

## Conjecture on the Appearance of the Galileo Probe's Entry and Descent in to the Jovian Atmosphere

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**Abstract:** The New York Museum of Natural History has developed a planetarium production entitled *Dark Universe* that includes a depiction of NASA's Galileo Probe as it entered the Jovian Atmosphere. A request was made to NASA Ames, through Mr. Charles Sobeck (Galileo Probe System Engineer) to provide information regarding the appearance of the probe's entry. The International Organizing Committee has been granted permission to present a clip from *Dark Universe* showing the depiction of Galileo's atmospheric entry. This paper documents information provided to the NYMNH's Director of Astrovisualization, Emmart Carter, to aid in creating a physically realistic depiction. One of the descriptions is a perspective of the side view of the probe near peak heating, including the bow shock wave and the wake to a distance of ten or so body diameters behind the probe. The color of these features accounts for the thermochemistry involved in the hypersonic entry and the composition of Jupiter's atmosphere. A second description is conjectural, and addresses the possibility of a trail of heat shield particles shed from the probe during its entry. These data are inferred by observations in ground test facilities (ballistic ranges and arcjets) and fluid dynamic simulations of the probe's bow shock wave. The texture of the probe's heat shield during cool down is based on that from a model recovered from a ballistic range test. Finally, the depiction of the parachute was based on detailed engineering drawings of the visible parts, photographs from the build-up of the flight article, and video from the project's high altitude balloon launch test. In some cases, such as for the swivel and its protective cover, a best estimate mock-up was generated to represent items for which no flight article photographs could be located.