

**Graph Presentation Type Supplement
User Interface
Developer's Guide**
TAE+ Version 5.2

March 1993

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Introduction

This document describes the TAE+ (Transportable Application Environment - Plus) User-Contributed GRAPH Presentation Type developed by the Laboratory for Atmospheric and Space Physics at the University of Colorado Boulder campus. The document supplements Chapter 5 of the TAE+ User Interface Developer's Guide for TAE+ Version 5.2.

Graphs

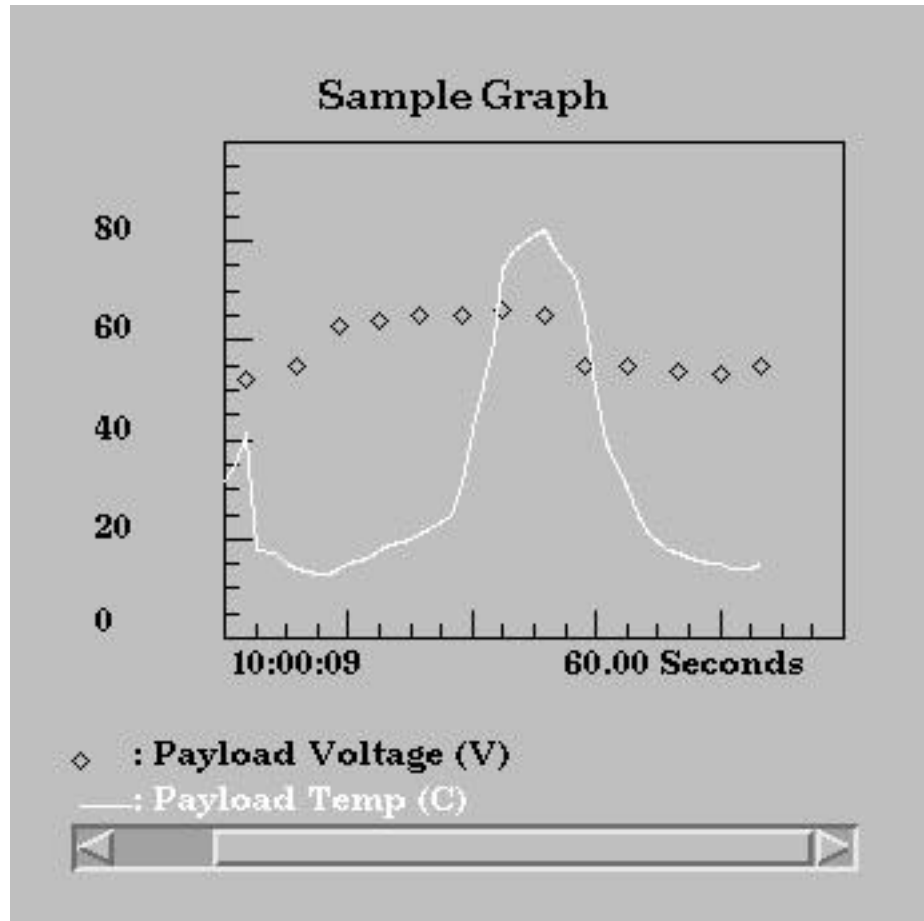


Figure 1: Graph Example

Usage and Examples

The graph presentation displays the value of numeric values against time or another variable. Graph lines are displayed in varied styles including lines, bars, steps, vertical lines, and markers. Line colors and styles may be specified. Figure 1 shows a graph with two items plotted versus time: one as a line and the other as a marker.

Graphs behave in several ways:

- 1- A stripchart effect is produced if automatic axis shifting is set. If a new value occurs outside the graph area, the graph shifts or scrolls by default to display the new value.
- 2- If automatic scaling is specified, the minimum and maximum values of the graph change dynamically to accommodate the new value. The graph rescales continually to display all values.
- 3- If no automatic graph control is selected, points beyond the graph are not shown.

The automatic graph control can be independently specified for each axis. The user may also specify that scroll bars be shown to scroll different parts of the graph.

Graph lines are updated when the target is updated (via Wpt_SetReal or Vm_SetReal/Wpt_ParmUpdate). A new point is plotted against the current system time each time the target is updated for graphs plotted versus time. For graphs plotted against another variable (X versus Y), the user can specify when a point is plotted. The choices are:

- 1- Plot a point whenever a new X value is set.
- 2- Plot a point whenever a new Y value is set.
- 3- Plot a point when either a new X or new Y value is set.

The plotting frequency can be controlled for each graph line.

Item Resources

Table 1 presents the graph resources common to all Presentation Types. Table 2 shows the resources specific to the graph.

COMMON RESOURCES	
Font	Specifies the Graph Title font and the Label font DEFAULT = parent (panel font)
Foreground Color	Specifies the Graph Title and Label color and default for other color resources DEFAULT = parent (panel foreground color)
Shadow Thickness	Not supported
Title	Title of Graph DEFAULT = ""

Table 1: Graph Resources Common to all Presentation Types

GRAPH RESOURCES	
Graph Type	Data vs time Data vs data DEFAULT = Data vs Time
When to Plot	Determines when to plot a point on a given graph line. Plot when new X Plot when new Y Plot when either a new X or new Y DEFAULT = Plot when either a new X or new Y
Graph Line Label	Specifies the label used in the legend for the current graph line DEFAULT = ""
Line Thickness	Pixel width of graph lines. DEFAULT = 1
Line Pattern	Pattern of lines Solid Dotted Dotdash Dashed Dotdotdash Dashdotdotdot DEFAULT = Solid
Mark Points	Use marker to mark points in a graph line. Unless the style is markers, this resource causes a marker to be plotted at the point regardless of the graph style. DEFAULT = Don't mark points
Graph Style	Style of graph lines Lines Hollow bars Filled bars Steps Vertical Lines Markers only DEFAULT = Lines

Table 2: Resources Specific to the Graph

GRAPH RESOURCES (continued)	
Marker Styles	<p>Style of marker</p> <ul style="list-style-type: none"> Square Dot Diamond Bullet Box Circle <p>DEFAULT = Square</p>
Graph Line Color	<p>Color of a single graph line.</p> <p>DEFAULT = parent (panel foreground color)</p>
Label Font	<p>Font used for X and Y labels.</p> <p>DEFAULT = parent (panel font)</p>
X Tick Format	<p>Print format for X Ticks</p> <p>DEFAULT = % T (strftime format for Data vs Time graphs)</p> <p>DEFAULT = %6.2f (for Data vs Data graphs)</p>
Y Tick Format	<p>Print format for Y Ticks</p> <p>DEFAULT = % T (strftime format for Data vs Time graphs)</p> <p>DEFAULT = %6.2f (for Data vs Data graphs)</p>
Tick Font	<p>Font used for X and Y tick labels</p> <p>DEFAULT = 6x10</p>
X Label	<p>X axis label centered under the X axis</p> <p>DEFAULT = ""</p>
Y Label	<p>Y axis label centered vertically to the left of the Y axis</p> <p>DEFAULT = ""</p>
Tick Color	<p>Color of ticks and graph border</p> <p>DEFAULT = parent (foreground color)</p>
Automatic X Axis	<p>Controls how X axis changes in response to new data values</p> <ul style="list-style-type: none"> Shift Axis Rescale Axis Neither <p>DEFAULT = Shift Axis</p>
Automatic Y Axis	<p>Controls how Y axis changes in response to new data values</p> <ul style="list-style-type: none"> Shift Axis Rescale Axis Neither <p>DEFAULT = Shift Axis</p>

Table 2: Resources Specific to the Graph (continued)

GRAPH RESOURCES (continued)	
Graph View Adjustment	Space left empty when graph is shifted or rescaled in terms of percent of total graph size DEFAULT = 15%
Maximum Points Saved	Maximum points saved in each graph line DEFAULT = 200 points
X Minimum	Minimum value for X axis DEFAULT = Current time for Data vs Time graphs DEFAULT = 0 for Data vs Data graphs
X Maximum	Maximum value for X axis DEFAULT = Current time + plot period for Data vs Time graphs DEFAULT = 100 for Data vs Data graphs
Y Minimum	Minimum value for Y axis DEFAULT = 0
Y Maximum	Maximum value for Y axis DEFAULT = 100
Number of X Ticks	Number of X tick marks. An algorithm determines the actual number of ticks marks to use to create rounded axis label numbers. As a result, the number of tick marks shown may differ from the specified number. DEFAULT = 5
Number of Y Ticks	Number of Y tick marks. An algorithm determines the actual number of ticks marks to use to create rounded axis label numbers. As a result, the number of tick marks shown may differ from the specified number. DEFAULT = 5
Enable Cross Hair Cursor	Display cross hair cursor and X,Y value at the cursor location DEFAULT = Disabled
Show New Update	Move to latest point if user has scrolled away. DEFAULT = Remain at current graph position
Tick Style	Style of tick marks None Ticks Grid DEFAULT = Ticks

Table 2: Resources Specific to the Graph (continued)

GRAPH RESOURCES (continued)	
Plot Period Time Units	Units of time for X axis for Data vs Time graphs Seconds Minutes Hours DEFAULT = Seconds
Number of Columns in Legend Columns	Specifies the number of columns in the graph legend DEFAULT = 3

Table 2: Resources Specific to the Graph (continued)

Item Creation

To create a Graph item, follow these steps:

- 1- Select the New Item operation on the main WorkBench panel.
- 2- On the Item Specification panel, select the User Contributed Category and the Graph Presentation Type.
- 3- Set the common item resource values on the Item Specification panel.
- 4- Press Specify Details... on the Item Specification panel to display the main Graph Presentation panel (see Figure 2).
- 5- Set the Graph resources as needed.
- 6- Graph line resources are specified individually for each line. Once the resources have been entered, click Add Graph Line button to add that line.
- 7- Editing resources for graph lines is accomplished by entering the Graph Line number in the Text keyin field or by using the arrow buttons to move to a new graph line.
- 8- Press Graph Control... to specify automatic graph control features (see Figure 3).
- 9- Press Apply or OK on the Item Specification panel.

Graph Format

Graph Control...

Graph Type
 Data vs Time
 Data vs Data

Plot period for X axis:
 Seconds
 Minutes
 Hours

Y Minimum: Y Maximum:

X Label:
 Y Label:

Label Font:

Number of columns in legend:

Tick Style
 Ticks
 Grid
 None

Number X Ticks: Printf Format X Ticks:
 Number Y Ticks: Printf Format Y Ticks:

Tick Color: Tick Font:

Graph Line Details

Graph Line Number: Graph Line Label:

Graph Line Color: Line Thickness: Initial Value:

Graph Style:
 Line Pattern:
 Marker Style:

Mark points in graph line
 Plot point when:
 newX newY either

Figure 2: Graph Details

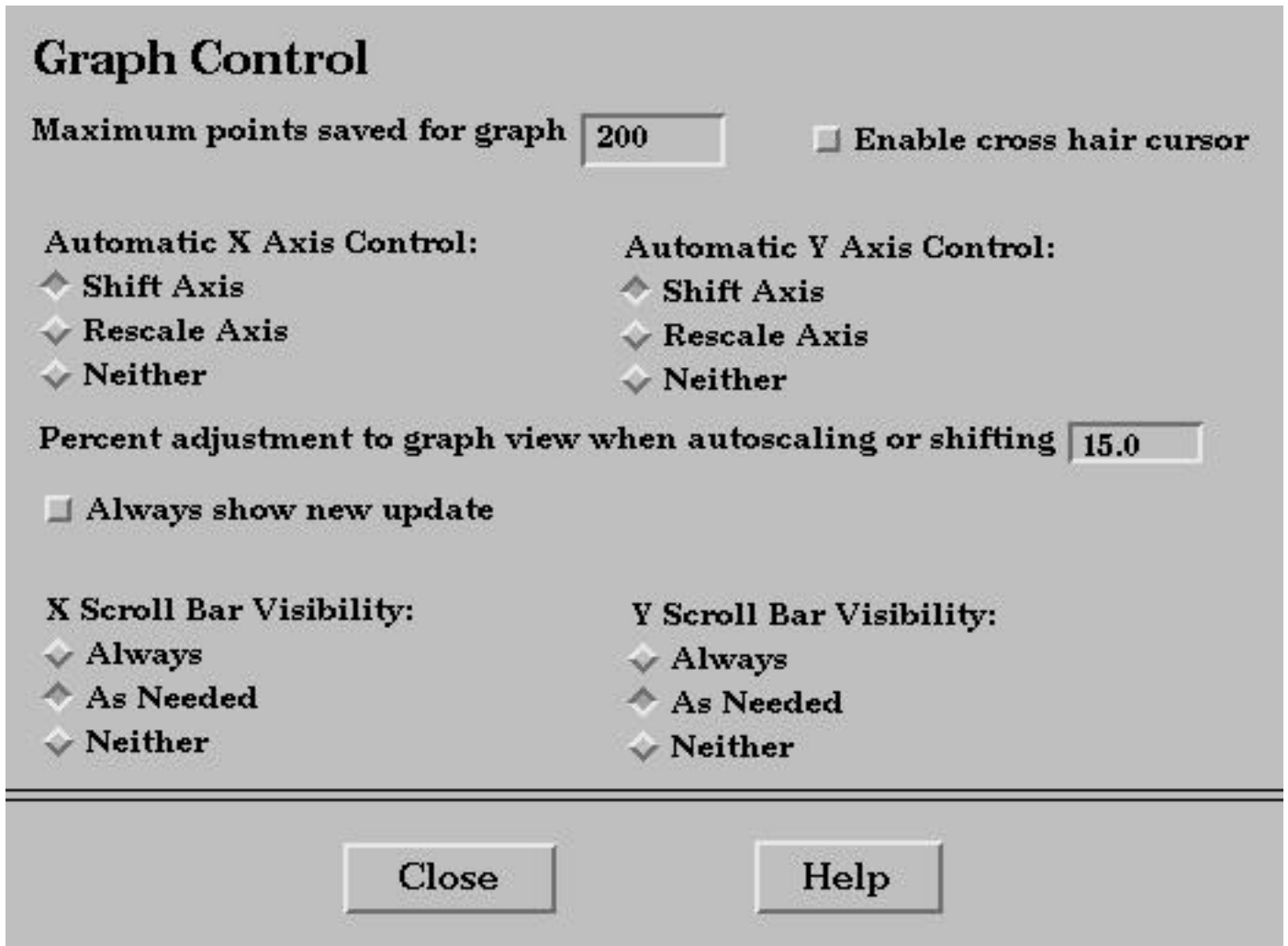


Figure 3: Graph Control

Item Constraints

Constraints are essentially meaningless for graphs since they are output-only objects.

Default Value

The Default Value is meaningless for graphs. Use the graph resource of Initial Value instead.

Keyboard Traversal

Keyboard traversal is not useful for a Graph item. No visual indication occurs when a Graph item has keyboard input focus. Also, no key activates the item (sends an event to the application).

Programming Considerations

See the *Presentation Types Reference Manual* and the *TAE Plus Programmer's Manual*.