Massachusetts Institute of Technology • Program in Science, Technology and Society

Science, Technology and Global Security Working Group

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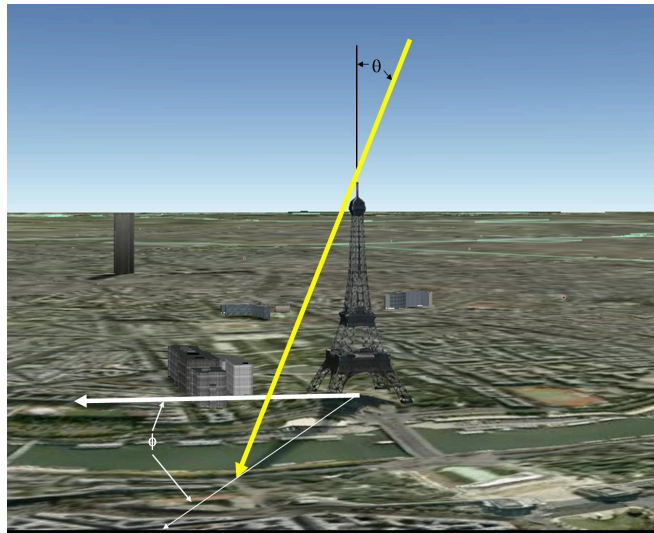
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Google Earth Tool Available!

Measure Heights of Objects with calculateObjectFromShadow

Recent versions of GoogleEarth, show a date stamp of scenes that are close enough to the Earth's surface for the scene appearing on the screen to come from a single image. If the day, month and year are given, it is possible to use the compass heading of the shadow itself to determine the effective local "time", much like a sun dial can be used to determine the time at a given position. CalculateHeightFromShadow uses this heading, together with the latitude, longitude, and date of the scene, to determine the Sun's elevation and from that to return the length of the object being studied.

Click here to download the program. (Note: you **MUST** have GUI_Missile_Flyout already installed for this program to work!)

Click here to download the **help file** for the program calculateObjectFromShadow

GUI_Missile_Flyout

Version 3.0 now available!

GUI_Missile_Flyout: A General Program for Simulating Ballistic Missiles
GUI_Missile_Flyout is a stand-alone program running under Windows for simulating ballistic missiles with 1, 2, or 3 stages in a framework with a round, rotating Earth. Users can easily input all the necessary parameters in an intuitive graphical user interface (GUI). A modest number of quantities can be interactively plotted on the
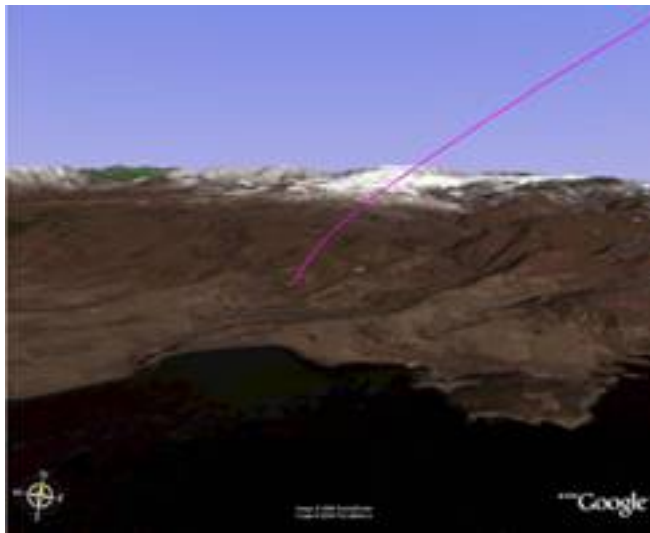
Interface but the complete trajectory can be saved as either an Excel or Matlab file for further analysis. The trajectory can also be directly displayed in Google Earth for visualization. The GUI can be used to optimize gravity turn parameters to maximize range or aim at a specific target (entered, as is the launch site) through latitude-longitude pairs. In addition to an introduction to using the program, this paper describes the integration of the three-degrees-of-freedom equations of motion and approximations made to the aerodynamic (such as a parameterized drag coefficient, Cd).

Download the program by clicking here. Download the Landareas file here.

Please "register" by sending your name, email address, and institution (if applicable) to dmancini@MIT.EDU. This will help us continue to provide information and services to the arms control and national security community. You can also request a help file.

If you use this program for a publication, please reference: Geoffrey Forden, *GUI_Missile Flyout: A General Program for Simulating Ballistic Missiles*, Science and Global Security, Vol. 15, No. 2, December 2006, pp. 133-146.
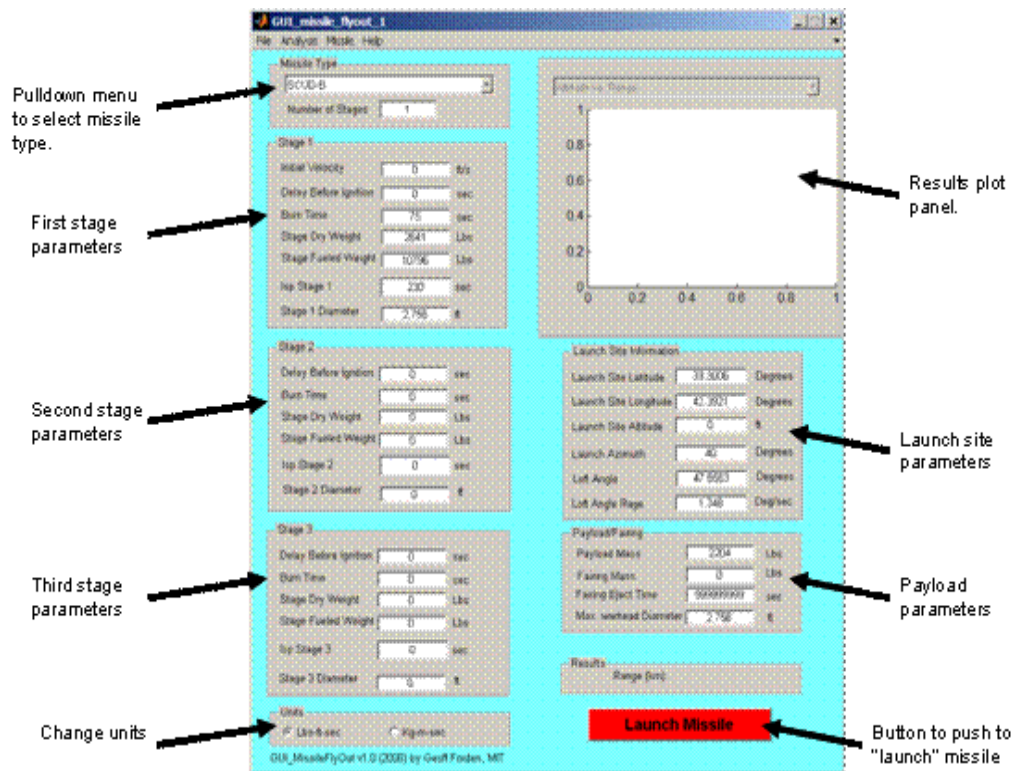
A Quick Guide to Using GUI_Missile_Flyout:

To install:
Download the file GUI_missile_flyout_pkg.exe to a windows based computer and run this self extracting file. Please keep the GUI_MISSILE_FLYOUT_3.0.ctf file in the same path (usually, same directory is easiest) as the executable image, GUI_MISSILE_FLYOUT_3.0.exe. The instillation package, GUI_MISSILE_FLYOUT_2.1_pkg, installs the necessary files on your system and can be deleted (together with MCRInstaller.exe, and _install.bat) after instillation.

Running the program:
Double click on GUI_MISSILE_FLYOUT_3.0.exe or use the "run program" from the start menu. Two screens will appear: a DOS command prompt window (which can be ignored but not deleted without stopping the program) and a Graphical User Interface (GUI) shown below. There are four missile models already programmed into the GUI that can be selected using the Missile Type pull-down menu. These can be run as is, or modified to reflect the user's preferred parameterizations. New missiles can be entered into the program from the GUI by selecting "Create New Missile" from the "Missile" pull-down menu. Missile models can also be saved to the disk for future use.

Pulldown menu to select missile type.

First stage parameters

Second stage parameters

Third stage parameters

Change units

Results plot panel.

Launch site parameters

Payload parameters

Button to push to "launch" missile