

NDA Research Board – NDA Response to Position Paper Recommendations

NDARB036

NDA Response to Recommendations – Review of NDA’s Approach to Robotics and Autonomous Systems (RAS) Position Paper NDARB027 Issue 1

January 2019

About the Independent NDA Research Board

Despite its title, the Research Board has terms of reference which cover the Research and Development (R&D) interests for waste management and decommissioning of the UK, not just the that of the NDA. Given the scale of the NDA’s work in this sphere however, much of its time is dedicated to the NDA’s own programme. Although the Board works cooperatively with the NDA, which provides the secretariat, it is independent. Neither its programme of work or published opinions have to be agreed with the NDA. Its membership comprises experts in the field and senior representatives of key stakeholder organisations such as Government departments and regulatory bodies. Its role is advisory only, reporting to Government departments via their Chief Scientific Advisors and to the main NDA Board. Further information on the Board can be found at www.nda.gov.uk.

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1 Introduction

The following text details the NDA responses to the recommendations published in NDA Research Board Position Paper 'Review of NDA's Approach to Robotics and Autonomous Systems (RAS)' (NDARB027). The original review document and further information on the NDA Research Board can be found on the NDA public website www.nda.gov.uk.

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2 NDA Response to Recommendations in NDA Research Board Position Paper ‘Review of NDA’s Approach to Robotics and Autonomous Systems (RAS)’ NDARB027

The table below details the NDA’s responses to recommendations made in the Research Board (RB) Position Paper ‘Review of NDA’s Approach to Robotics and Autonomous Systems (RAS)’. The NDA has previously agreed a vocabulary for responses to recommendations with the Research Board please see Appendix 1 for further details of the vocabulary.

Recommendation	Detail	Response
1 (Page 8)	There is a wealth of development in industry and academia on which to draw. NDA, in partnership with SL (see recommendation 4), should develop a clear RAS R&D strategy to address how to engage with the RAS community and benefit from the significant investment and developments in other industries and in academia.	Agreed NDA with the support of SL are developing a Robotics and Artificial Intelligence (RAI) R&D Strategy. A draft version of our Preferred Option paper is shared with NDA Research Board members for comment.

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Recommendation	Detail	Response
2 (Page 8)	While NDA's highest level R&D strategy is that, where possible, SLC's deliver the required R&D in conjunction with the supply chain there is a need here for an overall strategic input, i.e. this area should be an appropriate blend of NDA more strategically and SL as the lead site (see recommendation 4).	<p>Agreed</p> <p>NDA's R&D strategy is that, where possible, R&D is undertaken by our SLCs, subsidiaries and their supply chains as it is an integral part of delivery plans. Where necessary, NDA will directly maintain a strategic R&D programme. Overall strategic coordination for R&D is provided by the NDA.</p> <p>In line with this strategy, NDA's role will be to maintain oversight of the RAI R&D strategy and the SL led programme by monitoring its delivery and its impact on the NDA mission. NDA will also continue to influence and facilitate interactions between the developing RAI R&D programme and external organisations, both nationally and internationally. Multi-SLC RAI R&D could be funded by NDA via our existing strategic R&D portfolio if it represents the most efficient and effective mechanism. Building upon NDA's collaboration with Innovate UK, we will continue to develop and trial new approaches to procuring technical innovation, including RAI technology.</p> <p>SL's role will be to lead the development and implementation of an RAI R&D programme on behalf of the NDA estate. The programme will be delivered with the support of>NNL, RACE and the wider supply chain. It will involve engaging with the NDA estate to identify opportunities for RAI technology and sharing the outputs of the R&D programme. It will also involve engaging with a range of external organisations (e.g. AWE) to identify opportunities for collaboration and co-funding.</p>

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Recommendation	Detail	Response
3 (Page 9)	AWE's own study made a number of recommendations many of which seem equally applicable to NDA's position (see appendix 1). NDA should review these recommendations carefully and adopt those that are appropriate to its own strategy. Further, the NDA should consider how effective collaboration with AWE can be achieved as part of its strategy development.	<p>Agreed</p> <p>Our proposed RAI R&D Strategy aligns closely with the AWE recommendations that the implementation of RAI technology requires a holistic programme that includes a range of activities. It involves the formation of a small SL RAI leadership team with activities associated with technology development, governance, engagement, training and education.</p> <p>A key component of SL's RAI R&D programme will involve engaging with a range of external organisations, including AWE, to identify opportunities for collaboration and co-funding. This will be done through a range of mechanisms (e.g. 1:1 meetings, Nuclear Waste and Decommissioning Research Forum (NWDRF), RAI Special Interest Group). The effectiveness of the engagement and subsequent collaboration will be monitored by a RAI R&D Steering Group setup by SL. SL are proposing to invite AWE to be a member of this group.</p>
4 (Page 9)	Sellafield has the potential to benefit the most from RAS and should be the lead site for the NDA estate, but it must also ensure that the needs of and benefits to others are fulfilled as part of its remit.	<p>Agreed</p> <p>Within our proposed strategy a key role for SL would be co-ordination with NDA and rest of the NDA estate on RAI related topics. Other SLCs will primarily be engaged via the NWDRF and RAI R&D Steering Group set up by SL.</p>
5 (Page 9)	While the in house team at SL needs to be reinforced, use of external expertise is also encouraged by the RB. It would be sensible to start with a relatively modest in house team supplemented by outside experts and see how matters develop. This should be a consideration as part of developing the strategy.	<p>Agreed</p> <p>Our proposed strategy involves the formation of a small SL RAI leadership team supported by both technical and non-technical subject matter experts from National Nuclear Laboratory, Remote Applications in Challenging Environments (RACE) and the wider supply chain.</p>
6 (Page 9)	The emphasis to the Board was very much on the advanced intelligent systems. This should not be at the expense of completely excluding those with direct operator control.	<p>Accepted</p> <p>SL's existing R&D programme includes activities that cover the full range of technologies from remote manual operations (e.g. improved haptic feedback to master-slave manipulators) to autonomous systems. We expect the scope of the future RAI programme to be similar.</p>

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Recommendation	Detail	Response
7 (Page 9)	There is considerable experience across the UK industry (retrievals from the Sellafield silos and the Dounreay shaft, decommissioning of WAGR for example) and also in previous repairs of operating reactors (snake manipulators etc.). The NDA should consider whether there is benefit in drawing this experience together such that we do not reinvent the wheel several times over.	Accepted We have previously reviewed the use of robotic decommissioning technology across the NDA estate and have facilitated SLC discussions on robotics through the Nuclear Waste and Decommissioning Research Forum (NWDRF). We expect the future SL RAI R&D programme to build upon these activities and include a knowledge management component that looks to ensure that past knowledge is not lost and that new information is appropriately captured and disseminated.

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Appendix 1

Vocabulary for NDA Responses to NDA Research Board Position Paper Recommendations

NDA Response to Recommendation	Interpretation of the NDA Response
Agreed	NDA fully agrees that the recommended R&D work is needed. The NDA does not currently have this work in its R&D programme but it commits to introducing work in response to the proposal.
Accepted	NDA accepts that the work proposed in the recommendation is needed, but already has work in the R&D programme that addresses or partly addresses this issue. NDA accepts the need to review the currently associated work to identify the scope of any additions that are needed.
Noted	NDA notes that the recommendation is an interesting idea/proposal, but it requires more thought before it is incorporated it into the R&D programme. For example, it may need further development and review against other priorities.
Not Accepted	NDA does not agree with this proposal. NDA does not believe that this would add value to the R&D programme.