Chapter Four
Coordinated Development and Evaluation of Database Design for Future Systems

4.1 Summary

The research team considered an improved database management system that is tailored to the needs and responsibilities of the Flight Standards Service (AFS) Aviation Safety Inspectors (ASI). The result of this effort was a prototype interface design that provides an easy means for interacting with the various AFS database systems. The research team designed the prototype interfaces using the same user-centered design methods and criteria described in previous sections. A series of prototype and evaluation phases have culminated into a recommendation for an improved database management system.

4.2 Requirements Definition

After consultations with various ASIs and other information system contractors, a general set of guidelines were developed for this concept. First the new database interface had to be reconfigurable. The local system manager needed to be given some latitude to decide which applications and database systems will be presented for that Flight Standards District Office (FSDO) and how they will be grouped. Second, the interface was to be a relatively small window that could normally stay on top of all other windows on the display. Third, the interface was to be able to remember its last position on the display and the last application or database system that was used. Fourth, the interface was to use many of the Microsoft Windows user-interface conventions for ease of use and minimal training. Finally, the interface was to be standardized at all AFS offices so that any ASI could use any computer at any location and interact with a similarly configured interface.

4.2.1 Design Concepts

There were several options considered in meeting these guidelines:

Utilizing Program Manager

The first concept considered was just to use the existing Program Manager from the Windows operating system. One advantage was that all Windows users are familiar with this application. Other advantages were a shortened development time (since this is a simple modification of an existing program), and the need for little or no system maintenance. The disadvantages were that Program Manager must be shared with all other Windows applications, and the interface configuration could be easily modified by any user (though some safeguards could be put in place to minimize this problem.)

Developing a Program Manager-like Interface

The second concept was to create a new Program Manager-like interface that would be customized to the AFS needs and yet resemble Program Manager in look and functionality. The advantages were that this interface would act similarly to the existing Program Manager and be fully customizable with the ability to access new bitmaps, icons, colors, etc. Also, advanced features not available in Program Manager such as nested folders would be supported. The primary disadvantage with this approach was that it would require a much longer development time than the other concepts to capture not only all the existing Program Manager functions but all the unique AFS functions as well.

Toolbar Approach

The third concept evaluated was a dedicated small graphical application used to launch specific applications or databases. A tool bar approach could be called up quickly via a hot key to display the available applications and databases on one side of the display. The advantages were that this would be a small unobtrusive window that could ride on top of other windows and give quick access to all other available resources. The disadvantages would be lengthy development time, depending on the number of functions that are contained in the final product (though not nearly as long as the previous concept), and limited room for additional functionality due to restricted window size.

4.2.2 FSEO Prototype

The selected approach for the Flight Standards Electronic Office (FSEO) prototype was the toolbar approach due to its flexibility and moderate development requirements. With this approach, the FSEO prototype was divided into two basic components; the login screen and the base application.

Login Screen

The first component is the login screen which is designed to handle user identification and password access to all national AFS databases. An example of the login screen is shown in Figure 1. Upon activation of the login screen, a video clip of various FAA logos is displayed in the upper right corner. If desired, the video can be stopped by clicking once on the video with the mouse. The user accesses FSEO by entering his or her initials along with a password. When ID recognition occurs, the text fields in the lower left corner show the stored information about the user ID. After a user enters a correct ID and password, the option to change the password for that ID is enabled. The same identification can be used by all national databases and other applications launched with FSEO. This would eliminate the need for a separate user ID and password for each national database that the ASI was authorized to use. Also, with a user identification, the records stored by each inspector can be easily distinguished.

Figure 4.1 FSEO Login Screen

Base Application

The second component is the base application and is designed to activate desktop software and utilities. The base application is further divided into a main window and a group window. The main window contains a series of buttons each associated with a group window. The main window contains additional buttons connecting the user with features such as options and help. When a user selects a group button, the appropriate group window is displayed and becomes active. This window presents a series of application buttons. Each application button consists of an icon with a caption below the icon that identifies a particular database system or software application. Along with the caption, a balloon help feature provides a more descriptive statement about the application. The user then selects an application button to launch that application. Figure 4.1 shows the main window along with an associated group window.

An "always on top" feature is provided with FSEO. The "always on top" state keeps FSEO visible and accessible to the user while running other applications. The only time the FSEO window is minimized is by the direct action of the user. The user then can expand the FSEO window back to full size with the FSEO hot key.

Balloon Help

The balloon help feature activates when the user positions the cursor over an application button. At this time, a window appears adjacent to the button of interest containing descriptive text about the application button. The balloon help text can be any type of desired description, but generally the balloon help is designed to be an expansion of the abbreviation or acronym in the caption. The balloon help is time delayed in order to prevent interference when a user quickly searches for a button to select. The balloon help feature is shown in Figure 4.2.

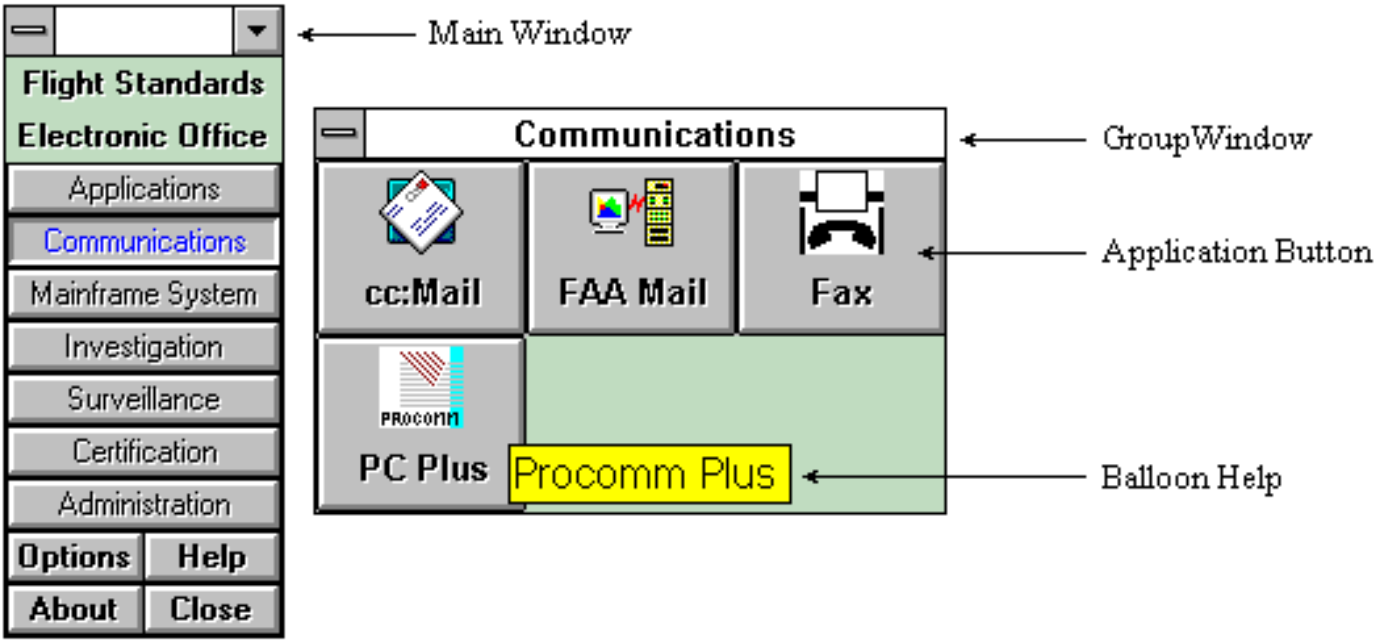

Figure 4.2 FSEO Base Application

Option Utility

Another feature of FSEO is the option utility. The option utility allows a system administrator to perform two operations within FSEO. The first operation adds a new user identification. A new user identification includes information such as name, initials, office and password. The second operation modifies the structure of FSEO. The system administrator can create or modify groups, buttons, icons and balloon help descriptions.

Help Documentation

The help documentation will contain information related to the operation of FSEO. The help documentation provides instructions and explanations for the FSEO components. When pressed, the F1 key launches the context sensitive help. A context sensitive help connects the current component of the program with an equivalent help topic.

4.2.3 User Evaluation

This prototype concepts was presented to six ASIs for comment and review. All agreed that this concept would be a better approach to their interactions with the many applications and databases that they use on a daily basis. Several commented that their own FSDO has implemented a similar type of common user interface application for their specific FSDO. Each agreed though that it would be advantageous if AFS adopted a agency-wide interface standard. The major disadvantage that was cited was how FSDO would interact with the database security procedures that are currently in place. Each database systems currently requires that each ASI have a unique user ID and password. A single point entry system such as FSEO would be a significant departure from current procedures.

4.2.4 Summary

Overall, the purpose of FSEO is to provide a front end for FAA applications utilizing a standard toolbar approach in a Windows environment. FSEO also aids the user by incorporating application identification and documentation for help. The goal for the FSEO project was to produce a fully developed software package that interacts with the national AFS databases and launches applications from an organized set of groups and buttons. As AFS continues to modify and incorporate new technologies and improved data handling procedures, a concept such as FSEO should receive more support from the AFS community.