



The Human Factor: the key to enabling secure systems

As the defence and national security and resilience sectors undergo the Strategic Defence and Security Review, the ability to provide value throughout the lifetime of systems and equipment is more crucial than ever. But however sophisticated the technologies and systems become, they will always require some aspect of human operation or maintenance. Sylvia Horner, NS&RC Executive Counsellor and Director of Human Factors at Quintec, examines the proposition for creating better value through consideration of the human aspects of future defence and security systems.

The Government is conducting a cross-government, policy-based, resource-aware Strategic Defence and Security Review (SDSR) which goes far wider than previous reviews of its kind.

The SDSR will be based on a new National Security Strategy (NSS) currently being developed. That strategy will define the UK's interests – for example in security and prosperity – and consider the international and domestic threats to those interests. It will then set the UK's priorities in addressing those threats, the implications for NS&RC and the current capabilities across government departments.

Preparation of the new NSS will effectively be the first step towards a coherent, well-founded SDSR and discussions on the Strategy are already well advanced. For the MOD, the NSS and SDSR will ensure that the resources for our Armed Forces are matched to our foreign policy requirements so that they have the systems and equipments that they need in order to be able to do what we ask of them, and that the defence budget is spent as efficiently, effectively and economically as possible. Indeed, the Defence Secretary is clear that the SDSR is an opportunity for radical thinking. All defence programmes will need to demonstrate their relevance and their value for money. As a result, there will inevitably be reductions in some areas in order to enhance others.

The human contribution to system design is an essential component in many, if not all, defence and security systems. While technology and automation, decision aids and computer processing all play essential parts in achieving necessary levels of system performance, human actions cannot be totally removed from the processes. Even where so-called fully automatic operation is achieved, human contributions to design, commissioning and maintenance need to be taken into account. At a higher level overall management, work practices, human relationships and interactions, and organisational culture all play important roles.

The human factor is key to securing complex systems. Technology and processes may all provide the background and framework for security but often the final arbiter is the human operator who has to remember and implement the latest operational instructions. Often security is seen as an irritant, to delay or hamper users and in many cases, this has led to security lapses, violations and even abuse of security systems.

“The human contribution to system design is an essential component in many, if not all, defence and security systems”

In fact, this need not be the case. With a little analysis and forethought, the expectations and capabilities of operators can be captured at an early stage and embodied in the hardware and software so that human error is designed out; training and help functions are built in, the equipment works well in the environment for which it is designed and tasks can be undertaken by the people they are designed for.

It is easy to attribute security failures to the users on the ground and to blame them for security failures but systems designers should take the human factors into account in new security architectures. They should not just focus on the technology but should also ensure that tasks, roles, responsibilities, skills, training, consulting users, communication, instruction manuals, aide memoires and so forth are clearly defined and ►

► understood and presented very simply, are practical and time-efficient and are designed with the end users in mind.

Human performance, and the many situational factors that may influence it, are well understood. It is, therefore, important to gather lessons learned and find better ways to quickly incorporate these findings back into the design process so that project managers and procurers can ensure that human factors are adequately addressed.

There are many other benefits of adopting user-centric approach, such as:

- Improved usability
- Faster response times
- Improved operational effectiveness
- Reduced operator error
- Reduced training time
- Reduced accidents
- Improved situational awareness
- Better decision making
- Reduced whole-life costs

Human factors processes, such as the MOD's Human Factors Integration process, provide models on which to base project-specific action plans. New technical standards (such as DEF STAN 00-250) recognise the need to account for the human contribution during the detailed design phase.

This includes:

- Human factors design requirements
- Allocation of functions
- Environment, health hazards, human error and input to the safety case
- Modelling and performance assessment
- Human computer interface design
- Task analysis, workload analysis and job design
- Training needs analysis, training design and delivery

- Manpower planning
- Control panel, workplace design and control room layout
- Trials and acceptance
- Change management

However, there is only so much that can be done to improve a design once it has been conceived. The traditional procurement approach fails to account for the human user at the pre-design phase: the processes and standards available are intended to ensure that the human factors aspects are properly captured once a design has been selected. But systems designers often give human factors only a cursory consideration and believe that these issues are extraneous to the design – a luxury – which can be reduced or removed altogether to save money.

The real key, then, is to get human factors issues built in at the earliest stages, as an integral part of the design process and the systems architecture and to embed the requirements into the design contract. It is important to adopt a user-centred design approach at the URD stage rather than trying to re-engineer the requirements back into the design at the SRD after the business case, concept studies and requirements have all been agreed.

The human factor can make or break the system – and although users are often considered to be the weakest part of a system, if considered properly, they really can become your best asset.

Further information

For further information, or to respond to any of the issues raised in this article, please contact:



Sylvia Horner
Director of Human Factors, Quintec Associates Limited
Tel: 07885 934033
Email: sylvia.horner@quintec.com



Helping Small Businesses Win Defence and Security Export Contracts

The Defence & Security Organisation (DSO) is a UK Trade & Investment business sector and its Small Business Charter initiative helps small companies to succeed in the highly competitive world of defence and security exports. Charter members each have a personal Account Manager from UKTI DSO's Small Business Unit who ensures that small businesses remain aware of the wide range of advice, information and support offered by UKTI DSO and helps them to get maximum benefit from it. This includes marketing advice and support, export policy and licensing information, military support and exhibitions (both at home and overseas). The Charter makes the following pledges to all members:

- We will meet you or visit your company and learn about your products
- We will offer expert military and marketing advice
- We will help you maximise the export potential of your individual products
- We will invite you to Charter-exclusive and other relevant exhibitions, inward missions and briefings
- We will work hard to encourage and maintain a close and frequent two-way relationship with you.

Charter membership also includes a free periodic newsletter – "Small Talk" – which keeps companies informed as to what's new in UKTI DSO small business support. Members also have access to the Charter Members' Centre – a section of the UKTI DSO website offering exclusive news of events and other Charter benefits.

So don't delay – contact:

HOWARD GIBBS
HEAD, SMALL BUSINESS UNIT
Tel +44 (0)20 7215 8204
Email howard.gibbs@ukti.gsi.gov.uk

**CHARTER MEMBERSHIP
AND THE SUPPORT OF THE
SMALL BUSINESS UNIT IS
COMPLETELY FREE OF CHARGE**

www.dso.uktradeinvest.gov.uk



SMALL BUSINESS UNIT