

CBRN Newsletter

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Foreword



Wg Cdr Lee Taylor (Comdt DCBRNC)

“Faced with the choice between changing one’s mind and proving that there is no need to do so, almost everyone gets busy on the proof”

Welcome to the 2011 edition of the CBRN Newsletter, which we have produced with the intent of updating the UK Defence CBRN community on some of the issues affecting its members.

It could be argued that the above quote from the 20th Century economist John Kenneth Galbraith pretty much sums up where UK CBRN has been for the past 11 months since the Strategic Defence and Security Review (SDSR) was

announced. What followed was a long period of debate, scrutiny and uncertainty as Defence decided the future of its specialist CBRN capabilities; all of us in the CBRN community must have sympathy for the hard-working members of 1 Royal Tank Regiment as they now await the outcome on deliberations over Future Force 2020. It must also be acknowledged that the challenges facing the new Defence CBRN Wing are significant too. The reconfiguration of specialist CBRN capabilities, combined with tough decisions over other Planning Round (PR) 11 options, the anticipated debate on PR 12 and the contribution to the upcoming Olympics, all combine to produce an unsettling and challenging period for all of us.

Yet the articles in this newsletter demonstrate that no-one was resting on their laurels in the hiatus of the SDSR/PR 11 deliberations; international terrorism - which specifically included CBRN attack - was affirmed as a Tier One Priority Risk in the National Security Strategy released in October 2010, and the requirement for the retention of CBRN science and technology capabilities that contribute to counter-proliferation and our military

means of responding to the potential use of CBRN materials by terrorist or state actors was confirmed in the subsequent SDSR. Indeed, the threat is evolving, and doctrine is being updated to better align our approach to counter it. Even in the 13 months that I have been in post, the new Light Role Team capability has become operational, IBDS has been reconstituted, a Radiation Monitoring Team deployed to Japan in the aftermath of the Fukushima Earthquake, the General Service Respirator was accepted into Service and fielded, and significant capability developments have been delivered by our civilian emergency service counterparts – all demonstrating that change is a constant, and we are striving to avoid hubris. In support of this operational output and activity, the DCBRNC is also evolving its training to better reflect the needs of the ‘customer’, better equip the enhanced generalist on operations, and exploit some of the opportunities that e-learning and simulation have to offer. Many of these developments are explained further in the following pages.

We hope that this Newsletter is of interest, and welcome feedback for the next edition.

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A New Defence Chemical, Biological, Radiological and Nuclear (CBRN) Wing

by Sqn Ldr Jamie Milnes RAF Regt

A Lengthy Process

The Secretary of State for Defence has approved the implementation of a measure within the Strategic Defence and Security Review, implemented under MOD Planning Round 2011, to delete the Jt CBRN Regt - which had comprised 1 Royal Tank Regt (1RTR), 27 Sqn RAF Regt, elements of the Royal Yeomanry, and 2623 Sqn RAuxAF Regt - and transfer the balance of Defence's specialist CBRN capability to the RAF Regt. This decision was reached after extensive, protracted and independent consideration across the MoD to the highest levels.

A New Order

A new, RAF Regt-manned, Defence CBRN Wing will form during Autumn 2011 and formally stand up in December 2011. It will deliver: all of Defence's biological warfare agent detection; light specialist CBRN detection and identification; decontamination; sampling, identification and transportation capabilities; as well as contribute to Nuclear Emergency Response and other CBRN capabilities. Following the Secretary of State's announcement, the Commandant General RAF Regt issued the following message to the Corps:

"On Tue 2 Aug 11, the Secretary of State for Defence agreed to the 2010 Strategic Defence and Security Review (SDSR) measure - subsumed by a PR11 Option - to delete the Joint Chemical Biological Radiological and Nuclear (CBRN) Regt and transfer all of Defence's specialist CBRN capabilities to the RAF Regt.

The key implications of this decision will be as follows: there will be no impact upon those capabilities currently provided by the RAF Regt (26 and 27 Sqns



RAF Regt and 2623 Sqn RAuxAF Regt, and the RAF will remain the Lead Service for CBRN); the wide area CBRN reconnaissance and survey capabilities, based upon the Fuchs armoured vehicle, will be gapped; all other capabilities currently provided by the Army element of the Jt CBRN Regt (the Multi Purpose Decontamination System, some of the Light Role Teams, and all command and control) will transfer to a wholly-RAF Regt manned Defence CBRN Wg, which will include 26 Sqn RAF Regt, 27 Sqn RAF Regt and 2623 Sqn RAuxAF Regt. Whilst there will be a modest increase to the RAF Regt establishment, there will be a net reduction of 319 Army posts in the current specialist CBRN Force. The total saving to Defence will be £129 million over 10 years.

The Commander-in-Chief UK Land Forces informed 1 Royal Tank Regt (1RTR) personally yesterday of the decision to cease all Army involvement in specialist CBRN. No decisions have been made on the future of 1RTR; this will be considered as part of the wider requirement to restructure the Army in light of the recent outcome of the '3-Month Exercise', and is wholly a matter for the Army. 1 RTR will remain at RAF Honington for at least

the medium term, while the transfer of capabilities takes place and their future is decided.

This decision brings to a conclusion a protracted period of intensive, sometimes understandably impassioned debate over the future provision of specialist CBRN capabilities for Defence. Detailed planning for the implementation of the measure will now commence. This will be the responsibility of the AOC 2 Gp, on whose behalf I will develop plans for the appropriately timely transfer of operational command and control and operational capabilities, the continued delivery of which remains the Defence priority. This will be done in close cooperation with HQ Land (specifically, Director Royal Armoured Corps) to ensure that Army personnel matters are addressed positively and sensitively.

1RTR have made a quite extraordinary (and often largely unsung) contribution to Defence over the past 12 years. They have done so with all the exemplary professionalism and commitment typical of their proud heritage. It has truly been an honour to serve alongside them, and I know that all members of the RAF Regt will wish them every success in whatever the

future may hold.

As for the RAF Regt, this decision will leave the Corps as the UK's sole provider of specialist CBRN capabilities for Defence. Clearly, given the circumstances of the MOD's preparedness to take risk against the deletion of the Fuchs capability in the context of a parlous financial climate, this is the right decision for Defence and it is not the time for inter-Service triumphalism. Be under no illusion that the responsibility placed upon the RAF Regt will be enormous and expectations will be high - we must deliver, and I know that we will, no matter what the challenges that lie ahead."

Handing Over Responsibility

Responsibility for delivery of specialist CBRN capabilities will be handed from the Jt CBRN Regt to the Defence CBRN Wg in a ceremony at RAF Honington in December 2011. The future of 1RTR will be informed by work on the future Army which is currently underway. It is intended that 1RTR should have left RAF Honington by March 2013.

The New Wing

The nomenclature for the new

Defence CBRN Wing (it is hoped that this will include an RAF Regt wing numberplate), has yet to be put to the Air Force Board for approval. On formation, the wing will comprise a Wg HQ, 26 Sqn RAF Regt, 27 Sqn RAF Regt, 2623 Sqn RAuxAF Regt, and a CBRN Operational Conversion Unit (OCU). The Officer Commanding (Designate) is Wing Commander Dave Williams; the Wing Chief of Staff will be the author of this article, Squadron Leader Jamie Milnes.

Until the Defence CBRN Wg formally takes on the specialist CBRN tasks, operational output will be delivered as at present, in that elements of specialist CBRN capability will continue to be provided by the Jt CBRN Regt and elements will continue to be delivered by the RAF FP Centre. Concurrently, the new Wg HQ and OCU will form and RAF manpower will be assigned and trained to undertake the roles to be transferred (currently fulfilled by 1 RTR personnel). This will involve training an additional 6 RAF-manned CBRN Light Role Teams (LRTs) (in addition to the 2 RAF-manned LRTs which have already been trained), decontamination (involving Multi Purpose Decontamination Systems),

and the provision of CBRN specialist command and control capability. 26 Sqn RAF Regt and 27 Sqn RAF Regt will expand to deliver these additional capabilities and 2623 Sqn RAuxAF Regt will train to meet its new tasks. The CBRN OCU will also be established to provide specialist CBRN training and evaluation, capability development and doctrinal/TTP support to the Wg and its sqns.

The decision to have the RAF Regt deliver all Defence's remaining Specialist CBRN capability into the future carries great responsibility and high expectations. By centralising these capabilities on a single unit, fully integrated with wider force protection capabilities and activities, there will be significant opportunities regarding the ways in which CBRN capability is developed and delivered for all areas of Defence. It also offers opportunities to develop closer linkages with other agencies involved in CBRN, such as the DCBRNC and the RAF FP Centre, Defence Science and Technology Laboratory, Defence Equipment and Support, and other nations' capabilities. This is a significant opportunity for the RAF Regt and one which we intend to fully meet.

Light Role Team Project Meets All In-service Date Targets *by Peter Fray, Business Manager CBRN DT*

The Light Role Team (LRT) project successfully achieved its in-service date on time, to performance and budget. This Category D project, delivered by DE&S' CBRN Delivery Team is a highly mobile, flexible and self-sufficient CBRN investigation team, which has delivered a significant uplift in the Jt CBRN Regt's capability following replacement of the UOR project Special Monitoring Team.

Each system produced by Smiths Detection Watford comprises a bespoke Command and Cargo 6x6 Pinzgauer vehicle fully loaded with CBRN Detection, Identification,

Monitoring and Analysis Equipment. The capability comprises both in-service and Commercial Off The Shelf equipment, which can be dismounted and loaded onto other platforms. Equipment selection was based on performance against key user requirements, ease of use, reliability and a reduced training footprint. A comprehensive training package, together with an initial 2 year spares pool, has also been delivered as part of the project.

The LRT carries enough spares and supplies to allow it to be self-sufficient for a 3-day period in which it's highly trained 8 man

team of CBRN specialists can carry out up to three 8 hour missions. This allows the LRT to be rapidly deployed from the UK to a remote Forward Operating Base or in support of Military Aid to Civilian Authority, where it can operate independently from any specialist supply chain.

The DE&S Project Manager, Andrew Staddon, said "The MOD and industry team worked extremely hard to deliver this technically complex project, overcoming significant integration issues to ensure the capability was not only fit for purpose but safe to operate."



Light Role Team project met all in Service date targets.

Joint CBRN Regiment Update

by Capt Nick Bridges, RSO 1 Royal Tank Regiment

The past twelve months have been busy and the Regiment has had to navigate through the turbulent waters generated by operational commitments, training requirements and role security.

G Sqn commenced training in September last year on the new Light Role Team (LRT) Equipment, which now replaces the Specialist Monitoring Team capability. After completing a 14 week course the teams completed their final exercise on Salisbury Plain and included missions in the confined spaces of the Copehill Down Village drain network alongside the Ambulance Service's Hazardous Area Response Team. The Sqn conducted Live Agent Training (LAT) with Dstl and declared readiness in March this year, relieving H Sqn as the high readiness Sqn. 27 Sqn RAF Regiment also achieved IOC with their IBDS platforms and subsequently generated two LRTs. In June D Sqn deployed to British Army Training Unit Suffield on the Canadian led multinational LAT Exercise PRECISE RESPONSE. The Squadron deployed with five

LRTs, three from 1RTR and two from 27 Sqn. The Regiment again demonstrated its professionalism and adaptability as it seamlessly integrated with the other nations. The Regiment has also uplifted to the latest version of the BOWMAN tactical communications system in April, with all the Sqns conducting Collective Training to verify the new capability. The Regimental headquarters deployed to Germany on Exercise IRON TRIANGLE 11, a biennial Collective Training Level 6 exercise designed to develop and train Headquarters 3rd (United Kingdom) Division Command and Staff. The Regiment was keen to take part in order to achieve a number of wider objectives, including: highlighting how the Jt CBRN Regt can integrate with the developing Divisional framework; testing staff planning and procedures in a demanding G3 environment; and finally to train in the use of BOWMAN for communication and planning. The Regiment achieved its aims and also identified many areas where it has to evolve, to keep pace with

current operations.

As covered in the previous article, in Apr 11 the Secretary of State for Defence approved a Planning Round 11 measure to rationalise the delivery of specialist CBRN capability to Defence. In Jul 11, after numerous studies and in depth consultations, it was decided within the MOD that the specialist CBRN capability would be lodged within Air Command.

Post handover on 16 Dec 11, 1RTR will become divisional troops with 3(UK)Div and current planning anticipates that the Regiment will be used for a variety of roles including operations, support to operations and experimentation. Future roles of 1RTR will be considered along with all other Household Cavalry/ Royal Armoured Corps regiments as part of the Future Forces 2020 review being undertaken by Maj Gen Carter, expected to deliver in late 2011.

Light Role Team personnel and equipment.



OP PEDIGREE - The UK Military Response to the Fukushima Nuclear Power Plant Incident – Japan

2011 by Flt Lt Glen Quayle, DSC 26 Squadron RAF Regiment

Due to the devastating Earthquake and Tsunami on 11 March 2011, the nuclear power plant at Fukushima suffered serious damage, resulting in a large radioactive release in the local area and, to a lesser extent, large areas of mainland Japan. In response to this incident, a small Radiation Monitoring Team (RMT) was generated ready to deploy to support the British Embassy Tokyo (BET). As a member of the Nuclear Emergency Response Organisation, 26 Sqn RAF Regt was tasked to provide the relevant experts to monitor, provide protection advice, health advice and reassure BET staff and British nationals in Japan. The team consisted of 4 personnel: Mr Geoffrey Todd, Senior Officer Nuclear Emergency Monitoring Organisation (SONEMO) who is also a qualified health physicist, and from 26 Sqn RAF Regiment: OC RMT, Flt Lt Trevor Slark-Hollis; SNCO RMT, Sgt Owen Hughes; and JNCO RMT, Cpl Jason Lovett.

The RMT deployed on Sunday 20 Mar in order to support the BET during the crisis as part of a Foreign and Commonwealth Office (FCO) task; specifically, it was to:

1. Provide data to inform FCO duty of care responsibilities.
2. Provide data to better inform UK analysis on which FCO travel advice is based.
3. Provide reassurance to Embassy staff on nuclear health risk issues.
4. Provide Embassy staff on best practice on nuclear protection issues.

Once at the Embassy, the RMT set up an Operations Room and acquired the first air sample. This baseline sample was significant, as it provided the data to formulate decisions regarding the need for



Map in General of Radiation Zone around Fukushima.

Embassy staff and British Nationals to take medical countermeasures (MCMs). As a precaution the team had taken the MCM Potassium Iodate prior to arriving in Japan. The first sample analysed identified that there was no need for the team or British Nationals to take medical precautions. However, it was decided that it would be prudent to supply British Nationals with the Potassium Iodate tablets via the Embassy in case of further, more wide-spread releases.

The first day in Japan began with the SONEMO nominating 8 points around the Embassy grounds for direct gamma and smear samples to be taken. This process would ascertain the level of contamination around the Embassy as a result of the initial release of radiation from

the Fukushima nuclear power plant. These first smear samples, when analysed, showed elevated levels of radioactive isotopes; however, these were not at harmful levels. Over the course of the next few days the Embassy was gridded into equal size boxes for a full ground deposition to be carried out with the samples tested on a Gamma Spectrometer. The results identified that the plume from the initial release had passed over Tokyo, but at levels that were not of any risk to health. For the remainder of the deployment, 7 points around the Embassy grounds were continually smeared and tested to ensure that the half-life decay rate was proceeding as expected.

The team was also tasked to conduct smear samples from several points around Tokyo city itself, predominantly in the main tourist locations. The resulting data indicated that the level of radioactive isotopes were raised but, again, not to a harmful level. Concurrently, SONEMO and OC RMT were liaising with other nations embassies and advising the BET staff on the significance of the results being collected, both by the UK RMT and the other nation's monitoring teams.

As a precaution and since aftershocks from the original earthquake were still substantial, the team conducted planning to protect all personnel within the BET grounds in the event of a further release from the Fukushima Nuclear Power Plant. Advice on movement, IPE precautions and the establishment of a citadel collective protection facility within the Embassy was provided.

As a measure of reassurance for Embassy staff, equipment and vehicles used on Embassy duties were monitored for contamination on a regular basis, particularly



Sgt Hughes and Cpl Lovett input data from readings taken.

those that had been further north of Fukushima to the Sendai area as part of Consular business. The team stayed in Japan for 2 half-life's of the radioactive isotopes as advised by SONEMO.

On return to the UK, the team underwent whole body monitoring at the Institute of Naval Medicine

Alverstoke, near Gosport. This entailed each member of the team positioned over 4 Gamma Spectrometers and a further 2 Alpha/Beta monitors being positioned over the lungs. This medical monitoring completed the medical care process that supported the team during Op PEDIGREE and complemented the constant self monitoring conducted by the team throughout the whole operation.

The deployment of the 26 Sqn RAF Regt RMT to Japan, in support of the FCO, demonstrated a military capability that has previously only ever been exercised. Although primarily tasked with nuclear incidents within the UK, the RMT has clearly demonstrated its ability and flexibility, whilst conducting its role on a short notice overseas deployment. The importance of the data gathered cannot be underestimated; it was this information gathered and analyzed by the team which formed the basis of decisions made regarding travel advice and the planning for any potential evacuation of UK Nationals from Japan. The experience gained from the deployment will be invaluable, providing a clear understanding and foundation for further development regarding the future military monitoring response to nuclear incidents, both at home and overseas.

Sampling Identification of Biological Chemical and Radioactive Agents (SIBCRA) Annual Update

by Flt Lt Glen Quayle, DSC 26 Squadron RAF Regiment

In addition to their deployment on Op PEDIGREE this year, February 2011 saw 26 Sqn's SIBCRA team deploying to the Dugway Proving Ground in Utah on Ex DESERT VAPOUR. The team conducted a full range of mission rehearsals at a number of locations. For the first time personnel received training in dealing with Home Made Explosives and Narcotics, crucial when dealing with potential illicit or clandestine

laboratories encountered in Afghanistan. The exercise also saw the first use by the Sqn of the First Defender, a Rahman Laser Spectrometer, that provides a 'point and shoot' chemical detector that can operate through clear sealed containers and can differentiate

between Chemical Weapon Agents, Toxic Industrial Chemicals, narcotics and white powders.

The Chief Scientific Adviser's Commendation

On 28 June 2011, 26 Sqn RAF Regt was awarded a commendation from the MOD's Chief Scientific Adviser, Professor Sir Mark Welland, in recognition of the Sqn's exceptional contribution to Science and Technology in Defence. Particularly, singled out for praise amongst the various capabilities and operational outputs of the Sqn, was the deployment to Japan of the RMT and it's contribution in informing cross-governmental decision making. The SIBCRA Military Sampling and Special Courier Teams were also highlighted as a demonstration of how 26 Sqn continues to evolve key Defence Strategic outputs and trail-blaze in an extremely niche, technical and scientific capability.

The SIBCRA Military Sampling Team (MST) conducting initial checks of an industrial complex CBR pre-cursors or production facilities.



Defence CBRN Centre Training Estate Development

by Matthew Hinds, SO3 Co-ord DCBRNC



Light Role Team (LRT) Training with crashed aircraft.

The article featured in last years CBRN Newsletter highlighted the changes made to the DCBRNC Training Estate in order to contemporise our facilities to meet the change in threat, both at home and on operations. The question must now be asked: how has this capability been utilised in the previous year?

In sum, interest from the User Community, both military and civilian has increased greatly. The Centre has and continues to receive enquiries from agencies based both at home and abroad as word spreads about the excellent training facilities available, which offer a series of realistic scenarios within the confines of a secure area; an ideal venue for a broad range of training to take place.



Hazardous Area Response Team (HART) use the DCBRNC training estate for their Incident Response training.

The resident Hazardous Area Response Team (HART) training faculty has continued to use the facilities in support of training for their Incident Response Unit (IRU) and Bronze courses. More recently the Centre has started to attract interest from surrounding counties, who plan to use the training scenarios to build on their existing skills and in the development of procedures. It is also hoped that the Centre can host a Faculty Exercise in the near future.



Sampling and Identification of Biological, Chemical or Radiological Agents (SIB CRA) teams using the DCBRNC training facilities during a recent exercise.

On the military front the Centre has hosted specialist teams from the Sampling and Identification of Biological, Chemical or Radiological Agents (SIB CRA) teams and the Joint Regiment's Light Role Teams (LRTs) who have both used the training estate to exercise techniques and procedures.

In the future the Centre is looking to add to our training suite with the addition of a number of scenarios. It is hoped that a 'Confined Search' scenario can be established that will simulate a collapsed building; focusing on search and rescue/casualty extraction; the Centre is also investigating the possibility of setting up a 'Crashed Train' scenario; both of which are realistic scenarios and regular occurrences in this day and age.

In addition to the extra physical training scenarios the centre has also begun to examine the opportunities offered by an 'e-learning' environment. Although only at an initial stage the Centre is investigating whether elements of its current syllabus could utilise an IT-based learning environment, as well as identifying where e-learning could provide new training capabilities both pre, during and post-course. As a part of this process the Centre is in the process of converting its IT suite into a Virtual Battle Space 2 (VBS2) training suite. VBS2 offers realistic, flexible battlefield simulations and the ability to operate

on foot, or in a wide variety of land, sea and air vehicles within tailored scenarios (very much in the vein of games like 'Call of Duty: Modern Warfare 2' that is available on the Xbox or the PS3). This flexibility could potentially enable the Centre to provide realistic environments, equipment and scenarios that would be either physically impossible, or cost prohibitive in the real world.

In order to promote these additional facilities more onus has been placed on marketing; promotional leaflets, a facilities catalogue and the introduction of Visitors' Days have all been instigated to attract new customers. More information on these can be seen on the centre website on the Defence Intranet. Alternatively, details can be found on the Centre's Internet site at: www.mod.uk/dcbnrc.



Virtual Battle Space 2 CBRN scenario simulation.

All Change in the Technical Support Group

by Maj Mike Macdonald RM, SO2 TSG DCBRNC



New TSG SO1 LTC Shane Wilde US Army

In this foreword to the main article I'd like to introduce myself as the new US Army exchange SO1 for the DCBRNC Technical Support Group (TSG); replacing Lt Col Greg Borchering, who has delivered a terrific performance over the past two years.

The following articles, covering the Trials, Combat Readiness Evaluation (CREVAL) and External Training Teams (ETT) illustrates the overall versatility of the TSG, which is fully dedicated to enabling the CBRN readiness of Defence. Our new mission statement is illustrated at the top of the article.

The trials team remains dedicated to providing integrity to CBRN equipment testing, thus conducting CBRN equipment testing and trials by Soldiers for Soldiers. The ETT continues to conduct training domestically and abroad for the MoD's international partners. In addition, under the direction of Headquarters 2 Group, the TSG is developing the evaluation criteria to support the development of an External Evaluation Team that will



focus on assessing General and Specialised CBRN unit capabilities.

Personally, I am excited at the opportunity to get to know the MoD and being embedded for the next two years within the DCBRNC; a chance to establish relationships where experience, professional knowledge, policies and doctrine are shared and I'd like to thank everyone I've met for their extremely gracious welcome.

ETT – The General Service Respirator has Landed!

With the General Service Respirator (GSR) now being fielded to all three Services, it was never going to be a quiet year for the ETT, and this was borne out by events. While the CBRN Instructor (CBRNI) students at the DCBRNC School received a 4-day GSR conversion after their course, there was still a requirement to convert the existing pool of S10 CBRNIs – no mean task!

Although GSR trained CBRNIs can deliver GSR Train The Trainer training to S10 CBRNIs within a 90 days of completing their own training, this couldn't capture all the CBRNIs out there. The conversion of the vast majority would be the responsibility of the ETT, as well as validating cascade training as required.

TSG's New Mission Statement

After much trial and error, the method of delivery has morphed from an entirely external basis, where the ETT would deploy to a Formation location and train that Formation's instructors en-mass, to a more flexible three-pronged approach.

This approach is where, in addition to cascade and external training, the ETT also runs a GSR conversion course at the DCBRNC itself. This minimises administration, accommodation and transport for both sides and allows a unit to send small numbers of students, in harmony with their diaries, as required, rather than having to concentrate on 20-30 NCOs in one place and time. In addition, because the courses are of minimal impact to the DCBRNC, they can be run frequently allowing maximum flexibility to bidding units.

The option of deploying an ETT to an external location can therefore be limited to locations outside the UK, where the logistical costs of sending a 3-4 man ETT there is far cheaper than sending many CBRNIs back to the UK, individually, to attend the internal course.

So far this approach seems to be working well. While occasionally

stretched, the courses completed to the present day have managed to cope with the high demand, which is expected to grow even higher as more units come into zone for roll-out. The ETT remains confident, however, that it can cope with this demand.

Further details on the methods of conversion and how to request ETT support can be found on the DCBRNC website, under 'GSR'.

TSG Trials Unit – No Cost Trial? No Problem!

Over the past year the TSG trials team has moved from a pair of individuals providing CBRN specific advice to the GSR and Advanced Respirator Test System (ARTS) programmes to being a fully recognised CBRN Trials Unit, after which the TSG began the development of the CBRN Trials Unit SOP.

This has been enabled through close liaison with the Trials Planning Office and the Trials Management Course that it runs at the Defence Academy, Shrivenham, with whom the CBRN Trials Unit has established a coordination relationship, while still reporting to 2 Group.

The CBRN Trials Unit is managed and led by the SO3 Trials post, currently held by Capt Ricky Davis RE. The SNCO Instructors within



SSgt Howe freezing in the UK during the cold weather trial.

TSG have already amassed much experience within the trials sphere; one being a former member of the Infantry TDU and the others having been instrumental in the development of the GSR and ARTS programmes.

The first tasking undertaken by the CBRN Trials Unit was to, at no cost, trial the ARTS; a prerequisite for acceptance by Front Line Commands. The ARTS, as it stood at the time, had an issue; while it performed well in the lab it didn't perform well in a UK outdoor environment, where it would most

likely be used.

After generation of a set of test criteria, the CBRN Trials Unit set about organising and conducting simultaneous UK Hot (Al-Udeid in Winter) and UK cold (UK in winter) trials with a revised ARTS that had just been produced by Scotts.

The trial itself had to be extended, as several further issues came to light, but each issue was identified, resolved and then re-tested as the trial progressed, leading to the final approval of a system that had changed radically from the original and that, if used correctly, would perform well in any UK environment.

Due to the relative complexity of the revised ARTS, a user and troubleshooting guide was produced and released on the DCBRNC website; subsequently it has also been adopted by the CBRN Delivery Team (DT) and included in the ARTS documentation itself.

Now that the CBRN Trials Unit is firmly established it is working with the CBRN DT to ensure it is fully involved with the development of any new CBRN equipment as it moves through the procurement cycle.

Capt Davis relaxing in Al-Udeid during the temperate trial.



Specialist Unit Evaluation – Getting Off The Ground

As stated in the foreword, in 2010 the TSG was tasked by Headquarters 2 Group to generate a REVAL regime for the UK's specialist CBRN units. A number of factors, such as the more generalist nature of DCBRNC instructors, the lack of established UK doctrine to base from and uncertainty about who would provide the UK's specialist CBRN capability, meant that this complicated role has taken time to be developed. In the meantime the TSG has worked to ensure it has all the information and skills required to understand both specialist CBRN SOPs and the evaluation criterion used to assess other NATO countries units.

The first task was to ensure the TSG instructors had a good understanding of specialist doctrine and SOPs, including other NATO countries. In addition to sending observers to the Jt Regt's Light Role Operators courses (LROC) two Sergeant Instructors were also deployed to the American CBRN School at Fort Leonard Wood, Missouri, to attend the Dismounted CBRN Recon Course run there for US Chemical Corps soldiers. On completion they also attended the Hapsite Instructor course, also at Fort Leonard Wood. Attendance



The first NATO CBRN Unit Evaluators Course.

on this course was found to be of great benefit when TSG personnel subsequently observed the LROC, as it both promoted a greater understanding of how the teams were operating and brought to the fore useful tactics, techniques and procedures not used in the UK.

The next course undertaken was a NATO CBRN Evaluator course in order to gain familiarity on the conduct of NATO CBRN CREVAL, including the doctrine and reference

materials used. The course took place at the Czech Joint CBRN Centre of Excellence in Vyskov and was attended by a wide range of NATO CBRN specialists. It was a worthwhile course, as it focused on the production of evaluation criterion for a CBRN CREVAL, which was the first task facing the TSG.

The knowledge gained on this course enabled to TSG to start generating a draft CBRN CREVAL concept. This task has fallen to WO2 Hamer, the TSG WO2, who has put many miles on the white fleet vehicles between DCBRNC and Honington, liaising with both the Jt CBRN Regt and 26 Sqn RAF Regt in order to properly understand their individual requirements.

At this stage the concept of specialist unit CBRN evaluation is still in its infancy. Much work is now required to expand on what has already been completed by engagement with the re-shaped specialist CBRN unit in the coming year.

US Chemical Corps soldiers conduct chemical survey planning at Fort Leonard Wood.



Defence CBRN School

Courses Update

by Lt Jim Hartley RN, 2iC CBRN School DCBRNC and Sqn Ldr John Harvey RAF, TDA DCBRNC

The Defence CBRN Centre School has undergone many changes over the last 12 months; there has been a large turnover of staff both military and civilian and there have been changes to all the courses which the School delivers:

CBRN Instructor Course / GSR Instructor Conversion Course

The CBRN Instructor Course has changed dramatically in the past year. The changeover to teach GSR, in addition to the S10, while initially affected by the delay in fielding of the Advanced Respirator Testing System, has now commenced at pace. With the changeover fully established, it is now planned to integrate the GSR Instructor Conversion Course (which is an additional 4 days) within a new 2-week CBRN Trainer Course, which will supersede the CBRN Instructor Course in January 2012. The CBRN Trainer Course, covering both S10 and GSR, will be aimed at students destined to deliver MATT 4 / CCS on their own units. For those students destined to deliver CBRN incident response training in support of deployed operations, a follow-on, but separate, one-week module will be offered in the shape of a CBRN Operational Instructor Course.

The GSR itself has divided opinion among the School's instructors; pick any 2 instructors and get at least two different views. The overriding opinion, especially after instructors conducted Live Agent Training in GSR, is that once it is properly fitted and donned, the GSR is a world-leading item of kit. In addition several visits conducted to the Scott factory in Skelmsdale have allowed the instructors to see, at first hand, the improvements that have been made.

In terms of supporting the single-Service GSR Fielding Plans, by the end of April 2011, over 250 Army students had completed the GSR Instructor Conversion Course. A dedicated GSR Conversion Course for existing RAF CBRN Instructors will have been run by the School by October 2011 and in the coming months the Defence CBRN Centre will run a GSR Conversion training programme for 40 Commando RM's CBRN Instructors.

GSR Instructor Conversion Cascade Training

Once they are GSR-qualified, CBRN Instructors have the delegated ability to cascade the Conversion Training to S10 Instructors on their own units. To take advantage of this scheme, however, the GSR-qualified Instructors must deliver the cascaded training within 90 days of attending the Conversion Course at the Centre. Furthermore, the S10 Instructors who receive the cascaded training must have originally gained their CBRN Instructor qualification at Winterbourne Gunner after October 2004. The cascaded training itself is coordinated by the Defence CBRN Centre, which issues the relevant course material on disk and accredits the students as GSR-qualified Instructors on successful completion of the training. For specific details, you should visit the Centre Intranet Site on www.dcbnrc.dii.r.mil.uk, locate GSR on the navigation bar and select GSR Trg on the pull-down menu.

CBRN Cell Controller (BRACIS) Course

Another course which has radically changed is the Cell Controller Course. Firstly, due to the introduction of ATP-45(D), the



Lt Jim Hartley RN, 2iC CBRN School DCBRNC

course content has been amended to cover the updated Warning and Reporting procedures laid down in the new NATO standard. Secondly, the 3-week training programme, which previously incorporated both manual and automated plotting, will, from September 2011, be condensed to a 2-week Cell Controller (BRACIS) Course, focusing firmly on the latter, albeit retaining emergency manual-plotting procedures. To maintain a niche manual-plotting capability, however, the School plans to run the occasional one-week manual-plotting modules, primarily aimed at its own instructors.

Tactical Commanders' Incident Response Course

A CBRN Tactical Commanders' Incident Response Course (TCIR) has also been recently introduced. This course considers the tactical response to a CBRN incident and is aimed at junior officers and SNCOs. The course is timed to coincide with the end of Junior RAF Regt Officers' Course (JROC), as they are the main audience at present together with RAF Regt Tactical SNCOs. Eligibility to attend this course is currently being reviewed, however, and it may soon be made available to a wider audience across Defence.

Building Instructors Knowledge at the Defence CBRN School

by Lt Jim Hartley RN, 2iC CBRN School DCBRNC

As part of the Centre's ongoing efforts to increase Instructor knowledge and skills, as well as broaden their appreciation and understanding of the Tri-Service environment, the Centre has conducted several external training evolutions over the past year:

Anchors Away, plus Drowning by Numbers

The Centre staff had the opportunity to visit HMS EXCELLENT where they undertook damage control training in the Royal Navy's Damage Repair Instructional Unit (DRIU) facility followed by radiological training. The DRIU proved to be immensely popular and all who undertook it thoroughly enjoyed themselves, receiving an insight into RN training and how challenging it can be. However, despite specific requests, the Senior Service managed to avoid drowning anyone.

The afternoon's radiological training consisted of small groups surveying an area of 'upper deck' to identify radiological contamination and then conduct decontamination drills. The unfamiliarity of the space and the use of the RN equipment proved to be challenging, but all the groups found and successfully decontaminated their area.

The other area of particular interest was the Navy's decontamination procedure, which differed fundamentally from the method utilised on land, but provides a robust and manageable method, elements of which could potentially be incorporated into the Land methodology.

The day provided the Army and RAF ranks with an insight into the RN and its working conditions, which can only be considered a benefit to a Tri-Service environment. Working conditions from the Navy of an



earlier era were on show as the entire team visited HMS VICTORY in Portsmouth dockyard to complete the day.

Live Scientist Training

There appears to be widespread belief in the Centre that scientists are some sort of otherworldly alien species, with large brains & poor social skills. Whilst this particular author, as an ex-research scientist, obviously disputes this (well the poor social skills part of it), in an attempt to increase the understanding between the military and the scientists at Dstl, Porton Down, a training day was instigated. The aim for the scientists was to gain an increased understanding about the way the military thinks (provide own joke here) and operates. Most of the scientists have been involved with the EOD teams as technical advisors or have provided reach back from operations (a number had been SCIADS in the past).

The day consisted of a series of lectures and tabletops in the

The Centre learning to Swim in a Sinking Ship.

morning, followed by an afternoon on the range undertaking a series of command tasks, familiar to all military personnel, and finishing off with a clay pigeon shoot. The feedback from the scientists was very positive and the military at the DCBRNC enjoyed the day. Both parties felt they had a better understanding of the other afterwards. Clearly increasing the relationship between the two institutions is of benefit to both.



Radiation Decontamination at HMS Excellent.

RAF Fielding of the GSR

by Sqn Ldr Joe Duhan, SO2 FP CBRN Capability Development

Planning for the next generation of CBRN respiratory protection is now well advanced, and Specialist CBRN Units (the Jt CBRN Regt and 26 Sqn RAF Regt) have successfully converted to use the GSR. Conversion training of the initial tranche of RAF Regt CBRN Instructors (CBRNIs) will be completed by October 2011, allowing them to return to unit to conduct train-the-trainer packages for other current and practising CBRNIs. HQ AIR determined in the early stages of the project that cascade training would be the most efficient way to ensure that sufficient numbers of instructors were trained to deliver GSR Conversion on all RAF stations from January 2012. This plan will ensure that we are working towards operational fielding of GSR for Op HERRICK 17, aligned with LAND and NAVY Command Fielding Plans, and that individuals will be trained at their home unit rather than having to travel to a more remote training location.

Although the AIR GSR Fielding Plan was promulgated in January 11, actual fielding of the GSR amongst the specialists of the Jt CBRN Regt and 26 Sqn RAF Regt began in the spring of 2010, ahead of Ex PRECISE RESPONSE in Canada for elements of the Joint CBRN Regiment and for Live Agent Training (LAT) in Dugway, USA, for 26 Sqn RAF Regt. Since then, both specialist units have conducted LAT in the UK, under the aegis of Dstl, and the GSR performed very well during all LAT interventions. The specialist CBRN troops were impressed with their new respirator under the demanding conditions of the ranges at Porton Down. Flt Lt Trevor Slark-Hollis, UK Operations Officer on 26 Sqn RAF Regt, was particularly impressed with the step up in capability: "Having undertaken live agent training in both the GSR and S10, I can confidently state



that the GSR is an excellent piece of equipment and significantly enhances the operator's down-range capability. The single lens allows great depth perception (which is) vital when working with agents in confined areas and in CBRN gloves. The comfortable fit and increased airflow enable the operator to conduct his specialist CBRN duties for greater periods of time. Overall, I found the GSR to be far better than the S10 and the protection factor, demonstrated by the ARTS, ensured that I was fully confident in the protection the GSR was providing".

GSR training will commence for the wider RAF in January 2012,

when the Phase One training establishments at RAF Halton, Cranwell and Honington will replace ab initio S10 training with recruits, officer cadets and trainee RAF Regt gunners respectively. For individuals already S10-qualified, the conversion process will take around 1.5 days and the initial conversion burden will put a considerable strain on Force Protection Training Flights as this new requirement is added to their training calendar. However, the rollout is scheduled to be complete by April 2014, by which time the vast majority of RAF personnel will be GSR-trained and equipped.

Fielding the Advanced Respirator Test System (ARTS) to the Royal Navy

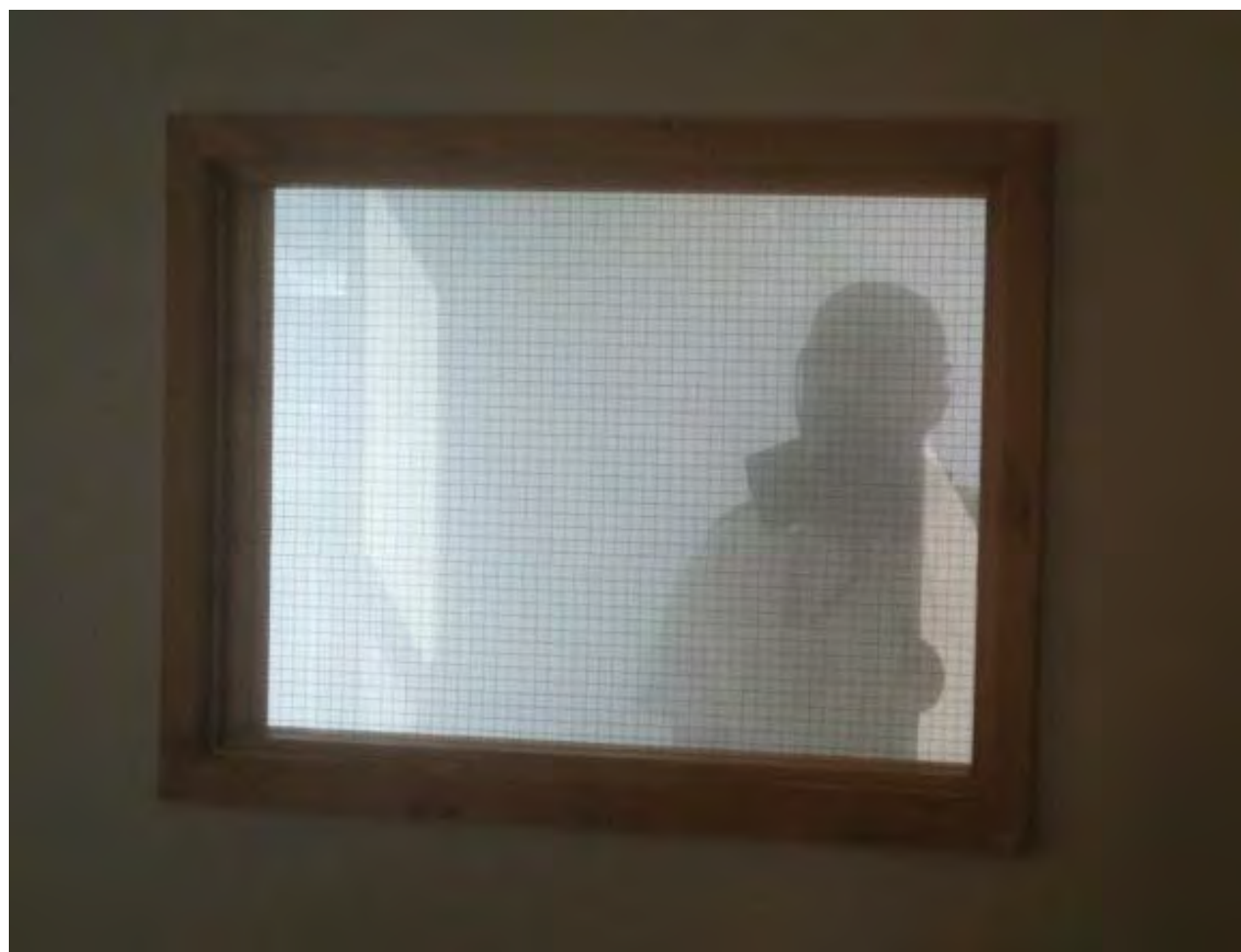
by CPOAET(AV) Paul Atkins (CBRNDC CPO at Navy Command HQ)

The introduction of the ARTS has posed a particular challenge for the Royal Navy, which has to contend with testing whilst on board a ship. Each ship carries an S10 Respirator Testing System (RTS) to allow annual testing of the crew by the ship's CBRN team. The introduction of the ARTS, which generates an oil vapour, is not suited for use within a shipboard environment, as it would require isolation of the ship's smoke detection system, as well as raising the logistical challenge of where to pitch the ARTS tent in the first place. These issues, combined, with the numbers of personnel that will require fitting and testing for initial GSR roll-out dictated a new approach and it was decided that the solution was for bespoke ARTS facilities to be set up ashore.

Investigations to identify suitable locations for issuing, fitting and testing of the Surface Fleet focused on three locations: HM Naval base (HMNB) Portsmouth, HMNB Clyde and HMS Raleigh. To ensure that this was feasible, a trial was conducted, the aims of which were as follows:

- Investigate the suitability of the current facilities within HMNBs.
- Obtain specialist advice from SMEs regarding the location and operation of multiple ARTS within the proposed location.
- Determine the optimum number of ARTS that can be located within the facility and determine the throughput of the facility.
- Use the information from the HMNB Portsmouth trial to help inform the decisions about the suitability of the other proposed locations.
- Demonstrate the ARTS to interested parties.

The trial was carried out using the existing Respirator Test Facility



The first lucky test subject.

within HMNB Portsmouth. This facility is housed within a two storey building. The ground floor comprises of a mustering area and office / admin area. The first floor comprises the test facility, hitherto with three RTS set up to test S10 respirators, and is accessed by an enclosed internal stairway with a self-closing fire door at the top. This floor has natural ventilation comprising tilt-opening windows along the full length of the external walls and a door onto the external fire escape stairway. Both floors of the building are protected by smoke detectors, which are routinely disabled for S10 testing. In general, the first floor of the building retains electrical supplies and lighting/heating systems, reflecting its former use as office space.

During the trial it was quickly established that the 8 ARTS on test suffered considerable vapour leakage. When operating, the atmosphere quickly became untenable. Additionally, it was found that the noise of 8 systems operating at the same time was

exceptionally loud within this confined area. Environmental health requirements dictated that suitable ear protection for personnel operating within the room or some type of soundproofing of the equipment was essential.

The conclusions of the trial determined that a total of 6 ARTS could meet the throughput requirement and that soundproofing for the smoke generators, an adequate ventilation system and additional fire extinguishers and door locks were essential. A MoD contractor was approached for advice and an initial estimate



ARTS cubicles during construction.

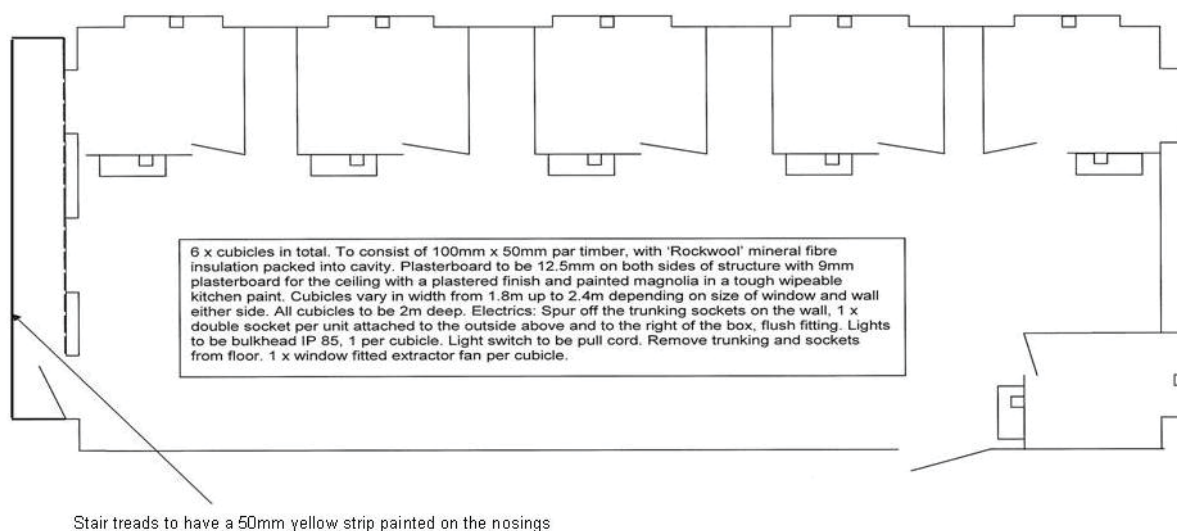


Figure 1 Portsmouth layout.

of costs. The resulting design included 6 enclosed test cubicles complete with a ventilation system, allowing the vapour to be dispersed at the end of the day, as well as a soundproofed housing for each smoke generator. The design layout of the facility in Portsmouth can be seen in Figure 1.

With the designs and contract in place (after some protracted financial discussions within NCHQ), work started on 25 Jul 11, supervised by the facility staff,

which included a newly funded Senior Rating acting as test facility manager, and NCHQ. At the same time the facility staff started to upgrade the rest of the building to ensure safety of equipment and personnel. The work was complete by 24 Aug 11.

An ARTS was then tested within one of the cubicles, with no apparent leakage and a considerable reduction in noise. End of working day ventilation was proven using the installed ventilation fans and open windows; the cubicle was clear



The finished ARTS cubicles.

of smoke within 10 minutes. With the success of this test, all 6 ARTS were then operated at the same time to ensure that the facility was functioning as required and that the soundproofing of the smoke generator boxes was sufficient to avoid the requirement for ear protection.

Facilities at HMNB Clyde and HMS Raleigh are in progress of being built to a similar design, ready for the GSR rollout across the Surface Flotilla commencing Dec 11.

General Service Respirator - One Year On

by Peter Fray Business Manager CBRN DT

Just under a year has passed since the General Service Respirator (GSR), developed to provide the UK Armed Forces with improved respiratory and ocular protection against CBRN threats, was accepted into service by Air Cdre David Stubbs, Head of Capability for Special Projects and CBRN (HoC SP&CBRN).

The production facilities at Scott Safety in Lancashire have been working two shifts a day to meet demand and have produced over 100,000 respirators so far. Over 30,000 of these have been shipped to units during the first year of the 4 year roll-out, with thousands more leaving stores every week. In total over half a million individual items have been delivered to MOD

stores so far to support the largest roll-out of a personal issue item since the SA80 entered service. In recent months we've seen the first mid-life upgrades enter service in the form of a smaller haversack in Multi Terrain Pattern fabric and the re-engineered, significantly more reliable, Advance Respirator Testing System (ARTS).

The CBRN Delivery Team has now begun to investigate how the capability can be expanded to meet emerging user needs. Two specific areas where scoping work has already begun are the integration of the GSR with Self Contained Breathing Apparatus and the provision of extended duration protection against Toxic Industrial Chemicals.



Police CBRN Update

by Vicki Hoare, Communications Officer PNCBRNC



The PNCBRNC team at the 'crashed train' scenario.

Recap on 2010

2010 was a busy year for everyone, and the Police National CBRN Centre (PN CBRN C) was no exception. The Centre had seen many changes throughout 2009 and 2010, with the end of the Police Operational Response Programme, a budget cut and inevitable staff changes. The site at Winterbourne Gunner closed in August 2009 and training has now been delivered successfully at Ryton for almost two years. In 2010 alone the Centre delivered 72 courses, training over 915 officers from police, fire and health agencies. So far in 2011, the Centre has delivered 51 courses, training over 619 officers at the Centre alone. Multiple training has also taken place off-site, at force locations.

2011

The Centre continues to support live play and table top exercises across the country and the PN CBRN C Exercise Team is committed to assisting multi-agencies in developing exercises. As well as supporting exercises, the Centre has supported high profile events, such as the 2010 Papal visit and the Conservative Party Conference in October 2010. In March 2011 the Centre supported the Liberal Democrat Conference that was held in Sheffield.

The PN CBRN Operations Centre continues to provide support and advice to forces and is staffed 24/7. In 2010 there was an increase in correspondence between forces and the PN CBRN Operations Centre and this has continued throughout 2011. Towards the end of 2010 and

into 2011 the UK saw an increase in chemical related fatalities, and the PN CBRN Operations Centre has been committed to offering advice to responders dealing with these types of incidents. The Centre consulted with the Health Protection Agency who have produced the guidance on the management of chemical fatality and self-harm incidents.

The PN CBRN C Training Team has been busy, not only in delivering already established courses, but also in designing new and developing existing courses. The main focus has been on the revised Bronze Command role and the development of the new Bronze Command Course. In conjunction with the development of the new Bronze Command course, the Bronze Operational Handbook has been written and was rolled out to



PNCBRNC command unit deployed.

forces earlier this year.

The training design team have also been busy producing Standard Operating Procedures (SOPs) which were rolled out to forces in March 2011.

The Centre had received considerable feedback from CBRN Commanders at various Command courses and exercise debriefs, highlighting the need for the specialised skills and knowledge of a Tactical Advisor. This feedback, together with the development of the SOPs, prompted the Centre's design team to develop the Tactical Advisor Course, the first pilot of which was held in June 2011. Comprising of pass/fail knowledge checks and pass/fail role play assessments, the course has been designed to equip suitably qualified officers to provide accurate, factual and timely CBRN Tactical advice to CBRN commanders, primarily at the Tactical (Silver) and Operational (Bronze) Command levels. CBRNE Interoperability Programme The PN CBRN C is leading on the CBRNE Interoperability Project, part of the ACPO UK Operational Interoperability Programme. The project is divided into 5 workstreams:

1. Deliver current UK CBRNE capability more effectively and efficiently.
2. Consistent quality assurance of

capability.

3. National standards of training delivery.
4. National standards of support to operations.
5. Oversight of equipment/technology development and procurement.

These workstreams are running in conjunction with one another and are delivered by the Centre's Capabilities staff, working closely with training and other business areas.

Chief Inspector Ian Stubbs, the project lead for the Centre, said, 'This is part of a wide ranging and ongoing programme to deliver interoperability across police forces and regions, through developing and promoting truly common standards and processes.' 'The UK Police Service CBRN capability is very well placed to meet the challenges of this programme, from the outset. We have developed a model of national capability and resilience, which is built around absolute consistency across the UK, with a high degree of interoperability, both within policing and partner agencies.'

1. Deliver current UK CBRNE capability more effectively and efficiently.

A key piece of work within this workstream is ensuring that the Police Service has the right number of trained CBRN responders, proportionate to the threat and risk. This review of how many CBRN

responders are needed and how they should be spread across the UK is a complex piece of work, and is subject to ongoing consultation and ACPO level review.

Within this workstream there is also a review of the required numbers of Gold, Silver and Bronze Commanders and Tactical Advisors nationally, with the aim of ensuring that the UK has the required number, in the right locations, to deliver the required capability.

Similar work is being undertaken around the use of firearms within CBRN. Do we have the right number? Can the training and doctrine be improved? Are they in the right locations to deliver UK resilience? Although not linked to this project, the capabilities team are looking at similar work around the roles and capabilities of Search and CSI.

This workstream also focuses on the interoperability between forces, within regions, and the interoperability between regions within the national response, to deliver an agreed national standard.

2. Consistent Quality Assurance (QA) of capability. Through this workstream the Centre aims to put in place a Quality Management Plan which will ensure ongoing and consistent Quality Assurance of training for all CBRN trained staff, from Gold Commanders to CBRN Responders. The outcome will produce a national framework which can be implemented locally to assist with the QA process within each force. One possibility that is currently being explored is the idea of 'peer review', whereby officers from a neighbouring force carry out the assessments. This model will closely follow the Quality Assurance Management System (QAMS) which has been developed for use on a force level by the National Policing Improvement Agency (NPIA).

Best practise and lessons from the Argon programme of site specific planning development may be used as a basis for continual assessment of, and support to, strategic CBRN



Major incident scenario.

contingency planning.

3. National standards of training delivery.

This workstream focuses on ensuring that all courses are mapped to skills for justice to ensure that courses have the correct skills base.

All training will be standardised and work is ongoing to review the number of refresher days that all officers must attend to remain current. It will be determined whether there is a need to standardise elements of refresher training content to ensure consistency.

4. National standards of support to operations.

Work is ongoing through this workstream to convert Operational Advisors to Tactical Advisors, and ensuring that all current and new courses are mapped to the Quality Management Plan.

The Centre is currently developing CPD (Continued Professional Development) for all CBRN trained staff. Once the appropriate CPD

model has been developed it will be devolved to forces in order that CPD compliance can be managed locally.

An airwaves tactical model for CBRN deployment is being developed and will be trialled at a Thames Valley Police training event in September 2011.

Staff within the PN CBRN C Operations Centre will be required to be Tactical Advisor trained by the end of August 2011.

5. Oversight of equipment/technology development and procurement.

This workstream focuses on ensuring national resilience for issuing equipment and PPE. A review of the PPE and equipment guidance is ongoing to assist in all operational tasking.

To summarise, Chief Inspector Ian Stubbs commented;

‘The project is not intended to re-invent the wheel, but it does ensure that we ask some critical questions around whether existing processes and doctrine are truly interoperable across disciplines and across force

boundaries.

‘We will continue to consult widely and we recognise that the policing landscape is changing. CBRN policing is not immune to these pressures and we must ensure it is both proportionate and represents genuine best value.’

Olympics

During the Olympic period the Centre will play a co-ordination role in reporting CBRN and E related incidents into the National Olympic Co-ordination Centre and subsequently the National Olympic Security Coordinator, Assistant Commissioner Chris Allison. Regular reporting is required to ensure that CBRNE situational awareness is maintained, and will detail the following:

- Any ongoing CBRN events (Olympic related and non-Olympic related) notified to the PN CBRN Operations Centre.
- Updates on CBRN events (suspected or confirmed) from previous reporting periods.
- Any proactive CBRN events that are notified to the PN CBRN C.
- Any CBRN intelligence notified to



Shift change at the training exercise.

the PN CBRN C or reported in the media.

Additionally, during this period, the Operations Centre will have representation from colleagues in Health and Fire and Rescue. Similarly, there will be arrangements in place between the Ops Centre and JSEODOC to facilitate the sharing of information.

Argon

In 2009 the Argon Programme began a three phase evaluation of CBRN Site Specific Plans for the UK's 18 model response sites.

The first phase of the evaluation was the Argon Check (2009/10). Each model response site submitted their plan to the PN-CBRN-C for assessment by a multi agency Argon 'Red Team' made up of representatives from the Fire, Ambulance and Police Services. The 'Red Team' was then able to evaluate the plans and provide feedback to planners on any perceived weaknesses or potential improvements.

The second phase was the Argon

Choice (2010/11). For this a tabletop exercise was designed by the 'Red Team' for each model response site so local silver commanders had an opportunity to use the plan in response to a local CBRN event. The commanders were then able to test their own plan while the planners were able to observe and note any potential improvements that could be made.

The final phase is the Argon Shield (2011/12) which is currently underway. In this phase of validation the model response sites will engage in a live-play exercise incorporating a multi-agency silver using the plan to direct resources in 'real time' to demonstrate the plan can be implemented locally and effectively. The Argon team have already seen 3 of the model response sites to full completion of the programme, the remaining 15 sites are also currently on target to pass the final stage of validation by the April 2012 deadline.

The Argon model is being successfully used for city centres, ports, airports and transport hubs. With little adaption the Argon principles are being used to validate

and examine the preparedness of venues for the Olympic 2012 Games.

CAPEX 2011

In March 2011 the Centre organised the biannual Capability Exercise (CAPEX) conducted under the auspices of the Australia, Canada, United Kingdom and United States (AUSCANUKUS) quadrilateral.

The exercise was conducted at the Fire Service College, Moreton in Marsh, and consisted of a technical capability demonstration by each nation, followed by four days of training scenarios.

Each scenario provided participants with the opportunity to undertake challenging training in specialist facilities amongst peers within the AUSCANUKUS CBRNE response community.

The exercise was judged a success, with each nation fulfilling their requirements and the aims and objectives achieved.

Fire & Rescue Service CBRN(E) Capability

by Andy Bell, Fire and Rescue Service National Resilience Team

The Operational Capabilities

The Fire & Rescue Service (FRS) CBRN(E) capability is managed, maintained and developed within the Chief Fire Officers Association (CFOA) National Resilience structure, and comprises two operational capabilities - Mass Decontamination (MD) and Detection, Identification & Monitoring (DIM).

Mass Decontamination

The FRS CBRN(E) MD capability comprises 72 Incident Response Units within England and Wales which provide Mass Decontamination equipment, a responder decontamination facility, a limited DIM capability, and Personal Protective Equipment for use within the 'hot' and 'cold' zones. The Incident Response Units are located within every FRS in England and Wales and provide



Mass Decontamination Incident Response Unit.

the specialist CBRN(E) response to support the first FRS resources on scene.

The Incident Response Units are in turn supported by 50 MD Resilience Modules (36 Disrobe and 14 Rerobe) located within England and Wales, which provide bulk quantities (1200 in each) of disrobe or rerobe packs (dependent on the type of module), and additional responder decontamination facilities. The modules are delivered to the



incident on Prime Mover vehicles.

Trained crews for all MD assets are provided by the host FRS' and their competency is assured by a Competency Standards Framework developed by the CBRN(E) Capability. CFOA National Resilience delivers Instructor training at the Fire Service College through a centrally managed and funded programme in order to meet an agreed Key Performance Indicator for the number of Instructors provided to each FRS.

These instructors deliver acquisition training within their respective



Detection, Identification and Monitoring equipped vehicles.

Fire and Rescue Service CAPEX 11 held at the Fire Service College in March.

FRS' and assure the required maintenance of skills through annual assessment. A model MD Operator acquisition course, and the performance criteria for annual assessment is provided to assist the MD Instructors.

Detection, Identification and Monitoring

The DIM capability in England and Wales currently consists of 18 purpose built vehicles equipped with a range of high specification equipment strategically located across the country. The vehicles have been designed to be relatively covert and are not readily identifiable as emergency service assets. Each DIM capability is operated by a highly trained cadre of DIM Advisors and a Competency Training Framework has been developed to enable the advisors to maintain their skills.

In the short term an additional



Fire and Rescue Service CAPEX 11.

vehicle will be located in the East Region bringing the total for England and Wales to 19.

The FRS DIM Capability has recently played a significant role in the CAPEX 2011 exercise held at the Fire Service College in March. This provided a fantastic opportunity to exercise with multi-agency partners and gain firsthand experience of the operating procedures of counterparts from Australia, Canada and the US. A number of learning outcomes were identified and these are now being evaluated by the team.

Mobilisation

The mobilisation of the national assets for a large scale incident is managed by the Fire & Rescue Service National Coordination Centre. Incidents on this scale are supported by additional assets and personnel brought together under the FRS National Coordination & Advisory Framework. These include:

- DCLG Emergency Room
- Strategic Holding Areas
- Chief Fire & Rescue Advisor (CFRA)
- CFRA Duty Officer
- National Strategic Advisors
- Capability Advisors

The effective mobilisation of national MD assets is assured through the utilisation of the Mass Decontamination Mobilising Model, developed by the CBRN(E) capability to ensure a standardised and proportionate response based on the assumed numbers of casualties.

Current Developments

2011 has seen the development of FRS Strategic and Operational Guidance documents to complement the Tactical Guidance document issued in 2008. These documents have all been produced following engagement with the Police National CBRN Centre, Ambulance HART and the CBRN communities within the Devolved Administrations to ensure interoperability.

The FRS contribution to interoperability is assured through an embedded National Resilience CBRN(E) officer in the Police National CBRN Centre. To further aid interoperability, members of the team provide input on the multi agency CBRN Gold and Silver Command courses delivered at Ryton, and also assist with the assessment of delegates undertaking the National Inter Agency Liaison Officer courses, which has delivered nearly 200 additional CBRN Silver Commanders / Tactical Advisors for the FRS since its inception in 2009.

In the future FRS CBRN Commanders and Tactical Advisors will be further supported by the establishment of a CBRN(E) Subject Matter Advisor cadre, who will be undertaking their training in the latter part of 2011 and early 2012.

The National Resilience CBRN(E)

officer embedded at Ryton, assisted by others within the CBRN(E) team are also assisting with the production and validation of site specific CBRN plans through the Home Office led Argon Programme. Support is also being given to the PN CBRN C team responsible for the validation of CBRN plans being produced for the Olympics.

Future Developments

A project is underway to extend the use of the filter based Powered Respirator Protective Suit (PRPS) from solely 'warm' zone operations to 'hot' zone working. A proving exercise will take place in October 2011 and it is anticipated that a Standard Operating Procedure will be implemented mid 2012. In recent years a great deal of scientific research has been undertaken to evaluate decontamination processes and the FRS is committed to working with the Department of Health (DH) to ensure that these emerging scientific outcomes are evaluated to ensure the most effective processes for casualties and responders.

Work is also ongoing with DH to ensure that the multi agency response to a CBRN(E) event and the decontamination processes arising meet the needs of the wider community, including the more vulnerable groups within society.

Fire and Rescue Service CAPEX 11 mass decontamination process.



Ambulance Hazardous Area Response Team (HART) Update

by Mick Heys, Training Manager, Ambulance HART

2011 has been an interesting year for the HART so far. It began with the culmination of Phase One of the initial roll out of HART and saw nearly 500 ambulance Paramedics and Technicians receive Incident Response Unit (IRU) training (mainly concentrating on CBRN and mass casualty management) and around half of them also trained in Urban Search and Rescue (USAR), focussing on areas of restricted access such as working at height or underground. The last of these courses was concluded at the end of March and it was anticipated that the training faculties would then focus most of their attention towards continuity training.

During this time the operational success of HART was being monitored and considered alongside the present threats to the UK. This has resulted in a further 3 HART teams being initiated, with second teams for the East of England, South East coast and also the South West. Additionally the Welsh Ambulance Service has also commenced their team recruitment, which has generated another 166 students to train in IRU this year with around half again for USAR.

There has also been a greater focus on the operational capability of HART as due to the project being still in its infancy it initially had a more training-led focus, based on case studies of similar projects. With fresh input from the experiences of the teams on the ground and the new responses included to the HART remit including flood water rescue etc, there is now enough HART specific feedback to steer the future of the teams, which is helping to drive the training forward.

This is an exciting opportunity



HART training in chemical protective suits.

for the training faculties, which have been able to re-structure to account for these changes. With a recruitment process underway presently, the re-built faculty will allow instruction for the new teams in a more focussed way, allowing us to concentrate on areas which will have the greatest benefits to patients.

This obviously doesn't detract from the need to complete the continuity training initially planned and as such there is also consideration about the new central support functions required to assist in the delivery of this training. This will allow an enhanced level of command and simulation training, ensuring that the whole system of treatment to which HART operates is taught in line with current practices and then trained for in the most realistic ways possible. This level of training allows the HART staff to deal with many of the emotional issues which will inevitably be involved, as well as the more practical skills they brought with them to the role.

With courses due to start imminently, new trainers coming on board, new teams in the making and continuity provided by the 12

fully operational teams currently in trusts; add to that the preparation for large national and international exercises such as Clean Care where the HART have been invited to return and the preparation for the Olympics where the HART are providing specific patient care responses using special items such as the Polaris 6 wheel drive off road vehicles to name but a few things, 2011 is set to continue as a very exciting year.



HART casualty evacuation exercise.

Re-supply of Fuller's Earth

by Peter Fray Business Manager CBRN DT

Most servicemen and women who have undergone any form of CBRN training will be well aware of Fuller's Earth and its use in personal decontamination kits (DKP1 & DKP2), which provide operational decontamination against liquid chemical attack. Indeed, mention "Fuller's Earth" to any one who has passed through the Defence CBRN Centre (DCBRNC) and they will instantly be thinking "BLOT-BANG-RUB!"

Many readers may also be aware that for some time now stocks of Fuller's Earth have been controlled, and demands screened, in order to preserve the capability while the CBRN Delivery Team (DT) worked towards securing a new source of supply.

On the face of it, re-supplying these fairly low-tech, low-value items, which have been around since most of us were in short pants, sounds relatively straightforward. However, with Fuller's Earth, nothing was ever simple and many myths and misconceptions have been encountered along the way. Chief amongst these is "The World has run out of Fuller's Earth!".

Fuller's Earth is a claylike material, normally with high magnesium oxide content and comes in two main varieties comprising the minerals montmorillonite or palygorskite (or a mixture of the two). Whilst true that the quarry previously used by the MOD as a source of Fuller's Earth has long been exhausted, it is not the case that Fuller's Earth itself is scarce the world over (or even in the UK). By examining Fuller's Earth powder and Def-Stan 68-142 (the MOD specification for Fuller's Earth) the CBRN DT, with support from

1. The process of cleansing and thickening cloth is known as "Fulling" and a person engaged in its trade and practice is called a "Fuller". Hence the term derived was "Fuller's Earth".



the experts at Defence Science and Technology Laboratory (Dstl), was able to identify the source of the myth: The Def-Stan was actually written based on the characteristics of a sample from the previous quarry. As alluded to above, the number and range of naturally occurring variables possible whilst still, rightly, calling something "Fuller's Earth" means, potentially, that any sample from any source could be unique.

A similar historical issue was uncovered with the specifications for Decontamination Kit, Personal, No. 1 (DKP1). Specifically, that the fabric used for the pad itself was a unique utility fabric originally produced during WWII and characterised such that only one company could produce it – that company and the fabric are both now long gone.

A Fuller's Earth cloud resulting from over enthusiastic personal decontamination.

With these issues understood the DT and Dstl set about developing a detailed requirement, capturing all important scientific qualities which contribute towards the efficacy of Fuller's Earth as a decontaminant whilst ensuring it could actually be achieved by potential suppliers.

This effort has culminated in the recent award of a 3 year contract for the supply of a minimum of some 150,000 items and introducing new, improved DKP1, DKP2, FE Technical and FE Special. This will enable current restrictions on demands to be lifted and ensure a continuous decontamination capability until such time as the Personal Decontamination Project delivers the next generation. More on that next time...

Tactical Noise - Strategic Consequence

by Lt Col Tim Price RA, UK Exchange Officer, US CBRN School

The Combined Arms Maneuver (CAM) Commander at the tactical level is primarily concerned with his ability to both maintain his freedom of action and his ability to cycle from one mission to the next. Apart from operations in a major conflict with Russia or China, a Chemical Biological Radiological and Nuclear (CBRN) operating environment is regarded by many commanders as tactical noise. This article is primarily an information paper, but briefly looks at some of the constraints that will be imposed on the maneuver formation and tasks required to be performed.

The Operating Environment

We have moved from the cold war construct where we were facing the monolithic Soviet block into a more fragmented environment encompassing countries with Weapons of Mass Destruction (WMD) programs. They are potential adversaries or states whose territory, in the failed state scenario, could become an Area of Operations (AO). Most countries do not have the capacity to create a wide area CBRN hazard or maintain that hazard effect over time, but because of guidance systems and targeting ability, the lethal challenge levels to individuals or high value assets remain as predicated in the cold war constructs; the threat to the force as a whole has dropped but the local consequence remains. Within an AO there may also be a number of non state actors with access to WMD who could use them for political gain. Any use of WMD will have strategic consequence and will require an immediate response at Presidential level.

Tactical Level Operations

At the tactical level an enemy may use CBRN weapons to deter, delay, deny or otherwise shape

the battlefield. WMD effects can be deadly, but the enemy is mainly trying to gain a temporal or spatial advantage. We, of course, are able to operate in a CBRN environment and can detect most threats in a timely manner, protect against them and mitigate their effects. This ability, although tactical, has a strategic deterrent effect and is often used as a key indicator of resolve in phase 0 to phase 2 operations. In phase 3 operations we may be forced to operate in a contaminated area to achieve a tactical objective, but only if geographically constrained against a time imperative. The impact is unlikely to reach outside of a Brigade Combat Team in CAM unless lines of supply or ports of entry are targeted. In CAM we need only know where a hazard exists and whether we can get round it or are forced to fight through it; in effect treat it as an obstacle. Because we may have to fight through a contaminated area, we also need a limited mitigation capability in the force. In Wide Area Security the impact on the force is focussed much more on protection which must also include protection of the population, in particular in cases of urban release; an attack on either has both an operational and a strategic significance.

Operational Level

The experience from Iraq should show the need to prevent proliferation and promote demilitarization. As part of the Intelligence Preparation of the Battlefield, securing sensitive WMD storage sites (or even conventional ammunition sites) and production plants and also Toxic Industrial Material plants will become operational level tasks. These will become a distraction and irritation to the maneuver commander as he sees his combat power whittled

away. What this means is that a specialist force needs to release the maneuver element as soon as possible. The corollary is that a broad spectrum reconnaissance capability needs to be pushed into the general purpose maneuver force at the tactical level to allow that force to move on. To do this a screening tool is required to act as a trigger for more specialist capability. Additionally the political imperative to show cause and effect will also require the evidence to prove attribution on the world stage. The forensics and evidential trail will become crucial to maintaining the moral high ground. The strategic screwdriver will be applied to focus effort in this arena lest the strategic corporal makes a strategic mistake.

Strategic Level

Most of the efforts of the military at the strategic level focus on elimination. How credible this is, bearing in mind that, by definition, elimination operations are conducted in a non compliant environment, has yet to be seen. Certainly the efforts supporting proliferation prevention, WMD destruction (Chemical Warfare Convention requirements), interdiction and evidential collection are significant and include a variety of portable chemical weapons destruction equipments available to the force. The proliferation prevention efforts include confidence building measures and outreach programs such as the Cooperative Threat Reduction. Here the US remains the unsung hero and deserves to gain greater kudos for its efforts. While immensely important, limited military resources are committed in this area and, in the interest of brevity, will not be discussed further.

Homeland Defense / Civil Support

9/11 is regarded as a paradigm shift in aggression against the US. Whether it is or not, there was a paradigm shift in the proportionate increase in investment in the response and resilience capability of the US. In military operations abroad, the political acceptance of casualties had been limited. 9/11 changed that and also created an acceptance that the nation was under siege. Al Qa'eda and other radical groups have declared their intent to destroy the West; of which the US is the lead and therefore number one target (we should not forget, however, that Madrid and London were also targeted at much reduced effect). As we move to the future the demographics of particularly the Middle East, but also the Far East, suggest that a large number of reasonably well educated and unemployed individuals, unable to be supported by declining oil wealth, will become vulnerable to radicalisation. Of additional concern, we are starting to see marginalised, disenfranchised and, to their minds discriminated against, individuals within both Middle Eastern and western societies becoming radicalised. It is these individuals who drive the requirement to develop a robust resilience plan; an ability to deal with the consequences of a catastrophic attack.

Consequence

Risk is normally characterised as severity verses probability as show in figure 1. Probability increases because of the proliferation of knowledge, availability of resources, availability of perpetrators and the ideological acceptability of an outrage. If we assume an absolute probability of an event occurring, however, the consequence becomes impact verses time as shown in figure 2. The longer it takes before an outrage succeeds the greater the likely consequence of that event.

The So What

We should not become complacent about operating in a CBRN environment; we know we can do it but it does deserve to be taken seriously because of its strategic

Severity:

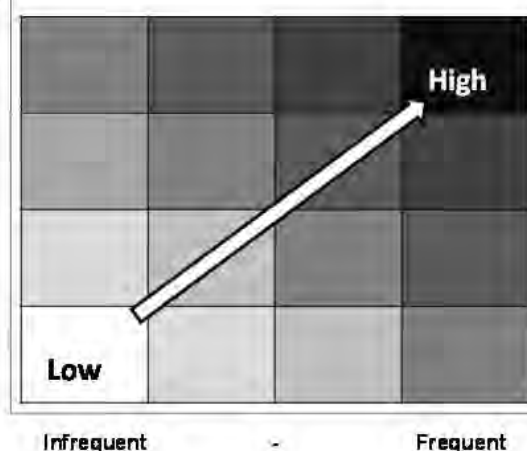
Catastrophic

Critical

Marginal

Negligible

Composite Risk



Probability

The potential severity of a CBRN event ranges from negligible to catastrophic. The likelihood of CBRN events has increased over time for several reasons, therefore the overall risk has increased.

Figure 1.

significance. At the tactical level, we need to try to migrate the reconnaissance capability into the general purpose maneuver element to inform its decision making and provide force protection. If the equipment is too big, power intensive, technically complex or takes too long to provide an answer then a specialist capability needs to be brought to the point to release combat power for other tasks. In an ideal world an unmanned capability would provide answers in advance of the CAM manned reconnaissance. Remediation allows a limited size

maneuver element to operate in a contaminated environment and then release it to move on. Remediation also needs to provide for the political demands of the local population in phase 3 and 4 operations. The tactical level will become constrained by devoting resources to operational level tasks (security of sensitive sites, destruction, remediation, attribution etc). The demands of the defence of the homeland and both foreign and domestic consequence management (as recently demonstrated in Japan) will only increase. Commanders need

Figure 2.

Severity:

Catastrophic

Critical

Marginal

Negligible

Composite Risk



Time

The potential severity of a CBRN event ranges from marginal to catastrophic. CBRN events have occurred and will occur. The Magnitude of CBRN events will increase over time for the reasons shown; therefore the overall risk has increased.

Increasing Probability Due To:

1. CBRN knowledge entering the public domain cannot be recalled.



2. Iterative relationship between frequency and inhibition. The more often an event occurs, the more acceptable it is.

Increasing Frequency



3. Increasing number of non-state actors:
Terrorist splinter organizations
Domestic actors

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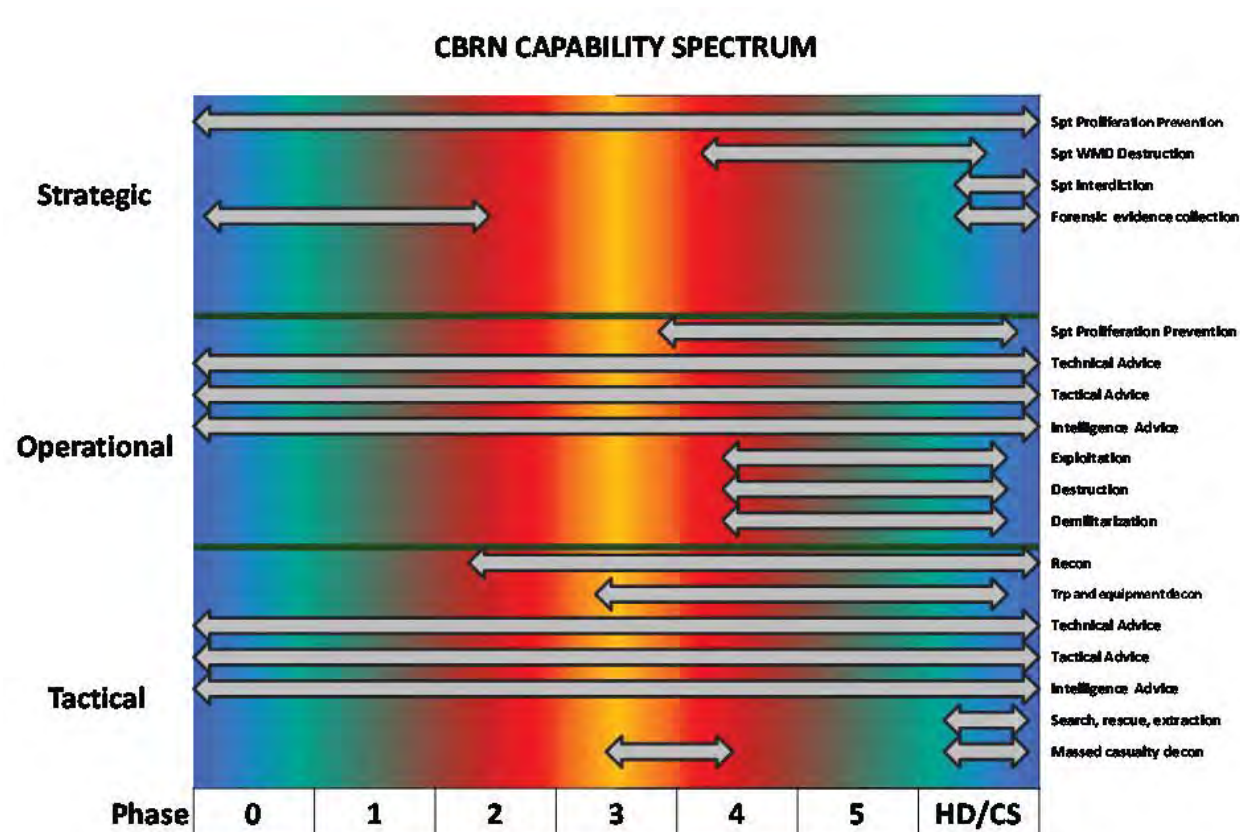


Figure 3.

to understand the impact of CBRN constraints on their operations. Figure 3 overleaf, graphically portrays and summarises CBRN capability across the operational spectrum by phases (HD/CS refer to Homeland Defence and Civil Support).

The author is the UK exchange officer at the USA CBRN School (USACBRNS). The opinions portrayed above are entirely his own and in no way reflect US government or USACBRNS policy. Spelling and terms are also appropriate to the continent.

DCBRNC Medical Simulation Suite

by Surg Cdr Steve Bland RN, Medical Director Joint CBRN Medical Faculty

The Surgeon General, Surgeon Vice Admiral Philip Raffaelli QHP, visited the Defence CBRN Centre (DCBRNC) at Winterbourne Gunner on 19 April 2011. Following a brief by the Commandant Wing Commander Lee Taylor on the role of the Centre that includes CBRN generalist and medical training, the Surgeon General opened the new CBRN Medical Simulation Suite. The simulation suite uses a combination of hi-definition clinical simulation and operational scenarios to train and test medical personnel as part of specialist training and preparation for deployed operations.



Surgeon General, Surg VAdm Philip Raffaelli QHP formally opens the Centre's CBRN Medical Simulation Suite. Surg Cdr Steve Bland briefs the Surgeon General on SimMan 3G.

Medical training in CBRN, led by Medical Director, Surgeon Commander Steve Bland RN, uses a blended training approach with lectures, pre-hospital scenarios using the outdoor training area and table top exercises. The new suite adds to this learning by providing hospital specialists with a simulated resuscitation and critical care area using a wide range of CBRN medical scenarios. DCBRNC runs a number of medical courses including the Emergency Medical Treatment course for new entry

medical officers, and the more advanced multidisciplinary CBRN Clinical course which has students from the Defence Medical Services, National Health Service as well as NATO and other allied nations. The Centre also hosts the Department of Health provided Hazardous Area Response Team (HART) training.

Speaking during his visit, the Surgeon General said "I was very impressed with the new training suite which has only come about

because of the initiative shown by the team at Winterbourne Gunner. The Defence Medical Services would be in the forefront in the event of a CBRN event so it is important that their training is as realistic and comprehensive as possible. This new facility goes some way to providing that."

The Specialist Vehicle Program – A CBRN Perspective

by WO2 Paul Taylor 1RTR, CBRN DRAC

The Specialist Vehicle (SV) program, which used to be called FRES, will form the Recce Family, which will replace CVR(T). The Scout, in particular, is the planned SV variant replacement for Scimitar.

Scout will have a generalist CRN detection capability with the emphasis on “Detect and Warn”. This will inform the commander of potential CRN threats and act as a cue for specialist CBRN recce and survey capability. It does not replace the requirement for specialist CBRN specialist recce and survey to support the Land Environment.

Scout has been designed with current Operations in mind, and in order to serve the Army beyond current Operations. It will offer better levels of protection to its crew by using modern design techniques and materials. Conventional armour will be thicker, made from stronger alloys and better shaped to defeat the threat. Scout’s other big protection advantage will be from the provision of soft and hard kill Defensive Aid Suits (DAS), which will better protect Scout without the tremendous weight of additional armour.

Traditionally, CRN detectors have been integrated with specialist CBRN vehicles. Installing a CRN detection capability onto a generalist platform has not previously been attempted in the UK, bringing in a new set of challenges: minimising the impact of the detection suite on the platform; minimising the training burden of the detection suite; and ensuring that detectors are robust enough to survive in the operational environment of a generalist Recce platform.

Modern ballistic computers and



ammunition technology will make Scout a lethal force on the battlefield. Scout is a recce vehicle, so Surveillance Target Acquisition (STA) technology will be vital. It will greatly extend the distance at which targets can be detected and recognised, both by direct line of sight using thermal and visual sights on Scout itself and by the use of a micro-UAV.

Scout will deliver more power to a far better drive train than CVR(T). Ride quality and suspension will be greatly improved, enabling the crew to both work and fight on the move. Scout will be bigger than Scimitar, at around 30 tones - more than double the weight of Scimitar. However Scout delivers a much improved overall capability, and without changing the laws of physics the only way to achieve the capability required, not only for current Operations, but for thirty years beyond, is with a bigger and heavier vehicle.

Scout will have three Radiological detectors - two external and one internal, that will have the ability to calculate the duration a crew will be

The UK Ministry of Defence has selected the ASCOD SV (Above) from General Dynamics UK for the FRES SV programme, a new generation of armoured fighting vehicles for the British Army.

able to stay in a Radiological hazard area without causing long term illness from the accumulated dose received. There will also be one internal and one external Chemical vapour detector with the ability to detect Toxic Industrial Chemicals.

The information generated by the detectors will be presented to the crew in a user friendly format that can be easily understood and translated into CBRN reports and also show the levels of danger in a similar format to that which is used with present chemical detection equipment.

Scout will enhance the generalist recce soldier with the capability to detect and warn of a possible CRN hazard. It will act as a cue for specialist CBRN recce and survey and the information the recce soldier receives will be provided in a format that is easy to understand and does not detract from his other duties.

CBR Modelling and Simulation Research

by Dr Chris Hindmarsh, Principle Scientist, Hazard Assessment, Simulation & Prediction, Dstl

Dstl are currently undertaking research into a wide range of modelling and simulation tools to support Chemical, Biological and Radiological (CBR) defence. A number of these tools are reaching a level of maturity that will allow them to be used for operational support. Research ranges from the development of specific tools to support CBR knowledge management, including warning and reporting, through to synthetic environments supporting operational analysis. This article will discuss a number of these tools and their applicability to CBR defence.

CBRN Knowledge Management Capability (KMC)

CBRN KMC is aimed at providing 'timely, accurate, relevant information and intelligence on CBRN aspects of the battlespace in order to enable decision makers to make appropriate timely decisions'. Work in this area supports the procurement of the Network Biological, Radiological and Chemical Information System (BRACIS), an upgrade to the current in-service system that implements NATO Allied Technical Publication (ATP) 45 Warning and Reporting doctrine. In addition, research is actively pursuing the development of decision support tools relevant to pre-operational planning, incident management and consequence management, in order to aid decision makers at the tactical through to strategic levels. Specific areas of interest include sensor placement, source term estimation (STE) and dispersion modelling.

Sensor Placement Tool (SPT)

To protect personnel from a CBR attack, it is necessary to perform timely detection of the presence of a threat agent, in order to enable protective measures to be taken,

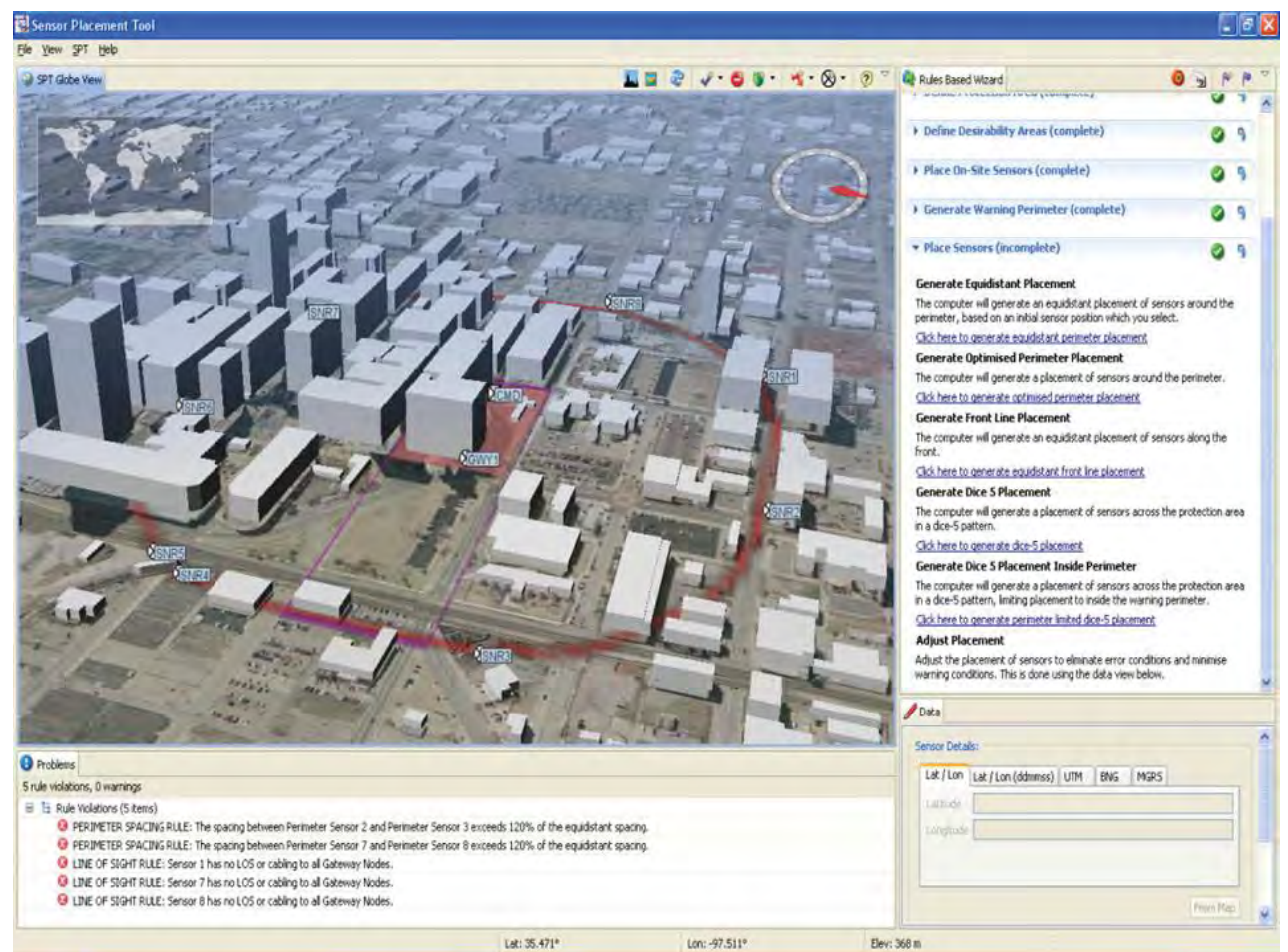


Figure 1 Sensor Placement Tool (SPT).

for instance through the donning of Individual Protective Equipment (IPE), or the administration of medical countermeasures. Dstl, in collaboration with the US Defense Threat Reduction Agency (DTRA), has developed a SPT to aid military personnel in the optimal positioning of their CBR sensor assets. SPT is a decision support tool, which can be used to provide advice on the optimal location for sensors to:

- Maximise probability of detection.
- Increase warning time.
- Minimise casualties.

SPT has two modes of operation, the first, automates current military doctrine to produce a very quick estimate on the best location of sensors, whilst the second provides a detailed, optimised placement which takes into account a wide range of parameters, including: (i) the CBR sensors available, (ii) terrain and meteorology, (iii) the threat, (iv) number of personnel,

(v) required warning time, etc, to optimally position the sensor assets. The tool can provide information on the number of sensors required to protect a specific area, as well as what the optimum sensor mix is. This allows an insight into the correct numbers of sensors to protect an area. The tool will also give an estimate on what the probability of detection is, based on the number of sensors and their location; this allows commanders to make informed risk management decisions, for instance is it better to place sensors off-base and protect them or locate them within the base perimeter. A screen shot of SPT is shown at Figure 1.

SPT has now reached a level of maturity that allows it to be used to support operations and studies in a Reachback capacity at Dstl.

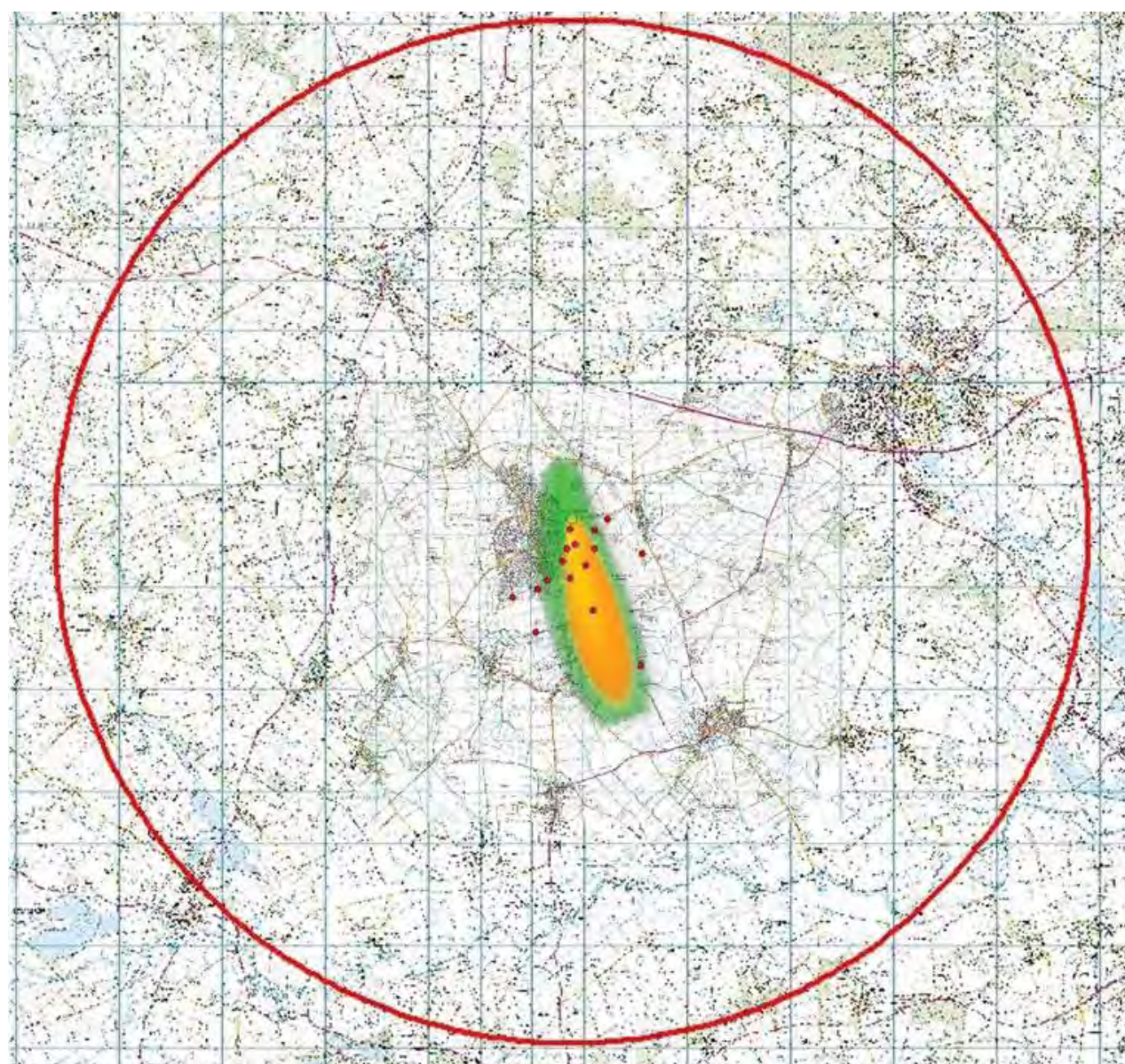
Source Term Estimation (STE)

In the event of a CB release on the battlefield, significant operational benefit can be obtained by having

a prompt and accurate prediction of the areas affected by the release. This will allow warnings to be sent to units and response procedures to be initiated, such as donning IPE and informed reconnaissance and survey. By undertaking these actions commanders will be able to ensure the safety of their troops and maintain the operational tempo. In order to provide accurate estimates of risk to ground forces, an atmospheric dispersion model must be used to predict the hazard areas. Most dispersion models require an estimate of the source parameters (the 'source term', including mass of agent released, size of initial cloud, etc.) as input for their calculations. In the first ten minutes of release, the true characteristics of the 'source term' are generally unknown and there is likely to be little information available. Despite this, some form of hazard assessment must be carried out, either through NATO ATP 45(C) warning and reporting procedures or through the use of atmospheric dispersion models. Compared to ATP-45(C), dispersion models have the potential to significantly refine and improve the accuracy of the hazard assessment; however, their ability to do this relies crucially on knowledge of the source-term and the local meteorology for model inputs.

Dstl, in collaboration with the US DTRA, have developed a STE model (the Monte Carlo Bayesian Data Fusion (MCBDF) algorithm) that is capable of taking a variety of inputs including meteorology, detector data and observations to provide an indication of the likely release point, size of the release and subsequent downwind hazard prediction. This tool runs in real time and can provide refined hazard estimates as more information becomes available. STE would assist with the following:

- During-event hazard management, by informing command decisions steering effort and focussing limited resources (e.g. administration of medical countermeasures).
- Post-event hazard management, by facilitating reconnaissance



and survey, clear-up and forensic investigation.

- Increasing confidence in route selection and freedom of movement in manoeuvre warfare across the Joint Operational Area (JOA).

Figure 2 shows an example of the information source term estimation can provide. The image shows a chemical release over a base that has a number of sensors deployed on it. The yellow plume shows the 'ground truth', that is what is actually happening. The red circle (10 km diameter) is the hazard area as a result of implementing ATP-45 procedures, whilst the green plume is the STE 'estimate' based on the sensor data and any observations.

STE has reached a level of maturity that allows it to be used to support operations in terms of informing Recce and Survey and hazard areas, following a CB release. Research is still required to allow timely hazard estimates in theatre, particularly with respect to integrating with sensor assets. Work is therefore focussed on ensuring that future upgrades to the Sense programme take advantage of this capability.

Figure 2.

Support to Operational Analysis, Research and Procurement

CBR Virtual Battlespace (CBR VB)

The CBR VB is a desktop-based synthetic environment developed to provide a verified and validated toolset to enable a low-level quantitative assessment of the entire CBRN Defence System. It is currently being used to support a number of tasks across the CBR domain, including:

- Support to research and procurement.
- Support to CBRN training.
- Aid in the development of policy, concepts and doctrine.

The CBR VB consists of a wide range of different models that have been coupled together in a flexible framework. The capabilities within the CBR VB include:

- State of the art dispersion models, including Dstl's Urban Dispersion Model (UDM) and the US Second order Closure Integrated Puff model (SCIPUFF).

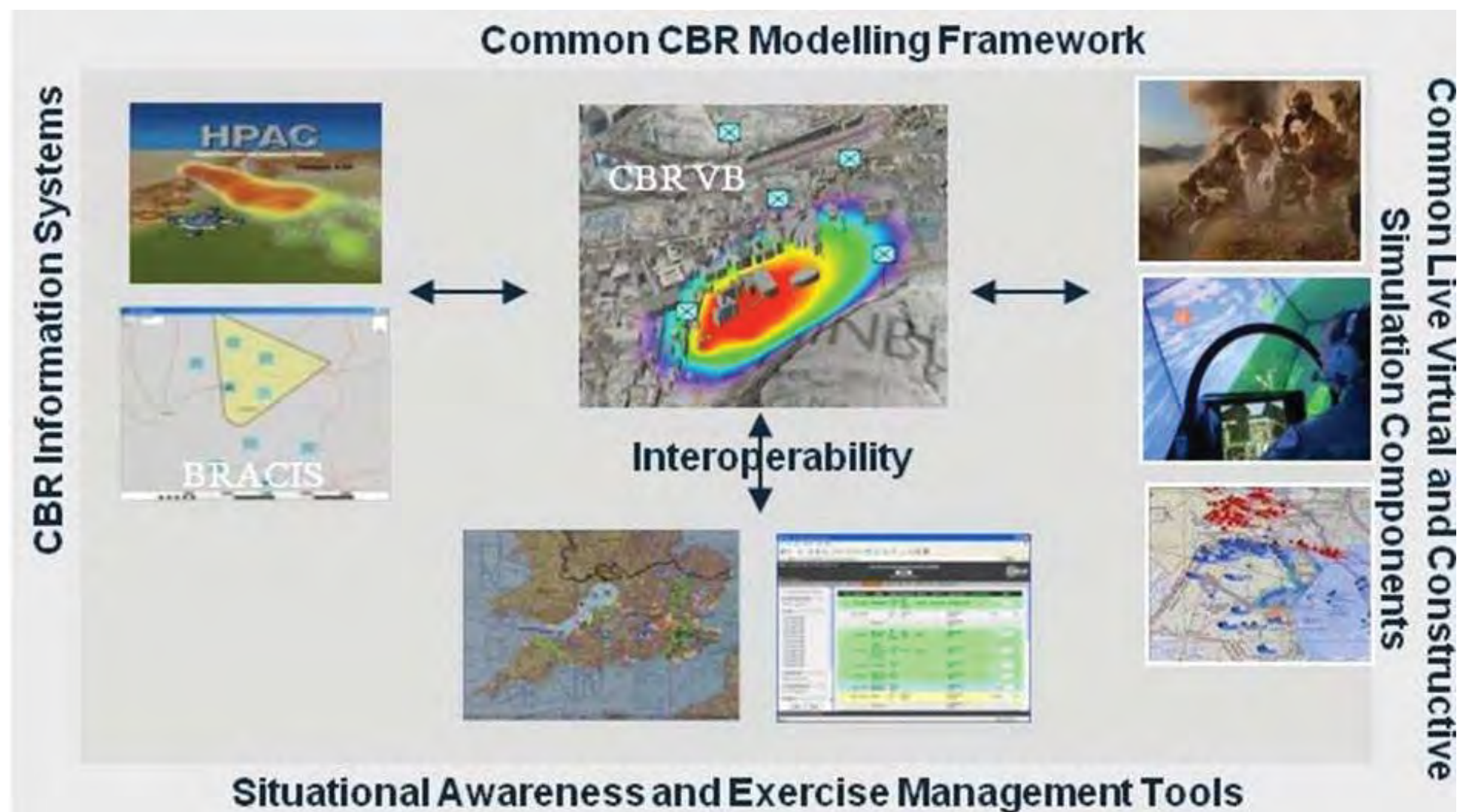


Figure 3 Overview of CBETS project.

- CBR Defence System models, including those of detectors, CBRN suits, physiological burden, medical countermeasures, etc.

- Models of entities – personnel, vehicles, aircraft.

- Links to non CBRN models and systems, such as One Semi-Automated Forces (OneSAF), Peace Support Operations Models (PSOM) and the Close Action Environment (CAEn) model.

Examples of how the CBR VB has been used to understand the impact of CBR on military operations include the linking of the CBR VB to the Close Action Environment (CAEn) model, a tactical level warfighting simulation. This has enabled the assessment of the impact of small scale chemical attacks on Company level operations. Ongoing work with Dstl's Peace Support Operations Model (PSOM), is allowing for a strategic level understanding of the impact of CBR incidents on stabilisation operations.

The CBR VB has also been used to support research and procurement for CBRN equipment, including the Personal CBRN Protective System (PCPS) equipment line

(the replacement to the MKIVa) and medical countermeasures. The CBR VB has been used to model the performance of a range of virtual suit systems comprising of different materials. Studies have looked at the number of CBR casualties and physiological burden casualties resulting from these systems over a range of realistic military vignettes. This has allowed an understanding of the most promising suit systems, in terms of protection and burden, to be constructed and trialled, thereby saving the MOD a significant amount of funding and effort pursuing systems that would not provide the desired capability.

CBR Effects in Training Systems (CBETS) Project

The CBETS project (Figure 3) is developing a core CBR Modelling and Simulation (M&S) component that can be used across defence training for the M&S of CBR vignettes and scenarios. Development will see interoperability with the common Live, Virtual and Constructive simulation systems used within Individual and Collective training. Some of these systems include OneSAF, JSAF, and VBS2. This capability enables more realistic M&S of the effects of CBR threats and how they propagate across the battlefield, incorporating

modelling of CBR doctrine and TTPs for responding to such events. This aims to provide Commanders and decision makers with a better understanding of the CBR threat and the consequences it would have on their plans. The system is also capable of generating synthetic feeds to prompt CBR Information Systems, such as BRACIS with realistic scenario data. This will further enable the incorporation of such Information Systems into training environments. It is envisaged that the capability will be delivered in the future as a CBR M&S service within the Defence Training and Simulation Services (DTS2) project.

Summary

Dstl are currently undertaking research into a wide range of modelling and simulation tools to support CBR defence. As described above, a number of these tools, in particular the SPT and STE model, are reaching a level of maturity that will allow them to be used for operational support. The CBR VB is now being used to answer a wide range of questions, including the impact of CBRN on operations at tactical and strategic levels.