

Second Independent Inter-governmental Expert Group (IIEG-2)
Report investigating possible violations of Georgian airspace and the recovered missile near Tsitelubani, Georgia, 6 August 2007.

This report results from investigations undertaken by a group of experts from Estonia, Poland and United Kingdom between 18 and 19 August 2007 of the missile incident near Tsitelubani, Georgia.

The Expert Group

Estonia

Brigadier General Vello LOEMAA – Former Su-24 (24M) Pilot – Estonian MoD

Lt. Märt MÄGI – Radar Expert – Estonian MoD

Poland

Major Andrzej WITAK – Su-22 pilot – Air Force Command

Capt. Przemysław PULKA – Weapons Engineer – Air Force Academy

United Kingdom

Mr Kim BAKER – Missile Systems Expert – UK MoD

Executive Summary

- **The Group agrees with the findings of the IGE report dated 14 Aug 07 and further information will be presented in this report.**
- **Georgian airspace was violated three times of 6 Aug 07 from by aircraft flying to from Russian airspace.**
- **The last two passes were towards the Georgian radar near Gori.**
- **The missile was launched towards the Gori radar site at a range of approximately 10 km from the radar site.**
- **If the target was the radar site, the missile was launched at near minimum range.**
- **Immediately after missile launch the radar crew acted defensively and using combat procedures turned the radar transmitter off.**
- **The missile impacted on Georgian territory about 5 km short of the radar site without exploding.**
- **The missile was a Russian built Kh-58U anti-radiation, air to surface missile.**
- **Examination of Georgian aircraft proved no Georgian capability to operate this missile.**

Reports Received

This Group read the following reports of previous investigations of the incident.

1. OSCE Spot Report 'Tsitelubani missile incident' dated 8 Aug 07
2. Report of the Joint Monitoring Group
3. 'Special Investigating Commission Report on the incident near village Tsitelubani on 6 Aug 2007'
4. 'Report from the International Group of Experts (IGE) investigating the possible violations of Georgian airspace and the recovered missile near Tsitelubani Georgia 6 Aug 2007' dated 14 August 2007

Scope of IIEG-2 investigation

The IIEG-2 visited the missile impact and radar sites, the Georgian Maranuli air force base, the Interior Ministry (missile debris examination) and the Georgian Central Command Post (radar plots). In addition, the Group combined their expertise to postulate

a likely scenario of the events surrounding the missile launch. At Annex A are a number of comments resulting from previous work which this Group has addressed.

Finding of IIEG-2 Site visits

Visit to Georgian Air Force Base at Maranuli

During the inspection of the Georgian Air Force (AF) Base at Maranuli the Group checked all 10 of the Su-25 aircraft in the Georgian Air Force inventory. The Group's aircrew experts confirmed that these aircraft are not equipped to carry or operate Kh -58 missile.

The Georgian AF has three versions of Su-25. The first two versions (single and two-seat trainer) have cockpit elements easily recognizable by the Group's Sukhoy experts. They confirmed that the cockpits are not equipped with the special displays necessary to operate Kh-58. The third version of Su-25 (the most modern) has a completely modernised cockpit with flat display panels and a head up display. After a thorough check of this aircraft's Storage Management System as well as the check of a technical documentation of the modernisation program, conducted by Elbit from Israel, it was determined that this modernized version of Su-25 is not capable of carrying or operating the Kh-58 either.

Moreover, the weapons storage facilities at the airbase were checked and no evidence of either a Kh-58 missile or additional necessary equipment such as the Kh-58 launch pylon (AKU-58) or target acquisition pod (WJUGA) was found.

Missile impact site visit

On 18 August the Group visited the missile impact site close to the village of Tsitelubani and found small items of missile debris such as circuit boards and pieces of radome. We found that the original impact crater had been cleared and filled in and the recovered missile parts had been taken to the Interior Ministry in Tbilisi some time before. We confirmed the location of the impact site, using GPS, to be the same as reported in the 14 Aug 2007 IGE report.

Radar Site Visit

On 18 August the Group visited the 36D6-M radar (NATO name TIN SHIELD) positioned near Gori. Interviews were conducted with the radar site commander and the radar operator who was on duty at the time of the incident. It was found that due to maintenance activity the radar was only fully operational after the aircraft turned away following a second pass; the aircraft made three passes in total. The aircraft turned back towards the radar and was tracked by the radar and also visually observed by one of the radar crew members. The aircraft launched a missile, seen by the crew member and briefly radar-tracked before the radar ceased transmitting. It is estimated that the radar transmissions ceased very soon after missile launch. Radar shut down is a standard procedure when under a missile attack. A smoke trail from the missile was reported by the observer. The missile impact site is not visible from the radar position. As the aircraft turned to leave the area, the radar was turned on again and the aircraft departure tracked.

Interviews with the Radar Commander confirmed that this particular version of 36D6-M radar does not have any simulation capability. That feature, which is software driven, was not included in the purchase of the radar system.

Radar analysis

Georgia military personnel presented to the Group recordings of the air picture in Georgian Central Command Post and also recording at the military 3D radar site from the time of the incident. From these recordings it is clearly seen that the aircraft involved in the incident were tracked by Georgian Civil Air Traffic Control 2D primary radar and they were also tracked by Georgian military 3D primary radar. Furthermore the recording confirmed that the aircraft did not have its on-board transponder activated, as there were no responses to the interrogations from secondary radars in range. This means that the secondary radars were unable to detect and therefore track the aircraft.

The Georgian air picture was also forwarded to Russia. The Russians, who claimed no involvement in this incident, provided their own air picture. This air picture from the time of the incident and in the same region only comprised secondary radar information. Thus the information supplied by the Russians cannot support their claim.

Examination of missile debris at Georgian Interior ministry, Tbilisi

We visited the Ministry of the Interior on Sunday 19 August and inspected the debris from the missile impact site. The key findings were

1. The motor was fully burnt indicating that the missile was fired or launched. If the missile was jettisoned (released from the aircraft in an emergency situation) the motor would not have fired.
2. The markings on the warhead casing, photographed prior to destruction, indicated a manufacturing date of October 1992. Thus the missile was built for the Russian Federation rather than the Soviet forces.
3. Similar dates were seen on other components along with markings indicating the missile was a 'U' variant (Kh-58U).
4. The missile radome was black with a metallic tip at the end.
5. The recovered 'western components' were two Swiss made DC/DC power converters not processing chips.
6. A section of the missile antenna (guidance seeker) was recovered for further analysis to determine the operational frequency range of the receiver in the missile seeker.
7. A video of the warhead destruction process, conducted away from the impact site, was presented to the Group.

In conclusion, the recovered parts support the claim that the missile fired was an indigenous variant (labelled Kh-58U) of the Kh-58 (AS-11, NATO name KILTER) air to surface, anti-radiation missile and this variant of the missile is not offered for export.

Possible MANPAD firing

A representative of the Ministry of the Interior reported that eye witnesses had observed the launch of a MANPAD (shoulder launched, surface to air missile) prior to the launch of the air to surface missile from the aircraft. The MANPAD was fired from the right of the aircraft as it approached the radar site. The Group examined the performance of the typical MANPADs and from the likely firing position along with the aircraft speed and altitude considered it highly unlikely that the MANPAD would hit the aircraft.

Possible Scenario

The Group combined its expertise to come up with a possible scenario to explain the facts.

The incident started with incursions into Georgian airspace by aircraft flying towards the radar site in Gori. The central command post was aware as several radars (including civilian) were fed into their air picture. Part of the first penetration was seen by the 36D radar but the information was not sent to the central command post in Tbilisi. The radar was only able to partly track the incursion as it was under going maintenance.

On the third incursion the aircraft turned towards the radar and the radar tracked the aircraft all the way until the missile launch, when the radar stopped transmitting. Just prior to launch the aircraft weapons system passed information on the position of the radar site to the missile on the pylon. At launch the missile dropped away and after approximately 50 m separation the motor ignited. We were very fortunate that the radar crew member saw the missile launch and the smoke trail. Due to the mountainous terrain in this region the aircraft was only a little higher in elevation than the radar site, perhaps 1-1.5 km. Upon detection of launch the crew quickly stopped the radar transmitting. At this point the aircraft was estimated to be about 10 km from the radar. Thus just after launch the missile was denied a valid radar target to home onto. The Kh-58 had to use the previously estimated position of the radar site derived from the aircraft sensors. It is likely that due to the short range, the missile flew a direct approach to where it believed the radar site was. A miss of 3-5 km is not unusual in these circumstances because of the old estimation of the target position and no opportunity for the seeker to refine that position. The missile requires several operations to arm the warhead correctly and a combination of short range and similar elevation (aircraft and radar site heights) may have interrupted the normal arming sequence.

It was reported that a MANPAD was fired as the aircraft was flying towards the radar during the third incursion. It is unclear if the missile caused any damage to the aircraft or the Kh-58 missile it was carrying. It is also uncertain if the aircrew reacted to the MANPAD launch or what affect the MANPAD had on the launch of their air to surface missile.

After launch of the Kh-58 the aircraft turned back towards Russian airspace and was tracked on radar into Russian airspace.

Recommendations

To fully answer all the questions regarding the operation of the air to surface missile (Kh-58) it is recommended that help from the Russian manufacturer is sought.

Further investigations are needed with information from pilots who currently fly the Su-24 and operate the Kh-58 missile.

It would be useful to get the radar tracks from neighbouring countries to add to the Georgian and Russian information.

The Group felt that more information about the incident could be determined if Russia supplied the military (primary) radar tracks in addition to the secondary tracks already received.

To prevent future incidents it is recommended that greater control and transparency is achieved over the border region air space.

IIEG-2
20 August 2007

IIEG-2 responses to issues raised by earlier reports and investigations

Was there any Russia involvement?

The aircraft came from and returned to Russian airspace. The missile was of Russian manufacture. Within the region Russia is the only feasible nation capable of using the weapon correctly.

Could the attack have been staged by the Georgians?

The Group examined the all Georgian aircraft at Maranuli and found they were incapable of launching the Kh-58.

Is the IIEG-2 representative?

The latest expert group (IIEG-2) comprises representatives from Poland, Estonia and United Kingdom.

Why were the Georgians in a hurry to destroy the evidence?

Only the warhead was destroyed for safety reasons as it contained explosive (150 kg of TNT) and the condition of the fuze was unknown. All the recovered debris is still on display at the Interior Ministry. The Georgians made a video of the missile recover operation and of the warhead removal and destruction. The serial numbers of parts recovered have been seen at the Interior Ministry and indicate a manufacturing date of the warhead of Oct 1992.

How many aircraft violated Georgian airspace and what type?

The radar tracks from both civil and military radars indicate at least one, maybe two, aircraft were involved. A single aircraft was visually observed by a crew member from the radar site at Gori, just prior to missile launch. The crew member was interviewed by the Group and shown pictures of aircraft for him to identify the most likely aircraft. It was clear that the crew member did not possess any aircraft knowledge. He thought the Su-24 was closest match to the aircraft he saw, discounting pictures of the Su-25, MiG-25 and MiG-27.

Why was the Georgian radar targeted at such close range?

The Group does not claim that the radar was deliberately attacked. The Group found that a single missile was launched approximately 10 km from the radar site and towards it. The missile was fired, proved by the fully burnt out motor section. The reason why the missile missed the target and the self destruct failed is uncertain at this time but probably related to the lack of radar transmissions when the missile was launched and the short range. The Group is unaware of a second air to surface missile falling in South Ossetia. There are reports of a single MANPAD firing from the South Ossetia region. Additionally the Georgians stated that they had no anti-aircraft units in the region.