SICUREZZA TERRORISMO SOCIETÀ

Security Terrorism Society

INTERNATIONAL JOURNAL - Italian Team for Security, Terroristic Issues & Managing Emergencies

4
2016

EDUCatt

SICUREZZA, TERRORISMO E SOCIETÀ

INTERNATIONAL JOURNAL
Italian Team for Security,
Terroristic Issues & Managing Emergencies

4

ISSUE 2/2016

Milano 2016

EDUCATT - UNIVERSITÀ CATTOLICA DEL SACRO CUORE

SICUREZZA, TERRORISMO E SOCIETÀ
INTERNATIONAL JOURNAL – Italian Team for Security, Terroristic Issues & Managing Emergencies

ISSUE I – 4/2016

EDUCatt - Ente per il Diritto allo Studio Universitario dell'Università Cattolica
Largo Gemelli 1, 20123 Milano - tel. 02.7234.22.35 - fax 02.80.53.215
e-mail: editoriale.dsu@educatt.it (produzione); librario.dsu@educatt.it (distribuzione)
web: www.educatt.it/libri

Associato all'AIE – Associazione Italiana Editori
ISBN: 978-88-9335-108-9

copertina: progetto grafico Studio Editoriale EDUCatt

Table of contents

From Nuclear and Radiological Smugglin to Nuclear Terrorism: Understanding the threat to the European cities

Nicolò Giuseppe Spagna

Abstract

After the terrorist attacks in Paris, Bruxelles and Nice claimed by Islamic State (ISIS) the question that has been raised is if ISIS could use nuclear or radiological weapons in addition to firearms and suicide explosions. This paper has the goal of clarifying the threat's scenario, answering to the following question: *Is there a concrete threat about the use of nuclear or radiological weapons in Europe by ISIS?* In order to this, the first part explains the strong political and divine motivation of attacking the apostates and the evidences in the interest of using CBRN weapons. Lastly, were described the different more likely smuggling routes and the states implicated in the trafficking which a terrorist organization could use for acquiring the materials. The last part concerns the threat assessment. It has been described the two main facilitators of the nuclear and radiological attack by terrorists, in other words the jihadist infiltration in the Balkan and the link between terrorists and criminal groups. The conclusion is that the concrete threat concerns the use of the RDD (radiological dispersal device) in a hypothetical attack against European city, however for logistical and technical reasons it is very unlikely the use of a nuclear device for generating an atomic blast.

Key Words

Terrorism, NBCR, Nuclear, Radiological

1. Understanding the threat scenario

The rise of the *Islamic State of Iraq and Syria* and its gradual claim as proto-state has created a new threat scenario about the use of nuclear and radiological weapons to cause mass casualties and to spread terror in Europe. Then, it is claimed that «there is a very real risk of ISIS using unconventional weapons in Europe and beyond» (Immenkamp 2015, 2). In this framework, is fundamental to analyze the concrete sustainability, the real threat, from the terrorist organizations, specifically ISIS, in relation to the acquisition of nuclear and radiological material. In this way, this paper will focus on three parts:

1. The evidences about the motivations of ISIS of using CBRN weapons in Europe;
2. The main core of the work will focus on the description and representation of the nuclear and radiological smuggling routes, considering specifically the Balkan area and Caucasus;
3. The final part of this paper concerns a descriptive threat assessment divided in two part: Firstly, a focus on jihadist infiltration in the Balkan region and the link between terrorism and criminal groups; Secondly, a brief analysis on the real threat to European cities.

1.1 Islamic State's motivation

Motivation can be decomposed in two different types: a political motivation and a strong-divine motivation of ISIS for achieving its political and religious goals. After the self-declaration of the Caliphate on 29 June 2014 by the current leader *Abou Bakr Al-Baghdadi*, the main ISIS' goal is to build a worldwide Caliphate with a great ambition to lead the lives of all Muslim within the framework of radical Islamic law called *Sharia* (Pichon 2015). Along similar line are U.S officials highlighting that «the Islamic State's goal is to established an Islamic caliphate through armed conflict with governments it considers apostate […]» (Humud et al. 2014, 43). The ISIS' propagandist system works a lot in this direction for spreading messages of terror "*to the nation of the cross*", indeed some video have been released by the most important ISIS' media branches, such as *Alwa'ad Media Production*, they have threated Rome, London and Berlin with phrases as "*Fight them; Allah will punish them by your hands*". The second side of motivation refers to the will of attack the infidels through any available instrument. This was confirmed by the concretes facts. In August 2015 U.S. intelligence community warned that ISIS would had carried out mass casualty attacks (Sciutto 2015), not long afterwards on 13 November 2015 a series of terrorists attacks have happened in Paris, Saint-Denis a northern district, killing 129 people and others 368 people were injured (Marcus 2015). After three days the arrest of the only survivor of the Paris attacks *Salah Abdeslam* in Molenbeek (Belgium), a second cell linked with the Paris cell attacked the Bruxelles airport and the subway station. Taking advantage of a window of opportunity ISIS, that claimed the attack, killed 35 people and 270 were injured (Readhead 2016). Following are shown the three summarizing aspects about the motivations:

- The extreme ISIS' will to attack the West and submits the infidels;
- The extreme ISIS' will to do that through any available instrument;
- The logistic capacity and the ISIS' will to take advantage of opportunities as much as possible for attacking.

1.2 Evidences on ISIS' motivation about the use of CBRN weapons

These aspects are not merely theoretical in relation to use of CBRN. ISIS has demonstrated different times how, if it can use CBRN, it will do that. Regarding the use of **chemical warfare agents**, since its proclamation, ISIS has used them against the infidels Muslims. Specifically, against the *Syrian Opposition Groups* that is formed by Iraqi, Syrian and Kurds government militia. Despite most of the chemical weapons has been destroyed from the Syria government, in 2014 ISIS used bombs during the battle with chlorine. In the same period, ISIS fighters used chlorine gas for suffocating Iraqi militiamen, causing the death of 300 soldiers.

In April 2015, ISIS bombarded different residential areas and security checkpoints using chlorine gas-imbued grenades. After four months, ISIS used artillery for bombarding Kurds in Makhmour (Iraq) with several health effects (e.g., blisters, burns, damage to the eyes and respiratory system). Finally, in 2015 were used mustard weapons against Iraqi and Syrian cities (Lt. Col. res. Dr. Shoham 2015; Eweiss 2016).

Considering the use of **biological weapons** there are different evidences about the will of use them. Firstly, In January 2014 a laptop was found by Abu Ali, a commander of Syrian rebel group in Northern Syria, in a ISIS' hideout in Syrian province of *Idlib* (close to the border with Turkey). Inside the 146 gigabytes were «found 19-page document in Arabic on how to develop a biological weapons and how to weaponized the bubonic plague from infected animals [but not just that, in fact] the document includes instructions for how to test the weaponized disease safely, before it is used in a terrorist attack» (Doornbos and Moussa 2014).

More recently, in March 25, after Bruxelles attack the authorities captured *Abderahmane Ameroud* in Schaerbeek during the inquiry about the jihadist network in Bruxelles. Inside the Ameroud's bag were found animal biologic materials, such as excrements and testicles, that it could be used for infecting people with illnesses (e.g., cholera) (Norman 2016).

Regarding the use of **nuclear** and **radiological materials**, ISIS fighters in June 2014 have approximately stolen 40kg of low enriched uranium from scientific department at the Mosul University in Iraq. Despite experts have minimized any superior threat in relation to the quantity and quality of uranium (NATO 2015), «looking at the level of brutality of ISIS, there is a clear signal that the would not hesitate to use [nuclear weapons] against their opponents» (K. Lalbiakchhunga 2015, 16).

In the same way, there are other evidences about the ISIS' interests to nuclear and radiological weapons. Even though the German Intelligence denied the notice, different articles (Dearden 2016; Halkon 2016; The Guard-

ian 2016) reported that *Salah Abdeslam* had relevant documents in his *Molenbeek* apartment about a nuclear research center. The documents would has concerned the *Juelich Research Center* and the atomic waste stored, near the Belgian border. As it is confirmed there is a clear link between Paris and Bruxelles attack, also there is a connection in relation to the interest about nuclear. This is evident from the Bruxelles suicide bombers *Khalid* and *Ibrahim El-Bakraoui*. They recorded at least 10 hours of footage of the outside of the home of the research and the development head of the Belgian Nuclear Program, probably for kidnapping him. The CEO of the European Strategic Intelligence and Security Center private consultancy said «The terrorist cell […] naively believed they could use him to penetrate a lab to obtain nuclear material to make a dirty bomb» (Steinbuch 2016).

2. Accessibility of nuclear and radiological materials

2.1 Investigating the nuclear and radiological smuggling routes

After the description of the motivation of ISIS, we proceed to study the accessibility of materials, therefore the related trafficking routes. The analysis will be focused on the Black Sea countries and the neighboring countries, in other words the Balkan Peninsula. Indeed, it was confirmed that «dozens of ISIS jihadists have infiltrated into European countries and have recently installed a "secret base" in the Balkans» (Yousef 2015). In fact, all Balkan countries reveal the existence of different jihadist's networks and the connected link with organized crime networks. In relation to nuclear and radiological smuggling, there is a concrete difficulty with open source analysis concerning the real number of the trafficking cases. In this sense with the problem of *dark number* are unknown the number of non-reported and not intercepted smuggling cases.

Historically, nuclear smuggling cases emerged in the aftermath of the fall of the Soviet Union in the middle of the 1990s, indeed this transitional period was characterized by a rapid reduction of security and the collapse of the economy. Most likely nuclear and radiological materials that entered in the black market could still be for sale today (Squassoni and Armitage 2015). In according to different researches (Delanoe 2015; Zaitseva and Steinhäusler 2014) the main countries involve in the smuggling are **Russia**, **Moldova**, **Ukraine**, **Romania**, **Georgia**, **Armenia** and **Turkey**. Each one with a different *role* within the smuggling routes. Firstly, it will be analyzed the Caucasus, after that the Balkan region. Secondly, investigating on open sources and Global Incidents and Trafficking Database (CNS 2016b), for the main country are shown different smuggling cases from 2010 to 2016 and a more specifically tables of the seizures from 2000 to 2016 (see appendix n. 1 e 2).

2.1.1 Main countries in nuclear smuggling routes: Russia, Caucasus and Turkey

Russia

Russia has been identified as the *primary source* of proliferation of the nuclear and radiological materials, indeed it represents the first point of origin of the materials in order to traffick them in the Balkan Peninsula and Caucasus. This is confirmed by different researches. According to L. Shelley, Director of the Transnational Crime and Corruption Center, «the fact that nuclear materials appear to be leaving Russia via the Caucasus rather than across Russia's long and loosely border with Kazakhstan suggests that smuggling networks have intentionally made the Caucasus their route of choice for nuclear materials […]» (Hofmann 2011). In the same way, the smuggled materials came from Russia to the Balkan countries through **Ukraine**, **Moldova** and **Romania**.

Taking into consideration the case in June 2011, when Moldovan authorities arrested in Chisinau different people during a transaction for selling a sample of uranium. For authorities this was a third case in a series of connected cases[1]. In this way, in according to Moldovan authorities the HEU[2] have been smuggled from **Russia** through **Ukraine** and **Moldova**, specifically **Trans-Dniester (Transnistria)** that subsequently has been analyzed. The Database on Nuclear Smuggling, Theft, and Orphan Radiation Sources (DSTO)[3] has reported that from 1991 to 2012 Russia was involved in 90 incidents relating nuclear material. Considering the trafficking routes in the Caucasus, the following will be analyzed the main countries of trafficking, in other words **Georgia**, **Armenia** and **Turkey**.

Georgia

As confirmed by M. Fitzpatrick (2007) «Georgia may be particularly attractive to smugglers due to its geographical position, which allows them to move their illicit goods using both land and sea routes» (128). In according to Georgian authorities and researchers the nuclear and radiological materials pass through into **Georgia** from **North Ossetia** and continue passing for **South Ossetia**, in fact «this channel for nuclear smuggling is considered the most common» (Zaitseva and Steinhäusler 2014, 15). Therefore, Georgia can be considered relevant and strategic country for nuclear smuggling in all Caucasus also for the maritime routes. In other words, Georgian authorities believe that Georgia has become a transit nation mainly for trafficking radi-

[1] In all three incidents «the uranium powder was in a glass ampoule inside a cylindrical lead container, suggesting that it may have been supplied by the same sellers» (Zaitseva and Steinhäusler 2014, 17).

[2] Acronym for highly enriched uranium.

[3] As reported in Zaitseva and Steinhäusler 2014, 14.

ological materials[4]. More specifically, «coming from **Russia** or **Central Asia** across the Caspian Sea, illicit radioactive materials are brought to Georgian ports through **Azerbaijan** and **Armenia**» (Delanoe 2015, 7). There are one main starting-port used for smuggling materials from Georgia: the port of Batumi, in the autonomous **Republic of Adjara**, the traffickers use it as a transit area. From port in Georgia the smuggled materials are directed to **Turkey** (via land or sea) or **Ukraine** (via sea) (Delanoe 2015; (M.P.P.) Fitzpatrick 2007). In the light of this, is interesting to show the Georgian route with a real cases presented below.

> Tamaz Demetradze, a former officer with military experience in the Soviet and Georgian armies, was arrested on August 1, 2006 in **Adjaria** for possessing 1 kg of yellowcake[5]. According to interviews with the case investigators, Demetradze was an established smuggler of illicit goods with especially strong business interests and contacts in **Abkhazia** (a breakaway region of **Georgia**), including among law enforcement agencies and organized crime groups, both of which often cooperate with each other in the disputed region. The investigators stated that the uranium originated in **Russia** and was smuggled by unknown Russian organized criminals first to Sochi, a Russian Black Sea resort, and then into **Abkhazia**, where it was stored for two weeks. Demetradze apparently was a long-time smuggling and business associate of these criminal groups and therefore was hired to transport the uranium from **Abkhazia** to **Turkey**, where he was to find a buyer for the material. In Adjaria he contacted two local residents, Aslan Miqeladze and Nodar Dzneladze, who also claimed to have access to radioactive materials. (Kupatadze 2010, 222–23)

In the same way, another case happened in June 2007.

> In June 2007, Georgian law enforcement officials arrested a Ukrainian citizen of Azeri origin, Mazhdun Shikhmamedov, and his Georgian accomplice, Emzar Saparidze, in Adjaria, an autonomous coastal region of Georgia bordering **Turkey**. The police recovered natural uranium (yellowcake) and an empty container – emitting an unspecified amount of ionized radiation – that was part of some specialized equipment. Investigation revealed that Shikhmamedov obtained the metal container and the uranium in **Kaliningrad** in 1991

[4] *Ivi*.

[5] The *yellowcake* is «the solid form of mixed uranium oxide, which is produced from uranium ore in the uranium recovery (milling) process. The material is a mixture of uranium oxides, which can vary in proportion and color from yellow to orange to dark green (blackish) depending on the temperature at which the material is dried (which affects the level of hydration and impurities), with higher drying temperatures producing a darker and less soluble material […]» (NRC Library 2016).

from a **Russian citizen**. He stored the materials in **Azerbaijan** until 2007 and then decided to sell them to a **Turkish citizen**[6].

Considering HEU smuggling in the Georgian route, it is highlighted an incident happened on February 1, 2006 in Tbilisi (the capital and the largest city of Georgia) where MIA authorities arrested four traffickers for trying to sell 100gr of highly enriched uranium. MIA, U.S. FBI and CIA conducted the operation. The main smuggler was *Oleg Khintsagov* a Russian citizens involved in illicit trafficking, with others three traffickers: *Revaz Kurkumuli*, a small businessman and drug-dealer; *Badri Chikhashvili*, a government security guard; *Henri Sujashvili* a contraband trader.

Khintsagov attempted to sell around 3kg of HEU for $30 million. Beyond this, he bought 80gr of uranium for $10.000 in Novosibirsk from Rashid in the winter of 1999. Khintsagov stored the uranium in Vladikavkaz (**Russia**) (Bronner 2008; Kupatadze 2010). In the same way, in 2010 two Armenians were arrested by authorities in Georgia for attempting to sell enriched uranium into country. The two smugglers travelled by train from **Yerevan** to **Tbilisi** with 18gr of HEU to a level of 89.4% sufficient for building a nuclear weapon (German 2016).

Others incidents happened have involved the Georgian route, for instance on April 2000 Georgian authorities arrested four persons in **Batumi** for the possession of around 1kg of HEU, the material could have been smuggled from Russia. On September 2000, three persons were arrested by police at Tbilisi airport for attempting to sell a quantity of mixed material (Plutonium and low enriched uranium). The smugglers (one Armenian and two Georgian citizens) said that they brought the material from Russia and Ukraine for selling it in Georgia. On December 2001, 300gr of uranium were seized by authorities in Georgia where probably the material was originated from Armenia (Mutua 2015).

Finally, another element that supports the existence of the **Georgian route** concerns the convictions in Georgia. Indeed, the Supreme Court of Georgia has recorded that since 2002 the smugglers involved in a court cases were twenty-seven, more specific twenty individuals were Georgian[7].

Armenia

Considering the repeated seizures at the Armenia border and the high number of Armenian traffickers implicated in illicit smuggling cases in Caucasus, it can be confirmed the existence of an **Armenian route** (Badalova 2016) as extension of the **Georgian route**.

[6] *Ibidem*.
[7] *Ibidem*.

Armenia is considered another point of entry of the nuclear and radiological materials in the black market. Indeed Armenia's nuclear smuggling starts mainly from *Metsamor nuclear power plant*. Metsamor is one of the most ancient and dangerous nuclear power plant, it was built in the 1960s and 70s and it has a high probability of accidents. In addition to this, Metsamor is dangerous also for the proliferation of nuclear and radiological materials, in fact «in Georgia several members of the gang of Armenian nationality were detained for smuggling of radioactive substances. It revealed the smuggling and transit of radioactive material on the "black market" from the Metsamor Nuclear Power Plant […]»(APA foreign 2016). In this way, arrests of Armenians smugglers who have entered into Georgia for trying to sell nuclear and radiological materials have increased in the past two years. The first Armenian trafficker was arrested in 2003 by Georgian authorities for trying to sell HEU that it could have been used for making a bomb. Usually, Armenian traffickers try to enter in Georgia with the materials because Armenia is a landlocked country. In this way, they can use the Black Sea ports for smuggling nuclear material to the Middle East (Sahakyan 2016) or Balkan Peninsula. In the final analysis, «the Armenian-Turkish border is closed, while Russian border guards stand on the border between Iran and Armenia. That is why Armenian smugglers try to use the territory of Georgia and its access to sea, which allows seeking buyers from larger region» (Dadashova 2016).

Turkey

In according to different researches (Lawlor 2011; Zaitseva and Steinhäusler 2014) Turkey rapresents the main destination inside the nuclear smuggling chain, mainly for the use of maritime routes. Considering the relevance of Turkey in the smuggling chain, the Turkish government has taken a series measures in order to increase the control and reinforce the borders. In order to this, as described by Dr. M. Kibaroglu (2015) in the last decade the government has produced the following security measures.

The first measures concern the inter-agency cooperation between Turkey and allied nations. Secondly, the measures also regard professionals training for the civil and military personnel. Both Turkish Atomic Energy Authority (TAEK) and Ankara Nuclear Research and Training Center (ANAEM) have organized regular training courses about various aspects of nuclear security for law enforcement personnel, nuclear industry personnel and academic institutions. More specifics ANAEM has organized courses about radiation protection, radiation safety, nuclear power, nuclear security, nuclear application and nuclear safety. Lastly, training courses on WMD and terrorism are habitually organized in collaboration with NATO Center of Excellence-Defense Against Terrorism (COE-DAT). A practical case of this cooperation concern the in-

stallation of the system for detecting radioactive materials in different border points. The first radioactive detectors were installed at the beginning of the 2000s with the collaboration of the U.S. Now, around 48 border gates are installed. Turkish Atomic Energy Authority (TAEK) continuously monitors these radioactive detectors in real time in order to respond to potential emergency.

Other measures concern the Turkey's membership in international conventions. For instance, Turkey collaborates with the International Atomic Energy Agency (IAEA) for the organization of workshop and meeting on nuclear security. To conclude, Turkey takes part in different international initiatives against nuclear smuggling. For example, Turkey is a partner in the Global Initiative to Combat Nuclear Terrorism (GICNT) and participant in the Proliferation Security Initiative (PSI). Furthermore, for avoiding the spread of radiological and nuclear materials, Turkey discourages the use of highly enriched uranium (HEU) and plutonium (Pu) and it encourages the use of alternative materials such as low enriched uranium (LEU). After all, Turkey surely represents a key country for opposing the nuclear and radiological trafficking in the Black Sea region.

The following are reported the main nuclear and radiological smuggling cases recorded from 2010 to 2016 in Caucasus, specifically in Armenia, Georgia and Turkey with the respective summary table (appendix 1).

- **March 2010 (Tbilisi).** Georgian authorities arrested two Armenians men, Sumbat Tonoyan and Hrant Ohanyan. They were trying to sell 18 grams of enriched uranium (HEU) to a buyer who was a Georgian undercover agent. Authorities said the smugglers received the sample from *Garik Dadaian*, another Armenian, who was arrested in 2003 for the sale of 180 grams of HEU into Georgia (European Dialogue 2010). Prosecutor said that the traffickers «had smuggled 18 grams of HEU by train from the capital of Armenia (Yerevan) to the capital of Georgia (Tbilisi), in a lead-lined cigarette box. Such a quantity was nowhere near enough to make a nuclear bomb but was meant as a "taster sample" with more HEU available if the buyer was satisfied» (Moscow 2010).
- **September 16, 2010 (Tbilisi).** Three traffickers were arrested at airport for attempting to sell a sample of uranium and plutonium (Azerbaijani Vision 2016).
- **April 5, 2011 (Batumi).** The Nuclear and Radiation Security Service of Georgia recovered a metal containing Caesium-137. It has been located on board a cargo train at Batumi International Container Terminal (SCHMID and SPENCER-SMITH 2012).
- **April 4, 2013 (Tbilisi).** Georgian authorities arrested three man involved in radioactive materials' sale (AM241). The authorities said the smugglers did not have enough materials for building a dirty bomb (CNS 2016b).

- **December 14, 2013 (Tbilisi).** Georgian border authorities arrested citizens that were transporting Radium-226 for selling it[8].
- **August 1, 2014 (Sadkhlo).** Georgian authorities arrested two Armenian smugglers, Samuel V. and Artiun X. while they attempted to smuggle Caesium-137 into Georgia[9].
- **June 19, 2015 (Akcakale).** Turkish authorities arrested two Georgian smugglers at the Tel Abyad border in Sanliurfa province. They tried to cross into Turkish territory with 1.24kg of Caesium-137 and 48.23 grams of a mercury all valued at $2.5 million[10].
- **January 2016 (Sadkhlo).** Georgian border authorities arrested three Armenians traffickers for trying to bring Cesium-137 across the border (Badalova 2016).
- **April 2016 (Tsibili).** At the beginning of April, Georgian authorities arrested six Georgian and Armenian citizens. They were trying to sell Uranium-238 isotope for $200 million (Antidze 2016).At the end of April, Georgian security services arrested five Georgian citizens who were trying «to sell [$3 million] nuclear material with total weights of 1 kilograms and 665 grams, which contained two radioactive isotopes – Uranium-238 and a small amount, 0.23 percent, of Uranium-235» (CNS 2016b).

2.1.2 Main countries in nuclear smuggling routes in the Balkan Peninsula

Ukraine

After the collapse of the Union of Soviet Socialist Republics (USSR), Ukraine became «the third largest nuclear weapon stockpile after Russia and the United States» (Buelles 2013). In this way, Ukraine's border is a sensitive position in relation to the smuggling of radiological and nuclear materials, for this reason there is a real security risk about it. If Russia is considered a first supplier state in nuclear smuggling, Ukraine represents the first country that open the nuclear smuggling chain until the Balkan Peninsula or Middle East. The main route from Ukraine to Turkey starts by sea from the famous port of **Odessa** that it is used by smugglers also as a hub for the human and drug trafficking. In addition to this, likely the port of **Ilichiovsk** could be used for smuggling radiological materials, given that it is used for the drug trafficking. For example, «the seaports of **Odessa** and **Ilichiovsk** alone had two tons of cocaine and 759kg of hashish confiscated in 2010. A considerable part of this shipment was destined for EU markets and was supposed to travel through the Republic of Moldova's territory, including its eastern border […]» (Cornell and Jonsson 2014, 143). Another likely port for trafficking are the

[8] *Ibidem*.
[9] *Ibidem*.
[10] *Ibidem*.

port of **Batumi** that it is located near the Turkish border in **Adjara**. In according to Europol Organized Threat Assessment (OCTA) report published in 2011, Black Sea ports are defined as key points of transit and entry for drug, especially cocaine from South America. The Moldovan-Ukranian border is an important point for storage and processing drug. However, Moldovan authorities have declined these claims despite the different evidences. For instance, in February 2012 in the Ilichiovsk port was intercepted a large cocaine load, around 40kg, that was decided to be received by two Moldovan smugglers[11]. The consolidated existence of the routes for drug trafficking and the several nuclear smuggling recorded cases in Ukraine allow to affirm with large probability the use of drug smuggling routes for smuggling radiological and nuclear material.

Although most of the illegal nuclear trade in Ukraine regards materials coming from Russia, some of the smuggled materials come mainly from abandoned Černobyl' nuclear power plant. After the accident in 1986 the power plant has become a very window of opportunity for smugglers. To confirm that, on April 5 and 6, 2015, different persons were arrested for attempting to take approximately 600kg (CNS 2016b) of radioactive materials from the exclusion area of the Černobyl'. In the same way, in one of the operations managed by FBI and Moldovian authorities in 2015, they suspected «but couldn't prove, that the uranium had come from the melted down Chernobyl reactor in Ukraine» (Butler, Ghirda, and Dearden 2015).

Aware of the situation in June 24, 2015 U.S. and Ukranian authorities met in Kyiv in order to define a bilateral agreement to strengthen the prevention, detection and the capacity to respond to nuclear and radiological smuggling. The action plan concerns the securitization of nuclear materials in Ukraine with a greater strengthening of the regulatory and legal infrastructures that control their posses and use. Finally, it is important the securitization of the Ukraine's borders and the U.S. support with the investigations and prosecutions of the nuclear trafficking cases (U. S. Embassy 2015).

Considering the smuggling routes direct to the Balkan countries, **Transnistria** is a very strategic "*tunnel*" in the smuggling chain that connect Ukraine to the other countries in the Balkan. The following it will be explain the different Transnistria's characteristics that make it a key country for many illegal trafficking including the smuggling of radiological and nuclear materials.

Transnistria: a key country for illegal trade in nuclear and radiological materials

The **Transnistria**, also called **Pridnestrovian Moldavian Republic** (PMR) is a republic that was born in 1991 from Moldova. The crisis between the Republic of Moldova and Transnistria started in 1990 after the Tiraspol's dec-

[11] *Ibidem*.

laration of independence from Chişinău, the capital of Moldova. Under the USSR, this strip of land was one of the most economical developed part of Republic of Moldova, it specialized in electricity production and heavy industry. Actually, Transnistria is also a fount of radiological materials used in metallurgical plants and other research centers (Gheorghe 2015). In this way, after the declaration Transnistria has progressively become the main center for all kind of illegal smuggling, such as trafficking in human, drugs and arms. Arms trafficking is the main source of revenue for the Transnistrian organized crime in collaboration with Tiraspol authorities. Similarly with the Ukraine's situation, during the conflict in 1990s many stockpile of weapons, such as the most important called Kobasna arsenal, were stolen by criminal groups. This claim was confirmed by different evidences. For instance one of the commanders of the Tiraspol army called *General Mihail Bergman* explained that arms used during the Transnistrian crisis later appeared in Ukraine, specifically in port of Odessa. In addition to this, General M. Bergman also highlighted that the organized crime is not the only ones implicated in the illegal trade arms, indeed also the Transnistrian separatists hide these illegal trafficking and sometimes they directly handle the trades (Cornell and Jonsson 2014).

Considering the nuclear and radiological illegal trade, the Transnistria region represent a reference point for all smugglers of this sector. In according to Gheorghe (2015), Cornell and Jonsson (2014), this claim is confirmed by different evidences in relation to smuggling cases.

On 8 **May 2005**, the *London Times* reported that a weapons dealer in **Bender (Transnistria)** tried to sell three Alazan rockets[12] equipped with radioactive warheads to an "undercover" journalist. The radioactive materials were Sr-90 and Caesium-137[13].

Another case regards the nuclear smuggling in Transnistria was revealed by *Washington Post* in 2003, where a journalist uncovered a document from 2001 reporting that Col. V. Kireyev, a commander in Transnistria, revealed the nuclear leakage of the armaments stocked in Transnistria. Linking the previous information, it is interesting to highlight that also the Colonel Kireyev warned that a large amount of Alazan rockets had been changed with radioactive materials[14]. The link between Transnistria region and Balkan Peninsula with nuclear smuggling was highlighted from other relevant cases. In July 2010, Moldovan authorities in collaboration with F.B.I. seized 1.8kg of U-238 in Moldova's capital (Perez and Martinez 2015). The smugglers would

[12] «The Alazan was originally designed by Soviet scientists as a weather control rocket to prevent hail. After the weather control experiment failed, the rocket was later used for military purposes. It has a maximum length of 1.4 meters and range of 10 km» (Thomas and Franchetti 2005).
[13] *Ibidem*.
[14] *Ibidem*.

have sold the enriched uranium in **Transnistria** (Cornell and Jonsson 2014) for €5 million. In 2011, seven people were arrested trying to sell 1kg of U-235, the weapons-grade isotope of uranium, which it had come from Moldova's side in **Transnistria**. Indeed, for this illegal operation the traffickers received orders from their leader, *Aleksandr Ageenko*, while he remained in **Tiraspol**. It is confirmed that uranium entered in **Moldova** through Transnistria region, and later was discovered that the traffickers were planning to manage in others nuclear materials such as plutonium[15].

In this way, is evident that the Transnistria is a center for the nuclear black market because the region includes different **facilitators**:

1. The presence of TOC (transnational organized crime);
2. High level of corruption;
3. Precarious political situation;
4. Precarious or non-existent collaboration with other authorities;

In other words, the political situation does not permit a real collaboration with other countries, especially with the neighboring countries. It is confirmed that «Transnistria amounts to more than a corridor for moving nuclear materials; it is also a choke point for law enforcement. Its police force does not share its records with international law enforcement agencies, because the Republic of Moldova cannot allow the PMR to become a member of Europol or Interpol, lest it amount to international recognition […]. The anonymity that separatist regions offer, knowingly or not, increases the chances that smuggling groups survive and continue their activities» (Gheorghe 2015, 15). We have many effects of this system, for instance, after the operation in June 2011 all traffickers were arrested except the leader A. *Ageenko*, because Moldovan authorities does not have jurisdiction in Transnistria[16].

Regarding the presence of the transnational organized crime in Transnistria, in according to Cornell and Jonsson (2014) the main crime group derived by criminal networks of the *Vory v zakone*[17] (*thieves in law*). The Vory v zakone are a secret criminal brotherhood originating in the Soviet prison system. The thieves in law see themselves as the elite of the underworld brotherhood and the highest status in the hierarchy of "qualified" criminals. The main goal of a Vor is to provide protection to lower-level criminals (Lampe 2015).

The second category of criminal group in Transnistria is «organized criminal activity controlled by political and economic elites, partially a remnant of the leadership of the Communist Party in Moldova» (Cornell and Jonsson

[15] *Ibidem*.

[16] *Ibidem*.

[17] Vory v zakone is translated in "thieves in law" where vor is the singular and vory the plural form. Vory v zakone has also been translated more loosely as "thieves professing the code" or "thieves-with-a-code-of-honor" (Lampe 2015).vor.

2014, 138). In this way, the *thieves in law* started becoming involved in the political dimension of the region by starting beneficial relations with political parties and the most important leading personalities. To take an example, the thief in law *Grigore Caramalac* (known under the alias "Bulgarian") during an interview in the Russian newspaper *Komsomolskaya Pravda* admitted to supporting the Communist party in 1997 during the election campaign with a donation of $500.000. Furthermore, Caramalac also admitted that he used his influence in order to obtain support for the Communist party in 2001 elections in the South of Moldova. In the 1990s until 2001 there were six criminal networks in Moldova managed by *thieves in law* for generating profits in illegal activities and obtaining power from the economic and political dimension. In this direction, the leaders of *thieves in law* were able to intensify their influences in order to increase the closer monitoring of territory of Moldova and in the closest neighbours including Transnistria (Cornell and Jonsson 2014).

Concerning the terrorist organizations, can be identified four elements that compose the smuggling network in Transnistria. Indeed, we have a combination of transnational organized crime, the State's support, the access to radiological and nuclear material and the general will to negotiate with terrorist organizations. On that connection, is interesting to highlight the figure of Semyon Mogilevich, who works closely with the Solntsevskaya Bratva organized crime. Osama bin Laden asked Mogilevich for obtaining a nuclear weapon or enough materials to build a dirty bomb. In this way, some sources confirmed that on November 2005 bin Laden purchased seven HEU rods from Mogilevich (Hagger 2013). Despite it is not clear if Ukrainian arms dealer Mogilevich provided Osama bin Laden with uranium (Gheorghe 2015), there is no doubt that from 1993, Al-Qāʻida started to search for nuclear and radiological materials in order to build a dirty bomb (Evans 2007).

In any case, Mogilevich rapresents a key figure link between the Russian-Ukraine organized crime, terrorist organizations and Transnistria, in fact «Mogilevich became involved in the privatization of various industrial complexes in Transnistria, including Metallurgical Plant in Rîbniţa which contained unsecured radioactive sources» (Gheorghe 2015, 19).

Romania

Another main point of trafficking is the Romania. Many Islamic organizations are present in Romania, some of them reported of having connections with jihadist terrorist organizations, historically Muslim Brotherhood and Al-Qāʻida. Another evidence about the link between terrorism and Romania concerns that some of the terrorists involved in the 2004 Madrid attacks has passed through Romania (Dronzina and Houdaïgui 2012). In the same way, on the 6th of November 2007 the Italian authorities have delivered arrests mandates

for 20 persons accused of terrorism inside an investigation for discovering a terrorist cell of Islamic fundamentalists originating in Italy with connections in other European states. During this inquiry the links between Romania and Italy were revealed when Kamel Abbachi was arrested in Romania in relation to other suspects who were arrested in Italy and other countries[18]. Furthermore, in the same inquiry, the Carabinieri Special Operative Group have highlighted the possible connections between Al-Qā'ida and Romanian groups, we can think that this happened before the phenomenon of the foreign fighters and the above all, the rise of the self-declared Islamic State.

It can be affirm that Romania represents a reference point of criminals and terrorists from states in Asia, Middle East, Central and North Africa that want to acquire materials for building nuclear weapons (Vreja 2007). More specifically Romania could be considered a "*bridge*" for passing in the Balkans Peninsula and vice versa, however Romania is also a meeting point of sellers and buyers, an instance of this concerns a case where two Ukrainian citizens tried to smuggle radiological materials into Romania (Ukraine News Agency 2015).

The importance of Romania as bridge and point of smuggling for nuclear and radiological materials in the Balkan scenario is proved by the collaboration between U.S. Embassy in Bucharest, the Romania's Ministry of Internal Affairs and the National Nuclear Security Administration (NNSA) for the installation of the radiation detection system located at Henri Coandă International Airport in Bucharest. In fact this program is a significant point of the them cooperation in order «to preventing unlawful nuclear transit through [the Romania, and for the] future to keep dangerous nuclear materials out of the hands of proliferators, smugglers and terrorists» (NNSA 2015).

Finally, as described by a National Progress Report, Romania is a State Party to different preventive measures following summed (Nuclear Security Summit 2016):

- *Multilateral instruments* for promoting nuclear security (e.g., the Convention on the Physical Protection of Nuclear Material, the International Convention on the Suppression of Acts of Nuclear Terrorism);
- *Reinforcement of national legislation* also for preventing terrorists from obtaining nuclear materials;
- *Collaboration with International Organizations* (e.g., IAEA);
- After the Nuclear Security Summit 2014, Romania has undertaken a series of *unilateral commitments*, some of these are currently being implemented;
- Restitution to the country of origin (Russia) the entire quantities of uranium;

[18] *Ibidem*.

- *Cooperation* with U.S. Department of Energy (DOE) for enhancing the physical security of infrastructures that use radiological materials (e.g., hospital and oncological institutes);
- *Support and implementation* of the Nuclear Security Culture.

Moldova

In according to L. Zaitseva and F. Steinhausler (2014) **Moldova** is another key country inside the nuclear trade, in fact this country has been used as a *trans-shipment territory* for nuclear and radiological materials. In this way, there are some evidences that shown the strategic relevance of Moldova, indeed as declared by Nuclear Security Summit[19] in 2016, Ukranian-Moldovan border are absolutely a hot line referring to the nuclear trafficking in the Balkans. Different smuggling cases and the repeated efforts to sell nuclear materials signal that a «thriving nuclear black market has emerged in an impoverished corner of Eastern Europe on the fringes of the former Soviet Union. Moldova, which borders Romania, is a former Soviet republic» (Butler and Ghirda 2015).

One of the case that it can be considered as representative of the situation in Moldova happened in 2010. A Moldovan police agent called Malic, was working in an anti-fraud unit in Chişinău when an informant of him received an offer for radioactive material. From this first notice three persons were arrested by Moldovan police in collaboration with FBI on August 20, 2010. Months later the Malic's source, a Moldovan businessman called *Teodor Chetrus* with the role of middleman was looking for a buyer in the Middle East and specifically he said different times that «this substance must have a real buyer from the Islamic states to make a dirty bomb[20]» (as referred by Malic). Chetrus would sell 10gr of highly enriched uranium for 320.000€, in this way the buyer could try it and after eventually buy a large quantity. The mastermind of this deal was *Aleksandr Ageenko*, as highlighted before, with a double Russian and Ukrainian citizenship he lived in Transnistria. In June 2011, he organized the uranium exchange, with the support of his wife *Galina Ageenko* and a Transnistrian policeman to smuggle the material in Moldova. Galina Ageenko delivered the box with the material to the policeman, after that, when *Aleksandr Ageenko* controlled the deposit money by the undercover agent during the material exchange the smugglers were arrested. During the investigations is found a contract by authorities made out with a doctor named *Yosif Fiasal Ibrahim*, and the tests of the material suggest that it was high-grade uranium that could be used for building a nuclear weapon. Furthermore, the tests shown a link of this material with other two earlier

[19] Focus on Romania.
[20] *Ibidem*.

seizures of highly enriched uranium, in fact the authorities believed that *Aleksandr Ageenko* was behind[21].

In order to prevent the smuggling of nuclear and radiological materials at the Ukranian-Moldovan border in June 2014, the Norwegian Ministry of Foreign Affairs (MFA) in collaboration with the Department of Energy of the U.S. (DOE) signed the "Cooperation on Nonproliferation Assistance". The main aim of this collaboration is the detection and the deterrence of illicit smuggling of nuclear and radiological materials across the borders. For this project, were installed different detection devices that delivers Custom and Border Protection (CBP) in order to screen any means of transport for revealing the presence of nuclear and radiological materials without intrusive methods. The installations have not yet been completed and it will be installed at ferry outbound and inbound border crossings, then at international interstate (Norwegian Radiation Protection Authority 2015).

The following are listed the different seizures from 2010 to 2015 in Moldova and Ukraine (see summary table appendix 2).

- **August 20, 2010** (**Chişinău**). Authorities seized 1.8kg of uranium (U-238) from a garage in Chisinau (Moldova). Two of the persons arrested were officers in the ex-Soviet army, indeed Moldovan investigators suspected that the uranium originated from the Černobyl' reactor in Ukraine (Zolotukhina 2015).
- **July 27, 2011** (**Chişinău**). Aleksandr Ageenko, Teodor Chetrus and others three people were arrested in Moldova for the organization of the sale of 1kg uranium (U-235) and blueprints for developing a dirty bomb to a man in South Sudan[22] who police believe was Yosif Fiasal Ibrahim (Reynolds 2015).
- **April 30, 2014 (Chernivsti)**. The Security Service of Ukraine (SBU) seized radiological materials, probably U-235 with a weight of 1.5Kg. The car from which it was seized had the license plates from Transnistria (Moldova). For this reason, a Russian citizen and nine Ukranian citizens were arrested in relation to the trafficking. The investigation are still open (CNS 2016b).
- **December 2014** (**Chişinău**). Moldovan authorities arrested seven persons suspected of trafficking uranium (U-238) from Russia. The authorities discovered 200 grams of uranium-238 mixed with 1 kg of uranium-235 and 1kg of mercury value of about €2.1 million (Davenport 2015).
- **February 19, 2015** (**Chişinău**). A trafficking was interrupted by the collaboration between FBI and Moldova authorities, where an undercover agent bought caesium (C-135) in order to discover the head of organi-

[21] *Ibidem*.
[22] *Ibidem*.

zation. The arrest was done after the suspects sold a sample of 83gr for €100.000. (BBC News 2015). A recent annual report (CNS 2016a, 12) underlines that «one of the smugglers expressed his hope that the material would be used by ISIS for a dirty bomb against U.S. citizens […]».

- **August 05, 2015 (Vorokhta).** The Ukrainian authorities arrested four members of the organized crime for the tried sale of uranium-238. Authorities seized the material during its transportation across Ukraine's border from Ivano-Frankivsk region to Romania in a car (CNS 2016b).
- **September 21, 2015** (**Chişinău**). An unspecified quantity of caesium (C-137) was noticed near a building on St. Andrey Street. The representative of the National Agency for the Regulation of Radiation and Nuclear Activities discovered the material with a portable docimeter. The authorities are investigating for understanding how a radioactive material was found in that area.

2.2 Final analysis: the routes of the nuclear and radiological smuggling

Summarizing, we can identify different roles of the countries inside the nuclear smuggling chain. In this way, Russia is considered the main State of origin of the radiological and nuclear material. Furthemore, Zaitseva and Steinhäusler (2014) suggest that Armenia (e.g., from the Metsamor Nuclear Power Plant), Kazakhstan and Ukraine (e.g., from the Černobyl' Exclusion Zone) are the more likely States of origin of the materials as well as Russia.

From Russia the radioactive material can follow two types of routes:

1. *The Georgian and Armenian route* (see image n. 1);
2. *The Balkan route* (see image n. 2);

In the *Georgian route*, coming from **Russia**, the material goes through the **North Ossetia** and the **South Ossetia** in order to enter in **Georgia**. In other cases, for entering in Georgia the traffickers have passed through the **Azerbajan**. In Georgia the material generally is sold to buyers on the Georgian territory (as shown by cases **Tbilisi** is the main smuggling point). Alternatively, the material can be brought by traffickers to the Balkan Peninsula using a sea route, specifically from the **port of Batumi** in the **Republic of Adjara** to the Ukraine port of **Odessa** or **Illichevsk**. Finally, from the port of Adjara the material can be brought to Turkish ports for selling it in **Turkey**.

Fig. 1: Nuclear Smuggling: Georgian and Armenian route

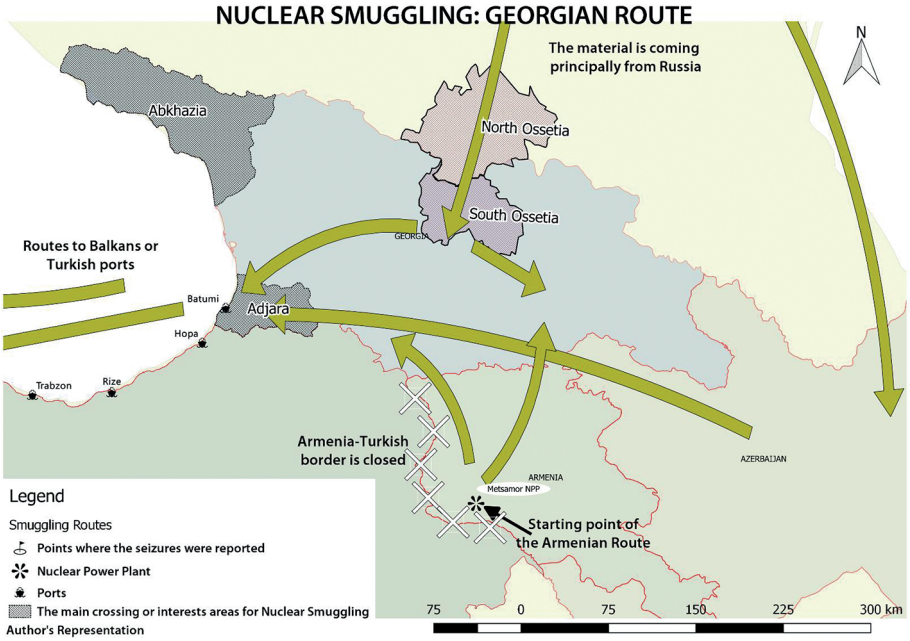
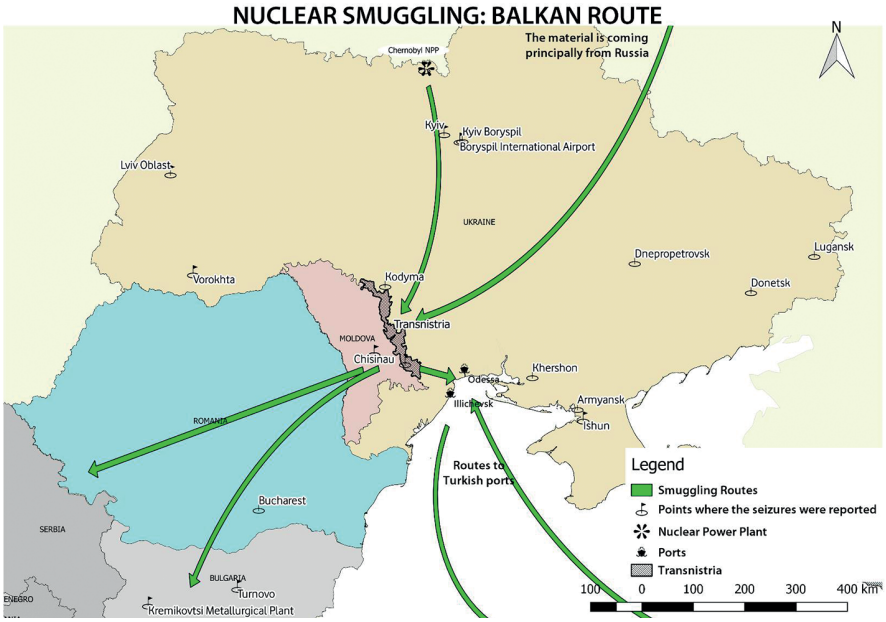


Fig. 2: Nuclear Smuggling: Balkan route
(Author's Representation)



Considering the Balkan route, from **Russia** the material enters in **Ukraine** in order to reach Transnistria. In many seizures the smuggled material came from the **Černobyl' Exclusion Zone**. As said in the previous paragraph, Transnistria region and its capital city, **Tiraspol**, are a very strategic tunnel in the smuggling chain. Transnistria represents also a storage country, in fact the smuggler from this region can manage and prepare any kind of smuggling without interferences by authorities. After that the material can continue its route crossing Transnistria to the main countries where evidences suggest them as principal selling points, in other words **Moldova**, **Romania** and **Bulgaria**. Finally, these countries could be used by traffickers or terrorists to reach the scene of the negotiation and in the same way for entering to the Balkan region.

3. Conclusive threat assessment

3.1 The main facilitators of the threat: Jihadist infiltration and criminal groups link in the Balkan Peninsula

Considering the **first facilitator**, we can affirm that **Bosnia-Herzegovina**, **Kosovo**, **Albania**, **Macedonia**, **Montenegro** and **Serbia** are countries which presents a very high ISIS infiltration (BIRN 2016). In relation to this, The Soufan Group (2015) suggests that at least 875 fighters have traveled to Syria from the Balkans Peninsula, specifically almost 800 of them come from four main countries, in other word, Bosnia, Albania, Kosovo and Macedonia. In addition, another research confirms as Black Sea region is an area which represents a supplier and transit zone for the black market of nuclear materials, therefore a real threat of nuclear terrorism (Delanoe 2015). In this way, it is very important to consider the link between these routes and the terrorist's infiltrations in the Balkan region. There are specific evidences about these infiltrations in Bosnia-Herzegovina, Albania and Kosovo.

Considering **Bosnia-Herzegovina**, the Islamic State has a strict link to this region, indeed in some villages in the north of country the people practice Sharia law, and they show the Islamic State's black flag (Dyer 2016). Bosnia-Herzegovina can be considered a true jihadist hub inside the Balkan with different connections in Europe. For instance, after the *Charlie Hebdo attack* the French and Bosnian authorities confirmed that the weapons used for attacking the headquarters of a newspaper could have come from Bosnia-Herzegovina (Bardos 2015). In the same way, another Bosnian connection concerns *Djamel Beghal* who had linked with the famous imam of London's Finsbury Park mosque, called *Abu Hamza al-Masri*. *Djamel Beghal* was the mentor of *Amedy Coulibaly* and *Chérif Kouachi* (two French attackers), moreover he was connected with Al-Qā'ida because he was recruited

by *Zayn al-Abidin Muhammad Husayn*, who was one of the most famous lieutenants of *Osama bin Laden*, with both Bosnian citizenship and a Bosnian passport[23]. Bosnia-Herzegovina's jihadist groups are also connected with **Italy**. Indeed, the Islamic Wahhabi preacher *Husein "Bilal" Bosnic* before his arrest he has preached in 2011 in Bergamo (with the Islamko Dzemat group) and in Pordenone, specifically in the Cremona's mosque. He came from the north-western Buzim a small area in Bosnia, and he was called the main Islamic State headhunter in Europe (Spaic 2015; Foschini and Tonacci 2014). All these shows as there is a concrete connection between the jihadist chain in Bosnia-Herzegovina and Europe.

On the same way, **Albania** is another jihadist hub in the Balkan region. This connection (Albania and jihadism phenomenon) was shown by different counter-terrorism operations, one example of these concern an operation conducted in July 2014, when the Italian and Albanian authorities carried an operation against a group of Islamic State who had recruited different foreign fighters to cross over to Turkey in order to reach the ranks of the Islamic State in Siraq (Spahiu 2015). The Albanian jihadist web is very interconnected with the Italian peninsula. In according to islamologist Giacalone (2015) the different police operations[24] in 2014 and 2015 have demonstrated as the Italy presents different small cells dislocated on the Italian territory with strong connection with the jihadist hubs in the Albanian region, where these cells have the main goal of recruitment and doing propaganda for the Islamic State. The Albanian region is in a strategic position in relation to the jihadist routes for three main reasons[25]:

1. Albania has a strategic position because it is one of the main transit point to Europe. A lot of foreign fighters have utilized Albania as a base before to go to Syria trough Turkey region;
2. Albania have many cities with a high level of radicalization (e.g., Tirana, Kavaja, Cerrik, Librazhd, Elbasan) because there are many mosques and different imam fundamentalist-inclined;
3. As in other part of the Balkan peninsula, the Albanian region presents a strong link between criminal syndicates and Islamic fundamentalist groups[26].

Finally, Romania «is the focus of criminal activities entities from states in Asia, the Middle East, and North Africa that are trying to acquire weap-

[23] *Ibidem*.

[24] For instance, Balkan Connection and Martese operation.

[25] *Ibidem*.

[26] An evidence of this, concerns the convergence between the Islamic State and the UCK (Ushtria Çlirimtare e Kosovës) famous also as KLA (Kosovo Liberation Army) criminal syndicate who operates also in Kosovo and Macedonia. Furthermore, different Albanian and Kosovar foreign fighters who are dead in Syria were member of the KLA (Cominetti 2015).

ons of mass destruction (WMD) and other dangerous substances. Moreover, Romania might still be a transit country for arms exports to countries under embargo or to EU countries» (Vreja 2007, 35).

In relation to **Kosovo**, «the bad economic situation should be regarded […] as an indirect factor which creates an advantageous environment for recruitment. The lack of opportunities, lack of occupation and simply an excess of free time is some of the reasons that push young people into the radical's arms. Another crucial reason – an identity crisis – is more a complex one» (Orzechowska 2014). On September 2015, the Kosovar government aware of this situation has published a document called "*Strategy on Prevention of Violent Extremism and Radicalization Leading to Terrorism 2015-2020*" with the aim of implementing four strategic objectives and different measures which aim to be achieved from 2015 to 2020. Specifically, the document reports that this big strategy will focus on the following objectives (18):

- *Early identification* – of the causes, factors and target groups;
- *Prevention* – of violent extremism and radicalization;
- *Intervention* – with the aim of preventing the risk from violent radicalization;
- *De-radicalization* and reintegration – of radicalized persons.

This strategy was thought in order to mitigate the threats within Kosovo. Indeed, in addition to the violent extremism presents in the North of Kosovo since at least 1999, there is a significant problem that regards the threat of the Islamic extremism. There were many «citizens of Republic of Kosovo who have joined to the conflicts in Syria and Iraq and some of whom have returned to Kosovo. Although from the estimates conducted so far, it appears that a number of about 300 Kosovars have joined in various phases the conflicts in Syria and Iraq […]» (11). In addition to the presence of the foreign fighters in this region, another relevant characteristic in relation to the nuclear and radiological smuggling material is the presence of the Islamic Charities. This network of charities was founded during the war in Bosnia-Herzegovina and it plays a central role in supporting Islamists. As affirmed by Shay (2011, 88) «the establishment of a network of "charities" which served as logistic backup (financial support) and covered the penetration of Islamic activists into the Kosovo arena». In this way, this dense network could help an eventual smuggled material to pass point by point, state by state, into the Balkan region in order to enter in the hearth of Europe.

The **second facilitator** concerns the link between Islamic terrorist organizations and organized crime. In the previous chapter was shown as in the Transnistria region there is a mix of organized crime and politics that support any kind of illicit trafficking. This connection is a real threat for different reasons. In according to Shelley, the very «dangerous today are the connections between corrupt officials [mainly in Russia] who have access to nuclear ma-

terials, criminal groups that already control transit networks for illegal goods, and terrorist groups that want to acquire nuclear materials» (Hofmann 2011). Besides, it is highlighted as this strict link have been formed when criminal membership of organized crime and Islamic fundamentalists have been imprisoned together in European jails[27]. In this way, we have a convergence of interests between criminal groups and terrorists. An evidence of this, concerns a Moldovan operation where the authorities arrested

Following the summary map (image 3, at the bottom), that graphically it shows the positions of the different countries. The arrows represent the smuggling routes concern nuclear and radiological materials trafficking. Regarding both the Georgian and Balkan routes, the materials arrive to *storage countries*, such as Romania, Moldova, Bulgaria, Georgia, Azerbaijan and the Turkish northern border, for being selling to different buyers. Specifically, as said before, the radiological materials (e.g., EHU, LHU, Hg, Pu[28]) come from Russia, Ukraine and Kazakhstan. These countries are considered also as *bridge zone*. Indeed, to the left of the Black Sea when the radiological materials are sold in Romania, Moldova and Bulgaria, the ISIS's potential planning of nuclear attack can count on jihadist infiltrations in Balkan countries such as Albania, Kosovo, Bosnia e Macedonia. In the same way from Armenia, Georgia and Azerbaijan or Turkish northern border the smuggled materials could pass through Turkey to territories of ISIS. In the map it has also been reported two possible main routes that terrorists could use to bring the material in Italy. Specifically, it has been shown two main routes, one maritime route from Albania's ports to **Bari** and **Ancona** port; the second through **Trieste** and **Gorizia** used several times by well-known figures (e.g., Bilal Bosnic).

Concluding, in the Balkan region there is a real background that surely can support the smuggling of the nuclear and radiological material. The presence of a high level of jihadists infiltration could support the purchase, transportation and the coverage of the material in order to achieve a European state. In the following paragraph we will focus on the real threat about the use of a nuclear or radiological weapon, in order to rationalize the threat in relation to a hypothetical attack to a European city.

3.2 What is the real threat to European cities?

In the previous part of this paper we have described the background in relation to the nuclear and radiological smuggling and the relative link with the

[27] *Ibidem*.

[28] HEU= Highly Enriched Uranium; LHU= Low Enriched Uranium; Hg = Mercury; Pu = Plutonium.

Islamic fundamentalism. When the smuggling routes has been shown, considering a hypothetical attack the question is what is the risk to which it is exposed?

On the basis of previous attacks in Europe and U.S. claimed by the self-declared Islamic State, we can identify a trend that relates the objectives of the attacks, in other words the *soft target*, *crowded places* inside major cities. Which can be concretely the damage caused by the use of nuclear or radiological material into a bomb against soft targets in a crowded place?

First of all, as outlined by Bunn et al. (2016) in "*Preventing Nuclear Terrorism*" we can consider three types of nuclear or radiological terrorist attack, where each of these pose different risks (4):

- Detonation of an actual nuclear bomb, either a nuclear weapon acquired from a state's arsenal or an improvised nuclear device made from stolen weapons-usable nuclear material;
- Use of a radiological dispersal device or "dirty bomb" to spread radioactive material and create panic and disruption;
- Sabotage of a nuclear facility causing a large release of radioactivity.

In relation to the first point, the reality of the situation is that an attack with a **nuclear bomb**[29] is almost impossible. In any case very unlikely, for different reasons. Firstly, it is very difficult for a terrorist organization acquires, mainly through theft, a comprehensive nuclear bomb ready to detonate. Considering simple the acquisition of the uranium, before it can be used by terrorists in an explosive device, the uranium must be enriched. Uranium ore in nature contains a large quantity of a stable isotope U-238 and a very few quantity of isotope U-235 that it is highly fissile than U-238. The isotope U-235 with its high fissile capacity permits to release a large quantity of energy. Without getting too specific, the process of enrichment consists in the increase of the U-235 fissile material and in the decrease of the non-fissile material U-238. More uranium has been enriched with a high percentage of isotope U-235 less material is required to make a nuclear bomb. Experts affirms that generally uranium can be considered highly enriched when the percentage of U-235 is at least 20% (Crowley 2005). Regarding the process of enrichment, it is evident that it is complex, and requires expensive instrumentation that it is extremely difficult of finding also in the black market, in this way terrorists «cannot make this themselves – that requires huge, high-tech facilities that only nations can construct» (Cirincione 2016). Even if ISIS with its network attracts scientists for building a nuclear device it surely would has problem to enrich nuclear materials, in fact «for uranium to be useful in a nucle-

[29] «Nuclear weapons, which are completely different from radiological weapons, refer specifically to true nuclear warheads [that generate an atomic explosion] as opposed to nuclear material» (Ward, Kiernan, and Mabrey 2006, 222).

ar weapon it needs to be highly enriched [, where the] enrichment can be achieved through gas centrifuge cascades, gaseous diffusion, laser separation or other less common techniques» (Eweiss 2016, 4). Furthermore, «if stolen in some forms [, uranium] would require industrial processes to convert to a form useful for weapons[30]». Another material that terrorists could use in addition to uranium for creating a nuclear bomb is plutonium. Crowley (2005) suggests that this is even more complicated because plutonium is produced by irradiating uranium in a nuclear reactor, in other words a difficult task for any terrorist organization even as the ISIS. It can be confirmed in according to different analysis (e.g., Eweiss 2016) that a terroristic organization as ISIS clearly has one main complication: the *expertise*.

Indeed, if ISIS acquires nuclear or radiological materials it probably could build an ***improvised nuclear device (IND)***, also called ***dirty bomb*** or ***radioactive IED***. A dirty bomb consists in a bomb «that uses a conventional explosion to disperse radioactive material over a targeted area […] could also include other means of dispersal such as placing a container of radioactive material in a public space, or using an airplane to disperse powdered or aerosolized forms of radioactive material» (DHS 2004, 1).

ISIS could use the nuclear and radiological material acquired with the smuggling network for creating a *radiological dispersal device (radioactive IED)*, which is more accessible for any terrorist organization. Even if ISIS could not cause mass casualties with RDD, potentially the strong point of this type of weapon is the advantage of having a psychological impact on population, with the spread of terror. In addition to this, there is a more likely of preparing and planning a radiological attack in Europe using a RDD in terms of assembly, in fact, «the construction of a dirty bomb is also relatively simple, and no enrichment processes are involved in the making of a dirty bomb, eliminating a huge obstacle necessary for nuclear weapons. Additionally, the radiological material is greatly accessible and can be used directly without the need for any adjustments. The material can even be strapped to conventional explosives and disguised in the form of a suitcase» (Eweiss 2016, 5). Thinking a hypothetical attack with a radioactive IED, for example in a busy square in a city, what could be the total damage?

We would have two types of impact.

1. *First order impacts*
   - It would have a considerable number of casualties and injuries with the explosion in the immediate vicinity;
   - The explosion immediately spreads the radioactive dust, indeed «if the radioactive material is release as fine particles, the plume would

[30] *Ibidem*.

spread roughly with the speed and direction of the wind. As a radioactive plume spreads over a large area, the radioactivity becomes less concentrated» (2);

- It would have an immediate impact to human health. The health effects of radiation tend to be directly proportional to radiation dose[31]. For instance, «a 10-pound satchel of dynamite mixed with less than 2 ounces of cesium (about the size of a pencil eraser) could spew a radioactive cloud over tens of square blocks. No one would die, unless they were right next to the explosion. But the material would stick to the buildings. Inhaling just a speck would greatly increase your risk of getting cancer» (Cirincione 2016).

2. *Second order impacts*
   - The affected area would be circumscribed and quarantined;
   - Direct economic impact in the affected area. Closure of businesses, with repercussions on tourism that for characteristics of attack would extend for a long time;
   - Psychological effects, as the fear, after the attack. «Fear is not only significant as an individual emotional reaction […] fear can translate into responses that put people at risk and make managing the incident even more difficult» (Becker 2012, 178) in fact when an attack involves radiation, the attack «produce widespread fear, a profound sense of vulnerability, and a continuing sense of alarm and dread. A combination of many perceived characteristics is thought to contribute to radiation's power to create apprehension and anxiety: the agent is invisible, odorless, colorless, and unable to be apprehended by the use of the unaided senses […]»[32];
   - Probably, the attack reported by the media would create more confusion and panic for the improper use of terms such as "nuclear attack", considering that the goal of the media is spreading the news using many times irresponsible communication.
   - Political instability.

3.3 Conclusions and limitation of the research

In conclusion, it can confirm that there is a concrete and real threat about the use of radiological material by ISIS in order to use a RDD in Europe. ISIS fighters in June 2014 have approximately stolen 40kg of low enriched uranium from scientific department at the Mosul University in Iraq. Despite

[31] *Ibidem.*
[32] *Ibidem.*

experts have minimized any superior threat in relation to the quantity and quality of uranium (NATO 2015), «looking at the level of brutality of ISIS, there is a clear signal that they would not hesitate to use [RDD] against their opponents» (K. Lalbiakchhunga 2015, 16). Otherwise, despite the network and thus the availability of resources of ISIS, it is very unlikely a purely nuclear attack for the reasons described above. In the same way, is also unlikely the success of an attack against a nuclear power plants because «are militarily hardened facilities with several layers of physical and armed security, as described by the Nuclear Energy Institute, that make them extremely difficult to attack with anything but an actual military. This is why terrorist targets are softer and include airports, open markets, sporting events and metro stations […]» (Conca 2016). For this reasons, is essential to monitor continuously the nuclear and radiological smuggling through Europe and Middle East for avoiding the acquisition by terrorists of the materials.

It can be said that in relation to a radiological terrorist attack it should not make more reference to a "**game of possibility**" but it must place the threat within a paradigm of a "**game of opportunity**". In other words, all the elements necessary to realize the threat of a radiological attack are present.

As described above:

- Evidence in the motivational dimension;
- Possibility of finding radiological material;
- Possibility of getting support from organized crime and from the jihadist hub mainly in the Balkan region;
- Porosity of borders by the sales areas of radiological materials to European cities;
- The simplicity both technical and logistics of assembling a RDD.

As said before, the existence of these elements involves moving toward a "game of opportunity "that is to exploit the *windows of opportunity* that they would allow the alignment of these elements to the target. All the pieces of the puzzle are already available, or readily available, the "game" is to put them in the right direction and right combination. The task of the institutions and authorities is to ensure that these pieces are never put in the right way. In order to contrast the opportunity to concretize this threat is fundamental the collaboration between States and the intelligence services with the purpose of controlling the Balkan region in order to reduce as much as possible the two main facilitators described previously, to put in another way: the jihadist infiltrations and the connections between terrorist organizations and criminal groups regarding the acquisition of the materials useful for the assembly of a dirty bomb. After the ISIS' motivation to attack Europe, this work has tried to show more clearly in a descriptive manner the main smuggling routes also considering the main seizures and smuggling cases mainly in the Balkan and

Caucasus region. One of the main limitations of this work has been the *lack of information* (black number) in relation to the real number of nuclear and radiological smuggling incidents. Indeed, the only institution that holds a continuously updated database and directly connected with the States participating in the project is the *IAEA* (International Atomic Energy Agency). Called *ITDB* (Incident and Trafficking Database), it is the IAEA's information system on incidents of illicit trafficking involving nuclear and radiological material outside of regulatory control, however it is a classified information system sharing only among State authorities and the IAEA. Knowing all cases of illicit trafficking allows to reconstruct precisely the entire network of smuggling routes and the identification of the hot areas. This would also help to define more effective prevention policies in order to fight the trafficking and the nuclear and radiological terrorism threat. Moreover, another limitation is that this work has analyzed the smuggling routes only in the Balkan and Caucasus region, however, no observations has been done in relation to other regions and the associated radiological and nuclear trafficking. Finally, it has not been done any kind of consideration in relation to the economic capacity of ISIS in relation to the acquisition of radiological material and the planning an attack in Europe.

Appendix 1: Summary table of main seizures in Caucasus' region (Armenia, Georgia and Turkey) from 2000-2016 (Source: Author's collection)

Year	Date	Country	City	Type of smuggled material
2000	April	Georgia	Batumi	HEU
2000	September	Georgia	Tbilisi Airport	Pu/LEU
2000	October 6	Turkey	–	LEU
2001	July 20	Georgia	Batumi (Adzhariya)	LEU
2001	October 15	Georgia	Tbilisi	Pu
2001	November 6	Turkey	Instanbul	LEU
2001	December 19	Georgia	Samtskhe-Javakheti	LEU
2002	January 27	Turkey	Avcilar	Red Mercury
2003	March 13	Armenia-Georgian border	Sadakhlo-Bagratashen checkpoint	–
2004	November 8	Georgia	Tbilisi	Cobalt-60
2005	August 16	Turkey	Istanbul	U-235
2005	August 18	Turkey	–	U-235/U-238

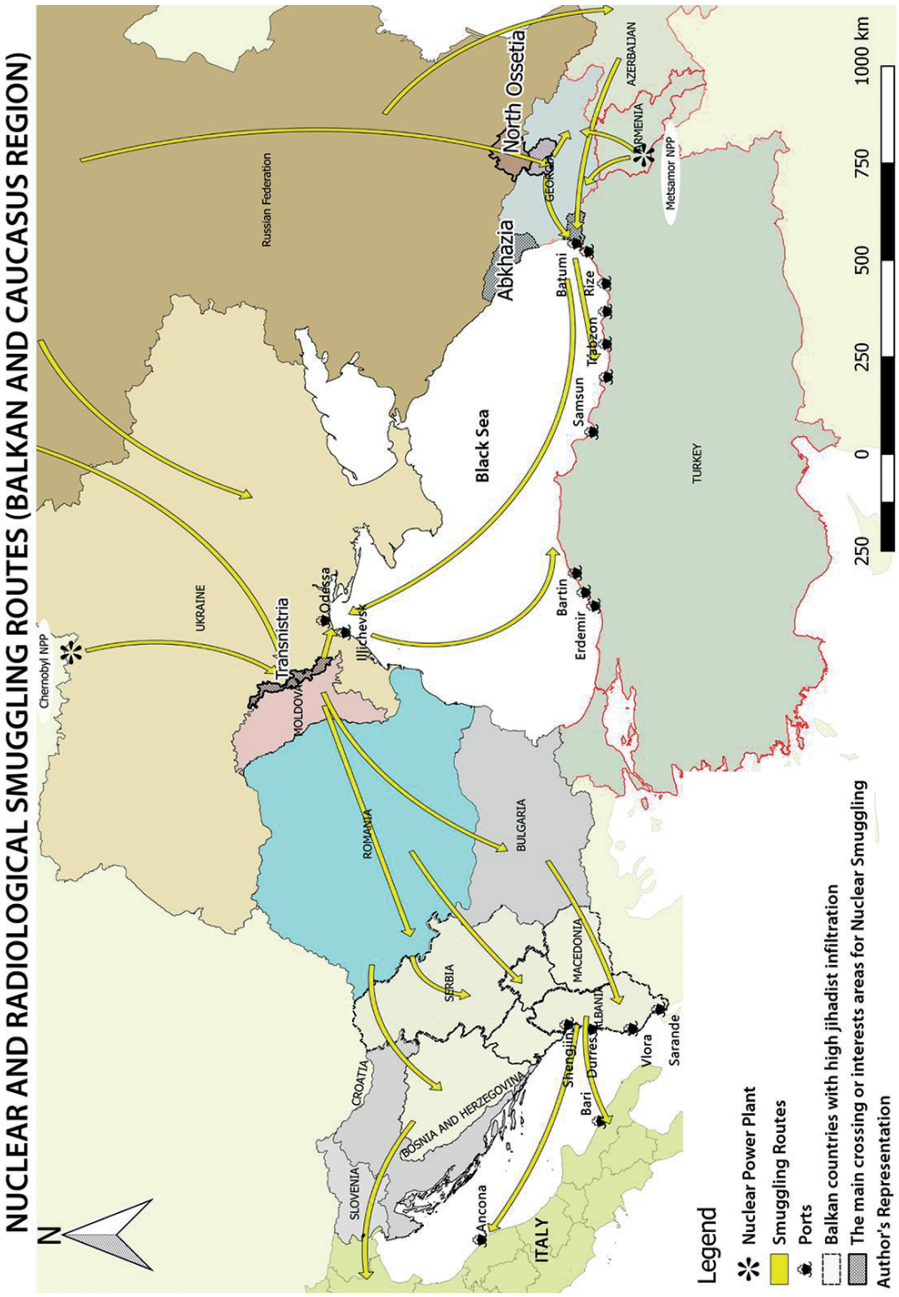
2006	February 5	Georgia	South Ossetia border	HEU
2007	October 24	Georgia	Georgian-Turkish border	Lawrencium-103
2007	November 2	Georgia	Zugdidi	C-137
2010	March	Georgia	Tbilisi	HEU
2010	September 16	Georgia	Tbilisi Airport	LEU/Pu
2011	April 5	Georgia	Batumi International Container Terminal	C-137
2013	April 4	Georgia	Tbilisi	AM241
2013	December 14	Georgia	Tbilisi	R226
2014	August 1	Armenia-Georgian border	Sadakhlo-Bagratashen checkpoint	C-137
2015	June 19	Turkey	Akcakale	C-137/Mercury
2016	January	Armenia-Georgian border	Sadakhlo-Bagratashen checkpoint	C-137
2016	April	Georgia	Tbilisi	U-238
2016	April	Georgia	Tbilisi	U-238/U-235

Appendix 2: Summary table of main seizures in the Balkan Peninsula (Moldova, Ukraine and Bulgaria) from 2000 to 2015 (Source: Author's collection)

Year	Date	Country	City	Type of smuggled material
2000	January 14	Romania	Bucharest	Depleted Uranium
2000	January 20	Bulgaria	Dupnitsa	Depleted Uranium
2000	February 5	Romania	Bucharest	Radioactive material
2000	February 23	Ukraine	Donetsk	Sr-90/Y-90
2002	May 16	Bulgaria	Turnovo	Radioactive instruments
2002	December 6	Bulgaria	Kremikovtsi Metallurgical Plant	C-137/Am-241
2003	December 7	Moldova	Tiraspol	Radioactive rocket
2004	April	Ukraine	Armyansk (North Crimea)	C-137
2004	May 18	Ukraine	–	Mercury
2004	August 16	Ukraine	Kodyma	Stronzium/Pu
2004	September 2	Ukraine	Kyiv	Am-241
2005	January 22	Ukraine	Ishun (Krasnoperekopskyi)	C-137
2005	March 1	Ukraine	Boryspil International Airport	U-238

2005	June 23	Ukraine	Khershon (Oblast)	Yttrium/Sr-90
2005	September 19	Bulgaria	Bulgarian border	Hafnium
2006	April 20	Ukraine	Smilnyytsa	Radioactive material
2007	November 11	Ukraine	Lugansk	C-137
2008	July 7	Ukraine	Kyiv Boryspil	HEU-Caesium
2008	July 8	Ukraine	Dnepropetrovsk	HEU-Caesium
2009	March 12	Ukraine	Ukraine-Moldova border	–
2009	September 11	Ukraine	Pripyat	Radioactive scrap material
2010	August 20	Moldova	Chisinau	U-238
2011	July 27	Moldova	Chisinau	U-235
2014	April 30	Ukraine	Cernivci	–
2014	December	Moldova	Chisinau	U-235/U-238/Hg
2015	February 19	Moldova	Chisinau	C-135
2015	August 5	Ukraine	Vorokhta	–
2015	September 21	Moldova	Chisinau	C-137

Fig. 3


NUCLEAR AND RADIOLOGICAL SMUGGLING ROUTES (BALKAN AND CAUCASUS REGION)
N
Chernobyl NPP
UKRAINE
Russian Federation
Transnistria
MOLDOVA
Odessa
Ulichevsk
Black Sea
Abkhazia
North Ossetia
GEORGIA
AZERBAIJAN
ARMENIA
Metsamor NPP
Batumi
Rize
Trabzon
Samsun
Bartin
Erdemir
TURKEY
ROMANIA
BULGARIA
SERBIA
MACEDONIA
ALBANIA
CROATIA
BOSNIA AND HERZEGOVINA
SLOVENIA
ITALY
Ancona
Bari
Durres
Shengjin
Vlora
Sarande
250 0 250 500 750 1000 km
Legend
Nuclear Power Plant
Smuggling Routes
Ports
Balkan countries with high jihadist infiltration
The main crossing or interests areas for Nuclear Smuggling
Author's Representation

References

Antidze, Margarita. 2016. 'Georgia Detains Five Suspected of Selling Uranium'. *Reuters*, April 28. http://www.reuters.com/article/us-georgia-uranium-idUSKCN0XP1P1.

APA foreign. 2016. 'Azerbaijan Should Bring the Closure of the Metsamor Nuclear Power Plant in the Agenda of the UN'. *APA*. May 13. http://m.apa.az/en/news/243550.

Azerbaijani Vision. 2016. "Nuclear Smuggling Orginating from 'Metsamor' –". *AzVision.az*. May 17. http://en.azvision.az/haber_-37817-xeber.html.

Badalova, Aygun. 2016. 'Alarming Trail of Armenia's Nuclear Ambitions – Report'. *Trend.Az*. May 10. http://en.trend.az/scaucasus/armenia/2531148.html.

Bardos, Gordon N. 2015. 'Charlie Hebdo: The Balkan Connection'. *World Affairs Journal*. February 4. http://www.worldaffairsjournal.org/blog/gordon-n-bardos/charlie-hebdo-balkan-connection.

BBC News. 2015. 'Nuclear Smuggling Deals "Thwarted" in Moldova'. October 7. http://www.bbc.com/news/world-europe-34461732.

Becker, Steven M. 2012. In *Medical Consequences of Radiological and Nuclear Weapons*, edited by Anthony B. Mickelson. United State of America: Government Printing Office.

BIRN. 2016. 'Balkan Jihadists The Radicalisation and Recruitment of Fighters in Syria and Iraq'. Balkan Investigative Reporting Network. http://www.balkaninsight.com/en/file/show/Balkan-Jihadists.pdf.

Bronner, Michael. 2008. '100 Grams (and Counting…) Notes from the Nuclear Underworld.' *Belfer Center for Science and International Affairs. Harvard Kennedy School*. June. http://belfercenter.ksg.harvard.edu/files/100-Grams-Final-Color.pdf.

Buelles, Anni-Claudine. 2013. 'Securing Borders Against Nuclear and Radiological Materials'. *Security Sector Reform Resource Centre*. December 9. http://www.ssrresourcecentre.org/2013/12/09/securing-borders-against-nuclear-and-radiological-materials/.

Bunn, Matthew, Martin B. Malin, Nickolas Roth, William H. Tobey. 2016. *Preventing Nuclear Terrorism. Continuous Improvement or Dangerous Decline?* Project on Managing the Atom Report. Harvard Kennedy School: Belfer Center for Science and International Affairs. http://belfercenter.ksg.harvard.edu/files/PreventingNuclearTerrorism-Web.pdf.

Butler, Desmond, Vadim Ghirda. 2015. 'AP INVESTIGATION: Nuclear Black Market Seeks IS Extremists'. *AP-The Big Story*. October 7. http://bigstory.ap.org/article/9f77a17c001f4cf3baeb28990b0d92eb/ap-investigation-nuclear-smugglers-sought-terrorist-buyers.

Butler, Desmond, Vadim Ghirda, Lizzie Dearden. 2015. 'Isis Nuclear Smuggling Gang: Read the Full Investigation into How FBI Stopped Extremists Getting Radioactive Material'. *The Independent*. October 7. http://www.independent.co.uk/news/world/middle-east/isis-nuclear-smuggling-gang-read-the-full-investigation-into-how-fbi-stopped-extremists-getting-a6684151.html.

Cirincione, Joe. 2016. 'Opinion: Nuclear Terrorism Threat Very Real'. *CNN*. April 1. http://www.cnn.com/2016/04/01/opinions/nuclear-terrorism-threat-cirincione/index.html.

CNS. 2016a. 'CNS Global Incidents and Trafficking Database. Tracking Publicly Reported Incidents Involving Nuclear and Other Radioactive Materials'. Nuclear Threat Initiative. James Martin Center for Nonproliferation Studies (CNS).

———. 2016b. 'Global Incidents and Trafficking Database'. *Nuclear Threat Initiative*. March 23. http://www.nti.org/analysis/reports/cns-global-incidents-and-trafficking-database/.

Cominetti, Valentina. 2015. 'L'alleanza Jihadista Fra Isis E Uck Minaccia l'Italia'. *La Nuova Bussola Quotidiana*, July. http://www.lanuovabq.it/it/articoliPdf-lalleanza-jihadista-fra-isis-e-uck-minaccia-litalia-13150.pdf.

Conca, James. 2016. 'Terrorism In Brussels Shadowed By Dirty Bomb Plans'. *Forbes*. March 29. http://www.forbes.com/sites/jamesconca/2016/03/29/terrorism-in-brussels-shadowed-by-dirty-bomb-plans/.

Cornell, Svante, Michael Jonsson. 2014. *Conflict, Crime, and the State in Postcommunist Eurasia*. University of Pennsylvania Press.

Crowley, Michael. 2005. 'Can Terrorists Build the Bomb?' *Popular Science*. February 1. http://www.popsci.com/scitech/article/2005-02/can-terrorists-build-bomb.

Dadashova, Gulgiz. 2016. 'Armenia's Nuclear Threat: How Real the Danger Is'. *AzerNews*. May 10. http://www.azernews.az/aggression/96394.html.

Davenport, Kelsey. 2015. 'Illicit Traffickers Arrested in Moldova'. *Arms Control Today*. January 8. https://www.armscontrol.org/ACT/2015_0102/News-Briefs/Illicit-Traffickers-Arrested-in- Moldova.

Dearden, Lizzie. 2016. 'Paris Attacks Isis Suspect Salah Abdeslam Had Nuclear Files Stashed in His Flat'. *Indipendent*. April 14. http://www.independent.co.uk/news/world/europe/isis-nuclear-threat-documents-on-german-atomic-research-centre-found-at-salah-abdeslams-home-a6983831.html.

Delanoe, Igor. 2015. 'WEAPONS OF MASS DESTRUCTION: A PERSISTING SECURITY CHALLENGE TO THE BLACK SEA REGION.' *NEIGHBOURHOOD Policy Paper* Center for International and European Studies (CIES) (16).

DHS. 2004. 'Radiological Attack. Dirty Bombs and Other Devices'. U.S. Department of Homeland Security. https://www.dhs.gov/xlibrary/assets/prep_radiological_fact_sheet.pdf.

Doornbos, Harald, Jenan Moussa. 2014. 'Found: The Islamic State's Terror Laptop of Doom'. *Foreign Policy*. August 28. https://foreignpolicy.com/2014/08/28/found-the-islamic-states-terror-laptop-of-doom/.

Dronzina, T., Rachid El Houdaïgui. 2012. *Contemporary Suicide Terrorism: Origins, Trends and Ways of Tackling It*. IOS Press.

Dyer, John. 2016. 'The Black Flag in the Balkans: The Islamic State's Links to Bosnia'. *VICE News*. April 10. https://news.vice.com/article/black-flag-the-balkans-the-islamic-state-bosnia-herzegovina.

European Dialogue. 2010. 'Georgia Unveils Details of Nuclear Smuggling Case'. November 19. http://eurodialogue.eu/Georgia-Unveils-Details-of-Nuclear-Smuggling-Case.

Evans, Mike. 2007. *The Final Move Beyond Iraq*. Charisma Media.

Eweiss, Nada. 2016. 'Non-State Actors & WMD: Does ISIS Have a Pathway to a Nuclear Weapon?' British American Security Information Council. http://www.basicint.org/sites/default/files/NonStateActors_WMD_Mar2016.pdf.

Foschini, Giuliano, Fabio Tonacci. 2014. 'Bosnia, Arrestato Bosnic: "Reclutava in Italia per Conto dell'Is"'. *Repubblica.it*. September 5. http://www.repubblica.it/esteri/2014/09/05/news/bosnia_arrestato_bosnic_reclutava_in_italia_per_conto_dell_is-95038544/.

German, Tracey. 2016. *Regional Cooperation in the South Caucasus: Good Neighbours or Distant Relatives?* Routledge.

Gheorghe, Eliza. 2015. 'After Crimea: Disarmament, Frozen Conflicts, And Illicit Trafficking Through Eastern Europe'. *Center for International Studies. Working Paper Series*, no. 4(July).

Giacalone, Giovanni. 2015. 'La Rete Jihadista Albanese E Le Ripercussioni Italiane'. *ISPI Analysis*, no. 288(July). http://www.ispionline.it/it/pubblicazione/la-rete-jihadista-albanese-e-le-ripercussioni-italiane-13719.

Hagger, Nicholas. 2013. *The Secret American Dream: The Creation of a New World Order with the Power to Abolish War, Poverty, and Disease*. Duncan Baird Publishers.

Halkon, Ruth. 2016. 'Paris Attacks Suspect Had Papers about Nuclear Research Base Hidden in Flat'. *Mirror*. April 14. http://www.mirror.co.uk/news/world-news/paris-attacks-suspect-salah-abdeslam-7752354.

Hofmann, Erin Trouth. 2011. 'The Links Between Organized Crime and Terrorism in Eurasian Nuclear Smuggling'. *Wilson Center*. July 7. https://www.wilsoncenter.org/publication/the-links-between-organized-crime-and-terrorism-eurasian-nuclear-smuggling.

Humud, Carla E., Alexis Arieff, Lauren Ploch Blanchard, Christopher M. Blanchard, Jeremy M. Sharp, Kenneth Katzman. 2014. 'Al Qaeda-Affiliated Groups: Middle East and Africa'. Congressional Research Service. https://fas.org/sgp/crs/mideast/R43756.pdf.

Immenkamp, Beatrix. 2015. 'ISIL/Da'esh and "Non-Conventional" Weapons of Terror - Think Tank'. EPRS | European Parliamentary Research Service. http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2015)572806.

Jim Sciutto, Correspondent, Chief National Security. 2015. 'ISIS Seen Building Capacity for Mass Casualty Attacks'. *CNN*. August 8. http://www.cnn.com/2015/08/07/politics/isis-mass-casualty-strategy/index.html.

K. Lalbiakchhunga. 2015. 'The Danger of Proliferation of Nuclear Weapon and Fissile Materials in the Era of Global Terrorism.' *International Journal of Humanities and Social Science Invention*, February.

Kibaroglu, Prof. Dr. Mustafa. 2015. 'Nuclear Security and Turkey: Dealing with Nuclear Smuggling'. EDAM. http://edam.org.tr/document/NuclearBook3/edam_nucphysec2015_ch3.pdf.

Kupatadze, Alexander. 2010. 'ORGANIZED CRIME AND THE TRAFFICKING OF RADIOLOGICAL MATERIALS. The Case of Georgia.' *The Nonproliferation Review* 17 (2): 219–34. doi:10.1080/10736700.2010.485425.

Lampe, Klaus von. 2015. *Organized Crime: Analyzing Illegal Activities, Criminal Structures, and Extra-Legal Governance*. SAGE Publications.

Lawlor, Maj. Gen. Bruce. 2011. 'The Black Sea: Center of the Nuclear Black Market'. *Bulletin of the Atomic Scientists* 67 (6): 73–80.

Lt. Col. (res.) Dr. Shoham, Dany. 2015. 'Does ISIS Pose a WMD Threat?' *BESA Center Perspectives*, no. Paper No. 322 (December). http://besacenter.org/wp-content/uploads/2015/12/Shoham-Dany-ISIS-as-WMD-threat-PP-322-13-Dec-2015.pdf.

Marcus, Mary Brophy. 2015. 'Injuries from Paris Attacks Will Take Long to Heal'. *CBSNews*. November 19. http://www.cbsnews.com/news/injuries-from-paris-attacks-will-take-long-to-heal/.

Moscow, Andrew Osborn. 2010. 'Armenian Smugglers Tried to Sell Nuclear Material to Terrorists'. *The Telegraph*. November 7. http://www.telegraph.co.uk/news/worldnews/europe/armenia/8116106/Armenian-smugglers-tried-to-sell-nuclear-material-to-terrorists.html.

(M.P.P.) Fitzpatrick, Mark. 2007. *Nuclear Black Markets: Pakistan, A.Q. Khan and the Rise of Proliferation Networks : A Net Assessment*. IISS.

Mutua, John-Mark. 2015. 'Uranium Yellowcake Trafficking Incidents in Africa. Proliferation Threat or Non-Proliferation Opportunity?' *African Security Review* 24 (2): 162–89.

NATO. 2015. 'Could ISIL Go Nuclear?' *NATO Review*. May 26. http://www.nato.int/docu/review/2015/ISIL/ISIL-Nuclear-Chemical-Threat-Iraq-Syria/EN/index.htm.

NNSA. 2015. 'NNSA, Romania Launch Radiation Detection System at International Airport near Bucharest'. *National Nuclear Security Administration (NNSA)*. July 22. http://nnsa.energy.gov/mediaroom/pressreleases/nnsa-romania-launch-radiation-detection-system.

Norman, Laurence. 2016. 'Belgian Suspect Ameroud Said to Have Carried Potentially Toxic Material'. *Wall Street Journal*, April 9, sec. World. http://www.wsj.com/articles/belgian-suspect-ameuroud-said-to-have-carried-potentially-toxic-material-1460210505.

Norwegian Radiation Protection Authority. 2015. 'Prevention of the Smuggling of Nuclear and Radioactive Materials at the Ukraine-Moldova Border'. *NRPABulletin* 8. http://www.nrpa.no/publikasjon/straaleverninfo-08-2015-prevention-of-the-smuggling-of-nuclear-and-radioactive-materials-at-the-ukraine-moldova-border.pdf.

NRC Library. 2016. 'NRC: Glossary – Yellowcake'. June 21. http://www.nrc.gov/reading-rm/basic-ref/glossary/yellowcake.html.

Nuclear Security Summit. 2016. 'National Progress Report: Romania'. *The 2016 Nuclear Security Summit*. March 31. http://www.nss2016.org/document-center-docs/2016/3/31/national-progress-report-romania.

Orzechowska, Ida. 2014. 'Kosovo: The Hidden Growth of Islamic Extremism'. *Global Research*. August 24. http://www.globalresearch.ca/the-hidden-growth-of-islamic-extremism-in-kosovo/5397371.

Perez, Evan, and Michael Martinez. 2015. 'FBI Helped Thwart Nuclear Smuggling Plot in Moldova'. *CNN*. October 8. http://www.cnn.com/2015/10/07/politics/fbi-helped-thwart-nuclear-smuggling-plot-in-moldova/index.html.

Pichon, Eric. 2015. 'Understanding the Rise of ISIL/Da'esh (the "Islamic State")'. EPRS | European Parliamentary Research Service. http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/551329/EPRS_BRI(2015)551329_EN.pdf.

Readhead, Harry. 2016. 'Photos Show Damage inside Brussels Airport Terminal after Bombing'. *Metro*. March 30. http://metro.co.uk/2016/03/30/photos-show-damage-inside-brussels-airport-terminal-after-bombing-5783695/.

Reynolds, Leda. 2015. 'WATCH: FBI Swoops on Gang Selling Dirty Bomb Chemicals to ISIS – but Admit There Are MORE'. *Express.co.uk*. October 7. http://www.express.co.uk/news/uk/610442/FBI-swoops-on-gang-selling-dirty-bomb-chemicals-to-ISIS-but-admit-there-are-MORE.

Sahakyan, Armine. 2016. 'Rise in Armenians Arrested for Nuclear-Materials Smuggling Is Worrisome'. *Huffington Post*. May 25. http://www.huffingtonpost.com/armine-sahakyan/rise-in-armenians-arreste_b_9769548.html.

Schmid, Alex P., Charlotte Spencer-Smith. 2012. 'Lllicit Radiological and Nuclear Trafficking, Smuggling and Security Incidents in the Black Sea Region since the Fall of the Iron Curtain – an Open Source Inventory'. *Perspectives on Terrorism, North America*, May. http://www.terrorismanalysts.com/pt/index.php/pot/article/view/schmid-illicit-radiological.

Shay, Shaul. 2011. *Islamic Terror and the Balkans*. Transaction Publishers.

Spahiu, Ebi. 2015. 'Militant Islamists, Organized Crime and the Balkan Diaspora in Europe'. *The Jamestown Foundation*, Terrorism Monitor, XIII (23): 3–7.

Spaic, Igor. 2015. 'Bosnia: Salafist Leader Gets Seven Years for Recruiting Boys to Islamic State'. November 6. https://www.occrp.org/en/blog/4579-bilal-bosnic-salafist-leader-gets-seven-years-for-recruiting-boys-to-islamic-state.

Squassoni, Sharon, Amelia Armitage. 2015. 'Nuclear Smuggling: From Moldova to ISIS?' *Center For Strategic & International Studies (CSIS)*. October 9. https://www.csis.org/analysis/nuclear-smuggling-moldova-isis.

Steinbuch, Yaron. 2016. 'Brussels Bomber Brothers Plotted to Kidnap Nuclear Official'. *New York Post*. March 24. http://nypost.com/2016/03/24/brussels-bomber-brothers-took-part-in-plot-to-kidnap-nuclear-official/.

The Guardian. 2016. 'German Intelligence Agency Disputes Reports Salah Abdeslam Had German Nuclear Files'. April 14. http://www.theguardian.com/world/2016/apr/14/paris-attacks-suspect-salah-abdeslam-had-german-nuclear-files.

The Soufan Group. 2015. 'FOREIGN FIGHTERS An Updated Assessment of the Flow of Foreign Fighters into Syria and Iraq'. http://soufangroup.com/wp-content/uploads/2015/12/TSG_ForeignFightersUpdate3.pdf.

Thomas, Brian Johnson, Mark Franchetti. 2005. 'Radioactive Rockets "For Sale" in Breakaway Soviet Republic'. *NTI*. May 8. http://www.nti.org/analysis/articles/dirty-bomb-rocket-again-reported-sale-transnistria/.

U.S. Embassy. 2015. 'United States and Ukraine Cooperate to Strengthen Counter Nuclear Smuggling Capabilities'. *Http://usembassy.state.gov/press-Releases/us-Ukraine-Nuclear-06242015.html*. June 24. https://ukraine.usembassy.gov/press-releases/us-ukraine-nuclear-06242015.html.

Ukraine News Agency. 2015. 'Two Ukrainian Citizens Try to Smuggle Radioactive Materials into Romania – PGO'. *Interfax-Ukraine*. August 6. http://en.interfax.com.ua/news/general/282349.html.

Vreja, Lucia Ovidia. 2007. 'Trafficking Routes and Link to Terrorism in South Eastern Europe: The Case of Romania'. The Quarterly Journal. http://procon.bg/system/files/06.1.03_vreja.pdf.

Ward, Richard H., Latj;eem Kiernan, Daniel Mabrey. 2006. *Homeland Security: An Introduction*. Routledge.

Yousef, Egid. 2015. 'ISIS Infiltrates Into Europe, Sets Up Secret Base in the Balkan.' *Assyrian International News Agency (AINA)*. August 11. http://www.aina.org/news/20151107231406.pdf.

Zaitseva, Lyudmila, Friedrich Steinhäusler. 2014. 'NUCLEAR TRAFFICKING ISSUES IN THE BLACK SEA REGION'. *EU Non-Proliferation Consortium* Non-Proliferation Papers (39). http://www.nonproliferation.eu/web/documents/nonproliferationpapers/lyudmilazaitsevafriedrichsteinhausler53451ed0bbecb.pdf.

Zolotukhina, Elizabeth. 2015. 'Nuclear Materials Smuggling in Moldova: A Watershed Moment?' Centre for Geopolitics & Security in Realism Studies (CGSRS). http://www.cgsrs.org/files/files/publications_28.pdf.

La Rivista semestrale *Sicurezza, Terrorismo e Società* intende la *Sicurezza* come una condizione che risulta dallo stabilizzarsi e dal mantenersi di misure proattive capaci di promuovere il benessere e la qualità della vita dei cittadini e la vitalità democratica delle istituzioni; affronta il fenomeno del *Terrorismo* come un processo complesso, di lungo periodo, che affonda le sue radici nelle dimensioni culturale, religiosa, politica ed economica che caratterizzano i sistemi sociali; propone alla *Società* – quella degli studiosi e degli operatori e quella ampia di cittadini e istituzioni – strumenti di comprensione, analisi e scenari di tali fenomeni e indirizzi di gestione delle crisi.

Sicurezza, Terrorismo e Società si avvale dei contributi di studiosi, policy maker, analisti, operatori della sicurezza e dei media interessati all'ambito della sicurezza, del terrorismo e del crisis management. Essa si rivolge a tutti coloro che operano in tali settori, volendo rappresentare un momento di confronto partecipativo e aperto al dibattito.

La rivista ospita contributi in più lingue, preferendo l'italiano e l'inglese, per ciascuno dei quali è pubblicato un Executive Summary in entrambe le lingue. La redazione sollecita particolarmente contributi interdisciplinari, commenti, analisi e ricerche attenti alle principali tendenze provenienti dal mondo delle pratiche.

Sicurezza, Terrorismo e Società è un semestrale che pubblica 2 numeri all'anno. Oltre ai due numeri programmati possono essere previsti e pubblicati numeri speciali.

EDUCatt - Ente per il Diritto allo Studio Universitario dell'Università Cattolica
Largo Gemelli 1, 20123 Milano - tel. 02.72342235 - fax 02.80.53.215
e-mail: editoriale.dsu@educatt.it (produzione) - librario.dsu@educatt.it (distribuzione)
redazione: redazione@itstime.it
web: www.sicurezzaterrorismosocieta.it
ISBN: 978-88-9335-108-9

9 788893 351089

Euro 20,00