JPL JIT OPERATIONAL CONCEPT DOCUMENT

1.0   INTRODUCTION

1.1   Background

The Jet Propulsion Laboratory is the lead NASA Center for planetary exploration, a federally funded Research & Development Center. JPL spends millions of dollars annually on items consisting primarily of large volume, low value purchases of office supplies, paper goods, chemicals, miscellaneous electrical and mechanical parts, and microcomputer hardware, software, and peripheral equipment.

Prior to the JIT system, these goods were purchased and delivered to JPL customers primarily through a conventional purchase requisition system. Customers would prepare a purchase requisition for the item, the request would then be converted to a purchase order by the JPL Acquisition Division. To reduce the volume of small repetitive purchases and to provide faster service, some high volume purchases were handled through pre-negotiated Blanket Purchase Agreements (BPA) with selected vendors. The frequently requested products would then be purchased in larger quantities and stored on-site to be distributed to JPL customers on demand.

In order to lower the operations cost, reduce inventory, and increase the speed of delivery of commodities to its customers, JPL implemented a Just-In Time (JIT) Materiel Acquisition System in 1995. JIT differs significantly from existing Purchase Order, BPA and stores system, in that JPL and the vendors enter into an arrangement where the vendors will manage the inventory of selected commodities and deliver these to JPL on an expedited (or JIT) basis. JIT provides its customers with automated access to vendors that will deliver commodities to JPL on demand.

The JPL JIT acquisition system currently processes approximately 42,000 requests per year, which has significantly reduced the items stored on-site in the JPL Stores Facility. Presently, the JPL Stores Operation stocks approximately 6400 inventory items with a total value of about $1 million.

JIT improves the speed of delivery, provides cost savings, and encourages the development of long-term positive relationships with vendors. Such a commitment can be accomplished by creating an environment of openness and trust that fosters a shared interest and vision between JPL and its vendors. Benefits will accrue for both parties because it will be a mechanism for the continuous improvement of the vendor's performance, products, and service, and JPL's procurement process, customer satisfaction and productivity.

2.0   SYSTEM OVERVIEW

The Just-In-Time Materiel Acquisition System (JIT) supplements the existing procurement processes used to buy low cost materiel items at JPL. The goals were accomplished by re-designing the procedures used to acquire low cost items and then by

automating various portions of the acquisition process. The implementation of JIT modified six distinct acquisition processes:

a.   Request for an acquisition action by JPL customers.
b.   Award and placement of a procurement with a vendor.
c.   Order fulfillment by the vendor.
d.   Vendor delivery.
e.   JPL Shipping and Receiving.
f.   Vendor payment.

In addition to modifying these acquisition processes, the JIT system has extensive reporting capabilities to facilitate the gathering and use of data needed by any organization that needs the information.

The ability to order products on the JIT system is available to any certified JPL employee. Certification is obtained through a training and examination process at JPL. Because there are many products available to order throughout the system, access will be controlled at the specific catalog level. For example, an employee may be certified to order office supplies but not chemicals. Access to the JIT program will be through personal computers or terminals via the ILAN. The system uses Human Resources Management System (HRMS) data files and an access control database to provide the necessary level of validation required for each type of order. However, product catalogs will be available for browsing by any employee via an internal internet access.

2.1   Key elements

The JIT system allows any JPL employee to search on-line product catalogs. Certified users enter orders through an on-line order entry system. Orders are electronically transmitted directly to the vendor through the use of Electronic Data Interchange (EDI). For vendors that do not have a bar code capable order entry system, JPL will provide the label specifications for use with the JIT receiving system. The vendor can obtain commerically available bar-code labelling software. The vendor will affix to each container before delivery to the JPL central receiving dock within the specified time limit.

The JIT system provides the following capabilities:

a.   A computer interface for all certified users to allow the electronic ordering of products for any JPL employee.
b.   An electronic catalog.
c.   The ability to order on any open account.
d.   Paperless electronic receiving using bar coded labels at the central receiving area with wands to scan items received.
e.   The capability to pay vendors using evaluated receipts.

3.0 SYSTEM FUNCTIONS AND CHARACTERISTICS

3.1   JIT key success factors

Just-In-Time is a supply concept that relies on close coupling between the customer, order taker, vendor, and the deliverer. The rapid response of JIT results from the integration of all processes in the supply chain. As a result, the JIT system is not primarily a computer system, but instead uses a computer as the "glue" to combine business processes in a seamless chain.

Some of these business practices that will support JIT include:

a.   A strong JPL/vendor relationship built on a mutual system of openness and trust.
b.   Responsibility for quality control shifts from the receiving and delivery processes to the customer. The customer will be responsible for product inspection and acceptance.
c.   Authority to order will only be granted annually rather than each time an order is placed.
d.   The ordering and delivery processes will be simplified to be faster and more accurate.
e.   Orders will be complete on receipt to allow for rapid payment.
f.   The system is catalog based and will be managed by JPL and the vendor.
g.   Payment will be paperless and not require vendor invoices.

3.2   JIT process flow

The following sections discuss the operation of each step of the JIT process.

3.2.1   Order entry

The order entry process will be on-line. Each certified user will be given access to the JIT server through a network connection, and can browse the product catalogs or place orders for themselves or others.

3.2.2   Order fulfillment

Once an order is entered, the JIT computer converts it into an Electronic Data Interchange (EDI) transaction and uploads the order to a Value Added Network (VAN). The vendor will download new transactions using the bar code labelling software, print a bar coded label to be affixed to every carton for delivery. The vendor will have the ability to select the number of cartons for an order to indicate the number of items delivered. If the vendor has an order entry system with EDI and bar code capabilities, JPL will provide specifications for the

information to be included on the label. The detailed process flow is shown in Figure 1.

3.2.3 Receiving and delivery

The JPL Shipping & Receiving Department is equipped with the hand-held bar code scanners for receiving. Each package received through the JIT system will be required to have a bar coded label. JPL will not accept shipments of less than the complete order quantity – no minimum quantities.

3.2.4 Vendor payment

The JIT system pays vendors through a process called Evaluated Receipt (matching the Material Release order number to the receipt of the scanned product). The JPL financial system will pay by matching orders and receipts without a vendor invoice. The financial system will automatically match orders with receipts which will be used as the basis for payment. Because all orders are defined to be complete on receipt, there is no need for partial or suspended payment. This system will allow JPL to pay JIT vendors within 10 days after receipt of an order. Any customer returns received after the 10 day period will be handled by an internally generated debit memo that will automatically post a debit on a future remittance advise.

Figure 1. JIT Vendor Order Fulfillment

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┌─────────────────────────────┐
│  Vendor dials into EDI VAN  │
│ and downloads all new orders│
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ Using software and equipment│
│ at vendor site print pick ticket│
└─────────────────────────────┘
              │
              ▼
           ◇ Minimum ◇ ──────────►  ┌──────────────────┐
           ◇ Order - No ◇           │ Hold order until │
                                     │    complete      │
                                     └──────────────────┘
                                              │
                                              ▼
         ┌─────────────────────────────────────────────┐
         │ Using software and equipment at vendor site.│
         │      Select number of units to ship         │
         └─────────────────────────────────────────────┘
                          │
                          ▼
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Using software and equipment at vendor site
    Select number of containers for order
    Print overwrap label if multiple orders in one container
    Print label for each item/package
      In human-readable form:
            -recipient name
            -phone number
            -delivery address
            -route
            -hazardous material flag (if applicable)

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┌─────────────────────────────┐
│ JIT receiving scans label(s) with │
│     hand-held bar scanner   │
│      Upload delivery data   │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│   JIT computer logs receipt │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Payment made within 10 days to │
│           vendor            │
└─────────────────────────────┘
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