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Accelerating Innovation From S&T Labs to Acquisition Programs

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Foundational Learning



Workflow Learning



Performance Learning

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Introduction

- DOD and Army are focused on technology innovation
- This paper examines best practices and challenges in the state of innovation and technology transition from Research, Development and Engineering Centers (RDEC) to Programs
- The focus is on the efforts at Tank Automotive Research, Development and Engineering Center (TARDEC) and programs under the PEO Combat Support and Combat Service Support (CS&CSS) and PEO Ground Combat Systems (GCS)



Methodology

- Questionnaire covered several topics
 - Current state of technologies developed in labs
 - Changes required to drive technology from labs to programs
 - Management practices in technology integration
 - Aids and barriers to successful integration
 - OEM/Contractor dependencies
 - Communication and organizational alignments
 - Crossing the chasm from technology development to programs
- Interview subjects
 - Directors
 - Chief engineers
 - Systems and integration engineers
- Practitioners views and experiences



Discussion

- Current state of technologies being developed in labs
 - Universities, DARPA provide basic research along with applied research
 - Significant applied research applicable to early phases of acquisition cycle from the RDEC
 - RDECs provide advanced development and prototypes to inform requirements for solicitations
 - OEMs, contractors in later phases of acquisition cycle managed by program offices
- Changes required to drive technology into programs
 - Training and Doctrine Command (TRADOC) to drive requirements to RDECs and PMOs supports synchronization between groups
 - Strategic initiatives of Army, versus incremental changes managed by PMOs versus revolutionary initiatives of RDECs must be reconciled
 - POM funding to include funding for transitions



Discussion

- Program Success in technology transition
 - Successful integration definition must include informing requirements in addition to transitioning specific development into programs
 - Metrics to capture all the value of RDEC efforts need to be defined and captured
 - Integration and transitions must have program owner even for efforts driven by contingency requirements
- Aids and Barriers to successful integration
 - Successful integration driven by demand from PM functions for risk reduction efforts or capability improvements
 - Efforts focused on contingency requirements, urgent fielding requests, and controlling sustainment costs result in successful integration
 - Strong personal relationships between RDEC leadership and PMO
 - Close cooperation required for exploratory efforts to mature and succeed
 - Transition agreements for well defined deliverables can help ensure success
 - PM focus on thresholds versus RDEC focus on objectives results in issues with limited interaction between groups



Discussion

- Aids and Barriers continued
 - Funding for prototyping, integration, and transitioning must be planned and available
- Participation in technology transfer programs
 - Several programs used
 - SBIR and SBTR used extensively
 - JCTD used on trailer program
 - FCT on Howitzer program
 - Agile Integration Development for Light weight track
 - Necessary condition for technology innovation and transition
- Management Practices
 - Roadmap reviews of technology plans
 - Technology requirements and alignment with program requirements
 - Formal collaboration
 - Technology Transfer Agreements or equivalent
 - Metrics to measure success of technology integration



Discussion

- Management practices continued
 - Several practices in use
 - Requirements reviews
 - 30 year plan review
 - Strategic engagement at the leadership level
 - Long range input from TRADOC
 - System agreements
 - Key success factor is alignment between RDECs and program offices
- Integration Issues
 - PM focused on low risk to meet performance and schedule; RDEC focuses on TRL 6
 - Revolutionary changes may be missed; 5% improvement in platforms can take 10 years
 - Role of integrator
 - Informal requirements can lead to technology demonstrators but integration into Program of Record is open
 - Lack of alignment between RDECs and Program Offices can lead to funding issues



Discussion

- OEM/Contractor Dependencies
 - 90% of the RDEC transition efforts require integration by OEMs
 - TARDEC prototype integration facility and systems integration lab have led to improved requirements and informed the integration efforts by contractors
 - Active Protection System
 - RDEC funding for prototype development leads to improved solicitation requirements
- Communication and Organizational Alignments
 - Research groups organized by programs
 - Chief Integration Engineer
 - Close collaboration with RDEC driven by Program Office
 - Active Protection System
 - Senior leadership summits
 - SME exchanges



Discussion

- Crossing The Chasm
 - SME interactions on an ongoing basis
 - RDEC and PMO joint participation in PDR and CDR reviews
 - TRADOC driven requirements short, medium, and long term leading to strategic and tactical plans
 - Support for using consortiums of small and large companies to develop prototypes with commercial technology using Other Transaction Authority
 - Autonomous vehicles
 - Sensor and robotics
 - Artificial Intelligence
 - Targeted funding of transition activities
 - Leadership support



Literature Review

- The Future of Army Science and Technology Requires Punctuated Equilibrium
 - “S&T focus less on technology transition and more on proving the value of technology through prototyping and requirements validation”
- DASA RT
 - “Align S&T and develop strategies which provide technology insertion points to programs of record”
 - DASA policy requires Transition Agreements for all Advanced Technology Development, Advanced Component Development and Prototypes, and Manufacturing Technology Development projects
- Bridging the Valley of Death
 - Transition Confidence Levels similar to Technology Readiness Levels measures transition projects from uncertainty to completed transition
 - Data driven standardized approach to measuring the progress of technology transitions



Conclusions

- Many organizations play a role in technology innovation; RDECs support the realization of the innovation and its transfer to programs
- Symbiotic relationship between RDEC, PMOs, and OEM/Contractors
- RDECs need to extend their reach to non-traditional companies to drive technologies and capabilities – use of OTA
- Integrated requirements between TRADOC, RDECs, and PMOs
- RDEC value in many forms – prototypes, requirements, process improvements
- Funding coordination and availability is critical
- Integration and transitions must have program owners in both RDECs and Program Offices who are aligned and in agreement
- Communications at the strategic level, collaboration of senior leadership and subject matter experts is required for transition success
- Operational view of a process for technology transfers



Technology Innovation and Transition A System View

