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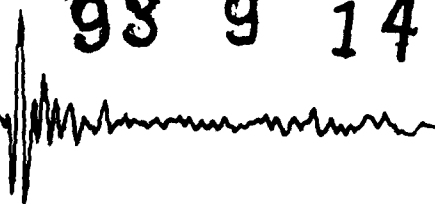
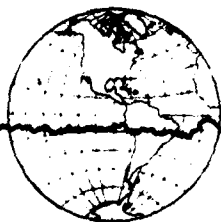
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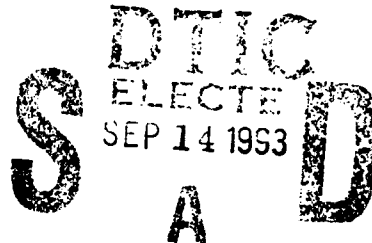
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CSS Technical Report C93-09

August 1993

CenterView Version 2 Tutorial

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Sponsored by:
Advanced Research Projects Agency
Nuclear Monitoring Research Office
ARPA Order Number 5557,
Program Code Number SO514S
Issued By: DSS-W
Contract No. MDA903-91-C-0151

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE August, 1993		3. REPORT TYPE AND DATES COVERED Technical Report	
4. TITLE AND SUBTITLE CenterView Version 2 Tutorial				5. FUNDING NUMBERS MDA903-91-C-0151 ARPA Order No. 5557	
6. AUTHOR(S) David Corley, Christine Ferraro					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Science Applications International Corporation Center for Seismic Studies 1300 N. 17th Street, Suite 1450 Arlington, VA 22209				8. PERFORMING ORGANIZATION REPORT NUMBER CSS Technical Rpt. C93-09 SAIC-93/1163	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Defense Advanced Research Projects Agency 3701 N. Fairfax Drive Arlington, VA 22203				10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for Public Release Distribution Unlimited				12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This report serves as a tutorial for Version 2 of the CenterView program, a menu based interface to the Center for Seismic Studies Version 3.0 format databases. This report guides the user through several of the more common queries performed in CenterView. It contains an appendix that describes how to set up communications between CenterView and other programs at the Center for Seismic Studies.					
14. SUBJECT TERMS Seismology Database Management Systems Nuclear Test Detection Data Access				15. NUMBER OF PAGES 46	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT NONE		

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Introduction

The CenterView program allows users to easily retrieve commonly requested data from the Center for Seismic Studies databases. After retrieving the data from the database, the user may process it in many ways, including dumping to flat files, sending to other programs via interprocess communication, sorting, resegmenting, etc.

In a typical CenterView query, the user specifies a series of constraints which provide enough information for CenterView to form a query. CenterView has two methods of operation. The first method is an X windows based interface, and the second is a batch mode, which allows the user to perform a subset of the queries using a simple command language. This tutorial describes the basic features of the X Windows interface to CenterView, and provides a tour through the most common queries.

This tutorial assumes that you are running CenterView on machines at the Center for Seismic Studies and that the database itself will also be at the Center. If this is not the case, then some of the exercises may be inaccurate. This tutorial also assumes that the user is familiar with X windows and Unix.

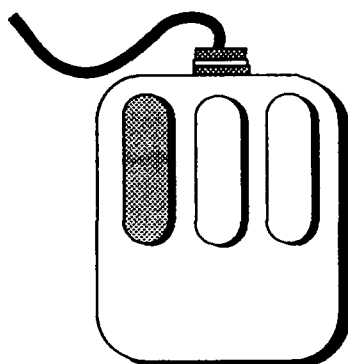
Section

1

Conventions

CenterView follows the conventions of the Motif user-interface environment. The following conventions will help you navigate through CenterView and this tutorial.

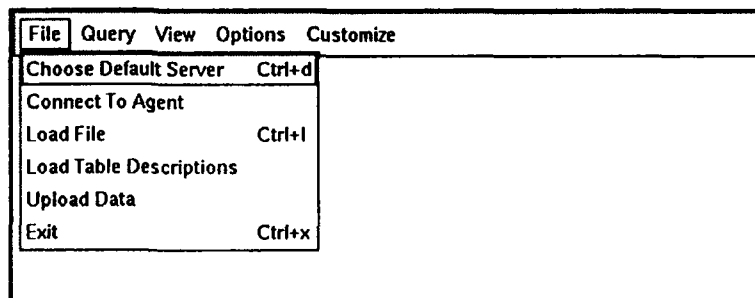
Mouse



- Only the left button is used in CenterView. To initiate an action with the mouse, place the pointer where you want the action to take place, then quickly press and release the left mouse button. This is called “clicking”.
- “Point the mouse” means without pressing the left button move the mouse until the arrow (pointer) is over the desired location.
- “Drag” means press the left button over the text, drag the cursor until the text becomes highlighted, then release the button.
- When the *mouse pointer changes to a watch icon*, CenterView is busy and no action can be taken in the Main window.

Menus/Windows

CenterView menus are located above the main window. To see the contents of a menu, click on the menu name. To select an item from the menu, drag the mouse to the item and click.



Many different windows are displayed in CenterView. The windows contain various buttons defined as:

Done	Proceeds to the next window after applying any changes.
Cancel	Aborts the current function and returns to the previous window.
Select All	Selects all of the items in the list. To select individual entries, click on the selection.
DeSelect All	Deselects all of the items in the list. To deselect individual entries, click on the selection.
Hide	Hide a window, taking no action.
Dismiss	Removes a dialog window.

Text Fields

A simple text field consists of a label followed by one input box:

Database Accounts:

Generally, one or more values, separated by commas can be entered into a simple text field. However, some simple text fields such as the User Event File field can only take one value.

Range text fields contain two input boxes separated by "to":

Event Depth: to

For these text fields the user should supply a range, i.e., enter a lower bound for the range in the left input box and an upper bound in the right input box. It is not necessary to supply both upper and lower bounds:

Phase Type Window: to

Velocity Window: to

To enter text in an input box:

Move the mouse to the input box and click the left button. The border around the input box becomes darker, indicating that it is

selected. Type in the appropriate text. Text fields are generally case-sensitive, although there are some fields where case is unimportant, e.g., the Database Accounts field.

Use the keyboard to move quickly through multiple input boxes. To move forward, press the **<Tab>** or **<Return>** keys. To move to the previous input box, simultaneously press the **<Shift>** and **<Tab>** keys.

To delete text from an input box:

Click the left mouse button at the beginning of the text and drag it to the end of the text segment or double-click to select the whole text entry. Press the **<Delete>** key to remove the highlighted text. You may also use the **<BackSpace>** key to delete the text letter by letter.

To move the cursor within an input box:

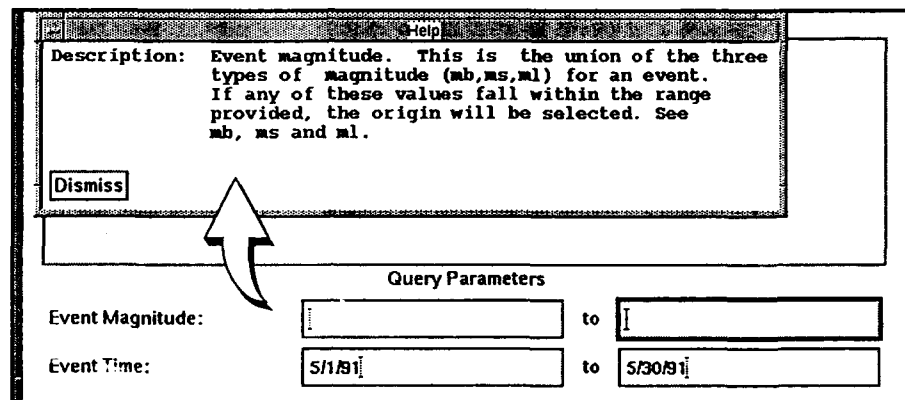
Move the mouse to the position where you would like the cursor and press the left mouse button. Use the left and right arrow keys to move the cursor.

NOTE: Input boxes retain their values. Values previously entered will be displayed as the initial value. Throughout this tutorial there are examples where it will be necessary to delete these initial values from input boxes.

Help

CenterView provides two types of help:

- (1) Every field can be described by a popup Help window. To display this help, delete the contents of the input box and press the <F1> key. On some systems the <Help> key should be used in place of the <F1> key. In the example below, a description for the Event Magnitude field has been activated. Remove this help window by clicking the **Dismiss** button.



- (2) A list of valid choices may be available for some fields. To display this help, type text in the field and press the <F1> key. If this help is unavailable for the specified field, then the field's description will be displayed instead. The text in a field determines what will be shown in the list. If one or more wildcard characters (* or ?) are present in the field, then the contents of the box will be treated as a pattern. In this case, only options matching the pattern will be displayed. The * character matches any number of characters, while the ? character matches exactly one character (similar in behavior to * and ? in most shells).

In this example, **E*** was typed in the Database Accounts field and the **<F1>** key was pressed. Select from the list of displayed accounts and click the **Done** button to enter your selection in the field..

Database Accounts:

Account	Database	Server	First Year	Last Year	# Stations	# Arrivals
☐ EUSEQK	HUGO		1962033	1986031	55	
☐ EUSEXP	HUGO		1961344	1966210	29	
☐ EVENTS	HUGO			1993110		
☐ EXPLOSION	HUGO		1945197	1992269	864	
☐ EXPLO_HIST	HUGO		1957207	1982360	45	9254

Section

2

Initialization

The instructions below describe how to start CenterView on machines at the Center. For this tutorial, we will run CenterView on sol.css.gov, which is one of the more powerful machines at the Center and is intended for research and data retrieval.

- ✓ **To give sol permission to see the display on your local machine, type:**

```
xhost +sol.css.gov
```

- ✓ **To log into sol from a UNIX system, type:**

```
rlogin sol.css.gov -l username
```

where username is your account name at the Center. If you do not have an account at the Center, contact the Center's system administrator at (703) 276-7900, or you can use the CenterView e-mail interface. For information on this service, send e-mail to cssinfo@seismo.css.gov, with the subject as "help".

- ✓ **To specify that CenterView should be displayed on your local machine, type:**

```
setenv DISPLAY machine.xxx.yyy:0
```

where machine.xxx.yyy is the complete internet address of your local machine. If you are running a shell other than csh, you may have to use a different command to set your display. For example, if you are using ksh you will have to type:

```
DISPLAY=machine.xxx.yyy:0
```

followed by:

```
export DISPLAY
```

If you are using a different shell, check the manpage for the shell to get help on setting environment variables.

- ✓ **To use CenterView in conjunction with other programs, e.g., geotool or Map, you will have to start ISIS and the CommAgent.** Appendix B of this tutorial explains the steps necessary for running CenterView with other programs. Examples are also provided later in this tutorial.

- ✓ **Before you start CenterView, you must set the ROOTPATH environment variable.**

CenterView reads a number of configuration files at start time. These files are located in the directory /nmrd/rel. Therefore, it is necessary to set the ROOTPATH environment variable to /nmrd/rel (See the notes for setting the DISPLAY environment variable).

✓ **Make sure that you are in a writable directory:**

During this tutorial we will be using CenterView to dump data to disk. To simplify this you should be in a writable directory. If you are not sure what directory you are in, you should return to your home directory by typing:

```
cd
```

✓ **To start CenterView, type:**

```
CenterView
```

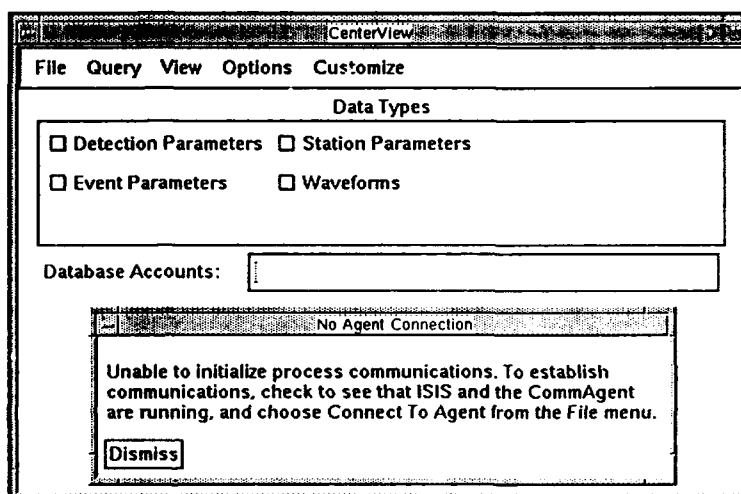
Several messages will appear indicating that several startup files have been read. If there are errors in opening any of these files, it is likely that your ROOTPATH environment variable is not set correctly (see above).

Section

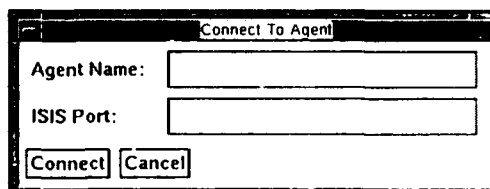
3

The Main Window

Once the Scheme extensions have been initialized, the main CenterView window is displayed. If CenterView is unable to initialize interprocess communications, a "No Agent Connection" message box will also be displayed. This message indicates that ISIS and the CommAgent are not currently running, and that CenterView will be unable to communicate with geotool and the Map program.



Click the **Dismiss** button to close this window. If you are able to resolve the problem, you may choose the **Connect to CommAgent** item from the File menu, which will display the Connect to Agent window:



Use this window to specify the Agent Name and ISIS Port. Click the **Connect** button to initialize the specified process communications or click the **Cancel** button close the window without connecting to an agent.

Section

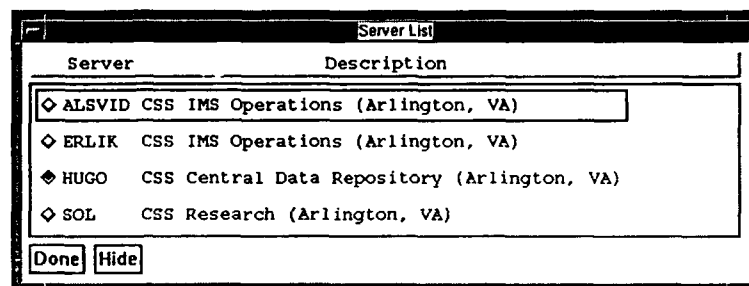
4

Connecting to a Database Server

Before CenterView can perform a query, it must be connected to a database server. By default, CenterView connects to hugo, which is the database for the central data repository.

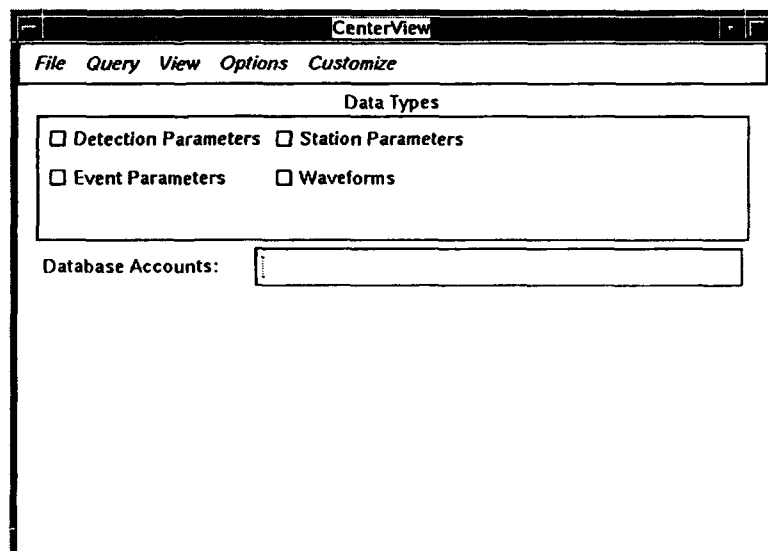
1. Choose **Default Server** from the **File** menu.

A **Server List** window is displayed. This window lists the available database servers with a brief description of each. In the example, the server **HUGO** has been selected.



2. Select **HUGO** and click the **Done** button.

The **Database Accounts** field specifies the accounts from which data will be retrieved. One or more accounts may be listed in this field.



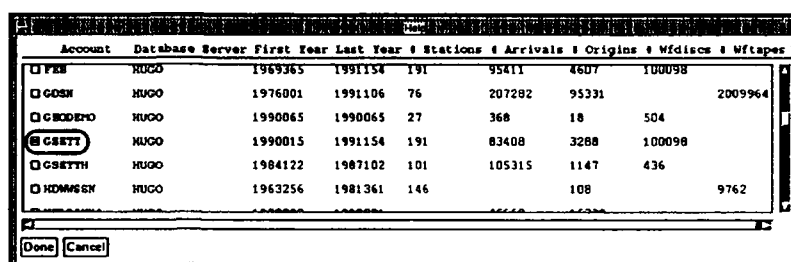
Unless otherwise specified, all database accounts entered in this field are expected to reside on the database server chosen as the default server. If this is not the case, then @server-name may be appended to the account name. This indicates that the account resides on the

specified server.

You can enter a Database Account in two ways:

- a) Type the account name in the Database Accounts field, *or*
- b) Type * in the Database Accounts field and press the <F1> key.

A Help window will be displayed. This window lists the available database accounts, provided that you are connected to a database server at the Center. Use the scrollbar to view all of the accounts. Select an account name and click the **Done** button. In this example, the GSETT account has been selected.



Account	Database Server	First Year	Last Year	# Stations	# Arrivals	# Origins	# Wdiscs	# Wtapes
☐ PER	HUGO	1969365	1991154	191	95411	4607	100098	
☐ GOSH	HUGO	1976001	1991106	76	207282	95331		2009964
☐ CRODERO	HUGO	1990065	1990065	27	368	18	504	
☒ GSETT	HUGO	1990015	1991154	191	83408	3288	100098	
☐ GSETTH	HUGO	1984122	1987102	101	105315	1147	436	
☐ HDMWSEN	HUGO	1963256	1981361	146		108		9762

Done Cancel

Section

5

A Simple Event Query

This query retrieves *event* information from a database. Later examples will demonstrate further uses of the query results.

1. Click on **Event Parameters** under **Data Types**.

Constraint Types are displayed for the Event Parameters.

2. Click **By Event Time** and **By Event Magnitude** in the **Constraint Types** list.

Query Parameter fields are displayed for Event Time and Event Magnitude. Use these fields to specify the values that will be used to form the query.

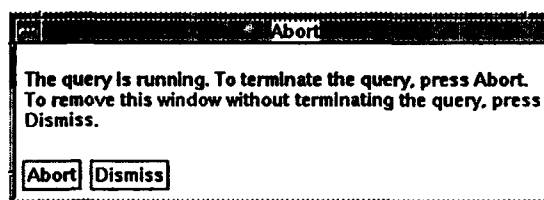
The screenshot shows the CenterView application window. The menu bar includes File, Query, View, Options, and Customize. The 'Data Types' section contains four checkboxes: Detection Parameters, Station Parameters, Event Parameters (checked), and Waveforms. Below this is the 'Database Accounts' section with a text box containing 'GSETT'. The 'Constraint Types' section contains six checkboxes: By Event Author, By Event Location, By Event Magnitude (checked), By Event Time (checked), By Event Type, and By Geographic/Seismic Region. Below this is the 'Query Parameters' section. It has two rows of input fields. The first row is for 'Event Magnitude' with a text box containing '4' and a 'to' field containing '4.5'. The second row is for 'Event Time' with a text box containing '5/1/91' and a 'to' field containing '5/30/91'.

3. Enter 4 and 4.5 in the Event Magnitude fields. Enter 5/1/91 and 5/30/91 in the Event Time fields.

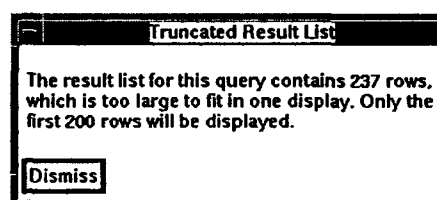
This query will retrieve all events that occurred between 00:00 on May 1, 1991 and 00:00 on May 30, 1991 that had a mb, ms, or ml magnitude between 4 and 4.5.

4. Select **Run Query** from the **Query** menu.

While the query is running, CenterView displays an Abort window with two options: Abort and Dismiss. The **Abort** button terminates the query. It is provided for times when the query is taking longer than expected, or when an error has been noticed after the query has been started. The **Dismiss** button closes the Abort window without terminating the query. The user may then further specify the query constraints in the View window.

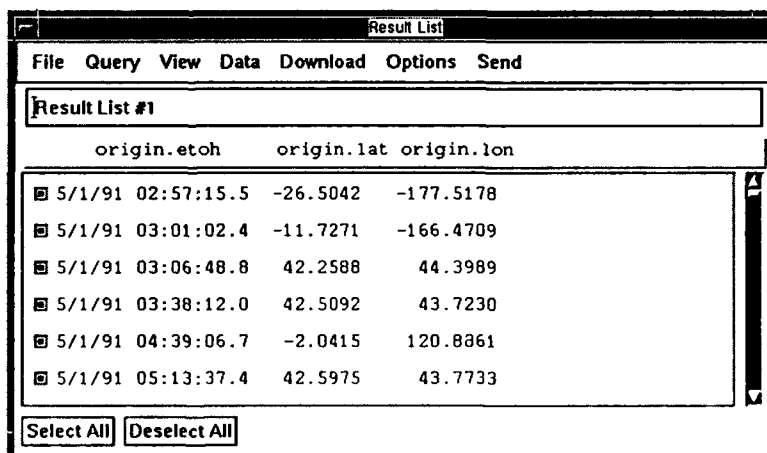


If the number of rows produced by the query is so large that it would impact the performance of CenterView, only a limited number will be displayed. This Maximum is set to 200 rows by default. In the event that CenterView truncates the result list, a window will appear notifying you that there are more rows than are actually displayed.



5. Click Dismiss in the Truncated Result List window.

CenterView displays default columns from the most significant database tables involved in making the query. For this query, origin.etch (the origin's epoch time to human time), origin.lat (the origin's latitude) and origin.lon (the origin's longitude) are displayed.



You have now completed your first CenterView query. In the next example we will use the results of this query.

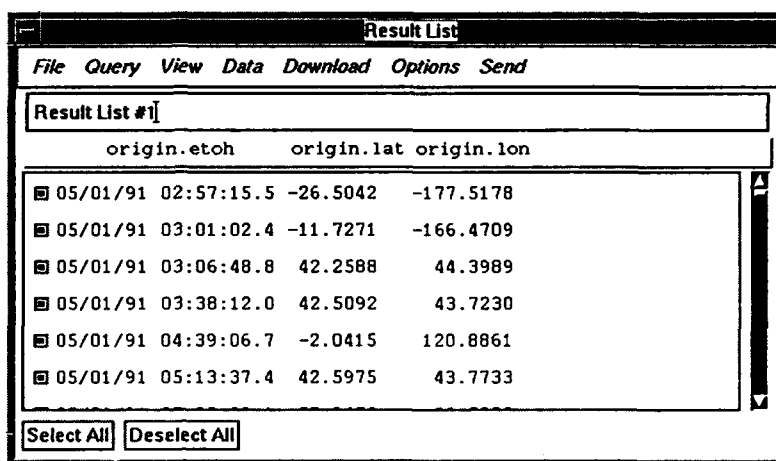
Section

6

Naming Queries

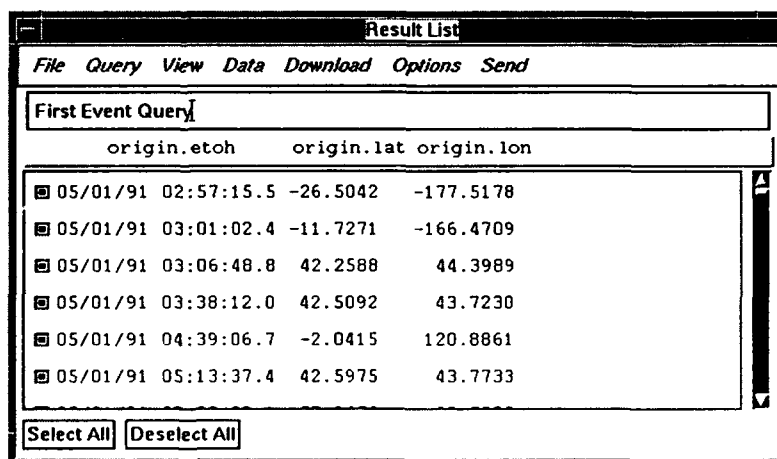
You can assign a name to each query for later use.

1. Click the mouse on the text labeled **Result List #1**.



You may now use the same methods described earlier for editing text in an input box to change the name of the query.

2. Enter the text **First Event Query** into the input box.



Section

7

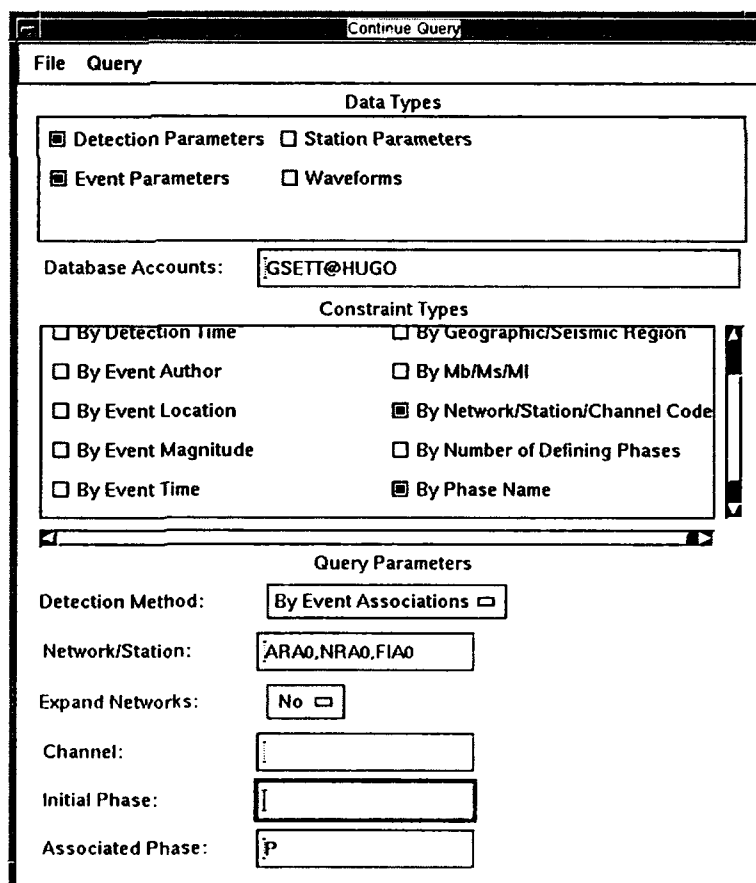
Continuing a Query

You may continue using a query by adding new constraints to an existing result list. For instance, a large number of events were selected in the previous query. It may be useful to find all of the detections at a small number of stations for some subset of those events.

For this example, we will display event and detection information for associated P phases at ARA0, NRA0 and FIA0, for all events in the previous query.

1. In the Result List, select **Continue Query** from the Query menu.

The Continue Query window is displayed. This window is similar to the main CenterView window except it retains default information from the current query.



Continue Query

File Query

Data Types

☒ Detection Parameters ☐ Station Parameters

☒ Event Parameters ☐ Waveforms

Database Accounts: GSETT@HUGO

Constraint Types

☐ By Detection Time ☐ By Geographic/Seismic Region

☐ By Event Author ☐ By Mb/Ms/MI

☐ By Event Location ☒ By Network/Station/Channel Code

☐ By Event Magnitude ☐ By Number of Defining Phases

☐ By Event Time ☒ By Phase Name

Query Parameters

Detection Method: By Event Associations ☐

Network/Station: ARA0,NRA0,FIA0

Expand Networks: No ☐

Channel:

Initial Phase:

Associated Phase: P

2. Click **Event Parameters** and **Detection Parameters** under **Data Types**, as shown above, so that they are both highlighted. The Continue Query window will display additional constraint types relating to the Detection Parameters.
3. To apply additional constraints to the query, click the **By Phase Name** and **By Network/Station/Channel Code** constraint types.
4. Since we are interested in associated P phases at ARA0, NRA0, FIA0, type P in the Associated Phase field and type ARA0 , NRA0 , FIA0 in the Network/Station field, separated by commas.
5. In the Continue Query window, select **Run Query** from the Query menu.

A result list is displayed. Since there is more than one detection for a given event, there may be many copies of the same event in the result list, each with a different detection. In general, CenterView displays all distinct combinations of results.

Result List						
File Query View Data Download Options Send						
Result List #2						
origin.etch	origin.lat	origin.lon	arrival.sta	arrival.iphase	arrival.etch	
5/1/91 03:06:48.8	42.2588	44.3989	ARA0	P	5/1/91 03:12:49.0	
5/1/91 03:06:48.8	42.2588	44.3989	NRA0	P	5/1/91 03:12:32.0	
5/1/91 03:38:12.0	42.5092	43.7230	ARA0	P	5/1/91 03:44:11.6	
5/1/91 03:38:12.0	42.5092	43.7230	NRA0	P	5/1/91 03:43:50.1	
5/1/91 05:13:37.4	42.5975	43.7733	ARA0	P	5/1/91 05:19:32.3	
5/1/91 05:13:37.4	42.5975	43.7733	NRA0	P	5/1/91 05:19:14.3	

We will now explore some of the uses for the results of a query.

Section

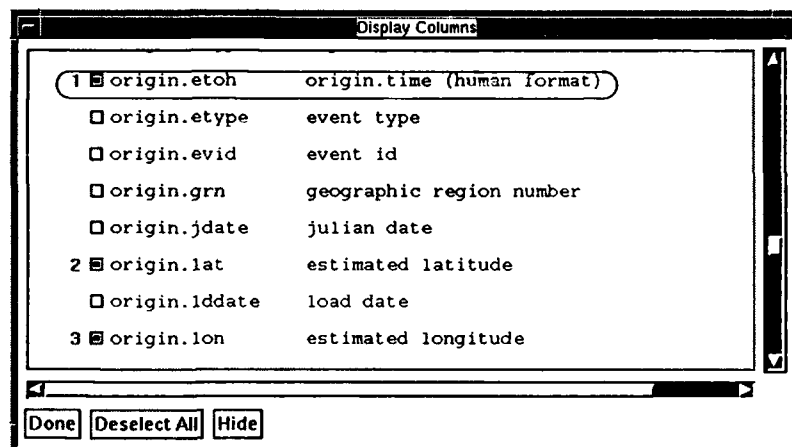
8

Displaying Columns

The Result List displays only a few columns from each database table used for the query. Often there are other columns that are of interest, and CenterView allows you to display columns other than or in addition to the default columns, and also allows you to reorder them. For this example we will add the column `origin.mb` and reorder the columns.

1. In the Result List choose **Display Columns** from the View menu.

A Display Columns window lists categories which can be selected as columns. Scroll through the list to see currently selected categories; they are numbered by the order in which they appear in the Result List. For example, `origin.eto` appears as the first column of the Result List and is numbered "1".



2. Click the **Deselect All** button in the Display Columns window.
3. Scroll to `origin.mb` and select it; it becomes #1. Continue selecting categories in the following order: (2)`origin.eto`, (3)`origin.lat`, (4)`origin.lon`, (5)`arrival.sta`, (6)`arrival.ip`, and (7)`arrival.eto`.
4. Click the **Done** button to apply the changes.

After a brief delay, CenterView displays the Result List in the newly-defined order.

Section

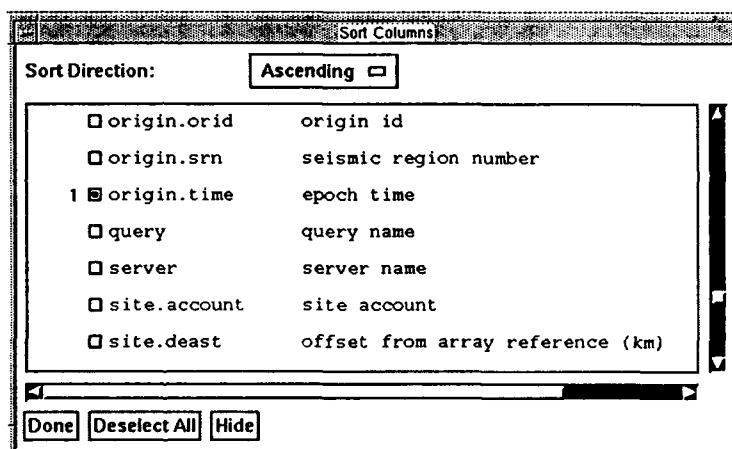
9

Sorting

In addition to selecting the *columns* displayed as the Result List, you can reorder the *rows* by selecting columns to sort by. You can also specify whether to sort the rows in ascending or descending order.

1. In the Result List, choose **Sort Columns** from the View menu.

A Sort Columns window lists the columns for sorting. Selected columns are numbered by the order they appear in the Result List. By default, the rows are sorted in ascending order by (1)origin.time, (2)origin.lat, (3)origin.lon, (4)arrival.sta (5)arrival.ipphase, and (6)arrival.time. NOTE: The rows were first sorted by origin.time but displayed in human time because origin.etoh would sort the rows by alphabetizing each origin.etoh string.



2. Click the **Deselect All** button in the Sort Columns window.
NOTE: To deselect one category at a time, press the <Shift> key and click on the category.)
3. Select column **origin.mb**. It becomes #1.
4. Continue selecting columns, e.g., (2)origin.time, (3)arrival.sta, (4)arrival.ipphase.
5. Specify **Ascending** or **Descending** in the Sort Direction box.
6. Click the **Done** button to apply the changes.
After a brief delay, the Result List is displayed in the new order. In this case, only the first three columns were necessary to complete the sort (i.e., no two rows contain identical data for (1), (2), and (3), therefore it was unnecessary to select column (4)).

Section

10

Closing Result List Windows

When doing more than one query in CenterView, the screen can become cluttered with windows from previous queries. These windows can be hidden, with their results retained for use later in the session.

1. In the Result List window named Result List #2, choose **Close** from the File menu.

The window will be removed from the screen.

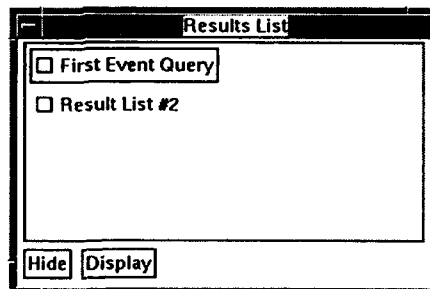
2. In the Result List window named First Event Query, choose **Close** from the file menu.

This window may be hidden underneath the Continue Query window. If this is the case, then you may first choose Close from the File menu of the Continue Query window.

To retrieve a result list:

3. Choose **Result List** from the View menu.

A list of all the result lists generated in this session will be displayed



4. Choose **First Event Query** from the list, and click **Display**.

The result list from the first query in this tutorial will be displayed.

5. To remove the Results List window, click **Hide**.

This window may be hidden underneath the First Event Query result list window. If this is the case, then you may first move the Result List window out of the way to expose the Results List window, and then click **Hide**.

Section

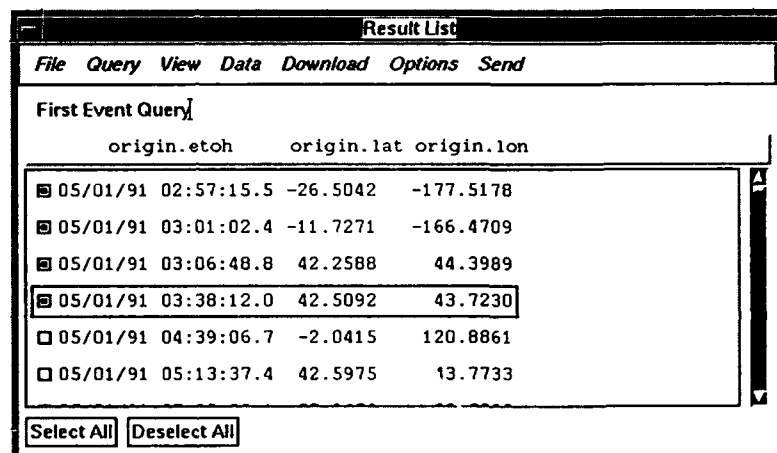
11

Formatting Bulletins

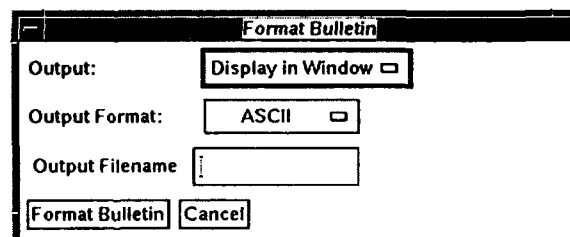
You can format bulletins when your result list is from a query that was for Event Parameters. When formatting a bulletin, you have the option of displaying the bulletin in a popup window, saving the bulletin to a file, or printing the bulletin.

To choose a subset of events to be included in the bulletin:

1. Click on **Deselect All** in the Result List window.
2. Select the first 4 events in the list, as shown below.



3. Choose **Format Bulletin** from the Data menu.
The Format Bulletin window will appear.



To display a bulletin in a popup window:

4. Click the Output button to Display in Window.
5. Click the Output Format button to ASCII.

6. Click the Format Bulletin button.

After a short period of time, a text window will appear, containing the bulletin for the selected events.

Event Bulletin

BULLETIN
of the
Center For Seismic Studies
GSETT

Date	Time	Lat	Lon	Smajor	Sminor	Strike	Depth	ML	Mb			
5/1/91	02:57:15.5+-0.4	-26.5	-177.5	301.7	49.9	166.6	33.0+-0.0		4.2			
SOUTH OF FIJI ISLANDS												
Sta	Dist	Ph	Time	Tres	Azim	Ares	Slow	Sres	Def	Snr	Amp	Per
CTA	33.8	P	03:03:54.4	0.7					T			
ASAR	43.8	P	03:05:17.9	0.4	92.0	-12.3	7.5	-0.5	TAS		5	0.4
WRA	44.5	P	03:05:22.0	-1.2	104.0	-4.1	7.6	-0.3	TAS		4	0.3
NRAO	145.2	PKP	03:16:48.9	0.0	22.0	7.7	3.1	1.4	TAS		0	0.4
Date	Time	Lat	Lon	Smajor	Sminor	Strike	Depth	ML	Mb			
5/1/91	03:01:02.4+-0.4	-11.7	-166.5	281.6	36.5	137.8	33.0+-0.0		4.0			
SAMOA ISLANDS REGION												
Sta	Dist	Ph	Time	Tres	Azim	Ares	Slow	Sres	Def	Snr	Amp	Per
STK	51.7	P	03:10:05.6	0.1					T			
WRA	57.2	P	03:10:45.9	0.4	90.0	-1.5	7.4	0.4	TAS		2	0.2
ASAR	57.6	P	03:10:47.6	-0.5	87.0	-2.1	8.5	1.5	TAS		6	0.5
YKA	84.3	P	03:13:30.4	0.0	145.0	-85.7	4.0	-1.0	T		0	0.8
YKA	84.3	UNK	03:13:38.0									

Dismiss

7. When you are done browsing the bulletin, click Dismiss.

To write the bulletin to a file:

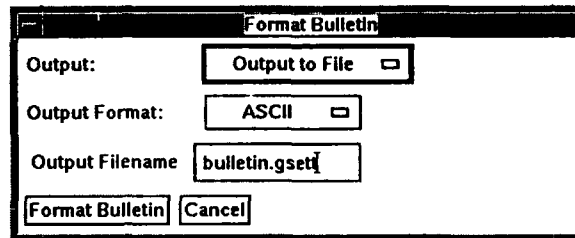
8. Choose Format Bulletin from the Data menu.

9. Click the Output button to Output to File.

10. Click the Output Format button to the desired format.

The Postscript format can be used if the file will eventually be sent to a postscript printer. The ASCII format produces files which are readable without applying any post processing, and nroff/troff options produce files which can be filtered through the standard UNIX typesetting programs to produce formatted output. If you are not sure which format to use, you should select ASCII.

11. Enter the name of the file to dump to into the **Output Filename** field, as shown below (here, we have used `bulletin.gsett` as the filename).



12. Click the **Format Bulletin** button.

After a short period of time, the Format Bulletin window will disappear. At that point, the file will have been created. To look at the file, you can type `more bulletin.gsett`.

13. Choose **Close** from the File menu of the Result list.

You are now done working with this result list. In the next section, we will perform some more complicated queries.

Section

12

Predicted Arrival Times

Often, a user will want to search for waveforms in a database account which has not been set up with links between events and waveforms¹. In this case, CenterView can search the database for waveforms which overlap a time window determined by computing theoretical travel times² for the desired events.

The next example demonstrates this capability by searching for waveforms in the GSETT database account for an event on May 29, 1991.

1. Select **Clear Query** from the **Query Menu** in the **CenterView** window.
2. Select **Event Parameters and Waveforms** from **Data Types**.
3. Enter **GSETT** in the **Database Accounts** field.

Specify event information:

4. Select **By Event Time** from **Constraint Types**.
5. In the **Event Time** fields, enter **5/29/91 18:00:00** and **5/29/91 20:00:00**.

This specifies events that occurred between 18:00 and 20:00 on May 29, 1991. It is not necessary to enter times that will uniquely specify *one* event. CenterView will provide a list of matching events before performing the waveform query.

Specify how to retrieve the waveforms, given the event:

We are interested in finding all waveforms which overlap with a time window beginning 30 seconds before the theoretical P arrival time and 120 seconds after the theoretical P arrival time.

6. Click the **Waveform Type** field **Online**.
7. Enter data in the **Phase Type Window** field, **Velocity Window** field, and **Time Buffer** field as shown in the next figure.

The **Phase-Type Window** and **Velocity Window** specify the same information i.e., the window start and end times relative to the event. If minimum or maximum values are entered in both the **Phase Type Window** and **Velocity Window** fields, then the value entered into the **Velocity Window** field will take precedence.

1. using a CSS Version 3.0 wftag table

2. currently based on the IASPE-91 travel time curves

CenterView

File Query View Options Customize

Data Types

☐ Detection Parameters ☐ Station Parameters

☒ Event Parameters ☒ Waveforms

Database Accounts:

Constraint Types

☐ By Event Author ☐ By Geographic/Seismic Region

☐ By Event Location ☐ By Mb/Ms/Ml

☐ By Event Magnitude ☐ By Network/Station/Channel Code

☒ By Event Time ☐ By Number of Defining Phases

☐ By Event Type ☐ By Waveform Time

Query Parameters

Waveform Type:

Waveform Method:

Phase Type Window: to

Velocity Window: to

Time Buffer: to

Station Distance: to

Event Time: to

8. Select **Run Query** from the **Query** menu.
An Intermediate Results message will be displayed.

Result List

File Query View Data Download Options Send

Result List **Intermediate Results**

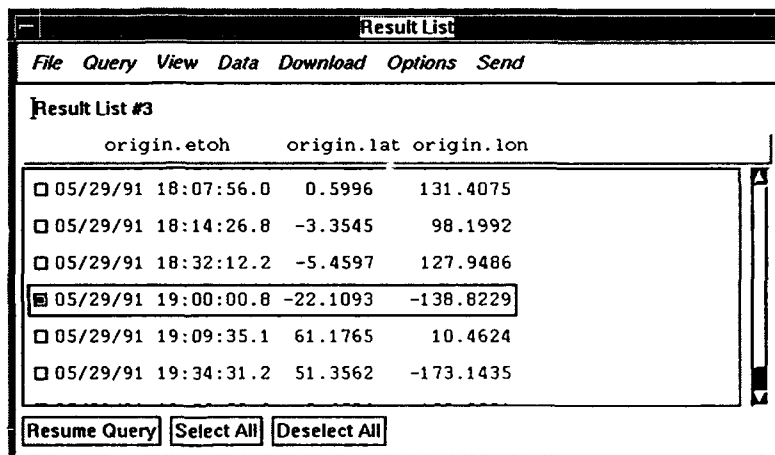
The results in this window are not the final results of your query. This list of results has been presented so that you may choose a subset with which to continue the query.

When done selecting from this list, hit the 'Resume Query' button at the bottom of the window.

This message states that the displayed Result List is not the *final* result of the query. **Dismiss** this window. The Results List displays all events (but no waveforms) which occurred during the specified time. From this Result List you can select the events for which you want waveforms. It is best to keep this list small since waveform retrieval can be a time-consuming process.

For this example, we will use the event of a nuclear blast from the Muraroa test site which occurred at 19:00:00.8.

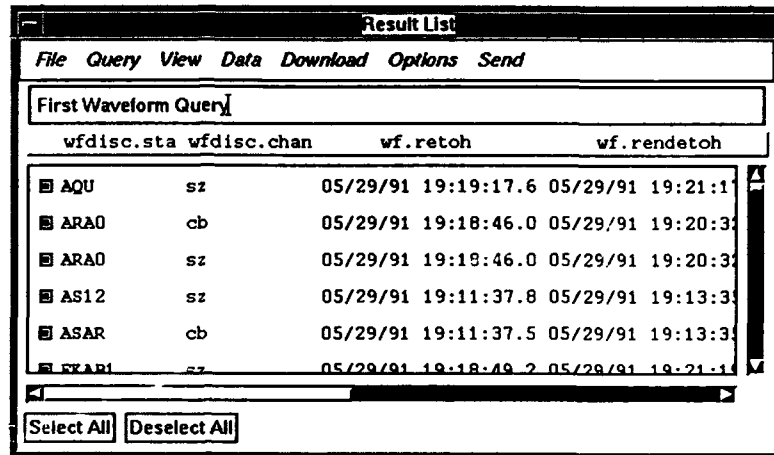
9. Deselect all of the events by clicking the **DeSelect All** button.
10. Select the event with the origin time 19:00:00.8.



11. Click **Resume Query** in the Results List window.
The query will resume execution. After a brief delay, the results will be displayed.

12. Rename the result list to First Waveform Query.

If you do not remember how to rename queries, refer to the section on renaming queries.



You have now completed this query. We will use the results from this query in a later section on dumping waveforms.

13. Close the Result List window.**14. Close any remaining result list windows.**

Section

13

More Predicted Arrival Times

Types of data other than waveforms can be retrieved by predicted arrival times. In the next example, predicted arrival times are used to retrieve detection parameters. In these queries, the user, rather than the database, supplies the events.

1. Create a file containing the event that you are interested in.

Using your favorite editor, create a file named **events** (the file name is unimportant) in the same directory that you started CenterView. We will use the same event that was used in the previous query. An event file can contain any number of events. Each line in the event file denotes a new event and should contain a **latitude, longitude, depth and time, in that order**. The time may be specified in either epoch time or human readable time. Any extra data at the end of the line will be ignored, therefore, you can use CSS 3.0 origin files.

2. Enter the following line into the newly created events file and save it.

-22.1093 -138.8229 0.0000 5/29/91 19:00:00

3. Since we are interested in retrieving detection information, select **Detection Parameters from the list. No other items should be selected.**

4. Enter GSETT into the Select Account field.

5. Select **By User Event File from the Constraint Type list.**

6. In the User Event File field, enter the pathname for the newly-created events file. Continue entering the constraint information as follows:

Query Parameters			
User Event File:	ne/gymer/ferraro/events		
Phase Type Window:	P	to	
Velocity Window:		to	2.0
Time Buffer:	-10	to	10
Station Distance:		to	

For this query we will select detections that arrived within 10 seconds of the predicted arrival time of the P phase. CenterView will use the event in the newly-created file.

CenterView

File Query View Options Customize

Data Types

☒ Detection Parameters ☐ Station Parameters
☐ Event Parameters ☐ Waveforms

Database Accounts:

Constraint Types

☐ By Arrival Author ☐ By Phase Name
☐ By Detection Time ☐ By Station-Event Azimuth
☐ By Event-Station Azimuth ☒ By User Event File
☐ By Network/Station/Channel Code

Query Parameters

User Event File:

Phase Type Window: to

Velocity Window: to

Time Buffer: to

Station Distance: to

7. Select Run Query.

Intermediate results will not be displayed since you have supplied CenterView with the exact list of events in which you are interested. When the query has finished running, the Result List will be displayed.

Result List

File Query View Data Download Options Send

Result List #7

	arrival.sta	arrival.iphase	arrival.etch	site.sta	site.l
☒ AQU	P	05/29/91 19:19:47.5	AQU	42	
☒ AQU	Pn	05/29/91 20:25:39.5	AQU	42	
☒ AQU	Sn	05/29/91 20:26:23.2	AQU	42	
☒ ARA0	Lg	05/29/91 20:44:55.0	ARA0	69	
☒ ARA0	P	05/29/91 19:19:14.0	ARA0	69	

Section

14

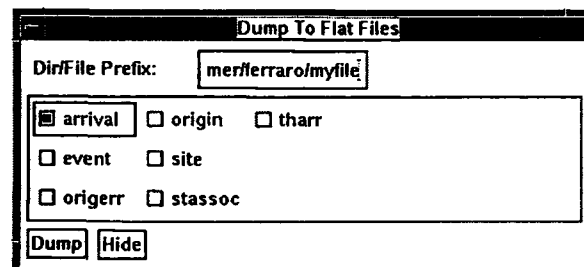
Dumping Query Results

Query results can be dumped to CSS 3.0 format files or the columns displayed on the screen can be dumped to disk. The following example demonstrates the different methods by which results can be dumped.

Dump the results in CSS Version 3.0 Format:

1. Choose **Download to Flat Files** from the Download menu in the Result List.

The Result List (as you see it) is dumped to a file. The Dump to Flat Files window will display a list of all tables that can be dumped from the current query.

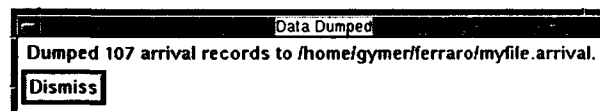


2. Select **arrival** and enter **myfile** (or any filename prefix) into the Dir/File Prefix field.

This string will be used to create one file named myfile.arrival.

3. Click the **Dump** button.

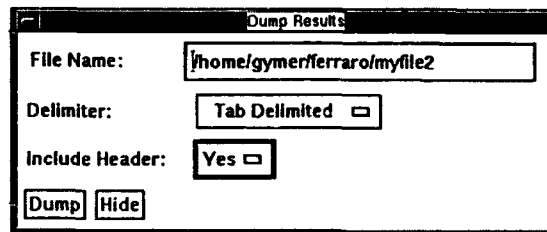
CenterView will dump the data to CSS 3.0 format and will display a window describing how many rows were dumped and to which files.



4. Dismiss the Data Dumped window.
5. Hide the Dump To Flat Files window.

Dump the results as they appear in the Result List window:

6. Select **Download Results** from the Download menu.
7. Click **Yes** in the Include Header field.



The screenshot shows a window titled "Dump Results". Inside the window, there are three labeled fields: "File Name:" with a text box containing "/home/gymen/ferraro/myfile2", "Delimiter:" with a dropdown menu showing "Tab Delimited", and "Include Header:" with a dropdown menu showing "Yes". At the bottom left of the window are two buttons: "Dump" and "Hide".

8. Click the **Dump button.**

The result list, as displayed in the Result List window, will be output into the named file.

Section

15

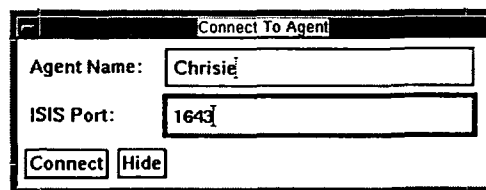
Sending Results to the Map

CenterView can send query results to other programs. For example, station, event and detection data can be sent to the Map program and waveform data can be sent to the geotool program.

To send data to other programs, ISIS, the CommAgent, and the destination program (Map or geotool) must be running. Refer to Appendix A for instructions for starting these processes.

In this example, we will send CenterView query results to the Map program. NOTE: The Map program requires a color display.

1. Make sure that ISIS and the CommAgent are running.
2. In CenterView, select **Connect to Agent** from the File menu in the main CenterView window.



3. Enter the Agent Name and ISIS Port in the appropriate fields.
4. Click the **Connect** button.
5. Perform a simple event query.

In this example, we've used the query from section A, except we've restricted the Event Magnitude field to be from 4 to 4.1. (By further restricting the results, we are reducing the amount of data sent to the map). To see the number of results generated, select **Result Count** under the Data menu in the Results List.

Send the query results to the Map program:

6. Run the Map program.
7. Select **Map Options** from the Results List Options menu.
The Map Options window will appear. Use this window to specify which data should be sent to the map.

Map

Destination: Map

Map Data Types

☒ Event Locations ☐ Event Error Ellipses

Event Locations

Symbol: point 

5

Size

Color: White

Update Send Hide

8. Choose your favorite color and enter it in the Event Color field (for this example, we use `White`).
9. Click **Send** to send the results to the Map program.
The events from the working query will be displayed on the map.
10. Close the Result List window.

Section

16

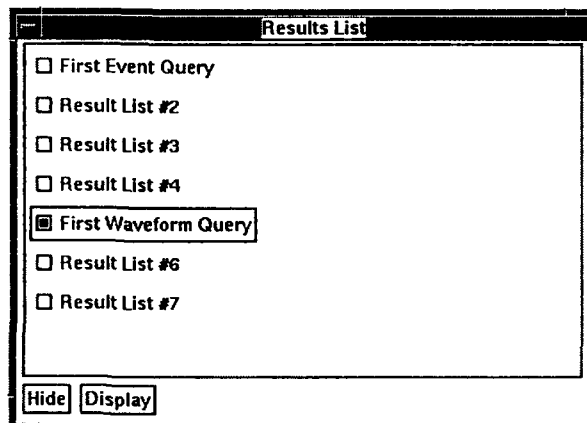
Sending Results to geotool

When a result list contains online waveforms, CenterView can send these waveforms to geotool. As with sending to the Map program, you must first make sure that interprocess communications are initialized properly (see section 15 on Sending Results to the Map).

For this example, we will use the results from the first waveform query in this tutorial.

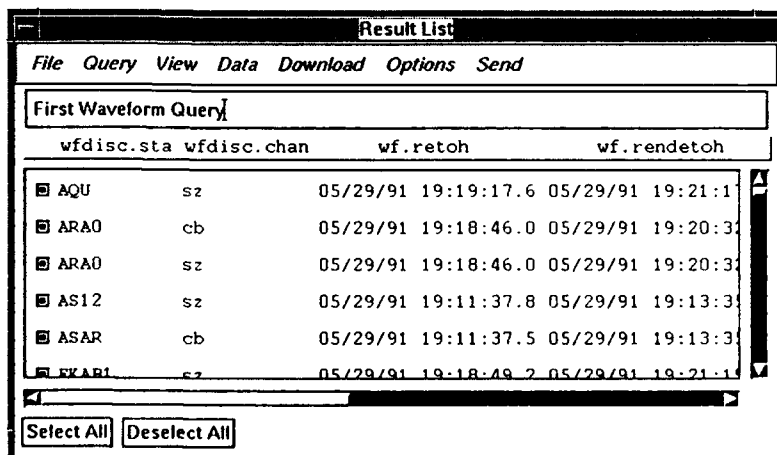
Display the results from the previous query

1. Choose Results List from the View menu.



2. Click on First Waveform Query.
3. Click on Display.

The result list will be displayed.

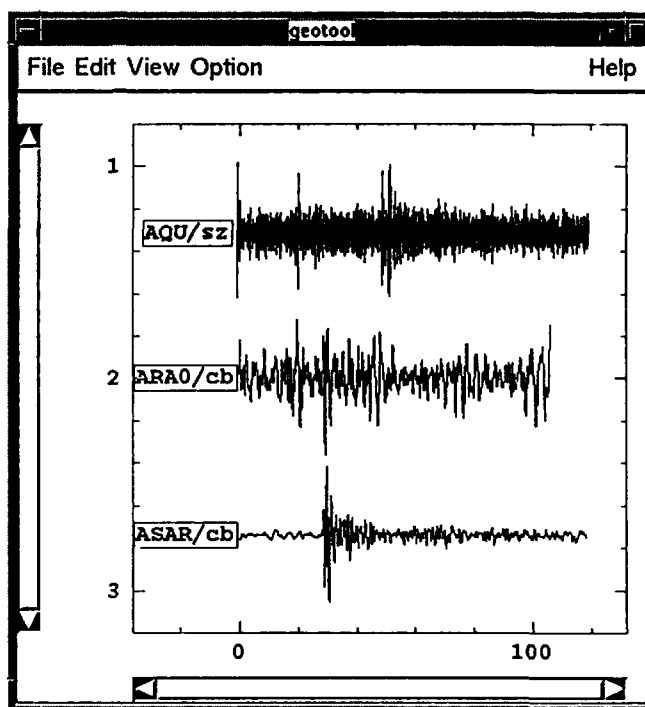


4. Run the geotool program (see Appendix B for more information on running geotool).

5. Select a small number of rows from the result list.

6. Select **Send** to geotool from the Send menu.

After a short time, the waveforms will appear in the geotool window.



Section

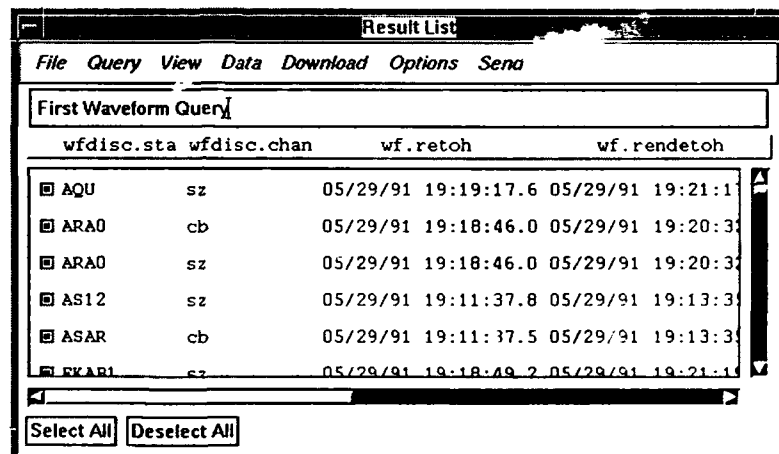
17

Dumping Waveform Data

One of the most commonly used (and abused) features of CenterView is the dumping of waveform data to disk. Both online data on mounted file systems and offline data (on tapes referenced in the wftape records in the database) can be dumped. Since the retrieval of offline data from tape requires operator intervention, it is more time-consuming than online waveform dumping and should always be considered carefully.

For this example, we will use the same result list that was chosen in the previous section. If you skipped section 16 on Sending to Geotool, please perform steps 1 - 3 from that section to select the necessary result list.

1. Click **Select All** in the Result List window, to make sure that all the waveforms are selected..



2. Select **Download Waveforms** from the Download menu in the Result List window.

A Download Waveforms window will be displayed.

This window allows the user to specify how the waveforms should be dumped. The User Name field should contain the user name to which mail will be sent upon completion of the waveform dump.

Download Waveforms

Output Directory:

Filename Prefix:

Waveform Options: ☒ Use Resegmented Waveforms

Dump Options: ☐ One Waveform File

Eliminate Overlaps: ☒ Yes

User Name:

Notify When Done: ☒ Yes

Output Data Type

☒ No Conversion

☐ a# ASCII single precision

☐ b# ASCII double precision

Maximum File Size:

Starting Waveform ID:

We will use the default values for each of these fields which will give the waveform files a prefix of dump and will place a subdirectory in `sol:/itch` on `sol`.

3. Click the No Conversion button to On.

CenterView will leave the waveforms in the format that they were originally stored. Note: In most cases, you will want to convert the waveforms to a format that will be useful on the machines you work on.

4. Click the Download button.

A Waveform Job Submitted window will be displayed. This window shows the job number and the name of the directory where the waveforms have been dumped. In this example, the job number is 11954 and the directory is `/itch/WaveformJob.11954`. The message also states that mail will be sent upon job completion.

Waveform Job Submitted

Your waveform request has been submitted as job #11954. The results of this request will be placed in the directory `/itch/WaveformJob.11954` on `sol`.

You will receive mail upon the completion of the job.

5. Click the Dismiss button.

After a brief delay a mail message will be delivered.

```
Your waveform request has finished at Tue Jul 20 10:55:34 EDT 1993
The data has been placed on sol
in the directory: /nfs/ndege1/var/tmp/WaveformJob.11954
A copy of the output log can be found in the above directory
in the file: data.log
```

For the rest of this example, you will need to substitute your job number for the job number of this example, 11954.

6. rlogin to sol and go to the dumping directory by typing:

```
cd /itch/WaveformJob.11954
```

7. To get a listing of the files that have been created, type `ls`.

In this directory, you will find three types of files.

- (1) The first type is the wfdisc file. There should be a file called data.wfdisc. This file contains CSS Version 3.0 wfdisc records for the data that were dumped.
- (2) The second type of file in the directory is the waveform file. This file will be named data.w. If a Waveform Method other than *One Waveform File* is chosen, then more than one file will be created, with names like data.XXX.w, where XXX is the wfid or station for the wfdiscs contained in the file.
- (3) Finally, there is a log file, which contains some information about how the dump was done.

8. Click `Hide` in the Download Waveforms window.

9. Close the Result List window.

Section

18

A More Complicated Example

To illustrate some advanced features of CenterView, the next example will locate an event in one database account and search for matching waveforms in another account.

We will begin by searching for the Soviet nuclear test that occurred on October 24, 1991. We will search for this event in the EXPLOSION database account.

1. Clear Query.
2. Select **Event Parameters** from the Data Types list.
3. Enter **EXPLOSION** into the Database Accounts field.
4. Since we know the date of the test, select the **By Event Time** constraint type.
5. Enter **10/24/90** and **10/25/90** into the Event Time fields.

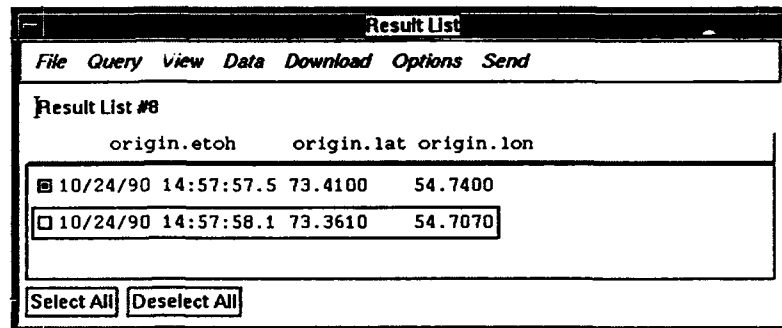
The screenshot shows the CenterView application window with the following settings:

- Data Types:**
 - ☐ Detection Parameters
 - ☐ Station Parameters
 - ☒ Event Parameters
 - ☐ Waveforms
- Database Accounts:** EXPLOSION
- Constraint Types:**
 - ☐ By Event Author
 - ☐ By Event Type
 - ☐ By Event Location
 - ☐ By Geographic/Seismic Region
 - ☐ By Event Magnitude
 - ☐ By Mb/Ms/MI
 - ☒ By Event Time
 - ☐ By Number of Defining Phases
- Query Parameters:**
 - Event Time: 10/24/90 to 10/25/90

6. Select **Run Query** from the Query menu.

The Result List displays the queried events from the EXPLOSION database.

7. Select only the first event from the Result List.



To continue the query, we will search for waveforms in the USSR database account, using predicted arrival times.

8. Choose **Continue Query** from the Result List Query menu.

The Continue Query window is displayed.

Since we are interested in retrieving waveforms from the USSR account for this event,

9. Select **Waveforms** from the list of Data Types.

10. Enter **USSR** into the Database Accounts field.

Any new information which was not retrieved in the original query will be retrieved from the USSR account.

Since the event information was retrieved in the previous query from the EXPLOSION account, it will continue to be accessed from the EXPLOSION account, not the USSR account.

Since waveforms were not retrieved in the previous query, they will be retrieved from the newly specified account, USSR. Whenever waveforms are retrieved from a different account than events, it is usually necessary to specify that either Predicted Times or Associated Arrivals be used as the waveform retrieval method.

11. Click the Waveform Method field to **By Predicted Time**.

12. Enter the values as shown in the next figure.

We will assume that we are only interested in waveform segments that begin 30 seconds before the theoretical P arrival time, and end 120 seconds after the theoretical P arrival time.

Continue Query

File Query

Data Types

☐ Detection Parameters ☐ Station Parameters

☒ Event Parameters ☒ Waveforms

Database Accounts:

Constraint Types

☐ By Event Author ☐ By Geographic/Seismic Region

☐ By Event Location ☐ By Mb/Ms/Ml

☐ By Event Magnitude ☐ By Network/Station/Channel Code

☐ By Event Name ☐ By Number of Defining Phases

☐ By Event Time ☐ By Waveform Time

☐ By Event Type

Query Parameters

Waveform Type:

Waveform Method:

Phase Type Window: to

Velocity Window: to

Time Buffer: to

Station Distance: to

13. Click the Waveform Type button Offline.

The USSR database does not contain any online waveforms so all of the waveforms we will be searching for are offline.

14. Choose Run Query from the Query menu.

At this point, you may refer to your scheme window to see the query that is being executed.

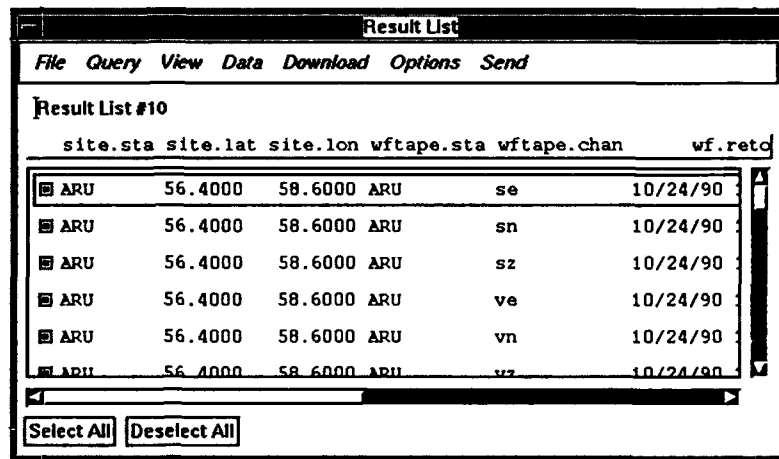
```

Executing SQL for query-12:

CREATE TABLE TMP_11214 AS
SELECT DISTINCT tharr.thid center_tharr_thid,
               wftape.wfid USSR_wftape_wfid,
               TMP_11212.USSR_site_sta USSR_site_sta, 'Y' SELECTED
FROM USSR.Wftape wftape,
     center.TMP_11212 TMP_11212,
     center.TMP_11210 TMP_11210,
     center.TMP_11213 tharr
WHERE wftape.endtime BETWEEN tharr.mintime AND (tharr.mintime + 86400.0) and
      wftape.time BETWEEN (tharr.maxtime - 86400.0) AND tharr.maxtime and
      TMP_11212.USSR_site_sta = wftape.sta and
      TMP_11210.EXPLOSION_origin_orid = tharr.orid and
      TMP_11212.USSR_site_sta = tharr.sta and
      wftape.sta||'' = tharr.sta and
      TMP_11212.selected = 'Y' and
      TMP_11210.selected = 'Y'

```

After a brief delay, the Results List will be displayed.



The screenshot shows a window titled "Result List" with a menu bar containing "File", "Query", "View", "Data", "Download", "Options", and "Send". Below the menu bar, the text "Result List #10" is displayed. The table has six columns: "site.sta", "site.lat", "site.lon", "wftape.sta", "wftape.chan", and "wf.retc". The table contains six rows of data, each starting with a checkbox and the station code "ARU". The data is as follows:

	site.sta	site.lat	site.lon	wftape.sta	wftape.chan	wf.retc
☒	ARU	56.4000	58.6000	ARU	se	10/24/90
☒	ARU	56.4000	58.6000	ARU	sn	10/24/90
☒	ARU	56.4000	58.6000	ARU	sz	10/24/90
☒	ARU	56.4000	58.6000	ARU	ve	10/24/90
☒	ARU	56.4000	58.6000	ARU	vn	10/24/90
☒	ARU	56.4000	58.6000	ARU	vz	10/24/90

At the bottom of the window, there are two buttons: "Select All" and "Deselect All".

Like the previous waveform query, the waveforms in this result list can also be downloaded. Generally, dumping offline waveforms takes longer than dumping online waveforms because it requires operators to search for and mount tapes. Requests for offline waveforms should thus be given careful consideration before dumping.

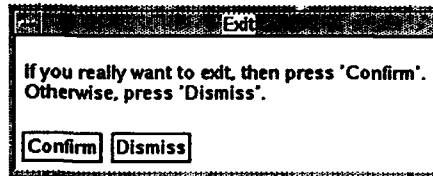
15. Close the Result List window.

You have now completed the last query in the tutorial.

Section**19****Exiting CenterView**

You have now completed the CenterView tutorial. To exit:

1. Choose **Exit** from the **File** menu.
2. The **Confirm Exit** window is displayed.



3. Click **Confirm** in this window.
CenterView will shut down after removing any temporary tables created during the session.

Appendix

A

Helpful Hints

We hope that the following helpful hints can make your CenterView sessions more productive.

- ☛ Help for all text fields in CenterView can be received by typing the <F1> key after clicking in the field. For some fields, if there is text present in the field, typing <F1> will produce a list of possible choices. In most other cases, a simple explanation of the field will be presented. NOTE: On some machines, it may be necessary to substitute the <Help> key for <F1>.
- ☛ When performing waveform queries based on theoretical arrival times, it is better to use small sets of events and stations. CenterView must compute theoretical arrival times at each station for each event. If you are looking for waveforms at 5,000 stations for 100 events, it could result in up to 500,000 possible time segments which must be compared to the wfdisc table. A query of this magnitude could take a very long time. If there is a specific list of stations that you are interested in, it is a good idea to constrain the query by station also, and enter the list of stations. This will greatly reduce the amount of work involved in *running the query*.
- ☛ Be aware that queries based on predicted arrival times in the ISC, EVENTS, EXPLOSION, and NUCLEAR accounts on hugo may take a considerable amount of time, as each account contains a very large number of stations.
- ☛ Pay careful attention when CenterView displays a window warning you that no tight constraints have been specified. Quite often, the query can be constrained in a way that will be much more useful to the user.

Appendix**B**

Interprocess Communication

CenterView can use interprocess communication to send data to other programs, including the Map program and geotool. Before CenterView can send data, the interprocess communications software must be initialized. To insure that this software has been initialized, execute the following commands.

1. Type `source -nmrd/rel/bin/start_ipc` (if you are running ksh as your shell, type `. -nmrd/rel/bin/start_ipc.ksh`).

ISIS is a program that needs to be running on the machine in order for interprocess communication to work. If ISIS is not running, you will be notified, and you will need to contact staff at the Center to start it.

2. When prompted for the agent name, enter your login name.

If ISIS is running, then you will be prompted for an agent name. The agent name is a name that is given to all processes that you run, and is unique for each user. Usually, people use their login names as their agent names

After entering the agent name, the script will start a process called CommAgent, which facilitates the delivery of messages between programs. The script also sets two environment variables, AESIR_HOST and ISISPORT.

If you wish to learn more about the interprocess communication layer, you can look at the manpage for CommAgent.

3. If you wish to run the Map program, type `runMap`.

In order to run the Map program, you must be using a color display, and your DISPLAY environment variable must be set correctly.

4. If you wish to run geotool, type `run_geotool -a &`.

Like the map program, it is necessary to have a properly set DISPLAY environment variable.

If you have any trouble starting any of these processes, someone on the Center's Geophysical Systems and Support staff can help you.