

## ***The Sentry KIDs Optical Scanner***

This project provides an optical ray trace analysis and preliminary lens selection for the novel optical scanner under development by Sentry Technology, Inc. This company is developing a novel product, SentryKIDS™, a pro-active portable electronic finger printing and imaging system designed to produce a forensic quality biographical document that includes fingerprints, a digital photograph, and vital identification information.

There are three main points concerned in our optical design of the scanner:

- Compact structure for a handheld scanner
- Economical elements
- High image quality

System structure comes from the technology specifications provided by the company, which results in a limited space for the optical system and specifies the focal lengths of lenses. Image quality is determined by aberrations as well as both system structure and choice of lenses.

### **System structure**

According to the need to a magnification difference between longitudinal and horizontal axles, we design lens system consisting of a Galileo-type telescope lens combination together with an objective lens. It realizes an optical magnification system with focal length ( $f$ ) being equal to the objective lens and magnifications differing from axle to axle. The optical part of the system includes two cylindrical lenses, one objective lens, and slits.