WHITE ELEPHANT GMBH

SkyTrack

User Manual

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Version:	Modified:	
1.0	5-Oct-17	Original Issue
1.1	17-Oct-17	Minor corrections
1.2	28-Nov-17	Clarify SkyTrack prerequisites
1.3	1-Jun-19	Stellarium 19.0

Table of Contents

1 Introduction

SkyTrack is a PC program that is able to control the movement of a telescope, in order to find and follow stars, planets, deep sky objects or near earth objects such as satellites.

It is easily integrated with Stellarium, a well-known virtual planetarium.

2 Getting Started

The easiest way to get SkyTrack running is to first install and configure Stellarium and then startup SkyTrack. Doing so, SkyTrack uses the configuration data from Stellarium to generate its initialization data.
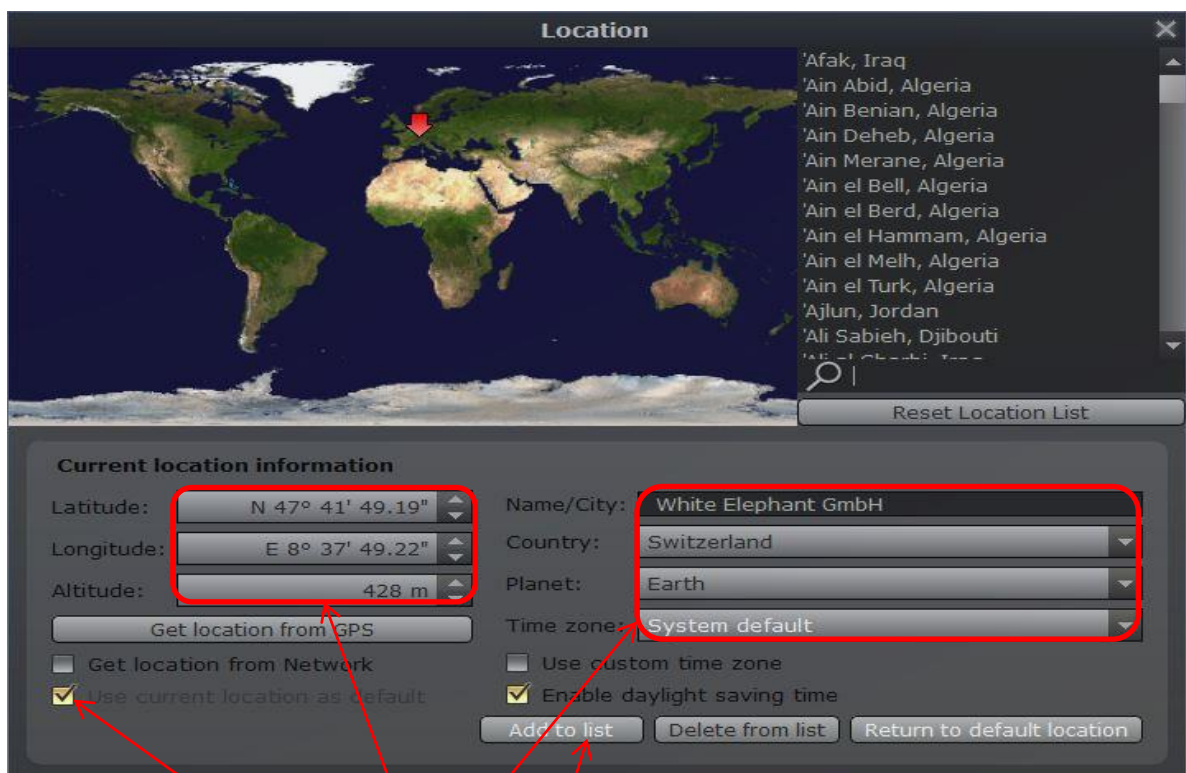
2.1 Install and Configure Stellarium

2.1.1 Download

Get the program and documentation from www.Stellarium.org and follow the instructions in the Stellarium user guide.

The version used for this document is stellarium-0.19.0.1-win64.exe
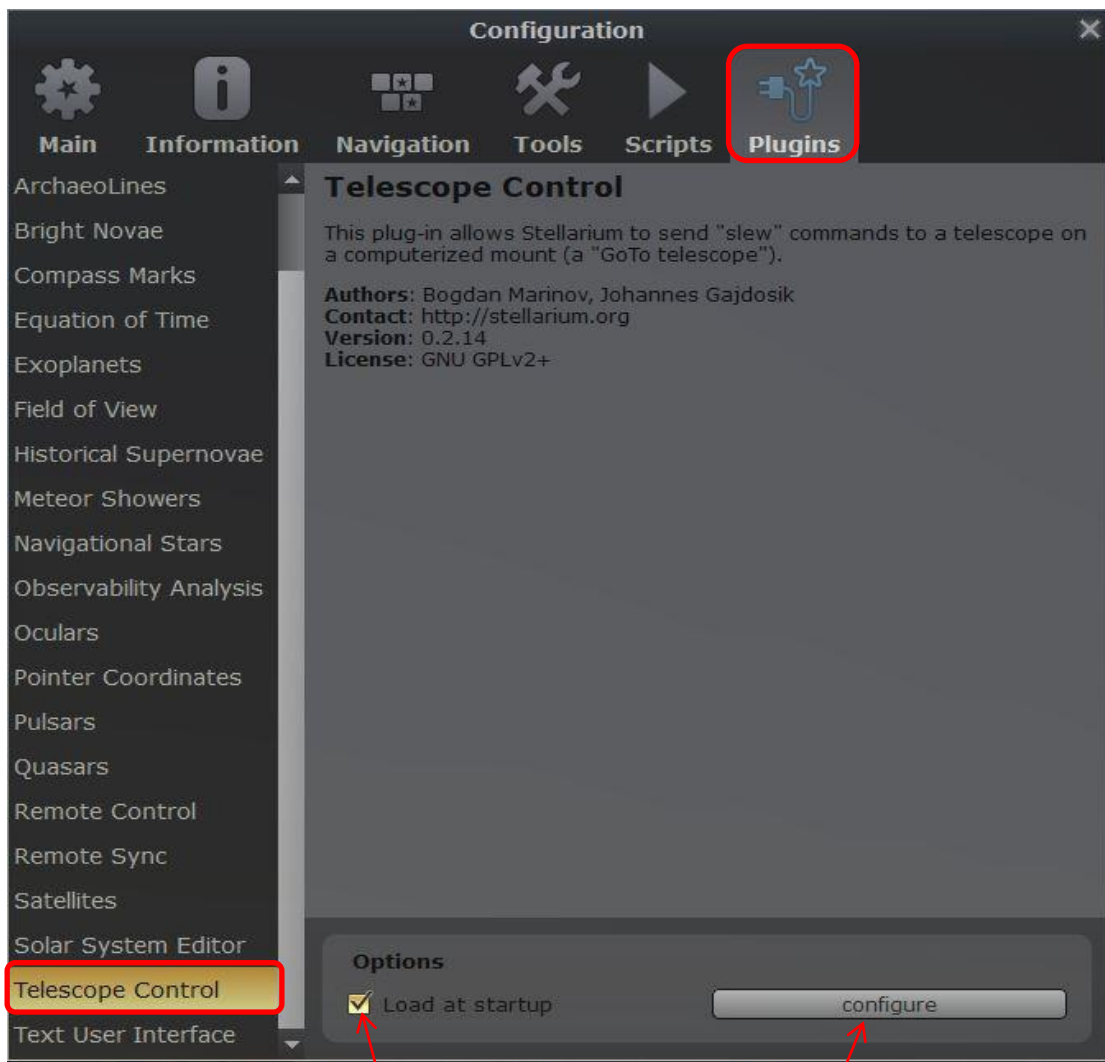
2.1.2 Setting Your Location

By pressing **F6** the following window is opened:

1. Enter new location
2. Edit coordinates and altitude
3. Add
4. Select as default

2.1.3 Configure Telescope Control

By pressing **F2** and then selecting "Plug-ins" and "Telescope Control" the following window is visible:

1. Select "Load at start-up"
2. Close Stellarium (**Ctrl**-**q**)
3. Reopen "Telescope Control"
4. Open the "Telescopes" window
5. Add a new Telescope connection
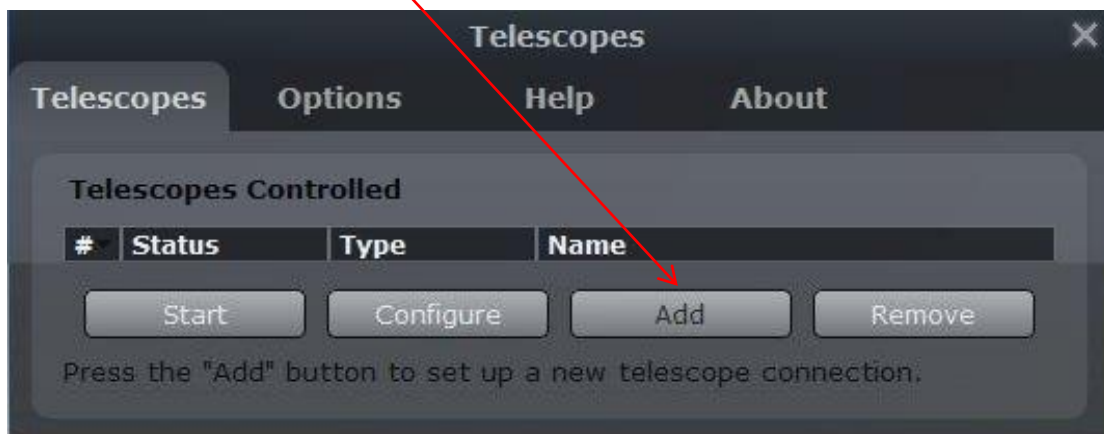
Add New Telescope

Telescope controlled by:

○ Stellarium, directly through a serial port
● External software or a remote computer
○ RTS2 telescope
○ INDI
○ Nothing, just simulate one (a moving reticle)

Telescope properties

Name:

M-Zero

Connection delay: 0,50s

Coordinate system:
○ J2000 (default)   ● Equinox of the date (JNow)

☑ Start/connect at startup

[OK]   [Cancel]

1. Select
2. Add name
3. Select
4. Tick
5. Scroll down to end

Configure Telescope

Telescope controlled by:

○ Stellarium, directly through a serial port
● External software or a remote computer
○ RTS2 telescope
○ INDI
○ Nothing, just simulate one (a moving reticle)

Host: TCP port:

127.0.0.1   : 10001

User interface settings

☑ Use field of view indicators

Circle size(s):

0.2, 0.5

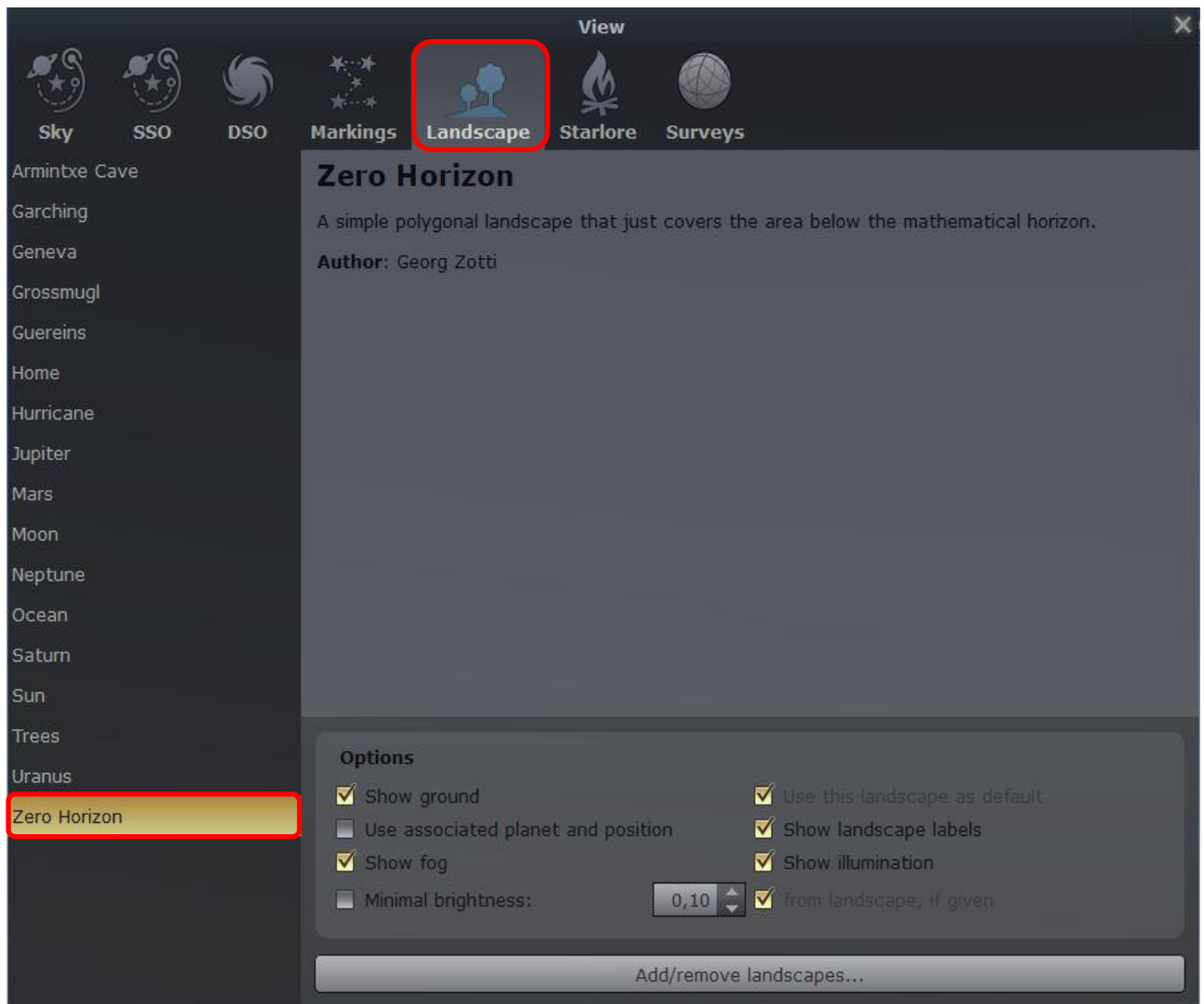[OK]   [Cancel]

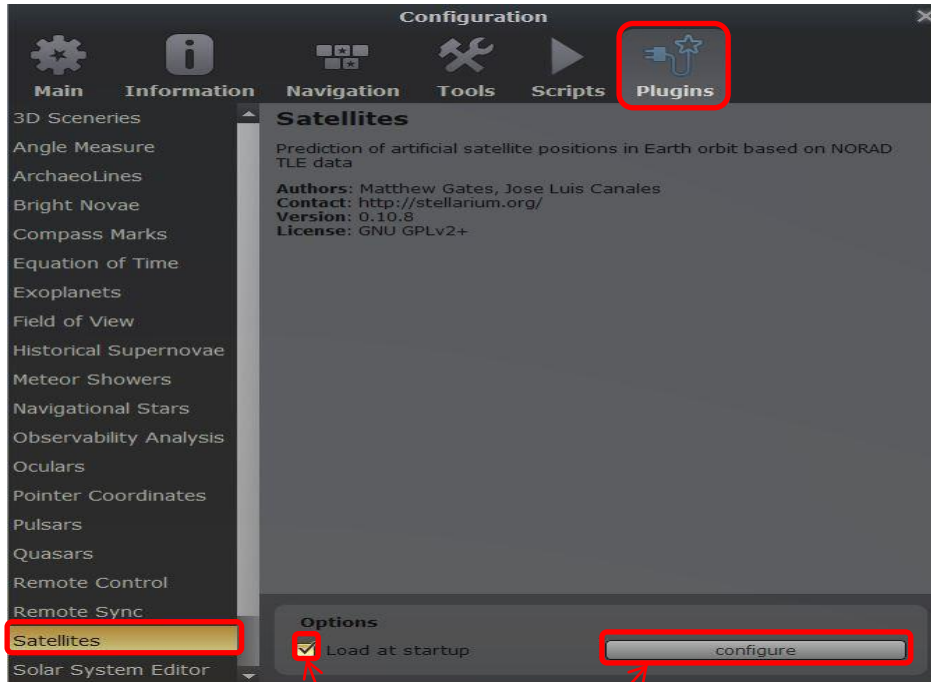6. Local host (IP4)
7. Tick
8. Enter values
9. Complete

2.1.4 Add Landscapes

By pressing **F4** and then selecting "Landscape" the following window is opened:
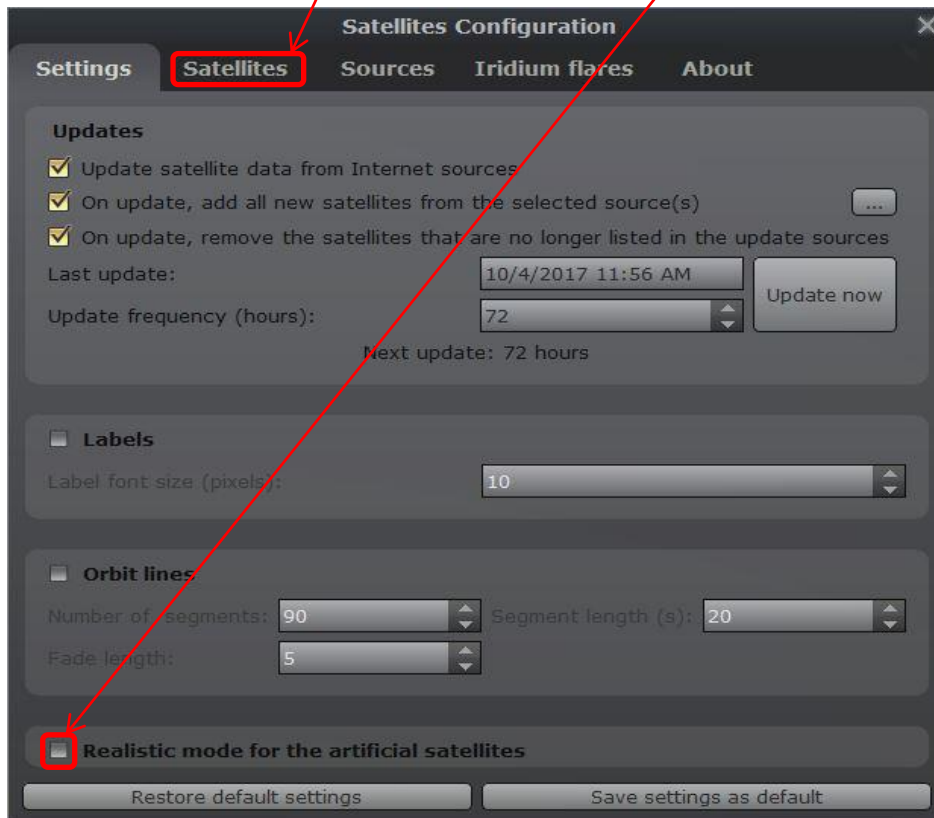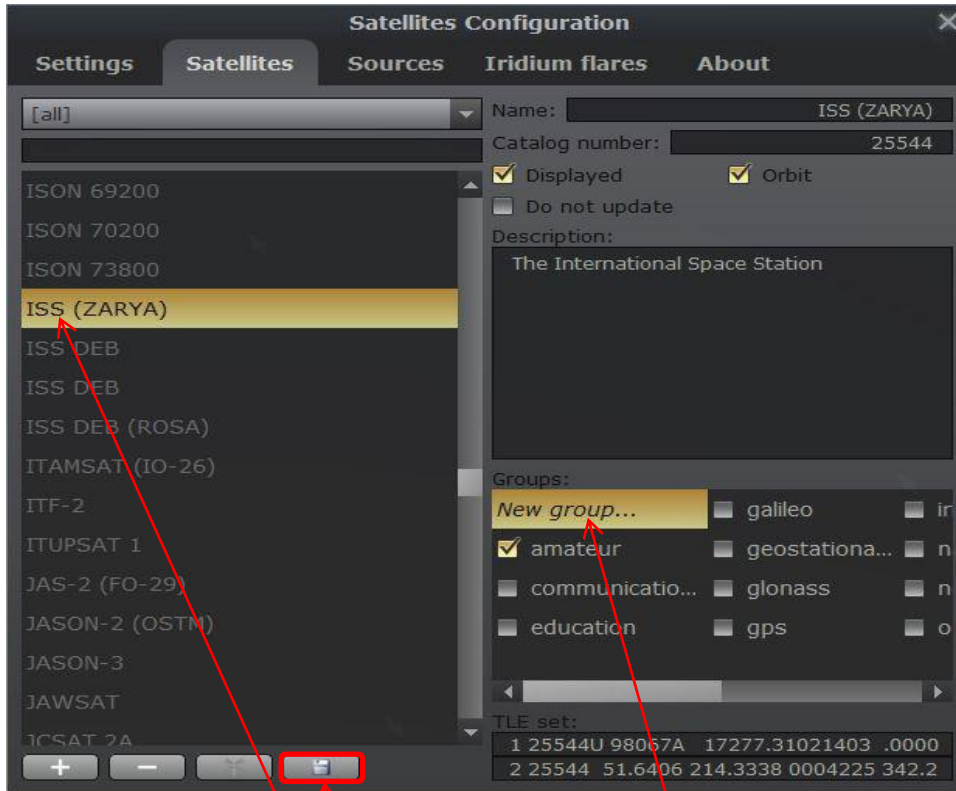
2.1.5   Satellite Configuration

By pressing **F2** and then selecting "Plugins" and then "Satellites" the following window is opened:
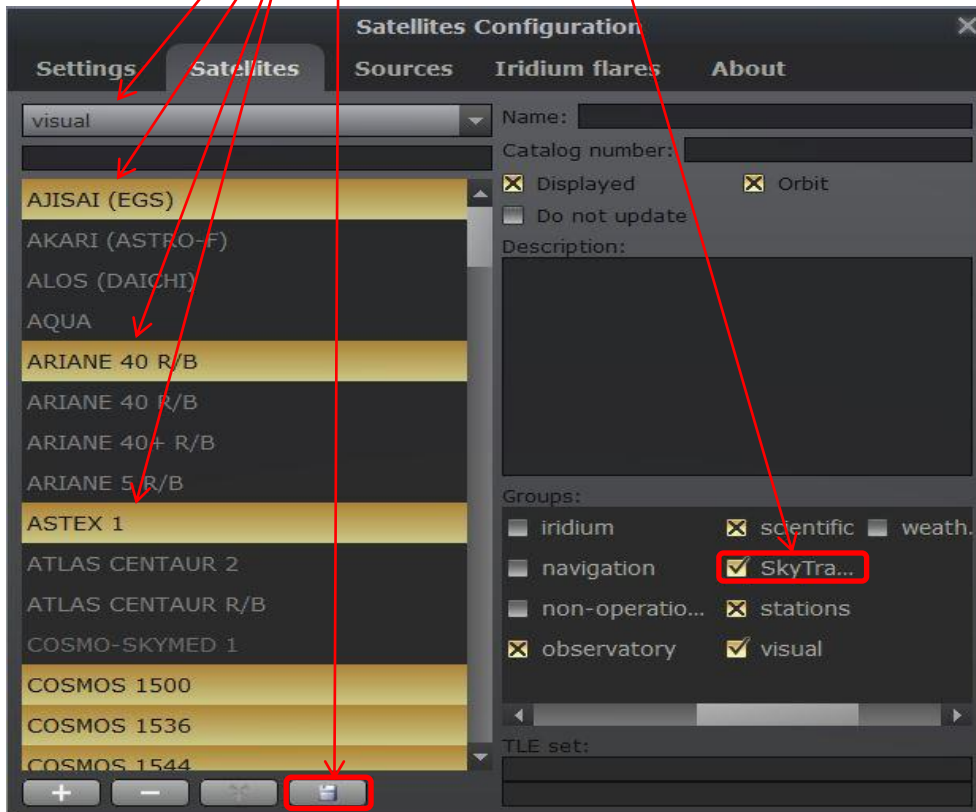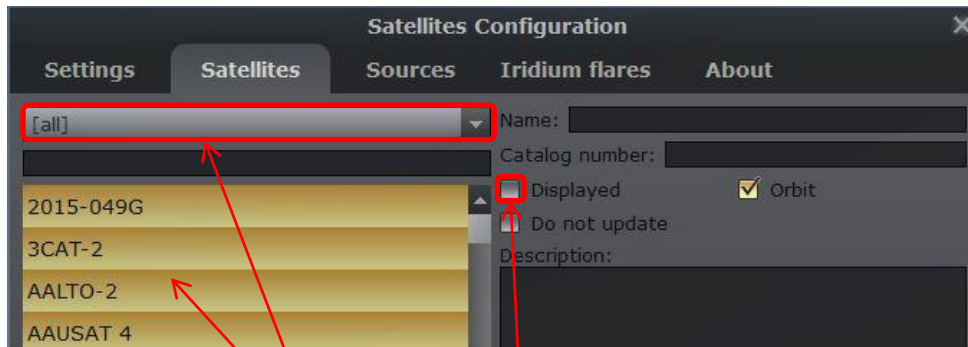

1. Select "Load at start-up "
2. Close Stellarium (**Ctrl-q**)
3. Reopen "Configuration"
4. Configure
5. No realistic mode for the artificial satellites
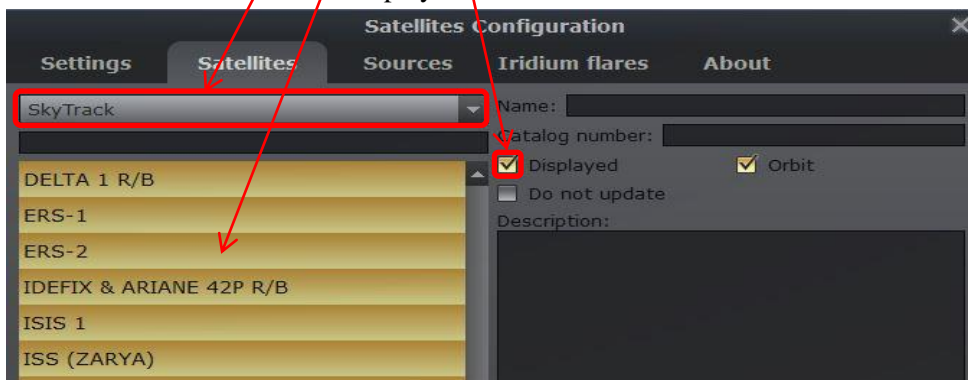6. Select Satellites

7. Select ISS
8. Define new group SkyTrack
9. Save
10. Only visual satellites
11. Select more satellites (**Ctrl-click**)
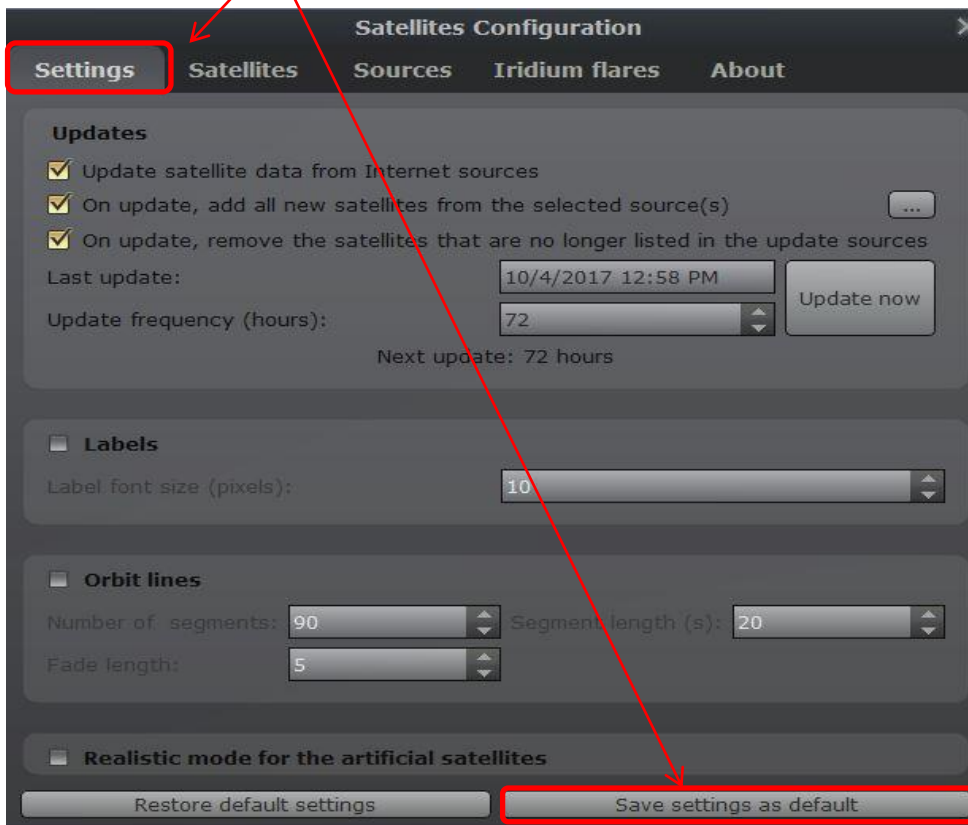12. Select group SkyTrack
13. Save

14. Select all
15. Highlight all (**Ctrl-A**)
16. Not displayed
17. Select SkyTrack
18. Highlight all (**Ctrl-A**)
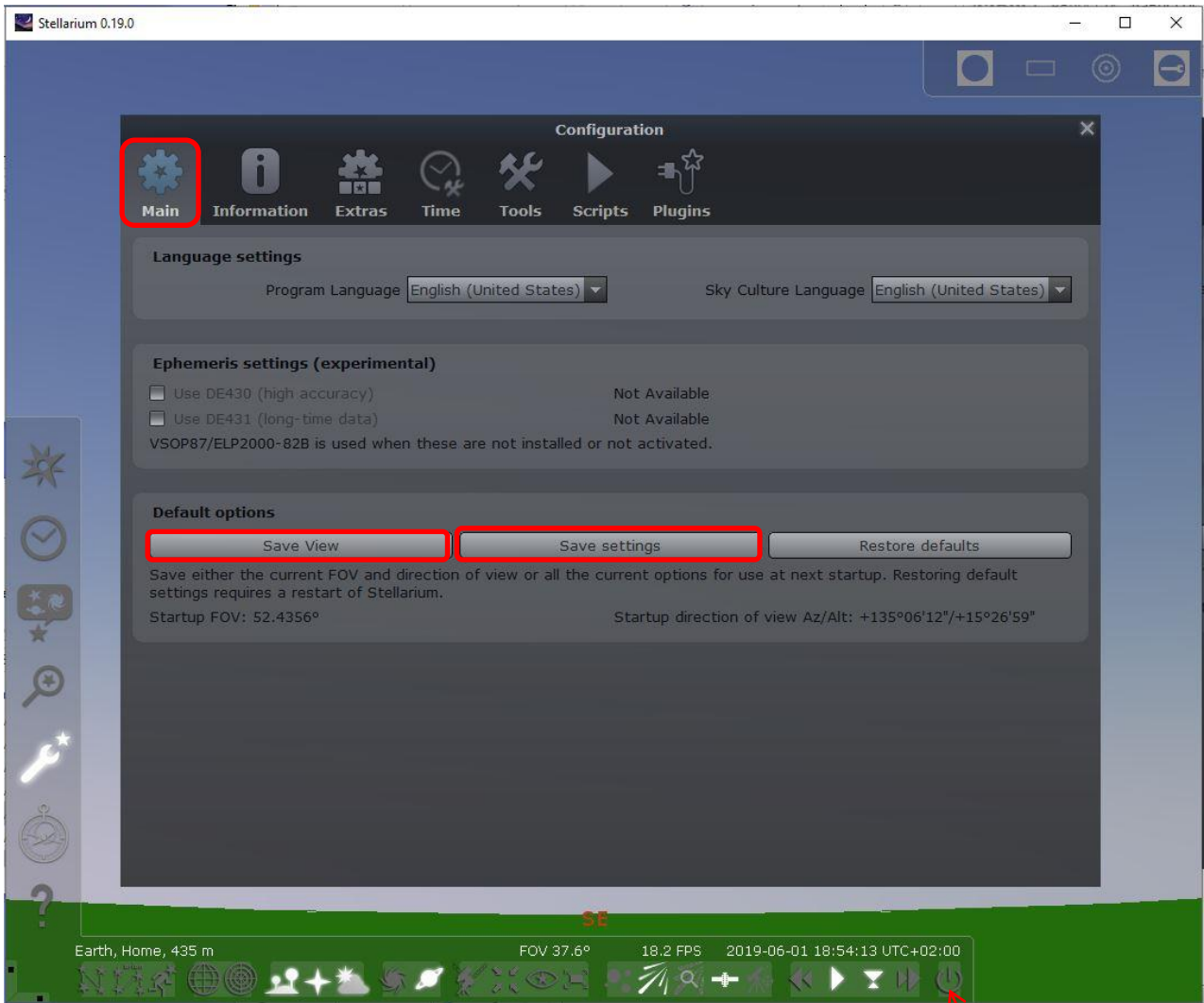19. Displayed

20. Select settings
21. Save settings

2.1.6 Customization

Any customization of Stellarium, such as changing the landscape, can be remembered for the next start of Stellarium by using "Save View" and "Save settings" from "Configuration (**F2**)" and "Main".

Quit Stellarium

2.1.7 Close Stellarium

Stellarium should not be executed more than ones on the same computer.

2.2 Run SkyTrack Simulation

After the execution of SkyTrack.exe the following window should be visible.

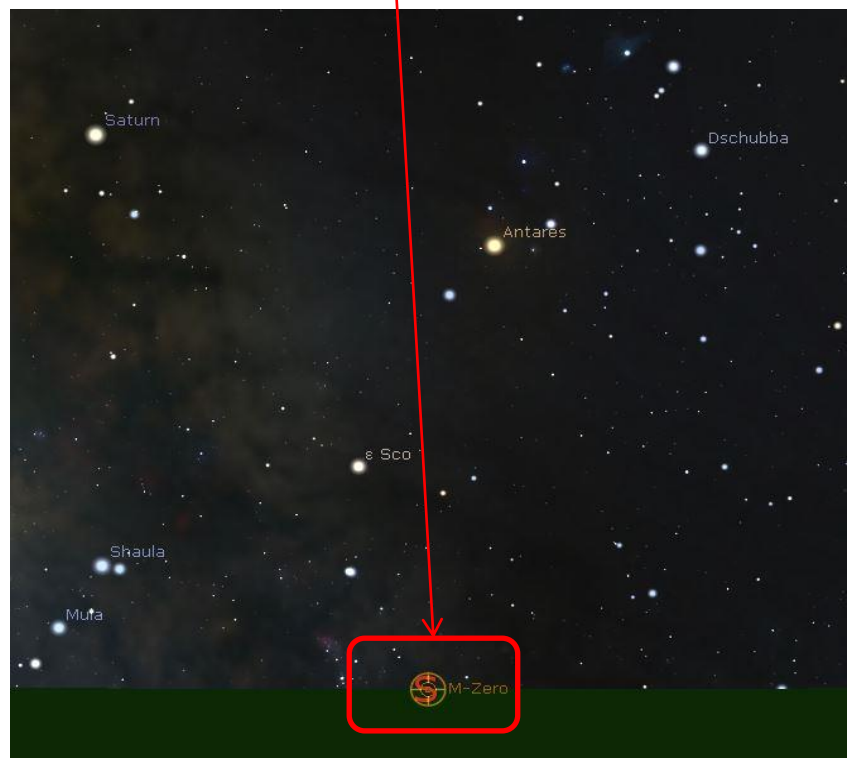Note: If windows' firewall is enabled then SkyTrack has to be unblocked.

If everything went well, the following items should be visible:

- Target at park position
- Status: PARKED

The telescope **cross-hair** is visible when Stellarium is started in parallel. To do so, a dual core PC is needed (Stellarium takes 100 per cent CPU).

Note: **F11** toggles the screen mode.

3   Using SkyTrack

Note: If Stellarium has been previously installed then it must be configured as described in the chapter 2.1 before executing SkyTrack.exe.
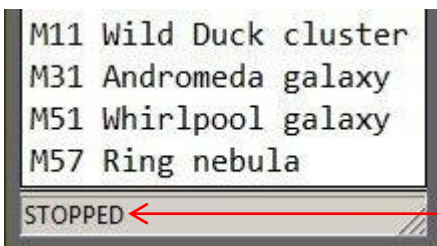
3.1   Moving the Telescope

The arrow keys **2**, **4**, **6** and **8** on the numeric keypad of the Pc's keyboard are used to move the telescope horizontally or vertically. The speed of the movement can be increased or decreased by pressing the **+** or **-**.

An external numeric keypad like this allows wireless control of the Telescope:


```
Relabelled Keys:

  Back  ⇔  Stop

    C  ⇔  Tab
    M  ⇔  Keypad /
    S  ⇔  Keypad *


  Enter  ⇔  Goto…
```
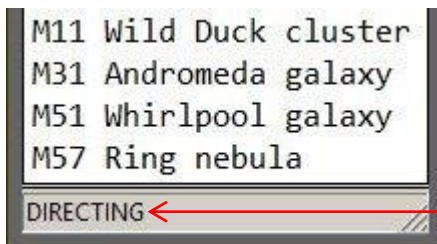

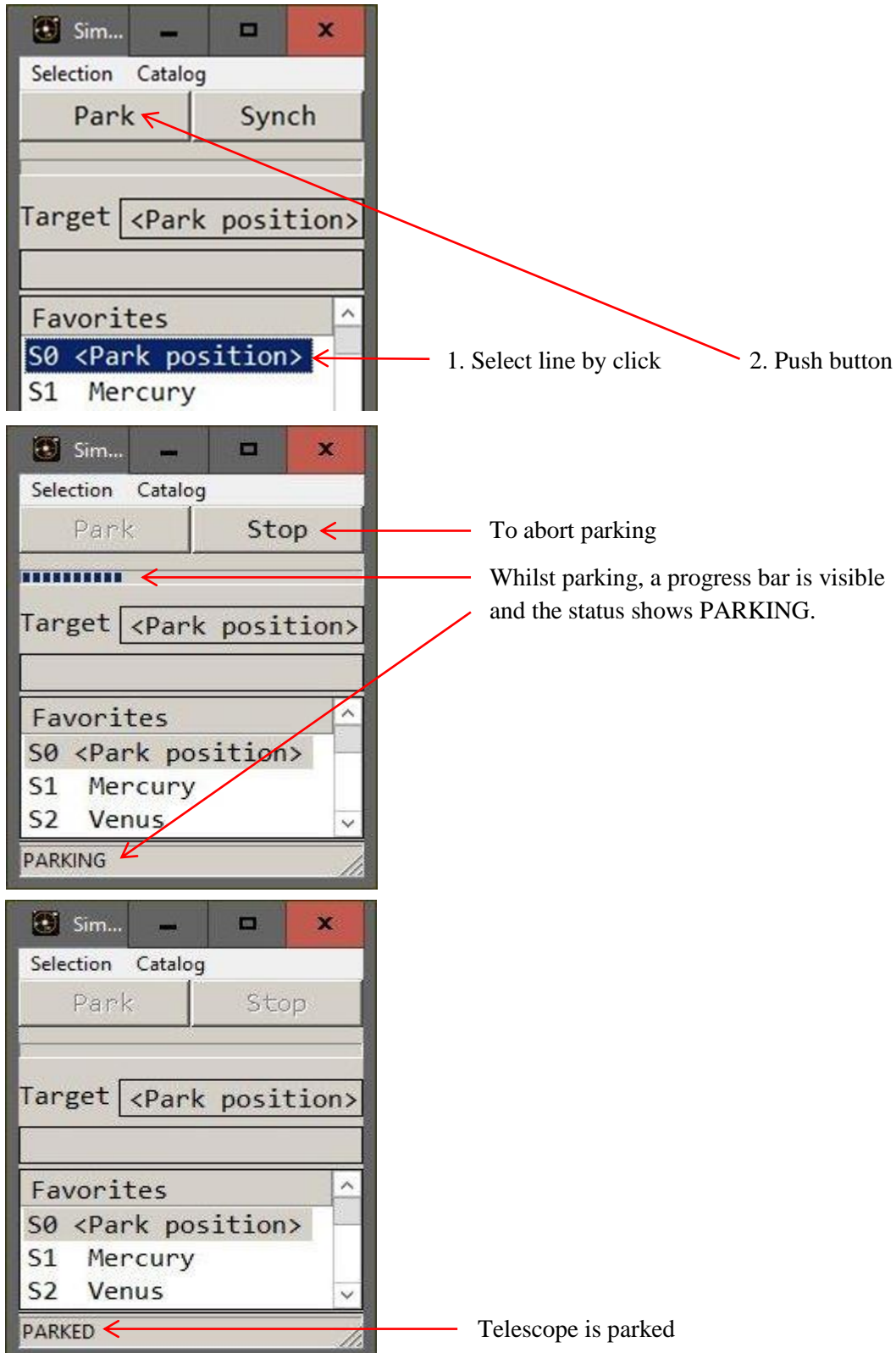Whilst moving the telescope the status is DIRECTING.

The Telescope is STOPPED when the arrow key is released.

3.2 Parking the Telescope

After selecting the target "S0 <Park Position>" and then pushing the **Park** button, the telescope moves to the park position.

Another way of doing this is to use the key sequence **S 0 Enter** on the external numeric keypad.

Note: The **Park** button is disabled (greyed out) if the telescope is already parked.

1. Select line by click   2. Push button

To abort parking

Whilst parking, a progress bar is visible and the status shows PARKING.

Telescope is parked

3.3 Synchronize to Park Position

To synchronize to the park position the telescope should be manually directed to the park position and then the **Synch** button pressed.

1. Select line by click   2. Push button

Telescope is parked
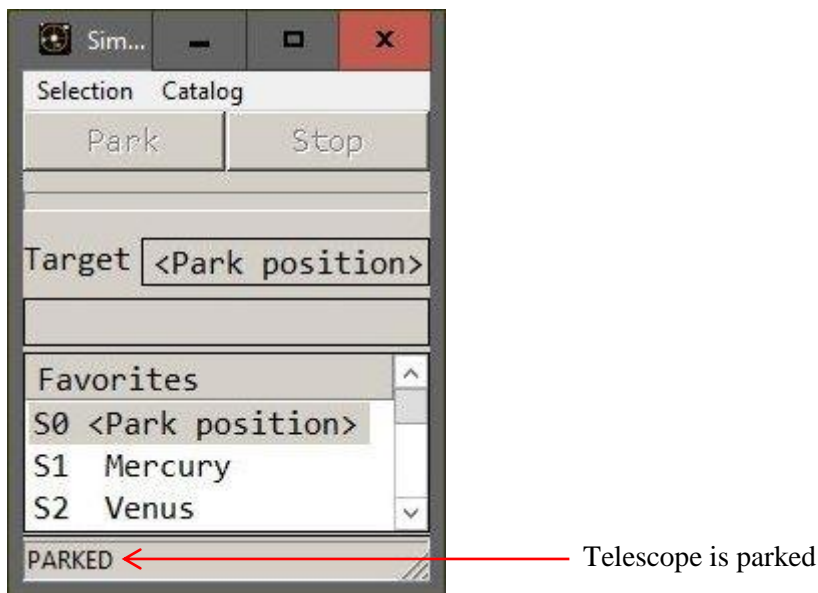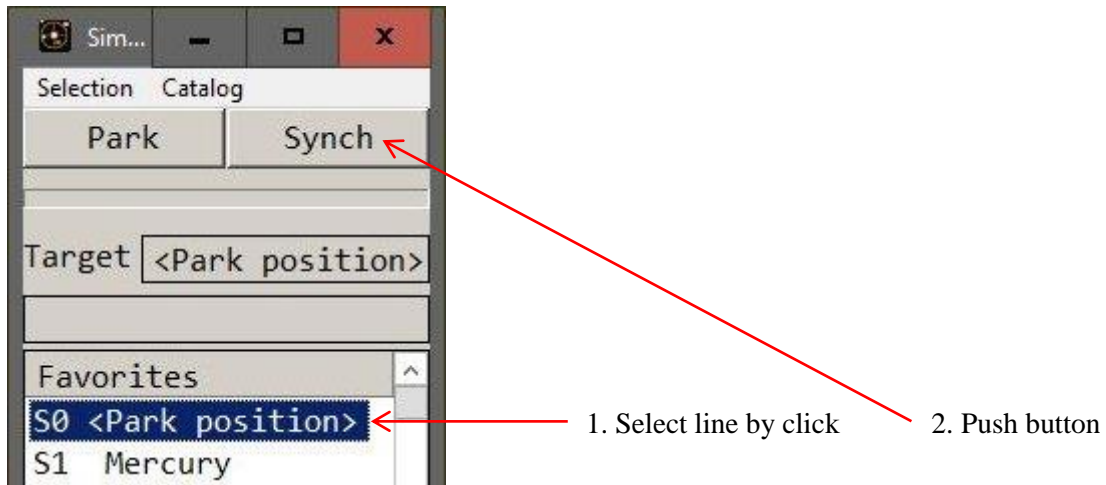
3.4 Synch on Targets

If the option is enables (see Reference Manual) it is possible to synchronize on targets.

3.5 Tracking Targets

After selecting the target and then pushing the **Goto** button, the status is changed to APPROACHING and the progress bar is visible. As soon as the telescope is following the target, the status is changed to TRACKING.

Another way of doing this is to use the key sequence **S 3 Enter** (Moon) on the external numeric keypad. The start key of the sequence is either **M** for a Messier objects, **C** for a Caldwell objects or **S** for stars and other objects.
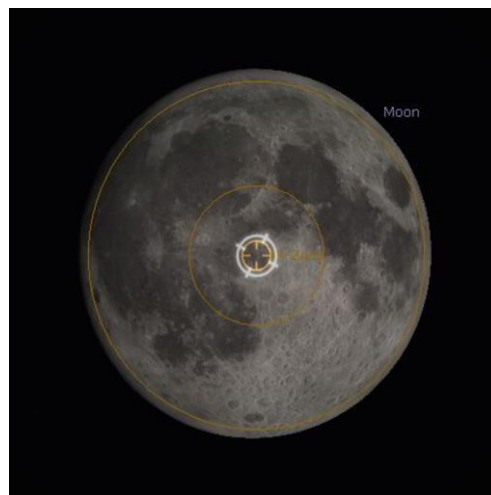
The arrow keys allow correcting the tracking position. These corrections are persistent until the next stop. The keys Stop and then Enter therefor will continue the tracking at the original position.
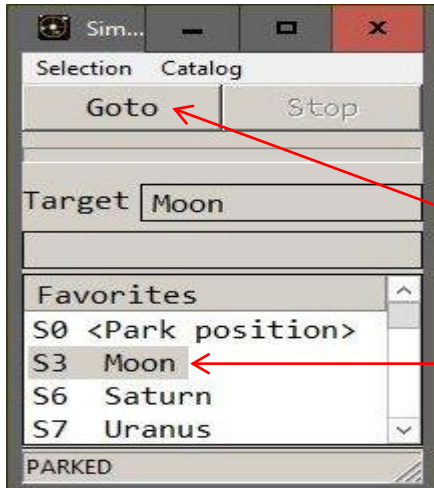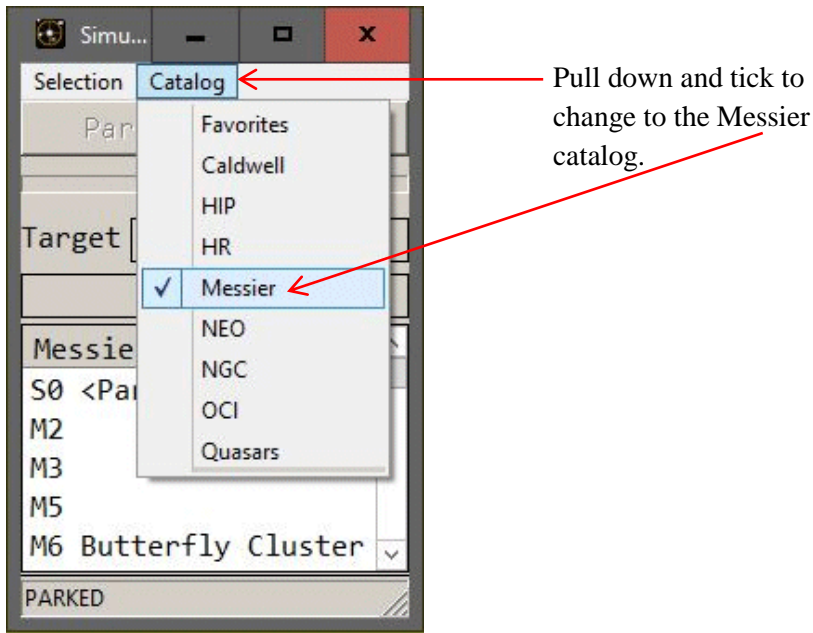

1. Select line by click   2. Push button

Stellarium shows:

3.6 Changing the Object Catalog

After starting up the SkyTrack program the "Favourites" catalog is selected.

Pull down and tick to change to the Messier catalog.

3.7 Selecting a class of objects

After starting up the SkyTrack program the class "All objects" is selected.

Pull down and tick to select Clusters from the actual catalog.
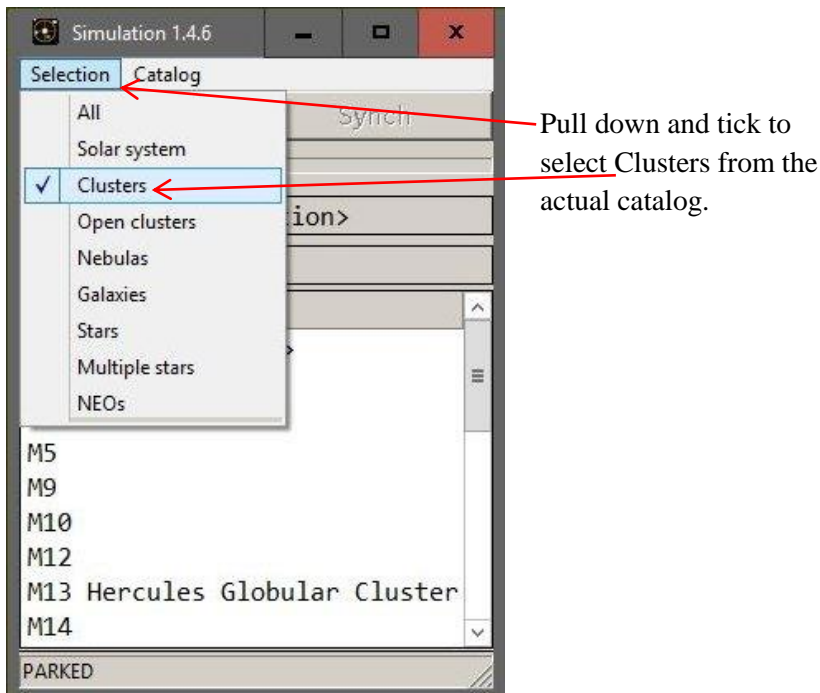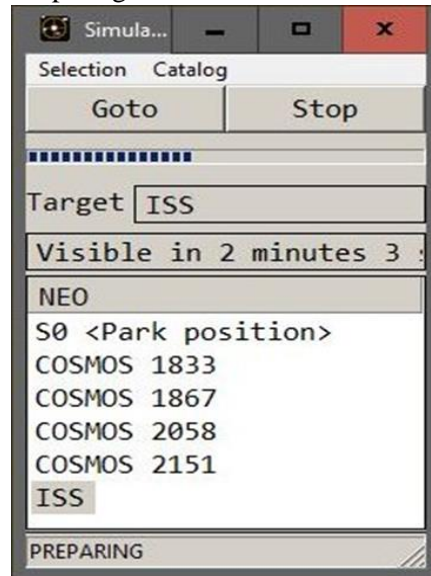
3.8 Tracking Satellites

After changing the catalog to Neo, all the Satellites that are visible or will be visible within the next 15 Minutes are shown.
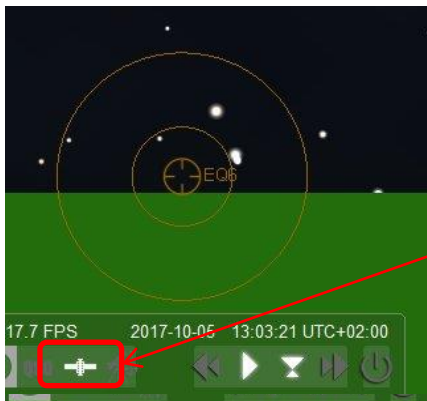
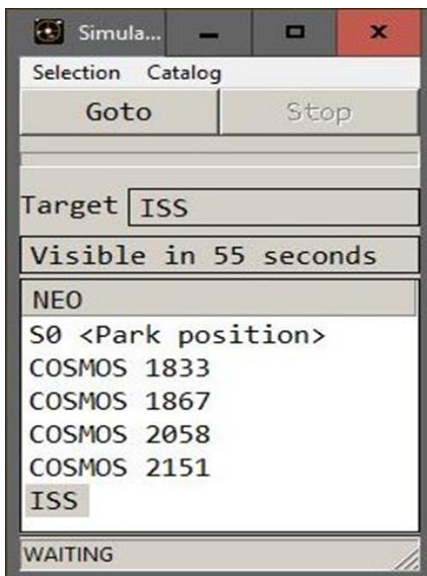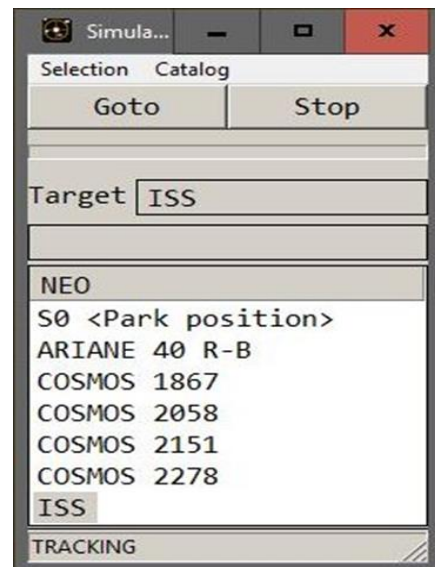1. Click on desired *Satellite* and then **Goto**

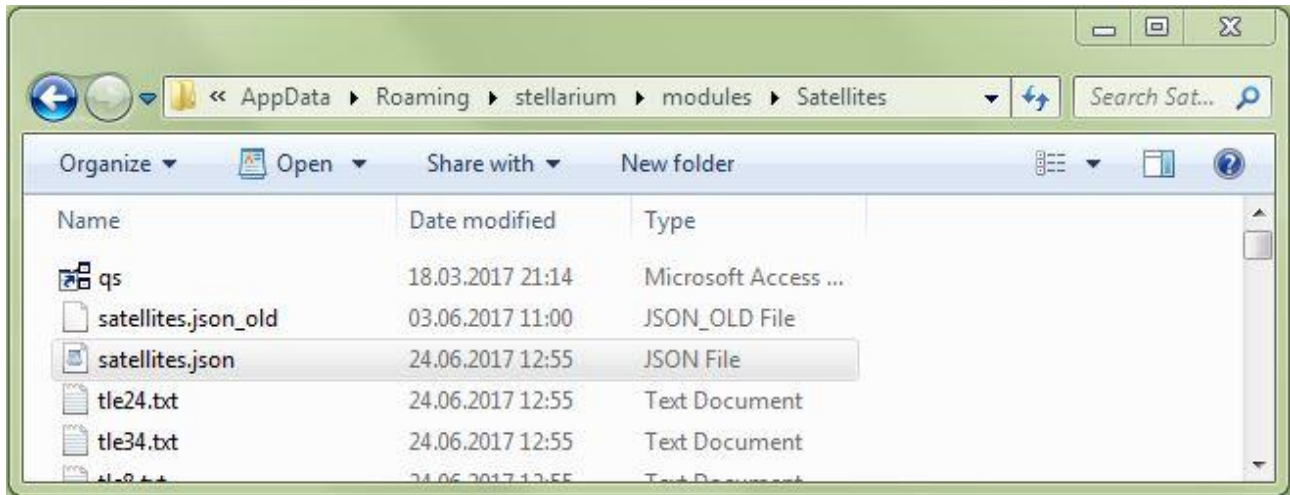2. Preparing

3. Waiting at horizon

Enabled

4. Tracking *Satellite*

3.8.1   Satellite Data

When SkyTrack is started, the satellite data is taken from the file modules/satellites/satellites.json relative to the Stellarium application data folder.

Example for Windows 10:

Note: If there are more than 500 visible satellites, the error message "*Too many near earth objects*" is shown when SkyTrack is started. (See chapter 2.1.5)