Dr Mirjana ANDELKOVIĆ LUKIĆ  
BEng. (Technology)

EXPERT ANALYSIS OF DOCUMENTS:


2. **IZVJEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva** /Report on the Effects of Strikes Against Urban Areas of Sarajevo by Rockets of Great Destructive Power/, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), produced in Sarajevo, 11 July 1995

In Belgrade  
26 July 2012

EXPERT ANALYSIS

RESULTS

PART 1

The document consists of 172 pages, 250 figures and 10 tables, which gave answers to 22 questions from the Prosecution of 17 November 2006 and the following three appendices:

1.2 **Vojna primjena aerosolnih eksploziva, pregled** /Military use of fuel-air explosives, Review/ Mr Berko ZEČEVIĆ, BEng., UNIS-INSTITUT Institute, Sarajevo, February 1994 (ppage 06067180 - 06067185);

1.3 **Aerosolni raketni projektil, Informacija** /Fuel-air rocket projectiles, report/, addressed to the Ministry of Defence of the RBH /Republic of Bosnia and Herzegovina/, for the personal attention of Brigadier General Arif PAŠALIĆ, Mr

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Berko ZEČEVIĆ, BEng., UNIS-Institut, Tršćanska Street 7, Sarajevo. 31 January 1994 (pages 06067186 - 06067187);

1.4 Aerosolni raketni projektil, Informacija /Fuel-air rocket projectiles – report/ Mr Berko ZEČEVIĆ, BEng. (Mechanical), Department of Defence Science, Sarajevo, 21 December 1994 (pages 06067188 - 06067189);

1.5. IZVJEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVić, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical) produced in Sarajevo, 11 July 1995 (0037-8659-0037-8799, 1D-03 282).

The document consists of 140 pages, 10 figures, and two appendices.
PART 2.

2.1 According to B. ZEČEVIĆ, the report has been written in accordance with the questions posed in the OTP’s request of 17 November 2006, with certain small changes to the order in which they were placed. Pages 06067021 to 06067037 were taken from the Internet and discuss mainly US-made aircraft bombs and modes of aircraft action in general terms, with the exception of pages 06067025 and 06067026 (figs. 7, 8 and 9), which present the characteristics of aircraft bombs used by the JNA /Yugoslav People’s Army/. These are the FAB-100 and FAB-250 bombs, which were manufactured by “the UNIS PRETIS factory in Vogošća near Sarajevo” and, “up to 1975 a part of the bomb manufacture process took place in munitions factory in Lički Osik, Croatia.” (B. ZEČEVIĆ, p. 06067025 fourth paragraph from the top).

2.2. Page 06067025 shows Yugoslav-made FAB-100, M80, FAB-250 M72 and FAB-250 M79 aircraft bombs containing various quantities of TNT explosive. The FAB-100 M80 aircraft bomb contains 39 kilograms of TNT explosive, and on page 06067092 in section 9.2 B. ZEČEVIĆ presents the characteristics of the FAB-100 rocket-assisted bomb with no indication of the model. He claims that it contains 43 kilograms of TNT (the same claim is on p. 06067050, second paragraph from the top). The same applies to the FAB-250 aircraft bomb on page 06067026. The FAB-250 M72 contains 96 kilograms of TNT, and the FAB-250 M79 contains 105 kilograms of TNT. On p. 06067093 in section 9.3 B. ZEČEVIĆ states that the rocket-assisted FAB-250 bomb (without model designation) contains 102 kilograms of TNT or fuel-air explosive, without indicating any sources for this information, so it is not clear from the text whether he found it in the literature or in a document on the basis of which he presents this claim, especially when discussing the fuel-air explosives.

2.3. Section 3 of the document (Methods and sequences of bombings/ page 06067027) and sections 4 (CEP (Circular error probable) page 06067030) and 5 concern the functioning of aircraft bombs launched from the air and have nothing to do with the mode of operation of modified aircraft bombs, which were modified so as to be fired from a launcher on the ground.

2.4. In section 5, Sistemi navođenja avionskih bombi /Guidance systems of aircraft bombs/ (page 06067038), in his answer to question Q4, “What guidance systems may have been fitted onto modified aircraft bombs?” Berko ZEČEVIĆ replied by listing guidance methods of US aircraft bombs which are ejected from the aircraft and can be guided or unguided, which has no relevance to Yugoslav-made FAB bombs,

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and only at the end of section 5 (page 06067039) does he say that “it can be claimed without any doubt that rocket-assisted bombs contained no guidance or control systems.” The answer to question Q4, continues up to section 6, which considers the effects of aircraft bombs on the target.

2.5 Section 6, which does not answer question Q4 and which is not related to the answer to question Q4 (pages 06067040 - 06067076) describes the effects of aircraft bombs on the target and discusses theoretical predictions of the effects of the blast waves of uncoated tetryl explosives, TNT (page 06067044); on page 06067050 it looks at the pressure created by the blast wave produced by the MK-82 bomb filled with various explosives (AFX-644 basic and AFX-644 modified, H-6, AFX-645 and tritonal) fig. 45 and fig. 46 and especially in the text above these images (fourth paragraph from the top, page 06067050), considers the blast wave that occurs after the explosion of a bomb filled with tritonal. The diagrams in fig. 45 and fig. 46 show the expansion of the blast wave caused by the explosion of an MK-82 and the changes of pressure of the blast wave for different explosives in the MK-82 bomb without specifying the amount of explosives. This diagram makes sense only if the blast wave of an MK-82 bomb weighing 500 lb (which B. ZEČEVić claims weighs 250 kg) is compared with the Yugoslav-made FAB-250 bomb. On page 06067050, fourth paragraph (and still on the subject of the unguided MK-82 bomb) B. ZEČEVić states that it weighs 500 lb, which, in B. ZEČEVić’s calculation, is 250 kg, which is not true: 500 lb converted to kg amounts to 226.7 kg or 227 kg. The MK-82 aircraft bomb is shown in different masses, depending on the explosives used. In the literature, the unguided MK-82 aircraft bomb has a mass of 241 kg and the mass of the explosives is 89 kg, but, depending on the type of explosive, the MK-82 aircraft bomb can have a mass of 227 kg, which can be tritonal, 644 AFX, AFX 645, as shown in the diagram in fig. 46 (page 06067050). These considerations cannot be compared with the explosion of the Yugoslav-made FAB-250 bomb filled with pure TNT (an explosive mass of 96 kg for the M72 or 105 kg for the M79) because the explosives are not the same (tritonal is TNT and aluminium), nor are the bomb bodies made of the same material. These considerations are completely irrelevant in the context of B. ZEČEVić’s document entitled PRIMJENA MODIFIKOVANIH AVIONSKIH BOMBI TOKOM OPSADE SARAJEVA 1994-1995, as are most considerations of the effect of aircraft launched bombs with a different explosive composition to that in the Yugoslav-made bombs.

2.6 He then shows in fig. 49 on page 06067053 (there are two fig. 49s in the document: one on page 06067052 and the other on page 06067053) and page 06067052 damage caused by blast wave of a GPS guided GBU-39/B bomb with 130 kg of explosives and “25 kg of high explosives”. This mass of explosives is also doubtful because there is relevant data that the GBU-39/B has 17 kilograms of inert

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9 http://www.aeromagazin.rs/arhiva/aero14/c11.htm MK-82.
10 http://www.hrvatski-vojnik.hr/hrvatski-vojnik/2122008/bomba.asp.
AFX-757 explosive,\(^{11}\) based on ammonium nitrate. This is a new generation aircraft bomb, developed in 2005.\(^{12}\) One cannot therefore compare the effects of the naked, uncoated trotyl charge (fig. 35, page 06067043; fig. 44, page 06067049)\(^{13}\) (which produces a higher performance blast wave in a coated, compressed state than an uncoated charge) with the effect of MK-82 and GBU-39/B aircraft bombs. The Army of Republika Srpska did not have these bombs. These are American bombs. Fig. 50 on page 06067054 shows the effects of the blast wave caused by an unidentified type of explosive of an unidentified bomb outside a building. This destruction is a consequence of the effects of the blast wave produced by the explosion of solid explosives which can be compared, only in terms of effects, with Yugoslav-made FAB-100 and FAB-250 aircraft bombs, which were unguided and filled with a conventional explosive, TNT, because the FAB-100 has 39 kg of TNT, and the FAB-250 has 96 kg of TNT or 105 kg of TNT, depending on the model.

2.7 Section 6.2 (page 06067056)\(^{14}\) considers the “natural” fragmentation of aircraft bombs, which cannot be “natural” under any circumstances, but are forced by the blast wave following the bomb explosion. It further states (third paragraph) that “General-purpose bomb performance depends on the geometric shape of the bomb, dimensions, mass, explosive charge type, bomb material type, the manner and the site of the explosion initiation, type of fuse, individual bomb variations and technological level of the equipment. Fragment velocity stems directly from explosive mass - metal casing mass ration, detonation velocity, and density of the explosives. According to this, each of the bombs shown has its own characteristics and they can in no way be compared to each other except in terms of gradation of the effect of the explosion, which in turn depends on all the factors listed in the preceding paragraph. The same section (6.2) considers bomb fragmentation and the lethal power of single pieces of shrapnel. This method of consideration is unreliable from the point of view of comparison with the Yugoslav-made FAB-100 and FAB-250 given that it shows the fragmentation of the MK82 aircraft bomb, and it cannot therefore be compared with the fragmentation of the Yugoslav-made FAB-100 or FAB-250 aircraft bombs because the explosives and material of which the body of the bomb is made are not the same. In one the steel in of US origin and in the other it is of Yugoslav origin (i.e. the steel used by the JNA). Thus, the composition of the steel and the types of explosives are different, and, consequently, the fragmentation and the effect of the shrapnel cannot be compared. Additionally, the performance of each bomb is dependent on the parameters which B. ZEČEVIĆ listed himself (page 06067056, third paragraph).

\(^{11}\) http://extrados.mforos.com/604278/7770288-nuevo-armamento-probado-por-la-idf-sobre-la-poblacion-de-gaza/.
\(^{12}\) http://www.hravatski-vojnik.hr/hravatski-vojnik/0712006/projektil.asp.

2.8 Page 06067058\textsuperscript{15} analyses the characteristics of the US-made general purpose MK 82 aircraft bomb, which weighs, according to B. ZEČEVIĆ, 250 kilograms (incorrectly calculated, as shown in point 2.5 above). Its fragmentation, shown in fig. 5, the method of determining the number of fragments, Pit or Arena tests, and theoretical considerations of spatial distribution of the fragments of the body of the bombs at the moment of explosion. There are mentions of fragmentation of the Virgo aircraft bomb, weighing 120 kg and, based on the analysis of Yugoslav-made FAB-100 and FAB-250 bombs, he gives an estimate of the cumulative number of fragments and finds that this number is 7,000 fragments for the FAB-100 aircraft bomb, and about 11,000 for the FAB-25 aircraft bomb. And all this is based on an analysis, but we are not told of what kind.

2.9 Section 6.3 (page 06067070), which still deals with the answer to question Q4, "What guidance systems may have been fitted onto modified aircraft bombs?" because it builds on section 5 in which the question was asked, considers volumetric weapons. "In fuel-air weapons, the projectile or a bomb contains a gaseous, liquid or powder fuel component. Oxidising component is taken directly from the surrounding air after a dispersal of the fuel component has taken place at the target. Fuel component is disseminated in the space around the target in the shape of liquid droplets, dust particles, or gas molecules. Then it mixes with the surrounding air containing oxygen, and an additional detonation of a solid explosive from the projectile or bomb body initiates the process of detonation. Blast wave lasts much longer than a solid based explosive blast wave, but its surface intensity is less strong.”

The section describes the action of thermobaric weapons in which the explosive is a combination of conventional explosives and aluminium or magnesium powder. The result is the formation of a fireball and high overpressure. There is no material evidence that the former JNA or VRS /Army of Republika Srpska/ had such a weapon in their arsenals (pages 06067070 - 06067075). The author provides a description of a typical fuel-air bomb, based on the use of fuel-air explosives. Page 06067071 describes the effect of a typical fuel-air bombs: “Typical FAE (fuel-air explosive) bombs or bombs with fuel-air explosives consist of a container with fuel and two separate explosive systems. When a bomb is released from an airplane or launched, first explosive system causes the destruction of a container at a predetermined altitude above ground and disperses the fuel in a cloud which is mixed with atmospheric oxygen. The size of the cloud depends on the munitions dimensions, dispersion altitude, bomb velocity, temperature, air humidity etc. The cloud, a mixture of fuel and air, envelops the objects and seeps inside structures. The second explosive system initiates detonation of the explosive cloud in at least three points, which then causes a massive detonation wave.”

It is evident from the above description that this is a sophisticated system with a time-adjusted initiation of the explosive cloud.

2.10 The section also refers to the existence of newer generations of the fuel-air explosive with a solid explosive charge, listing the characteristics of the Russian ODAB-500 fuel-air bomb (page 60607071), which is supplied with a parachute that

opens at a certain height. Some characteristics of the Russian ODAB-500 fuel-air bomb, which contains 193 kilograms of high-energy explosive, are set out without specifying its composition, which remains unknown in scientific circles.

2.11 On page 06067075, in the second paragraph from the top, he makes a professional error by citing the types of metal components in the explosive: “Thermobaric” compositions are fuel-rich, strong explosives ... which is achieved by adding metal components (boron, aluminium, silicon, titanium, magnesium, zirconium, carbon, hydrocarbons).” Of the above components, silicon and carbon are not metals, and hydrocarbons are organic compounds. Contemplating “thermobaric” explosive is irrelevant as a response to question Q4, because the question refers to the type of guidance systems and not the charge of the b.g. /warheads/.

2.12 On page 06067076, in section 7 – “Ways of modifying aircraft bombs and the influence of modifications on precision” – he attempts to answer question Q6-7: “Were these bombs modified for use in Sarajevo and if so, please explain in detail how they were modified. What is the basis of your knowledge? How did these modifications influence the accuracy of the air bomb?” Mr Berko ZEČEVIĆ moves immediately to his view of modification and throughout the report 16 regards “modification” as involving: a) replacement of the standard, solid TNT explosive in aircraft bombs with fuel-air explosives (this is his argument in relation to the aircraft bombs used by the VRS, but he has not presented relevant material evidence from the field, such as photographs of explosion of these “fuel-air” bombs); and b) the mounting of aircraft bombs on launchers. Here too he states (page 06067076, first paragraph) that the first use of “modified” bombs was in Sarajevo on 29 January 1994 in the area of Žuč hill and, “on the basis of an examination of fragments brought in,” (without specifying the location from which those remains were brought and where they were photographed) “it was noted that the assembly of four 122-mm GRAD rocket motors... were exceptionally well preserved.” When discussing the remains allegedly brought in from Žuč hill, ZEČEVIĆ considers the effects observed on the ground (scorched grass and earth within a radius of 30 meters), but does not state the source of this information given that he was not on the spot. It is unclear why he attributes such an effect solely to the action of a fuel-air bomb: the same effect can occur when a large conventional projectile is activated at a certain height above the ground, for example, if it strikes a tree or something similar. He claims (in the last paragraph) that, based on photographs obtained from members of the Dutch SFOR which, according to footnote 4 on page 06067080 under fig. 88, were photographed in Tuzla in 2006, he assumes that this system is based on the Russian ODAB-500 fuel-air aircraft bomb and constructs a 3-D model of a rocket-assisted ODAB-500 bomb shown in fig. 84, page 06067077). The diagram below fig. 84, i.e. fig. 85, shows the characteristics of the ODAB-500 rocket-assisted bomb. The mass of the rocket is 706.0523 kilograms. In the last line of the second paragraph on page 06067019, 17 he claims that the officers of the BH Army military unit who saw the effect of this projectile on Žuč hill did not accept ZEČEVIĆ’s view that this was a “volumetric weapon” (page 06067176, second paragraph from the top).

2.13 He further states in the third paragraph on page 06067076 that such weapons were possessed by the USA, Russia, China, France and Israel, and according to his testimony, also by the VRS! He argues that “the Russians used fuel-air missiles in their activities in Chechnya (probably KREMA-4 rockets in the early nineties).” What is KREMA-4 and in what context is this claim linked to these considerations? B. ZEČEVIĆ does not explicitly link the KREMA-4 system with the incident on Žuč hill on 29 January 1994.

2.14 In the fifth and final paragraph on page 06067076, B. ZEČEVIĆ says, “On the basis of the fuel-air rocket fragments that were found in Sarajevo and other parts of the theatre of war in Bosnia and Herzegovina, and particularly on the basis of photographs obtained from the Dutch team tasked with disposing of weapon systems left over from the war, a model was produced of the rocket system based on the Russian ODAB-500 fuel-air aircraft bomb. The 3-D model of this rocket is shown in the following diagram. The rocket was given the codename KREMA-4.” It is very difficult to follow the expert presentation of the author, especially when he talks about bomb modifications. For him, modification in one case involves attaching four rocket engines to the ODAB-500 fuel-air bomb, and he then immediately proceeds to talk about the same bomb, referring to it as the KREMA-4, which is already supplied with rocket engines. To document this, he refers to photographs taken in 2006, saying that these are the remains of a KREMA-4 bomb, which he himself said was modelled on the basis of photographs and given the codename KREMA-4. The provenance of the name of this rocket is not clearly indicated in the document. Mr B. ZEČEVIĆ does not provide any material evidence concerning the remains of fuel-air rockets found in Sarajevo or in any other part of the BH front. He does not provide relevant information about the photographs (fig. 86, fig. 87 and fig. 88) on pages 06067078, 06067079, 06067080, except that they were “obtained from the Dutch team”. He does not provide information as to the basis on which he obtained the photographs, the date of receipt, the date the photographs were taken or the locations where they were taken. These photographs are therefore contentious, because the question arises as to where exactly they were taken: in Iraq or in territory under the command of the VRS? Fig. 88 shows the remains of an ODAB-500 modified bomb, but, instead of “remains”, the photograph shows a preserved part of the motor of some rocket after it has hit the target. On page 06067079, below the photograph in fig. 87 – “Details of ODAB-500 modified bomb” – B. ZEČEVIĆ says, “The appearance of this modified bomb in the theatre of operations around Sarajevo came after a TV interview with Radovan KARADŽIĆ concerning a new ‘secret’ weapon that would supposedly radically alter the course of the war.”

2.15 The question is from which launchers could the VRS have fired ODAB-500 or KREMA-4 bombs, given the mass of the entire missile (rockets shown in Figures 84 and 85 on page 06067077): the mass of the rocket with propellant is 706.0523 kilograms. The photograph in fig. 86 (page 06067078), which was “obtained from Dutch members of SFOR,” shows an ODAB-500 bomb, without specifying the location where the photograph was taken. This can be any location or any training site.
2.16 On page 06067078 (second paragraph) “In this case (In which case?) a modification can be seen in the fact that a system of four rocket motors with a parachute canister has been attached to the ODAB-500 fuel-air bomb. The modified aircraft bomb can now be launched from a ground launcher.” The question is from which launchers could this modified aircraft bomb have been launched given its weight of 706.0523. And before this, (page 06067076, third paragraph) he talks about fuel-air rockets (“probably KREMA-4”), which were already equipped with rocket engines. Fig. 88 on pages 06067078, 06067079, 06067080, 06067081 shows photographs (footnote 4) “Remains of a KREMA-4 aircraft bomb. Photographs taken in Tuzla, December 2006 (personal collection)” without specifying who took these photographs. They do not prove that the aircraft bombs were fired from Serbian positions because there is a time lapse of nearly 12 years. There is also a reasonable doubt that these photographs were taken in some other country where a war was being waged, perhaps on an Iraqi battlefield, considering that page 06067082 (fig. 90) shows a cross section of an ODAB-500 aircraft bomb that was made in Iraq, and he concludes “on the basis of samples found of the fuel-air bomb“ (Where were the samples found? In Iraq?) that “it was used as the basis for the development and production of the KREMA-4 modified aircraft bomb” with footnote 5: Anon: Handbook of Ammunition Used in IRAQ and Surrounding Areas, ARDEC EOD, Picatinny Arsenal, Revision 5, 2005, which concerns the production of the KREMA-4 modified aircraft bomb. The Handbook was published in 2005 and is therefore chronologically removed from the event. Consequently, these considerations do not by any means indicate that this ordnance was indeed possessed by the VRS. Footnote 5 especially raises doubt as it reads as follows in the Serbian translation: Anon: priručnik za municiju korišćenu u Iraku i okolnim područjima! Revizija 5, 2005./Anon: Handbook of Ammunition Used in Iraq and Surrounding Areas! Revision 5, 2005./.

2.17 On page 06067086 (figures 97, 98 and 99) he emphasises the difference in the “quality of design” of the FAB-250 and the KREMA-4 system whose cross section is given on page 06067082. He does so in order to show that it was created by copying the Russian ODAB-500 OM aircraft bomb. The question is how the KREMA-4 fits into the arsenal of the VRS, from where was it fired, and from where (or whether) this system came into the VRS’s possession, there being a reasonable doubt that the RS Army ever had it.

2.18 Pages 06067083 and 06067085 show a 3-D model of the rocket-assisted FAB-100 bomb with a single rocket motor (fig. 91) and the FAB-250 (page 06067085, fig. 95) in a 3-D model and the FAB-250 with three rocket engines. These are his assumptions about the appearance of rocket-assisted FAB-100 and FAB-250 bombs. Fig. 93 (page 06067084) shows a FAB-100 aircraft bomb which did not explode on impact. Figs 95 and 96 on page 06067085 show a 3-D model of a rocket-assisted FAB-250 bomb, which, in the opinion of B. ZEČEVIĆ, was filled with fuel-air explosive like the Russian rocket-assisted ODAB-500. He also states that the assembly and quality of the rocket-assisted FAB-250 fall below the professional standard produced by “the pre-war PRETIS factory, in terms of both the quality of processing and the skill of the engineers and constructors.” If it is claimed that the VRS put fuel-air bombs in these bombs, for which certain work conditions and protection of people are required during the process of filling containers with fuel-air
explosives because of the nature of the fuel-air explosive itself, why then has explosive content of the bomb in fig. 93 not been removed or at least activated and photographed during the activation in order to confirm or deny its fuel-air content? How did the VRS “fill” these bombs with fuel-air explosives if they were already filled with trotyl? Does this mean that the VRS poured the TNT from the FAB-250 charge casing on the ground, in wartime conditions, and then filled these emptied containers with fuel-air explosives? This assumption is far-fetched because the process of pouring TNT from an already filled casing is difficult, dangerous and arduous work that is almost impossible in wartime conditions. It requires special working conditions and the use of steam to melt the explosives in the casing.

2.19 He then goes on to state that the PRETIS enterprise (where he himself worked until 1992) developed a fuel-air bomb, but he himself (B. ZEČEVIĆ) does not know the chemical composition of this “fuel-air bomb”. When he worked at PRETIS, he had access to all the documents and therefore must also know what label these “fuel-air bombs” had in order to differentiate them from the conventional bombs filled with trotyl. It is also impossible that he was unable to come into the possession of any document to prove the use of fuel-air explosives in the FAB-100 and FAB-250 aircraft bombs, but he was in a position to obtain a strictly confidential study done in 1976 by the Military Technical Institute – no. 02-24-231: “Development of 120 mm AR mines” – whose author he quoted at length on pages 18 00378699 to 00378793 of his “Report on the Effects of Strikes Against Urban Areas of Sarajevo by Rockets of Great Destructive Power” of 11 July 1995. This casts doubt on his claim about the production of “fuel-air bombs” at PRETIS. Furthermore, if PRETIS was as far advanced in the development of “fuel-air bombs” as claimed by Mr B. ZEČEVIĆ, then there should be some supporting documentation, technical and construction documentation with appropriate standards for “fuel-air” and other built-in components. This was standard practice in the former JNA, and PRETIS was part of the special purposes industry of the SFRY /Socialist Federative Republic of Yugoslavia/, and it was under the jurisdiction of the Ministry of Defence. Without a blueprint for the standard of quality, prototypes could not be made prior to the test production run. Had this been the case, had PRETIS advanced much in the development of the fuel-air bomb, there would have to be at least one document of piece of paper with at least the initial requirements (TTZ) for the characteristics of the asset, and this was also standard practice in the JNA. Had there been such a document, Mr B. ZEČEVIĆ would have seen it and probably made a photocopy of it and attached it here as he did with the aforementioned confidential document from the VTI /Military Technical Institute/. That would enable him to confirm that the development of the fuel-air bomb in PRETIS was “well-advanced”.

2.20 It is claimed in the second paragraph on page 06067088 that it was concluded on the basis of the effects on targets that “a fuel-air explosive was often used instead of solid TNT”. This means that he assumes that often – i.e. not always - there was fuel-air explosive in FAB-250 bombs! He supports the use of the term “often” with the absence of a sufficient number of fragments, and so he says that during the explosion of a bomb with solid TNT “over 10,000 fragments” are released. This overlooks the
fact that testing the fragmentation of bombs or artillery projectiles in static conditions produces results that are quite different from those in dynamic test conditions, when a high-speed impact on a solid surface causes inertial lateral displacement of the fragments.

2.21 On page 06067091, in his response to question Q9, “What was the effective range of the modified aircraft bomb?” B. ZEČEVIĆ says, “In the 1994-5 period, three types of rocket-assisted bombs were launched at urban parts of Sarajevo.” He next mentions, in addition to FAB-100 and FAB-250, a rocket-assisted bomb based on the Russian ODAB-500. In section 9.1 he shows a 3-D model of a rocket-assisted bomb based on the ODAB-500 and says that it weighs 706 kg without fuel and that the fuel-air explosive charge weighs 193 kg. The bomb mass data differ from the same bomb mass data given on page 06067071, where he says that “the best known Russian FAE ammunition is the ODAB-500PM aircraft bomb, which has a mass of 520 kg and a relatively low mass of the FAE charge of 193 kg.” The reasons for citing such a big range in the mass of the ODAB-500 bomb are not clear. Does that mean that there are different models of the bomb? This is not explained. In section 9.3 (page 06067092) he shows a 3-D model of a rocket-assisted bomb based on the FAB-100. The total mass of this bomb is 170 kg, the mass of fuel is 150 kg, and the mass of the TNT explosive charge is 43 kg. On page 06067025, it says in the second paragraph from the bottom that the total mass of the FAB-100 bomb without the retarding device or fuse is 117 kg and the mass of the TNT explosive 39 kg. The difference in the mass is evident. In section 9.3 on page 06067093 a 3-D model is presented based on the FAB-250 rocket-assisted bombs. The total mass is 420 kg, and the mass without fuel 360 kg. The explosive charge is TNT or fuel-air explosives and the mass (for both explosives) is 102 kg. On page 06067026, the total mass of the FAB-250 M72 bomb is given as 123 kg, and the mass of the TNT explosive is 96 kg. The total mass of the second model, the FAB-250 M79, without the retarding device or fuse, is 240 kg, and the mass of the TNT explosive is 105 kg. They evidently differ in mass. Which is correct?

2.22 In section 9 (page 06067091) B. ZEČEVIĆ claims that the VRS had a rocket-assisted bomb “based on the ODAB-500”. However, an article entitled Nacional otkriva strogo čuvanu tajnu (Nacional reveals closely guarded secret),19 which appeared in the Croatian weekly Nacional’s issue no. 352 of 13 August 2002 and was written by the now deceased Ivo PUKANIĆ, who was the owner of the newspaper and a very well informed investigative journalist, reveals confidential information and concludes that KARADŽIĆ, despite paying advances and mortgaging factories in Modriča, did not buy the Russian ODAB-500 PM vacuum bomb. The closely guarded secret that the Croatian army had in its warehouses about a dozen Russian ODAB-500 fuel-air bombs appeared in the Croatian press in April 2012, when the newspaper Jutarnji list20 stated on 14 April 2012, “The location where they are kept and their number are the strictest militarily secret. Until recently, even the fact that these bombs were in the arsenals of the Croatian Army was completely unknown. During the Homeland War, the Croatian Army detonated at least one fuel-air bomb. During Operation Storm, a MIG-21 dropped a bomb of this type above Serbian

19 http://www.nacional.hr/clanak/10328/.
position near Petrinja. The bombs were procured in the early '90s from the area of the former USSR.”

2.23 On page 06067097, the second paragraph from the bottom explains what a fuel-air explosive is. “The fuel-air explosive is in liquid form (a combustible substance) and is mixed with powdered tetranite. When the warhead explodes, the liquid is vaporised and mixes with the air, creating an aerosol cloud. When the mixture is detonated, a high temperature and overpressure (blast wave) are created.” No explanation is given as to the composition of tetranite powder and how it reacts when used. Furthermore, rocket systems such as the TOS-1-4 Buratino, that were not found on VRS battlefields, are unnecessarily enumerated and cannot be compared with FAB-100 and FAB-250 aircraft bombs because they are systemically not the same. Fig. 106 (06067096) and fig. 108 (06067098) are identical and concern the dispersion of bombs released from a height of 4,500 meters, which naturally has nothing in common with the dispersion conditions of a launch from the ground. On page 060067089 (second paragraph from the bottom) ZEČEVIĆ himself says in relation to the permitted variation in the mass of aircraft bombs, “Due to the conditions of the launch, the mass of an aircraft bomb has a wider dispersion zone than that of a rocket projectile. According to American data, variance of ±5% in the mass of an aircraft bomb is acceptable, while variance of only ±0.5% in the centre of mass and variance of ±10% in the main central moments of inertia is acceptable.”

2.24 In response to question Q13: “What qualifications and experience would one need to successfully assemble and fire a modified aircraft bomb accurately? What is the basis of your knowledge?” B. ZEČEVIĆ says that the production and use of weapons systems are two independent areas, “each requiring different knowledge, qualifications, equipment, working practices, controls, and conditions for carrying out primary tasks”. Thus in section 12.1 (page 06067101) he states, “According to the available data, the PRETIS factory produced approximately 1,280 units of the FAB-100 aircraft bomb and approximately 680 units of the FAB-250 aircraft bomb.” But he does not specify in which period or with which explosives and gives no evidence that could be based on a report of the military control of the enterprise. He would have to know because in Part 1. “Personal qualifications and professional experience”, he says, “From 1 August 1975 to the start of the war, I worked in a factory that produced artillery and rocket ammunition and aircraft bombs, which was called UNIS PRETIS in Vogošća, Sarajevo. Throughout that time I worked in the factory’s research and development centre, as an independent designer or the head of the ballistics department.” Consequently, a designer or “head of the ballistics department” would have to know exactly what kind of explosives were used to fill approximately 1,280 FAB-100 and approximately 680 FAB-250 bombs. As a designer of ordnance he must have been familiar with all the details of the production of these assets, and it is therefore surprising that he has failed to indicate the explosive with which the said quantities of the FAB-100 and FAB-250 aircraft bombs were filled. It is well known that these aircraft bombs were mass produced by PRETIS and filled exclusively with trotyl.

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2.25 At the beginning of the second paragraph of section 12.1 “The production and assembly of modified bombs” (page 06067101), at the beginning of the third paragraph he states that “the PRETIS factory was developing a fuel-air aircraft bomb. The first 50 bombs were made in 1990, and the next phase was due to be concluded in 1991-92, followed by mass production.” He does not say what happened to these 50 aerial bombs which he claims were the precursor to mass production, i.e. the test production run before the start of mass production.

2.26 In section 1 (page 06067018) **Personal qualifications and professional experience**, he talks about his involvement with the PRETIS factory with a great deal of imprecision. He says that from 1 August 1975 until the start of the war (no year is mentioned, but this is presumably 1992) he worked in “a factory that produced artillery and rocket ammunition and aircraft bombs, which was called UNIS PRETIS in Vogošća, Sarajevo.” He then states that he had additional employment at Sarajevo University’s Faculty of Mechanical Engineering, and “In the period 1986-86, I transferred to a job in the newly created UNIS Institute, as part of the UNIS holding company, where I was the head of the Weapons Department.” (Which period is this 1986-86?) In the preceding paragraph he says that he worked in PRETIS from 1975 until “the start of the war”, meaning that he was in PRETIS all the time. It is not obvious from this where he actually worked until 1986 or after 1986. Further in his professional CV (page 06067018, last paragraph), Mr B. ZEČEVIĆ says that “from PRETIS” he had attended consultations with Dr Zoran MAKSIMOVIĆ regarding his master's thesis on “the use of fuel-air bombs”, and he goes on to say, “I accepted his offer regarding experimental research, and the experiments were conducted in 1989. Unfortunately, the results of the research were not encouraging, and so I shifted the focus of my activities to another field.” So, although the results of the research into fuel-air explosives were not encouraging, he claims (on page 06067101) that PRETIS was developing a fuel-air bomb and that the first batch of 50 bombs was completed in 1990, and the next phase was to be completed in year 1991-92, after which mass production would commence. Equally, the development of the fuel-air bomb “was completed in 1990” (before the war in Bosnia-Herzegovina started), only one year after his experiments with fuel-air explosives had failed, or had not produced adequate results! PRETIS therefore needed only one year to complete all the phases of the development of a device as complex as the fuel-air aircraft bomb. This is at odds with his claim on page 06067099, first paragraph, that five to seven years are needed to develop a device. In addition, at that time he was still employed by PRETIS, as he himself mentioned in his CV, “up to the start of the war”, so it is curious that he has no knowledge of the kind of fuel-air explosive PRETIS used to fill these 50 bombs because later in his analysis he claims the VRS used fuel-air bombs, without specifying the composition of the fuel-air explosive.

2.27 Further on in his CV Mr Berko ZEČEVIĆ states, “In 1990, the Aircraft Bombs Department (by this time the head of the department was Captain KRSMANOVIĆ because Lieutenant Colonel TOMIĆ had been transferred to the JNA Kop/Land Forces/ Technical Testing Centre in Belgrade) and the Ballistics Department (my department) worked together on a project to copy the French DURANDAL penetration bomb (with rocket booster). The project was approved by the JNA Air Force, and two samples of the bomb were made available to us. During 1991 and 1992 the procedure of photographing parts of the bomb was carried out (by me), with the aim of
producing technical documents and attempting to develop a Yugoslav copy of the bomb.”

There is no mention whatsoever of the development of the fuel-air bomb except that preliminary experiments failed.

2.28 On page 06067099 in section 11, “Uniformity of parameters of modified aircraft bombs” he answers question (Q12: “Since it was not a standardised weapon (once modified), to what extent were its technical capabilities constant? In other words, using the exact same modification steps in the case of a number of aircraft bombs, what was the chance of hitting the same target when fired/launched in a short period of time?”). At the beginning of the first paragraph, he says, “The process of developing new weapon systems in modern armies lasts several years (usually five to seven years in countries of the former Yugoslavia). During that time, various research is conducted and tools and machinery are produced to ensure the reproducibility of the projectile’s parameters.” If there was an idea to develop a fuel-air bomb, it could not have been developed in less than “five to seven years”, according to B. ZEČEVIĆ, and this time was also needed to produce the tools necessary to complete the device and fill the warhead with explosive, to test the trial models at a testing range which, given the size of the bomb and the complexity of process of filling with hypothetical fuel-air explosive, would be a very complicated operation and would not go unnoticed. Then, in the third paragraph on page 06067099, he says, “The rocket-assisted bombs did not pass through any of the normal phases for the adoption of new weapon systems and nor was a stable production process established. Rather, combinations were assembled from rocket system parts procured from various sources.” He shows which rocket motors were used to his knowledge for each rocket-assisted bomb, and says that rocket motors from the 122-mm GRAD, 128-mm M77 OGANJ, 128-mm M74 MUNJA, and 127-mm HVAR were used for the rocket-assisted FAB-100 aircraft bomb, and rocket motors from the 122-mm GRAD, 128-mm M77 OGANJ, and 127-mm K-13 (AA-2) were used for the rocket-assisted FAB-250 aircraft bomb. Special adapters had to be made for each type of motor to connect them to the aircraft bomb.

2.29 Section 15 on page 06067108, The working mechanism of a modified aircraft bomb, should contain the answer to question Q16: “Describe the process of explosion of a modified aircraft bomb. Did they usually explode upon impact?” Everything that follows is an answer to the question requesting an explanation of the effects of aircraft bombs which were “modified” fuel-air bombs, which cannot be established beyond doubt from the content of the question. In the second sentence of the first paragraph, Mr B. ZEČEVIĆ (page 06067108) provides a definition of the term “fuel-air” and says, “A fuel-air explosive is a mixture of air and flammable hydrocarbons. The most frequently used hydrocarbons are ethylene oxide and propylene oxide, but recently the mixture DBA-22M (aluminium nitrate, aluminium powder, and polystyrene soap as a binding agent) has also been used.” Here Mr Berko ZEČEVIĆ makes a serious omission or mistake, because explosive DBA-22M contains not aluminium nitrate but ammonium nitrate, as the tendency in US laboratories is to use the artificial fertiliser aluminium nitrate to make a less sensitive, less expensive and energy-rich explosive. This is not an explosive that has been in use “recently”, but one used way back in 1960s, and it consists of aluminium powder,
aluminium nitrate, thickeners and stabilisers.\textsuperscript{22} According to another source, DBA-22M is a mixture of aluminium nitrate and aluminium powder with polystyrene as a phlegmatiser.\textsuperscript{23} Specialist literature also refers to this explosive as \textit{gel slurry explosive}, and it was used in battlefields in Laos and Vietnam. It was used in the American BLU-82/B bomb, which was tested on 31 July 1968 in the Eglin AFB test centre in Florida. The bomb that contained it was known as Big Blue.

\textbf{2.30} This “composition” of fuel-air explosives which contain “aluminium nitrate” can be found on some internet forums which do not always merit professional trust.\textsuperscript{24} Fuel-air explosive (FAE)\textsuperscript{25} are the result of dispersion of certain hydrocarbons and oxides of hydrocarbons, such as hexane, heptane, ethylene oxide, propylene oxide and others in the air. They are very effective against soft targets, light vehicles, fuel tanks, trenches, light bunkers and anti-tank mines.

\textbf{2.31} In the same section, no. 15, page 06067108, third paragraph, he describes the process of creating a fuel-air cloud of ethylene oxide lasting from 0.1 to 4 seconds, and says, “With materials that are sensitive to the impulse of a blast wave up to 30 bar, fuel-air explosives have an absolutely devastating effect throughout the volume of the cloud. In an aerosol cloud of ethylene oxide, the detonation pressure is between 20 and 30 bar. Outside the cloud it drops sharply.” He thus claims that two types of fuel-air modified bombs were used in the territory of BH. According to B. ZEČEVIĆ (the last paragraph on page 06067108), the \textbf{first type} was based on Russian systems developed from the ODAB-500 aircraft bomb. This system consisted of four rocket motors with a retarding parachute between them. The rocket flew as an unguided projectile at a speed of about 150 m/s with a maximum range of four kilometres. On contact with target, the primary TNT explosive charge was activated to rupture the container holding the aerosol explosive. Once a cloud of a certain concentration is created, three secondary fuses activate the cloud with the detonation taking place over a surface of approximately 25 to 30 meters in diameter. According to B. ZEČEVIĆ, the second type is based on a copy of the Russian system, but with significantly weaker performance. This is the FAB-250 aircraft bomb, which was used intensively in 1995. The speed of this projectile was approximately 200-250 m/s (as “seen” by witnesses in ZEČEVIĆ discussion of the effects of projectiles in Sarajevo!). In section 2, Ballistic analysis, on 00378666, the third line below the title reads: “According to witness statements, the velocity of the projectile in the terminal section of its trajectory was no more than 250 m/s!” The primary explosive filling dispersed the explosive and activated the secondary fuse a few seconds later. Subvarieties of the second type with the FAB-100 aircraft bomb and a single rocket motor used the FAB-100 aircraft bomb filled with trotyl TNT.

\textbf{2.32 In section 16, “The extent and type of damage caused by the use of modified aircraft bombs” page 06067110, he tried to answer question Q17: Describe the extent and type of damage that the modified aircraft bombs used in Sarajevo can cause.” He states that rocket-assisted bombs were fired at Sarajevo during 1995 and that these were rocket-assisted FAB-250 bombs completed with three rocket

\textsuperscript{22} http://www.vietnam.ttu.edu/star/images/039/0390209001.pdf.
\textsuperscript{23} http://www2.iath.virginia.edu/sixties/HTML_docs/Texts/Scholarly/Wolf_Distortion_01.html.
\textsuperscript{24} http://forum.airserbia.com/viewtopic.php?f=2&t=1756
\textsuperscript{25} http://www.drdo.org/pub/techfocus/dec04/fuel-air explosives.htm.
motors each (the 122 mm GRAD or the 128-mm M77 OGANJ or the 127-mm K-13) and rocket-assisted FAB-100 bomb with one rocket motor. He also claims (paragraph 4 on page 06067110) that “in 1994 fuel-air aircraft bombs began to be used, which were based on Russian ODAB-500 aircraft bombs, whose primary effect was a lower-intensity overpressure blast wave, but of significantly increased duration (greater time/pressure impulse). These were imported rocket-assisted bombs (four rocket motors with a parachute and electronic fuse).” Since he says that these bombs were “imported” - from where were they “imported”? There is no indication as to where these bombs where dropped, and they would certainly have been seen when the parachute opened as this is characteristic of this bomb and it is very noticeable. At least one witness would have confirmed that he saw the opening of the parachute while these “imported” bombs were landing. The question is whether the VRS had these systems at all. According to the sources of the very reliable journalist Ivo PUKANIĆ (point 2.22 of this Analysis), they were not imported. The question also arises as to the launcher from which they would have been launched given the bomb’s total weight of 790 kg, as stated by B. ZEČEVIĆ himself on page 06067091.

2.33 In section 16 (page 06067110) he argues that the FAB-250 aircraft bombs were filled with fuel-air explosives (and he refers to them as “fuel-air bombs”) and that they were put together following the model of the Russian ODAB-500 fuel-air bombs, but the FAB-100 aircraft bombs (page 06067113, first paragraph) were not filled with fuel-air explosives. He discusses the effects of fuel-air aircraft bombs based on ODAB-500, which were used in BH in 1994. He talks about the effects of FAB-250 bombs filled with fuel-air explosives and claims (page 06067111, second paragraph) that the FAB-250 aircraft bomb with fuel-air develops overpressure which causes the lungs to explode at a distance of 30 meters from the explosion and that there is a one per cent probability that death will occur at a distance of eight to nine metres as a result of the overpressure. On pages 06067110 to 06067114, B. ZEČEVIĆ presents a theoretical discussion of the fragmentation of FAB-100 and FAB-250 aircraft bombs filled with TNT. His discussion of the number and speed of dispersion of fragments relates to the solid troyt bomb charge in static Pit or Arena tests. Fragmentation under these conditions is different from that in dynamic, live tests (paragraph 2.20 of this Analysis). However, there is no analysis anywhere in the document of the fragmentation of a fuel-air projectile, not even a theoretical analysis.

2.34 Section 16.1 (page 06067116) presents “Live testing of the action of the GBU-39 aircraft bomb on a 122-mm BM-21 racket launcher”. According to B. ZEČEVIĆ (page 06067115, first row), the GBU-39 aircraft bomb contains 25 kilograms of solid explosives. According to the available information in the literature, the GBU-39 aircraft bomb falls in the category of guided bombs of small diameter and it contains 17 kilograms of AFX-757 explosives, which means it is not possible to compare it with the FAB-100 and FAB-250 aircraft bombs because they do not contain the same explosive or the same mass of explosives. AFX explosives are among the least sensitive explosives. It is specific to them that aluminium is added as a fuel and ammonium perchloride as an oxidiser in stoichiometric proportions that allow a more complete combustion in the chemical reaction zone. Its detonation speed is lower than


that of tritonal (TNT plus aluminium powder), which is found in MK-82 bombs (the fragmentation of which he considers on page 06067058), but its reaction temperature is increased. This provides more energy, which is released during the explosion, so it is not clear what kind of link there is between GBU-39 and MK-82 bombs and the Yugoslav-made bombs, which were filled with pure trotol (TNT).

2.35 On page 06067113, having discussed the FAB-250 aircraft bomb, ZEČEVIĆ states in the first paragraph: “Everything that has been said for the FAB-250 aircraft bomb also applies to the FAB-100 aircraft bomb, but the performance data of this bomb are somewhat lower. This bomb was filled with a fuel-air explosive, at least as far as available data indicates.” They are not somewhat lower, but proportional to the amount of explosives they carry (the FAB-100 has 39 kg compared to 105 kg for the FAB-250) i.e. 2.7 times lower. But something else must be pointed out here: in his analysis, directly under fig. 8 (a photograph of a FAB-100 modified aircraft bomb)28, he says, “The absence of traces of fragmentation effect, characteristic of conventional projectiles with a solid explosive charge (see item 7 in the above survey of classical aircraft bombs and large-calibre projectiles), as well as the predominance of the demolition effect both in enclosed spaces and in the open air, point to the use of unconventional rockets.

ON THE BASIS OF THE EFFECTS OF AIRCRAFT BOMBS AS DESCRIBED ABOVE, THE DESIGN GEOMETRY OF FAB 250 AND FAB 100, AND THE REMAINS FOUND AT INCIDENT SITES, WE HAVE EXCLUDED THE POSSIBILITY THAT AN AIRCRAFT BOMB MAY HAVE BEEN USED AS THIS PARTICULAR ROCKET’S WARHEAD. In view of the weapon’s effects at target and the manner of its activation, we believe that in all the above cases we are dealing with rockets with fuel-air warheads.” A very serious professional omission can be discerned from the above (because he says the opposite in 2007, or rather, even in 2007, when this report29 was drafted, there is no available data that the FAB-100 was filled with fuel-air explosives).

2.36 The photographs in figures 121 and 122 on pages 06067115 and 06067116 show the effects of the GBU-39 guided aircraft bomb with solid explosive (meaning: not fuel-air explosive) on the target and the final extent of the effect on a 15.5 meter diameter surface, as well as the effects of action on 122 mm BM-21 rocket launchers. It is unclear why this text is presented, and what it seeks to prove.

PART 3
Analysis of documented cases of the use of modified aircraft bombs in Sarajevo (pages 06067117 - 06067164)

(Part IV: Describe the scope and kind of damage that can be caused by modified aircraft bombs in Sarajevo)

28 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Mr Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIC, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995 (0037-8659-0037-8799, 1D-03 282), (pp. 0037- 8670, third paragraph).
3.1 Case 1: Documents 00334713 to 00334774, page 06067117
Date: 7 April 1995 at 0850 hours.
Location: Hrasnica, Alekse Šantića Street no. 1.
Effect on target:
One person was killed and three others were slightly wounded.

The projectile hit a two-storey house, with the following dimensions: 10.5 m by 10.25 m. It shattered (destroyed) it and the neighbouring single-storey which was 6m by 4m in size and stood five metres away. It also damaged the roofs of eleven nearby houses and one stable. The investigators concluded from a witness statement that the projectile came from the direction of Ilidža, which is north-west. It was concluded that the projectile had rocket motors (without specifying how many of them were found on the spot). Remnants of 128 mm OGANJ rocket motors and “probably 128 mm GRAD” were found. The projectile hit the house, which was made of bricks with no steel reinforcement rods or concrete walls and had wooden beams. Based on the photographs provided in this case file and shown on pages 06067118 and 06067119, it is concluded that this was not a volumetric bomb as argued by Berko ZEČEVIĆ because the people who were inside the house (two on the first floor and two on the ground floor) would not have survived the blast wave caused by the projectile hitting the house. The fuel-air bombs release a cloud of fuel-air explosives that permeate all areas of the affected facility, as the author himself says in the first paragraph of page 06067182 (items 2.9 and 2.31 of this Analysis). The victim was outside, about five metres from the house when it was hit and was probably killed by flying shrapnel. A fuel-air bomb would kill all civilians in a radius of 20 meters from the centre of explosion and produced the phenomenon described by Mr ZEČEVIĆ in the first paragraph on page 06067076 of this document: “White smoke appeared and then a bright yellow sphere. The grass and earth were scorched within a radius of 30 metres.” In the first paragraph of page 06067182 (Attachment “Military uses of fuel-air explosives”) he says, “The velocity of the blast wave varies between 600 and 2,200 m/s. The size of the blast wave is noteworthy for the low level of overpressure and the long duration of its effect compared to solid explosives. … The fuel-air explosive spreads over the whole combat area, between trees, over shelters or even entering inside them, and then it explodes in a powerful, uniform, relatively long, and deadly wave. … In an aerosol cloud of ethylene oxide, the detonation pressure is between 20 and 30 bar. Outside the cloud it drops sharply.” If a fuel-air bomb had exploded at Aleka Šantić Street no. 1, according to the effects described by the author himself, there would have been no survivors. In particular, the two witnesses, who were on the top floor of the house hit by the projectile would not have survived.

On this basis, and based on the type of damage, the house was hit by a destructive FAB-100 projectile filled with trotyl and not with a fuel-air charge, as indicated by the survival of the four witnesses who were in the house when it was hit.

The person who was killed (“with extreme injuries to the head”, as B. ZEČEVIĆ comments on page 06067119) was five meters away from the house when it was hit by the projectile, and this person was probably killed by flying shrapnel. There is neither a forensic pathologist report nor an autopsy report, but is a witnesses statement.
to that effect. The injuries that can be seen in the photo file could not be caused by the effects of a fuel-air warhead. B. ZEČEVIĆ did not describe such injuries on page under the heading “Blast wave injuries”. Extreme injuries to the head of the victim cannot be the sole proof that it was fuel-air bomb because Mr ZEČEVIĆ is not a pathologist who could use this as a basis on which to make such a conclusion.

The adjacent house (in front of which the victim was standing) was about five metres away and was badly damaged. The explosion of solid explosives also causes reflex waves which sometimes cannot be explained even theoretically. It is thus possible that the wave curved and thus went around the wall marked with a yellow arrow in fig. 1.

![Fig. 1. Remains of the wall after the explosion (page 06067119)](image)

The number of fragments in dynamic explosion conditions differs from the number of fragments obtained in static conditions, so that the number of fragments obtained in static conditions cannot be considered the same as the one that occurs in dynamic conditions. The absence of traces of the effects of shrapnel is quite understandable because the fragments hit walls that were knocked down and scattered onto the surrounding buildings.

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30 Case IT-98-29/1-T, D339 - I/5846 (Milošević Judgment) 175/5846, witness (481) Ziba ČUSTOVIĆ was killed in a grenade explosion. 1742 Ziba ŠUBO fainted when she saw Ziba ČUSTOVIĆ, “half of her head was missing, and she was covered in blood”. 1743 She does not remember what happened next, she only recalls finding herself later seated on the ground below the rubble, where she regained consciousness. However, she passed out again after she told her neighbour Zijo MUJANOVIĆ to look for Ziba ČUSTOVIĆ. 1744 When Ziba Šubo came to, she was in hospital. 1745 In the hospital ....
31 Photo file, 65#10466BCS, Body of victim Ziba ČUSTOVIĆ with injuries to the head, ERN 3347.
As B. ZEČEVIĆ says in the first paragraph on page 06067182, "In an aerosol cloud of ethylene oxide, the detonation pressure is between 20 and 30 bar. Outside the cloud it drops sharply." How, then, could a “fuel-air bomb” damage the roofs of 11 houses that were certainly standing more than 15 to 17 meters away from the house that sustained the hit ("The aerosol cloud is 15 to 17 metres in diameter"), as stated by ZEČEVIĆ himself in relation to the cloud of ethylene oxide (page 06067182, fourth paragraph), the mass of fuel-air explosive of 97.5 kg produces a cloud which is 2.5 to 3 metres high, AND OUTSIDE THE CLOUD THE PRESSURE DROPS SHARPLY. How, then, was it possible to damage the roofs of 11 houses with a pressure of 20 to 30 bar?

3.2 Case 2: Documents 00375031 to 00375063, 00375064 to 00375073 and 00375115 to 00375131 (page 06067121).

Date: 24 May 1995 at 0945 hours.
Location: Sarajevo, Safeta Zajke Street no. 43.
Effect on target: two people were killed and five others were injured.

The projectile hit the asphalt road near the house in Safeta Zajke Street no. 43. A crater of about 2 m by about 1 m in size and about 0.3 m deep was found in the asphalt road. The investigators claim that the projectile flew in from the south, from the direction of Lukavica.

Two rocket motors were found in the crater. In the opinion of the onsite investigators, a modified air bomb with four rocket motors exploded on the spot. There are conflicting opinions in the report (page 0607122, first paragraph) concerning the calibre and number of rocket motors. One report mentions a 122 mm GRAD rocket motor, and another a 128 mm OGANJ rocket motor. The investigators’ findings are mutually inconsistent because they talk about five and four motors respectively.

The findings of the investigators, in addition to being mutually inconsistent, are also inconsistent with the ZEČEVIĆ’s findings: the investigators claim to have found four rocket motors and ZEČEVIĆ says there were three. There is an obvious discrepancy in the number of motors found in the crater in the findings of the investigators and Berko ZEČEVIĆ.

Judging by the photographs, it was probably a modified FAB-100 air bomb that landed in Safeta Zajka Street because the crater measures 2 m by 1 m and is 0.3 m deep, which is much less than the craters produced by FAB 250 bombs. Two rocket motors were found “in the crater, and after it was dug up, several metal parts, stabilisers, a three-pointed star (with the arches corresponding to a 122 mm diameter circle).” This three-pointed star and the crater size of 2 m by 1 m and its 0.3 m depth point to the effect of a modified FAB-100 bomb filled with trotyl and modified with three rocket motors.

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Berko ZEČEVIĆ claims that this was a fuel-air bomb. He bases this claim on the statements of witness who said they felt “burning” and “strong pressure”, “the house was smoking”, “doors and windows knocked out” and, as the main argument, “absence of fragmentation”.

It is unusual that not a single large fragment of the projectile casing was found. The projectile did not fragment from the effects of the tetryl charge, but from the effects of the primary charge,\(^{37}\) which would have to be found given that, as B. ZEČEVIĆ claims, these fragments are larger in size and mass, and the blast wave of an area explosive is 20 to 30 bar, **had such fragments existed, they would have certainly been found because they could not have scattered far.**

The projectile landed on the street outside the building. The effects of the blast wave caused by the explosion outside the building point to the effects of the blast wave of solid explosives on the building at Safeta Zajke Street no. 43, the photograph from document 0037-5065: blown-off roof tiles and broken windows and doors, as shown in fig. 2. The photograph in documents 0037-5065b shows cars very close, about 20 yards away from the spot where the projectile landed. The cars were not damaged by the explosion (the effects of fuel-air explosive cover a surface of 20 to 30 meters in diameter).

![Slika iz dokumenta 0037-5065](image_url)

*Fig. 2 Roof tiles blown off by the projectile explosion; in the foreground one can see the rocket motors in the crater (page 06067122).*\(^{38}\)

Berko ZEČEVIĆ cites as proof that the projectile contained fuel-air explosive the fact that he found rocket motors in the crater. He says this proves “that it was not an

\(^{37}\) A special emphasis is put here on the fact that the primary charge’s function is only to break the container (in this case, according to B. ZEČEVIĆ, this is the casing), and its mass is be determined accordingly.

explosion of a classic aircraft bomb, because the detonation products would throw the rocket motor out of the crater (in case of a delayed fuse action).” The question therefore arises as to what would have happened to the motors if the fuse did not have a delayed action. Would the motors have been found in the crater?

The picture in document 0037 - 5068 (page 06067123) shows a small area of scorched earth around the crater caused by the explosion of a projectile containing trotyl, which may have been incorrectly filled due to the wartime conditions and has thus left traces of incomplete detonation.

Had it been a fuel-air bomb, more people would have been killed because all the witnesses were close to the explosion, except for one who was 300 meters away, close to the Miljacka river.

**Given the dimensions of the crater: about 2 m by about 1 m and about 0.3 m deep, this location was hit by a FAB-100 projectile containing conventional TNT explosive.**

Across the street from where the destructive projectile landed was the Žica factory and the RTV /Radio and Television/ building. It is said on page 06067123 that the Žica factory was also hit by a modified bomb with similar effects, without specifying when this took place or describing the effects.

**3.3 Case 3:** Documents 00375031 to 00375063, 00375064 to 00375073 and 00375115 to 00375131 (page 06067126)

Date: 24 May 1995 at 1400 hours.

Location: Sarajevo, Majdanska Street bb /no number/, next to the transformer station, on a soil surface.

Effect: Two people were killed and six others were injured. It is not specified where the fatalities were at the time of the explosion, or where the injured were when they sustained their injuries.

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The rocket projectile struck the soil surface 10 meters from an electricity pylon, knocking down the pylon and the power lines, which fell across the street. A 5m by 1.5 m and 1.5 m deep crater was found. According to the values in Table 4 on page 06067055 and according to the above dimensions of the crater, this location was hit by a destructive **FAB-100** projectile filled with trotyl, with one or three rocket motors and a fuse set to explode on impact.

Investigators established that there was an impact of a modified aircraft bomb with four or five 128 mm or 122 mm rocket motors (two reports with conflicting information).

The discrepancies between the findings of the investigators, who had gone to the scene immediately and who claim that the projectile flew in from southeast, and those of Berko ZEČEVIĆ, who cannot determine accurately from the sketch the incoming angle of the bomb, but says only that the incoming angle was “most probably” identical to that in the explosion in Safeta Zajke Street.

**3.4 Case 4:** Documents to 00375252 to 00375264, 00375290 and RR245913 to RR245963. (page 06067129)

Date: 26 May 1995 at 1130 hours.

Location: Sarajevo, Safeta Hadžića Street no. 52 (or 152, according to another report)

Effect: Two people were seriously injured and 15 others were slightly injured. No information is provided as to the location of these people at the time.

According to the investigators, a rocket projectile hit the flat roof of the building, broke through the concrete roof slab and then penetrated the slab between the fourth and fifth floors.

Discrepancies in the reports as regards the building number: 52 or 152.

Discrepancies between the findings of the investigators and Berko ZEČEVIĆ: BZ claims that three rocket motors were found, and the investigators that the roof of the building was hit by a projectile with more rocket motors. Mr Berko ZEČEVIĆ showed in his report on pages 06067092 and 06067093 that modified FAB-100 bombs had a single motor and that the FAB-250 bomb had three motors (if this is true), but it is shown that the terrain was hit by rocket-assisted **FAB-100** aircraft bombs with one or three rocket motors.

There are inconsistencies in the investigators’ reports with regard to the direction from which the projectile flew in: one report mentions the incoming direction as south-southwest, from the area of Lukavica, and the other as west, from the direction of Ilidža.

With all due respect to Mr ZEČEVIĆ, here too we have his “comments” in which, again without any explanation, he rejects the witness statements and the view of the investigators (page 06067129): “A number of witnesses have noticed that the projectile came in from the direction of Ilidža - Rajlovac. Directly after the explosion of the modified bomb, the same area was targeted by a number of projectiles from the

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direction of Lukavica, so that they thought by analogy that the direction from which this projectile came should be the same. This points to a good synchronisation of units from Ilidža and Lukavica. … From these witness accounts, it is clear that we are dealing with effects of an aircraft bomb with 122 mm GRAD rocket motors.”

Berko ŽEČEVIĆ is adamant that these are the effects of a bomb with fuel-air explosives. The event can be reconstructed from the description of the event and the attached photographs. The projectile penetrated the concrete slab on the 5th floor and exploded in a room, most likely on impact with the floor, and the concrete ceiling of the fourth floor was pierced by the blast wave. The following can be cited as proof that the projectile exploded on the fifth floor: the greater damage to the fifth floor than to the fourth and third floors and the survivor who was on the fourth floor. Had the explosion occurred on the fourth floor, this person would have not been able to survive.

It is curious that the witness Alma HEVAŠLIJA survived the explosion in an apartment on the fifth floor. It is indeed a rare but conceivable case where projectiles with conventional explosives are used. She could survive only if protected from the effects of the shock by some load bearing wall or column. The report does not state where she was at the time of impact. Had this been a bomb with fuel-air explosive, as claimed by B. ŽEČEVIĆ, this witness would have been killed.

The witness Nura OSMANAGIĆ was in an apartment (it is not stated on which floor) when the bomb struck (page 06067129) and “felt a powerful detonation, and after a couple of seconds she felt a lot of dust, then a blow to the arms and legs. Then she was buried and she lost consciousness.” In the opinion of B. ŽEČEVIĆ, “These are typical effects of fuel-air weapons. This witness was seriously wounded.” However, Berko ŽEČEVIĆ is unequivocal that there can be no survivors of the effect of bombs with fuel-air explosives because of the overpressure of 20 to 30 bar, especially in an enclosed area. How come this witness was not killed (see page 0607074, first and second paragraphs, and page 06067182 “Blast wave injuries”), despite the fact that a “bomb with fuel-air explosive” had exploded close to her?

According to a witness who was in the apartment on the fifth floor when the bomb struck, “she felt grey smoke and dust before she fell down to the fourth floor.” In this description of the “grey smoke” Mr ŽEČEVIĆ sees a confirmation of his argument that this was a fuel-air bomb. Had a fuel-air bomb really exploded inside the house, this witness would not have survived such an explosion in an enclosed space. The same applies to other apartments: everyone in them would have been mortally wounded, because, as Mr ŽEČEVIĆ himself says in the report on page 06067182, first paragraph, with regard to the effect of fuel-air explosives on manpower, “fuel-air explosives have an absolutely devastating effect throughout the volume of the cloud. In an aerosol cloud of ethylene oxide, the detonation pressure is between 20 and 30 bar. Outside the cloud it drops sharply. … The blast wave ruptures lungs, eardrums, and internal organs, and air bubbles can even enter the bloodstream and become lodged within the heart or brain, thereby causing rapid death from ‘air embolism’. … Fuel-air explosives cause a very high level of fatalities up to a certain distance, and then the fatality level drops sharply.”

“Grey dust” is a common occurrence when a projectile explodes near a plastered wall or indoors. For Mr B. ŽEČEVIĆ, however, it is “certain” evidence of the explosion of
a bomb with a fuel-air charge. It is especially interesting how he describes the bomb exploding inside the building and piercing the concrete slab between the fourth and fifth floors, whereas the investigators found on site that the “The rocket projectile impacted the flat roof of the building, went through the concrete plate, and then pierced the plate between the fourth and the fifth floor.” According to the report, two reinforced concrete slabs were pierced: the one on the roof and the one between the fifth and fourth floors. So how then could the “primary” explosive charge, which is contained in a fuel-air bomb and has the exclusive role of releasing the explosive cloud from the jacket, how was it possible that such a projectile with such performance could pierce two reinforced concrete slabs? Mr ZEČEVIĆ explains it (without mentioning the pierced roof plate) on page 06067130, in the first paragraph, as follows: “The effect of the primary explosive charge probably pierced the concrete plate between the fourth and the fifth floor. The fuel-air mixture migrated to the fifth floor, then the secondary explosive charge activated the aerosol cloud.” If the hypothetical filling contained ethylene oxide, or any flammable hydrocarbons, other than methane, the mixture could not have migrated because it is heavier than air. If, however, the hypothetical filling contained ethylene oxide and “migrated” to the fifth and fourth floors, how did witnesses Alma HEVAŠLIJA and Nura OSMANAGIĆ survive? On page 00378674 of the report, Berko ZEČEVIĆ shows a sketch of a projectile warhead in which the narrow central part of the explosive charge whose purpose is to break the casing is clearly marked. Was it this charge that Mr Berko ZEČEVIĆ had in mind when he talked about the “primary” charge, because there is no other or “secondary” charge in the sketch? Let us recall how B. ZEČEVIĆ explains the effects of the warhead with volumetric explosive. On page 00378673, under the heading “Warhead”, all conclusions are based on assumptions about the thickness of the warhead body, made on the basis of the fragments found: “The remains found do not suffice for an accurate calculation of the length of the warhead, but the use of appropriate methods from external ballistics makes it possible to determine the mass range of the warhead.” (page 00378673, seventh paragraph from the top).

In the next paragraph, he also makes assumptions about the mass of the warhead and the mass of the liquid explosive: “These parameters formed the basis of the reconstruction of the appearance and characteristic dimensions of the rocket as a whole and of the warhead separately. The relevant sketches are to be found on the next page.” (page 00378673 ninth paragraph from the top). Further on, Berko ZEČEVIĆ, having taken into account all these assumptions, with no real evidence and arguments except for some fragments, explains the composition of this hypothetical warhead and the mechanism by which the liquid explosives are activated (page 00378673, seventh paragraph from the bottom): “The central cavity at the base of the warhead, with an M86 x 3 inside thread, indicates the presence of a delayed detonation system for the activation of liquid explosive. The delayed detonation system must have a primary section, which ensures that there is contact between the

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41 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROSVIĆ, BEng. (Mechanical) Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.

42 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROSVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.)
liquid explosive and the surrounding air, so that an aerosol is formed. The secondary section serves to activate the aerosol or liquid explosive.” Is it possible that the explosives in the central cavity and the “primary section” can be that primary explosive that could pierce the flat roof of the building and destroy the reinforced concrete plate between the fourth and fifth floors?

According to B. ZEČEVIĆ, the sketch shown on page 00378674 of the report\textsuperscript{43} was created by a reconstruction “based on the remains found”. B. ZEČEVIĆ says that there are insufficient quantities of this “primary” explosive charge to break the reinforced concrete roof slab and the floor slab of the fifth floor and then drop down to the fourth floor and only then the fuel-air mixture “migrated to the fifth and the fourth floor, then the secondary explosive charge activated the aerosol cloud.” It has remained unclear from the sketch B. ZEČEVIĆ made on the basis of “the remains found” where the “primary” and “secondary” explosives respectively were installed and how they reacted with a delay. This building was most likely hit by a \textbf{FAB-250} aircraft bomb with three rocket motors.

\textbf{3.5 Case 5: Documents 00375178 to 00375209}  
\textit{(Page 06067132)} \newline  
\textbf{Date:} 16 June 1995 at about 1103 hours. \newline  
\textbf{Location:} Sarajevo, Dositejeva Street no. 4a.  

Effects on target: three people were slightly injured. It is not stated where they were when they were injured.  

The number of stories of the building hit by the projectile is not stated.  
It can bee seen on the photographs on page 06067133 that the houses were older and brick-built with no concrete slabs. The bomb exploded inside the first floor. Three 122 mm GRAD motors were found.

\begin{figure}[h]  
\centering  
\includegraphics[width=\textwidth]{fig4a.png} \hspace{1cm} \includegraphics[width=\textwidth]{fig4b.png}  
\caption{Fig. 4a} \hspace{1cm} \caption{Fig. 4b}  
\end{figure}

\textsuperscript{43} \textit{IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketačkih projektila velike razorne moći na urbane djelove Sarajeva,} Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIC, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282).
Judging by the destructive effects, this was a conventional FAB-100 high explosive bomb with a solid explosive, trotyl. The damage to the building made it impossible to see any effect of the fragments, although they exist (as shown in fig. 5). The explosion of the projectile blew the roof off the house and damaged the roofs of two neighbouring houses that were very close to the affected house. In fig. 5 (on page 06067133) the remains of a large number of fragments can be seen in the wall, and fig. 6 (on page 06067133) shows the remains of the rocket motors.

The surrounding houses in the immediate neighbourhood of the affected house show visible effects of shattered roofs and scattered roof tiles, which is a typical of the effect of the blast wave of the solid explosive trotyl. Based on the above effects of the projectile on buildings that are somewhat older and made of brick and timber, it can be concluded that they were hit by a FAB-100 projectile with three rocket motors (fig. 4 of this Analysis).

The author of the report, Berko ZEČEVIĆ did not accept the findings of the investigators that the incoming direction of the projectile was northwest, or azimuth 348° ± 10°, because he believes that they did not have a well-defined method for accurate determination, but he himself claims, “The projectile most probably came from the direction of Kobilja Glava, that is, the azimuth was 315° ± 10°,” without mentioning which more precise method he used for such a precise claim.

3.6 Case 6: Documents 00375210, 00375224, 00375225 and RR361662 to RR361662 (Page 06067135)

Date: 16 June 1995 at 1520 hours.
Location: Sarajevo, Trg međunarodnog prijateljstva up to number 10.
Seven people were slightly injured

A rocket-assisted projectile fell on a soil surface some way away from the building and created a crater 11 m by 7.8 meters and 2.5 meters deep. Judging by the size of the crater the site was hit by a delayed-action FAB-250 bomb with three rocket motors. The bomb pierced the ground and then exploded, which is why the surrounding buildings bear no traces of fragments and rocket motors were destroyed to a greater extent, as shown in fig. 7.

Fig. 7. Rocket motors found at the site of impact. (page 06067136)\(^{45}\)

Witnesses who were in the building of the Local Community testified that they felt buzzing and pressure in the head, which are also caused by the detonation of conventional troyt explosives, which produces a strong blast wave. B. ZEČEVIĆ himself claims in his comments on this event (page 06067136, third paragraph) that: “Witness statements about the pressure and buzzing they felt point to blast wave effect.”

Another question is why would fuel-air explosive, which has lower energy values than conventional explosives, be used in bombs without ensuring its proper functioning: the braking action in the air by means of a parachute, the opening of the fuel-air canister and its explosion above the ground. None of the cases in this report contains witness evidence of this type of action. Although the witnesses Miroslav BREZO and Sabit OSMANOVIĆ (according to B. ZEČEVIĆ) were in front of the premises of the Local Community, “They heard the sound of the projectile, and they saw the final stage of its flight. The projectile fell fifteen metres to their left and a few metres above

them” and it made a crater on the spot where it hit (page 0607135)\textsuperscript{46} the ground, as shown in figures 8 and 9. Had this been a fuel-air bomb, as claimed by B. ZEČEVIĆ, these witnesses would not have survived because the fuel-air cloud created by ethylene oxide when used as fuel-air explosive is lethal in a diameter of 15 to 17 meters, as claimed by B. ZEČEVIĆ (page 06067182, fourth paragraph).

\begin{figure}[h]
\centering
\includegraphics[width=0.4\textwidth]{fig8.png}
\caption{Crater created by the projectile}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=0.4\textwidth]{fig9.png}
\caption{Crater photographed from a different angle}
\end{figure}

In his comments ZEČEVIĆ says: “Some of the witnesses saw or heard the arrival of the projectile, but there was no time to react in terms of finding shelter because the velocity of the projectile was probably around 250 m/s (less than the speed of sound).” It is unclear what the point is of his assumption about the speed of the projectile before it exploded when he himself says that witnesses heard a hissing sound and saw a projectile. “There are no signs of fragmentation effects in the area around the place of explosion. There is a crater at the place of explosion. Witness statements about the pressure and buzzing they felt point to blast wave effect. This analysis is possible only after a detailed analysis of other locations where buildings have ken hit in Novi Grad area. On the basis of this approach, an azimuth angle of 285° was determined, which corresponds to the area of Butila (the case in Gete Street no. 5 and Safet Hadžić no. 52).”

This presumably means that he has no parameters for a conclusion of any sort that would fit this firing in with any other and place this event within the framework of something presumed. Of course, this could mean that it was near a target which was repeatedly fired at (the Bitumenka factory is the nearest to the site of explosion).

3.7 Case 7: Documents 00375232 to 00375235, 00375243 to 00375251 and 00453929 to 00453937
(page 06067138)

Date: 16 June 1995, at about 1700 hours.
Location: Sarajevo, Čobanija no. 7
Five people were slightly injured.

The projectile struck a horizontal beam above the ground on the outer wall of the boiler room on the ground floor. The dividing wall opposite from the impact point on the beam in the boiler room was destroyed, as shown in Fig. 10. (the picture from document 00375243).

Parts of the rocket motor components and the stabiliser were found. In their report, the investigators noted that only one motor was found and concluded that the projectile was a bomb with a single 122 mm GRAD motor, which corresponds to the modified FAB-100 bomb (page 06067092, section 9.2).

There is a discrepancy between the report of the investigators, who claim that the projectile came from the north-northwest direction (Request of the Sarajevo CSB /Security Services Centre/ no. 19/04-223-515), and the SJB /Public Security Service/ report, which maintains (the day after this event) that the projectile came from the east (onsite investigation book no. 1148/95 of 17 June 1995). This shows that they are guessing the direction from which the projectile came. There is also a discrepancy between the report of the investigators and that of Mr ZEČEVIĆ with respect to the type of the projectile: the former concluded that the bomb had a single motor with solid tetryl explosive and Mr ZEČEVIĆ says that this was a FAB-250 bomb with three motors and filled with fuel-air explosives. Only one 122 mm GRAD motor was found.

If M8 x 31 mm bolts, which fastened metal sheet stabilisers to the carrier, were found onsite, how is it that not a single larger part of the bomb casing has been found that would prove a small number of fragments and the use of a fuel-air charge?

In the third paragraph on page 06067140, B. ZEČEVIĆ says, “The investigators’ conclusion that the bomb had one 122- GRAD rocket motor is flawed, because FAB-100 modified bombs (with one motor) did not have a separate stabiliser fastened with M8x3 1 mm bolts (found at the place of incident), but had an aircraft bomb stabiliser and a rocket motor.”

The question arises (since no photograph is provided of the projectile and motor parts that were found) of whether the investigator was confused about the definition of the stabiliser. Further down, the fourth paragraph on the same page reads, “Three rocket motors and three sheet metal stabilisers were used for the FAB-250 aircraft bomb. They were fastened to the support structure with M8x31 mm bolts. This has been explained in detail in the part dealing definition of characteristics of modified bombs.” Mr ZEČEVIĆ challenges the findings of the investigators that this was a FAB-100 bomb and claims instead that it was a FAB-250 aircraft bomb.

He bases this view on the fact that M8 x 31 screws were found, because allegedly a special stabiliser was not made for the FAB-100. Instead, aircraft bomb stabilisers were used and parts of the 122 mm GRAD rocket motor. He completely neglects the fact that a part of the stabiliser was found and its dimensions must be different to those of the FAB-250 stabiliser and that the investigators could not have been wrong. It is shown that FAB-100 bombs with three rocket motors were used in the field (point 3.2 of this analysis).
The debris shown in fig. 00375243 (page 06067138) indicates that this was a low-intensity bomb such as a FAB-100. The massive wall on page 06067139 could not have been demolished by an explosion of fuel-air explosive. The damage to the garage door in fig. 10. (page 00375246) and to the building 25 meters away from the site of explosion, which shows traces fragments, indicate that solid trotyl explosive was used. The garage door has been blown out and part of the other door thrown inside and another part thrown out, indicating a much stronger blast wave than that generated by the detonation of a fuel-air explosive.

The remains of propulsion systems found (three rocket motors) and the effects on the target (the level of destruction and manner of action) indicate that that these were modified **RFAB-100/3** aircraft bombs with three 122-mm GRAD rocket motors.

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3.8 Case 8: Documents 00358705 to 00358833, 00378646, 00392142, RR361819 to RR361718 and 03064882 to 03064883 (page 06067142)

Date: 28 June 1995 at 0922 hours
Location: Sarajevo, Bulevar Meše Selimovićа no. 4, RTV building (also described in the document on pages 00378660 to 03378663)

One person was killed, and 28 others were injured.

According to the findings of the commission, a rocket projectile hit the flat roof, known as the “pasarela”, of the RTV building in front of the auxiliary entrance on the interior (or lower ground floor) part, which is opposite to the main entrance, on the side of the building between the foundations of Studio C and the restaurant.

The investigators established on site that the projectile had ricocheted off the wall between the first and the second floor and exploded right next to the outer wall of Studio C, making a 3.5 m by 4.5 m opening in the wall. Next to this hole there was a crater in the earth outside, which was 1.5 m deep, 1.5 m wide and up to 3 m long right next to the wall (page 06067143, first paragraph). In B. ZEČEVIĆ’s comments, the size of the opening in the wall is 4 m by 3 m, and it is connected to a semi-circular crater in the soil which is 2.4 m deep and 2.5 m in diameter (page 06067146, third paragraph).

The blast damaged and moved a bus and two vans. Traces of soot and mechanical damage to the concrete wall were found on the other side. All the windows from the steps up to the eighth floor were shattered. The most extensive damage was inflicted on Studio C at the spot where the projectile exploded. On the southern face of the wall there are no traces of damage from the impact, except for one opening in the wall about 0.5 m in diameter.

The onsite investigation commission concluded that a rocket-assisted FAB-250 bomb (with trotyl charge) had exploded. The rocket motors were not found.

Witnesses to the event have “heard” the sound of projectiles. The question is how they could physically, using their senses and remaining calm, identify and distinguish such fast-developing events as the fall of a projectile and then count the seconds until the explosion. Thus Rijalda MUSAEFENDIĆ (from the second floor) testifies that she “heard an unnatural sound followed by a loud thump, and then after seven or eight seconds, a loud blast, an unnatural flash, and then another detonation.”

49 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical) , Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282)

50 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical) , Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282)

The witness Fadila SERDAREVIĆ (second floor), “heard a loud thump and a couple of seconds later, a terrible blow.” Witness “Muhamed KOLENDER (first floor) heard the falling concrete and glass from the higher floors, and after around ten seconds, there was an explosion.”

Witness Jasmina ABAZ happened to be in the vicinity of the explosion “(Health Station, near the place of explosion) heard a detonation, and then another detonation that knocked everyone off their feet.”

Judging by the effects on page 06067144 and images 00392145 and 00392147, the RTV was hit by a projectile with a large explosive charge equivalent to a modified FAB-250 aircraft bomb with trotyl.

Given the effects of shown on pages 06067143 and 06067144, the claim that such effects are the result of a fuel-air bomb is brought into question because fuel-air bombs are not designed for hard targets such as the RTV building with a reinforced, 0.4 meter thick, concrete wall, because, “the overpressure of the detonation is 10 - 20 bar and lasts for mere milliseconds, but causes substantial destruction to light and moderately reinforced structures and living things” (B. ZEČEVIĆ, page 06067078).

All the windows from the staircase to the eighth floor were destroyed, and this indicates that the projectile exploded outside the building, right next to the wall of Studio C and that the blast wave resulting from the detonation of a solid explosive

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destroyed external structures and the windows above, as B. ZEČEVIĆ showed on the page 06067054, fig. 50.\textsuperscript{54}

Mr ZEČEVIĆ states in his comments about the event that the number of visible fragments is below expectations for a FAB-250 bomb. In so doing, he completely ignores the fact that the bomb exploded in the soil, and this conclusion is drawn from the size of the crater. The explosion in the ground drastically reduces the bomb fragmentation, but significantly increases its destructive effect. The example of the GBU-39 bomb effects shown in fig. 122 (page 06067116)\textsuperscript{55} and the aircraft bomb remains found on the site of explosion, page 00378662\textsuperscript{56} (fig. 1: Appearance and size of the shrapnel found in Studio C of the RTV BiH House) support the assertion that Mr ZEČEVIĆ made an erroneous conclusion about the nature of the explosive charge. It is obvious from the photographs in these two documents that the bomb which hit RTV fragmented in the manner typical of the GBU-39 bomb, which is filled with solid explosives (according B. ZEČEVIĆ, it contains 25 kg of solid explosives, page 06067115), and this is shown in fig. 13 and fig. 14.

Fig. 13. Fragmentation effect on launcher
Photograph from document 06067116

Fig. 14. Appearance and size of the shrapnel found in Studio C of the RTV BiH House
Photograph from document 00378662 (Fig. 1)

Mr Berko ZEČEVIĆ says in the analysis provided in his comments,\textsuperscript{57} “The size of the opening in the wall (0.4 m thick reinforced concrete wall, with 16 mm cross-section reinforcement bars) caused by the explosion is 4 m by 3 m, and it is of an irregular oval shape (images from document RR361741)” and this could have been caused by a projectile with a fuel-air charge, He concludes that the bomb ricocheted and landed on

\textsuperscript{56} IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIC, BEng. (Mechanical) and Amir KURTTOVIC, BEng. (Chemical) , Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282).
the ground at the base of the opposite wall, where Studio C was.\textsuperscript{58} “The fuse and the primary explosive charge were probably activated. The body of the bomb was destroyed, the fuel-air explosive evaporated and mixed with air. After a couple of seconds (a number of witnesses said that there were two explosions), the secondary explosive charge was activated, causing a volumetric explosion.” And the evidence Berko ZEČEVIĆ offers for this claim is that a hole was blown in the wall of Studio C, which was the 0.4 m\textsuperscript{59} thick and had 16 mm steel reinforcement rods! This puts him at odds with his remarks in “Military use of fuel-air explosives” on page \textsuperscript{60}06067182, where he asserts, “With materials that are sensitive to the impulse of a blast wave up to 30 bar, fuel-air explosives have an absolutely devastating effect throughout the volume of the cloud. In an aerosol cloud of ethylene oxide, the detonation pressure is between 20 and 30 bar. Outside the cloud it drops sharply.”

How is it possible then that the witness Muhammad KOLENDER from the first floor and the witnesses Rijalda MUSAEFENDIĆ and Fadila SERDAREVIĆ from the second floor, as well as the witness Jasmina ABAZ, who was in the outpatient clinic near the site of explosion, survived the volumetric explosion\textsuperscript{60} of the fuel-air explosive, which “evaporated” and has “an absolutely devastating effect throughout the volume of the cloud”? \textsuperscript{61}

Does this mean that, in the opinion of B. ZEČEVIĆ, fuel-air explosives can penetrate a reinforced concrete wall which is 0.4 m thick and has 16 mm steel reinforcement rods, and its “volumetric action” produces a wave with an impulse up to 30 bar which can at the same time create a hole in the wall measuring 4 m by 3 m?

According to the description of events and the photographs, the projectile hit the RTV building as follows. On the south side, the projectile hit the wall of Studio C, penetrated it and made an opening of about 0.5 m diameter and then flew over the studio and hit and penetrated the east wall. That the projectile penetrated the wall is observable in the figure on page \textsuperscript{60}06067144 (00392145). On the right side of fig. 11 it is clearly visible that the reinforced concrete slab is bent in the direction of the flight, i.e. towards the outer face of the wall (circled in yellow). After it went through the wall, the projectile plunged into the ground and exploded next to the wall, fig. 12. The explosion considerably enlarged the opening through which the bomb went, and the reinforcement bars (which broke free of the concrete when the wall was penetrated), were bent towards the interior of Studio C. Gases and rocks entered Studio C through this big hole (images from document RR361741 right).\textsuperscript{61

\textsuperscript{58} Berko Zečević, 65#04387BCS (06067014-06067189 ) \textit{Primjena modifikovanih avionskih bombi tokom opsade Sarajeva 1994-1995, Sarajevo, February 2007}, (ERN 06067146, first paragraph under the sketch).


\textsuperscript{60} Berko Zečević, 65#04387BCS (06067014-06067189 ) \textit{Primjena modifikovanih avionskih bombi tokom opsade Sarajeva 1994-1995, Sarajevo, February 2007}, (ERN 06067146, first paragraph under the sketch).

Such destruction is nevertheless consistent with the effects of a projectile with a solid explosive charge such as in the modified FAB-250 aircraft bombs with tritryl, whose detonation pressures is in excess of 200 kilobars.

3.9 Case 9. Date: 28 June 1995 at 1015 hours
Page 06067149
Location Sarajevo, Geteova Street no. 5 (described in the document, pages 00378663 to 00378665)
Three people were killed and seven others wounded.

The projectile exploded on the eighth floor of a high-rise building. It destroyed a number of flats from the seventh floor to the eleventh. Only the main concrete beams withstood the blast wave. Three people were killed and seven others wounded. The projectile exploded at 1015 hours.

The opinion of the investigators in the document is that the projectile flew in from the direction of the Doglodi sector.

In the report on page 00378663, B. ZEČEVIĆ and the authors state, “According to this analysis of the MUP /Ministry of the Interior/, at 1300 hours on 28 June 1995, the projectile arrived from the azimuthal direction of 260° and impacted the building at the height of the seventh- and eighth- floor windows. Two persons were killed, and seven residents were injured.” Berko ZEČEVIĆ argues in the comments on page 06067149 of the document, “Based on the analysis of the place of impact of modified bombs in the immediate vicinity of this incident, it is possible to assess that the azimuth angle was 285°, and the distance of the launch site was around 6,000 metres, that is, the wider area of Butila.” Obvious discrepancies between these reports are evident with regard to the time of the explosion of the projectile and the number of projectiles, the number of casualties (two or three fatalities), the azimuth angle (260° or 285°) and the place from where the projectile came: Doglodi or Butila. Which is correct?

That this concerns one projectile which hit the same building, for which B. ZEČEVIĆ stated different times (1015 hours and 1300 hours), can be seen from the photographs of the rocket motors found in the building, which B. ZEČEVIĆ presented on page 06067151 of the document (Fig. 15).

62 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Mr Berko ZEČEVIĆ, Ahmet H. OMEROVIĆ and Amir KURTÓVIĆ.
64 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ŽEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTÓVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282).
Fig. 15. Parts of rocket motors found in Geteova Street no. 5

On page 00378664 of the report\(^67\) (in which a different time of the event is stated, as well as a different direction and a different number of victims: two people were killed and seven others wounded) he shows the same photograph, but darkened and upright, which is placed in a horizontal position, as shown in Fig. 16 below:

![Fig. 16. Propulsion group of the rocket projectile found in the residential building in Geteova no. 5 (page 00378664 of the report)\(^68\)](image)

On the basis of these photographs of the pieces of rocket motors found in the building after the explosion, there is no doubt that these are the same rocket motors and that the target is the same. What is brought into question is the time of explosion (is it 28 June 1995 at 1015 hours, as on page 06067151, or 28 June 1995 at 1300 hours, as on page 0037664 of the report?) and the number of victims. The question that is put to the author of both documents is: **Which is correct?**

On approaching the building in Geteova Street no. 5, the projectile hit the eighth floor, and the blast wave caused by the explosion destroyed a part of the ninth floor above a part of the seventh floor\(^69\) below, Fig. 17

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\(^67\) IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVić, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282).

\(^68\) IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVić, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282).

\(^69\) Photographic documents of the Ministry of the Interior, Crime Police Sector, Forensic Department, no. 1289/95 (Photographed on 28 June 1995).
Based on the photographs and type of effects, this was a projectile of great destructive power, filled with a conventional solid explosive, tritolt. On the basis of a comparison of the effects (given in the photo file\textsuperscript{70}) at the site of explosion with the effects of projectiles obtained during the testing of the GBU-39/B bomb (containing 25 kg of solid explosives),\textsuperscript{71} this was most probably a rocket-assisted FAB-250 aircraft bomb with three rocket motors.

![Fig. 17 Projectile effects on the eighth floor of the building in Geteova St. no. 5](image)

Photographic documents of the Ministry of the Interior, Crime Police Sector, Forensic Department, no. 1289/95 (Photographed on 28 June 1995).

3.10 Case 10: Documents from 00375143 to 00375148 and from 00375170 to 000375174.

(Page 06067152)

Date: 1 July 1995 at about 2130 hours.

Location: Hrasnica, Alekse Šantića Street no. 50.

There were no casualties.

The rocket projectile hit the corner of the house and then landed in the yard, 3 meters behind the other side of the house, making a crater 6.1 meters by 2.4 meters and 1.1 meters deep. Two rocket motors were found in this crater, and the third was found a little further away in the yard.

The investigators established that, after hitting the corner of a building, the projectile ricocheted (and the engine fell off) and continued its flight towards Bunički potok Street, where it landed at number 233, having flown in from the north.

\textsuperscript{70} Photographic documents of the Ministry of the Interior, Crime Police Sector, Forensic Department, no. 1289/95 (Photographed on 28 June 1995).

Here too it is evident that the opinion of the (MUP) investigators differs from the opinion of Mr B. ZEČEVIĆ and this is reflected in respect of the type of the explosive charge and the mode of action of the fallen projectile. The investigators (subsequently) stated that this was a projectile which had hit the corner of the house and then hit the ground in the yard, while the rocket motors had detached and created the said crater, and then the projectile, carried by the inertia of ricochet, fell 150 meters away, in Bunčki potok Street (as stated in the document on page 06067155), whereas Mr Berko ZEČEVIĆ claims that the fuel-air explosive detonated incompletely in a water supply manhole.

His explanation was as follows: “According to the available information, the projectile hit the house at Alekse Šantića 50, went through the corner of the house at the level of the first floor, just below the roof structure (page 06067152).

“After passing through the corner of the house, the projectile hit the ground at the distance of 3m behind the opposite corner. Two rocket motors were found in the crater. The crater had the following dimensions: 6.1 m by 24 m, and the depth of 1.1 m. A few other metal parts were found in the crater, and the third motor was found in the yard, near the place of impact into the house. … The crater in the yard of the house points to the fact that the detonation took place in the ground, but that it was not caused by the effect of TNT explosive, but probably the effect of fuel-air explosive. The projectile penetrated into the ground, the primary explosive charge destroyed the body of the bomb, but there was no significant mixing of the fuel-air explosive and air in the ground, so that the activation of the secondary explosive charge caused only an incomplete explosion.” This assertion is supported by the fact that no “significant traces of fragmentation effect were found”, but also not many fragments of a fragmented “fuel-air” bomb or a fragmented metal casing that would point to the use of fuel-air explosives.

A carefully look at the images in the document on page 06067152 shown in Fig. 18, reveals that the direction of the projectile which hit the house and knocked off a corner of the house is different from the direction that Berko ZEČEVIĆ marked with a blue arrow on the photograph. Had the projectile indeed flown in as marked by Berko ZEČEVIĆ, i.e. right into the house, the house would have been destroyed.

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Fig. 18. The true direction of the projectile is marked with a green arrow and the hit manhole is circled in yellow

The projectile, in fact, went through the corner of the house, hit the fence and knocked it down and then hit the water supply manhole and created a crater. In the process, the rocket motors that were found in the crater had fallen off, and the projectile **ricocheted** out of the manhole and continued flying towards the Bunički potok Street no. 233 and no. 231, as established by the investigators. This is confirmed by the time of the event: the projectile landed in the yard of Alekse Šantića Street no. 50 at about 2130 hours on 1 July 1995, and it landed at the same time, at about 2130 hours on 1 July 1995, in Bunički potok, Hrasnica. As can be seen from the next case (section 3.11), this was a rocket-assisted **FAB-100** which landed in Hrasnica by inertia, without a motor.

B. ZEČEVIĆ argues that fuel-air explosive exploded in the yard, specifically in the water supply manhole, where this time it could not create a deadly cloud because it was prevented by the water in the manhole! (the explanation of B. ZEČEVIĆ on the last line of page 06067152 and the first line of 06067153 in the document\(^74\)): “The projectile exploded in the water manhole, which was completely destroyed. That is why water and wet soil can be clearly seen in the photos, and this explains the weak effects of the liquid fuel-air explosive.”

In support of this he cites the statement of the wife Halim KEČO, who lives opposite from the point of impact, that immediately after the projectile struck, “the entire area was enveloped in grey fog” on which “grey fog”, B. ZEČEVIĆ bases his argument about the effect of the fuel-air liquid explosive. The question is how the witness could have seen the fog and even the “grey” colour of the fog at the time the projectile exploded, which was at 2130 hours, when it was dark! There is no material evidence whatsoever that any bomb exploded in the yard of the house at Alekse Šantića Street no. 50, except that one gouged out a hole through which it ricocheted to Bunički potok no. 233.

At the end of his discussion of the projectile explosion in Alekse Šantića no. 50, B. ZEČEVIĆ photographed the location in 2007 and drew a very different trajectory of the projectile from that which had actually occurred in 1995 and been concluded by the investigators, as confirmed by Figs. 18 and 19, placed side by side:

**Fig. 18. The true projectile trajectory marked**
with a green arrow and the hit in the manhole - circled in yellow, 1994.

**Fig. 19. Zečević’s view of the projectile trajectory**, on-site photograph from crater January 2007

B. ZEČEVIĆ needed the photograph from 2007 in order to estimate (at a later date) “the incoming angle and the angle of descent with sufficient accuracy, since there are clear traces of destruction on the house caused by the penetration of the bomb through the corner of the house.” He did not take into account other details, such as the fence knocked down by the projectile, or the water supply manhole in which the projectile landed. This is obviously a **falsified account of the event**.

**3.11 Case 11:** Documents from 00375143 to 00375148 and 00375170 to 00375174 (page 06067155)
Date: 01 July 1995, about 2130 hours
Location: Hrasnica, Bunički potok at number 233
Effect: two persons were seriously injured, and a number of others were slightly injured.

Description of the event: “The projectile hit a garage in front of a two-storey house” (as shown in image 00375173, page 6067152, photographed in January 2007), “with the following dimensions: 8.3m by 9.4m. It destroyed the garage completely, and at the distance of 4.9 metres, it made a crater with the following dimensions: 3.5 m x 2.8 m, 1.1 m deep. The neighbouring two-storey house, at Bunički potok /Street/ 231, at the distance of 9.3m from the centre of the crater, sustained extensive damage, and nine people were injured. Two UN vehicles that were in front of the house were also severely damaged. Opposite from the place of explosion, at a distance of 14.4 m from the centre of the crater, there is a two-storey house, at Bunički potok 26, with the following dimensions: 6.4 m by 8.31 m, which also sustained considerable damage, and two people were injured.”
Fig. 20. Effects of the projectile which ricocheted in 2007
Image from document 00375173

Fig. 21. Photograph taken onsite
Image from document 00375173

Fig. 22. Visible traces of shrapnel from the explosion of a FAB-100 with solid explosive, trotyl, photographed in 2007

Damage to the house on the other side of the stream, opposite from the place of explosion

Fig. 22, photographed after the war in 2007, shows traces of shrapnel effects on the house across the street, so the argument of B. ZEČEVIĆ that there were no fragments because of the “fuel-air explosives” charge in the bomb is flawed.

The motors were not found in the crater or around the site of the explosion. There is disagreement about the direction from which the projectile flew in to Bunički potok: the investigators established that the projectile flew in from the north, but Mr ZEČEVić claims that the incoming direction is north-west. The investigators also argue (as in the previous case) that this is the same projectile that hit the yard of the house at Alekse Šantića no. 50. This means that there was no second projectile, which was proven in the previous point of this analysis (point 3.10 of this analysis), whereas Mr ZEČEVić claims that a new projectile landed on this location and that it was also filled with fuel-air explosive.

In view of the damage caused, the worst being to the garage in front of number 233, and given that other damage was caused by a blast wave generated within the crater (the building at number 231 is only 9.3 meters away from the centre of the explosion) and that major destruction caused from the direction of the projectile explosion was observed on it too, as well as the fact that the UN vehicles suffered damage from fragments caused by the explosion on houses at nos. 233 and 231, it can be concluded that this was a projectile with solid explosive, trotyl. The building opposite the place of explosion, Bunički potok Street no. 26, which is stands about 14.4 metres from the place of explosion, suffered “extensive damage” from shrapnel (the report does not specify what kind of damage, e.g. shattered windows, dislocated doors, fragments on the walls and the like). The photographs taken after the war show traces of fragments on the facade of the house, and the windows were probably shattered. Given the size of the crater and the fact that the buildings were weak structures made of brick (without reinforced concrete elements), which can be seen in pictures of the damaged buildings, and based on the results of testing the effects of aircraft bombs (250 kg and 500 kg), it is concluded that Bunički potok 233 was hit by a FAB-100 bomb filled with solid explosive, trotyl.

The assertion that this was a fuel-air bomb, given the destruction inflicted on hard objects, is not founded because a fuel-air bomb should act immediately on the ground with a wide radius of action (20 to 30 meters), with observable scorched grass and earth, which did not occur in this case, given the resulting crater directly in front of the garage of the house at no. 233. In all his reports about the fuel-air bomb, Mr ZEČEVić states that the diameter of the affected area is between 20 and 30 meters and the pressure is between 10 and 20 bar. Since trotyl (TNT) generates pressure in excess of 200 kilobar (10,000 times greater than that generated by fuel-air explosive), the effects on the ground directly in front of no. 233 correspond to the action of a trotyl projectile. It is true that the duration of this pressure is much shorter than that of fuel-air explosives, but the destructive effects are proportionally greater. Mr ZEČEVić says the following concerning the fuel-air explosive action in his document of February 2007 (page 06067108): the detonation pressure is between 20 and 30 bar, and it drops sharply outside the cloud. The detonation occurs on the surface of a diameter of about 25 to 30 meters.

**3.12** Case 12: Documents from 00374907 to 00374912 and 00374914 to 00374918.
Page 06067158.
Date: 23 July 1995 at 1930 hours
Place: Hrasnica, Sokolović Bjelašnička St. no. 54
Two persons were killed and eleven others were slightly injured.

The (MUP) investigators reported follows: The explosion occurred on the first floor of the house at no. 54. The projectile hit a two-storey building with the following dimensions: 12.5 m by 8.8 m, and severely damaged it and also caused damage to a number of neighbouring houses. A large number of vehicles in the vicinity of the place of explosion were damaged. Remains of 122 mm GRAD rocket motors were found in the debris in a room on the first floor. The projectile’s direction is northwest (as shown in the sketch of the scene)\(^79\), fig. 23.

![Fig. 23. Location Hrasnica, Sokolović, Bjelašnička 54.](image)

Two people were killed at a distance of around 20 meters from the nearest part of house no. 56, which was hit on the corner (sketch of the incident on page 06067158), and they were probably not killed by the blast wave, but by shrapnel resulting from the explosion (there are no medical documents or autopsy reports that could help determine the cause of death and manner of injury). The sketch shows that the house at Bjelašnička no. 60 was also damaged by the explosion of the bomb that fell on house no. 54, which is about 25 meters away.

The pictures on pages 06067158 and 06067159 show that the house was hit by a large-calibre projectile. Based on the material strewn around the house,\(^80\) it is

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concluded that the projectile exploded inside the house. Such damage can be caused by a FAB-100 aircraft bomb (39 kg of solid TNT explosive).

ZEČEVIĆ rejects the possibility that this was a projectile with a solid explosive and says, “There are no fragment traces on the existing interior walls, and no significant fragment traces on the surrounding buildings. The FAB-250 bomb has a minimum of 11,000 fragments with a mass greater than 0.25g and velocity of around 2,000 m/s. If TNT explosive had exploded, the fragmentation effects would have had to be visible on all the lateral interior walls of the house and on the façade of the surrounding houses.” Mr B. ZEČEVIĆ’s conclusion is inaccurate, because the bomb in this case exploded inside the house, so the fragments of the bomb hit the interior walls, which were destroyed, and this also rules out the possibility that they hit the walls of the surrounding buildings. On page 06067078, in the last sentence of the last paragraph, B. ZEČEVIĆ describes the effects of the rocket-assisted ODAB-500 bomb and says: “The overpressure of the detonation is 10 - 20 bar and lasts for mere milliseconds, but causes substantial destruction to light and moderately reinforced structures and living things.”

The fuel-air cloud could not have such a devastating effect and would not be able to destroy the corner of a building about 25 meters away from the explosion, as presented in the sketch of the event, given that the detonation pressure suddenly drops outside the fuel-air cloud and they were on the perimeters of the assumed zone of the detonation pressure effect (it is assumed that an area with a diameter of 20 to 30 meters is affected).

In describing the event, B. ZEČEVIĆ contradicts himself. In the comment on page 0606158 (last paragraph) he says, “The projectile hit the vertical wall of the house (brick with concrete beams, concrete rings, and concrete plate above the ground floor) from the direction of north-west, images from documents 00337915 and 00337916. The projectile exploded on the /first/ floor.” And on the next page, 06067159 (first paragraph), he claims something quite different: “the projectile penetrated the roof and impacted the concrete plate on the first floor at a distance of around 8 m from the vertical wall of the house in the incoming direction (image from document 00337917, mark 1).” Fig. 24.

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Fig. 24. Impact of the projectile on the house in Bjelašnička 54
1. the point of impact on the house (according to B. Z.) and
2. a damaged car

Thus, in the first case the projectile hit the vertical wall of the house, while in the second case the projectile came through the roof. Which of these situations is the true one cannot be established from ZEČEVIĆ’s interpretation. The investigators defined “the place of impact as the left side of the house” but did not state whether the projectile had landed on the roof or hit the vertical wall of the house.

3.13 Case 13: 00374936
Page 06067162
Date: 22 August 1995 at 1530 hours.
Location: Sarajevo, Zmaja od Bosne Street no. 64, Bitas building
One person was killed and another person was injured.
The investigators provided three statements with different incoming directions of the rocket: in the first two reports (23 August 1995 and 25 August 1995) the projectile came in from south-west, from the Rajlovac position (Mr Berko ZEČEVIĆ is of the same opinion), but according to the third report (compiled on 28 August 1995), the projectile came from the south-east direction.
According to the photographs on page 06067162, fig. 24, it can be concluded that a projectile hit the external beam between the second and third floor, as noted by the investigators, and then detonated. The explosion occurred immediately after the projectile hit the beam, since it flew into the second floor and exploded there. It can be considered that the explosion was closer to the outer walls of the building, as indicated by the effects of detonation, which are very similar to those in fig. 50 on page 06067054, and the misshapen beam on the second floor. The explosion, which occurred near the outer walls of the building, created a strong blast wave that caused

82 Berko Zečević, 65#04387BCS (06067014-06067189) Primjena modifikovanih avionskih bombi tokom opsade Sarajeva 1994-1995, Sarajevo, February 2007, (images on page ERN 06067162 bottom left, the spot is marked with a yellow arrow).
all the windows above and below to be smashed by the effects of the solid explosive, and it also damaged the interior of the building in the direction of the explosion, especially the staircase, which is the weakest component in buildings and the first to collapse in the event of more powerful earthquakes.

On page 06067163 ZEČEVIĆ describes the damage “opposite from the point of impact” and at the back of the Bitas building and states that the external walls on the opposite side from the point of impact on the fourth and fifth floors were penetrated (the building has four stories as he himself shows in the description on page 06067162, using a yellow arrow to show the point of impact, “severe damage to the horizontal concrete beam above the second floor.” ZEČEVIĆ links the damage on the “fourth and fifth floors” with this by saying that the projectile ricocheted off “the staircase and went on toward the third floor”.

In the first paragraph on page 06067163, Mr ZEČEVIĆ says, “Parts of the exterior walls opposite from the point of impact on the fourth and fifth floor were penetrated (image from document 00374967). This indicates that the projectile probably ricocheted off the staircase and went on towards the third floor.”

The assertion “the projectile probably ricocheted off the staircase and went on towards the third floor” (and damaged the “fourth and fifth floors of the building” in the process) is brought into question that. ZEČEVIĆ himself claims in the second paragraph on page 06067156: “The term ‘ricochet’ implies that the projectile deflects off a hard ground surface”, which means that, in order to ricochet, a projectile needs to hit a “hard ground surface”, which a staircase is certainly not.

The photographs shown in fig. 25. “Front of the Bitas building, photographed from two angles” show that the projectile hit the horizontal concrete beam above the second floor and detonated close to the external walls, and then the blast wave penetrated into the interior of the building causing damage to the external façade and windows of the Bitas building and damaging the rear part of the Bitas building as shown in fig. 26. “Back of the Bitas building”. 
That this is so can be seen from the structure of the damage to the external parts of the façade, on which the windows and wall have been blown out, which is consistent with the effects of the blast wave caused by an explosion outside the building, as shown by B. ŽEČEVIĆ in fig. 50. on page 06067054, and in this analysis in fig. 27.

**Fig. 27: Blast wave effect caused by an external explosion**

In his comment in the fourth paragraph on page 06067163, B. ŽEČEVIĆ presents his opinion of the event: “The effects of the projectile inside the staircase of the Bitas office building bear all the hallmarks of a volumetric weapon.” Further on, in the sixth paragraph on the same page, he says: “The photographs show no pronounced fragmentation effects (images of documents 00374969, 00374970 and 00374971).” These are the images on page 06067163. The investigators, who were at the scene, concluded (page 06067162, the sentence above the comment by B. Z.) “Only small parts of the projectile were found, because it was impossible to access the interior of the destroyed building.” Thus, “**only small parts of the projectile**” were found, which is characteristic of a destructive bomb with a solid explosive. If it was a volumetric explosion, as claimed by B. ŽEČEVIĆ, when “small pieces” were found, how is it possible that large pieces of the casing of the projectile with fuel-air explosive were not found?

Realising Having realised that the structure of the building – a multi-storey building with reinforced concrete walls – was too strong for the destructive effects that a volumetric bomb would cause inside it, Mr B. ŽEČEVIĆ has an explanation for the pronounced destructive effects and so he says on page 06067163, “The layout of the building, with its many corners, reinforced the reflected pressure effect, resulting in severe damage to the building.”

Although he tried to find arguments for the effects of volumetric fuel-air explosives in the Bitas office building, the detonation pressure that such an explosive has and which range from 20 to 30 bar, and despite every possible reflection in a building “with its
many corners”, could not cause such destruction as was caused by the projectile with solid TNT explosives. Given the fact that the pressure of the TNT detonation is more than 200 kbar, it can be concluded that the Bitas building was hit by a projectile of great destructive power, filled with solid explosive, trinitrotoluene, a rocket-assisted FAB-250 projectile.

PART 4
DISCUSSION OF THE ENCLOSURES 84

4.1 The Military Use of Fuel-Air Explosives - Summary
Prepared by Mr Berko ZEČEVIĆ, Sarajevo, February 1994. 85

4.1.1 In this summary (page 06067181), B. ZEČEVIĆ discusses the general methods of use of fuel-air explosives, mainly in US aircraft bombs, as they originated in US laboratories. At the very beginning, the composition of the explosive mixture DBA-22M is stated incorrectly. It is said that it contains aluminium nitrate (which is not true). The explosive mixture DBA-22M does not contain aluminium nitrate, but ammonium nitrate, and this is not an explosive that has been used “recently”, but one which was used as far back as the sixties and which consists of aluminium powder, aluminium nitrate, thickeners and stabilisers, 86 or, from another source: DBA-22M is a mixture ammonium nitrate, aluminium powder, and polystyrene soap as phlegmatiser. 87 This explosive is also referred to in the literature as gel slurry explosive and it was used in battlefields in Laos and Vietnam. It was used in the American BLU-82/B bomb, which was tested on 31 July 1968 in the Eglin AFB test centre in Florida. The bomb that contained it was known as “Big Blue”. This “composition” of fuel-air explosives which contain “aluminium nitrate” can be found on some internet forums which do not merit professional trust. 88

4.1.2 In the last paragraph on page 06067181, he states that, “fuel-air explosives use oxygen from the air … and their result is the creation of final products of combustion, such as CO, CO₂, and H₂O.” CO cannot be a final product of combustion because, in the presence of sufficient quantities of oxygen, it becomes the fully oxidised compound CO₂.

4.1.3 In this summary B. ZEČEVIĆ says, “The USA, USSR, France, Israel, and probably China have fuel-air explosive weapons. So far there is no data available about this weapon in the USSR other than the fact that they have it.” In view of this opinion, the question arises as to where Mr B. ZEČEVIĆ has obtained such detailed information about the structure and composition of the Russian ODAB-500 fuel-air bomb. Who gave him the information about that bomb? In which year and at what location was that bomb photographed (page 06067078)? We only know that he was

86 http://www.vietnam.ttu.edu/star/images/039/03902090 01.pdf
given the photograph by the Dutch SFOR because on pages 06067071, 06067077, and up to 06067082 of the document under consideration he presents detailed information about the bomb, about which, he claims, nothing was known in 1994 except that the USSR had it.

4.1.4 In the section about the effects of fuel-air explosives he talks about the detonation characteristics of fuel-air explosives and states that the velocity of the blast wave varies between 600 and 2,200 m/s, the duration of overpressure is longer in comparison to solid explosives, and that fuel-air explosive (page 06067182) “spreads over the whole combat area, between trees, over shelters or even entering inside them, and then it explodes in a powerful, uniform, relatively long, and deadly wave. With materials that are sensitive to the impulse of a blast wave up to 30 bars, fuel-air explosives have an absolutely devastating effect throughout the volume of the cloud. In an aerosol cloud of ethylene oxide, the detonation pressure is between 20 and 30 bar.” In the document he states that: “The overpressure of detonation is 10-20 bar and lasts for mere milliseconds, but causes substantial destruction to light and moderately reinforced structures and living things.” Why such a difference in the pressure of detonation if this involves ethylene oxide?

4.1.5 In the text, he describes under the subheading Blast wave injuries the blast wave effects on living beings: “The blast wave ruptures lungs, eardrums, and internal organs, and air bubbles can even enter the bloodstream and become lodged within the heart or brain, thereby causing rapid death from ‘air embolism’. When the lungs are ruptured, blood from small blood vessels fills the alveoli, causing the victim to drown in their own blood. The victim coughs up bloody foam as he or she tries to get air. Fuel-air explosives cause a very high level of fatalities up to a certain distance, and then the fatality level drops sharply.” Thus, fuel-air explosives cause “a very high level of fatalities”, but the considerations in 1.3 to 1.13 of this analysis, taking into account each victim, cannot fully confirm this.

4.1.6 Further on in the text, he discusses the effect of the American CUB-55B, CUB-72, BLU-95 volumetric bombs, combat equipment with fuel-air explosives of the US Army and Navy, which goes beyond the context of the document and can be considered as a general overview. All assets shown are part of the US armoury, and they are sophisticated combat assets requiring a strong basis in terms of scientific research and technical and technological support.

4.1.7 On page 06067184, B. ZEČEVIĆ discusses the “concept of the way fuel-air rocket projectiles work”. In the text below the subheading he states, “On contact with the target (using a contact fuse with sensor) or very close to it (using a proximity fuse), the solid explosive charge is activated to rupture the container holding the fuel-

air explosive. The liquid hydrocarbons evaporate and change into a gaseous state, causing the formation of an aerosol cloud. After a certain time, needed to allow the formation of a cloud of certain dimensions and concentration, secondary fuses housed in the rear of the projectile are activated, triggering the detonation of the aerosol cloud at multiple spatial points.” This concept of action, as described here, is not ascertained anywhere in the cases discussed (points 3.1 to 3.13 of this analysis). Nowhere did a first detonation of solid explosive destroy the can (this is a loud detonation, louder than a fuse action) to be followed by the detonation of a number of fuses positioned at the rear of the projectile, initiated in a number of spatial points. In none of these cases was part of a fuel-air explosive “can” found, although one should have been found after the explosion.

4.2 In the second enclosure, “Fuel-Air Explosive Rocket Projectiles”, which is a report (page 06067186) submitted to the RBH Ministry of Defence on 31 January 1994, he says that a projectile landed on the plateau of Žuč hill at 0945 hours on 29 January 1994 and that he was personally invited to identify the projectile.

4.2.1 He does not mention in the report the damage caused by the projectile on the plateau of Žuč hill and does not say whether anyone was killed or wounded. He listed what he found at the site after the explosion of the projectile, but he did not find any of the containers that had carried the hypothetical fuel-air explosive. He himself confirms in the introduction that the officers who were on Žuč hill did not agree with his assertion that this was a fuel-air bomb.

4.2.2 He first concluded that this was a projectile with solid explosive that had not detonated correctly at the target. He then expanded the report by adding references from the literature in point 2, where he cites the IDR military journal from 1987 (page 06067187) (without specifying whose journal this is, the issue number, the relevant article, page number or authors), saying that it “highlights the tendency to deploy fuel-air rocket projectiles”, and in section 4 of the report, he asserts, “On the basis of the remains that were found, one can assume that the diameter of the projectile was approximately 450 mm, its length was approximately 5,000 mm, and its mass was approximately 450 kg (with a mass of approximately 200 kg of fuel-air explosive). Eyewitnesses say that the aerosol cloud was approximately 50 metres in diameter.” He does not specify who the witnesses were and from where they witnessed the event. When talking about the remains that were allegedly brought from Žuč hill, ZEČEVIĆ discusses the effects that were seen on the ground (scorched grass and soil within a diameter of 30 meters), while not stating the provenance of that information given that he was not at the spot. It is unclear why he attributes such an effect only to fuel-air bombs since the same effect can occur when a large conventional projectile is activated at a height above the ground, for example if it hits a tree or something

similar. In the preceding pages of this document, he does not show anywhere the remains of containers which “held” the fuel-air explosive, nor does he show “the remains found” which would indicate the use of fuel-air explosives. What he says here is based on assumptions, as he himself says that “on the basis of the remains that were found, one can assume” the dimensions and quantity of the explosive in the bomb!

4.2.3 He also states that four rockets were launched “in yesterday's attack” (the report is dated 31 January 1994, so “yesterday” would have been 30 January 1994) “one of them did not explode” and his proposal was that “it would be exceptionally important to preserve it, both as proof of the violation of the arms embargo, and also for analysis of the weapon for its possible copying for the needs of our army.” There is no indication as to whether this recommendation of B. ZEČEVIĆ was taken up because the projectile found is shown on fig. 93. (page 06067084), on fig. 104 (page 06067094) of the document96 (point 1.1 of this analysis), and fig. 8 (page 00378670) of the document97 (point 1.5 of this analysis). This is evidently one and the same projectile that did not detonate fully at the target, but there is no information about what was done with that projectile and what were the results of examination.

4.2.4 In the second report on page 06067188, with no indication as to the recipient (it was probably sent to the same address, the RBH Ministry of Defence, but dated 21 December 1994 – almost a year later) he discusses the events of 29 January 1994, when he was asked to identify the remains of a projectile that had landed on the Žuč plateau at 0945 hours that day. The report contains mostly the same information as the previous one. The difference is in the submission date: the first report was submitted at the beginning of the year, on 31 January 1994, while the other was submitted at the end of the year, on 21 December 1994.

Both reports state (section 3 in the first, dated 31 January 1994, and section 5 in the second, dated 21 December 1994) that, “in the SR /Federal Republic/ of Yugoslavia, intensive activities were conducted in the field of fuel-air explosive aircraft bombs at the Institute in Vinča, but no final results were produced”, which means that the Yugoslav army had not managed to produce a fuel-air bomb.

4.2.5 In the second report, first paragraph on page 06067189, as in the first report (point 4.2 of this analysis), B. ZEČEVIĆ assumes on the basis on the remains found the diameter, length and mass of the projectile, and on the basis of these assumptions he assumes that the mass of fuel-air explosive is “about 200 kilograms”.

97 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIC, BEng. (Mechanical) and Amir KURTOVIĆ, BEng.(Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.
PART 5

5.1 Review of the document

IZVJEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva

/Report on the Effects of Strikes Against Urban Areas of Sarajevo by Rockets of Great Destructive Power/, by Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995 (hereinafter referred to as B. ZEČEVIĆ et al.)

5.2 This report discusses cases of the detonation of projectiles at the following sites:

[1] RTV BiH /Radio and Television of Bosnia and Herzegovina/ House, (at 0922 hours on 28 June 1995), shown in the document on page 06067142 and in section 3.8 of this analysis;

[2] Residential building at Geteova St. no. 5, (at 1300 hours on 28 June 1995), shown in the document on pages 06067149 to 06067151, and in section 3.9 of this analysis;

[3] Commercial building at Safeta Hadžića St. 90, heating plant (at 1020 hours on 28 June 1995);

[4] Geodetski Zavod /Institute of Surveyors/ (at 1230 hours on 29 June 1995) and

[5] Plinara /Gasworks/ (at 2000 hours on 28 June 1995), only the location is shown in fig. 27.

Fig. 28 shows the locations hit by the projectiles shown in section 5.2 of this analysis from [1] to [5].

98 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.


101 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.
1. RTV BiH House ...................................................... at 0922 hours on 28 June 1995
2. Residential building at Geteova St. no. 5 ............. at 1300 hours on 28 June 1995
3. Commercial building at Safeta Hadžića St. .......... at 1020 hours on 28 June 1995
4. Geodetski Zavod .................................................. at 1230 hours on 28 June 1995
5. Plinara ................................................................. at 2000 hours on 28 June 1995

5.3 In this report B. ZEČEVIĆ et al. argue that the above locations in Sarajevo were hit by projectiles with fuel-air explosives. Given that all these buildings were made of solid material, and fuel aircraft bombs generally have, according to B. ZEČEVIĆ himself (in the last sentence of the last paragraph on page 06067078102), “The overpressure of the detonation is 10 - 20 bar and lasts for mere milliseconds, but causes substantial destruction to light and moderately reinforced structures and living things.” It is unclear on what basis they argue that fuel-air explosives detonated at all the described locations, which were made of solid material (e.g. RTV BiH and the tower block in Geteova St. no. 5), although the descriptions of the destruction at these locations do not match the description of the effects of a fuel-air explosive, which, according to B. ZEČEVIĆ himself, “causes substantial destruction to light and moderately reinforced structures and living things”. Nor, with due respect for each victim, does the number of victims.

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5.4 In case number [1], RTV BiH HOUSE (28 June 1995 at 0922 hours), they give a description of the event in which, as well as the fall of the projectile, they present collectively the statements of witness without mentioning their individual names or what each of them heard. The witnesses (Igor MOČNAJ, Hazim BERISALIĆ and Sead TOKALIJA) heard a projectile which “was accompanied by characteristic sounds typical of bombs that have hit the neighbourhood of the RTV House and the general area of Alipašino Polje on several occasions during the past month”. No description of the “characteristic sounds” is given, and it is not clear on what basis they conclude that it was precisely such a projectile that was “accompanied by characteristic sounds”, and what kind of sound this is and how it differs from other projectiles that would make it “characteristic”. Doubts as to the credibility of the witnesses are raised by the claim that “the projectile impacted the RTV building at least once, no less than five (5) seconds before detonation.” How can anyone hear something that “impacted … at least once”? Does that mean that it happened more than once, when “at least once” was registered? This is a very problematic and absolutely unreliable testimony. The question arises here as to how it was physically possible at a stressful time to hear (listen to) the projectile hitting the wall “at least once”, and then coolly count five seconds after which (counted seconds!) an explosion was heard? The witnesses were also certain that they heard “two separate sound events”, one a “muted explosion” and the other “a very powerful explosion”, with five to seven seconds between them. Again, the question arises of how they (the witnesses) had the presence of mind to count five to seven seconds from the first, “weaker or muted explosion” to the next, “very powerful explosion”, and on the basis of these “credible” witness statements, B. ZEČEVIĆ et al. conclude that this was caused by fuel-air explosives. The assertion that the policeman who was killed managed to run from the column to the back entrance, a distance of approximately 15 m, “in the interval between the landing of the projectile and its activation,” is very problematic. It is obvious that he was thrown by a blast wave caused by the explosion of solid explosives.

The description of this event is also shown in the document\textsuperscript{103} (page 06067142), but according to point 3.8 of this analysis, a modified aircraft FAB-250 bomb filled with trasyl landed at this location.

5.5 In paragraph 1.2. (on page 00378663)\textsuperscript{104} they describe event [2] and show the effect of the projectile on the residential building in Geteova St. no. 5 (Cetinjska) (28 June 1995 at 1300 hours). Two people were killed and seven residents were wounded. Under the subheading “Witness testimonies”, a statement of only one witness, Hasan BJELAK, is cited (without specifying the place where he was during the explosion) to the effect that “the projectile that caused the destruction was accompanied by a characteristic sound,” and “a heavy blow to the building was felt, followed by a powerful detonation five seconds later.” Here, too, the question arises as to what is this “characteristic sound” and how could the witness have been so lucid that he was


\textsuperscript{104} IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVić, BEng. (Mechanical) and Amir KURTOVIĆ, BEng.(Chemical), Sarajevo, 11 July 1995. 0037-8659-0037-8799, 1D-03282.
able to start counting seconds from the moment “a heavy blow to the building was felt”, and counted five seconds until the “powerful explosion”.

The description of the event on page 00378663, section 1.2 contains a subsection entitled Visual aspects whose first line reads, “At the incident site, on the seventh, eighth and ninth floors of the building, there is extensive damage caused by explosion. The interior of the apartments, as well as partition walls, on all three floors have been completely destroyed.” But in the document on page 06067149, he wrote, “The projectile went off on the eighth floor of the high-rise building. It destroyed a number of apartments from the seventh to the eleventh floor.” The incoming direction of the projectile is also determined differently: the MUP investigators established that the projectile came from the azimuth direction of 260°, whereas B. ZEČEVIĆ (section 3.9 of this analysis) that the projectile arrived from the direction of Butila, azimuth angle of 285°. There are obvious discrepancies regarding the time when the event occurred, the number of casualties and the damage to the apartments on different floors in each document. The question is what is B. ZEČEVIĆ saw in 2007 when he drafted the report (apartments from the seventh to the eleventh floor were destroyed), and what he did not see when the first report was drafted on site in 1994. The information concerning the victims (in the description of the event, point 3.9 of this analysis) and the time of explosion of the projectile is different: in the document the time of explosion of the projectile is 1015 hours, but in the report the time of explosion is 1300 hours; the number of victims in the document from 1995 is two, but in the document from 2007 three. This incident is described in the document on page 06067419. According to this analysis (section 3.9), a FAB-250 modified bomb with three rocket motors landed at this location.

5.6 - In section 1.3 of the report, the authors describe event [3], the heating plant at Safeta Hadžića Street (Prvomajska Street) no. 90. He does not specify whether anyone was killed or wounded. According to the MUP findings, the projectile arrived from the azimuthal direction of 265°at 1020 hours on 28 June 1995, and “hit the flat roof of the heating plant, pierced the ceiling and the outside wall, and then hit the gas substation. The warhead ricocheted and landed next to the back wall of a single-storey office building approximately 20 m away.” On page 00378663, B. ZEČEVIĆ et al.

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108 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng.(Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282.
110 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng.(Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282.
111 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng.
give this description: “In the immediate vicinity of the office building, can be identified by a shallow crater 2.5 m in diameter and 0.5 m deep.” As an argument that a projectile with fuel-air explosive fell at this location B. ZEČEVIĆ et al. note that, “no significant traces of fragmentation effect are visible on what is left of the walls or on nearby buildings.” There could be no fragmentation effect because the projectile, according to this description, detonated incompletely on the ground, when the warhead broke up on hitting the gas substation, and its remains, together with the secondary fuse, rolled relatively far from the point of impact before the detonation occurred. In the analysis of the effects on the target, (page 00378677 Effects on target - Safeta Hadžića no. 90) the authors describe the effects of “fuel-air” explosive: “The results of the on-site investigation indicate that the warhead container burst next to the gas substation. Propelled by inertia, the remains of the warhead travelled as far as the back wall of the office building, where the explosion occurred. The blast wave formed was less powerful than in previously analysed cases.” From this description of the event, B. ZEČEVIĆ et al. assume that “the warhead container burst” and the remains of the warhead with hypothetical fuel-air explosive, prone to migration, flew on by inertia and exploded on the ground with lessened intensity, having previously come out through the pierced roof of the outer wall! Parts of the warhead and the rear end of the warhead casing were found on site and, “the MUP had also found the remains of the propulsion system in the area around the gas substation”, but the type of the propulsion system or the motor number are not specified. If all this was found, how come the remains of “the warhead container” containing “fuel-air explosives” were not found? They should have been found near the site of the explosion because the “blast wave formed was less powerful”. Finding container parts would be the most important item of evidence that this was a fuel-air projectile with fuel-air explosive, but all the cases presented so far (in sections 3.1 to 3.13 of this analysis) lack such evidence. Based on the descriptions of the projectiles, the warhead parts retrieved and the crater created, this location was hit by a projectile with a solid explosive, trotyl, creating a low-intensity blast wave due to incomplete detonation and, possibly, deflagration.

5.7 The objectivity of the witness to this event, Dževad BEČIROVIĆ, is brought into question (page 00378665, Witness statements) because he too heard the distinctive sound as the rocket-assisted projectile fell on the heating plant at Safeta Hadžića Street (Prvomajska Street) no. 90 (page 00378663): “The sound of an impact was heard as the projectile landed; five or six seconds later there was a powerful explosion.” Again, he was so well composed that after the shock caused by the fall of

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112 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane dijelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282, (p. 0037-8663).
113 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane dijelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.
114 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane dijelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.
the projectile he counted the seconds and managed to count until “five or six seconds later, there was a strong explosion.” The location from which the witness observed the effects produced by the projectile is not specified, nor is the “characteristic sound” of the projectile in flight.

5.8 Event [4], the Geodetski Zavod, is shown on page 00378665 of the report. No one was injured. According to the MUP’s findings, “at 1230 hours on 29 June 1995, the projectile landed in the immediate vicinity of the Geološki zavod /as printed/ building, next to the right-hand lane of Meše Selimovića Boulevard, across the road from the RTV building ... At a distance of 15 m from the front of the Geodetski zavod building, between the edge of the pavement and the kerb, there is a conical crater up to 1.5 m deep and up to 3.5 in diameter.” There were no traces of fragmentation on the containers /communal rubbish bins/ near the explosion, or on the front façade of the Institute or the car parked directly below the steps leading to the entrance. Nylon film covering the windows was torn. In the section Effects on target - Geodetski zavod (page 00378677) the report states, “The projectile fell directly on the ground, penetrated to a certain depth, and activated the charge in the warhead. It made a crater in the asphalt surface, whose dimensions were indicated above. The resulting aerosol cloud acted both in the ground and on the surface itself, forming a crater and a blast wave of modest intensity.” How could a fuel-air cloud form a crater “up to 1.5 m deep and up to 3.5 in diameter” in the asphalt surface, given that its detonation overpressure is 10 to 20 bar and it is used for the destruction of “light and moderately reinforced structures and living things” (B. ŽEČEVIĆ)? It should be especially borne in mind that in many cases bombs exploded inside the buildings, causing a great deal of damage, or in the soil, and for this reason there could not have been a significant fragmentation effect on the nearby objects (sections 3.1 to 3.13 of this analysis), which is the case here: the projectile “penetrated to a certain depth” and activated. The remains of the motors (without specifying their number and type) were in the crater itself. Judging by the size of crater made on the asphalt surface, a rocket-assisted FAB-100 aircraft bomb landed on this location.

5.9 Event [5], the Plinara (at 2000 hours on 28 June 1995), which is specified in section 5.2, is not shown in the document, but only the location is presented in fig. 28
The explanation why the Plinara event was not presented is on page 00378660, where it states, “On 28 and 29 June 1995, the team of experts examined the following incident sites:
- RTV BiH /Radio and Television of Bosnia and Herzegovina/ building,
- residential building at no. 5, Geteova (Cetinjska) St.,

115 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeja, Berko ŽEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng.(Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282.


117 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeja, Berko ŽEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282.
The Plinara event, referred to above, was not considered by Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical).

5.10 In the ballistic analysis (section 2. on page 0037-8666)\textsuperscript{118} the first sentence gives the projectile velocity in the terminal section of its trajectory: “According to witness statements, the velocity of the projectile in the terminal section of its trajectory was no more than 250 m/s.” On what kind of indicators and instruments did the witnesses base their judgment that the velocity of the projectile in the terminal section of its trajectory did not exceed 250 m/s? This is a completely arbitrary assessment given that velocity cannot be measured without electronic equipment. They could have registered that the projectile flew past very quickly, without making any assessment of its speed, because the speed of 250 m/s corresponds to the speed of a body travelling at the speed of 900 km/h! Witness statements about the speed of the projectile are subjective assessments that cannot even be considered information, and especially not as a useful parameter for the analysis of the velocity of a projectile in any section of its trajectory, including the terminal section. The question arises as to how accurately an observer can determine the speed of passing vehicles (of which he sees dozens every day in urban areas, whereas this concerns the speed which is at least 10 times greater) other than being able to say that it was fast or slow. There is probably no need to mention here that in wartime conditions such an observer is observing ordnance of which he has no experience.

5.11 On page 00378667\textsuperscript{119} paragraph no. 1 the authors state: “The thickness of the rear end of the warhead decreases towards the front of the warhead, until it reaches 9 mm at a distance of 61 mm from the rear edge of the warhead. The remains (fragments) found indicate that the average thickness of the case is approximately 6 mm.” This assertion is not substantiated in any way. That is to say, the document does not state anywhere how this claim was determined, as it would require that fragments be lined up along one side of the axis of the projectile, on the basis of which it would be possible to find the change the thickness of the casing, or to collect enough large fragments for statistical analysis. There is only an assertion! In particular, it has not been explained how the thickness of the casing was deduced from some unknown value and declared to have decreased to the “final” thickness of 9 mm at a distance of 61 mm from the rear edge, and then it is stated that the average thickness of the case is 6 mm. (If the final thickness of the casing decreased to 9 mm at the distance of 61 mm, how can the average thickness of the rear edge of the be 6 mm?)

\textsuperscript{118} IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282, (p. 0037-8665).

\textsuperscript{119} IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.
5.12 In section 7, page 00378669, the authors the characteristics of the Swedish bomb: the diameter of the bomb is 214 mm; its total mass, including the parachute, is 123 kg; and the mass of the charge is 30 kg of RDX-TNT. They also consider the fragmentation of the bomb, which is filled with explosives more powerful than trotyl, in order to compare the number of fragments in Yugoslav-made bombs of a similar mass. Because of the presence of higher energy hexogen, RDX, in the charge of the Swedish bomb (the velocity of detonation of such a mixture of explosives - usually 60/40 RDX/TNT - is 7800 m/s for a density of 1.65 g/cm$^3$, and 6,900 m/s for solid TNT with a density of 1.60 g/cm$^3$) so that the comparison with the Yugoslav-made FAB-100 and FAB-250 aircraft bombs is not correct because of the different materials in the casings and explosives, as they themselves say (on page 06067056, paragraph 3), which determines the performance of the general-purpose bombs, and they list: “shape of the bomb, dimensions, mass, explosive charge type, bomb material type, the manner and the site of the explosion initiation, type of fuse, individual bomb variations and technological level of the equipment.” With this in mind, the presented fragmentation results cannot be compared with the fragmentation of the Yugoslav-made FAB-100 and FAB-250 bombs, because they do not have the same explosives or mass, and their bodies are made of different materials. The Swedish-produced bomb contains 30 kilograms of the RDX/TNT mixture as its explosive charge, and the Yugoslav-produced bombs contain 39 kilograms of trotyl (TNT) in the FAB-100 and 96 kilograms of TNT in the FAB-250 M72, while the FAB-250 M79 contains 105 kilograms of TNT.

5.13 Fig. 7 (on page 00378669) is a photograph from the 28 November 1994 issue of the magazine Newsweek, which is also shown in two figures in the document: in fig. 94 and fig. 112, as evidence that “the Bosnian Serbs used modified aircraft bombs (FAB-100).” Below these images in Newsweek there is a caption “conventional airborne bombs”. The term “conventional” refers to bombs

120 *IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva*, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVić, BEng. (Mechanical) and Amir KURTOVIć, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.


123 *IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva*, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVić, BEng. (Mechanical) and Amir KURTOVIć, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.

124 *IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva*, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVić, BEng. (Mechanical) and Amir KURTOVIć, BEng. (Chemical), Sarajevo, page 00378669. “According to available data, during the war the Bosnian Serbs used modified aircraft bombs (FAB-100) combined with a propulsion system consisting of one motor from the 128 mm M75 MUNJA air-to-surface rocket and the fin assembly from the US 5” (127 mm) HVAR rocket. There is evidence that at least two such projectiles were launched from the hill of Blagovac at the building of the *Saobraćajni fakultet* /School of Transportation/ in Vogošća during 1993. Rockets of this kind were rather intensively used around Bihać. The photograph below further supports this claim.”

with the solid explosive, trotyl, and so this cannot be regarded as evidence of use of fuel-air explosives. On the next page, they offer a photograph of the “remains of the unexploded projectile of the design described above… found in the area Vogošća,” of a modified FAB-100 aircraft bomb (fig. 8 on page 00378670) and which they also show in two other places in the document.126

5.14 On page 00378670,127 paragraphs 4 and 5 read: “On the basis of the effects of aircraft bombs as described above, the design geometry of FAB 250 and FAB 100, and the **remains found** at incident sites, we have excluded the possibility that an aircraft bomb may have been used as this particular rocket’s warhead.” (The authors of the report128 consider the term “remains found” to include (paragraph 3) **the absence of traces of intensive fragmentation effect**” after the bomb explosion, but on page 06067056 of the document,129 Berko ZEČEVIĆ (fourth paragraph, fourth line from the top) says the following in connection with static arena bombs tests: “**Spatial distribution of bomb fragments is not uniform, and therefore testing of multiple bombs will produce significant variation in the number, size and shape of fragments.**” How, then, can fragments be “**uniform**” in dynamic conditions?) Further, on the same page, 00378670,130 (paragraph 5) reads: “In view of the weapon’s effects at target and the manner of its activation, we believe that in all the above cases we are dealing with **rockets with fuel-air warheads**.

“This is borne out by the following:

1. The remains of propulsion systems and warhead fragments found;
2. Literature on fuel-air weapons;
3. The ballistic parameters of rockets of this kind;
4. The effects at target.”

5.15 “The remains of propulsion systems and warhead fragments found.” There are no fragments of the warhead which prove this. In fig. 4 on page 00378665, they show a very indiscernable image (from which nothing can be seen nor deduced), and these would be warhead fragments with distinctive markings or fragments specific to a known construction that has already been described. It is emphasised that the said parts of the propulsion system, shown in figures 2 and 3 on page 00378664, cannot be regarded as elements on the basis of which the type and design of the projectile, can be identified, and especially not the kind of **explosive**. The propulsion system cannot

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127 *IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva*, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282.
128 *IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva*, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282.
130 *IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva*, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, ID-03282.
be used to identify the type of warhead, but only to identify the propulsion, except in cases involving an already known asset, which is not the case here.

5.16 “On the basis of the remains of the warhead found, including the base, part of the rear end, and several larger fragments of the body,” which do not carry any markings, “it has been possible to reconstruct its shape and dimensions”\textsuperscript{131} (page 00378673, first paragraph). Based on these components, B. ZEČEVIĆ \textit{et al.} concluded that the diameter of the warhead, which was made of steel, was 300 mm. However, they did not show anywhere in the preceding text the characteristics of the container which is filled with fuel-air explosives, except for the image entitled \textit{appearance of a rocket with demolition warhead, reconstructed on the basis of projectile remains} (on page 00378674), showing a standard warhead casing for an aircraft bomb with conventional explosive, mounted on a rocket motor. Everything is given schematically. The parameters for reconstructing the layout and characteristic dimensions of the rocket projectile and warhead are obtained entirely on the basis of assumptions (page 0378673, eighth paragraph) which are derived on the basis of fragments of the warhead shown in fig. 4 (page 00378665): the assumed mass of the warhead is 150 kg, the assumed mass of metal is 75 kg, the assumed mass of liquid explosive is 75 kg, the ideal speed of the rocket projectile is about 380 m/s, and

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IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282, (p. 00378665).
the range of the rocket is about 6,500 m/s, but on page 00378673, the seventh paragraph reads, “The remains found do not suffice for an accurate calculation of the length of the warhead, but the use of appropriate methods from external ballistics makes it possible to determine the approximate mass of the warhead” therefore, the length of the warhead cannot be determined, but the approximate mass can! Based on these assumptions, they assume that the length of the warhead (which they could not determine accurately) is 1,000 mm. Having considered these assumptions, without any connection to the physical evidence found at the scene, B. ŽEČEVIĆ et al. draw the rocket projectile without indicating anywhere in the drawing that this is actually a hypothetical drawing, deduced from assumptions “on the basis of the remains found”!

The question that inevitably arises in view of the assumed drawing shown in fig. 29 is whether in reality a container carrying fuel-air explosive is the same as a warhead casing filled with the conventional explosive, trotyl, as is presented it in the drawing. Is the thickness of the casing of aircraft bombs with the conventional explosive, trotyl, the same as the thickness of the fuel-air container with fuel-air explosives? Nowhere
in the previously analysed texts
did B. ZEČEVIĆ et al. give an answer to this very important question. At the end of the section entitled Warhead, (page 00378673) B. ZEČEVIĆ et al. conclude that, based on the traces, no unequivocal verdict can be provided about the type of liquid explosive used, but “for an accurate determination of the type of liquid explosive used we would have to find an unexploded warhead.” The unexploded warhead was found, but no one knows what happened to it! (Section 5.13 of this analysis).

5.17 Literature on fuel-air weapons cites from the relevant literature certain characteristics of US-made bombs with fuel-air explosives, as well as American comparative data on the characteristics of TNT and fuel-air explosives. Thus, on page 00378671, they cite as proof that fuel-air projectiles were developed in Serbia articles by M. I. TRTANJ, Z. B. MAKSIMOVIĆ, M. M. TUFEGDŽIĆ - Ispitivanje uticaja organskih rastvarača na kinetiku razlaganja tetranitrometana /Research into the effects of organic solvents on the kinetics of tetranitromethane decomposition/, JKEM /Yugoslav Committee on Explosive Substances/, Lučani, 1988 - and M. I. TRTANJ, Z. B. MILENKOVIĆ, A. A. VLAHOV, V. N. ĐAKOVIĆ - Uticaj nekih organskih rastvarača na detonacione karakteristike tetranitrometana /The effect of some organic solvents on the detonation characteristics of tetranitromethane/, JKEM, Lučani 1988. These are academic research papers on the kinetics of decomposition of tetranitromethane and the effect of solvents on its detonation properties. The information from the literature would have to be linked with the established documentary evidence by means of a relevant evidentiary procedure that could be used as additional evidence, which is also not the case here.

5.18 Tetranitromethane has long been known as an explosive substance, and it was synthesised in 1857. The papers whose titles are shown on page 00378671, do not explicitly refer to research of its use in fuel-air projectiles because these are typical research papers with no indication as to their application. Berko ZEČEVIĆ himself states in the reports Fuel-Air Projectiles (of 31 January 1994 and 21 December 1994), submitted to the Ministry of Defence of the RBH (pages 06067187 and 06067188), that “in the SR /Federal Republic/ of Yugoslavia, intensive activities were conducted in the field of fuel-air explosive aircraft bombs at the Institute in Vinča, but no final results were produced.”

5.19 The ballistic parameters of rockets of this kind - also refers to parameters from the literature (speed, resistance, mass of the projectile, mass of the propellant mass,
mass of the explosive charge, effects on the target, construction designs for launching, stabilisation, and so on), because in these parts there was no experience with the effects of fuel-air explosives, and Mr B. ZEČEVIĆ himself states that the development was in its infancy and they are also not linked with the established documentary evidence by means of a relevant evidentiary procedure.

5.20 **Effects on target** - are not in any respect different from the effects on target of aircraft bombs filled with TNT or other solid explosives, and they are also not linked with the established documentary evidence by means of a relevant evidentiary procedure. Fig. 8 (page 00378670)\(^{137}\) is a photograph of a modified FAB-100 aircraft bomb which did not explode at the target, and the question is why this bomb was not used to identify the type of explosive used. There is no information at all in the documents under consideration as to what was done with that bomb and whether it was tested, except for a photograph of it, which is shown in a couple of places in these documents\(^{138}\) (on page 06067084, fig. 93 and page 06067094, fig. 104) and in section 4.2.3 of this analysis.

5.21 On page 00378672,\(^{139}\) above fig. 9, B. ZEČEVIĆ et al. state in paragraph 4 that “122 mm BM-21 GRAD rockets are illegally imported into Serbia and adapted, by means of these adapter rings, for launching from 128 mm M77 OGANJ multiple launchers.” Based on what information, written document, written statement, commercial contract or personal insight are these claims made, given the arms embargo which lasted throughout 1994/95 and applied to all the warring parties?

5.22 The text under the subheading **the functioning of the hypothetical rocket with a demolition warhead** (page 00378675, the fifth paragraph) describes the functioning of fuel-air warheads filled with fuel-air explosive. According to this description, the warhead detaches from the rocket motor and, carried by inertia after the first hit, the primary detonation system activates and releases the liquid explosive from the warhead by means of a weaker, controlled explosion. “After a period of six seconds, during which an aerosol (fuel-air) cloud with the necessary characteristics is formed, the secondary detonator is activated and initiates the detonation of the aerosol cloud. We assume that the secondary detonator is located on the warhead itself and that initiation takes place in the warhead’s immediate vicinity, whereby the warhead is ultimately destroyed. This assumption is based on the fact that the rocket’s warhead was not found in any of the cases, in spite of its considerable overall dimensions. The only warhead remains, found where the rocket first hit the heating plant at no. 90, Safeta Hadžića (Prvomajska) St., were preserved thanks to the fact that the warhead broke on impact with the heating plant building and its remains, together with the secondary detonator, rolled away some distance from the impact site, where the

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\(^{137}\) IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.


\(^{139}\) IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical), Sarajevo, 11 July 1995, 0037-8659-0037-8799, 1D-03282.
detonation occurred. This case confirms the assumption that the secondary detonator is probably fixed to the warhead itself.” This description is adapted to fit the witness statements that a powerful explosion occurred six seconds after the weaker one. According to the description of these “fuel-air” projectiles, they are activated only when they hit a solid surface, thereby activating the primary detonator systems, and then the secondary, which initiate the detonation of the cloud, which destroys strong buildings made of reinforced concrete? Particularly untenable is the claim that the bombs self-destruct due because of the ignition in the immediate vicinity of the warhead, on account of which they could not find the projectile’s warhead (they did find it, however, and B. ZEČEVIĆ shows it in three places in the document under consideration, as stated in section 5.13 of this analysis). The use of fuel-air explosives against strong buildings is, in the opinion of B. ZEČEVIĆ et al., unjustified: “This kind of design, both of the warhead and of the entire projectile, depends very much on target characteristics and other conditions at the moment of target penetration. This implies a significant reduction in the possibility of making maximum use of the potential of the fuel-air charge, as in the designs realised in the world so far.” If B. ZEČEVIĆ et al. know that this approach to the use of fuel-air explosives implies a significant reduction in the potential usefulness of fuel-air explosives, then, from the practical point of view, the use of combat casings for aircraft bombs with fuel-air explosives, which would also show a significant reduction in the potential usefulness of fuel-air explosives, is totally pointless. These questions, which are very important for the use of fuel-air explosives in projectiles, have not been answered in the documents analysed. In light of all this, it is quite improbable that anyone made primitive fuel-air projectiles during the war (as B. ZEČEVIĆ himself stated in the document, in the second paragraph from the bottom of page 06067086: “The rocket system as a whole was a very incomplete system.”) with an uncertain effect on the target.

5.23 In the first paragraph of his note on page 00378675, B. ZEČEVIĆ says the following: “Rockets with Russian-made fuel-air warheads were used on the hill of Žuč, near Sarajevo, early in 1994; at the front around Olovo and Teočak in the course of 1994; and at the front around Bihać in the course of 1995.” In this text B. ZEČEVIĆ himself denies that fuel-air bombs were used against urban areas of Sarajevo in 1994-1995, because he rules it out at the very beginning of the sentence. As an example of a fuel-air projectile being used against the area around Sarajevo in 1994 he cites only one case on Žuč hill and then lists all the parts of the front where these projectiles were allegedly used, but this list does not include the urban areas of Sarajevo in the period 1994 - 1995, which, in the case of Žuč hill and all other cases (section 4.2.1 of this analysis), on-site investigators believed had been hit by demolition bombs with solid explosives (section 3.1 to 3.13 of this analysis).

5.24 Further on in the text he suggests that, “These rockets (referring to the Russian-made projectiles) provided the basis for the development of Serbian volumetric rockets with demolition warheads.” and in the document he refutes his own

141 IZVEŠTAJ o utvrđivanju stanja i uzroka djelovanja raketnih projektila velike razorne moći na urbane djelove Sarajeva, Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIC, BEng.
assertion: “in the SR of Yugoslavia, intensive activities were conducted in the field of fuel-air explosive aircraft bombs at the Institute in Vinča, but no final results were produced” (section 5.18 of this analysis). During the war, the Army of the Republic of Serbia did not procure Russian fuel-air projectiles (section 2.22 of this analysis).
PART 6

OPINION

6.1 The analysis of the document The Use of Modified Aircraft Bombs During the Siege of Sarajevo, 1994-1995, Sarajevo, February 2007 (pages 06067014 to 06067189, is shown in parts 2, 3 and 4 of this analysis, and the Report on the Effects of Strikes Against Urban Areas of Sarajevo by Rockets of Great Destructive Power, Berko ZEČEVić, BEng. (Mechanical), Ahmet H. OMEROVić, BEng. (Mechanical) and Amir KURTOVIć, BEng. (Chemical) Sarajevo, 11 July 1995, (pages 00378659 to 00378799) is shown in Part 5 of this analysis.

6.2 The document under consideration, The Use of Modified Aircraft Bombs During the Siege of Sarajevo, 1994-1995 (0606-7014-0606-7189), consists of several sections: a general section, which contains information from the Internet on mainly US-made military assets with various purposes that have nothing to do with the Yugoslav-made aircraft bombs, because the systems are completely different and therefore cannot be compared; answers to questions 1 to 21, an analyses of documented cases where rocket-assisted projectiles were used in the Sarajevo area (13 in total); and three attachments discussing fuel-air explosives (points 1.1, 1.2, 1.3 and 1.4 of this analysis).

6.3 Pages 06067021 to 06067037 are taken from the Internet and discuss in general terms mostly US-made aircraft bombs and methods of launch from aircraft, with the exception of pages 06067025 and 06067026 (points 2.1 and 2.2 of this analysis) which show the characteristics of the bombs used by the former JNA, the FAB-100 and FAB-250, which were manufactured by PRETIS and later in Lički Osik.

6.4 The analysis of part of the document relating to the general part revealed the following inconsistencies:
On page 06067025 it says that the FAB-100 aircraft bomb contains 39 kilograms of explosives, but on page 06067092 it says it contains 43 kilograms of TNT. The same applies to the FAB-250 aircraft: on page 06067026 it says the FAB-250 M72 contains 96 kilograms of TNT, but the FAB-250 M79 contains 105 kilograms of TNT; on page 06067093, it says that the rocket-assisted FAB-250 bomb (without model designation) contains 102 kilograms of TNT or fuel-air explosive, without naming the document on the basis of which this claim is put forward, especially when discussing fuel-air explosive (points 2.1 and 2.2 of this analysis).

6.5 The functioning of aircraft bombs launched from the air and the presentation of the circular probable error has nothing to do with the mode of operation of modified aircraft bombs (their probable deviations in direction and distance), which were modified by being fired from the launcher on the ground (point 2.3 of this analysis).

6.6 Pages 06067076 to 06067114 (point 2.12 to 2.36 of this analysis) mainly discuss in theoretical terms the modifications to FAB-100 and FAB-250, which B. ZEČEVić claims to be based solely on the Russian ODAB-500 volumetric bomb with fuel-air explosives, without citing any evidence whatsoever or at least a theoretical consideration of fragmentation of such fuel-air bombs; he shows photographs of the
remains of rocket motors that can be questioned because all the claims are based on assumed values, and then, the dimensions and mass of the bombs are assumed on the basis of these assumed values, as is the mass of the fuel-air explosive that was allegedly used. The origin of the codename KREMA-4 is unclear: is it the Russian name or the name given by B. ŽEČEVIĆ? In general, the discussion of the Russian rocket-assisted ODAB-500 bomb is very difficult to follow because it is written in a confusing and unclear manner (points 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16 and 2.17, 2.31, 2.32 and 2.33 of this analysis).

6.7 Pages 06067117 to 06067164 (points 3.1 to 3.13 of this analysis) show and document cases of the use of modified aircraft bombs in Sarajevo. B. ŽEČEVIĆ advocates without any arguments whatsoever that all of these 13 locations were hit by modified aircraft bombs with fuel-air explosive. According to B. ŽEČEVIĆ, all the bombs that fell in Sarajevo in these 13 cases had been modified in two ways: the first modification is that they were propelled by rocket motors of different calibres (point 2.28 of this analysis) and were fired from rocket launcher systems (points 2.31 and 2.32 of this analysis); and the second modification, based on the Russian, rocket-assisted ODAB-500 bomb, involved replacing the conventional trotyl explosive contained in the Yugoslav FAB-100 and FAB-250 bombs with fuel-air volumetric explosives, which have a much stronger effect on living targets than conventional bombs (point 2.31 of this analysis).

6.8 The text contains inconsistencies relating to the weight of the Yugoslav-made bombs, for which he lists various masses that do not correspond to the true values (point 2.2 of this analysis).

6.9 The answer to question Q4, which concerns guidance systems, shows the effects of aircraft bombs on the target and discusses theoretical predictions for unclad trotyl explosive (TNT) but also the American general-purpose MK-82 aircraft bomb. He compares the effects on the target and fragmentation of foreign-made bombs, mostly American, with Yugoslav bombs, but this cannot be compared in the conditions of exploitation, because the explosives in the bombs are different: in Yugoslavia it was cast TNT, but in the MK-82 and GBU 39/B it was tritonal and AFX explosive based on ammonium nitrate explosives, or Tritonal in the MK-82, based on TNT and aluminium powder. He incorrectly states the mass of 500 lb bombs, saying that the MK-82 is 250 kg instead of 227 kg and 241 kg, in which the mass of explosive is 89 kg. He also cites incorrect values for the mass of the US-made GBU-39/B bomb and the explosives it contains (points 2.4, 2.5 and 2.6 of this analysis). Such a discussion of the effects of US guided bombs (point 2.5 of this analysis), which are launched from an aircraft and have a different explosive content to that of the Yugoslav-manufactured bombs, is completely irrelevant to the discussion presented in this document (point 1.1 of this analysis).

6.10 He compares the fragmentation of the US-made MK-82 bomb with Yugoslav-made aircraft bombs. He describes the fragmentation of the MK-82 aircraft bomb as “natural”, which it cannot be under any circumstances, because fragmentation occurs as a result of the explosive detonation and is therefore “involuntary”. The comparison of the fragmentation of the American bomb with that of the Yugoslav bombs is not correct because the effect of the bomb on the target, and also the fragmentation, as he
himself says, is affected by: “shape of the bomb, dimensions, mass, explosive charge type, bomb material type, the manner and the site of the explosion initiation, type of fuse, individual bomb variations and technological level of the equipment” (point 5.8 of this analysis). It is therefore unacceptable to compare the American-made MK-82 bomb with the Yugoslav-made FAB-250, because they are not the same either in terms of mass or type or mass of explosives (point 2.7 of this analysis), all the more so because the mass of the MK-82 aircraft bomb is incorrectly calculated, and this wrongly calculated mass (250 kg) was used to compare its fragmentation with that of the Yugoslav-made FAB-250 (point 2.8 of this analysis).

6.11 In his discussion of the effects of fuel-air projectiles possessed by the forces of the United States, Russia, China, France, Israel, he claims the VRS also used fuel-air bombs without presenting a single piece of relevant information or detail: e.g. the remains of a container that held fuel-air explosive. He says that the Russians used fuel-air explosives in Chechnya, probably the KREMA-4 (point 2.13 of this analysis).

6.12 He gives the wrong composition of the explosives, listing as metals components that are not metals, such as silicon, carbon and hydrocarbons (point 2.11 of this analysis).

6.13 He states that the Russians used fuel-air projectiles during operations in Chechnya, “probably type KREMA-4 in the early nineties” and the question arises as to the purpose of this information other than to cause additional confusion in his account of the rocket-assisted ODAB-500 bomb, and whether the codename KREMA-4 was given by the Russians or by B. ZEČEVIĆ (point 2.13 of this analysis).

6.14 Based on the “remains of fuel-air rocket”, a system was modelled based on the Russian ODAB-500 bomb. An assumption was made about the appearance of the fuel-air bomb based on the Russian ODAB-500, for which there is no relevant evidence that it was used on the front given its feature of ejecting a retarding parachute (point 2.10 of this analysis). Such a sight would certainly not go unnoticed (point 2.14 of this analysis).

6.15 Photographs of a rocket-assisted aircraft bomb based on the Russian ODAB-500, photographs obtained from the Dutch team of SFOR and taken in Tuzla in December 2006, are also shown (point 2.16 of this analysis). These photographs are challenged due to the time lapse of nearly 12 years, and it is possible that they could have been taken in Iraq or somewhere else, given footnote 5, Anon: Handbook of Ammunition Used in IRAQ and Surrounding Areas, ARDEC EOD, Picatinny Arsenal, Revision 5, 2005, which in Serbian translation reads: Anon: priručnik za municiju korišćenu u Iraku i okolnim područjima! Revizija 5, 2005 (point 2.16 of this analysis), but for B. ZEČEVIĆ this is “proof” that bombs based on Russian ODAB-500 (point 2.21 of this analysis) filled with fuel-air explosive and codenamed KREMA-4 were used against Sarajevo. It is very difficult to follow the author’s expert account, especially when it concerns the modification of aircraft bombs. The modification in one case involves attaching four rocket motors on the ODAB-500 fuel-air bomb, but immediately after that he talks about the same bomb, referring to it as KREMA-4, which is already fitted with rocket motors. To document this, he refers to photographs taken in 2006, saying...
that they show the remains of a KREMA-4, which he himself says was modelled on photographs and given the codename KREMA-4 by him. The document does not fully specify who named the rocket, that is to say, whose is the name of that rocket (points 2.12, 2.13 and 2.14 of this analysis).

6.16 He discusses rocket-assisted FAB-100 and FAB-250 bombs in theoretical terms and notes that they were modified on the basis of the rocket-assisted ODAB-500 bomb with fuel-air explosive, and he says that the FAB-100 was carried by a single-rocket motor and the FAB-250 by three rocket motors, and that they were filled with fuel-air explosives. He also states that the assembly and quality of the rocket-assisted FAB-250 bomb was below the professional level achieved “by the pre-war PRETIS factory, in terms of both the quality of processing and the skill of the engineers and constructors.” If it is claimed that the VRS put fuel-air bombs in these bombs, for which certain work conditions and protection of people are required during the process of filling containers with fuel-air explosives because of the nature of the fuel-air explosive itself, why then has the explosive charge of the bomb on fig. 93 of the document (point 1.1 of this analysis) not been removed, or at least activated and photographed during the activation in order to confirm or deny its fuel-air content? How did the VRS “fill” these bombs with fuel-air explosives, if they were already filled with trotyl? In practice it is not possible to remove trotyl and place a fuel-air explosive in the same casing because of the manner in which fuel-air explosives are initiated, as this must ensure the explosion of the released cloud of fuel-air explosive. This makes the claim that the TNT in the FAB-100 and FAB-250 casings was replaced nonsensical because it is not feasible in practice in the way B. ŽEČEVIĆ imagines it (point 2.18 of this analysis).

6.17 He claims that the PRETIS enterprise (where he himself worked until 1992) developed a fuel-air bomb, but he himself (B. ŽEČEVIĆ) does not state the chemical composition of this “fuel-air bomb”. When he worked at PRETIS, he had access to all the documents and therefore must also know what label these “fuel-air bombs” had in order to differentiate them from the conventional bombs filled with trotyl. It is also impossible that he was unable to come into the possession of any document to prove the use of fuel-air explosives in FAB-100 and FAB-250 aircraft bombs because he worked at PRETIS and was in a position to obtain the highly classified study by the Military Technical Institute: no. 02-24-231 “Developing the 120 mm AR mine” from 1976, which the author quoted in its entirety (point 1.1 of this analysis). Prototypes made before the test production run could not have been made without a blueprint for the standard of quality. Had PRETIS advanced much in the development of the fuel-air bomb, there would have to exist at least one document or piece of paper, at least on the initial requirements (TTZ) for the characteristics of the asset, and this was also standard practice in the JNA. Had there been such a document, Mr B. ŽEČEVIĆ would have seen it and probably made a photocopy and attached it here, as he did with the aforementioned confidential document from the VTI/Military Technical Institute/. That would enable him to confirm that the development of the fuel-air bomb in PRETIS was “well advanced” (point 2.19 of this analysis).

6.18 B. ŽEČEVIĆ does not explain how an aircraft bomb based on the ODAB-500 (point 2.21 of this analysis) and weighing 706,0523 kg could have been fired from a ground launch system, or from what kind of a launch system given its weight (point
2.15 of this analysis), and R. KARADŽIĆ’s statement about a “new secret weapon” (point 2.14 of this analysis), which he links to the fuel-air bomb, did not come to fruition, as Ivo PUKANIĆ wrote in his newspaper (point 2.22 of this analysis). During the war in Bosnia and Croatia, the Croatian army possessed the Russian ODAB-500 fuel-air bomb and fired such a bomb from a MiG-21 at the Army of the Republic of Serbian Krajina near Petrinja during Operation Storm, and this has been recently disclosed (point 2.22 of this analysis).

6.19 According to B. ZEČEVić, it often happened that fuel-air explosives were used in place of solid explosives (point 2.20 of this analysis), which means that he is speculating on the existence of bombs filled with fuel-air explosive and based on the Russian ODAB-500 bomb. He has not provided any relevant evidence of the existence of this type of explosive charge in the aircraft bombs of the VRS. He erroneously states the mass of explosive charges in Yugoslav-made aircraft bombs, and the question arises as to what exactly he is analysing (point 2.21 of this analysis).

6.20 He needlessly shows the effects of TOS-1-4 fuel-air rocket projectiles of Russian origin, which were not even similar to those in the VRS’s possession. He lists the approximate composition of fuel-air explosives (containing powder tetranit), which is available only to developed armies such as the Russian army (point 2.23 of this analysis).

6.21 He states that about 1,280 FAB-100 and about 680 FAB-250 bombs were produced in PRETIS, without specifying in which period and in what year these bombs were produced or with what kind of explosive they were filled (point 2.24 of this analysis).

6.22 He claims that PRETIS produced 50 fuel-air bombs (point 2.25 of this analysis), without indicating which fuel-air explosive was in them. As an expert in munitions and aircraft bombs, which is what he claims to be in his personal qualifications (point 2.26 of this analysis), he would have to know this. It is not said what happened with these bombs (point 2.25 of this analysis).

6.23 He states his personal qualifications on pages 06067018 to 06067020 in the document (point 1.1 of this analysis) with a great deal of inaccuracy, so it is not clear where he was during the period “1986/1986”. He worked in PRETIS from 1975 to the “start of war”. He states that for the purposes of his master's degree thesis he tested fuel-air explosives with Professor Z. MAKSIMOVIĆ from Vinča, but the experiments were unsuccessful, so he abandoned them (point 2.26 of this analysis). He then claims that the Vinča Institute developed a fuel-air bomb and cites as proof of this completely irrelevant papers published in the proceedings of the Lučani JKEM 1988 symposium (point 5.10 of this analysis), which belong to the category of academic research and technical papers.

6.24 He them completely unnecessary talks about his cooperation with the ballistics department of the Technical Test Centre on a project to copy the French DURANDAL penetration bomb. Two bombs were available to them. During 1991 and 1992 the procedure of photographing parts of the bomb was carried out with the aim of producing technical documents and attempting to develop Yugoslav copies of
this bomb. The question is why this is mentioned, other than to support his own credentials as an expert, but it was standard practice in the JNA to analyse and break down approved foreign systems that were of interest, and this was normally the job of engineers. In any case, the JNA only went no further in the development of this bomb than copying it (point 2.27 of this analysis).

6.25 Responding to question Q12 about the technical capabilities of the systems and the likelihood of bombs hitting the same target if ejected from the same point within a short period of time, he says that the development of a new weapon in the former Yugoslavia required between five and seven years. Even if the idea existed of developing a fuel-air bomb, it could not have been developed in less than “five to seven years”, according to B. ZEČEVIĆ, and within this period of time the tools needed for the completion of the device would have to be produced, and it would be necessary to fill the warhead with explosive and to test the prototypes at a testing range, which, given the size of the bomb and the complexity of process of filling with hypothetical fuel-air explosive, would be a very complicated operation and would not go unnoticed. He shows which rocket motors were used to his knowledge for each rocket-assisted bomb, and says that for the rocket-assisted FAB-100 aircraft bomb, rocket motors were used from the 122-mm GRAD, 128-mm M77 OGANI, 128-mm M74 MUNJA, and 127-mm HVAR and that for the rocket-assisted FAB-250 aircraft bomb, rocket motors were used from the 122-mm GRAD, 128-mm M77 OGANJ, and 127-mm K-13 (AA-2). Special adapters had to be made for each type of motor to connect them to the aircraft bomb. His sources of this information (point 1.1 of this analysis) could not be established from the text of this document (point 2.28 of this analysis).

6.26 He considers it a modification if aircraft bombs are launched from from the ground by rocket systems, but also if solid TNT explosive is replaced with fuel-air explosives. In listing the components of fuel-air explosives he makes a serious mistake, stating that one of the ingredients is aluminium nitrate, which is never used in fuel-air explosives, which use ammonium nitrate (points 2.29 and 2.30 of this analysis).

6.27 He discusses the characteristics of fuel-air explosives and concludes that they are used solely against personnel or soldiers because the pressure of the blast wave is 20 to 30 bar (point 2.31 of this analysis). He also lists the types of rocket-assisted aircraft bombs that were used against some areas of Sarajevo, stating that the projectile velocity between was between 200 and 250 m/s according to witness statements, it is 250 m/s! (point 2.31 of this analysis).

6.28 He compares the action of GBU-39 bombs with Yugoslav-made aircraft bombs, which are is not comparable for a variety of reasons (point 5.8 of this analysis), and continues to state wrongly the mass of the explosive charge in this bomb is 25 kg. According to the available literature, the GBU-39 aircraft bomb is a guided bomb with a small diameter and it contains 17 kilograms of AFX-757 explosives, which means it is not possible to compare it with FAB-100 and FAB-250 aircraft bombs because they do not contain the same explosives or the same mass of explosives. AFX explosives belong to the group of very insensitive explosives. It is specific to them that aluminium is added as a fuel and ammonium perchloride as an oxidiser in
stoichiometric proportions that allow a more complete combustion in the chemical reaction zone. Its detonation speed is lower than that of tritonal (TNT + aluminium powder), which is found in the MK-82 bombs (the fragmentation of which he considers on page 06067058), but its reaction temperature is increased (point 2.34 of this analysis).

6.29 He is inconsistent in some of his statements. Thus, he states that there is no available data that the FAB-100 aircraft bomb was filled with fuel-air explosives (point 2.35 of this analysis) only to state in the report (Part 5 of this analysis) that the FAB-250 and FAB-100 aircraft bombs were filled with fuel-air explosives (point 2.35 of this analysis, second paragraph).

6.30 The text of the document under consideration (point 1.1 of this analysis) does not cite any evidence that bombs of this sort fell on parts of Sarajevo, such as part of a broken container (point 2.35 of this analysis) holding fuel-air explosive. There is also no theoretical consideration of the fragmentation of a container with fuel-air explosive, but the effects of the GBU-39 guided aircraft bomb with solid explosive are shown on 122 mm BM-21 rocket launchers, although it is not clear why this is shown (point 2.36 of this analysis).

6.31 The document under consideration (point 1.1 of this analysis) shows 13 locations in Sarajevo hit that were by rocket-assisted aircraft bombs, which B. ZEČEVIĆ claims were filled with fuel-air explosive. His analyses abound with inconsistencies and disagreements with the investigators who arrived at the site immediately after the bomb explosion and assessed the circumstances and size of the projectiles, as well as the location from which the projectile had come. All the buildings that were hit were hit by Yugoslav-made bombs with cast trotyl, and they were all made of hard materials, such as brick or reinforced concrete. Fuel-air bombs are mainly intended to neutralise personnel (soldiers) and destroy light and moderately reinforced structures (point 5.2 of this analysis). The cases where aircraft bombs were used in Sarajevo are analysed in Part 3 of this analysis (points 3.1 to 3.13 of this analysis).

6.32 In the event described in Case 1 (point 3.1 of this analysis) the bomb hit Alekse Šantića St. no. 1 in Hrasnica at 0850 hours on 7 April 1995. One person was killed and three civilians were slightly wounded. The investigators concluded from a witness statement that the projectile came from the direction of Ilidža, north-west. Remains of 128 mm OGANJ rocket motors and “probably 128 mm GRAD” were found. One person was killed, and B. ZEČEVIĆ believes that this person was killed by fuel-air explosive, which cannot be considered to be credible because he is not a specialist in forensic medicine. Had it been a fuel-air bomb, the persons on the top floor of the house that was hit by the projectile would not have survived because, as B. ZEČEVIĆ himself says, “The fuel-air explosive spreads over the whole combat area.” Based on the effects of the explosion, this site was hit by a FAB-100 aircraft bomb (point 3.1 of this analysis).

6.33 The event described in Case 2 took place in Safeta Zajke St. no. 43 in Sarajevo at 0945 hours on 24 May 1995. Two people were killed and five others were injured. The projectile hit the asphalt road near the house, and the investigators determined that it had come from the direction of Lukavica. There are inconsistencies in the
investigators’ report concerning the number of rocket motors: the investigators who conducted the on-site investigation claim that the projectile flew in with four 122 mm GRAD rocket motors, while another report states that there were five 128 mm OGANJ rocket motors. The investigators’ report, inconsistent in itself, is also inconsistent with ZEČEVIĆ’s findings: the investigators claim to have found four rocket motors, but B. ZEČEVIĆ said there were three. There is an obvious discrepancy between the number of motors that the investigators said had been found in the crater and the number that Berko ZEČEVIĆ said had been found. The size of the crater made by the projectile is 2 m by 1 m by 0.3 m, which corresponds to the effects of an FAB-100 bomb. The excavators found three rocket motors, stabilisers and a three-pointed star, whose angles correspond to a circle with a diameter of 122 mm. The three-pointed star and the size of the crater - 2m by 1m by 0.3 m deep - indicate that this was a modified FAB-100 bomb filled with tetryl and modified with three rocket motors, and not a bomb filled with fuel-air explosives (point 3.2 of this analysis).

6.34 The event described in Case 3 took place in Majdanska St. bb, Sarajevo, at 1400 hours on 24 May 1995. A projectile hit the soil surface next to a transformer station. Two people were killed and six others were injured. A 5m by 1.5 m by 1.5 m deep crater was found. According to the dimensions of the crater, this location was hit by a FAB-100 aircraft bomb. The Investigators established that there was an impact of a modified aircraft bomb with four or five 128 mm or 122 mm rocket motors (two reports with conflicting information). The discrepancies between the opinion of the investigators, who had gone to the scene immediately and who claim that the projectile flew in from southeast, and those of Berko ZEČEVIĆ, who cannot determine accurately from the sketch the incoming angle of the bomb, but only that the incoming angle was “probably” identical to those in the case of the explosion in Safeta Zajke Street (point 3.3 of this analysis).

6.35 The event described in Case 4 took place at Safeta Hadžića St. no. 52 (or 152), at 1130 hours on 26 May 1995. Two people were seriously injured and 15 others were slightly injured. The projectile hit the flat roof of the building, broke through the concrete roof slab and then penetrated the slab between the fourth and fifth floors. Discrepancies in the reports as regards the building number - 52 or 152 - and discrepancies between the opinion of the investigators and that of Berko ZEČEVIĆ: ZEČEVIĆ claims that three rocket motors were found, while the investigators say that the roof of the building was hit by a projectile with multiple rocket motors, but do not state the exact number of motors. There are inconsistencies in the investigators’ reports with regard to the direction from which the projectile flew in: one report mentions the incoming direction as south-southwest, from the area of Lukavica, and the other as west, from the direction of Ilidža. In this case too B. ZEČEVIĆ claims explicitly that the location was hit by a bomb with fuel-air explosive. However, witnesses who were in the affected floors survived the impact of the projectile. Two people were seriously injured, but no one was killed, which would have been the case had the building been hit by a fuel-air projectile. It is especially interesting how he describes the bomb exploding inside the building and piercing the concrete slab between the fourth and fifth floors, whereas the investigators found on site that the “rocket projectile impacted the flat roof of the building, went through the concrete plate, and then pierced the plate between the fourth and the fifth floor.” According to
the report, two reinforced concrete slabs were pierced: the one on the roof and the one between the fifth and fourth floors. So how then was it possible for the “primary” explosive charge contained in the fuel-air bomb and having the exclusive role of releasing the explosive cloud, how could a projectile with these capabilities pierce two reinforced concrete slabs? Mr ZEČEVIĆ explains this as follows (without mentioning the pierced roof slab) in the first paragraph on page 06067130: “The effect of the primary explosive charge probably pierced the concrete plate between the fourth and the fifth floor. The fuel-air mixture migrated to the fifth and the fourth floor, then the secondary explosive charge activated the aerosol cloud.” If the hypothetical filling contained ethylene oxide, or any flammable hydrocarbons, other than methane, the mixture could not have migrated because it is heavier than air. If, however, the hypothetical filling contained ethylene oxide and “migrated” to the fifth and fourth floors, how did witnesses Alma HEVAŠLIJA and Nura OSMANAGIĆ survive? Based on the effects of the explosion, this location was most likely hit by a FAB-250 aircraft bomb with three rocket motors (point 3.4 of this analysis).

6.36 The event described in Case 5 took place in Dositejeva St. 4 in Sarajevo at about 11:03 hours on 16 June 1995. Three people were slightly injured. The number of stories of the building hit by the projectile is not stated. Three motors of a 122 mm GRAD were found. Based on the effects inflicted by the explosion on the buildings, which were old and made of brick and timber, it can be concluded that they were hit by a FAB-100 projectile with three rocket motors (point 3.2 of this analysis). Berko ZEČEVIĆ did not accept the investigators’ opinion that the incoming direction of the projectile was northwest, azimuth 348° ± 10° because he believes that they did not have a defined method for accurate determination, but he claims himself that “the projectile most probably came from the direction of Kobilja Glava, that is, the azimuth was 315° ± 10°,” without mentioning which more precise method he used for such a precise claim (which also differed from the investigator’s) (point 3.5 of this analysis).

6.37 The event described in Case 6 took place on the Trg međunarodnog prijateljstva up to number 10 in Sarajevo at 15:20 hours on 16 June 1995. Seven people were slightly injured. A rocket-assisted projectile fell some way from the building on a soil surface and created a crater 11 m by 7.8 meters and 2.5 meters deep. Judging by the size of the crater, the site was hit by a delayed-action FAB-250 bomb with three rocket motors. B. ZEČEVIĆ supports his argument that volumetric explosives were involved by citing witness statements that they felt pressure and buzzing, which “points to blast wave effect”. In his comments ZEČEVIĆ says, “Some of the witnesses saw or heard the arrival of the projectile, but there was no time to react in terms of finding shelter, because the velocity of the projectile was probably around 250 m/s (less than the speed of sound).” It is not possible for witnesses to estimate that the speed of the projectile is about 250m/s and, moreover, that it was “less than the speed of sound”. The question still being asked is why would fuel-air explosive, which has lower energy values than the standard explosive, be used in bombs without ensuring its proper functioning: the braking action in the air by means of a parachute, the opening of the fuel-air canister and its explosion above the ground. None of the cases in this report contains witness evidence of this kind of operation (point 3.6 of this analysis).
6.38 The event described in Case 7 took place at Čobanija no. 7 in Sarajevo at about 1700 hours on 16 June 1995. Five people were slightly injured. The projectile struck a horizontal beam of the outer wall of the boiler room on the ground floor. The dividing wall opposite from the point of impact on the beam in the boiler room was destroyed. Rocket motor components and parts of the stabiliser were found. In their report, the investigators noted that only one 122 mm GRAD motor was found. There is also a discrepancy between the report of the investigators, who claim that the projectile came from the direction of north-northwest (Request of the Sarajevo CSB no. 19/04-223-515), and the SJB report, which maintains (the day after this event) that the projectile came from the east (onsite investigation book no. 1148/95 of 17 June 1995). This shows that the direction of the source of the projectile is being guessed. There are discrepancies between the report of the investigators and that of Mr ŽEČEVIĆ with relation to the type of the projectile: the former concluded that the bomb had a single motor and solid trotyl explosive and Mr ŽEČEVIĆ says that this was a FAB-250 bomb with three motors and filled with fuel-air explosives. Only one 122 mm GRAD motor was found. The question is, if M8 x 31 mm bolts, which fastened metal sheet stabilisers to the carrier, were found onsite, how is it that not a single larger part of the bomb casing has been found in order to prove that the number of fragments was small and that the projectile was charged with fuel-air explosives. He challenges the opinion of the investigators that this was a FAB-100 bomb and says it was a FAB-250 aircraft bomb. He bases this view on the fact that M8 x 31 screws were found, because allegedly no special stabiliser was made for the FAB-100. Instead, aircraft bomb stabilisers were used and parts of the 122 mm GRAD rocket motor. It is shown that FAB-100 bombs with three rocket motors were used in the field (point 3.2 of this analysis). The debris shown in the pictures indicates that this was a low-intensity bomb such as an FAB-100. The massive wall could not have been demolished by an explosion of fuel-air explosive, so that it can be safely presumed that this was a FAB-100 aircraft bomb. The damage to the garage door and to the building 25 meters away from the site of explosion, which shows traces fragments, indicates that solid trotyl explosive was used (point 3.7 of this analysis).

6.39 The event described in Case 8 took place at Bulevar Meše Selimovića no. 4, RTV building at 0922 hours on 28 June 1995. One person was killed, and 28 others were injured. According to the findings the commission, a rocket projectile hit the flat roof of the overhead walkway of the RTV building in front of the auxiliary entrance/exit of the interior (lower ground floor), opposite from the main entrance, along the building, between the foundations of Studio C and the restaurant. The investigators established on site that the projectile ricocheted off the wall between the first and the second floor, exploded right next to the outer wall of Studio C and made an opening in the wall 3.5 m by 4.5 m. A crater was created in the soil on the outside right next to this opening, which is 1.5 m deep, 1.5 m wide and stretches for to 3 m along the wall itself. In B. ŽEČEVIĆ’s comments, the size of the opening in the wall is 4 m by 3 m, and it is connected to a semi-circular crater in the soil which is 2.4 m deep and 2.5 m in diameter. The onsite investigation commission concluded that a destructive rocket-assisted FAB-250 bomb (with trotyl charge) had exploded, but the rocket motors were not found. Witnesses to the event “heard” the sound of the projectiles; they “heard an unnatural sound followed by a loud thump, and then after seven or eight seconds, a loud blow, an unnatural flash, and then another detonation.”
One witness heard a blunt thud and, after a couple of seconds, a terrible blow. Another witness heard mortar and glass collapsing from the higher floors and then, after about 10 seconds, an explosion was heard! The question is how they could physically, using their senses, whilst being calm, identify and distinguish such fast-developing events as the fall of a projectile and then count seconds until the explosion. Judging by the effects on images 00392145 and 00392147, (item 1.1) the RTV building was hit by a projectile with a large explosive charge equivalent to a modified FAB-250 aircraft bomb filled with trotyl. The claim that the RTV building was hit by a fuel-air bomb is brought into question because fuel-air bombs are not designed for hard targets such as the RTV building with its 0.4 meter thick, reinforced concrete wall, because, “the overpressure of the detonation is 10 - 20 bar and lasts for mere milliseconds, but causes substantial destruction to light and moderately reinforced structures and living things.” All the windows from the staircase to the eighth floor were destroyed, and this indicates that the projectile exploded outside the building, right next to the wall of Studio C and that the blast wave resulting from the detonation of a solid explosive destroyed external structures and the windows above. Mr B. ŽEČEVIĆ in his comments about the event, states that the number of visible fragments is below expectations for a FAB-250 bomb. In so doing, he completely ignores the fact that the bomb exploded in the soil, and this conclusion is drawn from the size of the crater. The explosion in the ground drastically reduces the bomb fragmentation, but significantly increases its destructive effect. Does this mean that, in the opinion of B. ŽEČEVIĆ, fuel-air explosive can penetrate a reinforced concrete wall which is 0.4 m thick and has 16 mm steel reinforcement rods, and its that “volumetric effect”, which produces a wave with up to 30 bar of pressure, can at the same time create a hole in the wall measuring 4 m by 3 m? According to the description of the event and the photographs, the projectile hit the RTV building as follows:, the projectile hit the south side of the wall of Studio C, penetrated it and made an opening of about 0.5 m diameter and then flew over the Studio and hit the east wall and penetrated that. That the projectile penetrated the wall is observable in the fig. 11 on page 06067144 (00392145) on the right side of which it is clearly visible that the reinforced concrete slab is bent in the direction of the flight, i.e. towards the outer face of the wall (circled in yellow). After it went through the wall, the projectile plunged into the ground and exploded next to the wall, fig. 12. The explosion considerably enlarged the opening through which the bomb went, and the steel rods (which broke free of the concrete when the wall was penetrated) were bent toward the interior of Studio C. Gases and rocks entered Studio C through this big hole (images from document RR361741 right). Such destruction is nevertheless consistent with the effects of a projectile with a solid explosive charge, such as the modified FAB-250 aircraft bomb with trotyl, whose detonation pressures is in excess of 200 kilobars (point 3.8 of this analysis).

6.40 The event described in Case 9 took place at Geteova St. no. 5 in Sarajevo at 1015 hours on 28 June 1995. Three people were killed and seven others wounded. The projectile exploded on the eighth floor of a high-rise building. It destroyed a number of flats from the seventh floor to the eleventh. The opinion of the investigators is that the projectile flew in from the direction of the Doglođi sector. In the report (item 1.5 on page 00378663) B. ŽEČEVIĆ and the other authors state, “According to the findings of the MUP, at 1300 hours on 28 June 1995, the rocket projectile arrived from the azimuthal direction of 260° and impacted the building at
the height of the seventh- and eighth-floor windows. Two persons were killed, and seven residents were injured.” In the comments on page 06067149 of the document, Berko ZEČEVIĆ argues that “Based on the analysis of the place of impact of modified bombs in the immediate vicinity of this incident, it is possible to assess that the azimuth angle was 285°, and the distance of the launch site was around 6,000 metres, that is, the wider area of Butila.” Obvious discrepancies between these reports are evident with regard to the time of the explosion of the projectile and the number of projectiles, the number of casualties (two and three fatalities), the azimuth angle (260° and 285°) and the place from where the projectile flew in (Doglođi or Butila). Which is it? That this projectile hit the same building for which B. ZEČEVIĆ stated different times (1015 hours and 1300 hours) can be seen from the photographs of the rocket motors found in the building which B. ZEČEVIĆ presented in the document (item 1.1) and the report (item 1.5) in which a different time of the event is stated, as well as a different direction and a different number of casualties: two people were killed and seven others wounded. He shows the same photograph of the three rocket motors, but this time it is darkened and upright, which is placed in a horizontal position (point 3.9 of this analysis). On the basis of these photographs of the pieces of rocket motors found in the building after the explosion, there is no doubt that these are the same rocket motors and that the target is the same. What is brought into question is the number of victims and the time of explosion: is it 1015 hours on 28 June 1995 or 1300 hours on 28 June 1995, as on page 0037664 of the report?. The question that is put to the author of both documents is: Which is correct? Based on the photographs and type of effects, this was a projectile of great destructive power, filled with the classic solid explosive, trotyl, most probably a rocket-assisted FAB-250 aircraft bomb with three rocket motors (point 3.9 of this analysis).

6.41 The event described in Case 10 took place at Alekse Šantića no. 50 in Hrasnica at about 2130 hours on 1 July 1995. There were no casualties. The rocket projectile hit the corner of the house and landed in the yard, 3 meters behind the other side of the house, making a crater 6.1 meters by 2.4 meters and 1.1 meters deep. Two rocket motors were found in this crater, and the third was found a little further away in the yard. The investigators established that the projectile hit the corner of the building, ricocheted (causing the motor to fall off) and continued its flight towards Bunički potok Street where it landed at number 233, having flown in from the north. There is an evident difference in the opinions of the MUP investigators and those of Mr B. ZEČEVIĆ with respect to the type of the explosive charge and the mode of action of the fallen projectile. The investigators (subsequently) stated that the projectile the corner of the house and then hit the ground in the yard, causing the rocket motors to detach and create the said crater, and then the projectile, carried by the inertia of ricochet, fell 150 meters away, in Bunički potok Street, whereas Mr Berko ZEČEVIĆ claims that the fuel-air explosive detonated incompletely in a water manhole. This assertion is supported by the fact that no “significant traces of fragmentation effect were found”, but not a single large fragment of a fragmented “fuel-air” bomb was found, nor a fragmented metal casing that would point to the use of fuel-air explosives. B. ZEČEVIĆ argues that the fuel-air explosive exploded in the yard, specifically in the water manhole, where this time it could not create a deadly cloud because it was prevented by the water in the manhole! In support of this he cites the statement of the wife Halim KEČO, who lived opposite the point of impact, that immediately after the projectile strike, “the entire area was
enveloped in grey fog” on which, i.e. the “grey fog”, B. ZEČEVIĆ bases his argument about the effect of the fuel-air liquid explosive. It is very odd that the witness saw the fog and even the colour of the fog, i.e. “grey”, at the time the projectile exploded, which was at 2130 hours when it was dark! It is questionable what the witness really saw. At the end of his report, B. ZEČEVIĆ photographed the location in 2007 and drew a very different trajectory of the projectile to that which actually had occurred in 1995 and, in fact, falsified the event from 1995, as shown in point 3.10 of this analysis.

6.42 The event described in Case 11 took place in Bunički potok street, near number 233, in Hrasnica at about 2130 hours on 1 July 1995. Two persons were seriously injured, and a number of others were slightly injured.

Description of the event: “The projectile hit a garage in front of a two-storey house” (the photograph shows that this was not a two-storey house but a house with a ground floor and a first floor, while the garage was a part of the house, not protruding towards the street, as shown in the photographs from January 2007). The motors were not found in the crater or near the explosion. The incoming directions of the projectile which landed in Bunički potok differ: the investigators established that the projectile flew in from the north, and Mr ZEČEVIĆ claims that the incoming direction is north-west. The investigators also argue (as in the previous case) that this is the same projectile that hit the yard of the house at Alekse Šantića no. 50. This means that there was no second projectile, whereas Mr ZEČEVIĆ claims that a new projectile landed on this location and that it was also filled with fuel-air explosive. In view of the damage caused, the worst being to the garage in front of number 233, and given that other damage was the effect of a blast wave generated within the crater (the building at number 231 is only 9.3 meters away from the centre of the explosion) and that major damage caused from the direction of the projectile explosion was observed there too, as well as the fact that UN vehicles suffered damage from fragments caused by the explosion on houses at nos. 233 and 231, it can be concluded that this was a projectile with solid trotyl explosive. The photographs taken after the war show traces of fragments on the facade of the house, and the windows were probably shattered. The assertion that this was a fuel-air bomb, given the destruction inflicted on hard buildings, is not founded because a fuel-air bomb should act immediately on the ground with a wide radius of action (20 to 30 meters), with observable scorched grass and earth, which did not occur in this case, given the resulting crater directly in front of the garage of the house at no. 233. Given the size of the crater and the fact that the buildings were weak structures made of brick (without reinforced concrete elements) which can be seen on the pictures of damaged buildings, and based on the results of testing the effects of aircraft bombs (250 kg and 500 kg) it is concluded that Bunički potok 233 was hit by a FAB-100 bomb filled with a solid trotyl explosive (point 3.11 of this analysis).

6.43 The event described in Case 12 took place at Bjelašnička St. no. 54, Hrasnica, Sokolovići, at 1930 hours on 23 July 1995. Two persons were killed and eleven others slightly injured.

According to the report of the MUP investigators: the explosion occurred on the first floor of the house at no. 54. The projectile hit the two-storey building, which was 12.5 m by 8.8 m in size, severely damaging it and also causing damage to a number of neighbouring houses. Two people were killed on the corner of the house no. 56, at a
distance of around 20 meters from the nearest part of the house that was hit (point 3.12 of this analysis) and they were probably not killed by the blast wave, but by a fragment caused by the explosion (there are no medical documents or autopsy reports that could help determine the cause of death or nature of injury). Based on the material strewn around the house, it is concluded that the projectile exploded inside the house. Such damage can be caused by a FAB-100 bomb (39 kg of solid TNT explosive). B. ZEČEVIĆ rejects the possibility that this was a projectile with a solid explosive, stating that there were no fragment traces on the existing interior walls of the affected house. However, the conclusion of Mr B. ZEČEVIĆ is wrong, because the bomb in this case exploded inside the house, so the fragments of the bomb hit the interior walls, which were destroyed, and this also rules out the possibility that they hit the walls of the surrounding buildings. B. ZEČEVIĆ himself describes the effects of the rocket-assisted ODAB-500 bomb as follows: “The overpressure of the detonation is 10-20 bar and lasts for mere milliseconds, but causes substantial destruction to light and moderately reinforced structures and living things.” The fuel-air cloud could not have such a devastating effect and would not be able to destroy the corner of a building about 25 meters away from the explosion as presented in the sketch of the event, given that the detonation pressure suddenly drops outside the fuel-air cloud and they were on the edge of the area affected by the detonation pressure (the affected area covers a surface 20 to 30 meters in diameter) (point 3.12 of this analysis).

6.44 The event described in Case 13 took place at the Bitas building at Zmaja od Bosne Street no. 64, in Sarajevo at 1530 hours on 22 August 1995. One person was killed, and another was injured.

The investigators provided three statements with different incoming directions of the rocket: in the first two reports (23 August 1995 and 25 August 1995) the projectile came in from south-west, from the Rajlovac position (Mr Berko ZEČEVIĆ is of the same opinion), but according to the third report (compiled on 28 August 1995) the projectile came from the south-east direction.

The projectile hit the external beam between the second and third floor, as noted by the investigators, and then detonated. The explosion occurred immediately after the projectile hit the beam, after it flew into the second floor and exploded. It can be considered that the explosion was closer to the outer walls of the building, this being indicated by the effects of the detonation and the misshapen beam on the second floor (point 3.13 of this analysis). The explosion occurred near the outer walls of the building and created a strong blast wave of the solid explosive, which caused all the windows to break along this vertical line and also damaged the interior of the building in its path, especially the staircase, which is the weakest component in buildings and the first to collapse in the event of more powerful earthquakes. B. ZEČEVIĆ links the damage on the “fourth and fifth floors” by saying that the projectile ricocheted off “the staircase and went on toward the third floor.” The assertion is brought into question that, “the projectile probably ricocheted off the staircase and went on towards the third floor” (and damaged the “fourth and fifth floors of the building” in the process). According to ZEČEVIĆ’s own interpretation (point 3.13 of this analysis), “The term "ricochet" implies that the projectile deflects off a hard ground surface,” which means that, in order to ricochet, a projectile must hit hard ground, which a staircase certainly is not. In his comment, B. ZEČEVIĆ states his opinion about the event: “The effects of the projectile inside the staircase of the Bitas office
building bear all the hallmarks of a volumetric weapon.” Further on, in the sixth paragraph on the same page, he says, “The photographs show no pronounced fragmentation effects.” The investigators who were at the scene concluded, “Only small parts of the projectile were found, because it was impossible to access the interior of the destroyed building.” Thus, “only small parts of the projectile” were found, which is characteristic of a destructive bomb with a solid explosive. If it had been a volumetric explosion, as claimed by B. ZEČEVIĆ, how was it possible, when “small pieces” were found, that large pieces of the casing of the projectile with fuel-air explosive were not found? Despite his effort to find arguments for the effects of volumetric fuel-air explosives in the Bitas office building, given the detonation pressure that such an explosive has, which ranges from 20 to 30 bar, and despite every possible reflection in a building “with its many corners”, it could not cause as much destruction as is caused by a projectile with solid explosives TNT, given the fact that the pressure of the TNT detonation is above 200 kbar, and so it can be concluded that the Bitas building was hit by a projectile of great destructive power, filled with solid explosive, trotyl, a rocket-assisted FAB-250 projectile (point 3.13 of this analysis).

6.45 Based on the analysis of the effects of the explosion and comparison with experimental results, and based on the number of victims and survivors, all the documented cases involved modified aircraft bombs with a solid explosive, trotyl, (points 3.1 to 3.13 of this analysis).

6.46 As seen from the analysed events from Case 1 to Case 13 (points 3.1 to 3.13 of this analysis), it can be concluded that the 13 locations discussed above were hit by the total of eight FAB-100 aircraft bombs, each with 39 kg of trotyl explosives (points 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.11 and 3.12 of this analysis) and four FAB-250 aircraft bombs (with 96 or 105 kg of solid trotyl, depending on the year of the FAB-250’s manufacture) (point 2.2 of this analysis), as shown in points 3.6, 3.8, 3.9 and 3.13 of this analysis, and one FAB-100 which ricocheted (point 3.10 of this analysis).

6.47 One FAB-100 aircraft bomb landed on an asphalt road (point 3.2 of this analysis), one FAB-100 aircraft bomb fell on a soil surface (point 3.3) and an FAB-250 fell on a soil surface (point 3.6 of this analysis). The other projectiles hit hard buildings, including four brick buildings (points 3.1, 3.5, 3.11 and 3.12 of this analysis) and five buildings that fall into the category of strongly built structures (points 3.4, 3.7, 3.8, 3.9 and 3.13 of this analysis).

6.48 In view of the buildings hit by aircraft bombs and the damage caused to them (point 3.1 to 3.13) all the cases concerned involve the use of aircraft bombs filled with a solid explosive, cast trotyl. It should be especially borne in mind that in many cases the bombs exploded inside the building, knocking down large parts of them, or in the ground, and for that reason and there could not have been significant fragmentation effects on the surrounding buildings. The destructive effects on the buildings did not match the effects of fuel-air explosives; all cases exhibited the effects of the solid explosive, trotyl, according to experimental results mentioned by the author himself (points 3.2, 3.6, 3.8, 3.11, 3.12 and 3.13 of this analysis).
6.49 The analyses of the cases (points 3.1 to 3.13 of this analysis) revealed frequent differences of opinion between the investigators and B. ZEČEVIĆ about the incoming direction and type of projectiles, and in some cases even the investigators had different opinions (points 3.2, 3.3, 3.4, 3.5, 3.7, 3.8, 3.9, 3.10, 3.11 and 3.13 of this analysis).

6.50 The enclosed *Vojna primjena aerosolnih eksploziva - pregled, prepared by Mr Berko ZEČEVić, Sarajevo, February 1994*, (point 4.1 of this analysis) discusses mainly in general terms and with a fair degree of imprecision the use of fuel-air explosives in foreign armies (points 4.1.1 and 4.1.3 of this analysis). At the very beginning of discussion, he makes a gross technical error by stating that the explosive mixture DBA-22M contains *aluminium nitrate*, which is not true because the explosive DBA-22M, which is actually a mixture of various energy materials, contains *ammonium nitrate, aluminium powder and other components that act as binders*. This explosive has not been used “recently”, as claimed by B. ZEČEVIĆ, but was used in Vietnam and Laos as far back as 1960s (point 4.1.1 of this analysis).

6.51 He incorrectly specifies the composition “of final products of combustion”, such as CO, CO_2 and H_2O. The final products of combustion are the products of complete oxidation, so that CO cannot be one of the “final products of combustion” because, in the presence of sufficient quantities of oxygen, it becomes the fully oxidised compound CO_2 (point 4.1.2 of this analysis).

6.52 B. ZEČEVIĆ said that the armies of the USA, USSR, France, Israel and China, had fuel-air weapons and said that as yet “there is no data available about this weapon in the USSR other than the fact that they have it”, but in the document (points 1.1 of this analysis) he presented a great deal of detail about the Russian ODAB-500 volumetric bomb (points 2.10, 2.12, 2.13, 2.14, 2.15, 2.16, 2.17 and 2.18 of this analysis). He claims that he was given the photographs by the Dutch SFOR, but the source of all the other details, photographs and sketches remains unknown (point 4.1.3 of this analysis).

6.53 When considering the effects of fuel-air explosives he says that the detonation pressure of the ethylene oxide fuel-air cloud is 20 to 30 bar, but elsewhere in the same document he states that the detonation pressure 10 to 20 bar. Why such a difference if this involves ethylene oxide (point 4.1.4 of this analysis)?

6.54 Further on in the text (point 4.1 of this analysis) he shows the effects of the fuel-air cloud on living beings and states, “Fuel-air explosives cause a very high level of fatalities up to a certain distance, and then the fatality level drops sharply.” The considerations from points 1.3 to 1.13 of this analysis, taking into account every victim, cannot confirm this, which means that fuel-air explosives were not used at the locations cited in the points of this analysis (point 4.1.5 of this analysis).

6.55 In the text (point 4.1 of this analysis) he considers the effects of US volumetric bombs and projectiles, which is completely irrelevant to conditions during the 1990s in the VRS because these American weapons are sophisticated combat assets requiring a strong basis in terms of scientific research and technical and technological support (point 4.1.6 of this analysis).
6.56 On page 06067184, B. ZEČEVIĆ discusses the “concept of the way fuel-air rocket projectiles work”, but this concept is not ascertained anywhere (points 3.1 to 3.13 of this analysis) in the considered case. At no point did it occur that the first detonation of solid explosives destroyed the container (this is a loud detonation, louder than the ignition of a fuse) followed by the detonation of a number of fuses positioned at the rear of the projectile initiated in a number of spatial points. In none of these cases was a part of the fuel-air explosive “container” found, although it would have to be found after the explosion (point 4.1.7 of this analysis).

6.57 The second attachment to the document (point 1.1 of this analysis) is a report submitted to the Ministry of Defence of the RBH on 31 January 1994, which he drafted after he was personally invited to identify a projectile which had landed on 29 January 1994. It describes the event around the plateau of Žuč hill at 0945 hours (point 4.2 of this analysis).

6.58 The report does not describe the material damage caused by the projectile or say whether anyone was killed and wounded. He found parts of the projectile and immediately identified them, but did not find anything that could be part of the container that had carried the hypothetical fuel-air explosive (point 4.2.1 of this analysis).

6.59 He first concluded that it was a projectile with solid explosives, but after consulting an article in the IDR journal – he does not cite the issue number, year, title or authors of the article – he concluded that this was a fuel-air explosive and, based on the remains found, he assumed the dimensions and mass of the fuel-air explosive, which is fairly unconvincing because he assumes the dimensions and mass of the fuel-air explosive on the basis of the remains found, which are not related to the warhead of the projectile. When talking about the remains that were allegedly brought from Žuč hill, B. ZEČEVIĆ discusses the effects that were seen on the ground (scorched grass and soil within a diameter of 30 meters), while not stating the provenance of that information given that he was not on the spot. It is unclear why he attributes such an effect only to fuel-air bombs since the same effect can occur when more conventional projectiles are activated above the ground, for example, when a tree or something similar is hit. In the introduction he himself confirms that the officers who were on Žuč hill did not agree with his assertion that this was a fuel-air bomb (point 4.2.2 of this analysis).

6.60 Further on in the same report (point 4.2 of this analysis) he mentions an unexploded rocket, one of four fired, and believes that it is important to examine the explosives in this rocket, which he discusses in three places in his reports, but he does not say anywhere what happened to the projectile, i.e. whether it was tested or destroyed (point 4.2.3 of this analysis).

6.61 On 21 December 1994, B. ZEČEVIĆ sent another report, probably to the same address as the previous one (point 4.2 of this analysis), in which he mainly repeats the contents of the previous reports, but also states that, “in the SR of Yugoslavia, intensive activities were conducted in the field of fuel-air explosive aircraft bombs at
the Institute in Vinča, but no final results were produced.” This means that the FRY Army had not managed to produce a fuel-air bomb (point 4.2.4 of this analysis).

6.62 In addition, in the second report, he assumes on the basis on the remains found the diameter, length and mass of the projectile, and on the basis of these assumptions he, assumes that the mass of fuel-air explosive is about 200 kilograms (point 4.2.5 of this analysis).

6.63 The Report on the Effects of Strikes Against Urban Areas of Sarajevo by Rockets of Great Destructive Power (point 5.1 of this analysis), which was drafted in Sarajevo on 11 July 1995, argues that the previously considered locations in Sarajevo were hit by projectiles with fuel-air explosives. Given that these buildings were made of solid material, and in fuel-air bombs generally, according to B. ZEČEVIĆ himself, “the overpressure of the detonation is 10-20 bar and lasts for mere milliseconds, but causes substantial destruction to light and moderately reinforced structures and living things”, it is unclear on what basis he argues that fuel-air explosives were involved at all the described locations, which were made of solid material (points 5.1, 5.2 and 5.3 of this analysis).

6.64 In discussing the locations shown in point 5.2 of this analysis (two locations are shown in section 1.1 of the analysis) he mainly relies on the statements of witnesses who described the event, and B. ZEČEVIĆ uses this to argue that these location were hit by bombs with fuel-air explosives, which, as B. ZEČEVIĆ describes in the report, cause severe harm to the human organism and death, and are very inhumane weapons (point 4.1.5 of this analysis).

6.65 In case under [1], RTV BiH House, the witnesses say they heard a projectile, “accompanied by characteristic sounds typical of bombs that have hit the neighbourhood of the RTV House and the general area of Alipašino Polje on several occasions during the past month.” No description of the “characteristic sounds” is given, so the basis for the conclusion that this projectile was “accompanied by characteristic sounds” is not clear (point 5.4 of this analysis).

6.66 In addition to the characteristic sounds, all the witnesses heard “that the projectile impacted the RTV building at least once, no less than five (5) seconds before detonation.” How can anyone hear something that “impacted … at least once”? Does that mean that it happened more than once, when “at least once” was registered? This is very problematic and completely unreliable testimony. The witnesses were also certain that they heard “two separate sound events”, one a “muted explosion” and the other “a very powerful explosion”, five to seven seconds apart. Again, the question is how come they (the witnesses) had the presence of mind to count five to seven seconds from the first, “weaker or muted explosion” to the next, “very powerful explosion”, but on the basis of the “credible” witness statements, B. ZEČEVIĆ concludes that this was the effect of fuel-air explosives. Within the context of this discussion, the assertion that “in the interval between the landing of the projectile and its activation, the policeman who was killed managed to run from the column to the back entrance, a distance of approximately 15 m,” is very problematic. It is obvious that what happened here was that he was thrown by the blast wave caused by the explosion of solid explosives (point 5.4 of this analysis).
In point 1.2. (on page 00378663), he describes the event [2] and shows the effect of the projectile on the residential building in Goteova (Cetinjska) St. no. 5 (at 1300 hours on 28 June 1995). Two people were killed and seven residents were wounded. Under the subheading “witness testimonies” a statement of only one witness, Hasan BJELAK, is cited (without specifying the place where he was during the explosion) to the effect that “the projectile that caused the destruction was accompanied by a characteristic sound” and that, “a heavy blow to the building was felt, followed by a powerful detonation five seconds later.” Here, too, the question arises as to what was this “characteristic sound” and how could the witness have been lucid enough to start counting from the moment that “a heavy blow to the building was felt” and count to five seconds before the “powerful explosion”. Inconsistencies abound in the description of the event. The incoming direction of the projectiles is also determined differently: the MUP investigators established that the projectile came from the azimuthal direction of 260°, whereas B. ZEČEVIĆ (section 3.9 of this analysis) says that the projectile arrived from the direction of Butila at the azimuth angle of 285°. There are evident discrepancies regarding the time when the event occurred, the number of casualties and the damage to the apartments on different floors in both documents. The question is what B. ZEČEVIĆ saw in 2007 when he drafted the report (the apartments from the seventh to the eleventh floor were destroyed) and what he did not see when the first report was drafted on site in 1994. The information concerning the victims (in the description of event, point 3.9 of this analysis) and the time of explosion of the projectile is different: in the document the time of the explosion of the projectile is 1015 hours, whereas in the report the time of the explosion is 1300 hours; the number of victims in the document from 1995 is two, whereas in the document from 2007 there are three victims. This incident is described in the document on page 06067419. According to this analysis (section 3.9), a FAB-250 modified bomb with three rocket motors landed on this location (point 5.5 of this analysis).

In the description of events [3], the heating plant at Safeta Hadžića St. (Prvomajska Street) no. 90, it is not specified whether anyone was killed or wounded. According to the MUP’s findings, the projectile arrived from the azimuthal direction of 265° at 1020 hours on 28 June 1995, hit “the flat roof of the heating plant, pierced the ceiling and the outside wall, and then hit the gas substation. The warhead ricocheted and landed about 20 m away next to the back wall of a single-storey office building, where it detonated and made a small slight crater with a diameter of 2.5 m and 0.5 m deep.” As an argument that a projectile with fuel-air explosive fell at this location, B. ZEČEVIĆ et al. state that no significant traces of fragmentation effect are visible. There could be no fragmentation effect because the projectile, according to this description, detonated incompletely on the ground. The most important proof that this was a fuel-air projectile would be the finding of parts of the container that had held the fuel-air explosive, but in all the cases presented so far (in sections 3.1 to 3.13 of this analysis) such evidence is lacking. Based on the descriptions of the projectiles, the warhead parts retrieved and the crater created, this location was hit by a projectile with a solid explosive, trotyl, creating a low-intensity blast wave due to the incomplete detonation and possibly deflagration (point 5.6 of this analysis).
6.67 The objectivity of witness Dževad BEČIROVIĆ is brought into question. He too heard the distinctive sound as the rocket-assisted projectile fell on the Toplana building in Safeta Hadžića (Prvomajska St.) St. no. 90. He also heard the “characteristic sound”: “The sound of an impact was heard as the projectile landed; five or six seconds later there was a powerful explosion.” Again, he was so composed that, after the shock caused by the fall of the projectile, he counted the seconds and managed to count until “five or six seconds later, there was a strong explosion” (point 5.7 of this analysis).

6.68 The description of event [4], the Institute of Surveyors, says that no one was injured. According to the findings of the police, “At 1230 hours on 29 June 1995, the projectile landed in the immediate vicinity of the Geološki zavod building, next to the right-hand lane of Meš Selimovića Boulevard, across the road from the RTV building. At a distance of 15 m from the front of the Geodetski zavod building, between the edge of the pavement and the kerb, there is a conical crater up to 1.5 m deep and up to 3.5 in diameter.” In support of the claim that a fuel-air bomb exploded, B. ZEČEVIĆ et al. state that there were no traces of fragmentation on the containers /communal rubbish bins/ near the explosion or on the front façade of the Institute or the car parked directly below the steps leading to the entrance. Nylon film covering the windows was torn. “The resulting aerosol cloud acted both in the ground and on the surface itself, forming a crater and a blast wave of modest intensity.” How could the fuel-air cloud form a crater “up to 1.5 m deep and up to 3.5 in diameter” in the asphalt surface, given that it has a detonation overpressure of 10 to 20 bar and is used for the destruction of “light and moderately reinforced structures and living things” (B. ZEČEVIĆ)? It should be especially borne in mind that in very many cases the bombs exploded inside the buildings, causing a great deal of damage, or in the soil, and for this reason there could not have been a significant fragmentation effect on nearby buildings, as is the case here. The projectile “penetrated to a certain depth” and activated. Judging by the size of the crater made in the asphalt surface, a rocket-assisted FAB-100 aircraft bomb landed on this location (point 5.8 of this analysis).

6.69 Only the location of the heating station is shown in the report (point 5.9 of this analysis).

6.70 In the ballistic analysis witnesses “estimated” while observing the projectile in flight that its maximum velocity was up to 250 m/s at the most. No less and no more, but exactly up to! On what kind of indicators and instruments did the witnesses base their judgment that the velocity of the projectile in the terminal section of its trajectory did not exceed 250 m/s. This is a completely arbitrary assessment given that velocity cannot be measured without electronic equipment. Witness statements about the speed of the projectile are subjective assessments that cannot even be considered information, and especially not as a useful parameter for the analysis of the velocity of a projectile in any section of its trajectory, including the terminal section. It is possible to estimate that a body passed very fast or very slowly, but it is absolutely impossible to estimate its speed accurately - and exactly up to 250 m/s - without electronic equipment (point 5.10 of this analysis).

6.71 The discussion of the average thickness of the body of a warhead is presented completely incomprehensibly and inaccurately. These discussions are not
substantiated in any way, and it is not explained anywhere in the document how the thickness was determined, as this would require that fragments be lined up along the axis of the projectile, on the basis of which it would be possible to arrive at the change the thickness of the casing, or the collection of a sufficient number of fragments for statistical analysis (point 5.1 of this analysis 1).

6.72 Presumably in order to prove the extensive fragmentation of aircraft bombs, B. ZEČEVIĆ shows the characteristics of the Swedish bomb. The diameter of the bomb is 214 mm; its total mass, including the parachute, is 123 kg; the mass of the charge is 30 kg of RDX-TNT. He also considers the fragmentation of the bomb, which is filled with explosives more powerful than trotyl, in order to compare it with the number of fragments of Yugoslav-made bombs of similar mass. However, the characteristics of the bomb - i.e. the material of the bomb’s body and the explosives - are not the same as in Yugoslav bombs, and so this comparison is completely superfluous and unnecessary because it does not prove anything. The presented fragmentation results cannot be compared with the fragmentation of the Yugoslav-made FAB-100 and FAB-250 bombs. The Swedish-produced bomb contains an explosive charge of 30 kilograms of RDX/TNT, and the Yugoslav-produced bombs contain trotyl (TNT): 39 kilograms in the FAB-100 and 96 kilograms in the FAB-250 M72, or 105 kg in the FAB -250 M79 (point 5.12 of this analysis).

6.73 The photograph from the 28 November 1994 issue of Newsweek, which is shown in two figures as evidence that “the Bosnian Serbs used modified aircraft bombs (FAB-100).” Below these images Newsweek placed the caption “conventional airborne bombs” (conventional airborne bombs), and the term “conventional” refers to bombs with the solid explosive, trotyl, so this cannot be considered as the evidence of use of fuel-air explosives. On the next page, he gives a photograph of a modified FAB-100 aircraft bomb with the caption “remains of the unexploded projectile of the design described above. It was found in the area Vogošća” (fig. 8 on page 00378670), which he shows in two other places (point 5.13 of this analysis).

6.74 B. ZEČEVIĆ bases the claim that these projectiles contained fuel-air explosives on the effects of aircraft bombs, the design geometry of FAB 250 and FAB 100, and the remains found at incident sites. The authors of the report use the term “remains found” to include “the absence of traces of intensive fragmentation effect” after the bomb explosion, but in connection with static arena bombs tests B. ZEČEVIĆ himself says, “Spatial distribution of bomb fragments is not uniform, and therefore testing of multiple bombs will produce significant variation in the number, size and shape of fragments.” How, then, can fragments be “uniform” in dynamic conditions? The authors of the report believe that from the point of view of the effects on the target and the manner of activation, the rockets in all the above cases (point 5.2 of this analysis) were “rockets with fuel-air warheads”. They support this claim by citing the remains of propulsion systems and warhead fragments found, data from the literature on fuel-air assets, the ballistic parameters of these rocket projectiles and the effects on the target (point 5.14 of this analysis).

6.75 The remains of propulsion systems and warhead fragments found. There are no warhead fragments to prove this; in fig. 4 on page 00378665, they show a very poorly visible image (from which nothing can be seen nor deduced), and these are
supposed to be warhead fragments with distinctive markings or fragments specific to a known design described above. It should be emphasised that the parts of the propulsion system shown in figures 2 and 3 on page 00378664 cannot be considered elements on which to base an identification of the type and design of the projectile, least of all the kind of explosive, because ZEČEVIĆ himself says that he has never heard of these projectiles before and they could be found in the arsenal of the former Yugoslavia, especially because these are propulsion systems which form an integral part of some other rocket artillery projectiles (OGANJ, GRAD, etc.). The propulsion system cannot serve for the purposes of identifying the type of warhead, but only to identify propulsion material, except in cases involving a well-known asset, which is not the case here (point 5.15 of this analysis).

6.76 Parts of the warheads found (base and the rear end with the ring connecting it to the propulsion system) which do not carry any markings make it “possible to reconstruct its shape and dimensions” (page 00378673, first paragraph). Based on these components, B. ZEČEVIĆ et al. conclude that the diameter of the warhead, which was made of steel, was 300 mm. However, they did not show anywhere in the preceding text the characteristics of the container which is filled with fuel-air explosives, except for the image “appearance projectile of a rocket with destructive warhead, reconstructed on the basis of projectile remains.” It is assumed that the mass of the warhead is 150 kg, the mass of the metal is 75 kg, the mass of the liquid explosive is 75 kg, the ideal speed of the rocket projectile is about 380 m/s, and the range of the rocket about 6,500 m/s, but on page 00378673, the seventh paragraph reads: “The remains found do not suffice for an accurate calculation of the length of the warhead, but the use of appropriate methods from external ballistics makes it possible to determine the approximate mass of the warhead.” Therefore, the length of the warhead cannot be determined, but the approximate mass can! Based on these assumptions, they assume the length of the warhead (which they could not determine accurately) to be 1,000 mm. Having considered these assumptions, without any connection with physical evidence found on the scene, B. ZEČEVIĆ et al. drew the rocket projectile without indicating anywhere in the drawing that this is actually a hypothetical drawing, deduced from the assumptions “on the basis of the remains found”! The question that inevitably arises when viewing this assumed drawing is whether in reality a container carrying a fuel-air explosive is the same as a warhead casing filled with the conventional explosive, trotyl, as he assumed in the said drawing. Is the thickness of the casing of aircraft bombs with the conventional explosive, trotyl, the same as the thickness of a container with fuel-air explosives? Nowhere in the previously analysed texts do B. ZEČEVIĆ et al. give an answer to this very important question. At the end of the section entitled Warhead (page 00378673) B. ZEČEVIĆ et al. conclude that, based on the traces, no unequivocal verdict can be provided about the type of liquid explosive used, but “for an accurate determination of the type of liquid explosive used we would have to find an unexploded warhead.” The unexploded warhead was found, but no one knows what happened to it! (point 5.16 of this analysis).

6.77 Literature on fuel-air weapons gives certain details about US-made bombs with fuel-air explosives, as well as comparative American data on the characteristics of TNT and fuel-air explosives. B. ZEČEVIĆ et al. cite as evidence of the development of fuel-air projectiles in Serbia academic research papers by engineers
published in the proceedings of the JKEM symposium in Lučani in 1988. These academic research papers deal with testing of certain characteristics of tetranitromethane, an already known explosive, and this is not evidence of any kind that work was conducted in the FRY to produce fuel-air bombs, which he himself says in the report. These are scholarly and research papers on the kinetics of decomposition of tetranitromethane and the effect of solvents on its detonation properties. Tetranitromethane has long been known as an explosive substance, and it was synthesised in 1857 (point 5.18 of this analysis). The papers do not explicitly refer to testing its use in fuel-air projectiles. They are typical research papers with no indication as to their application. Berko ŽEČEVIĆ says in his reports on fuel-air projectiles (of 31 January 1994 and 21 December 1994), which were submitted to the Ministry of Defence of the RBH (pages 06067187 and 06067188), that “in the SR of Yugoslavia, intensive activities were conducted in the field of fuel-air explosive aircraft bombs at the Institute in Vinča, but no final results were produced.” Information from the literature would have to be linked to the established documentary evidence by means of a relevant evidentiary procedure that could be used as additional evidence, which is also not the case here (point 5.17 of this analysis).

6.78 **The ballistic parameters of rockets of this kind.** These are also parameters from the literature (speed, resistance, mass of the projectile, mass of the propellant, mass of the explosive charge, effects on the target, design of the launch construction, stabilisation, and so on), because in these parts there was no experience with the effects of fuel-air explosions, and Mr B. ŽEČEVIĆ himself states that this development was in its infancy. Nor are they linked to the established documentary evidence by means of a relevant evidentiary procedure (point is 5.19 of this analysis).

6.79 **Effects on target.** These are not in any way different from the effects on targets of aircraft bombs filled with TNT or other solid explosives, and they are also not linked to the established documentary evidence by means of a relevant evidentiary procedure. Fig. 8 (page 00378670) is a photograph of a modified FAB-100 aircraft bomb, which did not explode at the target, and the question is why this bomb was not used to identify the type of explosive used. There is no information at all in the documents under consideration as to what was done with that bomb and whether it was tested, except for a photograph of it, which is shown in a couple of places in these documents (point 5.20 of this analysis).

6.80 B. ŽEČEVIĆ *et al.* state that “122 mm BM-21 GRAD rockets are illegally imported into Serbia and adapted, by means of these adapter rings, for launching from 128 mm M77 OGANJ multiple launchers.” Based on what information, written document, written statement, commercial contract or personal insight, are these claims made? It should be borne in mind that there was an arms embargo in place, which continued throughout 1994/95 and applied to all the warring parties (point is 5.21 of this analysis).

6.81 The text “functioning of the hypothetical rocket with a demolition warhead” describes the functioning of warheads filled with fuel-air explosive. According to this description, the warhead detaches from the rocket motor and, carried by inertia after the first hit, the primary detonation system activates and releases the liquid explosive
from the warhead by means of a weaker, controlled explosion. “After a period of six seconds, during which an aerosol (fuel-air) cloud with the necessary characteristics is formed, the secondary detonator is activated and initiates the detonation of the aerosol cloud. We assume that the secondary detonator is located on the warhead itself and that initiation takes place in the warhead’s immediate vicinity, whereby the warhead is ultimately destroyed. This assumption is based on the fact that the rocket’s warhead was not found in any of the cases, in spite of its considerable overall dimensions.” The claim that the aircraft bomb “self-destructs” is an attempt to justify the lack of evidence of a container holding fuel-air explosive. The use of fuel-air explosive to target strong buildings is, in the opinion of B. ZEČEVIĆ et al. unjustified: “This kind of design, both of the warhead and of the entire projectile, depends very much on target characteristics and other conditions at the moment of target penetration. This implies a significant reduction in the possibility of making maximum use of the potential of the fuel-air charge, as in the designs realised in the world so far.” If B. ZEČEVIĆ et al. know that this approach to the use of fuel-air explosives implies a significant fall in the potential usefulness of fuel-air explosives, then, from the practical point of view, the use of combat casings for aircraft bombs with fuel-air explosives, which would also show a significant fall in the potential usefulness of fuel-air explosives, is totally pointless. These questions, which are very important for the use of fuel-air explosives in projectiles, have not been answered in the documents analysed. In light of all this, it is quite improbable that anyone made primitive fuel-air projectiles during the war (as B. ZEČEVIĆ himself stated in the document on page 06067086, second paragraph from the bottom, “the rocket system as a whole was a very incomplete system”) with an uncertain effect on the target (point 5.22 of this analysis).

6.81 In the first paragraph of the note on page 00378675, B. ZEČEVIĆ et al. say the following: “Rockets with Russian-made fuel-air warheads were used on the hill of Žuč, near Sarajevo, early in 1994; at the front around Olovo and Teočak in the course of 1994; and at the front around Bihać in the course of 1995.” By saying this, B. ZEČEVIĆ himself denies that fuel-air bombs were used against urban areas of Sarajevo in 1994-1995, because he rules it out at the very beginning of the sentence. He cites only one case - on Žuč hill – of the use of a fuel-air projectile in the area around Sarajevo in 1994 and then lists all areas of the front where these projectiles were allegedly used, but this list does not include the urban areas of Sarajevo in the period 1994 - 1995, which on-site investigators considered to have been targeted by destructive bombs with solid explosives; this was the case in the event on Žuč hill (section 4.2.1 of this analysis), as well as in all other cases (section 3.1 to 3.13 of this analysis).

6.82 Further on in the text he suggests that, “These rockets (referring to the Russian-made projectiles) provided the basis for the development of Serbian volumetric rockets with demolition warheads.” However, B. ZEČEVIĆ is yet again inconsistent and refutes his own assertion: “in the SR of Yugoslavia, intensive activities were conducted in the field of fuel-air explosive aircraft bombs at the Institute in Vinča, but no final results were produced.” (point 4.2.4 of this analysis). During the war, the Army of the Republic of Serbia did not procure Russian fuel-air projectiles (point 2.22 of this analysis).
6.86 The overall conclusion is that B. ZEČEVIĆ wanted to show that the VRS used projectiles with “volumetric” explosives in order to demonstrate the “inhumanity of this weapon” given that, according to his writings and by all accounts (referred to in Parts 1 to 5 of this analysis of the document), they cause a large a number of casualties, but this does not follow from his analysis of the effects on the target. On the contrary. The number of casualties, with due respect for each victim, was nevertheless small in relation to the projectiles used and the mass of solid trotyl explosive they contained.

6.77 The CONCLUSION of this analysis, based on a detailed study of the text and all presented cases described in the documents The Use of Modified Aircraft Bombs During the Siege of Sarajevo, 1994-1995, produced in Sarajevo in February 2007, (point 1.1 of this analysis) and the Report on the Effects of Strikes Against Urban Areas of Sarajevo by Rockets of Great Destructive Power, by Berko ZEČEVIĆ, BEng. (Mechanical), Ahmet H. OMEROVIĆ, BEng. (Mechanical) and Amir KURTOVIĆ, BEng. (Chemical) Sarajevo, 11 July 1995, (point 1.5 of this analysis) is THAT THE BOMBS USED AGAINST SARAJEVO WERE NOT BOMBS WITH FUEL-AIR EXPLOSIVES BUT BOMBS FILLED WITH CONVENTIONAL TROTYL EXPLOSIVE PRODUCED BY PRETIS.

Belgrade, 26 July 2012
Dr Mirjana ANDJELKOVIĆ LUKIĆ
BEng. (Technology)