GSoC 2016 Final Report

KStars Lite

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The main goal of this project was to provide a subset of KStars functionality for mobile and low-powered devices. All general goals from proposal were met but still there are some things left to do that were started in this project.

Links

1. I was working on a separate branch and below you can find a link to all commits that I made: https://github.com/KDE/kstars/commits/gsoc2016-kstarslite?author=thelastpolaris
2. Also you can find KStars Lite version archive with all the intermediate versions of KStars Lite: https://drive.google.com/open?id=0B4b1uXgK0wdQR0tmLWhBRDRETlk
3. A blog describing some steps of the process of developing KStars Lite: http://thelastpolaris.blogspot.de/
4. Latest version of KStars Lite

Features Overview

1. SkyMap Lite

Almost all parts of SkyMap were ported to **Qt Quick Scene Graph** from **QPainter**. Instead of calling **draw()** of each **SkyComponent**, **SkyMapLite** creates **RootNode,** which in turn creates all needed **SkyNodes** for displaying **SkyComponents**.

Commits comprising this part:

1. https://github.com/KDE/kstars/commit/c0fcc1e421e62b3c64c017ab3046d61009b40b7e
2. https://github.com/KDE/kstars/commit/83b44f4ff555ea513b80a9d5032c02ade2db6018
3. https://github.com/KDE/kstars/commit/ea7ea2d07b25b8bcec4dc2068b8aa4c03e1ad158
4. https://github.com/KDE/kstars/commit/ee72b1758783f73ea0894b1250a0ccca71b0293a

5. https://github.com/KDE/kstars/commit/0a1a6b9a8b98ad08b42da2feed6ff1aad9c0bcc5
6. https://github.com/KDE/kstars/commit/f3cbe01c7593f02609945694d1d37aa74fe79548
7. https://github.com/KDE/kstars/commit/762487c3f9bea82d17e9a7e66a1dd7317165fe2e
8. https://github.com/KDE/kstars/commit/42bb14021e7537a345b4b7b59dd5e12ecefc55a0
9. https://github.com/KDE/kstars/commit/0a80604d28ac564c35b71efe20ef3d320a6609f6
10. https://github.com/KDE/kstars/commit/1aa79365420ac3374183e1945a939e4391d4d8d9
11. https://github.com/KDE/kstars/commit/4c02dbca790e031774b44a0ce1f41981842f21b6
12. https://github.com/KDE/kstars/commit/13562153080dbd1a5b9d0a54129a20d64cac0152
13. https://github.com/KDE/kstars/commit/923bdceb41d845f1aa28042e279594830414c7fd
14. https://github.com/KDE/kstars/commit/e782b2201100e67bb0514fd4b719f4e363a6df22
15. https://github.com/KDE/kstars/commit/0f31a955d6d38ba5b6ff8bbe043049b898841ad3
16. https://github.com/KDE/kstars/commit/037bb68e09f7a4d38fbf646c8ab01c33f6499a56
17. https://github.com/KDE/kstars/commit/dcf4bfd9b35e6947a2c6d6502f53fb4782e518ae

2. Android build

The reason why this at first trivial thing is described as the whole feature is that I spent a while on figuring out how to build and run KStars Lite on Android. My mentor helped me a lot by porting all I/O part from KIO to Qt libraries because KIO is not supported on Android yet. Still there are some things to do in this part - building process is tedious and requires several steps, which should be automated.

Commits comprising this part:

1. https://github.com/KDE/kstars/commit/a7fd3b67ecd10dc936b19d79cb2da10cc3aaa982
2. https://github.com/KDE/kstars/commit/5a45a75d35a29ffad1cb579df46a1c73e92e2265
3. https://github.com/KDE/kstars/commit/dff369e15c0cc9f14546c7c31fd73757ab591144
4. https://github.com/KDE/kstars/commit/f6e2d72aca9f89d3eb597589c6ab25ff0e0f1bfe

3. Color Schemes and Projection Systems

All present in KStars for desktop color schemes and projection systems are available in KStars Lite. Currently there is no way to edit and add custom color schemes and there are some issues with display of lines in Gnomonic projection system because of the way lines are drawn in KStars Lite. You can choose color scheme and projection system in a menu in right drawer whenever **SkyMapLite** is displayed.

Commit comprising this:

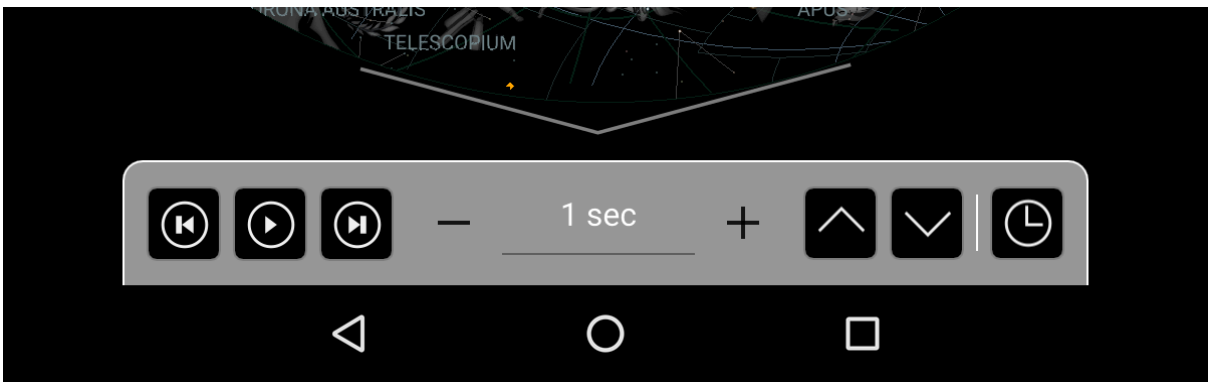
1. https://github.com/KDE/kstars/commit/a39c596a104c85e5168e7fefe4241fd13489b8ce

4. Simulation Time

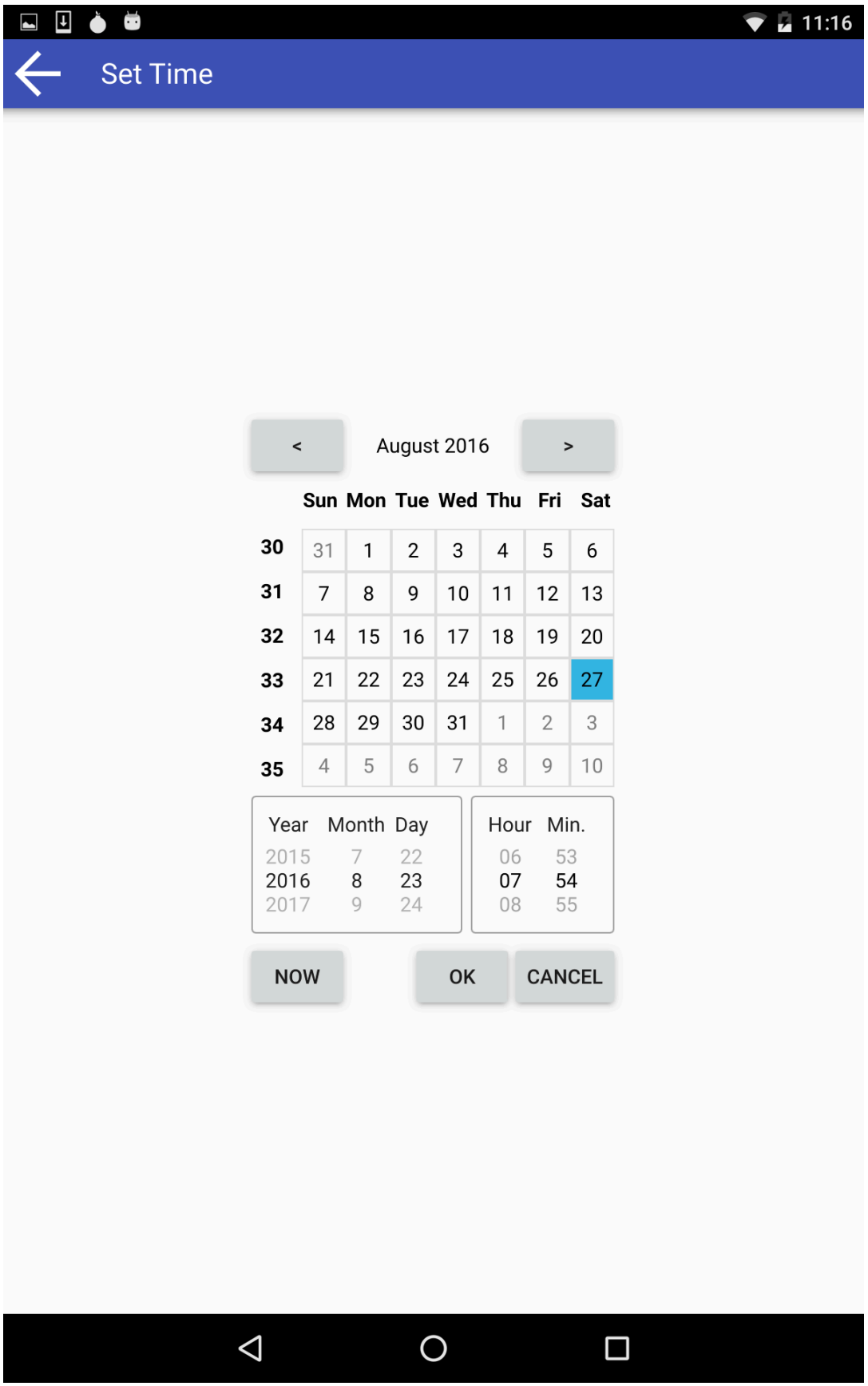
Starting/Pausing timer can be done from the bottom drawer whenever **SkyMapLite** is visible. By tapping on clock icon “Set time and date” page is opened where user can choose preferred date and time.

Commit comprising this:

1. https://github.com/KDE/kstars/commit/a39c596a104c85e5168e7fefe4241fd13489b8ce



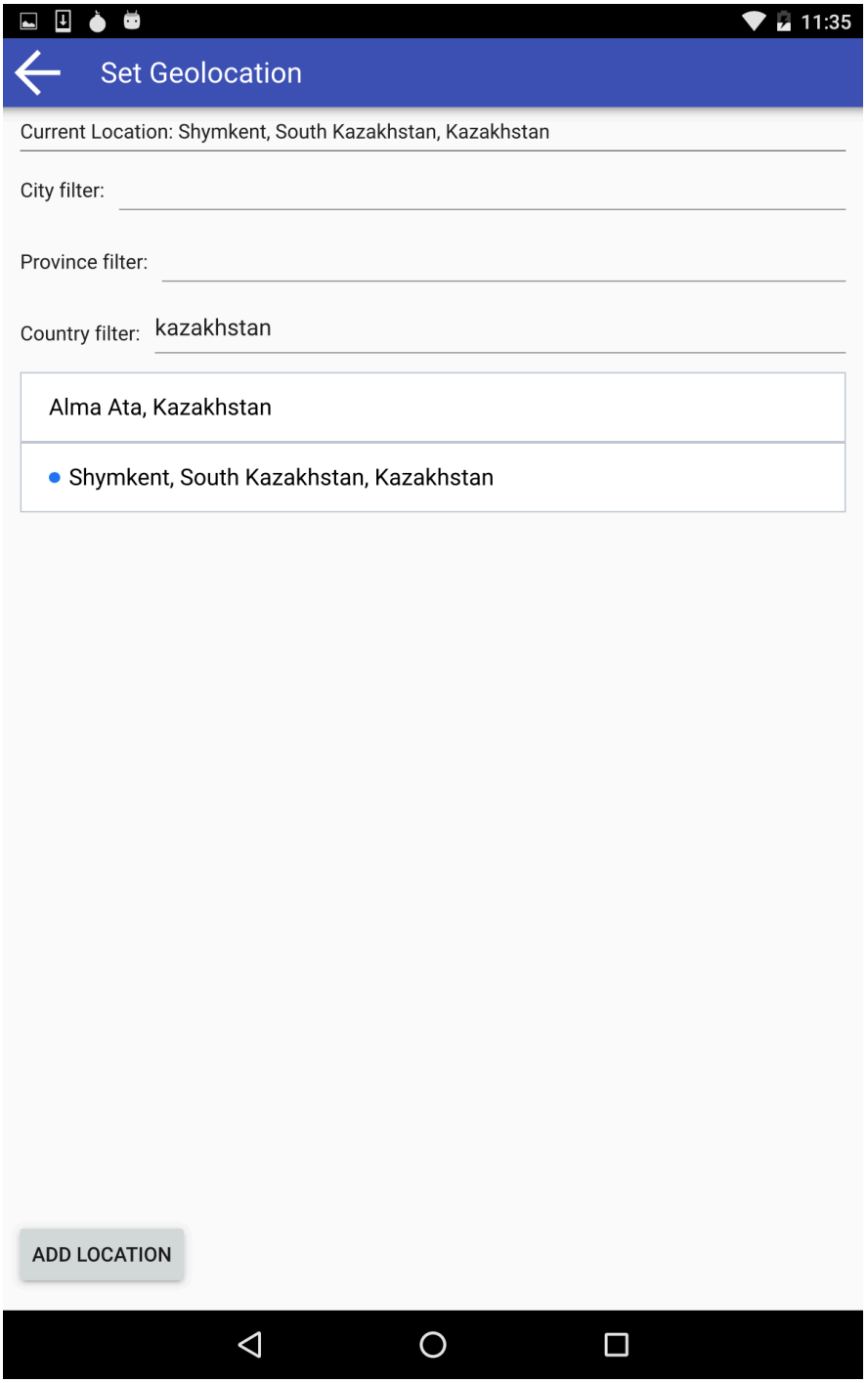
Bottom Drawer



Setting Time Page

5. Setting Geolocation

Geolocation can be selected by tapping on “Set Geolocation” from the left drawer. User can submit from the list of locations provided by KStars or add new location. Longitude and Latitude can be set either manually or can be fetched from GPS module of device. It now takes a couple of minutes to get position from GPS and this issue will be tackled already after GSoC end.



Choosing Geolocation

Commit comprising this:

1. https://github.com/KDE/kstars/commit/e498f19a762b431787dd2f5a0d0c9f4a502bcec9

6. Optimization of data loading

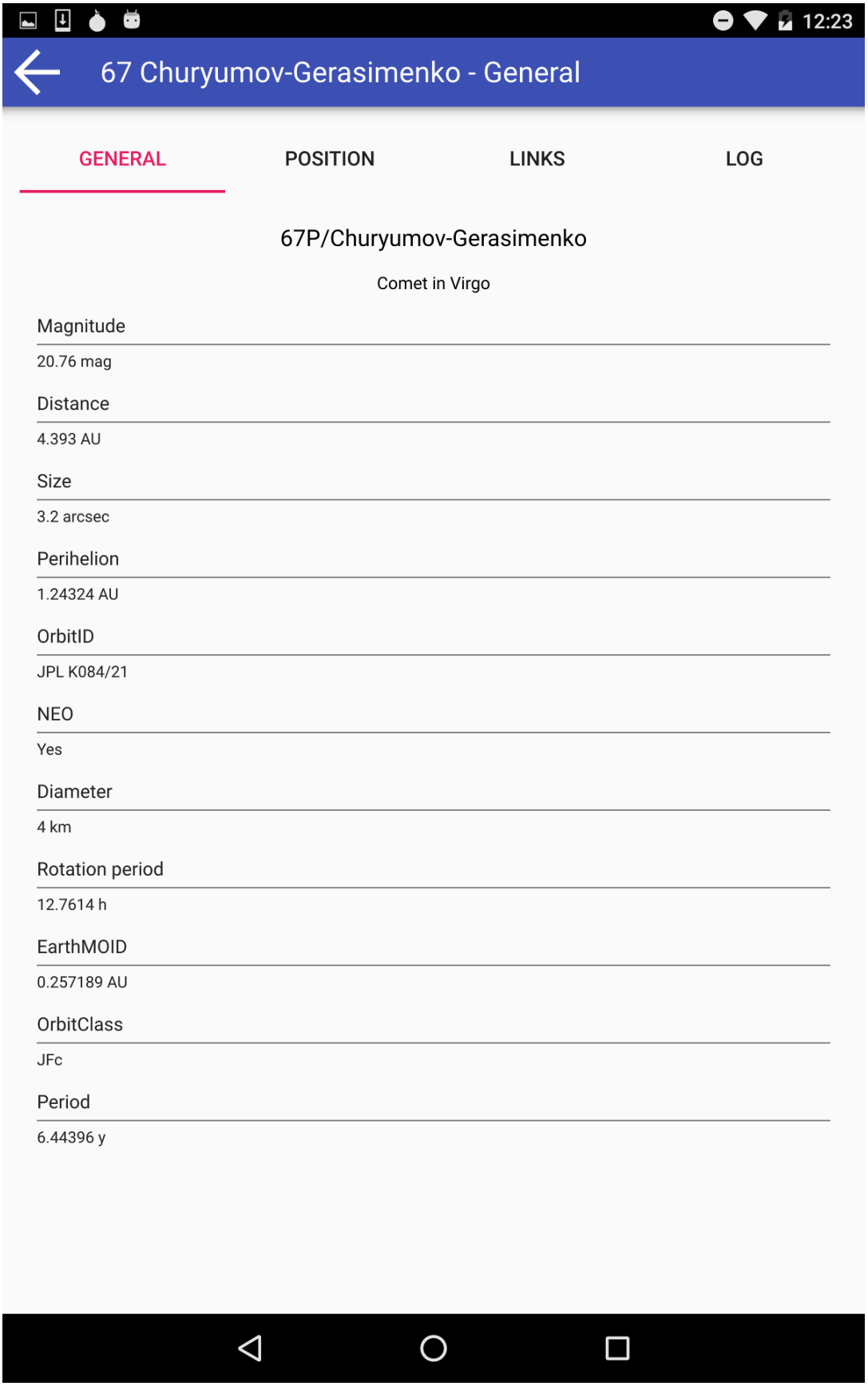
Due to small amount of memory on mobile devices the memory consumption of KStars Lite should be decreased. To do that we are calculating which **StarNodes** and **DeepSkyNodes** user won't be able to see based on the zoom level and delete them. Memory consumption also decreased significantly in both KStars Lite and KStars for desktops because of the changed way Constellation Art images are loaded.

Commits comprising this:

1. https://github.com/KDE/kstars/commit/fc3f9cd7d614edb1d11a8dcf633f6053bd9e12cd
2. https://github.com/KDE/kstars/commit/9a38857506643b8483f585261d246ab1281933f6

7. Details Page

Whenever user taps on **SkyObject** he/she can see almost the same as in regular KStars "Details" page (there is no "Advanced" tab in Lite version). User can assign links and write down logs for the object.



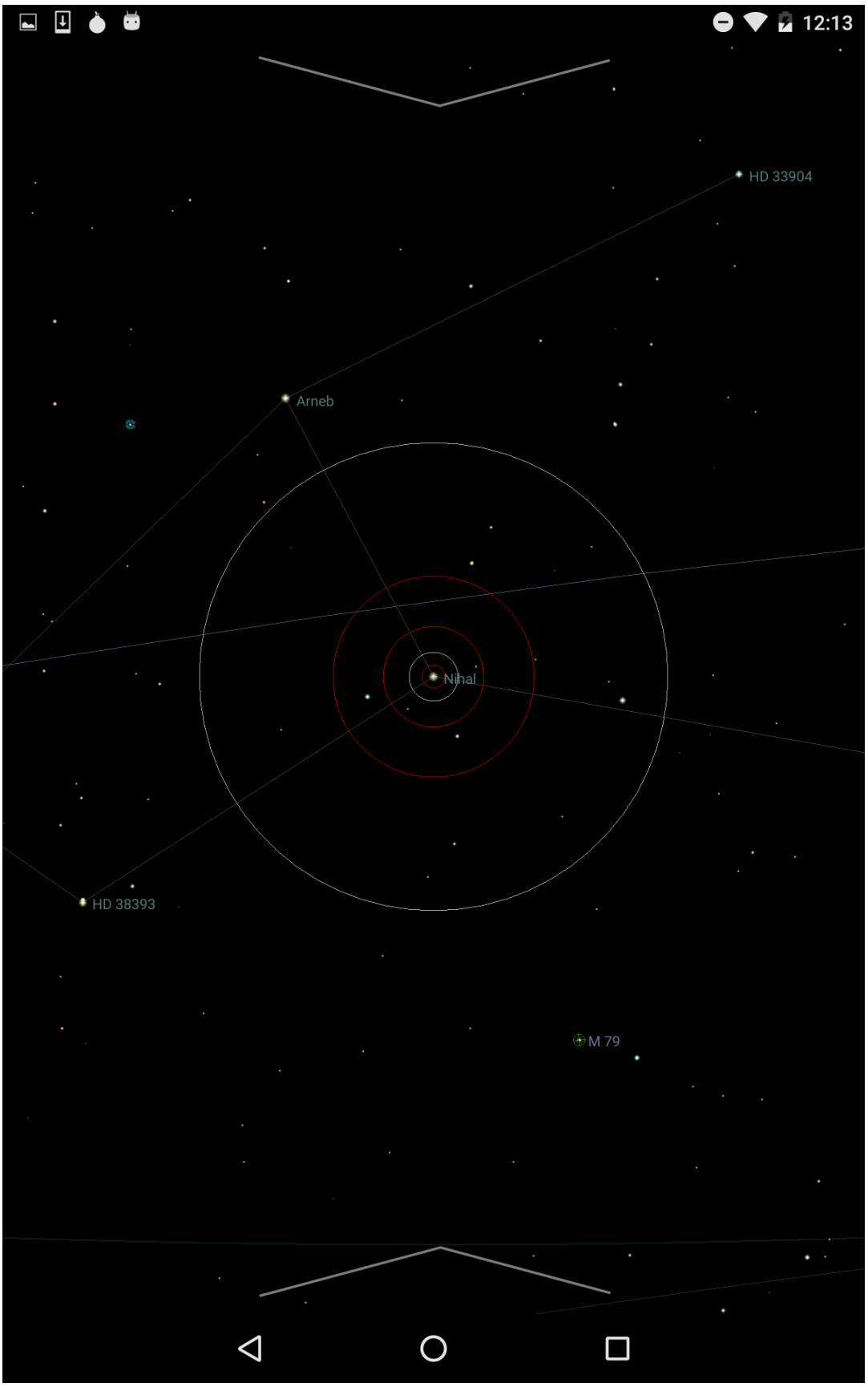
Example of “General” tab for Sun

Commits comprising this:

1. https://github.com/KDE/kstars/commit/a39c596a104c85e5168e7fefe4241fd13489b8ce
2. https://github.com/KDE/kstars/commit/6c9ddf1bf51053b3ed38e10b218683bf84212ea2

8. FOV Symbols

FOV symbols is one of the latest features added to KStars Lite. Currently user can't add custom FOV symbols and only default symbols are available. FOV symbols can be chosen from right drawer whenever **SkyMapLite** is visible.



All default FOV symbols switched on

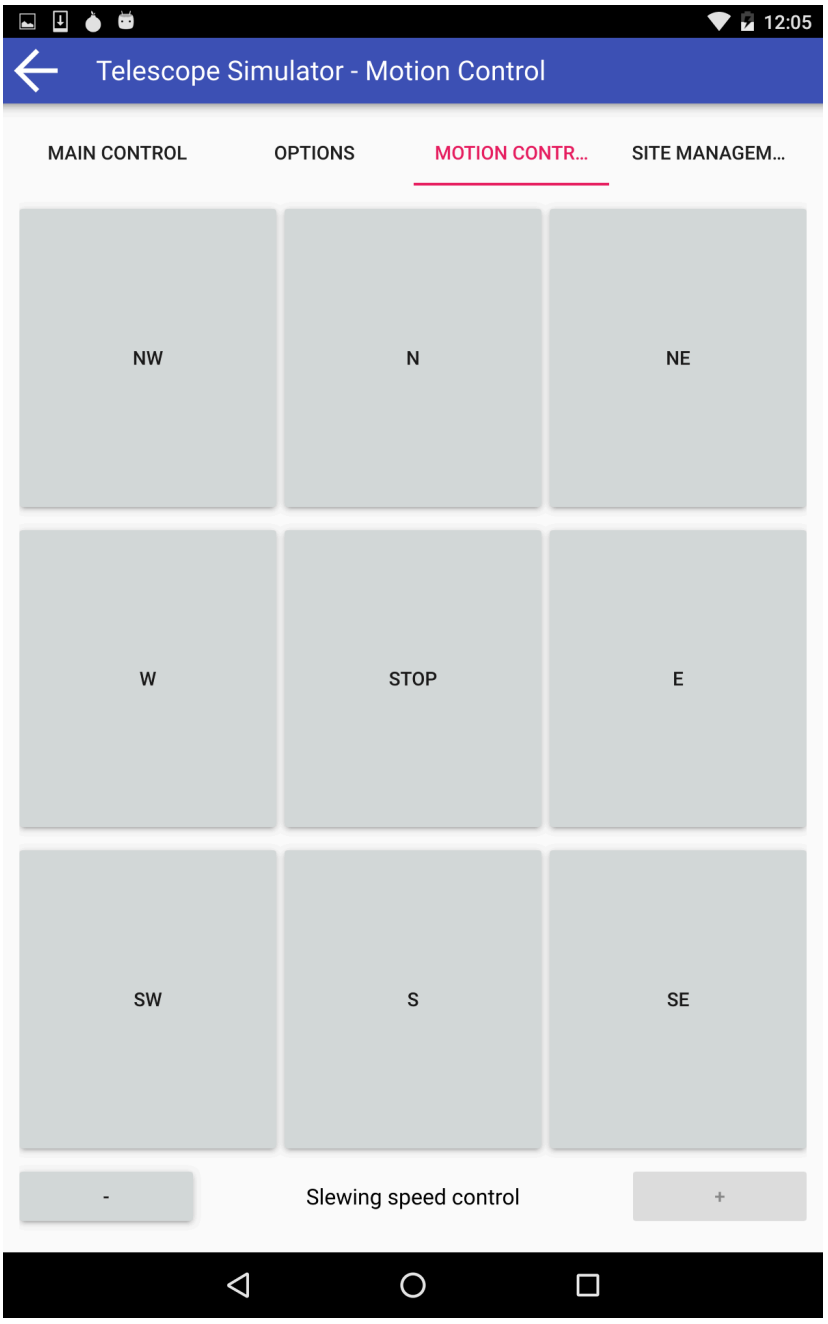
Commit comprising this:

1. https://github.com/KDE/kstars/commit/a520f0eca43caa9ffbe06271d2f063cd8bcc6486

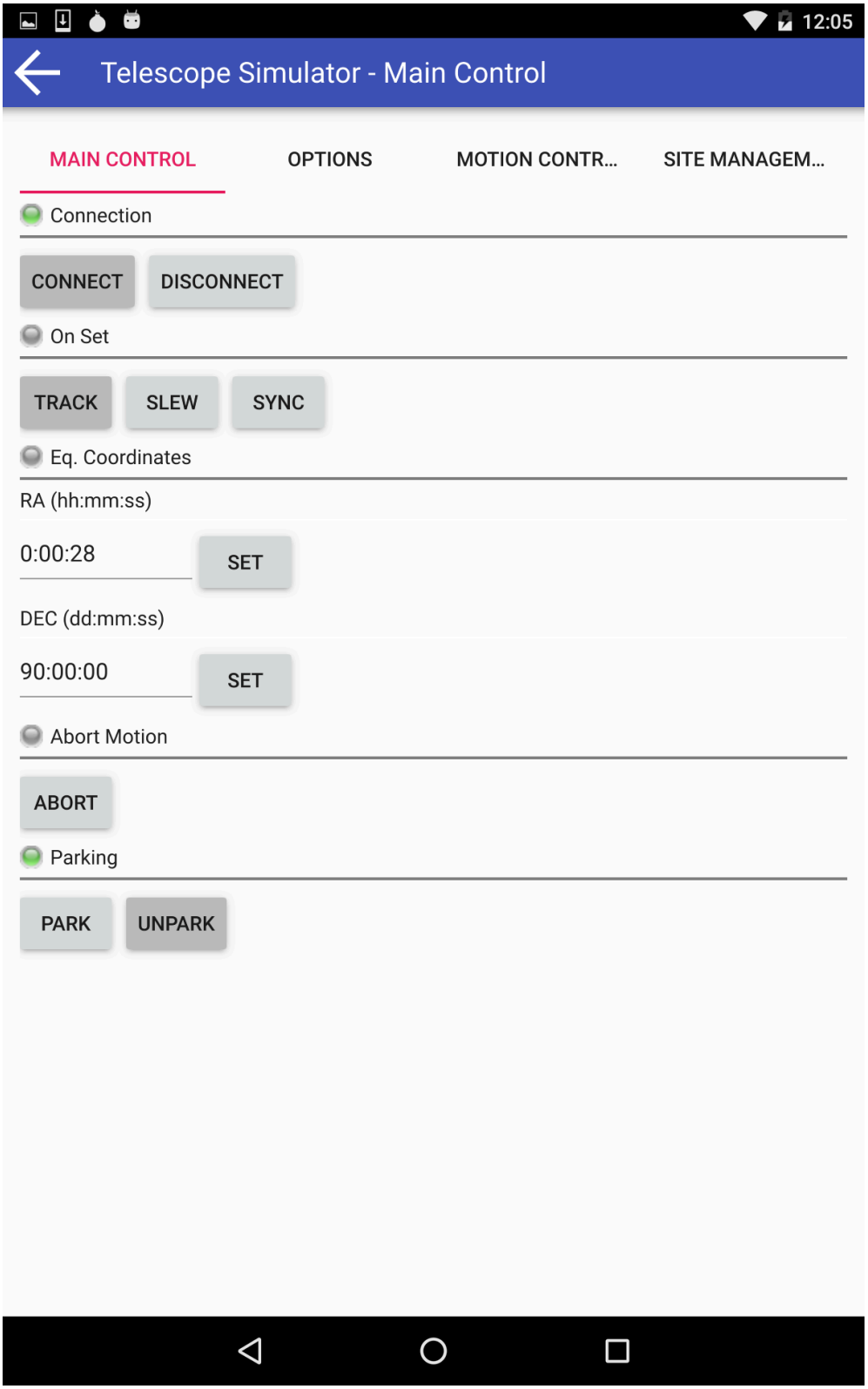
9. INDI Client

Porting of INDI library to Qt5 made it possible to use INDI on Android and Windows. In KStars Lite you can control your telescope and shutter. Images can be transferred both in FITS, RAW and plain JPEG formats.

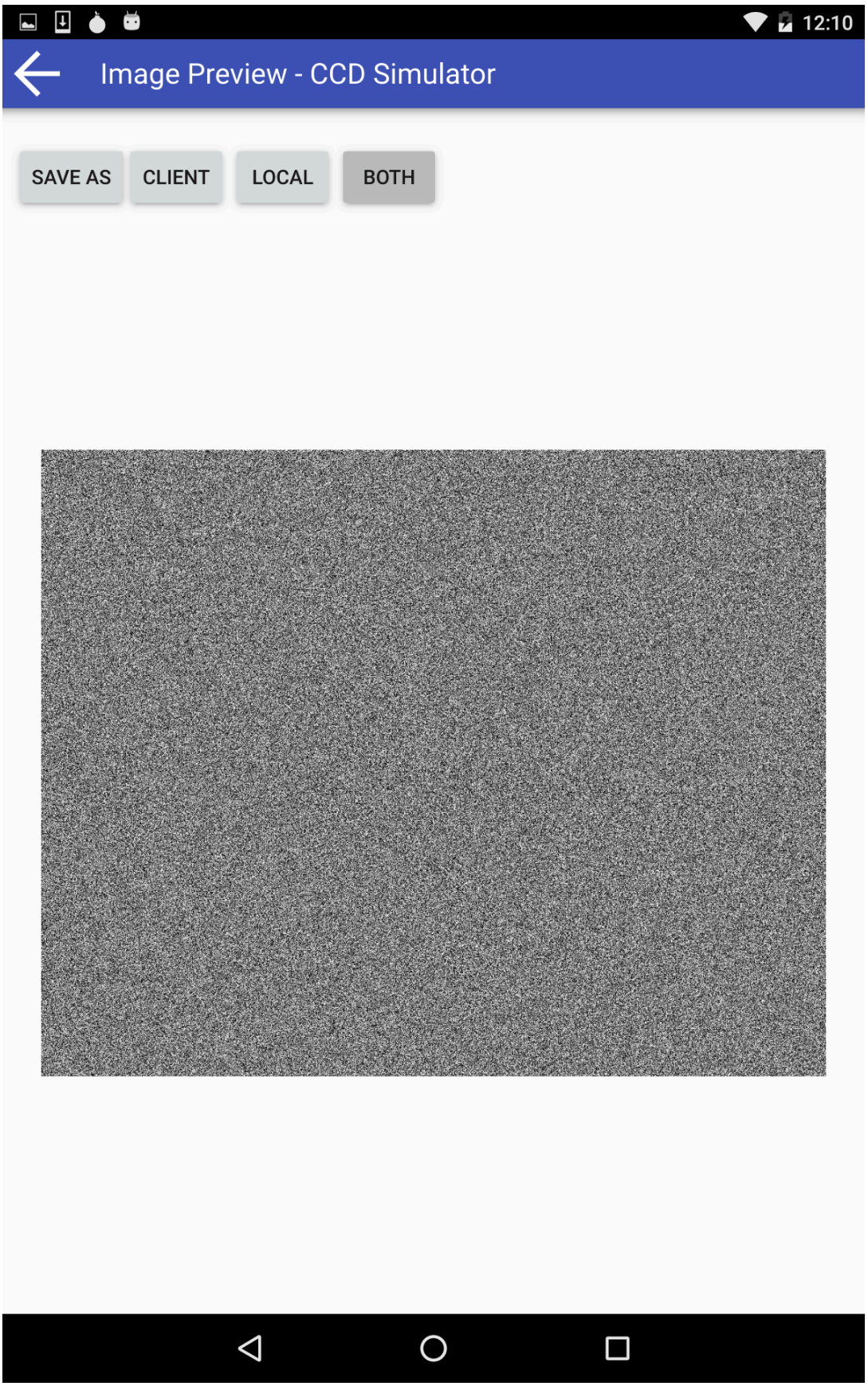
Currently KStars Lite uses precompiled only for armv7 versions of all libraries needed to make INDI work on Android. The process of compilation of these libraries should be included in KStars Lite building script.



Telescope Control Page



Setting telescope parameters



Previewing fetched image

Commits comprising this part:

1. https://github.com/KDE/kstars/commit/7cd2ae86cc875247528cf4e1235147f0864e101e
2. https://github.com/KDE/kstars/commit/32b61546363013993a4eaaeef522f84e1067c774
3. https://github.com/KDE/kstars/commit/d03d3fcc178442f053c91913f1c812b069dc6168
4. https://github.com/KDE/kstars/commit/1ec33812527b7ccc0c5b3bb2026994c362ef389c

10. Find Dialog

Search is done a bit differently from regular KStars. In KStars Lite each search entry is already assigned to the relative **SkyObject**, while in KStars after user selects an entry in a search list the search is performed again now against the list of **SkyObjects**. Currently “Search in Internet” button doesn’t work as newly added Internet Resolver should be yet adopted to KStars Lite.

Search Dialog

Commit comprising this part:

1. https://github.com/KDE/kstars/commit/eecc521f6e3a37144e2270d0e0be37faa70eaf0e

What has to be done yet

There are some small issues with tapping on **SkyMapLite** and fetching time of position from GPS that will be tackled soon. Once newly added functions for resolving DSO in internet will be adopted to KStars Lite, master branch will be merged with gsoc2016-kstarslite branch. Also building script will be created after GSoC end.

Credits

I would like to thank my mentor for his valuable advices, great help with the project and kindness to me. Also Gunnar Sletta on Qt interest mailing list helped me a lot to understand how **Qt Quick Scene Graph** works. It was a great pleasure to work with KStars community and I'm sure our story doesn't end up here :)