

Kodiak-100 N642RM Draft Report Courtesy Translation



INTERSTATE AVIATION COMMITTEE

AIR ACCIDENT INVESTIGATION COMMISSION

FINAL REPORT

Type of occurrence	Accident
Type of aircraft	Airplane, Kodiak-100
Registration	N642RM
Owner	Apelsin-T, LLC
Aviation Administration of place of occurrence	Rosaviatsia ITO AT for North-West Regions
Aviation Administration of the aircraft registration	FAA (USA)
Place of occurrence	1400 m southward of Pskov aerodrome ARP Coordinates: N 57°46,263', E 28°23,578'
Date and Time	06.07.2015, 13:18 UTC, 16:18 local time, day

In accordance with ICAO Standards and Recommended Practices this Final Report has been published with the sole objective of aircraft accident prevention.

It is not the aim of this investigation to apportion blame or liability.

The criminal aspects of this accident are described within a separate criminal investigation.

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Abbreviations and Definitions

AASS	– Airport Aviation Security Service
AD	– Aerodrome
ADF	– Automatic Direction Finder
AP	– Airport
ARP	– Aerodrome Reference Point
ATM	– Air Traffic Management
CA	– Civil Aviation
CAWS	– Civil Aviation Weather Station
CMC	– Crisis Management Centre
CoA	– Certificate of Airworthiness
ELT	– Emergency Locator Transmitter
EMERCOM	– Ministry of the Russian Federation for Civil Defense, Emergency Management and Natural Disasters Response
FAA	– Federal Aviation Administration (USA)
FAO	– Federal Autonomous Organization
FAP	– Federal Aviation Rules of the Russian Federation
FAP for Use of Airspace	– Federal Aviation Rules for Use of Airspace in the Russian Federation
FAP MA CA	– FAP for Medical Assurance in Civil Aviation
FAP-128	– FAP “Preparation and Conduct of Flight in Civil Aviation of the Russian Federation”, approved by Order №128 of Ministry of Transport of RF as of July 31, 2009
FAS	– Federal Aviation Service of Russia
FFS	– Firefighting Station
FIDS	– Flight Information Display System
FO	– First Officer
FSI	– Federal State Institution
FSUE	– Federal State Unitary Enterprise
GosNII GA	– State Scientific Research Institute of Civil Aviation
ITO AT	– Interregional Territorial Office of Air Transport
LLC	– Limited Liability Company
MAC	– Mean Aerodynamic Chord

MFD	– Multifunctional Display
MFEC	– Medical Flight-Expert Commission
MH	– Mag Heading
MLG	– Main Landing Gear
MSN	– Manufacturer Serial Number
NLG	– Nose Landing Gear
NPP	– Non-Profit Partnership
NTSB	– National Transportation Safety Board, USA
OJSC	– Open Joint Stock Company
PFD	– Primary Flight Display
PIC	– Pilot-in-Command
PWC	– Pratt-and-Whitney Canada
RF	– Russian Federation
RH	– Right Hand
Rosgidromet	– Russian Federal Service for Hydrometeorology and Environmental Monitoring
RQC	– Regional qualifications commission
RWY	– Runway
SB	– Service Bulletin
TOW	– Takeoff weight
TSB Canada	– Transportation Safety Board of Canada
TTSN	– Total Time Since New
TWR	– ATC Tower
UATMS	– Unified Air Traffic Management System
UTC	– Universal Coordinated Time

Synopsis

At 13:18 UTC¹ (at 16:18 local) on 06.07.2015, an accident with Kodiak-100 N642RM airplane occurred after the said aircraft had performed a takeoff from Pskov AD (Russia).

IAC received the information on 07.07.2015 at 09:51. For the purpose of the investigation the Investigation team was formed by Order № 24/730-p of 07.07.2015 signed by an officer temporarily assuming the responsibilities of Air Accident Investigation Commission Chairman.

The Notification was sent to NTSB (USA) and TSB of Canada.

In the said investigation, experts from EMERCOM, Rosgidromet of Russia, FSUE State ATM Corporation, Ministry of Healthcare of the Russian Federation, FAO State Centre for flight operating safety, Pratt & Whitney Canada Corporation (engine manufacturer), and Quest Aircraft Company USA (aircraft manufacturer) took part.

The investigation was open on 07.07.2015.

The investigation was completed 02.03.2017.

¹Here and further UTC time is shown. Local time is UTC + 3 hours.

1. Factual Information

1.1. History of flight

On 03.07.2015 at 15:05, Kodiak-100 N642RM airplane, which had left Riga AP (Latvia), performed a landing at Pskov AD (RF). The airplane was performing a ferry flight from USA (where it was bought) to Krutitsy landing site, which is 80 km to the Southeast from Ryazan (RF).

After the landing, flight crewmembers and passengers passed a border and customs control successfully. The aircraft was kept at Pskov AD from July 3 till July 6 under custody of AASS of Pskovavia(JSC).

On 06.07.2015 at 08:00, the flight crew – PIC and FO – arrived to Pskov AD with a view to the ferry flight resumption.

PIC was planning to fly the aircraft from Pskov AD to Krutitsy landing site on 06.07.2015. See the route plan at Fig. 1.

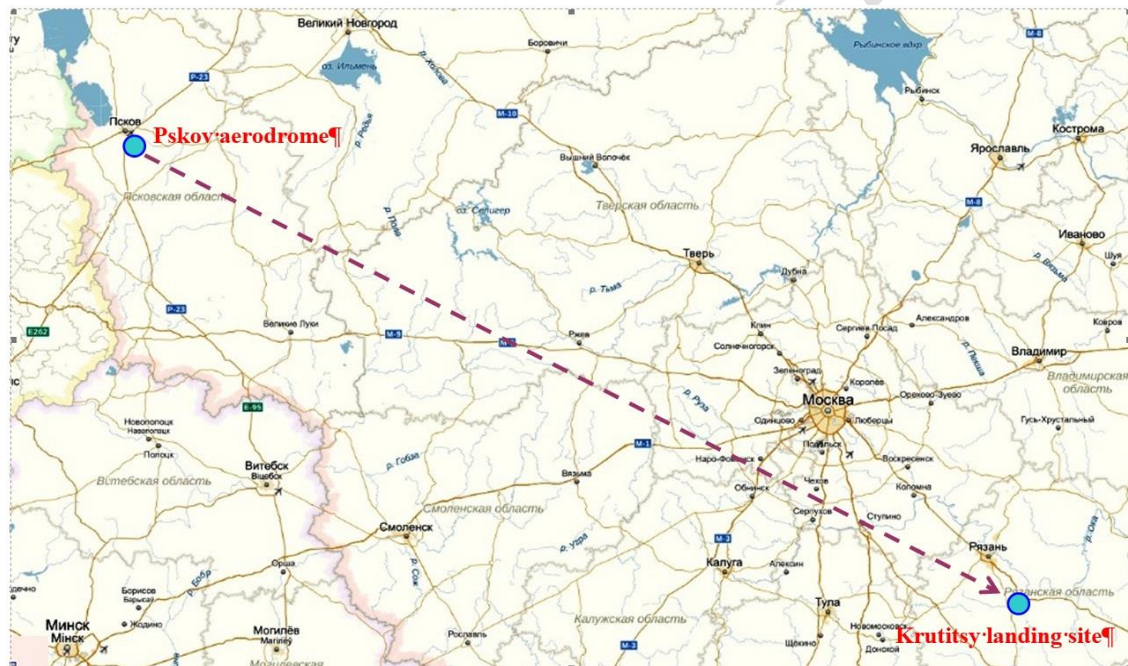


Figure 1. Route plan

In violation of FAP MA CA and FAP-128 requirements, PIC and FO didn't pass a preflight medical check in spite of the fact that Pskovavia medical service was available at the aerodrome.

Note. *FAP MA CA, Attachment 14, Requirements to Russian CA flight crewmembers' and ATC controllers' state of health when passing a preflight medical examination, item 1.*

Sub-item 1.3. prescribes to have a preflight medical examination to the following personnel:

– GA pilots.

At 08:10 PIC started the aircraft preflight preparation.

Note. *Extract from PIC explanatory report of 14.07.2015:*

"At 11:10 (local time²) I started the aircraft preflight preparation, which I accomplished at 11:30 (local time) in full."

At 08:10, FO sent a request for the permission to use the airspace to UATMS. In this request instead of Kodiak-100 N642RM state and identification marks, "RA-1799G" were shown.

Note. *According to the aircraft certificate of registration № 1802 of 24.07.2012, issued by Rosaviatsia Flight Safety Inspection Department, "RA-1799G" state and identification marks belong to "Piper Sport T2" home-built aircraft that PIC has in his ownership.*

According to FO explanatory report, they believe that in case they have used Kodiak-100 N642RM state and identification marks they would never receive the permission to use of airspace.

Note. *Extract from FO explanatory report of 14.07.2015:*

"The flightplan was submitted at 11:10 (Moscow time) through FlightPlan Submitting System, using the Internet, to St. Petersburg ATM Regional office. Doing that I put "RA-1799G" identification mark, because I have decided that they might refuse to issue a permission for N642RM identification mark."

In accordance with FAP for Use of Airspace, if the civil aircraft belongs to a foreign state aeronautical register, then the permission to use the airspace in Russian Federation might be issued by Rosaviatsia, but Rosaviatsia must inform the Ministry of Defense of RF.

Note. *Item 121, FAP for Use of Airspace:*

"A permission to use the airspace in Russian Federation for civil aircraft belonging to a foreign state aeronautical register in case ATS route isn't open for international flights, as well as to conduct off-airway flight, should be issued by Rosaviatsia, but to be agreed with Federal Security Service of Russian Federation. Ministry of Defense of Russian Federation to be notified."

The permission to use the airspace was received from North-West office of FSUE State ATM Corporation, but it happened 24 min later against the takeoff time stated in the request. Therefore, in the prescribed manner the takeoff time was rearranged to 12:50.

²For Pskov region term "local time" means "Moscow time".

- Note.** 1. From the North-West office of FSUE State ATM Corporation Director letter № 11.7-3288 of 29.07.2015:
- "Because the controller responsible for planning of the use of airspace in Moscow ATM zone was busy (he had over 1500 messages waiting for the processing) the final permission for the use of airspace was issued with a delay."*
2. From the Head of Moscow ATM zone letter № 1605.04-273 of 11.08.2015:
- "In case of a controller workload increases during peak periods in Moscow ATM zone, there is an internal procedure to be used, which consist in redistribution of personnel at their working stations. In the said case there was no redistribution implemented, therefore we've started an internal investigation."*
3. From the Head of Pskov unit "Pskov-Aerocontrol" of North-West office of FSUE State ATM Corporation letter № 2.3-166 13.07.2015:
- "– the confirmation of sending the request for the use of airspace to UATMS is the availability of the file number "FPL № 061045";*
- the permission for the flight can be confirmed by the availability of the file number "PLN № 061256".*
- according to St. Petersburg zone of UATMS information, the airspace in the accident area belongs to Class C."*

Neither PIC nor FO has requested a weather information from Pskov CAWS-4. The weather information obtained by the Internet, PIC and FO took as reliable information and based at this information they took a decision to depart that does not contradict FAP-128 requirements.

- Note.** 1. Extract from FO explanatory report of 14.07.2015:
- "The weather information I have found through the Internet."*
2. Item 2.8. FAR-128:
- "Before conducting a flight with air works or GA purposes, PIC has to insure that:*
- for VFR flights (except flights in the departure aerodrome zone) the actual weather information or list of actual weather reports and forecasts proves that the weather conditions in that part of the route, which is planned to fly in accordance with VFR, around the specified time, will meet VFR."*

Before the takeoff, two flight crewmembers were in the cockpit: PIC occupying a left seat, and FO occupying a right seat. Both were secured with safety belts.

At 13:15:30, PIC performed a takeoff from Pskov AD with MH=190°.

According to the flight crew explanatory reports, during the climbing with left turn, they had the engine troubles. Therefore, the flight crew put the airplane into gliding. They failed to re-

start the engine in flight. Before the emergency landing, they cut the fuel off and de-energized the aircraft.

The landing was performed at 13:18 to a marshy area with some bushes and individual trees around. The aircraft received significant damage during the landing. There was no fire: neither in flight nor on the ground.

At 13:21:21, FO reported the forced landing to ATC controller, using the aircraft radio station.

Pskov First-Aid Station suggested the help, but the flight crewmembers refused because they did not have any injuries.

1.2. Injuries to Persons

Injuries to Persons	Crew	Passengers	Others
Fatal	0	0	0
Serious	0	0	0
Minor/None	0/2	0/0	0/0

1.3. Damage to Aircraft

The aircraft received significant damage during the landing.

1.4. Other Damage

There was no other damage caused by the accident.

1.5. Personnel Information

PIC

Position	Pilot-in-command
Sex	male
Date of birth	09.03.1978
Education	Moscow Economics and Law Academy, 2011, diploma BBA № 0635851, issued on 30.06.2011
Pilot's license (Russia)	Private pilot license II № 001965, issued on 01.12.2010 by RQC of North-West office of Rosaviatsia. Qualification mark: single-engine land aircraft, pilot-in-command
Pilot's license (USA)	Private pilot license № 3691847, issued on 28.02.2013 by FAA (USA)

Medical report	Medical conclusion PA № 096854, issued on 28.10.2013 by MFECof Medical Unit "Polet", Ltd. Classified as a private pilot, valid till 28.10.2015
Total flying time ³	About 470 h (Yak-18T, Cessna-172, Cessna-182, Piper Sport T2, Mi-2, R-22, R-44 and Kodiak-100)
Total flying time on Kodiak-100	About 52 h
Flying time as Kodiak-100 PIC	About 9 h
Date of last check of flying and aircraft navigation techniques	On 05.07.2014, by pilot-instructor from Zvezda, NPP. Conclusions: "flying technique meets a qualification of a private pilot. Can continue to fly as PIC; aircraft navigation technique meets a qualification of a private pilot. Can continue to fly as PIC."
Flying time on the air accident day	≈ 02 min
Working time on the air accident day	5 h 18 min
Air accidents and incidents	None
Rest	About 8 h in a car with a sleeping berth installed

FO

Position	First officer
Sex	male
Date of birth	25.02.1980
Education	Ryazan Higher Airborne Command School, 2002, diploma № ДBC 0980635, issued on 20.06.2002
Pilot's license (Russia)	Private pilot license PPL № 000433, issued on 07.09.2012 by RQC of North-West office of Rosaviatsia. Qualification mark: single-engine land aircraft, pilot-in-command
Pilot's license (USA)	Private pilot license № 3691848, issued on 05.04.2013 by FAA (USA)
Medical report	Medical conclusion PA № 096855, issued on 28.10.2013 by MFEC of Medical Unit "Polet", Ltd. Classified as a private pilot, valid till 28.10.2015

³ PIC's pilot logbook is not available; all information is put according to his story.

Total flying time	1041 h 38 min (X-32, Yak-18T, Piper Cub J-3, Piper Sport, Piper PA-44, Piper PA-28, SM-92T, Cessna-172, and Kodiak-100)
Total flying time on Kodiak-100 and on flight simulator	10 h
Flying time as Kodiak-100 PIC	2 h 30 min
Date of last check of flying and aircraft navigation techniques	On 05.07.2014, by pilot-instructor from Zvezda, NPP Conclusions: "flying technique meets a qualification of a private pilot. Can continue to fly as PIC; aircraft navigation technique meets a qualification of a private pilot. Can continue to fly as PIC."
Flying time on the air accident day	≈ 02 min
Working time on the air accident day	5 h 18 min
Air accidents and incidents	None
Rest	About 8 h in a car with a sleeping berth installed

Both PIC and FO have a significant experience to fly different types of aircraft.

Both have passed training at Parkwater Aviation, Inc. (USA) on 24.04.2015, and received the certificates.

From June 26 till July 03, 2015, PIC took part in Kodiak-100 N642RM airferry from Fort Lauderdale (USA) to Pskov AD (RF).

Note. Extract from PIC explanatory report of 28.06.2016:

"I took part in a ferry flight as a first officer. Douglas Karlsen was PIC. Airferry route was: Fort Lauderdale (Florida) – DeLand (Florida) – Portsmouth (New Hampshire) – Goose Bay (Newfoundland and Labrador) – Narsarsuaq (Greenland) – Reykjavík (Iceland) – Bergen (Norway) – Riga (Latvia) – Pskov (RF)."

According to PIC explanatory report, he lost his pilot logbook at the accident site.

Note. Extract from PIC explanatory report of 14.07.2015:

"Also at the accident site, we failed to find out my black sport bag with my personal belongings and my documents including my pilot logbook."

On 06.07.2015, PIC and FO had letters of attorney for Kodiak-100 aircraft piloting verified on 03.07.2015 by Apelsin-T, LLC.

The Investigation team considers the qualifications of the PIC and FO were enough for performing of the flight in question.

TWR Controller

Position	TWR Controller
Sex	male
Date of birth	01.06.1971
Education	Riga Institute of Air Navigation, 1991, diploma MГ № 023351
License	License of ATM controller, CД № 012365, issued on 01.03.1998 by RQC of North-West office of FAS. Valid till 19.09.2017
Class	Class 1. Minutes № 12 of RQC of North-West office of FAS issued on 18.06.1999
Permission for work	As ATC Tower controller issued by Pskov unit "Pskov-Aeronavigatsia" of North-West office of FSUE State ATS Center on 07.06.1996
Medical report	Medical conclusion PA № 103343 issued on 20.09.2013 by High MFEC of Rossiya Airlines JSC. Classified as an air traffic controller. Valid till 20.09.2015
Date of last practical skills check	17.09.2014, by a senior controller who is responsible for the immediate supervision, Velikoluksky ATM center, mark "excellent"
Air accidents and incidents	None
Rest before shift	At home, about 8 h
Medical check before shift	At 10:25, Medical unit of Pskovavia(JSC)

The Investigation team considers the qualification of the TWR controller meets the applicable requirements.

1.6. Aircraft Information



Figure 2 View of Kodiak-100 N642RM before the accident

1.6.1. Airframe

Type	Kodiak-100, airplane
MSN	100-0104
Manufacturer, production date	Quest Aircraft Company (USA), 18.12.2013
Registration	N642RM, temporary registration valid till 22.07.2015
State of Registry	USA
Certificate of Registration	T154519, issued on 22.06.2015 by USA FAA Aircraft Registration Department. Valid till 22.07.2015
Aircraft Owner	Apelsin-T, LLC (Ryazan, RF). by the aircraft sale and purchase contract signed on 15.06.2015
Certificate of Airworthiness (CoA)	DART351034NM, issued on 18.12.2013 by USA ⁴ FAA
TTSN	391.9 h
Assigned service life	Not established, in service depending on technical condition

⁴ Terms and conditions. In case the Certificate was not suspended or withdrawn before the end of its period of validity, or if USA FAA didn't set another period of validity of the CoA, the said CoA is valid until the aircraft maintenance and routine maintenance is carried in accordance with FAR Parts 21, 43 and 91, because the aircraft is registered in USA.

Overhauls	None
Place and date of last repair	None
Fuel amount during the last flight	According to PIC explanations – about 750 l
Last maintenance	03.02.2014, a service center for Quest Aircraft (USA)
Aircraft preflight check	07.07.2015, by PIC, without documentation to prove
TOW	≈ 6407 lb. (2906 kg), which amount was under the Kodiak-100 Operation Manual (TOW=7305 lb. (3313 kg))

1.6.2 Engine

Power plant type	PT6A-34, Specification 1218
MSN	PCE-Rb0731
Manufacturer, production date	Pratt & Whitney Canada Corp.(Canada), 31.08.2013
Assigned service life	Not established; in service depending on technical condition
TTSN	391.9 h
Overhauls	None
Date of the aircraft installation	07.11.2013
Fuel type	Jet-A fuel
Last base maintenance	06.05.2014, SB A1742R2, a service center for Quest Aircraft (USA)

1.6.3 Propeller

Propeller type	HC-E4N-3P
Propeller number	HH4894
Propeller blades manufacturing numbers	L41277, L41275, L41270, L41276
Manufacturer, production date	Hartzell Propeller (USA), 24.10.2013
TTSN	391.9 h
Overhauls	None
Date of the aircraft installation	07.11.2013

On 03.07.2015 at Pskov AD, the Kodiak-100 N642RM aircraft MSN100-0104, which was owned by Viridian AG Corp. (Switzerland) was deeded to Apelsin-T LLC (registered in Ryazan, RF) in accordance with the aircraft sale and purchase contract signed on 15.06.2015.

The following documentation was collected by law-enforcement authorities at the accident site and presented to the Investigation team:

- Certificate of Registration;
- CoA;
- Air-frame Logbook;
- Engine Logbook;
- Propeller Logbook;
- Flight Logbook; and
- other engineering reference documents.

Having these documents analyzed, the Investigation team concludes that the Kodiak-100 N642RM aircraft MSN100-0104 received maintenance in accordance with normative documents of the aircraft State of Manufacture.

1.7. Meteorological Information

On 06.07.2015, a weather situation near Pskov AD was governed by south-west frontier area of high-pressure area with a center in St. Petersburg region.

Pskov AD weather forecast for 12:00 – 14:00 was following: surface wind, south-west direction, 03 mps, gust up to 08 mps, visibility over 10 km, scattered, cloud base 900 m.

Actual weather from the nearest (3 km to the north) to the accident site weather unit – Pskov CAWS-4 – at 13:21 was following: surface wind 110°, 03 mps, visibility with 190° landing heading over 6 km, scattered, cloud base 1500 m, temperature +22°C, dewpoint +10°C, pressure near the RWY thresholds 756 mm of mercury (1008 hPa), QNH 1013 hPa.

The weather conditions did not prevent the flight.

Neither PIC nor FO has requested a weather information from Pskov CAWS-4 before the flight.

1.8. Aids to Navigation, Landing and ATC

Air traffic management in area of Pskov AD is under responsibility of Pskov unit "Pskov-Aerocontrol" of North-West office of FSUE State ATM Corporation.

In accordance with Pskov AD internal procedures, TWR controller was responsible for air traffic control in Pskov terminal area (including takeoff and landing areas), and he had to provide this by visual means, and by radio aids: DRL-7SM (aerodrome control radar) and ARP-Platan (ADF).

DRL-7SM was located at distance about 730 m from RWY threshold with MH=010°, and 236 m from RWY centerline.

ARP-Platan was located at distance about 742 m from RWY threshold with MH=010°, and 313 m from RWY centerline.

The flight was conducted in Class C airspace. There were no navigation, landing or ATC aids used by the Kodiak-100 N642RM flight crew.

1.9. Communication Aids

In accordance with Pskov AD internal procedures, main ATC communication aids for TWR usage are VHF radio stations. Such radio stations as "Polet-2", "Fazan-R2", "Polet-1" and "Fazan-R5" are used for with aircraft communication. In case of emergency, VHF radio stations "Polet-1" is to be used.

Pskov AD ATM communications are to be done with the following channels: "Pskov-TWR" at frequency 122.0 MHz and 124.0 MHz, "Pskov-radio bearing" at frequency 130.0 MHz, and "Pskov-emergency" at frequency 121.5 MHz.

For CA aircraft that conduct international flights communications are to be done with PSKOV-TOWER 122.0 MHz, and at backup frequency 121.5 MHz.

At takeoff Kodiak-100 N642RM flight crew has communicated with "Pskov-TWR" at frequency 122.0 MHz. The in-flight communication was steady.

1.10. Aerodrome Information

Pskov AD is located on the southeastern edge of Pskov city, at 3 km to south-east direction from Pskov railway station.

Pskov AD is a Class 2 aerodrome, therefore in accordance with the Government edict № 1034-p of 10.08.2007, it is a joint civil and military aerodrome.

Pskov AD has a Certificate of state registration and of operation suitability issued by Ministry of Transport of RF on 25.04.1996. The Certificate is valid till 09.06.2016.

The Government edict № 1877-p of 01.12.1994 opened Pskov AD for international flights.

A Certificate of operation suitability for international flights was issued by IAC on 31.05.2011.

The aerodrome is under the Military Transport Aircraft Command of Air force of RF. The chief of Pskov AD is an officer in command of military unit.

Pskov AD is a base for a military unit, Pskovavia(JSC) and Lukiaviatrans(LLC).

There is one paved and one unpaved (backup) RWY, a high speed taxiway, taxiways, an apron, and an aircraft parking area at the aerodrome.

ARP altitude is +45.6 m. Magnetic declination is +8°.

The paved Class 2 (Class B) RWY has dimensions 2007 x 44 m, is paved with concrete plates ПАГ-14, and its extension (500 m) adjoining threshold 01 is used as a runway overrun (runway clear zone) for landing MH=190°.

At the paved RWY, MH=190° (threshold 19) and MH=010° (threshold 01) are to be used.

The unpaved RWY (1800 x 50 m) it is located 100 m to the east of the paved RWY and goes in-parallel to the paved RWY.

At figure 3 the aerodrome layout is shown.

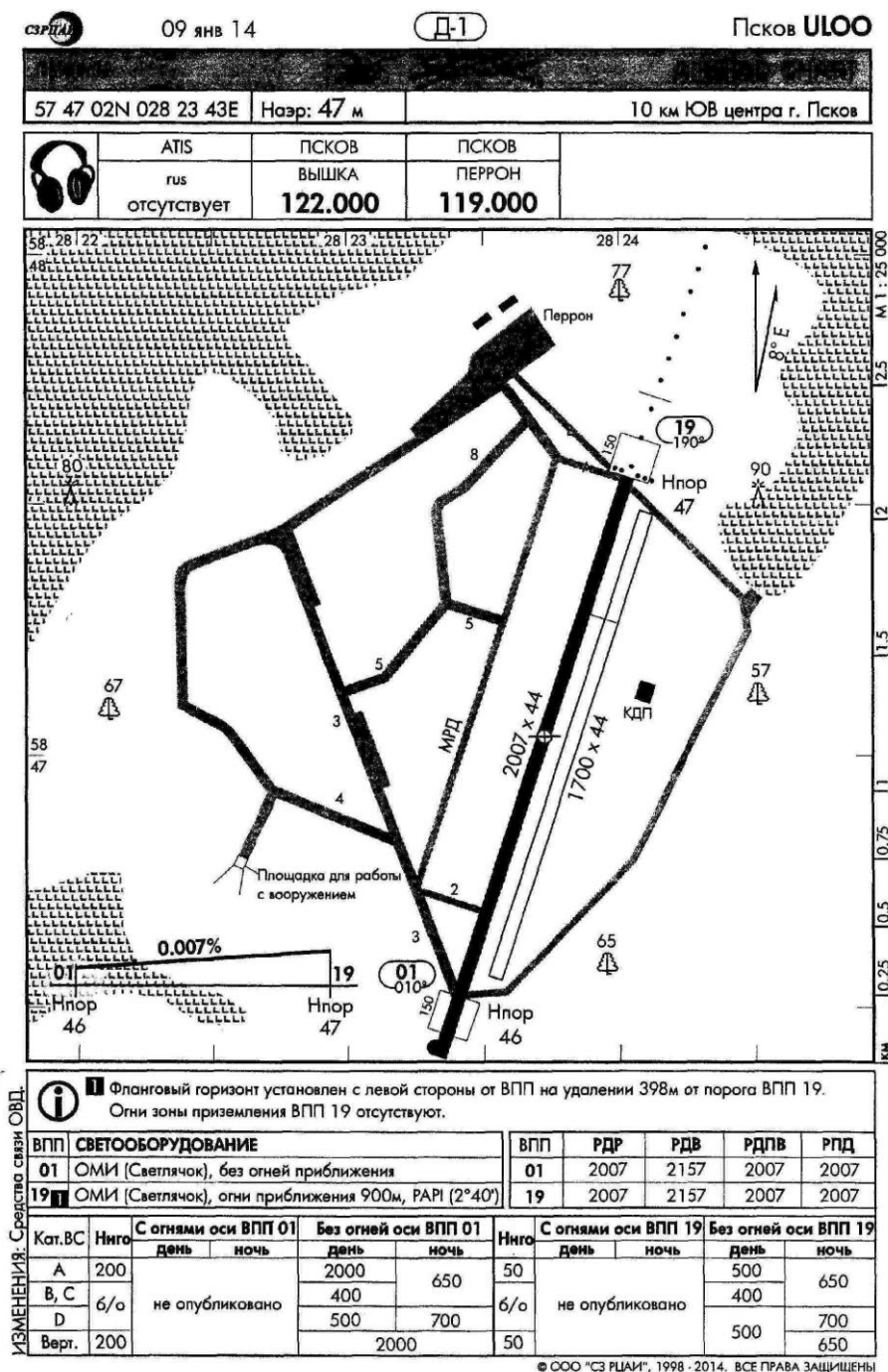


Figure 3. AD layout

1.11. Flight Recorders

Flight recorders' installation is not provided for the aircraft.

1.12. Wreckage Information

The accident site is located 1400 m to the south of Pskov AD ARP (see Figure 4).

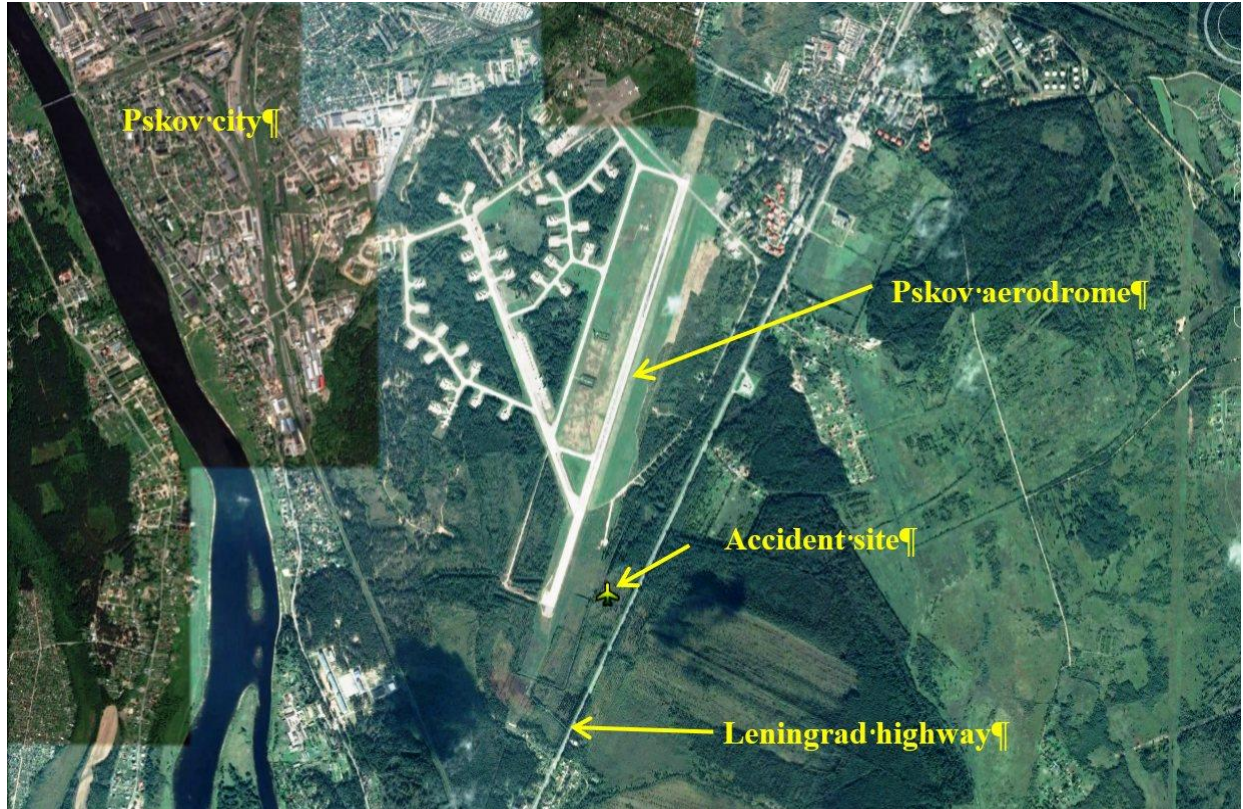


Figure 4. The accident site (picture was done from the space)

The accident site area is Pskov city southern suburb with all its small localities, farmer fields, forest plantations, and roads.

The accident site itself is a marshy area with bushes and individual trees with a height up to 10 m in frame of Pskov AD; it is located 110 m to the north of Leningradskoye highway and its elevation is 54 m above sea level.

Initially, the aircraft hit a tree (birch) occurred at a height of 6 m; moving further it hit three more individual trees (pine trees). At a distance of 37 m from the initial impact place, the aircraft hit the ground with RH MLG and with RH wingtip having MH $\approx 330^\circ$, right bank not less than 30° , nose-up angle $\approx 5^\circ$, and a small forward speed of $\approx 80\div 100$ km/h (see Figure 5).



Figure 5. Initial impact by RH MLG (left) and by RH wingtip (right)

During its further movement the aircraft hit the ground with its NLG, which was destroyed by that (see Figure 6).



Figure 6. Footprint of hitting ground with NLG (see arrows)

After the aircraft with ground collision, it started its right (clockwise) rotation. The rotation stopped after the fuselage tail section hit the pine tree (see Figure 7); at that, the aircraft was turned around, almost opposite to its flight direction.



Figure 7. With pine tree collision

At the accident site the aircraft was disposed at the fuselage with $MH=150^\circ$ and with right bank (see Figure 8).



Figure 8. Magnet compass indication in the cockpit after the accident

When collided with trees and with ground, off-design impact forces affected the aircraft. With that, the underbelly (baggage compartment) and fuselage tail part were destroyed; the tailfin, stabilizer and elevators were warped and destroyed; the engine bed was malformed and the engine was displaced.

At the following Figures (from 9 to 11) you can see the view of the aircraft after the accident.



Figure 9. Accident site. View to the aircraft from its RH side

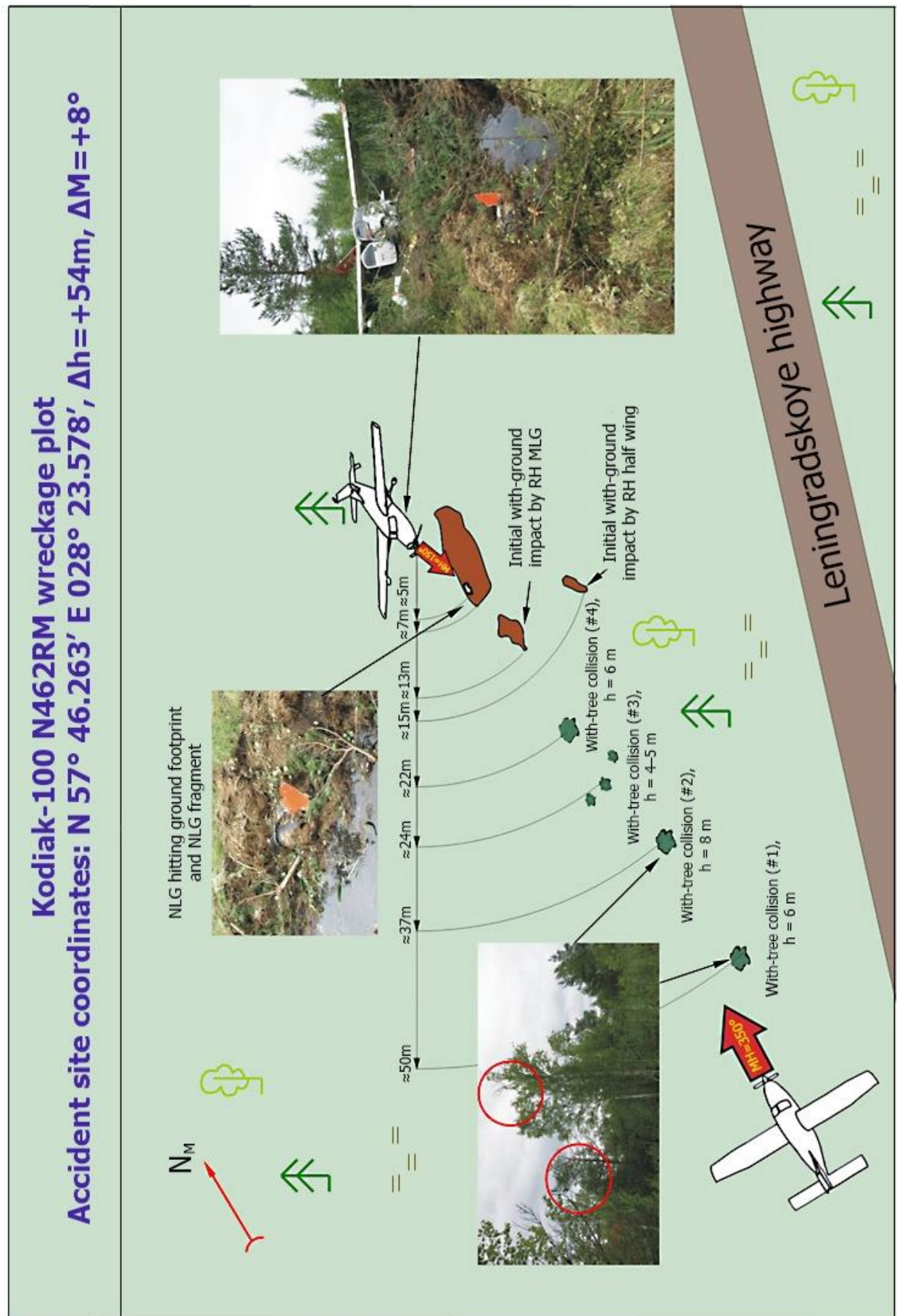


Figure 10. Accident site. View to the aircraft from its back



Figure 11. Accident site. View to the aircraft from its LH side

The wreckage plot is shown at the Figure 12 below.



1.13. Medical and Autopsy Information

On 06.07.2015, at 17:59, FO passed the alcohol test at the Narcological Dispensary of Pskov region. According the act № 1535 there was no alcoholic intoxication determined.

On 06.07.2015, at 19:22, PIC also passed the alcohol test at the Narcological Dispensary of Pskov region. According the act № 1536 there was no alcoholic intoxication determined.

1.14. Survival Aspects

During the accident flight, PIC occupied the left seat, FO occupied the right seat; both were fastened with four-point safety belts.

The flight crewmembers do not obtain any injuries.

1.15. Search and Rescue. Fire

On 06.07.2015, at 13:17:55, TWR controller received a message about the accident from the eyewitness and reported it to a senior controller on-duty.

At 13:18:20, the senior controller called the emergency alert and informed the emergency response and rescue station.

At 13:21, the information about the accident was reported to Pskov Regional Directorate of EMERCOM.

The following personnel and rescue equipment were sent to the accident site:

- at 13:22 – two units of Pskov Federal FFS №2 composed of 7 persons and 2 vehicles;
- at 13:22 – a duty shift of FFS and salvage and rescue operations of CMC of Pskov Regional Directorate of EMERCOM composed of 3 persons and 1 vehicle;
- at 13:23 – a duty shift of search and rescue unit of Pskov city composed of 3 persons and 1 vehicle;
- at 13:25 – a response team of CMC of Pskov Regional Directorate of EMERCOM composed of 3 persons and 1 vehicle;
- at 13:27 – an ambulance team from Pskov Hospital.

When at 13:31 one unit of Pskov Federal FFS №2 arrived at Pskovavia territory, AASS of Pskovavia, staff, which actually didn't have any responsibility to influence search works, sent them to Kresty (neighborhood area of Pskov) to search there.

At 13:35, the duty shift of FFS and salvage and rescue operations of CMC of Pskov Regional Directorate of EMERCOM, the response team of CMC of Pskov Regional Directorate of EMERCOM, and the second unit of Pskov Federal FFS №2 had arrived at the military base territory (where Pskovavia office also was located) and Pskovavia staff, which actually didn't have any responsibility to influence search works, addressed them to Cherekhare residential area.

Note. *Instructions on search and rescue operations at the aerodrome and at the Pskovavia territory:*

"2.6.1. Pskovavia Director General is to manage all search and rescue operations...

2.10. A chief of a search and rescue operation is responsible for the search and rescue operations at the accident site..."

At 13:37, Pskovavia Research and Rescue team composed of 33 persons and 7 vehicles arrived at the Pskov AD RWY southern threshold.

At 14:01, TWR controller had insisted to conduct a helicopter search, and a military Mi-8 helicopter (that was performing flights under another task) found the accident aircraft and made a hovering above to identify the place.

At 14:13, all rescue and firefighting teams and the ambulance team arrived at the accident site.

They deployed all firefighting equipment, fed it from the tank vehicle and made themselves prepared for the fire fighting in case of fire.

The flight crewmembers didn't need any medical assistance.

Therefore, all units spent 33 min in total in searching for the aircraft (that was located at distance of 1400 m from the ARP), that was caused by the following: because TRW controller didn't know the precise aircraft impact site (because he had no visual observation conditions from his working station), and because the activities of Pskov Regional EMERCOM units and Pskovavia(JSC) were not coordinated well.

1.16. Tests and Research

1.16.1. Engine examination

The examinations of the aircraft engine and its controls and accessories were conducted at Pratt & Whitney Canada Corp. facilities in St. Hubert, Canada during 26–28 of February, 2016 with presence of IAC representatives.

During the examinations, there were no anomalies found to preclude the normal engine operation.

Note. *4.0 CONCLUSIONS, Report No.: 15-072 issued on 20.04.2016:*

"The engine was not producing power at the moment of the impact which corroborates the pilot report that the engine was shut down before the impact. No anomalies were found to preclude the normal engine operation. The cause of the engine shut-down could not be determined."

1.16.2. Propeller Examination

The propeller examinations were conducted by Hartzell Propeller Inc. specialist at Pratt & Whitney Canada Corp. facilities in Canada on 29.03.2016.

In course of examinations, it was determined that the propeller was operational before the impact.

Note. *Aircraft Accident/Incident Report No.: 150706 issued 30.03.2016:*

Conclusions:

"The propeller did not show signs of being under power and there was now distinct evidence of rotation prior to the impact sequence.

There were no discrepancies noted that would prevent or degrade normal operation prior to impact. All damage was consistent with high impact forces bending the blades aft and twisting the blades towards low pitch, jamming the pitch change knobs against the fork in the low pitch position."

1.16.3. Fuel Analysis

The Investigation team sampled the fuel from the LH fuel tank and sent it for examinations to Center of Certification of Aviation Combustive-Lubricating Materials of GosNII GA where the examinations were conducted.

The fuel was identified as Jet A-1. The sample physical and chemical parameters met the average statistical values for fuel drained from aircraft tanks under the normal operation conditions. The sample microbial contamination level met the average.

1.16.4. Oil Analysis

The Investigation team sampled the oil from the aircraft oil cooler and sent it for examinations to Center of Certification of Aviation Combustive-Lubricating Materials of GosNII GA where the examinations were conducted.

The oil was identified as BP Turbo Oil 2380. The sample physical and chemical parameters met the average statistical values for BP Turbo Oil 2380.

1.16.5. Garmin G-1000 Examination

IAC Laboratory conducted the examination of 10 SD data cards⁵ that were found at the accident site installed into FDIS Garmin G-1000 of the aircraft. In course of examinations, it was determined that there was no flight data related to Kodiak-100 N642RM flight from 06.07.2015 recorded by Garmin G-1000.

⁵Three (3) memory cards were presented to the Investigation team by FO; seven (7) of them had been enclosed to AFM and were taken from there (see item 1.18.2).

1.16.6. Airplane Fuel System Check

Investigation team together with IAC Laboratory following the recommendations of the aircraft manufacturer Quest Aircraft Company (USA) conducted the check of aircraft fuel system components and sensors on 12–13 of May, 2016 at the aircraft custody place. In course of examinations, it was determined that all aircraft fuel system were operational before the impact.

1.16.7. The system of aural alert for fuel valves check

The Investigation team checked the aural alerts for fuel valves on 17–19 of November, 2016 at the aircraft custody place. In course of the examinations, it was determined that the aural alerts system for fuel valves was operational before the impact.

1.17. Organizational and Management Information

As of 06.07.2015, Apelsin-T, JSC owned Kodiak-100 N642RM MSN № 100-0104. Apelsin-T is registered: 390006, Russia, Ryazan, Griboyedovaproyezd, #17 A.

As of 07.10.2015 (after the accident), the aircraft was sold to Zvezda, NPP for the aircraft sport promotion. Zvezda is registered: 319510, Russia, Ryazan oblast, Shilovsky region, Ibredskoyelocality, Sasykino village.

Rosaviatsia ITO AT for North-West Regions provides the aviation activity oversight. The mail address is 199178, Russia, St. Petersburg, Vasilyevsky Island, Maliy prospect, #54, building 4 B.

1.18. Additional Information

1.18.1. Emergency Locator Transmitter

Kodiak-100 N642RM was equipped with ARTEX ME406 ELT registered in USA having Data Country Code 366.

At 13:23, COSPAS-SARSAT registered ELT transmission of Kodiak-100 N642RM.

1.18.2. Flight Information Display System

Three FDIS displays Garmin G-1000 were installed in Kodiak-100 N642RM cockpit (see Figure 13). Left and right displays were PFDs, the central one was MFD.

FDIS provides aircraft and engine flight data recording to SD data card inserted into central display top card slot.

Note. *GARMIN G1000 Integrated Flight Deck Pilot's Guide, QUEST Aircraft Company, Quest KODIAK 100:*
8.9 FLIGHT DATA LOGGING

The Flight Data Logging feature will automatically store critical flight and engine data on an SD data card (up to 16 GB) inserted into the top card slot of the MFD. Approximately 1,000 flight hours can be recorded for each 1 GB of available space on the card.



Figure 13. Kodiak-100 N642RM aircraft cockpit. FDIS displays are pointed by arrows

The Investigation team was provided with three(3) SD data cards, which had been inserted into FDIS Garmin G-1000 displays before the accident flight, and on next day after the accident, were recovered from the aircraft by FO. According to FO explanations, he had inserted five (5) SD data cards in total into all slots excluding the LH display top slot.

On 07.07.2015, he recovered three of them: one from the LH display and two from the RH display. There were no SD data cards found in the central display.

Note. *From FO explanatory report of 14.07.2015:*

"On 07.07.2015, next day after the accident, I arrived at the accident site and saw the aircraft without any safe storage guard. Inspected the cockpit and recovered one data card from the left unit and two data cards from the right one. I didn't find any data card in the central one, but found the central display damaged. The SD data cards recovered from the cockpit were provided to the Investigation team."

During the aircraft cockpit inspection it was determined that the central FDIS Garmin G-1000 display had received its damage in course of the accident; the display right side was shifted towards the power plant at approximately 15 mm (see Figure 14).



Figure 14. FDIS Garmin G-1000 display – after the accident. The amber arrow shows the shift

It doesn't contain any SD data card. The Investigation team failed to find out the missing data cards inside the cockpit and inside the aircraft cabin. They might have been thrown out of the aircraft cockpit in course of the aircraft with trees collision.

1.18.3. Issues related to the aircraft at Pskov AD parking

On 03.07.2015, the aircraft unsheathed was put under custody of AASS of Pskovavia(JSC). The appropriate entry was done to AASS acceptance-delivery logbook.

The aircraft was kept under custody at Pskov AD at the parking place in front of Pskovavia main office since 03 till 06 of July 2015 (see Figure 15).



Figure 15. Parking place in front of Pskovavia main office

The Investigation team inspected all video tapes of surveillance cameras at the aircraft parking place. There were no foreign persons recorded near the aircraft found at these taps. The security was organized in accordance with the normative documents requirements.

1.19. New Investigation Techniques

No new investigative methods were used in this investigation.

2. Analysis

All information related to the flight crew preflight preparation, Kodiak-100 N642RM preflight preparation on 06.07.2015 and to the decision to fly is shown in item 1.1.

At 13:05:25, FO sent TWR controller a request clearance for engine startup.

At 13:05:40, PIC had received a clearance for startup and started the engine up. After the engine startup, the flight crew checked the aircraft systems' operability, and did the preflight checklist. There were no remarks to the aircraft and systems' performance detected.

Note. *From PIC explanatory report of 14.07.2015:*

"After the engine startup, its performance was normal; no malfunctions or failures. Garmin G-1000 system was O.K. ... Before taxiing to takeoff position, together with FO, we read the preflight checklist, and I performed the taxiing to takeoff position."

At 13:10:17, the flight crew had received TWR clearance, took holding position MH=190°, and requested lineup clearance "Pskov-tower, 1799 Golf, lineup."

At 13:13:45, TWR controller gave clearance for lineup and provided a weather information: "1799 Golf clearance for lineup, RWY 19, surface wind 90 degrees, 4 meters."

At 13:15:22, the flight crew reported readiness for takeoff "Pskov-tower, 1799 Golf, ready for takeoff."

Before the takeoff:

- fuel Jet-A was about 750 l;
- airplane balance was about ≈ 70.54 inch (34.93% MAC), and was inside Kodiak-100 AFM limitations that was about $68.31 \div 80.78$ inch (33,83 \div 80,78% MAC);
- the aircraft TOW was ≈ 6407 lb. (2906 kg), and was inside Kodiak-100 AFM limitations that was about 7305 lb. (3313 kg).

Inside the cockpit, PIC occupied the left seat and FO occupied the right one. Both were fastened with safety belts.

In accordance with TWR controller Working Procedures, the controller has to check that there are no obstacles on RWY and provide a clearance for takeoff. The absence of obstacles he can check from his working station visually and relying on other flight crews' reports and on an air marshaller information.

Note. *TWR controller Working Procedures.*

5.1.12. After the flight crew reports their readiness to takeoff, TWR controller shall:

- *make sure that there are no obstacles on RWY;*

– provide a takeoff clearance.

5.1.20. The absence of obstacles can be checked visually from TWR controller working station, and also relying on other flight crews reports and on a responsible officer information.

The Investigation team underlines that there was no possibility for TWR controller to see the entire RWY from his working station because there are trees and bushes located between TWR and RWY (see Figures 16 and 17).



Figure 16. View to the north threshold of RWY 19 (red arrow) from TWR controller working station. Threshold is partly covered with trees and bushes



Figure 17. View to the north threshold of RWY 01 (red arrow) from TWR controller working station. Threshold is covered with trees and bushes

At 13:15:30, after the clearance from TWR controller, PIC conducted the takeoff with MH=190°. Liftoff from the runway occurred near ARP abeam TWR position.

Note. *From TWR controller explanatory report of 16.07.2015:*

"RA-1799 aircraft lifted off from RWY near TWR."

The aircraft climbed with speed about 100÷105 knots⁶ (170÷180 km/h). At height of 750 ft. (228 m) PIC started a left turn still climbing. During the left turn, some engine troubles started; the flight crew felt it by the thrust reduction.

Note. *From PIC explanatory report of 14.07.2015:*

We conducted a climb with speed of 100÷105 knots (170÷180 km/h); when reached a height of 750 ft. (228 m) considering field elevation pressure, we started to turn left still climbing. During the turn, some engine troubles arose. I felt the thrust drop; TRQ readings were "jumping", the same were TNT readings."

At 13:17:02, FO requested TWR controller the back course landing: "Back course landing requested". TWR controller missed⁷ the request and provided no answer.

Note. *From FO explanatory report of 14.07.2015:*

When the engine troubles had occurred, I requested a back course landing. TWR controller didn't respond. We didn't contact him again till the landing."

PIC tried to recover the engine with throttle lever. The speed dropped and the aircraft started to lose its height with a development of left bank. PIC and FO together recovered from the left bank and put the aircraft into gliding flight.

Note. *From PIC explanatory report of 14.07.2015:*

"The aircraft started to lose its speed. Left turn with descending started to develop. I tried to recover the engine using throttle lever. The aircraft continued to lose its height with the left bank development. Together with FO we dropped our operations with the engine and jointed our efforts for the aircraft recovering into the level flight."

The flight crew in accordance with Kodiak AFM did the emergency descending checklist. Emergency engine control performing by PIC failed to recover the engine performance capabilities.

Note. *From PIC explanatory report of 14.07.2015:*

"When we put the aircraft into a flat glide mode, we did the emergency descending checklist (checked the fuel valves, checked the power plant

⁶Here and elsewhere the descriptions of flight modes and flight crew actions are shown according to the flight crew members' explanations.

⁷When the Investigation team went through the "flight crew–ATC talks" records, it sounded low and illegible.

instrument readings). Fuel valves were in ON position, instrument readings were out of green arc: low TRQ, rotor speed drop. We continued to operate the engine that is we tried to use the emergency engine control moving the engine emergency power lever forward with the throttle lever in idle position. I did it. There were no response from the engine."

PIC performed an airstart; the airstart failed to recover the engine performance capabilities.

Note. *From PIC explanatory report of 14.07.2015:*

"After the airstart command I performed the airstart emergency procedure: generator switch – OFF, alternator switch – OFF, emergency power lever – NORMAL. Power lever – IDLE. Ensured that fuel valves were ON. Auxiliary fuel pump – ON. Pressed the button HI-START. However, no results came up."

The flight crew decided to perform a forced forward landing onto sparse forest. With the speed of 80 knots (148 km/h) the aircraft descended to the height of ≈ 30 m; put flaps to 35°, cut the fuel off and de-energized the airplane. Before with-trees-collision, PIC leveled the aircraft off.

Note. *From PIC explanatory report of 14.07.2015:*

It was our common decision to land to the sparse forest, as we understood that we would not reach the runway. Having control on the speed and height of gliding, we descended to about 30 meters. The speed was 80 knots (148 km/h). I put flaps down to 35 degrees; cut the fuel off and de-energized the airplane. When saw the tops of trees (which were far between) about seven or eight meters high, we levelled the plane off to reduce a forward speed. The plane was controllable up to the with-trees-collision."

At Figure 18, the aircraft calculated path after the takeoff is shown.

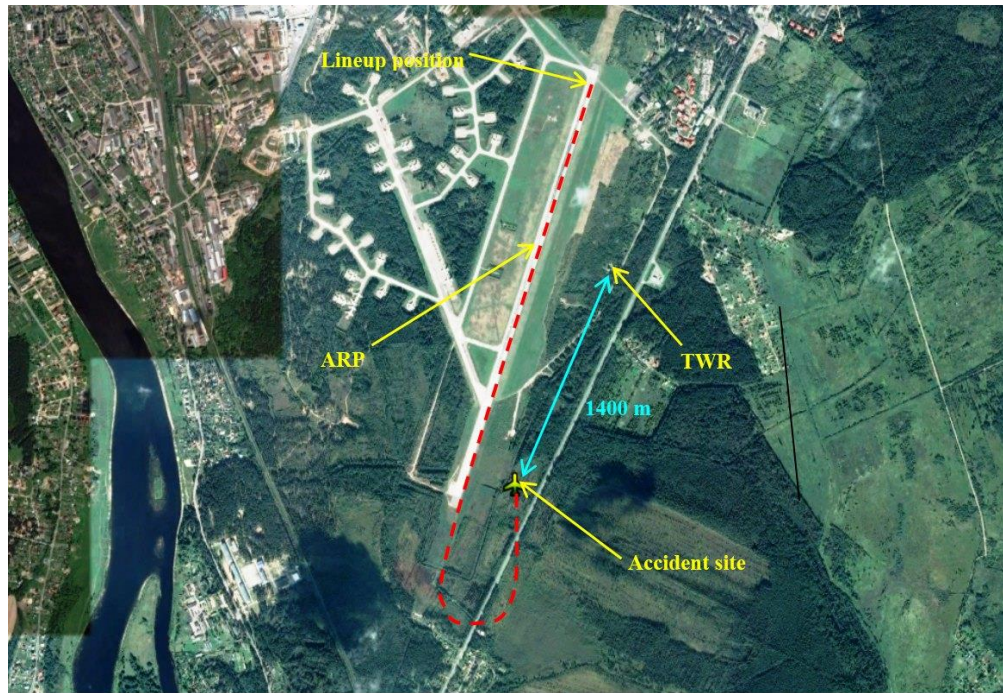


Figure 18. The aircraft calculated path after the takeoff

In accordance with TWR controller Working Procedures, item 5.1.12, TWR controller has to monitor a takeoff aircraft up to a height of 200 m or up to a specified height (within the range of vision), and in case of any aircraft problem is detected, to inform the flight crew.

However, in this case, when the engine failed and the flight crew performed a forced landing, TWR controller had no ability to see the aircraft because it was shielded by the curtain, which was covering an angle of view of the accident site (see Figure 19).

Note. *From TWR controller explanatory report of 16.07.2015:*

"After the aircraft took off near RWY threshold it performed a left turn. I was following the flight till the aircraft dropped out of sight when covered by a curtain."

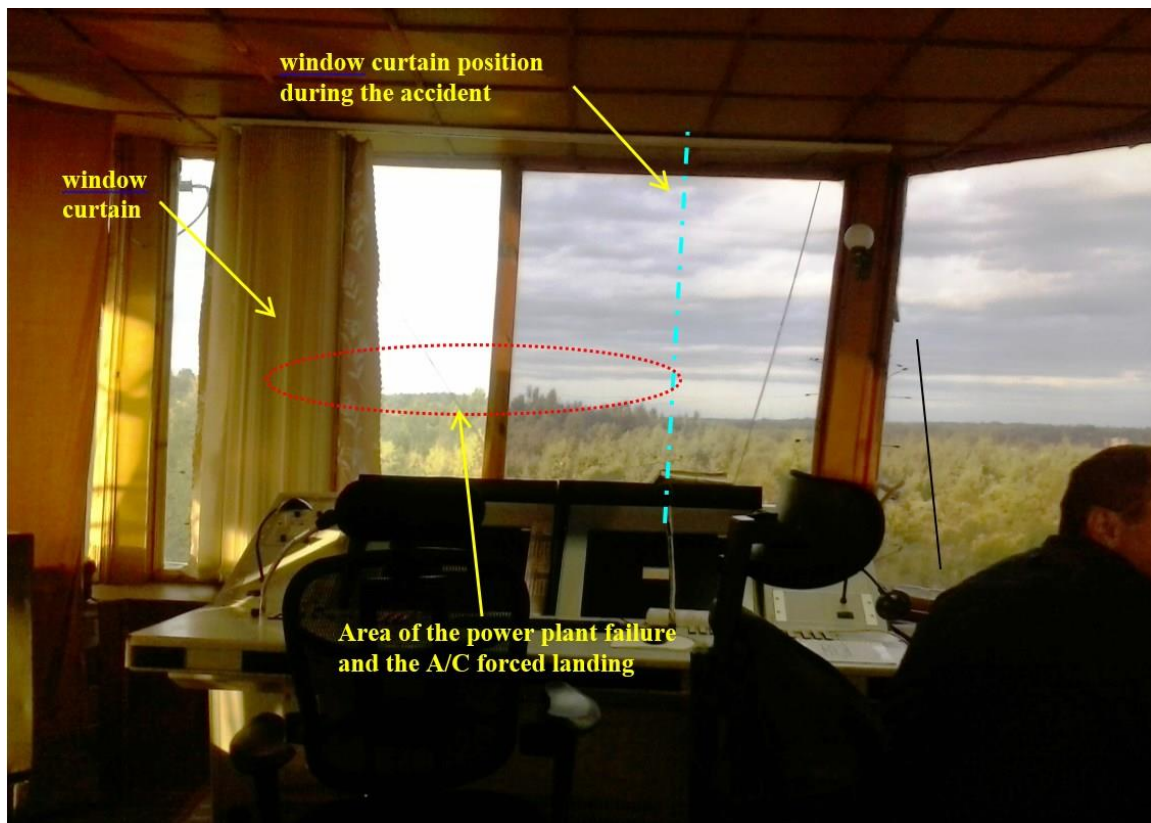


Figure 19. TWR controller angle of view of the accident site restricted by a curtain

At 13:18, the aircraft collided with trees and bushes, and further with ground. During the landing, the aircraft received significant damage.

After the aircraft had rested at the ground, PIC and FO evacuated through the left and right doors respectively. When ensured there is no fire, the flight crew returned to the aircraft.

In accordance with TWR controller Working Procedures, item 5.1.29, TWR controller has to receive areport from a pilot after takeoff.

Few seconds earlier, at 13:17:40, TWR controller when received no report tried to contact PIC through ground communication VHF radio.

At 13:18:35, through intrainport communication TWR controller received an information that the aircraft had crashed: "For your information, SIRENA, there is an information that the aircraft, which was taking off probably crashed."

TWR controller continued to call Kodiak-100 flight crew up through ground communication VHF radio.

At 13:21:21, FO turned the aircraft VHF radio on and reported the forced landing to TWR controller.

The Investigation team considered following scenarios that could cause the engine malfunction:

- engine failure scenario;
- propeller failure scenario;

- aircraft fuel system failure scenario;
- engine failure scenario in case the flight crew didn't open the fuel shut-off valves;
- engine failure scenario in case there was no fuel in tanks;
- engine failure scenario in case the fuel/oil was improper;
- wilful aircraft damage when parking at Pskov AD scenario.

Engine failure scenario

The Investigation team sent the aircraft engine to the manufacturer facilities of Pratt & Whitney Canada Corp. in Canada.

In course of the engine examinations, there were no anomalies found to preclude the normal engine operation.

This scenario was called off.

Propeller failure scenario

The propeller was examined by Hartzell Propeller Inc. specialist at the Pratt & Whitney Canada Service and Training Center in St. Hubert, Quebec, Canada.

In course of examinations, it was determined that the propeller was operational before the impact.

This scenario was also called off.

Aircraft fuel system failure scenario

Investigation team together with IAC Laboratory following the recommendations of the aircraft manufacturer Quest Aircraft Company (USA) conducted the check of aircraft fuel system components and sensors at the aircraft custody place. In course of examinations, it was determined that all aircraft fuel systems were operational before the impact.

This scenario was also called off.

Engine failure scenario in case the flight crew didn't open the fuel shut-off valves

Following a request of the Investigation team, the aircraft manufacturer Quest Aircraft Company (USA) specialists assessed the engine operation time from the startup till the failure considering the amount of fuel in reservoir tank and fuel lines in case LH and RH fuel tanks shut-off valves were OFF.

In course of examination, it was determined that actually the engine had to be operated steady till the aircraft reaches 215 m.

Note.

Extracts from Quest Aircraft Memorandum IOM-040516-15:

"5. Based on the information provided, the following are our estimates:

– Startup, Taxi, and Holdover Time: 9 minutes and 50 seconds. (.164 hours);

– Taxi fuel used @ 100 pounds per hour (ground idle):

(.164 hours x 100 pounds per hour) = 16.38 pounds (2.45 gallons);

– Usable fuel with fuel selectors off (reference Report 100-350-301, page 11, condition B-1): 2.98 gallons;

– Fuel available at beginning of takeoff: (2.98 gallons – 2.45 gallons) = .53 gallons (3.55 pounds);

– Fuel flow at 90% takeoff power = 400 pounds per hour (6.667 pounds per minute);

– Endurance at 90% takeoff power with .53 gallons usable: (3.55 pounds ÷ 6.667 pounds per minute) = .53 minutes;

– Takeoff rate of climb at 6400 pound aircraft weight = 1482 feet per minute;

– Estimated height above ground until flameout: (.53 minutes x 1482 feet per minute) = 707 feet (215 meters)."

However, if one of the fuel shut-off valves failed to come open, an aural alert with annunciation is generated; and it is not possible for a flight crew to switch it off.

Note.

Extracts from Quest REF: IOM-052716-22:

"1. Regarding the aural alert for fuel valves, if BOTH valves are in the OFF position, there is a chime that continues until one or both valves are opened.

Due to the criticality of this alert, there is no way to disable it. Since the pilot was in contact with ATC, at least one of the audio panels was functional, which would make the chime audible in at least one speaker."

The Investigation team checked the aircraft aural alert for fuel valves operability. In course of examination, it was determined that the aircraft aural alert for fuel valves was operational.

Time between the engine startup and the aircraft takeoff was 9 min 50 sec. By request of the Investigation team, IAC laboratory performed "flight crew–ATC" talks listening. In course of the talks' analysis there were no aircraft aural alert signals heard during with TWR controller talks.

This scenario was also called off.

Engine failure scenario in case there was no fuel in tanks

Before the aircraft was evacuated from the accident site about 200 l of fuel was drained from the aircraft fuel tanks.

This scenario was also called off.

Engine failure scenario in case the fuel/oil was improper

The examinations of fuel and oil sampled from the aircraft were conducted at Center Of Certification Of Aviation Combustive-Lubricating Materials of GosNII GA. The examinations shown that the fuel and oil meet the applicable requirements.

This scenario was also called off.

Wilful aircraft damage when parking at Pskov AD scenario

During the period from July 3 till July 6, 2015, the aircraft was kept at a parking place at Pskov AD under constant safe custody of PskovaviaAASS, and was under the constant video monitoring.

The Investigation team had looked through the video records and determined that nobody get close to the aircraft in question in the said period.

This scenario was also called off.

Therefore, all scenarios of possible causes of what had been mentioned by the flight crew were studied by the Investigation team. None of the above scenarios was supported by the examinations.

As in FDIS Garmin G-1000 central display, the SD data card that stores the engine parameters was not found, it was not possible to determine the engine power loss cause.

As there was neither FDR nor video recorder provided or installed to the aircraft, therefore it was not possible to assess the flight crew actions.

3. Conclusions

The accident with Kodiak-100 N642RM aircraft occurred when performing a forced landing to the forest. According to the flight crewmembers explanations, the need of this forced landing was caused by the engine power loss in flight.

Conducted examinations of engine, rotor and fuel system did not reveal any issue that can cause the power plant loss of power.

Because FDIS SD data card from the central display, which storages all recorded power plant flight parameters was lost, it was not possible to access the engine operability and the flight crewmembers' actions in full.

4. Shortcomings identified in course of investigation

4.1. The document "Instructions for managing of all search and rescue activities at the aerodrome and in the area of responsibility of Pskovavia, JSC" signed by Pskovavia Director General on 21.04.2008, includes the references to such withdrawn documents as HИИИ ГА-85⁸ and others.

In this document, there are references found to some organizations that have already stopped their activities at the said areas, such as: MurmanskayaAviatzionnayaCompania, LLC; Velikolukskiy ATM Center at Pskov AD, and others.

4.2. The document "Pskovavia Emergency Plan" signed by Pskovavia Director General on 21.04.2008 there are references found to the enterprises and organizations that have already stopped their activities at the said areas, such as: MurmanskayaAviatzionnayaCompania, LLC; Velikolukskiy ATM Center at Pskov AD, and others.

4.3. The accident site was discovered just after 33 minutes of search works (however it was located at distance of 1400 m to the south direction from Pskov AD ARP) because TRW controller didn't have any information about the accident site location as he had no visual observation conditions at his working station, and because the activities of Pskov Regional EMERCOM units and Pskovavia were not well coordinated.

4.4. In violation of requirements of item 110a FAP for Use of Airspace, in the submitted flight plan, the identification marks of another aircraft have been stated instead of Kodiak-100 N642RM identification marks.

4.5. The permission to use of airspace was issued by North-West office of FSUE State ATM Corporation 24 min later against the takeoff time stated in the request. This occurred because of the breakdown in use of airspace planning process in Moscow area office of FSUE State ATM Corporation.

4.6. In violation of item 1.3. Attachment 14 FAP MA CA requirements, neither PIC nor FO passed a preflight medical checkin spite of the fact that Pskovavia medical service was available at the aerodrome.

⁸Flight regulation manual of civil aviation from 1985.

5. Safety Recommendations

5.1. To Russian⁹ CAA authorities:

- to inform GA flight and maintenance personnel about Kodiak-100 N642RM aircraft accident history and causes;
- to interpret the procedures of flight personnel preflight medical checks' passing at aerodromes and landing sites where a medical worker, who has rights to perform a medical examination, is available.

5.2. To Pskovavia, JSC: to update the document "Instructions for managing of all search and rescue activities at the aerodrome and in the area of responsibility of Pskovavia, JSC" and the document "Pskovavia Emergency Plan" including the effective normative documents.

5.3. To Pskov unit "Pskov-Aerocontrol" of North-West office of FSUE State ATM Corporation: to provide TWR controller with visual observation conditions at his working station.

5.4. To FSUE State ATM Corporation Moscow area office to eliminate the shortcomings identified in course of investigation.

⁹CAA of other States-members of The Agreement on Civil Aviation and the Use of Airspace to consider the applicability of the above SRs with consideration of the actual situation in the State-member.