

## Brexit effects: The future of safeguards in the United Kingdom

The result of the referendum on 23 June has generated a great deal of uncertainty. As the UK enters what may be an extended period of political instability it remains unclear how and when the process to leave the European Union will begin. The result has also cast doubt over a swathe of policy areas that relied on close European coordination or collaboration. One of these areas of doubt—completely ignored during the referendum debate and liable to be overlooked during the exit negotiations—is the application of nuclear safeguards.

The majority of safeguarding in the UK is carried out by the oft-forgotten third European Community: the European Atomic Energy Community. The Community, otherwise known as Euratom, has been integrated into the European Commission, although it retains a separate legal character. It is responsible for promoting research, improving practices and maintaining the nuclear common market within Europe, as well as conducting safeguards in the region. Although the referendum question did not refer to the Community by name, the 2008 European Union Act stipulates that any reference to the European Union in British law also applies to Euratom. Euratom is also a party to the UK's Safeguards Agreement and Additional Protocol with the International Atomic Energy Agency (IAEA), so the referendum has thus called the UK's safeguards system into question.

Once Article 50 is triggered the UK will have two years, subject to extension by unanimous agreement, in which to negotiate its departure from the European Union. The Lisbon Treaty integrated the same exit procedure into the Euratom Treaty. The government will have ideally established a clear plan for the future of safeguarding in the UK by the end of these negotiations at the very latest. Before doing so, however, a number of outstanding questions will need to be addressed. These relate primarily to the continued roles played by

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Euratom and the IAEA—international agencies that can perform safeguards—in the UK, as well as the obligations of the UK government and industry. In order to demonstrate the difficulties inherent in these decisions, the article will look at the role of Euratom in the UK's current safeguards system before assessing the gap that will be left once the UK leaves the European Union. The second half of the article looks at how the UK might approach Euratom and the IAEA to maintain an appropriate safeguarding regime.

### Current safeguards

The European safeguarding system emerged in 1957 with the conclusion of the Euratom Treaty by the six original members of the European Communities: France, West Germany, Italy, Belgium, the Netherlands and Luxembourg. Euratom, along with the contemporaneous European Coal and Steel Community and the European Economic Community, embodied a key post-war endeavour to encourage cooperation and support economic development on the continent. The rapid expansion of civil nuclear industry promoted by Euratom, as well as conditions applied to technical and material support from the US, necessitated regional safeguards. European safeguards developed before those mandated by the NPT and—owing to the relative maturity of the system—the Community was allowed to 'self-safeguard' with reduced IAEA oversight (despite some on-going protestations). On joining the European Communities in 1973, the UK's civil nuclear material was placed under these Euratom safeguards.

Euratom safeguards are applied to ores, source materials and special fissile materials to ensure that they are not diverted from their intended use. In order to do so, the Treaty obliges nuclear operators to report the Basic Technical Characteristics of their facility, including location and intended activities; to maintain and report nuclear material accountancy records; and to allow unimpeded access to Commission inspectors to verify the declarations. Commission Regulation 302/05 further strengthened and modernised the reporting requirements to ensure the effectiveness of safeguards given the increased membership and amount of nuclear material present in the Community. The treaty does not specify safeguards practices, but Euratom safeguards, like their IAEA counterparts, rely heavily on nuclear material accountancy, with surveillance and containment as supplementary measures.

The treaty, unlike the Nuclear Non-Proliferation Treaty (NPT), does not distinguish between nuclear- and non-nuclear-weapon states. However, owing to French military ambitions while the treaty was being drafted, member states are still able to withdraw material from safeguards to meet defence requirements. Nonetheless, Euratom is guaranteed access to all civil nuclear material, even in facilities that also handle military nuclear material. As safeguards are applied in this non-discriminatory fashion, the UK and France are responsible for the majority of safeguard resources owing to their large nuclear industries. In 2014, for instance, the UK's 216 inspections alone accounted for over a quarter of total 'person-days' spent on inspections within Europe.

The IAEA also places all civilian source and special fissile material in facilities within the UK under safeguards as part of a voluntary offer agreement that came into force in 1978. The trilateral Safeguard Agreement between the UK, IAEA and Euratom (INFCIRC/263) superseded an earlier bilateral, albeit limited, arrangement with the IAEA from 1972 (INFCIRC/175) that, however, remains in force. The Agreement requires the UK to provide a list of facilities that contain source or special fissile material. The IAEA then designates any of these locations for regular inspections, although the UK retains the right to remove facilities for reasons of national security. Currently, only certain stores of plutonium at Sellafield and the enrichment plant at Capenhurst are designated for inspection in this way.

The entry-into-force of the Additional Protocol (INFCIRC/263/Add.1) in the UK in 2004 strengthened the agency's ability to detect undeclared nuclear activities in non-nuclear-weapon states. Further reporting mechanisms and complementary access were provided to IAEA inspectors to assist the agency in assessing the completeness of declarations, in particular on activities in cooperation with non-nuclear-weapon states, as well as making safeguarding under the voluntary offer agreement more effective and efficient. Declarations include the descriptions of fuel-cycle research to the processing of high-level waste relevant to non-nuclear-weapon states.

The IAEA Safeguards Agreement and Additional Protocol recognise the role played by Euratom in conducting safe-

guards. The Community must provide information to the IAEA, such as on transfers of nuclear material to or from any facility on the facilities list under the Safeguards Agreement. Under the Additional Protocol, Euratom also provides information on certain transfers outside of the Community and on small quantities of material that are processed or used on behalf of non-nuclear weapon states. The IAEA verified the work of Euratom through ‘observations’, where the IAEA inspectors shadowed the work of Euratom inspectors to assess whether safeguards were performed adequately. The agency also conducted ‘joint inspections’, whereby IAEA inspectors took measurements to corroborate Euratom conclusions on more sensitive facilities. However, subsequent arrangements, such as the 1992 New Partnership Approach and the introduction of integrated safeguards, introduced processes such as one-job-one-person and have gradually harmonised procedures while reducing financial and manpower costs.

### **What happens without Europe?**

If no alternative mechanism is decided upon before the negotiating period ends, the safeguarding regime developed over forty years could quite simply cease. Euratom safeguards would lapse, and the IAEA Safeguards Agreement and Additional Protocol may be deemed invalid. The single international agreement still in force would be INFCIRC/175, originally designed for a bilateral supply agreement with Spain. In this case, the government would have to report on material transferred into the UK, and the IAEA would maintain an inventory of facilities containing such nuclear material – source and special fissile materials – in the country. As such, it is only when the material in question is transferred to a new facility that the UK would be obliged to notify the agency of its existence and determine whether and how safeguards can be applied. Ores would also no longer be under safeguard, although this would not have a large impact on the UK’s current nuclear industry.

Such limited safeguards are unsustainable and undesirable. The remaining legal instrument, INFCIRC/175, was agreed in December 1972, following the UK’s signature of the Euratom Treaty and ratification of the NPT. As such, INFCIRC/175 was prepared mindful of future, more comprehensive safeguarding agreements. The ‘watering-down’ of safeguard obligations in the UK could also undermine its

traditional role as a promoter of international safeguards in NNWS (which is unlikely to change given its continued interest in limiting proliferation) and attract accusations of hypocrisy. The current voluntary offer agreement, aside from demonstrating an accepted international precedent, also recognises the importance of subjecting the UK to equal commercial disadvantages. Fewer safeguarding measures would equal a reduced burden, and perhaps be perceived by some states as unfair.

Safeguards in the UK should also not be thought of as an obligation the government would be eager to shirk. As a state with a developed nuclear industry, the UK enjoys a reputation as a leader in the field. It benefits from joint research into verification technologies and often uses the current safeguards agreements to support the testing of equipment and procedures under development. The nuclear industry in the UK also welcomes safeguarding. Operators such as URENCO highlight the importance of safeguards for public reassurance, allaying concerns of potential business partners and promoting safe nuclear power worldwide. Moreover, the change to the UK’s safeguards system would affect several bilateral nuclear cooperation agreements, in addition to those agreements signed with Euratom (which includes deals signed with the United States, Canada and Japan). Adequate safeguarding measures would have to be introduced on relevant material to satisfy the terms of the 1979 Nuclear Transfers Agreement with Australia, for instance. Those agreements that explicitly rely upon the UK’s current Euratom-IAEA safeguard system might also have to be rewritten.

### **A continued role for Euratom?**

To avoid the costs of redesigning the UK’s safeguards system, while freeing resources for other more contentious issues during the negotiations, the government may opt to remain a member of Euratom. The vote was marginal and provides the government some legitimate flexibility were it to decide to do so, and Euratom is unknown and relatively uncontroversial in Britain. It provides for a single market in nuclear and nuclear-related materials, which is attractive in an era of nuclear new-builds, while the issues of migration, financing and sovereignty that dominated the referendum debate do not apply. The UK may also understandably want to continue to benefit from the other elements of Euratom member-

ship, including the sharing of best practice, influence in setting international standards, and perhaps even membership of associated organisations such as the European Commission's Joint Research Centre (JRC).

Retaining membership, however, could prove more difficult. While non-member states, such as Switzerland, have been invited to collaborate in Euratom research, broader participation, including safeguards, have only ever been applied to full members of the Community. Any decision to retain full Euratom membership or the application of Euratom safeguards could also entail additional complex negotiations. Euratom decision-making and financing is integrated into the European Commission, which the UK will have left, complicating issues of representation, funding and direction. The decision would also provide the European Court of Justice influence over British law-making, particularly in areas of health and safety legislation. Furthermore, as the 1972 European Communities Act will be repealed, Euratom would need to be rewritten into domestic law. Were the UK to pursue an associate or full membership, Euratom could, therefore, emerge as a visible target for eurosceptics. Moreover—and perhaps most importantly—the UK may simply not be welcome to retain full membership in one of the original communities.

### **Can the IAEA fill the void?**

Should the government be forced to reassess the safeguards system in the UK, it could decide to negotiate a new voluntary offer agreement or just amend the current INFCIRC/263 to remove the references to Euratom. In this case, the role played by the IAEA would almost certainly increase. The IAEA would feel obliged to designate more UK facilities to be inspected given the withdrawal of Euratom controls, especially as the current Safeguards Agreement cites the effectiveness of Euratom safeguards as one measure informing the IAEA's designation decisions. The IAEA would also be called upon to perform safeguards stipulated by the UK's bilateral nuclear-related agreements. Reporting provisions would also need to be written into UK law and executed by the Office for Nuclear Regulation, as the European Commission, acting under the terms of the Euratom Treaty, currently fulfils the reporting requirements for the IAEA.

The substitution of IAEA safeguards for Euratom safeguards may appear obvious in practice. However, while complementary, IAEA and Euratom safeguards differ with regard to their application and ends. As already noted, reporting obligations and material under the two regimes are different. More importantly, Euratom safeguards are directed at operators, whereas the IAEA focuses on state obligations. The Euratom Treaty, although it refers to upholding other international obligations, is mute on non-proliferation. As such, safeguards are only applied to ensure material is not diverted from intended uses as declared by users. Sanctions, applied on operators, include the withdrawal of support, removal of source and special fissile materials or placement of an undertaking under temporary administration. The European Court of Justice can sanction the member state only if the state fails to enforce disciplinary measures on an operator within its jurisdiction. The IAEA Safeguards Agreement, on the other hand, is underpinned by the NPT and thus aimed at uncovering clandestine proliferation undertaken by a state. As such, if the UK does not take remedial action to allow the agency to verify that material has not been withdrawn from civil activities (unless permitted by the agreement) the IAEA Board of Governors can report the UK to the UN Security Council.

Practical issues of scope, expertise and financing would also need to be addressed. The IAEA would need to plan how to safeguard all facilities on a complex site, such as Sellafield, which has in the past handled military and civilian material. Article 34 of the current Safeguards Agreement states that uranium and thorium are not covered by safeguards 'until they have reached the stage of the nuclear fuel cycle where they are of a composition of purity suitable for fuel fabrication or isotopic enrichment'. As such, stores of uranium ore concentrate, for example at the Springfields site, would no longer be subject to international safeguards as they had been with Euratom. This is not to say, however, that any material accountancy and control practices would diminish, as these have tended to exceed those obliged by international treaties.

An increase in IAEA inspections, in particular in a country with a developed nuclear industry, would increase the costs of the IAEA considerably. While not all Euratom inspections would be replaced, the number of IAEA safeguard inspections could still grow by roughly a tenth. The burden on the inter-

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national organisation, which is currently tied to a zero-growth budget, would be pronounced. The UK would likely feel obliged to support the IAEA in an extra-budgetary capacity, perhaps under the auspices of the UK Safeguards Support Programme, and could do so with money no longer provided to Euratom.

The government may see benefits in an IAEA-led safeguards system. IAEA inspections, with a smaller scope than the Euratom Treaty, could reduce the aggregate financial and resource burden compared to the current regime of joint inspections, where two inspection teams reach independent conclusions. It could also be argued that increased IAEA safeguards in the UK would benefit the international non-proliferation regime. The ultimate objective of the NPT is to - eventually - place all nuclear material under international supervision, as nuclear-weapon states meet their disarmament obligations and dispense with military programmes. As disarmament efforts progress and verification methods develop (such as for the proposed Fissile Material Cut-off Treaty) increased comprehensive international safeguards in nuclear-weapon states would help to cultivate the necessary safeguarding skills and practices. Any growth of IAEA activities in the UK may be an opportunity in this regard.

### **Conclusions**

The referendum has raised many questions regarding safeguards in the UK. The government has been forced to decide how best to replace a safeguards regime that has developed over the past 40 years. It is still unclear, however, how the government will approach these decisions and what form the safeguards system in the UK will take following the exit negotiations. It should also be noted that, although the above description of the roles and remits of both agencies demonstrates some possible routes for the government, it also presents a false dilemma. The government could, of course, opt for a hybrid model, perhaps negotiating a bilateral agreement with Euratom that, aside from allowing the UK to continue its engagement with European research and development of best practices, would apply similar safeguards obligations and invite the IAEA to verify the findings. However, at the present moment, any attempt to pre-empt the government's decision in this regard is mere speculation. Nevertheless, it is crucial that the UK keep sight of these

important, albeit less controversial, issues during the exit negotiations. It is also important that, as the government establishes a plan for the future of safeguards in the UK, the verification community and British industry provide appropriate support to ensure the best possible safeguards system emerges.

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**Delegation of the European Union to Egypt**

# Open Skies Update

The Treaty on Open Skies has lived for long in a niche, drawing little political attention. This has changed since the annexation of Crimea and the Russian military engagement in parts of Ukraine in 2014, and the subsequent dramatic fall in trust between many NATO states and the Russian Federation. Fears in Washington of Russian Open Skies flights with modernised sensors even made it onto the front page of the *New York Times* (22 February 2016). So far the Treaty has withstood the test of time. However, the clouds in Open Skies have become darker, even though it is just a situation like this that makes the treaty valuable. This report gives an update on events since 2014. It complements a VERTIC brief of the author (No. 8, 2008) and reports in *Trust & Verify*, No. 146 and 152.

The Treaty is a military transparency measure. It opens the full territory of its 34 states parties to aerial observation flights. Since the decision of Russia to suspend the implementation of the Treaty on Conventional Forces in Europe (CFE) in December 2007, the Open Skies Treaty remains the only legally-binding multilateral military transparency regime in Europe and beyond. It covers Europe between 'the Atlantique and the Urals', as well as the vast Russian territories east of the Urals and the territories of the United States and Canada.

The Treaty-mandated resolution of optical cameras is restricted to 30 cm (ground sampled distance). While this resolution can be provided today also by commercial satellites like World View III, the Open Skies Treaty makes a distinct difference. It allows military men and women of states parties to set foot on the ground of other parties to start a cooperative flight and subsequently share the images taken. This bears relevance in the currently strained NATO-Russia relations, a result which cannot be created or replaced by satellite monitoring.

## The Review Conference 2015

Since entry into force of the treaty in 2002 three review conferences have been held, the most recent of which was held

on 8-10 June 2015 in Vienna. The conference was overshadowed by the Ukraine-Russia conflict and allegations of non-compliance. Russia was accused by the US representative and others of imposing two unilateral restrictions:

- a) a limitation of flight length over the Kaliningrad Oblast to 500 km; and
- b) a demand that Ukraine would have to deposit a prepayment before Russia would agree to observation flights of Ukraine over Russia. Both demands are not in accordance with the Treaty obligations. These disputes so far remain unsolved.

The Russian representative rebuffed the accusations by blaming the US for blocking Open Skies access to US Pacific Islands and for an outstanding payment of a US-Georgia shared flight in Russia in 2008. Both demands have been addressed by Washington in the meantime. Open Skies airfields on the Pacific Islands were designated on 18 September 2015 by the US, and the outstanding payment was transferred to Russia in June 2016

All parties made it very clear, despite these disputes, that they value the Treaty as a cooperative transparency regime and that they welcome modernisation of Treaty implementation by the transition to digital imaging sensors.

## Unsolved territorial issues

Arms control alone cannot resolve territorial status conflicts. This is why the parties refrained from formulating a final document at the review conference. They wanted to avoid a situation similar to that which they encountered at the end of the 2010 review conference, when Turkey clashed with the other 33 parties over the issue of its 2002 veto to an accession of the Republic of Cyprus to the Treaty. Apart from the Cyprus problem, two other territorial status questions impede the full implementation of Open Skies.

i. Since the Russian annexation of Crimea states parties refrain from flying over Crimea, which would only be possible with Russian host crews because Russia sees Crimea as part of the Russian Federation. Flying with Russia over the Crimea would be seen as recognition of the annexation.

ii. After its recognition of Abkhazia as an independent state, Russia does not approve flight plans that get closer than 10 km to the border of Abkhazia. Georgia and all other parties consider Abkhazia as a legal part of Georgia and hence do not accept the Russian position. Georgia is a party to the Treaty. The Treaty allows flights right to the border of parties with other parties. Georgia itself has staged a breach of the Treaty by refusing in April 2012 to accept any Russian flights over its territory.

All these issues form clouds over the Treaty, which hardliners in Washington and elsewhere might use to attack the Treaty.

### **Treaty implementation in 2016**

So far, the treaty's implementation is proceeding in a business-like manner, despite the above exceptions and several selective restrictions on flight altitudes. This year, the Russian Federation, together with Belarus, has scheduled 42 flights over most NATO states plus Bosnia-Herzegovina, Finland and Sweden (the latter three receiving one flight each). The two countries will, in return, receive 35 flights.

While the US will lead or share 16 flights over Russia and Belarus, Russia itself is planning only five flights over the US. Germany is leading or sharing ten missions and will receive five flights. Canada and Turkey will lead or share eight flights each, followed by France (seven) and Italy (six). Ukraine has scheduled 12 flights abroad, four of which will be shared with other parties over Russia. Russia will accept those flights without claiming prepayment because other parties will lead them. Twelve flights by other parties (not including Russia) over Ukraine will cover Ukraine's mainland - excluding Crimea and the disputed Donbass region in the East.

The flight pattern is dominated by NATO flights over Russia and Belarus and vice-versa. This reflects mutual security concerns. Some flights are carried out or received by non-

aligned states: Bosnia-Herzegovina, Finland, Georgia, Sweden and Ukraine. The Treaty gives rights and obligations to its parties, not to alliances. This allowed Ukraine in 2015 to share flights over Russia. Ukraine never overflew Russia in an Open Skies mission before 2014. Thus the implementation of Open Skies reveals a kernel of cooperation, even in times of confrontation.

### **Open Skies flights in open military conflicts**

Open Skies aircraft are unarmed and can operate only in a safe airspace. That is why Open Skies flights over the Donbass region of Eastern Ukraine had to end after the outbreak of fighting and the downing of several military and one civilian aircraft (flight MH 17). In such situations, overhead information gathering with unmanned systems might replace cooperative aerial observation. In fact, the Special Monitoring Mission (SMM) of the OSCE to the Ukraine has been successfully using unarmed observation drones in the Donbass region since October 2014.

Another case is flights close to the Syrian border. On 26 January 2016, Russia requested a flight over Turkey which would cover the full extension of the region close to Syria, a distance well over 1,000 km. Turkey refused to agree to the most western segment of the flight plan for security reasons. This is the part south of Adana (Turkey) and west of Aleppo (Syria) where Turkish territory reaches deep into Syria. The region beyond the Turkish border is not under the control of the Syrian government. The Russian team refused to accept a modified flight plan without that segment. The modified plan would still have covered the border region further east. The Russian team left Turkey under protest, and its representative in the Open Skies Consultative Commission (OSCC) blamed Turkey of noncompliance.

### **Preparing the next sensor certification**

Lessons have been learnt from the conflict around the first certification of digital optical cameras back in 2013/14. Open Skies digital images have to be protected against illegal manipulation. A sequence of five procedures for ensuring the authenticity of digital images has been adopted by the OSCC (see Trust & Verify 146). A further improvement was a March 2015 decision to introduce mandatory preparation steps for

any sensor and aircraft certification. These steps include:

1. The delivery of a Certification Technical Document (CTD) - a package of technical information of the observation aircraft and its associated sensors - 120 days before the certification event;
2. A multinational precertification event hosted by the certifying party to collect sensor calibration test data and to demonstrate certification procedures. This event is to be held between 60 to 90 days before the certification event;
3. The delivery of a full set of sensor resolution calibration data (flight test data) 60 days before the certification event, from which the minimum flight altitude of each sensor configuration can be derived; and
4. The right of each party to submit questions on inconsistencies in the CTD and the calibration data, and the right to receive answers.

Also, on 20 April 2015, the OSCC adopted an extensive list of instruments that inspectors can use to examine aircraft and sensors during the certification event. These include x-ray cameras and endoscopes for inspecting the interior of observation equipment. Russia originally was reluctant to accept all types of instruments requested by the US. However, it eventually agreed to all requests to pave the way for its next certification, discussed below.

### **Certification of the Russian Tu-154 aircraft**

In March 2016 Russia announced its intention to certify a Russian-made digital camera model (the OSDCAM 4060) on its Open Skies Tu-154/ON aircraft. Until now, this plane has flown over the US and Canada only with old-fashioned film cameras.

The prospect of being overflown with a digital camera has alarmed people in Washington (despite the resolution being the same as that of the film cameras). Therefore, both the Russian hosts of the pre-certification event (27 March – 4 April 2016) and the foreign inspectors were particularly careful in executing all required checks. Three minor deficiencies

were uncovered which Russia fixed before the certification event in June 2016. Russia even offered, on a voluntary basis, to characterise the software of the camera and the data processing station by a so-called ‘hash value’. Hash values are related to checksums or digital fingerprints. They can be used to check that software has remained unchanged between the first demonstration and following applications. Their introduction had been requested by the US but Russia had refused.

In addition to the pre-certification of the Tu-154, the near-infrared sensor configuration of the OSDCAM 4060 camera on the AN-30 aircraft was subjected to recertification at a new minimum flight altitude of 1420 m (formerly 1050 m).

These diligent preparations paid off during the actual certification event, which was held 19–28 June 2016 in Kubinka near Moscow. Twenty-five parties had sent representatives. All steps were executed as required. On 27 June the certification all parties, including the US, signed the document. No deficiencies were noted.

### **A new German Open Skies aircraft**

Germany lost its first Open Skies aircraft in September 1997 through a mid-air collision over the Southern Atlantic. Three attempts to replace the plane failed. A fourth attempt succeeded. The initiative came from dedicated parliamentarians in 2012. One of them managed to introduce the replacement in the November 2013 coalition agreement of the current German government. It took two more years to overcome resistance in the defence administration before the Bundestag approved the budget for the new aircraft in November 2015.

The aircraft will be an Airbus A319 CJ with a range of about 6,500 km, sufficient for direct flights from Germany to the Siberian point of entry of the Russian Federation at Ulan-Ude. Digital optical cameras will provide the mandated resolution of 30 cm at three altitudes (low, medium, and high). Also, the plane will be equipped with a thermal infrared camera. It has sufficient seating capacity to transport representatives of one or two other parties for shared missions. The aircraft will be a significant addition to the otherwise ageing fleet of Open Skies aircraft.

Two states have acquisition programs for replacing film cameras with digital cameras on their existing aircraft (the US and Turkey). Canada, France, Italy and Norway are establishing an acquisition program of sensors to be placed in a (joint) sensor pod. Sweden is examining the establishment of a sensor modernisation program for its aircraft within a limited budget.

### **Grumbling on Capitol Hill**

In April 2016 Mac Thornberry, the Republican chair of the US House Armed Services Committee, submitted a draft National Defense Authorization Act for Fiscal Year 2017, which would impose severe constraints to the Open Skies Treaty if accepted.

The language reads, in selected parts:

‘None of the funds authorized to be appropriated or otherwise made available by this Act or any other Act for fiscal year 2017 or any subsequent fiscal year may be used to approve or otherwise permit the approval of a request by the Russian Federation to carry out an initial or exhibition observation flight or certification event of an observation aircraft on which is installed an upgraded sensor with infrared or synthetic aperture radar capability over the territory of the United States or over the territory of a covered state party (i.e. US allies, added by author) under the Open Skies Treaty unless and until the Secretary of Defense, jointly with the Secretary of State, the Secretary of Energy, the Secretary of Homeland Security, the Director of the Federal Bureau of Investigation, the Director of National Intelligence, and the commander of U.S. Strategic Command and the Commander of U.S. Northern Command in the case of a flight over the territory of the United States and the Commander of U.S. European Command in the case of other flights, submits to the appropriate congressional committees the following:

(1) [...] A certification that [...] the Russian Federation [...] is allowing overflights by covered state parties over all of Moscow, Chechnya, Abkhazia, South Ossetia, and Kaliningrad without restriction [...]

(2) [...] A report on the Open Skies Treaty that includes [...]

a plan to replace the Open Skies Treaty architecture with a more robust sharing of overhead commercial imagery, consistent with United States national security, with covered state parties, excluding the Russian Federation [...]

Similar but less far-reaching restrictions had already be submitted in Defense draft bills for Fiscal Year 2015, but have been turned down by the White House in the overall budget deal.

The proposed language, however, looks more serious. Whereas the FY2015 bill tried to block the use of digital optical sensors over the US, the concerns focus now on the certification and use of Russian thermal infrared and radar imaging sensors. The use of infrared and radar sensors were enshrined in the Treaty on its signature in 1992, but they have not yet been used. The request of a plan to replace Open Skies by the exchange of satellite images with allies misses the point and benefit of Open Skies: the practice of cooperative transparency with an uncomfortable party. It is up to all parties to stand up for the Treaty and its approach to ‘verify even in times of distrust’.

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### Faith and funding in JCPOA verification

*Hugh Chalmers*

The Director General of the International Atomic Energy Agency (IAEA) presented his second full report on the verification and monitoring of the Joint Comprehensive Plan of Action (JCPOA) at the end of May. In his words, the report ‘presents the facts in an objective and factual manner and includes relevant information which the Agency can share with Member States’. Indeed, the report goes through the four main areas of the JCPOA - heavy water and reprocessing, enrichment and nuclear fuel, centrifuge development, and transparency - and presents information suggesting that Iran is complying with all its provisions.

The IAEA Board of Governors responded to his report by agreeing to incorporate €5.2 million of the annual JCPOA implementation costs into the Agency’s regular budget. From 2017, 57 per cent of the €9.2 million annual cost of implementing the JCPOA will be sourced from Member States’ mandatory weighted contributions to the Agency. The remainder (which cover the ‘transparency measures’ in the JCPOA) will continue to be sourced from voluntary contributions, and therefore subject to whims of the states that stump up the cash.

It seems highly unlikely at the moment that States would fail to do so. Despite threats from Senator Lindsey Graham that the US would withdraw funding if the IAEA failed to satisfy his doubts about ‘side deals’ with IAEA, none of the permanent members of the UN Security Council, nor Germany, have officially voiced any doubts in the IAEA’s verification of the deal (this grouping is referred to as the P-5+1). Quite the opposite: the US representative to the Board of Governors meeting went out of his way to praise the IAEA’s ‘exemplary performance in the conduct of their responsibilities in Iran’.

#### *A crisis of confidence?*

Not everyone shares the US ambassador’s faith in the way that the IAEA has conducted its work in Iran. The Institute for Science and International Security (ISIS), which pro-

vided detailed analysis of Agency reports before JCPOA implementation, has voiced concerns about how the breadth and depth of these reports have decreased since implementation. It has pointed to a lack of quantitative detail regards all aspects of implementation, as well as a lack of qualitative information about where the IAEA has conducted ‘complementary access’ inspections in Iran.

Separately, Ariel Levite at the Carnegie Endowment for International Peace is worried that the Agency’s reporting ‘has been laconic and less transparent than what is either normal or desirable’. He has also argued that the IAEA ‘has largely caved into Iranian pressure, and remains rather tight-lipped on the Agency’s safeguards and other confidence-enhancing activities in Iran.’

#### *Building faith in the IAEA’s verification*

This raises questions about how the IAEA builds confidence (or raises alarms) in the implementation of safeguards, and the role that its public reports play in this effort. First, it is important to understand the extent of the IAEA’s verification role in the JCPOA. Neither the JCPOA nor UN Security Council Resolution 2231 gives the agency a definite role in verifying Iran’s commitment not to carry out activities that could contribute to weaponizing nuclear material. Second, Resolution 2231 spells out different reporting requirements than the resolutions that preceded it (and were terminated by it). When presenting his report, the Director General also pointed out that it only includes ‘relevant information which the Agency can share with Member States’. Mark Hibbs, also with the Carnegie Endowment for International Peace, has argued that according to JCPOA negotiators, Iran would not have accepted the deal unless some details of verification were kept confidential.

Mr Hibbs points out that public reports to the Board of Advisors are only one way for the agency to keep member states informed of Iran’s implementation of the deal. The IAEA can work privately with both Iran and the P5+1 to identify and discuss any indications of violation before releasing any serious concerns to member states or the general

public. After all, UNSCR 2231 does not explicitly require the IAEA to report on Iran's 'compliance' or 'non-compliance' with the JCPOA. Moreover, the IAEA is arguably not going to be the judge of this issue. While its most recent report states that it 'has been verifying and monitoring the implementation by Iran of its nuclear-related commitments under the JCPOA', it does not explicitly say that Iran is abiding by these commitments. This judgement is left to others.

The P5+1 seem to trust that the IAEA will give them all the information they need to know about the implementation of the JCPOA. While this continues to be the case, states will continue to support the IAEA's work through regular and extra-budgetary contributions. Whether or not states will ultimately act on this information in a way that satisfies critics of the deal is another matter.

## Verification and the Open-Ended Working Group on Nuclear Disarmament

*Matteo Zerini*

The second session of the Open-Ended Working Group (OEWG) on nuclear disarmament convened in Geneva, Switzerland, between 2 and 23 May. National delegations from a host of countries, with the notable exception of nuclear-armed states, gathered in a deteriorated security environment with the ambitious goal of revitalising the multilateral nuclear disarmament process after two decades of paralysis in the Conference on Disarmament.

This reincarnation of the OEWG (chaired by Ambassador Thani Thongphakdi of Thailand) began in December 2015, when the UN General Assembly adopted resolution 70/33. The resolution asked the group to 'address concrete effective legal measures, legal provisions and norms that would need to be concluded to attain and maintain a world without nuclear weapons.' It also charged the group with addressing recommendations on measures 'that could contribute to taking forward multilateral nuclear disarmament negotiations.'

Talks in the second session included transparency measures concerning the risks related to existing nuclear weapons, measures to mitigate these risks, and essential elements of a

world free of nuclear weapons. The group also discussed 'additional measures to increase awareness and understanding of the complexity of and interrelationship between the wide range of humanitarian consequences that would result from any nuclear detonation.' The first session of the OEWG held its first session at the end of February 2016, when it worked in two panels addressing operative paragraphs two and three respectively of the resolution as mentioned above.

### *The route to nuclear disarmament*

The group's discussions have highlighted the enduring different opinions among the participating countries over some key issues. There are opposing views relating to the existence of a 'legal gap' in the current international regime for the prohibition and elimination of nuclear weapons. Opinions also differ over what approach should be taken to further the negotiations for nuclear disarmament. The group discussed three main approaches. The first, which attracted much attention on social media, involved the negotiation of a comprehensive nuclear weapons convention (also known as a nuclear weapons ban treaty). The second involves a less overarching framework agreement that could establish central principles, later fleshed out with additional protocols describing more precise nuclear disarmament measures. The third so-called 'progressive approach' essentially advocates a step-by-step approach to disarmament.

### *The role of verification in achieving and maintaining nuclear disarmament*

The first session in February also highlighted a variety of opinions on the role of verification in nuclear disarmament. Twenty-two European states and Japan submitted a Working Paper entitled 'A progressive approach to a world free of nuclear weapons: revisiting the building blocks paradigm', arguing that one such building block is the development of verification capabilities that can ensure a transparent, irreversible and verifiable disarmament process. The paper suggested that verification might be within the context of the International Atomic Energy Agency (IAEA). An alternative 'hybrid' proposal from Brazil also included a role for the IAEA in the adoption of a nuclear weapon ban treaty. Considering that nuclear-armed states are not likely to participate at first, the proposal suggests that a verification regime would have to be

negotiated subsequently, inspired by the IAEA's safeguards system.

Costa Rica and Malaysia have submitted the most detailed proposal on verification measures. They proposed a model nuclear weapons convention, with a verification regime that includes declarations and reports from the states, routine and challenge inspections, on-site sensors, satellite photography, radionuclide sampling and other remote sensors, information sharing with other organisations and citizen reporting. Rather than drawing on the IAEA, the proposal suggests that a new international body should deal with this task.

### *Evolving views on the role of verification*

The OEWG's second session in May renewed discussion on verification in its fourth panel on essential measures for attaining and maintaining a world without nuclear weapons. Japan underlined the importance of developing a technical and systematic mechanism for building confidence in the creation and maintenance of a world free of nuclear weapons. They argued that a robust and reliable verification regime, with effective international mechanisms to respond to violations is strictly necessary for the transition from the so-called 'minimization point' to global zero. The Japanese highlighted the work of the International Partnership for Nuclear Disarmament Verification (IPNDV) in this regard. Canada joined in stressing the importance of reliable verification techniques and made reference to the conclusions in this sense of the Group of Governmental Experts (GGE) working on recommendations for a fissile material cut-off treaty. According to Canada, the scientific and technical work that would go into developing the verification regime for such a treaty would prove useful for other disarmament verification efforts.

However, Brazil reiterated its view that without a general ban treaty there would be no political urgency for a verification system. Nicaragua, supporting the prohibition approach, argued that there would not be a need for any detailed verification provisions.

The OEWG will meet again from 5 to 19 August; it will then try to find agreement on recommendations to be made to the General Assembly for the next step in multilateral nuclear

disarmament.

## **Another setback for the US-Russia plutonium disposition agreement**

*Hugh Chalmers*

At the turn of the new millennium, the US and Russia signed the Plutonium Management and Disposition Agreement (PMDA) - committing both parties to verifiably dispose of 34 metric tonnes of weapons-grade plutonium from their respective defence programmes. Since then it has been slowly gathering dust while it waits to be implemented. When it was dusted down for a brief technical update in 2010, the parties aimed to begin plutonium disposition by 2018 - eighteen years after its signature. However, a recent setback suggests that the agreement may have to wait a little longer to be implemented.

After an extended period of reflection, the US administration has discontinued construction of the troubled Mixed Oxide (MOX) Fuel Fabrication Facility in South Carolina. From a financial perspective, this decision made perfect sense. The project was riddled with organisational and technical problems, and the projected costs had ballooned to more than \$30bn. That equates to approximately one million dollars per kilogramme of disposed material.

From a political perspective, the decision has caused yet another rift in the US arms control relationship with Russia. While the US aims to develop a new 'dilute and dispose' option for implementing the PMDA by 2017, Russia does not seem satisfied. Rather than turning weapons-grade plutonium into mixed oxide fuel that would then be irradiated in a reactor, the 'dilute and dispose' option mixes plutonium with an inert material (dilute) and then buried in an underground repository (dispose). President Putin has argued that this approach would make it too easy for the US to retrieve disposed plutonium and reintroduce it to a weapons programme, and it was 'not what we agreed on'.

### *Updating the agreement*

As Pavel Podvig, a Programme Lead at the United Nations Institute for Disarmament Research pointed out in an article

to the Bulletin of Atomic Scientists - President Putin is technically correct. The 2010 amendment to the PMDA states that 'disposition shall be by irradiation of disposition plutonium as fuel in nuclear reactors'. However, it also goes on to say 'or any other methods that may be agreed by the Parties in writing.' Any new arrangement for disposing of plutonium under the PMDA - whether by dilution or any other means - would need Russian approval. The first meeting between the US and Russia to discuss alternative disposition options took place on 25 April.

Russia's primary concern regarding the 'dilute and dispose' option relates to its reversibility, and most commentators have focussed on alternatives that might be less reversible, and therefore more appealing to Russia. Options have included 'immobilising' disposed plutonium within highly radioactive glass shells, or mixing weapons-grade plutonium with reactor-grade plutonium to diminish its suitability for weapons use.

### *The role of verification*

However, verification can also play a significant role in allaying Russia's concerns that the US might renege on the PMDA. As VERTIC has argued in its report *Irreversibility in Nuclear Disarmament*, verification can assure a state that agreed measures have been taken, detect efforts to reverse these steps, and deter these efforts through the risk of detection and punitive response. The PMDA allows for both parties to conduct monitoring and inspection activities to verify the implementation of the agreement, and the option to allow the IAEA to take on some or all of these activities. While both parties have sketched out the principles of verification in an annex to the agreement, the detailed procedures are undefined and will remain so until there is an agreed US disposition method. In the meantime, the parties contribute €180,000 in annual extrabudgetary funds to the IAEA to develop legal frameworks, verification approaches, and equipment to verify the PMDA.

The Waste Isolation Pilot Plant (WIPP), where the US plans to dispose of its diluted plutonium, has never been subject to IAEA verification. WIPP will ultimately contain a significant quantity of plutonium - some of which will need to be verified, some of which would have to remain unchecked. If

Russia is to agree to the proposed 'dilute and dispose' method (or indeed any other method) it must be confident that IAEA inspectors will be able to access WIPP and verify the status of the plutonium disposed there under the PMDA. Thankfully the US Department of Energy (DOE) study that proposed this option in 2014 argues that 'WIPP is the only facility [...] on the list of potential DOE sites for future IAEA monitoring and inspection'. Making the list is an encouraging first step, but there are several more steps to go before the PMDA can finally be implemented.

### **Crowdsourced Monitoring with 'Geo4NonPro'**

*Matteo Zerini*

Crowdsourcing is an increasingly common process that relies on the contributions from large groups of people to find the answer to specific questions. It can be applied to several fields and with different aims, thus potentially looking for different kinds of contributions each time.

The James Martin Center for Nonproliferation Studies (CNS) has recently launched a new project that aims at merging imagery analysis with crowdsourcing to analyse sites that are known or suspected to be involved in activities related to the proliferation of weapons of mass destruction. This project can be found at [www.geo4nonpro.org](http://www.geo4nonpro.org).

Ever since the 1960s, satellite imagery has played a valuable role in arms control verification and monitoring. Increasing accessibility and rapidly improving resolutions have opened up the field to non-governmental researchers. While a lot of information can be gleaned from an image, extracting and interpreting this information remains a highly specialised, and sometimes quite difficult, task.

For instance, the observed activity itself may be difficult to categorise from an overhead image. A particular industrial process, for example, could look very similar (or even identical) to many others. Moreover, those being surveyed may be careful to conceal distinctive features of proliferative activities that might provide useful references to understand what is going on at the site. Therefore, specific technical expertise or knowledge of the areas concerned might be needed to spot

any irregularities or hints that might be visible.

The CNS Project on Crowdsourced Imagery Analysis is a pilot project that wants to connect experts from a variety of backgrounds to interpret, annotate, and debate satellite imagery 'in the service of WMD non-proliferation and disarmament.' The spread of quality commercial satellite imagery allows anyone with an internet connection to contribute to this kind of analysis according to his or her expertise. CNS has invited a group of selected experts to contribute, but it is possible for anyone to send an application to join the group. At the end of the project, the CNS will draw conclusions on the results achieved by the crowdsourced experts and compare them with the work of an in-house red team. Hopefully, it will be possible to see how the crowdsourced analysis fared in comparison with the internal team, and therefore improve understanding of the potential of crowdsourcing.

The website of the project currently provides imagery for two different locations. The first is the Punggye-ri nuclear test facility in North Korea, with images from 2006, 2009, 2013 and 2016. The second collection of images covers six different sites in Myanmar. These facilities are located on a mountain ridge in the Magway Region, and are suspected of hosting chemical weapons production or storage facilities.

As in any case of crowdsourcing, the success of this initiative lies in the hands of the crowd, and the result of this pilot project will demonstrate whether or not this methodology is useful for crowdsourced monitoring of non-proliferation.

### **Monitoring Illegal Fishing with the Port State Measures Agreement**

*Simeon Dukic*

Fisheries form the economic base for many regions in the world. The Food and Agriculture Organization of the United Nations (FAO) estimates the total global aquatic production in 2015 to be 195m tonnes worldwide, with about half coming from fishery and the other from aquaculture.

It is hard to assess how much of this industry is illegal, unreported or unregulated (IUU). A 2003 FAO study estimated

that the total value of IUU fishing worldwide was between US\$10bn and US\$23bn per year, representing between 11m and 26m tonnes of fish out of that year's global production of approximately 140m tonnes. This is a staggering amount, especially considering the present stress on the world's oceans. In 2008, the FAO reported that only 15 per cent of the world's fish stock was 'underexploited or moderately exploited', whereas the proportion of 'overexploited, depleted or recovering stocks' comprised 32 per cent. IUU fishing is detrimental for the optimum management of fish stock, inhibits the preservation of marine endangered species, and undermines the activities of legal fishermen.

In 2009, the FAO adopted the 'Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing' (the PSM). It entered into force on 5 June 2016, after its 25th ratification.

#### *Locking them out*

The PSM enables port states to play a more active role in preventing IUU fishing. It gives these states the right to deny access and associated services to any vessel suspected of being involved in such fishing. The port can take measures either upon a ship's entry or after it has submitted itself to an inspection.

Article 8 obliges member states to request information detailed in the PSM's Annex A from each vessel wanting to enter a port. Apart from basic information about the ship itself, the vessel is required to declare the total catch on board, as well as the catch to be offloaded. This includes information on the species and its form, the catch area, and the quantity of the load. Based on this information, and if IUU fishing is suspected, the country can approve or deny entry into its ports. Moreover, article 11 grants a port state the right to deny the use of its port upon entry for any vessel that is found not to have an authorisation to fish, or if it does not receive a confirmation from the flag state that the ship has followed applicable regulations when catching its load. It could also deny access based on a 'reasonable suspicion' of illegal, unreported or unregulated fishing.

#### *Trust but verify*

Furthermore, when a ship enters a port, the state has a right to inspect it. Inspectors have the right to examine all relevant areas of the vessel, including the catch, fishing equipment, and related documents. If the ship fails the inspection, the port state can deny usage of the harbour and inform the flag state and other concerned entities of the result.

Specific inspection activities include:

- a. Verification that the vessel identification documentation on board and information relating to the owner of the ship is accurate, complete and correct;
- b. Verification that the ship's flag and markings are consistent with the information contained in its documentation;
- c. Verification that the authorizations for fishing and fishing-related activities are accurate, complete, correct and consistent with the information provided;
- d. Review of other relevant documentation and records held on board, which may include logbooks, catch, transshipment and trade documents, crew lists, stowage plans and drawings, descriptions of fish holds, and other records; and
- e. An examination of fishing gear to verify that it is in conformity with the conditions of the authorizations, as well as applicable regulations.

The PSM provides a uniform reporting template onto which the results of each inspection should be recorded. Additionally, Article 16 provides that each state should cooperate to establish an information-sharing mechanism to facilitate the exchange of information with existing databases relevant to the purpose of the Agreement. The arrangement should improve coordination between the State Parties in tracking down illegal fisherman and denying them access to their ports.

#### *A net not without loopholes*

The agreement is undeniably significant, and the powers of monitoring and inspection are a welcome addition. However, the PSM as it stands now has weaknesses. First, without universal ratification and compliance vessels undergoing IUU

fishing will use ports with the lowest regulations (also known as ports of convenience). By using such ports, ships can avoid inspections and elude the Port State Measures regime. There is, therefore, a clear and present need to promote the universality of the treaty.

Second, the PSM gives flag states the responsibility to sanction vessels engaged in IUU fishing. Nevertheless, many ships are registered in countries that have no maritime legislation or are unable to enforce national laws (also known as a flag of convenience). One would, therefore, expect a continued incentive for unscrupulous fishermen to register their vessels in those countries.

Despite this, the entry into force of the Port State Measures Agreement is a notable step in the right direction for counter-ing IUU fishing, and should be welcomed. If its adoption is widespread, illegal fishermen will have fewer ports where they can offload their products. Furthermore, the creation of an online database will make it easier for states to identify vessels that carry out IUU fishing, and harmonised inspections (conducted by trained inspectors) will improve the effectiveness of the regime by fostering cooperation and coordination between port states.

As of 5 June 2016, the following states were members of the PSM: Australia, Barbados, Chile, Costa Rica, Cuba, Dominica, the European Union (as a member organisation), Gabon, Guinea, Guyana, Iceland, Mauritius, Mozambique, Myanmar, New Zealand, Norway, Oman, Palau, Republic of Korea, Saint Kitts and Nevis, Seychelles, Somalia, South Africa, Sri Lanka, Sudan, Thailand, Tonga, the United States of America, Uruguay, and Vanuatu.



### The future of UN Security Council Resolution 1540 (2004)

*Scott Spence*

Open Consultations, by the Security Council Committee established pursuant to UN Security Council resolution 1540 (also known as the 1540 Committee), took place during 20 to 22 June at the United Nations in New York. The consultations were established by operative paragraph 3 of resolution 1977 (adopted by the Security Council in 2011), and they aimed to comprehensively review the status of implementation of the resolution since the last review in 2009. Resolution 1977 also stated that the 1540 Committee should intensify its efforts to promote the full implementation by all states of resolution 1540 and extended the Committee's mandate through April 2021.

#### *The budget of the 1540 Committee*

In an era of limited funding and greater accountability, the 1540 Committee's budget is a good starting point for reviewing the effectiveness of the Committee, with the modest aim of recommending ways to maximise their financial and human resources through the end of their current mandate in 2021. In 2016, the 1540 Committee's estimated budget is US\$3,143,100. The budget includes salaries and general staff costs for substantive and administrative support to the Committee (\$802,600), as well as fees for nine experts (\$1,724,900) and official travel (\$151,000). The budget also includes official travel of the Committee members and their staff (\$203,200); and other requirements totalling \$261,400, such as the rental of premises, communications and information technology, and equipment and maintenance. The 2016-2017 appropriation is in line with expenditure during 2014-2015, which came in at \$6,372,600. Moreover, the Committee can tap a 'Trust Fund for Global and Regional Disarmament Activities' amounting to approximately \$2 million, of which \$1.3 million will be used in 2016.

#### *The Committee's Work since 2009*

With its available financial and human resources, the 1540 Committee has carried out an ambitious programme of work

between 2009 and 2016. The Group of Experts grew to eight in 2011 after the adoption of resolution 1977, and then to nine in 2012 following the adoption of resolution 2055. Committee members and experts participated in 42 1540-related events in 2010, 54 in 2011, 47 in 2012, 88 in 2013, 83 in 2014, 64 in 2015 and 25 so far in 2016. The Committee, with the assistance of the Group of Experts, approved 183 1540 Committee Matrices by December 2015 and an additional seven by April 2016. Moreover, in addition to the 336 reports on national implementation received by the Committee through 2009 (a number of them follow-up reports), the Committee received an additional 7 reports in 2010, 11 in 2011, 8 in 2012, 28 in 2013, 26 in 2014, 11 in 2015 and two so far in 2016.

Since 2010, 18 states have sent requests for assistance to the 1540 Committee, as have two regional organisations (the Caribbean Community Secretariat and Central American Integration System). Twenty-three states have also submitted National Implementation Action Plans (NIAPs) to the Committee (Canada submitted two in 2010 and 2016). Eleven states – Armenia, Colombia, Ghana, Grenada, Kyrgyzstan, Malawi, Mexico, Montenegro, Niger, Serbia and Togo – submitted requests for assistance and NIAPs to the Committee, suggesting that they are politically committed to implementing the resolution but recognise that international assistance would be useful to fulfil their obligations. Also, 1540 Committee members and experts have visited 14 countries, at their request, since 2012. A request for assistance from Zambia, and requests for assistance as well as NIAPs from Grenada, Malawi and Niger, was submitted to the 1540 Committee after the official Committee visits. This suggests that these states were committed politically to implementation of the resolution before the visits and were motivated to take steps towards technical implementation thereafter.

#### *Financing the 1540 Committee*

It is fair to ask how the 1540 Committee, with its substantial financial and human resources, will carry out its activities through 2021 in a way that achieves full (or nearly so) implementation of the resolution by all states. The outreach activities undertaken by the Committee members and experts,

averaging 63 per year between 2010 and 2015, are important in that they keep attention focused on the varying aspects of the implementation of the resolution.

However, during this same period, there were significantly fewer 1540 Committee visits to countries (3.5 per year between 2012 and 2015), requests for assistance (3 per year between 2010 and 2015), or NIAP submissions (3.3 per year between 2010 and 2015). The Committee's official visits to countries are arguably useful: four out of fourteen of them appear to have led to four requests for assistance and three NIAPs, which may boost national implementation of the resolution in those countries. Given these findings, the 1540 Committee should consider the following recommendations with the objective of states achieving full implementation of resolution 1540 by 2021.

Firstly, the Committee should quickly shift its focus and expert capacity from a high number of annual outreach activities to a dramatic increase in the number of official visits to states (at their invitation of course), as called for in operative paragraph 11 of resolution 1977. Secondly, the 1540 Committee and experts should tie these visits to two outcomes by each state: the preparation of a NIAP (under operative paragraph 8 of resolution 1977) and an assistance request (under operative paragraph 13 of resolution 1977), with the objective of significantly increasing the number of both that are submitted to the Committee each year between 2016 and 2021.

The NIAPs are an effective way of identifying what must be done to implement the resolution, which ministries or agencies should take the lead on each item, and which implementation assistance providers can assist them to meet the identified needs. Once a State has completed an NIAP, the Committee should make every effort to encourage the government to generate a request for assistance, derived from the NIAP, and then actively match their requests for assistance with assistance providers. Currently, the 1540 Committee acknowledges offers of assistance from UN Member states; international, regional and sub-regional organisations; and other arrangements (e.g., the Zangger Committee, Nuclear Suppliers Group and MTCR). However, there is no official recognition of the role civil society can play as willing partners

in the implementation of the resolution, which may hamper full implementation by all states by 2021. For example, VERTIC assisted Malawi in 2013 to develop legislation to implement the Biological Weapons Convention, but has yet to receive notification from the 1540 Committee regarding Malawi's later and directly-related request for assistance.

The ultimate objective of resolution 1540 is more urgent than ever. Preventing non-state actors from engaging in any activities involving nuclear, biological or chemical weapons, and keeping related materials and technologies out of their reach, should be a high priority. Now is the time for a change in direction for the 1540 Committee's activities. This means moving the focus away from outreach activities (as there is now greater awareness globally about the importance of the resolution), to many more official visits to states by the 1540 Committee. These should be followed by a far more significant number of NIAPs and assistance requests submitted to the Committee. These must in turn be matched and met with offers of support from willing and capable assistance providers, including civil society organisations.

### **Entry into force of the CPPNM**

*Simeon Dukic*

The physical protection of nuclear material and facilities is an essential part of broader efforts to prevent the spread of nuclear weapons. The Convention on the Physical Protection of Nuclear Material (CPPNM), which was adopted in October 1979, lies at the centre of the physical protection regime. As of September 2015, this Convention had entered into force in 153 states, applying security standards to nuclear material used for peaceful purposes while in international nuclear transport. While it sets loose security standards, it leaves much of the implementation to member states' discretion. Parties to the treaty adopted an amendment in 2005 that (most significantly) bound members to protect nuclear facilities and material in peaceful domestic use, storage and transport. The amendment entered into force on 9 May 2016.

*What does the amended convention do?*

The most significant changes were introduced in Article 2A, which requires the establishment of a physical protection

regime applying to domestic nuclear facilities, nuclear material during domestic use, storage and transport (including international transfer). States are obliged to implement rapid and comprehensive measures for locating and recovering stolen material, and minimise the radiological consequences of nuclear material and/or facility sabotage. The article also calls for the designation of a competent authority that will implement a legislative and regulatory framework to govern physical protection. In fulfilling these obligations states are required to follow twelve 'Fundamental Principles of Physical Protection of Nuclear Material and Nuclear Facilities'. These principles cover a range of issues, including how to implement legislation, create a security culture, establish a graded approach to protection based on threat levels, and protect confidentiality.

The unamended CPPNM compelled members to provide assistance and cooperation to any state that has been affected by any unlawful taking of nuclear material. Its amendment further binds the states to share information and knowledge of an upcoming event that threatens the security of nuclear material and facilities of another state. Parties are also required to inform others if they are likely to be radiologically affected by an act of sabotage of nuclear material or facilities. The amended article places a firm focus on international information-sharing and cooperation, which adds another layer of protection and security.

The unamended CPPNM also provided a list of acts that should be made punishable under national law. Its amendment expands the list of offences to include the movement of nuclear material into or out of a state without authority, and acts of sabotage directed against the operation of a nuclear facility. Additionally, the amendment requires the criminalisation of the organisation and contribution to any such offence under defined circumstances.

#### *A reason to celebrate*

The amended CPPNM will improve the security of nuclear materials and facilities. Yukiya Amano, Director General of the International Atomic Energy Agency (IAEA) marked its entry-into-force by arguing that the 'implementation of the amended Convention will help to ensure that nuclear mate-

rial throughout the world is properly protected against malicious acts by terrorists.' The work now begins to boost the number of ratifications to the amendment, as well as incorporating its provisions into national laws.

### **Russia's chemical proposal**

*Simeon Dukic*

On 1 March 2016, Russian Foreign Minister Sergey Lavrov proposed the adoption of a new convention on the suppression of acts of chemical terrorism (see Trust & Verify no. 152). Later that month, the Russian Federation wrote a letter to the Secretary-General of the Conference on Disarmament (CD) outlining some further reasons as to why a new convention is required. About a fortnight later, on 28 March, it submitted the text of the elements of the proposed treaty itself.

#### *The main points of the proposal...*

The suggested treaty contains 23 articles and focuses on prosecution, international cooperation, jurisdictions, and extradition. The principal obligation, contained in the second article, lays down acts that constitute criminal offences under the convention. It proposes a wide-ranging duty to criminalise the 'unlawful' use of chemical weapons, if the purpose of the act 'is to intimidate a population, or to compel a government or an international organization to do or to abstain from doing any act.' The Russian Federation borrowed this formulation - in the absence of an internationally agreed definition of terrorism - from the 1999 International Convention for the Suppression of the Financing of Terrorism and UN Security Council Resolution 1566 (2004).

Articles 5 and 6 would commit parties to 'adopt such measures as may be necessary', to establish proscribed acts 'as criminal offences under its national law', and to make them punishable by 'appropriate penalties'. The proposed language would also remove criminal defences based on 'political, philosophical, ideological, racial, ethnic, religious or other similar nature'. This notion is repeated in Article 17 of the proposed convention when (borrowing language from the 1977 European Convention on the Suppression of Terrorism) it suggests that crimes under the Convention should not be considered

a 'political offence or as an offence connected with a political offence or as an offence inspired by political motives.'

Articles 7 and 8 establish international cooperation and coordination, as well as jurisdiction. Here, the proposal focuses on extraterritorial jurisdiction for these crimes, which is in line with other conventions and instruments attempting to combat terrorism.

The proposed articles 9-12 set out a clear obligation for the state to conclude criminal investigations, and then extradite or prosecute the individual. The purpose behind this proposal, as in similar conventions, is to deny alleged perpetrators a 'safe haven' in which they can avoid prosecution. Article 13 proposes an obligation for states to afford the 'greatest measure of assistance' in criminal investigations, 'including assistance in obtaining evidence', again borrowing language from other instruments, such as the 1997 International Convention for the Suppression of Terrorist Bombings. The proposal also contains rules relating to the fair treatment of suspects, the handling of evidence and testimony and the destruction of chemical weapons seized in any investigation.

*... however, will it fly?*

Much controversy surrounds the Russian Federation's choice of negotiating venue. The Federation maintains that the Conference on Disarmament is the most suitable forum. Traditionally, however, these conventions have been handled by the Sixth Committee (Legal) of the United Nations General Assembly. In fact, the Sixth Committee was principally involved in the establishment of the 1997 International Convention for the Suppression of Terrorist Bombings; the 1999 International Convention for the Suppression of the Financing of Terrorism; as well as the 2005 International Convention for the Suppression of Acts of Nuclear Terrorism. The committee is also trying to work on a Comprehensive Convention on International Terrorism (see UN General Assembly Resolution 51/210). This effort is presently bogged down, however, over a disagreement over the definition of terrorism.

Russia argues that the CD is the best choice of venue as chemical terrorism is at an intersection of disarmament, non-proliferation and anti-terrorist efforts. Furthermore, by agree-

ing on such a convention, it argues, the Conference will break the deadlock it has suffered ever since the Comprehensive Test Ban Treaty was negotiated in 1996. A European foreign ministry official has expressed scepticism over this suggestion, noting that the Sixth Committee usually is tasked with proposals of this kind. The official did, however, suggest that some European countries could be willing to discuss the Russian proposal under certain circumstances, for instance, if the matter was moved to New York.

The need for such a convention is still unclear and has attracted criticism in the non-governmental community. In a June 2016 article in the Bulletin of Atomic Scientists, Oliver Meier and Ralf Trapp, both notable experts in the field, asks whether the proposal is a 'red herring or useful tool?' Their question is rhetorical. In their piece, they note that Russia's proposal might in fact 'run the risk of increasing fragmentation, resulting in legal uncertainties and incoherence.' They instead propose a 'more productive approach', namely to 'address the issue of chemical and biological terrorism through strengthening of the existing regimes.' They also call for 'increasing the efforts to enforce their prohibitions and norms at the national level, and enhancing international collaborations and coordination within and between the institutional settings of the two treaties.'

While this may well be true, others are likely to argue that the Russian proposal merely complements international law in a similar way to the 2005 International Convention for the Suppression of Acts of Nuclear Terrorism supplemented several instruments governing the production and use of fissionable material. The last word on this matter is yet to be written.



## Detecting Nuclear Materials through FirstDefender RM

*Matteo Zerini*

The FirstDefender RM spectrometer (sold by Thermo Scientific) was designed for use by first responders, homeland security, military, law enforcement and forensic chemistry personnel. A recent paper in the *Journal of Radioanalytical and Nuclear Chemistry* examines its applicability to nuclear safeguards. The paper was written by staffers Berlizov, Ho, Nicholl, Fanghanel and Mayer from the International Atomic Energy Agency, the EU Joint Research Centre, and the DSO National Laboratories, Singapore

The FirstDefender is a hand-held Raman spectrometer, which uses a laser to observe the vibrational modes in different materials and chemical compounds. This method analyses the material of interest by measuring the light that is scattered by the sample to identify a chemical 'fingerprint'. The technique is versatile enough to allow investigation of solids, liquids, gases, and solutions, and analyses low-concentration impurities without the need of sample preparations or large amounts of the material.

FirstDefender RM weighs 800 grams, providing a lightweight, rugged, hand-held tool. It offers two different options for measurement: point-and-shoot and in-vial. In doing so, it provides useful non-contact and non-destructive analysis, keeping the sample intact for any additional study. The instrument does not require calibration, and fully automates the acquisition of sample information and the following analysis. It also uses a matching process that draws on a built-in and upgradable library. The FirstDefender RM relies on a near infrared diode laser and a charge-coupled device spectrometer. These lasers reduce the interference from fluorescence and provide compact size, long lifetime and low costs. However, the power might not be enough for certain applications, and the use of charge-coupled devices may degrade the Raman response due to the elevated noise, especially on the field.

The authors of the IAEA/JRC/DSO study interrogated more

than one hundred different uranium ore concentrates (also known as yellow cake). The results showed that the spectrometer was able to provide a sound identification of several samples, such as uranyl peroxide, sodium diuranate, ammonium diuranate, uranium trioxide and ammonium uranyl carbonate. However, the FirstDefender RM was incapable of analysing dark-coloured powders as well as some calcined yellow cake. Uranyl hydroxide was included in the study as well, but the instrument could not identify it (although previous studies and recorded Raman responses suggest that the problem is related to the matching algorithm).

Overall, the FirstDefender RM is a mature technology, and commercially available. Compared to other Raman spectrometers, its shorter spectral range and single frequency laser may prove limiting factors, along with its inability to identify certain compounds and persisting matching problems that require optimisation. However, this spectrometer can be quickly deployed in the field, which is important for nuclear safeguards applications, and can provide accurate measurements of certain other nuclear materials. Also, one of its benefits is that it can be operated with a minimum of training.

The research team concluded that the equipment represented a 'mature off-the-shelf technology with promising capabilities for identification of different nuclear fuel cycle signature materials relevant to safeguards'. They also noted that 'potential of the instrument for a quick and reasonably accurate quantitative determination of the uranium concentration in uranyl nitrate solutions, which also represent a useful additional capability during safeguards activities.

## Measuring greenhouse gas emissions from space with high resolution

*Simeon Dukic*

Human activity has been increasing the atmospheric concentration of greenhouse gases - namely carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) - since the Industrial Revolution. Efforts to control the emission of greenhouse gas depend on data

describing how much is being emitted, and from where. The CarbonSat concept – initially proposed to the European Space Agency (ESA) – may come to be a useful tool in the search for better information on greenhouse gas emissions.

The CarbonSat concept was developed by the University of Bremen, the Institute of Environmental Physics (IUP), and a group of greenhouse gas experts working on ESA's Earth Explorer 8 satellite. The concept envisioned placing a monitoring device on Earth Explorer 8, which would image small-scale emission of CO<sub>2</sub> and CH<sub>4</sub>. It would measure the amount of greenhouse gases in hotspots such as cities, industrial areas and landfills, and distinguish between natural and manmade sources.

The CarbonSat concept aimed to measure natural and anthropogenic sources of greenhouse gases, CO<sub>2</sub> and CH<sub>4</sub>, from a regional to sub-continental level. It was hoped that this instrument could help monitor the effectiveness of emission reduction schemes and implementation of effective regulation for monitoring and reducing greenhouse emissions in particular areas. However, the CarbonSat concept was never realised, losing out in an ESA competition to a project called FLEX, that maps vegetation fluorescence to quantify photogenic activity and plant stress.

#### *The technology behind CarbonSat*

Nevertheless, the results of the case study supporting the CarbonSat concept still highlights the potential of monitoring instruments of this kind. The study measured and analysed greenhouse data in and around Berlin - a city with a modest contribution to the global economy, of average size, and isolated from other main urban areas. In addition to retrieving city emissions, the paper developed a methodology for estimating retrieval errors, the special distribution of CO<sub>2</sub> fluxes, and atmospheric transport.

The study used data from three satellites: the (now defunct) SCIAMACHY imaging spectrometer; the Thermal And Near-infrared Sensor for Carbon Observation (or TANSO) instrument on Japan's Greenhouse Gases Observing Satellite; and the US Jet Propulsion Laboratory's Orbiting Carbon Observatory-2 (OCO-2).

The examination focused on measuring the local anthropogenic emissions relative to the background concentration (or 'XCO<sub>2</sub> enhancement'), using a 'cleanpixel' method to distinguish between local anthropogenic emissions from background and biospheric emissions. From the results of the study, the authors argue that XCO<sub>2</sub> enhancement from anthropogenic emissions over Berlin could be estimated with adequate accuracy from satellites in space.

The authors concluded that local anthropogenic XCO<sub>2</sub> enhancements over Berlin measured over a year were significant enough to be detected by the proposed CarbonSat instrument. Thus, by using appropriate inverse modelling on the recorded data, one could measure city emission trends or absolute emission fluxes.

#### *The future of CarbonSat*

Despite losing out to the FLEX project, the CarbonSat concept may eventually become a reality. In late 2015, the European Commission asked experts to analyse the need for an EU space CO<sub>2</sub> observation capacity to monitor and verify compliance with EU regulations and international agreements. The experts recommended a concept very similar to CarbonSat, so if all goes to plan, the CarbonSat concept may be realised through the EU Copernicus Sentinel program.

### **UN and private sector join to strengthen local capacity to monitor land-use**

*Larry MacFaul*

The survival and prosperity of human societies depend on the ability to identify and manage food and water supplies. The combination of sufficient global resources and adequate agricultural skills to exploit them has carried human societies into the industrial revolution and on into the modern world. However, a large and growing global population, a rapidly expanding consumer-driven and internationally-mobile middle class, and powerful industrial technologies mean that the modern world is suffers from rapid resource depletion and pollution.

Ensuring the continued availability of basic resources for all

will require resource managers and political decision-makers having access to sound information about their current status and future prognosis. This means having readily accessible data that is up-to-date and as detailed and comprehensive as possible. It will also require analysis and response planning, new technologies and approaches, and ultimately the will of a range of stakeholders to put sustainable plans into action.

In this context, the ability to monitor land-use change at a high level of detail and timeliness is now essential. Growing populations and industrial development can have a swift and significant impact on ecosystems that sustain food and water resources, and minimise climate change. Land-use monitoring technologies therefore need to be able to track and assess societal - and natural - drivers at a speed commensurate with this new pace of impact. Ideally, they should also enable an adequate preventative or mitigating response to be developed.

#### *Enter Google*

Against this backdrop, considerable efforts have been made to improve our understanding of how our environment works, and how our interactions affect it and us. A new international initiative launched by the UN Food & Agriculture Organisation (FAO) and Google is hoping to become a major contributor to these efforts. The two organisations are working together to make high-resolution satellite data a common tool for managing natural resources. The plan involves applying modern digital technology to such imagery in an accessible format. According to the FAO, this is 'revolutionizing the way countries can assess, monitor and plan the use of their natural resources, including monitoring deforestation and desertification'.

The tools that Google and FAO are launching should have significant advantages compared with the instruments and techniques used for the same monitoring purposes in the recent past. Over the last few decades, land-use surveillance relied on data that was comparatively limited in its geographic and temporal coverage, as well as its level of detail. Despite these limitations, the data still required considerable amounts of time and skill to process and analyse, and the results were not readily accessible. However, this situation is being turned around with new monitoring and data process-

ing technologies, combined with communications devices like smart phones and laptops. Such communications devices are already widespread across the developing world. Meanwhile, initiatives like that of FAO-Google are making large archives of images and fast data processing technologies widely available for free. In this particular case, the tool consists of Google's computing applications and information from an extensive archive of earth images, dating back to 1972, generated by the US-led Landsat satellite programme. Images are also drawn from the European Earth-monitoring system Copernicus, which can cover the same plot of land every five days. The FAO has then applied its country-level knowledge and forest sector experience to formulate software functions that generate useful data and results.

The level of information accessibility provided by FAO-Google means that it can be used by small-scale farmers as well as public and private organisations. Giulio Marchi, a forestry officer at the UN agency, said satellite images and products that used to take days to download and process can now be 'produced and visualised in a fraction of that time'. According to an FAO report from April, the project (launched at the end of 2015) has recently intensified its activities. The scope of the project involves building the capacity among national experts and FAO staff to map and classify information. FAO Director-General José Graziano da Silva says they are hoping to usher in an 'unprecedented level of environmental literacy'. The tools have been designed to make it easy 'even for people without prior remote-sensing experience to track land-use patterns and their changes over time'.

#### *A focus on wood ...*

The initiative is currently focused mainly on the forestry sector and national forest monitoring and inventory systems. This task typically involves identifying and recording main features of forest and other land-use in the country, including the extent and type of flora and its change over time. Useful conclusions can then be drawn on the sector regarding its health, future, and carbon content. Resource managers can use such analysis to assess the impact of manmade or natural drivers and to formulate appropriate management plans. The FAO says that the speed of analysis now possible can shorten national mapping and classification activities from weeks to

hours. The FAO also says that the level of detail in the images enables resource managers to ‘distinguish between temporary loss of tree cover due to harvesting and deforestation driven by land use change.’ They believe that the tool should significantly increase the ‘efficiency, quality, transparency, credibility, and above all the timeliness and efficacy of data collection and the validation of existing global mapping products.’

Nevertheless, as FAO points out, the job of establishing the truth on the ground, compared to data acquired from remote sensing platforms, will still be an important aspect of maintaining appropriate forest management systems, even with the current systems offered by Google. The FAO has assisted over 30 countries with their monitoring systems, carrying out full country assessments of Mongolia, Tunisia, Bhutan, and others. The tool can also be used to help countries monitor their adherence to UN-REDD initiatives (which stands for ‘reducing emissions from deforestation and degradation’, an essential mechanism of the UN climate change framework).

*... with hopes of expansion*

The initiative envisages tackling a range of other areas, such as agricultural crop productivity. It has already begun to play a role in monitoring drylands, and the FAO’s Locust Control Unit has also used Google’s Earth Engine to tackle locust outbreaks through improving the speed at which breeding areas are detected and ground responses formulated. Meanwhile, Google hopes that remote sensing capabilities and processing technologies will be used to monitor water resources.

The collaboration has clear benefits for resource management in the modern world. Data-rich applications with fast processing power are beginning to match the speed of change that societies are now capable of unleashing, wittingly or not. The enthusiastic accounts of progress so far suggest that the initiative is promising. Its long-term sustainability is, however, less clear. The collaboration has a timeline of three years. FAO researchers, in their presentations, have indicated that they hope they will have access to these tools into the long-term. It will likely be up to Google and FAOs management - and especially their funders - to assess the success of the initiative

and decide whether and how to continue it.


**Director's reflections**
*Andreas Persbo*

In 2012, the European Union (EU) received the Nobel Peace Prize for its 'successful struggle for peace, reconciliation and for democracy and human rights.' It is hard to think of any other organisation, save perhaps the United Nations, that has done more to international security than the union. The EU of today grew out of the 1952 European Coal and Steel Community (ECSC), which in turn was the brainchild of French foreign minister Robert Schumann.

Schumann's 1950 declaration begins with the sentence, 'world peace cannot be safeguarded without the making of creative efforts proportionate to the dangers which threaten it.' I, for one, repeat this sentence whenever I am giving an opportunity. Mr Schumann, today considered one of the founding fathers of the union, proposed a simple idea: by pooling the production of coal and steel, it would 'make it plain that any war between France and Germany becomes not merely unthinkable, but materially impossible.' The outcome was the ECSC. The 1957 European Atomic Energy Community (Euratom) followed half a decade later, proposing controls on fissionable material, alongside a verification regime that has stood the test of time.

Today, a war between central European states does indeed appear unthinkable, and the union should be credited for this. Therefore, the British vote to withdraw the United Kingdom from the European Union is, in some sense, not only a setback for those dreaming of closer political and social integration of the continent's peoples, but also a harsh blow to the arms control principles that underlies the unification of Europe.

In his famous Zurich speech, Winston Churchill, if there was any doubt about what he felt, said, 'we must build a kind of United States of Europe ...' He continued, 'the structure of the United States of Europe, if well and truly built, will be such as to make the material strength of a single state less important ...'

While uncomfortable, Mr Churchill's subsequent words may also offer some guidance to European countries going forward. He noted that 'if at first all the States of Europe are not willing or able to join the Union, we must nevertheless proceed to assemble and combine those who will and those who can.'

The European Union needs to reform, this much is clear. However, what it cannot afford to forget, in the challenging years ahead, is the very reasons for its formation. A continent of peace, built on arms control, integration, and the union of its peoples.

## National Implementation

*Scott Spence*

During 5-8 April, NIM Programme Director Scott Spence and Associate Legal Officer Giuseppe Di Luccia took part in two workshops co-organised with the Ministry of Foreign Affairs and Foreign Trade (MFAFT) of Jamaica. The aim of the first workshop was to draft instructions for revision of Jamaica's UN Security Council Resolutions Implementation Act to incorporate Financial Action Task Force Recommendation 7, while the second workshop focused on drafting instructions for implementation of the Biological and Chemical Weapons Conventions, related strategic trade measures and UN Security Council Resolution 1540.

During 10-12 May, Scott participated in the "International Law Enforcement Symposium: Impact of Chemical and Biological Agents on Food Defense" held at the INTERPOL General Secretariat in Lyon, France.

On 17-20 May, Andreas Persbo, VERTIC's Executive Director, participated in a training course arranged by the Swedish Radiation Safety Authority. The course was held in Moldova and was offered to state officials as well as journalists.

During 7-9 June, Scott participated in the Second Annual Regional Nonproliferation/CWMD Coordination Conference for Latin America and the Caribbean at the US Department of Defense's Southern Command in Miami. During 13-15 June, he participated in the International Security Forum held at the Geneva Centre for Security Policy.

During 20-22 June, Scott attended the Open Consultations by the Security Council Committee established under resolution 1540 on the comprehensive review of the status of implementation of the resolution. He also spoke at a side event, organised by the Global Emerging Pathogens Treatment (GET) Consortium, on initiatives to drive a biosecurity, biothreat reduction and infrastructure development agenda in the wake of the Ebola outbreak in West Africa.

During 27-28 June, Researcher Alberto Muti took part in the 2016 Workshop on Analysis of Trade Data and Related Open

Source Information for Non-Proliferation and Strategic Security, organised by Project Alpha and hosted in Vienna by the Vienna Center for Disarmament and Non-Proliferation.

Finally, on 27 June, Scott took part in an introductory workshop for new diplomats, hosted by the BWC Implementation Support Unit, Geneva Centre for Security Policy and International Law and Policy Institute.

## Verification and Monitoring

*Larry MacFaul*

During this quarter the Verification and Monitoring (VM) Programme has successfully established a cooperative relationship with the US International Nuclear Safeguards Engagement Program - part of the semi-autonomous National Nuclear Security Administration (NNSA). With funding from the UK Foreign and Commonwealth Office (FCO), VERTIC will provide legal and regulatory contributions to a series of workshops and technical assistance visits in West Africa and South East Asia.

Hugh Chalmers, Senior Researcher for the VM Programme, also contributed to the annual FCO Dialogue on Non-Proliferation. Alongside other NGO and government representatives, he discussed the upcoming Biological and Toxic Weapons Convention (BTWC) Review Conference, the future of the Conference on Disarmament, the use of chemical weapons in Syria, the 2016 Nuclear Security Summit, and the nuclear disarmament agenda.

Programme staff also delivered presentations at an event organised by the Vienna Centre for Disarmament and Non-proliferation in June.

## Grants and administration

*Katherine Tajer*

Last month, VERTIC welcomed two new interns: Matteo Zerini and Simeon Dukic. Matteo and Simeon are both Master's students in the War Studies Department of King's College London. Matteo previously interned at the "L. Sacco" University Hospital, working on European projects on biosafety and biosecurity. He also authors for the online Italian geopolitics journal "Il Caffè Geopolitico", writing on geostrategy and Russia and Eastern Europe. Simeon recently received his BA from Leiden University College in The Hague, where he interned Defence Team of former Bosnian Serb President Radovan Karadzic before the International Criminal Tribunal for the Former Yugoslavia. We thank them for their contributions to this publication and look forward to working with them throughout the summer.

VERTIC has received two grants from the Foreign & Commonwealth Office's Tactical Fund. These projects will be carried out by the Verification and Monitoring Programme and begin in July. Both projects focus on the implementation of IAEA safeguards. VERTIC's National Implementation Programme has also agreed on a project with the FCO's Strategic Programme Fund, to continue their work on BWC and CWC legislation. We remain grateful for the FCO's continued support of our activities.

building trust through verification

VERTIC is an independent, not-for-profit, nongovernmental organisation. Our mission is to support the development, implementation and effectiveness of international agreements and related regional and national initiatives, with particular attention to issues of monitoring, review, legislation and verification. We conduct research, analysis and provide expert advice and information to governments and other stakeholders. We also provide support for capacity building, training, legislative assistance and cooperation.

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Registered company no. 3616935  
Registered charity no. 1073051

#### EDITION 153

Editing and production by Andreas Persbo.

#### ORIGINAL DESIGN

Richard Jones

#### SUBSCRIPTION

Trust & Verify is a free publication. To subscribe, please enter your e-mail address in the subscription request box on the VERTIC website. Subscriptions can also be requested by contacting Katherine Tajer at [katherine.tajer@vertic.org](mailto:katherine.tajer@vertic.org)

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