

## Augmented Transition Network Model

Augmented Transition Networks build on the foundation of Finite State Machines. Like an FSM, the ATN model of a system consists of a collection of labelled states, with recognized events and transition arcs.

### New Concepts

To these, ATN modelling adds the following concepts:

- A transition to a new state can include a *test*; that is, an arbitrary condition which must be satisfied before the transition can be taken.
- During the transition arc, responses can be executed to achieve certain desired functionality. In the ATN model, these responses are called *actions*.

The addition of *tests* and *actions* to the simple transitions of the FSM model account for the name, Augmented Transition Network.

Hence the behavior model is expanded somewhat to allow both:

- Discrete inputs (events) and
- Discrete outputs (actions)

ATN modelling concepts may be expressed graphically, as below:

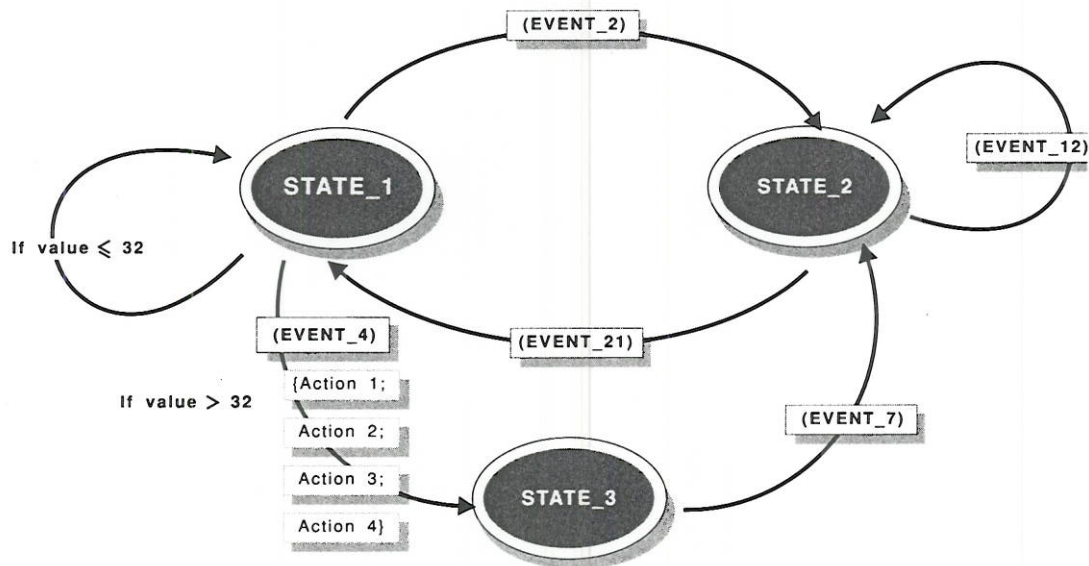


Figure 4-2. Augmented Transition Network Model

### ATN Language

The ATN model is implemented by a corresponding ATN language, as described and explained in the *VAPS Programmer's Guide*.

## The Implementation

### In Stateform Format

The following Stateform implements the behavior of the menu.

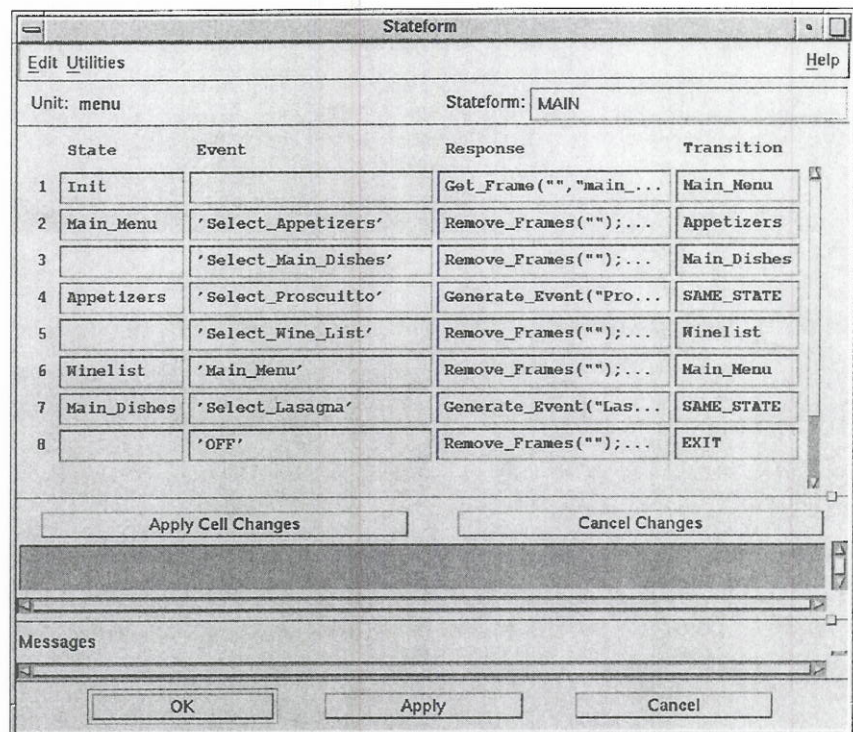
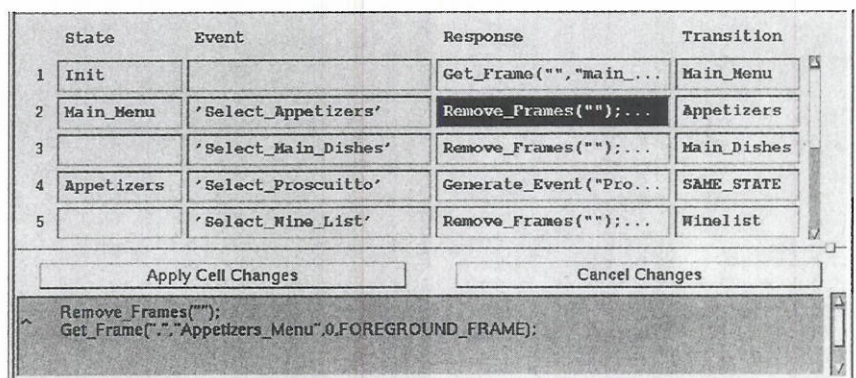


Figure 4-9. Stateform to Model Menu Behavior

### A Closer Look

Since the length of a cell permits you to view a limited number of characters, you may display the entire contents of the cell in the Cell Editor portion of the window. Let's take a look at the contents of two different Response cells for the State Main\_Menu.



	State	Event	Response	Transition
1	Init		Get_Frame("", "main_...")	Main_Menu
2	Main_Menu	'Select_Appetizers'	Remove_Frames("");...	Appetizers
3		'Select_Main_Dishes'	Remove_Frames("");...	Main_Dishes
4	Appetizers	'Select_Proscuitto'	Generate_Event("Pro...")	SAME_STATE
5		'Select_Wine_List'	Remove_Frames("");...	WineList

Apply Cell Changes      Cancel Changes

```

Remove_Frames("");
Get_Frame("", "Main_Dishes_Menu", 0, FOREGROUND_FRAME);
    
```

**In ATN Textual Format**

Displayed in a textual (ATN file) format, the program looks like this.

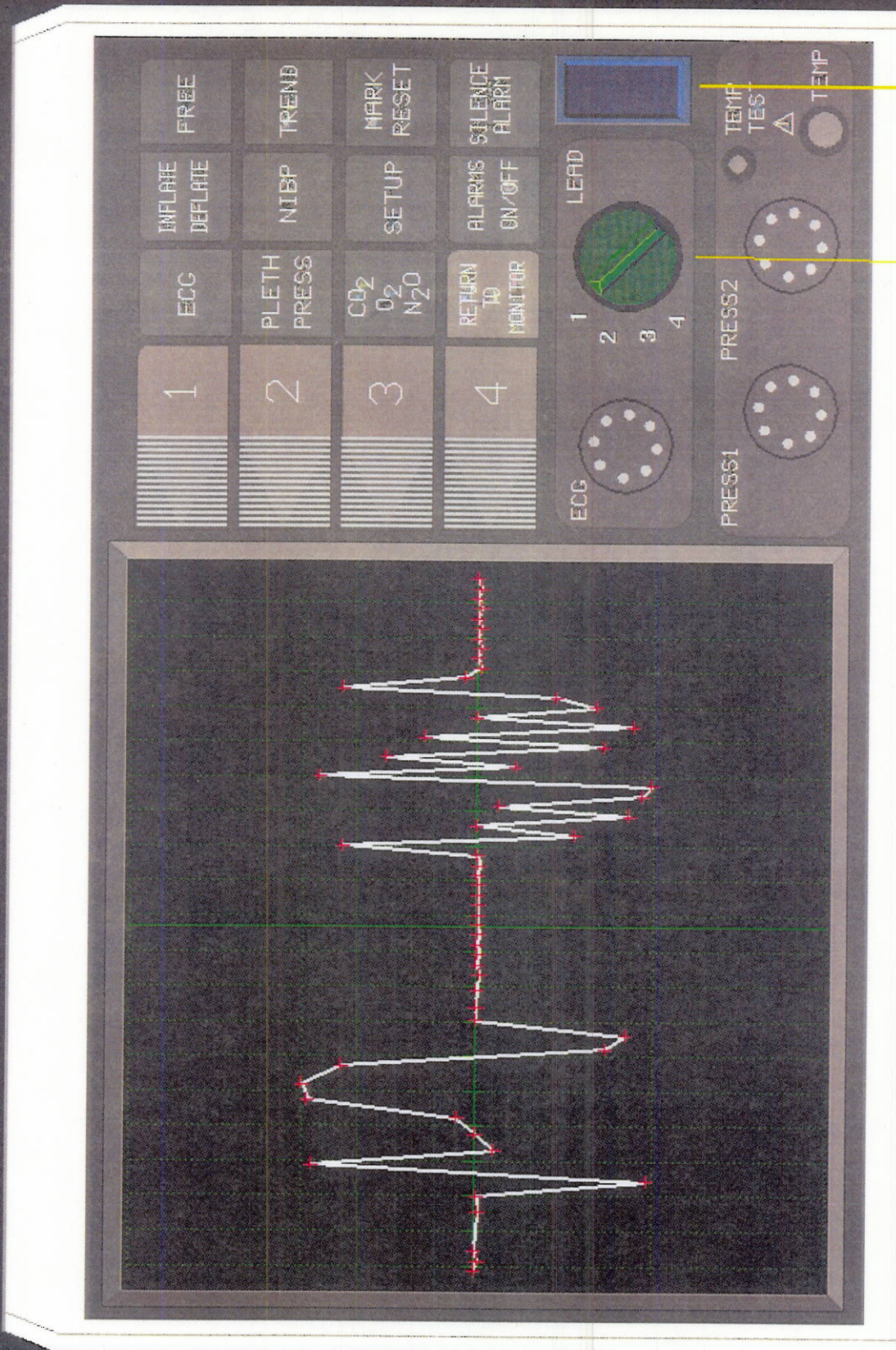
```

ATN File: menu.ATN
File Edit Options Search
Search Pattern: Replace Pattern:
Text
UNIT menu
AUTO MAIN
STATE Init
{
  Get_Frame("", "main_menu", 0, FOREGROUND_FRAME);
}
-> Main_Menu
STATE Main_Menu
(EVENT 'Select_Appetizers')
{
  Remove_Frames("");
  Get_Frame("", "Appetizers_Menu", 0, FOREGROUND_FRAME);
}
-> Appetizers
(EVENT 'Select_Main_Dishes')
{
  Remove_Frames("");
  Get_Frame("", "Main_Dishes_Menu", 0, FOREGROUND_FRAME);
}
-> Main_Dishes
STATE Appetizers
(EVENT 'Select_Proscuitto')
{
  Generate_Event("Proscuitto_selected");
}
-> SAME_STATE
(EVENT 'Select_Wine_List')
{
  Remove_Frames("");
  Get_Frame("", "Wine_Menu", 0, FOREGROUND_FRAME);
}
-> WineList
STATE WineList
(EVENT 'Main_Menu')
{
  Remove_Frames("");
  Get_Frame("", "main_menu", 0, FOREGROUND_FRAME);
}
-> Main_Menu
STATE Main_Dishes
(EVENT 'Select_Lasagna')
{
  Generate_Event("Lasagna_Selected");
}
-> SAME_STATE
(EVENT 'OFF')
{
  Remove_Frames("");
}
-> EXIT
END_AUTO
END_UNIT
    
```

OK      Save      Cancel

Figure 4-10. Textual ATN to Model Menu Behavior

Disable Quickdraw



Turn to change plot object

Push to change marker

network object to light  
and 10 output fields

ATN

gentilly\_2

Type : station  
Max Power : 685.0 MW  
Current Power : 540.0 MW  
# Turbines : 1.0

QUIT

ZOOM

ATN

