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Organisation: Federation of Australian Scientific and Technological Societies (FASTS)
Submission: FASTS submission to the Defence White Paper

The Federation of Australian Scientific and Technological Societies (FASTS) welcomes the opportunity to make comment on the Defence White Paper. FASTS is a peak body comprising about 60 professional science and technology organisations which collectively represent approximately 60,000 scientists and technologists.

Science and Technology underpins modern Defence capability, both through preparedness for future threats and through the acquisition of new materiel. It is surprising that the public discussion paper does not mention the importance of scientific research to Defence.

In-house Defence scientific research capacity is needed to develop new technologies, to provide knowledge for the uptake of new technologies developed elsewhere, and to enable awareness of disruptive technologies. It is also needed to provide the expertise needed for compliance with regulatory measures such as ITARS (the US International Traffic in Arms Regulations).

The in-house facilities and expertise provided by the Defence Science and Technology Organisation (DSTO) are also important to provide a secure environment for sensitive research. Specific demand-side capabilities for research need to be addressed, since the existence of in-house capacity drives demand for collaboration with external researchers who may have complementary capacity to DSTO. This enables greater nimbleness in changing environments, because external expertise can be accessed more rapidly than through building internal capacity. Secure facilities for outside users can enhance this process.

In-house human capability in Defence is also essential to link with other researchers in an open innovation system approach for long term preparedness. Being able to embed Defence scientists in outside research organizations allows monitoring of areas, which may have future defence applications. A good example is the linkage with the ARC Centre of Excellence for Quantum-Atom Optics (ACQAO) where a DSTO scientist plays an active role as part a research program on quantum information, with implications for secure communications. Alternatively, scientists in other institutions could be seconded to DSTO facilities.

Schemes such as RPDE (Rapid Prototyping, Development and Evaluation) and CTD (Capability and Technology Demonstrator) do exist for connecting with DSTO research requirements, but are relatively invisible in the wider scientific community. Much more could be done to advertise such programs aimed at demand-side generated involvement of external researchers.

On the supply side, no program exists to attract research proposals from the wider community on an open basis. Indeed, there is a need to diversify the Defence research funding portfolio, and in particular to diversify risk-aware approaches to research. Here risk is defined both in terms of transformative risk (the risk of a radical new idea not being taken up) or failure risk (where the research leads to a dead end). Often high-risk research such as this can have high payoffs, but not all research funding programs are sufficiently risk-aware to incorporate a high risk component. A desirable example is the DARPA program in the US, which is aimed specifically at supporting high-risk research. Australia may wish to establish a DARPA-like scheme to fund high-transformative-risk research. This may also help synergise relevant Australian research excellence.

Local climate change is a potential source of conflict. This means that detailed in-region studies are needed (perhaps via external research collaborators), and the

analysis of such data would require in-house expertise in climate change impacts.

There is an opportunity to explore procurement as a driver for local industries. Both Military Off The Shelf (MOTS) and Commercial Off The Shelf (COTS) procurement requires high-level in-house scientific and technological expertise to evaluate purchase options, but the same expertise can also provide a knowledge base for engagement with local Defence suppliers. Likewise this can also drive demand-side encouragement of R&D in local companies.

At what level should Australia maintain its human capability to service, repair and adapt increasingly sophisticated Defence materiel on an independent basis? This is a further question that relates to the level of in-house Defence capability in science and technology. Internationally Australia performs around 1% of defense R&D, but needs expertise across the whole platform. This requires a very large investment in human capacity at a high level, either in-house or via linkages with universities or PFRAs. There has to be benchmarking of standards with the wider scientific community so that the quality of the in-house capability is maintained. This requires cultural incentives that reward external engagement, including conference attendance and publications. The current level of publication (less than 100 in 2007 from DSTO which employs 2,200 scientists and technologists) is very low, even allowing for the classified nature of much of the work.

Opportunities for Defence Science engagement with the broader research community include:

- new DARPA-like funding sources to provide diversity;
- collaborations with external research organisations;
- embed Defence scientists in external research organizations e.g. ACQAO;
- Defence scientists presence at national discipline conferences as attendees/exhibitors/sponsors;
- national forums on specific topics of interest to Defence to which the wider science community would be invited (perhaps co-located with national scientific conferences); and
- "On the radar" in house briefings by external researchers (perhaps in camera) as undertaken by FASTS in conjunction with the Australian Science Media Centre (AusSMC).

With regard to the latter two, FASTS could play a role in brokering linkages with appropriate expert groups within its member societies.

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I agree to my submission being quoted in the Community Consultation Report