

Material man

Colonel Silas Suchanek, Defence Clothing IPT Leader for the UK MoD, talks to Gwyn Winfield about drawing up the pattern for future IPE

The Defence Clothing IPT (DC IPT) has one of the most varied portfolios of any other integrated project team (IPT). At one extreme it is bearskins and underpants (though hopefully not of the same material) and at the other it is bomb suits and individual protection equipment (IPE). Colonel Suchanek is the man in charge of the whole wardrobe and is always keen to ensure that each item of clothing is seen as part of an ensemble rather than an individual item. This has seen him, for example, plan in items of clothing as part of the sleep solution and to include anti-microbials in the combat underpants to help fight infection. On the tactical level he is also involved in ensuring that the physiological loading and environmental protection for the next generation NBC suit are well balanced and that the Mark 6 EOD suit provides a high degree of protection for bomb disposal operatives countering IED threats in Iraq.

Not only do the individual items of the ensemble need to balance, but they need to find some harmony with items in the larger military piece, such as the Future Integrated Soldier Technology (FIST) programme. FIST will provide a percentage of the UK Army with an improved war-fighting capability with enhanced optics, communications and situational awareness, but also has to integrate with existing IPE items such as the General Service Respirator and Mark IVa suit. There is often a trend to leave the physiological burden problems of IPE (IPE can also include items such

as body armour) to one side as too complicated or not “core” – a problem that is exacerbated by NBC which tends to be seen as high risk/low probability. This can lead to the problem of the Future Soldier passing out the first time he tries to use his heat-generating equipment with his NBC IPE. To mitigate against this problem, Colonel Suchanek is also involved in hydration and cooling solutions.

“It all revolves around the environmental conditions that the dismounted close combat soldier [DCC] has to fight in,” said Colonel Suchanek. “If he has to fight in heat then he will need something that will keep him cool, but it can’t have too much weight or too much of a power requirement. He will have to have something that protects him against CB attacks – and that is where the real challenges lie. Your FIST community will have situational awareness, fighting systems and other hardware, but you need to keep that to a manageable heat and weight burden of around 30kg. Then you have the rest of the Non-FIST force; how do they operate under the environmental threat conditions? The Commander of the DCC soldier wants him to carry all the kit he needs, but he also needs to sustain himself; he has to carry ammunition, batteries, mortar rounds, etc.

“On the heat side we are looking at a number of different options for cooling personnel. We have looked at systems that blow air, which hasn’t been entirely successful as what you need is something that will bring your temperature down, and in many cases

the forced air tends to circulate warm air. Then you have the problem of needing batteries for fans. We are looking at sophisticated systems that would cool the air drifting around the body, but defeating heat means energy and then you need batteries and everything else. There is an urgent requirement for some form of personal cooling system, but it is an enormous challenge in terms of budget and power. I can’t give any answers yet, but hopefully in a few months after the work we are doing now I may have a way forward,” said Colonel Suchanek.

In many respects the Defence Clothing IPT, while not being as sexy as some major project teams, is one of the integrators that drive the larger programmes. This can be as obvious as where an item of equipment sits on the soldier. I have seen the personal role radio (PRR), lightweight chemical agent detector (LCAD) and personal dosimeters all sitting on the left side of the soldier’s chest – yet there is clearly only room for one of them. Equally, the latest thermal imager needs to conform with weapon sight, respirator and helmet, and if the soldier cannot carry additional power supplies to sustain the system then his effectiveness in the field is curtailed. For the major IPTs this is a simple solution – the soldier just carries more batteries – yet these need to fit into pouches and need to be part of a weight envelope that will not disable the soldier. This is where DC IPT comes in.

“FIST is the programme that will provide the DCC soldier with the capability to know where the enemy and his friends are; that is the military challenge. Our challenge is having to say at some point, ‘Right, we are now fixing the volume, weight, and configuration of the boxes that you are going to carry, as we can’t design a load carriage system until those elements are fixed’. Part of the problem is that a green box comes at a certain size, and then someone says ‘That’s fine, but can’t you make it a bit smaller or lighter?’ And yes, they can, but at some stage we have to stop because we need something to work off. So we are working closely with the DCC IPT to make sure we design the load carriage around the likely components.”

Covering FIST

Two of the recent releases from the DC IPT were the Mark IVa NBC Suit, currently manufactured by Remploi Frontline, and the Mark 6 EOD Suit, manufactured by NP Aerospace. While the EOD suit does not have to conform with FIST – there is not likely to be a FIST bomb tech – the NBC suit does. Yet this poses the problem of whether there need to be two suits to deal with the different physiological burdens. Could we see a Mark V(a) NBC Suit for non-FIST soldiers and a Mark V(b) suit for FIST soldiers that has a lower level of protection to allow a lower physiological burden which could be countered by their enhanced mobility and sensor package that can allow them to move faster and smarter?

Colonel Suchanek went into detail: “There is a proposal to have the PECOC programme come up with an integrated NBC suit,” he said. “However, given the PECOC timescale and resources, bringing the NBC suit and combat clothing together is such a challenging exercise that it was not deemed practical at this stage. We will continue to have combat clothing and a protective suit that he dons to protect him from chemical attack.

“If the soldier has to wear his combat clothing and his NBC suit then there is a lot of physiological burden in that, so one of things we have done in the Mark IVa is to make it more breathable and enable you to wear it next to skin; so with the IVa we have the capability to work better in hot climates as you can breathe more. The next generation NBC suit, will take that as a baseline and work upon it, but what we don’t know is whether the future NBC IPE will be something more than an NBC suit. The other response would be to have some form of first line of chemical defence in the clothing we are developing for PECOC, allowing a soldier to survive in a small-scale surprise attack without needing to don his NBC suit. It is a



Tooled up. As well as CBRN, DC IPT also does EOD

possibility, and we are looking into the feasibility of putting on a coating which will not allow liquids to soak into the clothing, but the trouble is that if you put on non-permeable clothing you are cutting down its breathability; how realistic is it as the first line of defence? It is a desirable function of combat clothing, rather than an essential one.”

In terms of inherent protection it would seem that nano-silver thread could also play a larger role. While its anti-microbial properties are well known, other companies are working on nano-silver as a method of biological decontamination. Couldn’t the prevalence of silver thread be increased, meaning that decontaminated suits could be laundered either less or at lower temperatures? “It is a possibility, and you could use either silver or copper as they have the same properties, but the main function with the pants is to stop bacterial infection, rather than protection against biological attack,” said Colonel Suchanek. “The problem with the washing idea is that, even with washing instructions on the clothes saying ‘wash at 40 degrees centigrade’, the mobile laundry could still boil things at far higher temperatures. Soldiers and washing instructions can also be an uphill struggle; in operational environments soldiers don’t necessarily have the ability to wash their clothes at different temperatures so they have a developed a fairly unitary way of dealing with items – they all get put in the same pot. There are a lot of claims made about these materials which always seem good, but are not as effective as they are made out to be. The danger is the cost; with our combat underpants we have had good results of reducing fungal infection in the crotch area so that was a worthwhile activity.”

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Expensive weave or well-worn threads?

The US Soldier Centre in Natick is currently examining many of the same problems that the UK, and others, are facing and are trying to come up with new solutions. Yet the UK, despite its knowledgeable science and research base, does not have the funding of the US, so does this mean that any improvement in NBC and EOD suits will be an iterative rather than revolutionary changes? Will the UK have to remain wedded to activated carbon? "At the moment carbon is the basis of almost all NBC suits throughout the world," said Colonel Suchanek. "It is a long-standing technology; it hasn't been bettered in a long time and is a trusted form of protection. Research is looking at step changes, and whether they can be de-risked in terms of time and cost, but the end product has to be cost-effective. The US has many more resources and economies of scale may allow more activity in that area and may develop something more exotic. We have always had to cut our cloth accordingly in the British military, but if a step change comes along which has been sufficiently de-risked and is cost-effective then we will look at that. Currently we are maintaining our current capability in terms of the Mark IVa suits. It has yet to be decided who will take on the project of the next-generation NBC suit, so I wouldn't want to prejudge anything in terms of technology. Conclusions can be drawn when people decide who will run with the future NBC Suit and in what time scales."

The one thing that cannot be escaped in any conversation with a UK defence procurement official is the long shadow of the Defence Industrial Strategy (DIS) [For more information on this see the Winter 2006 edition], and DC IPT is no different. CBRN is a topic that is disseminated throughout the procurement chain: the new Royal Navy Carrier has a CBRN requirement which is dealt with by the Carrier IPT; DC IPT has a great deal of the CBRN IPE requirements (but not the respirator) while CBRN IPT has much of the core CBRN procurement activity. An early suggestion in the DIS change was whether these needed to be

consolidated – should all clothing go to a clothing IPT, or should all CBRN considerations go to a CBRN IPT, for example. Colonel Suchanek gave his opinion, "I want to see the most effective way of performing the task for Defence. There is no point in entering into turf wars of the level of 'I must retain this, because I must retain it.' That may not be the most effective way of doing it. Personally, I think of it very simplistically in terms of NBC hardware and software. Hardware is the detection, decontamination, warning and reporting, while the software is the kit that you wear – the boots, gloves, respirator and suit. The CBRN IPT could have all the hardware, the electronics and clever things, while the clothing should stay with the Defence Clothing IPT."

Until this is resolved, however, CBRN is littered throughout the Defence Procurement Agency teams, and in this process of change how do the relationships work? The CBRN IPT is looking to develop a Key Strategic Partner (KSP) arrangement, yet this need not be the case for the DC IPT, for example. Can a pick-and-mix situation

work where Colonel Suchanek has to work with a KSP in one team and not in another, or will it be a case of "one in, all in"?

"This KSP is very much in line with DIS and we are all encouraged to create these strategic partnerships where it makes sense for Defence; it makes sense, as where you have a shrinking industrial base and large multinational companies with technical expertise you should use it to the best effect. There is nothing stopping two IPTs having the same relationship with a KSP. It may be that certain industries focus on the technical expertise – NBC electronics – and others that are more on the clothing and textiles. We are moving that way with our supplier base optimisation programme, where we have decided to let product groups with a prime contractor; we are creating the same KSP concept. One of the things that we are looking at is the KSP for all the NBC IPE and we are doing that at the moment," said Colonel Suchanek.

Yet the IPE side is a vibrant and competitive market, with companies having strategic partnerships with other IPE companies and vested



Any changes to the EOD suit will be minor adaptations to the Mark 6



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interests galore. How then does Colonel Suchanek see this developing? “Within Defence Clothing, NBC IPE is a discrete group: the suit, the respirator, what you keep your respirator in – that sort of thing. DC IPT is in the process of transferring out those items which don’t sit within our core function – the RVD (Residual Vapour Detector), for example, which is a detector rather than a piece of personal protection. . We will then be seeking, through the competitive process, a prime contractor to supply all those items in the product group. The GSR respirator which has been developed through CBRN IPT will move into the DC IPT NBC Product Group when it becomes an in-service item”

One of the other items that came out of DIS was the need to safeguard the UK’s activated carbon, to make it a strategic interest. This would ensure that, should there be a crisis, the UK had to hand a ready store of carbon, rather than going cap-in-hand to market and scrounging what was left. While this is an excellent idea for the soldier, it does make procurement difficult as it presents a geographically closed market which could encourage high prices. How then does Colonel Suchanek buy ‘smart’ when he is faced with such limited options?

“My view, and this is reflected in DIS, is that there are certain things which are viewed as strategic and beneficial to have those things either in the UK or under UK control. Anti-Gas Cloth falls into one of those items and was mentioned in DIS. NBC suits do have a degree of sensitivity about what they are used for, in terms of availability and technical expertise that goes into it, and we would prefer that capability to remain on-shore. That doesn’t preclude a manufacturer from abroad coming to the UK and establishing a manufacturing source in the UK and then providing it. But for strategic interest we would like the Anti-Gas Cloth to be from the UK. There are a number of companies using this technology and so it can still be competitive.”

This would seem to leave the door open to British design, Anti-Gas Cloth and manufacture, but assembly or stitching to be done somewhere with skilled, but cheap, labour – China, for example. The cost saving from this could off-set any increase in carbon price. Colonel Suchanek agreed: “We have always said that while we want the Anti-Gas Cloth to be sourced and manufactured in the UK, there is no reason why an element or proportion of the garment manufacture can’t take place outside the UK if this increases

competitiveness and provides better Value for Money. We will be examining that possibility and looking at invitations to tender on that basis. We would want to have a degree of influence or control over where that manufacturing was. Therefore we don’t see the garment manufacture happening on a global basis, but in countries where our interests are more aligned; one example would be within a Nato country. There are political and national interests and sensitivities about NBC and while we see the possibility of garment manufacturing taking place off-shore from the UK it would be limited to something we were comfortable with.”

This would certainly bring in a lot of offers from Europe where there are a number of skilled textiles companies, some already in the IPE industry, and it will be interesting to see how UK industry adapts to this state of affairs. They will, however, have a lot of time to prepare for it, since PNPS has yet to have a firm date and the Mark IVa only entered service last year. Any further additions to CBRNe IPE is likely to be modular and dependent on a change in threat – that might force a change to the Mark 6 helmet, or create a Mark IVb, for example – a case of cutting your cloth to meet your threat.



“So last season, sweetie.” DCIPT is responsible for the full range of IPE ©CBRNe World