Global Aerospace Corporation is proposing to develop a revolutionary architecture that opens new and exciting pathways for planetary exploration. At the core of the architecture are the Directed Aerial Robot Explorers (DAREs), which are autonomous balloons with path guidance capabilities that can deploy swarms of miniature probes over multiple target areas. The DARE platforms will explore the planets in concert with orbiter(s) and surface platforms (landers, rovers, dropsondes). Flight path guidance will offer unprecedented opportunities in high-resolution targeted observations of both atmospheric and surface phenomena on global scales. Multifunctional microprobes will be deployed from the balloons over the target areas, and perform a multitude of functions, such as atmospheric profiling or surface exploration, relaying data back to the balloons or an orbiter. This architecture will enable low-energy, long-term global exploration of planetary atmospheres and surfaces. The proposed effort addresses objectives of several NASA Enterprises and of the new vision for the space exploration recently announced by the President. These objectives are related to the understanding of solar system formation and evolution, the search for life and its beginnings on other planets, the investigation of the composition, evolution, and resources of Mars, collaborative robotic missions to enable human exploration, and others. The technologies conceptualized in this study - such as very long-duration-flight balloons, flight path guidance, microprobes, and planetary platform navigation and communications - have direct relevance to future in situ exploration missions to Mars and Venus as outlined in the Solar System Exploration Survey published by the NRC (2003). Mission cost estimates will assist in the assessment of the performance and benefits of the concept and fitting it within future exploration mission cost categories. The results of this study can be applied directly to the development of future New Frontier, Discovery, or Scout-type missions to Mars, Venus and Titan.