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History of US Contribution to Astronautics Post WWII (2)

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FROM THE MOON TO MARS: THE COMMON THREADS - MAPPING CELESTIAL BODIES

Abstract

Individual elements of missions are frequently studied and discussed in great depth, by organization, mission, technology ingredients, scientific results, etc... However, many of studies reflect only a moment or singular topic in a continuum – a snapshot, that isolates them from relevant surrounding elements, both interdisciplinary, or time based. The elements can be parsed many different ways, but what happens when we examine the continuum itself, is that other patterns emerge. These patterns can be just as important as the individual elements, in understanding how we achieved success, and as lessons to apply to future missions. Examining the success of the Viking missions led me to conclude that (of many interesting topics) three elements in particular made the success of lunar missions and the leap to Mars missions both successful and accelerated. Mission personnel, site certification, and imaging technologies, all led to the success of Apollo and Viking, in quick succession, and were both made possible by their forbear, the Lunar Orbiter missions, which met the Apollo site certification requirements so quickly and effectively, that they were able to assign new objectives before 3 of the 5 planned missions were even completed. That rapid achievement resulted in the mapping of the moon's surface, and led to successful landings on the moon and Mars, and the first earth rise image – and advances in technology and applications of imaging technologies. The elements when examined together, represent 3 legs of the stool that future missions have been built upon, and they all have one thing in common – a core team of people and informal "collaborative" of organizations contributing research and experience, that played a critical role in the success of these missions and carried their knowledge base forward. We will share details of these three elements – team members who moved from Lunar Orbiter to Apollo and Viking building on and adapting lessons learned in, imaging methodologies, technologies, and the emerging new field of site certification. Other surprises include how gravity model discoveries affected real time decisions on Apollo, nonstandard applications of imaging hardware to solve real site mapping problems, and collaborations between multiple stakeholders to come up with unique solutions. In short, the fluid nature of these early missions, and the organizational decisions to collaborate more closely and intentionally blur the lines between organizations, set precedent that directly influenced the final results of these missions.