ASTROSOCIOLOGY, HUMAN FACTORS, AND THE US SPACE PROGRAM

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One of the many areas where astrosociology should apply sociology to space age activities is through the development and application of principles to support people who explore and settle space. Beyond this, sociologists can encourage space mission planners and managers, who often lack crucial sociological insight, to take behavioral principles into account. Charles Perrow's pioneering forcefully established that in many areas of engineering, including aerospace engineering, human factors is a "hard sell." Drawing on the author's thirty years of intermittent collaboration with NASA, this paper explores resistance to selected human factors topics within the US Space Program. We distinguish between *hard* human factors that encompass physiological and ergonomic considerations (for example, preventing black-out, and making sure that displays and affordances are easy to use) and *soft* human factors that encompass personal adjustment, group dynamics, intergroup relationships and other topics that are well established in psychiatry, social psychology, sociology, and organizational behavior. Within the US Space Program, the importance of hard human factors is generally recognized but the importance of soft human factors tends to be understated or overlooked. This reluctance to accord more than lip service to crucial areas of human life persists despite fragmentary evidence that personal and social issues have taken a toll on selected US and Russian space missions, and substantial evidence that they have affected performance in Antarctica, submarines and other undersea environments, experimental habitats such as Biosphere II, and other settings that are "spaceflight-analogous" in that they are characterized by some degree of isolation, confinement, deprivation, and risk. Reluctance to address a full spectrum of spaceflight human factors issues results from: (1) NASA culture, which is obsessed by maintaining sparkling public relations and maintaining a steady flow of funding from Congress; (2) engineering culture, with its emphasis on "lets get on with the metal bending," strong reliance on precedence and convention, coupled with an attitude that the astronauts can "take up the slack"; (3) astronaut culture, which calls for the suppression of any sign of personal imperfection or weakness; and (4) the inability of many human factors researchers to translate their findings into specific operational steps. We review recommendations to expand the role of human factors within the US space program, and consider various strategies and techniques that have been proposed for bringing this about. At the organizational level, flaws in leadership, communication and decision making contributed mightily to the loss of the space shuttles *Challenger* and *Columbia*, and it may be that an undeniable disaster at the level of the small group (crew) or individual (astronaut) is a precondition for spaceflight human factors to gain the recognition that they deserve. The Russian space program has always recognized a broad spectrum of behavioral topics, and cross-cultural differences help account for this. To maximize its contributions, astrosociology must move forward on many fronts, and spaceflight human factors is prominent among these.