

CHAPTER TWO

PENS PROJECT FIELD EVALUATION

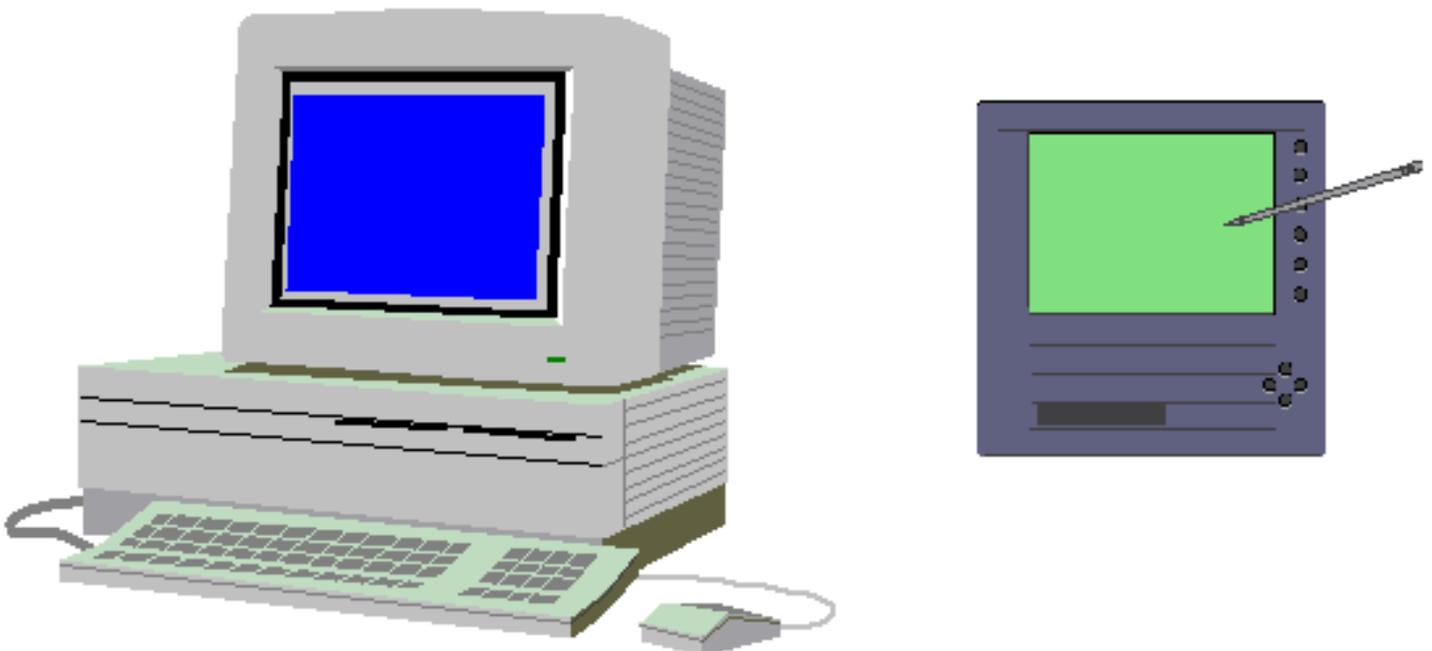
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2.1 PENS: A PERFORMANCE ENHANCEMENT SYSTEM

The Performance ENhancement System, PENS, is a tool designed to aid Aviation Safety Inspectors (ASIs) in performing their oversight duties. Aviation Safety Inspectors (ASIs) make up the inspection team for the Flight Standards Service (FSS), which is the regulatory branch of the Federal Aviation Administration (FAA). They perform a variety of tasks, in both commercial and general aviation areas, including: inspecting aircraft and equipment, reviewing manuals and records, certificating pilots, and evaluating training programs.

There are approximately 2,600 ASIs in the nine regions of the FAA. The initial target of PENS is an ASI performing an airworthiness (maintenance) inspection. PENS is an electronic performance support system (Gery, 1991) that combines a "smart" forms application and an on-line documentation system. PENS capitalizes on recent advances in pen computer technology.

Figure 2.1 Comparison of Desktop and Pen Computers



2.2 A BRIEF INTRODUCTION TO PEN COMPUTERS

Pen computers use handwriting recognition software and a pen stylus for input, rather than a keyboard. The operator writes on the screen and the handwriting recognition software translates the written characters to typed characters. The pen stylus also acts as a pointing device, much like a mouse. When combined with a graphical user interface, such as Microsoft Windows for Pen Computing, the pen stylus and handwriting recognition software hold the promise of making computers easier to use than traditional desktop computers. A comparison of typical desktop and pen computers is shown in [Figure 2.1](#).

2.3 IMPROVED FORMS

As is typical with regulatory agencies, there are several forms that must be completed while performing an ASI task. Currently, these forms are on paper and require that redundant information be recorded on each form. After completing the forms, the ASI either types the data into a local computer database or he/she submits the forms to a data entry clerk. There are several drawbacks to such an approach. First, redundant recording of data on multiple forms takes time that could be devoted to more productive activities. Second, the two-step process of recording data on paper and then entering the data into a computer is inefficient. Third, one is either paying an inspector to do a task for which he/she is over-qualified, or one is paying for a staff of data entry clerks. Fourth, a data-entry clerk may make transcription errors (due to misreading the inspector's handwriting) or errors due to incomplete knowledge and understanding of the inspector's activities. Such errors mean that the database is an unreliable source of information. Finally, the current process takes considerable time, which means there is a delay in getting safety data into the national database where it can be accessed by other members of the FAA.

Pen computer technology can be easily applied to such tasks to minimize the number of steps required to collect data and assimilate it into the database. Forms will be linked together so that an entry in one form propagates to the other forms, thus eliminating redundant data entries. Furthermore, the data will be collected so that they are ready for direct downloading into the database. This method of collecting data reduces the need for data entry clerks and it reduces data transcription errors. At the end of the work day, the inspector will return to the office, connect the pen computer to the network, and initiate a downloading procedure that will be carried out overnight.

2.4 ON-LINE DOCUMENTATION

The second major contribution of PENS is an on-line documentation system. Whereas ASIs currently must carry two briefcases full of books (including Federal Aviation Regulations (FARs), ASI Handbooks, and other regulatory documents), the necessary data will be stored on the hard disk of the pen computer or on a CD-ROM (compact disc, read-only memory). Not only is the computer media more lightweight and compact, it also facilitates quick retrieval of specific information. For instance, an ASI will be able to search the regulations for the word "corrosion" to answer a question on reporting defects. PENS would then indicate all of the instances of the word corrosion. The ASI could then ask PENS to retrieve the relevant documents and display the pages that discuss the term.

Besides the bulk and inefficiency of the books, inspectors must deal with problems of information currency. One complaint made by inspectors is that they will tell an operator that it is not in compliance with the regulations, only to be shown a more recent edition of those regulations. That is, sometimes the operators get the most recent editions of the regulations before the inspectors do. This problem could be dealt with by distributing updated documents to the pen computers when they are connected to the database computer network. Thus, a new edition of a document could literally be published one day and in the inspector's hands the next.

2.5 ADDITIONAL BENEFITS

A side benefit of using a computer to support inspection activities is that it opens the door to other types of activities and methods for documenting an inspection. For example, an inspector could follow an on-line checklist for an inspection. The checklist would then become the focus of interaction with the computer; by completing the checklist, all of the necessary forms would be automatically completed. We could even develop a scheduling component that would remind the inspector to follow up on an inspection. When documenting an inspection, ASIs currently must record their findings verbally. However, because the bulk of a ramp inspection is conducted by visually inspecting an aircraft, sketching is a more natural method for recording the results of such an inspection. Thus, if an inspector found a leaking seal on the wing of an aircraft, the inspector could annotate a line art drawing of that aircraft on the computer. This graphic could then be stored along with the completed form.

2.6 EVALUATION AND IMPLEMENTATION

There are a number of issues that can affect the success of introducing new technology into the ASI work environment. Many inspectors do not have experience using computers. Of those inspectors, some are willing to try the new tools based on promised increased productivity, while others think that using computers is not part of their job description. Some inspectors are even concerned with how they will be perceived by the operators when they are carrying a pen computer.

We are capitalizing on constraints built into the forms and data to make the system easy to use. For instance, because many fields on the forms require one item out of a finite set of possible entries, one can display that set and select an item from it. This approach has the added benefits of reducing memory demands on the inspectors and of increasing data reliability.

Pen computer configurations and durability must also be considered, as there are significant tradeoffs in these areas. Questions that should be asked include: Is it better to have a lightweight unit without a keyboard, or a slightly heavier unit with a keyboard? Which is more important to inspectors, weight or ruggedness? Is battery life sufficient to even consider using such a device?

Table 2.1 Features of Evaluated Computers

Computer A	Computer B	Computer C	Computer D
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486/25 Mhz CPU	486/25 Mhz CPU	386/25 Mhz CPU	486/25 Mhz CPU
200 Mb Hard Drive	80 Mb Hard Drive	200 Mb Hard Drive	120 Mb Hard Drive
Built-in Keyboard Pen	Separate Keyboard Pen	Separate Keyboard Pen	Built-in Keyboard Pen
	Trackball		

PENS is undergoing a field evaluation in one Flight Standards District Office (FSDO) in each of the nine FAA Regions in order to answer the above questions and to determine whether pen computers are a viable solution to the FSS information management needs.

2.6.1 Design of the Evaluation

Four models of portable computers, each from a different manufacturer, have been fielded in one office in each of the nine FAA Regions. These computers were selected because each one had a particular differentiating characteristic that may be important to ASIs. For example, three of the computers were pen computers, while the fourth used a trackball. The latter computer was fielded to address the following question: Is a pen computer necessary or will inspectors benefit simply from having a portable computer? This and similar questions have been raised, and rather than dictate an answer and force inspectors to adapt to our decisions, we deemed it more appropriate to provide the inspectors the opportunity to tell us what were their requirements.

The following sections address the details of the evaluation.

2.6.1.1 Evaluated Computers

A total of thirty-six computers (nine units of each of four models) are were fielded. These computers were selected based on their particular combination of features and differentiating characteristics. That is, the computers were selected because they had certain features in common, but they also had a particular feature that made them unique compared to the others. These features are described in [Table 2.1](#).

These computers allow us and inspectors to address the following questions:

1. Is a field computer a viable solution?
2. Is a pen computer required, or will any portable computer work?
3. Is a 486 processor required?
4. Is a separate or built-in keyboard preferable (given that it adds weight)?
5. The 80 Mb Hard Drive limits the functionality of the computer, but it also weighs less. Which is preferable: A lightweight machine with limited functionality or a slightly heavier machine with increased functionality?

The following features common to all four computers:

- 8 Mb RAM
- Backlit LCD Monochrome display

- PCMCIA Data Storage Card
- DOS 6.0
- Windows (Windows for Pen Computing or Windows 3.1; functionally equivalent except for handwriting recognition)
- PENS Software

Table 2.2 Evaluation Sites

Region FSDO Environment Installation Dates

Great Lakes	Milwaukee	Cold, snow	November 15-16, 1993
Central	St. Louis	Average	November 18-19, 1993
Southwest	Ft. Worth	Warm, dry	November 21-24, 1993
Western Pacific	Long Beach	Warm, humid	November 29-30, 1993
Northwest Mountain	Seattle	Average, humid	December 2-3, 1993
Alaska	Fairbanks	Extreme cold, dry	December 6-7, 1993
New England	Boston	Cold, snow	December 13-14, 1993
Eastern	Harrisburg	Cold, snow	December 16-18, 1993
Southern	San Juan	Hot, humid, rainy	January 10-11, 1994

The PENS software is common to all four computers and runs nearly identically on each of the three pen computers. (Computer B does not have sufficient hard disk space to contain all of the FARs or the Airworthiness Inspector's Handbook.) It runs essentially the same way on the trackball computer, with the exception that there is no handwriting recognition on that computer.

2.6.1.2 Evaluation Sites

Units were fielded in all nine FAA Regions. This scope gives the project broad exposure to field inspectors and it subjects the hardware to a range of environmental conditions. The nine FSDOs were selected based on the worst-case environmental conditions present in those regions. The FSDOs, environmental conditions, and installation dates are listed in [Table 2.2](#).

2.6.1.3 Experimental Design

A team of four inspectors in each FSDO is evaluating these units. These inspectors represent a cross-section of the inspector population in terms of age, sex, work experience, and computer experience. Each inspector is using one of the computers for a week and then switching to a different model. The rotation is counterbalanced to eliminate order effects. This rotation will continue until each inspector has had an opportunity to use each model. At the end of the rotation, each inspector will complete an evaluation form that requests him/her to rate each unit and answer some general questions. [Appendix 2-A](#) contains a complete set of evaluation forms. The inspectors still have access to the units at this time to refresh their memories of the specifics of each unit. From these data, we will recommend one commercial, off-the-shelf model (or its subsequent version) and a custom design for final implementation. The custom design will be specified because it is unlikely that a commercial, off-the-shelf model will incorporate all of the desired features.

2.6.1.4 Training

The inspectors were trained for two days as a group. The first day of training consisted of DOS and Windows basics, the specifics of Windows for Pen Computing, and training the pen computers to their individual handwriting. The second day of training consisted of using PENS and the On-Line Documentation, the computer rotation procedure, transferring field-collected data to the FSDO database system (the Flight Standards Automation Subsystem, FSAS), and training specific to each of the computers. [Appendix 2-B](#) contains copies of the training slides. [Appendix 2-C](#) contains copies of the software user manuals.

2.6.2 Expected Outcomes of the Evaluation

ASI activities are too diverse to expect that a single approach will address all of the difficulties that inspectors encounter in the field. Pen computers will certainly be appropriate for some inspection activities, but it is highly unlikely that they will be appropriate in all situations. For example, cockpit enroute inspections are likely not amenable to a computer tool for two reasons: 1) airlines are becoming increasingly sensitive to devices that emit radio frequency interference (RFI) and the potential for resultant difficulties with avionics; 2) cockpit environments are typically so small that an inspector has room for only a very small notepad, not a computer the size of a clipboard or larger. But one should not condemn the approach just because it does not work in all situations; it just means that PENS tools will have to be modified to meet the requirements of the various environments in which they will be used. For example, we are already investigating voice recognition systems that would permit nearly hands-free operation.

Furthermore, inspectors have already identified specific activities in which PENS would be invaluable even in its present prototype state. For example, inspectors frequently go on week-long trips to remote sites where they will inspect all of the operators in that area. As another example, inspectors also perform in-depth inspections on particular operators. They may spend several days at a single site inspecting all of the maintenance and training procedures, operations materials, and the like to ensure that the operator is complying with the regulations. In both examples, the inspectors need to be able to quickly and accurately collect such field data and they need access to reference materials (FARs, Handbooks, etc.) while they are in the field.

2.7 SUMMARY AND CONCLUSIONS

As discussed above, pen computers use handwriting recognition software and a pen stylus for input, rather than a keyboard. The user writes on the screen and the handwriting recognition software translates the written characters to typed characters. The pen stylus also acts as a pointing device, much like a mouse. The pen stylus and handwriting recognition really make computers viable field devices when they are combined with a graphical user interface, such as Windows for Pen Computing. After extensive in-house evaluations of pen computers, several models were chosen for a field evaluation by Aviation Safety Inspectors. Custom software to support the inspectors was also installed on the computers for evaluation.

As with the introduction of any new tool into an existing system, the effects are widespread. The potential for enhancing the productivity and job satisfaction of Aviation Safety Inspectors is great. However, with that potential comes the possibility of either having no effect (because of rejection of the tool) or, worse yet, actually decreasing performance. Time and again, experience has shown that buying systems and installing them without consulting the individuals who are supposed to use them does not work. Such an approach results in user and management frustration, as well as a waste of resources. Only by developing prototype systems and testing them in the field will the Flight Standards Service learn what tools are necessary and viable to Aviation Safety Inspectors and their supervisors. The PENS project is taking just such an approach.

2.8 REFERENCES

Gery, G. J. (1992). *Electronic performance support systems* (2nd ed.). Boston: Weingarten.

Appendix 2-A Evaluation Forms

Personnel Background

Post-Training Comfort Level

Evaluation Form Instructions

Evaluation of Computer A (Computers B and C used the same form)

Evaluation of Computer D

Evaluation of Pen Computer Products

PENS Software Evaluation

Personnel Background

Initials: _____ FSDO: _____

Age: _____ Years as ASI: _____

Type of operator you inspect regularly: 121 125 129 133 135 137

other _____

Type of operator you inspect most frequently: 121 125 129 133 135 137

other _____

Have you ever used a computer before? Yes No How many years? _____

What type of computer have you used? IBM PC Compatible (e.g., AT&T/NCR OATS)

Apple Macintosh

Other: _____

Do you own a computer? Yes No How many years? _____

What type of computer do you own? IBM PC Compatible (e.g., AT&T/NCR OATS)

Apple Macintosh

Other: _____

Have you ever used a "Mouse" before? Yes No

Have you ever used a "Trackball" before? Yes No

Have you ever used a "Pen Computer" before? Yes No

Do you currently use the PTRS Transmittal System (Paradox)? Yes No

At this point, how comfortable do you feel using a computer?

1 2 3 4 5
not at all comfortable somewhat comfortable quite comfortable

What is your opinion of the following computer manufacturers:

Computer A	Favorable	Unfavorable	No Opinion
Computer B	Favorable	Unfavorable	No Opinion
Computer C	Favorable	Unfavorable	No Opinion
Computer D	Favorable	Unfavorable	No Opinion

Post-Training Comfort Level

Initials: _____ FSDO: _____

Now that you have been trained...

How comfortable do you feel using a computer?

1 2 3 4 5
not at all comfortable somewhat comfortable quite comfortable

How comfortable do you feel using a pen computer?

1 2 3 4 5
not at all comfortable somewhat comfortable quite comfortable

How comfortable do you feel with handwriting recognition?

1 2 3 4 5

not at all comfortable somewhat comfortable quite comfortable

How comfortable do you feel with the PENS PTRS?

1 2 3 4 5

not at all comfortable somewhat comfortable quite comfortable

How comfortable do you feel with the On-Line References (Hypermedia)?

1 2 3 4 5

not at all comfortable somewhat comfortable quite comfortable

Do you have any other comments?

If there is anything you feel the least bit uncomfortable about, or if you have any questions, please bring them to our attention now. We are here to address your concerns and ensure that PENS meets your needs. PENS will only be as good as you personally make it. Please take the time to bring your concerns to our attention.

Evaluation Form Instructions

Please use the **Computer A, Computer B, Computer C, and Computer D forms** to evaluate the individual computers at the end of each week. (*One form per week.*)

At the end of the evaluation period, use the form labelled **Evaluation of Pen Computer Products** to evaluate all four computers at once. At that time, please use the **PENS Software Evaluation** form to tell us what you think of the project.

Chuck Layton will return between mid-January and early February to debrief you and answer individual questions.

Evaluation of Computer A
(Computers B and C used the same form)

Initials: _____ FSDO: _____

Please rate the computer on the following factors:

Weight Too Heavy Adequate Too Light/Fragile

Size Too Large Adequate Too Small (e.g., screen)

Speed Too Slow Adequate Fast

Display--inside Too Dark Adequate Too Bright

Display--outside Too Dark Adequate Too Bright

Pen Responsiveness Too Slow Adequate Too Fast

Pen Feel Too Slick Adequate Scratchy

Overall Comfort Not Comfortable Adequate Comfortable

What were the environmental conditions in which you used the computer?

 snow drizzle rain heat cold frigid

Did you use the computer for five working days? Yes No

If not, why not? Broken On Travel/Vacation/RDO Too difficult to use

Do you prefer to have the pen tethered to the unit? Yes No

Could you comfortably carry this unit throughout a typical day? Yes No

If a neck, shoulder, or waist strap were available, would you use it? Yes No

Which would you prefer? Neck Shoulder Waist

What are the three largest drawbacks to this product?1. _____

2. _____

3. _____

Would you use this computer in the field as part of your job? Yes No

If not, why not?

Evaluation of Computer D

Initials: _____ FSDO: _____

Please rate the computer on the following factors:

Weight Too Heavy Adequate Too Light/Fragile

Size Too Large Adequate Too Small (e.g., screen)

Speed Too Slow Adequate Fast

Display--inside Too Dark Adequate Too Bright

Display--outside Too Dark Adequate Too Bright

Trackball Speed Too Slow Adequate Too Fast

Trackball Ease Too Cumbersome Adequate Easier than a Pen

Overall Comfort Not Comfortable Adequate Comfortable

What were the environmental conditions in which you used the computer?

snow drizzle rain heat cold frigid

Did you use the computer for five working days? Yes No

If not, why not? Broken On Travel/Vacation/RDO Too difficult to use

Could you comfortably carry this unit throughout a typical day? Yes No

If a neck, shoulder, or waist strap were available, would you use it? Yes No

Which would you prefer? Neck Shoulder Waist

What are the three largest drawbacks to this product?1. _____

2. _____

3. _____

Would you use this computer in the field as part of your job? Yes No

If not, why not?

Evaluation of Pen Computer Products

Initials: _____ FSDO: _____

Please gather together all four of the evaluated computers, then *circle the best computer* and draw an *X through the worst computer* for each of the following characteristics:

Weight Computer A Computer B Computer C Computer D

Size Computer A Computer B Computer C Computer D

Speed Computer A Computer B Computer C Computer D

Display inside Computer A Computer B Computer C Computer D

Display outside Computer A Computer B Computer C Computer D

Pen Responsiveness Computer A Computer B Computer C Computer D (trackball)

Pen Feel Computer A Computer B Computer C Computer D (trackball)

Handwriting Computer A Computer B Computer C Computer D

Comfort Computer A Computer B Computer C Computer D

Which product do you prefer?

Computer A Computer B Computer C Computer D No preference

Do you think you could carry any of these units for a significant period of time? Yes No

Which one? Computer A Computer B Computer C Computer D

If a neck, shoulder, or waist strap were available, would you use it? Yes No

Which would you prefer? Neck Shoulder Waist

Would you prefer a very rugged unit, even though it weighs nine pounds? Yes No

What are the three largest drawbacks to all of these products? 1. _____

2. _____

3. _____

The following is a description of two products. Which one would you prefer?

Product A.

Product B.

Weight: 1-3 lbs.

Weight: 3-5 lbs.

Runs only PTRS form

Runs complete PENS system

Doesn't run Windows applications

Runs Windows and Windows applications

No keyboard

Built-in or separate keyboard

PENS Software Evaluation

Initials: _____ FSDO: _____

Now that you have used PENS for a significant period of time, please tell us what you think.

I enjoyed using PENS. True False

I am eager to see PENS evolve to meet my additional needs. True False

I would like all of my forms linked together so that I don't have to fill in the same information on multiple forms. True False

I will continue to use PENS after the evaluation period. True False

I would rather use paper in the field and transcribe the forms at the office. True False

I would rather use the current transmittal system (FSAS) for transcribing forms. True False

I like the On-Line References (Hypermedia), such as FARS and Handbooks. True
False

I would like more On-Line References (Hypermedia), such as ADs, ACs, etc. True
False

The On-Line References (Hypermedia) are the best part about PENS. True False

I had difficulty transferring my files from the computer to the network. True False

If any of the following need improvement, please comment below:

Section I

PTRS Record ID function

Inspector ID, Inspector Type, Activity Number, and FAR screen

NPG

Status

Callup Date, Start Date, Completion Date

Designator

Airman Certification #

Airman Name/Other

Aircraft Registration #

Make-Model-Series

Loc/Departure Point, Arrival Point

Flight #

Investigation #

Tracking

Miscellaneous

Numeric Misc

Local Use

National Use

Activity Time

Travel Time, Travel Cost

Section II, Personnel

Personnel Name

Position

Base

Remarks

New Entry, Save Entry, Clear Entry

Section III, Equipment

Manufacturer

Model

Serial #

Remarks

New Entry, Save Entry, Clear Entry

Section IV, Comments

Primary

Key Heading

Key Word

Opinion

Clear Comment

Erase Last Ink

Erase All Ink

Undo Last Erase

Transcribe

Transcription Screen

Scratchpad Entries

Transcribed Text

Done For Now, Keep Ink

Done, Erase Ink

Aircraft Graphic

Help

Save

Save Verify

Open

New

Exit

On-Line References (Hypermedia)

Open Book

Topics (Table of Contents)

Viewer

Searching

--This Chapter

--Entire Book

Bookmarks

Copying

Other

Data Transfer

Inspector Name

Transfer List

Record List

Supervisory Review

Previous

Next

Transfer

Print

Delete

Appendix 2-B Training Slides

Training Slide 1



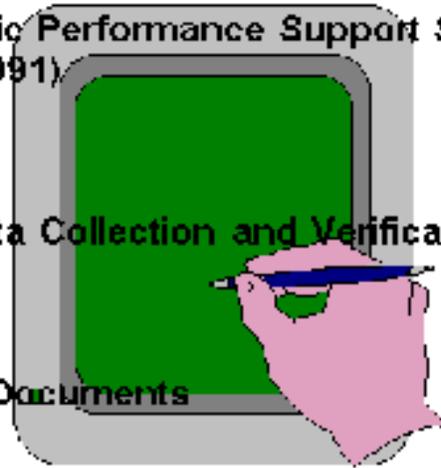
Training Slide 2

PENS

*The Performance
Enhancement System
for Aviation Safety*

What is PENS?

- Electronic Performance Support System (Gery, 1991)
- Field Data Collection and Verification
- On-line Documents



Training Slide 3

PENS

PENS Timetable

*The Performance
Enhancement System
for Aviation Safety*

1993	1994	1995
<ul style="list-style-type: none">• Field Evaluation of Airworthiness Prototype	<ul style="list-style-type: none">• Complete Airworthiness and Avionics PENS• Prototype Operations PENS• Field Evaluation of Operations Prototype	<ul style="list-style-type: none">• Complete Operations PENS• Prototype General Aviation PENS• Field Evaluations of General Aviation Prototype• Complete General Aviation PENS

Training Slide 4

PENS

**Schedule
Day One**

*The Performance
Enhancement System
for Aviation Safety*

- **Demo**
- **Background Information**
- **Introduction to Computer**
- **Windows Tutorial**
- **Windows Practice**
- **Pen Computer Tutorial**

Training Slide 5

PENS

**Schedule
Day Two**

*The Performance
Enhancement System
for Aviation Safety*

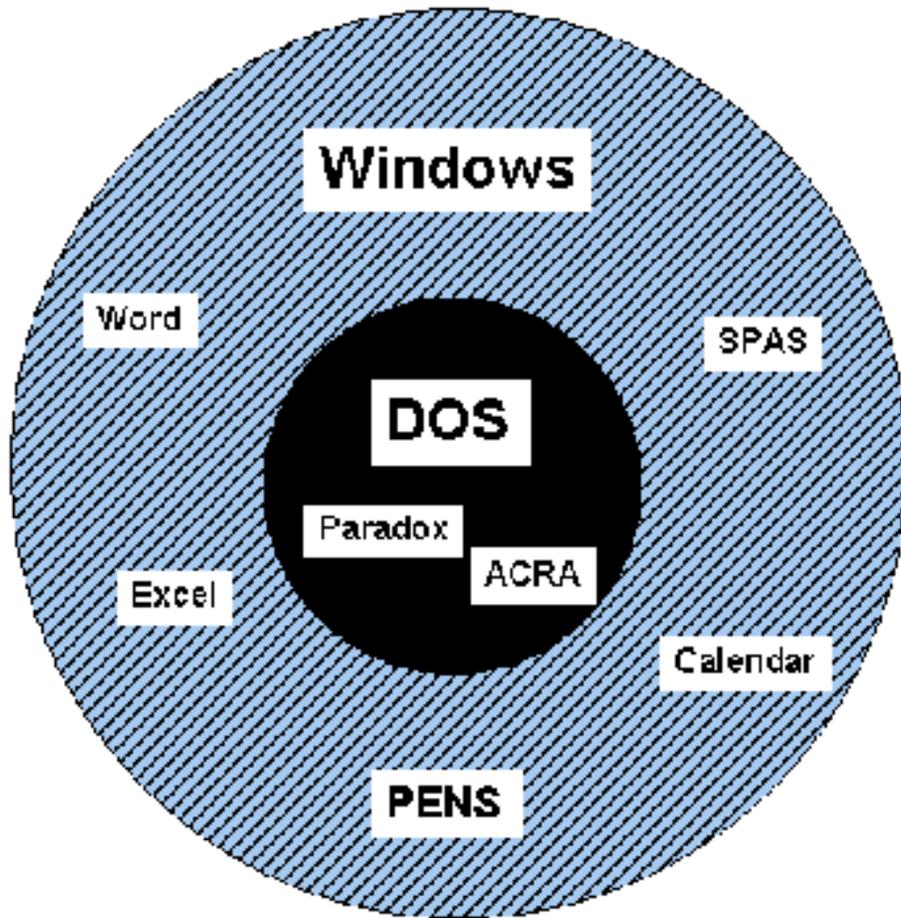
- **PENS Training**
- **PENS Practice**
- **Data Transfer Training**
- **Data Transfer Practice**
- **Evaluation Forms**
- **Rotation Schedule**
- **Specific Computer Training**

Training Slide 6

**You cannot harm the
computer by using it!**



Training Slide 7



Training Slide 8

You can harm the computer by:

dropping it

spilling liquids on it

throwing it against the wall



But if you do, you will make several people very unhappy with you.

Training Slide 9

D O S

- ◆ Stands for: *Disk Operating System*
- ◆ Basic operating level
- ◆ Runs programs and stores data
- ◆ Hierarchical organization of data

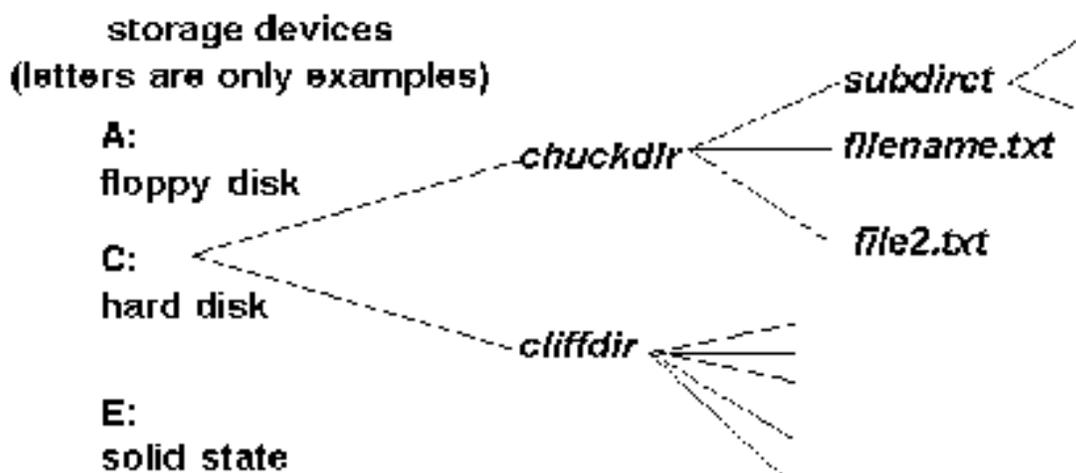
-files: lowest element

-subdirectories: hierarchies of files

-both are limited to eight letter names and three letter extensions: eg. *filename.txt*

Training Slide 10

DOS (cont.)



Training Slide 11

DOS (cont.)

To get out of DOS and back to Windows:

1. Type *exit* <Enter>
2. Type *wln* <Enter>
3. Restart the computer

Hold down <Ctrl> <Alt> and keys simultaneously

Turn off the computer and turn it on again

Training Slide 12

Windows

- ✦ Graphical User Interface (GUI)
- ✦ Shows programs as screen objects
- ✦ Take action on screen objects
 - Point
 - Click
 - Double Click
 - Drag

Windows for Pen transcribes printed text to "typed" text

Training Slide 13

Tips

 **Turn off the computer before plugging or unplugging any devices :**

–keyboard

–floppy disk drive

–network connection

–CD-ROM

 **Plug the computer into AC power when possible and convenient**

 **Plug the computer into the cigarette lighter when possible and convenient**

 **Turn off the computer if it will be idle for a half hour or more**

Appendix 2-C Software User Manuals

PENS User Manual

HyperMedia User Manual for FARS and Inspector's Handbook

PENS User Manual

PENS is a suite of tools to assist Aviation Safety Inspectors (ASIs) in their daily activities. It primarily addresses two main aspects of inspector activities: data collection via the PTRS form and accessing regulatory documents. The current PENS software provides these functions for airworthiness activities, including an enhanced version of the PTRS form. Future development will include the forms, job aids, and reference documents associated with all ASI activities.

1. Data Collection Procedure

Here are the necessary steps to run the PENS software:

1. Start Windows, if you are not already in the Windows environment.
2. Start the **PENS** software located in the **PENS** group.

3. Fill out the information on the PENS Login Screen. This information is needed to identify the job aids, forms, letters, and reports that are required for an inspection activity. (See PENS Login Section for detailed information on how to enter this information.)
4. Press the **OK** button. This action brings you to the PTRS screen.
5. The PTRS screen is divided into four sections. Boxes containing the required information for the activity are surrounded with thick black boxes. Fill out these boxes accordingly. (See PTRS Section for detailed information on how to enter this information.)
6. You can also access the FARs and Inspector's Handbook using the PENS Function buttons (the Job Aid and Aircraft functions are not currently functional).
7. Choose either **SAVE** or **SAVE VERIFY** to save your data. **SAVE VERIFY** will review your data for consistency and completeness. **SAVE** will not make such checks, but it will save your data for later verification. PTRS records cannot be transferred to FSAS database if they are not verified.
8. Select **EXIT** when you are finished with the data collection.

2. PENS Login

The following paragraphs illustrate how to fill out information on the Login screen:

1. **Inspector ID:** Enter your three character initials. (Other fields will be blanked until this information is filled in.)
2. **Inspection Type, Section, Heading** and **Subheading** fields will help you select the proper activity number. (These fields replace the small notebooks you currently use.) To supply this information press the down-arrow on the corresponding list box and select one of the options. Once these fields are filled out, the PENS will supply the relevant Activity Number.
3. If you know the Activity Number, you may write or type the number in the **Activity #** field instead of performing step 2. PENS will automatically fill the Inspection Type, Section, Heading and Subheading (if available) information.

4. Once you have entered an activity number, the FAR field will contain a list of relevant FARs for that activity number. Select the appropriate FAR for the activity.

5. Hit one of the following buttons to continue:

CLEAR: Erases all input on the Login screen.

NEW: Creates new PTRS form with the information from the Login screen. If a backup PTRS exists, PENS will give you a choice to restore or delete the backup.

OPEN: Opens a specific PTRS form. (See section 2.1)

CANCEL: Cancels the operation and exits from the PENS software.

[2.1 Opening an existing PTRS form](#)

Figure 1. The Open Screen

Open Existing Form

Form ID#	Activity	FAR	WPG	Desig	Make/Model	Callup	Status	Results
9400008	3512	65			ACRNDR-100		C	A
9400009	3627	135		FRPA	MA-B19		C	A
9400010	3512	65					C	C
9400011	3512	65					C	A
9400012	3731	135		IXYA			C	A
9400013	1312	121		ABYA			C	C
9400014	3512	65					C	C
9400015	3312	135		FRPA			C	C
9400016	5920				AERMER-FBL		C	C
9400017	1511	63			T-11		C	C
9400018	3419	91			T-11		C	C
9400019	5540	65			MA-B25		C	C

Activity: PSAS

Designator: Temporary

Start Date: / /

Stop Date: / /

The OPEN button accesses the Open Screen (Figure 1). The screen displays the Record ID Number for all PTRS forms found in the database. When the **FSAS** button is checked, PENS will display only the PTRS forms in the FSAS database. Likewise, PENS will only display PTRS forms in the temporary directory when the **TEMPORARY** button is checked. When a form is selected, PENS also provides the Activity number, Designator, Aircraft, Status, and Verification status to help you identify the desired PTRS form.

You can also search for a specific PTRS form. To do this, follow these steps:

1. Check the **FSAS** or the **TEMPORARY** button to identify the database to search on.
2. Enter a specific activity number in the **Activity:** field.
3. Enter a specific Designator Code in the **DESIGNATOR** field.
4. Hit the **SEARCH** button. All records in the database that match the search information will be displayed in the **FORM ID#** box.
5. Tap the desired form to select it. (Corresponding information about the file will be displayed.)
6. Press **OK**.

3. PTRS

The screen is divided into four sections (see below). Depending on the Activity number, thick black borders will be placed on several fields. This border indicates that the information is required for the activity (detailed instructions for completing the form are provided in each section).

Section I: Used for describing the PTRS activity, the overall results, the subject and other basic information

Section II: Used for recording information acquired on personnel (other than those recorded in Section I) during the accomplishment of the task. It is also used to record a certificate applicant's information along with the recommending instructor's information for a designated examiner's certification activity.

Section III: Used for identifying a particular item that was inspected by manufacturer, model and serial number (other than that identified in Section I).

Section IV: Used for classifying observations or evaluations into specific areas of interest in a coded format.

3.1 Section I -- General

The following paragraphs illustrate how to fill out Section I of the PTRS Screen:

Inspector Name Code, Inspection Type, Activity Number and FAR: These fields are not editable. To modify this information, hit the **SELECT** button next to the **Activity Number** or **FAR** field. This action takes you to the PENS Login Screen where you can change the information.

NPG: Check the box if the activity is an NPG required surveillance.

Status: Select Closed, Open or Planned from the status list.

Callup Date, Start Date and Completion Date: Modify these fields using the corresponding arrow buttons. (Some of these dates are automatically filled based on the activity status.)

Results: Select one of the following result codes:

Completed: Indicates that the activity was completed. It is used to close out all work activities except Surveillance.

Assistance: Used to prevent recording more than one unit of work for an activity when inspectors of the same specialty combine their effort to accomplish an activity.

Satisfactory: Used to close out Surveillance activities and indicates the activity was in full compliance. This code should only be used when no comments are made.

Information: Indicates that the result of the inspection was satisfactory in the Flight Standards program area, but there is information in the PTRS Section IV that is pertinent to future surveillance of the activity. Additional information must be provided in Section IV.

Follow up: Used in two ways, either to indicate that a corrective action was taken prior to completing the Surveillance activity, or that a re-inspection was opened for completion in the future to confirm continued compliance. Additional information must be provided in Section IV.

Enforcement: Indicates that a violation was found and an enforcement action opened. Additional information must be provided in Section IV.

X (Canceled): Indicates a Surveillance activity has been canceled. A planned activity should be canceled when the scheduled date exceeds 60 days, if the same activity is scheduled at a later date. Do not use X to cancel an NPG Required Surveillance, except when the DO's division grants a deviation from the required Surveillance in accordance with FAA Order 1800.56.

Terminate: Indicates that a certification activity was aborted or that an NPG required surveillance was terminated because the subject of inspection ceased operation or no longer was active within the region.

Pass or Fail: Check either box to indicate the result of certification activity or the conclusion of various evaluation activities.

Designator: Enter the designator code for the subject. If you do not know the code, hit the **SELECT** button to access the Designator Screen.

The Designator screen will help you select the appropriate designator code for an operator. One way to find the code is using the search function: Enter a portion of the operator name or the designator code in the **FIND** field, then press the **SEARCH** button. The first matching data will be highlighted. You may need to press the **SEARCH** button repeatedly until you find the right operator.

An alternative method is to use the **INDEX** buttons (**A-G** to **0-9**). Push the **INDEX** button that contains the first letter of the operator name and then scroll until you find the desired operator.

Once the right designator code is selected, press **OK**.

Airman Cert #: Enter the applicable certificate number.

Airman Name/Other: Enter the name of airman, non-certified organization, training course, or topic of a special project as applicable, which is not associated with an Air Operator or an Air Agency.

Aircraft Reg #: Enter the aircraft registration exactly as it appears on the registration.

Make: Enter the manufacturer of the aircraft. If you do not know the manufacturer, press either the **SELECT** button or the **Make/Model/Series** button.

The **SELECT** button will access the Make screen. There are two ways to find the aircraft manufacturer in this screen:

1. Enter the first few letters of the manufacturer name in the field **FIND** and press the **SEARCH** button. The first matching entry containing these letters will be highlighted. Additional manufacturers may be found by subsequent pushing of the **SEARCH** button.
2. Press an **INDEX** button containing the first letter of the manufacturer and then use the scroll bar to find it. Tap the manufacturer name to select it.

Once the right manufacturer is highlighted, press **OK**. The cursor will change into an hour glass while the software loads the models and series.

The **Make/Model/Series** button accesses the Make/Model/Series screen. This button can be used instead of the above method, provided that you know the aircraft popular name, model, or series. There are several ways of finding the aircraft code in this screen:

1. Enter the first few letters of either the manufacturer, popular name, model, or series in the field **FIND**. Then press either one of these buttons: **SEARCH MAKE** (search the manufacturer), **SEARCH NAME** (search the popular name), **SEARCH MMS** (search the make, model and series), or **SEARCH ALL** (search all information). The first matching entry containing these letters will be highlighted. Additional aircraft may be found by subsequent pushing of the **SEARCH** button.
2. Press an **INDEX** button containing the first letter of the manufacturer and then use the scroll bar to find the aircraft. Tap the aircraft name to select it.

Once the right aircraft is selected, press **OK**. The cursor will change into an hour glass while the software loads the make, model, and series.

Model and Series: Select the appropriate Aircraft Model and Series from the corresponding lists. (These codes will automatically be entered if you used the Make/Model/Series screen to find the aircraft code.)

Depart: Enter the code for the airport most proximate to the location of activities conducted outside of the office (for En Route inspections, enter the code of the departure airport). If you do not know the code, hit the **SELECT** button to access the Airport Screen.

There are three methods to find the airport code in this screen:

1. Enter the first few letters of the city, airport name or airport code in the field **FIND** and press the **SEARCH** button. The first matching entry containing these letters will be highlighted. Additional manufacturers may be found by subsequent pushing of the **SEARCH** button.
2. Enter the state where the airport is located, in the field **STATE:** and press the **SEARCH** button. Use the scroll bar to find the airport. Then tap the airport name to select it.
3. Press an **INDEX** button containing the first letter of the state (**INTL** for international airports) and then use the scroll bar to find it. Tap the airport name to select it.

Once the right airport is selected, press **OK**.

Arrival: Enter the code for the arrival airport. If you do not know the code, hit the **SELECT** button to access the Airport screen. (See the above information for searching the arrival airport code.)

Flight #: Enter the flight number, if available.

Investigation #: Enter the investigation file number assigned to the accident, violation, incident, or complaint associated with the activity.

Tracking: This field is only activated for certain activity numbers.

Miscellaneous: Enter miscellaneous information regarding a work activity. Enter "OBSVD" to document examiner certification activities that are observed by inspector.

Numeric Misc: Enter items for later mathematics manipulation, e.g., the number of records checked during a records system inspection.

Local Use: Used for temporary tracking of selected activities.

Regional Use: Used for temporary tracking of selected activities. This block may be used by the DO on a temporary basis and may be preempted by the region.

National Use: Used for temporary tracking of selected activities. This block may be used by the DO on a temporary basis and may be preempted by the national headquarters.

Activity Time: Enter the time consumed in the performance of an activity (rounded to the nearest hour) when required in Appendices A through F or the PTRS Pocket Guide. Do not use otherwise.

Geographic Activity: Check this box if you are performing the activity outside your geographic area.

Travel Time: Enter the travel time, rounded to the nearest hour. Do not use unless directed by management.

Travel Cost: Enter the travel cost. Do not use unless directed by management.

Triggers (Not Currently Functional): Used to automatically create new records containing some or all information from Section I. It is usually used to trigger an enforcement activity or a follow-up activity. INVS and REXM functions were used to generate letters of investigations and reexaminations, but are no longer available with the PENS software.

Activity #: Enter a new activity number to automatically create another record with this triggered activity number. The new record will have OPEN status and will contain some information from Section I.

R#(repeat): Enter an **R** and the **number** of identical records you want to create (up to 50). The new records will contain all information from Section I.

3.2 Section II -- Personnel

Current Personnel: Lists all personnel involved with the activity. Selecting an entry from the list will display the data on that person and enable you to modify the data. The default list is empty.

To record personnel information into the database, enter the information in the corresponding fields and hit **SAVE ENTRY** or **NEW ENTRY** button.

To erase an entry, select the desired entry from the Current Personnel list and hit **CLEAR ENTRY**.

Personnel Name: For an examiner's certification activity, enter the applicant's or the recommending instructor's name. For other activities, enter the name of any personnel involved with the activity. Enter one person at a time.

Position: For an examiner's certification activity, enter "APPL" (for applicant) or "RI" (for recommending instructor). Otherwise, enter the job title of the personnel.

Base: Enter the airport code for the location where the person is stationed.

Remarks: For an examiner's certification activity, enter the certificate numbers of the applicant or recommending instructors. Otherwise, enter any relevant data about the individual.

[3.3 Section III -- Equipment](#)

Current Manufacturer: Lists all manufacturers of the equipment or tools that are the subjects of the inspector's evaluation or inspection. Selecting an entry from the list will display the data on that equipment and enable you to modify the data. The default list is empty.

To record an entry into the database, enter the information to the corresponding fields and hit **SAVE ENTRY** or **NEW ENTRY** button.

To erase an entry, select the desired entry from the Current Manufacturer list and hit **CLEAR ENTRY**.

Manufacturer: Enter the name of the manufacturer of the equipment, component, or tool.

Model: Enter the model of the equipment, component, or tool.

Serial #: Enter the serial number of the equipment, component, or tool.

Remarks: Enter any relevant remarks about the equipment, component, or tool.

[3.4 Section IV -- Comment](#)

Section IV gives you the ability to classify observations or evaluations into specific areas of interest. The fields: **Primary**, **Key Heading**, and **Key Word**, provide the means of this classification. It also contains a special area where you can jot down short notes without the notes being translated to printed characters. When you have the time, you can click the **TRANSCRIBE** button, which will bring up a new screen that shows your notes. You may transcribe those notes, including adding information, until you have completed that comment. When you have completed the comment, press the **DONE, ERASE INK** button or **DONE, KEEP INK** button. You must erase the ink before the PTRS form can be verified.

Primary: Select the general comment classification.

Key Heading: Select one of the headings.

Key Word: Select one of the key words for that heading.

Opinion: Select Unacceptable, Information, Potential or Exceeds from the list.

Comments: Lists all comments you have made under the above classifications

Transcribe: Accesses a screen where you can transcribe the short notes you have entered in the field.

4. *PENS Function Buttons*

PENS Functions buttons are located on the right side of the screen. The available functions are:



NEW: Creates a new PTRS form, with a new Record ID Number. This Record ID Number is temporary and can be used to help you track your own forms. A permanent Record ID Number will be assigned when you transfer your data to FSAS. Temporary Record ID Numbers can be recognized by the word TEMP in the middle.



OPEN: Opens a previously saved PTRS form for subsequent editing. This opened form will either use a temporary Record ID Number or a Record ID Number. Along with the Record ID number, PENS provides the Activity number, Designator, Aircraft, Status, Results, and Verification status to help you identify the desired file. You can also specify an activity code and a designator, PENS will list only these Record IDs. (See [Section 2.1](#) for more detailed information.)



SAVE VERIFY: Checks the PTRS data to ensure that all required fields have been completed and that there are no conflicts between data. You will be notified of either case. When a form does not pass the verification, you will be returned to the PTRS form. Thick black borders will be placed around fields that need correction. Modify the form and re-verify the data. Only verified forms can be transmitted to FSAS.



SAVE: Saves the current file without any verification.



PTRS: Accesses the PTRS screen.



Job Aid (Not currently functional): Accesses the Job Aid screen for your PTRS activity if there is one available. Any data you record on the job aid will be automatically shared with the PTRS form and vice versa.



REFS: Accesses the on-line versions of the Federal Aviation Regulations and the Inspector's Handbooks. Which handbook is selected depends upon the inspection type. (Currently, only the Airworthiness Handbook is available.) These on-line documents allow you to quickly find specific information without having to thumb through the bulky paper books. Specific help for these on-line references is available when you are using them.



AIRCFT (Not currently functional): Illustrates an improved capability to document visual inspection. PENS provides line drawings for some Boeing and Airbus aircrafts. You can then mark the area of defects and add your comment to the drawings. If the FSAS database were modified properly, these drawings could then be saved with the PTRS data.

TOOLS: Accesses the standard windows for PEN computing tools:



Gives you information on editing gestures



Is not currently useful for PENS software



Is the standard on-screen keyboard



Starts the handwriting recognition trainer



Provides help for Windows for PEN Computing



HELP: Accesses PENS On-line Help File



EXIT: Exits the PENS software. If the changes in your PTRS form have not been saved, PENS gives the following options before it exits:

Verify and Save: Saves and verifies your file.

Save without Verifying: Saves your file.

Don't Save Changes: Exits PENS without saving the changes you made.

Return to Form: Cancels the exit command and returns to the PTRS form.

5. Data Transfer Utility

The Data Transfer Utility allows you to transfer your PTRS records either directly to the FSAS database or to a temporary data storage. The purpose of the temporary data storage is to hold your data until your supervisor verifies the data. When your facilities do not require this supervisor's approval, you can directly transfer the data to the FSAS database. [Figure 2](#) shows the Data Transfer Utility Screen.

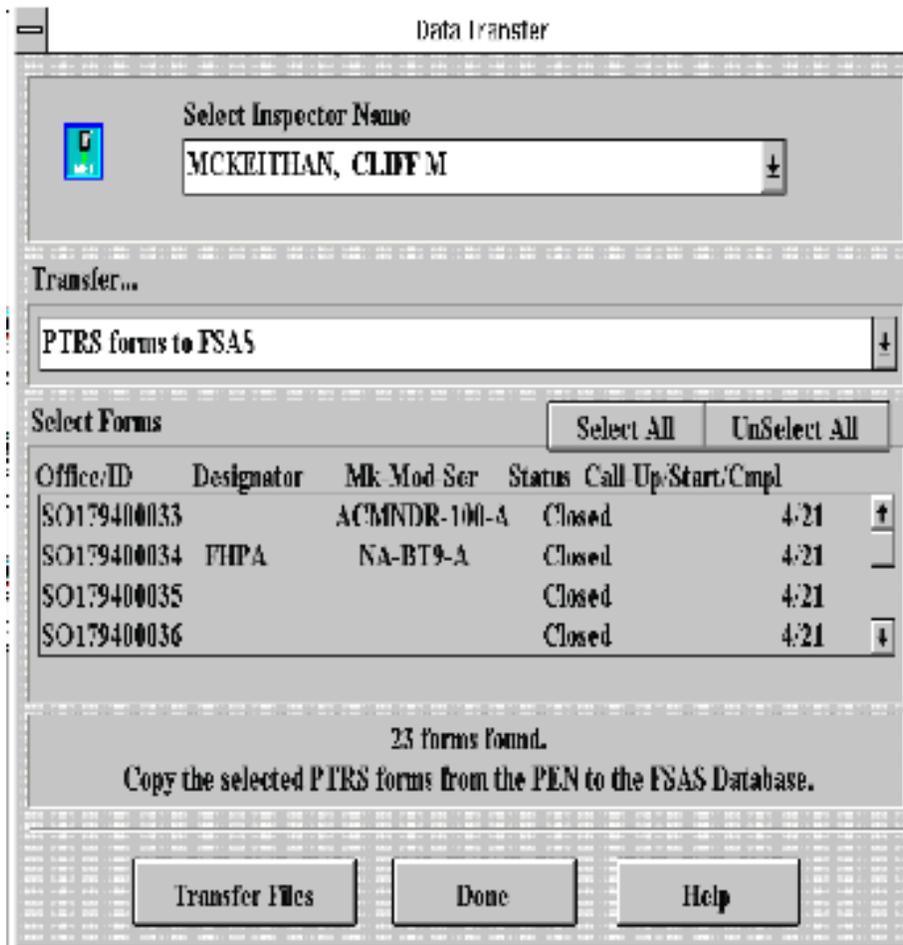
5.1 Data Transfer Procedure

To transfer the data follow these steps:

1. Connect the Xircom Adapter to your computer. (Follow the steps for **Connecting the Xircom Pocket Ethernet Adapter** in your computer user manual.)
2. Follow the prescribed network login procedure.

3. Start the **Data Transfer Utility**.
4. Select your name from the **Select Inspector Name** box.
5. Select the type of data transfer from the **Transfer...** box. Files available from the selected data transfer type will be shown in the **Select Forms** box. (See Type of Data Transfer section for more detailed information.)
6. Tap the file(s) you wish to transfer with your pen. (Press the **SELECT ALL** button to select all files; Press the **UNSELECT ALL** button to deselect all files.)
7. Press the **Transfer Files** button. (Messages about the transfer status will appear on the screen.)
8. Repeat steps 5 to 7, if you would like to transfer other files.
9. Choose **DONE** to exit from the Data Transfer Utility.

Figure 2. Data Transfer Utility Screen



[5.2 Types of Data Transfer](#)

Data Transfer Utility provides the following types of data transfer:

PTRS forms to Supervisory Review: This function transfers your PTRS data to a temporary storage location where your supervisor can review it before it is entered into FSAS.

PTRS forms from Supervisory Review to PEN: This function transfers PTRS data from the temporary storage to your computer.

PTRS forms from Archive: This function transfers PTRS data from the archive to your computer.

PTRS forms from FSAS to PEN: This function transfers PTRS data from FSAS to your computer.

PTRS forms to FSAS: This function transfers your PTRS data directly to FSAS.

Delete PTRS forms from PEN: This function erases PTRS data from your computer.

Delete PTRS forms from Archive: This function erases PTRS data from the archive.

Handwriting files from PEN to TEMP: This function transfers handwriting recognition files from your computer to a temporary network directory.

Handwriting files from TEMP to PEN: This function transfers handwriting recognition files from the temporary network directory to your computer.

Note: Depending on your site's policy, the options: **PTRS forms to Supervisory Review**, **PTRS forms from Supervisory Review**, or **PTRS forms to FSAS** may not be available to you.

[5.3 Data Transfer Help](#)

The Help function provides an on-line version of this manual.

6. *Supervisory Review Utility*

The Supervisory Review Utility allows you to review your inspectors' PTRS data before it is added to the FSAS database.

[6.1 Supervisory Review Procedure](#)

You have indicated that you wish to review your inspectors' PTRS data before it is added to the FSAS database. Here are the necessary steps to run the utility:

1. Start Windows.
2. Start the **Supervisor** utility located in the **PENS** group. (When you start this program, it loads the most recent record transferred by the Data Transfer Utility.)
3. Examine the PTRS record. (Use the scroll bar to move the record up and down.)
4. If you find errors or inconsistency in the record, write down the Record ID, the Inspector name, and Activity Number. Notify the inspector about the errors or inconsistencies and ask him to resubmit the revised record.
5. Select **N**ext or **P**rev to examine other PTRS records.
6. Choose **T**ransfer from the **F**orm menu. (A transfer dialog box appears with a list of PTRS records in the directory.) You can also select **P**rint to print the current record.
7. Tap the record IDs to select the records you want to transfer to FSAS. You can select more than one record. The selected records will be highlighted. You can also use the **S**elect **A**ll button to select all records.
8. To deselect a record tap the highlighted file with your pen (or mouse). Use the **U**nselect **A**ll button to deselect all records.
9. Press **O**K to transfer the selected records to FSAS and press **C**ancel to cancel the transfer process.
10. Choose **E**xit! when you are finished.

[6.2 Supervisory Review Help](#)

The Help function provides an on-line version of this manual.

[Hypermedia User Manual for FARS and Inspector's Handbook](#)

[1. On-line Documentation](#)

The PENS **REFS** button accesses the on-line versions of the Federal Aviation Regulations and the Inspector's Handbook. (Currently, only the Airworthiness Handbook is available.) These on-line documents allow you to quickly find specific information without having to thumb through the bulky paper books. It also eliminates the necessity to carry the FARs and the Handbooks to the field. Specific help for these on-line reference systems can be found when you are using it.

Here are the necessary steps to access these documents:

1. Press the PENS **REFS** button. A separate Galaxy Hypermedia window appears on your screen.
2. Press the **Bookshelf** button. Three book icons: **FARs, Handbook** and **ADs**, appear on the screen. (See Figure 1.) The **ADs book icon** is disabled because the ADs documents have not been incorporated into this version.
3. Press the desired book icon to open the corresponding book. The topic outline of the book will appear on the screen. (Figure 2 shows an example of the topic outline.)
4. When the Outline is first displayed, all topics are shown in a collapsed state with subtopics not shown. The three-dots following a **file icon** indicates the topic contains hidden subtopics. To display hidden subtopics either press the **file icon** twice, or select the topic and then choose the **Expand** menu item from the **Outline Menu**.
5. All hidden subtopics can be displayed by choosing the **Expand All** menu item from the **Outline Menu**.
6. To hide subtopics for a selected topic, either press the selected topic **file icon** twice, or choose the **Collapse** menu item from the **Outline Menu**.
7. Subtopics for all topics can be hidden in one step by selecting the **Collapse All** menu item from the **Outline Menu**.
8. To view a selected topic (or subtopic) either press the selected topic twice, or choose **View Topic** from the **Outline Menu**. A Viewer window will appear, displaying the selected document. (See Figure 3.)
9. You can also use the search function to quickly locate specific information. See the Search section for more detailed information.

Searching for a specific information.

To search for a specific information, first you will have to choose the location of the search from the **Search Menu**:

This Chapter searches for the information in a chapter or a portion of the chapter.

Entire Book searches for the information in the whole book.

When you are searching for the information in a chapter, a Find dialog box will appear. (See Figure 4.) Here are the steps to search for a specific phrase or term in a chapter.

1. Enter the terms or phrase to search in the **Find** box, choose the search direction, and then press OK. Boolean conditions can be assigned to the search string. For example, the search string "(cats and dogs) or "wild horses"" will execute a search for the documents that contain the terms "cats" and "dogs" or the phrase "wild horses".
2. The Hypermedia Viewer will display and highlight the first occurrence of the search term.
3. Use either the **Find Next icon** or the **Find Next** menu item to find the next instances.
4. Use either the **Find Previous icon** or the **Find Prev** menu item to find the previous instances.

When you are searching for the information in the entire book, a Search dialog box will appear. (See Figure 5.) Here are the steps to search for a specific phrase or term in a book.

1. Enter the terms or phrase to search in the **Enter Search:** box. Boolean conditions can be assigned to the search string. For example, the search string "(cats and dogs) or "wild horses"" will execute a search for documents that contain the terms "cats" and "dogs" or the phrase "wild horses".
2. Check the **Same Paragraph** button when you want to locate the paragraphs that contains all the search terms or phrases.
3. Press the **Enter** key or the **Do Search** button.
4. The **Topic Found** box will display all topics where search conditions were satisfied.
5. Press the topic twice to view the document.

Copying information to the PTRS form.

You can copy any information from the Viewer into the comment box in Section IV of the PTRS form. Here are the steps to copy the information:

1. Open the desired document.
2. Select the portion you wish to copy by dragging your pen (or mouse) across the document.
3. Select **Copy** from the **Edit** menu.
4. Switch to the PENS PTRS form.
5. Press the **TRANSCRIBE** button.

6. Press **Shift-Insert** keys simultaneously.

Exiting the On-line Documentation.

Choose **Exit** from the **File** menu.