As images and spectroscopy from the Mars Global Surveyor and Odyssey inform us as to the detailed nature of the martian surface, it is becoming increasingly apparent that Mars is not the desiccated world implied by early Mariner and Viking images. Water-bearing canals and oases of a century ago exist only in fiction, but a contemporary role for water in its various phases seems inarguable. Measurements from Odyssey, in particular, suggest the presence of vast ice sheets just centimeters below the surface at latitudes above 60°. In 2007, the Phoenix Scout mission will land north of the martian arctic circle for an up-close look at this icy region.

Phoenix resurrects bits and pieces of the failed Mars Polar Lander mission and the cancelled 2001 Surveyor Lander mission (including the spacecraft itself) to field a low-cost expedition to the buried Martian ice fields. In the northern Martian spring corresponding to mid-2008 on the Earth calendar, Phoenix will begin excavation of the surface with an articulated robot arm, feeding samples into the MECA and TEGA instrument suites for physical and chemical characterization. Originally developed as the Mars Environmental Compatibility Assessment on the cancelled 2001 Mars Surveyor Lander, the MECA payload will be adapted to the study of icy soils for the Phoenix 2007 Mars Scout mission.