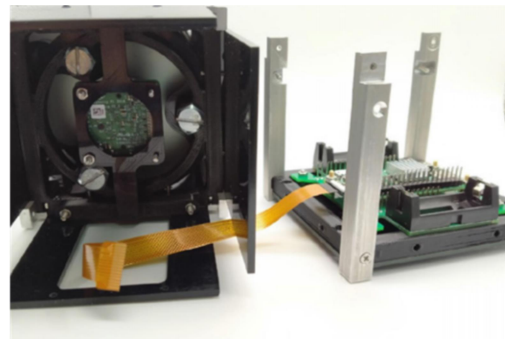
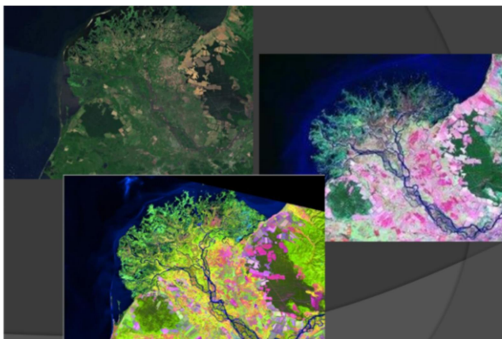
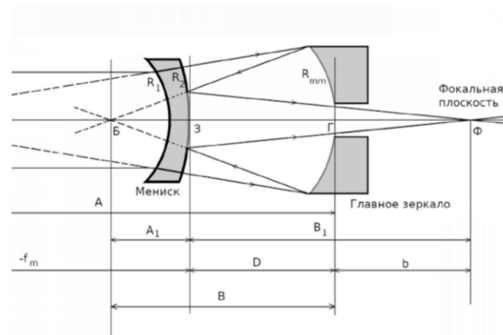




Introsat Educational Kit. Optics in Remote Earth Sensing Tasks



Constructor extension Introsat™ includes groups of topics "Space optics" and "Processing of space images" .

It is used for conducting in-depth classes in satellite engineering, space optics, problems of remote sensing of the Earth.

The kits allow you to conduct introductory workshops on optics, assemble functional models of CubeSat 3U satellites with a high-resolution optoelectronic system based on

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a Raspberry Pi single-board computer and a Maksutov-Cassegrain mirror-lens optical system.

The "Processing of space images" section covers the beginnings of working with space data and its application in geoinformatics problems.

The content of the course and the completion of the basic set allow you to conduct theoretical and practical classes, including on topics:

- 🖥️ Fundamentals of optics and remote sensing of the Earth;
- 🖥️ Geometric optics and spectral analysis;
- 🖥️ Refractors, classification of telescopes, calculation and assembly of the Kepler telescope, making observations;
- 🖥️ Reflectors, mirror-lens schemes, Maksutov-Cassegrain scheme, optical elements;
- 🖥️ Image quality, types of aberrations, collimators, alignment;
- 🖥️ Working with Raspberry Pi on-board computer;
- 🖥️ Cameras and specialized imaging software;
- 🖥️ Space images and how to work with them;
- 🖥️ Types of surveys by the used parts of the EM spectrum, computer processing of images;
- 🖥️ Working with optical images;
- 🖥️ Working with thermal images;
- 🖥️ Working with radar images.

The recommended age of students is 14-18 years old. Up to 3-4 students can work with one set. To work requires a PC or laptop.

Education Experience:

- ✓ Fundamentals of optics and remote sensing of the Earth,
- ✓ spectral analysis,
- ✓ refractors and reflectors,
- ✓ calculation and assembly of the Kepler telescope,
- ✓ observations,
- ✓ mirror-lens schemes,
- ✓ the Maksutov-Cassegrain scheme,
- ✓ optical elements,
- ✓ image quality,

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- ✓ types of aberrations,
- ✓ collimators,
- ✓ adjustment,
- ✓ Work with the on-board computer Raspberry Pi,
- ✓ Cameras and specialized software for working with images,
- ✓ Space images and techniques for working with them,
- ✓ Types of surveys by used parts of the spectrum,
- ✓ computer image processing,
- ✓ Working with optical, thermal, radar images

Engineering Skills:

- Optical systems calculations,
- Designing,
- Programming,
- Image processing

Hardware and Materials:

- 🔧 On-board single-board computer,
- 🔧 On-board camera compatible with the control on-board computer,
- 🔧 Set of optical and structural components with the ability to assemble an adjustable Maksutov-Cassegrain CubeSat 3U+ format optical circuit,
- 🔧 A set of optical and structural components with the ability to assemble a Kepler optical circuit,
- 🔧 A set of CubeSat form-factor housing elements 3U,
- 🔧 Set of fasteners and connecting wires, Set for the care of optics

Electronic Modules Features

Space Unit Type: CubeSat 3U format microsatellite, optoelectronic system of remote sensing device

Central Control Unit Type: Raspberry Pi Pico

Voltage Compatible with: Introsat, Raspberry

Power Connectors: The power system of the basic set is used

Battery Type: The power system of the basic set is used

Data Interfaces: Compatible with: Introsat, Raspberry

Data Connectors: Compatible with: Introsat, Raspberry

Wireless Interfaces: n/a

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