PSA DATABASE FILES

This section contains additional products that were produced by Calspan during the PSA analysis phase. Please note that the information and support for the data in this section are limited. This section contains the following:

- Two Microsoft Access files that contain the PSA Issues/Risks Database
- A users manual with instructions for operating the Issues/Risks Database
- Two Microsoft Access files that contain the PSA Literature Review Database

These three items are described below:

PSA Issues/Risks Database - The PSA Issues/Risks Database was initially developed by Calspan Corporation for use in their PSA analyses of the automated highway system. The intent of this effort was to summarize the findings in a medium that provides search and filter capabilities. Database implementation has allowed extensive cross-referencing and search capabilities that are not provided by word processing packages.

The start-up password for this database is "new". Users can change this password as per the instructions on page 29 of this manual.

PSA Issues/Risks Database Users Manual - This manual provides instructions on how to load and operate the database. The manual has been indexed for viewing with the Adobe viewer.

PSA Literature Review Database - The PSA Literature Review Database was initially developed by Calspan Corporation for use in their PSA analyses of the automated highway system. The intent of this effort was to provide the literature review in a medium that provides search and filter capabilities. Database implementation has allowed extensive cross-referencing and search capabilities that are not provided by word processing packages. This information is also available within the Calspan body of reports included on this disk. The database files have been included to provide the user with an additional research tool. Although no users manual exists for this database, the function is similar to the Issues/Risks Database. After gaining a familiarity with the Issues/Risk Database and Microsoft Access, you should be able to use this database.

PSA DATABASE MANUAL

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1.0 INTRODUCTION

The PSA Issues / Risks Database was initially developed by Calspan Corporation for use in our precursor systems analyses of automated highway systems. Our intent was to summarize our findings in a medium that provides search and filter capabilities. Database implementation allowed us extensive cross-referencing and search capabilities that are not provided by word processor packages.

A goal of the PSA of AHS study was to standardize issues and key findings formats so that the consortium could resolve them more easily. Therefore, MITRE, under the direction of FHWA, asked Calspan to expand the PSA Issues / Risks Database to accommodate the other PSA contract teams. This involved adapting our input form to reflect the data which FHWA required and changing the database structure to reflect the input form changes. By using MITRE's input form and adapting our database to accommodate all of the PSA contract teams, a standardized format for the issues and risks was accomplished.

When using this database, you will discover that in the add, browse, and report features, specific Calspan options exist. This was necessary because the Calspan input form, while reflecting all of FHWA changes, still includes the task origin and RSC impact fields as contained on our original database form. These fields were included for Calspan study purposes.

2.0 INSTALLATION

A copy of Microsoft Access 2.0 is needed in order to run the PSA Issues / Risks Database. If Access 2.0 is not installed on your PC install it. Consult the Access 2.0 User's Guide for installing Access.

> Note: Before using the PSA Issues / Risks Database, it is a good idea to familiarize yourself with Microsoft Access 2.0. The Microsoft Access Getting Started Manual is a good place to begin.

Before copying the PSA Database files to your hard drive you may wish to create a specific directory where the database will reside. For help on the following procedures consult your DOS or Windows manuals.

Create a directory on the hard drive where you intend to store the database files. This can be accomplished two ways. From the DOS prompt, use the make directory command. For example:

1. Type: cd\ {ENTER} - DOS will display c:\>
2. Type: md issues {ENTER} - DOS will display c:\>

Or from the File Manager in Windows use these steps:

1. From the File Menu select Create Directory - A dialog box appears.
2. Type the directory name you want to create - for example, c:\issues
3. Select OK; Windows will create the directory.

Now we need to copy the PSA Issues / Risks Database files to the PC's hard drive. Insert the PSA Database CD-ROM disk provided into your D: or E: drive. From the DOS prompt use the following procedure:

1. Type cd c:\{directory name you created}; for example, cd c:\issues
2. Use the copy command to move the files from the CD-ROM disk in d:\psa_data {or e:\} to the hard drive. For example type,
   copy d:\psa_data*.* c:
3. When finished, DOS will display the message 2 file(s) copied.

Using the File Manager in Windows:

1. Place the CD-ROM disk provided in the appropriate drive.
2. Make sure you are in the proper directory on the hard drive. You can use the mouse (or keyboard up and down arrows and ENTER) to select a directory.
3. Select the d: {or e:} icon using the mouse (or use Disk Select Drive from the menu bar). This will display the contents of the CD-ROM disk.
4. Highlight the files on the CD-ROM:
   - Using the mouse - click once on the top file hold down the SHIFT key and click on the other file
   - Using the keyboard - press TAB to get to the file list hold the SHIFT key and use the down arrow to select the files
5. Copy the files to the hard drive - use the mouse to drag them to the c: icon (or press F8 or Copy from the File Menu and type the directory you will be copying the files to). A dialog box will appear to confirm this action.

You can now open Microsoft Access and open the database from the Access File Menu. The proper file name is PSA_DATA.MDB. To automate this procedure, we can create a new widows group (or item) containing the database that, when double-clicked on with the mouse, will automatically open Access using the PSA Issues/Risks Database. Use this procedure to create the PSA Database item:

Note: For more help on this procedure, consult your Windows manual.

1. Choose New from the Windows File Menu. The New Program Object dialog box will appear asking if you want a new item or group. If you select New Group, type the name of the group that the PSA Database will reside in and press ENTER. For example, use the name PSA of AHS Issues / Risks Database.
2. To create a new item in a Windows Group choose New from the Windows File Menu and select Program Item and choose OK, the Program Item Properties dialog will appear.

3. Select the Browse command button.
4. From the Browse dialog select the directory which contains the database files. From the List Files of Type list in the dialog choose All Files. Select the file PSA_DATA.MDB and choose OK, this will return you to the Program Item Properties dialog.
5. Fill out any other information (e.g., working directory, Program Item Name, etc.) or change the icon and select OK. Windows will create the PSA Database item.
6. When you double-click on the PSA Database item, Access will open with the PSA Database as the default file.

Note: The above procedure can also be accomplished using the File Manager in Windows. Select the PSA_DATA.MDB file with the mouse and drag it to an existing group in the Windows Program Manager - Windows will automatically create the PSA_DATA Item.

3.0 LOGGING ON

When the PSA Database opens, a Log On dialog box appears as shown in figure 1.

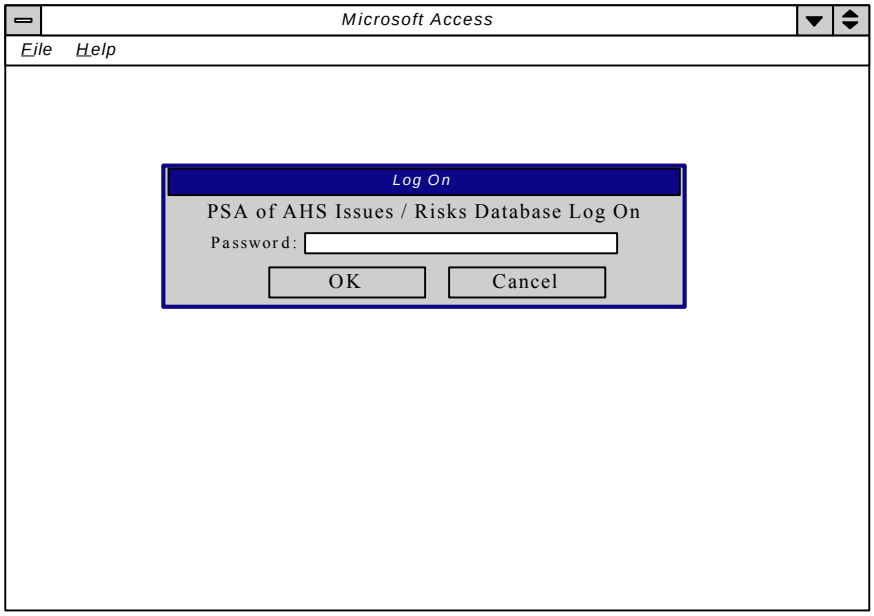


Figure 1. PSA Log On Screen

The start-up password for this database is new . Users can change this password as per the instructions on page 29 of this manual.

You must enter the correct password (up to eight characters) in order to use the PSA Database. If you enter an incorrect password, a message box will appear stating that the password you entered is incorrect. There is no limit on the number attempts

used to log on. If you select the Cancel option, the message shown in figure 2 will appear. when you select OK the program will automatically exit access. So write the password down in a safe place.

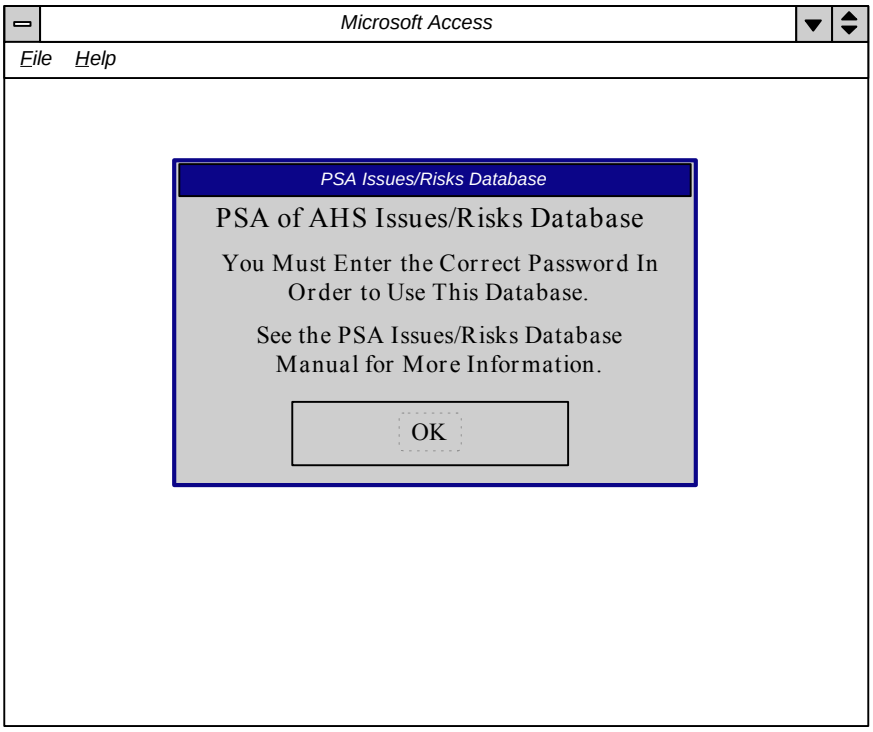


Figure 2. PSA Database Log On Cancel Message

If the password is entered correctly, the Main Menu, shown in figure 3, will appear. There are five features available. They include:

- Add New Issues
- Browse Issues
- Report Issues
- Exit the PSA Database
- Options

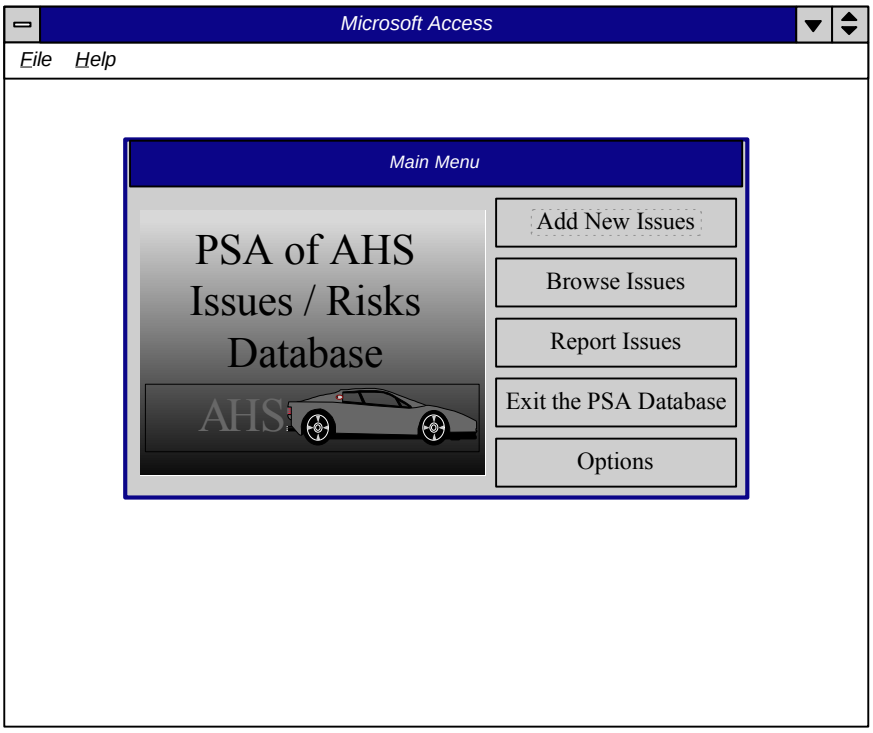


Figure 3. PSA Database Main Menu

When the user selects Exit the PSA Database, the file will automatically close and exit Microsoft Access (This can also be accomplished by selecting Exit from the File Menu). The Help menu provides three features Contents, Search, and About the PSA Database. The help files available are the standard Microsoft Access help files and are not specific to this database.

4.0 DATA INPUT

The PSA Database is intended for capturing issues, risks, concerns, and conclusions/findings that come from PSA activities. When entering data put yourself in the consortium role and consider the following:

- Is the item relevant to AHS?
- Is it “value added”?
- Will it be useful to consortium engineers?
- Is it actionable?

The term actionable refers to an issue that is a concept- or architecture-level item--not a design-level item, but also not an item that is so broad that a team of people cannot be put to work on it. Remember that the primary “audience” for AHS issues will be the consortium; it is their job to see that all issues are identified and resolved. Items captured should all be supported by specific sections of your research and its documentation.

4.1 Adding Records

From the Main Menu select the Add New Issues Button by pointing to it and clicking the left mouse button. The dialog box, shown in figure 4, will appear. The user has three options:

- Add New Issues
- (Add New Issues) Use the Calspan Input Form
- Return to the Main Menu

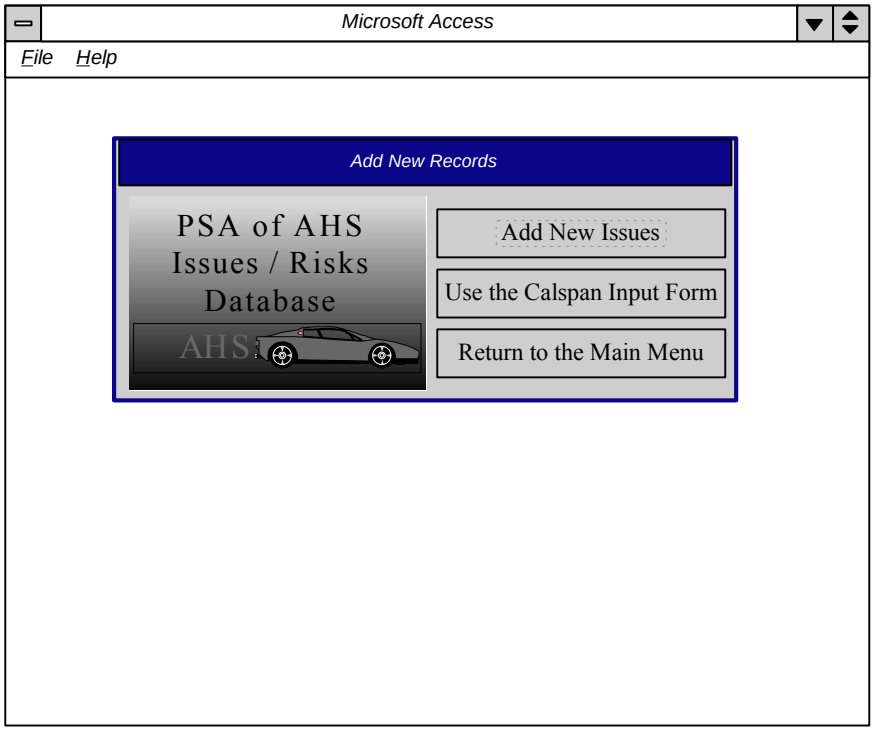


Figure 4. Add New Records Dialog

Note: Keyboard Users, use the ENTER key to select the Add New Issues Button. Use the TAB or up/down arrow keys to move from one command button to another.

4.1.1 Add New Issues Using the Standard Input Form

Selecting the Add New Issues from the Main Menu button brings up the dialog screen shown in figure 4. A blank input form opens with (Counter) listed in the Item Number field. The Access screen showing the standard input form is shown in figure 5. A hardcopy printout of the Input form is also included in the Appendix. The item number is automatically entered by the database when an entry is placed in any of the fields on the input form. The item numbers are assigned sequentially. The item number field serves as the Primary Key for the PSA database records. For an explanation of Primary Key see the Microsoft Access 2.0 User's Guide pages 29, 118.

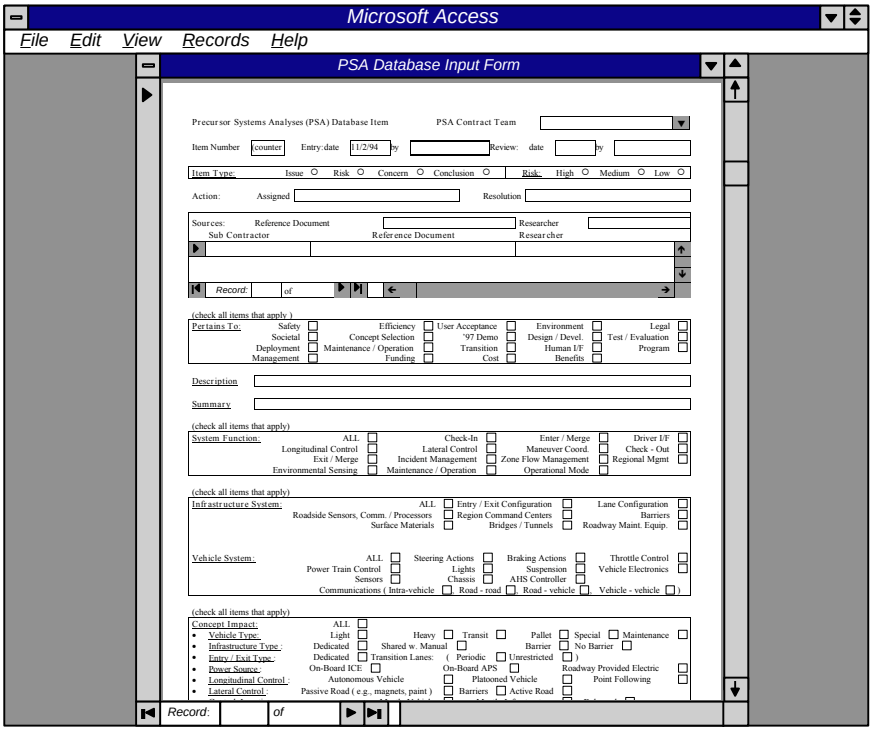


Figure 5. Standard PSA Database Input Form

Note: Item Numbers do not necessarily correspond to the database record numbers.

4.1.1.1 Selecting Fields From a Drop Down List

Drop down lists are used in the PSA input form to facilitate data entry. The PSA Contract Team field contains a list of the 15 teams awarded contracts by FHWA to perform precursor systems analyses of automated highway systems. To select the appropriate organization from the list, click the down arrow to the right of the PSA Contract Team field with the left mouse button. A list will appear with the names of the 15 PSA teams. You can select the appropriate team by any of these methods: (The mouse is the most efficient method)

Note: Keyboard Users, ALT+DOWN ARROW or the F4 key activates the drop down list.

1. Select the name of your team with the mouse and click the left mouse button.
2. Use the down arrow on the keyboard to highlight your team and press enter.
3. Type the first few characters of the team name until the proper team is identified and hit enter.
4. Type your contract team's name.

4.1.1.2 Field Specifics

The following fields are contained in the PSA Input form:

- Entry: Who on your team captured the item and when?
- Entry Date: This field defaults to the current date of when the item was recorded, you can change it by typing a date in the field. The proper format is mo./dd./yr. To reenter the default value use CTRL+ALT+SPACEBAR.
- Review: Who on your team reviewed the item and when?
- Item Type: The item type is selected by pointing to the proper choice and clicking the left mouse button. (The SPACEBAR can also be used to select the proper checkbox.) There are four possible choices:
  - "Issues" refer to items where there are reasonable questions concerning how to proceed; issues may arise as concerns are addressed; they should be posed as questions; Issues are resolved.
  - "Risks" are conclusions that identify potentially negative situations that, if they happen, could result in system failure or major problems; severity of risk can be indicated; Risks are Managed.
  - "Concerns" is for items that may be risks or issues, but sufficient analyses has not yet been done to know for sure; Concerns are addressed (perhaps through further analysis.)
  - "Conclusions" are supportable results of analyses; they may be resolved issues; Conclusions reference supporting analysis
- Action: This field is for use by the consortium.
- Sources: Indicate your team name, reference the document in which the basis for the item can be found (use whatever identification will be on the documentation submitted to FHWA), and the name of the researcher on your team. If more than one document references this item, list them.

4.1.1.3 Using a Subform

The PSA Database Input form contains a subform (the Sub Contractor, Reference, and Researcher fields) which is used to list references. This subform represents a detail table in the database. Detail tables store the many side of a one-to-many relationship for a database record.

Note: The one-to-many relationship is defined on page 128 of the Microsoft Access 2.0 User's Guide.

This subform is activated by pointing to any of its three fields with the mouse and pressing the left mouse button.

Note: the TAB can also be used to navigate through the form field using the keyboard.

Any number of supporting references can be listed. You can move through any of the Sub Contractor (Reference) Sub Form by using the TAB key, the right / left keyboard arrows, or the mouse. Use the ENTER key to add a new record to the

subform. The number of records entered in the subform is shown on the lower left hand side of the subform. You can browse through these records using the up and down arrows on the keyboard or the mouse.

Note: Keyboard Users: Depress the CTRL+TAB keys to exit the subform and move to the next record of the main form.

4.1.1.4 Remaining Fields

Note: Keyboard Users: The spacebar can be used to check or uncheck a field using a Checkbox control.

- Pertains To: The item must pertain to at least one of the categories shown. Check a box by pointing to it with the mouse and clicking the left mouse button.
- Short Description: This field provides a descriptive title for the item; no more than 10 words.
- Summary: Summarize so the reader can understand the essence, list additional references, no more than 200 words. Use CTRL+ENTER to add a new line to a memo field.
- System Function: Check those functions related or most closely related to the item.
- Infrastructure and Vehicle System: Check those elements of AHS that the item impacts.
- Concept Impact: Check the characteristics of the AHS concept that may be affected by the item.

4.1.2 Calspan Form Differences

A sample Calspan Input form Access screen is shown in figure 6. A hardcopy printout of this form is also included in the Appendix.

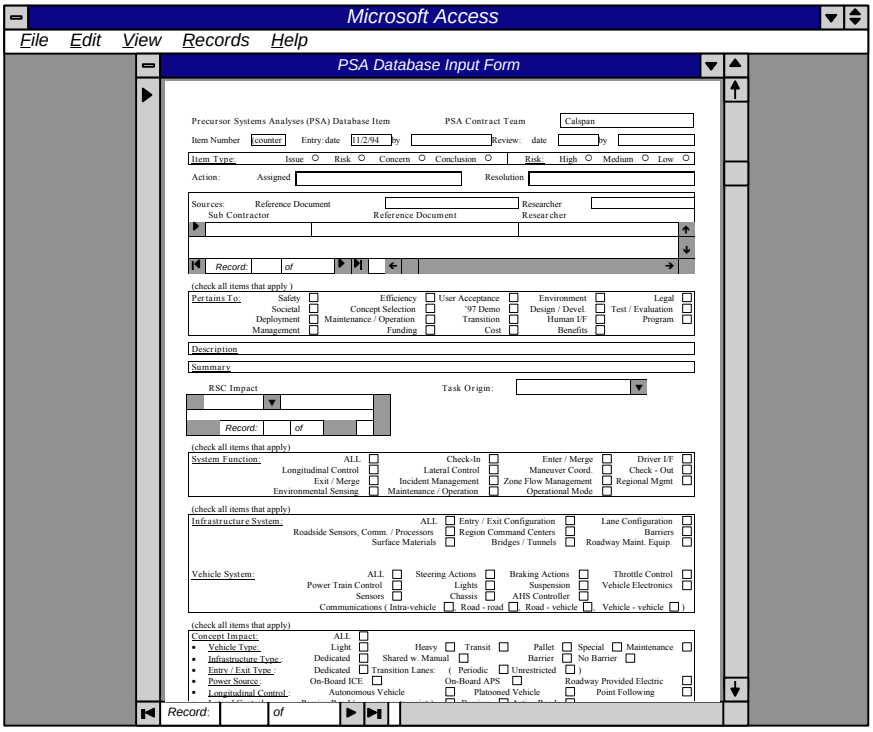


Figure 6. Calspan PSA Database Input Form

This form automatically defaults the PSA Contract Team field to Calspan and contains the RSC Impact and Task Origin fields. These fields are described as follows:

- RSC Impact: This form is also a subform similar to the Sub Contractor subform above. To select an RSC impact use the mouse, ALT+DOWN ARROW, or F4 key to activate the drop down list and make your selection (or type the appropriate RSC number or ALL). Press the ENTER key to add a new record to the subform. When finished use CTRL+TAB or the mouse to exit the RSC subform.
- Task Origin: The task that originated the item can be selected from a drop down list which shows the 17 PSA tasks. Activate the drop down menu using the mouse, ALT+DOWN ARROW, or the F4 key and make your selection. You can also type the FHWA designation to select your task origin from the list.

4.1.3 Making Data Entry Easier

Certain shortcuts can be used to make data entry easier. The CTRL+’ key combination will insert the same value in the field that was in the previous record. The CTRL+; combination will insert the current date.

4.1.4 Adding New Records In the Input Form Mode

To add new records with the Input form screen select Add New from the Records Menu at the top of the form screen or use the TAB key from (Control Location:) Balanced field on the form.

4.1.5 Record Navigation

The number of records added for the data input session is shown in the bottom left hand corner of the screen as shown in figure 7. You can view various records by manipulating the navigation buttons with the mouse.

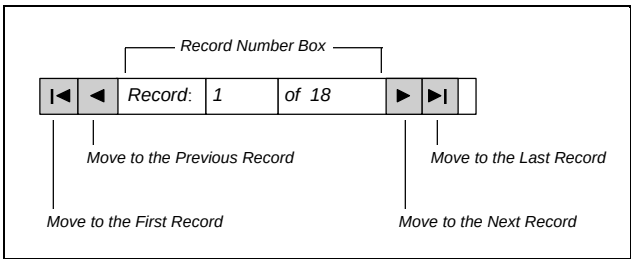


Figure 7. Example Access Form Record Navigation Buttons

To move to a specific record double click the left mouse button in the record number box (or press the F5 key), type the record number, and press ENTER.

The Records menu also provides the following database record navigation options:

- Goto First
- Goto Prev
- Goto Next
- Goto Last

5.0 BROWSING RECORDSIN THE DATABASE

From the Main Menu Select the Browse Issues command button. The dialog box shown in figure 8 will appear providing the following options:

- Browse Issues
- Browse Issues Using the Calspan Form
- Return to the Main Menu

Figure 8. Browse Records Dialog

5.1 Browse Issues

Selecting the Browse Issues option from the Browse Records dialog opens the PSA Contractor Browse Form dialog box shown in figure 9. This form allows the user to filter the database records using any of the fields contained on the form. If no filter criteria are selected, all of the database records will appear.

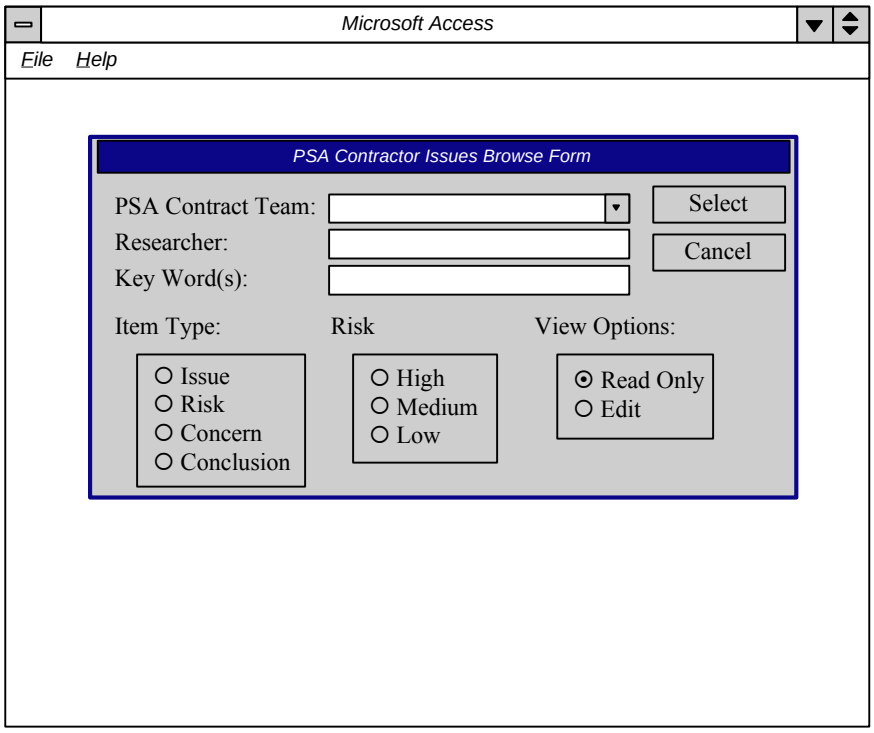


Figure 9. PSA Contractor Browse Form

5.1.1 Explanation of Browse Form Fields

The PSA Contractor Issues Browse Form filters the database records on any of or any combination of the five fields shown. The field, View Options, allows the user the option of viewing the records in the Read Only (the records can not be altered) or the Edit mode (any record information can be changed). The default view is read only.

The field descriptions are as follows:

- PSA Contract Team: This field contains a drop down list identical to that on the input form. Select your contract team from the list or type your team name.
- Researcher: This field queries the database on the researcher field contained on the main form. Any combination of letters can be used here to sort issues on an appropriate researcher much like a key word search. Therefore, the user does not have to type in the researcher's name exactly. However, spelling counts.
- Key Word(s): This field allows a key word search on any of the database item descriptions.
- Item Type: Select any of the four item types.
- Item Risk: Select any of the three risk types available.

After filling in the appropriate filter criteria and view mode, use the Select button to view the database records through the Input Form. The Cancel button returns you to

the Main Menu. A sample Access screen browse output is shown in figure 10. Access browse results are also included as full page printouts in the Appendix.

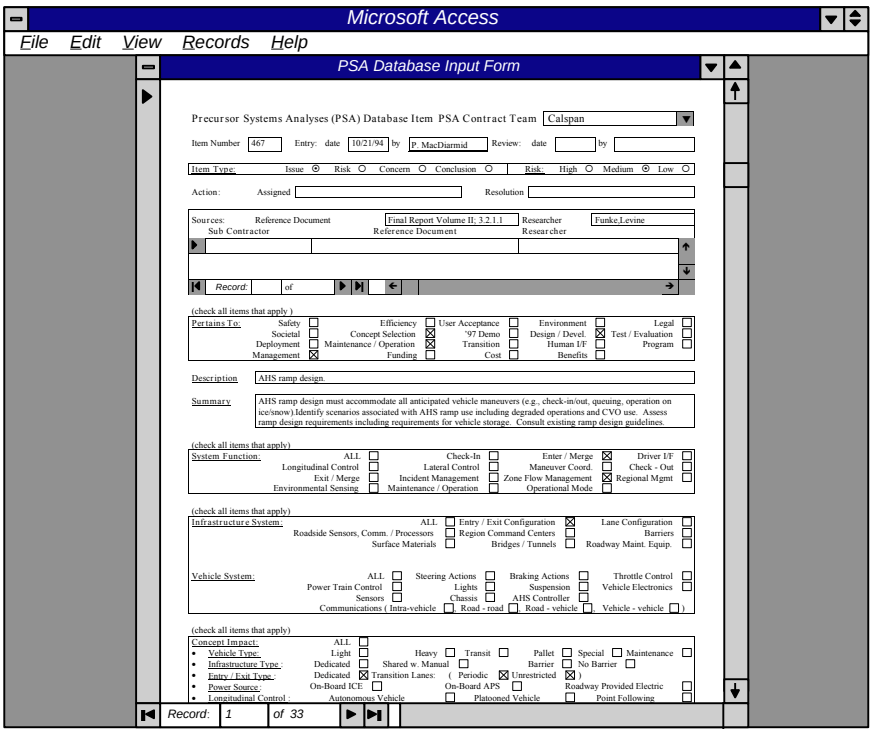


Figure 10. Sample PSA Contractor Browse Filter Output

Note: Consult figure 7 for the record navigation techniques used in the browse mode.

5.2 BROWSE ISSUES USING THE CALSPAN FORM

Select the Browse Issues Using the Calspan Form option from the Browse Records Dialog. The Calspan Issues Browse Form dialog box will appear as shown in figure 11.

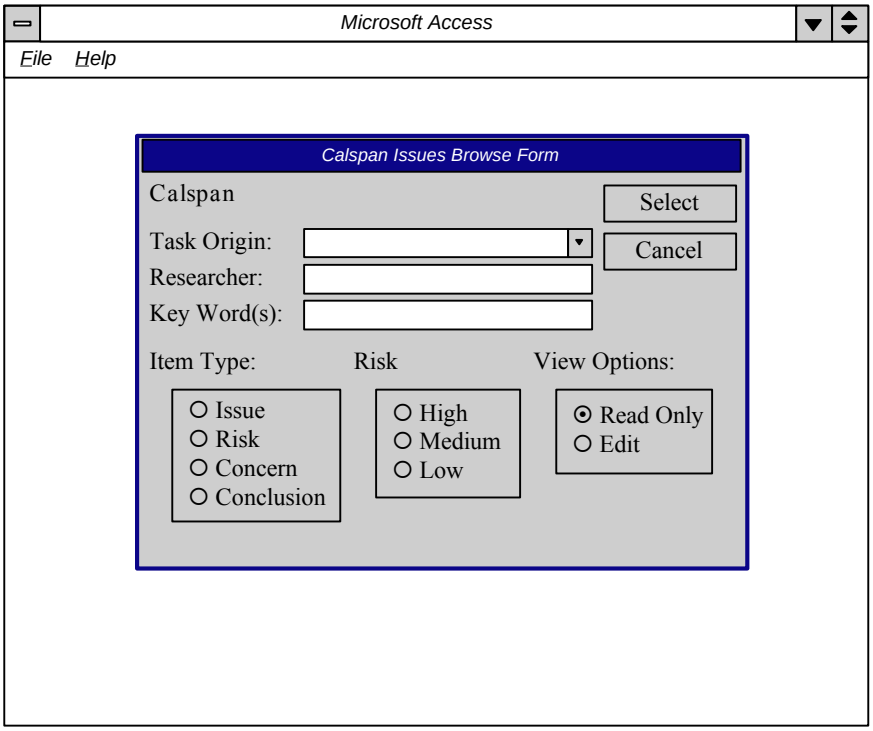


Figure 11. Calspan Issues Browse Form

This form is similar to the standard browse form dialog. However, the PSA Contract Team defaults to Calspan and the Task Origin field is added. You can select the appropriate Task Origin from the drop down list identical to that on the Calspan Input Form or type the one letter FHWA designation. Again the default view is Read Only. A sample Calspan browse filter output is shown in figure 12.

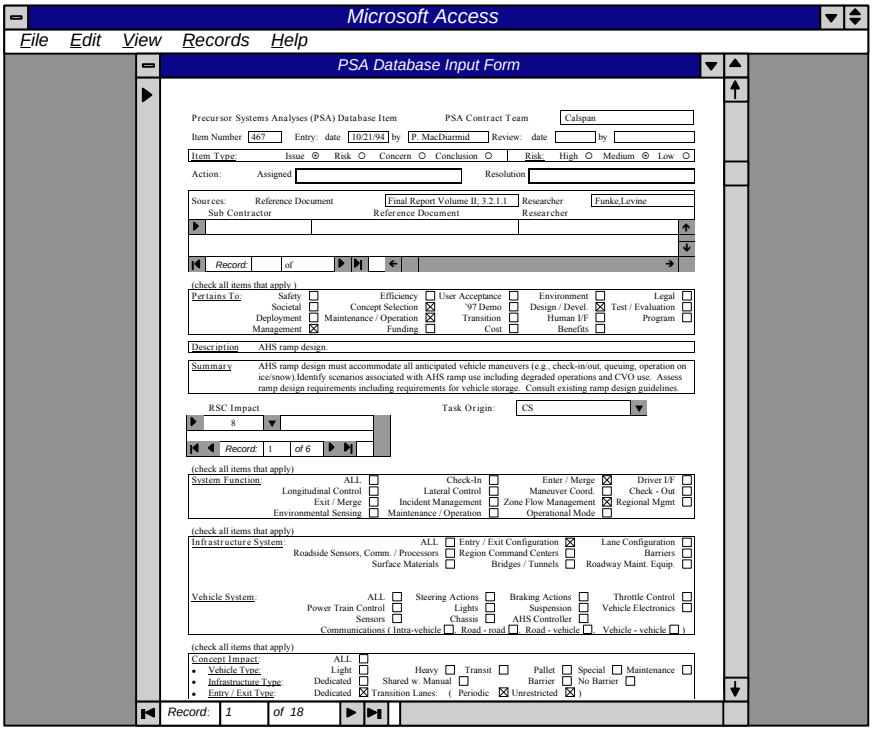


Figure 12. Sample Calspan Browse Filter Output

6.0 REPORTING

From the Main Menu select the Report Issues command button, the PSA Database Report Form Dialog will appear as shown in figure 13. There are two standard report types in the PSA Database. Both summarize the database items into formats which present data more clearly for use in other documents. The default report contains item type, risk, PSA contract team, researcher, description, and main reference document. The second report option adds the item summaries to the standard report information.

Note: All the report outputs discussed in this section are included in the Appendix as full page printouts.

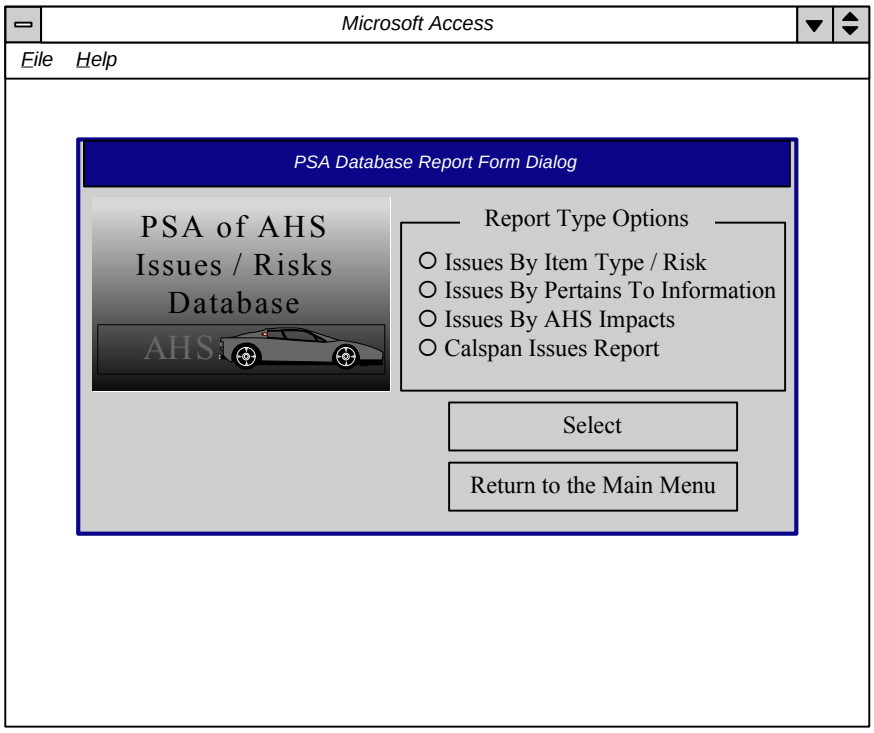


Figure 13. PSA Database Report From Dialog

Four report filter options are provided:

- Issues By Item Type/Risk
- Issues By Pertains To Information
- Issues By AHS Impacts
- Calspan Issues Report

6.1 Issues By Item Type/Risk

After selecting the Issues By Item Type/Risk option from the PSA Database Report Form Dialog, the Item Criteria Selection Form will appear. This form is shown in figure 14.

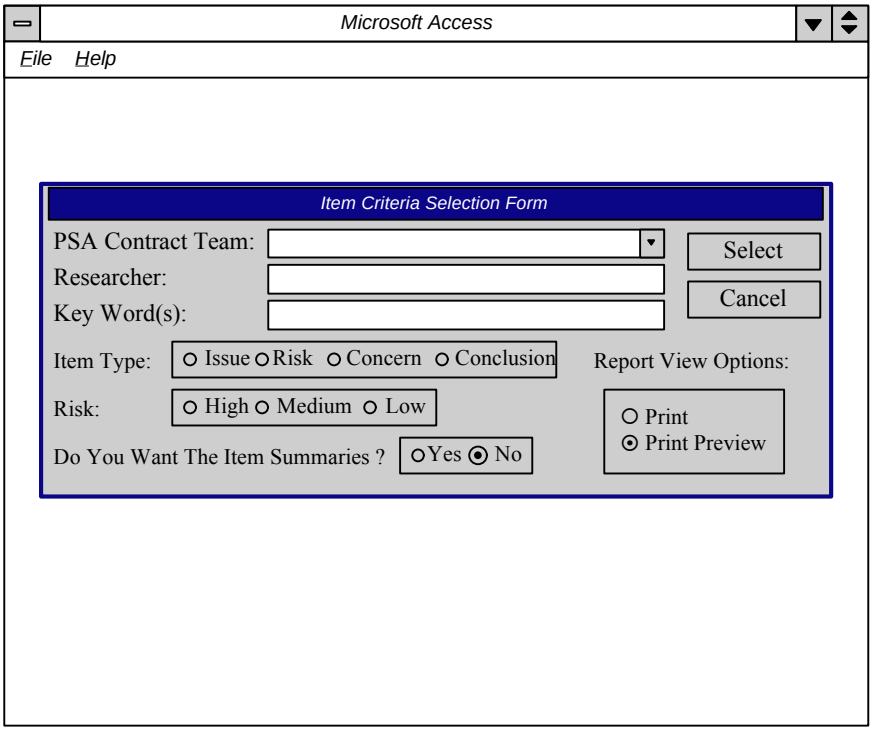


Figure 14. Item Criteria Selection Form

The Item Criteria Selection Form is similar to the PSA Contractor Issues Browse Form discussed earlier. The PSA Contract Team, Researcher, Key Word(s), Item Type, and Risk fields filter the database records based on the user inputs. If no criteria is selected, all of the database records will be reported. The default report output is shown in figure 15.

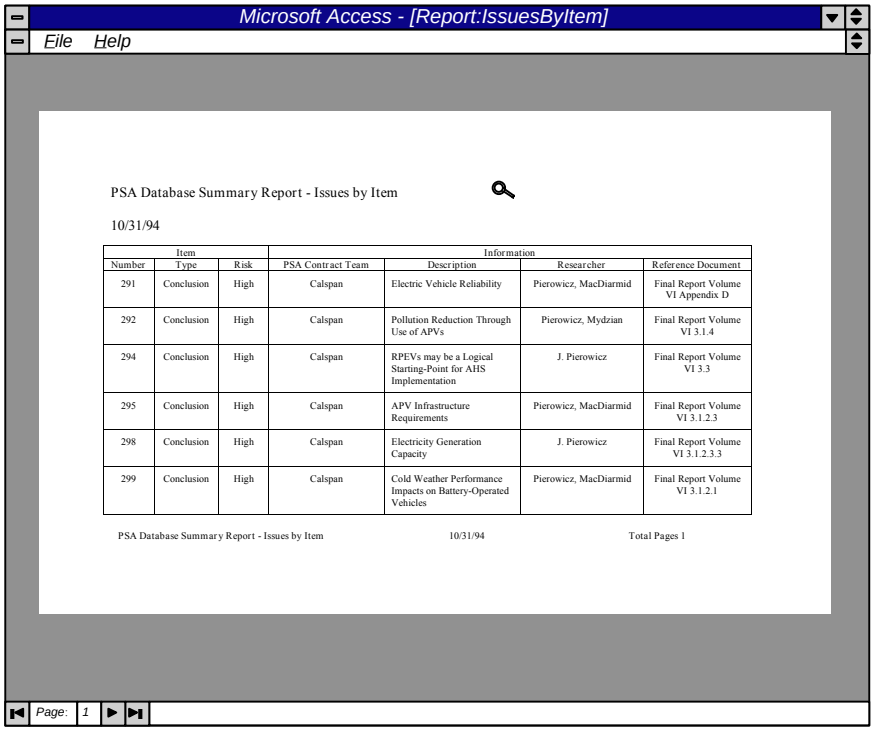


Figure 15. PSA Database Summary Report - Issues by Item

Moreover, two additional report options appear on this form, the Do You Want The Item Summaries? selection box and Report View Options box. The default values for these fields are no summaries and print preview. If the user wants item summaries the summaries report, as shown in figure 16, will appear. Selecting the Print report view will automatically queue the report to the printer.

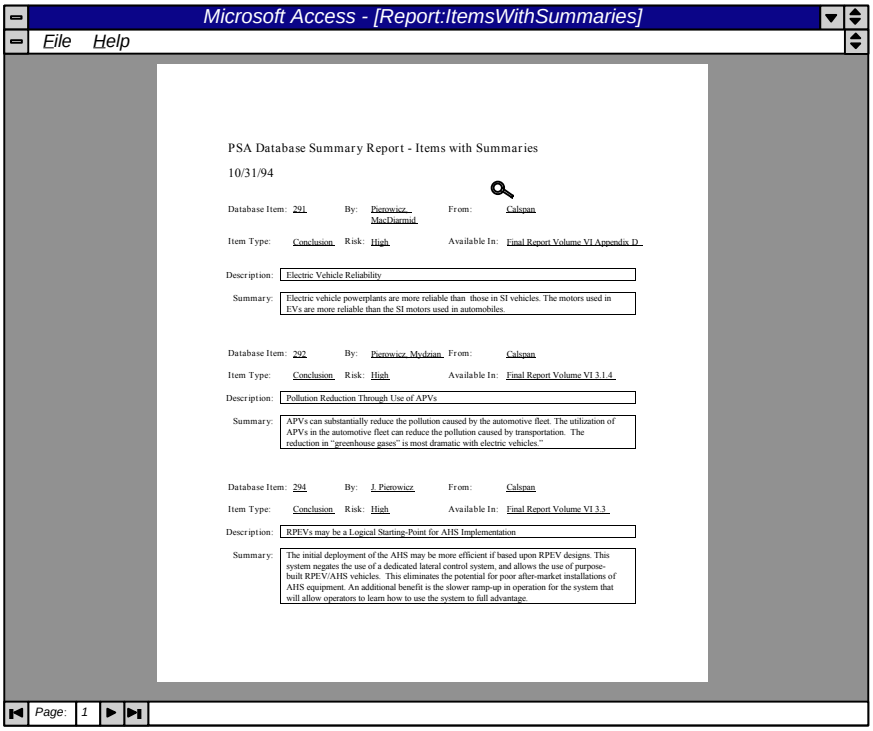


Figure 16. PSA Database Summary Report - Items With Summaries

6.2 Issues By Pertains To Information

Selecting the Issues By Pertains To Information option on the PSA Database Report Form Dialog will open the Pertains To Criteria Selection Form. This form is similar to the Item Criteria Selection Form but it adds the Pertains To fields from the PSA Input Form. The Pertains To Criteria Selection Form is shown in figure 17.

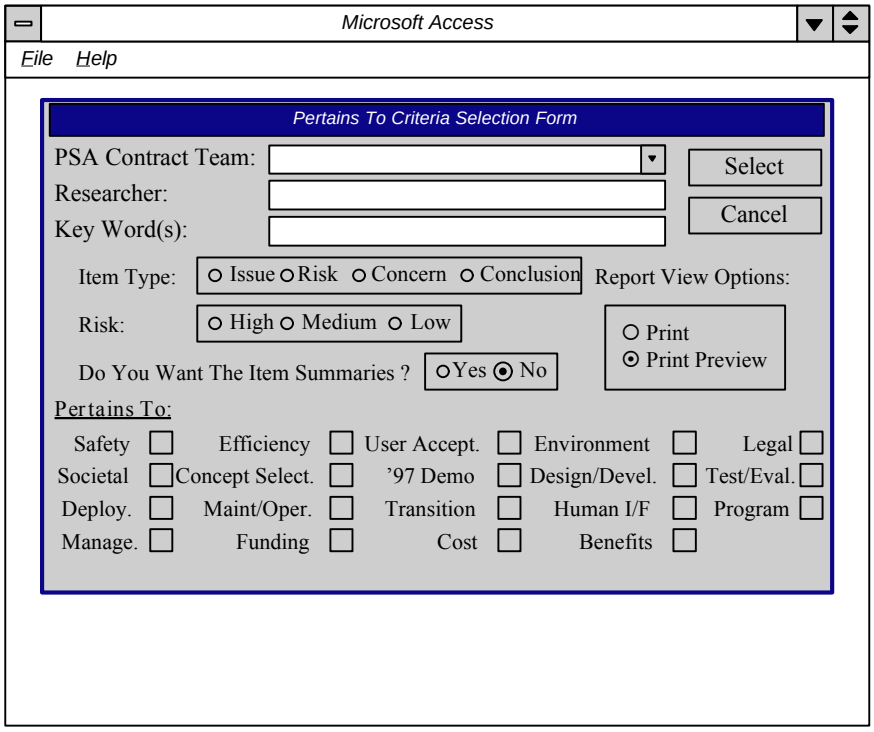
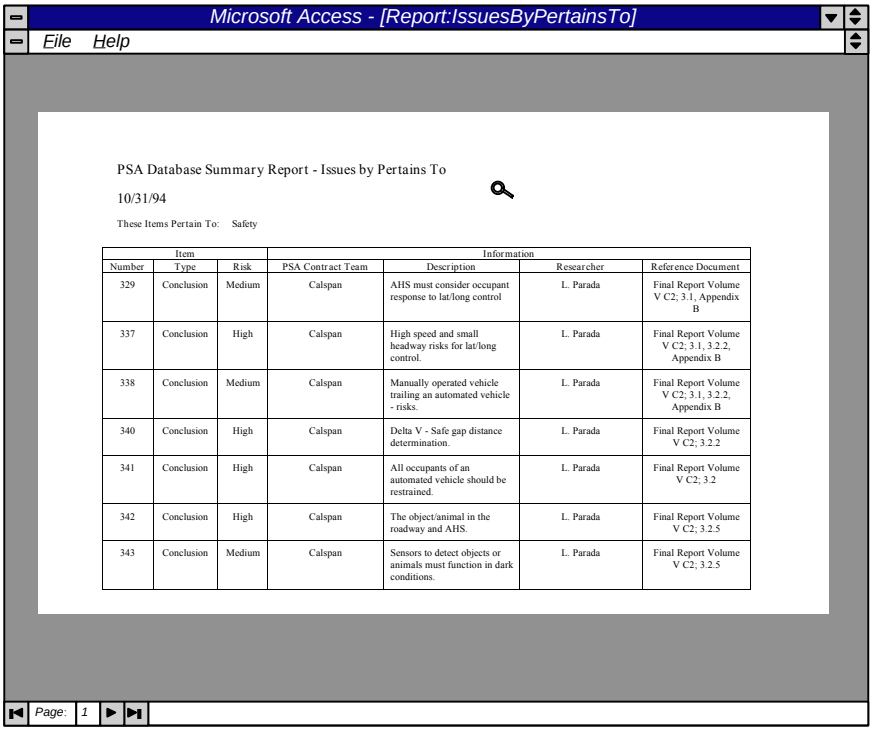


Figure 17. Pertains To Criteria Selection Form

The Pertains To Criteria Selection Form allows the user to further filter the database records using the Pertains To options. The default views are no summaries and print preview. The default Pertains To Criteria report is shown in figure 18. Notice that this report contains a string in the header which shows the user selected Pertains To criteria that the records were filtered on.



Item			Information			
Number	Type	Risk	PSA Contract Team	Description	Researcher	Reference Document
329	Conclusion	Medium	Calspan	AHS must consider occupant response to lat/long control	L. Parada	Final Report Volume V C2; 3.1, Appendix B
337	Conclusion	High	Calspan	High speed and small headway risks for lat/long control.	L. Parada	Final Report Volume V C2; 3.1, 3.2.2, Appendix B
338	Conclusion	Medium	Calspan	Manually operated vehicle trailing an automated vehicle - risks.	L. Parada	Final Report Volume V C2; 3.1, 3.2.2, Appendix B
340	Conclusion	High	Calspan	Delta V - Safe gap distance determination.	L. Parada	Final Report Volume V C2; 3.2.2
341	Conclusion	High	Calspan	All occupants of an automated vehicle should be restrained.	L. Parada	Final Report Volume V C2; 3.2
342	Conclusion	High	Calspan	The object/animal in the roadway and AHS.	L. Parada	Final Report Volume V C2; 3.2.5
343	Conclusion	Medium	Calspan	Sensors to detect objects or animals must function in dark conditions.	L. Parada	Final Report Volume V C2; 3.2.5

Figure 18. PSA Database Summary Report - Issues by Pertains To

The Pertains To report with summaries is shown in figure 19.

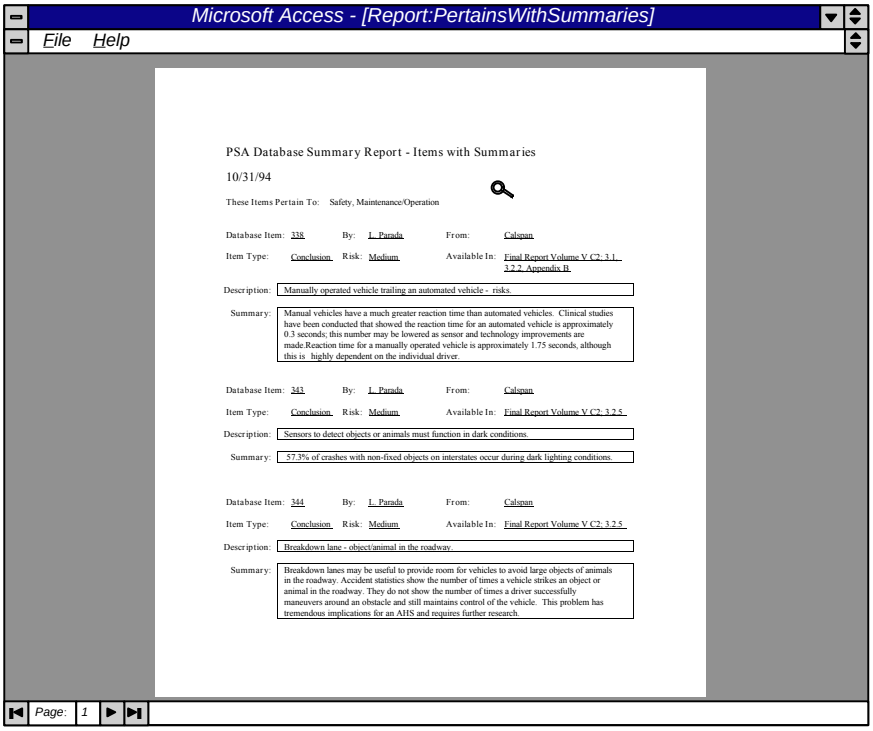


Figure 19. PSA Database Summary Report - (Pertains To) Items With Summaries

6.3 Issues By AHS Impacts

Selecting the Issues By AHS Impacts option from the PSA Database Report Form Dialog opens the PSA System Criteria Selection Form. This form, shown in figure 20, provides the same selection criteria as the Item Criteria Selection Form but includes the AHS impacts section from the PSA Input form as well.

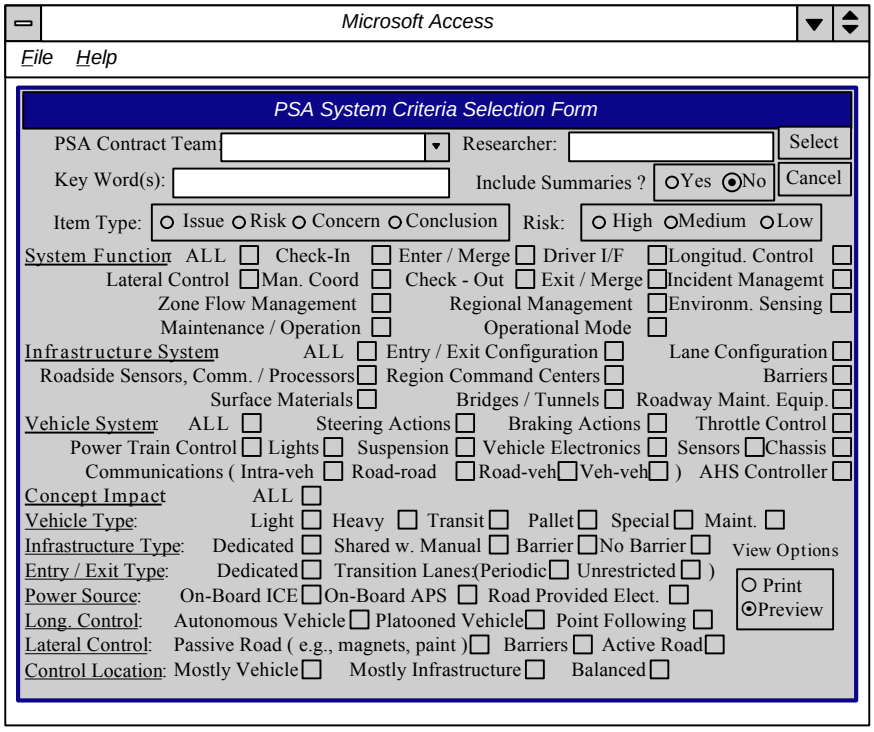


Figure 20. PSA System Criteria Selection Form

Therefore, the user can filter the database records using the AHS impacts selections. The default report is shown in figure 21. Notice that the AHS impact selections are written out as strings in the report header. (One string per section, i.e. System Function, Infrastructure System, etc.) If a particular System Area filter is not selected, no string appears for that section.

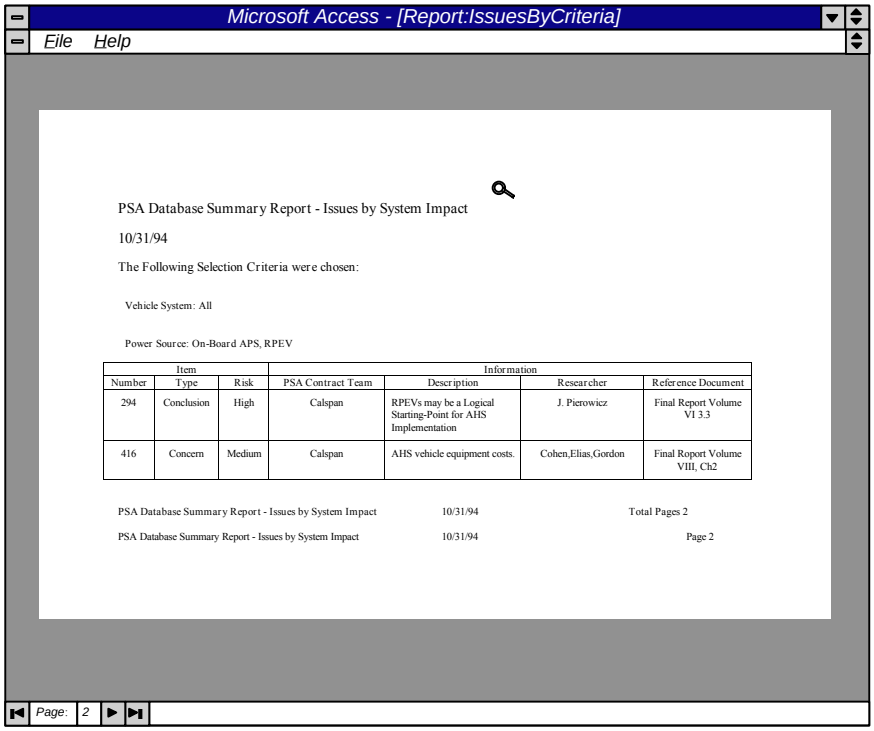


Figure 21. PSA Database Summary Report - Issues by System Impact

The System Impact report including item summaries is shown in figure 22.

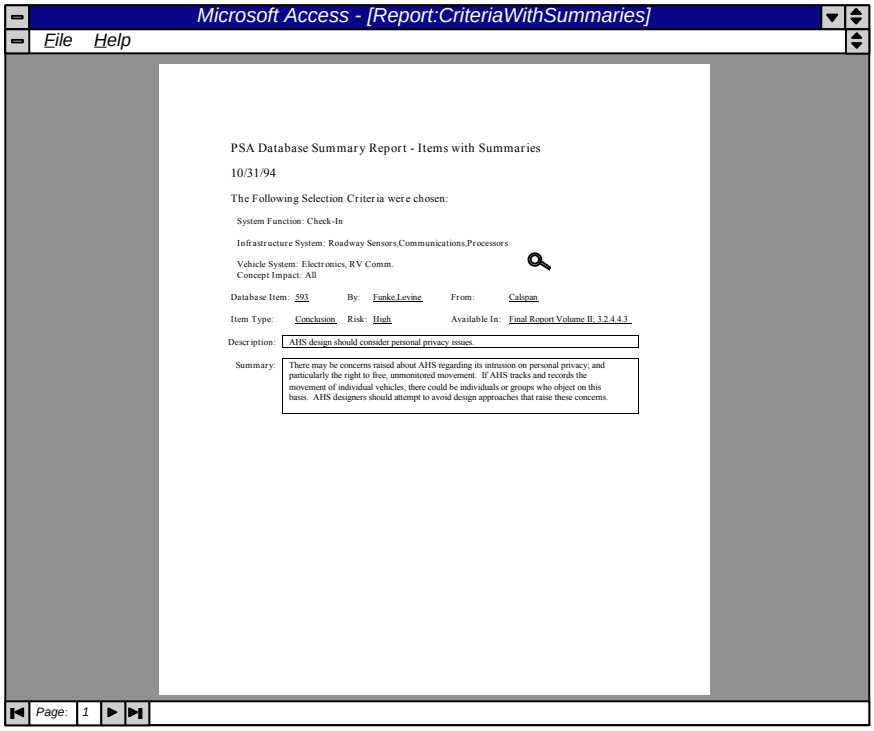


Figure 22. PSA Database Summary Report - (System Impact) Items With Summaries

6.4 Calspan Issues Report

Selecting the Calspan Issues Report option from the PSA Database Report Form Dialog opens an Item Criteria Selection Form automatically defaulting the PSA Contract Team to Calspan. The Calspan form is shown in figure 23.

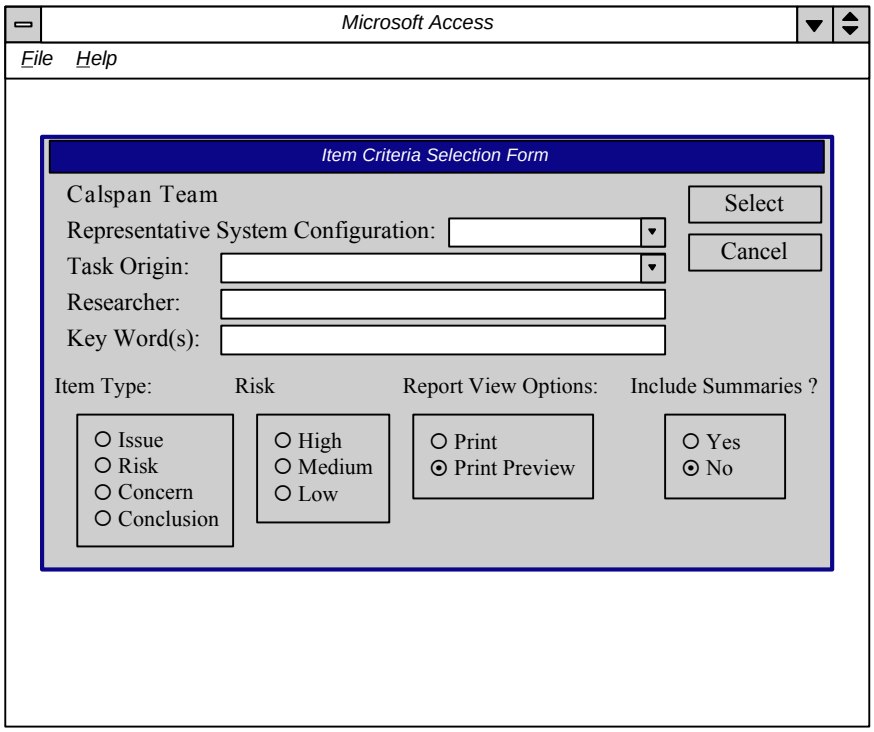


Figure 23. (Calspan) Item Criteria Selection Form

This dialog provides two filter options not available on the other reports, the Representative System Configuration and Task Origin Fields. The standard Calspan Report Output is shown in figure 24.

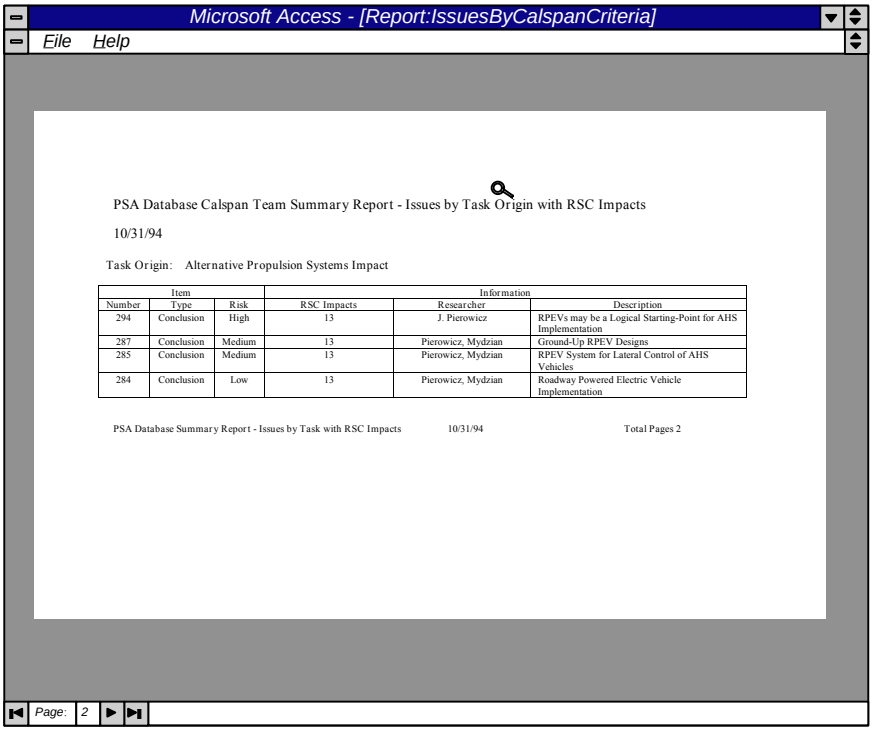


Figure 24. PSA Database Calspan Team Summary Report - Issues By Task Origin With RSC Impacts

The Calspan Report with Item Summaries is shown in figure 25.

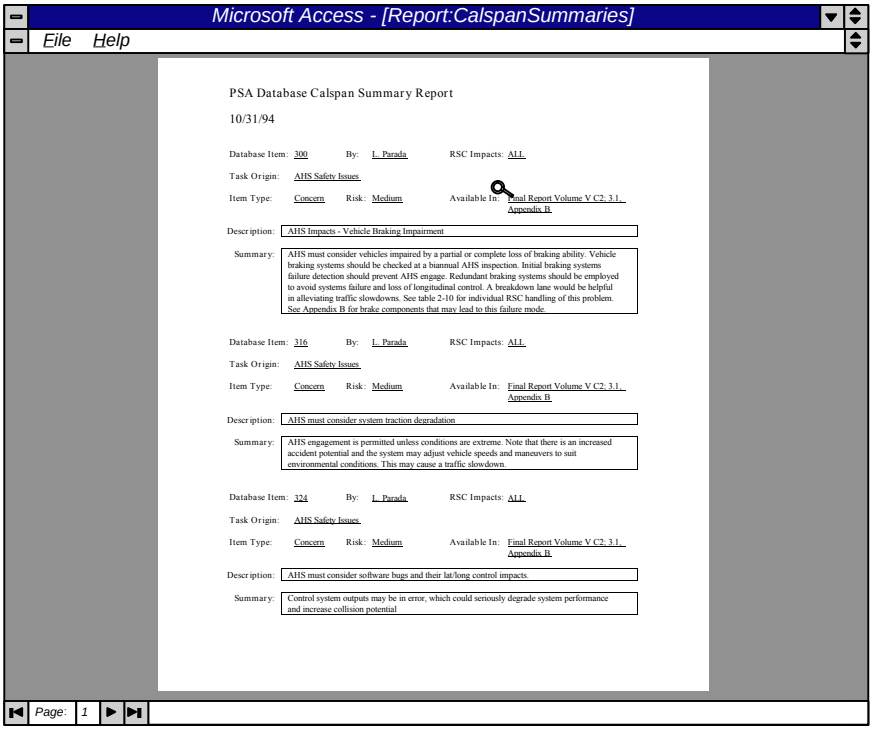


Figure 25. PSA Database Calspan Summary Report

6.5 Report Mode Features

6.5.1 Report View File Menu Options

When viewing a report, several options are available from the file menu. They are limited to:

- Close
- Output To
- Print Setup
- Print Preview
- Print

The Close, Print Preview, Print, and Print Setup options are standard options available to many Window's applications. The Output To options provides a means for writing the report to a format that can be used for other Windows applications like word processors and spreadsheets. Selecting this option opens a dialog box allowing three output criteria, text (.txt), rich text format (.rtf), or Excel spreadsheet (.xls). For more information on these file menu options see the Access 2.0 User's Guide.

6.5.2 Navigating Report Pages

The Access report navigation buttons are shown in figure 26.

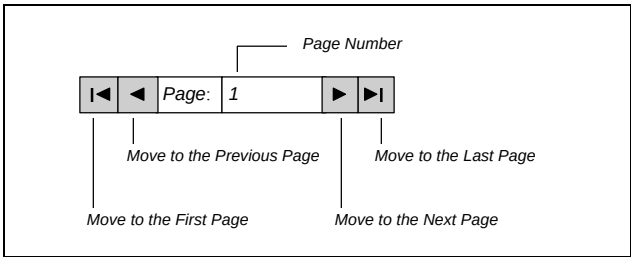


Figure 26. Microsoft Access Report Navigation Buttons

These buttons can be manipulated using the mouse. To move to a specific page double click the left mouse mutton in the page box or press the F5 key, type a number and hit ENTER.

7.0 PSA DATABASE OPTONS

Selecting the Options button from the Main Menu opens the PSA Database Options Dialog shown in figure 27.

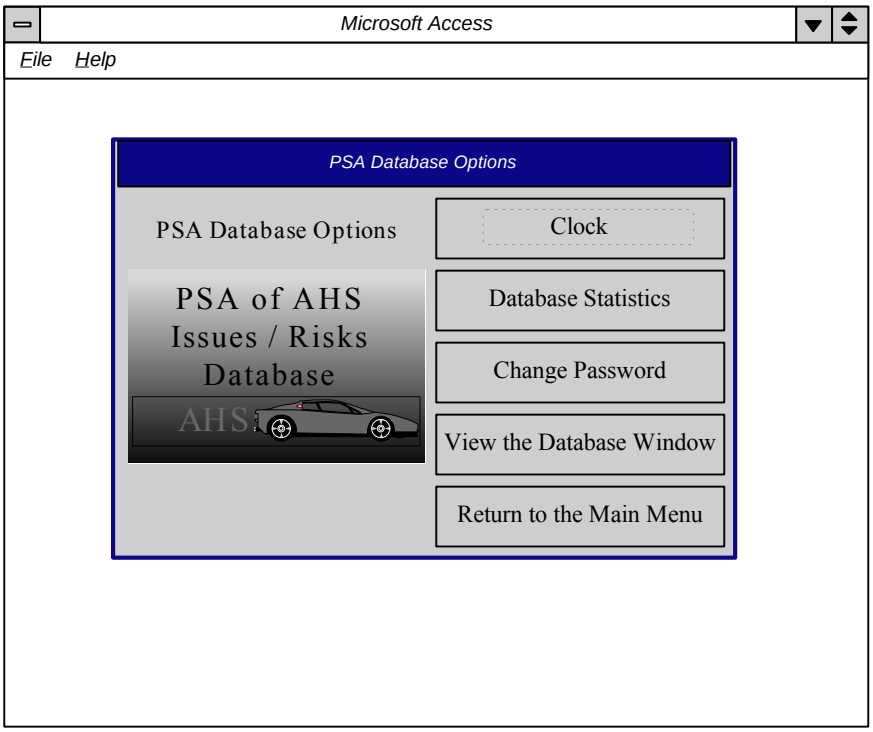


Figure 27. PSA Database Options Menu

There are five options available:

- Clock
- Database Statistics
- Change Password
- View the Database Window
- Return to the Main Menu

The clock option runs the standard clock application available from windows, while return to the main menu is self explanatory.

7.1 Database Statistics

The database statistics report is shown in figure 28. It includes a summary of the number of Issues, Risks, Concerns, Conclusions, and Unknown items submitted by each of the PSA Contract Teams. Database totals are also provided.

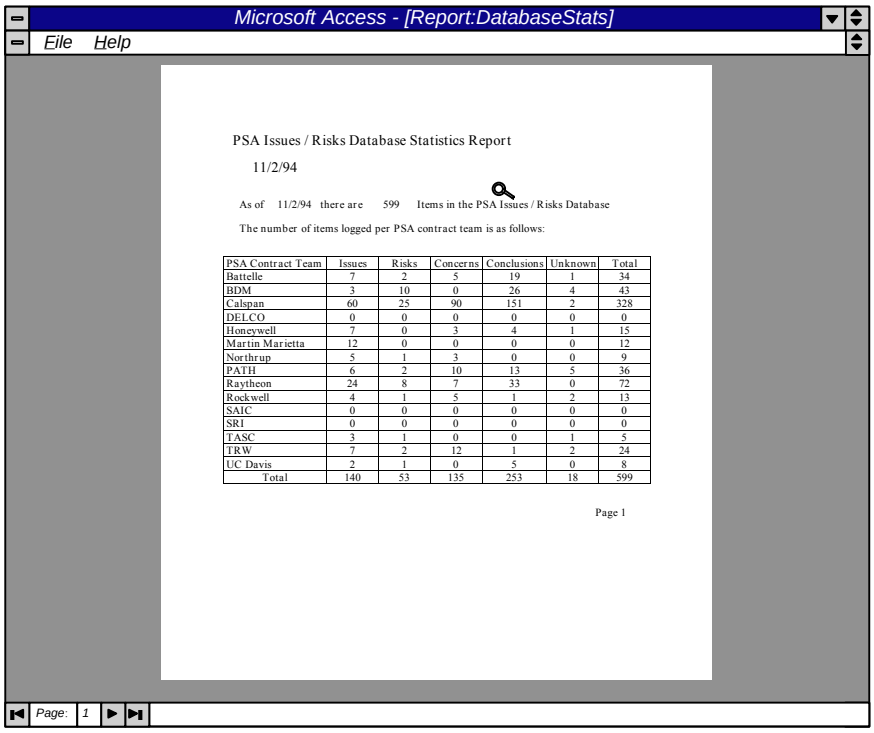


Figure 28. PSA Database Statistics Report

7.2 Change Password

Selecting the Change Password option opens the Change PSA Database Password Dialog shown in figure 29. This will change the PSA Database Log On password. Note that passwords are limited to eight characters. If you change the password, write it down in a safe place and make it available for other authorized users because there is only one password allowed for access to the database. You must enter the old password and new password verification correctly or this process will not work.

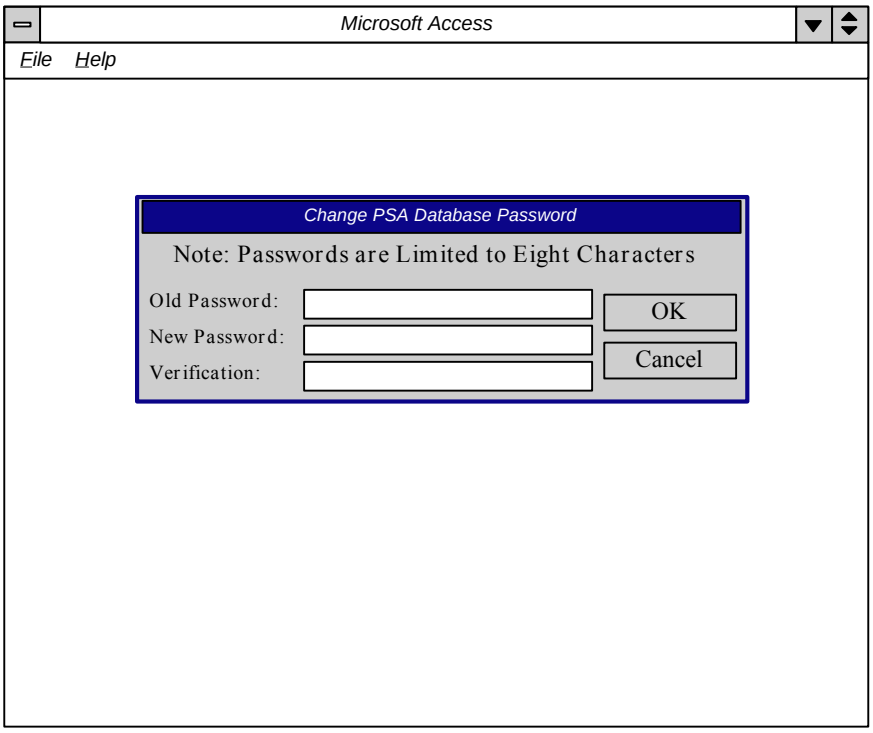


Figure 29. Change PSA Database Password Dialog

7.3 View the Database Window

This feature, intended for database maintenance purposes, can also be accomplished using the F11 key. If you are unfamiliar with Access, do not select this option because it may serve to confuse a user unfamiliar with the application.

8.0 APPENDIX

8.1 PSA of AHS Issues / Risks Database Standard Input Form

Precursor Systems Analyses (PSA) Database Item PSA Contract Team

Item Number (counter) Entry: date 11/2/94 by Review: date by

Item Type: Issue ○ Risk ○ Concern ○ Conclusion ○ Risk: High ○ Medium ○ Low ○

Action: Assigned Resolution

Sources: Reference Document Researcher
Sub Contractor Reference Document Researcher

Record: of

(check all items that apply)

Pertains To: Safety ☐ Efficiency ☐ User Acceptance ☐ Environment ☐ Legal ☐
Societal ☐ Concept Selection ☐ '97 Demo ☐ Design / Devel. ☐ Test / Evaluation ☐
Deployment ☐ Maintenance / Operation ☐ Transition ☐ Human I/F ☐ Program ☐
Management ☐ Funding ☐ Cost ☐ Benefits ☐

Description

Summary

(check all items that apply)

System Function: ALL ☐ Check-In ☐ Enter / Merge ☐ Driver I/F ☐
Longitudinal Control ☐ Lateral Control ☐ Maneuver Coord. ☐ Check - Out ☐
Exit / Merge ☐ Incident Management ☐ Zone Flow Management ☐ Regional Mgmt ☐
Environmental Sensing ☐ Maintenance / Operation ☐ Operational Mode ☐

(check all items that apply)

Infrastructure System: ALL ☐ Entry / Exit Configuration ☐ Lane Configuration ☐
Roadside Sensors, Comm. / Processors ☐ Region Command Centers ☐ Barriers ☐
Surface Materials ☐ Bridges / Tunnels ☐ Roadway Maint. Equip. ☐

Vehicle System: ALL ☐ Steering Actions ☐ Braking Actions ☐ Throttle Control ☐
Power Train Control ☐ Lights ☐ Suspension ☐ Vehicle Electronics ☐
Sensors ☐ Chassis ☐ AHS Controller ☐
Communications (Intra-vehicle ☐, Road - road ☐, Road - vehicle ☐, Vehicle - vehicle ☐)

(check all items that apply)

Concept Impact: ALL ☐
Vehicle Type: Light ☐ Heavy ☐ Transit ☐ Pallet ☐ Special ☐ Maintenance ☐

Infrastructure Type:	Dedicated	☐	Shared w. Manual	☐	Barrier	☐	No Barrier	☐
Entry / Exit Type:	Dedicated	☐	Transition Lanes:	(	Periodic	☐	Unrestricted	☐)
Power Source:	On-Board ICE	☐		On-Board APS		☐	Roadway Provided Electric	☐
Longitudinal Control:	Autonomous Vehicle			☐	Platooned Vehicle		☐ Point Following	☐
Lateral Control:	Passive Road (e.g., magnets, paint)			☐	Barriers	☐	Active Road	☐
Control Location:	Mostly Vehicle			☐	Mostly Infrastructure		☐ Balanced	☐

8.2 PSA of AHS Issues / Risks Database Calspan Input Form

Precursor Systems Analyses (PSA) Database Item PSA Contract Team: Calspan

Item Number: (counter) Entry: date: 11/2/94 by: Review: date: by:

Item Type: Issue ○ Risk ○ Concern ○ Conclusion ○ Risk: High ○ Medium ○ Low ○

Action: Assigned: Resolution:

Sources: Reference Document: Researcher:

Sub Contractor	Reference Document	Researcher

Record: of

(check all items that apply)

Pertains To:						
	Safety	☐ Efficiency	☐ User Acceptance	☐ Environment	☐ Legal	☐
	Societal	☐ Concept Selection	☐ '97 Demo	☐ Design / Devel.	☐ Test / Evaluation	☐
	Deployment	☐ Maintenance / Operation	☐ Transition	☐ Human I/F	☐ Program	☐
	Management	☐ Funding	☐ Cost	☐ Benefits	☐	

Description

Summary

RSC Impact: Task Origin:

Record: of

(check all items that apply)

System Function:					
	ALL	☐ Check-In	☐ Enter / Merge	☐ Driver I/F	☐
	Longitudinal Control	☐ Lateral Control	☐ Maneuver Coord.	☐ Check - Out	☐
	Exit / Merge	☐ Incident Management	☐ Zone Flow Management	☐ Regional Mgmt	☐
	Environmental Sensing	☐ Maintenance / Operation	☐ Operational Mode	☐	

(check all items that apply)

Infrastructure System:				
	ALL	☐ Entry / Exit Configuration	☐ Lane Configuration	☐
	Roadside Sensors, Comm. / Processors	☐ Region Command Centers	☐ Barriers	☐
	Surface Materials	☐ Bridges / Tunnels	☐ Roadway Maint. Equip.	☐

Vehicle System:					
	ALL	☐ Steering Actions	☐ Braking Actions	☐ Throttle Control	☐
	Power Train Control	☐ Lights	☐ Suspension	☐ Vehicle Electronics	☐
	Sensors	☐ Chassis	☐ AHS Controller	☐	

Communications (Intra-vehicle ☐, Road - road ☐, Road - vehicle ☐, Vehicle - vehicle ☐)

(check all items that apply)

Concept Impact:	ALL						
Vehicle Type:	Light	☐ Heavy	☐ Transit	☐ Pallet	☐ Specia	☐ Maintenanc	☐

Infrastructure Type:	Dedicated	☐	Shared w. Manual	☐	Barrier	☐	No Barrier	☐		
Entry / Exit Type:	Dedicated	☐	Transition Lanes:	(	Periodic	☐	Unrestricted	☐	)	
Power Source:	On-Board ICE	☐		On-Board APS		☐		Roadway Provided Electric		☐
Longitudinal Control:	Autonomous Vehicle			☐	Platooned Vehicle			☐	Point Following	☐
Lateral Control:	Passive Road (e.g., magnets, paint)			☐	Barriers	☐	Active Road	☐		
Control Location:	Mostly Vehicle			☐	Mostly Infrastructure			☐	Balanced	☐

8.3 PSA of AHS Issues / Risks Database Standard Form Browse Mode

Precursor Systems Analyses (PSA) Database Item | PSA Contract Team: Calspan

Item Number: 467 | Entry: date 10/21/94 by P. MacDiarmid | Review: date ____ by ____

Item Type: Issue ⊙ Risk ○ Concern ○ Conclusion ○ | Risk: High ○ Medium ⊙ Low ○

Action: Assigned ____ Resolution ____

Sources: Reference Document: Final Report Volume II; 3.2.1.1 | Researcher: Funke,Levine
Sub Contractor | Reference Document | Researcher

Record: ____ of ____

(check all items that apply)

Pertains To:						
	Safety	☐ Efficiency	☐ User Acceptance	☐ Environment	☐ Legal	☐
	Societal	☐ Concept Selection	☒ '97 Demo	☐ Design / Devel.	☒ Test / Evaluation	☐
	Deployment	☐ Maintenance / Operation	☒ Transition	☐ Human I/F	☐ Program	☐
	Management	☒ Funding	☐ Cost	☐ Benefits	☐	

Description: AHS ramp design.

Summary: AHS ramp design must accommodate all anticipated vehicle maneuvers (e.g., check-in/out, queuing, operation on ice/snow).Identify scenarios associated with AHS ramp use including degraded operations and CVO use. Assess ramp design requirements including requirements for vehicle storage. Consult existing ramp design guidelines.

(check all items that apply)

System Function:					
	ALL	☐ Check-In	☐ Enter / Merge	☒ Driver I/F	☐
	Longitudinal Control	☐ Lateral Control	☐ Maneuver Coord.	☐ Check - Out	☐
	Exit / Merge	☐ Incident Management	☐ Zone Flow Management	☒ Regional Mgmt	☐
	Environmental Sensing	☐ Maintenance / Operation	☐ Operational Mode	☐	

(check all items that apply)

Infrastructure System:				
	ALL	☐ Entry / Exit Configuration	☒ Lane Configuration	☐
	Roadside Sensors, Comm. / Processors	☐ Region Command Centers	☐ Barriers	☐
	Surface Materials	☐ Bridges / Tunnels	☐ Roadway Maint. Equip.	☐

Vehicle System:					
	ALL	☐ Steering Actions	☐ Braking Actions	☐ Throttle Control	☐
	Power Train Control	☐ Lights	☐ Suspension	☐ Vehicle Electronics	☐
	Sensors	☐ Chassis	☐ AHS Controller	☐	

Communications (Intra-vehicle ☐, Road - road ☐, Road - vehicle ☐, Vehicle - vehicle ☐)

(check all items that apply)

Concept Impact:	ALL	☐									
Vehicle Type:	Light	☐	Heavy	☐	Transit	☐	Pallet	☐	Special	☐	Maintenance ☐
Infrastructure Type:	Dedicated	☐	Shared w. Manual	☐		Barrier		☐	No Barrier	☐	
Entry / Exit Type:	Dedicated	☒	Transition Lanes:	(	Periodic	☒	Unrestricted	☒	)		
Power Source:	On-Board ICE	☐		On-Board APS		☐		Roadway Provided Electric		☐	
Longitudinal Control:	Autonomous Vehicle			☐	Platooned Vehicle			☐	Point Following		☐
Lateral Control:	Passive Road (e.g., magnets, paint)			☐	Barriers	☐	Active Road	☐			
Control_Location:	Mostly Vehicle			☐	Mostly Infrastructure			☐	Balanced	☐	

8.4 PSA of AHS Issues / Risks Database Calspan Form Browse Mode

Precursor Systems Analyses (PSA) Database Item — PSA Contract Team: Calspan

Item Number: 467 — Entry: date 10/21/94 by P. MacDiarmid — Review: date ____ by ____

Item Type: Issue ○ Risk ⊙ Concern ○ Conclusion ○ — Risk: High ○ Medium ⊙ Low ○

Action: Assigned ____ Resolution ____

Sources: Reference Document: Final Report Volume II; 3.2.1.1 — Researcher: Funke,Levine

Sub Contractor — Reference Document — Researcher

Record: ____ of ____

(check all items that apply)

Pertains To:						
	Safety	☐ Efficiency	☐ User Acceptance	☐ Environment	☐ Legal	☐
	Societal	☐ Concept Selection	☒ '97 Demo	☐ Design / Devel.	☒ Test / Evaluation	☐
	Deployment	☐ Maintenance / Operation	☒ Transition	☐ Human I/F	☐ Program	☐
	Management	☒ Funding	☐ Cost	☐ Benefits	☐	

Description: AHS ramp design.

Summary: AHS ramp design must accommodate all anticipated vehicle maneuvers (e.g., check-in/out, queuing, operation on ice/snow).Identify scenarios associated with AHS ramp use including degraded operations and CVO use. Assess ramp design requirements including requirements for vehicle storage. Consult existing ramp design guidelines.

RSC Impact: 8 ▼

Record: 1 of 6

Task Origin: CS

(check all items that apply)

System Function:					
	ALL	☐ Check-In	☐ Enter / Merge	☒ Driver I/F	☐
	Longitudinal Control	☐ Lateral Control	☐ Maneuver Coord.	☐ Check - Out	☐
	Exit / Merge	☐ Incident Management	☐ Zone Flow Management	☒ Regional Mgmt	☐
	Environmental Sensing	☐ Maintenance / Operation	☐ Operational Mode	☐	

(check all items that apply)

Infrastructure System:				
	ALL	☐ Entry / Exit Configuration	☒ Lane Configuration	☐
	Roadside Sensors, Comm. / Processors	☐ Region Command Centers	☐ Barriers	☐
	Surface Materials	☐ Bridges / Tunnels	☐ Roadway Maint. Equip.	☐

Vehicle System:					
	ALL	☐ Steering Actions	☐ Braking Actions	☐ Throttle Control	☐
	Power Train Control	☐ Lights	☐ Suspension	☐ Vehicle Electronics	☐
	Sensors	☐ Chassis	☐ AHS Controller	☐	

Communications (Intra-vehicle ☐, Road - road ☐, Road - vehicle ☐, Vehicle - vehicle ☐)

(check all items that apply)

Concept Impact:	ALL	☐									
Vehicle Type:	Light	☐	Heavy	☐	Transit	☐	Pallet	☐	Special	☐	Maintenance ☐
Infrastructure Type:	Dedicated	☐	Shared w. Manual	☐		Barrier		☐	No Barrier	☐	
Entry / Exit Type:	Dedicated	☒	Transition Lanes:	(	Periodic	☒	Unrestricted	☒	)		
Power Source:	On-Board ICE	☐		On-Board APS		☐		Roadway Provided Electric		☐	
Longitudinal Control:	Autonomous Vehicle			☐	Platooned Vehicle			☐	Point Following		☐
Lateral Control:	Passive Road (e.g., magnets, paint)			☐	Barriers	☐	Active Road	☐			
Control_Location:	Mostly Vehicle			☐	Mostly Infrastructure			☐	Balanced	☐	

8.5 PSA Summary Report - Issues by Item

PSA Database Summary Report - Issues by Item

10/31/94

Item			Information			
Number	Type	Risk	PSA Contract Team	Description	Researcher	Reference Document
291	Conclusion	High	Calspan	Electric Vehicle Reliability	Pierowicz, MacDiarmid	Final Report Volume VI Appendix D
292	Conclusion	High	Calspan	Pollution Reduction Through Use of APVs	Pierowicz, Mydzian	Final Report Volume VI 3.1.4
294	Conclusion	High	Calspan	RPEVs may be a Logical Starting-Point for AHS Implementation	J. Pierowicz	Final Report Volume VI 3.3
295	Conclusion	High	Calspan	APV Infrastructure Requirements	Pierowicz, MacDiarmid	Final Report Volume VI 3.1.2.3
298	Conclusion	High	Calspan	Electricity Generation Capacity	J. Pierowicz	Final Report Volume VI 3.1.2.3.3
299	Conclusion	High	Calspan	Cold Weather Performance Impacts on Battery-Operated Vehicles	Pierowicz, MacDiarmid	Final Report Volume VI 3.1.2.1

PSA Database Summary Report - Issues by Item 10/31/94 Total Pages 1

8.6 PSA Summary Report - Items with Summaries

PSA Database Summary Report - Items with Summaries

10/31/94

Database Item: 291 By: Pierowicz, MacDiarmid From: Calspan

Item Type: Conclusion Risk: High Available In: Final Report Volume VI Appendix D

Description: Electric Vehicle Reliability

Summary: Electric vehicle powerplants are more reliable than those in SI vehicles. The motors used in EVs are more reliable than the SI motors used in automobiles.

Database Item: 292 By: Pierowicz, Mydzian From: Calspan

Item Type: Conclusion Risk: High Available In: Final Report Volume VI 3.1.4

Description: Pollution Reduction Through Use of APVs

Summary: APVs can substantially reduce the pollution caused by the automotive fleet. The utilization of APVs in the automotive fleet can reduce the pollution caused by transportation. The reduction in “greenhouse gases” is most dramatic with electric vehicles.”

Database Item: 294 By: J. Pierowicz From: Calspan

Item Type: Conclusion Risk: High Available In: Final Report Volume VI 3.3

Description: RPEVs may be a Logical Starting-Point for AHS Implementation

Summary: The initial deployment of the AHS may be more efficient if based upon RPEV designs. This system negates the use of a dedicated lateral control system, and allows the use of purpose-built RPEV/AHS vehicles. This eliminates the potential for poor after-market installations of AHS equipment. An additional benefit is the slower ramp-up in operation for the system that will allow operators to learn how to use the system to full advantage.

8.7 PSA Summary Report - Issues by Pertains To

PSA Database Summary Report - Issues by Pertains To

10/31/94

These Items Pertain To: Safety

Item			Information			
Number	Type	Risk	PSA Contract Team	Description	Researcher	Reference Document
329	Conclusion	Medium	Calspan	AHS must consider occupant response to lat/long control	L. Parada	Final Report Volume V C2; 3.1, Appendix B
337	Conclusion	High	Calspan	High speed and small headway risks for lat/long control.	L. Parada	Final Report Volume V C2; 3.1, 3.2.2, Appendix B
338	Conclusion	Medium	Calspan	Manually operated vehicle trailing an automated vehicle - risks.	L. Parada	Final Report Volume V C2; 3.1, 3.2.2, Appendix B
340	Conclusion	High	Calspan	Delta V - Safe gap distance determination.	L. Parada	Final Report Volume V C2; 3.2.2
341	Conclusion	High	Calspan	All occupants of an automated vehicle should be restrained.	L. Parada	Final Report Volume V C2; 3.2
342	Conclusion	High	Calspan	The object/animal in the roadway and AHS.	L. Parada	Final Report Volume V C2; 3.2.5
343	Conclusion	Medium	Calspan	Sensors to detect objects or animals must function in dark conditions.	L. Parada	Final Report Volume V C2; 3.2.5

8.8 PSA Summary Report - (Pertains To) Items with Summaries

PSA Database Summary Report - Items with Summaries

10/31/94

These Items Pertain To: Safety, Maintenance/Operation

Database Item: 338 By: L. Parada From: Calspan

Item Type: Conclusion Risk: Medium Available In: Final Report Volume V C2; 3.1, 3.2.2, Appendix B

Description: Manually operated vehicle trailing an automated vehicle - risks.

Summary: Manual vehicles have a much greater reaction time than automated vehicles. Clinical studies have been conducted that showed the reaction time for an automated vehicle is approximately 0.3 seconds; this number may be lowered as sensor and technology improvements are made. Reaction time for a manually operated vehicle is approximately 1.75 seconds, although this is highly dependent on the individual driver.

Database Item: 343 By: L. Parada From: Calspan

Item Type: Conclusion Risk: Medium Available In: Final Report Volume V C2; 3.2.5

Description: Sensors to detect objects or animals must function in dark conditions.

Summary: 57.3% of crashes with non-fixed objects on interstates occur during dark lighting conditions.

Database Item: 344 By: L. Parada From: Calspan

Item Type: Conclusion Risk: Medium Available In: Final Report Volume V C2; 3.2.5

Description: Breakdown lane - object/animal in the roadway.

Summary: Breakdown lanes may be useful to provide room for vehicles to avoid large objects of animals in the roadway. Accident statistics show the number of times a vehicle strikes an object or animal in the roadway. They do not show the number of times a driver successfully maneuvers around an obstacle and still maintains control of the vehicle. This problem has tremendous implications for an AHS and requires further research.

8.9 PSA Summary Report - Issues by System Impact

PSA Database Summary Report - Issues by System Impact

10/31/94

The Following Selection Criteria were chosen:

Vehicle System: All

Power Source: On-Board APS, RPEV

Item			Information			
Number	Type	Risk	PSA Contract Team	Description	Researcher	Reference Document
294	Conclusion	High	Calspan	RPEVs may be a Logical Starting-Point for AHS Implementation	J. Pierowicz	Final Report Volume VI 3.3
416	Concern	Medium	Calspan	AHS vehicle equipment costs.	Cohen,Elias,Gordon	Final Report Volume VIII, Ch2

PSA Database Summary Report - Issues by System Impact 10/31/94 Total Pages 2

8.10 PSA Summary Report - (System Impact) Items with Summaries

PSA Database Summary Report - Items with Summaries

10/31/94

The Following Selection Criteria were chosen:

System Function: Check-In

Infrastructure System: Roadway Sensors,Communications,Processors

Vehicle System: Electronics, RV Comm.
Concept Impact: All

Database Item: 593 By: Funke,Levine From: Calspan

Item Type: Conclusion Risk: High Available In: Final Report Volume II; 3.2.4.4.3

Description: AHS design should consider personal privacy issues.

Summary: There may be concerns raised about AHS regarding its intrusion on personal privacy; and particularly the right to free, unmonitored movement. If AHS tracks and records the movement of individual vehicles, there could be individuals or groups who object on this basis. AHS designers should attempt to avoid design approaches that raise these concerns.

PSA Database Summary Report - Issues by System Impact 10/31/94 Total Pages 2

8.11 PSA Database Calspan Team Summary Report - Issues by Task Origin with RSC Impacts

PSA Database Calspan Team Summary Report - Issues by Task Origin with RSC Impacts

10/31/94

Task Origin:Alternative Propulsion Systems Impact

Item			Information		
Number	Type	Risk	RSC Impacts	Researcher	Description
294	Conclusion	High	13	J. Pierowicz	RPEVs may be a Logical Starting-Point for AHS Implementation
287	Conclusion	Medium	13	Pierowicz, Mydzian	Ground-Up RPEV Designs
285	Conclusion	Medium	13	Pierowicz, Mydzian	RPEV System for Lateral Control of AHS Vehicles
284	Conclusion	Low	13	Pierowicz, Mydzian	Roadway Powered Electric Vehicle Implementation

8.12 PSA Database Calspan Team Summary Report

PSA Database Calspan Summary Report

10/31/94

Database Item: 300 By: L. Parada RSC Impacts: ALL

Task Origin: AHS Safety Issues

Item Type: Concern Risk: Medium Available In: Final Report Volume V C2; 3.1, Appendix B

Description: AHS Impacts - Vehicle Braking Impairment

Summary: AHS must consider vehicles impaired by a partial or complete loss of braking ability. Vehicle braking systems should be checked at a biannual AHS inspection. Initial braking systems failure detection should prevent AHS engage. Redundant braking systems should be employed to avoid systems failure and loss of longitudinal control. A breakdown lane would be helpful in alleviating traffic slowdowns. See table 2-10 for individual RSC handling of this problem. See Appendix B for brake components that may lead to this failure mode.

Database Item: 316 By: L. Parada RSC Impacts: ALL

Task Origin: AHS Safety Issues

Item Type: Concern Risk: Medium Available In: Final Report Volume V C2; 3.1, Appendix B

Description: AHS must consider system traction degradation

Summary: AHS engagement is permitted unless conditions are extreme. Note that there is an increased accident potential and the system may adjust vehicle speeds and maneuvers to suit environmental conditions. This may cause a traffic slowdown.

Database Item: 324 By: L. Parada RSC Impacts: ALL

Task Origin: AHS Safety Issues

Item Type: Concern Risk: Medium Available In: Final Report Volume V C2; 3.1, Appendix B

Description: AHS must consider software bugs and their lat/long control impacts.

Summary: Control system outputs may be in error, which could seriously degrade system performance and increase collision potential

8.13 PSA Issues / Risks Database Statistics Report

PSA Issues / Risks Database Statistics Report

11/2/94

As of 11/2/94 there are 599 Items in the PSA Issues / Risks Database

The number of items logged per PSA contract team is as follows:

PSA Contract Team	Issues	Risks	Concerns	Conclusions	Unknown	Total
Battelle	7	2	5	19	1	34
BDM	3	10	0	26	4	43
Calspan	60	25	90	151	2	328
DELCO	0	0	0	0	0	0
Honeywell	7	0	3	4	1	15
Martin Marietta	12	0	0	0	0	12
Northrup	5	1	3	0	0	9
PATH	6	2	10	13	5	36
Raytheon	24	8	7	33	0	72
Rockwell	4	1	5	1	2	13
SAIC	0	0	0	0	0	0
SRI	0	0	0	0	0	0
TASC	3	1	0	0	1	5
TRW	7	2	12	1	2	24
UC Davis	2	1	0	5	0	8
Total	140	53	135	253	18	599