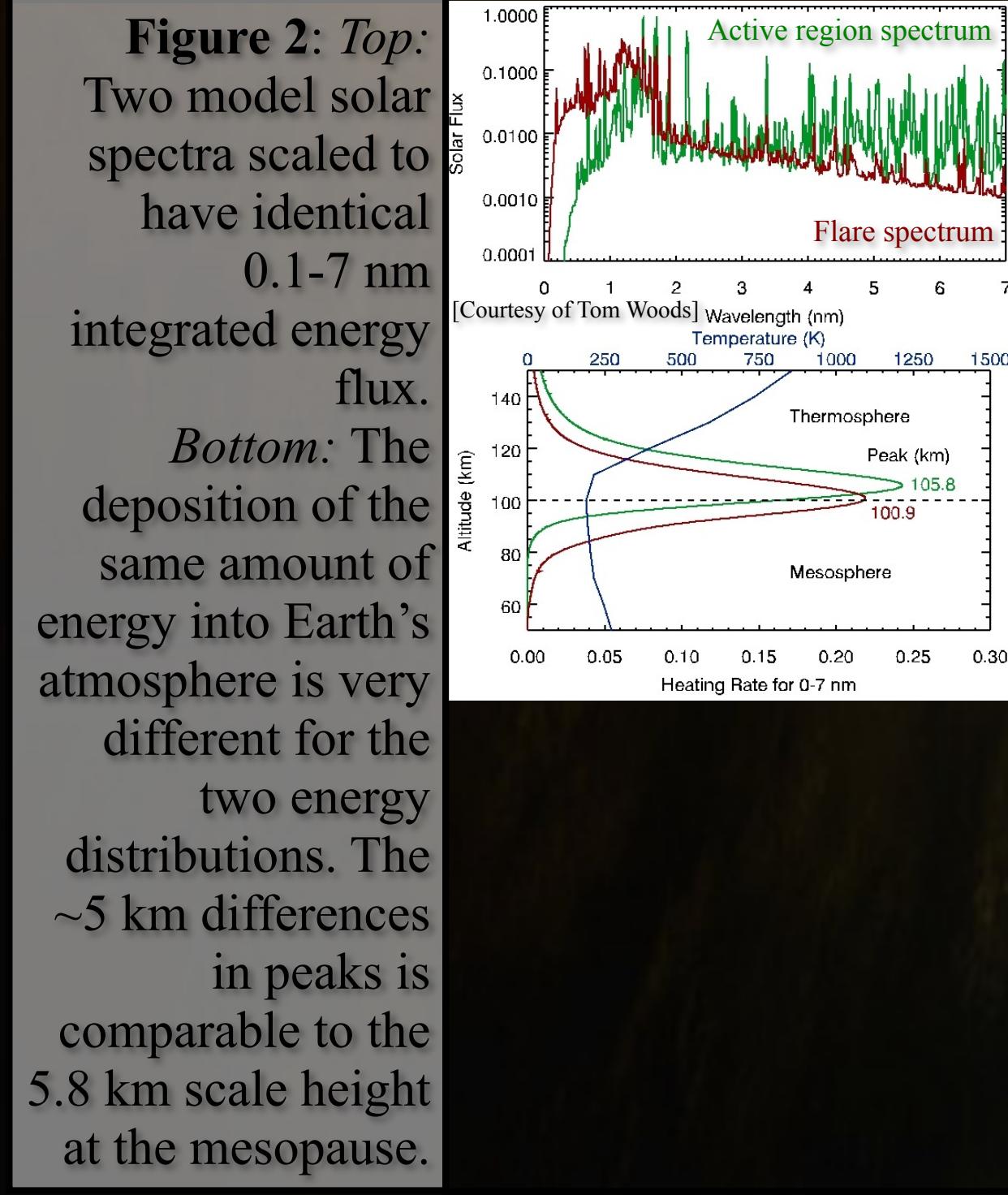
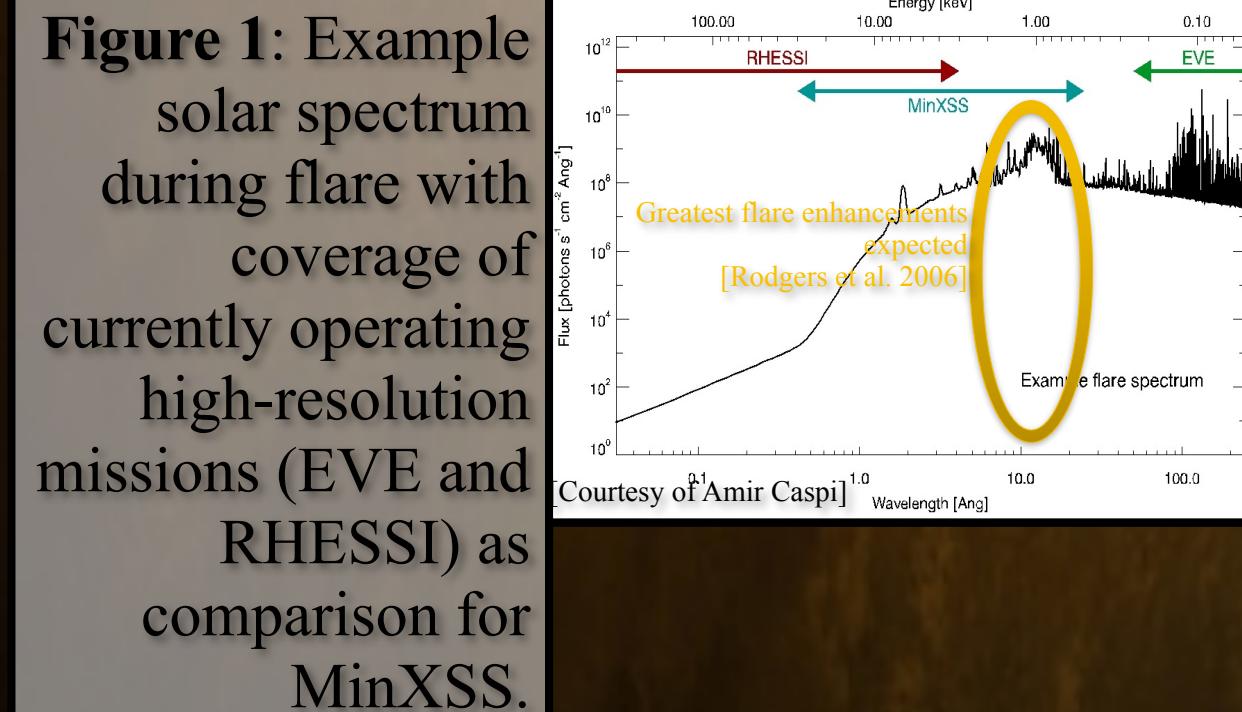


OVERVIEW AND MOTIVATION

MinXSS is a 3U (34.5 cm x 10 cm x 10 cm), ≤ 4 kg CubeSat intended to launch into low-Earth orbit in 2015 and will observe the soft X-ray (SXR) spectrum (0.4-30 keV or 2.5-20Å) of the Sun at high resolution (0.15 keV). This band has historically been difficult to observe at high resolution due to technological limitations.

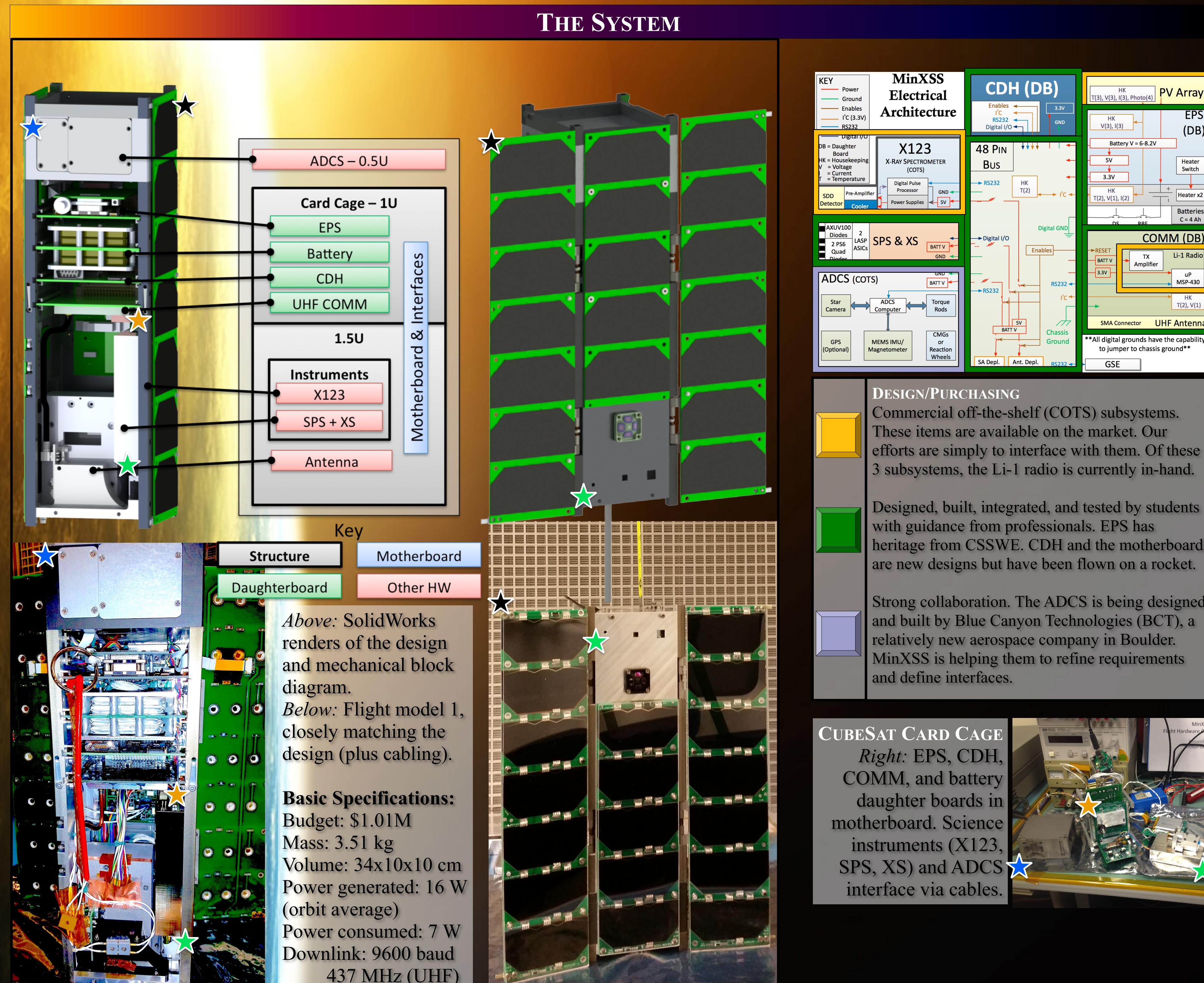
Solar SXRs are particularly important because the greatest intensity enhancements during solar flares are expected to occur near 20 Å (Rodgers et al., 2006, see Figure 1).

Additionally, the distribution of energy in the SXRs plays an important role in Earth atmospheric properties (Figure 2). Current models of the Earth's thermosphere and mesosphere can be improved by incorporating data that MinXSS will provide.



TECHNOLOGY ENABLING SCIENCE

The Amptek X123 is a commercial off-the-shelf (COTS) X-ray spectrometer that uses a silicon drift detector and includes a thermoelectric cooler, beryllium filter, and support electronics. Its price (~\$11k), size (14 x 5.4 x 2.5 cm), mass (180 g), and power (2.5 W nominal), make it ideal for a CubeSat mission. Originally developed for applications such as X-ray fluorescence analysis for art and archaeology, process control, and quality assurance, it will now be used to observe the Sun from space to enable new scientific studies and the improvement of Earth upper-atmospheric models.



COLLABORATION AND INDUSTRY

CU LASP: CU provides graduate students from aerospace and electrical engineering, computer science, and astrophysical and planetary sciences. Professors act as mentors for the MinXSS graduate project. LASP provides professional mentors and facilities.

BCT: Blue Canyon Technologies provides attitude determination and control system and support. This will be the first flight of their system, concurrent with an Air Force CubeSat also flying this XACT ADCS. As a local company, they have supported major reviews of the MinXSS project and have assisted in multiple air bearing tests of the satellite.

FIRST RF Corporation: First RF in Boulder allowed us two opportunities to measure the RF gain pattern of our system in their anechoic chamber. The data collected were used as model validation and high fidelity input to the MinXSS link budget.

BRAXTON: MinXSS flight model satellites are being used to aid in the development of Braxton's ground software for ground telemetry and control operations, a system intended to improve upon and replace ISIS, the ground software MinXSS currently uses.

THE WORK AND PEOPLE

