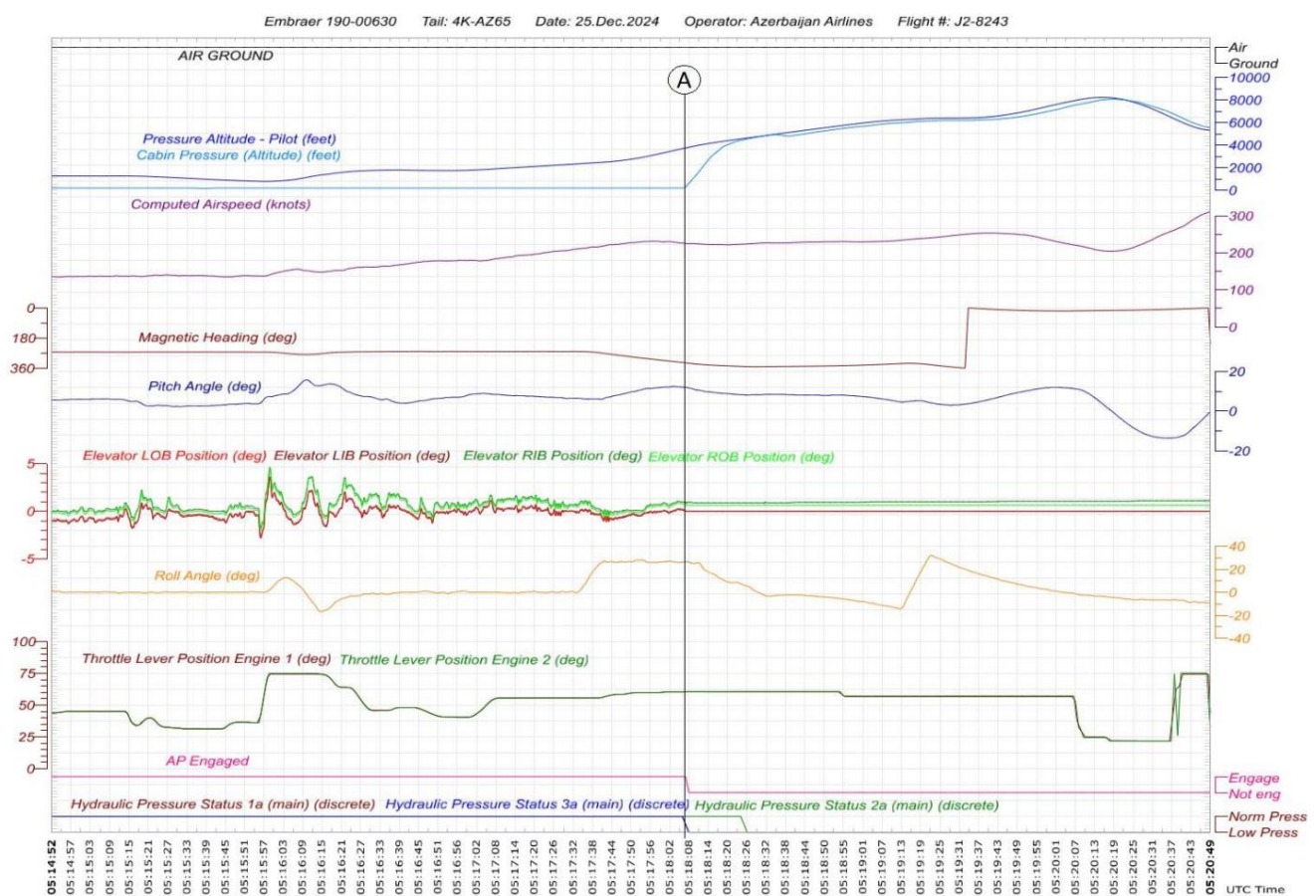
According to the CVR data, the PIC announced the name of the alarm on the EICAS screen:
«DOOR...SERVICE DOOR AFT OPEN».

05:13:39 According to FDR data, the beginning of cabin depressurization was recorded.

Note: Below are some excerpts from the recordings obtained from the CVR.

05:14:07	Grozny Tower	Azerbaijan eighty two forty three, pick up flight one five zero
05:14:17	Grozny Tower	Azerbaijan eighty two forty three and speed up the dialp
05:14:23	E	We are speeding up the recruitment of Azerbaijan eighty two forty three

05:13:47 the alarm "HYD 2 LOW PRESS" was triggered. Pressure in the 1st hydraulic system dropped to 0 PSI. The fluid level in the 1st hydraulic system dropped to 0%.



05:13:54 (FDR) The pressure in the 2nd hydraulic system dropped to 4 PSI (Fig. 4).



Fig. 4. Flight reconstruction after the occurrence of a special situation.

05:13:56 According to the recordings received from the CVR, a repeated sonic boom is recorded.

05:14:58 according to CVR data the captain contacted the cabin crew via the intercom

to clarify the situation: "Hello, what happened?" The flight attendant reported: "2 exploded

seats, I ... mmm I can't come up because the passengers have stood up, I'm helping them sit down."

Note: Below are some excerpts from the recordings obtained from the CVR.

05:15:57	E	Grozny control failed, bird strike in the cockpit. Aa bird strike and in the cockpit 2 seats exploded
05:16:08	Grozny Tower	Azerbaijan eighty two forty three understood you, and what kind of help do you need?
05:16:14	E	Aaa we need, we need the nearest airfield where the weather is normal
		let's go sit down (in-cabin conversations)
05:16:32 E 05:16:36		What is the weather like in Mineralnye Vody? Please help.
Grozny Tower		Azerbaijan eighty two forty three, at the 16th minute
05:16:40 E 05:16:44		Didn't get it? Didn't get it?
Grozny Tower		Azerbaijan eighty two forty three, at the 16th minute
05:16:48 E 05:16:52		What's at the 16th minute?
Grozny Tower		Azerbaijan eighty-two forty-three please repeat your message, I can't hear you well.
05:16:54	E	So, ah, there was a strong blow, the rear seats there exploded, the flight attendant reported. We are heading to Mineralnye Vody, please give us the weather in Mineralnye Vody

05:17:07 Grozny Tower		Azerbaijan eighty two forty three board order?
05:17:07	E	"All clear, we are heading to Mineralnye Vody"

05:18:58 according to (FDR) the EICAS alarm "CABIN ALT HIGH" was triggered.

During the subsequent flight, this alarm was repeated 8 times.

05:19:04	E	I can't maintain 150, we have high pressure in the cabin.
05:20:20 Grozny Tower		Azerbaijan eighty two forty three left course three six zero
05:20:24 E 05:20:48		Left three six zero and I, I have. the plane is losing control
Grozny Tower		Azerbaijan eighty two forty three for information weather Mineralnye Vody: wind one hundred twenty degrees six meters per second, visibility more than ten kilometers, solid cloud cover, lower edge one hundred eighty meters. QNH 10...
05:22:59	E	At the reception, our hydraulics failed.
05:23:03 Grozny Tower		Azerbaijan eighty-two forty-three, understood, aaa can you complete the courses?
05:23:11	E We can't	carry out, give a specific course, we will go to Makhachkala
05:23:34 Grozny Tower		Azerbaijan eighty-two forty-three, and the weather in Makhachkala: wind three hundred and ten degrees, two meters per second, visibility three thousand three hundred meters, lower edge seven hundred and fifty meters. haze
05:24:17 Grozny Tower		Azerbaijan eighty-two forty-three, confirm, has a disaster been declared?
05:24:24 E 05:24:37		Didn't understand?
Grozny Tower		Azerbaijan eighty-two forty-three, is the flight okay?
05:24:41 E 05:25:45		Board, order
Grozny Tower		(inaudible) Azerbaijan eighty-two forty-three, I don't see you on the control tower, can you...? Tell me your altitude
05:26:58 Grozny Tower		Azerbaijan eighty two forty three, work Rostov Control, one hundred thirty four comma one
05:28:01	E	Next we proceed to Baku, at this altitude, please vector
05:28:05	Rostov Control 134.1	...Control, confirm, you are proceeding at flight level ninety.
05:28:59 Rostov Control 134.1		Azerbaijan eighty two forty three, please advise the current exchange rate
05:29:24 Rostov Control 134.1		Azerbaijan eighty two forty three, course one four zero
05:30:47 Rostov Control 134.1		Azerbaijan eighty two forty three, confirm, can you stand it? Echelon ninety

05:34:04	Rostov Control 127.9	Azal eight ten two forty three, recommendation, southeast of you one hundred sixty kilometers Makhachkala is located, technically suitable, ready to accept. Your decision?
05:34:16	E	Please give me the weather in Baku
05:34:35	Rostov Control 127.9	Azal eight ten two forty three, Baku, actual weather thirty minutes before: wind three hundred twenty degrees fourteen knots, visibility over ten kilometers, significant cloud cover at six hundred sixty..., correction nine hundred sixty meters, temperature nine, dew point five, QNH one zero two seven hectopascals, no significant change for two hours
05:34:57	E	Got it, what about the weather in Makhachkala?
05:35:35	Rostov Control 127.9	Azal eight ten two forty three, actual weather Makhachkala thirty minutes before, wind three hundred twenty degrees two meters per second, visibility four thousand eight hundred meters, haze, cloud cover insignificant, one hundred eighty meters, overcast seven hundred twenty meters, temperature seven, dew point five QNH one zero two six hectopascals, runway thirty two in operation, braking efficiency good, no significant changes for two hours and QBB one hundred eighty meters.
05:36:01	E	No, we're heading to Baku.
05:37:24	Rostov Control 127.9	Azal eight ten two forty three, if possible, please let me know the remaining fuel and which engines the bird hit?
05:39:01	E A	Rostov, Azerbaijan eight ten three forty three, eight ten two forty three, fuel on board three eight hundred thirty, engines running, aileron and elevator control system failed
05:39:53	E	I ask you, I have no time yet. How is the weather in Aktau?
05:41:30	Rostov Control 127.9	Azal eight ten two forty three, actual weather Aktau, uniform alfa tango echo, thirty minutes in advance, wind zero forty degrees, six meters per second, visibility over ten kilometers, significant cloud cover at one thousand eighty meters, temperature four, dew point minus one, QNH one zero two seven hectopascals, no significant change for two hours
05:42:40	E	And then Rostov, then we go to Aktau
05:45:33	be needed upon arrival 127.9	Azal eight ten two forty three, and if possible please advise what Rostov Control assistance will
05:45:49	E	Firefighters, evacuation, uh, doctor, Azerbaijan eight ten two forty three
05:51:10	Rostov Control 127.9	Azerbaijan eight ten two forty three, repeat the number of passengers and the presence of dangerous goods
05:51:18	E	Sixty two passengers, no dangerous goods Azerbaijan eight ten two forty three
05:52:39	E	So, we have the following situation, the oxygen is running out in the passenger cabin, which means that the oxygen tank exploded, I think, aaa, which means there is a smell of fuel, some passengers are losing consciousness, let us go at a lower altitude

05:52:58	Rostov Control 127.9	Azerbaijan eight ten two forty three, what is the required flight, please inform and information received, oxygen tank exploded, oxygen is running out, passengers are losing consciousness
06:02:47	E	One hundred twenty point seven, thank you, Azerbaijan eight ten two forty three. Mayday, mayday, mayday Azerbaijan, eight ten two forty three, Aktau tower, ah good afternoon, the control surfaces have failed, and we are controlling the throttle sectors, we are requesting an emergency landing on the runway eleven.
06:03:06	Aktau Tower	AHY 8243, Aktau Tower, good afternoon, identified, information received, control rudders only, distress code 7700, continue descent to 1800 feet, QNH 1025, and let us know how it would be more convenient to approach, visually most likely, yes?
06:03:25	E	We are descending to an altitude of one thousand eight hundred feet, we will approach visually, Azerbaijani eight ten two forty three, we are managing the gas sectors
06:03:39	Aktau Tower	Azerbaijani eighty-two forty-three, provide vectoring for entry?
06:03:44	E	Yes, please vector Azerbaijan eighty two forty three

06:19:13 according to (FDR) the TERRAIN TERRAIN PULL sound alarm was triggered UP.

At 06:22:20 the crew began releasing the mechanization in position one (FLAPS 1).

06:22:24 the crew began releasing the chassis.

06:22:40 the crew began releasing the mechanization in position two (FLAPS 2).

06:23:30 the crew began releasing the mechanization in position three (FLAPS 3).

06:24:52 according to (FDR) the TERRAIN TERRAIN PULL sound alarm was triggered UP.

06:25:25 according to (FDR) the TERRAIN TERRAIN PULL sound alarm was triggered UP.

06:27:58 the aircraft collided with the ground with a 35 degree bank to the right, pitch "-5.8" degrees, in the configuration:

- Flaps/slats extended to position three (FLAPS 3);
- The chassis is released, the doors are open;
- γ Stabilizer 1.76 UP.

1.2. Bodily injury

Bodily injury	Crew	Passengers	Other persons
Fatal	3	35	0
Serious	1	15	0
Minor/none	1/0	6/6	0/0

1.3. Aircraft damage

As a result of the accident, the aircraft was completely destroyed and partially burned.



**Fig. 5. The main source of the fire
(right wing, nose and center sections of the fuselage, center section and left wing)**



Fig. 6. Cabin canopy and upper panel



Fig. 7. Front part of the right engine



Fig. 8. Left engine with part of the pylon

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The information presented in this report is preliminary and may be clarified and supplemented based on the results of research and study of all materials.



Fig. 9. Rear and tail part of the aircraft

The Republic of Kazakhstan has ensured the complete safety and security of the crash site involving law enforcement agencies. The Commission, upon completion of the field stage the investigation was carried out to organize the transportation of the aircraft fragments to a specially designated and guarded hangar for further work.

Damage:

The commission of inquiry continues to conduct a detailed investigation. damage to the aircraft structures. Initial inspection of the surviving fragments revealed multiple through and non-through damages of various sizes and shapes in the tail section fuselage, vertical stabilizer and stabilizer, elevator and rudder. Similar damage was were found on the left engine and left wing of the aircraft, as well as on units and components of the aircraft. In some places, the damage has the correct rectangular shape.



Fig. 10. Damage to the left side of the tail section



Fig. 11. Damage to the left side of the tail section

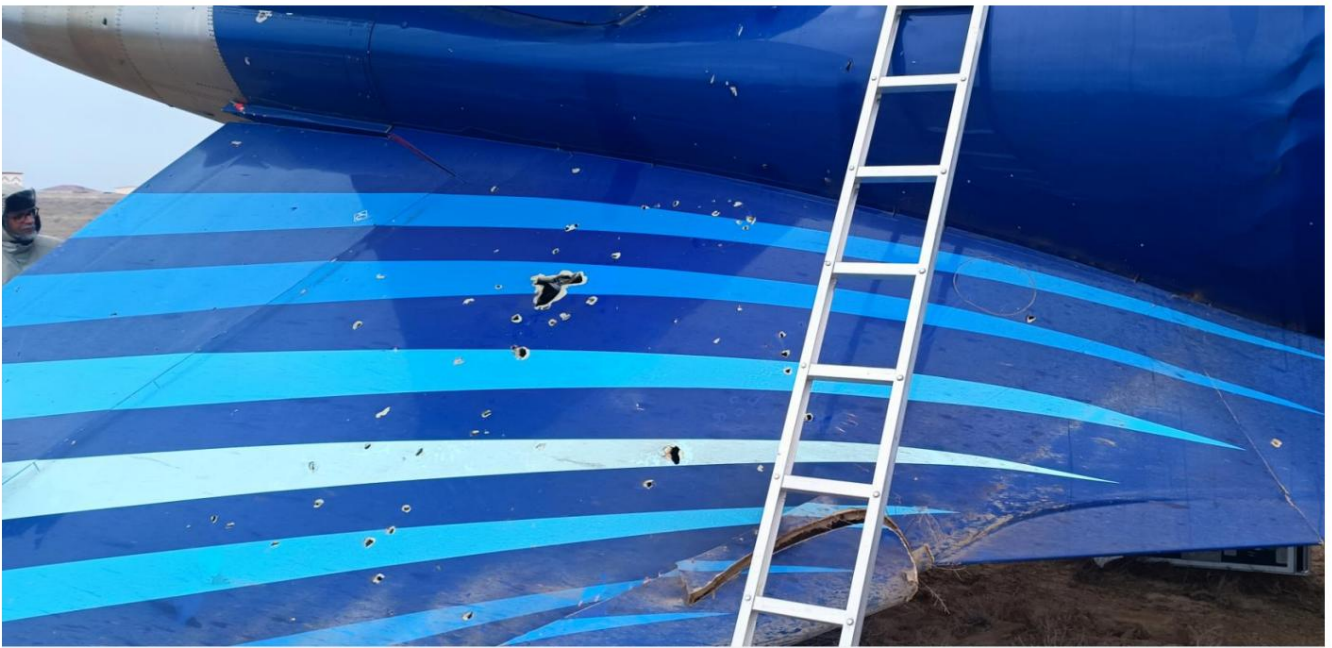


Fig. 12. Damage to the left side of the tail section

Below are photographs and a graph containing evidence of the damage.

hydraulic systems 1, 2 and 3 before impact with the earth's surface, probably caused by external objects that have penetrated the components of the armed forces.

The consequence of this damage will be a loss of hydraulic fluid/pressure.

Damage to hydraulic system tubes 1.



Fig. 13. Hydraulic system 1 – Damaged tube



Fig. 14. Hydraulic system 1 – Damaged tube - detailed view

Damage to the Hydraulic System Tube 3



Fig. 15. Hydraulic system 3 – damaged tube



Fig. 16. Hydraulic system 3 – detailed view of the damaged tube

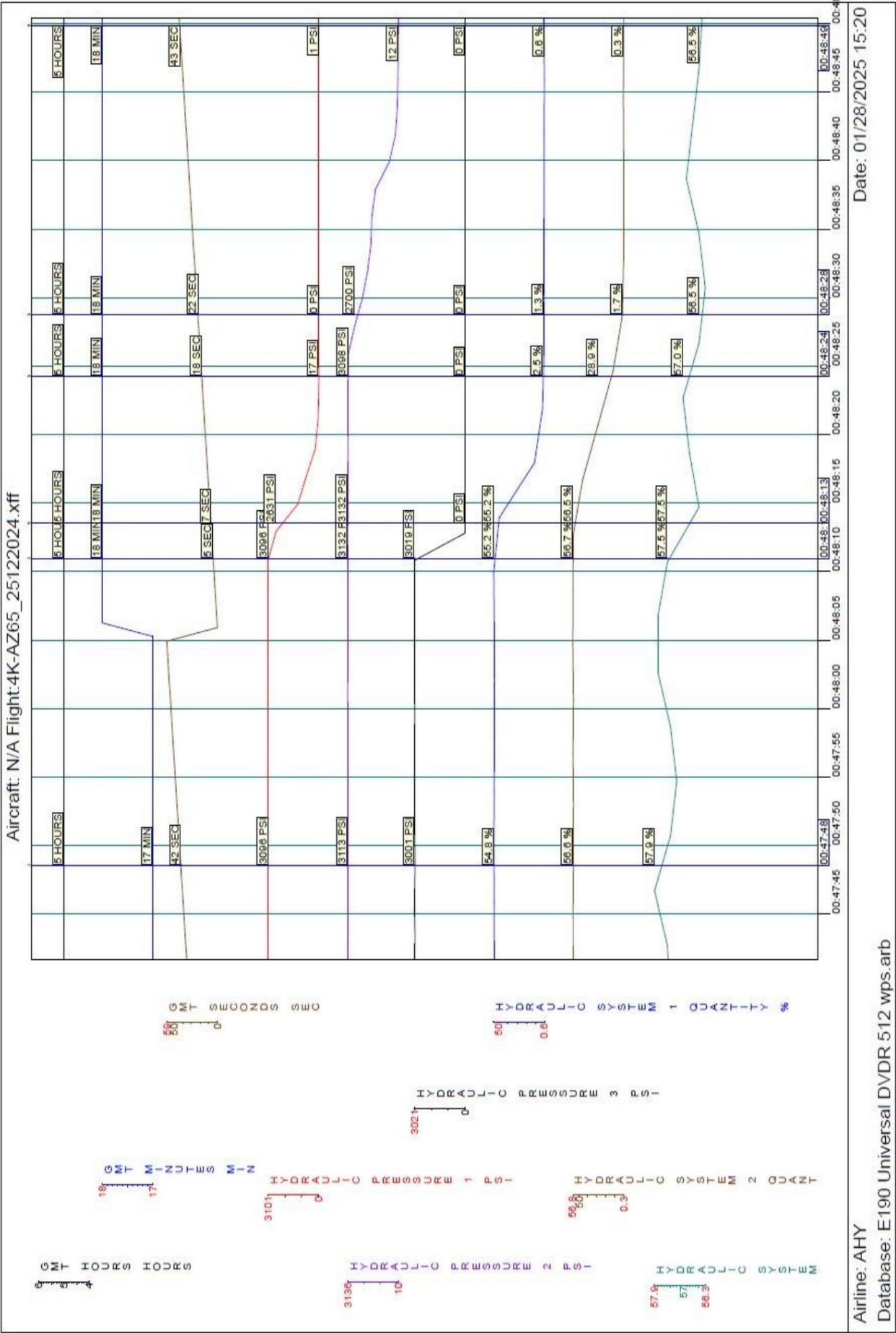


Fig. 17. Schedule of operation of hydraulic systems from mQAR

Damage to hydraulic system reservoir 3



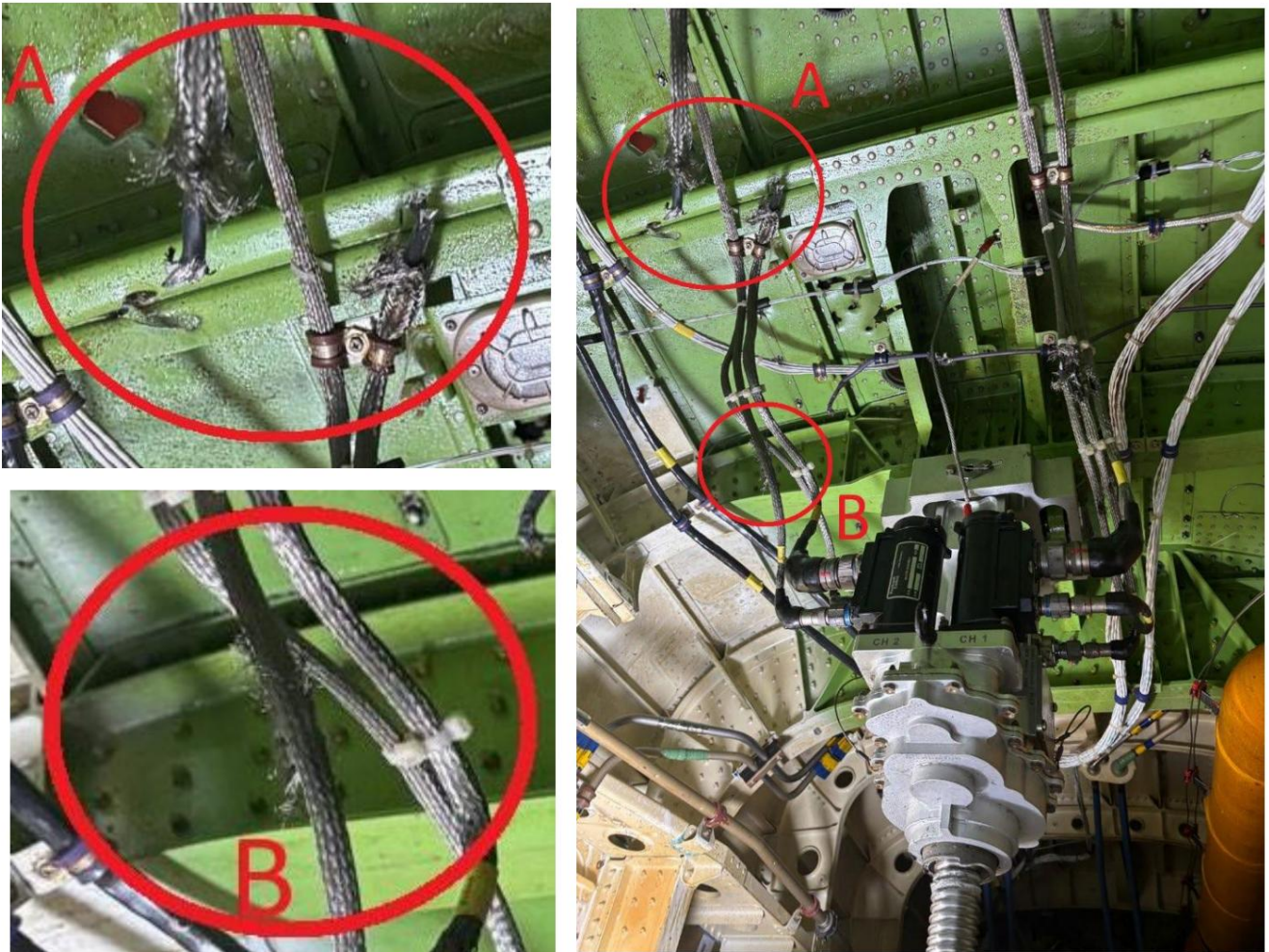
**Fig. 18. Hydraulic system 3 –
damaged tank**



**Fig. 19. Hydraulic system 3 –
detailed view of the damaged tank**

Below are photographs showing evidence of electrical damage.
stabilizer drive control wiring (pitch trim) before impact with the ground
surface, probably caused by external objects.

The consequence of these damages will be the inoperability of the first and second channels.
trimming by pitch angle.

Damage to the stabilizer control mechanism wiring (pitch trimmer)**Fig. 20. Stabilizer control mechanism****Through damage in the hydraulic system compartment No. 3 and the stabilizer control mechanism**

Through-and-through damage to the aircraft indicates penetration of external objects into design of the aircraft.

Most of the through-and-through damage is in the keel and stabilizer.

Visual inspection of the through damage shows that some of them are through, while while others are blind/non-through lesions.

By the Investigation Commission in the presence of Authorized Representatives Federative Republic of Brazil, the Republic of Azerbaijan and law enforcement The authorities of the Republic of Kazakhstan carried out actions to remove foreign objects, which could be preserved in blind lesions, in order to direct them to additional forensic examination. As a result, a large number of pieces were extracted from the blind injuries. foreign objects.

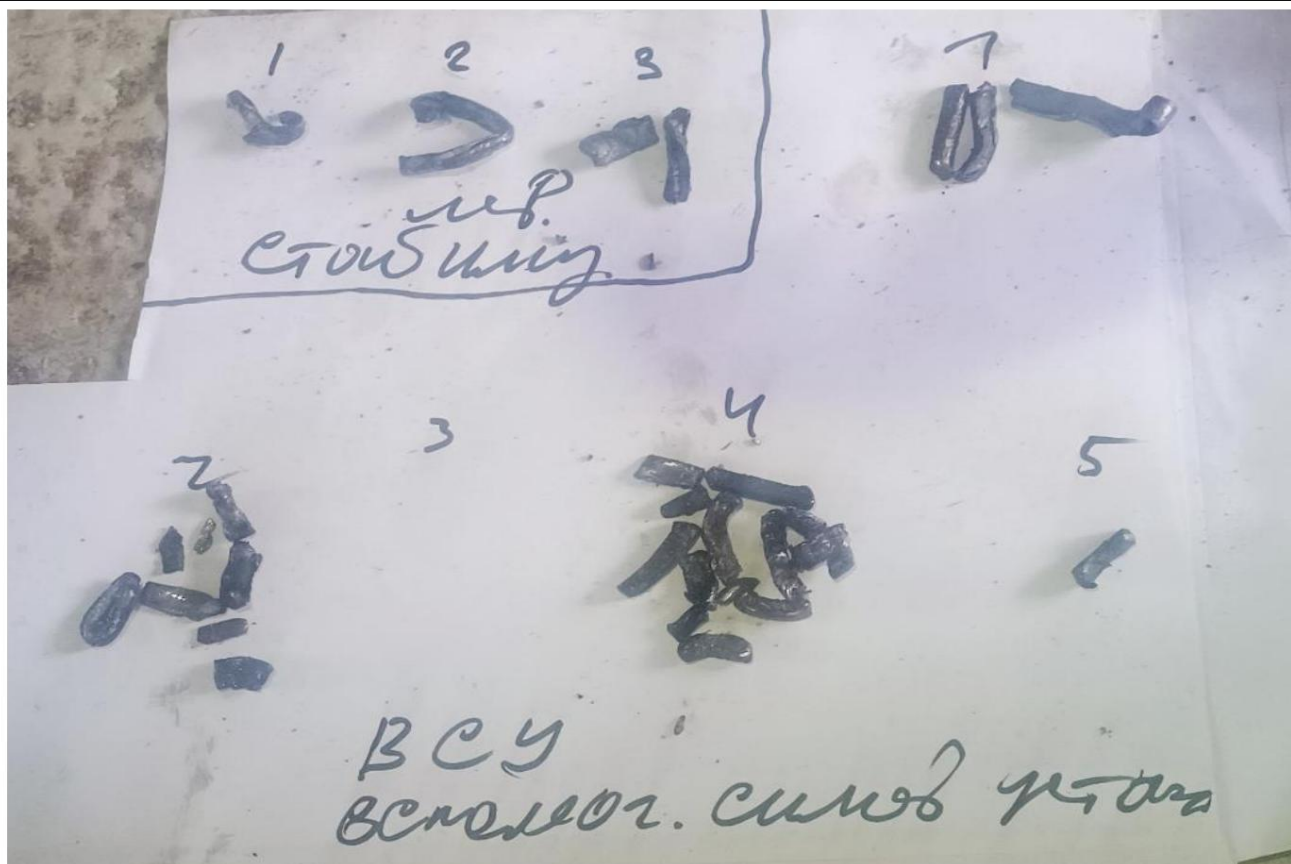


Fig. 21. Part of the foreign metal objects removed from the left stabilizer and the APU compartment



Fig. 22. Part of the foreign metal objects removed from hydraulic system compartment No. 3 and the stabilizer control mechanism



Fig. 23. Examples of extracted foreign metal objects

To determine the nature and origin of through-and-through damage caused by foreign objects, appropriate research and examinations will be carried out.

1.4. Other damages

There was no other damage caused to other objects.

1.5. Information on personnel

KBC

1	Position	KBC
2	Floor	Male
3	Age	62 years old
4	Education	Sasovskoye named after the Hero of the Sasovsky Union Taran G.A. Flight School of Civil Aviation. (1982),

		specialty - <i>"flight operation"</i> <i>aircraft"</i> , qualification – <i>"pilot"</i> . Leningrad Hydrometeorological Institute in 1992, specialty – <i>"meteorology"</i> , qualification - <i>"engineer-</i> <i>meteorologist»</i> .
5	Aviation Personnel Certificate GA	Airline Transport Pilot's License civil aviation, AZE.FCL.00217.A.ATPL, issued State Agency for Civil Aviation of the Republic of Azerbaijan 01/29/2021 to 05/19/2027, <i>qualification</i> <i>marks: "IR-EMB170" until 04/28/2025,</i> <i>"PIC-EMB170" until 28.04.2025.</i>
6	Medical examination VLEK	11.09.2024, medical report 1 class AZ No. 008384, valid until 14.03.2025
7	Minimum FAC	CAT II, Takeoff-150 m, Landing-100 ft ÷ 300 (RVR)
8	Total Flight Time	15139 h. 10 min. An-2: 2237 h. 50 min. Yak-40: 2933 hrs 36 mins. Tu-134: 48 h 03 min An-140: 37 h. 29 min. ATR 42/72: 2872 hrs. 46 m. E-170/190: 7009 hrs 26 mins.
9	As KVS5	7009 h. 26 min.
10	Flight hours in the last 30 days	46 h 57 min
11	Raids in the last three days	The data is being clarified
12	Raids per day AP	02 h 39 min
13	Total working hours per day AP	03 h 50 min
14	Break in flights for	The data is being clarified

⁵ On the Embraer 190 aircraft

	last year	
15	Final check of equipment piloting and navigation	12.07.2024, flight examiner - pilot-Instructor of CJSC "Azerbaijan Hava Yollari", overall rating - "Satisfactory"
16	Training on the simulator	Last Simulator: Recurrent - 10/26/2024; LPC -27.10.2024
17	Professional Development Courses level	The data is being clarified
18	Pre-flight preparation	1 hour 30 minutes.
19	Rest before the flight	The data is being clarified
20	Pre-flight medical examination	25.12.24, medical start of the airport named after G. Aliyev
21	AP in the past	The data is being clarified

Second pilot

1	Position	Second pilot
2	Floor	Male
3	Age	29 years old
4	Education	National Aviation Academy of Baku in 2015, specialty - <i>"flight" engineering"</i>
5	Aviation Personnel Certificate GA	Commercial Pilot License, AZE.FCL.00203.A.CPL, issued State Agency for Civil Aviation of the Republic of Azerbaijan 14.02.2024 to 14.02.2034, <i>qualification marks: "CP-EMB170" until 07/26/2025, "IR-EMB170" until 26.07.2025, special marks: "MIN-EMB170-CAT II" to 26.07.2025.</i>
6	Medical examination VLEK	22.02.2024, medical report 1 class AZ No. 007844, valid until 21.02.2025
7	Total Flight Time	828 h. 50 min.

		E-170/190: 670 hours 06 minutes. Cessna-172S: 158 hrs 44 mins.
8	Flight hours in the last 30 days	10 h 04 min
9	Raids in the last three days	The data is being clarified
10	Raids per day AP	02 h 39 min
11	Total working hours per day AP	03 h 50 min
12	Break in flights for last year	The data is being clarified
13	Final check of equipment piloting and navigation	08.10.2024, flight examiner – pilot- Instructor of CJSC "Azerbaijan Hava Yollari", overall rating - "Satisfactory"
14	Training on the simulator	Recurrent Simulator Training-03.11.2024; Recurrent Proficiency Check-16.11.2024;
15	Professional Development Courses level	The data is being clarified
16	Pre-flight preparation	1 hour 30 minutes.
17	Rest before the flight	51 h 49 min
18	Medical examination before departure	12/25/2024, medical start of the airport named after G. Aliyev
19	AP in the past	The data is being clarified

1.6. Aircraft details



Fig. 24. Embraer 190-100IGW aircraft

1	Type of aircraft	Embraer ERJ 190-100 IGW
2	Date of manufacture, manufacturer	25.06.2013, Embraer S.A.
3	Factory (serial) number	19000630
4	State and registration identification marks	4K-AZ65
5	Certificate of state registration of hot water supply	No. 393 dated 28.08.2015, issued State administration civil aviation of Azerbaijan Republics
6	Certificate of Airworthiness	No. AR-336 dated 16.07.2013, issued State administration civil aviation of Azerbaijan Republic, extended by the Certificate of airworthiness check No.CAMO/010/2022 from 18.10.2024
7	Assigned resource/service life	As of

8	Development of the SNE	15257 l.h. 22 min./9949 landings
9	Remaining assigned resource/term services	As of
10	C-Check interval	7500 l.h.
11	Number of PTO	2
12	Date and place of the last PTO	18.10.2024 Azerbaijan, Baku «Silk Way Technics branch of Silk Way West Airlines»
13	Operating time after PTO	471 flight hours
14	Remaining service life/period between repairs services	7029 flight hours
15	Last operational maintenance	48 FH check 24.12.2024 Departure Check 25.12.2024

1.6.1 Engines

1	Type	CF34-10E6G07	CF34-10E6G07
2	Factory number	424554 (left)	424560 (right)
3	Date of manufacture, plant-manufacturer	29.04.2013, General Electric	10.05.2013, General Electric
4	Appointed resource/assigned term services	As of	As of
5	Operating time of the SNE / Remaining resources	15257 h. 22 min./9949 cycles	15257 h. 22 min./9949 cycles
6	Time between repairs and between repairs services deadline	25000 cycles	25000 cycles
7	Number of repairs	Not repaired	Not repaired
8	Date and place of the last repairs	Not repaired	Not repaired
9	Remaining overhaul period resource/service life	15051 cycles	15051 cycles

1.7. Meteorological information

Grozny (Northern) airfield

Forecast for 25.12.2024 valid from 03:00 to 12:00 wind direction 250°; speed wind 3 m/s with gusts of 8 m/s; visibility 3100 m, haze; solid cloud cover with a lower boundary 210 m; at times from 03:00 to 09:00 visibility 300 m, light drizzle, fog; cloudiness continuous with a lower boundary of 60 m.

Forecast for 25.12.2024 valid from 06:00 to 15:00 wind direction 270°; speed wind 3 m/s with gusts of 8 m/s; visibility 3500 m, haze; solid cloud cover with a lower boundary 210 m; at times from 06:00 to 15:00 visibility 300 m, light drizzle, fog; cloudiness continuous with a lower boundary of 60 m.

Actual weather 12/25/2024 from 04:30 to 05:30

04:30 surface wind direction 260°, wind speed 1 m/s; visibility meteorological: start of runway 3700 m, middle of runway 3300 m, end of runway 3500 m, haze; solid cloud cover 210 m high; air temperature +2.5°C, dew point temperature +1.9°C, relative air humidity 96%; QFE pressure 754.1 mm Hg (1005.5 hPa), QNH pressure 1025.2 hPa. Landing forecast: unchanged; mountains closed, obstructions closed; coefficient of adhesion 0.50.

04:50 surface wind direction is unstable, wind speed is 1 m/s; visibility meteorological: start of runway 3300 m, middle of runway 3400 m, end of runway 3400 m, haze; solid cloud cover 420 m high; air temperature +2.6°C, dew point temperature +2.0°C, relative air humidity 96%; QFE pressure 754.2 mm Hg (1005.7 hPa), QNH pressure 1025.4 hPa. Landing forecast: unchanged; friction coefficient 0.50.

04:55 surface wind direction is unstable, wind speed is 1 m/s; visibility meteorological: start of runway 3500 m, middle of runway 3500 m, end of runway 3400 m, haze; solid cloud cover 240 m high; air temperature +2.6°C, dew point temperature +2.0°C, relative air humidity 96%; QFE pressure 754.2 mm Hg (1005.7 hPa), QNH pressure 1025.4 hPa. Landing forecast: unchanged; mountains closed, obstructions closed; coefficient of adhesion 0.50.

04:59 surface wind direction 220°, wind speed 1 m/s; visibility meteorological: start of runway 3400 m, middle of runway 3400 m, end of runway 3700 m, haze; solid cloud cover 420 m high; air temperature +2.6°C, dew point temperature +2.0°C, relative air humidity 96%; QFE pressure 754.2 mm Hg (1005.7 hPa), QNH pressure 1025.4 hPa. Landing forecast: unchanged; friction coefficient 0.50.

05:00 surface wind direction 220°, wind speed 1 m/s, visibility
meteorological: start of runway 3500 m, middle of runway 3300 m, end of runway 3700 m, haze;
solid cloud cover 420 m high; air temperature +2.6°C, dew point temperature
+2.0°C, relative air humidity 96%; QFE pressure 754.2 mm Hg (1005.7 hPa),
QNH pressure 1025.4 hPa. Landing forecast: unchanged; friction coefficient 0.50.

05:02 surface wind direction 220°, wind speed 1 m/s, visibility
meteorological: start of runway 3300 m, middle of runway 3300 m, end of runway 3400 m, haze;
solid cloud cover 240 m high; air temperature +2.6°C, dew point temperature
+2.0°C, relative air humidity 96%; QFE pressure 754.3 mm Hg (1005.7 hPa),
QNH pressure 1025.5 hPa. Landing forecast: unchanged; mountains closed, obstructions
closed; coefficient of adhesion 0.50.

05:10 calm, meteorological visibility: start of runway 3400 m, middle of runway 3500 m,
end of runway 3600 m, haze; solid cloud cover 360 m high; air temperature +2.6°C,
dew point temperature +2.0°C, relative air humidity 96%; QFE pressure 754.4 mm
Hg (1005.9 hPa), QNH pressure 1025.6 hPa. Landing forecast: no change; obstacles
closed; coefficient of adhesion 0.50.

05:11 calm, meteorological visibility: start of runway 3500 m, middle of runway 3500 m,
runway end 3500 m, haze; solid cloud cover 240 m high; air temperature 2.6°C,
dew point temperature 2.0°C, relative air humidity 96%; QFE pressure 754.4 mm
Hg (1005.9 hPa), QNH pressure 1025.6 hPa. Landing forecast: no change; mountains
closed, obstacles closed; coefficient of adhesion 0.50.

05:14 calm, meteorological visibility: start of runway 3500 m, middle of runway 3700 m,
end of runway 3600 m, haze; solid cloud cover 360 m high; air temperature +2.7°C,
dew point temperature +2.1°C, relative air humidity 96%; QFE pressure 754.4
mmHg (1005.9 hPa), QNH pressure 1025.6 hPa. Landing forecast: no change;
obstacles are closed; coefficient of adhesion 0.50.

05:18 calm, meteorological visibility: start of runway 3600 m, middle of runway 3600 m,
end of runway 3400 m, haze; solid cloud cover 210 m high; air temperature +2.7°C,
dew point temperature +2.1°C, relative air humidity 95%; QFE pressure 754.3
mmHg (1005.8 hPa), QNH pressure 1025.5 hPa. Landing forecast: no change; mountains
closed, obstacles closed; coefficient of adhesion 0.50.

05:21 calm, meteorological visibility: start of runway 3500 m, middle of runway 3800 m,
end of runway 3100 m, haze; solid cloud cover 360 m high; air temperature +2.7°C,
dew point temperature +2.1°C, relative air humidity 95%; QFE pressure 754.3 mm

Hg (1005.8 hPa), QNH pressure 1025.5 hPa. Landing forecast: no change; obstacles closed; coefficient of adhesion 0.50.

05:25 calm, meteorological visibility: start of runway 3500 m, middle of runway 3700 m, end of runway 3400 m, haze; solid cloud cover 210 m high; air temperature +2.7°C, dew point temperature +2.1°, relative air humidity 95%; QFE pressure 754.3 mm Hg (1005.8 hPa), QNH pressure 1025.5 hPa. Landing forecast: no change; mountains closed, obstacles closed; coefficient of adhesion 0.50.

05:27 surface wind direction is unstable, wind speed 1 m/s, visibility meteorological: start of runway 3400 m, middle of runway 3700 m, end of runway 3300 m, haze; solid cloud cover 360 m high; air temperature +2.7°C, dew point temperature +2.1°, relative air humidity 95%; QFE pressure 754.3 mm Hg (1005.8 hPa), QNH pressure 1025.5 hPa. Landing forecast: unchanged; obstacles closed; adhesion coefficient 0.50.

05:30 surface wind direction 160°, wind speed 1 m/s, visibility meteorological: start of runway 3300 m, middle of runway 3600 m, end of runway 3200 m, haze; solid cloud cover 360 m high; air temperature +2.7°C, dew point temperature +2.1°, relative air humidity 95%; QFE pressure 754.3 mm Hg (1005.8 hPa), QNH pressure 1025.5 hPa. Landing forecast: unchanged; obstacles closed; adhesion coefficient 0.50.

Mineralnye Vody airfield

Forecast for 12/25/2024 valid from 03:00 12/25/2024 to 03:00 12/26/2024:

wind direction 110°, wind speed 3 m/s with gusts of 8 m/s, visibility 6 km, cloudiness continuous with a lower boundary of 150 m. Maximum temperature +5°C at 12:00 12/25/2024, minimum temperature -0°C at 03:00 25.12.2024. Sometimes between 03:00 and 08:00 12/25/2024: visibility 300 m freezing fog, solid clouds with a lower boundary of 60 m. Gradually in the period from 08:00 to 09:00 25.12.2024: wind direction 120°, wind speed 5 m/s gusts of 13 m/s, significant cloud cover with a lower boundary of 480 m.

Actual weather 12/25/2024 from 05:00 to 06:00:

05:00 surface wind direction 150°, wind speed 5 m/s, visibility meteorological start of runway 10000 m, middle of runway 10000 m, end of runway 10000 m, cloudiness continuous layered 180 m high, air temperature +1.1°C, dew point temperature +0.1°C, relative humidity 92%, QFE pressure 739.8 mm Hg (986.4 hPa), QNH pressure 1024.0 hPa, landing forecast unchanged, mountains closed, obstructions closed, adhesion coefficient 0.60.

05:06 surface wind direction 120°, wind speed 4 m/s, visibility

meteorological start of runway 10000 m, middle of runway 10000 m, end of runway 10000 m, cloudiness continuous layered 180 m high, air temperature +1.1°C, dew point temperature +0.1°C, relative humidity 92%, QFE pressure 739.8 mm Hg (986.5 hPa), QNH pressure 1024.1 hPa, forecast for landing, visibility 300 m at times, fog, solid clouds 60 m high, mountains closed, obstacles closed, coefficient of adhesion 0.60.

05:22 surface wind direction 130°, wind speed 6 m/s, visibility

meteorological start of runway 10000 m, middle of runway 7000 m, end of runway 8000 m, haze, solid layered clouds 180 m high, air temperature +1.2°C degrees Celsius, dew point temperature 0.2 degrees Celsius, relative humidity 92%, pressure QFE 739.8 mmHg (986.5 hPa), QNH pressure 1024.1 hPa, forecast for landing at times visibility 300 m fog solid clouds 60 m high, mountains covered, obstacles covered, adhesion coefficient 0.60.

05:30 surface wind direction 120°, wind speed 4 m/s, visibility

meteorological start of runway 9000 m, middle of runway 8000 m, end of runway 8000 m, haze, solid layered clouds 180 m high, air temperature +1.2°C, temperature of the point dew point +0.2°C, relative air humidity 93%, QFE pressure 739.9 mm Hg (986.6 hPa), pressure QNH 1024.2 hPa, forecast for landing, visibility 300 m at times, fog, cloudiness solid 60 m high, mountains closed, obstacles closed, coefficient of adhesion 0.60.

05:31 surface wind direction 110°, wind speed 4 m/s, visibility

meteorological start of runway 10000 m, middle of runway 7000 m, end of runway 8000 m, haze, solid layered clouds 180 m high, air temperature +1.2°C, temperature of the point dew point +0.3°C, relative air humidity 93%, QFE pressure 740.0 mm Hg (986.7 hPa), pressure QNH 1024.4 hPa, forecast for landing, visibility 300 m, fog, cloudiness solid 60 m high, mountains closed, obstacles closed, coefficient of adhesion 0.60.

05:34 surface wind direction 100°, wind speed 4 m/s, visibility

meteorological start of runway 9000 m, middle of runway 8000 m, end of runway 7000 m, haze, solid layered clouds 150 m high, air temperature +1.2°C, temperature of the point dew point +0.3°C, relative air humidity 93%, QFE pressure 739.9 mm Hg (986.6 hPa), pressure QNH 1024.2 hPa, forecast for landing, visibility 300 m at times, fog, cloudiness solid 60 m high, mountains closed, obstacles closed, coefficient of adhesion 0.60.

05:42 surface wind direction 120°, wind speed 5 m/s, visibility

meteorological start of runway 10000 m, middle of runway 8000 m, end of runway 7000 m, haze, solid layered clouds 150 m high, air temperature +1.2°C, temperature of the point

dew point +0.3°C, relative air humidity 93%, QFE pressure 740.0 mm Hg (986.7 hPa),
pressure QNH 1024.4 hPa, forecast for landing, visibility 300 m, fog, cloudiness
solid 60 m high, mountains closed, obstacles closed, coefficient of adhesion 0.60.

06:00 surface wind direction 110°, wind speed 5 m/s, visibility
meteorological start of runway 8000 m, middle of runway 8000 m, end of runway 7000 m, haze,
solid layered clouds 150 m high, air temperature +1.2°C, temperature of the point
dew point +0.3°C, relative air humidity 93%, QFE pressure 740.0 mm Hg (986.7 hPa),
pressure QNH 1024.4 hPa, forecast for landing, visibility 300 m, fog, cloudiness
solid 60 m high, mountains closed, obstacles closed, coefficient of adhesion 0.60.

Makhachkala Airfield (Uytash)

Forecast for 25.12.2024 valid from 03:00 to 12:00 wind 340° 3 gusts 8 m/s, visibility:
5000 m haze, significant cloudiness 480 m. At times from 03:00 to 09:00 wind 60° 3 gusts
8 m/s, visibility 2500 m, haze, clouds, scattered 150 m, solid 300 m.

Forecast for 25.12.2024 valid from 06:00 to 15:00 wind 300° 3 gusts 8 m/s, visibility
6000 m, significant cloudiness 510 m. At times from 06:00 to 12:00, wind 60° 3 gusts 8 m/s,
Cloudiness, scattered 150 m, continuous at 480 m.

Correction to the forecast for 12/25/2024 for the period 06:00 – 15:00 wind 300° 3 gusts 8 m/s,
visibility 6000 m, significant cloudiness 510 m. At times from 06:00 to 12:00 wind 60° 3
gusts 8 m/s, visibility 2500 m haze, clouds, scattered 150 m, solid 300 m.

Actual weather 12/25/2024 from 05:00 to 06:00:

05:00 surface wind 320° 2 m/s, visibility 6000 m, overcast 750 m, temperature
air +6°C, dew point temperature +5°C, pressure reduced to sea level
standard atmosphere 1026 hPa, friction coefficient 0.7, landing forecast unchanged.
Runway threshold pressure 769 mm Hg, 1025 hPa.

05:30 surface wind 320° 2 m/s, visibility 4800 m, haze, cloudiness: insignificant
180 m continuous 720 m, air temperature +7°C, dew point temperature +5°C, pressure
reduced to sea level using the standard atmosphere of 1026 hPa, the coefficient of adhesion is 0.7,
Landing forecast unchanged. Runway threshold pressure 769 mm Hg, 1025 hPa.

06:00 wind at ground 310° 2m/s, visibility 3600 m, haze, clouds: few, solid
690 m, air temperature +7°C, dew point temperature +5°C, pressure reduced to level
sea level at standard atmosphere 1026 hPa, friction coefficient 0.7, landing forecast without
changes. Pressure at the runway threshold level is 769 mm Hg, 1025 hPa.

1.8. Navigation aids

The following were in operation at the Grozny (Severny) airfield on 12/25/2024

radio navigation and landing aids:

1. Distance-measuring navigation and landing radio beacon RMD-90NP (DME) with magnetic landing course 260° (RWY 26). Designation IWK, frequency CH24X. Coordinates of the installation site 43°23'24.3" N 045°42'39.0" E, transmitting antenna elevation 180 m.

2. Local control and correction station LKKS-A-2000 (GBAS (H) 26) with magnetic landing heading 260° (RWY 26). Designation G26A, frequency CH20828.

3. Airfield surveillance control radar DRL-7SM.

4. Automatic radio direction finder ARP-75.

5. ARM-150M homing beacon (NDB) with a magnetic landing heading of 260° (RWY-26). Designation WK, frequency 408 kHz. Coordinates of the installation site 43°23'21.9" N, 045°43'41.9" v.d.

6. Broadcasting/broadcasting automatic dependent surveillance system AZN-B 1090 ES HC-1A.

On 25.12.2024, NOTAMs were in effect at Grozny (Severny) airfield for work

radio navigation and landing aids:

NOTE:

(G0446/24 NOTAMR G0414/24)

Ÿ) ŸŸŸŸ/ŸŸŸŸŸŸ/ŸŸ/ŸŸŸ/ŸŸ/000/999/4323Ÿ04542Ÿ025

A) URMG B) 2411291100 C) 2412300700

E) IN THE AREA OF THE AIRFIELD, THERE ARE POSSIBLE DISRUPTIONS IN THE OPERATION OF SATELLITE NETWORKS NAVIGATION SYSTEMS (GNSS).)

(G0456/24 NOTAMR G0437/24

Ÿ) ŸŸŸŸ/ŸŸŸŸŸŸ/ŸŸ/ŸŸŸ/ŸŸ/000/999/4323Ÿ04542Ÿ150

A) URMG B) 2412101200 C) 2503101200

E) LKKS 08 SN 20417 DOES NOT PROVIDE APPROACH TO GLS RWY 08.)

A4188/24 NOTAMN

Ÿ) URZH/ŸŸŸŸŸŸŸŸ/ŸŸ/ŸŸŸ/ŸŸ/000/999/4323Ÿ04542Ÿ025

A) URMG B) 2407010800 C) POST

E) Runway 26: ILS (KRM, GRM) WITHDRAWN FROM SERVICE.

REF AIP STR AD 2.1 URMG-7,31,97,98.)

The descent for landing at the Grozny (Severny) airfield was carried out using REMKA 1X approach charts for landing on NDB V on runway 26.

In accordance with the procedures for flights under the instrument flight rules (paragraph 1 of section URMG AD 2.22, AD 2.1 URMG-13 AIP of Russia):

"Descent and landing approach under IFR, for all categories of aircraft and helicopters is carried out according to established schemes using landing systems and radar control. External radio marker recording TVG for category II landing approach, missing.

In the absence of a radar for all categories of aircraft and helicopters, the flight under IFR is carried out according to the landing approach schemes through the near approach with MKpos=260° according to standard routes."

For ATS surveillance procedures, the DRL-7SM radar locator is used (paragraph 4 of section URMG AD 2.22, AD 2.1 URMG-14 AIP of Russia).

As of December 25, 2024, aviation radio communication, navigation, surveillance, landing and ATC equipment, facilities providing service air traffic and the work of the air traffic control staff of the Aktau branch of the RSE "Kazaeronavigatsia" in the area of the Aktau airfield and in the area of responsibility of the branch, were in in good condition and comply with the requirements of regulatory and technical documentation,

NGEA(V) of the Civil Aviation Authority of the Republic of Kazakhstan, the Rules of the Aviation Safety and Nuclear Power Plant in Civil Aviation, as well as the "Air Traffic Management Instructions".

Equipment maintenance was carried out within the established timeframes, in accordance with maintenance regulations.

Comments from the air traffic control staff and aircraft crews on the operation of the equipment
There was no RTOP and aviation telecommunications in Aktau on December 25, 2024.

1.9. Communication

The E-190 4K-AZ65 aircraft was equipped with:

VHF COM (118/000-136/975 MHz)

ATC Mode S Transponder (ADSB-OUT) (1090+/- 1 MHz transmit, 1030 +/- MHz receive)

DME Interrogator (1025,0-1150,0 MHz, 962,0-1213,0 MHz)

TCAS COMPUTER (Change 7.1) (Transmit on 1030.0 MHz, Receive 1090.0 MHz)

Weather Radar (9345.0 MHz)

Radio Altimeter (4200.0-4400.0 MHz)

ELT (Portable) (406 MHz, 121.5 MHz, 243.0 MHz)

ELT (Fixed) (406 MHz, 121.5 MHz, 243.0 MHz)

Grozny Airport is equipped with the following means of communication: the main radio station Pheasant-R5 No. 03022147 and backup radio station Pheasant-R5 No. 11043418.

During the flight of the Embraer-190 4K-AZ65 aircraft, communication was carried out with using on-board and ground-based VHF radio communications equipment on published radio frequency:

Time		Service provider and call sign; radio frequency.
with	by	
03:47:40	03:53:15	Baku Ground Controller of the Main Center of the Unified Air Traffic Control System, frequency: 121.7 MHz.
03:53:24	03:56:07	Dispatcher Baku Tower Main Center of the Unified Air Traffic Control System, frequency: 119.2 MHz.
03:56:07	03:59:22	Baku Departure Dispatcher of the Main Center of the Unified Air Traffic Control System, frequency: 120.8 MHz.
03:59:30	04:12:33	Dispatcher Baku Control Main Center of the Unified System Air Traffic Control, frequency: 133.1 MHz.
04:12:50	04:36:43	Radar control controller of sector M1 of the district control center of the regional center of the Unified Air Traffic Management System (Rostov-on-Don), call sign "Rostov-Control"; frequency 127.9 MHz.
04:36:56	05:27:15	Dispatcher of the command control center of the Grozny (Severny) airfield, call sign "Grozny - Tower"; frequency 120.2 MHz.
05:27:31	05:31:34	Radar control controller of sector B5 of the district control center of the regional center of the Unified Air Traffic Management System (Rostov-on-Don), call sign "Rostov-Control"; frequency 134.1 MHz.
05:31:37	06:02:45	Radar control controller of sector M1 of the district control center of the regional center of the Unified Air Traffic Management System (Rostov-on-Don), call sign "Rostov-Control"; frequency 127.9 MHz.
06:02:55	06:28:08	Dispatcher exercising direct control air traffic of aircraft of the control center "Tower" of the air traffic service of the Aktau branch of the RSE "Kazaeronavigatsia", frequency 120.7 MHz

1.10. Information about the airfield

Grozny (Northern) airfield

Grozny (Northern) airfield, location index URMG. Local time UTC+3 hours.

The airfield control point is 43°23'18" N 045°42'00" E in the center of the runway strips. Airfield elevation 164 m (estimated temperature 28.1°C). Magnetic declination 7° eastern (2016). The airfield is approved for flights under instrument flight rules and visual flight rules.

Grozny (Severny) airfield is located 4 km north of Grozny (Russian Federation, Chechen Republic). The airfield operator is JSC Vainakhavia.

The airfield has one runway RWY-08/26:

Runway 08 (true track angle 086.73°, magnetic track angle 080°), dimensions 2501×45 m. Pavement bearing capacity (PCN) 44/F/D/X/T, asphalt concrete. Runway threshold coordinates 43°23'15.15" N, 045°41'03.90" E; end of runway 43°23'19.75" N 045°42'54.85" E.

Runway Threshold Rise (THR) 163.2 m;

Runway 26 (true track angle 266.76°, magnetic track angle 260°), dimensions 2501×45 m. Pavement bearing capacity (PCN) 44/F/D/X/T, asphalt concrete. Runway threshold coordinates 43°23'19.75" N, 045°42'54.85" E; end of runway 43°23'15.15" N, 045°41'03.90" E.

Threshold Rise (THR) 164.4 m, highest Touchdown Zone (TDZ) elevation 163.7 m.

The dimensions of the obstacle-free zones are 150×150 m, the dimensions of the runway are 2801×300 m.

Declared distances for RWY 08 and RWY 26: Take-off run available (TORA) 2501 m, takeoff distance available (TODA) 2651 m, distance available rejected takeoff distance (ASDA) 2501 m, landing distance available (LDA) 2501 m.

Figure 25 shows a map of the Grozny (Severny) airfield (AIP of Russia, AD 2.1 URMG-31).

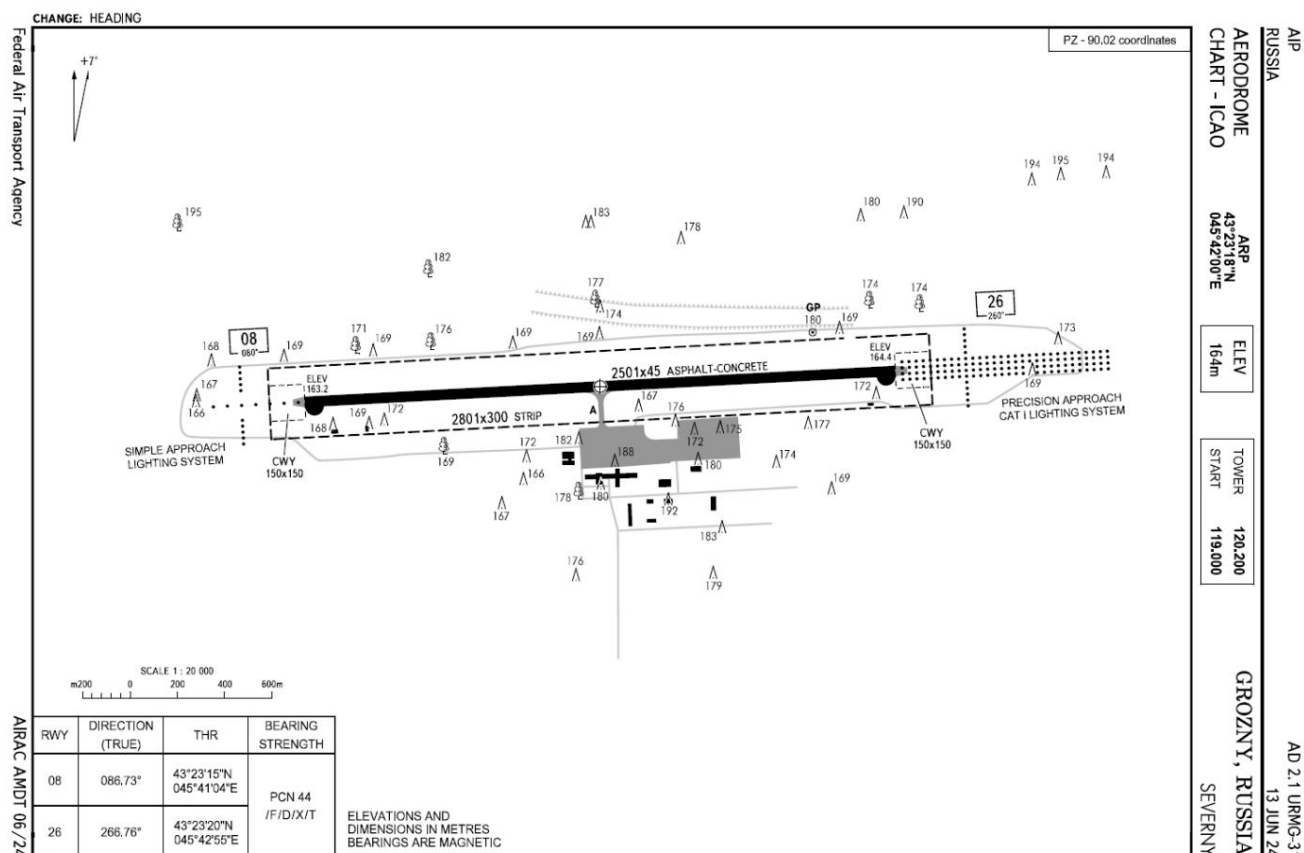


Fig. 25. Map of the Grozny (Northern) airfield

Approach and runway lights:

Runway 08 is equipped with a simplified approach lighting system (SALS) with a length of 420 m with low intensity lights. Runway threshold lights are green. Fine line path indicator landing approach (PAPI) is installed on the left, angle of inclination 2°40'. Landing lights are installed over a distance of 2501 m with an interval of 60 m; 1900 m white, the last 600 m yellow. The limit lights are red;

Runway 26 is equipped with a precision approach lighting system. Category I (CAT I) 900 m long with high intensity lights. Runway threshold lights green. The precision approach path indicator (PAPI) is mounted on the left, the angle of inclination 2°40'. Landing lights are installed along 2501 m at intervals of 60 m; 1900 m white, The last 600 m are yellow. The boundary lights are red.

Figure 26 shows a map of the Grozny (Severny) airfield with runway lights (AIP Russia, AD 2.1 URMG-31.1).

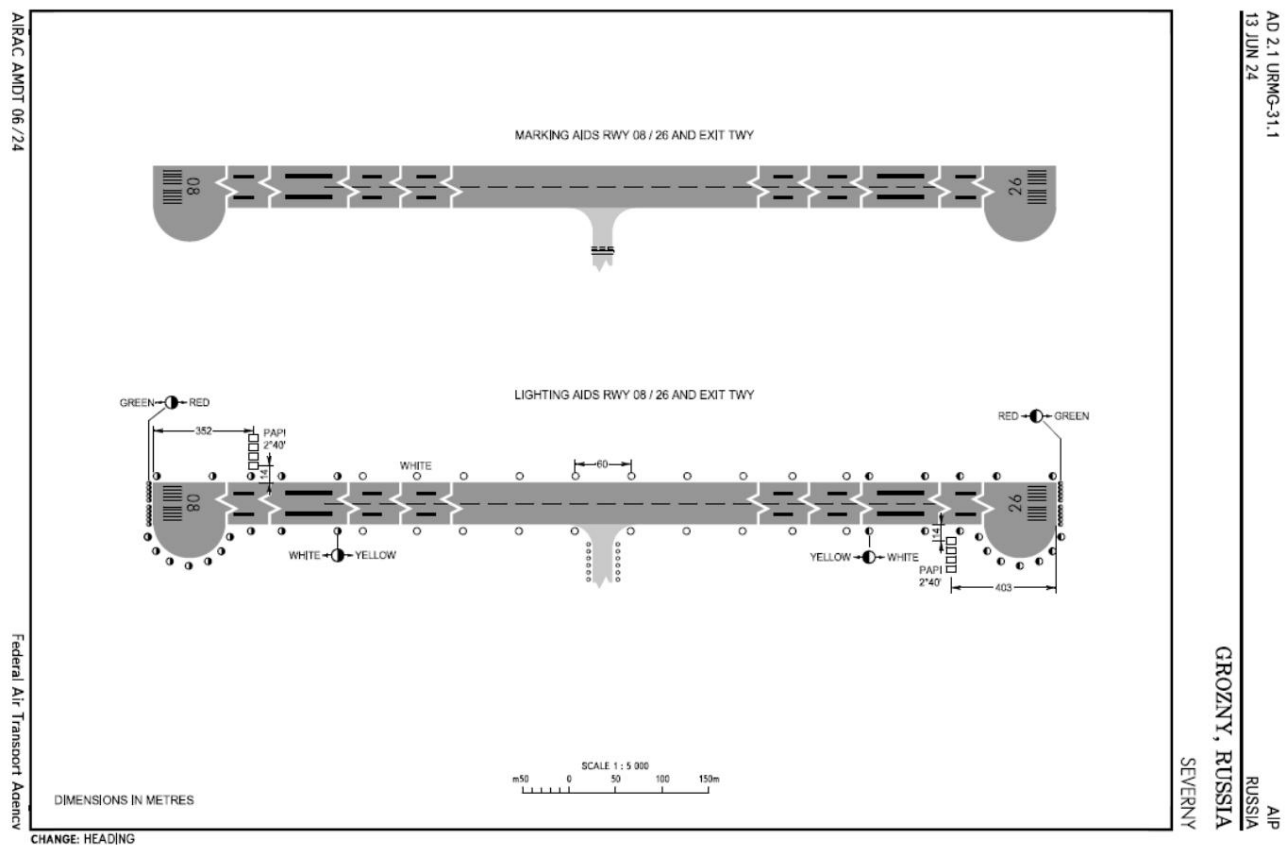


Fig. 26. Map of Grozny (Severny) airfield with runway lights

1.11. Flight recorders

The E-190 4K-AZ65 aircraft was equipped with the following onboard recording devices:

1. Flight data recorder installed in the nose of the aircraft:

Recorder manufacturer: Universal Avionics Systems Corp

Model: CVFDR-145R WITH RIPS

Party Number 1605-01-00

Recorder serial number: 621

2. Flight data recorder installed in the tail section of the aircraft:

Recorder manufacturer: Universal Avionics Systems Corp

Model: CVFDR-145

Party Number 1605-00-00

Recorder serial number: 640

1.11.1. Description of Universal Avionics CVFDR-145R and CVFDR-145

The Universal Avionics CVFDR consists of a voice and flight data recorder. It uses a digital method of recording and storing data, using a solid state drive in

as a recording medium. It has two functional zones: one is an on-board Cockpit Voice Recorder CVR with voice and channel recording capabilities communications, and the other is a flight data recorder (Flight Data Recorder FDR).

The CVR stores one hundred twenty minutes of cockpit audio data in a hard-wired module. memory. Four channels of audio input defined by ARINC 557 or ARINC 757 and ED-112, consists of a zone microphone, a pilot microphone, a cabin microphone and one additional source, as a rule, a record of an address to passengers (Passenger Address).

Universal Avionics CVFDR-145R uses independent power supply for the recorder (RIPS) to supply power to the CVR in the event of loss of aircraft electrical power, including loss of power supply during a normal power outage. Removing the CVR from the aircraft disables the RIPS.

EUROCAE classifies this FDR as a "Class A FDR" and it is stored in digital form. format of at least 25 hours of flight data from an external source. Universal Avionics CVFDR can receive data in ARINC 573/717/747 configurations and can record at least 25 hours of flight data. It records 512 12-bit words of digital information per second. Each subframe consists of 512 words (every second) and represents one second of information. The first word consists of a unique 12-bit synchronization information that specifies subframe number 1, 2, 3, or 4. Each data parameter (e.g., altitude, direction, and airspeed) has a specially assigned word number within a subframe.

The CVFDR is designed to meet the following certification requirements and flight safety:

- TSO-C124b, Flight Data Recorder Systems
- TSO-C155, Independent Power Supply for Recorder
- TSO-C177, Data Channel Recording Systems
- EUROCAE ED-112, Minimum Performance Specification

for fail-safe On-Board Recorder Systems

- FAA Revisions to the Cockpit Voice Recorder and Digital

Flight Data Recorders; Final Rule

1.11.2. Status of registrars

The flight data recorder, located in the forward section, was in damaged but working condition and the data was extracted without any problems using (Universal Avionics Data Retrieval Unit DRU) Universal software for flight data retrieval (UFRR).

The flight data recorder, located in the tail section, was in good condition. condition, without visible signs of external damage, and after connection to it power supply, LABDATA used a universal software to extract flight data (Universal Avionics' Flight Recorder Retrieval UFRR). The data was extracted no comments.

1.11.3. Description of records

An FDR record contains approximately 140 hours of data. Time in FDR data measured in subframe identification numbers (SRN), where each SRN is equal to one elapsed second. The FDR data was examined and it was found that the last recorded The flight was on December 25, 2024.

The CVRs contained 2 hours 2 minutes 45 seconds of audio recording from four channels (zonal speech, speech of the captain of the crew, speech of the second pilot of the crew, speech of address to passengers PA). Each CVR recording started at 04:25:20 UTC.

1.12. Information about debris and impact.

The site of the accident involving the E-190 is located approximately 5 km from Aktau International Airport in a northwesterly direction.



Fig. 27. The moment of collision of the aircraft with the earth's surface

After the collision with the earth's surface, the aircraft broke up into several pieces. the linearity of the spread of the elements of the aircraft and their location can be characterized by the direction

The aircraft (3) and the terrain where the accident occurred. From the point of contact the left landing gear (4) and up to the point where the fuselage touches the ground (5) begins an elevation of the ground, then a smooth transition into a lowland (10).

The central and forward parts of the fuselage, the lower part of the cockpit and the right wing completely destroyed by fire (10).

The upper part of the cockpit separated from the lower part, which still retained upper instrument panel, 2 cabin windshields and 1 side window (9).

The rear part of the fuselage with the tail section was located at a distance from the rest parts of the Armed Forces (17).

The left wing with the central part of the aircraft was located at the site of the fuselage fire and partially preserved (11).

The chassis were destroyed and scattered around the site as a result of the collision. incident, the upper part of the left pillar remained in the niche of the left wing (15,16,18).

The right engine is destroyed into several large and small pieces (13,14). Left The engine is partially preserved (12).

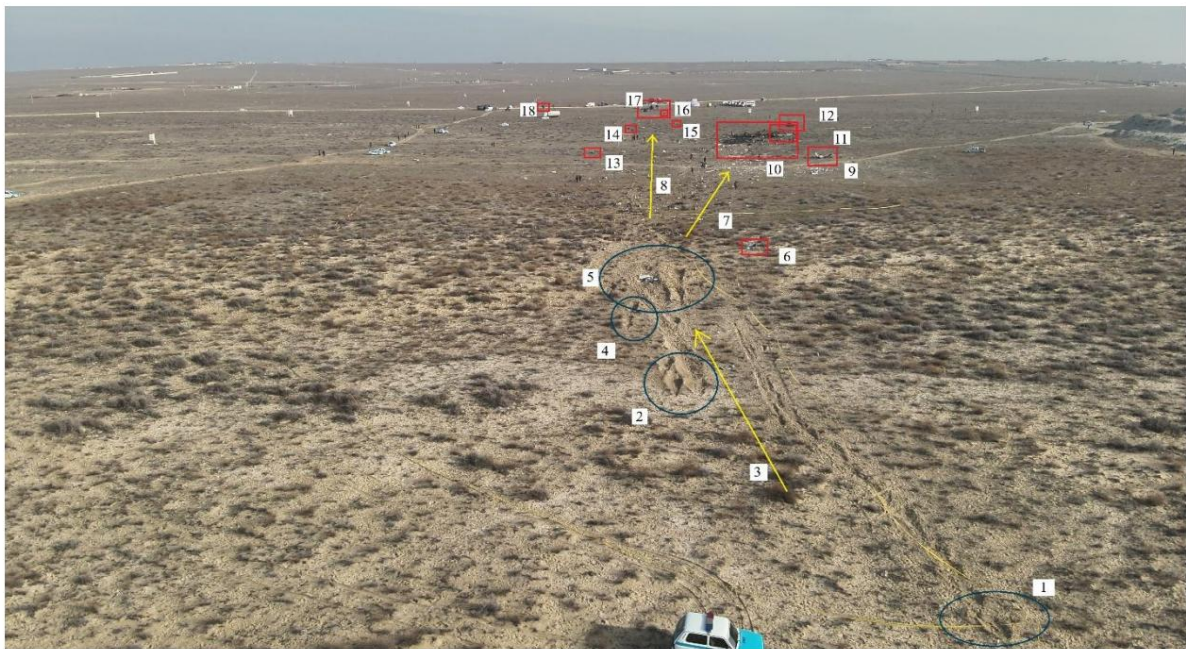


Fig. 28. The location of the aviation accident and the scattering of elements



Fig. 29. Location of AP and scatter of elements. View from the opposite direction

1. Place of contact with the right wing.
2. The point of contact between the right engine and the right landing gear.
3. Approximate direction of the aircraft at the moment of contact, with a course of 70° N-E
4. The point of contact with the left landing gear.
5. The point of contact between the fuselage and the left engine.
6. Right wing tip (winglet).
7. Approximate direction of the crash site of the cockpit, front and center parts of the fuselage, right and left wings, with a course of 90° E.
8. Approximate direction of the impact site of the rear and tail sections of the fuselage course 80° N-E.
9. Upper part of the cockpit skin.
10. The location of the fire in the cockpit, the front and central parts of the fuselage, and the right wings.
11. Left wing with central keel beam.
12. Left engine.
13. The destroyed front part of the right engine.
14. The destroyed rear part of the right engine.
15. Right landing gear.
16. Right landing gear rod with wheels.
17. The rear part of the fuselage with the tail section.
18. Part of the left landing gear with wheels.

1.13. Medical and pathological information

Medical and pathological studies are not completed. Will be presented in the final report.

1.14. Fire (local time)

At 10:47 Aktau tower received information from the Rostov Control control center that the plane flying from Baku to Grozny had collided with a bird and was heading to the airport Aktau for an emergency landing, estimated time of arrival at the airport is 11:16.

At 10:56 from Aktau Tower, a message "Alarm" is received on GORN-2 to Aktau airport. 11:02 all 4 units of SPASOP equipment and part of the emergency rescue team (ERS) gathered in assembly point on square H-24. At 11:03, 3 units of equipment and a UAZ SPASOP operational vehicle occupied RD "C" and a fire engine of military unit 30153 of the Ministry of Defense of the Republic of Kazakhstan occupied RD "A" to provide operational readiness.

At approximately 11:21 a.m., an airplane began to be observed chaotically changing its trajectory. flight (rapid climb/descent). At 11:21, 2 ACs from SPCh-12 Munaylinsky district. At 11:25 the aircraft disappears from the visibility zone airport territory, after which at 11:28 the RP reported an aircraft crash near the village of Sayyn, closer to the sea, approximately 3 miles from the airfield.

At 11:28, search and rescue teams and airport staff left for the following:

- 3 units of SPASOP equipment (SIRENA 1,2,3) and UAZ, 13 people.
- 1 airport ambulance, 2 paramedics.
- AS 6 people, ZIL with a first aid kit and UAZ of the airfield service,
- TiSTO 8 people, 1 unit of equipment (Gazelle).
- SAB 2 units. equipment (UAZ and RENO) 11 people.
- SPO 12 people 2 units of equipment (HIACE, HILUX)
- GT, SVH 2 people.
- SNA 2 people.
- Vehicle fleet 1 person.
- AUP 7 people.
- Fuel and lubricants – 1 person.
- Supply department 1 person.
- Fire engine of military unit 30153, 4 persons.
- 2 fire engines SPCh 12, 9 people.

At 11:35 we arrived at the scene and found the rear (tail) part aircraft with civilians evacuating passengers. Approximately 300- The front part of the aircraft was on fire 350 meters from the rear of the plane.

- 5 fire trucks began to extinguish the front part:
- SIRENA 1.2 supplied medium expansion foam through the monitor nozzles.
- 2 units of fire engines SPCh-12 and a fire engine of Military Unit 30153 conducted a full combat mission deployment, medium expansion foam was supplied through GPS-600 and 2 RSK-50 nozzles to extinguish the fire.

The fire was localized at 11:38.

At 11:42 the fire was extinguished.

The time recording data was duplicated to the airport's central control panel, compared, verified and transferred to a special commission in the "Investigation Department aviation accidents and incidents in transport of the Ministry of Transport of the Republic of Kazakhstan".

1.15. Survival factors

Under analysis. Will be presented in the Final Report.

1.16. Testing and Research

Research is underway and will be presented in the Final Report.

1.17. Information on organizations and administrative activities

The owner of the E-190 4K-AZ65 aircraft is Azerbaijan Airlines CJSC.

CJSC Azerbaijan Airlines has an Air Operator Certificate No. AOC-004 (issued on 01.01.2024 by the State Agency for Civil Aviation under the Ministry of Digital Development and transport of the Republic of Azerbaijan) the E-190 4K-AZ65 aircraft was entered into operational specification of the certificate (Part A - General Provisions) dated 16 October 2024, in the column types of flights performed operational specification (Part B) noted:

- dangerous goods;
- takeoff;
- approach and landing;
- RVSM (Reduced Vertical Separation Minimum) approval;
- minimum navigation performance specifications (MNPS);
- cabin crew training;
- resolution "B" in the EFB (Electronic Flight Bag) specifications

tablet);

- other.

Legal address of CJSC "Azerbaijan Airlines": Heydar Aliyev International Airport, AZ1044, Baku city, Republic of Azerbaijan.

Maintenance of the E-190 4K-AZ65 aircraft was carried out by the Engineering and Technical Service of Silk Way Technics LLC, which has Certificate of organization for maintenance and repair of aviation equipment from 17.06.2022 No. AZ.145.0001.

Legal address of Silk Way Technics LLC: Heydar Aliyev International Airport, 41 Mardakan Avenue, AZ1044, Baku, Republic of Azerbaijan.

Inspection control is carried out by the State Safety Inspectorate flights in civil aviation. under the State Agency for Civil Aviation.

Address: Azerbaijan Republic, g. Baku, Azadlyg Avenue 11, AZ1095.

1.18. Additional information

According to information from the means of objective control, the Far East Regional Center The Unified Air Traffic Management System (Rostov-on-Don) informs about the introduction plan "Carpet". Below is a fragment of the negotiations:

	Unknown	Good morning.
	DVZ	To the reserve leaves the weather conditions of Grozny in Baku AHY8243 (is he leaving us?) leaves from the approach
	Unknown	8243, good
	ICE	Mh, well, just this minibus
	ICE	Mx, Vladikavkaz ICE
	Vladikavkaz	Yes, I'm listening.
	ICE	In 15 minutes Grozny "Carpet" with a radius of 50
	Vladikavkaz	Grozny "Carpet" radius 50 accepted
	Unknown	Rostov (inaudible)
	ICE	15 minutes Grozny "Carpet" radius 50
	Unknown	15 minutes Grozny "Carpet" radius 50
	Nalchik	Nalchik-approach
	Nalchik	Grozny 15 minutes "Carpet" radius 50
	Internal	Got it, Grozny "Carpet" with a radius of 50, who's calling?
		In 15 minutes DVZ Rostov
	Combustion	Got it, thanks.
	Plant	Yes
	Nalchik Internal	Yes, what did you want, RP?
		Grozny 15 minutes radius 50 "Carpet"
	Combustion Plant	Yes, yes. We already know, we are completing the work in the established order.
	Unknown	Anything
	Internal Combustion	else? No, nothing, just that...
	Plant	No, no, I'm asking our RP
	Unknown Internal	Aaa
	Combustion Plant Unknown Internal Combustion Plant	He will call you

	Unknown DVZ	Fine
		Yes
	Unknown DVZ	Grozny yes there is information
		Yes, there is already a carpet for the screen.
	Unknown DVZ	Mhm
		Makhachkala - ICE
	Makhachkala	I answer
	ICE	Terrible "Carpet" in 15 minutes with a radius of 50
	Makhachkala	Grozny "Carpet" in 15 minutes Yes,
	ICE	there is
	Makhachkala	Rostov (inaudible)
	ICE	You have information on AKHY8243, yes? To you on the reserve weather conditions of Grozny and the closure
	Makhachkala	Yes, yes. Yes, we accept technically suitable ones, we will provide a spare one.
	DVZ	Embraer...Good
05:21:42	Grozny	At the reception Grozny
	DVZ	At 15 minutes "Carpet" you have a radius of 50 and for information AHY8243 to Mineralnye Vody goes to the reserve
	Grozny	Siyu decided to Makhachkala from him from a collision with a bird, he has a very unstable situation on board To Makhachkala?
	internal combustion engine	Okay, there is Makhachkala was hit by....
	Makhachkala	I answer
	ICE	So, write it down, Aÿ8243 Embraer 190 is heading to your alternate due to the closure and weather conditions of Grozny, to your alternate, here is some additional information, it had a collision with birds, there during the approach, in general, special attention

2. Recommendations for improving security

To aviation authorities and aircraft operators

2.1. Conduct a risk assessment for flights to regions where aircraft are registered

Global Positioning System (GPS) signal loss.