

Organization of the Joint Technology Office

Finding the Right Model for an Integrated, Coordinated Investment Strategy

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In fiscal 2000, the Office of the Deputy Under Secretary of Defense for Science and Technology, ODUSD(S&T), established the High Energy Laser Joint Technology Office (JTO) to advocate and execute a High Energy Laser technology investment strategy for the Department of Defense. While DoD establishes joint acquisition program offices fairly frequently, the JTO is basically the first of its kind, as this article will show. Our foremost consideration, obviously, is how the JTO can organize to best accomplish its mission.

In this article, I first explain what the JTO is and then offer and evaluate possible organizational models. Although the JTO is focused on High Energy Lasers, DoD will almost certainly establish other JTOs in the future, focused on other joint technical issues and organizational considerations. Our experiences may prove of value to those future organizational planners tasked with the important job of standing up a new JTO.

The JTO—Composition and Mission

In September 1999, at the request of Congress, the Under Secretary of Defense (Acquisition, Technology and Logistics), USD(AT&L), chartered the High Energy Laser Executive Review Panel for the purpose of studying DoD High Energy Laser technology development. The panel was composed of high-level



Airborne Laser

laser technology experts in and out of the government.

In its "Report of the High Energy Laser Executive Review Panel Department of Defense Laser Master Plan," published

in March 2000, the panel found insufficient funding for adequate research, a fragile national industrial base for High Energy Lasers, and little or no coordination with the national laboratories. Among its recommendations, the panel

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suggested the DoD adopt a new, central management structure formed around an office charged with the responsibility for managing a joint program to revitalize the High Energy Laser S&T investment.

This office would also advocate appropriate funding and stimulate the industrial base with focused investments. It would be supported by Technology Area Working Groups, which would concentrate on six Service-led technology



areas: Advanced Technologies, Beam Control, Chemical Lasers, Free Electron Lasers, Lethality, and Solid State Lasers.

Composition

The JTO, formed on June 6, 2000, is an extremely small and lean office comprised of six full-time people: an SES-level director, an executive assistant, a business manager, and three lieutenant

colonel/commander-level Service representatives (one each from the Army, Navy, and Air Force—Marine and Defense Agency representation is on a part-time basis). Understandably, an effective division of labor is especially critical to accomplishing its mission.

Mission

According to Dr. George Ullrich, the first JTO Director, the JTO's mission is:

“To serve as the DoD High Energy Laser advocate and develop/execute a High Energy Laser investment strategy that builds on existing Service/Defense Agency programs [while exploiting] promising new technology developments for multi-Service High Energy Laser weapon system applications.”

Integrated Business Process

The JTO developed an integrated business process that includes strategy development, review, and validation by successively higher authorities within DoD (Figure 1). Under this process, the JTO integrates and coordinates an investment strategy the Technology Area Working Groups develop and prioritize in response to requirements and opportunities (i.e., technology assets).

A Technology Council, comprised of the Service S&T executives or their representatives and chaired by the DUSD(S&T), reviews and prioritizes this strategy. Following review and if required, the JTO then presents the plan to the Board of Directors—comprised of the Service Acquisition Executives and chaired by the USD(AT&L)—for validation and final approval.

Once the investment strategy is approved, the JTO executes it via a competitive process designed to award funding to the best technical proposals that fit within the investment strategy. The funds are actually executed by government, university, and industry laboratories.

Congressional Influence

As with any program, outside forces also influence the JTO, not the least of which is Congress, which has a great interest in

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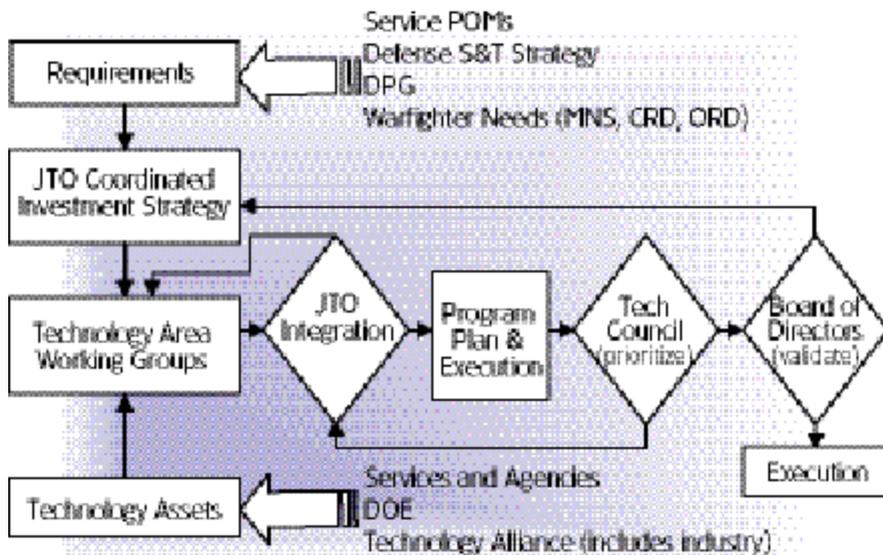


FIGURE 1. High Energy Laser JTO Business Process

High Energy Laser weapons development. In particular, the New Mexico delegation made concerted efforts to increase funding for High Energy Laser technology development in the United States, and pushed for the establishment of a new center of excellence in directed energy weapons, which includes High Energy Lasers at Kirtland AFB, N.M.; these efforts culminated in the Directed Energy Coordination and Consolidation Act of 2000, S.2573, of the 106th Congress.

The Senate Armed Services Committee also expressed an interest, primarily because of the potential for High Energy Laser-based weapons to transform warfare. This interest was clearly expressed in Section 211 of the fiscal 2001 Floyd D. Spence National Defense Authorization Bill.

PPBS Interaction

The JTO must also interact with various Pentagon organizations via the Planning, Programming, and Budgeting System (PPBS). Two of the most critical organizations are OUSD(AT&L), which sponsors the High Energy Laser program, and the Office of the Under Secretary of Defense (Comptroller), or OUSD(C), which controls program funding. These interactions are especially important during the programming and budgeting phases of the PPBS.

The Services, particularly the Air Force, have a substantial investment in High Energy Laser technology development. The Air Force funding totals approximately \$65-70 million per year for directed energy technology development in general, \$35-40 million of which is for laser development. The Air Force also executes two large acquisition programs for the Missile Defense Agency—the Airborne Laser and the Space-based Laser—which, according to news releases, total approximately \$1 billion.

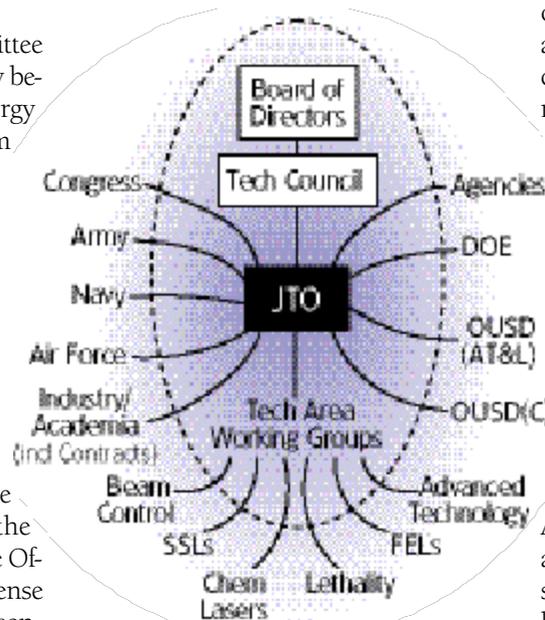


FIGURE 2. Modified Interrelationship Digraph for the High Energy Laser JTO

Influence of Industry/Academia

As partners in any technology development effort, industry and academia are also forces that the JTO must address, both because they do much of the work and because of their ability to advocate funding via the legislative process. However, much of the JTO's direct relationship with industry and academia centers on managing JTO-funded research and development contracts.

Influence of High-Level Panels/Study Groups

Finally, because of the High Energy Laser program's visibility, there are inevitably briefings to, and requests for information from, high-level review panels and study groups such as the Technology Area Review and Assessment panels and the Defense Science Board. These relationships can be mapped using a variation of the Interrelationship Digraph described in Brassard and Ritter's *The Memory Jogger II*.

Figure 2 shows my view of how this mapping would look. It displays the diverse array of entities with which the JTO must interact—extending from the field agencies (Army, Navy, and Air Force laboratories) to the Pentagon and Congress. It is critical to understand that all of these agencies can either be the JTO's allies or its adversaries as it attempts to carry out its mission. Thus, adequately managing all of these relationships is vital to the effective day-to-day functioning of the JTO and its activities.

The real question, then, is how to organize the JTO so it can do this, especially since only four full-time technical people work in the JTO, one of whom is the Director with all the responsibilities inherent to that type of position.

Possible Organizational Models

An organizational structure designed to accommodate the environment and mission just described must satisfy the following requirements:

- It must be lean, so that as much of the JTO's funds as possible go toward High Energy Laser development at

government, university, and industry laboratories.

- It must maximize the JTO's effectiveness at developing and executing its investment strategy.
- It must address the stakeholders' and other interested parties' concerns regarding High Energy Laser development.
- It must be a clean, clear organizational structure, with a minimum of overlap in responsibilities.
- It must work effectively with the JTO's personnel.

Four alternative models potentially provide an overall philosophical framework from which an organizational design can flow. Under all these models, certain roles are constant:

- First, the JTO Director leads the office and is the primary interface with the Technology Council, the Board of Directors, and other higher-level officials in and out of the government.
- Second, the Business Manager handles the details of the JTO's day-to-day business, i.e., finance, accounting, and contracts.
- Third, the Executive Assistant provides executive support to the JTO. Thus, the four models outlined in the following discussion concentrate mainly on the roles of the JTO's three military representatives.

Technical Area Model

The first model is the **Technical Area Model**, which is oriented around the Technology Area Working Groups (Figure 3). Under this model, all activities in a given technical area, to include the Groups' activities, are the responsibility of a given person. The six technical areas are divided evenly among the three military members, who are responsible for monitoring all the contracts in the area, as well as all planning, programming, and budgeting for those areas. They are also the JTO's representatives on the Technology Area Working Groups. In effect, the Technical Area Model gives each representative the task of being the JTO's expert in a given technical area.

The JTO Director maintains the only top-level, program-wide view, and addresses cross-cutting technical and strategic issues with the assistance of each technical area manager as required. Direct higher headquarters interactions are handled by the Director, but support is divided among the three military members according to their area of technical responsibility.

Functional Area Model

The second organizational model is the **Functional Area Model**, shown in Figure 4 (see p. 30). Under the Functional Area Model, I will consider the following major functions: Contract Management of the technical efforts executed by industry and government laboratories; PPBS and Strategy Development, including preparing and defending budgetary submissions and interacting with the rest of the Department staff; and Service and Agency Program Monitoring, including assessing gaps and shortfalls and managing the Technology Area Working Groups' activities. Again, the Director addresses overall, cross-cutting technical and strategic issues. However, unlike the Technical Area Model, the Director develops investment strategy as part of a three-member team.

- First, the Service and Agency Program Monitoring assesses existing programs and works with the Technology Area Working Groups to develop a list of opportunities for JTO investment.
- Second, the Director reviews and integrates the list, possibly with the help of the chairs from the Working Groups.
- Finally, using the investment strategy as a starting point, the PPBS and Strat-



egy Development function develops budgetary input for the PPBS. Under the Functional Area Model, the PPBS and Strategy Development function and the Director share responsibility for higher headquarters' interactions.

Service/Agency Model

The third organizational model is the **Service/Agency Model**, in which the JTO is organized so that all activities, whether they are monitoring, contracting, program planning, or developing strategy, are divided by Service or Agency (Figure 5, p. 30). Under this model, military members are responsible for their Service's JTO-funded activities. This includes all Technology Area Working Group activities for which their Service

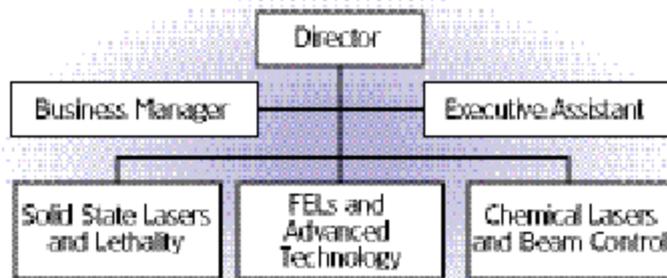


FIGURE 3. Technical Area Model Structure

has the lead, and for being away from Service's own High Energy Laser related activities. As before, the Director handles overall cross-cutting issues and strategy, and like the Technical Area Model, does so as the only individual with the overall view.

Thus, the JTO would develop its investment strategy in much the same way as with the Technical Area Model; military members advise the Director on their Service's area, but the Director actually develops the investment strategy. The Director also interacts with higher headquarters, with assistance from the JTO's Service representatives as required.

Funding/Program Model

The fourth model, shown in Figure 6 (p. 31), is the **Funding/Program Model**, in which two of the JTO's Service representatives essentially fill a role very much like the Air Force's Program Element Monitors (PEMs). One PEM handles all Basic (6.1) and Applied Research (6.2) in High Energy Lasers, regardless of executing agency, as well as monitoring contracts funded by the JTO's 6.1 and 6.2 funds.

The second PEM does the same for Advanced Technology Development (6.3). Under the Funding/Program Model, the PEMs split the Technology Area Working Group coordination between them, with each PEM taking three of the Working Groups according to their areas of expertise. In the course of their duties, the PEMs maintain an in-depth knowledge of their parts of the overall program.

The third position is the PPBS manager, who plans, programs, and budgets for the overall High Energy Laser program and serves as the primary interface to the PPBS. In this role, the PPBS manager has a top-level, cross-cutting view of the program, but is not necessarily cognizant of the details. In addition, this individual assists the JTO Director in developing the overall investment strategy;

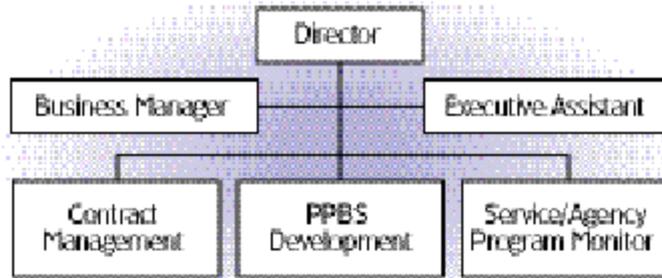


FIGURE 4. Functional Area Model Structure

the PEMs assist the PPBS managers as required. The Director and the PPBS manager also handle interactions with higher headquarters.

How Well Might These Models Work?

Before I evaluate the four models, I need to develop criteria based on the JTO's needs and situation, although some criteria are general in nature and should be considered regardless of the organization. The criteria I used as I thought about how we might organize the JTO follow:

Mission: Does the structure impede the JTO's mission or enhance it ("advocate and develop/execute a High Energy Laser investment strategy")?

JTO Interface: Does the structure allow adequate interfacing with the Technology Council and Board of Directors within the JTO mission area?

External Interface: Does the structure allow adequate interfacing with the OSD staff, the Services, and Congress for the purposes of advocacy and gaining support?

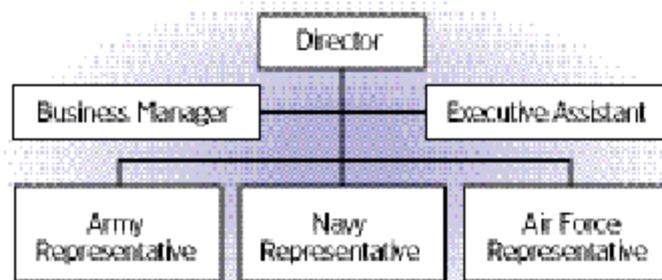


FIGURE 5. Service/Agency Model Structure

Efficiency: Are there areas in which there is duplication of effort, thereby most likely leaving other areas without coverage? Is workload balanced?

Lines of Authority: Are responsibility and authority clear and relatively unambiguous?

Empowerment: Are people empowered to do a "whole job?" Or, are jobs arbitrarily split between people in ways that are counter to the mission?

Using the criteria just described, I rated each model on a numerical scale as to how well the model satisfies the criteria (3 for poor, 6 for fair, and 9 for good). Under most circumstances, this exercise would be best done using Brassard and Ritter's nominative group technique, perhaps as part of an off-site. For purposes of this article, the evaluation represents my opinion only. However, should a JTO for a different technology area be organized, it may be useful to use the nominative group technique at an off-site as a means of engaging the members of the new JTO in deciding their organizational structure.

As shown in Figure 7 on p. 31, I did the evaluation in two steps. The first step involved working through each model, criterion by criterion, and assigning a rating of 3, 6, or 9 for each criterion. Next, I refined this initial rating by ranking each model within each criterion such that one model is a "3," two models are "6's," and one model is a "9." In this manner, I was forced to choose which model is the weakest in a particular area, which two are mediocre, and which one is the best.

The evaluation, while admittedly subjective, offers us a choice in that it supports the use of the Technical Area Model, Functional Area Model, or the Funding/Program Model structures. This choice de-

depends on whether one wants on the technical issues relate High Energy Laser development; cover, in a broad fashion, the specific tasks of the JTO; or focus on the investment strategy and advocacy issues related to High Energy Laser development.

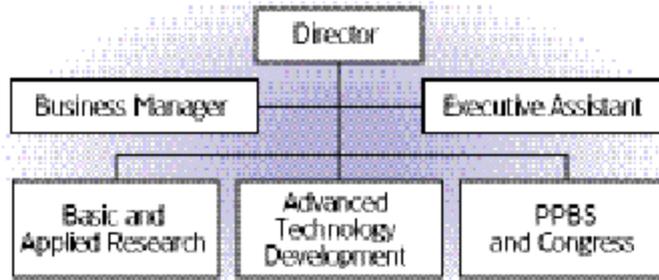


FIGURE 6. Funding/Program Model Structure

For example, the Technical Area Model structure increases presence in a given technical area, across all program types (i.e., 6.1, 6.2, 6.3), but it is probably weaker from a strategy development viewpoint since the Director is the only individual who has an across-the-board view of the JTO mission area.

The Functional Area Model structure provides good coverage of the functional areas that are part of the JTO mission and permits specialization by each military member in each area. Investment strategy development and advocacy are enhanced because three individuals are involved. However, technical insight is weakened because the Technology Area Working Groups' responsibilities are not specifically assigned. Furthermore, the contract management function is placed on one person, which means the JTO's ability to manage contracts could be compromised since it is very rare that one person possesses the expertise to effectively monitor all technology areas.

The Functional Area Model structure reduces presence in the technical areas as compared to the Technical Area Model structure, since two people share

the six technical areas. However, it enhances strategy development and advocacy because these cross-cutting areas are shared by two people, with the planner handling the details and the Director handling the overall strategy and interface with the Technology Council and the Board of Directors.

The Service/Agency Model structure is the only organizational model that is clearly inferior, mainly because it discourages the joint philosophy and outlook that is important in any joint office. It also fails to recognize the vastly different investment levels between the Services and is weak from a strategy development and advocacy perspective because the Director is the only individual who has the broad view across all Services and technical areas.

The Four Models—A Starting Point

To summarize, the choice of an organizational structure for a new, small, cross-cutting JTO is ultimately dependent on

tor's assessment of the JTO staff members and their mission. It may be that two of the models could be overlaid on each other, with one model providing a structure for primary duties and the second model providing a structure for secondary duties. However, regardless of the model the Director chooses, it is critical that the organizational structure allow the office to meet its highest priority commitments. In reality, the four models represent starting points for discussions regarding organizational structure of these new, smaller joint offices, which could represent a new way of managing technology development within DoD.

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Postscript

You may be wondering how the JTO is now organized. The topic of organization came up at a January 2001 JTO off-site, at which time I presented the four models. After much discussion, the Director adopted the Technical Area Model approach, mainly to emphasize the JTO's technology development and advocacy mission.

While this approach has worked well to date, I recommend (and intend to practice) the strategy of revisiting the issue of organization periodically as the program matures and people come and go. An organizational model that worked well early in a program may be less appropriate later in the program life cycle.

Editor's Note: Wissler welcomes questions or comments on this article. Contact him at John.Wissler@osd.mil.

FIGURE 7. Evaluation of Structure Models

Model Criteria	Mission	JTO Interface	External Interface	Joininess	Strategy	Efficiency	Lines of Authority	Empowerment	Sum	Comments
Technical Area	6	9	3	9	6	6	9	6	54	technology areas covered, but focus is internal; not enough emphasis on advocacy
Functional Area	6	3	6	6	9	9	6	9	54	externally oriented; good advocacy; weak tech insight; contract mgt workload high
Service/Agency	3	6	6	3	3	3	3	3	30	too Service-oriented; encourages stove-piping; strategy/tech insight weak
Funding/Program	9	6	9	6	6	6	6	6	54	good coverage for external stakeholders, strategy; may be confusing to non-AF