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INTELLIGENCE ANALYST ASSOCIATE: MAIN MENU DEVELOPMENT, PROGRAM EVALUATION AND RECOMMENDATIONS

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13. ABSTRACT ***(Maximum 200 Words)***

The Intelligence Analyst Associate (IAA) is a software program developed under the sponsorship of AFRL to aid Intelligence Analysts in the task of deriving information from text documents. The primary goal of the project documented in this report was to design a new Main Menu for the IAA that is more intuitive and user friendly.

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I. Introduction:

The Intelligence Analyst Associate (IAA) is a software program, developed by Veridian and sponsored by AFRL/IFED, to aid Intelligence Analysts with the task of deriving information from text documents. IAA takes text documents and uses natural language understanding to extract relevant data from those documents. This extracted data may then be searched through for specific terms or concepts that the user requests. The results from this search can be visualized in four different manners, and from each of the different visualizations the results can be traced back to the original text document.

The architecture as seen by the user is pictured in Figure 1. This flow-chart shows how the different functions, or tools, in IAA operate together. Documents are selected for loading and extraction. The extraction process takes the text documents selected by the user and, using natural language understanding technology, takes key words in the sentence structure and places them in a database for querying. During extraction, the processing status of each document may be viewed from the Extraction Process Status tool. The processing status is shown in a table, with each row representing a document. Each column holds a specific process in the extraction, and in that process each document is either PENDING, RUNNING, or is SUCCESS-ful.

After extraction, the data may be queried using the Query tool, which allows the user to enter terms or concepts from the Term Organization tool as criteria for the search. The Term Organizations, which are usually created prior to using the Query tool, hold terms the user has entered in a hierarchical structure. Any group (organization) in this structure may be used in the query as criteria.

When the query has been run, the results may be viewed with the Analysis and Visualization (A&V) tools. These tools show the results in different manners—as a table of information from each result, as columns of statistical information on how many times a particular word or phrase appeared in the results, as points plotted on a timeline, and as points plotted on a world map. The A&V tools can send the query results to any other A&V tool, and each A&V tool can access the Document Browser, which shows the document a result came from in its entirety. The query may be saved from the Query Development or any of the Analysis and Visualization tools.

The primary goal for this summer's work was to develop a new Main Menu for the IAA program. The new Main Menu needed to be more intuitive and user-friendly. Also, it needed to be larger. With these guidelines in mind, as well as suggestions previously collected by a survey of intelligence analysts who have used the program, a new Main Menu was designed and developed.

Along with designing the new Main Menu interface, a User Manual update and Trace-Through of the program were developed in regards to the new Main Menu. The User Manual update gives a basic overview on using the Main Menu and is intended to replace the section on the Main Menu in the existing User Manual made by Veridian. The User Manual is included as Appendix A.

The Trace-Through is intended to aid the user by giving an example of how to use IAA. Starting from the Main Menu, the Trace-Through gives step-by-step instructions on how to load documents, create term organizations, perform queries, view query results, and save query structures. The Trace-Through is included as Appendix B.

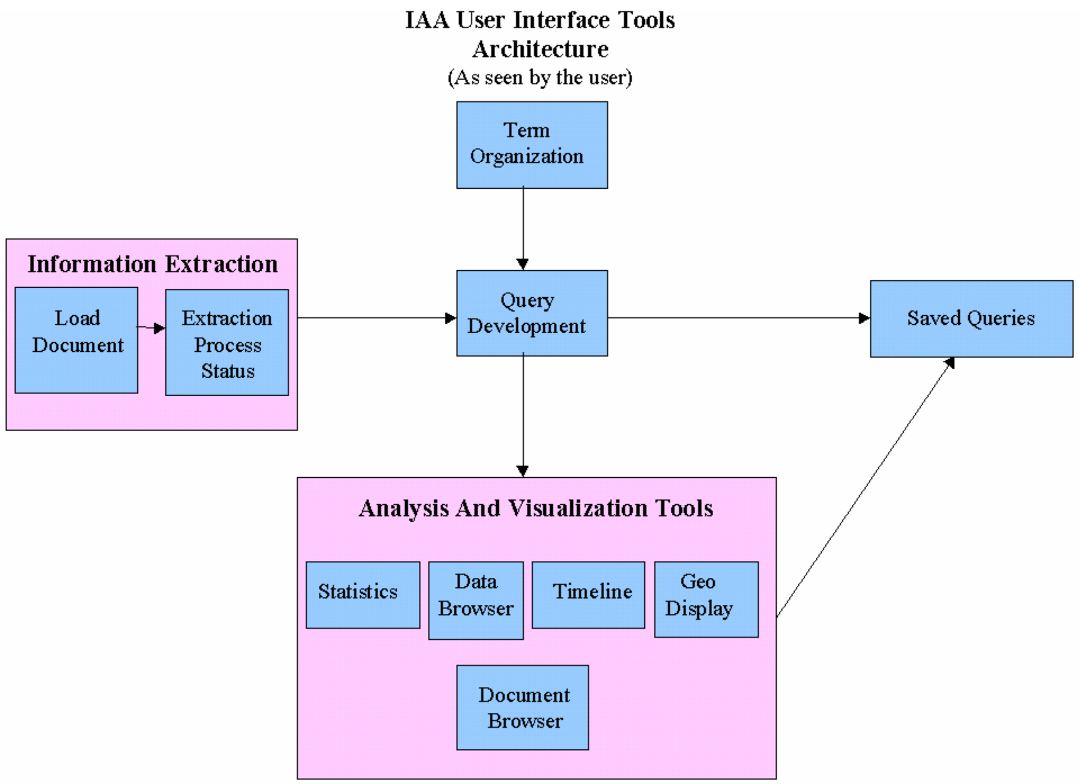

Figure 1: IAA User Interface Flow-Chart

II. The Original Main Menu

The original Main Menu is depicted below in Figure 2. As can be seen in the picture, the Main Menu is small, and can be confusing. There is no indication for the beginning user of how to go about using the program. When presented with this interface, the beginning user wouldn't know what to start with. The icons are confusing and the button names aren't very descriptive. Also, when many tools are open (each tool opens in its own frame) the Main Menu tends to "get lost" behind all the tools.

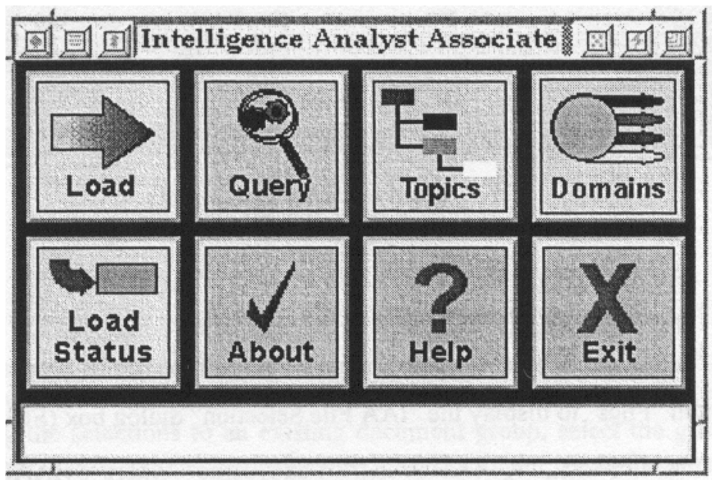

Figure 2: Original Main Menu Interface

III. Main Menu Upgrade:

This summer a new Main Menu for IAA was designed. It is shown in Figure 3. The new Main Menu is larger than the previous menu, and allows for a much more intuitive use of the program. The IAA tools are grouped by function and in order they should be used.

Features of the new Main Menu include:

- When the mouse is over a button, a description of that tool appears on the bottom of the screen in the Comments section.
- The Term Organization, Query, and Notebook tools may have multiple displays open at one time. In order to organize these tools, they may be hidden in the drop-down list under the tool's corresponding section of the Main Menu. Comments added by the user for each display may be viewed by selecting the tool name from the drop-down list. These comments also appear in the Comments section on the bottom of the Main Menu.
- Help is available on each tool, as well as on the Main Menu. The Help for the Main Menu gives an overview of how to use IAA.
- The Analysis and Visualization tools are only available if there is a query in the Query Development drop-down list. Otherwise, they are grayed out. The A&V

tools, when accessed from the Main Menu, will open up with the results from the query currently selected on the list.

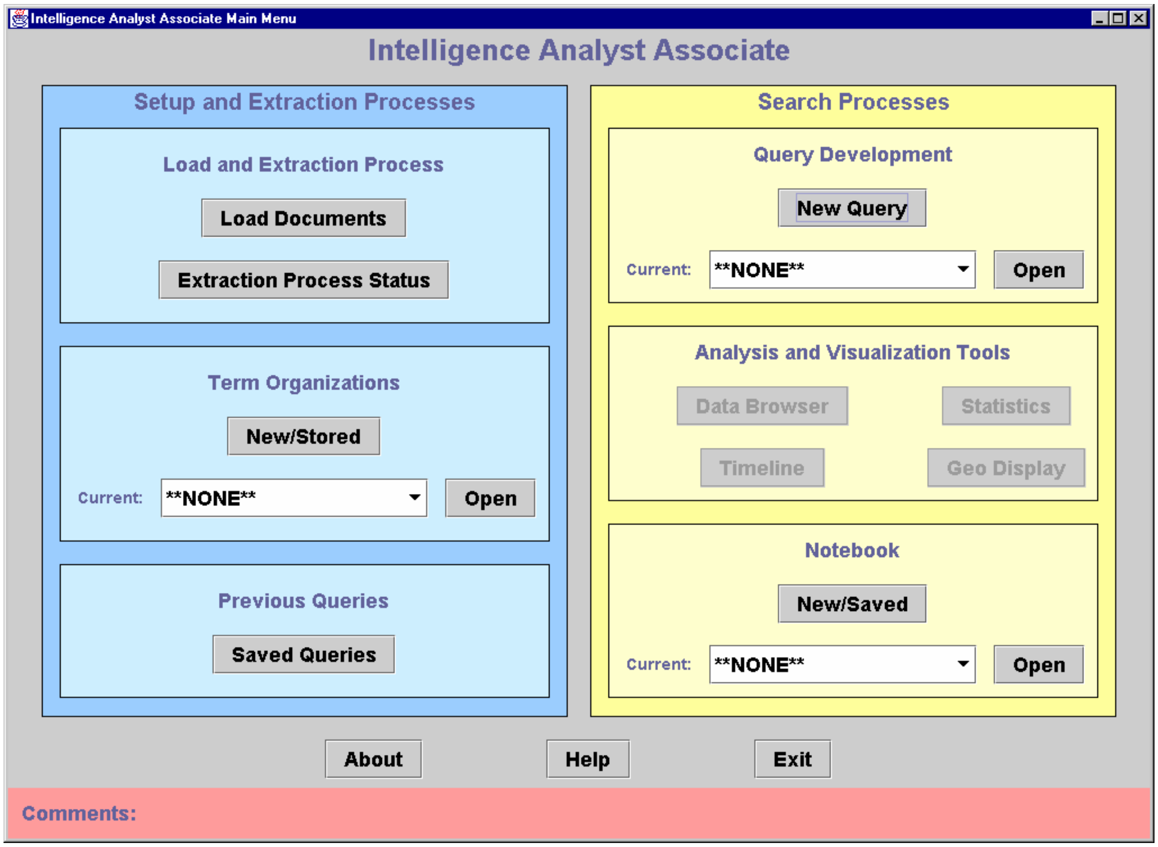

Figure 3: Main Menu

The tools (functions) of IAA will, for the most part, remain the same. Each tool, however, will be placed in a frame that holds two or three buttons (depending on the tool). These buttons will access help for the tool, close the tool display, and with Term Organizations, Query Developments, and Notebooks, hide the tool in the drop-down lists. An example of this frame is pictured in Figure 4. The tool will appear in the middle (where the picture is), and the frame will stretch or shrink to accommodate the tool's size.

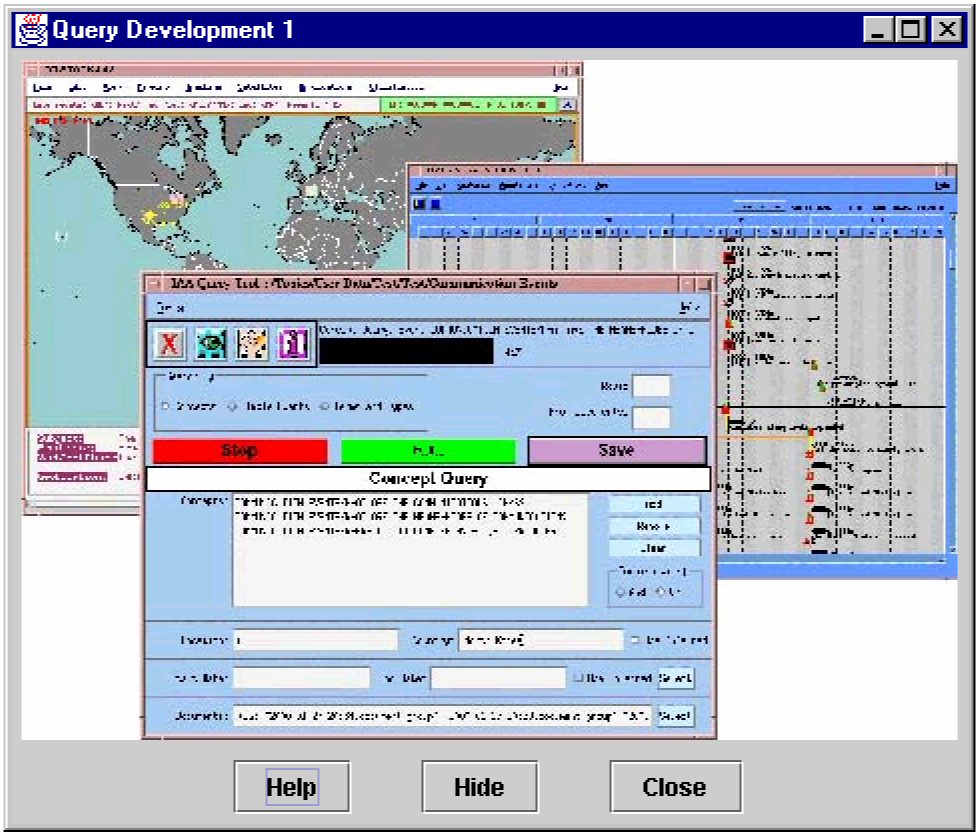

Figure 4: Tool Frame

IV. Recommendations for Future IAA Development:

While IAA is a very useful tool to have, its interface often presents problems with the users. The program would be easier to use if it was simplified. Here are some recommendations on improvement, ordered by tool:

- Login:
  After the user types in the password, hitting the enter key should do the same as clicking the "OK" button.
- Main Menu:
  Have the Load Documents and the Load Status buttons combined to one Loading Documents button (see Loading Documents below).
- Loading Documents:
  The Loading Documents interface displays information about the progress of the information extraction process on documents that the user has chosen to load. The Add Documents button on the bottom will open up the Load dialogue box.

- Term Organizations (Concept Domain Manager):
  *See below for further suggestions.
- Saved Query Results (Topic Areas):
  *See below for further suggestions.
- Query Tool:
  Change the "Entity" buttons to say: Subject Type, Object Type, or Term Type (Any Field), so that the user would have more of an idea what that button does. The "Concepts" button should be changed to "Term Groups".
- Analysis & Visualization Tools:
  All the A&V tools should have a similar look to them (the Geo Display and the Timeline display are very different). All tools should have a Records (File?) menu in which the user can save and save as the dataset, send records to another tool, and exit the tool. This would replace/rename the DataInfoSet menu on the Statistics and Data Browser. When records are sent from one tool to another, unless no records are selected the program should ask if the user wants to send all, selected, or view document.
  All the A&V tools should have the same closing question (Confirm Exit).
  The popup menu to send records to a tool should have no tools already selected and should explain more clearly what simple events, sentences, and named entities mean in terms of data displayed.
  - Data Browser: When the columns are resized, when the browser is reopened they should remain the changed size.
  - Statistics: When a column is resized, the rest of the columns should adjust position accordingly. Also, the columns should be able to be tied together somehow (these 2 things appeared x number of times in the documents) and there should be an option for the user to organize things by document (how many times this particular thing appeared in this particular document).
  - Timeline: In the group by list box, is the ability to type into the text field necessary or should the user just be limited to choosing from the list? Are all the menus (Annotations, Customize, Edit) necessary? And the summary popup information (after plotting) should be given focus until the user clicks "OK" so that the display doesn't get hidden behind the timeline.
  - GeoDisplay: The Plot Inferred Locations question should come up after the map is displayed. It keeps getting hidden behind the map and the map must be minimized in order to plot the locations. Also, are all the menus (Edit, Mapping, Tracking, Satellites, Applications) necessary? And the summary popup information (after plotting) should be given focus until the user clicks "OK" so that the display doesn't get hidden behind the map.
  - Document Browser: An Edit menu should be added on the menu bar, or the choices to select all and to copy selected items to the clipboard, where they can be pasted onto a notebook page. The "Dismiss" option on the File menu does nothing. Perhaps it should be removed.

- Notebook:
  The notebook should open the system's main text editor program (Notepad, Text Editor) where analysts can send documents or parts of documents to make notes on, and then save to a folder or send elsewhere.

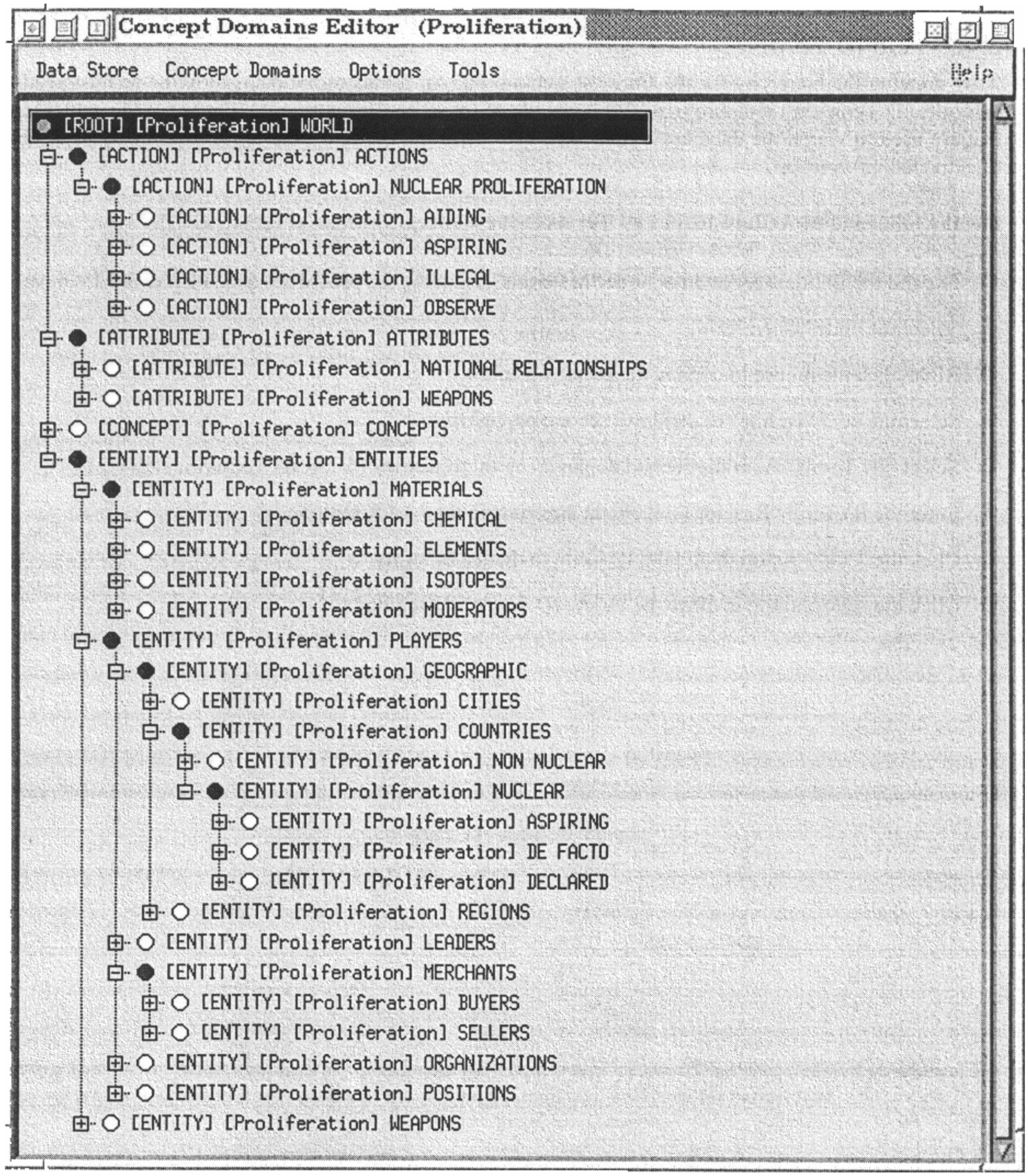

Figure 5: Current Concept Domain Manager

* Term Organizations (Concept Domain Manager) Suggestions:
The current Concept Domain Manager (renamed Term Organizations in new Main Menu), while it doesn't look all that complicated, is difficult to use. Adding groups and terms takes several steps and opens several screens that can become lost if the user clicks on an area in the original screen. Figure 5 shows a screenshot of the current Concept Domain Manager.

One suggestion on improving it include allowing the user to type in directly what they want the node to be instead of having to right-click, select, then type. Based on this suggestion, a new Term Organization was designed as a suggested solution. This Term Organization design, which has not yet been developed, is pictured below in Figure 6.

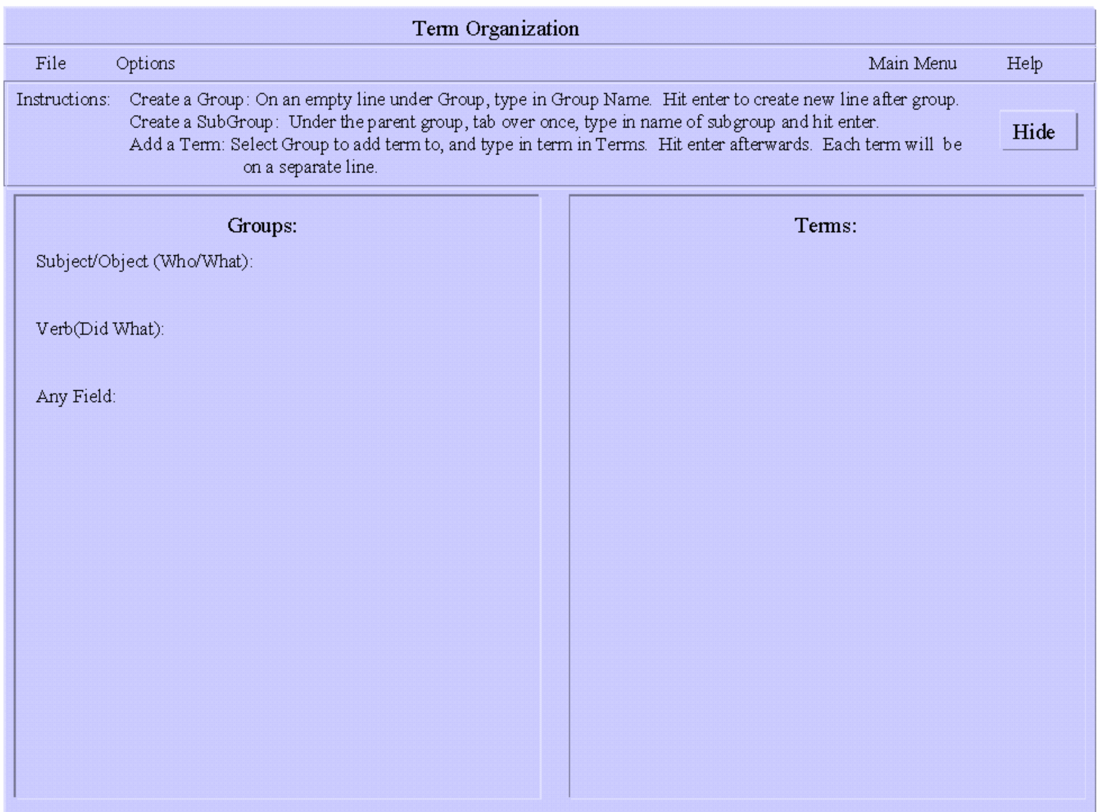

Figure 6: New Term Organization Design

In the new design, right clicking on a group will display a menu with the options to add categories, rename, delete, and hide/show instructions. When the instructions are hidden, the Group and Term sections fill the empty space. The file menu holds the new, open, save/as, close and delete organization, and exit properties. The Options menu holds all the capabilities of the right-click menu, as well as Export Categories and Find Term. Adding terms in the new design will be accomplished by selecting a group name to add the term to, and then typing the term under the Terms section. Each term will be on a single line, and if the term list becomes larger than the display the display will scroll.

*Saved Queries (Topics) Suggestions:
The current Topics interface (renamed Saved Queries on the new Main Menu) is also a very confusing interface. Saving queries or results involves moving files from a temporary to permanent place before the file will be saved. Also, there is no way to view relevant information about a query or result. The information currently viewed when the user clicks on a query is confusing and not of much use. The user must really know the program to be able to utilize this interface, as it is not very intuitive. The current Topics interface is depicted in Figure 7 below.

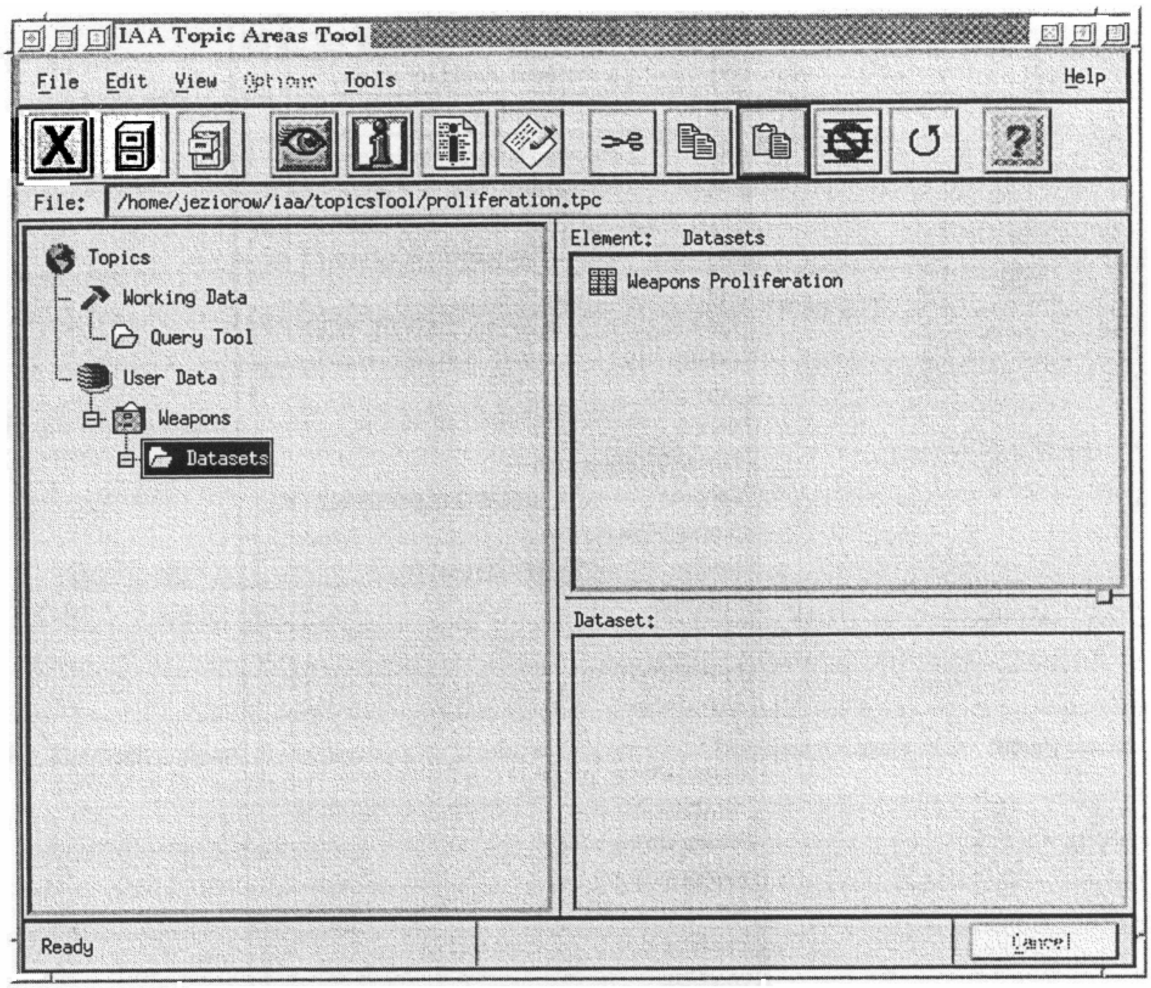

Figure 7: Current Topics Area screen

Due to the confusing interface, a new Saved Queries interface was designed, but has yet to be developed. This interface appears in Figure 8.

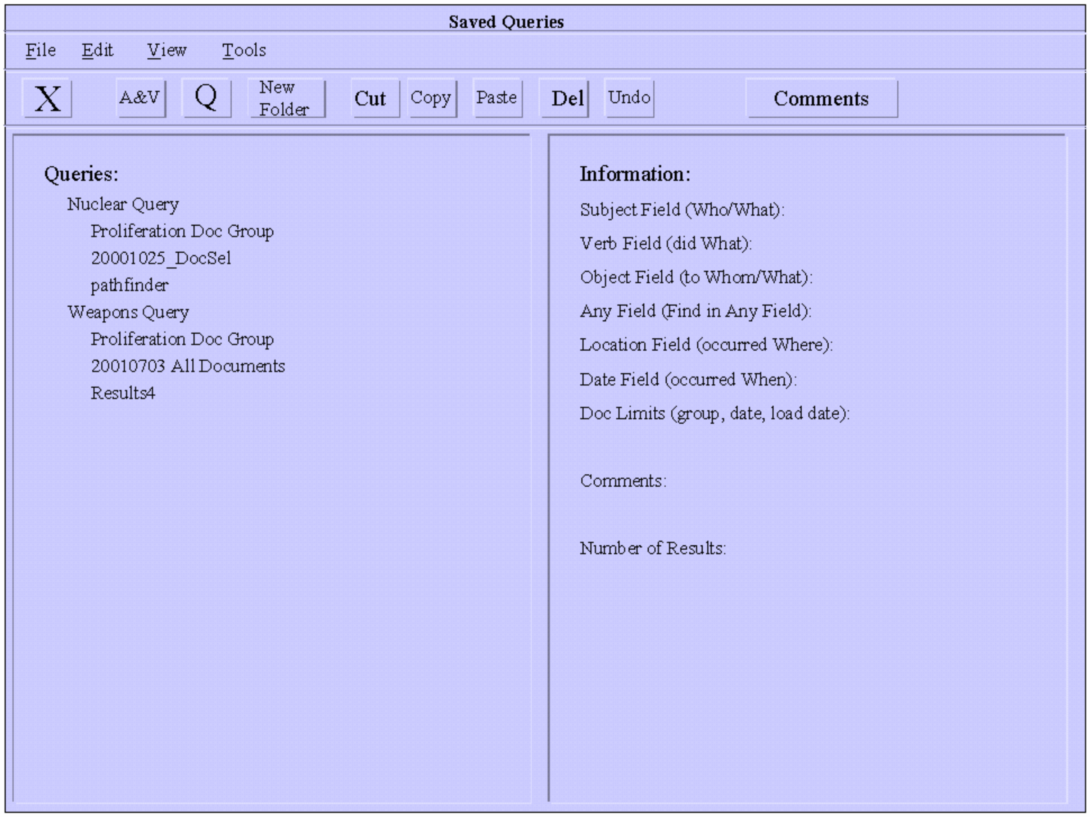

Figure 8: Suggested Design for Saved Queries

In the new interface, the structure of the query will be saved, not the results. Each query saved will open the query tool so that the user can change the document group to query a new set of data. The user will also be able to view the results of the original query (on the original document group) in any of the Analysis and Visualization tools without having to run the query (directly) again. The user can rename the, but the default name for the results and query will be the same as it is now. Recommended names for the results would be the name or date of the document group queried.

The toolbar buttons stand for different functions, some of which in the current tool require two or more steps to access. X is exit, A&V sends the results to an A&V tool (opens up the current Send Dataset dialog box which allows the user to choose the which tool to open and the type of data sent), and Q opens the query tool with the selected query set up. New Folder creates a new folder to organize queries into a hierarchical organization. The cut, copy, paste, delete (Del) and undo options are also on the toolbar to help organize the queries into a hierarchical structure. The A&V and Q buttons will be grayed out unless a result or a query is selected.

Selecting a Query will cause the summary (information that created the query) to appear in the Information section. Right clicking on a name in the Queries section will cause a menu to appear that allows the user to rename, cut/copy/paste, delete the item. Double clicking will send a query to the query tool.

The File menu holds the Exit option, Edit holds the New Folder, Rename, Cut, Copy, Paste, Delete, and Undo options, View allows the user to expand or collapse all folders (and queries), and Tools opens the Query tool or the Send Dataset dialog (the A&V tools).

The user can enter comments about the items by right clicking (on the menu that appears) or under Edit or by a button on the toolbar. A dialog box will be displayed that has a textbox in it for the user to enter the comment into or change the current comment. The comment will be displayed on the Information section.

The program will take any saved results that haven't been viewed in x amount of time (days, weeks, etc.) and ask the user if it's ok to delete those saved results. The user can set the amount of time between asking, and if the process is automatic or if it needs the user's permission. These options will be under the File menu.

V. Summary:

The technology behind Intelligence Analyst Associate, and most of the tools of the program, is extremely useful to intelligence analysts. However, the Main Menu, Term Organization, and Saved Queries interfaces are extremely confusing for users just starting to use the program, and even for users experienced with the program. Through suggestions from analysts and using the program, new interfaces for the three tools were designed, and the new interface for the Main Menu was developed. Other suggestions were also made in the hopes of improving a promising program.

The new Main Menu consists of many features intended to make it easier for intelligence analysts, or anyone, to use. The features include separation of tools from other functions (Help, About, Exit), and separation of tools into chronological order of use. Tools may be managed better due to the new Current lists under the Tool Organization, Query Development, and Notebook sections. The Notebook tool offers a basic text editor within the program that can be used by the user to hold notes about a specific query. Additional help is available through mouse movement, and through the Help button on each of the tools and the Main Menu.

References:

Software User Manual For The Intelligence Analyst Associate (IAA) Build 3 Prototype 3A. Veridian Engineering (Calspan). 21 Sept 2000.

Intelligence Analyst Associate (IAA) Analyst-User Tutorial Draft. Veridian Engineering (Calspan). 21 Sept 2000.

Appendix A

User's Manual

Main Menu:

The main menu is where all the functionality of IAA may be accessed. It is divided into two main sections, and each section is divided into three subsections, in order to organize the functionality of IAA into an ordered process.

Setup and Extraction Processes:

Load and Extraction Processes:

- Load Documents—This button opens a dialog from which the user chooses files or directories to extract information from. The extraction process runs in the background so that the user can take care of other tasks on the computer.
- Extraction Process Status—This button displays a table that shows where documents are in the extraction process. From this display documents may be removed from the process.

Term Organizations:

- New/Saved—This button opens up a new Term Organization screen from which old organizations can be retrieved. In the display, words can be organized into different categories, all under four main categories (Entities, Actions, Attributes, and Concepts), to make querying the data extracted from the documents easier.
- Current—This drop-down list holds all the Term Organization displays that were hidden (not closed). To open one, select it from the list and click the "Open" button next to the list.

Previous Queries:

- Saved Queries—This button opens up a display where saved query structures (from the Query tool) can be organized and opened.

Search Processes:

Query Development:

- New Query—This button opens a new Query Development display where the user can enter terms or phrases to search for. Term organizations, or parts of them, may also be used as query criteria.
- Current—This drop-down list holds all the Query Development displays that were hidden (not closed). To open one, select if from the list and click the "Open" button next to the list.

Analysis and Visualization Tools:

The A&V tools allow the user to view the query results in a variety of ways. The tools are accessible in the query tool itself, and the buttons on the main menu are only activated if there is at least one query hidden in the Query Development Current list. When pressed from the main menu, the A&V tool selected will open for the query development currently selected in the Current list.

- Data Browser—This tool displays the query results in a table format. Depending on the type of data sent to it, different columns appear in the table for each piece of data. For example, if sent Extracted data, there will be a column for subject, direct object, etc., for all query results. Each row represents a sentence or clause from the queried data.
- Statistics—This tool displays columns of data that show how often the particular term or phrase appears in the query results. The columns to be shown (which correspond to the columns in the Data Browser) are chosen when the tool is first opened, and can be changed at any time. Unlike the Data Browser, rows do not represent sentences or clauses. Each column group (which has two columns-one for the term or phrase, one for the count of how many times that term or phrase appeared in the results) exists independently of the others.
- Timeline—This tool displays the query results by extracted, document, or load dates. The results may be further organized by different categories, like location or subject. The records are then plotted on a timeline. Records or their icons (which denote the type of result) may be clicked on for further information on that particular record.
- Geo Display—This tool displays the query results by either inferred or explicit location in the result. The results are plotted on a world map. Areas on the map may be zoomed in on, and distances between points may be calculated among other utilities. The plotted points may be clicked on for further information about that particular record.

Notebook:

- New/Saved—This button opens a Notebook display (the system's current default text editor). From the display old Notebooks may be accessed. Information from the query results may be copied into the notebook, and the user can add notes to that information.
- Current—This drop-down list holds all the currently active Notebook displays (ones that were hidden and not closed). Selecting the particular display to view from the list and clicking the "Open" button next to the list may open these displays.

Appendix B

Trace Through:
Start at Main Menu

1. Load Documents:
   Click this button on the Main Menu to choose the text documents to extract data from. Once the data has been extracted, the Query tool can search through this data. To choose documents and extract data from them:
   - Open the Load Documents screen by clicking on the "Load Documents" button on the main menu
   - Select either Files or Directories to be loaded
     - Only files OR directories may be loaded, never both
   - In the dialog box that opens, find and select the document(s) to be added to the Load list and click "OK" to return to the Load Documents main screen
   - To remove a file or directory from the Load list, select the file/directory and click "Delete"
   - To save the documents being loaded as a new Load Group, type the name the group is to be saved under in the "Load Group" text box.
   - To add the documents being loaded to an existing Load Group, click "Select" under "Load Group," choose the load group to add to and click "OK" to return to the Load Documents main screen
   - When finished, click "OK" to add the documents in the Load list

2. Extraction Process Status:
   While the documents selected under Load Documents are loading, click this button on the Main Menu to view where each document is in the extraction process. To view this data:
   - Click "Extraction Process Status" to view where in the extraction process loading documents are
   - Loading documents appear in a table. Each column represents an extraction process, and in that column each document is either PENDING, RUNNING, or SUCCESSful.
   - To remove a document from the process, click "Delete Entries", click "OK" in the pop-up box that appears telling you what to do, then select the document to be removed and click "Delete Entries" again.

3. Term Organizations:
   New term organizations, or saved ones, are created and viewed under this tool. Words (terms) are organized into hierarchical groups in this tool. These groups are used as query criteria in the Query tool.
   When a Term Organization is hidden, it can be displayed again by selecting the Term Organization name from the "Current" drop-down list under the Term Organization section.

- Click "New/Stored" under the Term Organization section of the Main Menu to open the Term Organization Manager
- To create a new concept domain, under the "Data Store" menu select "New"
- To open an existing concept domain, under the "Data Store" menu select "Open," select the concept domain to be opened, and click "Open Data Store"
- To close an open concept domain (more than one may be open at a time) under "Data Store" select "Close," select the name of the concept domain to close, and click "Close Data Store"
- To add a category to Entities, Actions, Attributes select the category the new category (or node) is to be placed under, and right-click the mouse. Select Add Subnode from the pop-up menu, and type in the name of the new category. DO NOT select Add Category. When the name of the node is typed, click "OK" and it will appear under its "parent node" (the category it was placed into).
- To remove a node from anywhere, select the category and hit the Delete key, or right-click and select Delete Nodes from the pop-up menu.
- To add an ID Term select the node to add the term(s) to, and right-click the mouse. Select Define, then ID Terms from the pop-up menu. Type in the name of the first term to be added, and click Add. Keep typing in terms and clicking Add until done and then click "OK". The number of terms entered will appear next to the node name.
- To remove an ID Term select the node to remove the term(s) from, and right-click the mouse. Select Define, then ID Terms from the pop-up menu. Select the name of the term(s) and click "Delete." Click "OK" to close the pop-up window.
- To add a node to Concept select the Concept category to be added to, right-click the mouse and select Add Subnode then select Concept, and type in the name of the node to be added.
- To add an Event select the Concept category to be added to, right-click the mouse and select Add Subnode then select Event, and type in the name of the node to be added.
- To remove an Event, select the Event and hit the Delete key, or right-click and select Delete Nodes from the pop-up menu.
- To define an Event open the Event to be defined (it must be added to the Concept first), and select a category (Actor, Act, Affected, or Other) to define. Right-click the mouse, and select Define then Add Reference from the pop-up menu. In the display that pops up, select the category you wish the event to be defined by. Note that the display only shows categories for the specific part of the event (Entities for Actor and Affected, Actions for Act and Attributes for Other), and you can only choose what you have already defined in another category. Not all the parts of the event need to be defined in order to create the event, however the more parts defined the more specific the search will be.

- To remove a definition in an Event open the Event to be changed, select the category to be undefined, right-click and choose Define then Remove Reference. Be sure that you want to remove the particular reference, as you get no question asking you if you are sure.

4. Query Development:
   New queries are created with this tool. In the query display, words or phrases may be entered, or term organizations can be used, as search criteria. The four available fields, Subject, Verb, Object, and Any, can be used in any combination to create a Concept. Terms may be entered directly into the display by the user, or the groups created under the Term Organization tool may be used as search criteria. Not all query fields must have information to search for, but the more information entered into the display the more specific the results returned will be.
   Once a query has been hidden, it can be displayed by selecting the query name from the "Current" drop-down list under the Query section.
   - Click on the New Query button to bring up an empty Query display.
   - To enter terms directly into the tool, under the field section to search enter the term(s) to be searched for in the top, white-colored text field.
   - Term Organization groups may be used by clicking the "Concept" button under the field section to add the group to. In the dialog box that appears click "Add". This brings up the Term Organization tool. Select the group(s) to add from this display.
   - To remove a term group from the search criteria, click the "Concept" button under the field section the unwanted term group is in. Select the term group(s) from the dialog displayed, and click "Remove". All the term groups may be removed by clicking the "Clear" button on the Concept display.
   - To add an Entity Type to the search criteria (a specific type of entity to search for, such as organizations, locations, etc) select the "Entity" button under the field section to add to. From the left side of the dialog box displayed choose the entity type(s) to be searched for and click "Add". The types will appear on the right side of the display. Entity Types are not available for the Verb field.
   - To remove an Entity Type, click the "Entity" button, and in the dialog displayed select the entity type to remove from the right side of the display. Click "Remove" and the entity type is removed. The "Reset" button on the Entity Type display clears all entity types from the search criteria for that field.
   - Under the Object field is the option to make its search criteria the same as the Subject field. Checking the checkbox next to the Same as Subject label makes it so that both the Object and Subject field are searched for the information under the Subject field.
   - Fields may be cleared of all information by clicking the "Clear" button under that particular field.

- Fields may be hidden from view by clicking the “Less” button under the line of fields. The Any field may be hidden, and the Subject, Verb, and Object fields may be hidden as well.
- Locations may be specified to search for under the Location field. Clicking the “Change” button displays a dialog where locations to be searched for may be entered. The locations may be entered as either Political Divisions or Other. Political Divisions use normalized country, subnational, and city names as search criteria. The name(s) of the country, subnational, and/or city may be entered into their respective text fields, and each text field may be cleared by clicking the “Clear” button next to that particular field. The Other section holds locations not normalized. These locations are entered in the text field in the Other section of the Location display, and are cleared by clicking the “Clear” button next to the text field.
- Dates to search for may be specified in the Date field. Clicking “Change” brings up a date display where starting and ending dates may be chosen by clicking the “Between” button between the two calendar displays, and in those calendar displays selecting the starting and ending month, day and year. The dates to search for may also be specified by only inputting the start OR end date, then clicking the +/- button beneath the calendar display inputted into and in the bottom inputting the amount of time to add (to the start date) or subtract (from the ending date). Years, months, days, hours, and minutes may be entered as the amount of time differing from the start/end date. The current date may also be used in the calendar displays by clicking the “Use Current Date” button above the calendar display.
- The documents searched may be limited under the Document Limits field by clicking the “Change” button. This displays a dialog box where document groups may be specified by clicking the “Add” button next to the Document Groups text field and selecting the document group(s) to search through. These groups may be removed by clicking the “Remove” button next to the Document Groups text field and selecting the group(s) to remove. Document Date Range and Loaded Date Range may also be specified by clicking the “Change” button under the text field of the date range section. This brings up the same display as the Date field displayed, and the dates may be chosen from this display.
- When all the desired search criteria have been entered into the Query display, clicking the green “Run” button on top of the display runs the query. A progress bar is shown above this button to show how far the query has searched. When the query has finished running, the results may be sent to the Analysis and Visualization tools by clicking the eye icon on the toolbar.

5. Analysis and Visualization Tools
   The A&V tools display query results in four different ways. The document that a particular result came from can be accessed from each of these tools.

On the Main Menu, these tools are only available when there is a query hidden. When chosen from the Main Menu, they display the results from the query currently selected in the "Current" drop-down list in the Query section.
To get the A&V tools from the query tool (or the data browser or statistics tool) click on the eye icon on the toolbar. In the "Send Dataset" dialog box that appears choose which A&V tool to view. Set the maximum number of results to view in that tool, and select which data type to view. Simple Events sends the extracted data (verbs, subjects, etc), Sentences sends sentences, and Named Entities sends the proper nouns (names of people, organizations, locations, dates, etc) that were extracted. Click "OK" to view the information through the selected display tool.

5a. Data Browser:

Displays the query results in a table. Each row represents a query result and each column is a specific part of that result. To use the Data Browser:

- The columns and categories shown in the Data Browser may be changed under the Options menu by clicking on the one you wish to change, then unchecking the categories or columns to hide and checking those to show.
- Columns and the Category column may also be highlighted by category by choosing Color under the Options menu, and selecting to highlight the Category column, all the columns, or no highlighting.
- Cells of the table may be changed by selecting "Allow Cell Editing" under the Edit menu, selecting the cell to alter and change it.
- Unwanted or unneeded rows may be removed from the display (but not from the results sent to other tools) by selecting the row to take out and then selecting "Delete Selected Row" from the Edit menu.
- All or selected rows may be sent to another A&V tool by selecting the rows to be sent (if all rows then this may be skipped), and clicking the eye icon or "Visualize" under the Files menu. Choose either "All" or "Selected from the dialog box that appears (or "Document Browser" to view one document in full-text form). This will bring up the "Send Dataset" dialog box.
- One result may be sent to the Document Browser by selecting the result to view, clicking the eye icon or "Visualize" under the Files menu, and choosing "View Document" from the dialog box that appears. The result can also be sent to the Document Browser by double clicking on it.

5b. Statistics Tool:

Displays statistical information on the query results. The different column pairs shown (each representing a different sentence-structural or informational part of the result) are chosen by the user. These column pairs show the term/phrase found and the number of times it was found in the query results. To use the Statistics Tool:

- When the tool starts up, choose which columns of information to be displayed. The columns displayed may be changed at any time by selecting the "Show Columns" under the "Options" menu. A dialog box will appear. On the box check any columns to view and uncheck any columns to hide.
- The minimum number of occurrences shown can be changed by selecting "Minimum Count" under the "Options" menu. In the dialog box that appears type in the minimum number of results to show in the statistics display. To show all results, type in "1"
- To show how many results did not have an entry for the columns select "Show Empties" under the "Options" menu. These blank rows may be hidden in the same way as they were shown.
- To send all or selected rows to another A&V tool select the rows to be sent (if all rows then this may be skipped), and click the eye icon or "Visualize" under the Files menu. Choose either "All" or "Selected from the dialog box that appears. This will bring up the "Send Dataset" dialog box.

5c. Timeline:

Displays the query results by date (extracted, document, or load date) on a timeline. Results may be further organized on the timeline by grouping results into a category chosen by the user. Once plotted on the timeline, information on a specific result may be viewed by clicking on it. To use the Timeline:

- Select the type of dates to be plotted from the dialog box that appears when the timeline tool is opened. The types are extracted (from the specific clause), document (I have no idea), or load (when the information was extracted through the program) dates. The option to use an inferred date, which the program assigns to a result, is also on this dialog box.
- Select what the results will be grouped by from the list that appears in the second dialog box and click "OK". If no grouping is desired, select "None."
- When the results are finished a dialog box will appear with information on how many results were plotted, and why the rest of the results weren't plotted. Click "OK" to close this screen
- Clicking on a button in the row of date buttons on the top of the timeline will display only the events in that time (decade, year, etc.)
- Left clicking on an icon or a result opens an "External Event" dialog box, which shows information about that particular event.
- To select a group of events, left-click and drag to box the events to be selected. Right-click on any of the selected events to send those events to another A&V tool. To do so, select "Visualize Data" from the menu that appears, and choose "All" or "Selected" from the dialog box that appears. This will bring up the "Send Dataset" dialog box.

- One result may be sent to the Document Browser by right clicking on the result to view and choosing "View Document" from the menu that appears.

5d. GeoDisplay Tool:

Displays the query results by location on a world map. Results may be clicked on to display further information on that result plotted and different map utilities (for example calculating distances) are available. To use the Geo-Display Tool:

- Answer the "Plot Inferred Locations" question that appears when the GeoDisplay tool is opened to choose whether or not to display only locations explicitly stated in the extracted information.
- When the locations are finished plotting an information box will appear displaying the results sent, plotted, and the reason why the rest of the results were not plotted.
- Left clicking on an icon on the map will display extracted information on the result that icon represents on the bottom of the screen. Right-click to end this mode.
- Click on the "Utilities" menu to view and use the Utilities dialog box
  - On the dialog box, clicking "Recenter" then clicking on a region of the map will center the map around that region.
  - The "Prev Map" button on the Utilities dialog box returns the map to its previous view.
  - To calculate distances between two points on the map, click "Calc Dist" on the Utilities dialog box, and click on the two points to see the distance between them displayed in several different formats on the bottom of the screen.
  - Zooming in on an area of the map is accomplished by clicking "Box Area" on the Utilities dialog box, selecting one corner of the area to zoom in on, then selecting the opposite corner (a box will appear as the mouse moves to show which area will be zoomed in on).
  - To find a country or area by its name click on the "Show Area" button on the Utilities dialog box. In the box that appears type the name of the country or area into the text field and click "OK." To return to a worldview, type in "world".
- To send the results to another A&V tool, right-click anywhere on the map area to display the "Send Dataset" dialog box.
- To view a result's document, right-click on that result and select "View Document" from the question box that pops up.

5e. Document Browser

- To view the categories that correspond to the highlighting colors, under the "Files" menu select "Categories." This will bring up a table of the categories, highlighted by their corresponding colors, and the number of times the categories appear in the open document.

6. Previous Queries (Topics):
   Queries can be saved from the Query tool, or from any of the visualization tools. Saved queries can also be accessed by opening this tool from the Main Menu. When "Save" is selected from any of the visualization tools or the query tool, it opens up the Saved Query Results dialog box. The dataset, or query information, is saved temporarily under "Working Data," and unless moved to "User Data" will be deleted when the tool is closed.
   - To move the dataset, select the name it was saved as under "Working Data" (the names of temporarily saved datasets appear under the "Element:" section when Working Data is selected), and use the icons on the toolbar to Cut (scissors) or Copy (two sheets of paper) the dataset. Then, under User Data, select the file and folder to save the dataset under, then click the Paste (paper with clipboard) icon on the toolbar. The Cut, Copy, and Paste options can also be found under the "Edit" menu, or by right-clicking on the items rather than just selecting them, and selecting the option to use from the menu that appears.
   - Datasets, folders and topics may be moved between displays (each display is its own file on the computer) by using the cut, copy, and paste utilities. New displays can be created under the "File" menu by selecting "New." Save the current display if desired when the pop-up box asks, and the new display will open.
   - Displays may be saved under the "File" menu by selecting "Save" or "Save As," or by clicking the save icon (closed file cabinet) on the toolbar.
   - Previously saved displays can be opened by clicking on the open icon (opened file cabinet) or under the "File" menu by clicking "Open," and finding and selecting the display to open from the dialog box that appears.
   - Under User Data, saved datasets can be organized into a hierarchy of topics (cabinet drawers) and elements (folders). To create a topic, right-click on User Data or the topic the new topic is to be saved under. Select "New Topic," name the topic in the dialog box that pops up and the topic is created. Elements (folders) are created in the same way, by clicking on "New Element" instead of "New Topic." New topics and elements may also be added by selecting the item to add to, and under the "Edit" menu selecting "New" and then the type of item to be added. Elements can be added to User Data or any topics, but only datasets may be added to an element.
   - The topic and element sections under User Data may be hidden (collapsed) or viewed (expanded) by clicking on the plus or minus sign next to the icons (plus will expand the item, minus will collapse it). Right-clicking the item and choosing "View" and then either "Expand Folder" or "Collapse Folder" from the menus that appear accomplishes the same thing. All topics may be expanded or collapsed under the "View" menu and selecting either "Expand All Topics" or "Collapse All Topics."

- Information about the datasets is displayed under the “Dataset:” section by selecting the dataset under “Element” when the element folder is selected. The same information is displayed by clicking the “i” icon on the toolbar when the particular dataset is selected, or by right-clicking on the dataset and choosing “Item Information” from the menu that appears. Another way to view the information is by selecting the item and then selecting “Item Information” under the “View” menu.
- Topics, elements and datasets may be deleted by selecting the items to be deleted and clicking the delete (circle with a line through it) icon on the toolbar or by selecting “Delete” from the “Edit” menu. A “Delete” option can also be found by right clicking on the item and selecting “Delete” from the menu that appears. Only items under User Data or Query Tool may be deleted.
- The Undo icon (arrow going in a circle) on the toolbar reverses the last action performed. The last action may be undone by selecting “Undo” under the “Edit” menu, or an Undo option can be found by right clicking on any item in the display.
- To open up help on the Saved Query Results click on the question mark icon or the Help menu.

6a. To open and run a saved query, or change the saved dataset, select the Saved Queries button on the Main Menu and:

- The saved dataset may be changed by selecting the dataset, then clicking the Edit (paper with pencil) icon on the toolbar or by right-clicking on the dataset and selecting “Edit Dataset”. In the dialog that pops up, clicking “Set Parameters” will bring up the query screen with all the query information saved. From there, the query may be changed.
- The datasets may be sent to the visualization tools by selecting the particular dataset and either clicking the Visualize (eye) icon on the toolbar, choosing “Send Dataset” from the “Tools” menu; or by right-clicking on the dataset and choosing “Send Dataset.”

Appendix C: Button Comments Table

Section/Button	Comment
Setup and Extraction Processes	
Loading and Extraction Processes	
Load Documents	Choose files or documents to extract data from
Extraction Process Status	View where loading documents are in the extraction process, remove loading documents
Concept Development	
New/Stored	Create or change a saved term organization (concept)
Current (drop-down list)	Currently open/active concepts (term organizations). To display comments on a current term organization, select it from the list.
Previous Queries	
Saved Query Results	Open and organize saved queries and query results
Search Processes	
Query Development	
New Query	Create a new query to search extracted data
Current	Currently open/active queries. To display comments on a current query, select it from the list.
Analysis and Visualization	
Data Browser	View table of extracted data from query results
Statistics	View statistical information on query results--how often particular terms occurred
Timeline	View query results plotted on a timeline by extracted date/time
Geo-Display	View query results plotted on a world map by extracted locations
Current	Currently open/active analysis and visualization displays
Notebook	
New/Saved	Open text window to copy information from documents, and write notes on queries
Current	Currently open/active note windows. To display comments on a note window, select it from the list.
About	Displays a window containing information about the creators and the version of IAA
Help	Displays a pop-up box of information about the IAA System
Exit	Closes the program

Appendix D: Help Screens Table

Tool:	Help:
Main Menu	Welcome to Intelligence Analyst Associate IAA takes text documents and extracts sentence structural information out of them (nouns, verbs, etc.). To do this, IAA uses state-of-the-art natural language understanding. After extraction, the user may query the extracted data to find specific data in documents. Setup and Extraction Process: To load documents, click the Load Documents button. The Extraction Process Status will show where documents are in the extraction process. While documents are loading, the user may create a Term Organization, to use to query the loaded documents for the terms in the organization. Previous Queries allows for a particular query to be run on different documents without having to reconstruct that query each time. Search Processes: Query Development, of course, allows the user to determine what to search for in the documents once they are loaded. After running a query, the Analysis and Visualization tools may be used to view the results in various manners. Notes on the query results can be written in the Notebook. Each section in IAA has its own help file. If more help is required, see the user's manual and the trace-through.
Load Documents	Documents may be selected to load as files or as whole directories (a group of files in the computer), but not as both. Click the corresponding button to select and add documents to the load list. Documents to be loaded may be named as a Load Group, which makes it easier to query just those documents. The group may be named by typing in a name in the “Load Group” text box. Documents may also be added to existing load groups by selecting the load group from the “Select” button in the “Load Group” section.
Load Status	Information on where the documents selected from Load Documents are in the extraction process. Documents are either pending, running or successful in each stage. Documents can be removed from the process at any point in the process.

Tool:	Help:
Concept Development	Create organizations of terms to search for in the extracted data (from the documents selected in Load Documents). Terms can be Entities (Actors, people, objects, or things), Actions (Acts, verbs, what the entities did), or Attributes (any other terms to be searched for, in any field). Terms may also be organized into Concepts, which are made of Events. Events define the Actor (who, chosen from Entities), the Act (did what, chosen from Entities), the Affected (to whom, chosen from Entities), and Other (anything else to be searched for, chosen from Attributes). Not all parts of an Event need to be defined, but the more definition an Event is given the more specific the results returned from the query are.
Previous Queries	Store and organize query results (a.k.a. datasets). When saved from the query tool, the dataset appears under "Query Tool." The dataset must be moved to a drawer or folder under "User Data" to permanently save the dataset. Once saved, the query results may be sent to any of the analysis and visualization tools.
Query Development	** Wait to view/use new interface before creating help pop-up **
Data Browser	Displays the query results in a table of extracted data (simple events), sentences, or named entities (people, places, organizations, locations, etc.). Columns may be hidden or viewed, and rows or categories (the types of information in the record) may be highlighted. The cells in the table may also be edited.
Statistics	Displays statistical information on the number of times terms or clauses appear in query results. The columns displayed are chosen by the user, and can be changed at any time. The columns may be sorted alphabetically or by number of occurrences.
Timeline	Displays query results on a timeline. Results are placed on the timeline based on extracted dates, loaded dates, or document dates. Results can also be grouped together by different categories (for example, location or type of information). Information about a specific result can be accessed by double clicking on the result. The icon next to the result denotes the category (type of information).

Tool:	Help:
Geo Display	Displays query results by location on a world map. Information about a specific result may be viewed by double clicking on the result. Areas on the map may be zoomed in on, distances can be calculated, and the map can be re-centered, among other available utilities.
Document Browser	Displays full-text documents a result was taken from. Sentences/clauses are highlighted by category, and the sentence/clause the document browser was opened from is highlighted in yellow.
Notebook	Cut and paste information from the data browser, statistics, and document browser, add notes to the information, and save to a folder/directory on the computer for future access.