

# Visual Tutorial



## Altimeter Errors

### Adobe (formerly Macromedia) Flash Requirements

Thank you for using the Altimeter Errors Simulator from [luizmonteiro.com](http://www.luizmonteiro.com). Please note that this tutorial is designed to help you understand how to use the simulator. Note that the results are only approximations and should never be used in real flight.

Before you begin using the simulator, please make sure that your browser has Adobe (formerly Macromedia) Flash version 8 or higher. If you do not have this you may go to the Adobe website at: <http://www.adobe.com> and go to the downloads section where you will be able to download and install the latest version.

The Altimeter Errors Simulator web page will also run a test (Flash Version Detector) to check which version is installed in your browser. If you have at least version 8 installed the following message will appear on the page right before the simulator section:

A query on your Flash viewer's version returned the following: Version 8  
Congratulations! You have the correct version of Flash.

If your browser has an older version which will not allow the simulator to function correctly the following message will appear:

A query on your Flash viewer's version returned the following: Version 7  
The version of Flash on your computer must be updated  
Please visit the Adobe site below for the latest version of flash.

If this happens, you must download the latest flash plug-in in order for the simulation to work properly. The download should not cause any problems to your computer, however, it is at your own risk and luizmonteiro.com shall not be held liable for any damages caused by this download.

### Altimeter Errors Simulator Application Parts

The screenshot shows the simulator interface with several labeled parts:

- Flash Version Detector:** A small window at the top left showing the website logo and navigation menu.
- Aircraft's Relative Vertical Position:** A top section showing two aircraft icons at 7000 ft, labeled 'True Altitude'.
- Aircraft Altimeter:** Two circular altimeter gauges showing 'Indicated Altitude' of 07000.
- Initial Conditions:** A panel on the left with 'Indicated Altitude: 7000 ft' and 'Altimeter Setting (QNH): 1013.3 [hPa] 29.92 [InHg]'. Below it is a text box explaining the simulation scenario.
- New Conditions:** A panel on the right with 'Temperature change (°C): 0.0 [Δ°C] 0.0 [Δ°F]' and 'New correct Altimeter Setting (QNH): 1013.3 [hPa] 29.92 [InHg]'. Below it is a panel for 'Wrong Altimeter Setting (QNH): 1013.3 [hPa] 29.92 [InHg]'.
- Reset Button:** A button at the bottom right labeled 'Reset'.
- Preferences Menu:** A bottom section with 'Units: Meters Foot' and 'Aircraft icon: Boeing 747'.

## Altimeter Errors Simulator Application Parts (cont.)

### Flash Version Detector

Used to check which version of Macromedia Flash is installed in your browser. If you have Version 8, the Altimeter Errors Simulator will operate correctly. If you have a previous version you must upgrade to the latest version in order for the simulator to function properly.

### Aircraft's Relative Vertical Position

Displays the aircraft's vertical position relative to its initial position from point 1 to 2.

### Aircraft Altimeter

Displays the reading that the altimeter would have in the aircraft. The pilot uses this as the reference to maintain altitude.

### Initial Conditions

Altimeter setting and indicated altitude at point 1 (initial part of the flight)

### New Conditions

During the flight, atmospheric conditions may have changed. A change in barometric pressure causes the altimeter setting to change. This section is also where the temperature change is entered.

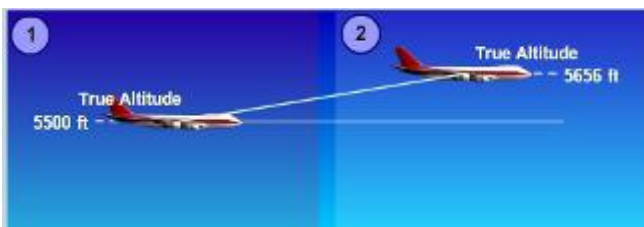
### Reset Button

Causes all values to return to their original settings.

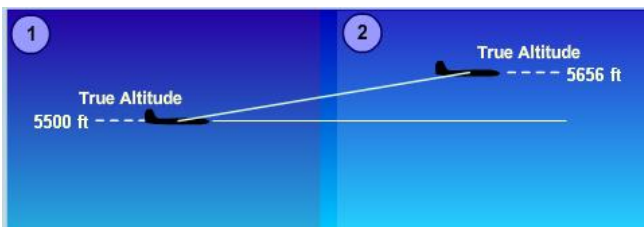
### Preferences Menu

In this menu the units can be changed from feet to meters and different aircraft icons can be selected.

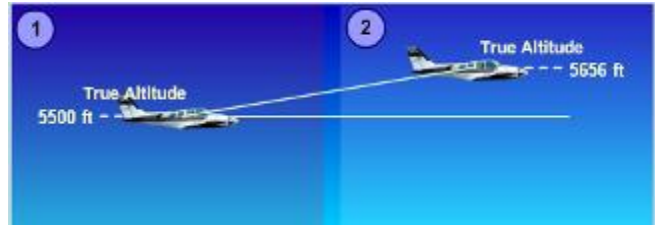
### Available Aircraft Icons



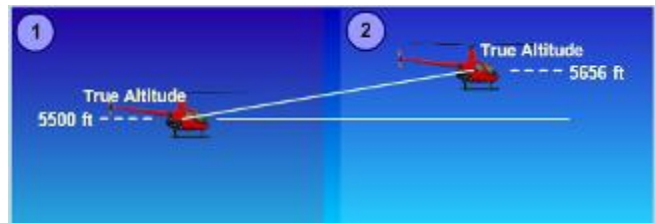
747



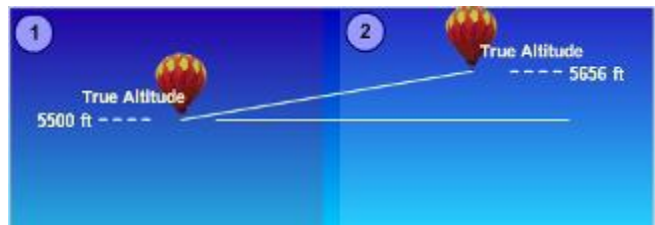
Plane silhouette



Twin Engine



Robinson R22



Balloon

## What It Simulates

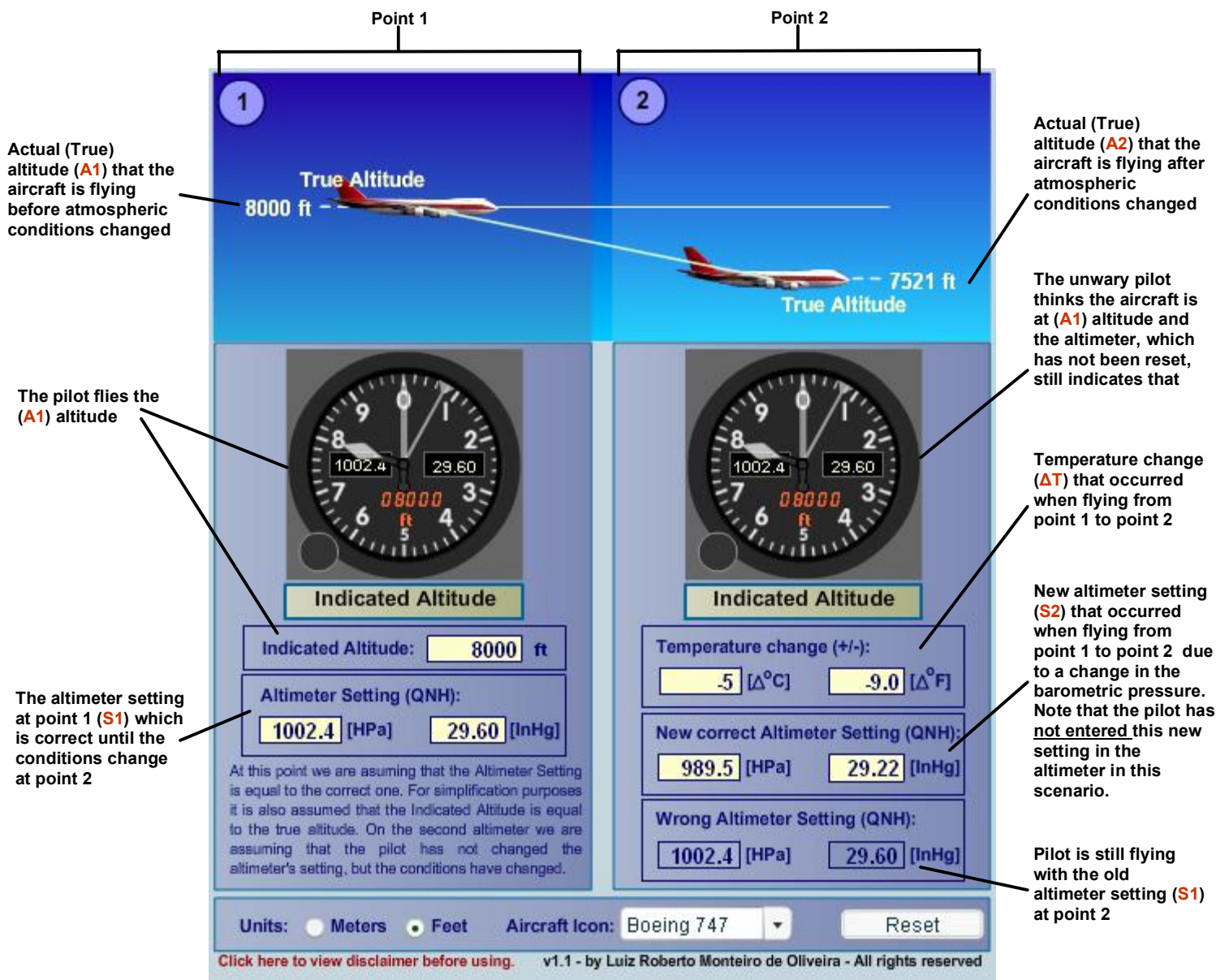
Imagine the following scenario:

A pilot is flying at an altitude of **A1** and at the current and correct altimeter setting of **S1** that he/she obtained from an appropriate source, such as an ATIS, AWOS, air traffic control, etc. Assume that this (**A1**) is the true altitude for simplification purposes at this point in time.

While flying, the atmospheric conditions change, perhaps from passing through a cold or warm front or for other reasons. As the conditions (temperature and/or pressure) gradually change the pilot continues to fly the altitude (**A1**)

indicated on the altimeter. The unaware pilot continues to fly this indicated altitude, even though the aircraft is actually either descending or ascending depending on how the atmospheric conditions are changing.

The new pressure (barometric) conditions are reflected on a new altimeter setting (**S2**) that a pilot Has Not entered in the altimeter. The change in temperature is  $\Delta T$ . Therefore, there will be a new true altitude (**A2**) in which the aircraft is actually flying in even though the indicated altitude is still the same. The simulator will show this altitude.



### Example 1

A pilot is flying at an altitude of **5500ft** and at the current and correct altimeter setting of **30.12 InHg** that he/she obtained from an appropriate source, such as an ATIS, AWOS, air traffic control, etc. Assume that this (**5500ft**) is the true altitude for simplification purposes at this point in time.

While flying, the atmospheric conditions change, perhaps from passing through a cold or warm front or for other reasons. As the conditions (temperature and/or pressure) gradually change the pilot continues to fly the altitude (**5500ft**) indicated on the altimeter. The unaware pilot continues to fly this indicated altitude, even though the aircraft is actually either descending or ascending

depending on how the atmospheric conditions are changing.

The new pressure (barometric) conditions are reflected on a new altimeter setting (**30.84 InHg**) that a pilot Has Not entered in the altimeter. The change in temperature is: **+8°C**.

1) What is the actual (true) altitude that the aircraft is at point 2? Answer: **6286 ft**

2) What is the altitude that the pilot thinks he she is at point 2? Answer: **5500 ft**

Enter **5500ft** here

Enter **30.12** here

Read Actual (True) altitude (**6286 ft**) here

Enter Temperature change (**+8**) here

Enter **30.84** here

Units:  Meters  Feet Aircraft Icon: Boeing 747 Reset

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**Example 1 part II (use data from previous page)**

Now lets assume that the pilot inputs the correct altimeter setting (30.84 InHg) so that only the change in temperature of +8°C is responsible for the Altimeter error.

1) What is the actual (true) altitude that the aircraft is at point 2? Answer: 5656 ft

2) What is the altitude that the pilot thinks he she is at point 2? Answer: still 5500 ft

Note that in practice, the pilot can only correct for the change in pressure by setting the correct altimeter setting. To estimate the effect of a temperature change, the pilot must use a flight computer and calculate the true altitude based on the temperature outside the aircraft.

The screenshot displays a flight computer interface with two panels, labeled 1 and 2. Panel 1 shows a true altitude of 5500 ft and an indicated altitude of 5500 ft. Panel 2 shows a true altitude of 5656 ft and an indicated altitude of 5500 ft. Below the panels are two altimeter dials, each showing an indicated altitude of 5500 ft. The left dial has an altimeter setting of 30.84 InHg. The right dial has an altimeter setting of 30.84 InHg and a temperature change of +8 [Δ°C] and 14.4 [Δ°F]. Below the dials are input fields for the altimeter setting and temperature change. The left panel has an input field for the altimeter setting (30.84 InHg) and a note: "Enter 30.84 here". The right panel has input fields for the temperature change (+8 [Δ°C] and 14.4 [Δ°F]), the new correct altimeter setting (30.84 InHg), and the wrong altimeter setting (30.84 InHg). At the bottom of the interface are units (Meters and Feet), an aircraft icon (Boeing 747), and a Reset button. A disclaimer is visible at the bottom: "Click here to view disclaimer before using. v1.1 - by Luiz Roberto Monteiro de Oliveira - All rights reserved".

Read Actual (True) altitude (5656 ft) here

Enter 30.84 here

**End**

