DUST MEASUREMENTS BY THE STUDENT DUST COUNTER ONBOARD THE NEW HORIZONS MISSION TO PLUTO, , J. Szalay, M. Piquette, M. Horanyi, Laboratory for Atmospheric and Space Physics, U. of Colorado, Boulder, CO 80303, USA, (horanyi@colorado.edu).

Introduction. The Venetia Burney Student Dust Counter (SDC) is an impact dust detector on board the New Horizons Mission to Pluto. SDC is capable to resolve the mass of dust grains in the range of $10^{-12} < m < 10^{-9}$ g, covering an approximate size range of 0.5 − 10 μm in particle radius [1]. The measurements can be directly compared to theoretical predictions of grain trajectory tracing models of dust originating from Edgeworth-Kuiper Belt (EKB). Through the end of 2014, the New Horizons spacecraft reached beyond 30 AU, enabling SDC to map the dust density distribution across the solar system. SDC will continue to measure dust as it transits through the Edgeworth - Kuiper belt.

SDC is the only experiment to date that was designed, built, and is now operated by students on a deep space mission. It has provided an unparalleled opportunity for about 25 students to learn about space instrumentation. SDC continues to involve an ever changing smaller group of 3 students who operate the instrument and analyze the data, handing over their responsibility to the next 'generation' every few years. SDC could not have been built without the support of the late Dr. Tony Tuzzolino who first designed these types of instruments.

The SDC instrument. The instrument (**Figure 1**) consists of a set of polyvinylidene fluoride (PVDF) film impact sensors, carried on a detector support panel, which is mounted on the exterior of the New Horizons spacecraft. It is outside the spacecraft multi-layer insulating blanket, facing the ram direction. Signals from the sensors are collected through an intra-harness that runs from the detector assembly into the spacecraft interior to the instrument electronics box mounted opposite the detector panel.

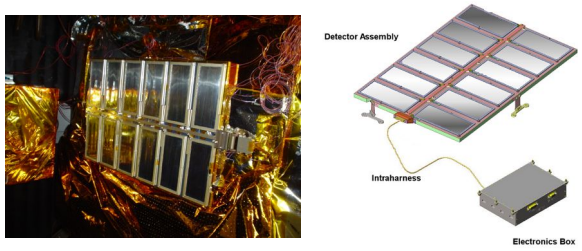

Figure 1. Photo of the SDC during thermal testing (*left*), and the schematics of the instrument (*right*).

SDC observations. The SDC measured densities, converted from fluxes measured outside the orbit of Jupiter through to the time of this analysis at ≈30 AU, are shown in **Figure 2**. Combining interplanetary dust grain measurements by SDC with a dynamical dust grain trajectory tracing code provided an estimate for he mass production rate $M = (8.9 \pm 0.5) \times 10^5$ g/s and power law index of the initial size distribution $\alpha = -3.02 \pm 0.04$ of dust in the EKB. [3]. This talk will share the latest available SDC data.

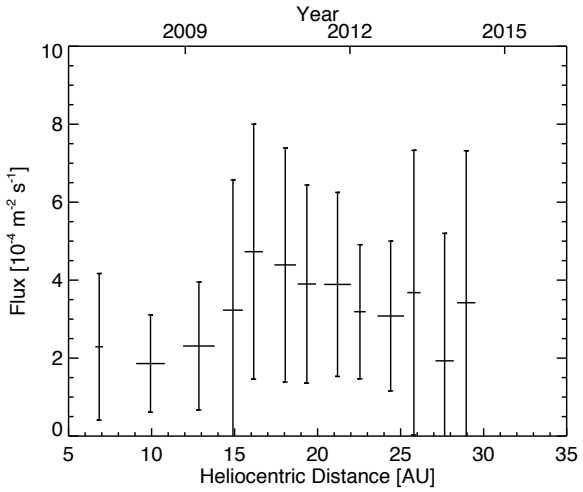

Figure 2. SDC measurements of the dust flux ($m > 10^{-12}$g) through the end of 2014.

Based on in-flight tests and calibrations, and the science data as of to date, we expect SDC to continue to make dust measurements beyond Pluto. The Pluto encounter will take place in July 2015, at a distance of 32 AU from the Sun. New Horizons is expected to remain fully functional and operate for decades to come, reaching deep into the Edgeworth - Kuiper belt. SDC will continue to provide insight about the dust production at the outskirts of our Solar system and enable comparisons with dust disks around other stars.

References: [1] S. A. Stern, *Space Sci. Rev., 140*, 3 (2008). [2] M. Horanyi, *et al., Space Sci. Rev.*, 140:387 (2008). [3] D. Han, et al., *Geophys. Res. Lett.*, 38:L24102 (2011).