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Implementing and Evaluating an Innovative Approach to Simulation Training Acquisitions

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Summary

In the wake of the failure of the Joint Simulation System (JSIMS), the Department of Defense (DoD) sought to improve its approach to buying training and simulations through a process called the Training Capabilities Analysis of Alternatives (TC AoA). The DoD has decided to move forward with a prototype of one alternative developed as part of this process, Alternative #4, an innovative business model that hopes to align the financial incentives of industry participants with positive training and technology development outcomes. The model proposes to turn what has traditionally been the acquisition of training simulators into a service acquisition (the acquisition of training) with a private sector "tool vendor" marketplace to support it. RAND was asked to produce an implementation and evaluation plan for this prototype. This report details the Alternative #4 (henceforth, Alt#4) business model, examining it in light of economic theory and of other business models for training and simulation acquisition. The report concludes that although Alt#4 has merit, it is not without challenges. It discusses those risks and challenges and presents detailed plans for the implementation and evaluation of a prototype of Alt#4.

The report's findings are based on analyses from two data sources:

- a review of documents, academic literature, economic theory, and publicly available information about various simulation training initiatives; and

- interviews with industry and DoD participants in the TC AoA process or with experience developing, procuring, or using simulations for training; we also interviewed personnel from both the industry and defense side of simulation training provision in the United Kingdom.

From these data, we assembled business model case summaries of relevant programs and a set of business models with various approaches to buying simulation tools or training support.

The Policy Problem

Alt#4 addresses the way the DoD has traditionally bought simulations and simulated training support. The "old" business model is characterized as being both fiscally wasteful and a hindrance to innovation because it created a system of inefficient long-term commitments to what are effectively contractor-proprietary simulation systems. The features of the old business model that Alt#4 seeks to address are detailed in Chapter Two.

At issue is how best to acquire simulations and simulation training support. Alt#4 claims to be *a* way to buy high-quality simulation training support at good value. It does not claim to be the only way to do so or even the best way under all circumstances. This report finds that Alt#4 is based on sound economic principles and has the potential to efficiently deliver high-quality training and innovation in training tools. But to reach this potential, tools should not be completely DoD-specific and training tasks should have both requirements and performance measures that can be clearly specified. A prototype of Alt#4 could demonstrate the ability of this potential to be realized in a real DoD training context.

The Alt#4 Business Model

Alt#4 proposes a twofold solution to the simulation training procurement problem: First, in areas subject to the business model, the DoD stops buying both tools *and* training support and buys only training support; second, the DoD stops buying training support with "cost-plus" contracts and starts buying it on firm-fixed-price (FFP) per training outcome contracts.

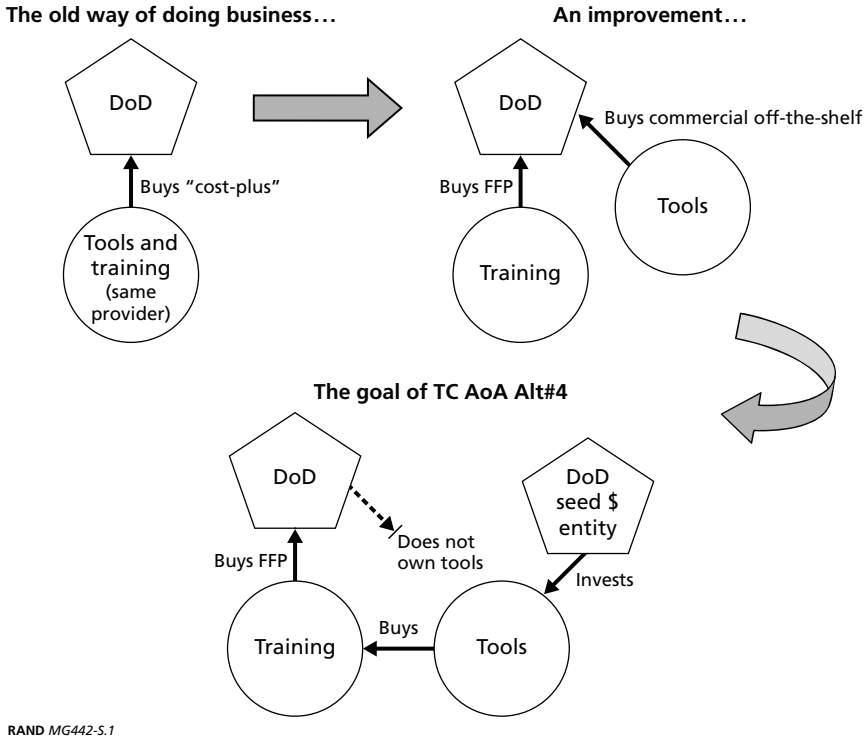
In addition, Alt#4 proposes that the DoD engage in several efforts to ensure innovation and competition in the simulation tool market:

- separate the training support and tool markets by including conflict of interest clauses in training support contracts (referred to as "untying" the markets);
- impose compliance with adopted technical standards to guarantee product operability and interoperability; and
- create a mechanism to inject seed money into the tool market to support innovation or create competition in submarkets.

The logic underlying each of these elements is to have the DoD eliminate the perverse incentive structures of previous business models and instead create incentives for the training service providers (TSPs) and tool vendors to provide responsive simulation training support using best products and practices at best value prices.

The Alt#4 business model is described in detail in Chapter Two. Figure S.1 presents a notional summary of the transformation envisioned by Alt#4. The designers of Alt#4 maintain that the biggest problems with the DoD's old way of buying simulation training stem from the vertical integration of tool and training provision in single contractors and the use of cost-plus contracts for the procurement of training support and simulation tools. Under the Alt#4 business model, the DoD would use firm-fixed-price contracts instead of cost-plus contracts and the tool market would be separated (untied) from the training service provider market. These two changes alone would

Figure S.1
The Transformational Objective of Alt#4



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significantly change the incentive structures for TSPs and tool vendors, but the designers of Alt#4 included additional elements in the business model aimed at obtaining further cost savings for the DoD and increasing DoD access to innovative simulation tools. Under Alt#4, the DoD would no longer buy simulation tools but would instead rely on TSPs to buy or license tools. To ensure a robust simulation tool market that meets the tool needs of the TSPs, the DoD would establish a seed money investment entity to stimulate the tool marketplace.

Other Business Models for Buying Simulations and Training

Chapter Three summarizes seven case studies: Joint Simulation System (JSIMS), Special Operation Forces Air Ground Interface Simulator (SAGIS), Virtual Convoy Combat Trainer (VCCT), Distributed Mission Operations (DMO), two examples from the United Kingdom Ministry of Defence (MOD) Naval Recruiting and Training Agency (NRTA)—Fire-Fighting Training Units (FFTUs) and Maritime Composite Training System (MCTS)—and the Central Intelligence Agency's (CIA's) In-Q-Tel venture capital corporation. Although the Alt#4 model has points in common with the other approaches, it has some distinctive features.

Table S.1 highlights several key differences between the different business models. The first critical difference is what the defense entity buys. The DoD (or MOD) buys simulation tools, simulation training, tools and training, or--in the case of DMO, FFTUs, and MCTS—availability of simulation tools. The core conceptual difference is between buying tools as goods (and then owning them) or buying tools as services (either directly or as part of a training service package).

Second, there are critical differences in the terms of the contracts under which the defense entity buys goods or services. Contracts are either cost-plus or firm-fixed-price and can be for either a short or a long duration.

The third critical difference is whether the simulation tools and the training come from the same contractor/provider. In several of the business models, delivery of training is wholly or partially integrated with provision of tools; in other models, tools and training are provided by different vendors.

Fourth, funding for tool development runs on a spectrum from public (funded by the DoD) to private (funded by contractors, tool makers, or the original equipment manufacturers). All the case study business models fall near one of the two extremes on this spectrum. Alt#4, however, offers the possibility of hybrid funding, where the

Table S.1
Features of Different Business Models for the Acquisition of Simulation Training

Model	Who Buys Tools	Who Funds Tool Development	Who Builds Tools	Who Owns Intellectual Property [*or Assembled Simulators*]	"Units" Tools Provided in	Who Provides Training	"Units" Training Provided in	Length of Contracts
JSIMS	DoD	DoD	Contractor	DoD (full government rights) [*DoD*]	Cost-plus	Same contractor	Billable contractor hours	Long and locked in
SAGIS	DoD	DoD	Contractor	DoD (full government rights) [*DoD*]	Cost-plus	Uniformed personnel	Classes	Acquisition length for tools, no contracts for training
VCCT	Contractor	Contractor	Contractor	Contractor [*Contractor*]	(a)	Same contractor	FFP person-hours of training	Relatively short
DMO	DoD	Contractor	Contractor	Contractor [*Contractor*]	FFP hours of simulator availability	Uniforms or different contractors	Varies	Long, performance extended tools contracts
FFTU	PFI contractor	OEMs	OEMs, subcontractor	OEMs [*PFI contractor*]	(a)	PFI contractor (with transferred MOD personnel)	FFP training days; excess capacity sold for MOD & PFI profit	Long
MCTS	PFI contractor	OEMs	OEMs, subcontractor	OEMs [*PFI contractor*]	Fixed-price for tool availability	RN uniforms and PFI contractor	FFP training days	Long
Alt#4	TSP contractor	OEMs, perhaps w/ catalog conductor seed money	OEMs	OEMs [*TSP contractor*]	(a)	TSP contractor	FFP per training outcome	Short

[a] Blank cell indicates that the training user, DoD or MOD, is not buying tools but is instead buying training outcome. The tool purchases are up to the contractor providing the training.

main responsibility for funding tool development lies in the private market place, but the DoD can contribute to tool development through seed money investments.

Economic Theory and Challenges Facing Alt#4

Chapter Four presents economic theory relevant to key aspects of Alt#4 and other observed business models. Theory relevant to the ownership of tools, cost-plus versus firm-fixed-price contracting, tied or untied markets, and the role of competition in innovation are all discussed. *The main conclusion we draw from the economics literature is that Alt#4 is based on sound economic principles and has good prospects for delivering efficiencies to the DoD's training community.* Our second conclusion is cautionary; theory suggests that the Alt#4 model is most likely to realize the cost efficiencies and innovations of the private sector when it is applied to technologies that also have commercial applications and training needs that are relatively straightforward to specify. Alt#4 may struggle if applied to certain technology/training areas.

Based on findings from economics, RAND experience with DoD acquisitions, and interviews conducted for this report, Chapter Five identifies six challenges facing the successful implementation of an Alt#4 prototype. These challenges and risks are not all of the same magnitude but each, if not dealt with effectively, could impede the success of the prototype. The discussion includes risk abatement strategies relevant to those challenges, where possible. The core risk/challenge areas are:

- setting operability/interoperability compliance standards that are neither too inclusive nor too exclusive;
- having a DoD component legally and effectively invest in a "venture-capital-like" fashion in the tool market;
- identifying and sharing new or emerging training needs;

- writing solicitations and contracts that allow providers to offer innovative best value solutions while ensuring that training needs are met;
- establishing effective performance measures for each firm-fixed-price contract let under the prototype; and
- resolving issues regarding risk, including:
  - transfer of cost uncertainty from the DoD to the TSPs;
  - risk to the DoD that providers may fail to manage their risks, go out of business, and not deliver contracted outputs; and
  - risk that prototype host/executor will implement a business model other than the desired full Alt#4 model.

Critical Elements of a Prototype Implementation Plan

Chapter Six lays out critical elements of a plan to implement a prototype of Alt#4. The RAND team framed a plan so that the prototype implemented following this guidance will

- be able to function legally within the DoD context;
- be true to the model as envisioned by the TC AoA business game team that conceived it;
- adhere to the model principles validated by economic theory in Chapter Four; and
- be well positioned to implement mitigation strategies against the risks identified in Chapter Five.

Full details are provided in Chapter Six. The implementation plan includes the establishment (or assignment to existing functions) of four core components: a governance/oversight entity; a tool catalog standards, sustainment, and investment entity we call the "catalog conductor"; an advisory board; and a contracting and grants office. Prototype implementation will leverage existing entities inside the DoD (one or more training users) and outside the DoD (the TSP and tool vendor markets). Chapter Six breaks down roles and respon-

sibilities necessary for the prototype, and recommends allocations of those roles and responsibilities across prototype components.

This implementation plan recognizes that the prototype will have a limited budget ($15 million over three years). These funds need to support the operation of the core prototype components, including administrative costs and the personnel costs associated with executing the prototype. This budget is also the source for any seed money the catalog conductor invests in the tool vendor market and must cover costs associated with compliance testing as well. As much of the prototype budget as possible should be reserved for catalog conductor activities.

The prototype budget *should not* pay for training support. Training users already have funds with which to buy training and training support; the prototype simply asks them to do it in a new way. Training users should be either convinced to participate because of the efficiencies they are likely to realize through the prototype or coerced to participate through the DoD management structure or chain of command. Expensive incentives to training user participation, such as prototype budget funds for training support, should not be required.

Evaluating the Prototype

Chapter Seven presents an evaluation plan for the prototype. We recognize that implementing a program prototype takes a great deal of effort. Collecting evaluation measurements may not always receive the highest priority. Nevertheless, it is critical that the prototype executor collect and track sufficient data for a process evaluation, an outcomes evaluation, and an assessment of efficiency.

The best way to make sure that there are sufficient data for the evaluations is for the prototype executor to track data on critical transactions. Although evaluation is a core responsibility of the governance body, the action components (the catalog conductor, the contracting/grants support, and the training user) must carefully document their activities and expenditures. Even if critical data are

just stored for future use, archived copies of all solicitations generated and all responses received (at all stages of the proposal and bid process) should be retained. When the catalog is established, catalog conductor personnel should make sure that the database in which it resides includes fields for date of certification and whether the vendor received seed money support from the catalog conductor or support from any DoD funding source (for example, the Small Business Innovation Research program).

In addition to keeping careful records on the DoD component side, effective prototype evaluation will require two active data collection efforts:

- satisfaction and performance surveys of the training users; and
- informational surveys of the training service providers.

Information about the TSPs' experiences—which catalog tools they considered, which they ultimately used, and their understanding of prototype policies—will make a significant contribution to evaluating the functioning of the prototype. Careful data tracking and plans for surveys of training users and TSPs should be added to the list of responsibilities presented in the implementation plan in Chapter Six.

Recommendations

We recommend that the DoD proceed with the prototype of Alt#4. The observed balance between theoretical plausibility and empirical risks suggests that this activity is highly appropriate to a test, pilot, or prototype project. We further recommend that the DoD strive to make the prototype implementation as close as possible to a test of the "pure" Alt#4 business model. Chapter Three shows that business models similar to Alt#4 can also be successful. But the Alt#4 business model contains some innovative elements not seen in existing approaches, and the prototype is an important opportunity to see those innovations in action.

For the prototype to succeed and for it to be an accurate representation of the Alt#4 business model, certain elements must be in place and several risks avoided or mitigated. Chapter Six contains RAND's proposed implementation plan for the Alt#4 prototype. The prototype also needs to include a training user who is willing to buy training under the rules of the prototype.

Finally, *we recommend that the DoD arrange for an impartial outsider to evaluate the prototype.* Evaluation by a nonstakeholder decreases the likelihood that parochial interest will play a part in the evaluation and increases the legitimacy of the evaluation.