



Bulletin

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GUN LAUNCH EXPLOSIVE SETBACK SURVEY



The Gun Launch Setback Ignition Study Working Group was initiated by the NATO AC/326 Subgroup/A – Energetic Materials and is being led by the USA, with Sean Swaszek from US Army ARDEC overseeing the process. The goal of the working group is to develop a new Allied Ordnance Publication for standardizing the approach to testing and evaluating the safety of energetic materials and munitions under setback loading.

To help gather input to support this effort, we would appreciate it if you could take time to complete an on-line questionnaire.

www.msiac.nato.int/surveys/setback_survey

The purposes of this survey are to:

- ◇ Identify issues related to gun launch explosive setback
- ◇ Identify issues related to setback actuator testing
- ◇ Identify and share best practice
- ◇ Make recommendations to develop a related STANAG if needed

The survey completion date is 17th August 2018, so please take the time today to provide your input.

Find the survey from the MSIAC website under the Areas of Expertise tab, on the Warheads technology page.

Ernie Baker
Warheads Technology TSO



PM's PERSPECTIVE

The summer holiday season is upon us and, like many of you, MSIAC staff are carving out some time for rest, relaxation, and rejuvenation. Therefore I have the honor of addressing you in this MSIAC Newsletter as the Acting PM, as Dr. Michael Sharp is on holiday. I promise not to let the immense power of this responsibility get the better of me.

The summer always brings excitement here in Brussels. Commuting gets easier, the prospect of getting outside and exploring the community is always there, and we had a NATO Summit on 11-12 July. There is nothing like preparing for 29 Heads of State and Government to arrive at your building! MSIAC is usually only involved in the political machinery of NATO when it comes to getting new staff members' security clearances in place. In this case, we had front row seats to the three months of preparations leading up to the Summit, and we all have a new appreciation for the amount of effort that many hundreds of NATO staff members put in to making the event go smoothly, safely, and productively.

Speaking of security clearances – the process of getting clearances in place for new staff members seems to be taking longer and longer. In cases where we used to budget 3-5 months for the process, we are now budgeting 6-9 months and even that does not seem long enough. We have already lost the possibility of hosting one fantastic student this summer due to a clearance not being issued in time, and we really don't know how to fix this process. In the case of summer students, it is impractical for them to commit to an internship a year in advance. And once they have committed, it is difficult to find an alternative opportunity if the lack of a clearance means they can't come here with only a 30 day warning. If anyone is experiencing similar problems in your organizations, or has insight on how to improve it, please let us know.

Even though this Newsletter is a little lighter than usual, we have included some very interesting nuggets for your enjoyment. Ernie Baker is shedding some light on the gun launch setback survey effort and the International Detonics Symposium. Martin Pope is updating us on the IM/HC consolidation effort; and Matt Andrews is pointing out the most intriguing findings at energetic materials meetings of the past few months.

And it is clear that the pressure of upcoming vacations may have spurred all of us to get a few "to do" items off of our lists: MSIAC has a slew of open and limited reports either already published or making their final laps through our editing queues. Of particular note is the series of three limited reports from our amazing Stokes Fellow, Ms. Rebecca Millar of the UK Defense Ordnance Safety Group. As touched on in her article in this newsletter, the series of reports breaks down the lifecycle of pyrotechnic flares and aircraft countermeasures into three parts: first an overview of the types, chemistry, and science of flares; next a thorough breakdown of flare lifecycle from manufacture to disposal; and lastly a comprehensive look at aging, degradation, and other factors that affect overall flare safety and suitability for service. This series represents a significant contribution to MSIAC and its member nations' knowledgebase on pyrotechnics – an area that is sometimes overlooked as the energetic content and possibility of danger of these inherently complex devices are often underestimated.



Wade Babcock
Materials Science TSO

For those of you preparing to attend the MSIAC workshop on explosives and munitions risk management in Granada, Spain, many of the read-ahead materials have been posted and many more are being added in the coming weeks. Keep checking those links and get ready for a very productive, interactive, and informative workshop.

Please enjoy the Summer wherever you are, take this lighter issue of the MSIAC Newsletter along with you, and we will see you all in the Fall. Also, keep an eye out for the energetic materials TSO recruitment which will begin in the coming months.



I volunteered to help NATO International Staff for a few hours during the two days of the Summit. They assigned me the task of holding a door. That's me on the right.

 **You can find the *LATEST PATENTS OF INTEREST* on our MSIAC Website via this [hyperlink](#).**



2ND RAM WORKING GROUP MEETING

Impact of Resonant Acoustic Mixing (RAM) on Munitions Safety and Suitability for Service

The second MSIAC-led technical meeting on the impact of RAM was held on 4th July at Cranfield University, Shrivenham, UK and 5th July at The Falcon Project, Westcott, UK. This was a continuation of the first meeting held in Portland, OR and the rationale for the meeting remained the same: to address the potential qualification challenges that come with the use of new manufacturing technologies and a need to engage in discussion between RAM users and national authorities.

The meeting was attended by 28 personnel from government, industry and academia representing eight nations: Australia, Canada, France, Germany, the Netherlands, Norway, the United Kingdom and the United States of America.

MSIAC provided all attendees with the output from the first meeting and technical questions, and facilitated the technical meeting through Dr Matthew Andrews (Energetic Materials TSO) and Christelle Collet (Propulsion Technology TSO).

The meeting included presentations from Germany, the Netherlands, and the United Kingdom, as well as MSIAC's review of a recent US Strategic Environmental R&D Program (SERDP) presentation. MSIAC also provided the output from the first meeting to help set the conversation. Topics for discussion included batch, continuous, and in-case mixing; requirements for quality assurance; risk-based approach to qualification; suitability of current standards; and lessons learnt from other manufacturing techniques.

Our thanks go to all attendees for their contributions and to both Cranfield University and The Falcon Project for hosting the meeting.

MSIAC are collating the results from both meetings into a slide output that will be available for MSIAC members and work will continue on a Limited Report for discussion within the relevant communities. Continued work within this forum will be announced after the next Steering Committee meeting in October.



A RAM-mixed Falcon K round being fired during the MSIAC visit; picture courtesy of The Falcon Project ©

Dr Matthew Andrews
Energetic Materials TSO

and

Christelle Collet
Propulsion Technology TSO



**Improved Explosives and
Munitions Risk Management**

Granada, Spain | 10 - 14 September 2018



INTERNATIONAL DETONATION SYMPOSIUM

Dr. Ernie Baker was a plenary speaker at the International Detonation Symposium (IDS), held 15-20 July 2018 at the Hyatt Regency Chesapeake Bay in Cambridge, MD USA. This was the 16th IDS held to date, with the symposium being held every 3 years. The Detonation Symposium brings together scientists and engineers from around the world that are actively engaged in the Research and Development (R&D) of detonation science, shock physics, and associated phenomena.

The papers presented at the Symposium are peer-reviewed, and competitively down-selected for presentation at the symposium. There were more than 450 people in attendance with more than 250 papers addressing topics including: experiments and models of detonation phenomena; shock wave propagation; properties of explosives; and equations of state.

Ernie presented a paper entitled "Gap Test and Critical Diameter Calculations and Correlations" which was co-authored by MSIAC trainees Vincent Pouliquen and Maxime Voisin, as well as the MSIAC Energetic Materials Technical Specialist Officer, Dr. Matt Andrews. The paper summarized an MSIAC study that investigated laboratory test characteristics correlations. Correlations found included: NOL-SSGT to NOL-LSGT, NOL-LSGT to critical diameter, critical diameter to Held criteria and NOL-LSGT to density for a given explosive. The Gurney energy, the Figure of Insensitiveness of the Rotter Impact test, the detonation velocity and the detonation pressure characteristics do not provide any correlation relationship with the gap test results or critical diameter.

The MSIAC tool NEWGATES (New Excel Worksheets on GAP TESTs) has been modified to include an improved NOL small scale to large scale gap test correlation and a critical diameter estimation calculation. MSIAC reports L-202 and L-148 (Edition 4) provide complete details.

Ernie Baker
Warheads Technology TSO



16th International Detonation Symposium Plenary Presenters

ACCIDENT REPORTING

We have engaged the community at a number of recent international meetings about organizing a two day MSIAC Accident Database exchange (MADx) contributors and users meeting.

On the agenda would be the harmonization of accident reporting within MSIAC nations including a common terminology. As you will know, MADx is only available to selected government employees of contributing nations. Contributing nations provide input in their own format, and MSIAC converts that into the corresponding MADx datafields, adjusting to national terminology and context. The meeting would also include discussion of user experiences and feedback as well as areas for further improvement and development of MADx.

MSIAC could host this meeting at the new NATO HQ in Brussels early next year, but before picking a specific date we would first like to hear about the appetite for such a meeting. Please let us know if you, or perhaps a colleague, would have an interest to attend and provide feedback on suggested and related agenda items?

Martijn van der Voort
Safety of Storage and Transport TSO



49th INTERNATIONAL ANNUAL CONFERENCE OF ICT FRAUNHOFER 26TH – 29TH JUNE 2018

The 49th edition of the ICT conference was held in the Gartenhalle of the Karlsruhe Conference centre as the Stadthalle is undergoing renovation work. This year's conference, Energetic Materials – Synthesis, Processing, & Performance, attracted more than 220 participants from 24 nations. The two and half day event managed to fit in 35 oral presentations, over 100 poster presentations and two games of World Cup football. Although the conference was a success, unfortunately this was not a positive result for Germany as they lost their final group stage game to the Republic of South Korea and consequently left the competition.

The presentation and poster topics covered synthesis of new energetic materials such as co-crystals, nanocomposites, energetic ionic liquids, amorphous materials and metal-organic frameworks. Several papers covered processing technologies that allow access to new materials; these technologies included Resonant Acoustic Mixing, Micro Flow Reactors, Spray Evaporation and Spray Drying.

Poster Awards

ICT provides three awards for the best posters at the symposium in recognition of their work. The committee judged all the posters and acknowledged the high standard and range of topics including chemistry and engineering oriented papers, construction of novel materials and understanding of traditional methods. This year's awards were:

1st Place P62 Preparation of Sheet-on-Sheet Structured Graphitic Carbon Nitride/Reduced Graphene Oxide/Layered MnO₂ Ternary Nanocomposite with Outstanding Catalytic Properties on Thermal Decomposition of Ammonium Perchlorate (Jianhua Xu; Nanjing)

2nd Place P74 Defining a Reliable Test Regime for Tetryl (Ruth Tunnell; QinetiQ)

1st Place (ICT) P105 Formation of ADN-Prills in Microfluidic Drop Generators (Radulescu; ICT)

MSIAC did not have a presentation this year but did staff a booth to remind MSIAC member nations of the products and services that can be accessed through the secure website.

The tour of ICT Fraunhofer facilities always provides an insight into the research work being carried out including microfluidics, mixing technology, and detonics. The tour concludes with refreshments, a BBQ, and fireworks. Next year will be the 50th anniversary of the ICT conference and as such the title of the conference will be The Past, The Present and The Future.

Dr Matthew Andrews
Energetic Materials TSO



The winners of the poster awards.

3rd NEW ENERGETIC MATERIALS WORKSHOP

The 3rd New Energetic Materials Workshop (NEW) was held at FOI Headquarters in Stockholm, from the 29th – 31st May 2018. This meeting, although only in its third edition, has its historical roots in technical discussions around ammonium dinitramide (ADN) and 1,1-diamino-2,2-dinitroethene (FOX-7). The meeting was fully subscribed with 64 attendees representing 15 countries.

MSIAC provided a presentation entitled "Recent Development in Energetic Materials", that provided a brief round up, but in no means a comprehensive review, of work within the MSIAC member nations. Along side the FOI historical brief this provided an opener for the two day meeting. The first two days consisted of 30 presentations covering new and current energetic materials, flow reactor synthesis, rocket motor and gun propellant formulations, fragment impact modelling and testing, additive manufacturing, space propulsion and modelling.

The third day of the meeting involved a tour of the FOI facilities at Grindsjön, which included their underwater test facility, x-ray facility for SCJ analysis, synthetic capabilities, scale up including flow reactor technology, and related activities such as space propulsion testing.

Dr Matthew Andrews
Energetic Materials TSO



France Country Visit

MSIAC conducted a country visit to France on 18-19 June 2018. The MSIAC delegation, consisting of Christelle Collet, Matthew Andrews and Ernie Baker, visited Eurengo in Sorgues, France. The visit provided an opportunity to introduce MSIAC services and products, as well as for MSIAC personnel to be better acquainted with the French requirements, processes, and current work.

The MSIAC delegation was hosted by Emmanuel Schultz, the previous MSIAC Propulsion Technology TSO who now works as a Contracts Manager for Eurengo. Seventeen Eurengo personnel attended the briefings. Eurengo provided a presentation on their industrial and development capabilities and a tour of the Sorgues energetics site.

Production at Sorgues has been ongoing for more than 100 years, with the first production capability established in 1915. Production at Eurengo is primarily defense related, however the plant is also a large producer of the diesel fuel additive 2-EHN (2-ethylhexanol nitrate). There are about 200 production buildings on 204 hectares at Sorgues. Production is divided into three parts: defense energetics synthesis (RDX, HMX, NTO, TATB and GAP), munitions loading, and EHN production. Production of RDX began in 1954 at Sorgues, followed by HMX in 1963. A new defense energetics synthesis facility, named PHENIX, is currently under construction with a projected completion date in 2019. The tour included viewing the LabRAM facility, a 1600-liter mixer, curing of CBEMS (corps de bombe à effets multiples sécurisée) bombs, and the POGS (petits objets explosifs en grandes series) cast cure loading production facility including precision x-ray inspection.

The second day included an MSIAC overview and additional presentations and lively discussions on the MSIAC tools, RAM technology, MSIAC's Energetic Materials Producers Catalogue, IM design, NATO standards, and gun launch setback.



TSOs Andrews, Collet and Baker find a serendipitous place to stand for a group photo.

**Ernie Baker, Matthew Andrews and Christelle Collet
Technical Specialist Officers**

USA East Coast Country Visit

MSIAC conducted a USA east coast country visit during July 2018. The visit included the US Army Armament Research Development and Engineering Center (ARDEC), the Naval Surface Warfare Center sites at Indian Head, MD (NSWC-IHEODTD) and Dahlgren, VA (NSWC-DD), and the US Army Research Laboratory (ARL). The MSIAC delegation consisted of Drs. Ernie Baker and Michael Sharp.

On 10-11 July, Philip Samuels hosted the delegation for a visit to ARDEC. On 12 July, Lori Nock hosted the delegation for a visit to IHEODTD. On 13 July, Dr. David Hubble hosted the delegation for a visit to NSWC-DD. Attendance was good at all four sites engaged with the MSIAC briefings, with 30 participants at ARDEC, 24 at Indian Head, 9 at Dahlgren, and 6 at ARL. The personnel represented the key areas of the laboratories that would have interest in MSIAC's products, services, and programs.



**US Army ARDEC Explosives Development Testing
facility personnel.**

ARDEC, NSWC-DD and ARL provided overview presentations. MSIAC provided informational briefings including an overview of MSIAC activities, IM design and tools, future workshops and technical meetings including the upcoming "Improved Explosives and Munitions Risk Management" workshop in Spain, recent developments in energetic materials research, probabilistic initiation, and gun launched setback ignition. ARDEC presenters included Dr. Victor Stepanov on amorphous energetics, Dr. Rajen Patel on nano organic energetics, and Sean Swazek on the mechanical analysis working group. At ARL Dr. Jason Robinette discussed IM gun propellant coatings, and Dr. Brian Roos presented ARL's synthesis activities.

Lively conversation included several questions related to tools access, collaboration opportunities and the application process for Stokes Fellow positions with MSIAC to encourage professional growth. The MSIAC delegation was provided extremely interesting tours of the ARDEC and NSWC-DD testing facilities.

**Ernie Baker
Warheads Technology TSO**



AASTP-1 AND AASTP-5 LECTURE SERIES

We have completed the first four of the planned six AASTP courses for 2018.

Date	Nation	Location	PoC
19-23 February	Germany	Berlin	Lt. Col Sascha DECKER
19-23 March	France	Versailles	Commandant Johannes LAMIRÉ
16-20 April	Spain	Madrid	Lt. Col Emilio LARRIBA DE LA RUBIA
28 May – 1 June	Belgium	Brussels	Maj. Gunnar PLOVIE
20-24 August	Finland	Helsinki	Mr. Kosti NEVALA
22-26 October	Canada	Ottawa	Maj. Kim BROOKS

The most recent was held from May 28 to June 1 at the Belgium MoD in Evere, Brussels (indeed, that's not far from our old NATO HQ!) The preparation for the courses in Helsinki and Ottawa is going according to plan.

We also started the planning of the course program for 2019. We have asked the national PoCs about an interest to organize the course in their nation or to send students abroad. In October, at our Steering Committee meeting, decisions will be taken with regards to the 2019 program.

Martijn van der Voort
Safety of Storage and Transport TSO



The AASTP Lecture Series Participants Brussels 28 May

8th INTERNATIONAL SYMPOSIUM OF ENERGETIC NITROCELULOSE

The 8th edition of the nitrocellulose symposium was held in Bergerac, France from 5th to 7th June 2018. There were 135 attendees from 20 countries representing cellulose and nitrocellulose producers, propellant manufacturers, end users, research and development agencies, government, and academia. The aim of the meeting was the continued sharing of knowledge of a material that has been in use for more than 150 years.

The key topics were:

- ◆ Safety, stability and ageing of nitrocellulose and NC-based material.
- ◆ Effect of nitrocellulose on the performance of propellants and explosives.
- ◆ Synthesis / processing of nitrocellulose and preparation / processing of NC-based material.
- ◆ Characterization and properties of nitrocellulose.

Dr Matthew Andrews provided a presentation entitled "Life Assessment of NC-Based Energetic Materials: Flares, LOVA, CCC", which was co-authored by Christelle Collet (TSO Propulsion Technology), Rebecca Millar (2018 Stokes Fellow), and Emmanuel Schultz (Eurenco). A pa-

per accompanies the presentation and has been released as a Limited Report (L-222); this can be downloaded from the MSIAC secure website.

One of the meeting's highlights was confirmation that the Abel test is no longer the best solution to determine safety parameters for nitrocellulose. The Bergman-Junk test and the Methyl Violet test are now highlighted as the recommended procedures for stability measurement; this will be reflected in the next editions of the STANAG and the MIL-SPEC for nitrocellulose. Several presentations covered accidents and incidents that involved NC-based materials but also the solutions and new, safer approaches to working with these materials.

Copies of the released presentation can be accessed via the MSIAC secure website.

Dr Matthew Andrews
Energetic Materials TSO



2018 Benjamin Stokes Fellowship Lifecycle of Flare Countermeasures

In my eight months as a Benjamin Stokes Fellow I have focussed my research on flare countermeasures. The output (across three limited reports, L-219, L220 and L-221 and 1 open report, O-189) covers all aspects of the flare lifecycle from formulation to disposal, focusing on risk and risk mitigation. The finalised reports will be available in the near future. Information has been collated from various open sources, a MSIAC survey and discussions with experts in the industry. I extend my thanks to those who have provided input to this project.

The principal output has been to highlight the changes in risk as flares have developed from traditional, well-established pyrotechnic formulations (usually a mix of magnesium, Teflon® and Viton®) to more novel and often higher energy formulations (such as those based on solid propellants). Flares are commonly generalised as pyrotechnic stores; but this move to spectral flares renders the categorisation ambiguous or in some cases incorrect. Spectral flares have the potential to exhibit more violent responses to accidental stimuli and there is evidence of severe accidents at various stages of the lifecycle. For example, on 26 June 2006 an explosion during manufacture of flares caused significant damage (see figure) and the fatality of one worker. The manufacturer, Wallops Defence Services Ltd., failed to address the consequence of nitroglycerine migration during the curing process of their spectral flare pellets.



Wallops Defence Service Ltd. following spectral flare explosion

On 8 April 2010, early ignition from dispensing spectral flares resulted in substantial airframe damage to one of the Royal Australian Air Force's Orion AP-3Cs. Reports on the ability of flares to ignite within the flare dispenser had been raised prior to this in some NATO countries. On review, testing of the flare sequencer (an interrupter between the igniter and main pellet) provides a means to assess this risk but varies from nation to nation and is not covered under any standard (STANAG 4187: Fuzing Systems: Safety and Testing currently excludes pyrotechnic countermeasures). A review of testing variations has been completed and passed to the AC/326 Initiation Systems and Technology Subgroup for further consideration.

The security restrictions on spectral formulations appear to have limited international collaboration and research. Yet across the lifecycle, the primary consideration needs to be the energetic materials rather than the ammunition type. This set of reports attempts to break this discussion barrier;

highlighting that it is possible to have open international discussion on safety, without breaching confidentiality.

Alongside this project, I have provided input to MSIAC research on the life assessment of nitrocellulose based energetic materials (LOVA, flare and combustible cartridge cases), TNT equivalency and created a presentation on the hierarchy of munition safety related NATO standards. I have also contributed to the AC/326 steering committee meeting in Utrecht and Integrated Munition Health Management workshop in Bristol.

Outside of the office I have experienced living in Brussels and travelled to many cities in and around Belgium. I have indulged in the typical tourist traps like the Grand Place and Delirium as well as discovering the quirkier side to Belgium, such as the annual cat throwing festival in Ypres (no real cats involved)! Thanks to the MSIAC running group I also ran my first 20 km race.



MSIAC Running the Brussels 20 km

Overall, the Stokes Fellowship has been an excellent opportunity to enhance my technical knowledge and dedicate time to a topic that is of great interest to me and the energetics community. I have learnt a vast amount from the technical specialist officers (TSOs) at MSIAC and appreciate how willing they are to share their knowledge and expertise. I am extremely grateful to MSIAC and the UK MoD for this opportunity and the support they have provided along the way.

Rebecca Millar
2018 MSIAC Stokes Fellow



EOD DISPOSAL OF IM COMPLIANT MUNITIONS

MSIAC has recently been undertaking a study into the disposal of IM compliant munitions by EOD personnel.

This has been a concern within the NATO EOD group and the challenge of disposal of IM compliant munitions has been discussed but to date there had been no supporting technical guidance or operational advice on options and techniques that could be incorporated into NATO publications and training .

From our perspective this is an interesting topic as it is looking at IM from the other end of the telescope. Whilst IM seeks to minimise the vulnerability of our munitions, EOD personnel look to exploit vulnerabilities in order to dispose of the munition. Removal of Explosive Ordnance (EO) hazards on the battlefield and during post operational clearance is a challenging activity for EOD personnel. There is a degree of risk in approaching EO that has failed to function and there is a degree of risk to operations in any delays caused by failures in clearing the EO hazard.

The EO hazard has historically involved munitions filled with well characterised and known energetic materials where response to a number of established EOD techniques is well documented, understood and training provided. The techniques generally consist of attack by directed energy EOD weapons such as shaped charge jet or other explosively formed fragment. Some EOD weapons of this type may also use different liner materials. The other widely used technique is disposal by shock initiation using a donor charge, normally a plastic explosive, placed close to or on the target munition. There are other more specialised techniques that seek to minimise the reaction of the EO hazard to deflagration or a lesser energetic response. This would be required where the risk of damage to the surroundings is unacceptable and moving the EO hazard is too risky.

IM compliant munitions are intended to have a response to hazards represented by these types of EOD techniques with a Type III response (explosion) and lower degrees of energetic response. As you may be aware this can be achieved by a combination of design and materials however these subtleties are not necessarily obvious to an EOD technician faced with rapid disposal of an EO hazard.


Some nations commit significant resource into developing EOD techniques for munitions, particularly their own, which enable EOD technicians to undertake rapid disposal. However these are all IT based or otherwise not available to all nations. What is required is a simple pocket guide for EOD technicians that can be used to provide guidelines on dealing with IM munitions that identify any limitations in response to traditional EOD techniques or specific requirements or techniques that will enable disposal with more reliability.

To date we have looked at disposal by shaped charge jet and are researching disposal by shock initiation. Results will be presented to the NATO EOD Group for discussion into ways in which this can be made available to EOD technicians.

We will provide an update via the Newsletter as we develop the pocket guide. In the meantime if you have any comments, thoughts or options which will help us with this work please contact us.

Martin Pope
Munitions Systems TSO



 **Further information about MSIAC interns and trainees can be found on our website via this [hyperlink](#).**

 **Do you have an article you want published in our newsletter? Send it to: info@msiac.nato.int**



IM/HC HARMONIZATION UPDATE JULY 2018

In the last Newsletter we reported on the pending Technical Meeting at IMEMTS in Portland on the 23rd April and a questionnaire.

The questionnaire generated a useful number of responses and a summary of the information they contained was presented to the technical meeting.

Currently we have received responses from eight nations with the largest contribution from the United States. Of the nine questions set, and not trying to pick and chose from the responses, the more interesting answers were to questions 5, 7, 8 and 9.

- ◆ Question 5 - Do you agree that the introduction of additional evidence to support HC assessment would increase confidence in assignments of Hazard Divisions (HD)?
- ◆ Question 7 - Do you support a review of the substance tests in UN Test Series 7 used for assignments of HD 1.6?
- ◆ Question 8 - Do you agree that it would be beneficial to use HC/IM tests to generate information to support situation-specific quantitative risk assessment and/or hazard classification assignment (i.e. HD 1.1 thru 1.4 & 1.6) when siting/licensing/ESMRM?
- ◆ Question 9 - Do you believe that the current Hazard Divisions provide sufficient granularity to optimise the management of risk throughout the lifecycle?

The majority of the answers to these questions were strongly in favour although those responding to question 5(c) about the use of additional evidence as a goal to support HC opinions were divided.

There were only two unanimous responses to the questionnaire:

Question 3 - Do you agree that Hazard Classification (HC) and Insensitive Munitions (IM) testing should become further harmonised wherever possible?

Question 5(c) - Do you agree that using the response descriptors (RD) should help in assignments of hazard classification? (i.e. using the existing AOP-39 RD).

There was no strong disagreement to any of the Questions where an opinion was requested.

The results were presented at the technical meeting. There was also significant discussion on how the NATO documents should be structured to address IM/HC harmonisation. There are a limited number of options and a number of views were expressed about the complexity of any proposed changes in documents and structure to support a harmonised approach. MSIAC are producing a number of options on how the supporting policy and process documents could be structured.

Clearly there was no outright rejection of the initiative. The US has already incorporated IM testing into its Hazard Classification process and their policy provides a useful template and experience on which to build. There is still much work to do on the detail of the processes prior to submitting draft documents to NATO nations for review. Further effort will be undertaken at the MSIAC IEMRM workshop in September.

The questionnaire is still open (find it on our website) if this has inspired you to make your views known. If you have difficulties accessing this please contact us.

Martin Pope
Munitions Systems TSO



Improved Explosives and Munitions Risk Management

Granada, Spain | 10 - 14 September 2018

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