Ten Things You Need to Know About Operational Architecture

Operational architecture can accurately identify force requirements to illustrate the investments needed to move the Army forward.

■ By Juan Giraud Jr.

Operational architecture (OA), as a capabilities development function, represents a dramatic change in thinking about requirements determination and generation. Nevertheless many Army capability developers shy away from the topic, intimidated by its complexity. If you have ever thought about designing or building a house you have already taken a crash course in OA.

You probably do not need to create a model before putting together a doghouse. It is not very complex, and if the house fails, the consequences are probably not too dire. However, if you consider building a more complex family dwelling, the need to model is more important because the consequences of this structure failing are more serious.

House Plan Analogy

In the concept of a house, the floor plan is similar to OA. The floor plan of the house is determined by the tasks you will conduct in it. For example, since you need to prepare food, you will need a kitchen.

The systems architecture specifies the systems and their functions that will enable you to perform the operational activities. In order to prepare food, you will need to be able to store it, wash it, and cook it. So you will need systems: a refrigerator, a sink, and a stove.

Most homeowners are not even aware of the hundreds of technical standards that constrain the design of the systems in their homes. Examples of these technical standards are the voltage, power, and current standards for the electrical appliances and the pipe size and threading standards for the plumbing.

Views

Think of it this way. House blueprints have three components. The first component, the floor plan, can be compared to a version of OA commonly called operational view and defines operational processes and information requirements. This view explains what you are trying to accomplish.

The Combined Arms Support Command (CASCOM) capability developers and architects are responsible for developing the OA view for the Sustainment Center of Excellence, while program managers are responsible for developing technical and systems views. Together, these three views give a complete blueprint of a capability that can be used for design development and acquisition. This blueprint is the basis for implementation. (See figure 1.)

With that in mind, here are the 10 things you really should know about OA.

1. What Is OA?

OA is the art of taking unstructured problems and giving them enough structure to enable decision-makers to plan further useful action. OA is presented from the viewpoint of the warfighter through the following activities:

- ☐ Analyzing operational concepts to frame the requirements (mission, task, and purpose).
- ☐ Continually refining requirements for doctrine, organization, training, materiel, leadership and education, personnel, and facilities analysis, which ensures the examination of a wide range of potential solutions.
- ☐ Producing standard products.
- ☐ Using common formats for integration and interoperability.
- ☐ Describing a function, who performs it, and why, when, and how often it is performed.

The OA provides a disciplined and documented approach to linking military concepts and doctrine to the employment of technology used in executing military operations; developing an investment strategy; managing the complexity of command, control, communications, computers, intelligence, surveillance and reconnaissance; identifying redundancy of functions and information requirements; and developing future requirements.

2. Who Can Help Me With OA?

The CASCOM commander's lead for architecture support requirements is the logistics architecture cell (LAC) located in the Enterprise Systems Directorate. The LAC's mission is to provide support and advice to the CASCOM commander on architecture requirements, coordinate with CASCOM directorates and external support agencies, pro-

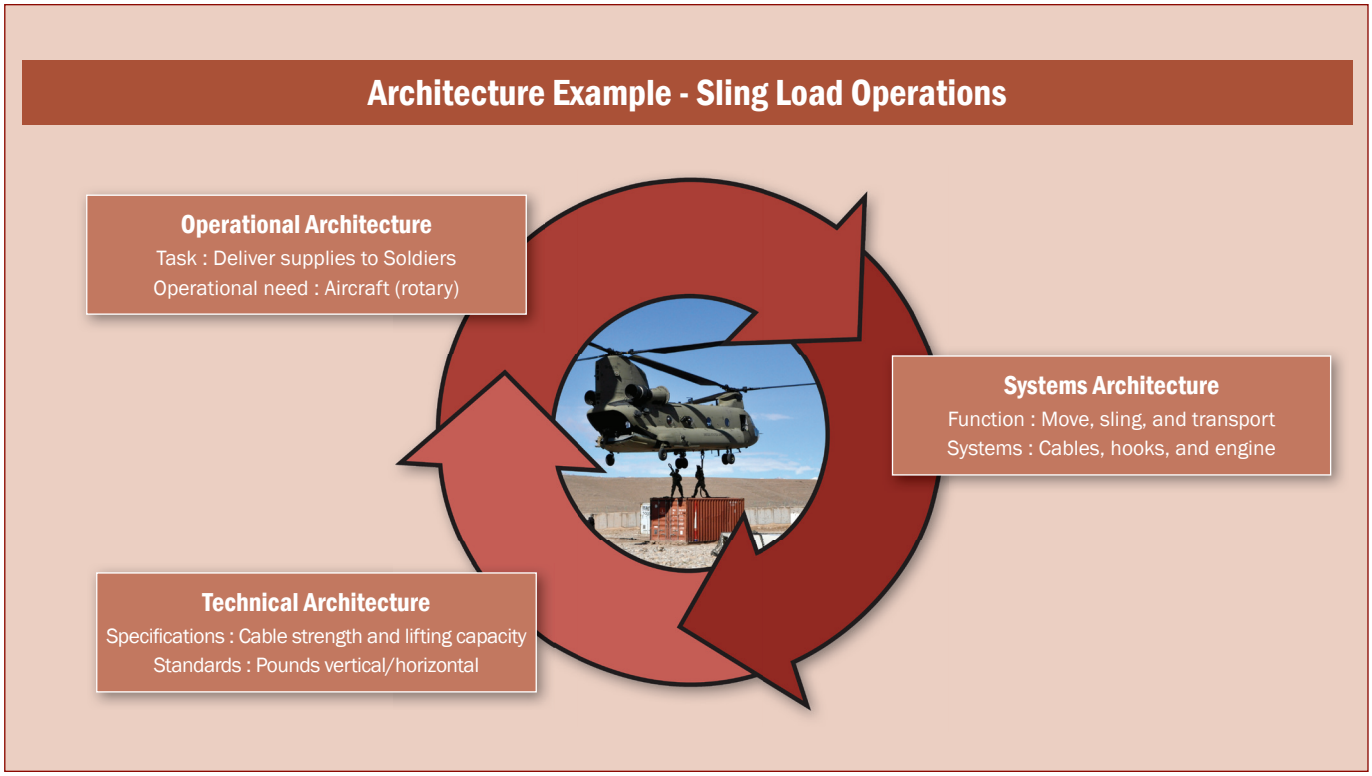

Figure 1. This provides examples of the items that might be used to complete each category for sling load operations architecture. Operational architecture is determined by the tasks or activities that must be performed. Systems architecture specifies the system functions and the systems that will be used to perform the operational activities. Technical architecture guides the systems selection for the operation.

vide technical expertise to supported units, and synchronize OA support to ensure that it reflects current and future operational requirements.

The LAC works closely with all CASCOM directorates and other Army agencies, such as the Logistics Innovation Agency and the Army Integrated Management Division, to develop OA. The resulting products are verified by subject matter experts (SMEs) to ensure they conform to applicable government standards, concepts of operations, plans, and doctrine. This procedure ensures everyone has a common perspective and that the context is complete and well-defined.

3. Who Needs to Create Architecture?

CASCOM capability developers identify an architecture requirement and begin coordinating with the LAC. The LAC, capability developers, and SMEs work together to create an architecture development plan (ADP). This gives a scope to the architecture product requirements. A signed, final ADP is then used by capability developers and LAC architects to develop a project schedule and additional supporting documents.

The LAC and the CASCOM Capabilities Development Integration Directorate (CDID) work together to develop the project schedule and timeline as part of the ADP. After the ADP has been developed, architecture development may begin.

4. What Are the Kinds of Architecture?

The three kinds of architecture are operational, systems, and technical.

Operational. OA includes a description of the tasks, activities, and information exchange requirements between each node. An operational view–1 (OV–1) is a high-level operational concept graphic. It describes a mission, class of mission, or scenario.

An OV–1 provides a picture of what the architecture is about and an idea of the players and operations involved. It can be used to orient and focus detailed discussions. Its main use is to aid communication, and it is intended for presentation to high-level decision-makers.

Systems. Systems architecture is the graphical and textual description of systems and interconnections used to satisfy operational needs.

Technical. Technical architecture consists of the universal rules and standards governing the arrangement, interaction, and interdependence of a system's parts or elements. Each rule or standard serves a specific purpose. The rules and standards are interrelated and provide a template that assists in architecture development.

5. What is the DOD's OA Framework?

The Department of Defense architecture framework (DODAF) pro-

vides a visualization infrastructure in which data is synchronized to allow the customer to view detailed consolidated information through points organized by various views. Each layer of each view offers status, methodology, and other key information. This architecture framework is especially suited to large systems with complex integration and interoperability challenges.

Using OA facilitates intelligent decision-making during the early stages of requirements determination and establishes vision, goals, objectives, and strategies.

The DODAF views offer an overview of and details for specific stakeholders within their domains and interacting with other domains in which the system will operate. These views are tools for visualizing, understanding, and assimilating the broad scope and complexities of an architecture description through tabular, structural, behavioral, ontological, pictorial, temporal, graphical, probabilistic, or alternative conceptual means.

6. How Are the OA Views Created?

The architects work closely with the SMEs to gather information and develop required products. A series of working groups convene until all architecture products are completed. Before providing all completed architecture products to the customer, an architecture validation review (AVR) is conducted to vet the final products with designated SMEs.

7. What Is an AVR?

The purpose of an AVR is to provide an opportunity for the architects to present architecture products to the designated SMEs for review and validation. The validation process ensures that the operational input results in a realistic and reasonable operational output that passes a "face validity" test. A face validity test is a technique in which knowledgeable experts provide feedback on whether the inputs and outputs of the architecture meet their expected outcomes.

8. What Is the Difference Between Validation and Verification?

Validation ensures that operational input results in a realistic and reasonable operational output and passes the face validity test. Verification ensures that the OA data is compliant with DODAF guidance and the data works within the Army capabilities, analysis, development, and integration environment (ArCADIE).

9. Can I Reuse Architecture?

Once OA products have been delivered to the customer and posted to ArCADIE, they can be reused for similar requirements. ArCADIE is an architecture repository owned by the Training and Doctrine Command and designed to house validated architectures. ArCADIE is managed by the Army Integrated Management Division and can be used to leverage existing architecture.

In order to optimize architecture development, one of the first considerations should be the reuse of existing architecture products. A key source of architecture product information used to fulfill CASCOM requirements exists in the Army integrated logistics architecture. The most current validated and verified version of this architecture resides in ArCADIE.

Additional architecture products designed for reuse are also located in ArCADIE. Anyone with an authorized DOD common access card can log in to ArCADIE and view the information.

10. How Do I Get Architecture Training?

The LAC offers a one-hour Introductory Architecture class at CASCOM once a month. Good architecture can be the difference between growth or stagnation, availability or breakdown, and success or failure.

Well-defined and validated architecture products are resource informed, integration focused, and outcome based. Our warfighters' visions and concepts lead to requirements that are the starting points and foundation of the OA process. Using OA facilitates intelligent decision-making during the early stages of requirements determination and establishes vision, goals, objectives, and strategies.

Given the unprecedented complexity of the digitized battlefield and the current austere resource environment, forming vague requirements in generic detail will not do. OA is the combat development process that can accurately identify force requirements in sufficient detail to properly illustrate the investment decisions that must be made to move the Army forward.

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