

## Preserving the Body of Knowledge of the UK's Defence and Aerospace sector

2015 will see the UK go to the polls in May. The outcome of the election is unclear, as opinion polls give no major party a clear lead. Predictions of the result range from another coalition to a short term minority government holding a further election in the autumn. The outcome is important for the UK's defence sector, as 2015 is also the year another Strategic Defence and Security Review is due. Decisions taken under either economic or political pressures could have implications far beyond the 5 year period of the next SDSR, or of the next Comprehensive Spending Review. Sir Brian Burrige, the Vice President Defence in the trade association ADS, expressed his concerns in a recent interview with Nick Watts Deputy Director General of the UK Defence Forum, and Editor of its recently published collection of interviews on strategic perspectives.

"The UK's influence in the world and its seat at the 'top table' has traditionally been a blend of our diplomatic capability, our economic capability and our military capability. In that respect we are still regarded as a first division player, the only premier league player is the United States. In European NATO only two countries can deploy significant force; ourselves and France." This position derives from a deep understanding in the UK of how best to use the military instrument effectively. Sir Brian defines this as 'The Body of Knowledge'.

"The Body of knowledge is the entire understanding from science through to military doctrine, which enables a country to exercise its military instrument effectively. Contributors include universities, industry – both SMEs and larger companies with laboratories, the public sector armed forces and civil service as well as the think tanks." Sir Brian is concerned that this Body of Knowledge could wither on the vine due to decisions which may be taken for short term reasons, but which will have a long term effect. In particular the amount of money invested by Government in Science and Technology (S & T) which in turn feeds through to the Research and Development (R & D) undertaken by industry and UK based universities.

"The Office for National Statistics figures show that the amount of funding put into researching Science, Engineering and Technology by MOD has reduced by £1.2bn over 10 years. (Between 2001 and 2012, defence expenditure on SET decreased by £1.2 billion in constant prices. This

was offset by an increase in Research Councils' expenditure on SET of almost £1.0 billion in the same period. Source: <http://www.ons.gov.uk/ons/rel/rdit1/science--engineering-and-technology-statistics/2012/index.html> )

" Why this matters is due to the process of getting early stage conceptual research undertaken by either industry or universities into a practical piece of technology. It requires crossing the 'valley of death' and Government funding helps to achieve this. The defence and security sector comprises a high proportion of advanced complex technology. The result is world class technology. If the R & D is undertaken in the UK then the associated Intellectual Property (IP) remains onshore. This makes the system or platform exportable by UK plc, enriching the economy.

Sir Brian points out that the £ 1 bn reduction in spending by MOD has been balanced by a roughly equivalent amount contributed by the Research Councils ), but he recognises that the priorities of the Engineering and Physical Sciences Research Council would not be applied in areas that ultimately would lead to defence capability.. He also points out that high-tech, high-value research helps to maintain the credibility and reputation of UK universities. But he points out that competition is increasing. "If I look back 15 years at the top 20 tech and engineering universities in the world, 5 were in the UK, 1 was European, the rest were American. In 2013 there were 2 UK universities in the top 20; 2 European universities, but 6 Far Eastern universities."

Sir Brian calls for a better understanding of what the Body of Knowledge represents. It is he claims "A National strategic resource; nothing short of that. No successful military power has succeeded historically over the longer period without it." Having this resource gives the UK 'operational sovereignty' which means that the knowledge, experience and IP resides within the UK's defence industrial base. This allows freedom of action in rapidly modifying or upgrading equipment to meet changing threats. Having it close at hand on-shore means that – "you can reach out and touch it. There is no problem about resolving priorities as there would be if you were talking to a firm from the US." This requires investment in the eco-system of the science base. " If investment in this sector makes the UK economy strong, then this too should be included in the definition of operational sovereignty."

Sir Brian points out that the equipment used by UK forces in the Libyan campaign of 2011 derived from S & T which began in the 1970s. Defence companies have to make decisions about where to invest their funds depending on the demand from customers. The decision by

the UK government in 2012 to buy rotary wing capability off-shore, principally Chinook, represented a change in the previously existing Rotary Wing Strategy. Under this strategy companies could see where to invest in capability. The new approach means that, beyond Wildcat, there is now no new production in the UK and little 'noble work' apart from up-grading the Chinook and Merlin fleets. The current Wildcat production line is the last remaining indigenous rotary wing production in the UK. Sir Brian fears that this will put a question mark beside any future investment by industry.

Similarly the decision to invest in the U S Joint Strike Fighter (JSF) marks an end to the era of collaboration in European fast jet production. Design and development activity is now in a major lull. The investment in the Franco-British Unmanned Combat Aircraft (UCAV) programme which aims to develop a platform for the 2030 timeframe is intended to preserve key skills above critical mass until a requirement for design, development and production returns. In the interim, we will be confronted with a very lean time for the UK defence and aerospace sector.

Sir Brian returns to his thoughts about the Body of Knowledge by referring to other European partners in the JSF programme. They are all buying and operating the aircraft, with little or no direct input. Policy makers might be tempted to look at the JSF programme as a way to sustain industrial capability, but the reality is different. Equally, both the domestic and export markets are complicated by the variety of different European platforms. There is one US offering – the JSF – but three from Europe: the Gripen new-generation, Typhoon and Dassault's Rafale. The result is that three European companies are fighting against one major US prime.

In aerospace, there are six major European defence industrial nations ; Spain, Italy, Germany, France, UK and Sweden. A nation such as the Netherlands operates US and European equipment with an 'end user' perspective, with no intention of making significant changes to the aircraft. "If you are determined to buy off-shore, you need to do so with your eyes open. It comes back to the indigenous capability that you are left with in terms of those design and development engineers."

"Looking at JSF, you can take 15% of the work into the UK supply chain, but it is not 'noble work', just build to print. This has jeopardy when it comes to the sustainability of your sector, because you are at the mercy of your costs. If fixed costs start going up, you only have one decision as an owner, you move production. That is what happened to ship building in the UK."

The prospect of re-shoring work which might be lost to foreign competitors is also driven by cost. Sir Brian recalls that the MOD 2012 Defence Technology Paper referred to collaborative costs increasing in relation to the number of partners. Ahead of production work, there are non-recurring costs to be absorbed. Indigenously producing a 6th Generation fighter with an off-take of just 60 aircraft for the UK would make it too expensive.

Another factor to consider is the cost of through life support for new aircraft. "The UK defence industries are world leaders in support solutions starting with Tornado and Typhoon, and helicopters. The US model of customer support offered for JSF could not be more different. It is significantly more expensive."

Sir Brian returns to the 2012 Defence Technology Paper by drawing attention to the government's stated ambition for the UK defence sector to sustain itself by producing world class products which can be exported with the UK brand sticker on. This has produced the Defence Growth Partnership which is focussed entirely on exports. Policy makers and service chiefs will have a busy year ahead. Industry wants to ensure that it can play its part in both helping the economic recovery, but also in promoting UK plc as part of the wider effort of the British Government to promote UK's wider role in the world.