
BCiTool

- Addon Tools for TurboCAD

BCiTool_SP – Sun Positioner for Anilab

Introduction

This is a quick little addon for an addon! It adds a new command to the Scenario Editor in TurboCADs Animation Lab v3.1

The new command, SPMoveSun, allows you to easily control the position of a TC Light based on where the sun would be at a given time and place. In this way you can use TC/Anilab to produce either full day and/or full year simulations for a given site/time period.

Compatibility

- Requires TurboCAD V9 Pro and AnimationLab V3.
- Windows 95 & later.

Installing

- Unzip into an empty Folder, and run Setup.exe
- Sun Positioner will be installed, and available next time you start TurboCAD.

Removing

- Uninstall from Windows Control Panel

License

BCiTool_SP is Freeware, but if you want to use it you must still comply with the License. Essentially, you can use as pleases you, but if you want to send it to your friends you can only do so by sending an unmodified copy of the original distribution package in it's entirety. My preferred method is that you send them the link to my web site at www.bcitool.com J

On the other side of the coin, you use this entirely at your own risk. Bell Cracking Pty Ltd accepts absolutely no responsibility or liability for any losses incurred through the use of this tool. In other word if it matters that much, check the results manually – that's your job.

General Instructions for Use

It's really very easy. Using the Anilab pallet, basically what you do is...

1. Create a Graphic + Actor for the CenterNorth indicator. This can be any graphic that has two or more vertices - I use a two segment Polyline, with the second segment set up as an arrow head. It must be on the World WP. SPMoveSun will treat the first vertex as the 'centre of the known universe', and the second vertex as the North direction (taken from the centre)
2. Create a Sun Actor based on any TC Light. A Directional light is recommended.
3. Select the Sun Actor, then in the scenario editor, choose the command SPMoveSun, and fill in values as described in the next section.
4. Set the number of steps etc, and hit Run in the Anilab pallet

SPMoveSun Command

Lights\SPMoveSun

Description

Moves a TCLight object, according to a path describing where the natural Sun would be found at a given time & place.

Syntax

SPMoveSun *CenterNorth, Latitude, DayOfYear, TimeOfDay*

Parameters

CenterNorth Actor that acts as both the centre of the arc described by the 'Sun' Actors, and also as the indicator of North.

CenterNorth must be a graphic with at least two vertices. The first vertex will be used as the centre of the arc described by the 'Sun', and the vector from Center to the second vertex will be taken to indicate North.

Note also that distance from the Center to the Sun will remain unchanged for the entire animation – so the radius of the arc is determined by their relative positions at the start of the animation (their absolute positions are not really important)

Latitude Latitude of the location being simulated in decimal format, where latitudes South of the equator are negative.

For example Sydney Australia is at 33°52'00"S, so you would use the value -33.8667

DayOfYear Either a formatted date or a number counting days from the start of the year in decimal format. Thus either 16/Feb/03 or 47.0 will give the same result.

However be careful with plain dates, because they could be interpreted as a formulae ... for eg does 16/2/03 mean Feb 16, 2003 or does it mean $16 \div 2 \div 03 = 2.67$? The answer depends on your Windows date format settings. For certainty it is best wrap formatted dates in #s, which signals the system that it really is a date. Thus in this case you would use #16/2/03#

Formulae are valid, for eg

StepNum * 10
or ...
DatePart("y", #1-Mar-03#) + StepNum * 2

There is also an 'Auto' mode, best explained by example...

"Auto" (incl quotes) ...

will automatically fill all the steps in the current command so that they do a full-year animation (Winter->Summer->Winter) for the time selected in TimeOfDay (see below).

"Auto 100 To 200" (incl quotes) ...

will do roughly the same thing, except for a specific date range. Note this form of the command only accepts arguments for days counted from Jan 1, in decimal format.

The number of steps is determined by the To & From fields of the command, so you can stack several Auto commands one after another within a single Actor.

Finally before moving on to TimeOfDay, it should be noted for calculation purposes SPMoveSun assumes the March Equinox falls on day 79.0, but in reality it moves around from year to year. Other special days like this are not exactly correct either as SPMoveSun uses circular approximations for the Earth's elliptical orbit about the sun. The lesson is, that for these special days it is best to forget actual dates and use the values below

March Equinox	79.0000
June Solstice	170.3125
September Equinox	261.6250
December Solstice	352.9375

TimeOfDay – Time of day in 24hr decimal format. Thus 1.35pm would be entered as 13.58

Formulae are valid, for eg

$$6 + \text{StepNum} / 3$$

TimeOfDay also accepts 'Auto' commands

"Auto" (incl quotes) ...

will automatically fill all the steps in the current command so that they do a Dawn-to-Dusk animation for the day selected in DayOfYear.

"Auto 9 To 17.5" (incl quotes) ...

will do roughly the same thing, except for a specific time range. Note times are in 24hr decimal format.

The number of steps is determined by the To & From fields of the command, so you can stack several Auto commands one after another within a single Actor.

Example Commands

From	To	Command	CenterNorth	Latitude	DayOfYear	TimeOfDay
0	59	SPMoveSun	MyNorth	-33.8867	352.9375	"Auto"
60	119	SPMoveSun	MyNorth	-33.8867	79.0000	"Auto"
120	179	SPMoveSun	MyNorth	-33.8867	170.3125	"Auto"
Taken together these three commands simulate the sun for Sydney, Australia from Dawn to Dusk for the Summer Solstice, Autumn Equinox, and Winter Solstice, taking 60 steps for each 'season'.						
0	144	SPMoveSun	MyNorth	-33.8867	#17-Aug-03#	"Auto 6 to 18"
Simulates the sun for Sydney, Australia on the 17 th Aug, from 6:00am to 6:00pm in 145 steps.						
0	144	SPMoveSun	MyNorth	-33.8867	229	6 + StepNum / 12
Simulates the sun for Sydney, Australia on the 17 th Aug, stepping every five minutes from 6:00am to 6:00pm. (Exactly equivalent to previous example command.)						
0	31	SPMoveSun	MyNorth	51.5000	"Auto"	9.00
32	63	SPMoveSun	MyNorth	51.5000	"Auto"	15.00
Taken together these two commands simulate the sun in London, UK for an entire year (Winter ->Summer->Winter), for 9:00am and 3:00pm taking 32 steps for each 'time'.						
0	73	SPMoveSun	MyNorth	51.5000	"Auto 1 to 365"	9.00
Simulates the sun for 9:00am in London, UK for an entire year in 74 steps.						
0	73	SPMoveSun	MyNorth	51.5000	1 + StepNum * 3	9.00
Simulate the sun for 9:00am in London, UK stepping every fifth day for an entire year. (Exactly equivalent to previous example command.)						

Which Light type to use?

The simple answer is to use TCs Directional light, as it behaves most like the real sun. To get sharp ray-traced shadows, set the Resolution = 0, or alternatively to a value above 1000, which will be considerably softer. You can achieve a compromise by combining two 'Suns' with the two different settings.

You can use the other light types, but be aware that it is not possible to correctly model the suns shadows using light types such as Point or Spot, unless they are placed a very very long way away. So far I haven't had any real success with the Sky light.

Light data

Another new feature is that after running an animation, it records various bits of information in the lights 'Attribute'. This can be viewed either in the Selection Info pallet or in the first tab of the Properties dialog. The information can be used for a number of things especially when using 'Auto' commands, it provided the step increment used, which can be used to calibrate other time-dependant actors.