

# LANDER v1.1

by George Moromisato  
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Welcome to Lander!

Lander is a real-time simulation of a Lunar Excursion Module on its final approach to the lunar surface. As the pilot of the lander, you must control the vertical and horizontal rockets to guide your craft to a safe landing.

## Playing the Game

As a Windows application, Lander attempts to conform to the guidelines set by Microsoft. You may play the game with either the keyboard or the mouse using standard interface conventions. For example, you may make menu selections and interact with dialog boxes as you would in any other Windows program.

When the game first starts, your lander is at one thousand meters. Press any key or click on the window with the mouse to start the game. The display on the upper-right part of the screen shows your altitude, horizontal velocity, vertical velocity, and remaining fuel. The three buttons below let you apply thrust in three different directions: left, right and down. The object of the game is to land on flat terrain with a horizontal velocity of less than one meter per second and a vertical velocity of less than ten meters per second.

## Status Information

The different pieces of information displayed on the screen are described below.

*Altitude:* The altitude of the lander with respect to the landing pad is displayed in meters. Note that this display is only accurate to within a few meters because of round-off errors.

*Velocity X:* The horizontal velocity of the lander is displayed in meters per second. If the velocity is negative, the lander is moving to the left; if positive, it is moving to the right. The horizontal velocity must be between -1 and 1 meters per second for a safe landing.

*Velocity Y:* The vertical velocity of the lander is displayed in meters per second. A negative velocity indicates that the lander is falling towards the ground. The lander must land with a velocity less than ten meters per second.

*Fuel:* The fuel left in the lander is displayed in kilograms. This contributes to the weight of the lander.

## Thrust Controls

The vertical thrust control burns ten kilograms of fuel per second and applies a constant vertical force. The horizontal thrust controls burn two kilograms of fuel per second and apply force horizontally. By default, the right control will thrust to the right, pushing the lander to the left, but you may change this in the Options screen. (See Lander Options.)

## **New Game and Restart Game**

Selecting New from the Game menu will generate a new random terrain and start the lander at one thousand meters. Selecting Restart will restart the lander but use the current terrain.

## **Lander Options**

Several options and parameters can be changed with this screen. The fields available are described below:

*Gravity:* The acceleration due to gravity may vary from 1.0 to 9.0 meters per second per second in increments of 1.0 meter per second per second. The default is 3.0 meters per second.

*Fuel:* The initial fuel of the lander may vary from 200 to 2,000 kilograms of fuel in increments of 200 kilograms. The default is 1,000 kilograms.

*Thrust:* The force applied by the main thruster may vary from 5,000 to 22,500 Newtons in increments of 2,500 Newtons. The default is 10,000 Newtons.

*Reverse Thrust:* If you prefer the left thrust button to move the lander to the left and the right button to move the lander to the right, select this option. This option is off by default.

*Draw Flame:* If you want the computer to draw a flame on the lander while it is thrusting, select this option. Because the game is faster if it does not draw the flame, players with slower machines may wish to turn this option off. This option is on by default.

## **System Requirements**

Lander requires Microsoft Windows 3.0 or higher to run; it will not run under Windows 2.x.

## **Source Code**

The source code for this program, written in Microsoft C 5.1, is available from TMA for \$15. If you would like to see the code, including all resource files and bitmaps, please send a check or money order to:

TMA  
15 Whittier Rd.  
Natick, MA 01760  
(508) 655-5823