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(NASA-CR-179395) PROBIS (FEDCUREMENT MANAGEMENT INFORMATION SYSTEM) Final Report
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PROMIS Final Report

PROMIS (PROcurement Management Information System) provides both detailed and summary level information on all procurement actions performed within NASA's procurement offices at Marshall Space Flight Center (MSFC). It provides not only on-line access, but also schedules procurement actions, monitors their progress, and updates "Forecast Award Dates". Except for a few computational routines coded in Fortran, the majority of the system is coded in a high level language called "NATURAL". A relational Data Base Management System called ADABAS is utilized. Certain fields, called descriptors, are set up on each file to allow the selection of records based on a specified value or range of values. The use of like descriptors on different files serves as the link between the files, thus producing a "relational" data base.

Twenty related files are currently being maintained on PROMIS. The PRMS-PLAN file consists of Procurement Requests in the planning stage. Management and Negotiators can use the information on this file to facilitate the generation of schedules for measuring the progress of procurement activities. New Procurement Requests (PR's) are stored on the PRMS-PR-OPEN file. Type Procurement Action (TPA) codes are used to generate milestone
dates for the accomplishment of the steps involved with processing a PR, from initial receipt until it is awarded to a Contract and/or Purchase Order (KPO). When a PR is awarded to a KPO, or canceled, the PR then moves to the PRMS-PR-CLOSED file.

Basic vendor information is stored on the PRMS-VENDOR file which is part of the vendor subsystem. The PRMS-VENDOR file stores data such as address, business size, commodity categories, date last solicited, date last selected, etc. Files related thru the use of the descriptor VENDOR-CODE include PRMS-SOLICIT (solicitation), PRMS-VENDOR-COMM (commodity codes), and PRMS-VENDOR-FOI (fields of interest). Commodity and Field of Interest files are related to the PRMS-COMM-FOI-TABLE where code descriptions can be obtained. Vendor profiles gained thru the relational use of these Vendor files, are used by buyers and negotiators to help with their selection process.

After a vendor has been selected, the PR is awarded to a KPO and will be stored on one of three files. The PRMS-ACONTRACT file contains contract information, the PRMS-CON-MOD file contains contract modification information, and the PRMS-PO-OPEN file contains Purchase Order (PO) information. These files are related to the PR-CLOSED file thru descriptors common to all the PR files and KPO files such as CONTRACT-NUMBER, and CONTRACT-MOD-NUMBER. The VENDOR-CODE field shared by the PR files, the KPO files, and the VENDOR files links the files to each other. Information from the PRMS-BUYER-TABLE is obtained for each PR and each KPO thru the common descriptors BUYER-CODE (PR's), CONTRACT-ADMIN-CODE (Contracts and mods), and PO-ADMINISTRATOR-CODE (PO's). TPA Code
and Procurement Placement (PP) Code information for KPO's and PR's is accessed thru the TPA and PPC fields on the PRMS-TPA-PP file.

Upon completion of performance, or delivery of merchandise, final payment is made for the KPO, and it moves to its respective closed file: PRMS-ACONTRACT-CLOSED, PRMS-CON-MOD-CLOSED, and PRMS-PO-CLOSED. KPO's are transferred from the Closed files to the PRMS-KPO-HISTORY after two years. These files are related to PR files, Vendor files, TPA file, Buyer file, etc. thru the same fields as the open KPO files.

PROMIS has two other files: PRMS-SECURITY, which identifies the privileges a user enjoys, and PRMS-DOCUMENTATION, which contains all related documentation. Access to PROMIS, made possible thru the utilization of ADABAS, makes it a powerful Management Information System. It has several functions and capabilities that make it a useful tool.

PROMIS has five broad functions and/or capabilities. It has modules for the update and maintenance of all the files, on-line inquiry and reporting, batch reporting and production scheduling, self-contained security system, and documentation. The earliest function that was developed in PROMIS is the update/maintenance feature.

One of the most useful update features is PR tracking. Automatic scheduling of major procurement milestones, calculation of schedule variance, and automatic rescheduling of remaining milestones to account for variances are the major functions of the PR tracking module. Seven numbered milestones mark the major events that PROMIS can automatically schedule:
1. Procurement Package Received
2. Solicitation Issued
3. Proposal Received
4. Technical Evaluation Complete
5. Price Analysis Complete
6. Negotiation Complete
7. Award

Depending on the TPA and estimated amount of the anticipated award, standard lead times are established to provide the mechanism of generating the schedule for each PR received. The TPA is represented by a 3-digit code with an optional fourth position which, if used, is an alphabetic character.

The first two digits must be input to the system in order to have a schedule generated. The third digit is determined by the system based on the estimated amount entered in the PR record (and is dependent also on the first 2 digits).

Each TPA has an associated "lead time" matrix. The matrix contains the number of calendar days normally required to progress from each milestone to the next for various sizes of procurement. Generally the higher the estimated amount, the longer the lead time. Moreover, for procurements over $5 million, a flag must be set to indicate whether NASA Headquarters approval is required.

For some TPA's, not all milestones are applicable. Small purchases (generally less than $25,000) are usually satisfied by issuing a Purchase Order. In this case, only milestones #1 and #7 are of management interest, thus #2 thru #6 contain the same scheduled date as milestone #7.
There are two schedule generation routines in PROMIS. Both use the standard lead time matrix. One of the routines (MSCALC) uses the PR received date for milestone #1, along with the first digits of the TPA Code, estimated amount, and headquarters approval flag, and returns the scheduled dates for milestones #2 and #7.

The system performs an edit to disallow invalid weekend or holiday dates. All generated dates follow the same restrictions. In those cases (as often happens) where the standard lead would cause a milestone to be scheduled to fall on a non-workday, it is scheduled to occur on the first workday following that date. The total length of the schedule may exceed the sum of the individual lead-times in the matrix by several days because of the frequent need to move a milestone past a weekend or holiday.

In addition to the schedule generators, the system also calculates a schedule variance. This calculation is made in terms of number of working days late. By taking this definition, all variances can be compared on an equal basis.

The design logic calls for the remaining milestones to be rescheduled after the recording of each milestone actual date to account for variance for scheduled date, i.e. if milestone #2 actually occurs 5 working days later than originally scheduled, then each of milestones #3 thru #7 will be rescheduled to occur exactly 5 working days later than originally scheduled.

To keep the system current, rescheduling is done on a daily basis for each open PR whose "next scheduled/rescheduled" milestone date has past. This is accomplished by running a daily program to interrogate each PR record in the open file. For each
record it locates the first scheduled/rescheduled milestone date that does not have a corresponding actual date. If the rescheduled date is later than today's date, then bypass the PR. If the date has past, the number of workdays that have elapsed from the rescheduled date until today is computed. This number is then totaled with stored variances from earlier milestone. The total is then used with the original scheduled dates for every subsequent milestone (the milestone that is currently late will not be adjusted) including the projected award date milestone #7.

Another major function of the PROMIS update/maintenance module is the vendor sources system. The bidders on the vendor source system exist in order to complement the bid list selection process. Companies interested in obtaining business from MSFC submit a SF 129 form which contains all of their business commodities and/or fields of interest. PROMIS will provide interactively all businesses or fields of interest. Options to help select sources include:

1. Three ranges (from & thru) of commodity codes.
2. Three ranges (from & thru) of fields of interest codes.
3. Five sphere of interest codes (applies only when requesting a particular field of interest).
4. Three city and state restrictions.
5. Three business code restrictions (such as Small, Large, Non-profit, Government Agency, etc.)
6. Selection of minority and/or woman owned businesses.
When sources are viewed, the requester has the option of printing all sources who meet the selection criteria, or requesting a particular number of sources and rotating those selected to the bottom of any selection criteria they meet. The list is always (for a particular selection criteria) presented in oldest "last date selected" order. This date is changed if an award is made to a vendor, in response to a solicitation, or when a request is made for a rotated source list.

The system bypasses vendors classified as "debarred" or "inactive". The vendor sources option is intended to provide a rotation method of soliciting vendors to bid on a particular procurement, not to aid in the selection process. The vendor profile aids in the selection process.

Vendor profiles consist of pertinent statistical, historical, award, and current information that is recorded for each vendor:

1. Solicitation information is recorded from the solicitation, bid, and response information report. A summary by year of bid response information is recorded for each vendor.

2. Award information (by PR, Contract/Grant, or PO number) is maintained from 1978 to current date.

3. All information provided by SF 129 form relating to addresses, commodities, fields of interest, business type is also available.

Award processing is another PROMIS update/maintenance function. The logical flow of actions and documents is such that
a single PR may result in the award of several PO's. or conceivably, multiple Contracts or Grants. Conversely, many PR's may be satisfied as the result of a single award of a Contract or modification (Mod). Moreover many PR's are closed (satisfied) by adding their requested items and committed amounts to open PO's flagged as "charge accounts".

As implemented in PROMIS, the award processing function allows the user to specify all the PR numbers that are to be closed in the process of awarding a particular contract, mod, or PO. After the PR's are closed, a record will be created and added to the appropriate file: i.e. ACONTRACT if a contract or grant is awarded, CON-MOD if a contract modification is made, or PO-OPEN if a PO is issued (awarded) or modified. The exception to this flow occurs in three special cases:

1. With charge accounts where the PO will already exist, the PR record will be moved to the PR-CLOSED file, and the committed amount from the PR will be automatically added to the obligated amount on the PO record.

2. With split PR's where several awards are to be made, the PR will be added to the PR-CLOSED file after the award and also remain on the PR-OPEN file awaiting the next award. Designated amounts are subtracted from the committed amounts on the PR-OPEN record and become obligated amounts for the award record. Once the money is depleted and "F" or "final" award is submitted, the record is deleted from the PR-OPEN file.
3. The third special case occurs when the buyer wishes to remove the PR from the open file due to the issuance of an "Action", "Stock", "Memo", or "Cancel". When the appropriate option is selected the PR is added to the PR-CLOSED file and removed from the PR-OPEN file without any "award" type files being updated.

PROMIS also has the ability to track administration of KPO's and mods thru closeout. Once a KPO has been awarded, the administrator can modify the contract or PO thru the issuance of a modification (mod). Mods are necessary for any changes made to original KPO's such as Scope of Work changes, performance period changes, and increases or decreases to negotiated values or obligations. The letters "A" thru "M" in the STAGE field of a KPO allows the tracking thru several status milestones. Each letter, which represents a different stage, accompanied by a date (except "A" "Current") is entered in order to know the present status of that particular KPO.

When a contract becomes administratively complete, it is passed on to the closing manager (often the same as the administrator), an administratively complete date is entered, and an appropriate stage letter is entered. Upon physical completion, the date is entered, and when final payment is made the KPO moves to the appropriate closed file. All records are transferred and retained on a history file after being closed for two years. PR's and their related KPO's or mods are tied into one record and cannot be updated or removed from this file.
In addition to the update/maintenance functions, PROMIS has an on-line inquiry/reporting module. This subsystem allows an individual to get any piece of information from any of the files without knowledge of either the file structure or programming. The inquiry system is menu driven with all of the files listed utilizing choices of "A" thru "V". Users have one of three options: a list of records can be displayed listing a few selected fields, a series of records can be displayed individually in detail, or a single record can be displayed with all related details. This "User Friendly" inquiry system can also be used to format reports using the same options. These reports can be of any format selected by the user, and therefore save an incredible amount of programming time. Reports are launched to a remote printer of the user's choice, and can be picked up within minutes.

The value of this inquiry subsystem is that it gives the user the capabilities of a programmer. Selection of data is the first option offered to the user. On this first menu is a list of files from which to choose. This is equivalent to the "FIND" or "READ" statement. After the appropriate file has been selected, the user is then presented with a data selection screen. This allows the choice of from and thru field values without the user having any understanding of Boolean logic, or inclusive or exclusive "and's" or "or's". The selection of data, in most cases, is in direct correspondence to the use of descriptors. However, the ADABAS "reject" statement is used for dollar amount selection and calculated fields such as "Days ahead/behind schedule".

After the data selection criteria string is completed, a field selection screen is presented to the user. All available
data found on the file is contained on this screen. This provides the user with a "roll your own" report generator. The user may specify what fields are to appear on the screen or on a hard copy printout. While paging thru the data interactively, the user may wish to select one record and view its entire contents. This can be easily accomplished at any time. Also unique in this PROMIS system, is the ability to page forward or backward, select any starting point, or select a total page at any time.

Help is provided for all screens at any time to assist the user with all PROMIS functions. Educated users may use advanced functions such as "PF" keys and keying different menu selections to move rapidly thru different types of data. It is an extremely powerful yet "simple to use" tool.

Also available is the function whereby a buyer may select a particular record to be updated. PROMIS security insures that buyers may only update their own records. Security also allows buyers to update only selected fields such as actual milestones, estimated dollars, and remarks.

PROMIS also provides an on-line batch submission of "canned" or scheduled production reports. Menu selections are provided for daily, weekly, monthly, yearly, or unscheduled production lists from which users can make any selection. Naturally, these functions are controlled by PROMIS security. After a user selects a particular report to be submitted to the batch queue, a screen is provided showing the job to be submitted, default dates based on run frequency (which may be changed), and default report distribution which may also be changed. Report distribution can be routed to:
1. The system printers available on the IBM 3083.
2. Any printer on any node in the MIS network.
3. The Xerox 9700 publishing system.

As each job is submitted, the on-line information is updated to reflect who last submitted the job, the date of submission, and the time. When each job completes, the time is also recorded and available for inquiry. This negates the need for "babysitting" to insure correct completion of each job.

The following is a brief description of the production reports:

A. DAILY

1. PRDB010D - PR Balance Report: Provides balanced reporting of all PR's entered for the day.
2. PRDB020D - PR 1850-1 Labels: Automatic turnaround documents to status milestones for open PR's.
3. PRDB030D - Shuffle: Moves Final Paid KPO's and their mods to the closed files.
4. PRDB040D - Fluff: Reschedules all unaccomplished milestone dates due prior to the current day.

B. WEEKLY

1. PRPQ034W - Lists all open PR's greater than $100,000.
2. PRSR030W - Lists all open PR's Overall.
3. PRSR040W - Lists all open PR's by Division.
4. PRSR050W - Lists all open PR's by Branch.
5. PRSR050W - Lists all open Pr's by Group.
6. PRSR010W - Workload and Production: Summary by Branch and Division.
7. PRSR020W - Buyer Status: Summary of all actions current, week-to-date, and year-to-date.
8. PRSR043W - Cross reference of active KPO's by PR.

C. MONTHLY

1. SUPAR - Status Unilateral Procurement Action Report: provides a set status of all unilateral actions by selected projects.
2. SUPAR20 - 20/20 Spread Sheet File: Provides a downloaded spreadsheet file to 20/20 for graphs, charts, and multilevel reports.
3. PRB200BM - Lists all active PR's by Division.
4. PRB200CM - Lists all active Pr's by Branch.
5. PRSR030M - Lists all open Contracts Overall.
6. PRSR031M - Lists all open Contracts by Division.
7. PRSR032M - Lists all open Contracts by Branch.
8. PRSR033M - Lists all open Contracts by Group.
9. PRSR034M - Lists all open Contracts by Buyer.
10. PRSR035M - Lists all open PO's Overall.
11. PRSR036M - Lists all open PO's by Division.
12. PRSR037M - Lists all open PO's by Branch.
13. PRSR038M - Lists all open PO's by Group.
14. PRSR039M - Lists all open PO's by Buyer.
15. PRSR040M - Lists all final paid KPO's.
16. PRSR041M - Lists all expiring Grants.
17. PRSR042M - Lists all History KPO's.
18. PRSR043M - Lists History KPO's by PR.
19. PRSR044M - PR action detailed by Division.
21. PRSR046M - Contract closeout file generator.

D. QUARTERLY

1. PRCA010Q - Lists basic Contracts by age/PP/negotiated value.
2. PRCA020Q - Lists basic PO's by age/PP/negotiated value.
3. PRMDR03Q - PMDR query: Procurement Management Data Report for Headquarters.
4. PRPE025Q - Lists open KPO's by Contractor.
5. PRPE006Q - Lists open KPO's by Division.

E. ANNUAL

1. PRPQ028A - Lists open KPO's by geographical area.
2. PRPQ029A - Lists closed KPO's by geographical area.
3. PRPQ016A - Lists open KPO's by contractor for Alabama.
4. PRPQ019 - Lists closed KPO's by Contractor.
5. FYHISCO - Transfers Contract and PR records to the History file and deletes them from the PR closed file.
6. **VENFYUPD** - Updates the Vendor file with solicitation information.

**F. UNSCHEDULED PRODUCTION**

1. **PRPM010U** - Lists Prime Contractors.
5. **PRPM050U** - Lists open PO’s by geographical area.
6. **PRPM060U** - Lists open PO’s by geographical area with PP Code 98.
7. **PRPM070U** - Lists all woman owned Contracts for a given FY.
8. **PRPM080U** - Lists all minority Contracts for a given FY.
9. **PRPM090U** - Lists all woman owned PO’s for a given FY.
10. **PRPM120U** - Lists all Contracts that are minority and woman owned for a given FY.
11. **PRPM100U** - Lists all minority PO’s for a given FY.
12. **PRPM110U** - Lists all open PR’s for a given FY.
13. **PRPQ048U** - Lists all open PR’s with expiring funds.
14. **PRP0001U** - Lists all vendors in numerical order by Vendor Code.
15. **PRVR002U** - Lists all vendors in alphabetical order.
F. GENERIC

1. Any program can be submitted using this choice.

PROMIS, as mentioned earlier, has its own security system. Several levels of control are designed into this subsystem. The initial contact with the security checks is attained when logon is complete. If a user does not have PROMIS Supervisor privileges, they are presented with the Inquiry Menu. If they have supervisor (Directory) privilege, they are offered the Directory Menu. Three of the selections on the Directory Menu are PROMIS inquiry, PROMIS update, and PROMIS batch. When the user makes a choice, security either allows or refuses entry into that particular part of the system. For instance, almost everyone has access to the inquiry system, but very few people have update capabilities. If a user cannot update records, but chooses PROMIS update, the security system, after checking the logon for approval, will deny access.

The second level of security is the file level. Each logon not only has the type of access for each user, but also the particular files that a user can access. Therefore, again, PROMIS security will either allow or deny a user according to their security privileges and the file selected.

Control is also maintained even at the record level. One of the functions of the inquiry system is to allow buyers to update their own records. As previously mentioned, security controls which records can be updated. Along with the logon, the security file has the appropriate buyer code and will only permit the
update of records that have the buyer code which accompanies the logon. In conjunction with the record level of security control, is the field level of control. Built into the buyer update function is the restriction that only certain fields can be updated. This prevents a buyer from manipulating the data in such a way that an incorrect or untrue "picture is painted" on actions that have taken too long to work.

The beauty of the entire security system is that interactive control is maintained by the NASA PROMIS Administrator assigned to security. The security file can be modified to allow or deny various types or degrees of access at any time for anyone at the security administrator's discretion.

Documentation is covered using two methods with PROMIS. An on-line manual is available to all users as a selection on the inquiry menu. It is broken down into four basic headings: system overview, AP guidelines and instructions, ad hoc inquiry, and procurement updates.

The system overview explains how to use the documentation, the system architecture, and functional descriptions. AP guidelines and instructions includes the purpose, scope, definitions, procedures and policies, TPA codes and leadtimes. The ad hoc inquiry system is discussed at length touching on how to get started, the use of mode and selection, PF keys, each file selection, and buyer and originator update capabilities. The last heading, Procurement Updates, is discussed in detail.

Individual help screens comprise the second form of documentation. These help screens are available for every screen
within the inquiry system. At the inquiry menu level, the mode selections are explained in detail by selection:

1. **SI (SIMPLE-INQUIRY)** - Allows inquiry of a single record.
   Such as, PR (DCN) & Supplement numbers for PR selections, PO number for PO selections, etc... One record per screen is displayed.

2. **LI (LIST-INQUIRY)** - Allows inquiry by a selected number of fields including ranges of data. Also, allows selection of fields to be displayed. (Note: The number of fields is limited to the number that will fit on 1 line). Default fields are provided. Multiple records per screen are displayed.

3. **DI (DETAIL-INQUIRY)** - Allows inquiry by a selected number of fields including ranges of data. Display field selection is allowed providing the capability of switching to mode "LI" (See above). One record per screen is displayed.

4. **BU (BUYER-UPDATE)** - Allows update of PR tracking, PR description, and estimated amount for open PR's.

5. **LP (LIST-PRINT)** - Allows batch printing of "LI" option.

6. **DP (DETAIL-PRINT)** - Allows batch printing of "DI" option.

7. **? (HELP)** - Available per screen

8. **Q (QUIT)** - Returns to inquiry menu.

9. **PF KEYS** - PF12: Fetch inquiry menu
    PF11: Fetch update menu
    PF10: Fetch directory menu
At the file, data, and field selection levels explanations are given on such things as the proper entry of PR and KPO numbers, from and thru values, display sequences, field display selections, changing modes, and scrolling thru the use of PF keys.

The programming philosophies used in PROMIS incorporate fourth generation methods of programming, such as structured modular programs. However, third generation procedures were used to document the programs such as comment statements to define in the programs the program ID, a brief description of the program, any remarks, a maintenance log, and descriptions of routines as they occur. This eliminates the need for individual program documentation. All programs are selectable from a menu, including batch programs. Each program contains a standard error handling capability and a second routine to insure the user is permitted to access this particular function.

The inquiry module incorporates the use of global variables to build pieces of programs which are then installed in a source program and compiled. This is transparent to the user. This allows the user the power and flexibility of designing their own reports including the Boolean selection criteria, as well as report layout. This method of inquiry has caused the users to identify this system as a "User Friendly" inquiry system, thereby fulfilling the requirement that the system be simple as well as powerful.

Each screen presented to the user always includes options to allow "Help", to quick transfer to other programs without going thru the menus, or "Quit". The on-line submission philosophy places total control of the reporting methods, electronic
transfers, or electronic publishing into the hands of the user without the requirements for a computer specialist. This philosophy carries over into security which can be changed "on the fly" as often as needed and again is controlled totally by the user base.

It is felt that in the future, if the same philosophies are maintained, the user will be able to enter, report, design, and secure all forms of data without the continuous support of a computer specialist, thereby controlling their own destiny.

The PROMIS system has the following entry points via the update menu:

A. PR PLANNING - Allows entry, update, and maintenance of Planned Procurement Actions.
B. PR OPEN - Allows entry, update, and maintenance of Open Procurement Requests.
C. PR CLOSED - Allows update and maintenance of Closed Procurement Requests.
E. OPEN CONTRACTS - Allows update and maintenance of Open Contracts.
F. CLOSED CONTRACTS - Allows update and maintenance of Closed Contracts.
H. CON MOD CLOSED - Allows update and maintenance of Closed Contract Mods.
I. PO OPEN - Allows update and maintenance of Open Purchase Orders.

J. PO CLOSED - Allows update and maintenance of Closed Purchase Orders.

K. CLOSING STAGE - Allows the mass entry of the Stage and Stage Dates of Open KPO's

L. FINAL PAYMENTS - Allows the mass entry of the Final Payment Dates of Open KPO's.

M. AWARDS - Allows the awarding of Open PR's to KPO/MOD's. The Open PR's are moved to the Closed file and if the KPO or Mod does not exist, a new record is created.

N. VENDORS - Allows the entry, update, and maintenance of Vendors.

Q. SOLICITATIONS - Allows the update and maintenance of solicitation information.

R. BUYER TABLE - Allows the entry, update, and maintenance of Buyers.

T. TPA/PP TABLE - Allows the entry, update, and maintenance of TPA and PP codes and their description.

U. SECURITY - Allows the entry, update, and maintenance of the Security information. Logons can be added with the users privileges, and/or present logons and their privileges can be modified.

V. DOCUMENTATION - Allows the entry, update, and maintenance of documentation.

1. REOPEN KPO'S - Allows a particular KPO and it's related mods to be moved from it's closed file to it's respective open file.
2. CONVERT PR NBR'S - Alters the second digit of a 10-year-old PR number to enable the reuse of the number for the current year.

3. DELETE OPEN CON - Deletes a particular Open Contract and it's Mods.

4. DELETE CLOSED CON - Deletes a particular Closed Contract and it's Mods.

5. DELETE OPEN MOD - Deletes a particular Open Contract Mod.

6. DELETE CLOSED MOD - Deletes a particular Closed Contract Mod.

7. DELETE OPEN PO - Deletes a particular Open Purchase Order and it's mods.

8. DELETE CLOSED PO - Deletes a particular Closed Purchase Order and it's mods.

(Selections D, O, P, and S are unused at this time.)

In conclusion, PROMIS has advanced from an entry and statistical reporting system to a state of the art Management Information System as well as a comprehensive tool for Procurement Office Personnel.