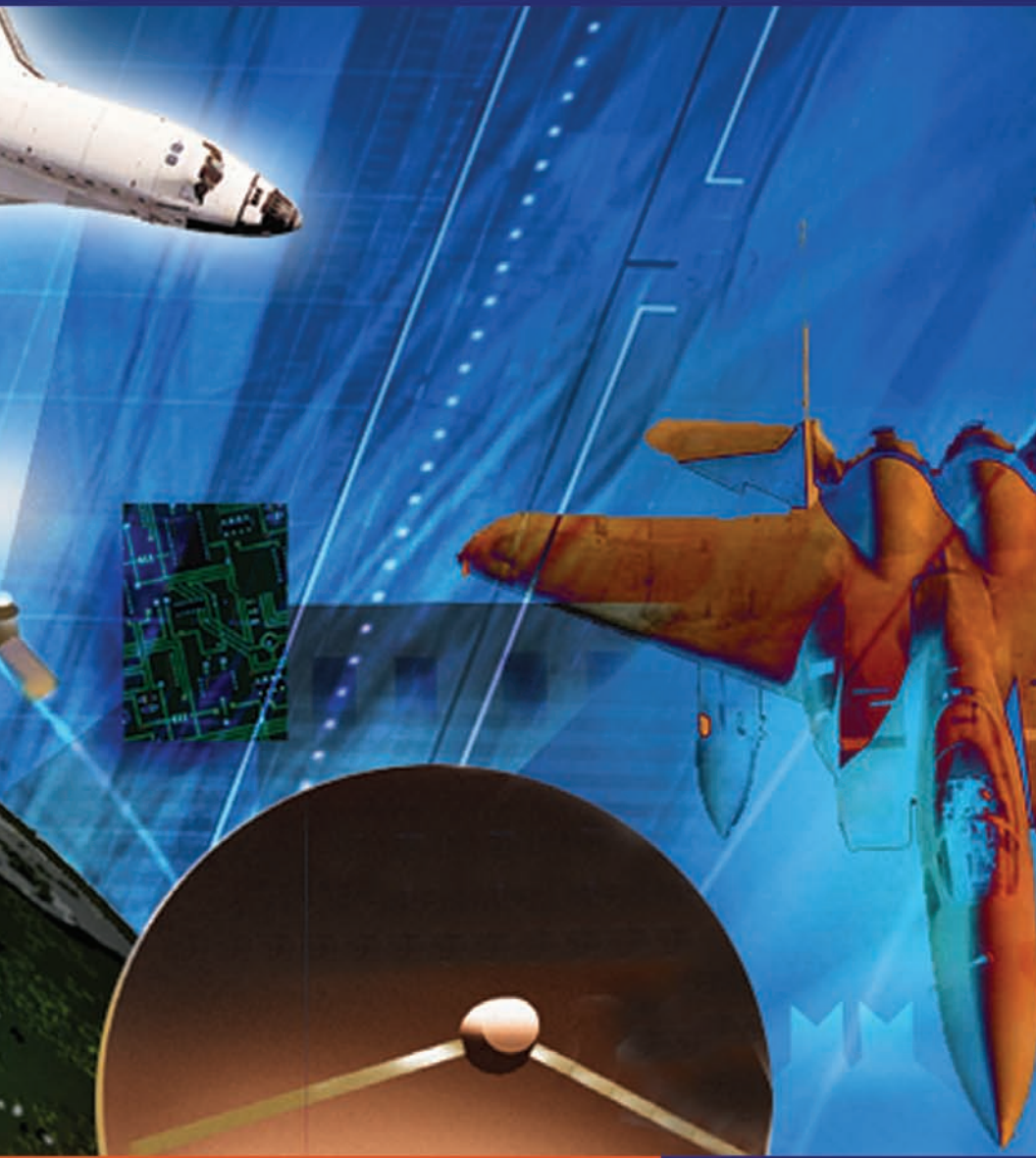


OPTIMIZING INVENTORY with the AIRCRAFT SUSTAINABILITY MODEL™



LMI



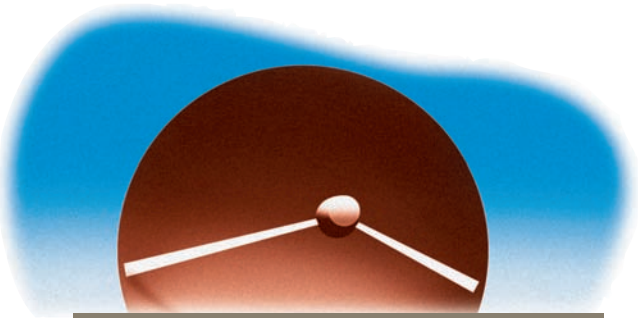
Modern inventory management looks as much to quick response to provide materiel when requested as it does to buying and holding in anticipation of demand. Particularly when items are low-cost, are stable in demand, and can be procured quickly, the practice is to carry as little inventory as possible. Modern variants of the “just-in-time” principle allow managers to treat the holding of inventory as a last resort. Supporting advanced military systems, however, poses unique problems, which will be discussed in this brochure.

A modern warplane contains many components that are designed to be removed from the aircraft and replaced when they fail. Many of these components — such as brake assemblies, avionics units, and engine fuel controls — are expensive enough to warrant repair in their own right. Spares for these repairable components are needed to keep the aircraft ready to fly while the failed unit is being repaired. The typical low operating tempo and small fleet sizes of military aircraft (or similar end items) lead to sporadic and unstable demand patterns; the specialized nature of many components leads to small market size and to procurement lead-times that can stretch into years. These two factors limit the utility of some of the newer practices and argue in favor of large inventories to ensure support of the end items. Yet, when unit costs can exceed \$1 million, the necessity to control inventories is obvious.



The Aircraft Sustainability Model
sizes the spares inventory on the
basis of desired readiness levels.

Military materiel management, then, must use as much of modern commercial practice as is practicable so that spares can be repaired and shipped quickly. But these methods do not eliminate the need to forecast requirements and make the best inventory decisions possible.



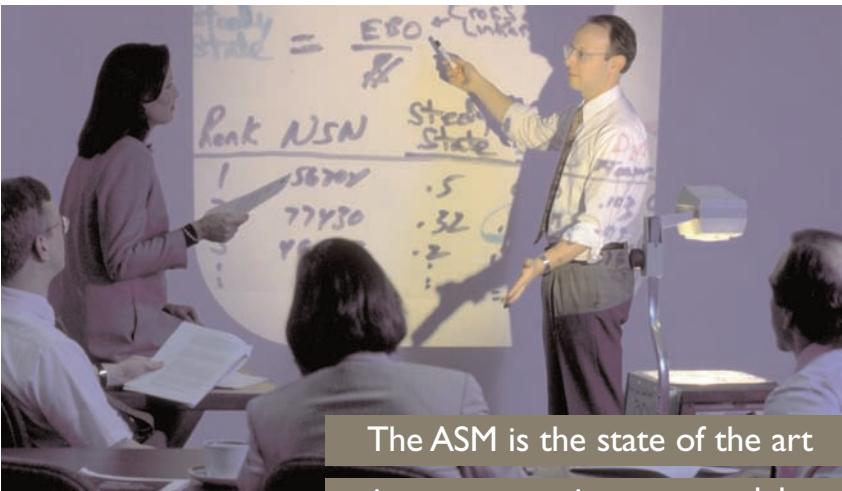
The ASM's greater efficiency over traditional methods can lead to savings of up to 25 percent in spares inventory.

The Aircraft Sustainability Model™ (ASM™) sparing model, developed by the Logistics Management Institute for the United States Air Force (USAF), computes optimal spares mixes to support a wide range of possible operating scenarios and system applications. The ASM sparing model sizes the spares inventory explicitly on the basis of desired weapon system readiness levels, such as aircraft availability — the percentage of the fleet ready to fly a mission — rather than supply-oriented measures, such as stock on shelf or percentage of demands filled.

The ASM sparing model is the result of over 20 years of experience in inventory analysis and modeling. It is used by the USAF to determine spares kits to support wartime deployments and has been specially enhanced for the initial provisioning process. The USAF uses it for initial provisioning of the F-22 Raptor and the E-8 Joint Surveillance Target Attack Radar System (JSTARS), and the Joint Strike Fighter Program Office is using it for initial provisioning of the F-35 Lightning II.

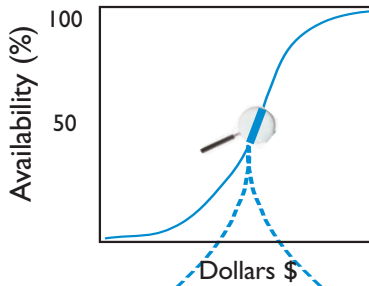
The ASM sparing model resides on a personal computer platform with a graphic user interface and an integrated database management system to aid user analyses. It is also fully capable of integrating with today's Enterprise Resource Planning systems. The ASM sparing model can accommodate a wide range of support system and aircraft operating characteristics, including the supply and maintenance system echelon structure, the aircraft indenture structure, cannibalization, and flying profiles, all of which can vary over time.

The ASM sparing model uses the typical component data — demand rates, repair times, unit cost, and so on — in conjunction with any of a wide range of operating scenarios. It then uses a marginal analysis approach, ranking possible additions to the inventory in terms of their probable benefit to aircraft availability divided by their procurement cost. Spares with the greatest benefit per dollar appear at the top of this “shopping list,” guaranteeing that the spares mix is optimal. Accumulated costs and resulting aircraft availability are tracked as the shopping list is formed to provide a curve relating overall



The ASM is the state of the art in spares requirement models.

Cost vs. Availability Curve

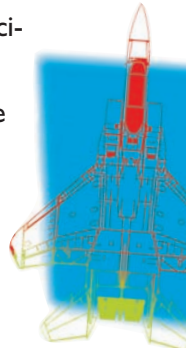


Shopping List

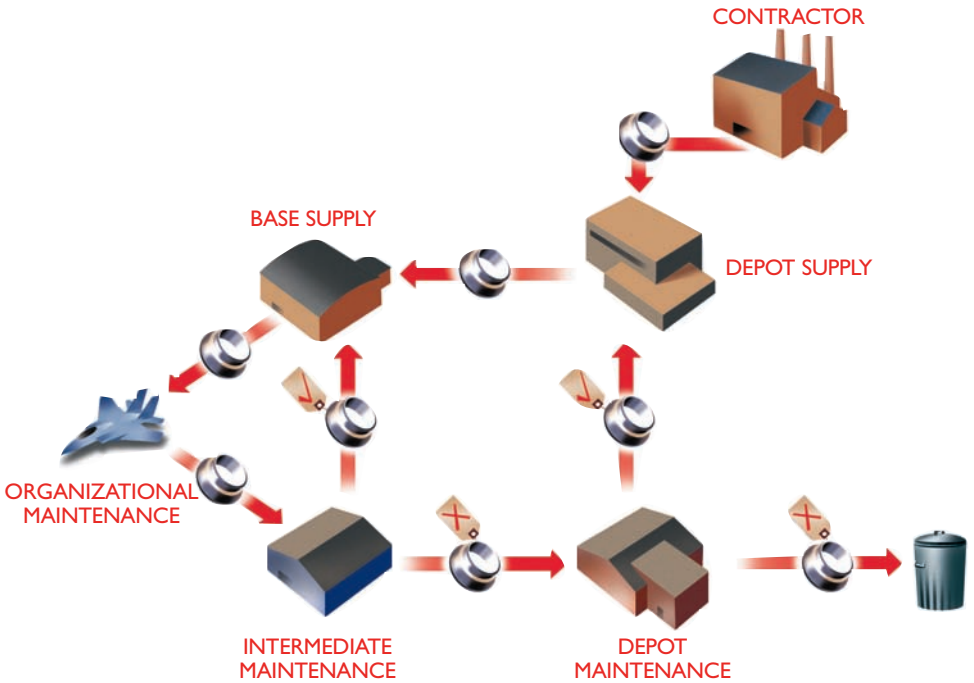
Item	Unit cost (\$)	Added aircraft per \$10K	Total cost (\$)	Availability rate (%)
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
6th A	1,600	0.388	101,600	66.67
11th B	2,300	0.352	103,900	66.69
2nd C	10,400	0.312	114,300	66.74
12th B	2,300	0.283	116,600	66.76
1st D	13,800	0.154	130,400	66.78
7th A	1,600	0.144	132,000	66.79
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•

funding to projected availability. The curve can be used by logistics planners to formulate budgets and allocate resources. On the component level, item managers can use the shopping list to determine detailed buy requirements consistent with those aggregate funding decisions.

The ASM is the state of the art in spares requirement models. It is highly capable, yet user-friendly. Its basic principles have been proven in use by the USAF, the National Aeronautics and Space Administration International Space Station Program, and several international air forces. The ASM sparing model's efficient spares mix can provide the same level of support as traditional methods while reducing spares inventories by as much as 25 percent.



ROTATING FLOW OF SPARES



The ASM sparing model is a flexible and adaptive modeling environment. Its basic systems approach accommodates a wide variety of logistical and operational characteristics, including: multiple items, multiple echelons, indented parts relationships, non-uniform bases, stationary or dynamic flying programs, etc.

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LMI was formed by Secretary McNamara under the Kennedy Administration to achieve a single mission. “To solve the government's most complex management issues.” LMI continues today as the premier government consulting firm providing the highest level of technical and analytical support across all levels of government.

As a not-for-profit company, LMI has a unique role as a trusted advisor. We have the opportunity to provide independent perspectives, ideas, analyses, and solutions free of political bias and commercial pressures. We deliver the best value for the government dollar as all revenues are applied against our mission of advancing government management. And, most importantly, our corporate objectives are completely aligned with the government's mission and values.





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