



# Creating Tours in Worldwide Telescope

---

*A Beginner's Guide*

6/18/2012

---

## Table of Contents

Section 1: Introduction .....	1
Section 2: Initial steps .....	2
Section 3: The Worldwide Telescope Interface (Figure 1) .....	3
Section 4: Creating a Tour .....	4
Section 4.1: Slides and Camera Movement .....	4
Section 4.2: Slide Duration .....	5
Section 4.3: Moving Between Slides .....	5
Section 4.4: Adding Elements to Slides .....	6
Section 4.5: Animating Slide Elements .....	6
Section 4.6: Adding Audio .....	7
Section 4.6.1: Master Slides .....	7
Section 4.7: Saving Your Tour .....	7
Section 5: Importing Data .....	8
Section 5.1: The Worldwide Telescope Layer Manager (Figure 2) .....	9
Section 5.2: Playing with Data .....	9
Section 5.3: Adding Data .....	10
Section 6: Conclusion .....	11

## Section 1: Introduction

Worldwide Telescope is a data visualization application developed by Microsoft Research. This application is free and permits users to employ a virtual camera to view the planet Earth, objects in the solar system, and composite images of the cosmos.

In some respects, Worldwide Telescope resembles Google Earth, but Worldwide Telescope also has the ability to create and deploy self-contained multimedia presentations called *guided tours*, which are structured much like presentations in Microsoft PowerPoint and may contain images, sound, and creator-defined camera movement.

This tutorial will provide a brief introduction to Worldwide Telescope and a tutorial describing the construction of guided tours.

## Section 2: Initial steps

1. Download and install Worldwide Telescope. Worldwide Telescope may be found at the following web location:

<http://www.worldwidetelescope.org/>

2. Open Worldwide Telescope
3. In the bottom-left corner of the Worldwide Telescope window, you will need to select the celestial body you wish to look at using the **Look At** pulldown menu:
  - By default, WWT begins looking at celestial bodies in the solar system
  - If you wish to examine locations on Earth, select **Earth** from the **Look At** pulldown menu
  - If you wish to examine locations in the sky, select **Sky** from the **Look At** pulldown menu
  - If you wish to examine panoramic images from various planets, select **Panorama** from the **Look At** pulldown menu
4. To reveal on-screen camera controls, mouse over the **View** button at the top of the screen and click the **arrow** that appears beneath this button. In the menu that appears, click **Show On-Screen Controls**
5. If you wish to create a tour, mouse over the **Guided Tours** button and click the **arrow** that appears beneath this button; this will bring up a context menu; click **Create a New Tour...**, which will bring up the **Tour Properties** dialog box for your new tour
  - In the **Tour Properties** dialog box, you will be given the opportunity to provide a title, description, contact e-mail, and categorization tags
6. Provide a title for your tour and populate the other fields in the **Tour Properties** dialog box; click **OK**; note that the WWT window changes slightly to provide you with the controls necessary for creating a tour. These are labeled in **Figure 1**

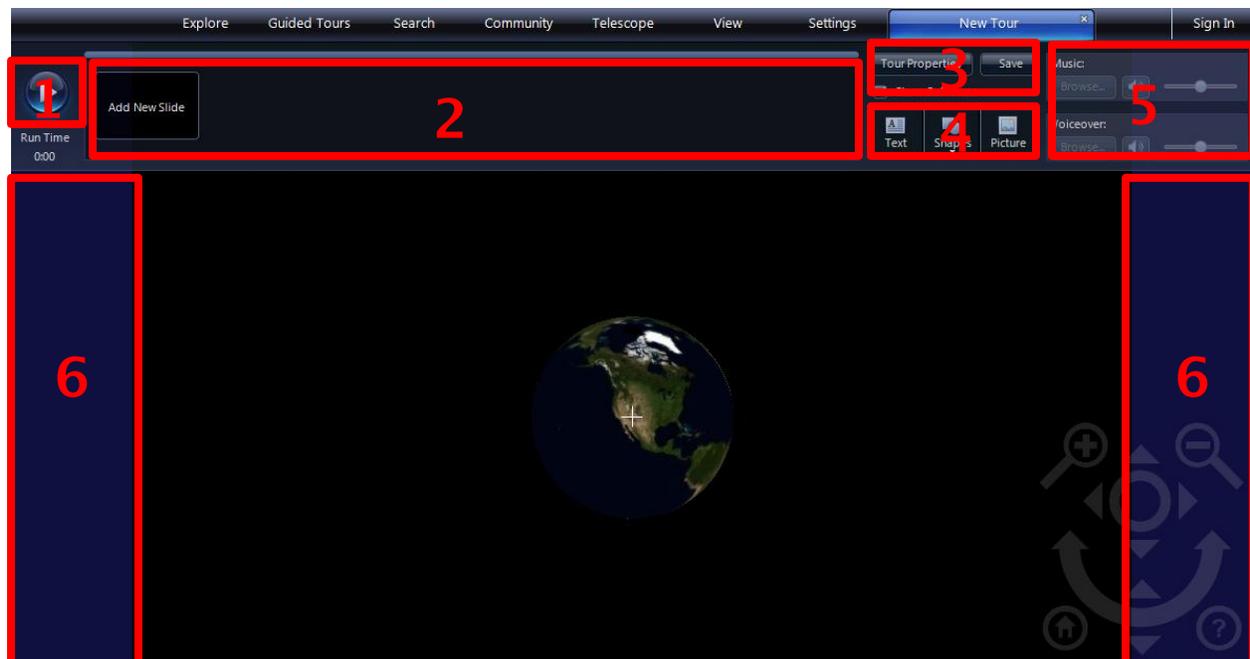


Figure 1

## Section 3: The Worldwide Telescope Interface (Figure 1)

1. The **Play** button: preview your tour from the beginning by clicking this button
2. The **Slides** pane: this pane acts as a timeline for your tour containing icons representing each slide in your tour in the order they will be played during the presentation of your tour
  1. The **Slide** pane is your primary means of organizing the slides in your tour, managing these slides, and navigating from slide to slide
  2. Slides in the **Slide** pane can be dragged to new positions in the tour, duplicated, and otherwise altered in ways explained by this tutorial
  3. Slides are the primary method by which Worldwide Telescope tours are organized. For more information, see [Section 4](#)
3. The **Tour Properties** button, which brings up the **Tour Properties** dialog box for your tour; and the **Save** button, with which you save your tour
4. Three **Insert Element** buttons:
  1. **Insert Text Box**: Adds a text box element to a given slide
  2. **Insert Shape**: Adds a shape element to a given slide
  3. **Insert Picture**: Adds a picture from your computer to a given slide
    - i. Pictures added to a Worldwide Telescope tour in this way are stored in the tour file when it is saved. So, if you add a 5-megabyte image to your tour and then save your tour, the tour file on your computer will grow by 5 megabytes. Since large image files will load slowly into a tour, it is recommended that you use low-resolution images (approximately 640x480)
5. Two **Audio** controls (**Music** and **Voiceover**, though there is no functional difference between the two), permitting the user to import audio files into a given tour and control the volume of each
  1. Worldwide Telescope's audio controls allow users to play two audio files simultaneously on any given slide
  2. By using a **Master slide**, users can play up to four audio files simultaneously: two throughout the entire tour, and two on a given slide
  3. As with images, any audio files imported into the tour are stored within the saved tour file
6. Two **Safe Areas** that indicate areas of the frame that will be occluded if the tour is not shown on a widescreen monitor (if these safe areas do not appear, nothing in the frame will be occluded)
  1. Most computer monitors from the mid-nineties use an aspect ratio of 4:3 pixels -- that is, for every four pixels wide, monitors were 3 pixels tall. Typical 4:3 resolutions include 640x480, 800x600, 1024x768, and even 1280x960 (modern computers using the 4:3 aspect ratio typically support a resolution of 1600x1200)
  2. Though many modern monitors continue to use the 4:3 aspect ratio, some monitors and mobile devices use *different* aspect ratios. For example, HD video, HDTV and non-HD digital television sets use an aspect ratio of 16:9 pixels – almost 2 pixels wide for every 1 pixel tall. Common 16:9 resolutions include 640x360, 1280x720, and 1920x1080. Note that YouTube videos use these resolutions as well.

## Section 4: Creating a Tour

Worldwide Telescope tours are structured in terms of slides. A tour will consist of a series of slides in sequence. Slide elements, such as pictures or text captions, are added to slides on an individual basis.

The process of creating a tour, therefore, will include positioning the camera, creating slides, specifying slide duration, and adding appropriate slide elements to these slides. More advanced tours will use audio, Master slides, and transition slides.

### Section 4.1: Slides and Camera Movement

In Worldwide Telescope, each slide captures two camera positions: one at the beginning of the slide, and one at the end of the slide.

If the starting camera position for a given slide is different than the ending camera position, the camera will *move* when the slide is played during a tour. Camera movement can include panning, tilting, zooming, and dollying (lateral movement), either individually or all at once.

The perceived speed of camera movement depends on three factors:

- The *duration of the slide*: camera movement that takes place over a shorter span of time will appear faster
- The *amount of camera movement present*: camera movements over a large area will appear fast unless given plenty of time
- The *distance of the object in the frame*: just as smoke billowing in the distance appears to hardly move at all, large-scale movements viewed from a great distance can appear to move slowly

When you create a slide, Worldwide Telescope records the camera's position at the time the slide was created as both the starting and ending position of the slide.

If you want the camera to move when a slide is played, you need to move the camera to the desired position and then specify the new camera position as the new starting position or ending position for the desired slide.

For example, assume you wanted to create a slide that would slowly dolly from Tucson to Phoenix when played. To do this, you would create a slide looking at either Phoenix or Tucson. Since you want the slide to start in Tucson and end in Phoenix, if you create the slide whilst looking at Phoenix, you will need to move the camera to Tucson and set this as your starting position; if you create the slide whilst looking at Tucson, you will need to move the camera to Phoenix and set this as your ending position.

To set the starting or ending position of a slide you have already created, position the camera in the desired location and then

**Tip:** To make sure a new slide is positioned at exactly the same position at which the preceding slide ends, right-click the desired slide and click **Duplicate Slide at End Position**; this will create a new slide at the end position of the slide from which the new slide was generated.

right-click the appropriate slide in the **Slide** pane ([Section 3](#)); in the context menu that appears, click either **Set Start Camera Position** or **Set End Camera Position**, as the situation demands.

You can check the start and end position of a given slide at any time by right-clicking the appropriate slide in the **Slide** pane ([Section 3](#)). In the context menu that appears, click either **Show Start Camera Position** or **Show End Camera Position**; this will move the camera to the appropriate position.

## Section 4.2: Slide Duration

It's easy to change the duration of a slide in Worldwide Telescope.

Each slide in the **Slides** pane ([Section 3](#)) has a number below it; this number represents the duration of the slide. The default slide duration is ten seconds.

To change the duration of the slide, click the number below the slide. You will now have the opportunity to adjust the slide's duration, either by manually specifying a duration, or by clicking the up and down arrows which appear on either side of the number representing the slide's duration. Each click of the arrow increases or decreases a slide's duration by one second.

## Section 4.3: Moving Between Slides

If a given slide starts in a different place than the preceding slide ends, Worldwide Telescope will automatically transition between the two slides by moving the camera for you.

For example: assume Slide **A** starts and ends in Tucson, Arizona, and Slide **B** starts and ends in Phoenix. If these slides are played in succession during a tour, Worldwide Telescope will automatically zoom out from Tucson when Slide **A** ends, dolly over to Phoenix, and zoom in to the starting position for Slide **B**.

Often, the automatic transition available in Worldwide Telescope is perfectly suitable for a tour: it provides an overview effect between slides that display distant locations. However, there are certain circumstances in which a different transition is more desirable.

The only way to prevent Worldwide Telescope from automatically transitioning between two slides is to instruct a given slide to end at exactly the same place as the following slide begins. But if two slides take place at distant locations, one must create a third slide – a *transition slide* – to move between these two locations.

For example: Slide **A** takes place in Tucson; Slide **C** takes place in Phoenix. You are dissatisfied with the automatic Worldwide Telescope transition between Slide **A** and Slide **C**, so you create a new slide, Slide **B**, between the two. Slide **B** *starts* at the ending position of Slide **A** and *ends* at the starting position of Slide **C**, thereby bridging the gap between the two. You can control the speed of transition by adjusting the duration of the transition

**Tip:** Slide elements copied and pasted from slide to slide usually maintain their position, so it is often possible to copy and paste elements into the exact same positions from slide to slide. That failing, one can also **duplicate** a slide to preserve element positions from slide to slide. While building your presentation, it is usually easier to preserve slide element positions by duplicating slides.

slide, and you can control the path of transition using multiple transition slides.

## Section 4.4: Adding Elements to Slides

Once you create a slide, it becomes possible to add elements to it using the controls provided by the Worldwide Telescope interface ([Section 3](#)). One can add text, images, and shapes to any Worldwide Telescope slide.

- Text elements are entered via a text editor box in which you can choose the font size, font setting, font color, background color, and transparency of each text element in a given slide
- Image elements are loaded by browsing your hard drive and selecting the desired image. Images can be resized, tinted, and made transparent by clicking the various options in the context menu that appears when the image is right-clicked
- A limited array of shape elements can also be added, resized, colored, or made transparent within Worldwide Telescope

**Tip:** The larger the image element, the longer it will take for Worldwide Telescope to load it during a tour. Consequently, optimal resolution for image elements is rather low (usually no higher than 800x600).

Slide elements can be sent forwards and backwards within a slide, an effect similar to shuffling a pile of papers to change which paper is on top. This can be accomplished in Worldwide Telescope by right-clicking existing elements in a slide and clicking **Send forward** or **Send backward** in the context menu that appears. If you want an element to appear “in front” of other elements in the slide, send it forward; if you want an element to appear “behind” other elements in the slide, send it backward.

## Section 4.5: Animating Slide Elements

Slide elements can be animated, allowing them to move, resize, fade in, or fade out over the course of a slide. This is controlled in very much the same way that camera movement is controlled ([Section 4.1](#)): by designating a camera start position and end position.

**Important Note:** slide elements must *always* be animated *end-first* – that is, by designating the end position first.

Slide element animation steps are as follows:

1. Right-click the element(s) you wish to animate
2. In the context menu that appears, click **Animate**  
Note that *any* changes to the element register as animation, including changes in color, transparency, and position
3. Right-click the icon of the associated slide in the **Slide** pane (Section 1)
4. In the context menu that appears, click **Show End Camera Position**
5. Make any positional, opacity, or color changes to the element(s) you wish to animate
6. Right-click the icon of the associated slide in the **Slide** pane
7. In the context menu that appears, click **Set End Camera Position**
8. Right-click the icon of the associated slide in the **Slide** pane

9. In the context menu that appears, click **Show Start Camera Position**
10. Make any positional, opacity, or color changes to the element(s) you wish to animate
11. Right-click the icon of the associated slide in the **Slide** pane
12. In the context menu that appears, click **Set Start Camera Position**

Among other things, this process can be used to fade-in and fade-out certain elements over the course of a slide (by setting element opacity); this can be a time-consuming task for long presentations.

## Section 4.6: Adding Audio

Given the appropriate sound file on your computer, it is easy to add music or narration to either a given slide or an entire tour.

To add audio to your tour, simply click the desired slide in the **Slide** pane ([Section 3](#)) and click the **Browse...** button; in the dialog box that appears, locate the desired audio file on your computer and click **Open**. The audio file will then play on the desired slide; you can adjust playback volume using the nearby **Volume** slider.

It should be noted, however, that audio files that play on a given slide will stop once that slide is complete. To play an audio file throughout your tour, you need to create a Master slide.

### Section 4.6.1: Master Slides

Master slides are used to preserve elements throughout a tour. This applies to both visual and audio elements, and is useful for presenting logos or music in every slide of a tour. Any slide can be made a Master slide at any time; likewise, Master slides can be turned back into normal slides at any time.

To create a master slide, add a new slide your tour and position it where you wish (Master slides are usually positioned at the beginning of the presentation). Set the duration of the slide to 1 second. Right-click the associated slide icon in the **Slides** pane ([Section 3](#)); in the context menu that appears, click **Master Slide**.

Add any elements to the slide you wish; remove any elements from the slide that you don't want.

Audio files added to this slide will begin playing from this slide and will not stop until the music ends or the tour ends. Any visual slide elements you add will appear as they do on the Master slide throughout the tour.

## Section 4.7: Saving Your Tour

To save your tour at any time, click the **Save** button on the Worldwide Telescope interface ([Section 3](#)).

Note that any time you re-open your tour, clicking the **Save** button will act as a **Save-As** command, meaning that you will have to once again designate a location and name for the file you are saving. If you wish to save an existing tour after re-opening it, you will need to locate and overwrite the tour you are saving.

Each tour is self-contained; a tour file saved on your computer acts like an archive of any media loaded into it. Any media added to the tour, including pictures and audio, will be saved within the tour file on your computer, allowing you to freely distribute the tour to others without fear of missing media files.

It should also be noted that tours automatically adjust for monitor resolution, so a tour designed on a 1600x1200 monitor will automatically scale all visual elements appropriately for a 720x480 monitor (and vice-versa).

## Section 5: Importing Data

In addition to the above capabilities, Worldwide Telescope can import and display geospatial data from a wide variety of sources, including:

- Worldwide Telescope Layer Files
- Text files
- Comma-separated value files (.csv)
- ESRI shapefiles (requires proprietary ESRI ArcGIS software)
- 3D Models (.3ds)

Geospatial data imported and displayed in this way includes:

- Point data, for specific events (such as earthquakes) and locations; symbolized in WorldWide telescope by a circular, square, push-pin, or Gaussian icon, which can be scaled in accordance with data values
- Line data, for features like rivers, roads, and political boundaries
- Polygons, for natural and artificial features having surface area that may be represented on a map

Though entire Worldwide Telescope presentations may be built and edited directly from Microsoft Excel (with impressive results), doing so is a complicated and technical procedure requiring extensive knowledge of the Worldwide Telescope Layer Control API<sup>1</sup>. For less advanced users, it is often easier to directly import a discrete dataset via the Worldwide Telescope **Layer Manager** and take advantage of the tools built in to Worldwide Telescope to work with the data.

To do so, mouse over the **View** button; click the arrow below this button. In the menu that appears, click **Show Layer Manager**.

A sidebar will appear (Figure 2); this is the **Layer Manager**.

---

<sup>1</sup> Tutorials:

- Constructing a presentation from Microsoft Excel: <http://www.layerscape.org/Content/Index/453>
- Worldwide Telescope LCAPI: [http://www.worldwidetelescope.org/Docs/WorldWideTelescope\\_lcapi.html#general\\_parameters](http://www.worldwidetelescope.org/Docs/WorldWideTelescope_lcapi.html#general_parameters)

## Section 5.1: The Worldwide Telescope Layer Manager (Figure 2)

1. The **Layers** pane: displays all available and imported datasets, organized by location. Right-clicking layers in this pane will bring up a context menu containing appropriate options, some of which (such as **Color** and **Opacity**) can be used to adjust the appearance of datasets displayed in Worldwide Telescope; another useful option available through the right-click context menu is the **Expand** command, which reveals the individual features that comprise a dataset
2. The **Data** table: displays attributes describing individual features in a given dataset; individual features are listed and selected by **expanding** them in the **Layers** pane
3. The **Time Scrubber** pane: used to control the display of data for which temporal information is provided. When the **Time Series** checkbox is checked, Worldwide Telescope displays features with temporal attributes in a linear sequence as the slide is played during a tour. The slider here is used to preview this sequence and set the start and end position of a given slide
4. **Administrative** buttons: used to add or remove datasets to and from the **Layers** pane; the **Reset** button is used to revert any changes that were made to datasets using the **Layers** pane

## Section 5.2: Playing with Data

Worldwide Telescope's ability to display data in a variety of ways is wholly dependent on the data provided and the manner in which these data are structured.

For example: given the appropriate data, Worldwide Telescope is fully capable of presenting a sequence of earth quakes in time series, such that smaller earthquakes appear smaller and larger earthquakes appear larger. In order to do this, the Worldwide Telescope needs a data file containing the following:

- Latitude in decimal degrees, positive to the North
- Longitude in decimal degrees, positive to the East
- Date (**month/day/year** or **month/year**); alternatively, for events that take place over time:
  - Start Date (**month/day/year** or **month/year**)
  - End Date (**month/day/year** or **month/year**; can be the same value as Start Date)
- Richter scale magnitude, from .1-10
- Fields providing an altitude value of each event; a description of what that value represents; and the units of measure for each altitude value

An example of these data in a .csv file as viewed in Microsoft Excel is provided in Figure 3:



Figure 2

	1	2	3	4	5	6	7
1	Date	Latitude	Longitude	Magnitude	Alt	AltType	AltUnit
2	11/29/185	32.5	-115	6.5	0	Depth	Kilometers
3	3/11/1870	34.55	-112.47	5	0	Depth	Kilometers
4	8/12/1870	34.55	-112.47	4	0	Depth	Kilometers
5	2/7/1871	34.1	-112.44	5	0	Depth	Kilometers
6	5/3/1872	32.8	-115.2	5.75	0	Depth	Kilometers

Figure 3

If imported into Worldwide Telescope, these data would be sufficient to generate a time series presentation of each earthquake in the dataset.

It should be noted that this is but one of many datasets that Worldwide Telescope can ingest; data sets can provide significantly more data, which must be structured according to specific schema in order for Worldwide Telescope to ingest it properly (these schema are beyond the scope of this document).

### Section 5.3: Adding Data

1. In Worldwide Telescope, mouse over the View button; click the arrow below this button
2. In the menu that appears, click **Show Layer Manager**
3. In the **Layer Manager**, click **Add** ([Section 5.1](#))
4. Browse your computer for the desired dataset; select the dataset and click **Open**
5. In the **Layers** pane of the **Layer Manager**, **right-click** the dataset you just added
6. In the context menu that appears, click **Properties**
7. Here, you will map the data fields in your dataset to a Worldwide Telescope schema
  - a. Under the **Position** tab, make sure that the **Lat** field corresponds with the field in your dataset that contains *latitude* coordinates in decimal degrees
  - b. Under the **Position** tab, make sure that the **Lon** field corresponds with the field in your dataset that contains *longitude* coordinates in decimal degrees
  - c. Under the **Position** tab, make sure that any altitude data is mapped appropriately (so that the appropriate columns are referenced to provide altitude type, altitude units, and altitude measurements)
  - d. Under the **Scale** tab, specify the manner in which points on the map will be represented
    - i. Under the **Scale Type** field, indicate whether the values in your dataset will be interpreted linearly, exponentially, or logarithmically to produce symbology in Worldwide Telescope
    - ii. Under the **Size/Magnitude Column** field, specify the field in your data set in which magnitude or other appropriate measurements are listed

- iii. Under the **Scale Factor** field, use the slider to manually adjust overall symbol scale as necessary
  - e. Under the **Markers** tab, indicate what type of marker you wish to use to represent points in your dataset, and whether or not the marker will vary depending on values in your dataset (this requires the addition of a specific field in your dataset)
  - f. Under the **Date Time** tab, indicate which field in your dataset contains temporal data
8. Click **Done**
  9. If your data is a time series, click the **Time Series** check box in the **Time Scrubber** pane (Section 5.1) and use the slider to specify the **Start Position** and **End Position** of your data on a given slide

## Section 6: Conclusion

The above tutorial provides the basic steps necessary to create a multimedia guided tour in Worldwide Telescope. Further familiarity with this application can be attained by experimentation.