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# MSIAC – Supporting the Munitions Safety Community

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**Abstract.** The NATO Munitions Safety Information Analysis Center (MSIAC) is a multinational collaboration that collects, stores, and analyses technical information related to Munitions Safety (MS) and Insensitive Munitions (IM). This paper and presentation will provide an overview of MSIAC's recent achievements in advancing munition safety efforts on behalf of its member nations. MSIAC supports its member nations through a variety of products and services. Poland is anticipated to become a member nation near the end of 2016. In addition to a core responsibility of addressing technical questions related to Munitions Safety posed by nations, MSIAC has a diverse programme of work aimed at developing and sharing the related underpinning scientific knowledge. This is then applied to support policy implementation and development related to munition safety. Some examples of current activities are given in this paper as well as future activities.

**Keywords:** munition, safety, risk, NATO

This work has been compiled from the paper presented during the 11th International Armament Conference on Scientific Aspects of Armament and Safety Technology, Ryn, Poland, 19 to 22 September 2016.

## 1. BACKGROUND

Munitions Safety Information Analysis Center (MSIAC) is a Member Nations' funded and directed NATO project office, which was established in 1991 (as NIMIC). Poland has submitted a request and is currently being approved to be a Member Nation.

Its goal is to help nations reduce, and eliminate, the risk to personnel and materiel from explosive incidents associated with our own munitions.

The overarching goal agreed by MSIAC member nations is to: *Eliminate Hazardous Consequences due to Unintended Reactions of Munitions and Energetic Materials throughout their Lifecycle.*

To help its member nations realize this goal, the project gathers, stores, exchanges, and analyses information and technology related to munition safety and insensitive munitions. Over the years MSIAC has played a central role in facilitating member nation's efforts to design, develop, procure, and use safer munitions. The MSIAC Project is directed and administered by the Project Manager (PM) and Steering Committee (SC) who are responsible for the implementation of the MSIAC MOU and the effective and efficient management and direction of MSIAC. The SC consists of one Member from each of the 13 participating Nations[1].

Fig. 1. MSIAC will move into the new impressive NATO Headquarters building early 2017

[1] Current members include: Australia, Belgium, Canada, Finland, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, United Kingdom, United States.

MSIAC is located at NATO Headquarters in Brussels Belgium. The team consists of the project manager, support staff and 6 technical specialist officers (TSOs). Key to the successful operation of the project are the knowledge and experience of the TSOs and the extensive MSIAC database[2].

The TSOs are recruited from MSIAC Member Nations[3] and each has a focused area of expertise, details of which are summarised below:

- ***Energetic Materials*** – Dr Matthew Andrews (UK)
  - *Interest areas:* Synthesis; formulation, production techniques, testing and qualification, chemical and physical properties, and reaction mechanisms.
- ***Munitions Safety, Transport and Storage*** – Mr Martijn van der Voort (NL)
  - *Interest areas:* Safety principles, regulations, testing, hazard classification, storage facilities, packaging features, risk analysis, and training.
- ***Munitions Systems*** – Mr Martin Pope (UK)
  - *Interest areas:* Weapon system integration, threat and hazards analysis including: natural, induced and extreme environments. Demilitarization and disposal, weapon platform vulnerability, and safety testing and evaluation.
- ***Propulsion Technology*** – Mr Emmanuel Schultz (FR)
  - *Interest areas:* Design, manufacture, safety testing and evaluation, ignition/initiation systems, and operation and performance. Surveillance and munitions health monitoring.
- ***Warhead Technology*** – Dr Ernest L. Baker (US)
  - *Interest areas*: Design, manufacture, safety testing and evaluation of warhead systems, fuzing systems, operation (detonics), accidental initiation and reaction mechanisms.
- ***Munitions Materials Technology*** – Mr Wade Babcock

  This a new post which was developed to provide additional expertise with a focus on understanding the effects of ageing on materials and safety. Focus areas include:
  - importance of material properties (energetic and inert) on munition safety and the effects of ageing over the lifecycle;
  - techniques and tools to aid the investigation of materials, products, or component failure;

[2] MSIAC Document Management System
*17,000 Docs Directly Accessible via Secure Web Environment*
*https://www.msiac.nato.int/Weblink/ 120,000 Docs (2.9M pages) Accessible by MSIAC staff on your behalf*

[3] There is an additional caveat in that employment in NATO is limited to nationals from NATO nations.

- ageing models for predicting material life and changes in properties;
- safety design principles and margin of safety;
- wider application of material modelling to munitions.

The expertise required by the project has changed over the years with interest areas being determined in consultation with the nations and guided by the strategic plan and work plan. TSOs are on definite duration contracts and can expect to spend up to 6 years at MSIAC. The post on warhead technology is the most recent change of personnel with Dr Baker filling the position as of 1 June 2016. Dr Baker has strong technical background in the warheads area with over 30 years of service for the U.S. Army. Dr Baker retired from the U.S. Army Armament Research, Development and Engineering Center in May 2016, where he was the U.S. Army Senior Research Scientist for Insensitive Munitions.

## 2. PRODUCTS AND SERVICES

The products and services developed by MSIAC are organised under 4 areas of activity defined in the MSIAC strategic plan, which are listed below. Knowledge development and policy support deliver the products and services that our customers are most familiar with. MSIAC is also active in requesting feedback on nations needs to ensure that requirements are reviewed and kept current.

- **Requirements**. Capture and analyse MSIAC Member Nations' and relevant stakeholders' munitions safety requirements.
- **Knowledge**. Develop, synthesize, and maintain knowledge and understanding to enhance Munitions Safety.
- **Policy**. Define, harmonize, improve, and promote policies for munitions safety.
- **Delivery**. Promote munitions safety and execute MSIAC's mission.

The products and services are offered at no additional cost[4] to MSIAC member nations and are delivered in a variety of forms and typically cover:

- Responses to technical questions.
- Lectures and training courses.
- Technical articles and reports.
- Workshops and technical meetings.
- Software tool development and maintenance.
- Database development and maintenance.
- Evaluation/assessment of national documents for the MSIAC Technical Library.

[4] Nations pay a yearly contribution to MSIAC which entitles access to products and services.

Much of the output of MSIAC is available through the secure web environment, which is accessible once credentials have been agreed by MSIAC national focal point officers. More information is available on the MSIAC open website at: https://www.msiac.nato.int/, which includes an electronic application form.

MSIAC also supports requests for technical assistance from NATO AC/326, on matters of common interest with Member Nations, which is a subject to approval by the MSIAC SC. As all MSIAC Member Nations are very active participants in AC/326, this support is important in furthering the Member Nations priorities in the AC/326 program of work.

The following section provides an overview of some of the current and future areas of work which MSIAC is involved in. Current challenges facing the munitions community are used to place support provided in context.

## 3. OVERVIEW OF MSIAC ACTIVITIES LINKED TO MUNITION CHALLENGES

### A. Insensitive Munitions

Insensitive Munitions continues to be a priority area for investment, particularly for those nations actively involved in developing munitions. Benefits include reduced probability and consequences of accidents and incidents, including in conflict, involving our own munitions. Significant developments have been made and there are now many examples of Insensitive Munitions (or those with significantly reduced vulnerability) in service. However, challenges remain towards complete compliance e.g. high performance rocket propellant, min smoke propellant, high performance explosives, explosives fillings for large diameter munitions that pass sympathetic reaction.

MSIAC maintains a technology watch on energetic materials and systems and regularly updates a number of databases that are available online:

- AIMs – Advanced IM Search Web-based platform for quick and easy search of IM Test Results.
- EMC – Database providing information on explosives, propellants and pyrotechnics.
- Technical reports on emerging energetic materials and systems; e.g. an Energetic Ionic Liquids review will be published shortly.
- MSIAC's IM state-of-the-art (SOA) provides a review of munition systems with reported significantly improved IM performance.

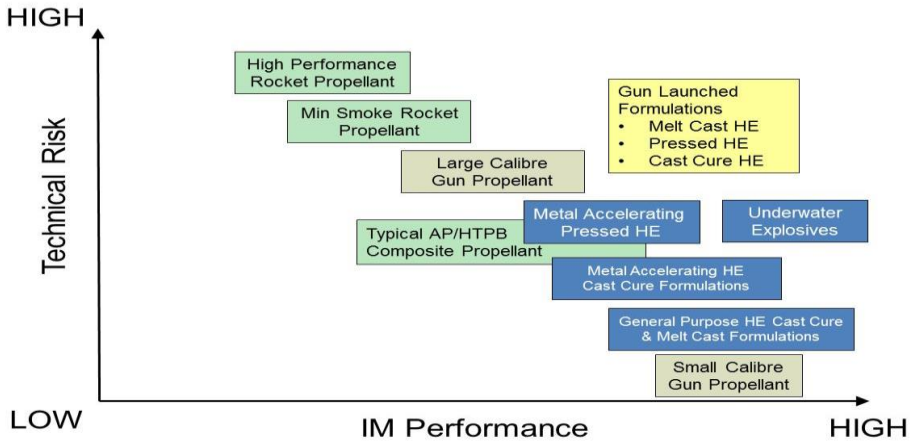


Fig. 2. Taken from IM SOA

Many nations have an IM policy and international policy also exists which is regularly reviewed. Recent efforts have been directed towards improved understanding of munition response to the threats and the tests conducted to assess IM performance. As a consequence, MSIAC is active in supporting the review of:

- Structure of STANAG 4439, AOP-39 and test STANAGs (supported meeting April 20-21 2015).
- Fragment Impact STANAG 4496: A questionnaire was used to gather input for a report detailing issues, conclusions, and recommendations (O-156).
- STANAG 4526 Shaped Charge Jet Custodians Working Group (CWG)
- STANAG 4240 Fuel Fire CWG: A joint paper between the custodian and MSIAC will be presented at this IMEMTS.
- The AOP-39 review of Response Descriptors. MSIAC supported the technical meeting in February 2015 in USA, with a further meeting scheduled for September. The MSIAC technical paper (O-153) was presented and additional support has been requested to further this effort.

MSIAC held a workshop in April 2016 on the Science of Cook-off. The goal was to improve MSIAC nations understanding of cook-off. The focus areas have to be agreed upon by experts in the community over the coming months.

However, initial discussion indicates that key outputs would be: improved understanding on the role of heating rate (conditions) in determining reaction violence, and improved and updated methodologies to predict response.

Maintaining momentum for IM development and procurement against a background of shrinking investment is a challenge for many nations. MSIAC continues to promote IM and munitions safety (MS) via training and through products and services, e.g. lessons learnt from accidents, and cost benefit analysis.

**B. Ageing and lifeing of munitions**

This is a challenging area for many nations requiring specific technical expertise and T&E capability. The need to understand ageing and useable life is driven by the need to demonstrate continued safety and suitability over the munition lifecycle. It is also needed to inform decisions on operational life and limitations. Introduction of more complex and expensive munitions has driven the need to maintain availability by extending the life, ensuring maximum return on investment.

The developing nation and design authority are normally best placed to make the required assessments but sharing the data and assessment with other nations remains an issue (for commercial, IPR and applicability reasons).

Environmental health monitoring has been recently highlighted as a tool to enable more accurate prediction of remaining life. A NATO STO programme, AVT-212, has done much to promote the visibility and encourage uptake and use of such technology by the community. MSIAC is active in this group and has contributed to the discussions and helped organise a STO cooperative demonstration of technology on Integrated Munition Health Management held at NATO HQ on the 15-16th October 2014. This was very successful in showcasing technologies to decision makers and end users.

MSIAC has also surveyed nations regarding their experiences using sensors and communications technology for Health Monitoring. So far responses have been received from organisations in 9 nations. MSIAC used this information to prepare a MSIAC limited only available to MSIAC Member Nations was published in 2016[5].

In addition, a new work element was agreed for 2015 and forward to review information available on ageing. MSIAC will collate and review the large body of knowledge on the effect of ageing on munition response to IM threats. This will then be exploited for wider munitions safety ageing issues.

Deliverables will be prepared to detail the state-of-the-art (SOA) with respect to understanding the tools and techniques that can be applied, and key properties to be studied in order to evaluate and monitor changes to materials through life. Evaluation against the known failure modes of materials will be made to put in place tools to help improve the approach to life assessment.

[5] E. Schultz, "Munition Health Monitoring – Feeback from the Use of Environmental Data Loggers", MSIAC report L-193, January 2016.

Significant safety and financial benefits are possible by implementing an appropriate ageing and surveillance programme over the life of a munition. Numerous accidents could have been prevented if such programmes had been in place to identify unstable or degraded energetic materials which have reached the end of their service life.

MSIAC provided an analysis of one such accident that occurred in Cyprus in 2011, which serves as a powerful reminder of the importance of munitions safety and appropriate management. A report and posters are available for download from the MSIAC secure website and can be used by nations to promote munition safety.

Fig. 3. MSIAC Review of the 2011 accident in Cyprus: 13 fatalities, 62 injuries and an estimated 4 billion Euros damage (report O-150 now at rev 1 includes preventative measures)

Another related product is a database of accidents which MSIAC maintains on behalf of AC326 SG/C. Currently, contributing nations provide a disparate contribution which makes searching or trend analysis between nations difficult. MSIAC is developing a common database MADx, MSIAC Accident Database exchange, as a web application. A first prototype is currently being tested. A final distributed version will be operational in the near future.

A key enabler is common accident reporting and MSIAC is keen to encourage contributors to provide similar fields of information (following AASTP-1 and AASTP-5 guidelines on accident reporting).

## C. Harmonisation of Testing and Assessment

Test and Evaluation (T&E) requirements, as part of development and qualification of a munition, imposes substantial financial and time pressures on munition programmes. As a consequence, there is continuing pressure to optimise and ensure that test programmes have the widest applicability, nationally and internationally (particularly for joint programmes). Significant progress has been made in recent years to standardise approaches to testing with NATO standards being used, but differences still exist.

Hence, for a munition purchased off-the-shelf the required data may not always be available. Duplication of testing does still sometimes occur when there is a lack of understanding or confidence in how a test has been conducted. Also, munitions are used in different ways and subjected to different environments by the different forces or services, which can necessitate differences in T&E programmes.

Harmonised explosive safety testing helps promote understanding, assessment and interoperability; it provides the necessary assurances that you are not being hazarded in multinational operations by other nations. It also facilitates a smart Defence approach; it is an enabler for joint international development of munitions.

A number of tools have been developed by MSIAC over the years, to help nations address some of the obstacles to harmonisation, which includes:

- Databases help MSIAC member nations grasp the extent and applicability of the international, national and civil standards e.g.:
  - Munitions Safety and Standardisation database (MSAS) enable instant access to the latest munitions national and international standards.
  - Safety Assessment Software tool (SASO) an intelligent tool to help the safety assessor identify relevant munition safety requirements and standards using a simple process.
- The MSIAC Audit Procedure of IM Testing Organization Competences and Capabilities (L-150). The purpose of the MSIAC self-audit procedure is to help establish and promote test methods leading to mutual acceptance of: test results, reports and IM signatures. It also serves to recognize organizations that have demonstrated competence in testing which meets the NATO standards.
- A catalogue of environmental testing facilities has been initiated and will identify international capabilities and facilities used to conduct safety testing.

Another major task was a recently conducted review of the safety policy and practices used by MSIAC member nations to assess the safety of munitions over their lifecycle. Phase one of this programme of work compared national policy and processes and is captured in an initial report, with a final report due for release shortly.

The combined outputs will benefit nations in determining best practice, gaining confidence in other nations processes, and highlighting alternate approaches as a benchmark for comparison.

In a recent development, there has been some NATO discussion on further harmonising hazard classification (HC) and (IM) testing and assignment procedures. Mr Brent Knoblett from US DDESB presented a paper to NATO AC326 SGs B and C, to develop some discussion.

The idea being "socialized" is to take the opportunity, whilst reviewing the structure of IM and HC policy documents STANAG 4439 AOP39 and STANAG 4123 AASTP3, respectively, as well as the associated test STANAGs, to develop combined guidance for both the IM and HC communities. A single standard reference document is proposed for NATO, which would help to ensure that system level tests meet the requirements of both communities, and from the outcomes of those tests IM signatures and HC assignments would be derived. To then further harmonise IM and HC testing beyond NATO, Mr Knoblett proposed that UN TS7, currently only utilized for hazard division 1.6 extremely insensitive articles (rarely used), could be evolved to provide the means to hazard classify, mainly but not exclusively, military munitions to assign hazard divisions 1.1, 1.2, 1.3, 1.4, and 1.6. There could be some significant benefits if such a goal was to be achieved:

- It will address some of the issues related to applying UN TS6 to large military munitions.
- Will help to reduce differences between competent authorities in interpreting test results.
- Will treat IM and HC testing as a single body of testing.
- Improves confidence; encouraging a "whole body of evidence" approach requiring EIS substance testing.

It is very early in the discussions to predict whether such changes will be acceptable to both communities. However, reaction to the ideas has been viewed positively by most and MSIAC has agreed to help facilitate discussions.

Modelling and simulation is seen as a key tool by some nations in offering a route to improved understanding with the potential to supplement and enhance confidence in munition safety assessment whilst T&E, time, and cost pressures. Capabilities vary between nations as do levels of maturity.

At the 2014 MSAIC workshop on SCJ Assessment methodology, the sub-group on SST and Modelling recommended follow on work to help develop common datasets on a few common explosives. This new effort is part of the 2015 work plan and will encourage an exchange of ideas on required properties and experimental values for modelling ignition and growth. Major elements of this programme of work include:

- Establishing a focus group for modellers.
- Develop a list of properties required by models.

- Document experimental methods (and instrumentation) to determine properties.
- Identify materials of interest on which to exchange material properties as input parameters for models.
- Develop datasets for materials of interest.

At the end of April 2016 MSIAC held a five day workshop to discuss the science and understanding of, to quote Blaine Asay, "a very complex series of events" that is cook-off.

The workshop was held at the Executive Management Center, located in the business-focused midtown area of Atlanta, Georgia. The workshop's objectives were to improve the understanding of cook off of energetic materials and their systems. These objectives were achieved through discussions and presentations on chemical and physical changes, heating rate and heating conditions, critical ignition and growth conditions, reaction phenomenology, models and modelling, and sub-scale testing to system-level tests. Overall it was felt that the workshop was successful in bringing together the current SME's on cookoff and allowing discussions to take place. The output of each group will be recorded in further detail within serval MSIAC reports.

## D. Improved Energetic Materials Processing

Resonant acoustic mixing (RAM) is a technology that is of current interest and is actively being assessed by research labs for the formulation and manufacture of energetic materials. Benefits include improved efficiency of mixing and ability to mix combination of ingredients not currently possible with current technologies (potential to better incorporate nano materials).

The use of any new technology to process energetic material will always come under close scrutiny to ensure that users are not unduly exposed to an unacceptable risk. When generating risk assessments, experience has to be gained either through trials or shared from other users in the community. It is this latter point that has prompted MSIAC to gather and report the current status of the RAM technology. A questionnaire was circulated earlier this year and responses received will be included in a report due to be published later this year.

## E. Environmental Policy

The emphasis on environmental impact, policy which is being increasingly implemented internationally and nationally, has resulted in the need to conduct even more detailed environmental impact assessments for munitions over their lifecycle (from manufacture to disposal). Environmental compliance during usage has gained attention recently in relation to duds, range clearance, EOD operations and toxicity of new material. In parallel, the pressure to develop more environmentally friendly munitions is also driving requirements.

There are many ongoing activities in support of this, e.g. development of lead free primers, alternatives to perchlorates (particularly AP), removal of HCE from smokes, reduced use of heavy metals, and changes in manufacturing process (solvent less).

NATO STO AVT-151 The Environmental Impact of Disposal of Munitions and Propellants is an example of a collaborative activity helping nations share knowledge and experience in this area. For many, this is a new requirement in the munitions area and there is a lack of skills and understanding on how to approach this.

In recent years, MSIAC has increased the support that it is providing in this area and is seeking to assist nations developing methodology for environmental impact assessment of munitions. We were fortunate to have the support of a UK MOD employee, Rebecca Stonhill, who was seconded to MSAIC for 6 months in 2014/15 as the Stokes Fellow[6] to help support this work area. The result is case studies on the lifecycle impact of PBXN-109 and Comp B which is detailed in a report that will be published shortly.

Reduced whole life costs can be realised through implementing environmental policy, which can be brought about by: reducing energy use, reducing or simplifying disposal, and reducing range clean-up or remediation requirements.

## F. Precision Guided Munitions (PGMs)

National defence requirements continue to place priority on precision guided munitions, they are often the munition of choice in the conflicts we face today. Costs are driving a number of initiatives to reduce the variety of systems needed. Recent developments include multirole systems requiring sophisticated sensors and fuzing and common weapon systems designed to be used across multiple platforms. Work on tuneable weapon effects is ongoing and has clear benefits in managing collateral risks. NATO also has a SMART defence project to develop innovative ways of increasing the availability of precision guided munitions to the Alliance.

Although MSIAC has no specific PGM work element, many of the projects do support nations in their efforts to reduce vulnerability of munitions and address lifecycle issues. Noteworthy is the work to support health monitoring which has greater applicability to costly complex munitions.

[6] For opportunities to spend time working, seconded or as a trainee, at MSIAC please see the website or feel free to contact staff members: https://www.msiac.nato.int/news/interns-fellow

## G. Security of supply

A concern for many nations is security of supply affecting both energetic materials and munition components. Lists of critical energetic materials are maintained by a number of countries. The problem stems from a reduction in defence spending leading to a consequent reduction in the industrial base, with many companies consolidating production and closing facilities. Hence, many nations do not have the necessary indigenous capabilities to support the complete manufacturing process.

Changes in supply, particularly for energetic materials and their ingredients, can cause significant issues, for example, failure to function as intended (possibly catastrophically), the requirement to re-qualify (incurring significant T&E costs), can result in re-design, may alter conditions of use or life.

Reduced requirements (quantities) have the potential to impact availability and cost. A break in manufacturing can result in obsolescence issues, skill shortages and a need to requalify the munition.

Introduction of the European REACh regulations exacerbates the problem by limiting access to chemicals used directly or indirectly in the production of munitions.

MSIAC will research international developments and scientific reports regarding supply of materials of interest to the energetic community. This will focus on determining manufacturing sources and how factors, such as REACh, affect supply with the consequent impact on design, testing, assessment and impact on service use.

## H. Other Aspects

Munitions and explosives sector skills shortages; technical expertise in munitions safety has diminished in many nations. Many organisations are downsizing and have reduced staff numbers, which reduces the opportunity to develop the next generation of explosives specialists. In some areas there is an over reliance on using retired experts to fill the gap. An EU collaboration, EUExcert, aims to establish a framework for vocational education for people in the European explosives sector. The intent is to provide the tools to assess and develop competencies using training developed in partnership with education institutions.

MSIAC continues to provide opportunities for training and development. Individuals are encouraged to spend time working at MSIAC as either an intern, or if more experienced, as the Stokes Fellow.

MSIAC also provides specific training on request. A course which has become particularly important and popular in recent years is training on storage safety standards AASTP-1 and 5.

NATO Explosive Safety and Munitions Risk Management (ESMRM) is a risk management process that has been developed over the last few years.

Its purpose is to standardise the approach to application of control measures to ensure an acceptable level of risk when AASTP1 and 5 standards cannot be met. The new standard, NATO ALP 16, titled; Explosive Safety Munitions Risk Management (ESMRM) in NATO Planning, Training and Operations, outlines a risk assessment process which includes the risk analysis methodology contained in AASTP-5.

That methodology uses a combination of quantitative calculations and qualitative assessment of the probability of an event associated with the operational environment. MSIAC continues to support this effort and has updated the MSIAC training course mentioned above to include it.

Changes in the types of weapon system that are being developed presents new challenges to the community, which will likely impact the future MSIAC work plan. Examples include:

- Hypervelocity missiles.
- Directed energy weapons e.g. laser, high power microwave. Exposure of munitions to laser weapons has been discussed as an emerging threat.
- Weaponising remote operating vehicles such as drones provides a challenge for weapon safety assessment. Semi-autonomous, autonomous and networked systems will provide additional challenges e.g. loitering munitions.

Changes to fuzing safety-and-arming and development of micro electro mechanical systems (MEMS) continue. Increased use of software controls present challenges in verifying safety.

## 4. CONCLUSIONS

MSIAC continues to aid in the advancement of Insensitive Munitions and Munition Safety efforts through work on underpinning knowledge and science and by assisting nations in their efforts to develop and implement safety policy.

MSIAC continues to prove its value to its Member Nations by providing sound technical advice, information, databases, and analysis of munitions safety information. A priority for member nations continues to be the answering technical questions and we encourage the community to continue to use this service[7].

The programme of work has evolved to meet challenges facing the munitions community; there are 7 new areas of work that will be progressed in 2015.

[7] Questions related to munition safety can easily be submitted using our electronic form accessible via our website:
https://www.msiac.nato.int/questions/click-here-to-ask-a-technical-question
This service is offered without charge to MSIAC member nations.

Key in ensuring that the programme of work stays current are the MSIAC technical specialist officers who are committed to providing new and innovative services to our Member Nations, and to the wider NATO munitions safety community. Also essential, is that we continue to receive feedback from our customers and we encourage the community to get involved and make suggestions on all aspects of our work. Feel free to contact the MSIAC staff if you think that we might be able to provide support[8] or where you are facing new challenges.

It is encouraging to see the progress that has been made in MS. MSIAC has the honour, on behalf of its member nations, to recognise this progress through the annual presentation of MSIAC Munitions Safety (MS) Awards at the Insensitive Munitions and Energetic Materials Technology Symposium (IMEMTS). The last awards for Technical Achievement and for Career Achievement were presented in Rome in May 2015. The next IMEMTS will be held in Nashville, TN in September 2016.

With respect to IM, technologies are now available to meet the IM requirements for many systems as evidenced by the number of reduced vulnerability systems now in service. Advances in processing techniques, materials technology, improved understanding of reaction mechanisms, and modelling provide the opportunity for further advances.

The continued importance of munition safety policy and preventative measures was highlighted all too clearly by the failures that lead to the horrific accident in Cyprus in 2011. MSIAC still receive requests for presentations on this incident and is committed to continue promoting munition safety.

[8] https://www.msiac.nato.int/contact-us/msiac-staff