Role and Importance of Lead System Integrator in Context of New Air Operations Centers

On November 18, 2003, more than 50 representatives from industry and over a dozen representatives from the government agencies and MITRE participated in presentations and discussions related to the vision and strategy for the creation of new Air and Space Operations Centers (AOCs).

Centralized Planning and Control

At this Industry Day, a guest speaker mentioned that if one walks into a large store in Russia, one is likely to find most of the shelves empty. He highlighted that because of years of very centralized planning and control, there is great shortage of consumer goods. Unlike the situation in the US where one finds many different types of bread and other essential goods, with different brand names and sizes, goods in Russia are generally available in one brand only. And even items with such generic brand and size are hard to find.

Decentralized Planning and Control

Let me present a different scenario. I live in a small town located about 8 miles west of Boston. On my street, there are about 30 houses. Each owner has opted to hire a different landscape company; the owners change the company whenever the service is deemed substandard. A typical landscape company looks after only one house on this street; its next customer may be situated 2-3 miles away. Because of the significant geographic distance across the customer base, the price charged by each landscape company is significantly higher as compared to a scenario in which all the customers were located in close proximity to each other.

In the latter scenario, the problem is not of premium price alone. Over the weekend of December 6 and 7, we received nearly 2 feet of snow. Different cities took varying amounts of time to clear the snow from the public roads. The staff members of the landscape company had to wait till this was done. In many cases, they were stranded in towns or on streets where the snow had not been cleared. And it took these individuals couple of hours to travel between two neighboring cities; under normal weather conditions, this distance can be covered in less than 10 minutes. Because of all these issues, a typical customer had to wait for 8 to 10 hours to see his/her driveway be cleared.

The two scenarios delineated above highlight the poor outcome that can result from excessive centralization and excessive decentralization respectively. If one looks at the international defense arena, we have similar situations too. At one end, we may have a situation where everything is centralized and one organization is attempting to do everything; this could either be a development lab owned by the DoD (as many foreign governments do in their respective countries) or a major defense contractor. At the other

end, we may have a situation where everything is decentralized, with each element of DoD handling its own needs and going ahead with mechanisms to address these local needs, totally independent of other elements of DoD. Both these scenarios usually yield sub-standard results.

An Alternative Scenario

Let me present a third scenario. A city in Germany wanted to improve its transportation infrastructure. It found that many delivery trucks were using its narrow to carry goods in and out of the city. Most of these delivery trucks had only one or two parcels to deliver on a particular street. But based on the trucking company selected by each shipper, each of the trucking companies was required to send its respective vehicle to pickup the parcel from the pickup address within the city or to deliver it to the concerned address. Since the roads of the city were narrow, this was causing frequent traffic blocks in parts of that city. Further, each of these trucks was burning fuel, resulting in significant emissions of poisonous gases within the crowded city.

In order to mitigate the above problem, a research team was formed. This team suggested that a logistics warehouse be established at the outskirts of the city. Trucks belonging to all trucking companies were mandated to make deliveries to this common warehouse. From this warehouse, one delivery truck takes all the parcels for different customers who live on the same street. Obviously, if the concerned set of parcels cannot be accommodated on one delivery truck, then either multiple trucks would be assigned to make the deliveries, or the designated delivery truck will make several rounds to a particular street on the same day. The same principle is also utilized for picking up parcels from customers located on a particular street. Through such consolidation of delivery and pickup from all streets located within the geographic boundary of the particular city, one has achieved several benefits. The number of delivery trucks has reduced, resulting in a corresponding reduction in the amount of polluting gases. The congestion on crowded inner city roads has reduced. The total cost involved in pickups and deliveries was also reduced through the creation of this logistics center.

In the scenario just outlined, one needs to think carefully about whether the logistics center should be established by one of the transportation companies, by the city itself, or by an independent contractor. The organization that creates the logistics center will impact, to some extent, the level of overall benefits that accrue through the adoption of this novel concept. The company that creates the logistics center must carry and convey a deep purpose and vision, as well as command the respect of the key users and participants in that center. In my view, this is akin to the role that we should expect the LSI for AOCs to play.

Pivotal Role of LSI

A strong and capable LSI can potentially provide the optimal solution. Such a solution typically would involve a centralized vision and decentralized development and implementation. In my view, the key success factor for good LSIs is not their internal

capabilities to design, develop, and implement major defense systems, but their ability to be visionaries and leaders who can coordinate, motivate, and work closely with a set of co-contractors to achieve the ultimate objective in an optimal manner. The LSI must seek to perform its mission, not by performing the bulk of the work in-house, but by seeking to leverage the work that is being done by others in a highly coordinated manner.

LSI: A Role Model

The concept of an LSI is a profound and powerful one that involves the LSI playing a surrogate role for some of the functions of the contracting agency. I think the best example of an LSI is the role played by the Boca Raton unit of IBM in the creation of the IBM Personal Computer. Until the end of the seventies, IBM attached heavy emphasis on use of parts manufactured by its own units. This meant that if an IBM unit manufactured resistors, all IBM units were heavily encouraged to buy resistors from this manufacturing unit rather than from non-IBM manufacturing units. In fact, if the IBM wanted to sell the resistor at 11 cents each and non-IBM units were willing to sell it at 10 cents each, the concerned end product developer was still expected to use the 11-cent resistor from IBM. The net result of this policy was that the price of the end product was usually higher than of competing products from other manufacturers.

The IBM Entry Systems Division at Boca Raton was granted an exemption from the above policy. As such, they decided that they would select and utilize the most cost economic parts and subsystems, whether they came from within IBM or outside of IBM. This division of IBM created a broad architecture for the IBM Personal Computer, and then began the process of selecting vendors for all the parts and subsystems. Representatives of other IBM divisions and outside vendors would make trips to Boca Raton to attend meetings with concerned persons of IBM Entry Systems Division. To the credit of the visionaries at the latter division, I must say that they strived hard to maintain full parity between these two categories of potential sources. In terms of internal security and access to facilities, representatives from other IBM divisions were treated exactly as representatives from outside vendors. The net result of this policy was that when the IBM Personal Computer was released, it contained an extremely high percentage of parts that had been produced by companies other than IBM. One version that I heard at Boca Raton was that the only item in the IBM Personal Computer that was manufactured within IBM was its logo. Even though this characterization may not be entirely accurate, the real message is that the IBM Entry Systems Division performed an outstanding job as an LSI: it brought out the Personal Computer in a very short period of time; it provided very good value to its customers through its policy of buying the parts at the most favored prices; it made a profound impact on the whole industry; it let IBM continue as a major force in an industry where even a very respected like Digital Equipment Corporation (DEC) got decimated; it helped to increase the price of shares of IBM; and it provided very significant benefits to the shareholders of IBM.

LSI for AOC

In the case of AOC scenario too, I believe that an LSI can play an equally pivotal role in terms of totally transforming the concerned landscape, helping the Air Force to meet its objectives in the most effective manner, while simultaneously providing rewards for the LSI's own parent company.

Any potential LSI for this endeavor must realize that the bulk of the proposed set of activities are being performed, and will continue to be performed, by organizations other than its own. The LSI will act as the vital link between the sponsor on one side and these co-contractors on the other. In this context, the notion of Interdependent Value Chains is very pertinent, as the ultimate success of the proposed endeavor will depend heavily on establishing and facilitating effective inter-organizational relationships at multiple levels of the hierarchy. An Interdependent Value Chain involves a number of organizations, each with its own goals and priorities. However, the success of the common endeavor is heavily contingent on the ability of the concerned parts of these organizations to work closely with their counterparts in other organizations. Even though these organizations may compete aggressively against each other on other potential endeavors, there is a common acceptance of the need for these organizations to develop close working ties on the particular endeavor. This is the notion that needs to be nurtured and highlighted by the LSI.

Conclusion

The proposed strategy for new AOCs places great emphasis on the use of an LSI. With appropriate structure and effort, this strategy can lead to much superior results as compared to alternative strategies that favor heavy centralized control and planning, or heavy decentralized control and planning. The "hybrid" nature of the LSI approach implies that the LSI will need to rely very heavily on other organizations. Accordingly, potential LSIs must recognize the new set of underlying responsibilities that characterize the LSI paradigm, and must carefully think about the strategic, technical, organizational, and economic ramifications of the new inter-organizational framework.

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