VISIBLE/NEAR-INFRARED SPECTRAL PROPERTIES OF MUSES C TARGET ASTEROID 25143 ITOKAWA. K. S. Jarvis[1], F. Vilas[2], M. S. Kelley[2,3], P. A. Abell[2,4]. [1]Lockheed-Martin Space Operations, 2400 NASA Rd. 1, Houston, TX 77058, Kandy.S.Jarvis@nasa.gov, [2]NASA Johnson Space Center, [3]Georgia Southern University, [4]Rensselaer Polytechnic Institute.

Introduction: The Japanese MUSES C mission launched the Hayabusa spacecraft last May 15, 2003, to encounter and study the near-Earth asteroid 25143 Itokawa. The spacecraft will obtain visible images through broadband filters similar to the ECAS filters, and near-infrared spectra from 0.85 – 2.1 µm. In preparation for this encounter, opportunities to study the asteroid with Earth-based telescopes have been fully leveraged. Visible and near-infrared spectral observations were made of asteroid 25143 Itokawa during several nights of March, 2001, around the last apparition. We report here on the results of extensive spectral observations made to address the questions of compositional variations across the surface of the asteroid (as determined by the rotational period and shape model); variations in phase angle (Sun-Itokawa-Earth angle) on spectral characteristics; and predictions of Itokawa observations by Hayabusa based on the spectral resolution and responsivity of the NIRS and AMICA instruments.

Visible reflectance spectra were acquired using the McDonald Observatory 2.1-m telescope with the facility cassegrain spectrograph on the nights of UT 24, 26, 27 March 2001. A Schott GG475 filter was used to acquire spectra having a resolution (here defined as 2 X the dispersion/element) of 14.6 Å across the spectral region ~ 0.475 – 0.92 µm. The solar analogue standard star SAO 65083 was used to correct for atmospheric extinction and remove the spectral signature of the Sun by ratioing the asteroid spectrum to the stellar spectrum. Data reduction procedures followed those described in Vilas and Smith (1).

Near-Infrared reflectance spectra were acquired using NASA's Infrared Telescope Facility on the nights of UT 10, 11, 12, 23, 24 March 2001. The Spex facility instrument was used to acquire spectra having a resolution of ~60 Å across the spectral region ~ 0.8 – 2.5 µm. The solar analogue stars SAO 120107, 16 Cygni B, SAO 65083, and local standard SAO 83786 were used to correct for atmospheric extinction and remove the spectral signature of the Sun by ratioing the asteroid to the standard star. Data reduction procedures followed those described in Vilas and Smith [1] and Gaffey *et al*. [2].

Limited phase coverage in the visible spectral region due to bad weather limited the observations during the beginning of March, 2001. Over the phase range of 51 – 63°, no difference in the visible spectrum is observed to within 1% of the relative reflectance. Figure 1 shows the visible reflectance spectrum combined with the composite near IR spectrum from 10 Mar 2001.

The results of this analysis - in progress while the abstract is being written - will be presented.

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References: [1]Vilas, F., and Smith, B. A. (1985) *Icarus* ,64, 503-516. [2] Gaffey, M. J. *et al*. (2002), *Asteroids III* (Bottke *et al*., Eds.) 183-204.

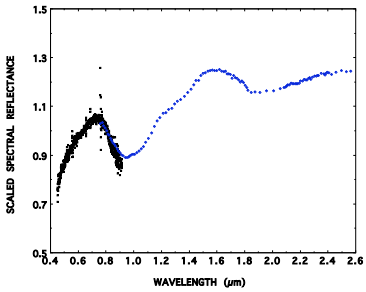

Fig. 1. VIS/NIR reflectance spectrum of 25143 Itokawa (black squares) (phase angle = 51°) from McDonald observations on 24 Mar 2001 plotted with IRTF NIR observations taken on 10 Mar 2001 (phase angle = 24°). Spectra are scaled to 1.0 at 0.8 µm.