

## BSc Thesis Project

### A star telescope for tablets or PC

**Introduction:** Apps and accessories to iPhone/iPads and tablets have been developed and produced through the last decade of years. E.g. various kinds of sensors and different gadgets to be clicked into the connector for the headset or external lens systems to be clicked onto the build-in camera in the tablet. The motives could be for fun but potential solutions to vital problems can also be addressed due to the easy access to tablets globally speaking. An external lens system combined with a tablet could enable easy access to microscopy or optical diagnostics tools in the medical field work and at the same time provide on-line connections to international expertise.



In the Optical Sensor Technology Group at DTU Fotonik (DTU Risø Campus) we are working with geometrical and statistical optics as a tool for designing optical sensors, or optical solutions to problems addressed to us by industry. In general, the theme of our work is robustness, compactness. And, the optical devices shall be low-cost, non-contacting devices.

**The aim of this project** is to design and construct a Newtonian star telescope around a 66.5mm/130mmØ parabolic mirror and integrate it with a tablet/iPhone or a USB camera.

**In this project,** the student will look into the optical design of the camera section in a tablet (lenses, apertures and autofocus mechanisms). The student will then design the telescope, using raytracing matrices to build a paraxial model of the entire telescope. Zemax simulations can be applied to confirm the optical design, to test alignment procedures and estimate possible aberration of the telescope. The student will consider the optomechanical options, construct and demonstrate the telescope. We have *SolidWork*, a workshop and 3D printer facilities available for the construction.

#### **Prerequisites:**

- 34020/34021

**Practical details:** ECTS-points for a Bachelor student: 15.

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