Planetary Data Visualization Using OpenSpace

Marina E. Gemma,[1,2,3,*], Corrie Roe[1], Carter Emmart[1], Vivian Trakinski[1], Micah Acinapura[1], Denton S. Ebel[1,2,3], and Rosamond Kinzler[1]

[1] *American Museum of Natural History (AMNH), Central Park West at 79th Street, New York, NY, 10024*
[2] *Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY, 10964*
[3] *Department of Earth and Environmental Sciences, Columbia University, New York, NY, 10025*
*mgemma@amnh.org

Abstract. OpenSpace [1] is an open source interactive data visualization software designed to visualize the entire known universe and portray our ongoing efforts to investigate the cosmos. OpenSpace supports interactive presentation of dynamic data from observations, simulations, as well as space mission planning and operations, and allows visualization at the outcrop level on extraterrestrial bodies. The software works on multiple operating systems with an extensible architecture powering high-resolution tiled displays and planetarium domes, making use of the latest graphic card technologies for rapid data throughput. In addition, OpenSpace enables simultaneous connections across the globe creating opportunity for shared presentations among audiences worldwide.

OpenSpace is a robust tool to communicate NASA science results and mission activities to public audiences. Work within OpenSpace has been shared via hundreds of public programs at AMNH and partner institutions. OpenSpace is particularly effective as a science communication tool, as it can be used to visually answer questions regarding celestial phenomena at all scales of the universe.

OpenSpace allows visualization of scientifically important data, as well as the technology, engineering, and math of space missions. It enables science communicators to visually explain how we engage in discovery across the solar system and beyond, accomplished in part by accurate rendering of image pointing and regions of acquisition projected from instruments as view frustums in OpenSpace. Navigation kernels and AMNH's Digital Universe atlas allow time- and space-accurate rendering of spacecraft paths throughout the solar system. The open source nature of the software encourages module development by collaborators beyond the existing team. Academic publications about OpenSpace are at [2]. OpenSpace is supported by the NASA Science Mission Directorate in response to NASA Cooperative Agreement Number (CAN) NNH15ZDA004C, Amendment 1.

---

[1]https://www.openspaceproject.com
[2]https://www.openspaceproject.com/academia