



MINISTRY OF DEFENCE

Technology Partnership in Defence

Maintaining a cutting edge for planning and investing in Defence R&D



A Report by the National Defence Industries
Council - Research & Development Group
(NDIC RDG)



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Sept 08

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Foreword

Foreword by National Defence Industries Council Research & Development Group Co-chairs



Paul Stein, MOD Science & Technology Director & Steve Wadey, Managing Director MBDA (UK)

We recognise that MOD and Industry face the joint challenge of delivering and sustaining military advantage in the face of rapidly developing threats to our Armed Forces through the development of technology.

Addressing this problem will require a different relationship between stakeholders with consequent changes and developments in roles and responsibilities. We have formed three working groups focusing on improvements in engagement and planning for capability-related R&D, improving business and commercial models and becoming smarter at Systems Engineering, particularly for open systems architectures and modular approaches to improve technology insertion. We see the consolidated output in this report as taking forward the Government's innovation agenda and more specifically MOD's Innovation Strategy (published in December 2007). In particular our report sets out how MOD and industry will work together to deliver the Defence Technology Plan.

Through this report we make clear recommendations which, if adopted across Industry and throughout MOD, will have an immediate and enduring impact.

We look for endorsement from the National Defence Industries Council for the implementation actions identified in this report and accept the joint challenge of delivering clear military operational advantage and the sustaining of a strong UK technology base.

A handwritten signature in black ink, appearing to read 'P. Stein'.

Paul Stein
MOD Science & Technology Director

A handwritten signature in black ink, appearing to read 'Steve Wadey'.

Steve Wadey
Managing Director MBDA UK



Section One

Introduction

1.1 The National Defence Industries Council R&D Group (NDIC RDG) established three working groups to identify clear recommendations which will lead to more effective planning of defence research and development (R&D) expenditure in the UK. The activities of the working groups are set in the context of the developing relationship between MOD, wider UK government and Industry. The activities focus on the Defence Technology Plan as the primary vehicle for joint R&D planning and implementation. The output from the three working groups has been consolidated into this single report which forms a major step in taking forward MOD's Innovation Strategy (published in December 2007) and Through Life Capability Management (TLCM).

1.2 This report sets out how Industry through an agreed set of principles (as it did with the Defence Industrial Strategy published in 2005) participates, interprets and supports a plan owned by MOD where UK Industry is the sustaining Partner. It focuses on key issues of joint interest and responsibility:

- Optimal use of UK MOD's £2.6BN R&D investment and related Industry Private Venture (PV) spend, driving increased military operational effectiveness through more timely and affordable procurement
- Greater investment in Defence Technology to provide faster, more innovative, cost-effective solutions addressing changing threats through rapid technology insertion
- Addressing directly the TLCM challenge to provide sustaining military capability within better informed budget plans
- The leverage of appropriate civil technologies to deliver military capability and exploit the wider economic benefit of core UK technical capabilities
- Sustaining a high level of skills based in science and engineering within UK MOD, Industry and Academia, and most importantly
- Enabling operational sovereignty in those areas where critical technology is central to the UK capability.

1.3 To address these issues and to encourage a vibrant and agile relationship between MOD and Industry, the report recommends:

Strategic Engagement - End to End Planning:

- Where feasible, mutual transparency in appropriate budget and planning horizons to enable alignment between MOD and Industry investment
- Sustainable structure for planning, to balance openness and transparency with a continuing commitment by investors from Industry
- A partnership approach to R&D implemented through the Defence Technology Plan.

New Business Models –Supporting the front line through an effective link with technology:

- The development of a new risk/reward Model to encourage greater investment in Defence Technology and more effective bridging of the ‘Valley of Death’, i.e. the vulnerable gap between technology development and exploitation through manufacture
- Clear entry and exit criteria within R&D programmes, in order to allow Industry and Academia to join and leave programmes, with a clear appreciation of the risks in doing so
- A partnership approach to Intellectual Property creation, exploitation and management.

Systems Engineering and Open Systems Architecture – Impacting all future procurements:

- MOD to own the high level architectural function of the systems of systems (the organisation, design and integration of combinations of military and defence systems)
- Industry to recognise its role in supporting the above and commit to the appropriate resources, realising that MOD and Industry will urgently need to establish sub-groups for implementation
- MOD and Industry to adopt the systems engineering and open systems architecture charter to foster and enable insertion of new or improved technology and capability – recognising this may enable MOD to grow internal expertise and engage Subject Matter Experts within industry in order to manage the necessary greater acceptance of risk.

1.4 Additionally the working groups acknowledged other issues which MOD and Industry need to address jointly, in taking forward a partnership to planning R&D investment, namely:

- European collaborative projects
- Developing a wider supplier network (i.e. a wider cross-section of Industry, including Small & Medium sized Enterprises (SMEs) and Academia)
- USA – UK relationships
- Valuing Defence Technology impact in the wider economy.

These issues need to be prioritised and will be addressed by the NDIC RDG during 2008/9.

Section Two

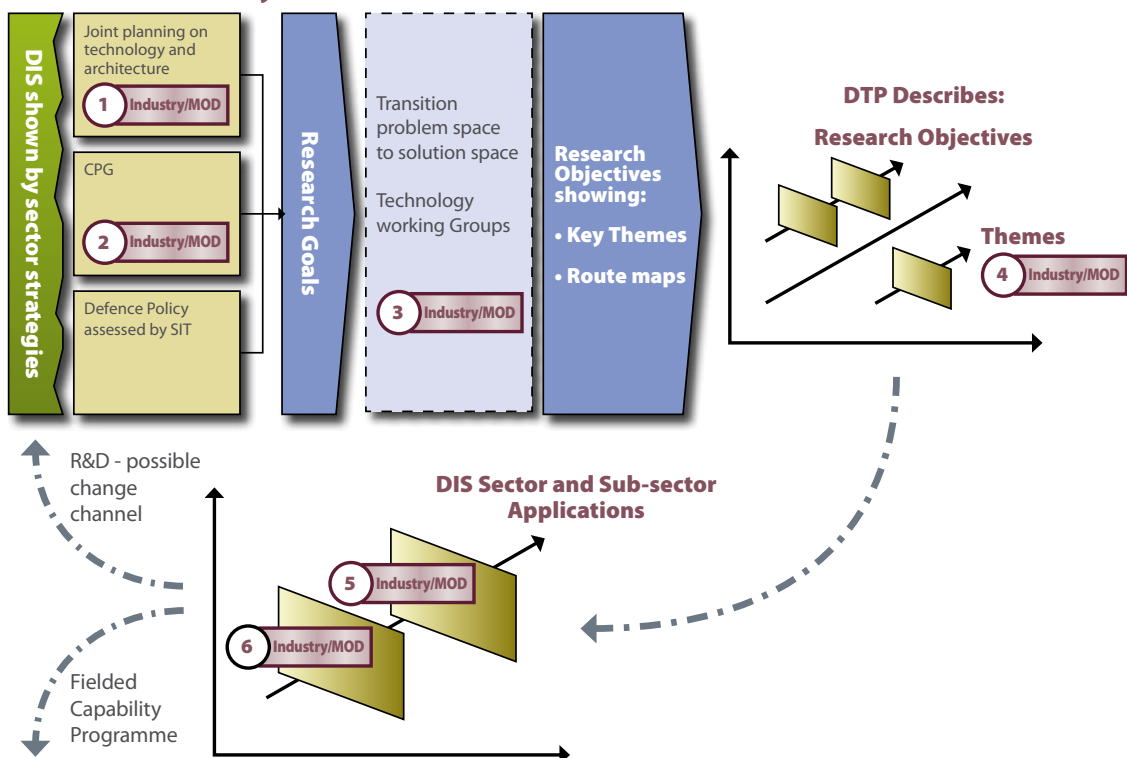
Strategic Engagement

2.1 The recurrent theme between MOD and Industry in developing and delivering a joint technology strategy and plan is the need for engagement throughout the R&D cycle. The principal drivers behind this thinking are as follows:

- Industry needs to understand the rationale for linking operational requirements to key technologies to justify meaningful and sustainable investments
- MOD needs to have visibility of Industry's commitment to Defence Technology investments to determine competitiveness of military effect and sustainability
- Industry has a role in advising of potential military threats arising from technology developments accessible by an adversary
- Both parties need to contribute to the formation of UK centres of excellence to create critical mass, improve efficiency and avoid duplication.

2.2 In order to inform the MOD/Industry relationship throughout the R&D cycle a process map was constructed to identify critical interaction points supporting the formation and implementation of the Defence Technology Plan:

R&D high level process map, showing points of MOD and Industry interaction



- 2.3** For each interaction point the working groups have identified joint objectives, inputs required by MOD of Industry, outputs required from MOD by Industry, constraints and enablers affecting the relationship and recommendations for change/development. Summarised below are the critical issues at each point.

Interaction points 1 and 2 – the front-end capability planning

- 2.4** It was recognised that early visibility of the rationale leading to research goals would be more effective in assisting Industry to prioritize its own PV investment and encourage a higher level of Defence Technology investment. Also MOD would benefit from Industry's awareness of threats developing from disruptive technologies and shifts in industrial capability. Mutual visibility is key and Industry will need to be more transparent regarding PV planning and expenditure, and will need to field the right type of individuals into the capability planning process. The critical issue is to balance broad involvement against the need for a sustainable planning forum comprising serious technology investors.

Interaction point 3 – the transition from problem space (Research Goal) to solution space (R&D Objective)

- 2.5** The working groups determined the importance of joint transition planning which they believe will lead to better R&D programme management, clarify with Industry where particular centres of expertise lie, assist the debate around operational sovereignty and enable both MOD and Industry to look across sectors and optimize synergy between Research Goals/research themes. Again visibility is key to ensure realistic R&D Objective milestones and to construct joint risk mitigation plans, particularly utilising technology demonstrators as a risk-reduction technique.

Interaction point 4 – development of R&D Objective themes

- 2.6** The critical issue is to implement best practice R&D management to secure earlier deployment of technology, reflecting well informed risk/benefit balance. The initiation and management of R&D plans will draw heavily on the new business models output (in Section Three) which in itself will reflect different models appropriate to the stage of the R&D cycle.

Interaction point 5 – Defence Industrial Strategy Sector and sub sector applications leading to capability insertion

- 2.7** The critical issue is the early and effective fielding of military capability. This may require reconciliation between the delivery mechanism coming principally from the Defence Industrial Strategy and Defence Technology Strategy sectors and the capability insertion affected through an Equipment Capability Customer and improved end user focus.

Conclusions and Recommendations

- 2.8** The working groups conclude that, irrespective of process, there are certain underpinning principles, which are the foundation of optimal joint MOD and Industry R&D planning. To this end the working groups have developed an agreed set of principles with MOD and Industry stakeholders, namely:

- An end-to-end interaction which embeds common planning milestones and most importantly a common understanding of the rationale for R&D priorities
- Where feasible, a level of mutual transparency which gives Industry visibility of the appropriate related budget and planning horizons, and allows MOD to understand and assess Industry's commitment and capability



- Recognition that optimal planning groups will necessarily be a balance between inclusiveness and sustained momentum from UK industrialists
- A means for MOD to engage with the multi-company entity 'Industry' in a practical way that enables the benefits outlined in this report.

2.9 The working groups recommend the principles set out above are adopted and taken forward, but we acknowledge that a 'one size fits all' approach is inappropriate, and therefore that optimal planning fora are created and developed which recognise the specific objectives at each of the interaction points (identified in Section 5). In summary:

- A 'front end' forum which enables rapid, informed convergence from a broad-base Director of Equipment Capability (DEC) Industry day, through to the working (potentially the Capability Planning Groups or an aggregate thereof) group which represents an ongoing joint activity
- Establish the forum for joint R&D 'transition planning' to take Research Goals to R&D Objectives
- Evaluate and as appropriate draw on existing R&D planning Models, particularly from the US and from the civil arena
- Develop a joint framework for R&D Objectives programme management under MOD leadership which links and engages the essential stakeholders
- Ensure a feedback loop, linking customer (especially user) pull to and from R&D Objective outputs.

Section Three

New Business Models

Introduction

- 3.1** The Defence Industrial Strategy and Defence Technology Strategy encourage more investment by Industry in R&D and it is recognised that Industry needs to provide more innovative, timely solutions with inherently more risk. It is acknowledged that current business models available do not achieve the required criteria and hence the need for new, more innovative business models which encourage investment from both traditional and non-traditional industries and innovators that meet the requirements of the future military need.
- 3.2** In summary, these new business models need to yield solutions for our defence forces whilst at the same time, improving the procurement efficiency from both Industry and MOD. The challenge is to increase the likelihood of maturation and exploitation of technology and to reward innovation regardless of its position in the supply chain, or the contracting mechanism used and fostering a richer, more agile relationship between Industry and MOD.

Principles

- 3.3** In developing new business models, a set of principles are needed to address the following areas:
- Remove barriers to investments and optimise incentives
 - Balance investment over the maturity cycle
 - Move towards open investment models and encourage partnering
 - Streamline the R&D contracting process
 - Optimise the Intellectual Property (IP) regime.
- 3.4** It is also recommended that the new business models need to recognise two different types of funding arrangements; either competition through a single 'prime' or via partnership/consortia type models. These routes offer the optimal delivery of key technologies or capabilities within the defence R&D domain.
- 3.5** In order to optimise investment in defence R&D, a clear distinction is needed between work that requires full MOD funding, with that which requires either joint funding or wholly funded industrial development. It needs to be recognised, however, that more effective engagement is required in joint business planning between stakeholders in order to increase the pull-through of technology and investment into operational capability, independent of the funding mechanism.

Framework and Issues addressed include

Entry, exit and exploitation arrangements for members of consortia

- 3.6** Facilitating entry of new participants, into and from research consortia is vital for rapid technology insertion and progression into fielded capability. There is a need to develop

arrangements and rules of engagement and disengagement to ensure this can be achieved whilst also recognising the true value and contribution of all members in such an arrangement.

Intellectual property ownership and exploitation conditions

3.7 Progress has been made in this regard. A set of ten principles has been established (see below) between MOD and Industry stakeholders concerning the treatment of Intellectual Property created/used under joint-funded MOD contracts for operational use in the context of the new Centre for Defence Enterprise (CDE). For fully funded MOD contracts then the DEFCON 705 clause as agreed in the wider context between MOD and Industry for equivalent contracts will be applicable. The pilot CDE covers the ideas phase of the R&D activity but it is intended that these principles, along with relevant input from other existing approaches, will form the starting point for further discussion and development into the growth and demonstrator phase of contracts subject to further work which the group are pursuing and developing over the next few months and to feed-back on the success of the IP conditions in attracting participants in the ideas phase. This activity will be aligned to that taking place in the NDIC Commercial Policy Group on MOD's Commercial Policy Statements in particular on IP generally and demonstrators in particular phase. The 10 principles referred to above are:

- IPR in the results of the joint-funded work ("Contractor Foreground") will vest in the Contractor. The Contractor will be encouraged to exploit this Contractor Foreground, in particular for the benefit of UK MOD programmes, either directly or through the Contractor's own licensee.
- MOD automatically acquires certain (mainly internal) user rights in the contract information deliverables (termed "Constrained Rights") that meet MOD's minimum requirements. This does not include the right to disclose those deliverable to others to run competition for further work or otherwise exploit the results in other than a limited way.
- MOD can acquire more extensive rights (termed "Enhanced Rights") to use the main deliverables on payment of a Conversion Fee, the amount of which is to be agreed in each Contract on a case-by-case basis.
- Enhanced Rights grants MOD the right to use the contract results for competing future work and engaging in international collaboration. Internal MOD guidelines will make it clear that competing for further work should normally only be considered where the Contractor is unable or unwilling to perform that work itself for the MOD on fair and reasonable terms.
- The breadth of MOD rights can by agreement in the Contract be limited to less than those enjoyed under DEFCON 705 (see definition "Government Purposes"), leaving other UK government markets open for exploitation by the Contractor itself.
- Where a Contractor possesses the only capability in the UK to exploit the results of the contract, the MOD would not seek Enhanced Rights to contract with others if the Contractor agrees to undertake further work on fair and reasonable terms.
- MOD is granted rights in patents and registered designs arising under the Contract, but these are constrained by other provisions of the Condition that deal with MOD's rights (Government Rights, Conversion Fee etc.).
- The Contractor will not unreasonably refuse to grant licences in its Background Intellectual Property Rights (IPR) to third parties authorised by MOD where needed to exercise "Enhanced Rights" on MOD's behalf.

- The Contractor should mark its contract deliverables with appropriate caveats/legends identifying ownership and release conditions consistent with the Contract condition.
- The confidentiality of commercially sensitive information belonging to the Contractor will be respected in any disclosure made by MOD of the same to others, which may include establishing direct confidentiality agreements with the intended recipient.

Terms and Conditions

- 3.8** Progress has been made in having off-the-shelf non-negotiable MOD contract terms and conditions available for ideas capture/seed corn work (for example, led by the new CDE) and this will be developed for growth/development R&D activity. These have been recognised by MOD and NDIC industrial representatives as being fair and reasonable, and will reduce costs and delays associated with agreeing terms and to ensure through-life consistency. They include IP terms and conditions, although those for shared-funded contracts, which are currently based upon the ten principles referred to above, have yet to be debated for migration beyond CDE contracting. Contracts for demonstrators are potentially more complex and will need to be negotiated on a case by case basis.

Mechanisms for creating stronger incentives/behaviours and for recognising and better balancing MOD and supplier risks

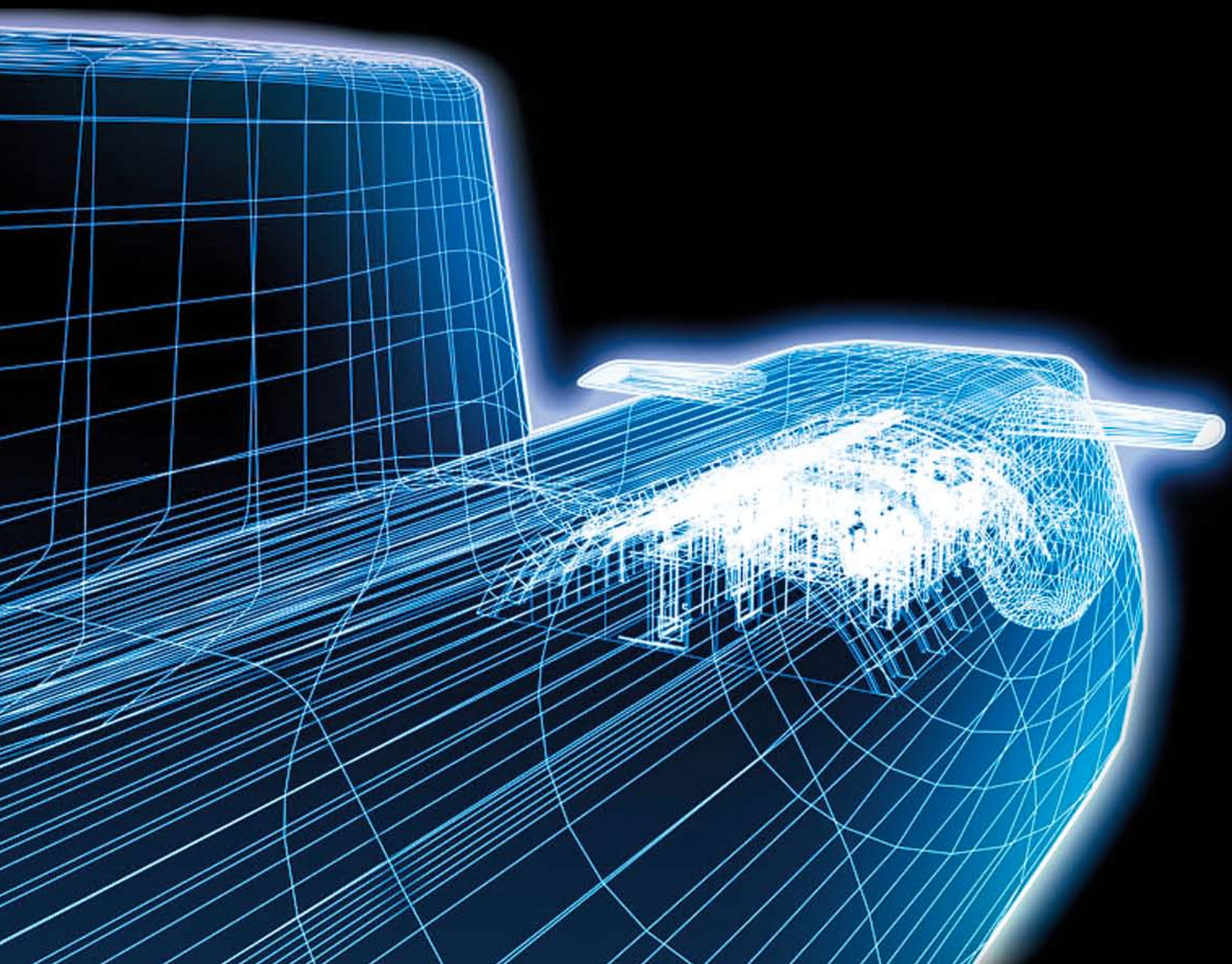
- 3.9** There is concern that existing MOD profit formulae are not consistent with the financial risks associated with Industry investment. Attention needs to be given to a wider set of options to balance risk and reward in order to encourage broader investment in R&D from Industry and potential new investors. Particular focus should be placed on the potential success of the products being developed, or the liabilities that accrue from jointly funded activities and/or consortium.

An assessment framework for rapid decision making

- 3.10** Criteria need to be clearly defined for responding quickly to new ideas and for quickly terminating work that is falling below expectations or is no longer needed. These criteria should be based on assessments of innovations, potential benefits to defence, timeliness of pull-through and associated entry integration costs.

Conclusions and Recommendations

- 3.11** The working groups conclude that MOD and Industry should build on the jointly agreed set of principles developed for the Centre for Defence Enterprise programme and further develop business models. Particular focus should be on development and demonstrator programmes with appropriate IP conditions and risk/reward mechanisms that make industrial contributions to investment more attractive to MOD, Industry and the inventor.
- 3.12** The working groups recommend that Mechanisms for creating stronger incentives/behaviours and for recognising and better balancing MOD and supplier-risks should be developed in order to:
- Endorse proposals concerning assumptions on risks and reward and risk liabilities and encourage teams to develop specific proposals based on real cases where changes will encourage greater innovation, pace and effectiveness
 - Develop best practice arrangements for joint funded partnerships to strike a reasonable balance between the needs to protect and exploit the owner's IP so that both Industry and MOD have an incentive to invest
 - Development of an agreed assessment framework with the desired, necessary and appropriate behaviours from all stakeholders.



Section Four

Systems Engineering and Open Architectures

Introduction

- 4.1** Modern defence operations are characterised by the requirement to integrate individual systems, platforms and infrastructure to give military effect. There is also a strong need to introduce new technologies rapidly where they can add benefit. Improved systems engineering across the defence sector is essential to ensure that an integrated defence capability can be sustained as individual parts are updated or improved as part of TLCM.
- 4.2** Modular systems with open (standard and non-proprietary) interfaces and architectures) are highlighted in the MOD Innovation Strategy (published in December 2007) as an essential means to improve the quality and cost-effectiveness of the UK defence capability.
- 4.3** MOD has acknowledged ownership of the System-of-System (SoS) architecture which delivers its military capability. MOD's commitment to change is stated in "Implementing Systems Engineering in Defence" (published by Defence Equipment & Support organisation in March 2008):

"at the organisational level, steps are being taken to improve alignment between and where appropriate consolidate the organisations responsible for System of System coherence, in order to establish the basis for "top-down design," open architectures and effective systems of systems governance."

In this section we set out the principles which need to be followed to implement Open Systems and Open Architectures across MOD procurement.

- 4.4** To support the business model set out above in Section Three, the following are needed:
- Well-understood open architectures to provide a clear context for the insertion of new technologies and which can be used to plan exploitation routes
 - Widespread use of open standards in defence will remove many of the barriers to technology insertion due to the elimination of proprietary or unique interfaces.
- 4.5** An open innovation approach is increasingly common in the civil sector. Underpinning such an approach are modular and open architectures. Companies compete to supply new components based on enhanced functionality or lower cost. Widespread knowledge of the standards and architecture encourages innovative companies and universities to enter the marketplace because they can make accurate financial assessment of the likely return on their investment and intellectual property.
- 4.6** The defence market is much smaller than the open innovation markets in the civil arena. It also has additional constraints such as the need to operate in hostile environments. These constraints act as contractual and technical barriers to commercial and technical innovation.
- 4.7** Terms such as architecture, systems, SoS and components are usually used in a specific context within sectors and programmes. This can cause misunderstandings for new entrants and cross

interaction between programmes. Such terms need to be clearly defined and understood in context when addressing specific technology development issues.

Guidelines

- 4.8** The systems architecture describes the structure of the components of the system, their relationships and the principles governing their design and evolution¹. It sets out the context of how the system operates within its immediate environment.
- 4.9** As well as designing the system and owning its architecture, the role of the architect is to understand how the system will operate. Both MOD and Industry have roles in defining the systems architecture. The difference between the roles needs to be clarified for both technical and contractual reasons.
- 4.10** It is recognised that integration of open systems brings a common ownership of, and shared responsibility for, their performance and sustainment. To achieve the integration function MOD and its suppliers must develop the required relationships.

Principles

- 4.11** MOD and all sectors of the defence community should work together to develop the appropriate standards and framework to implement an open modular systems architecture.
- 4.12** MOD should develop its systems engineering skills and processes to meet its SoS responsibilities.
- 4.13** MOD, as the demand side of the market, should encourage a more open supply side through the use of open standards and open architectures. However, it is recognised that market drivers and products change in response to changes in the world civil and military markets.
- 4.14** The application of system engineering principles will be across the whole life cycle and all defence lines of development (DLODs).

Framework

- 4.15** The working groups have developed a “Charter for Adopting Open Systems in Defence Acquisition” to help those tasked with practical implementation. A draft of this Charter is set out in the Annex. The diverse commercial, technical and operational conditions do not allow a single Model to be applied. The Charter provides both overarching principles and an implementation vehicle.
- 4.16** The Charter summarises the goals of improved flexibility, a more open supply base and better value for money. It notes that this can only be achieved via the collaborative engagement of all parties and establishes NDIC as the appropriate body to oversee the joint benefits.
- 4.17** An empowered MOD/Supplier task force is proposed to lead the introduction of Open Systems Architecture, with the support of a Consultation Network of a wider group of experts who would ensure innovation, rigour and constructive review. A Steering Committee is proposed that would maintain the overall vision and measure achievement against the goals. It should report directly to NDIC.

¹ IEEE STD 610.12



- 4.18** The Charter describes the behaviours required of MOD, Industry and Academia for the successful implementation of Open Systems Architecture, and notes that the Defence Acquisition environment must encourage these. In particular, it addresses the challenge that:
- All parts of the defence community must work together to promote and manage a Modular and open systems architecture approach
 - MOD and Industry need to agree a common method of exchanging systems information
 - MOD needs to develop its systems engineering skills to meet its SoS responsibilities
 - There needs to be an attractive balance for risk and reward for suppliers at all levels of the supply chain, including SMEs, Universities and Prime Contractors
 - A philosophy of Open Systems (well-defined architectures with standard interfaces wherever practical) needs to be applied across the whole life cycle and all lines of development, recognising the open systems solutions are not appropriate in every circumstance.
- 4.19** The MOD Architectural Framework (MODAF)² structures can be applied to a broad range of capability and are not limited to computer and information infrastructures. Industry and MOD will build on the existing MODAF structures to develop MOD's architectural role. It is recognised that this cannot be based on a mechanistic description of current systems based on extant specifications.
- 4.20** MOD, with Industry and Academia, has identified a set of widely-used tools and methods which can be evolved to a preferred set with a common method of exchanging system information.

Conclusions and Recommendations

- 4.21** Widespread use of open systems and architectures will facilitate the rapid and cost-effective introduction of new technologies into defence systems for enhanced UK military capability.
- 4.22** The open systems architecture approach must include all Defence Lines of Development, TLM and contractual issues.
- 4.23** Architecture development should be carried out collaboratively between MOD, system, sub-system and technology suppliers, with a clear division of responsibilities.
- 4.24** The working group recommends that the NDIC accept the 'Charter for Adopting Open Systems in Defence Acquisition' as an agreed set of principles to form a basis for the future implementation of open systems.
- 4.25** MOD and Industry, through NDIC RDG should develop a plan for exploiting R&D in a basis of open systems and architectures using the above Framework.
- 4.26** MOD should equip itself to perform the challenging and complex SoS Architect role. Industry should support MOD in this function. Both MOD and Industry need to agree the allocation of technical and contractual responsibilities.

² The MOD Architectural Framework (MODAF) is an enabler for managing complexity. It provides a specification of how to represent an integrated model of an enterprise, from the operational / business aspects to the Systems that provide capability, with appropriate Standards and programmatic aspects. (www.modaf.org.uk)

4.27 As architect and owner of the SoS, MOD should make appropriate elements of the defence architecture available to organisations developing new systems and technologies. MoD also needs to recognise areas where up-skilling of its own people will be required and where supplementing its own team with industry expertise is necessary. Ownership of the SoS architecture will inform and determine important changes in the procurement strategy.



Section Five

The way ahead

- 5.1** In this report the NDIC RDG attempts to set out how MOD and Industry work together to improve planning and joint investment in defence R&D. It sets out jointly agreed principles for improved engagement in planning and investing in R&D, improved business and commercial models, which have already been applied to the Centre for Defence Enterprise and better systems engineering, including a draft Charter for Open Systems Architecture in defence.
- 5.2** The working groups recognise that further work is required to implement the reports, recommendations and take forward specific elements of new business models and improved systems engineering. In particular, we recognise that implementation will require engagement with a greater number of stakeholders across MOD and Industry, including other NDIC groups, such as TLMC and Commercial Policy Groups.
- 5.3** Against the three main themes, we propose:

Strategic Engagement:

- coordinate with the NDIC TLMC sub-group, confirm MOD/Industry interaction points and implement the recommendations of section 2.

New Business Models:

- Expand the collective buy-in lessons learnt (how do we achieve broad buy-in from those involved and who participate and others who choose/cannot attend the various discussions)
- Focus on demonstrator phases of R&D
- Address the risks/reward balance (IP, profit, increased pull-through).

Systems engineering and Architectures:

- MOD moves ahead with its ownership of the top-level military architecture and its consequent role as SoS Architects. There are contractual, technical and training implications which MOD will address
- Industry will collaborate with, and support MOD in implementing open architectures and the SoS Architect role
- The 'Charter for Adopting Open Systems in Defence Acquisition' is to be used as the basis for implementing open systems across defence programmes.



Annex

A draft 'Charter for Adopting Open Systems in Defence Acquisition'

This Charter sets out our shared vision and our shared principles for the adoption of open systems in defence acquisition. The Charter will guide our policies and strategies. It will form a basis for promulgating guidance and changing working behaviours everywhere in the defence acquisition enterprise at all levels from the working to the highest executive levels.

The Charter describes the behaviours required of MOD, Industry and Academia for the successful implementation of Open Systems Architecture, and notes that the Defence Acquisition environment must encourage these. In particular, it sets out 18 key principles:

This Charter is for everybody involved in defence acquisition. In MOD, it embraces policy formers, sponsors, users and Agencies. In the MOD's supplier base it embraces all of 'Industry and Academia that support Defence' and all aspects of supply: equipment, infrastructure, services, training, education and skills and research. The Charter is applicable to all areas of acquisition where an open systems approach may be adopted including: networks; information and software systems and data; mechanical, electrical and energy systems; and, services. It is relevant to all stages of the acquisition lifecycle from research and innovation to disposal and to all of the defence lines of development.

In adopting this Charter, MOD can expect that its Suppliers will:

1. Commit to develop the behaviours, relationships and competencies to enable the full exploitation and benefits of an open systems approach in acquisition
2. Form a community of Suppliers that understands how to design, engineer, integrate and manage complex, safe and secure open systems and services that meet MOD's needs
3. Provide a route for smaller companies and providers to contribute
4. Offer to deliver open system solutions under appropriate commercial and IP rights arrangements, applicable through-life
5. Support MOD in sustaining the UK's sovereign capability to define, integrate, prove, support and upgrade systems and services through-life
6. Seek out agile solutions, allow space for innovation, and apply best practice.

In adopting this Charter, MOD's Suppliers can expect that MOD will:

7. Recognise the primacy of commercial and contractual incentives in responding to its requirements
8. Be responsible for the top level architecting, design and integration task for military capability
9. Accord appropriate weight to adoption of modular and open system needs

10. Be an intelligent user and customer, giving informed and intelligent guidance on their requirements for openness, modularity, standards, specifications and certification
11. Recognise the need for sustaining an Industrial base that is world class
12. Be receptive to innovative proposals and develop open business models
13. Establish a common approach across MOD.

Within the scope of our defence acquisition enterprise and in facing the wider world beyond it, MOD and its Suppliers will, together:

14. Sustain open channels of communication to foster dialogue and debate
15. Identify ways to reduce the cost of entry for newcomers and increase diversity in supply
16. Develop a robust partnership to implement and promulgate an open systems approach, jointly fostering better understanding of objectives, processes, skills and competencies
17. Commit to education, staff development and interchange
18. Promote open systems and the transfer of knowledge.

