THE DAWN MISSION & ASTEROID MAPPERS: VESTA EDITION: THE IMPACT OF CROWD-SOURCED CRATER COUNTING. J. E. C. Scully[1], B. E. Schmidt[2], P. Gay[3], R. Hart[1], C. T. Russell[1], J. Wise[4], W. H. Cobb[5], J. Ristvey[5], J. Counley[5], N. Hess[5], CosmoQuest Build Team[6], [1]Department of Earth and Space Sciences, University of California, Los Angeles, California 90095-1567, USA (jscully@ucla.edu), [2]Institute for Geophysics, U. T. Austin, Austin, TX, United States, [3]Southern Illinois University Edwardsville, Edwardsville, IL, United States, [4]New Roads School, Los Angeles, CA, United States, [5]McRel, Denver, CO, United States, [6]The Center for STEM Research, Education and Outreach at Southern Illinois University Edwardsville, Edwardsville, IL United States.

Introduction: While the driving principle for a science investigation may be the pursuit of knowledge, the process of acquiring that knowledge matters as much as the result. This process is known to many as the scientific method, a concept regularly taught in schools but that remains in many cases poorly tied to science outreach. But with the growth of the Citizen Science movement, we have entered a new era for both science and science outreach marked by the accessibility of tools that allow the public to experience science first hand in a manner previously unimagined. Gone are the days when a launch and a landing are all that are seen of a mission. Now, it's time to let the public in on the fun, and of course, all the work. In a time of large data returns and dwindling science budgets, citizen science may help scientists and educators with two fundamental problems: (1) increasing science literacy (including knowledge of new discoveries) and (2) accomplishing the key science investigations. The Dawn Mission has long been on the path towards involving the public in the process of science, and with the advent of the new Asteroid Mappers: Vesta Edition project, joint with CosmoQuest, the long-term goal of presenting the data to the public in a meaningful manner will be achieved. And in the long run, the public may also prove key to accomplishing mission science.

Vesta & aims of project: Vesta is a unique body in the solar system, a likely a witness to the earliest stages of solar system formation and the environment within the main asteroid belt. Its impact history will be critical not only to understanding the initial population of the asteroid belt and thus impact hazards on the early Earth, but also the production of Vesta's impact family and the samples of Vesta, the HED meteorites, we have on Earth. Thus determining the impact crater population and distribution is a critical mission goal. Because craters are easily recognized and relatively straightforward to measure, a careful member of the public may be able to perform the same basic tasks as a scientist. But the benefit to citizen science is getting multiple eyes on the data, removing personal bias via statistical tests. Thus crater counting is uniquely suited to crowd sourcing, as seen with the Moon Mappers project [1]. In Asteroid Mappers: Vesta Edition, the public have the chance to experience what it is like to be a scientist on the Dawn mission. And since mission scientists and educators have been integrated in developing Asteroid Mappers: Vesta Edition, the surprise of finding tectonic features on Vesta—ridges, troughs—opened up a new set of questions for Citizen Science. Can the public do more than circle craters and boulders? Might they help to map faults on an asteroid?

Tools in Asteroid Mappers: Vesta Edition: Asteroid Mappers: Vesta Edition allows users to mark craters, boulders, light albedo features, dark albedo features, boulder fields, crater chains, odd shaped features, odd albedo features and unknown features. After a feature has been marked the symbol can be moved or deleted. The mark craters tool only accepts craters that are larger than the threshold diameter of the size of craters that are useful for crater counting. The locations and diameters of the craters are saved to a database that can be used for further analysis of the distribution of craters on the surface of Vesta and for calculating the ages of various surface units.

The other feature tools allow any size of feature to be marked. The aim of getting the citizen scientists to mark these features is to create a catalog of boulders, crater chains etc. that can be used by Dawn scientists in further analysis of the data. Thus, the mapping of the features by the citizen scientists accelerates the scientific process. Currently, citizen scientists can also label an image containing tectonic features in the form of ridges or troughs. Future development of the site will include adding a tool that will allow users to mark these ridges and troughs, with the aim of compiling a catalog of these features.

Launch & progress: Asteroid Mappers: Vesta Edition launched on September 8th 2012 and in the first two weeks 226 people viewed 12,531 images and marked 81,704 craters and 8,644 other features. Since then, 2,058 users have worked on 6,196 images. 1,603 images have been marked by more than 5 users and 1,035 have been marked by more than 10 users. In total, craters have been marked 61,500 times and other features have been marked 31,874 times.

Conclusions: In this presentation, we will highlight the progress of Asteroid Mappers: Vesta Edition, in terms of the participation by the public, and will share an assessment of the scientific potential of the results

returned by the public from the first half year of the project.

References: [1] Antonenko et al. (2012) 44th LPSC.

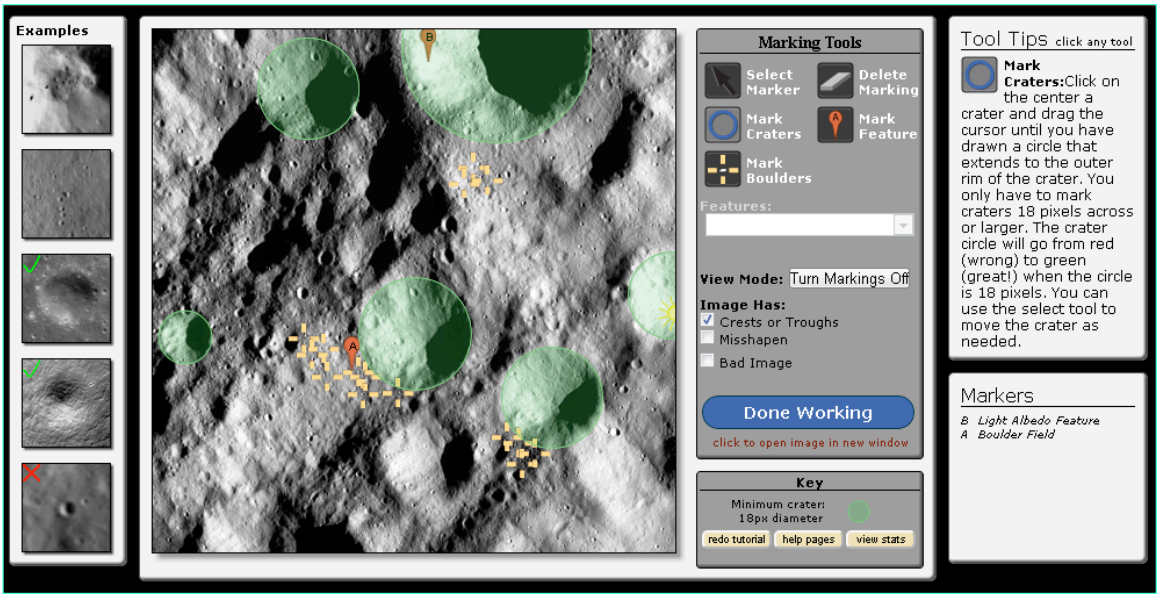

Figure 1: Example of the Asteroid Mappers: Vesta Edition interface showing a marked image of Vesta.