# Liquid Galaxy Stellarium Documentation

## Usage

Download Stellarium from :GitHub and follow these steps
1. Build from the source code. Refer:
   https://github.com/Stellarium/stellarium/blob/master/BUILDING.md
2. Refer this to locate config.ini file in your PC
   http://stellarium.sourceforge.net/wiki/index.php/Advanced_Use#Files_and_Directories
3. Open config.ini file as administrator and enter following lines of code in beginning:
   There should be only 1 master and rest can be slaves. Master should be in the center of grid.
   a. Master:
      ```
      [LGConnect]
      ip_addr          =
      Offset           = 0
      thisPC           = 1
      ```

      ```
      [LGConnect]
      ip_addr                              =
      offset                               = 0
      thisPC                               = 1
      ```

   b. Slave:
      ```
      [LGConnect]
      ip_addr          = <Master's IP address>
      Offset           = <unit distance from master>
      thisPC           = 0
      ```

      ```
      [LGConnect]
      ip_addr                          = 192.168.43.12
      offset                           = 1
      thisPC                           = 0
      ```

4. Start Stellarium on master and make sure it's up and running properly.
5. Start Stellarium on all slave PCs.

All displays should be synced now.

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To make changes to code and build application

refer- https://github.com/Stellarium/stellarium/blob/master/BUILDING.md

# Implementation

## Function details

```
static void LG_communicate_master(StelCore *core, StelMovementMgr *mmgr,
QSettings* conf, StelMainScriptAPI *msapi);
```

- Location: core->StelLGConnect.cpp
- Responds to requests by slaves with current parameters.
- Only runs on master PC.

```
static void LG_communicate_slave(StelCore *core, StelMovementMgr *mmgr,
QSettings* conf, StelMainScriptAPI *msapi, int unsigned microsecond,
QString ip);
```

- Location: core->StelLGConnect.cpp
- Initiates UDP connection with master.
- Continuously requests the master for current set of parameters.
- If parameters have changed, then call set functions to set new parameters.
- Only runs on slave PC.

```
static size_t split(const std::string &txt, std::vector<std::string> &strs,
char ch)
```

- Location: core->StelLGConnect.hpp
- Split string by '|' when it arrives from master.
- Done on slave PC.

```
UDP_connect(StelCore *_core, StelMovementMgr *_mmgr)
```

- Location: core->StelLGConnect.hpp.
- Constructor function.
- Called when initializing StelMovementMgr.
- Reads parameters from config.ini file and calls either slave or Master related functions.

```
void lookAtJ2000(const Vec3d& pos, const Vec3d& up, QSettings* conf=
StelApp::getInstance().getSettings());
```
- Location: core-> StelCore.cpp and StelCore.hpp
- Used for rotating view matrix by certain offset

## Edited or added Files

### *core-> StelLGConnect.hpp and StelLGConnect.cpp (added)*
- Contains LGConnect class to communicate with master and slave.
- Contains functions to establish UDP connection and transfer data continuously.

### *src-> CMake (edited)*
- Added StelLGConnect.hpp and StelLGConnect.cpp to list of files to build under core.

### *core-> StelMovementMgr.cpp (edited)*
- It makes new object of LGConnect while initializing.

### *core->StelCore.cpp (edited)*
- Edited lookAtJ2000() function to incorporate horizontal FOV offset.

# Getter and Setter function for different parameters

**View Direction**
getViewDirectionJ2000()
setViewDirectionJ2000()

**FOV**
getCurrentFov()
setCurrentFov()

**Time**
getPresetSkyTime()
setPresetSkyTime()

**Time rate**
getTimeRate()
setTimeRate()

**JDay (not used)**
getMJDay()
setMJDay()

**Atmosphere flag**
getFlagAtmosphere()
setFlagAtmosphere()

**Landscape flag**
getFlagLandscape()
setFlagLandscape()

**Cardinal Points flag**
getFlagCardinalsPoints()
setFlagCardinalsPoints()

**Constellation art flag**

getFlagArt()
setFlagArt()


**Constellation lines flag**

getFlagLines()
setFlagLines()


**Constellation label flag**

getFlagLabels()
setFlagLabels()

**Location**

getObserverLocation()
setObserverLocation()

**Date**
getDate()
setDate()

## Plugins

- *Satellite plugin*: https://sites.google.com/site/stellariumuserguide/plugins#TOC-Satellites