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Phased provisioning is a technique for deferring the procurement of certain spare parts for a new weapon system until there is more certainty of weapon system characteristics and support needs. This report examines the concept, its use and its potential as an initial provisioning strategy. It describes a hypothetical application of phased provisioning to examine its advantages and how best to use it. Phased provisioning does have the potential to be an effective technique. In the report, we conclude that specific changes to DoD policy will result in enhanced use of phased provisioning.

PHASED PROVISIONING

September 1982

Joan E. Lengel

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LOGISTICS MANAGEMENT INSTITUTE
4701 Sangamore Road
P.O. Box 9489
Washington, D.C. 20016

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EXECUTIVE SUMMARY

Predicting the spares requirements of new weapon systems is fraught with uncertainty -- unknown reliabilities, changing configurations, uncertain maintenance concepts, and incomplete deployment plans. Consequently, true requirements are unknown, making initial spares investment risky. Buy too little, and readiness suffers. Buy too much, and money needed for other investments is wasted. The Department of Defense, through its provisioning policy, seeks to minimize the risks. One technique for doing so is phased provisioning.

Phased provisioning is the deferral of the purchase of all or part of the computed spares requirements. During the initial support period the contractor maintains a production buffer stock in the latest configuration. The Department of Defense depends on it as a ready source of spare parts and retains the options of procuring some or all of the buffer stock or releasing it for production installation.

Although phased provisioning was first implemented in 1963 in DoD Instruction 4140.19, there have been few applications. The Military Services have other techniques that they consider equally effective in meeting their provisioning objectives. They have depended increasingly on contractor support, in which the contractor provides maintenance, including any spares required. Contractor support arrangements can provide the same spares purchasing options as phased provisioning.

Other reasons for the sparse application of phased provisioning lie in the specific requirements prescribed by DoDI 4140.19 and Military Standard 1517. Those requirements include selection criteria, annual reports,

and difficult financial accounting methods. The Standard must be cited for optional use by the government in all production contracts that meet the selection criteria. The requirements make it difficult, though certainly not impossible, to use phased provisioning.

Our examination of past applications and analysis of a hypothetical F-16 case convince us that phased provisioning can save money and should have broader application than it has had to date. Two alternatives are viable for promoting its use. The first is to eliminate or revise paragraphs in DoDI 4140.19 that inhibit the use of phased provisioning by making it unnecessarily burdensome. A better alternative -- our recommendation -- is to 1) rescind the DoDI 4140.19 and its accompanying MIL-STD 1517 and 2) revise DoD policy on provisioning (DoDD 4140.40) to include phased provisioning as a special case of contractor support. This change would put phased provisioning in its proper perspective as one of several techniques available to support new weapon systems without unacceptable risk.

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1. INTRODUCTION

Phased provisioning is a management technique used to defer procurement of selected spare and repair parts during initial support of weapon systems, support systems and end items of equipment while still supporting the operation of the weapon system. Department of Defense Instruction (DoDI) 4140.19, issued in July 1963 and reissued in May 1968, encourages its use by specifying that phased provisioning be included in every applicable contract for optional use by the Government. In the late 1960s, phased provisioning was used on the F-111 aircraft -- the only serious application of the technique. This report describes reasons for phased provisioning disuse, examines the potentially large savings that could be realized from its use, and suggests changes to DoD policy that will foster such use.

PHASED PROVISIONING CONCEPT

Initial spares acquisition decisions for new weapon systems must be made prior to the availability of reliable data on component characteristics, end-item delivery dates, deployments, and production quantities. Therefore, initial sparing decisions are subject to the risk of over or underprocurement. To decrease this risk, the DoD developed phased provisioning as a refinement to the management process of acquiring costly new systems. The refinement is designed to minimize unnecessary spares purchases for selected systems, while assuring the timely availability of spare parts needed to support the systems' readiness.

Phased provisioning defers procurement of all or part of the total computed requirement for selected spare and repair parts until the later stages of production. The quantity deferred is placed in a production buffer

stock managed by the contractor. These buffer-stock items are available to the DoD upon requisition from the contractor -- presumably with leadtimes much shorter than normal. Financing of phased provisioning is similar to that of advance procurement of long-leadtime items.

Reviews of the quantities of items held in the buffer stock are scheduled throughout the production run. Each review includes a redetermination of the required quantities of the items based on the latest field experience and test data. Items experiencing fewer demands than anticipated may be released to production, thus avoiding the purchase of unnecessary items. Items experiencing a greater usage rate may be purchased immediately or kept in buffer stock, thus assuring adequate end-item readiness or continuing to provide some hedge against uncertainty. The final redetermination must occur not later than a leadtime in advance of the final production run for the system. Some or all of the initial procurement of the selected items may be deferred until the final production run when (1) the latest in-service experience and test data are available, thus allowing for better provisioning decisions, (2) the design of the system is more stable, thus lowering the risk of engineering changes that require retrofit, and (3) the Service has had time to develop firm operational and maintenance programs and deployment plans, thus reducing uncertainties concerning the scope of the project and maintenance requirements. Phased provisioning can provide protection from underprocurement through the accelerated production of items in the buffer stock, and protection against overprocurement by deferring the ultimate procurement decision until uncertainty is diminished.

PHASED PROVISIONING SPECIFICS

The procedures, terms and conditions for phased provisioning are contained in MIL-STD-1517, published in June 1971. DoDI 4140.19 states that

MIL-STD-1517 will be cited for optional use by the Government in all production contracts for complex weapon and support systems and high-cost end items of equipment that are new to the DoD operating inventory, or existing systems and equipment undergoing major modifications. (We will use the term "weapon system" to encompass all the systems and end items just described.)

The buffer stock established under phased provisioning may consist of raw materials, semifinished items, or finished items that may be used to offset the range and quantities of items not procured. During the production period, while phased provisioning is in effect, stocks of selected items include the minimal quantities of items purchased for the supply system plus the buffer stock held in reserve by the contractor. The quantity of any item in the buffer stock may not exceed the quantity required for the production of the remaining weapon systems under current contract; nor may the quantity in buffer stock exceed the normal total requirement computed for provisioning (less any quantity actually ordered). However, if a follow-on contract has been programmed by the Service, the Service may require the buffer stock to be continued. Also, the items in buffer stock must be maintained in the proper configuration.

Selection Criteria

DoDI 4140.19 cites the following general criteria for deciding to use phased provisioning in an acquisition program.

- Weapon system is programmed to be in production by a single source for approximately three years or longer.
- Weapon system will be in operational use, excluding tests, for at least six months prior to the last material ordering point.
- Weapon system will be placed in production before the design configuration has been stabilized.
- Weapon system contains items having uncertain maintenance requirements or failure rates that cannot be assigned with assurance of accuracy.

- Operation and maintenance programs and deployment plans for the weapon systems are incomplete or are likely to change.

- Rapid transportation can be economically arranged between the contractor's plant and the points of installation or use of the weapon system while phased provisioning is in effect.

- Military essentiality of the weapon system will not preclude applying phased provisioning.

DoDI 4140.19 also defines the following criteria for selecting items for phased provisioning item:

- High cost items (either a high unit cost or a high extended cost)

- Insurance items

- Items designated for or likely to need design changes

- Items with new or unique design or operating characteristics for which spares requirements cannot be computed with reasonable assurances of accuracy

- Items with production leadtimes over six months

- Items not commercially available or unavailable in the DoD Supply System

Items selected will be treated as provisioning items and will not be procured and managed as replenishment items of supply. In addition the items will not be used for the support of Research, Development, Test and Evaluation Programs and will not be procured for insurance purposes until a leadtime in advance of the end of the production period.

There are several contractual and funding guidelines associated with phased provisioning.

- Phased provisioning will be identified as a separate item in the weapon system contract.

- In-production buffer stock materiel will be accounted for and financed with advance procurement funds, as for long-leadtime items.

- Spares delivered from the buffer stock will be accounted for and financed with initial provisioning funds.

- Buffer stock items released to production of the weapon system will be accounted for and financed with weapon system procurement funds.

- Administrative costs associated with phased provisioning will be accounted for and financed with initial provisioning funds. These costs include maintenance, by the contractor, of records on the items in buffer stock.

- Usage data from analytic overhaul, modification, or other maintenance performed by the contractor, will be provided to the Government.

- The contractor will notify the Government of the project schedule for diverting buffer stock to production.

- When phased provisioning is in effect, the items selected will not be subject to break-out consideration for competitive or direct purchase procurement.

The criteria used to decide whether phased provisioning should be used, as described above, are complex, as are the item selection criteria. Thus, although the concept is one that is potentially cost effective, there has been limited use of "phased provisioning" in its entirety in the past two decades. The use, or lack of use, of the phased provisioning methodology is discussed in Chapter 2. In Chapter 3, data from the F-16 program are used in a hypothetical application of phased provisioning to learn how best to use phased provisioning and what the cost savings might be. An evaluation of phased provisioning and a comparison of it to other hedges against uncertainty and cost avoidance techniques, such as interim contractor support and spares acquisition integrated with production, will be found in Chapter 4 along with our conclusions and recommendations.

2. THE USE OF PHASED PROVISIONING

Phased provisioning was promulgated to the Military Departments and Defense Agencies in July 1963, but it has not had widespread use. Its most successful application was during the late 1960s on the Air Force contract with General Dynamics for the F-111A aircraft. We will briefly describe the environment that fostered the development of phased provisioning, some past applications of phased provisioning, and reasons for its disuse.

ENVIRONMENT

A 1958 Rand study[1] on phased provisioning contained the following observations:

- To hedge against uncertainty, provisioners made liberal estimates of support needs (spares) leading to an upward bias in estimates of requirements.
- The value of excess stock has more than 50 percent of total stock procured.
- 85 to 95 percent of total spares purchases entered the inventory through initial provisioning procurements.
- Airframe manufacturers normally produced one or two aircraft's worth of parts to maintain their production buffers.
- Certain high value items represented three percent of all airframe line items but 50 percent or more of the spares budget. These items tend to have low demand rates during the phase-in period and procurement excesses occurred.

A key to the ability to use phased provisioning during the 1960s was the relatively low cost of capital and the small number of items placed into buffer stock. Manufacturers could maintain a buffer stock to hedge against work stoppages or other supply interruptions at a relatively low cost. During

[1]Peterson, James W. "Savings from Procurement Deferral with Interim Contractor Support: The Case of High Value Airframe Spares," Rand Memorandum RM-2085, January 1958.

the 1970s, high interest rates, defense budget curtailments, new government accounting practices, and a contractor's accounting to shareholders combined to discourage manufacturers from increasing their buffer or work-in-process inventories. The financial environment combined with a poor understanding of phased provisioning has led to variations in the use of phased provisioning and, in many cases, rejection of it as a provisioning strategy.

EARLY USE OF PHASED PROVISIONING

Three weapon systems served as Air Force test applications of phased provisioning before a joint Government/Industry task group drafted terminology and contract language for uniform application in all Defense contracts involving it. The experience from these three applications resulted in the existing DoD Instruction 4140.19 and MIL-STD-1517.

J-79-15 Engine (F-4 Aircraft)

This was the pioneer case for phased provisioning. Buffer stocks of a number of spares were established in late 1964; however, all of the buffer stocks were bought by about August 1965, largely because of increased requirements associated with support of operations in Southeast Asia.

C-141A Aircraft

During 1967, phased provisioning was completed on the C-141A aircraft program. Approximately 80 items had been placed in buffer stock; they had an extended price of approximately $13 million. Over $6 million worth of buffer stock was released to production.

F-111A Aircraft

The Air Force and General Dynamics, the F-111 prime contractor, agreed on the use of phased provisioning, though the agreement was made some months after the contract was let. They agreed to select items configured for final assembly in the aircraft. The only vendor items selected were end

assemblies. In addition, the prime contractor performed the complete management of phased provisioning; there was no subcontracting. General Dynamics and the Air Force agreed in advance that any engineering changes on buffer stock items would be charged to the production contract and that there would be some simplified means of calculating charges for phased provisioning.

During the course of the F-111 aircraft phased provisioning effort, approximately 150 items with a total value of over $25.8 million were placed in buffer stock. These items represented over 2000 individual parts. Table 2-1 shows the number of parts and their total value (if delivered as a final assembly).

TABLE 2-1. F-111 BUFFER STOCK

	Number of Parts	Percent of Total	Value of Parts ($million)	Percent of Total Value
Procured as Spares	1580	62	22.19	86
Returned to Production	962	38	3.63	14
Total in Phased Provisioning Program	2542	100	25.82	100

When the use of phased provisioning on the F-111's engine (the TF-30) is included, the savings are even greater. During fiscal year (FY) 1969, a total of over $5 million worth of buffer stock was released to production. Phased provisioning on the F-111 and its engine was completed in FY 1971 with a total value of items returned to production of $8 to $10 million. The Air Force stated that, had the F-111 production program been continued with the original aircraft procurement quantities, greater benefits could have accrued.

In hindsight, it is not clear whether the savings attributable to phased provisioning on the F-111 understate or overstate the potential of savings with phased provisioning. The Air Force was required to notify the

contractor, within a 30-day deadline, when a particular item should not be returned to production. The Air Force had difficulty in meeting that deadline. They allowed some items to return to production that might otherwise have been purchased as spares. Had the 30-day deadline been less constraining, they might have purchased more spares and the savings from returning items to production would have been smaller. On the other hand, more savings might have been realized if design change effectivity decisions had been made concurrently for production and buffer stocks. As it happened, more aircraft were delivered with superseded configurations than were necessary. The Air Force had to retrofit part of the fleet and its related logistics assets to the correct configuration. A 1970 Air Force Audit report[2] points out still other problems with the F-111 phased provisioning:

> "Although the phased provisioning concept was used on the F-111 aircraft, it was ineffectively applied. Dates established for notifying the contractor of decisions to buy as spares or divert to production were not commensurate with Air Force need dates. Also items for which there were no immediate requirements were bought three and a half to eight months prior to the deadline date for procurement actions. In other instances, items were procured from sources other than the contractor's buffer stock, although identical items were available in the buffer stock. We believe these deficiencies in application indicate the need for an intensive training program on phased provisioning."

Despite the problems, phased provisioning did allow some items to return to production. The total price to the Air Force for administering the program was about $325,700, and when the Air Force required an item from buffer stock it was available within 24 hours.

USE OF PHASED PROVISIONING IN THE 1970s

DoDI 4140.19 requires an annual report on the status of phased provisioning items by the Military Services and Defense Agencies. These reports reveal

[2]Audit Report, Phased Provisioning, Department of the Air Force, Auditor General, Comptroller of the Air Force, 26 February 1970, p. 3.

that phased provisioning has never really caught on, despite the documentation of savings by the Air Force. Since 1968, the Marine Corps has filed a negative report, that is, it reports that there are no items being managed under the phased provisioning technique. The Navy filed a negative report in 1974 and has filed no report since then. The Army has filed no report since 1973. The Air Force used phased provisioning and filed reports until 1978. However, no items or systems have been added to Air Force phased provisioning efforts since 1977. We now describe some past attempts at phased provisioning and discuss the Air Force's 1980 recommendation that it should discontinue use of phased provisioning.

Army Phased Provisioning

In 1968 the Army selected the M561, one-and-a-half-ton truck, as a candidate for phased provisioning. Twenty-nine items with an extended cost of $30,000 were placed in buffer stock. In 1973, one item was procured and the remaining 28 items (valued at $20,000) were returned to production. The only other application by the Army was the M520E1, M553 and M599 series of vehicles in 1971. Eight hundred line items with an extended cost of approximately $3 million were placed in buffer stock. The cost of the items ranged from four cents each to $2,300 each. In 1972, all of these items were released to production because the program was selected as a pilot for full contractor support. Neither of these two applications can be considered more than a token use of phased provisioning.

From 1968 to 1973, the Army evaluated the use of phased provisioning on approximately 30 other systems. In each case the Army decided that it could not apply phased provisioning. Reasons cited for not using phased provisioning included:

- Programs do not meet criteria of phased provisioning

- System will be contractor operated and maintained
- Due to short leadtime required for delivery of certain type items, phased provisioning is not applicable.

This last item indicates that DoDI 4140.19 criteria for rapid, economical transportation between the contractor's plant and the deployed system, as well as the availability of items in buffer stock upon order for delivery with significant reductions in leadtime, could not be met.

Limited use of phased provisioning by the Army does not imply rejection of the concept of deferring the procurement of initial spares. Army Materiel Development and Readiness Command (DARCOM) procedures now incorporate many of the concepts of phased provisioning. Phased or limited procurements and deliveries are specified for some long-leadtime items. Insurance and unstable design items receive specific management attention.

Navy Phased Provisioning

The Navy, despite pressure to use phased provisioning and attempts to do so, has had only two applications. Phased provisioning for the A-7A program could never successfully be negotiated, even though the contract was modified in July 1966 to include implementation of phased provisioning. After two and a half years of OSD encouragements and Navy attempts to apply phased provisioning, the opportunity for application expired. The Navy did begin to apply phased provisioning in the F-14 program. Sixty-four items valued at $9.2 million were placed in buffer stock in 1971. In 1973, items valued at over $147,000 were placed in buffer stock for the AN/WSN-1 inertial navigation system. Neither of these systems remained a phased provisioning application.

The Navy evaluated more than ten other systems, including several engines, aircraft and ships during the years 1968 to 1974. However, since the criteria for applying contractor support and selecting items for phased

provisioning are similar, they are viewed as alternative methods of support by Navy acquisition managers. Some form of contractor support has always been preferred to phased provisioning. Navy managers believe that the maintenance of separate records of phased provisioning items in buffer stock results in administrative costs that are higher than a comparable form of contractor support. The Navy has not conducted an economic analysis to support this belief, but it may well be true in light of Navy planning practices. The Navy has, at least for some systems, provided production go-ahead to a contractor before the maintenance plan, required maintenance capability, and the associated mix of spare and repair parts could be estimated. This level of uncertainty during system production usually will require contractor support, and this support will be for a long period of time. For instance, in 1977 Navy contractor support periods were estimated to average 24 to 36 months. In comparison the Air Force averages 18 to 24 months and the Army plans for 24-month support periods.

We did not examine the cost tradeoffs between contractor support and phased provisioning, nor has the Navy. According to a Defense Audit Service report[3], "The Navy presumed that the added administrative costs (e.g., to maintain separate records for items in buffer stock) made phased provisioning less cost-effective than other forms of supply support, such as interim contractor support. However, the Navy did not perform the necessary cost analyses to properly evaluate this issue." If such an examination were to be made, the "probable" higher cost of contractor support would have to be weighed against the advantages of early weapon system delivery and the disadvantages of potential redesigns due to eventual feasible maintenance concepts.

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[3]"Report on the Review of Initial Spares Provisioning for Tactical Aircraft," Defense Audit Service, No. 80-034, November 1979, p. 9.

Air Force Phased Provisioning

We have already discussed the Air Force use of phased provisioning in the 1960s: the J-79-15 engine, C-141A aircraft and F-111A aircraft. The next application following the F-111 was the C-5A aircraft. There were difficulties in phased provisioning implementation because of the nature of the total procurement contract, but in 1968, 85 items worth approximately $2.7 million were placed in buffer stock. In 1969, 60 additional items worth about $229,000 were placed in buffer stock. In 1970, the Air Force procured all these items and ceased using phased provisioning for the C-5A. The A-37B aircraft program also attempted phased provisioning. In 1968, 16 items were placed in buffer stock ($59,000), but in 1969 15 items were procured and one item was released to production for a savings of about $600.

In 1973, the Air Force attempted to use phased provisioning for the F-15 and the F-100 engine. Some 22 items worth over $2.8 million were placed in buffer stock. In 1974, ten more items were placed in buffer stock for the F-100; these items were procured in 1975 and 1976. In 1974 and 1975, 32 more items were placed in buffer stock for the F-15; in 1976 one item was procured and 21 items were released to production. In 1978, the remaining ten items in buffer stock were released to production. Despite this activity, the Air Force and the contractor could not agree on a billing procedure for F-15 phased provisioning and the application was terminated.

The E-3A application had a shorter life; two insurance items were selected for buffer stock in 1976 and were removed in 1977 because the items were reclassified as nonprocurable.

The F-16 suffered a similar fate; 17 insurance items worth less than $580,000 were selected for buffer stock in 1977 and all were released to production in 1978 because the Air Force and the contractor could not agree on

compensation for phased provisioning. In each of these last three applications, the extended value of the buffer stock was less than two percent of the amount of the initial provisioning orders placed on the contract.

COST ACCOUNTING STANDARDS APPLIED TO PHASED PROVISIONING

In the late 1970s it became apparent that phased provisioning was not being used to the extent envisioned for such a good idea. The Air Force was the lead Service in developing the phased provisioning concept so the Air Staff suggested that the Air Force Acquisition Logistics Division (AFALD) review phased provisioning procedures and effectiveness. The AFALD report focused on the inability of the government and the contractors for the F-15 and F-16 to agree on the pricing techniques for phased provisioning. In both instances, a review by the Defense Contract Audit Agency recommended that the Air Force request a change in the contractor's proposed pricing. Both contractors disagreed with the government's proposed changes, and in both instances phased provisioning was terminated. Due to the apparent problems with Cost Accounting Standards (CAS) and to the availability of alternative methods of delaying the purchase of some items, AFALD recommended that the Air Force discontinue use of phased provisioning.

DoDI 4140.19 (IV.C.4) states that "Administrative management and other associated contract service costs incurred by the contractor in applying phased provisioning in accordance with MIL-STD-1517 will be accounted for and financed similarly to initial provisioning." The instruction also states that phased provisioning will be identified as a separate line item on the contract. The problem is, however, that there can be no direct (and therefore no indirect) charges associated with the phased provisioning line item because the instruction further states that:

- orders for buffer stock items will be accounted for and financed similarly to initial provisioning items, and

- buffer stock released to production will be accounted for and financed similarly to the weapon system (end item).

Thus, all direct charges go either to the production contract or the spares contract (or to the applicable contract line items if there is a single contract). This is the first of two CAS issues raised by the Instruction.

CAS Number 402

CAS 402 states that all costs incurred for the same purpose (such as tracking inventory) are either direct costs only or indirect costs only with respect to the contract. That is, costs can only be charged once.

The "administrative management and other associated contract service costs" caused by applying phased provisioning could be charged to the spares contract, but this would preclude charging the government for those costs as part of the production contract. To do this might mean, for example, that all inventory management costs are applied to the spares contract when in fact the bulk of inventory management costs are related to the production of the weapon system. There must be some criteria for separating categories (such as administrative costs) so that the contract will be charged its share and only its share of both direct and indirect costs. This prevents direct charging to the phased provisioning line item for work that is actually the same as work undertaken as a part of the contractor's overhead. To comply with this cost accounting standard and still have a direct charge to the contract line item for phased provisioning would require administratively awkward techniques for differentiating between the work involved in the different financing situations. Another approach, which might seem attractive, would be to agree on a formula by which charges could be made for the phased provisioning. This idea, however, runs afoul of CAS 401.

CAS Number 401

CAS 401 states that a contractor's practices used in estimating costs in pricing a proposal must be consistent with his cost accounting practices used in accumulating and reporting costs. So, if the contractor estimates administrative costs by cost function, such as tracking inventory for phased provisioning, then he may not accumulate inventory tracking costs in one undifferentiated account. He must record actual costs based on criteria such as actual direct labor hours or an estimate of the actual cost agreed to by the government and contractor. That is, a person or persons would have to be assigned to managing phased provisioning items exclusively for certain periods of time. These persons would have to reflect the time actually spent each day on phased provisioning. Contractors are unlikely to agree to such an arrangement since, in practice, no inventory manager is likely to spend more than a small amount of time, maybe ten minutes a day or a week, on phased provisioning in conjunction with his other duties.

Accounting Solution

What the above discussion suggests to us is the following. Rescind the specific pricing instructions in DoDI 4140.19 (IV.C.). Spares purchased from buffer stock would naturally be purchased with spares money. Items returned to production would naturally be purchased with production money. The administrative costs would be part of the costs of the overall production contract and would be considered a part of the cost of building the weapon system for the government. No line item for phased provisioning would appear on the contract. Just as the government does not pay, specifically, for requiring affirmative action policies by the contractor, it would not pay, specifically, for phased provisioning.

For a specific concept of buffer stock (such as buying no spares and requiring that any buffer stock item be shipped within 24 hours), the overhead cost due to phased provisioning may be very expensive. The contractor may have some discomfort in putting such a large cost into overhead. The DoD should encourage the contractor to discuss this "phased provisioning overhead" cost. With this visibility of the cost, the DoD may evaluate the specific buffer stock concept and other phased provisioning concepts or alternative methods of hedges against uncertainty, cost avoidance, and weapon-system availability.

3. PHASED PROVISIONING EFFECTIVENESS

Phased provisioning has been a hedge against uncertainty and a cost avoidance management technique for initial provisioning of at least one weapon system. There remain questions, however, as to its effectiveness in today's environment of long leadtimes for items and high manufacturers' carrying costs for buffer stocks. In this chapter, we will construct a hypothetical case to examine both the potential of phased provisioning and how best to implement it.

A HYPOTHETICAL PHASED PROVISIONING APPLICATION

As we indicated previously, phased provisioning "sounds" like an excellent idea. Assuming that details concerning accounting for costs, coordinating design changes and delivering spares quickly could be resolved, we examined the magnitude of possible savings using phased provisioning. The magnitude of the possible savings can be weighed against the cost of administering phased provisioning. Savings can be estimated by multiplying the number of items that could be returned to production (the difference between the spares requirements computed initially and the spares requirements computed after six months) by the unit price. These "savings" are only savings with respect to initial provisioning. The same number of spares as are returned to production may ultimately be purchased to support future deployments either as initial or replenishment spares. To the extent that phased provisioning defers procurement of items that will not be required or will undergo expensive modification, the savings can be considered "real".

Because there is no actual example of phased provisioning recent enough that detailed data are still available, we used data for 810 repairable items of the F-16 program to construct a hypothetical case of phased provisioning.

We then analyzed the hypothetical case to estimate the magnitude of the savings that might be possible from phased provisioning. We examined two initial provisioning strategies for the F-16: (1) procuring a pipeline of spares, and (2) procuring a mix of spares to yield an expected aircraft availability rate of 90 percent. The first provides a conservative or lower bound on the potential savings; the second provides an optimum or upper bound on the potential savings. In both these strategies, we assumed that after six months of operational data, the newly computed initial spares requirements would be purchased.

For both initial provisioning strategies, we made two computations of spares requirements. To make the first computation we used component characteristics (unit price, condemnation rates, maintenance factor, etc.) as recorded in the Optimum Repair Level Analysis (ORLA)/Depth of Repair Record (DORR) notebooks. They were the estimates of component characteristics the Air Force used in January 1977 when it computed F-16 initial spares requirements and placed orders. To make the second computation we modified the ORLA data with maintenance factors calculated from actual Air Force maintenance actions during the first six months of F-16 operation. Whenever the quantity of an item was less in the second computation than in the first, we assumed the difference would be released to production. The total cost of the items released to production constitutes the potential savings from phased provisioning.

Pipeline of Spares

Requirements to provide a pipeline of spares for 150 aircraft (using their latest flying hour program) were computed as described above. The first calculation used the ORLA/DORR data. For the second calculation we modified the ORLA/DORR maintenance factor estimate as specified in DoDI 4140.42, that

is, a 25 percent weight was given to the first six months of operational data and a 75 percent weight was given to the ORLA estimates. (Maintenance factor is defined as number of failures per 100 flying hours; there were 964 flying hours in the first six months). If there were no failures for a component during the first six months, the ORLA/DORR estimate remained unchanged. We call this second computation 75/25.

The 75/25-based pipeline level of investment is slightly (0.2 percent) larger than the ORLA/DORR-based pipeline level of investment, as shown in Table 3-1. There is a savings of almost $1 million. Sixty-four buffer stock spares could have been returned to production for an estimated savings of $976,844. These 64 spares represent 23 different items.

TABLE 3-1. SAVINGS WITH A PIPELINE OF SPARES ACQUISITION STRATEGY

	Buffer Stock ORLA/DORR	Investment Level 75/25	Total Savings
810 Items (all placed in buffer stock)	$26,914,287	$26,972,244	$976,844

As we mentioned previously, buying a pipeline of spares to support a weapon system is a conservative approach to spares procurement. It typically results in low weapon-system operational-availability rates. Assuming that all the buffer stock items are available from the contractor within 24 hours rather than from the base level, an even lower operational availability would exist.

Sparing to Availability

Another spares acquisition strategy is to buy the spares needed to meet aircraft availability rates rather than to minimally fill the spares

pipeline. We used the model VARI-METRIC, described in a prior LMI report,[1] to calculate spares requirements to meet a 90 percent predicted availability rate. (This model is similar in many respects to the MOD-METRIC model used by the Air Force to calculate spares for the F-16). The initial spares investment level for the 810 initial provisioning items using ORLA estimates was $111 million. After modifying the data based on six months' maintenance actions, we recomputed the spares investment level.[2] The revised investment level was $29 million -- again for a 90 percent predicted availability rate. The difference between these two levels represents the maximum potential phased provisioning savings. In the case of the F-16, the difference is unusually large because early operational experience proved the original estimates of component failures to be much higher than actual failures. (Of course, phased provisioning is designed to hedge against exactly that kind of uncertainty in estimates.)

The savings are a function of the number of each item placed in buffer stock. The highest savings occurs when all spares are placed in buffer stock. This strategy is unlikely to be used, since even with a 24-hour delivery of spares from the contractor, weapon system availability would be reduced. (Had phased provisioning been used in the F-16 program, placing 75 percent of the spares requirements into buffer stock would have made sense because less than 20 of the 150 aircraft were scheduled for delivery in the first six months.)

Table 3-2 shows the savings as a function of the percentage of total requirements placed in buffer stock. When the percent of total requirements

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[1]Abell, John B., Joan E. Lengel, and F. Michael Slay, "Toward Improved Initial Provisioning Strategies: The F-16 Case," Logistics Management Institute Report #ML108 (Washington, D.C.) April 1982.

[2]We used the Bayes-Lin technique described in (1) to modify the estimates.

is not a whole number, the amount placed in buffer stock is truncated to a whole number while the amount procured is rounded up to the next whole number.

TABLE 3-2. SAVINGS* USING AN AVAILABILITY ORIENTED SPARES ACQUISITION STRATEGY

Item Selection Criteria	Percent of Requirements in Buffer Stock			
	100	75	50	25
All Items (810)	$82.17	$74.76	$53.58	$26.52
EP** ≥ $10,000	81.71	74.31	53.20	26.30
EP** ≥ $20,000	81.61	74.21	53.12	26.26

*Savings in millions of dollars.
**Leadtime > 6 months or unit price ≥ $500 or extended price (EP) criteria.

Item Selection

DoDI 4140.19 provides criteria to select items for buffer stock (described in Chapter 1). Because we do not have sufficient information about the 810 F-16 items (for example, the degree of design stability), we used only three of the criteria to select items. We selected items with a leadtime of more than six months or with a unit price of $500 or more. In addition we tried two variations of the extended price, one with an extended price (EP) of $10,000 or more and one with an EP of $20,000 or more. (Extended price is defined as the unit price times the number of items required.) As Table 3-2 shows, doubling the extended price did not have much effect on the savings.

The price criterion does make a difference in the number of items in the buffer stock. When all 810 items are selected, 772 items had some savings, that is, at least one spare for each of the items could be returned to production. When the items selected had a leadtime of more than six months, a unit cost of $500 or more, or an EP of $10,000 or more, 512 items had some savings. A 33 percent reduction in the number of items resulted in only a nine percent reduction in savings.

Table 3-3 shows the results of selecting items for the buffer stock based on extended price alone. Placing the total number of all 810 items into the buffer stock would yield a maximum theoretical savings of $82.17 million. Note, however, that selecting only the 20 percent of the line items with the highest extended prices would yield about 94 percent of the maximum possible savings. Similarly, when 75 percent of the depth (truncated) of selected items is placed in buffer stock, selecting only the top 20 percent of the line items using extended price alone yields about 93.7 percent of the savings ($70.02M out of $74.76M).

TABLE 3-3. SAVINGS* FOR HIGH EXTENDED COST ITEMS WHEN ALL ITEMS ARE SELECTED

Number of Items in Buffer Stock	Percent of Requirements in Buffer Stock			
	100	75	50	25
810	$82.17	$74.76	$53.58	$26.52
202** (25%)	77.80	71.42	50.56	24.98
162** (20%)	77.36	70.02	49.42	24.42

*Savings in millions of dollars.

**The number of high extended cost items in the buffer stock.

SHORTCOMINGS OF THE HYPOTHETICAL CASE

Based on the theoretical application of phased provisioning to the F-16 program, placing a large percent of spares requirements in buffer stock and selecting 20 to 30 percent of the items ranked by extended price, would reap large savings. But we have not yet discussed some factors that would reduce these savings in a practical application.

Long-Leadtime Criteria

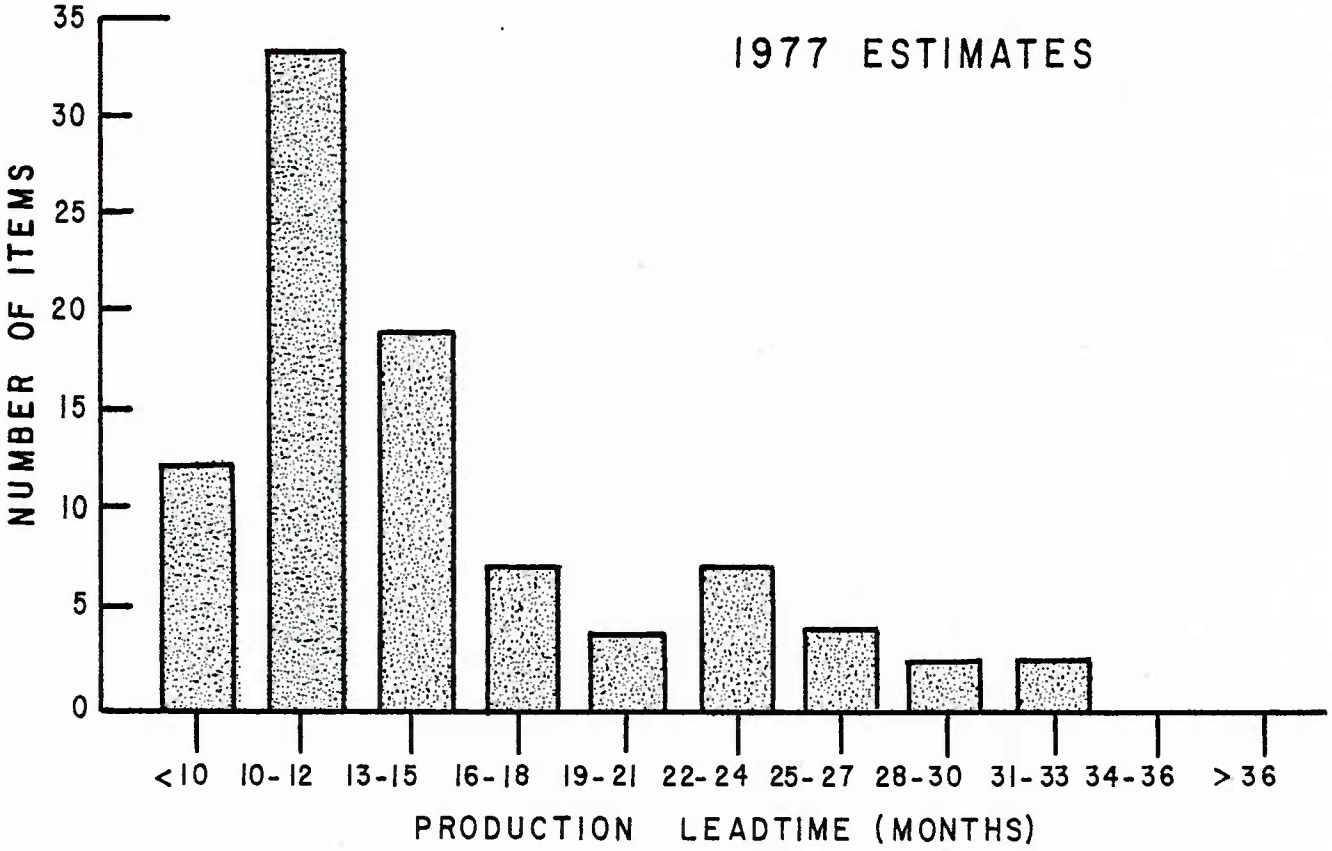
One reason that phased provisioning criteria specify a weapon system that will be in production for three or more years is that after six months of

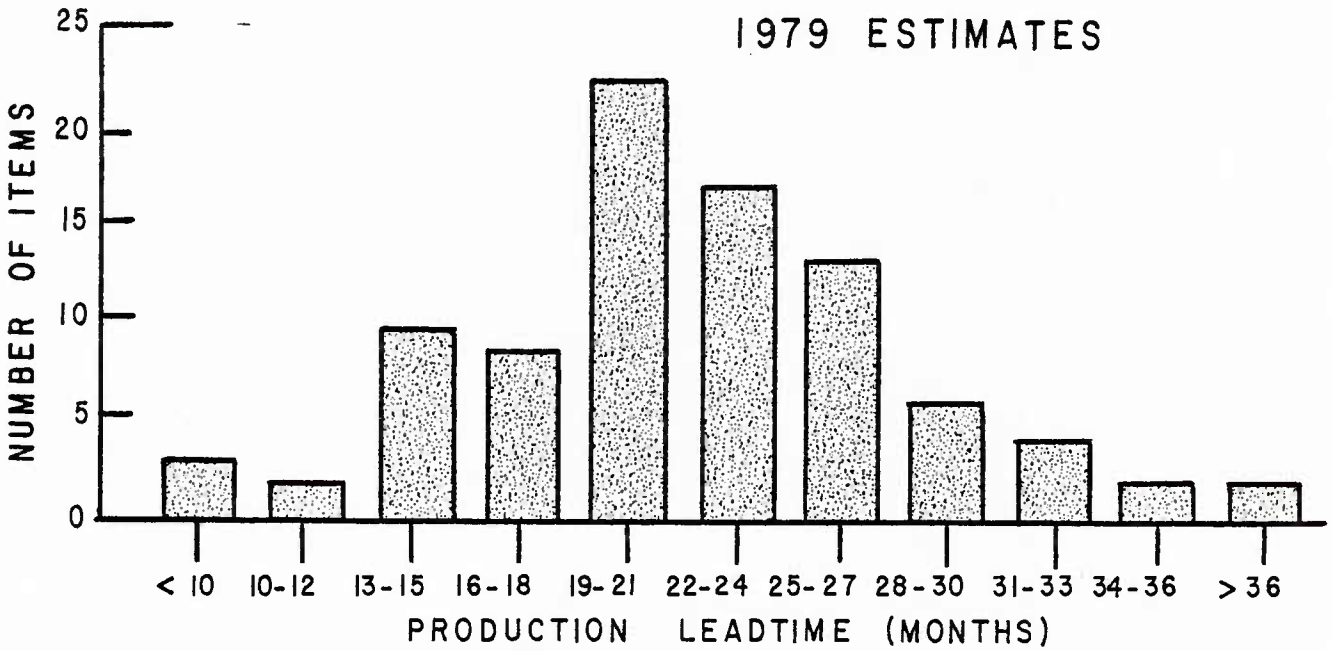
operation there will be time to return items to production because the production line will still be operating. This criterion might have been sound in the 1960s, but today, leadtimes for some items are so long that it may not be possible to return them to production. We examined the changes in leadtime for a set of items for the F-16 to determine the magnitude of the problem. We had detailed leadtime data only for 90 items selected for the Spares Acquisition Integrated with Production (SAIP) program. SAIP items are also high-cost items and would account for about 60 percent of the savings described in Table 3-3. If phased provisioning had been used only for the SAIP items, placing 75 percent of the requirements into buffer stock would have resulted in a theoretical savings of $45.76 million.

Figure 3-1 shows the change in leadtimes from the estimates in January 1977 to the estimates in July 1979, after six months of operation. One item had a leadtime decrease, from 11 to 8 months. Thirty-two items (36 percent) had leadtimes that were the same or within one month of being the same. Twenty-six items (29 percent) had leadtimes that more than doubled and 6 items had leadtimes that tripled. The median leadtime rose from 12 months to 21 months.

We estimate that if high-cost items for other weapon systems have leadtimes of 20 months, the weapon system would need to be in production four or more years before deferring procurement of spares would yield significant savings. For example, had the last F-16 aircraft been scheduled for delivery in January 1982 (approximately a four-year production period), spares with a leadtime of 30 or more months would have had to be purchased or returned to production just when six months of operational data became available. On the SAIP items this would have reduced the savings by $2.65 million. If the purchase/release decision were made when only 20 months remained to the end of

FIGURE 3-1. LEADTIMES FOR F-16 SAIP ITEMS





production, the savings would be reduced by $34.6 million out of the possible $45.76 million.

Long Production Run Criteria

The increase in leadtimes alone would suggest a change in the criteria of weapon system selection from three years to four years of production. We do not believe that the solution is this straightforward. For instance, DoD policy encourages the "breakout" of spares after initial provisioning; that is, a contract to supply spares is let to the "lowest bidder" rather than procured through the prime contractor as are initial spares. DoDI 4140.19 states that phased provisioning items will not be broken out, and it would in fact be difficult to do so. Thus, the cost effectiveness of phased provisioning must also be weighed against potential savings due to breakout. Furthermore, when a weapon system is being produced for a long period of time, it is more difficult to overprocure spares. For stable design items requirements are stable. Procuring the weapon system spares requirements becomes a matter of funding and timing; spares may be purchased with initial spares funds or replenishment spares funds. We believe that the length of the production run should not be specified, but should be taken into consideration when selecting items for phased provisioning.

Unstable Design

Unstable design items pose a different problem. The effect of design changes on items in buffer stock depends on whether the items are kept as finished goods, semifinished goods or raw materials. In past applications of phased provisioning, the Air Force has required that the items be finished goods in order to facilitate quick delivery should the item be required. The Air Force has also placed only one or two of an item into buffer stock. If large savings are to be realized with phased provisioning, a larger number of

each item should be placed in buffer stock. Under these circumstances, the cost of retrofits or reworks could be very high if all the items in buffer stock were finished items. It makes sense however, to have one finished item available for immediate delivery. Remaining items may be semifinished, raw materials, or vendor orders for stock to be delivered to the prime contractor in advance of actual installation.

SUMMARY

Phased provisioning has the potential for substantial savings by at least partially deferring procurement of spares. The potential for savings is greatest for those items which tend to be overprocured because of the uncertainty about their characteristics. This potential for savings also depends on the ability to predict the "actual" item characteristics once operational data exist.

When initial estimates overstate requirements, when hundreds of items would be purchased, and when accurate revisions can be made to item characteristics, then phased provisioning can produce large savings. But we must point out that for the F-16 program, the estimates of spares requirements were unusually high compared to actual needs during the first two years of operation. Had the requirements been underestimated rather than overestimated, our hypothetical example might have shown no savings at all.

A very important factor of phased provisioning and DoDI 4140.19, is that the Instruction specifies that as little as six months of operational data will be used to revise estimates. This revision and subsequent revisions are key to provisioning intelligently, to either reduce or increase the spares required to sustain the programmed operation of the weapon system.

The hypothetical examination of phased provisioning for the F-16 dramatizes the potential savings of the technique. Just buying a pipeline of

spares had a potential saving of almost a million dollars and the comparable upper bound was over $80 million. In practice however, savings this large are unlikely to be achieved. The savings depend upon both the accuracy of the initial estimates and the ability to revise these estimates with a small amount of operational data.

Other practical problems in implementing phased provisioning include:

- extended leadtimes
- determination of the depth of buffer stock and its configuration control
- availability of items from the contractor in a timely manner
- bookkeeping burdens.

In addition, other management techniques are available for meeting DoD provisioning objectives. In the next chapter we will discuss alternatives to phased provisioning and its future implementation in new weapon systems procurement.

4. ALTERNATIVES AND THE FUTURE OF PHASED PROVISIONING

BASIC PROVISIONING OBJECTIVES

There are three elements in the basic policies and objectives of provisioning as set forth in DoD Directive 4140.40, "Basic Objectives and Policies on Provisioning of End Items of Materiel." These three elements are:

- to assure the timely availability of minimum initial stocks of spares,
- to provide this support at the least initial investment costs, and
- to sustain the programmed operation of weapon systems until normal provisioning can be effected.

Current DoD policies concerning the initial provisioning of weapon systems have a bias toward cost conservatism. One source of this conservatism stems from a reaction to the 1950's environment when 85 to 95 percent of total spares purchased entered inventory through initial provisioning. In addition, uncertainties in defense programs' scopes, schedules, and priorities have led to policies favoring phased provisioning, leadtime-away procurement policies, and contractor support.

ALTERNATIVES

There are techniques other than phased provisioning that can be used to minimize cost and risk for the procurement of spares. We will briefly describe two of those techniques, SAIP and contractor support, and compare them to phased provisioning. Our comparison is limited to the ability of the three techniques to meet the provisioning goal of assuring the timely availability of minimum initial stocks of spares at the least initial investment cost.

Spares Acquisition Integrated With Production (SAIP)

SAIP is the concurrent procurement of items to serve as spares and items to be installed in weapon systems during production. Although DoD

policy does not require it, SAIP has been used in initial provisioning with success in reducing costs. The key element in SAIP is concurrent ordering and pricing of spares and production quantities of an item to reduce the unit price. It involves (1) submitting spares orders to the prime contractor, (2) having configuration control and automatic proration clauses in the contract, (3) giving the prime contractor chief responsibility for ensuring on-time delivery, and (4) pricing the spares order at the same time as production items. Cost reductions are realized because manufacturer setup costs can be reduced and planning for production is enhanced.[1]

Contractor Support

Full contractor support involves the deferment of the purchase of spare items and reliance on the contractor for both spares and maintenance support for a specified period of time. During contractor support, operational usage of the weapon system is supported, and item failures and maintenance actions may be observed. Before the close of the contractor support agreement, many of the uncertainties about weapon system performance are reduced so that the risk of over or underprocurement is much less. The contractor is generally responsible for all costs for spares and maintenance during the contract period.

Logistics Support Commitment (LSC) is an alternative to full contractor support devised by the Air Force. It is a contractual technique whereby the contractor is given the opportunity to trade off purchase prices, support activities, and costs in an attempt to meet a performance target. This target includes the total ownership costs of the items for a specified

[1]Allen, Brenda J. and John B. Abell, "An Evaluation of Spares Acquisition Integrated with Production," Logistics Management Institute Report #ML108 (Washington, D.C.), August 1981.

period of time. The LSC gives the contractor visibility over those elements of ownership costs which he can change, such as reliability, maintainability, unit costs, maintenance costs and repair times. The contractor weighs these elements against one another in an attempt to meet the LSC contract. If ownership costs exceed the LSC contract for the period, the difference can be made up either by the contractor or by some sharing of the excess costs.

COMPARISON OF TECHNIQUES

We compare phased provisioning, SAIP and contractor support from two viewpoints: (1) characteristics of the techniques and (2) the relative ability of the techniques to meet DoD provisioning objectives.

Characteristics

Phased provisioning, contractor support and SAIP techniques are compared in the context of initial provisioning for spare and repair parts for complex weapon and support systems and high-cost end items of equipment that are new to the DoD operating inventory or are undergoing major modifications (that is, weapon systems as defined in this report).

DoDI 4140.19 states that phased provisioning must be cited for optional use in contracting for new, expensive weapon systems and major modifications to such systems. SAIP, while usually applied to such systems, is not currently required for consideration by DoD policies. Contractor support is usually used only for new weapon systems, though it would be effective for selected items or portions of major modifications programs.

Phased provisioning policy also specifies that the weapon system should be in production for three or more years and in operation at least six months prior to the last initial provisioning order. This operational experience reduces the uncertainty about item characteristics so that requirements can be more accurately predicted. Contractor support addresses

this uncertainty by assigning responsibility to the contractor. Under SAIP spares are ordered concurrently with production items, but some flexibility exists to change the number of spares ordered.

Phased provisioning and SAIP may be used only for items that are not commercially available and are not already in the DoD supply system for use by another weapon system. Under contractor support, however, the contractor may purchase commercial items or receive government furnished items to carry out his contractual obligations.

Both phased provisioning and SAIP are for high-cost items. Contractor support is usually used to support high-cost items, but because it encompasses maintenance activities it also affects low-cost items.

Phased provisioning policy specifies that it may be used for insurance and unstable design items. Since insurance items are not likely to fail early in the program, delaying their purchase makes good sense, especially if their designs are unstable. Delaying the purchase of unstable design items may or may not be an optimal strategy, depending on whether an expensive retrofit program must be undertaken. In any strategy, configuration change clauses should appear in the spares contract. Contractor support can be applied to insurance and unstable design items, with the advantage of not purchasing any items until their characteristics are better known.

Meeting Provisioning Objectives

As mentioned earlier, there are three basic elements to DoD provisioning objectives. They are to assure the timely availability of minimum initial stocks of spares, to do this at the least cost, and to still support weapon system program requirements. Table 4-1 lists six actions which help to meet the DoD objectives. Deferring procurement of unstable design items and delaying procurement due to program uncertainty (items 1 and 2 in the table)

are two ways to minimize stocks of spares. Least cost objectives are met not only by lower unit prices but also by deferring procurement, not overprocuring, and procuring items in the correct configuration (items 1 to 5). Weapon system availability program requirements -- operating tempo and system availability -- are supported by buying spares in the correct configuration and not underprocuring spares (items 4 and 6). A comparison of contractor support and phased provisioning as defined in DoDI 4140.19 indicate that the two techniques are very similar. In fact, we would consider phased provisioning a type of contractor support where the spares, but not the manpower and support equipment, are supplied by the contractor.

TABLE 4-1. MEETING DOD PROVISIONING OBJECTIVES

DESIRED ACTIONS	TECHNIQUES		
	Phased Provisioning	Contractor Support	SAIP
1. Defer procurement of unstable design items	Y	Y	N
2. Defer procurement due to program uncertainty	Y	Y	N
3. Lower unit price of spares	P	P	Y
4. Buy spares in proper configuration	Y	Y	Y
5. Hedge against overprocurement	Y	Y	N
6. Hedge against underprocurement	N	P	N

Y: Yes, this technique addresses the objectives.
N: No, this technique does not address the objective.
P: The technique could be used or partially addresses the objectives.

Of the three techniques, contractor support and phased provisioning offer the best hedge against buying items that will be obsolete or unnecessary due to changes in design or program plans such as deployment and maintenance

concepts. SAIP offers little or no protection against such uncertainties; it was designed to facilitate procurement of stable design, long-leadtime items.

SAIP was also designed to minimize unit prices by taking advantage of the lower costs available in combined orders. Neither phased provisioning nor contractor support address the unit price issue directly, although in both instances the contractor can, and should, combine spares orders with production orders so that both installed and spare items cost the same.

All the techniques affect the spares configuration issue. Phased provisioning, if buffer stock items are semifinished or unfinished stages, can provide spares in the proper configuration without any extensive rework. Under contractor support, the contractor is expected to provide the appropriate spares. And under SAIP, configuration clauses are written into the contract to insure delivery of spares in the same configuration as the fielded weapon system.

Of the three techniques, phased provisioning and contractor support offer the best hedge against overprocurement. In other words, if estimated requirements are the same in all three cases and the requirements prove to be lower than estimated, items can be returned to production under phased provisioning. Under contractor support, the items are never procured. The potential exists for overprocurement under SAIP, which is why SAIP is recommended for stable design items for which the requirements are likely to be known.

Contractor support may be the best hedge against underprocurement. The contractor has a monetary incentive to support the weapon system. He has the option of tapping his manpower and materiel resources to deliver the needed spares and make design changes to correct unexpected support problems. SAIP does not address underprocurement, and phased provisioning would help only if the contractor was willing to divert items from production.

THE FUTURE OF PHASED PROVISIONING

It is important to distinguish between the management technique, phased provisioning, and the implementation of the technique described in DoDI 4140.19 and interpreted by weapon system program officers and contractors. In concept, phased provisioning is the deferral of all or part of the purchase of computed spares requirements during the initial support period. The contractor is responsible for maintaining a production buffer stock that the Service(s) can depend upon for a ready source of spare parts in the appropriate configuration. The DoD instruction defines criteria for using phased provisioning. These include weapon system and item selection criteria, management reporting requirements and difficult financial accounting arrangements. The relative inflexibility of DoDI 4140.19 makes other management techniques (contractor support, in particular) more attractive than phased provisioning.

We believe a wide application of phased provisioning is possible and desirable under conditions different from those set forth in DoDI 4140.19. Phased provisioning should be considered a form of contractor support where only spares are covered by the contract. Any evaluation of contractor support should consider this limited form of support.

When phased provisioning is considered in this light, there are two areas of importance -- the use of operational data and the criteria for weapon system and item selection. The Instruction assumes that operational data are available. This implies that the weapon system must be in production at least six months plus an item leadtime to use phased provisioning. Practically speaking, this implies a major weapon system that will be in production several years. We stop short of specifying two years or three years of production because of the interdependence with the leadtimes. We would only

recommend that whenever a significant portion of the high extended-cost items have the potential to be returned to production, phased provisioning should be considered as a contract support arrangement.

Another criterion that appears, at first, to be reasonable is the selection of unstable design items. In the F-16 case, even those supposedly stable design items selected for SAIP were subject to numerous design changes. Had SAIP items been selected they would have accounted for 64 percent of the $82.165 million savings shown in Table 3-2. We believe that the highest 20-to-30 percent extended-price items is the best selection criterion for significant savings.

Related to 20-to-30 percent range criteria is the depth consideration. As mentioned in the previous chapter, procuring 25 percent of the items makes sense in the F-16 case since only about 13 percent of the weapon systems were scheduled for delivery in the first six months of operation. Assuming that weapon system delivery schedules often follow the pattern of a small number of deliveries during the early operational period; placing 70 to 80 percent of the depth of items in buffer stock and procuring the remaining 20 to 30 percent would offer a reasonable balance between having spares immediately available and minimizing procurements. Radically different delivery schedules would call for a smaller or larger proportion of spares requirements to be carried in buffer stock.

RECOMMENDATIONS

The phased provisioning concept should be encouraged because it embodies the potential for substantial savings. There are two alternatives for promoting the use of phased provisioning in the DoD. The first is to remove and/or change DoDI 4140.19 and MIL-STD 1517 making them more flexible. The second alternative is to rescind the Instruction altogether and treat phased

provisioning as a type of contractor support. In Appendix A we have specified the changes to DoDI 4140.19 needed to implement the first alternative. However, we recommend the second: rescind DoDI 4140.19.

We would also recommend the following changes to DoD Directive 4140.40, "Basic Objectives and Policies on Provisioning of End Items of Materiel." An item describing the use of phased provisioning should be added to DoDD 4140.40 Section V.D.3, Policies, as follows:

- V.D.3. When phased provisioning, a limited form of contractor support, is determined to be cost effective, the DoD provisioning activity, with assistance from the contractor, will select a portion (such as the top 20 to 30 percent) of high extended-price items for deferred procurement. The contractor will arrange for the availability of raw materials, semifinished items, or finished items to serve as an interim source of responsive supply. The response time required, penalties for noncompliance, and the compensation to the contractor for providing the service will be negotiated for the set of items selected.

In addition to the above, references to DoDI 4140.19 need to be removed from DoDD 4140.40 and the definition of phased provisioning must be added to its list of definitions in Enclosure 1. Phased provisioning should be defined as follows:

- A form of contractor support involving the deferral of procurement of approximately 70 to 80 percent of the total computed quantity of selected items until the later stages of production coupled with the accelerated production of items for inclusion in production buffer stock, with contractual arrangements to use the buffer stock as an interim source of responsive supply for the military services.

In summary, we recommend that the ASD(MRA&L)

- Rescind DoDI 4140.19 and MIL-STD 1517
- Revise DoDD 4140.40 to include the concept underlying phased provisioning and encourage its use as one of several spares acquisition techniques available.

APPENDIX A. CHANGES TO DODI 4140.19

A number of changes can be made to DoDI 4140.19 to make it more flexible and to make phased provisioning a more attractive and cost beneficial procurement technique. These changes are described below in the form of paragraphs or sections of the existing instruction. If a section is not mentioned, it should remain unchanged.

Recommended Selection Criteria

DoD Instruction 4140.19 provides some criteria for item selection in III.B.2 and III.B.3 under Background, Phased Provisioning. These paragraphs should be amended to read as follows:

> III.B.2. When the decision is made to apply phased provisioning on a contract, the DoD provisioning activity, with assistance from the contractor, calculates initial provisioning requirements and ranks the required items by extended price. A portion of the high extended-cost items (such as the top 20 to 30 percent) will be selected for phased provisioning.
>
> III.B.3. Procurement orders placed with the contractor for initial support items (spare and repair parts) will exclude up to 70 to 80 percent of the total computed requirements, depending on the delivery schedule of the weapon system. If this number is not a whole number, the number may be truncated to a whole number. The remaining percent (rounded up) of the items may be procured. For items not procured, arrangements will be made for the contractor to accelerate the manufacture of these items so as to create a production buffer stock. At least one of each of the items in the buffer stock will be available upon order for delivery with significant reductions in leadtimes. Thus, the buffer stock serves as an interim source of responsive supply to meet demands on the supply systems of the using military services.

Accounting Changes

> Change IV.C. Policies, to read :
>
> IV.C. The terms of the contract will provide that costs to the contractor to implement phased provisioning will be borne by the DoD as follows:
>
> IV.C.1. Buffer stock items released to production will be accounted for and financed similarly to the production system or equipment.

IV.C.2. All other costs associated with phased provisioning will be accounted for and financed similarly to initial provisioning.

Criteria Changes

Change Section V.A. Criteria, to read:

V.A.1. Phased provisioning is best applied to programs that involve quantity production of complex systems or high-cost end items; it should not be applied to contracts for commercially available end items.

V.A.2. The systems or end items will be in operational use for at least six months prior to the last material ordering point so as to obtain actual usage experience.

V.A.3. The production contract applies to new models or classes of systems or end items of equipments wherein little or no historic maintenance or overhaul experience data can be reasonably applied.

V.A.4. Rapid transportation can be economically arranged between the contractor's plant and the points of installation or use of the system or end item while phased provisioning is in effect.

Reports

Delete Section VI. Reporting Requirements.