Astrosociology Research Institute (ARI)

Astrosociological Insights

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Happy New Year from ARI!

The officers and advisors at the Astrosociology Research Institute wish everyone a healthy, safe, prosperous, and happy new year! July 2013 marks the tenth anniversary of the founding of astrosociology as an academic field by Dr. Jim Pass, so we are planning for a busy year. The field was first introduced on a website called "Astrosociology.com" and sought to define the academic field while also discussing its scope, relationship to the behavioral and natural sciences, and its relevance to human societies.

We have many plans aimed at expanding the academic field of astrosociology and we would like our supporters to participate at a greater rate this year. Announcements will occur throughout the year, including Astrosociology in the Classroom project, introduction of the Journal of Astrosociology, ongoing newsletters, and much, much more to come.

"Constructing the Future Society in Japan" Symposium at Meiji University, Tokyo, Japan / March 31, 2013

Renato Rivera Rusca
Meiji University, Tokyo, Japan, Lecturer

Japanese youth in modern society are at a loss when asked about their hopes, dreams and motivation for the future. By borrowing aspects of social entrepreneurship and critical thinking, I seek to establish an interdisciplinary forum where experts from a wide variety of fields gather and young people can take the initiative to reform a new society of their own accord. We aim to look globally to explore the possibilities for new generations of Japanese in brand-new areas of cultural studies such as space-related business opportunities and their social ramifications. Recent publications and news reports around the world point to the potential of these new sectors and awaken us to the realization that "outer space" is no longer a distant concept, removed from daily life, rather, it is an area deeply integrated into society, and full of new possibilities, as well as being the key to the future of today's young generation. Meiji University, as an institution which prides itself on developing the "individual," has a duty to provide such an opportunity for young people to look to their future from as many viewpoints as possible, so that they may make educated undertakings to create their own paths towards a better society.

The symposium will kick off with an online presentation by ARI representatives Dr. Jim Pass and Christopher Hearsey, and feature a series of talks from experts in a wide variety of fields such as Social Entrepreneurship, Anthropology and Sociology, as well as individuals active in raising awareness of space research and development, which include members of JAXA, YAC (Young Astronauts Club Japan), SDF (Space Development Forum) and even science fiction authors active in the creative fields.

The event will close with presentations by current Meiji University students, showcasing their own space-related activities from the Special Themed Practicum "Astrosociology" course, and a panel discussion where they will have the opportunity to interact and brainstorm together with some of the day's speakers, to create a unique forum conducive to an exchange of ideas for our future society.

For more information and updates on the symposium, please visit http://constructingfuture.wordpress.com/.

Overview of Critical Human Factors in a Manned Mission to Mars

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A manned mission to Mars will be one of the most crucial missions in the history of space exploration. Although current exploratory missions (missions into the unknown) to Mars and elsewhere involve intensive robotic operations, robotic exploration will eventually give way to human exploration, at least periodically in various stages of space exploration. That is because human cognitive capabilities are based on different principles compared to robotic software operating automats. In contrast, human subjects are capable of 'seeing and recognizing' patterns in unknown systems (including potentially habitable ecosystems) with subsequent modeling and identifications of major controlling variables. Thus, manned space missions are inevitable because exploratory activity cannot be done just by robots.

A roundtrip mission to Mars will take more than 2 years (some estimates show durations up to 879 days and longer). During that time, the crew will be exposed to a variety of environmental factors such as alternating between Earth 1g gravity-space microgravity and Mars 0.38 g-space microgravity-Earth 1g conditions, extended exposure to space radiation, spacecraft confined environmental effects, delays in communications with Mission Control, and multiple sensory deprivation in amounts which have never been experienced or tested before (for example the longest stay in space microgravity on board of MIR space station performed by Russian cosmonaut – physician Valery Polyakov was more than 438 Earth days). How can astronauts survive this long duration trip in various hostile environments of outer space and Mars? How can they maintain their health for an acceptable level of performance? What are those natural mechanisms which help people to survive in extreme environments? Which mitigation technologies are being developed today to assist astronauts in such a mission? These and other intriguing questions concerning human aspects of long duration space flight still persist.

Countermeasures for extended physiological deprivations of space flight are being developed currently. Some of these include exercising on board (specifically in microgravity, at least 2 hours a day), thorough scheduling for work/recreation and development/sleep cycle, food composition and supplements design, medical and hygienic procedures and approaches (another Russian cosmonaut Sergey Krikalev totally spent more than 803 days in space microgravity without serious health and performance deteriorations—he is still active in ground based projects). However, the psychological aspects of confined remote expeditions remain uncertain. Based on our exploratory experiences here on Earth we can currently hypothesize about those major stresses expected for long duration space flight: loneliness & depression, multiple tensions in relations with colleagues on board and in Mission Control, decline in mood and performance level, "lethargic" modes of functioning, symptoms similar to PTSD, relatively new 'stress of machine/technology dependence', and more stresses that reduce human operational capabilities.

Participants of Mars500 (confinement test conducted within Russian Space Agency) spent their time in a physically closed volume for more than 500 days before leaving their ground based module 'exhausted but smiling'… (probably because of confinement termination). This relatively recent experiment indicates the new phase of systematic research in the area of human psychology (specifically stress psychology of small group in extreme environments) and emphasize the importance of this research for future long-duration space missions.

In conclusion, we have to identify the existence of new stresses (mostly psychological) endemic to long-duration space missions which include, but not limited to, long periods of confinement combined with repetitive routine operation on an everyday basis. To counteract those stresses, additional extensive research has to be provided on those effects and their dynamics of evolution as well as efficiency of countermeasures testing. Pre-mission training (physical, psychological, and operational) will remain a major technique for space crew preparation for long-term voyages. Moreover, any approach has to ensure final mission to Mars success and therefore cannot only involve the "hard" sciences; rather, it must also involve the humanities and social sciences (i.e.., astrosociology).

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On the Predictive Qualities of Science Fiction

Simone Caroti, PhD, ARI Officer

During the golden age of science fiction (1926 to 1957), the general consensus of public opinion was that behind the garishly hued gadgets might stand some actual truths. The stories themselves may have been silly or poorly written (although many were neither), but that mattered less than the future they had seen thanks to their unique blend of fiction and science: a world of inventions stretching away in a hazy distance traced by the skylines of megalopolises yet to come, perfect and clean; a world of wonders. Science fiction (SF) knew the way.

We did have a track record to support this view: Jules Verne's work inspired the design of the first submarine; Arthur C. Clarke invented the satellite; Aldous Huxley envisioned cloning; Vernor Vinge and William Gibson foresaw the internet; and so on. There are many other instances of SF's predictive abilities, and they served the genre well. However, there are two problems with this perspective.

First, we tend to focus exclusively on those instances when SF accurately guessed the advent of some form of technology or correctly speculated on a future scientific breakthrough. For every SF narrative with an accurate forecast, there were ten broadcasting wildly inaccurate predictions. Secondly, the gadgets or the discoveries were secondary to the future world they made possible. SF was then, as it is today, a thought experiment in literary form – a way to posit a breakthrough and speculate on how it might change us. This is why SF matters. In this sense, however, it is seldom correct; the causal links between a scientific or technological innovation are so many, and their connections to everything else so varied, that for every innovation there must be a thousand, ten thousand, or a million different thought experiments exploring every possible ramification.

The idea of SF as predictive literature was a creation of its fathers, and in those early years it was probably a necessary creation. What do you do with a genre born inside the lowest form of publishing market available at the time? What do you say to make the street urchin presentable? At the time Hugo Gernsback founded *Amazing Stories* in 1926, SF was a poor man's literary fare, and neither academia nor mainstream publishing cared; thus, those working in SF argued its worth by stressing its real-life benefits: scientific and technological education, new inventions, offbeat solutions, and accurate forecasting of future trends.

Those benefits have, in time, proved more ephemeral than the intellectual and esthetic aggregate of SF's achievement, which is to give us a window into possible versions of ourselves. It matters little whether or not those versions are the stuff of prophecy, because the act of arguing a plausible future already turns it into a reality of sorts – if people can argue about it, then it's real enough, and in a sense it has already happened inside our minds. This, I would submit, is what we should mean when we discuss SF as prophecy, and what we should be addressing when we utilize SF works as tools for an astrosociological study. In its current incarnation, our discipline is a possibility engine, always struggling to define, articulate, and resolve plausible scenarios to pave the way between today on Earth and tomorrow in space; as such, it shares with SF the same intellectual framework – the same penchant for devising simulations, we might say. At least some such simulations constitute a fertile common ground from which astrosociology can derive useful policies, practices, and plans.