THE REPUBLIC OF POLAND

COMMITTEE FOR THE RE-INVESTIGATION OF THE SMOLENSK AIR CRASH

TECHNICAL REPORT

Facts regarding the crash of the TU-154M No. 101,
(Fight PLF101), that took place in Smolensk, Russia on the 10th of April 2010

This crash is being investigated by the Committee for the Re-Investigation of Air Crashes (hereby referred to as the "Committee") and is a part of the Committee for the Investigation of National Aviation Accidents. The Committee has been tasked with the responsibility of determining the circumstances and causes of this air crash, and with the issuance of appropriate preventive recommendations.

This Technical Report includes findings concerning the most important technical aspects of this crash.

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PREFACE

The Committee for the Re-Investigation of the Aircraft Accidents (Committee) at the Ministry of National Defense of the Republic of Poland, hereby presents the findings of its investigation into the causes of the air crash of the Polish Air Force aircraft TU-154M (Flight PLF101) in Smolensk, Russia, on April 10, 2010. The crash claimed the lives of all occupants onboard, among them, the President of the Republic of Poland, Lech Kaczyński (Smolensk Crash).

According to the international standards of aircraft accident investigation, all important facts (circumstances, and crash evidence), which are later analyzed before stating the final conclusions and recommendation, are included in the first part of this report. In this document the Committee focuses on the most important pieces of information, especially facts and evidence not taken into consideration in the Final Report of the Committee on State Aircraft Accident Investigation (Pol. Komisja Badania Wypadków Lotniczych Lotnictwa Państwowego) - KBWLLP), headed by Jerzy Miller. Key analysis, which lead to the main conclusion of the Committee, are hereby cited as examples.

Important facts, information and circumstances presented in this document were not taken into consideration in the reports of the Russian Interstate Aviation Committee (Rus. Межгосударственный Авиационный Комитет – "MAK Report"), and the Miller's Committee Reports. The findings of Miller's committee were proved to be untrue in the light of the conducted analysis, pointing to the wrong reason for the crash, and repeating the findings of the MAK Committee, which are also not true. At the same time the report of the Committee on State Aircraft Accident Investigations of Jerzy Miller, in the case of the Smolensk crash from July 29, 2011, is not valid, and is hereby nullified.

The KBWLLP Committee of the Ministry of Defense of the Republic of Poland hereby nullifies the classification of the crash causes, of the TU-154M aircraft in Smolensk on April 10, 2010, as a *Controlled Flight into Terrain* being a result of a pilot's mistake (CFIT) due to the following reasons:

1. The Russian air traffic controllers at the Severny North airport in Smolensk (Severny), in agreement with the commander of the Russian Military Transport Aviation, Gen. Benediktov in Moscow, gave false information to the crew of TU-154M during the landing approach on April 10, 2010. The approach of TU-154 was preceded by a controlled landing approach of the Russian military IL-76 aircraft, which was supposed to verify the functioning of the navigation instruments of the Severny aerodrome. The IL-76 performed a landing approach twice with weather conditions being below minimum, and every time approached at an altitude only a couple of meters above the runway, and significantly to the left.

2. Contrary to the statement of Miller's committee, General Andrzej Błasik, Commander of the Polish Air Force, was not present in the cockpit of TU-154M during the crash, and had no influence on the crash. Miller's Committee accused general Błasik without any due evidence.

3. During the entire flight, the TU-154M air crew, and the Pilot in Command (PIC) made correct decisions, which were agreed upon by the entire crew, and were carried out according to the prescribed flight regulations. 16 minutes before the crash the captain made the decision to go around, and in the case of bad weather, to only perform a look-and-see approach. He

gave the order “go-around” at a safe altitude, which was confirmed by the second pilot. During the entire period of the landing approach the crew responded properly to the commands issued by the air traffic controllers, who instructed the crew about their distance from the runway.

4. The TU-154M aircraft was destroyed in the air as a result of several explosions.

5. At first there were explosions in the left wing leading to the destruction of the structure of the end of the detachable wing part, approximately 900m before the runway threshold No. 26 of the Smolensk Severny aerodrome. The explosions destroyed the slats, ribs and spars, as well as the skin, and the pieces were scattered over an area 30m wide , and 400m long beside the flight path. Then the flaps were torn off, parts of which were also found over 400m away.

6. When the plane passed the point defined as TAWS38 (710m before the runway threshold) a series of errors occurred: left engine error, generator, flaps, undercarriage, both radio-altimeters, the first hydraulic installation and the magnetic course measurement system.

7. An explosion in the fuselage of TU-154M occurred above the ground. At this time, before the plane impacted with the ground, a failure of the electrical power supply occurred. The explosion took place in the left part of the fuselage, in the area of Lounge 3, where the left passenger door was blown away due to the pressure wave, as well as the first and third spar of the left center wing. The bodies of more than ten passengers were damaged and the parts were scattered throughout an area of over 100m.

The evidence enumerated in document is not final. A complete list of facts, information, research and analysis will be presented in the final report.

Previous investigations

The proceedings related to the crash of the military aircraft TU-154M PLF101 in Smolensk on April 10, 2010 should be subject to the bilateral agreement between the Russian Federation and the Republic of Poland of August 1993. This agreement stated that both countries are equally represented in one investigative body consisting of members of institutions authorized to examine military aircraft crashes (in Poland: KBWLLP). By virtue of Article 11 of the agreement, both parties have equal rights and equal access to all evidence and information.

Source: Agreement from December 14, 1993 between the Ministry of National Defense of the Republic of Poland and the Ministry of Defense of the Russian Federation concerning the air traffic of military aircrafts of the Republic of Poland and the Russian Federation in the air-space of both countries.

In accordance with Polish law, the former Minister of National Defense, Bogdan Klich, was in 2010 obliged to appoint an appropriate "Committee for Investigation of National Aviation Accidents", the KBWLLP. This did not take place, and Polish specialists were sent to Smolensk without the appropriate authorization. The Chairman of the State Commission on Aircraft Accident Investigation was added to the group. The Chairman dealt exclusively with civil aviation accidents, and did not have formal authorization to investigate the crash of a military aircraft.

At noon, on April 10, 2010, the then Deputy Ambassador of Poland Piotr Marciniak sent a diplomatic note to the Russian Ministry of Foreign Affairs demanding the security of the crash scene, and full and unobstructed access for Polish representatives to carry out their investigation. This was not confirmed by the Polish Minister of Foreign Affairs Radosław Sikorski, and Polish experts were never afforded such an opportunity. The Russian side began to interfere with the crash site

On April 11, 2010 the Council of Ministers created the Inter-Ministerial Team, headed by Prime Minister Donald Tusk, which was supposed to deal with all issues concerning the Smolensk crash. This team consisted of: Minister of Foreign Affairs, Minister of Defense, Minister of Infrastructure, Minister of Justice, as well as heads of the civilian and military special services. The decisions on behalf of the team were made by Donald Tusk, who said many times, that he is personally responsible for all decisions made with reference to the investigation of the Smolensk crash.

Donald Tusk acquiesced to Russian pressure demanding that the investigation be conducted not according to the Agreement from 1993, but according to the Appendix 13 to the Chicago Convention from 1944, which is applicable only to civilian aviation.

On April 13, 2010 Minister Ewa Kopacz and Tomasz Arabski, who were present in Moscow during a meeting with the Prime Minister of Russia, Vladimir Putin, and representatives of the Russian government, confirmed this decision.

The chairman of the Russian military commission, General S. Baynetov, did not recognize the demand of Polish specialists to create a joint Russian-Polish committee, and postponed the resolution of this issue to the decision of the state authorities in Moscow. Until then, the Poles were not allowed to conduct any independent research, and were only allowed access to the information made available by the Russians.

The CVR (Cockpit Voice Recorder) and other recorders constituting key research and/or investigative material were extracted without the presence of the Polish representatives. On April 10 at

approximately 17:00 Moscow time, according to the statement presented by the Minister for Emergency Situations Sergei Shoigu, who was responsible for the activities on the Severny aerodrome, the Russians began to read the CVR without the participation of Poles.

On April 13, by virtue of a joint decision of the government of the Russian Federation and the government of Donald Tusk, it was decided to investigate the crash based on the ICAO principles from the Annex No. 13 of the Chicago Convention of 1947 regarding civil aircraft crashes.

In practice, the Polish experts did not have independent access to evidence material, witnesses and other information.

Source: Information by PAP - 16:23, 10 04, 2010, 19:10, 10.04.2010, RG.RU, 18.26, 10.04.2010, Vesti.RU

On April 15, 2010 the Polish Minister of Defense Bogdan Klich appointed the members of the KBWLLP. Its first chairman was Edmund Klich. On April 28, 2010 he was replaced by the Minister of Interior Jerzy Miller.

The recording from the kick-off meeting of the KBWLLP from April 28, 2010, shows that Jerzy Miller and his team worked in a "non-standard" fashion, through the adaptation of the rules of investigation applicable to a crash of a civilian aircraft - just as the Russians did. Subsequently, he also adjusted his team's findings to match the results later acquired by the Russians. This was accompanied by warnings about "unpleasant consequences" if both reports were not the same. Quotation: "We'll either have a unified [same] message, or we can whip our backs."

KBWLLP did not have a full and independent access to the original flight data recorders, or voice recorder (CVR). The original recorders along with the wreckage still remain in Russia's possession.

KBWLLP did not conduct an impartial independent investigation, and in the same manner, did not analyze the debris at the crash site. Neither lab tests of the wreckage, navigation instruments, nor engines were analyzed. The subsequently released data is based solely on the data provided from the Russian side. An exception was the examination of the engines during the period April 11-13, 2010, and later at the location where the debris was kept, on April 16, 2010. The KBWLLP' chief engine expert showed a lack of specialized knowledge concerning the necessity and importance of conducting tests for the starting engine TA 6A.

After analyzing findings of the experts who were in Smolensk during the initial days after the crash, the KBWLLP formulated, in writing, a plan of research to be done to clarify the nature of the crash. The investigation aimed to verify whether the "fuselage showed damage typical of an explosion", an important point in that plan. This however, was never performed. Despite that, the KBWLLP published a report concluding that there was no explosion on board of the plane. The report of the archeologist was also not taken into consideration. Contradicting itself, that report clearly and unequivocally showed that the plane disintegrated into tens of thousands of pieces.

Source: Memo of Stanisław Żurkowski, Head of the Technical Committee KBWLLP from September 2010.

According to the ICAO regulations, and Appendix 13 to the Chicago Convention, the Russian Federation gave the draft report of MAK to the Polish side on October 20, 2010. On December 19, 2010, Poland responded and handed over its remarks to MAK, and within the 148 pages it was

proven that the Russians did not give the Polish authorities over 100 key documents. It also clearly stated that research performed by the Russian authorities was contradictory and contained numerous mistakes. The Polish authorities rejected the MAK report and demanded that changes in the analysis and conclusions be introduced. In contradiction to the requirements of Appendix 13, comments of the Polish authorities were not taken into consideration. On January 12, 2011, MAK published its report without the "Remarks of the Republic of Poland".

On July 29, 2011 KBWLLP published its report, in which it accepted all key theories from the MAK Report, and at the same time, it ignored in their entirety the previously stated doubts and objections included in the document entitled the "Remarks of the Republic of Poland to the draft version of the final report".

The Miller Committee did not include facts about the overhaul of TU-154M and the incomplete pyrotechnical procedure before the departure to Smolensk.

During the several months following the crash, the remains of the TU-154M were treated in a way completely incompatible with proper crash investigation procedures.

The crash site was not secured according to standards and guidelines of proper crash investigation.

Source: Point 3.3 and Recommendation 5.4.3 Appendix 13 to the Chicago Convention

Part of the remains were moved to new places, which were described in the protocols of conduct as the place where they were found (i.e. fragment of the left part of the horizontal stabilizer was moved between 11th and 12th April, 30 meters closer to the main field of debris).

Source: Satellite photos taken on April 10, 2010 and April 11, 2010.

The KBWLLP Committee has more than ten digital (neither bit-accurate, nor identical) copies of the CVR, Russian production MARS BM, made in Moscow during the years 2010-2011 and 2014.
Source: Copies dated 12.04.2010, 31.05.2010, 09.06.2010 and February 2014 and other copies.

The KBWLLP possesses 5 (five) ATM QAR copies, differing from each other (from April 2010, July 2010, February 2011, August 2016 and January 2018) and 2 (two) copies of the Russian recorders KBN 1.1 and MLP-14-5.

Even though, it was obligatory under the Polish law, no post-mortem examinations of victims' bodies were conducted after they were transported to Poland. Russian medical documents, which were handed over to Poland, contained major mistakes. In the KBWLLP report, in Appendix 7, the autopsy results of only 3 bodies of crew members, and the captain were taken into consideration.
Source: Art.209 Penal Code. Numerous mistakes in the description of body injuries, included in the documentation made and handed over by the Russian side, were described and noted especially during exhumations and medical-forensic examinations of the body parts.

Polish authorities had knowledge of the swapping of bodies in coffins as early as September 2010, yet they failed to take the necessary and prudent steps to correct this unacceptable situation. They informed the victims' families about these mistakes almost two years after they took place. The subsequent exhumations confirmed swapping of bodies.

Source: Protocols from exhumations and medical-forensic examination of body parts. Materials in the possession of the Committee.

In 2016 the State Prosecutor's office decided to perform exhumation of all victims, hence, confirming the swapping of bodies in coffins. This process revealed additional, and numerous in nature mix-ups, whereby fragments of bodies belonging to other victims were discovered in the wrong coffins.
Source: Exhumation protocols and medical-forensic examinations

Overhaul of TU-154M, PLF101

In February 2009 the Polish Minister of National Defense announced a tender for the overhaul of two Polish government TU-154M aircraft. Two Polish companies "Metalexport" and "Bumar" took part in the tender (all previous overhauls were performed at the aviation works in the city of Vnukovo), but by a decree of the Russian president, were eliminated in January 2009 from participating in signing contracts with any Russian parties; apparently due to their earlier supply of armaments to Georgia. At the same time the Polish Minister of National Defense, Bogdan Klich, was informed that the only Russian company authorized to perform the overhaul of the Polish Government Tupolev aircraft is the OAO Aviacor in Samara; furthermore, the only company to execute this contract was to be the MAW Telecom and Polit Elektronik consortium. The committee convened by the Ministry of National Defense assigned the overhaul to the consortium consisting of those companies.

The MAW-Telecom/Politelektronik consortium represented the interests of the Russian company Aviacor in Samara. The board of Aviacor testified before the Russian prosecutor that the overhaul of both TU-154M was already agreed with Politelektronik by the end of 2008 (before the tender). None of the Polish secret services organizations questioned the credibility of the MAW-Telecom and Polit Elektronik despite the warning signs, and prior-knowledge, that people connected to the communist intelligence services are active in both companies.

The overhaul of the engines was not done at Samara, which lacked the properly certified facility for this type of operation, but rather, was to be carried on Aviacor's behalf in Rybinsk and Mineralne Vody.

Source: Correspondence from MAW Telecom to Director of the Department of Armed Forces Supply dated November 30, 2009 in regards to the aircraft overhaul. Warsaw prosecutor Doc. Po.Śl. 54/10, t. 66-67, 73-76, 80-81, 84 and 85.

Representatives of Polish authorities, who made the decision to award the contract to Politelektronik and MAW-Telecom, were later rewarded with high management positions on the board of Politelektronik. As early as 2009, the Polish special services vetted the credibility of Aviacor.

During the renovation in Samara, and the engine overhaul in Rybinsk and Mineralne Vody, there was no proper supervision from the Polish side. After its renovation, the TU-154 M exhibited a greater failure rate than before the renovation took place. This concerned key parts of avionics, including the autopilot and slats, as well as satellite communication system(s). Some of these defects were repaired by reassembling parts from the TU-154M No. PLF 102 (the parts were transported from Russia to Poland and were installed in Poland). Other parts were not repaired at all (i.e., the satellite communication).

Source: Correspondence from MAW Telecom to "Director of the Department of Armed Forces Supply" dated 30th. November 2009 in regards to the aircraft refurbishment. Warsaw prosecutor doc. Po.Śl. 54/10, t. 66-67, 73-76, 80-81, 84 and 85.

Access to evidence

Due to the decision of the government of Donald Tusk, handing over the investigation to the Russian Federation, and the decision of the majority of the Polish parliament from May 2010 not to take over the investigation from the Russians, Poland was deprived access to the key evidence materials and to its analysis. As a result, the Committee appointed 6 years after the crash, had limited access to the evidence material. The KBWLLP Committee had to come up with innovative and break-through research methods. The newest scientific-technological developments were helpful in this matter. In reference to the three essential groups of evidence the Committee used: analysis of photographs, video recordings, satellite pictures, available maintenance documentation, and numerous experiments and simulations. In reference to the bodies of the victims, the Committee performed an original reconstruction of the distribution of body parts at the crash site, based on photographic analysis, and prosecutor's documents. One important source of information were the subsequent interviews and questioning of witnesses, whom the prosecutor's office was often not able to reach. Key evidence, in possession of the Committee which has not been used by other institutions thus far, is the PLF101's sister plane, the TU-154M, PLF102.

Efforts to get access to substantial evidence kept by the Russian Federation

Members of the Committee, working formerly as a Parliamentary Group, contributed to putting through a resolution by the Council of Europe to secure return of the debris back to Poland. From the very beginning of its work, the Committee made efforts to gain access to the debris. At the same time, along with the State Prosecutor's Office, the Committee wanted to analyze the area of the crash site. The necessity to regain Polish property, the debris, black boxes and navigation devices, was mentioned as an important point in order to analyze it in Poland. Similarly, the necessity to analyze the area of the crash site was voiced and communicated to Russia on numerous occasions. On two separate occasions, the Polish side submitted formal requests to the MAK Committee requesting access to key information concerning the Smolensk Crash. This request remains ignored and refused to this day, and the key evidence still remains in Russia.

During a meeting, between the Committee and a team of archeologists on June 7, 2016, a scope of further analysis of the crash site was defined. The Committee determined that further research was needed and that the team would depart immediately to the crash site upon receiving approval from the Russian side to continue its research.

In October 2017, the Committee received official information from the spokesperson of the Ministry of Foreign Affairs that further diplomatic notes from the government of the Republic of Poland, regarding the return of the debris, were rejected by the Russian Federation. As a result, the Committee officially filed a document with the Minister of Foreign Affairs asking him to undertake necessary steps to secure permission from the Russian Federation to analyze and investigate the debris in Smolensk, and carry out a reconstruction of it, according with the ICAO recommendation(s).

The KBWLLP Committee is in constant contact with the Prosecutor's Office and its representative(s) participating in the ongoing exhumations, and actively observes these activities.

The Committee expects the final results of the post-mortem examination to be delivered, which is a key element of the final report.

Source: Report of a member of the Committee and external expert

Research and conclusions of the Committee

Due to a wide scope of research, it was necessary to assign particular tasks to different scientific and research centers. Every task was assigned to a renowned scientific center. The following centers specifically contributed to the research: Wojskowa Akademia Techniczna (WAT – Military Technical Institute) and Instytut Lotnictwa (Military University of Technology in Warsaw and Institute of Aviation). Foreign centers included: University of Akron and the National Institute for Aviation Research from Wichita State University, USA.

The same research was conducted in different research centers, and when possible, was performed utilizing different methods, i.e. simulations and experiments, in order to verify the correctness of the research.

Flight preparation

The electronic personnel access control system, for people entering the restricted area in the vicinity of the TU-154M 101 aircraft, did not function during the night of 09.04/10.04.

Source: Report on the BOR procedures.

Volume: Testimony of a Soldier from the 36th Regiment, 4th May 2011, Prosecutor Vol. 172, Page 95.

During the pyrotechnic control of the aircraft, a technical kit containing more than 1066 kg of spare parts was not checked. It was loaded before the arrival of the security inspectors, on the night of April 9th through April 10th 2010. Neither BOR (*Biuro Ochrony Rządu* - Government Protection Bureau), nor SKW (*Służba Kontrwywiadu* Wojskowego - Military Counterintelligence Services) claimed to have any information concerning the means of loading of, nor the content of the technical kit.

Source: Report on the implementation of BOR procedures. Response of the Minister of National Defense and Interior to the interpellation of MP Opioła.

Russian ATC activities prior to the crash

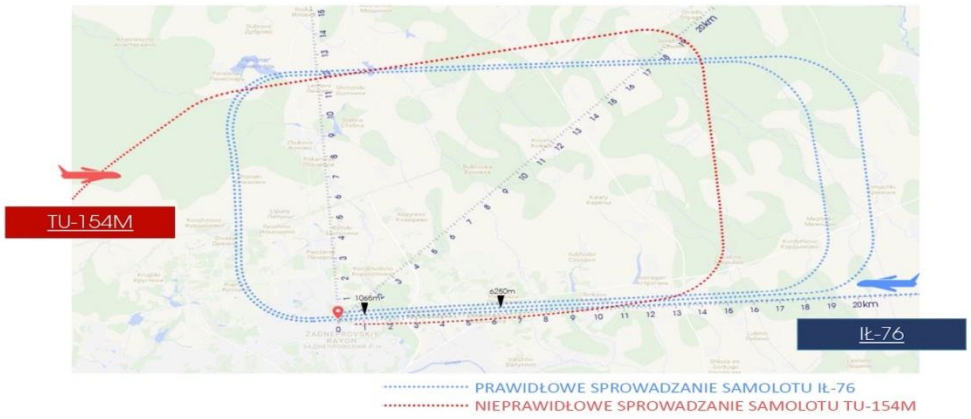

Fig. 1. Comparison of guidance of IL-76 and TU-154M on April 10th, 2010.

Yak-40 and IL-76 and TU-154M were guided with the use of a well-functioning, precision approach radiolocation station and properly functioning radio technical devices.

Source: Committee report, 10.04.2017.

The IL-76 pilot testified that the he was told to check the navigation system of the aerodrome.

Source: Testimony of the IL-76 pilot to the Russian prosecutor.

A two-time landing approach of IL-76 ended with the plane flying approximately 170 meters to the left of the runway axis.

Source: Recording of the radio correspondence between the air traffic controller and the IL-76 pilot.

The guidance of the TU-154M was performed with a systematic misleading of the Polish pilots by Russian general V. Benediktov, who supervised the guidance of the crew of TU-154M from the "Logika" (Eng. "Logic") headquarters in Moscow. The crew of the TU-154M performed all approach procedures correctly.

The air traffic controller did not inform the TU-154M about weather conditions, which, according to the witnesses were as follows: 40m of cloud base and 200m of horizontal visibility.

At 10:23:05 (Local Time) the Flight Management Group, being in contact with the crew, took full responsibility for the guidance of the TU-154M.

The permission for a test approach was given by an unauthorized person, namely, Colonel Krasnokucki, then the deputy commander of the air base.

The flight controller did not tell the crew of TU-154M about the method of landing approach, which he did previously in the case of the IL plane crew.

At 10:29:43 (Local Time) the position of TU-154M was determined at an altitude of 1500m before entering the second turn.

Despite major deviation from the course by TU-154M, the flight controller did not introduce any corrections to the course.

Before entering the third turn, the crew of TU-154M received the order from the traffic controller: "101 perform third, radial 19". These orders were given too early and misled the pilots.

At 10:34:56 (Local Time) the crew of TU-154M received the communique: "A, Polish 101 and from 100m be ready to go-around". The first pilot confirmed and made the fourth turn to the landing course, then he received the order "101 increase the fourth", which resulted in moving to the left axis of the runway.

Despite the worsening weather conditions, the air traffic controller did not inform the crew of TU-154M. He did not even react to any deviations from the landing course and behaved passively.

At 10:38:43 (Local Time) the air traffic controller said that TU-154M is on path 9 km before the runway threshold, but in reality the plane was 10.5 km from the runway threshold.

Due to the understated distance to the runway, the crew assumed a higher descent velocity, which changed the angle of the descent path, which ended a kilometer before the runway**.**

At 10:39:05 (Local Time) the air traffic controller gave information about the location of the plane: "101 distance 8 on glide on path". The location of the plane, however, was different - that is, 80 meters from the left side of the runway and at a lower altitude.

At 10:39:12 (Local Time) the air traffic controller allowed for a landing approach by giving the order "Free runway" "Conditional landing (…)"

At 10:39:24 (Local Time), in accordance with the military procedure USL RSL, the air traffic controller again gave a false order "on glide on path 6". This distance was understated by approximately 400 meters, the plane was still on the left side of the runway and the ATC did not introduce corrections to the course and altitude.

The ATC gave another false order "Four on glide on path". TU-154M was still on the left side of the runway, and 100 meters too high.

At 10:40:01 the landing zone controller said "Three on glide on path" despite the fact that TU-154M was still on the left side of the runway and approximately 60 meters too high compared to the descend path in the approach card. There was still no reaction of the landing zone controller in the form of a correction of the course and altitude. This order assured the pilot that the plane is in the right position compared to the runway.

At 10:40:13 the landing zone controller gave false information about the distance: "Two on glide on path". The plane was before the nearer radio-beacon (1065m) and was approaching the minimum height of the aerodrome.

After the navigator said "Hundred" the commander of TU-154M decided to go-around, which was repeated by the second pilot.

At 10:40:27 the landing zone controller gave late incorrect information "Horizon 101".

After ten seconds the flight controller gave the order "Go-around" at the moment the plane lost its left wingtip and a series of errors began.

Explosion of the detachable part of the left wing

The wing tip shows a number of curls up to 450° seen as significant signs of explosion. In addition a long number of characteristic signs of explosion can be seen (Fig.2).

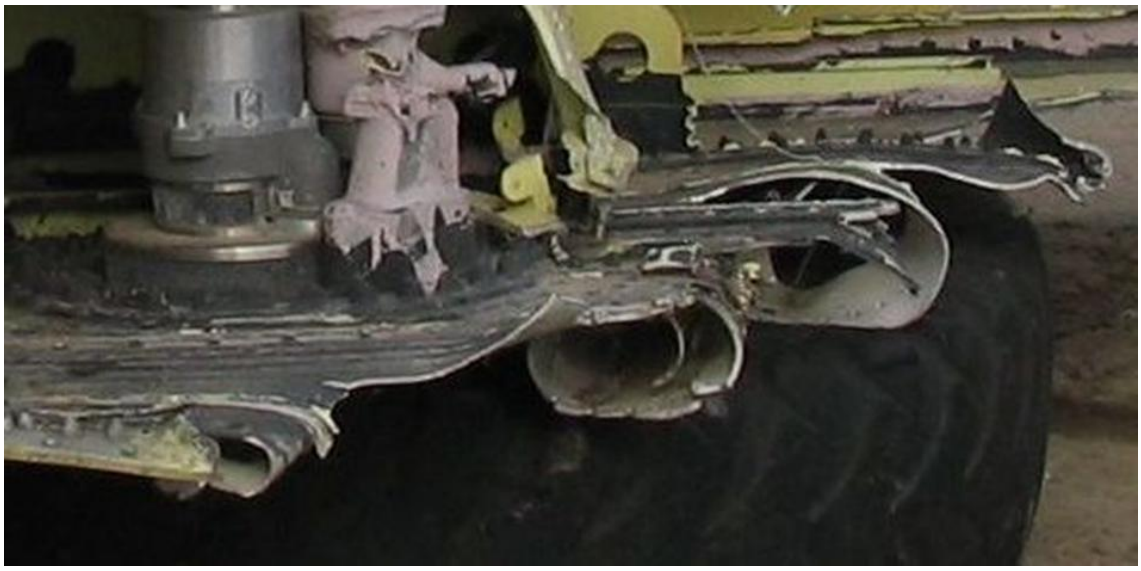

Fig. 2. Side view of the broken section of the left wing tip of TU-154M no.101 showing significant explosive signatures (curled edges of up to 450°).

Source: Note from the meeting with the leading investigator of the crash committee for MH17.
Expertise of Frank Taylor - Fellow Member of the International Society of Air Safety Investigators (ISASI)
„Forensic Investigation of Explosions" Second Edition, Alexander Beveridge, ISPN 9781420087253, 2011
ICAO Manual of Aircraft Accident and Incident Investigation Part III - Investigation. Doc 9756-AN/965.

Many pieces of the left wing, in the vicinity of the Bodin birch (bb), were found in front of the tree in an area of 41 meters north and 17 meters south in the direction perpendicular to the flight direction, and 43 meters to the east of the tree (Fig. nr.3)

Source: WPO Expert opinion

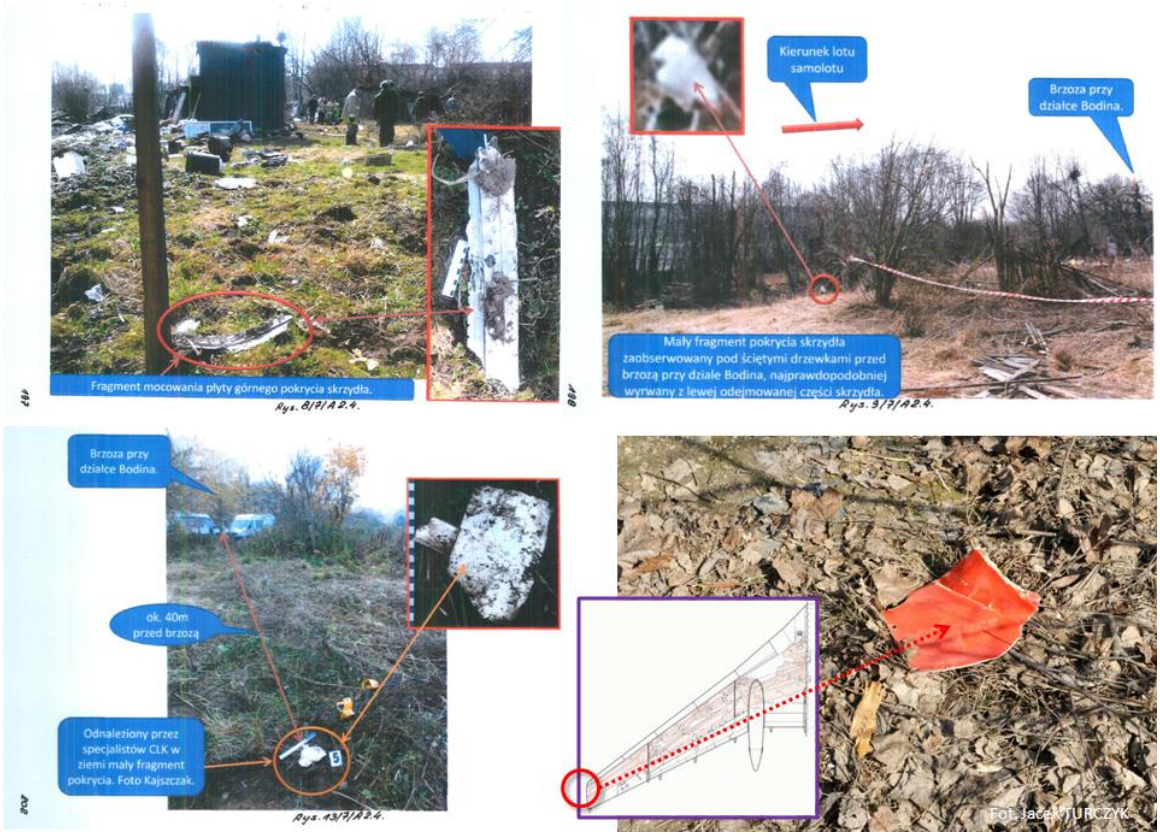

Fig. 3. Debris of the detachable part of the left wing identified by the Committee and experts of the Prosecutor's Office of the Republic of Poland.

Three pieces of the detachable part of the left wing were hanging on the branches of the so called Bodin birch (Fig.4).

Fig. 4. Identified pieces of the detachable left wing part hanging on April 10, 2010 on the branches of (Bodin) birch tree claimed to have cut the wing (noted "bb").

Experiments conducted by the Committee in 2016 on an element in 1:1 scale with a similar shape and weight to one of the hanging elements showed that the distance needed to lose velocity, and to land on the branch is at least 100m and a height not less than 26m.

One of the elements rammed into the trunk of the so called Bodin birch does not come from the hypothetical place of contact between the wing and the birch, and was identified as an element in the construction of the plane being 70cm closer to the fuselage, than the place of contact described by the MAK and Miller reports. (Fig. 5).

A piece of the skin of the nose, to which the piece rammed into the birch tree trunk was attached, was identified over 200m further in the direction of flight-next to the Kutuzov street. A fragment of the spar, to which this piece was attached, was identified 400m further in the direction of flight in sector 10. (Fig. 6).

Fig. 5. The place in the wing construction of the piece rammed into the so called Bodin birch tree.

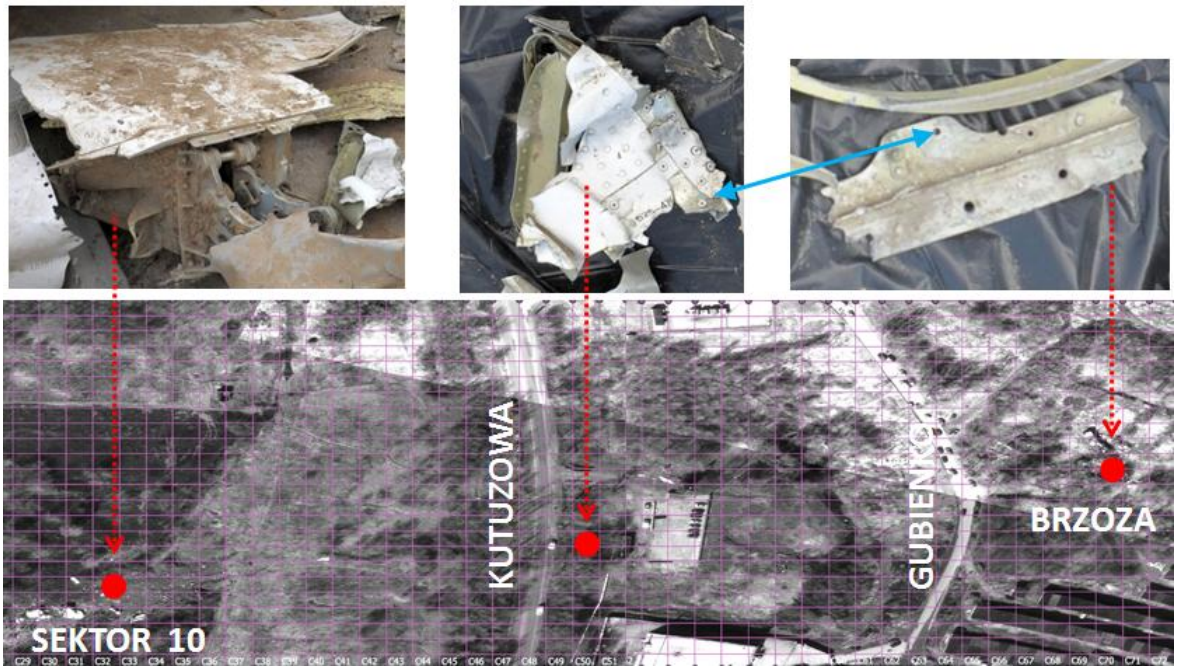

Fig. 6. Position on the ground of neighboring elements in the wing construction to the debris rammed into the trunk (bb).

In the area of damaged pieces bent in the opposite direction to the flight direction the presence of buckling and bandings due to an impact against the terrain obstacle was stated.
Elements of the skin of the left wing, which according to the MAK and Miller reports were supposed to have contact with the bb tree were torn off and bent outwards; upper side bent upwards, bottom side bent downwards. (Fig. 7).

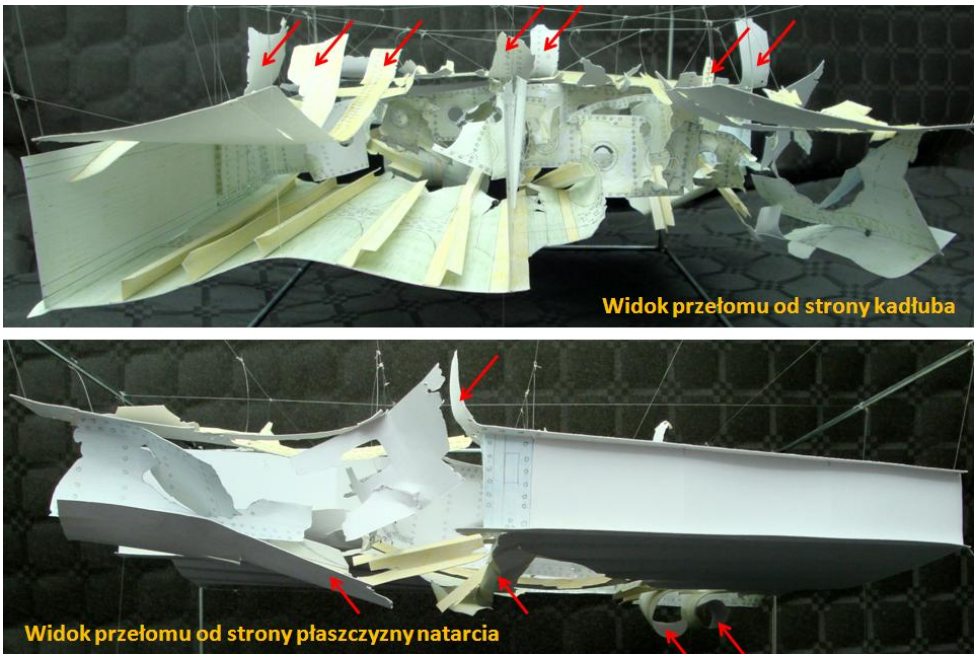

Fig. 7. Place of separation of the left wing tip. Places in the outer and bottom skin have been marked with red arrows, which have been bent outwards.

Some stringers of the left wing, which according to the MAK and Miller reports were supposed to have had contact with the Bodin birch tree, were torn away and bent outwards which shows the activity of high pressure (Fig. 8)

Source: Reconstruction of left wing by the KBWLLP Committee based on video and photographic material.

Fig.8. Pieces of stringers of the left wing curled outwards

Elements of the plating of the removable part of the left wing, which according to MAK and Miller reports were supposed to have contact with (bb), were ripped out and bent outside the structure; on the surface upwards (Fig. 9), on the bottom surface downwards (Fig. 10).

Fig. 9. Pieces from the top skin curled outwards.

Fig. 10. Fragments of the bottom skin curled outside the structure.