Introduction to CompuRoc

Your CompuRoc distribution diskette comes with a copy of the program as well as libraries of thrust-time curves and example problems. Immediately copy these files to your hard disk and save the distribution copy as your backup.

CompuRoc has been tested and works on all Macintosh computers and requires a memory partition of 640K of RAM under typical circumstances (big-screen monitor users may need a bit more). It works running under either System 6.0.x or System 7.x. CompuRoc will run on any Macintosh 680x0-based computer (or on PowerMacs in emulation mode). If your Macintosh has a floating point co-processor (FPU), CompuRoc 2.0 will automatically take advantage of it, and run correspondingly faster in calculation mode. This manual will assume that the user is familiar with the standard Macintosh operations such as clicking, dragging, selecting menu items and so forth. If you are unfamiliar with Macintosh operations, consult the Apple manuals and documentation. CompuRoc complies with the standard Macintosh interface guidelines, and so is very intuitive to learn and use.

CompuRoc works with two kinds of custom files: the simulation profile document and the thrust curve document. (In addition, CompuRoc can, under certain circumstances, read and write plain text files.) The desktop icons corresponding to these documents are illustrated below in Figure 1.

ig. 1 - CompuRoc document icons

Starting the CompuRoc application is accomplished by opening either one of its documents, or the program directly. As with any Macintosh application, this is done by either double-clicking on the icon or selecting the icon and choosing 'Open' from the 'File' menu. CompuRoc has two operating modes - simulation mode and thrust editor mode. Opening CompuRoc directly starts the program in simulation mode by default, and the user is prompted for startup data. Holding down the option key on the Macintosh keyboard while opening CompuRoc

causes it to start up in thrust editor mode with a blank worksheet. Opening either a simulation or thrust document starts the the program in the appropriate mode and loads the data from that document.

At this point you can probably start playing with CompuRoc and discover most of its features by trial-and-error exploration. The more methodical may want to begin by running the sample simulation provided on the distribution disk (named 'Sample Simulation'). When you open this document, you'll be presented with the screen shown in Figure 2. This screen contains one moveable window (moving is accomplished by dragging in the window title bar) which we'll refer to as the simulation status window.

ig. 2 - Simulation Status Window

This window contains a grid of event "cells" which are used to define a simulation profile. In addition, the window contains readouts of the current simulation time, mass, acceleration and "state vector", that is, the current vertical and horizontal components of position and velocity. Metric units of measurement (grams, meters, millibars, etc.) are used throughout the program. For a table of conversion factors, consult the appendix of this manual.

The window also contains three "buttons" used to start and stop the calculations. The function of these buttons is duplicated by the corresponding menu items found under the 'Events' menu, which may be easier to use if the simulation status window doesn't happen to be frontmost on the screen.

The sample simulation presented here for illustration consists of the launch conditions configuration, and two sequential flight events. These two events are a burn and a delay, respectively. Thus this simulation represents a simple single-stage flight. Before running this simulation, you may want to examine these events more closely. The current event is that which is highlighted in the event grid, and is initially the launch configuration. In order to "open" the current event, either "double click" on its grid cell, or choose 'Change' from the 'Event' menu. Click once in a cell to highlight it.

The next chapter of the manual will discuss adding, removing, and changing events in more detail, but this information should be sufficient to allow you to examine the events contained in the example. When you are ready to run the simulation, simply click on the 'Start' button and watch the numbers roll by. If you want to temporarily suspend the calculations, hit the 'Pause' button. To end the simulation, click on 'Stop'.

Of course, simply watching numbers roll by on a digital display isn't too good for visualizing the flight, so the graphical displays controlled from the 'Display' menu are helpful. Before, during, or after the simulation run, you can select one of the distance / velocity / time plot options for display in a window. More will be said about this option later in the manual as well.

The best way to learn a program like CompuRoc is to play with it, so go ahead and experiment. The following chapters contain more complete documentation needed to access every feature of CompuRoc, but the experienced Macintosh user should have no difficulty "walking" his or her way through most of the options.