DEFENSE ACQUISTION UNIVERSITY
BUSINESS, COST ESTIMATING, & FINANCIAL MANAGEMENT DEPARTMENT

OCT 02

TEACHING NOTE

BUILDING THE PROGRAM BUDGET

Ellen Rosenthal

Program cost estimates are normally done in ***constant year dollars***, ignoring the effects of inflation and the budgeting implications of using various appropriations, or "colors of money." However, both of these factors must be taken into consideration in constructing the program budget in ***then-year dollars***.

BEFORE YOU START

To construct a defensible budget request, we need three things:

1. Program Direction. A statement of what the program manager is expected to do.

2. Program Work Breakdown Structure. A comprehensive listing of the tasks required to achieve the program objectives.

3. Master Schedule. The sequence of tasks in the work breakdown structure, showing when each task begins and ends, how the tasks are related one to another (critical path), and how workload for each task is distributed within the time period.

Program Direction

Clear program direction minimizes miscommunication in execution. The DoD 5000 series documents provide requirements for the preparation, submittal, approval, and reporting of Acquisition Program Baselines (APBs) for Major Defense Acquisition Programs and Major Automated Information System programs. The APB, which is prepared by the Program Manager (PM), sets forth key cost, schedule, and performance objectives for the program. The APB is approved by the Milestone Decision Authority (MDA) at milestone reviews. As long as the program is being managed within the established framework of the APB, in-phase review is not necessary. If there is a major change in the program, such as a significant cut or addition of funds by the Congress, the APB will be updated at subsequent milestone/program reviews, or with the approval of the MDA. It cannot be changed unilaterally by the PM.

Program Work Breakdown Structure

A key step in defining an acquisition program is the establishment of a Program Work Breakdown Structure (PWBS), reference MIL-HDBK-881B. The PWBS breaks down the entire

program into its component elements. It is organized in tiers or levels and can have as many levels of detail as management desires. The PWBS provides a comprehensive basis for projecting financial requirements. Whether elements are performed by the government or a contractor, the structure must be compatible with cost estimating and scheduling requirements.

Prudent managers will include “risk dollars” as part of the cost estimate for each PWBS element that merits it. These risk dollars are the PM’s management reserve to deal with contingencies when things go awry in the program. The PM must do this with the knowledge that this is a somewhat contentious subject within each of the services, OSD, and Congress and may therefore be subject to reduction or deletion as part of the budget review. There are several ways to estimate and budget for management reserve. The method used should be adapted to the program's specific needs.

1. Determine the area of risk and add some percentage of that area’s dollar value (e.g. 10%). The entire program may not be risky, only portions of it.

2. Add some dollar percentage to the entire forecast (e.g. 3% of entire fiscal year request). When risk cannot be more specifically assessed, this may be the only way.

3. Follow agency guidelines. Some field organizations have rule-of-thumb guidelines that are acceptable in the program review process (e.g., by fiscal year for RDT&E programs -- 15% in FY 1, 12% in FY 2, 10% in FY 3, etc. Procurement programs would use a smaller percentage.)

PMs should place the reserve where the risk is, e.g., in the airframe line, support equipment line, or wherever else it is needed. Most programs have a line item labeled “Engineering Change Orders” (ECO) to cover general development or production risks which are not easily tied to a specific PWBS element. There is <u>no</u> line item called "management reserve".

Program Master Schedule

With a sound PWBS, we can create a Program Master Schedule. We need a reliable estimate of the total time required to accomplish each task and the sequence in which the tasks must be executed. We must also know if there are tasks which must be completed--or partially completed--before other tasks can begin. These interrelationships are provided by a critical path-type schedule. A key date that generally governs the master schedule is Initial Operational Capability (IOC). Task schedules evolve by balancing the work to be done against the time when the work must be completed to achieve IOC.

STARTING THE BUDGET

Once the WBS tasks are time sequenced so we know when they will take place, we must also estimate the cost of each task, and the time-phasing of costs within the task so that funding can be requested in an appropriate year. We must also determine what appropriation will be used to fund each task so that we can comply with applicable funding policies.

Appropriations

To execute our program, we need ***budget authority*** provided by Congress so we can incur obligations and make payments. Budget authority is most commonly provided by an appropriations act, in which Congress specifies the purpose(s) for which each particular appropriation may be used as well as the amount of budget authority provided under each appropriation. DoD receives many appropriations, most of which can be grouped into the five major categories: ***Research, Development, Test and Evaluation (RDT&E); Procurement; Operation and Maintenance (O&M); Military Personnel (MILPERS); and Military Construction (MILCON)***. Volume 2A, Chapter 1 of the DoD Financial Management Regulation (DoD 7000.14-R) (DoD FMR) provides guidance as to the proper use of these appropriations categories to finance program efforts. A summary of this guidance is provided below:

RDT&E appropriations finance research, development, test and evaluation efforts performed by contractors and government installations to develop equipment, material, or computer application software; its Development Test and Evaluation (DT&E); and its Initial Operational Test and Evaluation (IOT&E). These efforts may include purchases of end items, weapons, equipment, components, and materials as well as performance of services – whatever is necessary to develop and test the system. This applies to automated information systems as well as weapon systems. RDT&E funds are also used to pay the operating costs of dedicated activities engaged in the conduct of Research and Development programs. RDT&E funds are used for both ***investment***-type costs (e.g., sophisticated laboratory test equipment) and ***expense***-type costs (e.g., salaries of employees at R&D-dedicated facilities). There is an RDT&E appropriation for each service (Army, Navy, Air Force) as well as one to cover other Defense agencies, operational test and developmental test.

The ***Procurement*** appropriation category consists of a number of procurement titles such as Shipbuilding and Conversion Navy, Aircraft Procurement Air Force, Missile Procurement Army, Procurement Marine Corps, etc. Procurement appropriations are used to finance investment items, and should cover all costs integral and necessary to deliver a useful end item intended for operational use or inventory. Items classified as investments and financed with Procurement appropriations include those whose system unit cost exceeds $100K; all centrally managed end items not purchased from Defense Working Capital Funds, regardless of unit cost (e.g., handguns); purchases from the Defense Working Capital Fund furnished as part of a system acquisition, system modification, major service life extension program and initial spares. The cost of fabricating and installing additions or modifications to existing end items is also funded with procurement appropriations, with certain limited exceptions.

Low Rate Initial Production (LRIP) items should generally be funded with Procurement appropriations except for those items which will be consumed during testing or are otherwise not intended for operational fielding.

The ***O&M*** category of appropriations is also composed of many appropriation titles, e.g., Operation and Maintenance Army, Operation and Maintenance Marine Corps Reserve, Operation

and Maintenance Air National Guard, etc. O&M appropriations traditionally finance those things whose benefits are derived for a limited period of time, i.e., expenses, rather than investments. Examples of costs financed by O&M funds are headquarters operations, civilian salaries and awards, travel, fuel, minor construction projects of $750K or less, expenses of operational military forces, training and education, recruiting, depot maintenance, purchases from Defense Working Capital Funds (e.g., spare parts), base operations support, and assets with a system unit cost less than the current procurement threshold ($100K).

MILPERS appropriations are similar in nature to the O&M accounts in that both are considered expense accounts. MILPERS appropriations are used to fund the costs of salaries and compensation for active military and National Guard personnel as well as personnel-related expenses such as costs associated with permanent change of duty station (PCS), training in conjunction with PCS moves, subsistence, temporary lodging, bonuses, and retired pay accrual.

MILCON appropriations receive considerable attention from Congress, and are enacted separately from the Defense Appropriations Act. These appropriations fund the costs of major construction projects such as bases, facilities, military schools, etc. Project costs include architecture and engineering services; construction design; real property acquisition costs; and land acquisition costs necessary to complete the construction project. MILCON is considered an investment account. Examples of projects properly paid for from the MILCON appropriations are missile storage facilities, intermediate maintenance facilities, medical/dental clinics, technical libraries, and physical fitness training centers.

Table 1 below lists the four-digit codes for DoD's most commonly used appropriation accounts.

DoD Appropriation Account Codes

Appropriation Account	Army (21-)	Navy (17-)	USMC (17-)	Air Force (57-)	DoD Wide (97-)
RDT&E	2040	1319		3600	0400
Procurement					0300
Aircraft	2031	1506		3010	
Missiles	2032			3020	
Weapons		1507			
W&TCV	2033				
Ammunition	2034	1508		3011	
SCN		1611			
Other	2035	1810		3080	
USMC			1109		
MILPERS	2010	1453	1105	3500	
O&M	2020	1804	1106	3400	0100
MILCON	2050	1205		3300	0500

Table 1

FINANCIAL RULES AND PRACTICE

The DoD Financial Management Regulation (FMR) articulates a number of ground rules derived from Congressional direction concerning the amount and timing of budget requests for different appropriations. These funding or budgeting policies basically serve to ration scarce budget authority among DoD's many activities and programs. These policies are discussed below.

Annual Funding

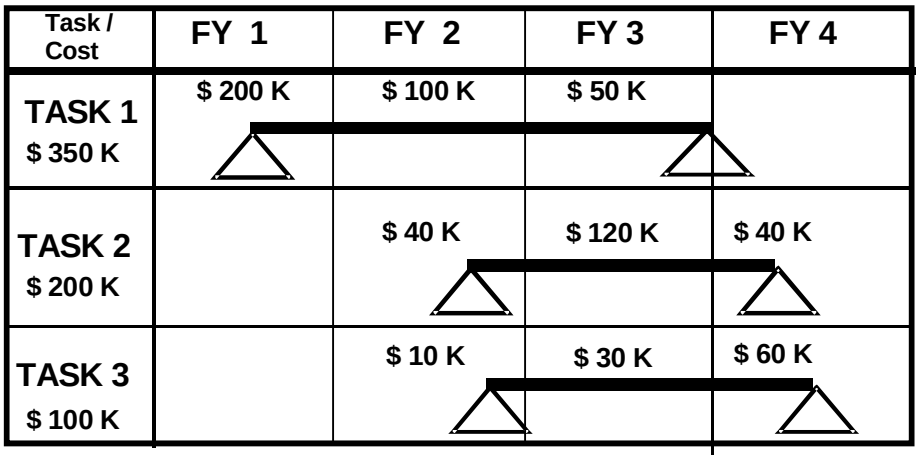
The rule governing the O&M and MILPERS appropriations is the ***annual funding policy***. Simply stated, the policy requires that you request only the dollars that you need to operate, maintain, or pay the forces in a given fiscal year. The major exception to this policy is the statutory provision governing DoD financing of service contracts whose period of performance crosses fiscal years. As long as these service contracts are 12 months or less in duration, DoD may fund the entire period of performance with funds available for obligation at the time of the contract award. Thus, a service contract covering the period April 2004 to March 2005 (12 months, starting in FY04 and ending in FY05) may be funded entirely with FY04 funds, and may be budgeted for accordingly.

Incremental Funding

The rule governing budgeting of RDT&E funds is the ***incremental funding policy***. As stated in the FMR, the incremental funding rule is:

> "…only those funds required for work in a given fiscal year shall be included in the RDT&E budget request for that fiscal year for most classes of effort."

Thus, we need to know when the costs will be incurred. In practice, this can be tricky, particularly when looking forward to competitive development without knowing who the contractor will be, much less how or when the costs will be incurred. Conceptually the task is much easier. Funding profiles for three hypothetical tasks are shown in **Figure 1**.



Cost Incurred by Task by Fiscal Year

Figure 1

For each of the tasks shown, the triangles represent the start and end dates. The expected cost to be incurred for each task is shown for each fiscal year. The first task represents a front-loaded task with respect to cost, perhaps early purchase of a large quantity of material. The second task represents level cost incurrence, perhaps a fixed level of quality assurance support. The third task might represent testing, with heavy cost incurrence near the end of the project.

The incremental funding policy says to request funds each fiscal year for the costs expected to be incurred that year. Since the diagrams are plotted in terms of cost incurred each fiscal year, we can simply add the costs in each column to determine the proposed RDT&E financial requirement for that year. Thus, for the program represented in Figure 1, the budget request would be $200K for FY 1, $150K for FY 2, $200K for FY 3, and $100K for FY 4.

For some RDT&E requirements there is no logical way to divide the work; it is clearly unfeasible to limit the contract to a shorter period; or the planned technical effort is such that no contractor is willing to accept a contract for a less-than-completion increment. For these type efforts that take longer than 12 months but less than 18 months, the Service or Defense Agency Comptroller may approve financing of the total requirement in one fiscal year.

Full Funding

The rule governing the computation of estimates for procurement and military construction appropriations is called the "***full funding*** " policy, which is defined in the FMR as:

> "The practice of funding the total cost of major procurement and construction projects in the fiscal year in which they will be initiated."

With respect to procurement programs, the full funding policy also calls for providing funding each fiscal year to procure a complete, usable end item, i.e., an end item budgeted for in one fiscal year may not depend on a future year's funding to complete its procurement. Thus, piecemeal procurement of systems is NOT permitted. This prevents DoD from ending up with large amounts of unusable parts, materials, or components if a program is cancelled or experiences a gap in procurement funding.

The full funding concept can be confusing, and can best be illustrated by stating what one may not do under that concept. For example, if the Army plans to purchase 1000 tanks at the rate of 100 per year for ten years, the Army may not contract for 1000 turrets in the first year, 1000 tracks in the second year, 1000 engines in the third year, and continue with piecemeal procurement up to the tenth year when all of the pieces are assembled and the Army has its 1000 complete tanks. Instead, the Army must contract each year for some number of completely fabricated and ready-to-fight tanks until at the end of 10 years it has contracted for the full buy of 1000 tanks.

All funds required to complete the delivery of each buy are included in the budget request for the year of the planned contract award, regardless of the date of the actual delivery, unless an

exception applies for advance procurement or multiyear procurement as described in later paragraphs.

Funded Delivery Period

To prevent programs from tying up excessive amounts of budget authority in a single year, DoD generally limits procurement budget requests to just the number of end items that can be delivered within a 12-month ***funded delivery period***. The funded delivery period begins when the contractor delivers the first item of a fiscal year procurement (or **lot**) and ends when the last item in that lot is delivered. For example, assume that the planned lot buy for FY 1 is 300 and **Figure 2** depicts the delivery schedule.

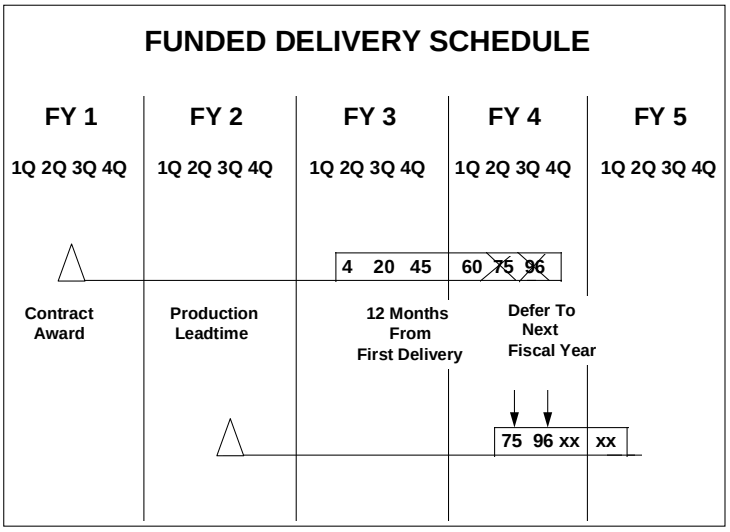


Figure 2

The first scheduled delivery in this case occurs in the second quarter of FY 3. The funded delivery period covers the 12 months from that first delivery, therefore, through the end of the first quarter of FY 4. In this 12-month window, all of the items associated with this lot buy should have been delivered. In this case, only 129 items can be delivered by the end of the first quarter of FY 4. Therefore, the budget request for FY1 should only include funds for 129 items instead of the 300 originally planned. The remaining 171 items should be funded in the following fiscal year. In theory, this should have no adverse impact on the program. In practice, however, such “annual buys” tend to drive up the overall cost of procurement as contractors attempt to reduce their financial risk (see “Multiyear Procurement” below).

Advance Procurement

An appropriate exception to the full funding policy is the use of advance procurement. Advance procurement can be described as funds "fenced" to procure certain components, material, or effort in advance of the end item buy, to preclude serious and costly fluctuation in program continuity. Advance procurement may be used: (1) to maintain critical skills that would otherwise be lost between System Development and Demonstration and Full Rate Production;

and/or (2) to protect the schedule by providing necessary components at the right time for incorporation into the production of the weapon system, i.e., to prevent a slowdown or break in production. Advance procurement funds for a system are budgeted as a separate procurement line item from the related end item. However, the relationship of the advance procurement funds to the end item budget is identified in both accounts so as to prevent double counting. Generally, advance procurement funds are budgeted one fiscal year in advance of the funds for the related end item.

Multiyear Procurement (MYP)

Multiyear procurement is a vehicle for acquiring multiple years of requirements for systems or subsystems with a single contract, usually up to a maximum of five years. The purpose of MYP is to reduce program cost growth and introduce stability into the acquisition process. In theory it does so by making a commitment to the contractor to procure a specific quantity of a weapon system over several years to be funded on a year-by-year basis. The contractor is thus incentivized to realize savings, particularly through ***economic order quantity*** (EOQ) purchases (i.e., bulk purchases), and investment in ***productivity enhancements***.

The funding of EOQ buys associated with a MYP is considered an exception to the full funding policy in that whole end items are not being financed. Funding for EOQ procurements is included in advance procurement budget requests unless an exception is granted by USD(Comptroller).

Although MYP can benefit the government, it can also entail certain risks. Accordingly, in Public Law 97-86, the Congress established criteria that multiyear candidates must meet to limit those risks. The criteria have been further refined by the GAO, OSD, and the congressional committees and are discussed next.

- ***Substantial savings*** -The MYP should achieve "significant" savings compared to annual procurement of the same quantities to compensate for the reduction of future budget flexibility and added program risk. There is no officially defined “significant” percentage or dollar value of savings for a MYP. In the past, minimum savings of 10% or more were expected, although very costly programs were able to obtain approval for MYP with less than this due to the high dollar value of the savings.

- ***Realistic cost estimates*** - Estimates should be based on historical cost data for the same or similar item. Savings are calculated as the difference between cost estimates, proposals, or negotiated prices for the multiyear contract and the cost of procuring the same quantities in the same time frame with successive annual contracts.

- ***Continuing/stable requirement*** **-** A stable requirement means that the minimum need for the item will not vary significantly (particularly downward) over the term of the multiyear contract. Decreases in procurement quantities or procurement rate can cause increases in unit cost and subsequently reduce savings.

- ***Funding availability and stability*** **-**There should be a reasonable expectation that program funding at the required level for the procurement will be available throughout the multiyear contract period. Both DoD and the Congress must be committed to ensuring that sufficient funds are provided to complete the multiyear contract at planned production rates.

- ***Design stability*** - System or subsystem design should be stable before initiating MYP. Test and evaluation should be completed and demonstrate that the system or subsystem is operationally effective. A program should be judged mature and stable only after research and development and one or two production runs have been successful.

- ***National security enhancement*** - The use of a multiyear contract should promote national security in some way.

- ***Impact on Industrial Base*** **-** Programs seeking approval for MYP must describe the impact on the industrial base, including improved competition, enhanced facilities investment, improvement in vendor skills, increased production capacity, etc.

Multiyear procurement contracts cannot be initiated for over $500 million unless specifically provided for in an appropriations act **and** an act other than an appropriations act. Congress has mandated the following requirements: (1) proposed multiyear contract costs must be provided for with the Presidents's budget submission or as a budget amendment and (2) the House and Senate Armed Services and Appropriations Committees must be notified at least 30 days in advance of a proposed contract award that employs advance procurement or economic order quantity procurement in excess of $20 million in any one year of the contract or an unfunded contingent liability of over $20 million. In addition, thirty days prior to a contract award, SECDEF must certify to Congress that the support costs associated with a multiyear procurement of over $500 million are fully funded in the FYDP. The certification letter must be then approved and signed by the defense committees.

"Cancellation ceiling" is a term that applies to multiyear procurements only. It represents protection to the contractor in the event that the government cannot continue the contract due to lack of funds. It is designed to reimburse the contractor for those costs that have been incurred as a result of ordering material in advance, or investing and facilitizing for the procurement. There is a cancellation ceiling associated with each fiscal year and it decreases in dollar value in the later years of the contract. An exception must be approved by USD(C) to award a multiyear procurement contract with an unfounded cancellation ceiling. Congress must be notified a minimum of 30 days prior to awarding a contract with a cancellation ceiling in excess of $100 million.

Congress and DoD have several concerns regarding multiyear procurement. The first is the amount of budget authority necessary to initiate a multiyear program. Due to the provisions for expanded advance buy and the cancellation ceilings, multiyear programs require more budget authority in the first year and have a large cancellation ceiling in the early years.

The second concern is reduced flexibility. It is expensive to cancel a multiyear procurement contract, therefore, once it is started it is generally wise to finish it. The budget is thus less flexible because large amounts of budget authority are now tied up for multiyear programs and are not available to be used somewhere else. Congress dislikes making commitments in the current year which have outyear consequences. DoD also likes to retain as much flexibility as possible to respond to changing requirements.

PRODUCT IMPROVEMENT

Determining the correct appropriation with which to fund product improvements or modifications of existing major weapon systems has its own logic. Product improvement involves a change to existing systems or components which usually either extends the system's useful military life or expands the system's performance capability. The funding of this change should be viewed in two phases: 1) development and testing of the modification, and 2) fabrication and installation of mod kits. The logic is depicted in **Figure 3**.

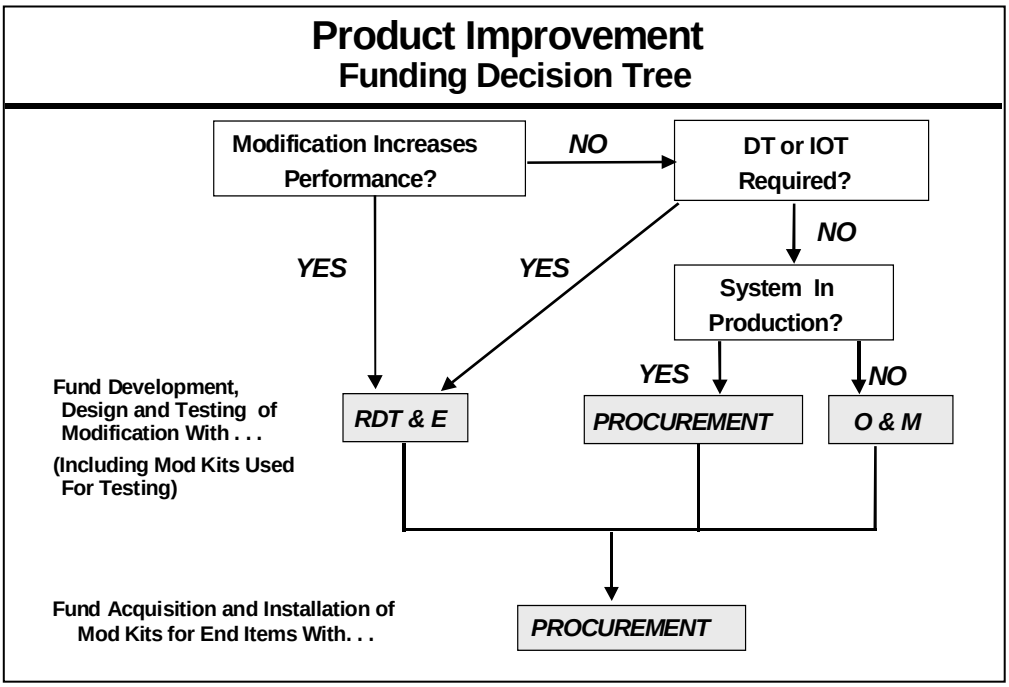


Figure 3

In the first phase, three issues may have to be considered: 1) does this redesign increase the performance capability; 2) does this redesign require extensive developmental testing or operational testing (e.g., is it a major modification); and 3) where is this system in the life cycle? If the redesign <u>increases</u> performance capability or extends the useful life of the system beyond its original design parameters, we must use RDT&E funds for the development, test and evaluation of the modification. If the redesign <u>does not increase</u> performance capability (e.g., a safety modification) or merely extends the useful life of the system to its original design value, we need to ask if the modification requires extensive testing because it is classified as a major modification.

If it is, then RDT&E dollars should again be used to pay for development, test and evaluation of the modification. If it is not, then we need to look at where the system is in the life cycle. If the system is in production, then we finance the development, test and evaluation of the product improvement with Procurement appropriations. If the system is no longer in production we finance the development, test and evaluation of the product improvement with O&M funds.

Whatever type of funding was used for the development and testing of the modification, the mod kits should be fabricated and installed using a Procurement appropriation of the same type as was used to originally procure the end item.

Aircraft engine improvements are exceptions to the general decision logic described above in that development and testing of these types of improvements are always funded with RDT&E appropriations.

Pre-Planned Product Improvements (P^3I) are different from the Product Improvement efforts described above and are considered concurrent but separate research projects from the research being done for their corollary system. The primary purpose of this research effort is to push technology beyond current boundaries, thereby achieving greater performance capability than possible with existing technology. The P^3I effort is planned before the system is produced/deployed and the R&D effort is actually done concurrently with the R&D for the main system (using currently existing technology, which is sufficient to achieve the user's threshold requirements).

THE APPLICATION OF INFLATION TO THE FINANCIAL FORECAST

Inflation, defined as an increase over time in the general price level, is a pervasive phenomenon affecting all aspects of financial planning and therefore directly impacts the development of program cost/funding forecasts for weapons systems.

When a program puts together a cost estimate, it is usually done in ***constant dollars***. Constant dollars are going to be tied to a specific year, with no inflation across the life of a program. This is very useful for cost estimating, since it is easy to make changes across the years without having to consider the impact on the cost of money over time. It is also beneficial if you want to analyze a program to see things like cost growth and the impact of learning curves.

However, budget requests are projections into the future, so what we budget for today must be what we expect to pay in the future; i.e., our budget estimate must account for inflation. To properly factor in inflation, we need to account for the effects of rising prices as well as account for the timing of when those bills will actually be paid. For a contractor, the price level changes are felt when material or salary costs increase. The problem is to predict when a contractor is going to incur those costs. Since program budget requests must be made prior to receiving and negotiating contract cost proposals, we must develop estimates of the anticipated costs and the time-phased profile of their incurrence. The estimated inflation for a task or end item is provided by the Office of Management and Budget (OMB). To estimate the profile of how those costs will be outlayed over time, we use DoD historical outlay rates based on similar

programs and appropriations. Each of the services uses that information to calculate ***then-year dollars***. Then-year dollars are used in the Program and Budget Documents and in the Future Years Defense Plan (FYDP).

There is a time lag between the creation of budget authority and outlays that flow from that budget authority. Expense-type appropriations (e.g., O&M) would be expected to outlay quickly, while investment-type appropriations (e.g., Procurement) would be expected to outlay more slowly. **Table 2** reflects typical outlay rates for various appropriations based on historical data. Each specific appropriation account has a unique outlay profile that is taken into account when we adjust our constant dollar cost estimate to include the effects of inflation and convert it to then-year dollars.

Illustrative Outlay Rates
(Percent of Total Budget Authority Outlayed Each Year)

	First Year	Second Year	Third Year	Fourth Year	Fifth Year	Sixth Year	Seventh Year
Army							
Aircraft Procurement	24.60	42.00	29.40	2.00	2.00		
Missile Procurement	9.50	36.10	38.00	12.70	3.70		
RDT&E	41.97	45.60	7.32	2.49	2.62		
Navy							
Aircraft Procurement	16.00	39.50	32.20	5.90	4.10	2.30	
Shipbuilding & Conv	7.29	17.88	22.51	19.42	13.25	9.83	9.82
RDT&E	52.33	38.19	6.13	1.50	1.85		
Air Force							
Aircraft Procurement	12.40	37.60	28.90	14.00	3.50	3.60	
Missile Procurement	24.10	30.90	23.80	10.90	3.70	6.60	
RDT&E	57.20	34.66	5.53	1.46	1.15		

Table 2

Assume that in FY 2003 a PM plans to receive authorization and contract for the purchase of a certain number of aircraft for the Navy. While the contractor will build the aircraft and incur the costs over several years, the PM must (consistent with full funding) budget for the entire lot buy in the fiscal year authorized/appropriated by Congress. The estimated cost of this lot of aircraft expressed in *constant year FY 2003 dollars* is $100 million. The inflation estimating community projects that the price level in FY 2003 will be 1.3 percent higher than the previous year (2002); prices will be 1.7 percent higher in FY 2004 than in FY 2003, and so on according to the data in **Table 3**.

Illustrative Inflation Rates

Fiscal Year	Annual Inflation Rate	Raw Inflation Rate (FY 03 Base Year)	Raw Inflation Index (FY 03 Base Year)
2002	1.7%	98.72%	0.9872
2003	1.3%	100.00%	1.0000
2004	1.7%	101.70%	1.0170
2005	1.8%	103.53%	1.0353
2006	1.9%	105.50%	1.0550
2007	1.9%	107.50%	1.0750
2008	1.9%	109.54%	1.0954
2009	1.9%	111.63%	1.1163

Table 3

Raw Indices

The far right hand column of **Table 3** provides a ***raw index*** which relates the price level for each fiscal year to a "base" year, which in this example is 2003. This **compounds** the yearly incremental price increase over the prior year such that the inflation relationship between FY 2003 (base year) and any other year can be shown in a single number. It is obtained by multiplying the price level index for the prior year (1 or 100% is always assigned for the base year) by the price level rate of increase for the subsequent year. In Table 3, the price level in 2007 is predicted to be 7.50 percent higher than the price level in the base year 2003. This process is analogous to receiving interest on a savings account at the bank. In addition to being used to compute the weighted indices below, raw indices are also used to convert a constant dollar estimate from one base year to another base year for comparison with other programs. For example, if Program A's cost estimate was done in constant FY 2003 dollars and Program B's cost estimate was done in constant FY 2005 dollars, we could either convert Program A's estimate to FY 2005 constant dollars or convert Program B's estimate to FY 2003 constant dollars using the raw index to produce an "apples-to-apples" comparison.

The following example (**Table 4**) shows how you would convert the cost estimate for a program from FY 2003 constant dollars to FY 2005 constant dollars:

ABC Program - Cost Estimate
Conversion FY 2003 Constant $ to FY 2005 Constant $
($ Millions)

	2002	2003	2004	2005	2006	2007	2008
FY 2003 Constant Dollars	50.000	60.000	70.000	70.000	60.000	50.000	40.000
FY 2005 Raw Index Inflation Factor	1.0353	1.0353	1.0353	1.0353	1.0353	1.0353	1.0353
FY 2005 Constant Dollars	51.765	62.118	72.471	72.471	62.118	51.765	41.412

Table 4

Weighted Indices

Weighted indices take into account the historical outlay pattern of the appropriations and inflation rates associated with the fiscal year(s) when cash flows out of the U.S.Treasury (outlay). We use the weighted index to convert constant dollars into ***then-year dollars***. Then-year dollars are used for program and budget documents and they are the type of dollars used in the FYDP. Combining the inflation rate data from **Table 3** with the historical outlay pattern for Navy aircraft procurement from **Table 2**, we can compute the inflation-adjusted forecast needed for the total FY 2003 aircraft buy. This is done in **Table 5**, which shows that instead of the $100 million required for this aircraft purchase with no inflation, we really need $102.62 million in then-year dollars. Inflation acting on the future outlays (costs incurred) has added - in this example - $2.62 million to the expected cost of this aircraft purchase.

Applying Escalation Methodology (Dollars in Millions)
Aircraft Procurement, Navy

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
(a) Procurement Price Index (raw index)	1.0000	1.0170	1.0353	1.0550	1.0750	1.0954
(b) Outlay rates for Aircraft Procurement Navy	0.1600	0.3950	0.3220	0.0590	0.0410	0.0230
(c) Price Escalated Outlays **(a x b)**	0.1600	0.4016	0.3333	0.0622	0.0440	0.0251
(d) Sum of Price Escalated Outlays (weighted index) **(sum of line c)**	1.0262					
(e) FY03 Lot Cost in CONSTANT FY03 dollars	$100.00 M					
(f) Budget Entry for FY03 in THEN YEAR dollars **(d x e)**	$102.62 M					

Table 5

Computation of the inflation premium, while complex, is purely mechanical. Of greater concern is the validity of the inflation projections for future years made by the President's Council of Economic Advisors (CEA) and promulgated by the Office of Management and Budget (OMB). DoD must (in normal circumstances) use these projections in the program and budget formulation processes. However, the CEA's inflation numbers are not free from political forces. Officially published inflation predictions tend to become self-fulfilling prophecies, particularly if they are large. They will be used in contract negotiations and other arenas which affect future costs and compensations. Therefore pressure is on the CEA to project the lowest possible rates of inflation - perhaps rates below those actually predicted by their econometric models. Actual inflation rates that exceed those used in the DoD budgeting process can contribute significantly to acquisition program cost overruns relative to budgeted amounts.

The PM will rarely have to actually compute an inflation factor, if ever. Each component publishes escalation indices to be used in preparing budget submissions, usually in January each

year. A sample is shown in **Table 6**. A simple application of the appropriate fiscal year's weighted index is all that is necessary to complete the forecast.

AIRCRAFT PROCUREMENT, NAVY - ESCALATION INDICES
BASE YEAR: MID-FY 2003
(Sample, for training purposes only)

Fiscal Year	Inflation Rate %	Raw Index	Weighted Index
2000	1.40	0.9535	0.9780
2001	1.80	0.9707	0.9937
2002	1.70	0.9872	1.0091
2003	1.30	1.0000	1.0262
2004	1.70	1.0170	1.0449
2005	1.80	1.0353	1.0646
2006	1.90	1.0550	1.0849
2007	1.90	1.0750	1.1055
2008	1.90	1.0954	1.1265
2009	1.90	1.1163	1.1479

Table 6

The following example (**Table 7**) shows how you would convert a FY 2003 constant dollar cost estimate to then year dollars for use in the Program/Budget:

ABC Program - Cost Estimate
Conversion FY 2003 Constant $ to Then-Year $
($ Millions)

	2002	2003	2004	2005	2006	2007	2008
FY 2003 Constant Dollars	50.000	60.000	70.000	70.000	60.000	50.000	40.000
Weighted Index Inflation Factor	1.0091	1.0262	1.0449	1.0646	1.0849	1.1055	1.1265
Then-Year Dollars	50.455	61.572	73.143	74.522	65.094	55.275	45.06

Table 7

SUMMARY

Many things need to be considered when building a program budget. For each of the various program efforts, we must determine work content, time-phasing, expected costs, and the proper appropriation to be used. For each appropriation we plan to request, we must apply the relevant funding policy (annual, incremental, or full funding) and consider any exceptional circumstances (e.g., advance procurement or multiyear procurement) to properly time-phase the budget request. In addition, we must ensure that the correct escalation indices are applied to convert cost estimates prepared in base-year dollars to budget estimates submitted in then-year dollars.