



Bulletin

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UNITED NATIONS CHANGES TO EXPLOSIVES HAZARD CLASSIFICATION BENCHMARKS

Background

Most, if not all, NATO nations hazard classify explosives based on publications produced by the United Nations (UN) Committee of Experts on the Transport of Dangerous Goods (TDG) and on the Globally Harmonized System (GHS) of Classification and Labelling of Chemicals. That UN Committee's three publications, and the relevance of each to explosives, are:

- 1) the GHS, or "purple book", which describes recommended explosives hazard classification and hazard communication criteria applicable during manufacturing, transport, storage, supply and use in workplaces and for consumers;
- 2) The model Regulations, i.e., the "orange book", where recommended explosives classification assignment criteria and hazard communication provisions pertaining specifically to transport are described; and
- 3) The Manual of Tests and Criteria (MTC), a compilation of recommended testing protocols classifiers may utilize in assigning hazard classifications to explosives.

What's Recently Happened at the UN

The first edition of the MTC published in 1986 provided descriptions of test methods and procedures for assigning transport hazard classifications to explosives and organic peroxides. Over the years, since the GHS Sub-Committee was established in combination with the existing UN committee presiding over hazard classification assignments for transport, new parts of the MTC, such as relating to assigning other-than-transport classifications to various dangerous goods for example, have been added. The context of the MTC's explosives classification verbiage, nonetheless, has until recently remained completely focused on transport; however, that focal point was agreed to be changed during the UN Committee meetings concluding on December 7, 2018.

The verbiage regarding explosives classification assignments within the upcoming seventh revised edition of the MTC, to be published in 2019, will remove much of the text specifically referring to transport. The next edition of the MTC will thus shift to a compilation of protocols classifiers may utilize in assigning explosives hazard classifications intended to apply across the explosives life cycle.

Please follow this link to read the full article: <https://www.msiac.nato.int/news>.

By Brent E. Knoblett
US Department of Defense Explosives Safety Board

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PM's PERSPECTIVE

I have a couple of items that I would like to bring to your attention this quarter.

The first is that we will shortly start the recruitment for a new Energetics Materials specialist. I expect that we will announce the recruitment in early July and potential applicants will have about 6 weeks to complete their submissions.

What are we looking for? We are looking for an individual from a MSIAC NATO member nation who has a good understanding of the chemical and physical properties of energetic materials and how these relate to safety. They should also be familiar with latest processing methods suitable for the range of energetic materials and their applications. The position offers an opportunity to get involved in many of the ongoing safety related activities within member nations and the international community. It's an opportunity to develop your knowledge working with a diverse group of international experts on a programme of work which makes a significant contribution to the safety of those using and handling munitions. The working environment involves significant collaboration within MSIAC and with the international community and hence excellent team working and communication skills are essential.

As well as the technical requirements for the post we are aware that a positive work/life balance is essential for potential applicants. MSIAC is located at NATO Headquarters which is in the beautiful city of Brussels. Being at the heart of Europe provides the individual with many opportunities. There is the chance to be immersed in a country where multiple languages are spoken and improve your second, third or even fourth language; French, Flemish and German being the official languages of Belgium.

Good transport links to neighboring countries provides the opportunity to explore the European continent. Belgium is also world famous for its cuisine and beverages so plenty of opportunities to taste the delights.

For those applicants with families there are many international schools in the Brussels region which will ensure your children are able to continue their education with minimal disruption. For those that have an interest in sport you won't be surprised to hear that Belgians really enjoy cycling; this year the Tour de France is starting in Brussels. But there are plenty of opportunities to get involved with any type of sport either through NATO or in local communities.

If you have any questions please don't hesitate to contact Matt Andrews or myself about the position or application process.

One of the harder sides of working at MSIAC is that we regularly have to say farewell to colleagues. Such is the case in the last 6 months with Martin Pope and Wade Babcock both having left after completing their rotations.

Wade has now returned to the US Navy, Indian Head, where he continues to work in Insensitive Munitions and is also set to become the US MSIAC Steering Committee member. Wade was our first incumbent of the Materials Technology position and took on the challenge of a new post, developing support on ageing and materials properties. During his time he delivered some significant

reports on these topics in addition to answering questions and providing support to nations. He also produced excellent contributions to the workshop on cook-off, and was a significant contributor to the Munition Health Management effort, which including facilitating the NATO Smart Defence project in this area. Wade also took the lead on organizing our 25 anniversary event and helping to bring webinars to MSIAC.

Martin has returned to the UK and is now working back in the MOD Defence Ordnance Safety Group. During his time at MSIAC he used his extensive knowledge on the assessment of Safety and Suitability for Service, and nation's processes and procedures, to deliver a comprehensive review of this area. He also contributed to the workshop on Improved Explosives and Munitions Risk Management. He was also widely consulted by the MSIAC staff for his knowledge and supported member nations through answering questions and providing briefings.

We have very much enjoyed working with Martin and Wade and miss their camaraderie. We wish them all the best in their future endeavors.

2020 Workshop on Defects: Causes, Characterisation and Criticality

We are still early in the planning phase so specific details on location and date have still to be set. However, I can tell you that it is likely to be held in Europe in May 2020 (still to be confirmed) .

Background to the workshop

Flaws or anomalies in energetic materials, or in other materials used in munitions systems, are often a cause for concern. This includes: voids, cracks, foreign materials; and or chemical, physical and or mechanical properties that are out with design tolerance specifications. Such incidences occur fairly regularly and can be classed as defects when they have a significant impact on the safety and or reliability of the munition and designates rejectability.

Guidance and understanding on how to deal with defects is often limited and this workshop offers an opportunity to share knowledge and experience on how to approach such situations.

A goal of the workshop is thus to assist nations in developing a methodology by which we approach the problem of defects (based on international best practice). That is, the process by which we pull together information to make an informed decision with respect to the criticality of defects and the sentencing of munitions (i.e. are they safe and suitable for service). This will address how we use evidence to formulate safety arguments and the tools that can be used.

More detailed technical discussions are planned in the following areas:

- ⊕ Understanding defect causes, and ability to predict their occurrence.
- ⊕ Identification of typical defects for different types of munition systems and designs/energetic materials/ service environment/manufacturing processes/



inert materials

- ⊕ Defect lexicon and taxonomy
- ⊕ Detection methods for defects (e.g. destructive/non-destructive; emerging technology; identifying gaps)
- ⊕ Typical techniques for different munition system types
- ⊕ Effect of defects (e.g. how do they change the properties of energetic materials, and ultimately safety, reliability and performance)
- ⊕ Setting of acceptance criteria (e.g. at what point do defects impact on safety, performance, ageing etc. – can we standardise acceptance criteria on this basis?)
- ⊕ Role of statistical methods in quantitative risk assessment

The scope of the workshop still has to be discussed and refined with input from the international community. If you are interested in getting involved in this effort, and or are keen to help lead discussion groups, please get in touch with Matt Ferran who will be leading this effort within MSIAC.

We have already started work on a lexicon and taxonomy of defects and will be circulating this for discussion in the coming months, which will probably take the form of a questionnaire aimed at gathering feedback.

We will also endeavor to set the location and the date in the coming months and will post more information on the website and in future newsletters.

Michael Sharp
PM MSIAC

STANAG 4375 SURVEY REVIEW OF THE DROP HEIGHTS

In light of increasing potential drop heights that ammunition and explosives are exposed to throughout the lifecycle, particularly in the naval environment, the continued applicability of the Safety Drop Test described in STANAG 4375 has been discussed.

In support of AC/326 Sub Group B and the Custodians of STANAG 4375, MSIAC have developed a survey to better understand the current safety drop height requirements for naval vessels and other scenarios for NATO nations.

The results of the survey will be used by the Custodians of STANAG 4375 to inform the next update of that standard. It is requested that organisations involved in specifying requirements for, or conducting, drop testing take part. In order to allow time for analysis of results before the Fall 2019 meeting of AC/326 Sub Group B, it is requested that responses to this survey are provided by **31st July 2019**.

The survey can be found at the following link:

<https://www.msiac.nato.int/stanag-4375-review-of-safety-drop-heights>

Any question regarding the survey or related comments can be directed to Matt Ferran (MSIAC TSO Munition Systems): m.ferran@msiac.nato.int

Matthew Ferran
TSO Munition Systems

AASTP-1 AND AASTP-5 LECTURE SERIES

We have kicked off the 2019 program with two courses in France and Germany. Johnny de Roos and Eric Deschambault taught the course at the Camp de Matelots in Versailles (25 to 29 March). Thanks to Capt. Sylvain Souday and ADC Arnaud Gigogne for the great organization. The event hosted a delegation from Poland and the UK, and some of you might recognize two of the MSIAC staff in the group picture, broadening their horizon to the more operational sides of ammunition safety!



In Berlin (1-5 April) Johnny was accompanied by Matt Wingrave to teach the course. Lt Col Sascha Decker and Torsten Krahn had arranged the event very well, also helping out with some strikes in public transport. This week hosted delegations from the Netherlands, Norway, Croatia, UK and Canada, and again someone from MSIAC staff!



The course program for the rest of 2019 is shown below. Unfortunately, we cannot accept new students for this year, all events are fully booked. Please let me know about your interest as soon as possible so that we can inform you when 2020 planning activities begin.

Organizin g Country	Location	Date
US	Quantico (VA)	23-27 September
AUS	Canberra	11-15 November
NZ	Wellington	18-22 November
US	Ramstein (DEU)	2-6 December

Martijn van der Voort
TSO Safety of Storage and Transport

GUN LAUNCH SETBACK IGNITION STUDY WG

The 3rd Gun Launch Setback Ignition Study Working Group (WG) was held 12 March 2019 at the Naval Surface Warfare Center, Indian Head, MD, USA. The Gun Launch Setback Ignition Study Working Group was initiated by the NATO AC/326 SG/A – Energetic Materials and is being led by the USA, with Sean Swazek 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 to setback loading. The meeting was attended by 15 subject matter experts (SMEs) representing USA, Norway, Sweden, Netherlands, and United Kingdom. Dr. Ernie Baker from MSIAC has been providing technical support to the group. Dr. Matthew Andrews from MSIAC provided presentations on a Defects Lexicon and Projectile Fill Adherence. MSIAC has an ongoing work element in developing a lexicon of terms for munitions defects, including gun launched projectiles.

There is an associated planned workshop on munitions defects to be held in the spring of 2020. Dr. Baker has recently researched the intentional explosive filling of munitions with the intent to not have the explosive adhere to the projectile body. An associated paper is planned for the 2019 Insensitive Munitions and Energetic Materials Symposium. Technical presentations were also provided by American, Swedish and German representatives. The group has begun initial development an assessment protocols NATO STANREC for: acceptability of explosive for gun launch; acceptable defect types, sizes, distributions; and acceptable defect identification methods.

The 4th WG meeting is planned in Meppen, Germany on 17 SEP 2019. NATO country SMEs participation is encouraged, particularly with expertise in gun launch munition dynamics (acceleration and acceleration perturbations).



Artillery Projectile Gun Launch.

Dr Ernie Baker
TSO Warheads Technology

MATERIAL PROPERTIES IN SUPPORT OF MODELLING EFFORTS

During two recent workshops, Shaped Charge Jet (2014) and Science of Cook Off (2016), a recurrent theme was the lack of standard sets of materials data for well-known energetic materials for use in computational models. Indeed, practitioners of IM modeling and simulation efforts have long lamented the often limited availability of verified and validated material parameter data. Typically some data exists, but the parameter set is not complete, or the provenance of the available data might be unknown. In turn, experimentalists have expressed similar concerns as well. Of the sheer number of materials that are produced each year requiring characterization, a large fraction of those are rejected during the development process which leads to a maze-like array of incomplete datasets in published reports, presentations, and papers.

In response to the call for an international effort to identify, prioritize, and make progress toward making material data available, the Materials Technology TSO Wade Babcock reviewed the data requirements in [Limited Report 213 - Material Parameters Needed for](#)

[Insensitive Munition-Related Modeling and Simulation Efforts](#). Appended to that report is a reviewed set of data for Comp-B, PBX-9501, and PBXN-109, for use by modelers to assist model development and validation.

For the effort to be worthwhile, MSIAC requests feedback on the accuracy and completeness of this data. In addition, comments on the suitability of the data for extrapolation to analogous commercially available formulations would be valuable (to give an indication of sensitivity of parameters to slight formulation change). Please also let us know if you have any corrections or additions to the data set, or suggestions on establishing new datasets for other commonly used materials. We would also be grateful for comments on the parameters that are key to the modelling efforts. Such information would benefit the community: potentially improving standardization (qualification), helping with the understanding of key material properties, and assisting munitions safety efforts in the long term. Please contact the Materials Technology TSO, Kevin Jaansalu, at k.jaansalu@msiac.nato.int.

Dr Kevin Jaansalu
TSO Materials Technology

MSIAC EFFORTS IN MHM ACTIVITIES

Since 1996, MSIAC has been involved in Munitions Health Management (MHM) in the frame of different NATO technology exchange programs, such as the Science & Technology Organization as it is called now. Some may say that MHM is only about implementing fancy high tech data loggers inside or around the munitions, but it actually goes well beyond this: it is in fact a whole integrated strategy which consists in turning data into useful information.



After the first Cooperative Demonstration of Technology on MHM which was held at the old NATO HQ (see Newsletter Q3-2014 on this topic), a Smart Defence Initiative was started in 2017 with 10 signatory nations (lead nation: UK) under the supervision of AC/326 SG/B. The main objective is to develop an implementation guide for munitions health monitoring technologies. By doing so, the participants will have a common understanding of MHM. In April of this year, just prior to the AC/326 SG/B meeting, the participants worked together in the new NATO HQ Conference Centre. It was the 5th meeting of this group and some great advances have been made, especially on the structure of the final document which will contain chapters on: Life Decision Process, Cost Benefit Analysis, Implementation Strategy, System Requirements, and Data. The final draft of the implementation guide is expected to be issued by the end of 2020.

In connection with this SDI project, it is our pleasure to announce the second [Cooperative Demonstration of Technology on MHM](#). **This event will take place on October, 7-11, in the NATO HQ Agora** which is the big open space linking the wings of the building. This exhibition will allow the participants to showcase the latest advances on MHM technology and how an integrated MHM strategy can lower life cycle costs while improving munitions safety. We hope to see you there for this event!

Christelle Collet and Dr Kevin Jaansalu
TSOs Propulsion Technology & Materials Technology



MUNITION SAFETY AWARDS



OPEN

To acknowledge and encourage progress and achievements in munitions safety and insensitive munitions technology, MSIAC has presented awards for munition safety excellence at the NDIA IM/EM Technology Symposium (IMEMTS) since 1997.

Once again MSIAC will be presenting awards at the upcoming 2019 IMEMTS in the categories of **Technical Achievement** and **Career Achievement**, and nominations are **now open**.

The deadline for nominations is **COB 14th August 2019**. All nominations will be reviewed and winners selected by the MSIAC Steering Committee, made up of senior government representatives from each member nation.

To make a nomination please visit the MSIAC website, where you can find further details of criteria and the required format for nominations: <https://www.msiac.nato.int/news/msiac-munition-safety-award-2019-call-for-nominations>.

The full list of previous award winners is available on the MSIAC website:

<https://www.msiac.nato.int/news/ms-awards>

MSIAC SURVEYS

One of our most important ways of gathering information from the community is through the use of surveys. This valuable resource allows you, the subject matter experts, to provide your views, thoughts and data on important questions relating to munitions safety. Based on the multi-national submissions we are able to analyse, better represent your points of view points and, where possible, draw conclusions and/or make recommendations.

In the past we have used the survey format to help with the review of the IM STANAGs for Fast Heating, Slow Heating and other areas such as new technologies (Data Loggers, Resonant Acoustic Mixing, etc.).

Why do we use the survey format?

It is an efficient way to contact large numbers of users that reside across the globe.

How have we improved the process?

We have transitioned to a web based version of forms that allows the user to contribute through their internet browser. This has streamlined the process and reduces the time taken to complete the questions. The online forms has also reduced our processing time which allows us more time on the analysis of the data set. We also receive automatic updates when a survey has been completed by you; this makes our day!

What topics are we working on at the moment?

The topics of interest to the community (see the table) relate to our work elements and support to AC/326. If you would like to contribute to a survey but have missed the closing date, don't worry. We will accept all contributions and carry out updates to our reports/work.

Questionnaire Title	Release Date	Closing Date	Link	Target Audience
Data Collection in IM/HC tests	29-Jan-19	31-May-19	https://www.msiac.nato.int/questionnaire-on-data-collection-in-imhc-tests	Test facilities
Energetic Material Qualification	14-Apr-19	31-May-19	https://www.msiac.nato.int/energetic-materials-qualification-questionnaire	Qualification
STANAG 4375 Drop Height	02-Apr-19	31-Jul-19	https://www.msiac.nato.int/stanag-4375-review-of-safety-drop-heights	Test facilities; test specifiers
Update L-106 - IM/HC Testing	Nov 2018-Feb 2019	31-May-19	Contact TSO (Christelle Collet)	Test Centre PoCs
MHM Survey			Contact TSO (Christelle Collet)	S3; Users
Processing Technologies	07-Jun-19	30-Sep-19	https://www.msiac.nato.int/questionnaire-on-novel-processing-technologies-in-the-manufacturing-of-energetic-material-em	Manufacturers; Researchers

As always these surveys rely on your input and as such we would like to remind you of what we are working on currently and what we need help with. Without these surveys and the time spent by you the analysis carried out by the MSIAC team would be less representative.

So please continue to take the time to provide your input and a big thank you to those that have contributed.

Dr Matthew Andrews
TSO Energetic Materials



ESMRM TRAIN THE TRAINER (T3) COURSE

MSIAC received the green light from its Steering Committee for the development of a new 3-day **Explosives Safety and Munitions Risk Management** (ESMRM) course. ESMRM is the overarching NATO policy (ALP-16) that defines roles and responsibilities with respect to risk management on NATO missions, and describes the risk management process to be followed if criteria provided in AASTP-1 and AASTP-5 cannot be met.

<https://www.msiac.nato.int/news/explosives-safety-munitions-risk-management>

The course is aimed at students that have previously followed the AASTP-1 and AASTP-5 lecture series or already have a significant experience in explosive safety siting and risk management. The first course is expected to be delivered early 2020.

Martijn van der Voort
TSO Safety of Transport and Storage

OPENING TNO TEST FACILITIES YPENBURG (24 MAY '19)

MSIAC visited the official opening of the TNO test facilities in Ypenburg, The Netherlands. A welcome by Dr. Louk Absil, Director Protection, Munitions & Weapons, was followed by presentations about research groups on 'Energetic Materials' and 'Explosions, Ballistics and Protection'. An impressive tour featured among others 3D printing of Energetic Materials, the High Energy Laser Lab, and a new Vehicle Test Hall.

The following videos summarize some of the capabilities:

- ⊕ [Energetic Materials](#)
- ⊕ [Vehicle Test Hall](#)
- ⊕ [High Energy Laser Lab](#)

Martijn van der Voort
TSO Safety of Transport and Storage

NEW

Check out these **ACCIDENT POSTERS** on some of the most significant munitions or explosives accidents in history via this [hyperlink!](#)

Check out these short reports of recent **ACCIDENTS** from open media via this [hyperlink](#).

You can find all **Technical PUBLICATIONS** via this [hyperlink](#).

Do you want to know what's going on in **AC/326** and its **SUB-GROUPS**?
Check it out [here!](#)

THE FRENCH CHRONICLE

From a technical perspective, it is sometimes very confusing to deal with technical words in a foreign language and their meaning in your native language, in French in my case. I give you a recent example. I take the opportunity to acknowledge our current French intern from the engineering school ENSTA Bretagne, Aurihona Wolff, who is working on Innovative Processing Techniques for energetic materials. As she is very clever and curious she keeps asking questions, which is exactly what we expect from students at MSIAC. And of course, she is asking very clever questions. One of the latest ones was about the isostatic pressing technique to manufacture samples of highly pressed explosives. The technique is described in the reference given below*, and here is the specific part of the text on which she had a clever question: "The energetic material is contained in a rubber membrane, which is evacuated before the application of pressure by using an incompressible oil". It might be totally clear for any native English speaker but I assure you that this sentence is very confusing for a French mind. I explain: "evacuated" sounds very similar to the French word "évacuer" which means "to remove" or "to get rid of". Consequently, how to remove the bag before applying the pressure?? When our dear colleague Matt Andrews heard us discussing this problem, he came to offer his help, and thanks to him, Aurihona and I discovered that "evacuate" in this sentence was meaning "remove the air from the bag"! And all of a sudden, the sentence made sense... Now that you have evacuated the pressure reading this article, you can go back to work!

*Jonghyun Park, Heng Pan, Mark J. Mezger, Steven M. Nicolich, John M. Centrella, Frank T. Fisher, Nezahat Boz, Moinuddin Malik, Seda Aktas, Jing He, and Dilhan M. Kalyon, "Mixing, Coating and Shaping" in book : "Energetic Materials - Advanced Processing Technologies for Next-Generation Materials", Chapter 9, ISBN 9781138032507, 2017

Christelle Collet
TSO Propulsion Techniques

FAREWELL FROM ... MARTIN POPE !



After 4 and a bit years at MSIAC it is time to move on and return to my home and family in UK. Whether they will be happy about that only time will tell!

I have fond memories of my time at MSIAC working with a team of truly Subject Matter Experts. I have previously worked in other similarly organised teams but what struck me most was the depth of knowledge and expertise each of my colleagues in MSIAC have in their specialist field, truly a group of world leading experts, all very inspiring. Now working back in UK what also strikes me most was the enthusiasm and energy in MSIAC.

I also wish you all in the wider munitions safety community well. I met many people in the Member Nations who have great enthusiasm and energy for the importance of our work. Many face the same challenges of gaining knowledge, experience and skilling the next generation, to my mind this emphasised the importance of MSIAC as a



focal point and support for this.

I also have to say thank you to Diane, Angy and Dimitri working in the MSIAC 'engine room', they made our work so much easier. I hope you will all remember me every time you make yourself a hot drink.

As my colleagues will tell you, what I will not miss about Belgium is the driving. It is a pleasant change to see turn indicators used and people saying thank you and acknowledging an act of courtesy, if only I stopped driving like I was still in Brussels.

I have handed over to Matt Ferran who I have worked with in the past. He is broadly experienced having worked in Australia and UK and will bring enthusiasm, energy and youth (damn him) to the job.

From a very old and exhausted ex-TSO, thanks for all your good wishes and I wish you all well in your future endeavours, from the land of warm, flat beer, pull me another one please landlord.

AND FAIR WINDS AND FOLLOWING SEAS... FROM WADE BABCOCK !



Preparing your farewell message is somewhat double-edged – one can look back with some pride on the things you accomplished with a great team of people, but you will also be saddened by the fact that you are leaving that team.

So, first I'd like to thank that team at MSIAC. These are some of the most dedicated, intelligent, and creative thinkers working in the munitions safety design community today. These folks offer so much: from the technical skills that the TSOs bring to the table, the technical and programmatic leadership of the project and office manager, the data gathering and document management prowess of the information specialist, all the way to the information technology that is kept "always on" by the IT admin. I have rarely worked with a smoother-running, more agile, responsive, and technically capable group of people – always willing to help, always looking to solve problems.

Next, working with the professionals across the member nations is one of the best aspects of MSIAC. You are truly part of something bigger – exercising common goals of improving the landscape of munitions safety for all, and assuring we are all playing to the same rulebook. I immediately saw that we all had similar challenges and opportunities, and they are just as dedicated to achieving their goals as we are.

The technical work and other projects that I was a part of while at MSIAC definitely offered experience like no other, and I hope they will have a lasting impact across the organization.

- Establishment and advancement of the NATO Smart Defence Initiative focused on Munitions Health Management.
- Providing technical input to MSIAC workshops and information gathering, including the Science of Cook Off workshop, the novel energetics manufacturing effort, and international use of munitions dataloggers.

- Planning and participating in multiple national and international workshops and symposia.
- Planning and executing multiple national visits including Australia, France, Germany, Spain, Switzerland, the United Kingdom, and the USA.
- Planning and executing the MSIAC 25th Anniversary event, promotional video and supporting materials.

Also, working at NATO HQ was a real treat. I was able to glimpse how a large military and political alliance can facilitate nations working together, and how the people you meet are just like you with the same concerns for their kids, good jobs, a stable and bright future, and a safe place to work and live. My family and I were also welcomed into a very supportive and engaging community of Americans working in Brussels for the US Government.

My three and a half years at MSIAC will very likely be some of the most fondly remembered times of my career. Not only did I have the privilege to work with a great team at MSIAC, but I also met and worked with members of the munitions community across many nations.



WELCOME KEVIN JAANSALU !

Kevin joined MSIAC on April 1st, 2019 as the Technical Specialist Officer for Materials Technology, coming from the Royal Military College of Canada (RMC).

With an undergraduate degree in Fuels and Materials Engineering, Kevin completed his Masters at McGill University in Ceramic Engineering in 1991, and his PhD at RMC in Chemical and Materials Engineering in 2002.

As a former military officer, Kevin has very broad work experience spanning from operations to research and development. His posting to 408 Tactical Helicopter Squadron led to UN operations in Haiti and also included duties of radiation safety officer, environment officer, general safety officer, and air weapons safety officer. He also served for a time as a research staff officer for aeropropulsion research and development and as a Lecturer and Assistant Professor in RMC's academic programs in chemical and materials engineering. In 2005, Kevin retired from the military and promptly joined the faculty at Montana Tech, teaching courses in ballistics, explosives engineering, and materials engineering and design. In 2009, Kevin returned to RMC to develop and provide programs in Ammunition Engineering. Kevin became involved in many aspects of the academic program, its students, and the requirements for the Canadian Armed Forces. Kevin jumped at the opportunity to come to MSIAC, eager to advance materials engineering and related aspects to the safety of munitions.

... AND GREETINGS FROM RODRIGUE BARLERIN, LUCAS CAYLAR ET FLORIAN DJEDIS !

We are three students at ENSTA Bretagne, a French engineering school. We have just finished our 2nd year in general mechanics and will start our specialization year in September in pyrotechnics. During our time here, we will



try to exploit and analyse as much information as we can from the exceptional database of MSIAC. This will help us to provide comprehensive reports about our different internship subjects.

I am **Rodrigue Barlerin**, a French civilian student. Here at MSIAC I will be working on "Defect detection and characterization capability study for energetic materials" under the supervision of Matthew Ferran, TSO in Munitions Systems and Dr Matthew Andrews, TSO in Energetic Materials. The aim is to generate a review of the process and equipment capability regarding the detection and characterization of defects in energetic materials. This is a very interesting and technical task and thanks to MSIAC's database, I am able to find relevant information about it easily! Also having the possibility to visit Brussels, which seems to be a very dynamic and multicultural city, thrills me!

I am **Florian Djedis**, a French military student. I am currently working on the subject "Collation and Analysis of IM Tests" under the supervision of Martijn van der Voort, TSO in Safety of Ammunition Storage and transport. I will gather information about IM tests and results and particularly about munition responses deflagration and explosion. I will also develop a tool for TNT equivalency calculation in order to make a review of safety distances

for different tests. This is a very complete subject that will also help me for my last year in school and, thanks to MSIAC's data and the TSOs, I will be able to complete the subject and will learn a lot.

I am **Lucas Caylar**, a French civilian student. I am currently working on a project entitled "Instrumentation Techniques" under the supervision of Christelle Collet, TSO Propulsion Technology and Martijn van der Voort, TSO in Safety of Ammunition Storage and transport. I will be focusing on gathering information regarding the instrumentation required for IM and HC tests and specifically on the instrumentation techniques related to the blast effects and the velocity of the detonations. The topic of this project is very stimulating, and the amount of information I will learn, will be definitely beneficial for my future professional life.



PARARI is the premium international explosive ordnance safety symposium held in the southern hemisphere.

PARARI provides an opportunity to discuss key safety issues, professional development, education and network building for people working in and around explosives.

PRESENTATIONS

Abstract submissions are now open!

Registration Costs	Amount	Date
Military - Early	AUD \$ 450.00	13 May—23 August
Non-Military - Early	AUD \$ 550.00	13 May—23 August
Military - Standard	AUD \$ 550.00	24 August—23 Oct.
Non-Military - Standard	AUD \$ 650.00	24 August—23 Oct.
Day Registration (no social event)	AUD \$ 300.00	13 May—23 August
Full Time Student (no social event)	AUD \$ 150.00	13 May—23 August

Your valuable contribution makes PARARI the event it is. We welcome submissions of abstracts for a range of presentation types: research papers, technical briefs, workshop/tutorials, lessons learned, product briefs, and poster sessions.

We will be considering all abstracts linked to this year's theme:

Safe Explosive Ordnance for the Warfighter Through Innovative Technology & Culture

DELEGATE REGISTRATION

Delegate registration includes:

- 3 day program including keynotes, technical presentations, and workshops
- Conference entrance fee
- Welcome drinks at the conclusion of proceedings on day 1
- The conference dinner, held in ANZAC Hall at the Australian War Memorial on day 2.

Military registration is open to Australian and International uniform Military member and government employees working directly for the Department of Defence/Ministry of Defence.

Delegates can register through the PARARI 2019 website:

<https://www.unsw.adfa.edu.au/conferences/parari/registration>

CONTACT US

For more information on PARARI, please see our website or contact us via email:

<https://www.unsw.adfa.edu.au/conferences/parari>
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