IPPD—One Year After

Untapping the Ingenuity of People

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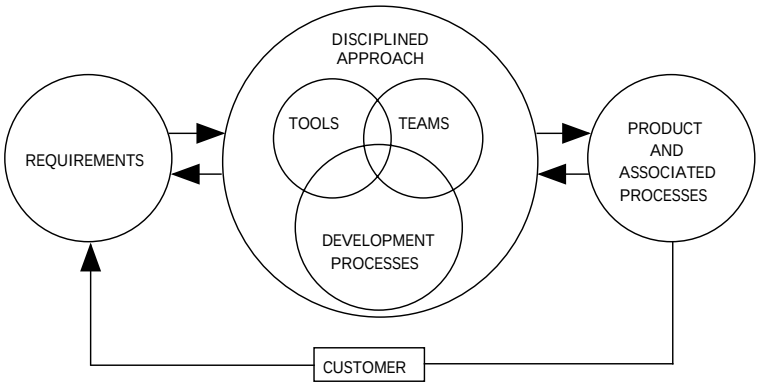
A little over one year ago the Secretary of Defense, Dr. William J. Perry, promulgated a new and different management approach for the Department called Integrated Product and Process Development (IPPD). This decision was based on industry and government successes with IPPD.

Perry outlined that the IPPD approach would be applied to the Department of Defense (DoD) Acquisition System for acquiring goods and services for our warfighters. This new way of doing business is characterized by simultaneous development of a system's products and associated life-cycle processes with an objective of reduced acquisition time, reduced cost, and optimized products.

SE Directorate Established

With the adoption of IPPD within the Department, the Principal Deputy Under Secretary of Defense for Acquisition and Technology, R. Noel Longuemare, directed the establishment of the Systems Engineering (SE) Directorate within the existing Test and Evaluation Directorate, led by John Burt. The SE Directorate was established to foster the development and use of systems engineering principles and practices as well as to implement IPPD within the Department. Within months, the Director, Test, Systems Engineering, and Evaluation (DTSE&E) published a *DoD Guide to IPPD*.

Figure 1. A Generic IPPD Iterative Process



About the Guide

Version 1.0 was published in February 1996. Widely distributed, the Guide is now available on the Internet:

http://www.acq.osd.mil/te/survey/survmain.html

Outlining in detail the DoD IPPD Process, this generic process, as shown in Figure 1, was constructed from research within the government and industry. Specifically, it described the components/elements of a disciplined IPPD approach to organizing tools, teams, and processes to meet the customer's product requirements. The document outlines the key tenets of the process and cites from experience some examples of obstacles encountered when IPPD is implemented. Specifically, the Guide discusses the need for early involvement of all disciplines such as design, manufacturing, configuration management, quality, test, logistics, finance, operations, disposal, etc.

IPTs, Industry, and PMs

The Guide also discusses the establishment and use of integrated product teams (IPT) as a key tenet to the implementation of IPPD, which provide for improved communications and the untapping of the ingenuity of people to improve the design of both the product and its associated process.

In April 1996, the Director of SE requested an additional review of the Guide by industry to gain further insight into how to improve its content and overall ability to communicate the Department's thinking. Industry suggested minor modifications, but gave the Guide high marks overall. A recent survey conducted by the Department of selected Program Managers (PM) revealed that IPPD is alive and well among those solicited acquisition programs from across the Services. One

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PM was quoted as stating that the IPPD/IPT process "saved my program." Other examples provide additional evidence of better, faster, cheaper acquisitions as a result of IPPD:

- A major fighter aircraft program reported a 10-percent reduction in development costs, a 50-percent reduction in engineering change proposals, and reduced rework/repair/scrap by more than 50 percent.
- A navigation system program reported reduced manufacturing costs by more than 40 percent and life-cycle costs by more than 25 percent.
- A major Navy program, which is following in the footsteps of the Boeing 777, is relying solely on computer-based design. The program IPTs are using leading edge design, manufacturing, and engineering technologies to reduce cycle time and development costs.

As stated in the *DoD Guide to IPPD*, the IPPD process involves three major components: tools, teams, and processes.

Tools, highlighted in the Guide, are helpful aids that are available to assist PMs in managing and developing certain elements of their programs. As defined in the Guide, tools include management, organizational, analytical, measurement, and design tools—all of which assist in the development of programs. Tools highlighted include information technology and decision support aids, integrated master schedules, design for manufacturing, rapid and virtual prototyping, modeling and simulation, CAD/CAE/CAM, metrics, cost models linked to process simulations/activity-based costing, development process control methods, and earned-value management.

Teams, made up of everyone who has a stake in the outcome or product (i.e., IPTs), are fundamental to the integrated development of the products and associated processes that represent best value solutions, and to resolving issues as early in the system development as possible. The Guide discusses program-level IPTs made up of both government and contractor representatives who are responsible for actual program implementation. A complementary document, *Rules of the Road—A Guide for Leading Successful Integrated Product Teams*, provides a discussion of oversight IPTs.

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Development Processes are those activities that collectively lead to the definition of the end product and its associated processes (e.g., manufacturing, support, etc). Application of a systems engineering process, such as that depicted in Figure 2, is fundamental to IPPD. It is through the SE process, within an IPPD context, that the requirements are translated into a product design and its associated processes.

The Customer's Role

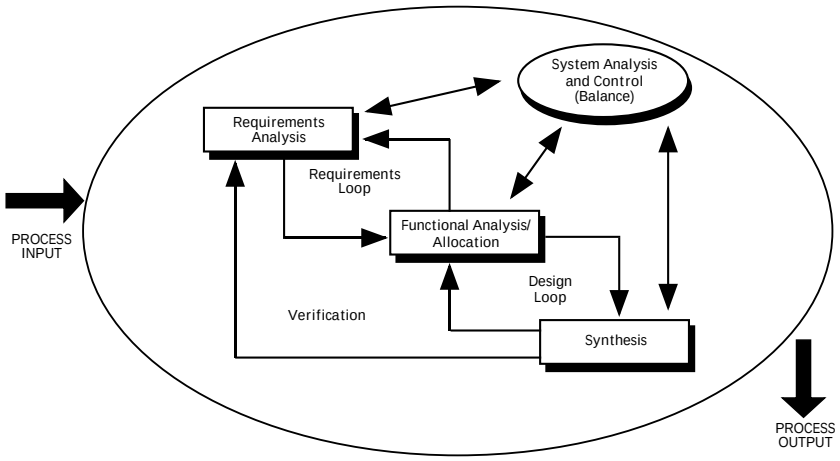
The Guide highlights the *customer's* role as being key to the success of the IPPD process. The customer originates the requirements and must be involved in all team actions and, most importantly, all the feedback actions to close the loop. *The customer is the ultimate authority regarding the product requirements.*

The Guide provides the first step by the Department to define the basic framework for use of IPPD with IPTs along with the use of Systems Engineering. The challenge now is to institutionalize these concepts and relationships throughout the Department. Thousands of DoD employees in the acquisition workforce need this information and need it quickly if they are to become active, value-added participants in the acquisition process.

Getting the Word Out

The primary vehicle for training in the Defense acquisition workforce is the curricula offered through the Defense Acquisition University (DAU) con-

Figure 2. Systems Engineering Process



sortium. However, there is an urgent need for widespread training that cannot be accommodated through the normal training process. Therefore, efforts are underway to supplement current training opportunities with mass distribution of a video and/or CD-ROM series on the fundamentals of IPPD.

With the first year's success of the Guide, DTSE&E has embarked upon a program to develop an IPPD Handbook as an enhancement to the Guide. This Handbook, to be completed by the end of this calendar year, will further expand on the IPPD Process, the Systems Engineering Process, and the integration of both of them into the Acquisition Process. This is a large undertaking to adequately explain how these three processes interact with and support each other. The Handbook will expand discussions on the attributes and characteristics of selected acquisition tools; will discuss principles of organizing, educating, and training teams; and will explain why processes are so important in the program. Finally, and probably most important, the Handbook will focus on several case studies currently being written that will contain not only lessons learned in the application of IPPD, but also highlight detailed examples of the positive and practical implementation of tools, teams, and processes used by existing programs.

What Lies Ahead?

So, one year after the Secretary's IPPD process promulgation, there is no question that IPPD is the overall management approach being supported by IPTs within the Department of Defense. The DoD has made significant progress toward establishing an environment that allows industry to excel using IPPD, and the acquisition workforce to effectively participate in IPTs. There will be more to come over the next year to further enhance the Department's ability to exploit the full potential of IPPD in the DoD acquisition process.

What Makes A Successful Acquisition Program?

Maj. Art Greenlee, USAF

As part of a Principles of Program Management block of instruction for the Advanced Program Management Course (APMC) 96-2 at the Defense Systems Management College, students were asked to answer the question, "What Makes A Successful Acquisition Program?" Their responses are revealing and relevant to the entire professional acquisition workforce. Separated into 10 categories—No. 1 being the most frequent response, No. 2 the next most frequent response, etc.—the bullets under each category represent actual responses from APMC students.

1. Meets Warfighter's Requirements
   - Meets user's needs.
   - Demonstrates combat capability.
   - Delivers product/service that meets user needs.
   - Better equipped/more survivable force.
   - Introduces new capability that works.
   - Enables soldier, sailor, marine, or airman to accomplish mission.
   - Achieves Operational Requirements Document/user requirements.
   - Passes Operational Test.
   - Satisfies customer.

2. Meets Cost and Schedule Objectives
   - Affordable, meeting enough user requirements (read Cost As an Independent Variable).
   - Timely = Initial Operational Capability or better.
   - Stable resources and funding.
   - Delivery on time, under budget.
   - Funding there when you need it.
   - Don't get your budget cut.

3. Competent Leadership
   - Competent Program Manager.
   - Program Manager, Program Executive Officer, Component Acquisition Executive, Overarching Integrated Product Team, Defense Acquisition Executive politically astute.
   - Doesn't get fired.
   - Avoids past mistakes.
   - Ability to balance cost, schedule, and performance.

4. Politics
   - Congress—jobs, funding, satisfaction.
   - Program gets needed support at all levels.
   - Satisfies political interests.
   - Avoids Washington Post.
   - Taxpayers satisfied, national will increased.

5. Well Planned and Executed Program
   - Sound strategy.
   - Innovative plan/execution.
   - Accommodates growth/P^3I.
   - Uses open systems architecture.

6. High-performing Teams
   - Teamwork at all levels.
   - Integrated Product Team synergism.
   - Streamlined oversight.
   - Communication.

7. Effective Management of Risks

8. Good Contractor
   - Good contractor/government partnership.

9. Program Supportable

10. Mature, Stable Design

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