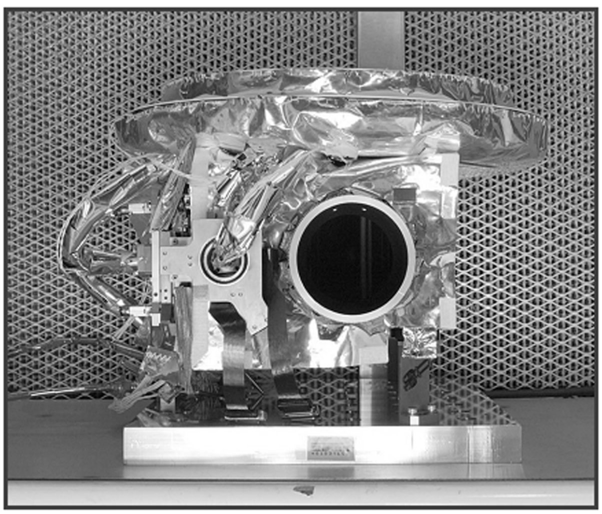
SIRSE: A Spectral ImageR and Spectrometer for Europa. A. A. Simon[1], D. C. Reuter[1], C. Olkin[2], S. A. Stern[2]. [1]NASA Goddard Space Flight Center, [2]Southwest Research Institute

Introduction: Building upon the instrument heritage of the Earth Observing-1 LEISA Atmospheric Corrector, New Horizons Ralph, and OSIRIS-REx Visible and IR Spectrometer (OVIRS) instruments, SIRSE is a next generation spectral imaging instrument with improved capability for handling the harsh Europa radiation environment. The Europa Clipper strawman payload includes a Short-Wave IR Spectrometer, and the enhanced mission option also includes a Reconnaissance Camera; SIRSE addresses the goals of both instruments simultaneously. This instrument follows the optical layout of the New Horizons Ralph instrument, with a wedged-filter IR spectrometer (LEISA) and a time delay integration (TDI) visible imager (MVIC), and leverages the savings of shared optics and electronics. A combined instrument offers significant cost, mass and power savings in this environment.



New Horizons Ralph

Heritage: SIRSE is based on the proven design of several in-flight or in development instruments; Lewis LEISA (launched 1997), the Earth Observing-1 LEISA Atmospheric Corrector (launched 2000), New Horizons Ralph (launched 2006), and the OSIRIS-REx Visible and near IR Spectrometer (launches in 2016) [1-4].

Science: The shortwave IR region is uniquely suited to determining surface composition and is critical to meeting the Clipper's mission objectives. There are many bands of interest in the 1 to 5-micron region, including hydrates, brines, organics, and ice features, as discussed in detail in the Clipper report [5]. Many of these features are of interest to our current missions, New Horizons and OSIRIS-REx, as well [6-10]. Mapping the distribution of these compounds on global and regional scales will help to identify the source of the material, as well as recent exchange processes between the surface and subsurface.

The high-resolution panchromatic camera can be used to discern the fine geologic structure of any potential future landing sites. It will also provide context for spectral measurements, along with other mission cameras and highlight any recent geological changes, particularly when compared with Galileo imaging data.

References:

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A composite Ganymede view from New Horizons LEISA/LORRI. *This visible and near-IR spectral composites shows the type of data SIRSE will provide on a global scale.*