

Refining the Definition of Astrosociology Utilizing Three Perspectives

*Jim Pass*¹

Astrosociology Research Institute (ARI), Huntington Beach, CA 92647

*Christopher Hearsey*²

Astrosociology Research Institute (ARI), Huntington Beach, CA 92647

*Simone Caroti*³

Astrosociology Research Institute (ARI), Huntington Beach, CA 92647

A void has existed within the social sciences for over fifty years since the launch of the first Sputnik satellite in October 1957. This void delineates the boundaries of a missing field, a discipline capable of focusing on the relationship between social life and outer space. It is not that surprising that many may interpret a discussion of how outer space affects society as an “alien” idea, so we seek to delineate the ways in which such a discussion relates to the varied facets of social life. As a starting point, one may express the relationship between social life and outer space as astrosociology. We can define *astrosociology* as the study of social, cultural, and behavioral patterns related to outer space. The purpose of this paper is to provide a general framework for more precise language concerning the definition, scope, character, and future development of astrosociology, while simultaneously attempting to elicit a broader discussion of astrosociology’s association to other disciplines.

Astrosociology was originally a new subfield under the umbrella of sociology for a short time. However, a broader perspective fits much more aptly than a restrictive sociological perspective. Supporters from the social and behavioral sciences, humanities, and arts voiced their interest in astrosociology over the past few years via different scholarly mediums. Such scholarship is adding to the body of work of astrosociology. Moreover, an increasing number from the broad and heterogeneous space community began to recognize the interrelationships between the social science community and the space community. The three perspectives found in this paper include (1) astrosociology as a social science, (2) law and astrosociology, and (3) astrosociology in science fiction. These three perspectives symbolize threads within the discipline of astrosociology that link together to form a more coherent pattern of social interconnections, and better represent humanity’s movement into outer space. The authors strive to provide a better explanation of how astrosociology can bridge the divide within the various components of the space community and thus deliver a greater level of enlightenment regarding the social dimensions of outer space. In addition, the authors will critique the other respective disciplines in this paper and offer recommendations for further analysis and debate. A central outcome is to determine how the various fields and disciplines that comprise astrosociology as a multidisciplinary field can work together to build a missing body of knowledge and its related literature. Filling this void, we believe, cannot occur soon enough because a greater level of understanding regarding humans in space must exist before humanity actually migrates into the solar system and beyond. The continued development of this new field called “astrosociology” can achieve that goal.

I. Introduction

ASTROSOCIOLOGY cannot develop in a manner that reaches its full potential as an academic field without several rounds of careful thought and discussion – even considerable debate – concerning its very definition

¹ Jim Pass, Ph.D. (sociology), CEO and board member, ARI, P.O. Box 1129, Huntington Beach, CA 92647; Full AIAA member.

² Christopher Hearsey, M.S., ARI officer (Director of Programs and Special Projects) and board member, P.O. Box 1129, Huntington Beach, CA 92647; Student AIAA member.

³ Simone Caroti, Ph.D. (literature), ARI officer (Director of Educational and Public Outreach) and board member, P.O. Box 1129, Huntington Beach, CA 92647.

and character. As the founder of the field, Dr. Jim Pass constructed a working definition of astrosociology in order to facilitate the process of bringing in additional voices. Dr. Pass always intended this foundation, constructed in 2003, to serve as a starting point from which others could both challenge and refine issues related to the definition and scope of this developing field. The exercise demonstrated in this article is a good example of the formalization of this process. The authors anticipate that others interested in this emerging field will join the fray and participate in its development. This article serves as an invitation to other interested parties to comment directly on the contents presented here so that the field of astrosociology may progress in a healthy and relevant manner.

The first section of this article consists of three major parts. First, Dr. Jim Pass offers details about the definition and character of astrosociology as it now stands from a social scientific perspective – or more precisely, from principally a sociological standpoint – as an opening stance with the expectation that it will receive critical comments from the other two authors. This definition largely stays true to the original definition with a few updated concepts. Second, Christopher Hearsey weighs in with comments from a space law perspective. Third, Dr. Simone Caroti offers his perspective from the world of literature, specifically science fiction.⁴ This opening section sets the stage for the reader to familiarize himself or herself with each of the authors' basic positions.

The second section consists of comments from each author as they relate to the other two authors' original statements. Once again, this section is divided into three sections, organized by author. This second section attempts to examine the important issues illuminated by the three authors and provides both enhancements and criticisms as deemed appropriate. In this section, the potential is greatest for definitional expansion due to the synergies produced by the interactions among the authors.

The final section consists of conclusions provided by all three authors, in the form of a consensus, as a way to express accomplishments and limitations of this overall exercise. This section includes recommendations about furthering any accomplishments made and exploring new areas of research brought to light. Will the contents of this article change the direction of astrosociology's development? We shall see.

II. Defining Astrosociology from a Social-Scientific Perspective (J. Pass)

As a sociologist, my main concern centers on how astrosociology unites the space environment with the human ecology consisting of human societies. As expressed in the title of Albert A. Harrison's book, *Spacefaring: The Human Dimension*, the "human dimension" is a key concept in understanding the character of this field's approach.⁵ My reason for initiating the movement to develop astrosociology as an academic field in 2003 focused on the idea that the social and behavioral sciences, while extremely relevant and significant, had not paid much attention to the impact of space on human society.⁶ Moreover, the space community tolerated psychological input to a limited extent but did not significantly seek input from social and behavioral scientists.

Thus, both the social science community and the space community remained nearly isolated from one another. The astrosociological movement began as a response to this mutual isolation, as an effort to bridge the gulf between these two communities. Also known as the "Great Divide," it has resulted in an almost total concentration on engineering and physical/natural sciences in the American space program.⁷ Something was missing, and I thought it

⁴ Each author wrote their first section without input from the other two authors.

⁵ See Albert Harrison, *Spacefaring: The Human Dimension* (University of California Press 2001).

⁶ There has been some significant scholarly work over the years considering how outer space affects social life, but much of the scholarship has not specifically addressed astrosociological issues by name. For example, social scientists and humanities scholars like historians, political scientists, and economists have documented and commented on the space race and its Cold War context, policy as it relates to Earth-centric applications, and, to a lesser extent, the dubious economics of extraterrestrial resources. Only recently has the social dimension of spaceflight been taken seriously by scholars and only in limited or isolated contexts. See e.g., Steven Dick & Roger Launius, *The Societal Impact of Spaceflight* (NASA SP-4801 2007). A few sociologists, anthropologists, and social psychologists also took the initiative in contrast to their mainstream disciplines. See e.g., B.J. Bluth, *Sociology and Space Development*. A copy of this web article is located in the Astrosociology Research Institute's Virtual Library (as the original website no longer exists), www.astrosociology.org, <http://www.astrosociology.org/Library/PDF/Sociology%20and%20Space%20Development.pdf>, accessed August 9, 2010.

Another example of sociology examining space and social life is Alvin Rudoff, *Societies in Space* (Peter Lang Publishing, Inc. 1996). Nevertheless, the point remains that in-depth astrosociological studies of the interactions between society and outer space are limited in scope and the field that may be properly called astrosociology is underdeveloped. Consider William Sims Bainbridge, *Goals in Space: American Values and the Future of Technology* (State University of New York Press 1991) (pointing out sociology's indifference to space issues compared to the general public. Additionally, Alvin Rudoff (p. 75) asks, "And where is sociology?" Both sociologists expressed their frustration about their discipline's failure to recognize astrosocial phenomena as significant facets of social life and consequently the failure to develop a "sociology of outer space").

⁷ Marilyn Dudley-Rowley (-Flores), "The Great Divide: Sociology and Aerospace", unpublished proceedings of the California Sociological Association Annual Meeting (2004). A copy of this article is located in the Virtual Library of the Astrosociology

was time for the space community to acknowledge the potential of the social/behavioral sciences. Reciprocally, it was also time for the social/behavioral sciences themselves to acknowledge their own potential and, remarkably, finally acknowledge the significance of astrosocial phenomena in the social lives of people as well as to larger social structures.

While pioneers in the social/behavioral sciences existed before the advent of astrosociology, they largely worked in isolation within existing disciplines, often to the dismay or even shunning of their colleagues.⁸ A recognized single field within the social science community could theoretically bring together all of these individuals and allow them to interact more easily. Bringing the study of astrosocial phenomena to the mainstream allows for a more consistent accumulation of knowledge that is accessible to a much greater number of scholars, students, and professionals in both communities. Providing a definition of astrosociology allows for a shared understanding of what the field can offer. Doing so in the context of a tangible academic field allows for participation of interested people in astrosociological research, including a honing of that definition. The key is to create a definition that is accessible to the greatest number of people because that will ultimately result in the greatest number of participants. Furthermore, it would place pressure on both the space and social science communities to address the relevance and therefore acceptance of this developing new field.

A. Original and Current Definitions

Initially, I developed the working definition below.

“Astrosociology is defined as the sociological study of the two-way relationship between astrosocial phenomena and other aspects of society (i.e., non-astrosocial phenomena or other social phenomena) at the various levels of social reality and organization (i.e., the micro, middle, and macro levels of analysis). The concept of *astrosocial phenomena*...pertains to all social conditions, social forces, organized activities, objectives and goals, and social behaviors directly or indirectly related to (1) spaceflight and exploration or (2) any of the space sciences (e.g., astronomy, cosmology, astrobiology, astrophysics).”⁹

This working definition obviously emphasizes the sociological perspective even though there is no explicit mention of the concept of “culture.” It also seems to leave out space settlement due to its overly high precision.

Not long after the first definition, I changed the definition of astrosociology to “the social and cultural patterns related to outer space”.¹⁰ I intended this definition to focus on sociological subject matters related to space with the idea that this discipline continued to overlook a major area of theory and research. In its early stages, for less than a fortnight, this newly emerging field existed as a subfield of sociology. However, it became clear almost immediately that scientists, scholars, and space enthusiasts liked the idea but thought that limiting the field to sociological analysis was too narrow and thus too exclusive. Astrosociology was to take a different course than originally planned. The original concept of the relationship between space and humanity was never excised from the definition, and remains an integral element incorporated into the concept of astrosocial phenomena, despite the fact it receives no mention in the definition.

Very soon after its inception, it started to become apparent that astrosociology was much more robust than simply a sociological subfield. Other professionals, including those in the social and behavioral sciences, humanities, and even the arts expressed interest in the newly emerging field. These individuals included sociologists, space historians, space law and policy scholars, psychologists, social psychologists, anthropologists,

Research Institute’s website, www.astrosociology.org,

http://www.astrosociology.org/Library/PDF/Submissions/the%20Great%20Divide_CSA2004.pdf, accessed August 9, 2010.

⁸ See Jim Pass, *Astrosociology and Space Exploration: Taking Advantage of the Other Branch of Science*, proceedings of the Space Technology and Applications International Forum 2008 879-887 (Albuquerque, NM). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, www.astrosociology.org, http://www.astrosociology.org/Library/PDF/STAIF2008_OtherBranch.pdf, accessed August 9, 2010.

⁹ Jim Pass, *Inaugural Essay: The Definition and Relevance of Astrosociology in the Twenty-First Century (Part One: Definition, Theory and Scope)*, unpublished roundtable presentation at the American Sociological Association Annual Meeting 2004 (San Francisco, CA). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, www.astrosociology.org, http://www.astrosociology.org/Library/essay/iessay_p1.pdf, accessed August 9, 2010.

¹⁰ See Jim Pass, *The Astrosociology of Space Colonies: Or the Social Construction of Societies in Space*, proceedings of the Space Technology and Applications International Forum 2008 1153-1161 (Albuquerque, NM). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, www.astrosociology.org, http://www.astrosociology.org/Library/PDF/Submissions/STAIF_Astrosociology%20of%20Space%20ColoniesPDF.pdf, accessed August 9, 2010.

political scientists, economists, and those from several other disciplines and fields. It became clear that astrosociology had to become a multidisciplinary field that transcends sociology alone.¹¹

The third and current social-scientifically based definition reflects this greater diversity as follows: “the social, cultural, and behavioral patterns related to outer space”.¹² The addition of the “behavioral” component to the definition acknowledges the broader approach, especially as it applies to psychology, though it did not occur “officially” until 2009.¹³ These three types of patterns constitute a most central conceptualization known as *astrosocial phenomena*. This concept emphasizes the separation of space-related phenomena from other social and physical phenomena, as the latter do not focus on space issues. In a sense, then, astrosociology groups together relevant topics that speak to issues revolving around the relationship between outer space and humanity. The social component includes social interactions, group dynamics, societal issues, and interactions among nations. Cultural elements include norms, physical manifestations known as “material culture,” ideas – and thus values – and subcultures. The behavioral component adds phenomena that focus on the individual involving mental processes and resulting behavior. Thus, the definition implies that astrosociology includes micro-, middle-, and macro-levels analysis. Still, this definition emphasizes sociological concepts and thus it is subject to revision over time.

1. *The Multidisciplinary Scope of Astrosociology*

As stated, we have passed the point in which a focus on astrosocial phenomena by a single social or behavioral science field is justifiable. A great hindrance to the field of astrosociology would occur if various social science fields began competing to become its “official” home in academia. We can avoid such a useless and harmful bout of conflict by sharing the field through a cooperative approach, through a collaborative effort aimed at bringing together the best of what each science can add to the study of astrosocial phenomena. In this way, we can maximize the potential for building the greatest body of knowledge possible. On the other hand, infighting can only lead to a minimalization of the effort to understand humanity’s place in the universe and all of its fascinating corollaries.

Defining a new field inevitably creates issues related to how it fits with existing fields and disciplines. Unless the field is so unique that nothing exists to share any part of its subject matter, a new field will share existing areas of content. Such is the case with astrosociology. Many of the space-related fields that focus nearly exclusively on biology, geology, astronomy, or cosmology – as examples – fail to pay much attention to their impact on human beings and their societies. What makes astrosociology unique, despite the fact that it does share considerable existing subject matter, relates to its focus on any topic that deals with the combination of humans and space, i.e., its focus on astrosocial phenomena.

Existing fields such as space law and policy, and even astrobiology, do share overlapping contents, so what does this mean for the scope – and boundaries – of astrosociology? Astrosociology is different from the other fields in that it takes a social-scientific perspective and utilizes a multidisciplinary approach. It also binds existing fields together with a focus on the relationship between space and humanity. The human dimension serves the central conceptualization, or the glue that ties often-disparate topics together. Similarly, it alters existing space-related fields to some extent by adding the focus of astrosocial phenomena.

An easily understood definition would also benefit efforts to collaborate between the space and social science communities. Fields and disciplines within the space community cannot continue without considering the human dimension and, in fact, they have not done so even if on an informal basis. Humans were always in the equation in various facets. However, they were secondary to the analysis. The formal acknowledgment of a dedicated social science field – that is, astrosociology – has made it possible to collaborate with a tangible group of social scientists rather than pioneering individuals, which has allowed for a more inclusive interaction among all types of scientists. Both branches of science can now finally work together, bridging the Great Divide to allow for a balance between solving engineering problems and conducting human-based research as a single unified effort.

2. *Theoretical vs. Applied Astrosociology*

As with any scientific field, the emerging field of astrosociology must divide itself into two related parts. The theoretical half focuses on conceptualization or theoretical aspects. On the other hand, the applied half leans toward the practical application of more abstract concepts; that is, on the operationalization process. The former approach

¹¹ See Jim Pass, “Astrosociology and the Space Community: Forging Collaboration for Better Understanding and Planning,” *The Space Review website*, August 8, 2005, <http://www.thespacereview.com/article/424/1>, accessed August 9, 2010.

¹² See Jim Pass, *Pioneers on the Astrosociological Frontier: Introduction to the First Symposium on Astrosociology*, proceedings of the Space Propulsion, and Energy Sciences International Forum 2009 375-383 (Huntsville, AL). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, www.astrosociology.org, http://www.astrosociology.org/Library/PDF/Pass2009_Frontier_SPESIF2009.pdf, accessed August 9, 2010.

¹³ *Ibid* Pass at 375.

attempts to understand human behavior for its own sake. The latter approach seeks to solve concrete problems or contribute positively in some way to an existing set of conditions.

Thus, the theoretical half focuses on models of human behavior in isolated space environments. It attempts to discover laws of human behavior in isolated social settings complicated by issues added by the space ecology, or the set of relationships between human beings and their local space environment. For example, the subfield of medical astrosociology attempts to understand how biomedical issues common to space medicine affect human behavior. An illustration of this is how space-based realities such as contaminants from a planetary body or radiation from space affect humans' health and their behavior related to subsequent reactions to these threats as well as precautionary measures taken to protect their wellbeing in the future. Theory building remains the focus. Conducting research to verify hypotheses, and then refining the theoretical models continue as part of a never-ending loop.

Knowledge gained from theoretical exercises and empirically tested requires scrutiny for its potential for practical applications.

“Thus, the definition of *applied astrosociology* is the application of astrosociological knowledge to astrosocial phenomena in a manner consistent with improving them for the betterment of (1) space exploration and potentially (2) other aspects of a particular society. In other words, applied astrosociology involves the use of theory and research to solve real social problems related in some way to astrosocial phenomena.”¹⁴

In a sense, then, applied astrosociology can help mitigate social problems that arise anywhere humans subsist.

The applied half looks at how one could apply theoretical ideas and predictions to practical problems in various space environments. Social problems will occur in space, of course. However, astrosociological research can assist in mitigating social problems on Earth. Many may overlook or disparage this reality, but bringing space to Earth in more and more in meaningful ways seems the pattern of the future, especially as Earth-based nonrenewable resources continue to dwindle or else become contaminated.

Applied astrosociology must exist as an important part of astrosociology's definition because conceptualizations alone fail to improve the human condition on Earth or in space. Applications of theoretical principles will prove especially indispensable in space environments due to their unforgiving natures and the rigors of living and working in these isolated conditions. In space especially, this could mean a matter of life or death. Ongoing astrosociological research must continue, and quick successful adaptations to new or evolving threats must remain viable options. Theory building by itself will never result in practical solutions. Applied astrosociology represents a separate, but essential, facet that complements the theoretical side.

3. *The Astrosociological Imagination*

At a high level of conceptualization, the *astrosociological imagination* – borrowed from sociologist C. Wright Mills' (1959) concept of “sociological imagination” – consists of a special insightful way of looking at the world in which connections are made between macro-level astrosocial forces and the actions of individuals.¹⁵ It involves the ability to separate personal biography from historical social change. Possession of the astrosociological imagination means that the individual understands that he or she does not exist in isolation, but as part of larger space-related forces that influence him or her.

In my original essay on astrosociology,^{16,17} I noted the importance of applying the sociological imagination to understanding the astrosocial world.

“Bringing sociology into this area of inquiry is largely unrealized despite the irrefutably significant effects of astrosocial phenomena. Therefore, the application of the *sociological imagination* (Mills 1959) to

¹⁴ Jim Pass, *The Sociology of SETI: An Astrosociological Perspective*, unpublished proceedings of Contact Conference 2005 (Mountain View, CA) at 23. A copy of this article is located in the Virtual Library of the Astrosociology Research Institute's website, www.astrosociology.org, <http://www.astrosociology.org/Library/PDF/Submissions/Sociology%20of%20SETI.pdf>, accessed August 9, 2010.

¹⁵ See C. Wright Mills, *The Sociological Imagination* (Oxford University Press 1959). Mills' concept of the “sociological imagination” provides an important model for members of the space community. They can use this perspective, in the form of the “astrosociological imagination,” to incorporate astrosocial phenomena into their perceptions and thereby better appreciate the interrelationships between ordinary social life and the impact of astrosocial phenomena.

¹⁶ *Supra* 9, Pass.

¹⁷ See Jim Pass, *Inaugural Essay: The Definition and Relevance of Astrosociology in the Twenty-First Century (Part Two: Relevance of Astrosociology as a New Subfield of Sociology)*, unpublished proceedings of the California Sociological Association Annual Meeting 2004 (Riverside, CA). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute's website, [www.astrosociology.org](http://Astrosociology.org/Library/Iessay/iessay_p2.pdf), http://Astrosociology.org/Library/Iessay/iessay_p2.pdf, accessed August 9, 2010.

understanding the relationship between the typical citizen and astrosocial phenomena remains vital due to its ongoing, and arguably increasing, relevance.”¹⁸

This observation applies to bringing in all of the social sciences as well.

The astrosociological imagination relates to the definition of the field in the sense that it provides a framework for analyzing astrosocial phenomena. A definition is useless unless one possesses the ability to use the lens of the astrosociological imagination. In other words, the ability to recognize astrosocial phenomena is vital to studying their characteristics as well as their impact on individuals and society.

A good astrosociologist must be able to understand his or her connections to the social fabric beyond the obvious events recognizable on the surface that often hide much more complex phenomena from the uncritical eye. The average person lacks the astrosociological imagination. It takes an earnest effort to develop it, so we must not assume that an understanding of the definition of astrosociology represents the end of our preparation to become competent astrosociologists. It is just the beginning.

4. *Evaluation of a Technical Definition of Astrosociology*

Without question, defining astrosociology involves the provision of a technical description as provided above. A need exists to provide a precise theoretical definition of astrosociology. Such an approach provides the boundaries that encompass the subject matter of astrosociology as an academic field. In the present case, the precise definition indicates the social-scientific perspective inherent in the astrosociological approach.

On the other hand, such a technically precise definition remains inadequate in the sense that is rather vague as to its application. “Social, cultural, and behavioral patterns” do not speak to the nuances and details of how to apply these patterns in various subfields. The more precise definition serves as a foundation for more subtle observations and additional conceptual ideas from an expanded perspective, but it remains inadequate alone. For this article, the expansion into the more precise areas of legal and science fictional dimensions of astrosociology provide good examples of applying the precise definition to specific areas utilizing the astrosociological imagination. The ability to make the connections between the individual and society, and between space and society, provides an indispensable tool for expanding the astrosociological definition.

B. The Relationship between Outer Space and Human Society

Astrosociology as defined above clearly involves a human interaction with space ecologies, whether directly through space travel or indirectly via the deployment of space robots. The human component is essential, as I have emphasized from the very first time I discussed astrosociology.

“The significance of astrosocial phenomena is further demonstrated when comparing it to non-astrosocial phenomenon, such as what may be termed *space phenomena*. When considering space phenomena, the focus is on characteristics of the physical properties of objects and processes in space *without human interaction*. As such, space phenomena are not inherently social phenomena and thus not astrosocial phenomena. Space phenomena remain important, of course. However, they are not the specific focus of astrosociology unless a particular space phenomenon becomes linked to human beings in some way. For example, an asteroid on a collision course with Earth is, by itself, a space phenomenon. However, when discovered by human beings, studied, and perhaps even redirected off its collision course, each of these social patterns represents an astrosocial phenomenon. Astrosocial phenomena, in this context, refer to humans interacting with one another as they relate in some way with space phenomena (*italics in the original*).”¹⁹

The human dimension is the key to the astrosociological approach. There is an interaction between astrosocial phenomena and non-social phenomena.

The inverse relationship between space and the human species, a main element that defines the nature of astrosociology, results in the creation of another bilateral split. At some point, Earth will matter less, very little, or not at all for those living in distant space societies. However, for now, nearly all human beings reside on Earth, so this relationship must receive a great deal of attention as it represents the incubation period that precedes humanity’s eventual transition to a true spacefaring species. Today, our most advanced development has produced only space-capable societies.²⁰ Thomas Gangale offers a good analogy based on my definitions of space-capable societies and spacefaring societies, and their differences.

“...as we approach the 50th anniversary of human spaceflight, we are still not truly a “spacefaring” culture, but merely a “space-capable” one. The analogy I draw is of a coastal culture that puts out to sea in small

¹⁸ *Ibid* Pass at 5.

¹⁹ *Ibid* Pass at 4.

²⁰ *Ibid* Pass at 20.

boats and returns with catches of fish, as distinct from a seafaring culture that as a matter of regular commerce voyages between the continents. Likewise, a true “breachment” of the planetary cradle means voyaging to other planets on a routine basis and establishing permanent, self-supporting settlements on them. (quotation marks added)²¹

This area of theory and research is important to the definition of astrosociology because it involves astrosocial phenomena at various stages of development. Moreover, the contributions from multiple fields and disciplines are important to characterize properly societies along the continuum from no flight capability to spacefaring status.

Theoretically, characteristics of spacefaring societies include most people on Earth affected by space in a myriad of ways, societal institutions intertwined with astrosocial phenomena in addition to more people traveling, working, and living in space.²² Astrosocial phenomena do not dominate how our societies on Earth function. Astrosocial phenomena are not ubiquitous to everyday social life or in the functioning of our institutions. Today, the most advanced societies on Earth are merely space-capable societies, and thus just at the beginning of the continuum leading to true space societies on Earth.²³

In the current context of reviewing the relationship between outer space and human society, the growing influence of space on human populations on Earth and in space will become increasingly significant to humanity’s future. The two-way relationship between Earth/humanity and space includes two directional forces that will result in a bifurcation of the human species and eventually the creation of at least two independent evolutionary paths. Thus, Earth and space affect each other in two related causal directions. One relates to what happens when humanity leaves Earth into various space ecologies while the other concerns what happens when space impinges on Earth, both directly and indirectly. The former leads to migration into space while the latter results in humans remaining on Earth to cope with their existence in part through the utilization of space resources.

When looking at the cause-effect relationship in terms of what causes humanity to favor migrating into space and leaving Earth, the focus becomes phenomena on Earth that compels humanity to favor the unknown over the known, a set of social forces produce the imperative to settle the space environment.²⁴ The causal arrow is from Earth to space, indicating a pattern of emigration from Earth. For the current epoch, the focus remains Earth-centric because no humans remain forever in space. The lure of additional “land” may cause some groups to leave Earth. Such things cause a portion of humanity to explore space, work and play there, and eventually stay there indefinitely. The intent to live in space outweighs the familiarity and safety of living on Earth. People elect to abandon Earth’s surface for a variety of reasons. Examples include overpopulation, energy and resource scarcity, global warming, the fear of destruction from super volcanoes and asteroids, and religious persecution and conflict. Another illustration involves astronomers who may wish to relocate themselves on the far side of the Moon or an even further object in order to construct and operate a telescope without interference from Earth’s atmosphere. In this example, scientific discovery lures astronomers away from Earth.

²¹ Thomas Gangale, *Practical Problems in Astrosociology*, unpublished proceedings of the California Sociological Association Annual Meeting 2004 (Riverside, CA) at 4. A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, www.astrosociology.org.

<http://www.astrosociology.org/Library/PDF/Practical%20Problems%20in%20Astrosociology2.pdf>, accessed August 9, 2010.

²² See Jim Pass & Albert Harrison, *From Airports to Spaceports: An Astrosociological Model of Social Change toward Spacefaring Societies*, AIAA-2007-6067 (2007). Proceedings of the American Institute of Aeronautics and Astronautics Space 2007 Conference and Exhibition (Long Beach, CA). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, www.astrosociology.org.

<http://astrosociology.org/Library/PDF/Contributions/Space%202007%20Articles/Airports%20to%20Spaceports.pdf>, accessed August 9, 2010.

²³ *Ibid* Pass & Harrison.

²⁴ The “space environment” as a general conceptualization, in the singular, refers to the vast region beyond Earth’s atmosphere. In the plural tense, I would define “space environments” to refer to the idea of multiple locations, each with its own unique mix of physical characteristics found in specific regions of space such as on the Moon, in low Earth orbit, or on the surface of Mars. Each environment possesses the potential of becoming an ecology if humans ever visit there. Each ecological system possesses its own set of conditions that require specific adaptations by humans to varying conditions (e.g., radiation, gravity field, atmospheric chemistry). Thus, an environment refers to a physical location while an ecology refers to the human relationship(s) to that location. See Jim Pass, Marilyn Dudley-Rowley (-Flores), and Thomas Gangale, *The Cultural Imperative to Colonize Space: An Astrosociological Perspective*, AIAA-2006-7488 (2006). Proceedings of the American Institute of Aeronautics and Astronautics Space 2006 Conference and Exhibition (Long Beach, CA). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, www.astrosociology.org, <http://www.astrosociology.org/Library/PDF/Cultural%20Imperative.pdf>, accessed August 9, 2010.

Some of the ways in which space affects humanity on Earth – and, by definition, on societies, institutions, social groups, and individuals – causes human beings to become content with remaining on Earth. Abstractly, humanity pulls space toward Earth. The causal arrow is from space to Earth. Most humans reside on Earth but utilize space resources to enhance their lives. Travel into space occurs to fulfill the objective of bringing benefits back to Earth. Some people may recognize the benefits of space but prefer to improve conditions on their home planet rather than leaving for off-world destinations. These types of forces both contribute most to the development of terrestrial spacefaring societies. The exploitation of space resources from asteroids for use on Earth serves as a good example. The areas of solving or mitigating social problems with space assets, spinoffs and technology transfers, and knowledge resulting from the space sciences such as astronomy and space missions easily come to mind. Of course, there will always be those on Earth who benefit from space resources and other forms of astrosocial phenomena without taking part in the process. They do not seek benefits from astrosocial phenomena. They merely stand by, ignore, or fail to recognize efforts made without taking part or supporting the effort. If they benefit, it is only because their passivity did not hinder the creation of beneficial results through their opposition. This category of humanity represents the largest segment in the beginning phases of humanity’s migration into space.

The relationship between humanity and space will not result in consistent outcomes. At the micro level, individuals will possess unique perspectives. For example, one person may view social problems as unsolvable and opt for a new start in a space environment. Here, the lure of space resources draws humanity into space to the extent that individuals agree on a specific mission and organize themselves to realize their ideas on the macro level. Alternatively, another person may assess the same social problems and look to terrestrial science for solutions. In this case, there is no expectation that space assets could solve, or even mitigate, Earthly problems. Thus, various social groups and societies on Earth are likely to take distinctive perspectives on these sorts of matters. Obviously, then, this relationship between space and human society, like exploration in general, is a complex and evolving one that will become even more compelling as we move further into the twenty-first century.

Therefore, the relationship between space and humanity remains interwoven, one intrinsically connected to the other. As humanity continues to pursue space exploration, space exploitation, space science, and settlement, this relationship will strengthen as more humans venture into space on temporary and permanent bases, along with social institutions and groups on Earth creating ties to extraterrestrial ecologies. True migration into space will provide an even greater connection to space, one in which the connection to Earth becomes weakened to some extent. Thus, one cannot simply dismiss the significance of space for humanity even while terrestrial social problems demand a great deal of attention. The existence of terrestrial social problems and that of evolutionary pressures toward migration into space are not mutually exclusive. Rather, they actually possess a great many ties to one another that are worthy of examination. Definitional principles and the astrosociological imagination will guide the way.

C. Rocket Science vs. Social Science

Space exploration and settlement do indeed require engineering expertise for successful outcomes. The hardware comprising spacecraft and space habitats must work flawlessly, or nearly so, in order for any space mission to enjoy sustainability. Nevertheless, this necessary condition – a minimal requirement – is not sufficient to ensure success when human beings are involved. When one places humans in the space exploration or settlement equation, the possibility of a successful outcome becomes much more complicated. Thus, the correct way to understand the relationship between rocket science and social science boils down to a cooperative approach that blends the two into a single set of conditions.

Nevertheless, the traditional way of looking at this relationship remains clearly identified in the history of the first fifty years of the space age in which the physical environment is pitted against the social environment. This approach is clearly faulty and becomes less logical as we move further into the twentieth century. We should remember that the relationship between the heavens and human society began long before the modern space age. Today, it serves as a key component of humanity’s future. Yet those in the space community have tended to downplay the importance of the human dimension to the extent warranted for most of the space age.²⁵ After all, human beings explore space – and the rockets, spacecraft, and probes serve merely as tools to make this possible. Thus, the human dimension exemplifies our drive to explore and accumulate knowledge.

In truth, then, it is not a matter of pitting “rocket science against social science.” Rather than “rocket science vs. social science,” we should really be talking about “rocket science *and* social science.” The same rule is applicable to all space-related physical and natural sciences. That is, we should look for ways to add the social-scientific perspective to the existing curricula that focus on rocket science. Rocket science and social science represent two

²⁵ *Supra* 5, Harrison.

sides of the same coin that correspond to the natural/physical and social/behavioral branches of sciences.²⁶ Although originally applied to space settlements, the following fundamental rule also applies to all human space endeavors: “*construction of the social environment is just as important for survival as construction of the physical environment*” (italics in the original).²⁷ Humans are social animals who thrive in social groups and endure hardships during isolation. Thus, the social environment must be part of the definition of astrosociology. The social and physical worlds are complimentary to one another. Together, they interact to enhance the probability of survival of humans in space to its ultimate potential.

Only a collaborative effort between the two can provide the greatest potential for success. Collaboration, and not antagonism or denial, addresses the big picture of hardware and humans coexisting in a mutual or symbiotic relationship. Each depends on the other to function over the long term. There is no way of continuing to deny the extensive knowledge gained by social and behavioral sciences. Terrestrial analogs to extraterrestrial situations do indeed exist. One cannot credibly argue that social science knowledge lacks application to space-related conditions because very similar social conditions exist on Earth.

D. Astrosociology as the Missing Perspective

The absent viewpoint throughout the space age loomed over the space community for over fifty years without major repercussions. Engineering and technology were able to carry the U.S. space program through its intended paces with a minimum of problems related to astrosocial phenomena. As we move into the second decade of the twenty-first century, however, especially as we prepare to move beyond low Earth orbit, the astrosociological implications of that significant expansion will move to center stage alongside the technological considerations. It can no longer remain missing because it would likely result in a series of disasters as people migrate into space and attempt to live in confined quarters without input from the social sciences. While people are encouraged to learn from their mistakes, it is best to use terrestrial examples in order to avoid accidents in space. However, as long as astrosociology remains the missing perspective among mainstream social scientists, applicable knowledge will be ignored by social scientists and remain unknown to the space scientists.

1. Expansive Scope, Limited Attention

The fact that astrosociology is constructed as a multidisciplinary field, which focuses on humanity and outer space, inevitably results in a sweeping field with expansive scope. Part of it relates to the fact that the human dimension is added or greatly emphasized in fields and disciplines that already exist though focusing on the nonhuman elements of space science and research. The introduction of “human factors” served as a way to bridge the human dimension with the technological dimension, but it was not truly the introduction of the social sciences, which remained largely barred from participation in the space program.²⁸ Today, I am starting to recognize signs that this isolation is slowly ending. Members of the space community are beginning to understand the need for a field such as astrosociology.

The interesting fact about the scope of astrosociology lies in the limited attention given to the subject matter. This is certainly not universal, as areas such as space law and space policy have received their due consideration, but most of the other potential subfields rarely receive much discussion. When taking into account the fact that the ultimate goal – or at least a substantial part of it – has always involved a human migration into space, the fact that the study of astrosocial phenomena were largely ignored for most of the fifty plus years of the space age is no less

²⁶ Jim Pass, *Developing Astrosociology for the Space Sciences*, unpublished proceedings of the International Space Development Conference Annual Meeting 2006 (Los Angeles, CA). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, www.astrosociology.org, <http://www.astrosociology.org/Library/PDF/submissions/Developing%20Astrosociology.pdf>, accessed August 9, 2010.

²⁷ Jim Pass, *Living in Space: Cultural and Social Dynamics, Opportunities, and Challenges in Permanent Space Habitats* 71, 74-75 (Sherry Bell & Landon Morris, eds., Aerospace Technology Working Group 2009).

²⁸ Arguments exist for utilizing human factors nomenclature, though I prefer social-scientific definitions. For example, “[i]n planning extended space missions, one simply cannot count too much on the capacities of individual crewmembers alone, but instead one must bank on a comprehensive picture, the components of which are the different human factors interfaces: the human-technology interface, the human-environment interface, and the human-human interface.” See Marilyn Dudley-Rowley (-Flores), *The Mir Crew Safety Record: Implications for Space Colonization*, AIAA-2006-7489 (2006). Proceedings of the American Institute of Aeronautics and Astronautics Space 2006 Conference and Exhibition (Long Beach, CA). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, www.astrosociology.org, <http://www.astrosociology.org/Library/PDF/MIR%20Safety%20Record.pdf>, accessed August 9, 2010. Two questions remain. How do we integrate human factors literature into astrosociology? How does this affect its definition? These questions, important as they may be, are beyond the scope of this discussion. However, we hope to follow up on this discussion in the near future.

than astonishing. One would expect that the social and behavioral sciences at the very least would recognize their importance. Yet even today, this is hardly the case.

2. *Missing, but Not Irrelevant*

During the course of the space age, NASA managers in charge of overseeing the day-to-day progress of the American space program concentrated much more strongly on the physical dimension of space exploration to the detriment of the human dimension.²⁹ Ensuring that machines function properly garnered the most attention and thus the most funding. Keeping humans alive in their space vehicles was also important, of course, but it served as a secondary concern originally clamored for by the Mercury astronauts. Of course, this type of climate could only downplay involvement of the social and behavioral sciences beyond a limited involvement by psychologists. They selected astronauts who possessed “the right stuff” and thus it seemed to many that professionals need not worry about superfluous complications such as astrosocial phenomena. Movement toward the acceptance of a field such as astrosociology took a slow and winding road, but we have arrived at a point in history at which the definition of the field requires attention.

Thus, the fact that astrosociology was missing during most of the space age does not equate in any way with its importance to the future of humanity’s relationship with space. This fact is inherent in the very definition of the field. In fact, the relevance of astrosociology will only increase as humans move beyond low-Earth orbit and especially beyond the Moon. We should begin to treat astrosocial phenomena as significant influences of humanity’s future without delay.

E. **The Significance of an Academic Field**

Without a formal presence of a committed social science field dedicated to the human dimension of space, it seems unlikely that the human component would ever receive adequate attention. This remains true even when humans travel into space. Sociology and the other social/behavioral sciences emerged in terrestrial societies because the study of human behavior and the complex social/cultural structures created by humans required application of the scientific method. Logically, one would expect the same is true for understanding human behavior as well as complex social and cultural structures in space. If this comparison is valid, then it should surprise no one that we need to develop a field such as astrosociology *before* humans migrate into space on an escalating and sustained basis. Astrosociology is vital because it fills an empty void in academia in both the theoretical and practical realms, as expressed earlier. The absence of astrosociology as a field dedicated to the social/behavioral issues related to space would result in space programs and commercial enterprises that fall short of the ability to sustain humans in space for substantial periods. We need to apply the lessons learned in terrestrial societies to human groups in space.

1. *The Astrosociological Frontier*

The early stage of development for any academic field involves the absence of its presence in academic settings. This, in fact, represents the initial condition that members of the movement to develop the field must overcome. The *astrosociological frontier* refers to the largely unexplored territory characterized by education and research related to astrosociological issues. As I note in previous work,

“[t]he astrosociological frontier refers to the lack of development of astrosociology as a scientific field – or anything like it earlier during the space age. It includes both the (1) unoccupied “landscape” in academia characterized by the lack of astrosociology in its curricula and (2) dearth of space research focused on social-scientific (i.e., astrosociological) topics both inside and outside of traditional academia in collaboration with traditional space community members and the new space entrepreneurs. Within academia, the “frontier” is characterized by a lack of courses, programs, and departments dedicated to astrosociology.”³⁰

The astrosociological frontier exists. We must now seek to “settle” it.

The astrosociological frontier represents an academic wilderness in which very few astrosociologists have settled. This metaphor is helpful in the sense that it illustrates the very small impact that astrosociology has made in

²⁹ The emphasis here is on the resources used by the NASA workers and contractors to make the Moon landing possible eventually. They focused on solving engineering problems and secondarily acknowledged social issues, as when the Mercury astronauts demanded windows in the capsule. The human dimension was secondary. At the same time, it is true that the space program was approved and funded based on political issues related to the power and prestige relationships between United States and the Soviet Union. However, I want to emphasize the type of knowledge that was thought to be crucial for getting the U.S. to the Moon first as a practical matter – and engineering reigned supreme in this practical exercise, rather than the issues related to maintaining the bipolar political world of international relations by others who had influence on the space program, including Congress and the military. This indifference toward astrosocial phenomena continued well beyond the end of the Cold War.

³⁰ *Supra* 12, Pass at 375.

academic circles, including within sociology and the other social/behavioral sciences. It also lucidly demonstrates the challenges ahead, which is a good thing for any fledgling field. Armed with a clearly defined definition and the astrosociological imagination, the settlement of the frontier by astrosociological pioneers seems inevitable. The challenge remains to assist others to develop the astrosociological frontier and thereby have the knowledge and perspective necessary to settle this academic wilderness.

F. Defining Points for an Expanded Definition

In concluding my initial section, it seems prudent to emphasize that my background in sociology inevitably resulted in a perspective that focuses on issues related to issues such as social structures, culture, social interactions, group dynamics, and social change. The question arises, how do we expand the definition of astrosociology beyond a technical social-scientific starting point? While these issues centered on astrosocial phenomena make up the core of astrosociology, they do not encompass its entire conceptualized nature. Alternatively, viewed another way, we need to expand the scope of astrosocial phenomena to include new concepts. Input from other fields, both inside and outside of the scope of astrosociology, must occur.

The very nature of a multidisciplinary field allows for, and even demands that, unique perspectives of other fields and disciplines become part of the conversation about defining astrosociology. The central theme tying all the possible perspectives together is the central dichotomy of outer space and humanity. The former is the ecological backdrop while the latter consists of the human beings complicated by their numbers, behavioral patterns, frailties, and technologies. The inverse of this relationship involves Earth as the ecology with the great bulk of humanity on its surface. The difference is how space issues intrude on their lives, social structures, and cultures from space as various forms of astrosocial phenomena. Each direction of this inverse relationship has its own set of issues and expectations, along with multiple areas in which the two interact and sometimes fall into conflict. These concerns will serve as a fertile area for both definitional work and research into other areas.

Although not a major focus of this article, it is important to note that collaborative issues between the two branches of science produce areas of interest that link engineering and architectural considerations to the social science backbone of the field. A good example of this is the relationship between astrobiology and astrosociology.³¹ Any overlapping issues tie the physical/natural sciences to the social/behavioral sciences as this particular example demonstrates. An underlying theme relates to the impact that the detection of extraterrestrial life would have on terrestrial societies, along with their institutions and social groups. The detection of extraterrestrial intelligence would affect us much more strongly, altering fundamental elements of culture and even the direction of our species in a myriad of ways. It clearly demonstrates how astrosocial phenomena affect society, culture, and individuals. We are unlikely to predict most of the implications without preliminary careful thought.

Thus, part of the development of astrosociology must focus on making the definition of the field comprehensible to others so that (1) they can decide if it interests them and (2) those in other fields can understand how astrosocial phenomena relate to their work. Accomplishing the former task will help recruit students and others into the field. The latter makes collaboration possible. Another important part of the development of astrosociology lays out the principles under which the field will operate. This task defines things such as the subfields, central concepts, theoretical models, and empirical directions.

Next, my fellow co-authors present two additional perspectives regarding the evolving definition of astrosociology. This developing academic field continues to shape itself beyond my original delineation while simultaneously incorporating it as it becomes more complex and accommodating to other disciplines/fields. Finally, it is noteworthy to point out that the definitional elements presented in this first section represent the initial state of the field, as no one has specifically challenged or purposely sought to alter this definition since the field was instigated in 2003. This fact makes the present exercise that much more important because its purpose is to expand it beyond its original form.

III. The Nexus between Law & Astrosociology (C. Hearsey)

Astrosociology, as we discuss throughout this paper, is a defining concept that attempts to bridge a variety of disciplines into a single field of research. The main tenets of astrosociology engender a view that pulls together the elements of social life on Earth with the impact and affect that the outer space environment has on humanity *in toto*.

³¹ See Jim Pass, *The Astrosociological Implications of Astrobiology (Revisited)*, 1208 American Institute of Physics 402-417 (2010). Proceedings of the Space, Propulsion & Energy Sciences International Forum 2010 (Greenbelt, MD).

Dr. Jim Pass has defined the term astrosociology³² to mean “the study of astrosocial phenomena (i.e., the social, cultural, and behavioral patterns related to outer space).”³³ This is a good starting point, but I believe this definition needs to be fleshed out further and connected to more recognizable disciplines within the field of law. Below I delineate how some subjects of law that have been neglected in the astrosociology literature fit in with the study of astrosocial phenomena. Nevertheless, my hope is to grow and perhaps enlighten the view that astrosociology can produce new knowledge and insight into humanity’s ever-growing appetite for the exploration and exploitation of outer space. Along these lines, I will follow a course that fleshes out how law, legal norms, and legal theory fit into the definition of astrosociology. My goal is to show how scholars may combine law and astrosociology into productive research and analysis.

Over the past several years, I have attempted to develop my own writing relating to law and astrosociology. The focus of some of my work has centered on how activities and conduct in the outer space environment affects the development of legal rules for outer space.³⁴ The social aspects of law are well documented in various literatures,³⁵ and it only seems natural that outer space has affected, still affects today, and will continue affecting in the future the development of legal rules capturing society’s push beyond Earth’s vital embrace. The definition Dr. Pass provides is a good starting point in which to analyze the merits of law and astrosociology, and I shall begin with a critique of it while providing my own definition of law and astrosociology. I will then move on to addressing the elements of analysis that explain the connections between law and astrosociology. Moreover, I do not intend for the discussion below to be an exhaustive listing of all avenues of research. There is adequate room for expanding the definition and scope of astrosociology, as well as the definition and scope of law and astrosociology.

Let me begin by setting the boundaries of the discussion. Astrosociology describes the intersection between (although I would not necessarily say human)³⁶ ecologies and the outer space environment. I use the term “outer space environment” in the physical sense. This is juxtaposed with the “Earth environment”, in which humanity currently resides. Other extraterrestrial environments, such as the surface of the Moon or the Sun, would be by definition under “outer space environment”. Thus, I do not mean to extend the term beyond the physical sense into the psychic or sociological sense. My precision here in using the term is meant to provide context for understanding how facts shape law. Knowing the elements and conditions a physical environment places upon the establishment of social (i.e., norms) and legal rules is, in my mind, important to refining the definition of astrosociology. In addition, by differentiating the outer space environment from the Earth environment, we can examine more definitively the intersecting astrosocial elements of both the outer space environment and the Earth environment. The outer space environment may nest human activity thereby giving root and room for space ecologies. I would define the space ecology to mean the relationship between the distribution, abundance, and relations of organisms within the outer space environment. Perhaps the issue is a matter of degree; nevertheless, space law has evolved from a set of analogous environments and the legal rules and norms expressed in various human ecologies have adapted to those environments, e.g., social and legal rules pertaining to the sea, air, and Antarctic. Therefore, astrosociology, applied and theoretical, considers to a large degree how, why, when, and where astrosocial phenomena develop(ed) and/or evolve from or in space ecologies.

In Part One of the Inaugural Essay on astrosociology, Dr. Pass lays out the definition, theory, and scope of astrosociology – defining it early on as simply a sociological subfield.³⁷ But by 2005, he began to think of it as a multidisciplinary approach.^{38,39} Today, he defines it this way, “astrosociology [i]s intended as both (1) a subdiscipline of sociology and (2) a multidisciplinary field that includes, but is by no means limited to

³² Allen Tough originally coined “Astrosociology” as a social-scientific term. See Allen Tough, *Positive Consequences of SETI Before Detection*, 46th International Astronautical Congress (October 1995), *Invitation to ETI* website, <http://www.ieti.org/articles/before.htm>, accessed August 9, 2010.

³³ *Supra* 12, Pass.

³⁴ See e.g., Christopher Hearsey, “The Evolution of Outer Space Law: An Economic Analysis”, forthcoming Graduate Thesis (The University of North Dakota 2011); and Christopher Hearsey, “Morality and Ethics in Outer Space Laws and Policies: An Astrosociological Approach” presentation given as part of the Second Symposium on Astrosociology as part of the Space Propulsion and Energy Sciences International Forum 2010 (Greenbelt, MD).

³⁵ See e.g., *The Politics of Law*, 3rd ed. (David Kairys, Ed., Basic Books 1998) (1982); David Friedman, *Law’s Order* (Princeton University Press 2000); Steven Vago, *Law and Society*, 8th ed. (Pearson Prentice Hall 2006) (1981).

³⁶ See e.g., Christopher Hearsey, *Universal Conservationism: A Proposal to Establish World Heritage Sites Beyond Earth*, AIAA-2009-6747 (2009) (discussing the moral considerations of various space ecologies). Proceedings of the American Institute of Aeronautics and Astronautics Space 2009 Conference and Exhibition (Pasadena, CA).

³⁷ *Supra* 9, Pass.

³⁸ *Supra* 11, Pass.

³⁹ *Supra* 14, Pass at 27.

disciplines/fields such as psychology, anthropology, economics, social psychology, political science, space history, space law, space policy, philosophy, as well as the arts.”⁴⁰ The growth and dependence on outer space for social interconnectedness, security, and scientific investigation requires a deeper understanding of the astrosocial dynamics that infuse human society. Thus,

“[t]he field of astrosociology takes a perspective that emphasizes the study of the relationship between “outer space and society,” sometimes referred to as the “intersection between space exploration and humanity.” This relationship is characterized by a two-way, or reciprocal, interaction between the two and occurs at the micro, middle (or meso), macro, global, and, at some point in the future, the interplanetary level.”⁴¹

Moreover, the subtle influences that the outer space environment has upon society becomes obvious when scholars face limitations in traditional fields of social science to describe what rightly should be identified as astrosocial phenomena. The relevance of astrosociology therefore becomes clear. Earth envelops the social, cultural, and behavioral patterns of human society, while social patterns simultaneously operate at the cusp of outer space.⁴² The two-way connection between outer space and Earth affects and facilitates new social relationships on Earth. Astrosocial phenomena are thus a product of outer space’s influence on society at every level of analysis.

The usefulness of astrosociology is its multi- and inter-disciplinary focus. Although there are many interconnections between the concepts of astrosociology and law, it is beneficial to provide some perspective on why both concepts fit together. First, the sociological aspects of law are quite entrenched in both legal and sociology literatures.⁴³ There is research into a variety of forms including definitions of law, types of law and legal systems, functions of law, dysfunctions of law, and social paradigms of law.⁴⁴ Legal experts and sociologists discuss these aspects in behavioral, economic, political, and historical contexts, as well as within the context of other disciplines and fields. As the Law and Society Association notes, its scholarly focus is concerned with “the place of law in social, political, economic and cultural life.”⁴⁵ Most of the work coming out of the law and society field is based upon investigations into Earthly social patterns.⁴⁶ This missing perspective (i.e., astrosociology), arises because the content of law is primarily Earth-centric. It is not surprising, then, that academics in the field of law and society have not attempted to investigate how the outer space environment influences the dynamics and kinematics of social systems and the law. Astrosociology provides answers to the missing or hidden perspectives that beset many social science fields and the legal profession. For example, space technology affects, *inter alia*, social organization, policy, law, and justice. Look, for example, at the proliferation of satellite transmissions integrating governments, institutions, and individuals into an entrenched global society. What are the social, cultural, and legal implications of satellite utilization?

Therefore, expanding the focus of law and society to include the subset of law and astrosociology can provide important insights into how outer space influences the law, as well as the social, political, economic, and cultural aspects of human society. Moreover, humanity’s slow transition from an Earth-centric to an outer space-oriented society can provide new ways of studying “the place of law in social, political, economic and cultural life”⁴⁷ *via* different or new modes of observation. These themes of research can also provide unique case studies for testing social science and legal theories.

I define law and astrosociology as the study of the nexus between law and astrosocial phenomena. As defined by Dr. Pass, astrosocial phenomena consist of “the social, cultural, and behavioral patterns related to outer space.”⁴⁸

⁴⁰ Jim Pass, “What is Astrosociology?”, Astrosociology Research Institute (ARI), *ARI website homepage*, <http://www.astrosociology.org>, accessed August 9, 2010.

⁴¹ *Ibid* Pass *ARI website homepage*.

⁴² From this point of view, it is appropriate to note how religious, mythological, and science fiction literatures have influenced the human conception of outer space. My colleague Dr. Simone Caroti will speak within the context of science fiction in the next section addressing this point.

⁴³ This includes social science in law and law in social life. See e.g., John Monahan & W. Laurens Walker, *Social Science in the Law* 7th ed. (Foundation Press 2009 (noting ways in which social science research has been used in the law, including the bases for rationales and evidence in legal decisions); see also, *infra* 49.

⁴⁴ See e.g., *supra* 35, Vago.

⁴⁵ The Law and Society Association, *The Law and Society Association website*, <http://www.lawandsociety.org/>, accessed August 9, 2010.

⁴⁶ In a recent literature search, I was not able to find an article in the journal of Law & Society discussing the affects outer space has upon society. This, however, may change in the future and would be a welcome start to astrosociology’s ability to penetrate other fields. Although other fields may be discussing outer space’s influence upon society, my literature searches do not name such studies rightly as astrosocial investigation.

⁴⁷ *Supra* 45, The Law and Society Association, *LSA website homepage*.

⁴⁸ *Supra* 12, Pass at 375.

Law may be loosely defined as a system of rules, or legal norms, enforced in some manner.⁴⁹ Moreover, law is tied to all facets of social life in a variety of ways depending on the source and type of law.⁵⁰ Both law and social life exist and function on Earth and in outer space. Hence, combining the disciplines of law and astrosociology provides a basis of analysis for investigating the nexus between law and astrosocial phenomena.

The patterns that arise due to humanity's orientation toward securing outer space for utilization has far-reaching implications for legal institutions used to regulate activities and conduct. For example, consider how international society came to coalesce around particular rules for outer space. The application of legal arrangements from analogous environments such as the high seas, the Antarctic, and air space used to describe outer space law⁵¹ arose precisely because human knowledge about outer space placed limitations upon what constituted legal, moral, and/or just activities and conduct in outer space. As private actor⁵² activities proliferate beyond Earth, we will need to consider the dependence, interdependence, or independence Earth will have with respect to extraterrestrial human societies, and *visa versa*. What rules will flow from Earth into the Solar System? What types of legal systems will be required to govern extraterrestrial societies, if at all? How can States extend their sovereignty into the Solar System, and how does or will this jurisdictional expansion affect international and national law? Indeed, some types of law developed on Earth may find its way into extraterrestrial societies, while new laws may be developed to fit a particular extraterrestrial society. Such questions are at the heart of the relationship between law and astrosociology.

The outer space environment also provides researchers with a pristine test bed in which to observe the interactions between astrosocial and legal phenomena. Scholars may approach law and astrosociology *via* several avenues. I believe one interesting avenue of research is how national and/or international legal systems will handle the increase of public and private, exploration and exploitation of outer space. What types of courts, if any, will handle which types of claims? How will States organize lawmaking and jurisprudential systems for outer space?

⁴⁹ However, the concept of law has been interpreted in a variety of ways. For example, law may be classified as: a system of rules (primary and secondary) which have no necessary connection to morality (*infra* 56, Hart, *The Concept of Law*); "the command of a sovereign, backed by the threat of a sanction" (John Austin, *The Province of Jurisprudence Determined* (W. Rumble ed., Cambridge University Press 1995) (1832); an "interpretive concept" to achieve justice (Ronald Dworkin, *Law's Empire* (Harvard University Press 1986)); or, an "authority" to mediate people's interests (Joseph Raz, *The Authority of Law* (Oxford University Press 1983)). Obviously, different definitions of law may lead to various conclusions. However, it is not clear where outer space law may fit into these definitions of law.

⁵⁰ On one hand, we may make the distinction here to be between positive and natural law in terms of sources of law. On the other hand, we may make the distinction between civil and common law in terms of types of law. It thus depends upon your frame of reference when discussing the source and types of law. Sources and types of law vary. For example, canonical and rabbinical law are both made and adopted by religious authorities.

⁵¹ Outer space law encompasses both international and national law related to all aspects of space technologies, human and robotic activities and conduct, and applicability of such laws to space ecologies as specified in treaty law, statute, or code.

⁵² From an international law perspective, private actors (or persons) are either natural or juridical persons who are objects of the law. See e.g., George Manner, *The Object Theory of the Individual in International Law*, 46 *The American Journal of International Law* 3 (1952) ("[T]he object theory of the individual in international law predicates, first, that the individual is not a subject or person of [international] law; that [the individual] has no rights and duties whatsoever under it or that [the individual] cannot invoke it for his protection nor violate its rules. Second, this doctrine predicates that, as object, the individual is but a thing from the point of view of this law or that [the individual] is benefited or restrained by this law only insofar and to the extent that it makes it the right or the duty of states to protect [the individual's] interests or to regulate [the individual's] conduct within their respective jurisdiction as through domestic laws.") On the other hand, subjects of international law are generally sovereign States and international organizations and may be bound to the law of nations (*ius gentium*) and/or international agreements and conventions (*ius inter gentes*). For a succinct explanation of objects and subjects of international law, see Bin Cheng, *Air and Space Law: De Lege Ferenda* 203 (Tania Masson-Zwaan & Pablo Mendes de Leon eds., Martinus Nijhoff Publishers 1992).

However, domestic legal classification of a private actor, whether natural or juridical, is defined by individual States and under particular contexts. For example, under United States trade law, a private person (or actor) means

- (A) any individual who is a citizen or national of the United States; and
- (B) any corporation, partnership, association, or other legal entity organized or existing under the law of any State, whether for profit or not for profit. (19 U.S.C. § 2571 (9))

More generally, Black's Law Dictionary defines a private person as

- 1) A person who does not hold public office or serve in the military;
- 2) Civil law. An entity such as a corporation or partnership that is governed by private law. (Black's Law Dictionary 8th ed. (2004)).

In contrast, the concept of private person is not defined in the Constitution of the People's Republic of China (2004). The terms private and public refer only to the description of and definition for property.

Can or will outer space law be described as a post-modern legal system?⁵³ Moreover, how will outer space law continue to function and evolve? The limitations that arise due to the distance between Earth and potential sites of human settlement in the Solar System will invariably place limits on criminal justice, social control, and dispute settlement, as well as affect social change. Will extraterrestrial societies be held together by a consensus of values or by coercion?⁵⁴ These are important paradigms to consider, and theories exploring the development of those paradigms can be devised and tested over time.

Another more contemporary avenue of research concentrates on current outer space law. The application of historical and legal approaches to outer space law has already laid the foundation for the relationship between law and astrosociology, but also requires more research and analysis.⁵⁵ On the one hand, the legal history of outer space law can provide data to test other legal theories such as natural law and positive law theories.⁵⁶ On the other hand, outer space law may need to be reconciled with the evolution of legal systems.⁵⁷ In addition, we may analyze outer space law for continuity, appropriateness, and customary applicability to other forms of law. For example, are provisions of outer space treaty law part of general or customary international law?⁵⁸ Are there aspects of outer space law that constitute peremptory norms (i.e., *ius cogens*)?⁵⁹ Legal scholars have investigated these questions for decades without realizing their application to the field of law and astrosociology.

Finally, we may also consider how outer space law creates social change, as well as the limitations of outer space law on creating social change and those factors that may lead to a resistance to change. There are many avenues to follow in such research. One example mentioned above is the proliferation of communication satellites. Data is quickly shared across borders and used to organize protests, make economic transactions, and provide more precision to warfare. Another example is the limits of international law in creating binding rule making for orbital debris mitigation and space situational awareness.⁶⁰ All the examples above are but a microcosm of the types of issues researchers in the subfield of law and astrosociology may investigate.

⁵³ Postmodern thought has been used to analyze the law. See e.g., *Postmodernism and Law* (Dennis Patterson ed., Ashgate 1994); Dennis Patterson, *Postmodernism/Feminism/Law*, 77 *Cornell L. Rev.* 254 (1992); and see Douglas Litowitz, *Postmodern Philosophy and Law* (University Press of Kansas 1997).

⁵⁴ On the consensus perspective, see e.g., Roscoe Pound, *A Survey of Social Interests*, 58 *Harv. L. Rev.* 909 (1943); Roscoe Pound, *An Introduction to the Philosophy of Law* (Yale University Press 1959); and Talcott Parsons, *Law and Sociology: Exploratory Essays* 56-72 (William Evan ed., Free Press 1962). On the conflict perspective, see e.g., Austin Turk, *The Sociology of Law: A Conflict Perspective* 213-232 (Charles Reardon & Robert Rich eds., Butterworths 1978); William Chambliss & Robert Seidman, *Law, Order, and Power* 2nd ed. (Addison-Wesley 1982); Philip Goldstein, *Post-Marxist Theory* (SUNY 2004); and Richard Quinney, *The Social Reality of Crime* (Little, Brown 1975).

⁵⁵ See e.g., Roger Launius, *Frontiers of Space Exploration* 2nd ed. (Greenwood 2004) (discussing the history of the space age); and see Walter McDougall, *...The Heavens and the Earth: A Political History of the Space Age* (Johns Hopkins University Press 1986) (discussing the political history of the space age within the Cold War context). See also *Manual on Space Law Vols. I-IV* (Nandasiri Jasentuliyana & Roy S. K. Lee eds., Oceana Press 1979, 1981) (providing a comprehensive treatise of the debates arising from the drafting and adoption of the first five outer space treaties, including all relevant United Nations documents until 1980. These volumes provide insight into how States viewed outer space from the perspectives of politics, economics, security, law, and policy. Thus, the social dimensions of outer space are implicit throughout the United Nations debates regarding the status of outer space).

⁵⁶ See e.g., Hans Kelsen, *Pure Theory of Law* (University of California Press 1967) (are rules for outer space derived from basic norms?); H.L.A. Hart, *The Concept of the Law* 2nd ed. (Oxford University Press 1997) (1961) (how does outer space law fit into the social construction of law?); and John Finnis, *Natural Law and Natural Rights* (Oxford University Press 1995) (how are rules for outer space connected to the natural law whose content is set by nature and has universal validity?).

⁵⁷ See e.g., Adam Watson, *The Evolution of International Society* (Routledge 2009) (1992) (expressing the English School of International Relations theory, which argues that there exists a society of States, despite the condition of “anarchy”, and that the evolution of States are founded upon the influences of other States in the past. There exist social mechanisms that weed out certain functions and activities in society, or incorporate or improve past functions and activities into society operating within the “evolved” State.). Here, we may depart into international relations theory, opening up debates about realism, constructivism, and liberalism. I leave it to the reader to explore this avenue.

⁵⁸ See e.g., Ben Cheng, *United Nations Resolutions on Outer Space: “Instant” International Customary Law*, 5 *Indian Journal of International Law* 23 (1965) (were initial United Nations declarations on outer space considered instant customary international law?).

⁵⁹ Peremptory norms are considered “compelling norms”, i.e., fundamental principles of international law which no derogation is permitted. For a discussion of outer space law and peremptory norms, see Frans von der Dunk, *Air and Space Law: De Lege Ferenda* 219 (Tania Masson-Zwaan & Pablo Mendes de Leon eds., Martinus Nijhoff Publishers 1992).

⁶⁰ For example, the current trend among States is to create “rules of the road” for orbital debris mitigation and space situational awareness. So far, States have been unable or unwilling to negotiate binding space law agreements for certain types of activities. How will non-binding rules affect the development of space law going forward? What impact will it have on society? See *Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space* (United Nations Press 2010), *Johnson Space*

As resources and individuals move further away from Earth, we will see changes in society. At the same time, decision-makers will need the best information when designing missions or developing the necessary infrastructure in which to support society's appetite for outer space. Law and astrosociology can fill in the gap of knowledge about outer space and its affect on law and human society. Therefore, scholars must endeavor to embrace all avenues of inquiry and be able to provide proper context to outer space's influence on human civilization. We will be able to explain and predict the occurrence(s) of astrosocial phenomena and thereby fill in the missing gaps of knowledge that is endemic in other fields and disciplines. More importantly, law and astrosociology can be imbedded into the traditional space community disciplines of engineering and science fiction thereby linking the field of astrosociology together. Engineering may be discussed with respect to how society operates and uses space technology and the legal rules that develop as a consequence, as well as how other subjects of space law are influenced by technology. On the other hand, science fiction, or literature in general, continues to see law as literature and law in literature. Hence, it is no great leap to note the many ways in which astrosociology can be "found" in the various fields and used to expand the depth of astrosociological investigation.

IV. Defining Astrosociology from a Science Fiction Perspective (S. Caroti)

I am a literary critic by training, a science fiction critic by personal preference, and an astrosociologist by desire. Science fiction (SF) and astrosociology (AS) do not inhabit exactly the same general field of endeavor; AS focuses its attention exclusively to space-related social phenomena that represent only a part, albeit a very large one, of science fiction's range of competencies. Even when the two fields do overlap, their respective goals are, once again, not the same: SF is a literary form, an intellectual and aesthetic construct designed to present a reflection on human nature through the lens of drama; astrosociology is a scientific field, a conglomerate of disciplines – science fiction among them – working together to develop and sharpen our understanding of the influence of space-related matters on the human condition, whether still on Earth or already out into the solar system. SF, however, does constitute one of the subdisciplines of astrosociology. As part of the general field of the humanities, it represents one of the many contributors to AS's mission, and it shares with astrosociology a common intellectual attitude toward the premises that inform their respective tasks. Before the matter of space becomes either the basic scaffold for a SF narrative or the starting point for an astrosociological study, it must be analyzed and speculated on. Humanity is not a spacefaring species yet, and our relationship with the environments that extend beyond the Earth's atmosphere is still largely unknown.⁶¹ Any study aimed at representing this relationship must necessarily engage in a certain degree of speculative thinking, basing its premises, reasoning, and conclusions on the tension between the foundation of what we already know about humanity in space and our extrapolation of where these foundations might conceivably take us if followed down a certain path. Those who study science fiction and astrosociology, therefore, begin their intellectual work with the same process: speculation on the future based on the store of knowledge of the present, bolstered by the scientific study of the space-analog environments here on Earth. To put it another way, we could say that SF contains a lot of astrosociological thinking and AS contains a lot of science fictional thinking. That, to my mind, represents the common ground across which the two disciplines can talk to one another and be useful to one another: an astrosociological study could become the speculative foundation for a SF story, whereas the reading of a space-related science fiction narrative can often yield insights into the matter of AS, once these have been extracted from their fictional environment and made to serve a fact-oriented approach. My contribution to this paper addresses the second of these two borrowings – from science fiction to astrosociology.

A wide-band, general-purpose declaration of intent addressing the relationship between AS and SF would probably not need much refining beyond the formulation expressed in the paragraph above. A scholar would only need to select a novel, short story, movie, or another format, read it, and extract whatever lessons they deem useful for their specific astrosociological study. The trouble, however, begins at the specifics: what work should one pick, and more to the point, from what time period? It is here that the age difference between science fiction and astrosociology becomes an important factor in determining their relationship.

The origin of astrosociology as a fully formed discipline dates back to 2003. A lot has been accomplished in this time, but even so the field's definition and mission statement remain, for the time being, very cohesive and unified. In 2004, Jim Pass, the founder of astrosociology and chief executive officer of the Astrosociology Research Institute (ARI), provided the initial formulation of AS's identity and goals to date. This formulation constitutes the template

Center website, http://orbitaldebris.jsc.nasa.gov/library/Space%20Debris%20Mitigation%20Guidelines_COPUOS.pdf, accessed August 9, 2010. For a synopsis of space situational awareness, see Space Situational Awareness Factsheet, Secure World Foundation, *Secure World Foundation website*, http://www.secureworldfoundation.org/siteadmin/images/files/file_21.pdf, accessed August 9, 2010.

⁶¹ *Supra* 17, Pass at 14.

through which individual scholars in this multifarious realm of endeavor recognize themselves and their colleagues as belonging to the same field:

“Astrosociology is defined as the study of *astrosocial phenomena* (i.e., social and cultural patterns related to outer space). It is simultaneously a sociological subfield and a multidisciplinary social science field. As a sociological subfield, it includes in its purview all areas of research and theory that ties human behavior at all levels of social analysis from the micro level (involving social interaction among two or just a few people) to the macro level (involving large-scale patterns, such as human migration into space, and society as a major form of social structure).”⁶² (Emphasis in original)

In 2009, Pass expanded the definition to include “cultural and behavioral patterns related to outer space,” thus expanding the envelope of AS’s scope as well.⁶³ Cautiously, we could say that, for now, this is it. This is what astrosociology amounts to, the threshold where our collective sense of professional identity has so far placed us. As I write, this threshold is being pushed ever forward, expanded upon, and précised as more scholars belonging to other disciplines enter the field, each with their own sense of what AS should be and where it should go. A further ten years from now – or maybe twenty, fifty, one hundred, or more – new generations of astrosociologists will reshape the field’s identity and priorities as the world changes, and with it the social and psychological needs of the people living in it at the time. Once that happens, it will no longer be possible to fit a definition of astrosociology into one single approach, and answering the question “what is AS and what does it do?” will by necessity require not just a definition, but also and above all the history of that definition throughout the field’s most important evolutionary stages. For now, however, astrosociology is, emphatically, *this*.

Science fiction, on the other hand, has long ago ceased to be susceptible to such a laser-thin identification. Even if we make it the youngest genre in contemporary letters by establishing its age at the moment it was born as a publishing entity, then SF is at least 84 years old. It was, in this incarnation, “born” in 1926, when Hugo Gernsback started publishing *Amazing Stories*, the first periodical to be exclusively dedicated to printing narratives of what he then called “scientifiction” and shortly thereafter science fiction. If, however, we decide to abandon the admittedly artificial labeling of the publishing market, then SF becomes substantially older – at least a century and a half if we set its birth at the time of Jules Verne, and almost two hundred years if we do so at 1818, the time Mary Shelley wrote *Frankenstein, or the Modern Prometheus*.⁶⁴ Some scholars have gone even further back in time, suggesting for example that Dante Alighieri’s *Divine Comedy* may be considered at least proto-SF.⁶⁵

The upshot is that science fiction is fairly old, or at least old-ish, by any standard of measurement, and especially by the yardstick we employ when we think of the aging of thought in the cognitively overloaded, future-shocked socio-historical environment of the twentieth and twenty-first centuries. The identity, meaning, and task of SF have undergone several permutations across the decades, each with its own reworked set of priorities, each with a sense of what the genre was supposed to do, and also of what it was supposed to stop doing at once because it had been doing that for long enough already. To arbitrarily pick a starting point, SF went from H.G. Wells’ idea of SF as a commentary on the present and the future, hope and despair, progress and decadence, to our contemporary sense of it as the literary expression of a multiform set of futures describing the kaleidoscopic nature of the universe and humanity’s place in it – at least so far as we have been able to understand either one up until now. Between H.G. Wells and now, moreover, science fiction’s awareness of itself and its mission progressed through several watersheds, so that the SF narratives written throughout these moments in history should be read both as individual works of literature and as responses to the socio-historical realities prevailing within and without the genre at the time they were written.

That said, the problem for the astrosociologist remains. What narrative(s) should one pick for their specific study? And, once they have picked something, what interpretive parameters should they employ to (1) correctly place this narrative within its context and (2) extract useful data from its pages? The first answer, which may sound like stating the obvious, is that every narrative is potentially useful, irrespective of the period in which it was written – with the caveat that the scholar must be fully aware of this work’s artistic environment, its historical milieu, and

⁶² Jim Pass, *Enhancing Space Exploration by Adding Astrosociology to the STEM Model*, AIAA-2007-6068 (2007). Proceedings of the American Institute of Aeronautics and Astronautics Space 2007 Conference and Exhibition (Long Beach, CA). A copy of this article is located in the Virtual Library of the Astrosociology Research Institute’s website, [www.astrosociology.org](http://astrosociology.org), <http://astrosociology.org/Library/PDF/Contributions/Space%202007%20Articles/Adding%20Astrosociology%20to%20STEM%20Model.pdf>, accessed August 9, 2010.

⁶³ *Supra* 12, Pass at 375.

⁶⁴ See Brian Aldiss & David Wingrove, *Trillion Year Spree*, 2nd ed. (House of Stratus 2001) (1986).

⁶⁵ See Carl Freedman, *Critical Theory and Science Fiction* (Wesleyan University Press 2000). See also Dante Alighieri, *Divine Comedy* (Chartwell Books 2008).

the overarching goals of the genre at large at that particular juncture. To this store of contextual knowledge we must also add a parameter that, by its very nature, comes fairly close to the category of the intangibles: authorial agency. Writers are not simple generators of their society or literary genre's desires at the time they are working (if that were the case, literary studies would be a lot more boring and less relevant than they actually are). They are, first and foremost, artists,⁶⁶ people who write stories because, as Stephen King puts it, "there was nothing else I was made to do. I was made to write stories and I love to write stories. That's why I do it. I really can't imagine doing anything else and I can't imagine not doing what I do."⁶⁷ Indeed, we could argue that the value of a SF narrative for an astrosociological study will increase in direct proportion to the degree of intellectual and artistic independence the writer who crafted it brought to bear on its subject matter. Stories that do nothing but express the mood of their times tend to fade fast in the memory of their readers, dull examples of merely competent craftsmanship without anything substantial to say for themselves. On the other hand, stories that face their world and say something to it endure for quite a while.⁶⁸ The issue here does not simply consist of a Manichean opposition between defiance and acquiescence, or between iconoclasm and conformity. Rather, it has to do with the individual writer's ability to weave the thread of their narrative around the shape of the world as they found it, thereby engaging it in a critical discussion safely disguised as an honest lie ("it's just a story").

Thus, following this line of reasoning, we can for example say that Alfred Bester's *The Stars my Destination* is at once a fundamental representative of the science fiction of the Heinlein/Campbell era and one of its more trenchant criticisms.⁶⁹ Gulliver Foyle, the novel's anti-heroic protagonist, is bent on revenge for being shipwrecked, and in the course of pursuing this revenge he discovers that it is possible for humans to learn teleportation. Throughout his cruel, serendipitous peregrinations across inhabited space, Foyle becomes the thread of story uniting the novel's celebration of the Campbell template of science fiction advocacy as well as its critique of this template's more intransigent aspects, both cemented together by the strong literary precedents informing the core of the novel's plot and themes – specifically William Blake's poem "The Tyger"⁷⁰ and Alexandre Dumas' *The Count of Montecristo*.⁷¹ Bester had not originally set out to write *The Stars my Destination*⁷² as an apology of the science fiction of his time, nor had he intended it as a rebuke of the genre's faults. He had a story, a number of literary precedents to drive the engine of its plot, the external influences that the theory and practice of science fiction writing during the 1950s exerted on his craft, and his personal artistic concerns – besides the literary precedents, an interest in semiotics and wordplay, and a desire to write a story driven more by his protagonist's psychological makeup than by pure plot. In the course of the novel's writing, all these factors contributed to create an amalgam of meaning unlike anything that had ever come before or will ever come since, and the socio-historical subtext that characterizes the work's coming to grips with the reality of its times... happened, half-consciously, half-instinctively.

All this discussion of artistic concerns, interesting as it may be, seems to have removed our attention from the proper subject of this paper. Not so. Like every other narrative mode, science fiction is a form of literature, and it therefore partakes of motivations and drives that are neither precise nor easily quantifiable. Yet we do not refuse to consider SF's usefulness for astrosociology because of its nature. We deal with it as effectively as possible, adjusting our measurements according to the biases our subject matter presents us with. I am seeking to foster a certain sense of awareness here, the awareness that the more directly useful tidbits of information the astrosociological scholar may be looking for in a SF story are not only inseparable from the emotional and artistic aspects of the narrative, but also and more importantly gain added value *because* of them.

In simple terms, we could define astrosociology as the interdisciplinary field that worries about how people will think, feel, talk to one another, relate to their environment, and institutionalize that relationship once they decide to go out into space, and what we should do to prepare for it so we do not nuke our own species out of existence, despoil the solar system, fill half the Milky Way with garbage, or start an interstellar war with the first alien race we meet because we do not know how to say "we come in peace."⁷³ A discipline created to grapple with such variables

⁶⁶ Here I use the term "artist" to mean someone dedicated to an artistic pursuit. In this specific case, I refer to the writing of fiction. Were I to employ the term as a value judgment rather than as a statement of intentions, my choice would immediately prompt the question of what art is, and what SF narratives can be described in such terms. Whatever the answers to these questions, they would immediately open a debate that, by its very nature, has no resolution.

⁶⁷ FAQ, *Stephen King website*, <http://www.stephenking.com/faq.html#1.0>, accessed August 9, 2010.

⁶⁸ Just how long this "quite a while" might be, no one can say for sure. The decision on the matter is always left to the generations to come, and our track record for predicting the future of our race's decisions on any subject is signally poor.

⁶⁹ See Alfred Bester, *The Stars my Destination* (Putnam 1957).

⁷⁰ See William Blake, *The Classic Hundred Poems* (Columbia University Press 2008).

⁷¹ See Alexandre Dumas, *The Count of Montecristo* (Penguin 2003).

⁷² The novel is also known with the title *Tiger! Tiger!*, after the first two words in the first line of Blake's poem.

⁷³ Or worse yet, because we do not know how to actually come in peace to begin with.

cannot but constantly encounter the intangible, or the seemingly unquantifiable. As such, fields as sociology, psychology, or even literature itself have taught us, it is in fact possible to quantify and channel human impulses and motivations, or at least explain them to ourselves so that their impact may be normalized and inserted within a meaningful interpretive system. It's just that the process of quantification/normalization is fraught with anomalies,⁷⁴ and even when it is complete it will not remain stable. By their very nature, measurements stemming from the observation of human behavior are always contingent. Indeed, it is my belief that literature – or, in our case, that subset of it we call science fiction – is closer to the rest of the social sciences than we have so far given it credit for.

What follows is a set of general-purpose recommendations for scholars who desire to include one or more science fiction narratives in their astrosociological study. I have tried to devise this set in such a way as to keep to the indispensable minimum the danger of drift or inaccuracy in the observations gained:

- Acquainting oneself with the genre. What is science fiction? What does it do? How have the definition and scope of the genre changed over the decades, from one school of thought to the other?
- Examining the author(s). What common characteristics does their overall body of work display? How do they fit within the community of SF writers of their time? What kind of thematic concerns did they mean to insert in the narrative under examination, and what intentions, if any, did they declare to possess concerning it?
- Reading the work. Ideally, more than one reading should be conducted, for two reasons: first, because the highly compressed and interwoven nature of the information presented in a fictional document makes it very difficult for a reader to absorb everything it has to offer at the first try. Moreover, this is particularly true with SF, where making sense of the world presented in the narrative almost always takes the form of a search for clues. Secondly, in much the same way as an engineering text has been written precisely so it can be used for the purpose of studying engineering, a work of fiction has been written precisely so it can generate a complex emotional response in the reader. Everything in it – the vocabulary, the syntax, the semiotics of the imagery deployed by the author – contributes to that goal. Therefore, in order to truly understand the work of fiction under examination, one should begin by experiencing it on its own terms – as a story. The book should first be read as entertainment and exercise for the mind, without note-taking or book-marking. At the end, the scholar might do worse than reflect on their reaction to the narrative they have just experienced. Later on, as the emotional assessment sinks in, the story should be read as a repository of useful information.
- Studying the work. How does the data the scholar was looking for fit within the rest of the narrative? What kind of commentary does the story provide on the prevailing climate of SF as a whole at the time of its completion? How does the narrative engage the contingent values and desires of the genre – is it criticism, apology, or something else altogether? What kind of literary influences, if any, does the work either acknowledge openly or weave into the fabric of the text? How do these influences affect the economy of the narrative, especially as concerns the data under scrutiny?

Once this set of procedures have been implemented, it is reasonable to expect that a certain amount of useful information will start emerging from the text. At this point, the fundamental final step would be to bring everything the astrosociologist learned in the four stages above into an interpretive model that can functionally answer the question “what can we glean from all this?” For example, is the world described in the story a utopia or a dystopia? Why? Irrespective of the author’s socio-political bias, every utopian or dystopian story constitutes a form of advocacy in favor of – or against – a certain shape the world might take somewhere down the line, and every advocacy contains identifiable, logically interconnected steps leading to that future. What processes allowed the pan-galactic Culture in Iain M. Banks’ *Excession*⁷⁵ and *Look to Windward*⁷⁶ to become a utopian regime, and how can we use the fictional description of those processes to draft a set of recommendations for moving in that direction? Conversely, what happened to the society in Frederik Pohl and Cyril Kornbluth’s *The Space Merchants*⁷⁷ that turned it into a dystopia of rampant capitalism, and how do we follow the chain of events that led to it in order to avoid in actuality the future it adumbrates in the fiction?

Let me give a practical example of the process I outlined above. I will use as a case study Robert Heinlein’s *Future History*, a multi-narrative fictional account of the stages through which the humanity of the near future (late 20th to 23rd century) will travel to the moon, explore the solar system, and finally break through into interstellar

⁷⁴ In fact, we may perhaps be justified in thinking that the only constant in human affairs is the presence of anomalies. As frustrating as the thought may sound, I personally find it oddly cheering.

⁷⁵ See Iain M. Banks, *Excession* (Orbit 1996).

⁷⁶ See Iain M. Banks, *Look to Windward* (Orbit 2001).

⁷⁷ See Frederik Pohl and Cyril Kornbluth, *The Space Merchants* (Ballantine 1953).

space. The term was first coined by Heinlein's then-editor, John W. Campbell. In the May 1941 issue of *Astounding Science Fiction*, the magazine he edited and in whose pages the early stories in Heinlein's cycle appeared, Campbell described SF stories as "historical novels laid against a background of a history that hasn't happened yet."⁷⁸ He then went on to explain that, while a writer of mainstream historical narratives "studies the manners of the time, the customs and the tools available, the means of travel and the social and economic conflicts in the life of a man of the time" in order to highlight the path taken by the past to become the present, the SF writer conducts "mental research into possible futures"⁷⁹ in order to illustrate how the present can become the future – and not just can, but also and more importantly, should. As several critics have pointed out,⁸⁰ the science fiction of the Campbell/Heinlein generation was a distillation of pure advocacy for the future they knew was coming. In their minds, and in the minds of the many readers who bought the magazine, SF was not a literary exercise that extrapolated current trends into possible futures and then described the shape of these futures in fictional form. Rather, it was a manual for making the future happen, and for ensuring that this future had the proper utopian shape as Campbell, Heinlein, and their generation understood the term.

The influence of this ideology was not limited to the field of science fiction. It broke through into the larger context of the debate over space during the late '40s and early '50s. As Howard E. McCurdy has illustrated in his book *Space and the American Imagination* (1997),⁸¹ Heinlein and Campbell's advocacy for the future became part of the cultural resonance chamber that during those years was drumming up interest in the then-fledgling space program, and whose other tendrils were scientists like Wernher Von Braun and Willy Ley, artists like Chesley Bonestell, and magazine articles like the eight-part *Collier's* series on the upcoming conquest of space.⁸² Thus, an astrosociological study of the *Future History* could conceivably focus its attention on three main aspects:

- 1) The ideological, political, and social assumptions Heinlein supports in his various narratives, and in what way – if any—these assumptions are examined, challenged, or discussed.
- 2) To what extent those narratives reflect the prevailing cultural climate within science fiction, and to what extent they diverge from it to express authorial agency.
- 3) What Heinlein's writing reveals about the relationship existing between the SF of the time and the world for which it produced its stories – how one influenced the other, and vice versa.

In the first case, Heinlein was not a follower of the ideology supported in his stories. Together with Campbell, he was its originator. Thus, there is little or no internal examination of the assumptions coloring his narratives. There is only advocacy in their favor.

In the second case, the *Future History* represents one of the crucial documents of that stage in the history of SF, together with such works as Asimov's *Foundation* series⁸³ and A. E. Van Vogt's *The World of Null-A*,⁸⁴ both of which featured very similar ideological attitudes. Therefore, the characteristics of Campbellian advocacy outlined above were literally born in the *Future History*, and in fact, they held sway over the field for two decades, until Sputnik upset the basis for their claim to supremacy. During the '40s and '50s a few authors wrote narratives departing from the Campbell/Heinlein model, writers like Theodore Sturgeon, Chad Oliver, Ray Bradbury, or Cordwainer Smith, but their works constituted isolated instances of personal advocacy, without any claim to represent anyone else's opinions but the author's. The overarching grand narrative of space exploration and colonization between the end of the '30s and the end of the '50s belonged to Heinlein, Campbell, and their school of thought.

In the third case, the *Future History* and its author constitute at once one of the originators of the ethos surrounding the birth of the American space program and one of its staunchest supporters. In 1950, Heinlein collaborated with Chesley Bonestell on *Destination Moon*, the movie that gave the American public its first visual impression of how a moon landing might proceed, largely thanks to "Bonestell collaborat[ing] with writer Robert Heinlein in making the film as technically accurate as possible, even computing the correct phases of the Earth as seen from the Moon."⁸⁵ This merging of literary SF, visual SF, and Hollywood glitz heralded the beginning of a constant, cross-pollinating process of cooperation between the various pro-space agencies of the '50s: while *Astounding* drummed up support for the human venture into space through the publication of fiction, it also gave

⁷⁸ See John W. Campbell, "History to Come," *Astounding Science Fiction* 5-6 (May 1941).

⁷⁹ *Ibid* Campbell at 5.

⁸⁰ *Supra* 64, Aldiss & Wingrove. See also, John Clute, *Scores: Reviews 1993-2003* (Becon 2003); and Brooks Landon, *Science Fiction after 1900: from the Steam Man to the Stars* (Routledge 1995).

⁸¹ See Howard McCurdy, *Space and the American Imagination* (Smithsonian 1997).

⁸² *Ibid* McCurdy at 38-39.

⁸³ See Isaac Asimov, *The Foundation Trilogy* (Doubleday 1963).

⁸⁴ See A. E. Van Vogt, *The World of Null-A* (Sphere 1971).

⁸⁵ Steve Holland, *Sci-Fi Art: A Graphic History* 128 (Collins 2009).

room to non-fictional articles on orbital mechanics, propulsion systems, or the effects of weightlessness, which were all designed both to inform the American public and to stimulate its sense of wonder. The writers penning those articles represented a relevant cross-section of the space community at the time – Heinlein, Asimov, and Clarke on the fiction writers’ side, Willy Ley and Wernher Von Braun on the scientists and engineers’ side, with covers and internal art by Bonestell, Frank R. Paul, and many other illustrators. In a further instance of cross-contamination, both von Braun and Ley published science fiction narratives in the pages of *Astounding*, while mainstream magazines such as *Collier’s* borrowed Bonestell and von Braun for the eight-part Conquest of Space series mentioned above. And anyone who wanted to know how it would all end, anyone wondering whether von Braun and Bonestell could keep the promises they had made in *Collier’s*, needed only to pick up those issues of *Astounding* in which Heinlein had outlined the history of the human colonization of space. Conversely, anyone looking for scientific support in favor of Heinlein’s *Future History* only had to turn to the pages of *Collier’s*, or to Willy Ley’s 1949 book *The Conquest of Space* (once again illustrated by Bonestell).⁸⁶ Surrounding the printed word, and lending it further power in the giant cultural resonance chamber that space advocacy had become, was celluloid SF. Besides *Destination Moon*, movies like *When Worlds Collide* (1951), *Earth vs. the Flying Saucers* (1951), *The War of the Worlds* (1953), and *Forbidden Planet* (1956) contributed to spreading the word and making it sound all the more compelling.

Thus, the aforementioned astrosociological study of the *Future History* would be tapping onto part of the primary vein of 1940s and 1950s pro-space advocacy. The characters Heinlein created in the interconnected tales making up the *History* are all true believers, from Delos D. Harriman in *The Man Who Sold the Moon*⁸⁷ to William Gaines in “The Roads Must Roll”,⁸⁸ and they all express the values connected to that particular way of looking at the shape of the future. For example:

1) a marked reliance on private enterprise and individual initiative as triggers for the human adventure into space, as represented in *The Man Who Sold the Moon*;

2) a tendency to apply engineering and scientific principles to devise solutions to social problems, as exemplified by the developments in “The Roads Must Roll;”

3) a belief in mankind’s manifest destiny among the stars, i.e., that our race would be the key player in whatever developments would impact inhabited space, while other non-human races would fulfill the roles of either sidekicks or (mostly losing) antagonists – for example, see “Logic of Empire”,⁸⁹

4) the conviction that exploring and colonizing outer space in the name of a human-owned future Commonwealth represented the only possible path to humanity’s growth as a species, and that there was only one way – Campbell’s and Heinlein’s – to realize that vision; and:

5) the implication that the part of humanity that would blaze the path to the stars would be mostly North American, mostly white, and mostly male.

Today, this model seems obsolete: some of its parts are unacceptably nationalistic or male-chauvinist, while its cavalier dismissal of any discipline other than the hard sciences is hard to countenance for an astrosociologist. However, we should also remember that for all their warts, for all the traditionalist assumptions that ended up anchoring them more firmly to the past than to the future, documents like the *Future History* constitute a very precious resource for scholars precisely because of their limitations. They were not perfect, but they began something, and they helped our thinking grow through a critical probing of their faults. In Heinlein’s mind, the *Future History* outlined the necessary steps on the path to utopia. It truly was a better world he was trying to adumbrate – or at least, a better world as far as he could see. This body of work may be dated, but if subjected to a rigorous enough socio-historical analysis and separated from its obsolete aspects, it can still yield useful lessons for astrosociologists.

And speaking of astrosociologists, I will now take off my SF hat, replace it with my AS hat, and attempt to bring into focus the lessons I learned during my time as an astrosociologist. I think that the inclusion of science fiction works within an astrosociological study will yield very useful results, especially if the SF works in question can be made to constitute the hub(s) of one or more astrosocial phenomena. Let me explain by way of example, using a very well known science fiction series. In the late 1960s, a US Navy committee visited Gene Roddenberry’s *Star Trek* set, specifically that part of it comprising the *USS Enterprise’s* bridge. They were interested in looking at the layout of the various stations along the semi-circle behind Captain Kirk’s chair, because they were planning to replicate it on the real-life bridge of the Navy’s then-brand-new nuclear aircraft carrier, which had already been

⁸⁶ See Willy Ley & Chesley Bonestell, *The Conquest of Space* (Viking 1959).

⁸⁷ See Robert Heinlein, *The Man Who Sold the Moon* (Shasta 1950).

⁸⁸ See Robert Heinlein, “The Roads Must Roll”, 25 *Astounding Science Fiction* 2 (June 1940).

⁸⁹ See Robert Heinlein, “Logic of Empire”, 27 *Astounding Science Fiction* 2 (March 1941).

christened *USS Enterprise*. The visit proved fruitful, and the team did indeed incorporate some of the results obtained through their observations onto the design of the bridge of the seafaring *Enterprise*. This alone might constitute an astrosocial phenomenon, if we decided to look at it from the point of view of the American military's growing awareness of the potential gains involved in the study of space-related constructs – an awareness that would only grow with time and the achievements of the first space age.

There is more, however. The US Navy team's visit carries implications that extend beyond the realm of technology and engineering. Roddenberry had originally been inspired to come up with the basic *Star Trek* format by his reading of C. S. Forester's *Horatio Hornblower* novels – to the extent that the first proposal he wrote for Desilu Studios had described his new SF series as “Horatio Hornblower in space.”⁹⁰ Roddenberry decided to employ naval terminology and procedures on the show, both to help viewers quickly familiarize themselves with its dramatic premises and to lend plausibility and a lived-in feel to existence onboard the star-faring *Enterprise*. Thus, by the time the naval brass and engineers came to visit the *Star Trek* set, the basic concept whose realization had eventually led them there had already migrated several times between actuality and fiction – from the reality of British naval operations in the age of sail to C. S. Forester's pen, who employed that setting for his reflections on power, war, and empire; from Forester to Roddenberry, who transferred the idea from one fictional world into another in order to talk about freedom and democracy, progress and technology, civilization and barbarism; and from Roddenberry back to the actual practice of seafaring from which the idea had originally come. In the course of its manifold transfers, the concept that had become *Star Trek* had taken on the awareness of the possibilities inherent in applying human experience on Earth to the human adventure in space. Roddenberry's world did not simply contain starships, phasers, and teleporters. It also contained a sense of esthetics, ethics, and morals related to an extrapolative reflection on how things might be out there, and it is very difficult indeed to separate the hardware of a SF story from its software, as witnessed by the many astronauts, scientists, and engineers who, over the years, have given Gene Roddenberry and the rest of the *Star Trek* cast credit for their desire to work in – and with – space. This relationship was cemented when, in the wake of the show's cancellation, Nichelle Nichols – the African-American actress playing Lt. Uhura – started working with NASA in a program designed to recruit minority and female personnel for the space program,⁹¹ thereby making a real-life commitment to the better, more equal society advocated in the show.

Thus, we can say that in its several connections to American (and today planetary) life, as well as in its manifold influence on this country's development of a space-related sense of ethics, *Star Trek* is indeed an astrosocial phenomenon, and therefore susceptible to an astrosociological study. And so are Heinlein's *Future History*, Bester's *The Stars my Destination*, Samuel Delany's *Nova*,⁹² Greg Bear's *Eon*,⁹³ or Ken MacLeod's *Learning the World*⁹⁴. Individually, they can be linked to the loosely connected group of people who have read the novel and developed a desire for the human presence in space, as well as a sense of how it should – or should not – happen. Taken together, these works connect to the rest of science fiction's increasing body of work on the subject to constitute an overarching commentary on the development of a socio-historical desire for the human presence in space. Either way, they become the province of astrosociology, thus acquiring a value for the discipline and for those working within it.

V. Interactions among the Three Perspectives

Disagreements among the three authors were inevitable, yet the three authors consider them indications of progress in the current enterprise. In this section, then, the purpose turns to addressing points of contention in amicable ways in order to further the overall discussion in terms of finding ways to better define astrosociology. These three perspectives provide opportunities to expand the definition in some aspects while perhaps uncovering areas that prove that other aspects of the definition works as initially declared.

A. Integrating Space Law and Science Fiction (J. Pass)

Readers should be aware that some of my past writings were intended for strictly sociological audiences. In such cases, the definition elucidated was more specific to a sociological analysis though I usually alluded to the benefits

⁹⁰ For both the Horatio Hornblower reference and the US Navy team's visit, see David Gerrold, *The World of Star Trek* (Virgin Books 1996); and Stephen Whitfield & Gene Roddenberry, *The Making of Star Trek* (Titan Books 1991).

⁹¹ Among the many recruits was astronaut Sally Ride. In the mid-1980s, Nichols moved on to become a member of the Board of Governors of the National Space Society, a post she holds to this day.

⁹² See Samuel Delany, *Nova* (Doubleday 1968).

⁹³ See Greg Bear, *Eon* (Bluejay Books 1985).

⁹⁴ See Ken MacLeod, *Learning the World* (Tor 2005).

of a multidisciplinary approach. These exercises were intended to attract sociologists to space research, often rather forcefully, in a climate of indifference to the astrosociological subject matter.⁹⁵ Thus, the emphasis on sociology does not represent my overall commitment to a multidisciplinary approach. Astrosociology as a subfield of sociology serves as a tool to gain traction in this particular discipline.

In a multidisciplinary approach, however, the definition of astrosociology becomes much more inclusive of other perspectives. This article represents a strong attempt to break beyond the confines of sociology to explore the contributions of space law and science fiction so that the social-scientific definition gains the broader context that it needs in order to address the multitude of issues surrounding how space affects human beings in both terrestrial and extraterrestrial social settings. Beyond the individuals, astrosociology must address social constructs, both conceptual and manifest.

The concept of astrosocial phenomena can be likened to an atom with its theorized, but unknown, constituents.⁹⁶ In this context, these constituents of astrosociology include social, cultural, and behavioral patterns – which would be equivalent to the proton, neutron, and electron – but what lies beneath the surface? We can say space law and science fiction fall into these categories in various ways. The exact components are currently unknown, but we must strive to discover them and determine where they fit among the existing known elements that comprise the definition of astrosociology. Beyond fitting them into existing cubbyholes, we must remain cognizant that they provide new angles of vision unknown previously. They add new insights that redefine astrosociology in ways that expand the original notions set forth in Part-One of my Inaugural Essay and my subsequent tweak characterized by the addition of behavioral patterns.⁹⁷

1. The Legal/Astrosociological Nexus

Space-related legal considerations do not exist in isolation. They are part of any social system. Today, we are most concerned with laws and other legal instruments from an Earth-centric viewpoint, even when we discuss space law. In the future, humans living in space will form their own social systems and orient their laws to favor and protect them. Earth may well become a secondary consideration at some point, especially if a space society becomes sustainable. It may wish to govern itself. Various scenarios are possible, so we need to begin to think outside of the “terrestrial box.”

I am not certain that the focus on “the nexus between law and astrosocial phenomena” sends the correct message as a long-term strategy. Should we concentrate on “law and astrosociology” or simply legal forms of astrosocial phenomena? This may seem like a trivial difference, but I guess that I value a greater sense of integration when taking into account the multidisciplinary nature of astrosociology. It is true that space law existed long before astrosociology. However, I am not convinced that astrosociologists specializing in what amounts to legal astrosocial phenomena should treat astrosociology as a separate field. On the other hand, perhaps “law and astrosociology” could become a subfield within astrosociology. Moreover, the comparative or contrasting points made by Mr. Hearsey are valuable at this early stage in the process. The question is, should we continue down that road into the future? This point is something to keep in mind as we move forward during the development process.

As Mr. Hearsey explains, sociologists have studied various aspects of terrestrial law for decades. Legal institutions and legal norms are part of the social world and thus social lives of individuals. There already exists a well-established relationship between sociology and law. There is no reason why the same relationship cannot continue in the areas related to astrosocial phenomena. Again, the level of integration remains an area to work out, but that will occur at some point. The main point is that we can apply much of what we have learned about legal practice as we establish new settlements in various space ecologies.

Mr. Hearsey observes that the application of the law has been mostly Earth-centric. We may expand this reality to include the entire social/behavioral/humanistic/artistic branch of science for the most part. While insight points out a sad state of affairs, it touches on perhaps astrosociology’s greatest strength; that is, to alert these disciplines and fields about the relevance and significance of astrosocial phenomena. Alerting the physical/natural science

⁹⁵ Jim Pass, *Space: Sociology's Forsaken Frontier*, unpublished proceedings of the California Sociological Association Annual Meeting 2004 (Riverside, CA). A copy of this article is located in the Astrosociology Research Institute’s Virtual Library, [www.astrosociology.org](http://astrosociology.org) website, http://astrosociology.org/Library/PDF/Submissions/Space_Sociology%27s%20Forsaken%20Frontier.pdf, accessed August 9, 2010.

⁹⁶ Many of the particles in physics remain unknown to researchers until they smash atoms together to briefly reveal the paths of previously unseen components of physical reality. The holy grail of physics today is the detection of the Higgs boson, an elementary particle thought to provide mass to other particles, predicted by the Standard Model. What lies beneath the surface of space law and science fiction that we have yet to discover?

⁹⁷ *Supra* 7, Dudley-Rowley (-Flores).

branch is arguably a close second priority. Therein lays the challenge, however. Astrosociologists and their supporters need to increase the existence of astrosociology, though in a manner that makes it relevant for humanity as a whole and for scientists, scholars, and lay persons from all backgrounds in an increasingly understandable – and hopefully a universal – format.

Mr. Hearsey's focus on space law reminds me that human behavior is regulated at another level as well. Legal issues in space environments, legal norms – or formal social rules/expectations – in sociological parlance, help shape human behavior in a given social system. Formal social control seeks to protect these norms. Perhaps more importantly, informal forms of social control come from larger culture and subcultures, and enforcement from outside of the criminal justice system provide the backbone of normative behavior. Non-legal norms do not always hold up, or conflict between subcultures arises, so legal norms serve as a backup for failures in socialization within families and other social groups. We must understand non-legal norms in space environments in addition to the most commonly addressed legal norms.

The observation that astrosociology provides a means by which interested parties can apply their normally terrestrial perspectives to space scenarios presents another important point. In fact, analogous non-astrosocial phenomena provide a foundation for an ongoing analysis concerning how to integrate disparate ideas into the fabric of the astrosociology definition, as Mr. Hearsey describes. This exercise clearly points out what we must accomplish, and that is a very significant step.

Legal ramifications will not disappear in space environments, so we must attend to them before we move into space on a sustainable basis. As Mr. Hearsey points out, "The outer space environment also provides researchers a pristine test bed in which to observe the interactions between astrosocial and legal phenomena." How will the law be applied in space environments? What types of courts will arise? How will space law evolve? Will extraterrestrial courts accept or adopt legal findings coming out of Earth-based courts? Legal astrosocial phenomena could well strongly influence how humanity migrates into space and what types of settlements they create. Of course, legal ramifications are only part of the overall picture. We also need input from other perspective to round out our understanding about all forms of astrosocial phenomena.

As an overall impression, Mr. Hearsey provides a very good discussion about how space law applies to astrosociology, which definitely highlights an area too long ignored. We must begin to take such issues seriously *before* we move into space to a significant extent. It would prove too late if we attempted to work out legal complications or even lawlessness after arriving at our off-world destination. The intelligent approach involves scrutinizing the ramifications of space law from all angles before leaving Earth.

2. *The Science Fictional/Astrosociological Intersect*

Many people probably fail to see the connections between science fiction and astrosociology. Dr. Caroti clearly places a spotlight on this relationship, and this action broadens the field of astrosociology. How are the humanities related to space? What does literature have to do with astrosocial phenomena? Others, of course, are well versed about such connections, but it is important to spell them out in the context of astrosociology's definition. In this light, fictional science does indeed relate to "real" science. Even so, we tend to perceive the connection to only part of the equation rather than the entire construct.

That is, we tend to focus on the "physics of science fiction;" that is, whether the technology in a given story or franchise such as Star Trek is possible from a physical science perspective. And, no doubt, this is a perfectly justifiable set of concerns. We ask many important questions. Does the futuristic science portrayed in science fiction have real-world applications that push science forward in unexpected ways? In the present example, can we achieve invisibility or cloaking, beam people from one place to another, or travel faster than the speed of light? The physical sciences can – and have – take(n) advantage of ideas generated by SF authors in various media.⁹⁸ However, this is only half of the "story." We readily think about the so-called "hard" sciences, but we too often overlook the "soft" sciences. The latter comprise the social sciences that are best equipped to focus on astrosocial phenomena. These phenomena concentrate on the human/space relationship, which in the present case must definitionally involve how science fiction and astrosociology overlap.

The aspect of science fiction that often fails to attract enough attention falls under the category of astrosocial phenomena. The human dimension receives less attention. The problem is that a focus on astrosocial phenomena must exist, and it must become more commonly recognized. Any believable story must not only build a physical world, but a social world as well. It is my opinion that Dr. Caroti correctly concentrates on the macro level of analysis in his contribution above. The social world must place individuals in a context beyond individuals, one in which they live, interact, and respond to social conditions beyond themselves. Readers too often fail to appreciate

⁹⁸ For example, see L.M. Krauss, *The Physics of Star Trek*, (Basic Books 1995); and Michio Kaku, *Physics of the Impossible* (Doubleday 2008).

fully the importance of the social world in SF just as natural and physical scientists do the same with social-scientific phenomena. Similarly, some SF writers take it more seriously than others do.

To summarize this last point, new insights into the social world will foster modifications to our current view of astrosociology from a variety of sources that will result in its expansion in formally unanticipated ways. We should look at these SF-generated social worlds as the rich source of analogs they represent. This could then cause us to recognize them as potentially advantageous models that could help move us toward the planning and implementation of successful space societies. We must begin now to learn how to conduct such an exercise by using forms of social-scientific analyses to determine their agreement with established theory and research. Otherwise, we could neglect a rich source of ideas, and thus fail to benefit from them.

One cannot interpret science fiction literally, as Dr. Caroti astutely points out, for it is much too complex to understand at a superficial level. Many factors exist that affects one's understanding of a given story. Still, if we carefully study a work of science fiction and develop a proper understanding of it, I believe that we can benefit from lessons provided. Furthermore, just as the technology found in science fiction can inspire physicists, societal structures portrayed in science fiction that afford livable environments in space can inspire astrosociologists. As we strive to create utopian societies, we know that this ultimate goal can never become a reality; but we can strive for it nevertheless. We can also learn from stories that characterize dystopias and attempt to avoid the social conditions that make them possible. At the micro level, we can learn about morality, discrimination, criminal behavior, and a number of other aspects of the human condition.

Thus, in summary, Dr. Caroti's discussion provides excellent insights about the relationship between science fiction and astrosociology. We have just begun to explore what all these elements are, or how they will affect us as astrosociology develops. The important thing to remember is that science fiction already has an impressive record of accomplishment in terms of how it affects different elements of society. We would be remiss if we failed to pursue this course of investigation as part of astrosociology's development. The addition of science fictional analysis to the field of astrosociology only strengthens our understanding about the nature of the relationship between humanity and outer space.

3. The Intersection between Law and Science Fiction

My primary response to the other two initial sections is to compare them to my own social-scientific perspective. However, I would be negligent if I did not examine, at least to a superficial extent, the interconnections between space law and science fiction. What do they have in common irrespective of my contribution? Further, how do these observations tie into my presentation of the initial definition of astrosociology? I wish to make two general points that briefly explore this legal/science fictional intersection.

First of all, the legal regimes portrayed in science fiction help to create a believable social world in which beings, whether human or alien, can live and interact. They are part of the social world discussed earlier in this section. All societies possess a system of formal social norms that come into effect when informal norms break down or fail to handle a particular circumstance. As in other areas of social life, science fiction can create scenarios in which legal systems operate in ways never implemented in terrestrial societies. These examples could serve to prompt legal scholars to ponder over new laws, legal systems, and their consequences.

Secondly, the intersection between the law and science fiction provides a hint about the complexity of astrosociology's rather straightforward definition. Astrosocial phenomena come in different flavors, some based on legal considerations, some based on science fictional concerns, and others based on a number of other possible facets of the human dimension. How these phenomena relate to one another would serve as a very interesting study, though it falls outside the scope of this particular exercise.

4. Astrosociological Development through Familiarity and Understanding

The addition of these two perspectives in relation to my original definition provides an excellent example of how others from various backgrounds can contribute to astrosociology's development. Expansion of the definition to include concrete examples of new areas provides others with a better understanding of how my definition serves as merely the framework for much more detailed expositions regarding how astrosocial phenomena really play out and how humanity may create new examples in the future. Greater familiarity with the definition of astrosociology and its ramifications can result in both an appreciation for its need and the desire to participate in its development. Truly understanding the concept of astrosocial phenomena will require input from typically unrelated perspectives, and this represents a good first step in that direction.

To illustrate, space societies – more commonly known as space settlements – may not exist today, but they will someday. What will they look like? How will they function, both technologically and socially? Will they emulate terrestrial societies or forge new social structures and cultural identities unrecognizable to us? Both science fiction and space law make us think about such things. When we think about them, we often attempt to build on these initial

ideas. These ideas find their way into our planning. This results in social change. First, it will occur on Earth, but later beyond the confines of our biosphere. Humanity's fascination with space will continue as it waxes and wanes. The future is there. Humans will migrate into space.⁹⁹ Moreover, the effects of astrosocial phenomena will occur in all aspects of people's social lives, wherever they may exist. This is why it is important for a growing number of people from all walks of life to familiarize themselves with astrosociology. From there, a good understanding of the field becomes possible. Thus, it falls to the current pioneers of the field to create conditions favorable to astrosociology's development.

After considerable thought during the process of writing this article, I have concluded that this exercise is not seeking a new definition of astrosociology as much as it is examining the nature of astrosocial phenomena. In other words, how do ideas from other fields and disciplines relate to social, cultural, and behavioral patterns? The concept of astrosocial phenomena is actually quite expansive in the sense that it allows for inclusion of a myriad of perspectives. After all, the study of the human dimension of outer space represents a rather expansive scope! Perhaps its greatest problem at this point relates to this generalized character. What types of astrosocial phenomena are most important and how do they relate to others? Astrosociologists with various backgrounds will need to think about how their distinctive ideas can contribute to developing the field. In the end, the synergies gained from astrosociology's multidisciplinary approach will result in insights and revelations that would prove impossible from a single perspective. But first, we must make the field relatable to a broad section of the space and social science communities in order to attract the many diverse perspectives that we seek. Otherwise, we will never attract the diversity that we require to investigate all the facets of astrosocial phenomena.

B. Putting All the Perspectives Together under Astrosociology (C. Hearsey)

In this section, I present a brief critical analysis of the social-scientific and science fiction perspectives, insofar as they are offered in this paper. At the same time, I identify common themes and contrast several elements of discourse presented above by my colleagues.

Let me begin by addressing the context of the social-scientific perspective. First, Dr. Pass has outlined astrosociology from a social-scientific perspective in a manner that social scientists would recognize. Second, the astrosocial phenomena definition expresses the types of interactions we should or might see when analyzing the two-way relationship between society and outer space. By definition, astrosociology is a multi- and inter-disciplinary field. Thus, astrosociologists must be conscious of the fact that we are asking different types of scientists, who all have different and unique ways of expressing information in their fields and disciplines, to contribute to astrosociology. Moreover, it is important to articulate how applied and theoretical astrosociology fits into different fields and disciplines, while explaining how we may develop the types of theories and hypotheses necessary for the growth, and under the flag, of astrosociology. Any programmatic approach we attempt must be made with the acknowledgment that the goal of astrosociology is to fill in the missing "gaps" persistent in other fields and disciplines. By drawing in different types of expertise to astrosociology, we start to lose the pure sociological aspects of astrosociology that was originally engendered by Dr. Pass. Nevertheless, this need not concern us because we are expanding the definition and reach of astrosociology precisely to engender a complete view of the two-way relationship between society and outer space.

Astrosociology seeks to develop methods of positive and normative analysis so that an astrosociologist may attempt to weave the threads of various disciplines together. The intersections where such disciplines meet provide nodes of analytical starting points. These nodes encompass the base assumptions inherent in astrosocial investigations. As such, addressing the concept of astrosocial phenomena is a good starting point in which to analyze the interactions among the three perspectives noted in this paper.

As discussed before, astrosocial phenomena are the social, cultural, and behavioral patterns related to outer space. Astrosocial phenomena may occur at every level of analysis and astrosociologists may devise ways in which to test or identify such phenomena. Notwithstanding, astrosocial phenomena is an ecologically descriptive term designed to capture the diverse and complicated relationship society has with the outer space environment. Astrosociologists must seek to engender a view of astrosocial phenomena that can be more expressive with other disciplines. As we attempt to do just that in this paper, we must not lose sight of the fact that astrosocial phenomena have been present in human society since recorded history, and beyond that.¹⁰⁰

⁹⁹ Ben Finney & Eric Jones, *Interstellar Migration and the Human Experience* (University of California Press 1985).

¹⁰⁰ For example, it is rumored that "the black stone" in the Kaaba (thought to be built by the prophet Abraham) in Mecca, Saudi Arabia may indeed be a large meteorite. Thus, it could be said that the norms of worship in the Muslim religion may be a product of an astrosocial phenomenon.

While stories of the heavens persist in all human cultures, it is clear that outer space has influenced human society through all forms of communication. The concept of outer space has evolved and changed as humans devised and utilized scientific reasoning and observation to explore the nature of the heavens. Moreover, astrosociologists seek to turn observations of the heavens inward upon Earth, as well as outward. The social dimensions of rhetoric and technological evolution oriented toward outer space fall precisely within the purview of astrosociology. Astrosociologists ought to make an effort to find all causal or correlated relationships between human society and outer space. Astrosociologists and scholars alike must be aware of the dynamic influence outer space has had on the human species, including the evolving description of outer space as both an ecology and environment. Astrosocial phenomena are the elements we seek to discover to inform us of the two-way relationship between outer space and society.

I articulated above how law fits into the definition of astrosociology. By doing so, I attempted to provide a range of methodologies and theories that may be used by the theoretician or observational scientist to investigate astrosocial phenomena. In addition, there are particular avenues within astrosociology that law may seek to traverse. To the law, facts matter. When faced with new legal landscapes, lawyers and judges seek to analogize such landscapes to pre-existing principles in the law. The development of outer space law follows this line of reasoning. For example, outer space law draws upon principles found in the law of the sea, such as the freedom of the seas, which is analogized to produce the principle of freedom of overflight (or freedom of orbit).¹⁰¹ The use of legal analogies is an important tool in providing continuity in the law. However, legal analogies also tell a story. Legal analogies can be used as a narrative to describe the evolution of the law from its basic beginnings as social norms (or moral rules).¹⁰² As we apply such legal analogies to outer space, we develop a distinct set of rules for, and relate hundreds of years of jurisprudence to, outer space. This connection brings outer space closer to society and society closer to outer space. Law is but one thread in humanity's connection to outer space.

On the other hand, the connection between outer space and society forces our species to try to make sense of the world (or universe) we inhabit. Such connections can be unclear or obvious. As Konstantin Tsiolkovsky famously said, the "Earth is the cradle of humanity..."¹⁰³ This apt description may be interpreted in a variety of ways, literally and figuratively. Nevertheless, Tsiolkovsky was correct. The human species sits in a gravity well, propelled around a star by physical processes described by the language of mathematics. We must understand these physical processes and the risks involved in order to escape the cradle. Then we can crawl into the Solar System and explore the universe beyond our planet. Like a child, humanity will mature technologically and socially. Yet, complex social forces combined with the multifaceted human condition will challenge humanity's effectiveness to control resources and people, including the ability to govern in new environments. Any movement beyond the confines of Earth will enable cultural differences producing bifurcations among our species.¹⁰⁴ How are astrosociologists to make sense of this impending evolution? Alternatively, how are astrosociologists to make sense of the complexity outer space provides to human culture today?

Science fiction is one such mechanism used to facilitate understanding or, at least, a narrative of outer space's influence on human society. My colleague, Dr. Caroti, studies the relationship rhetorical forms have with the fiction of the human mind. The rhetorical devices humans use to describe outer space have evolved and varied in human cultures.¹⁰⁵ In general, writers seek to make sense of the world by analyzing the human condition through fictions. Such fictions today may be fact tomorrow; the fantastic transformed into the real. Over the last several thousand years, outer space and all the elements in the cosmos were used as rhetorical devices, fantastic and extraordinary, by historians, playwrights, and by other types of authors and storytellers. Over time, humans developed technologies that enabled our species to pierce the painted veil of stars to see outer space as a separate environment devoid of the "perfect spheres" or great houses of the gods. Yet, outer space played an important part in the cultural life of early

¹⁰¹ For the Eisenhower Administration's formulation of this concept, see NSC 5520 (1955). Compare also with the justifications given by Hugo de Groot regarding the freedom of the seas. See Hugo Grotius, *Mare Liberum*, *The Free Sea* (David Armitage ed., Liberty Fund 2004) (1609).

¹⁰² Alternatively, in the case of natural law, rules that are discovered by reason.

¹⁰³ I leave it to the reader to think about Tsiolkovsky's statement that the "Earth is the cradle of humanity, but one cannot remain in the cradle forever." However, it should be noted that Tsiolkovsky actually said "Планета есть колыбель разума, но нельзя вечно жить в колыбели". (Translated: A planet is the cradle of mind, but one cannot live in a cradle forever). See Konstantin E. Tsiolkovsky, *URANOS Group website*, <http://web.archive.org/web/20060421175318/http://www.uranos.eu.org/biogr/ciolke.html>, accessed August 9, 2010.

¹⁰⁴ Of course, we must also be aware of the affect extraterrestrial life, in whatever form, might have on the human identity, religious dogma, and all other forms of belief systems.

¹⁰⁵ Consider that oral traditions, pictograms, art (e.g., paintings and sculptures), literature, and music all provide a means of expression and story telling.

human societies. For example, the Moon played protagonist, antagonist, and a setting in Native American cultures, as well as the Muslim religion.¹⁰⁶ These interactions can be subtle, vague, and powerful. Thus, scholars in any field must try to consider the possibility that outer space affects social life in a multitude of ways and in different contexts.

Throughout the twentieth century, science fiction writers wrote about the complexities inherent in national and international society within various futuristic contexts. It is indeed true that the literary community played a major role in inspiring individuals to pursue the study of outer space in all of its forms. Science fiction writers influenced many members of the space community with their ability to voice various perspectives about society and project those perspectives into an alternative reality through prose. Moreover, science fiction writers were integral in society's transformation into a space-oriented culture.¹⁰⁷ One hundred and five years after Jules Verne wrote *De la Terre à la Lune* (From the Earth to the Moon), humans walked on the Moon.¹⁰⁸ In between that time, several national and international societies were created to address problems related to spaceflight. For example, members of the British Interplanetary Society (BIS) were all science fiction fans and science fiction writers such as Edgar Rice Burroughs and H.G. Wells were fascinated with the goals of the BIS.¹⁰⁹ Incidentally, science fiction writer Arthur C. Clarke was an active member of the BIS. Clarke's 1945 article in *Wireless World* predicted the use of the geostationary orbit for satellite communications.¹¹⁰ While not taken seriously at that time, the idea eventually reached a tipping point and the organization Intelsat launched the first commercial geostationary satellite in April of 1965. To what extent then did science fiction writers affect human society? Moreover, how do such fictions prepare society for the manifestation of the extraordinary in the future? These questions link astrosociology to various genres of literature and provide a basis in which to investigate astrosocial phenomena, as well as to think more deeply about the evolution of human society.

Science fiction is, of course, but one way to express humanity's investigation of the influence of outer space on social patterns. However, it would seem that science fiction also provided a psychological cushion or a means to invoke a suspension of disbelief for Americans and the world during the early days of the space age with respect to the future formulations of space ecologies. The fusion between sub-genres of fiction and the engineers working to construct rockets in the first fifty years of the twentieth century helped to provide a context for humanity to consider the possibility of space travel and the creation of ecologies in space. Consider how Walt Disney Pictures helped Wernher von Braun promote the future of spaceflight in the series *Man in Space* beginning in the spring of 1955; and subsequently *Man and the Moon*, and *Mars and Beyond*.¹¹¹ Also in tandem, consider how the works of Robert Heinlein, Isaac Asimov, and Arthur C. Clarke influenced a generation of young men and women to pursue science and engineering degrees, many of which sought employment at NASA. As Roger Launius notes:

"Humanity...dreamed of traveling into space for centuries, but in the twentieth century, scientific and technical capabilities converged with this dream for the first time. From the work of Robert H. Goddard through the heroic era of spaceflight into the 1960s, the modern age of rocketry signaled a beginning that would eventually lead to human flights beyond Earth to the Moon. All of these enthusiasts believed humanity would soon explore and eventually colonize the solar system. And many of them worked relentlessly to make that belief a reality. They successfully convinced a large majority of Americans of spaceflight's possibility. Through their constant public relations efforts during the decade following World War II, they engineered a sea change in perceptions, as most Americans went from skepticism about the probabilities of spaceflight to an acceptance of it as a near-term reality."¹¹²

¹⁰⁶ For example, in the Hopi tradition, the Great Chiefs made the Moon and the Sun. See First People: Native American Indian Legends D-H, "How the Great Chiefs made the Moon and the Sun", *First People website*, <http://www.firstpeople.us/FP-HTML-Legends/HowtheGreatChiefsMadetheMoonandtheSun-Hopi.html>, accessed August 9, 2010. Consider also that the crescent Moon is a symbol of Islam and that it is fabled that the Prophet Muhammad was able to split the Moon. See Quranic verse 54:1-2. Quran: The Final Testament 3rd Revised Edition (Khalifa Rashad, trans., Universal Unity 2001).

¹⁰⁷ As noted above, a great deal of science fiction work used outer space as a setting to investigate the human condition.

¹⁰⁸ See Jules Verne, *From the Earth to the Moon* (Walter James Miller trans., Gramercy Books 1995) (1865).

¹⁰⁹ See *The British Interplanetary Society website*, <http://www.bis-spaceflight.com/sitesia.aspx/page/1714/1/en>, accessed August 9, 2010.

¹¹⁰ See Arthur C. Clarke, *Extraterrestrial Relays*, *Wireless World* 305 (1945). A reprint exists at the following address, <http://lakdiva.org/clarke/1945ww/>, accessed August 9, 2010.

¹¹¹ See Dave Bryan, "Walt Disney Helped Wernher von Braun Sell Americans on Space", *Space.com website*, August 13, 2002, http://www.space.com/news/spacehistory/vonbraun_disney_020813.html, accessed August 9, 2010.

¹¹² Roger Launius, *Exploring the Unknown*, Vol. VII, *Human Spaceflight: Projects Mercury, Gemini, and Apollo 29* (John Logsdon & Roger Launius eds., NASA SP-4407 2008). Launius is expressing the core argument of Howard McCurdy in *Space*

Moreover, as Howard McCurdy argues, the reality that spacefaring was soon possible tapped into deep-rooted American cultural ideologies.¹¹³ The projections that outer space exemplifies such American ideals as exploration of new frontiers and faith in technological progress as a means to a better life influenced both the public's imagination about outer space, but also the formulation of early national space policy.¹¹⁴ Thus, science fiction played an integral part in the early days of spaceflight by providing a context for understanding humanity's possibilities in outer space, writing about those possibilities, and, in some cases, actively influenced the development of space technologies via satellite, rocket, and spacecraft design.

To understand this argument, let us consider two public polls. Gallup conducted a poll in December 1949 asking Americans whether they believed the U.S. would reach the Moon within fifty years. The "pollsters found that only 15 percent of Americans believed humans would reach the Moon within 50 years, while 15 percent had no opinion, and a whopping 70 percent believed that it would not happen within that time."¹¹⁵ In the same month that the Soviet Union launched *Sputnik I*, "only 25 percent believed that it would take longer than 25 years for humanity to reach the Moon, while 41 percent believed firmly that it would happen within 25 years, and 34 percent were not sure."¹¹⁶ As Launius points out, "[a]n important shift in perceptions had taken place, and it was largely the result of well-known advances in rocket technology coupled with a public relations campaign that emphasized the real possibilities of spaceflight."¹¹⁷ The alignment of science fiction writers and physical scientists to produce a narrative of future possibilities in outer space allowed the inconceivable to be probable. The public relations campaign for outer space coupled the fiction of today with the realities of tomorrow. This may well represent the first evidence of modern astrosocial phenomena and a locus where astrosociology and science fiction meet.

Astrosociology has come a long way definitionally since Dr. Pass' first paper on the subject. Both Dr. Pass and Dr. Caroti note where elements of sociology and literature may fit into the definition of astrosociology. Nonetheless, astrosociology may be described as a polymorphic field connected by the manifestation of astrosocial phenomena identified surreptitiously in various disciplines. The exact shape and structure of astrosociology is still uncertain. Astrosociology is still an evolving field that seeks to provide answers to neglected questions of outer space's influence on social life and the human condition. Where the social-scientific perspective is limited in seeking evidence of astrosocial phenomena, other fields and disciplines may provide further insight into humanity's place in the universe, as well as what humans can expect conducting their affairs beyond Earth. Thus, astrosociology's multi- and inter-disciplinary nature invites a deeper perspective not found in any one particular field or discipline.

C. Law and Sociology within an Astrosociological Context (S. Caroti)

Since I am neither a social scientist nor a practitioner of the law, I will limit myself to a very general overview of how I see these two disciplines fitting into the larger interpretive model afforded by astrosociological studies. This way, I hope to complement Dr. Pass and Mr. Hearsey's contributions through an analysis of the relation between science fiction, space law, and AS at large.

In my reading of AS's current state, the threshold separating the element of social life, norms, and legal rules from their astro-social and astro-legal¹¹⁸ counterparts is the same as that separating a standard science fiction scenario from one that can be useful to the astrosociologist; that is, whether or not these elements can be said to constitute astrosocial phenomena. In this sense, we already have astro-social and astro-legal phenomena, and both Dr. Pass and Mr. Hearsey have described them in their contributions to this paper. Therefore, I will limit myself to offering one example for each:

- On the social side, Albert A. Harrison's *Spacefaring: the Human Dimension*,¹¹⁹ a work addressing the social and psychological aspects of life in space as experienced by astronauts from the years of *Sputnik* to today. Apart from constituting an intelligent discussion of astro-sociological issues in its own right, Harrison's study also represent an astrosocial phenomenon by virtue of its very existence – i.e., its subject matter

and the American Imagination as noted in footnote no. 2 of *First Steps into Space: Projects Mercury and Gemini* at 29. See also *supra* 81, McCurdy.

¹¹³ *Supra* 81, McCurdy.

¹¹⁴ *Ibid* McCurdy.

¹¹⁵ *Supra* 112, Launius at 29.

¹¹⁶ *Ibid* Launius at 29.

¹¹⁷ *Ibid* Launius at 29.

¹¹⁸ Throughout my argument, I will utilize these hyphenated forms to distinguish between astrosocial and non-astrosocial phenomena connected to sociology and law. I find them useful, especially the term "astro-social," since it provides me with a welcome basis for distinguishing its referent from those of "astrosociological" and "astrosocial." I really do not want to write a paper with three near-identical terms referring to three different realities.

¹¹⁹ *Supra* 5, Harrison.

possesses enough critical mass for (1) a large enough group of people to feel its existence is necessary, and (2) a publisher to accordingly want to include it in its catalog so they can make a financial profit from its sale.

- On the legal side, the complex network of norms and legal rules regulating relations onboard the ISS. This network, I believe, is particularly susceptible to an astrosociological study, because while the station occupies a territory outside the envelope of Earth-referent space, the various modules comprising it have each been built by one among several nations, thus constituting part of that country's territory. Moreover, the activities taking place onboard the ISS and the individuals carrying them out are all connected to (or born on) Earth, and that means to the equally complex web of norms and legal rules regulating relationships between nations on the ground.¹²⁰

These two examples will, I hope, serve as a demonstration of the existence in the here and now of astro-social and astro-legal phenomena, and therefore of the presence of overlapping intellectual territories between those two disciplines and astrosociology. The issue, then, is not whether these exist, but rather how we can use the larger context of astrosociological studies to expand their scope to include much larger communities than the limited ones we have been able to send out so far. I do not think I am issuing a false statement if I say that the whole of sociology and a very appreciable chunk of the law are intimately dependent of the presence of large groups of humans for their existence.

Here, science fiction scholars like me have the advantage. It is not necessary to actually have a lot of people in space for science fiction to plausibly write about having a lot of people in space. Stories are regimes ruled by despots. When, at the beginning of *Time Enough for Love*,¹²¹ Robert Heinlein describes the staggering quantities of colonists living in space by using strings of ciphers containing more figures than those comprising an intercontinental phone number, he really is sending all those people away, and to argue that they do not actually exist is not just beside the point, it is also incorrect. For the narrative to become alive in the heart, for the willing suspension of disbelief necessary to enter the story at all, let alone finish it, the mind's eye must be able to perceive those numbers as representing living, breathing human beings. Since Heinlein was very good at suspending his readers' disbelief, those human beings are indeed living and breathing. They are real and he is sending them out into space, whether they like it or not. Such are the perks of godlike powers. The sociologist and the lawmaker, on the other hand, do not have such a luxury. For their fields to fully come into play on the matter of space, they need to wait for a lot of flesh-and-blood people to actually go, and this has not happened yet. What to do?

As I mentioned above, we already have astro-social and astro-legal phenomena. There already are people in space. Their numbers are certainly very small when compared to the multitudes still rooted to the Earth's soil, but we can say of them what we said of such documents as Heinlein's *Future History*: they are a beginning. One of astrosociology's missions is to pave the way for humanity's space venture from Earth, before the first rocket, generation starship, interstellar cruiser, or space-warp liner have even left the space dock on their maiden voyage. AS strives to turn humanity's Earth-bound dreams of space into qualified, calibrated speculations, and to guide these speculations toward the achievement of their goal; in this respect, science fiction can be of enormous help.

In much the same way as SF narratives speculate on the invention of the warp drive, or on first contact with an alien race, they can also speculate on their legal and social implications. As an example, we should once again turn to Heinlein's ubiquitous figure: a good deal of *The Man Who Sold the Moon*, for instance, is dedicated to illustrating Delos D. Harriman's manipulations of corporate and international laws in his attempt to jump-start the space age in the name of free enterprise. Also, *The Moon Is a Harsh Mistress*¹²² contains substantial amounts of legal negotiations, as the inhabitants of the Earth's satellite struggle to be recognized as an independent nation with all the rights of a fully fledged member of the UN. As for social studies, Iain M. Banks' aforementioned Culture series

¹²⁰ The intricacy of the legal ramifications of life onboard the ISS was brought home to me with particular force during a recent conversation with Mr. Hearsey. At that time, he posited the taking place of a crime—a murder, if memory serves—to explain the legal issues coming into play. These are variously related to where the crime has been committed (who built the module? Since it is their territory, should we follow their laws concerning murder?), by whom (should we follow the laws of that astronaut's country or not? What about extradition?), against whom, and in what circumstances. It was a truly educational experience, only slightly marred by my Hollywood-fed psyche—I found myself thinking about how one could kill an American astronaut in the Russian module, blame them, and then trace the weapon back to a black-market racketeer who designed it according to specifications issued by the Chinese secret service. Done properly, I kept reflecting, such an incident could alone be responsible for global thermonuclear war, the rise of the machines, and the future of the Terminator movies.

¹²¹ See Robert Heinlein, *Time Enough for Love* (Putnam 1973).

¹²² See Robert Heinlein, *The Moon Is a Harsh Mistress* (Putnam 1966).

constitutes an overarching, multi-novel exploration of the social, cultural, and evolutionary variables involved in the existence of a heavily civilized galactic environment whose societies find themselves at different stages of technological and scientific development. These different stages naturally create many possibilities for the exploitation or enslavement of comparatively backward collectives on the part of their more advanced neighbors, thus replicating on the macro scale the events that took place on Earth during the age of discovery. These are comparatively small examples of SF's usefulness to the legal and social sciences within an astrosociological context, but the field is replete with further instances of cross-pollination between disciplines. Extracting from science fiction narratives the legal and social models elucidated in their plots can provide astrosociologists with relevant theoretical blueprints for the formulation of actual systems out in space, once large numbers of humans have made the jump.

Speaking of actually making the jump: what can the existing astro-social and astro-legal phenomena do to facilitate this Diaspora? I do not have an insightful answer to that, but that may not be because of my ignorance of those fields. I do not know that anyone does at his stage. From whatever depths of understanding I can reach within myself, I would venture to say that their very existence constitutes an assurance of future relevance, since every day that passes seems to bring the matter of space closer to human affairs which we had so far considered exclusively Earth-bound. For the same reason why no argument, law, or social phenomenon can exist in isolation, no argument, law, or social phenomenon is devoid of implications. If the roots of their existence are buried deep into humanity's past experiences, then their branches will by definition extend into those future human endeavors their very presence is shaping right now. Thus, I believe that the practice, discussion, and critique of astro-social and astro-legal phenomena AS carries out every day represents the engine of growth those disciplines need to survive and thrive – two needs that both science fiction and astrosociology at large share. Like every other discipline intimately bound to human interaction, difference and disagreement will, if conducted in fairness and respect, nurture astro-sociology and astro-law. Indifference and silence, however, will kill them just as surely as they will every other realm of human endeavor.

VI. Conclusion: Finding Disagreement, Reaching Consensus, and Offering Recommendations

In this final section, we combine our efforts to determine the lessons learned here and to offer suggestions for an ongoing campaign to make the definition of astrosociology relevant to an even greater diversity of space scholars and researchers. Interestingly enough, we need to make it relevant to social scientists as well. While members of the space community have paid little attention to astrosocial phenomena in the past, members of the social sciences have paid very little attention to space.

This exercise has demonstrated that the basic definition of astrosociology provided by Dr. Pass, which emphasizes astrosocial phenomena, provides scholars, theoreticians, and researchers with a strong foundation infused with implications pertinent to a large number of disciplines and fields. It seems simple, but it possesses ramifications for humanity and space that largely have been overlooked or ignored for as long as humans have looked up into the night sky and wondered how they fit into the larger scheme of things. We demonstrated how space law and even science fiction – a part of the humanities – relate to, and affect, the relationship between humanity and outer space. This article is thus a manifestation of the multi-disciplinary nature of the field of astrosociology. The goals and objectives of which cannot be met without input from other fields and disciplines. From this exercise, we draw some conclusions and provide recommendations for future scholarly work within the astrosociological context.

A. Conclusions

First, we must point out the obvious. This exercise fulfills an invaluable function. The development of astrosociology will ultimately depend on making the field understandable and relatable to a wide variety of people, inside and outside of the space community, and among space advocates and scoffers alike. This represents a most important goal if the field expects to attract the necessary following. We anticipate that this exercise becomes the first of many efforts aimed at engaging potential astrosociologists possessing a multitude of perspectives to embrace the study of astrosocial phenomena. The multidisciplinary nature of astrosociology demands it. Only time will tell if our assumptions are correct, but we believe that this is a very good start in that potentially long and challenging process. This exercise has produced the framework for future contributions to the definition of astrosociology. It demonstrates how others can communicate their ideas from their specific fields in ways that fit into the definition of astrosociology that move the field forward, and this is essential for the future development of the field.

As implied in this article, human space settlement and exploration will inevitably rely on astrosociological input to succeed on a sustainable basis. Why? Because human interactions represent complex phenomena that can result in a number of different outcomes. These outcomes may cause a social group, subculture, or even entire social system to move in unanticipated directions. The more we understand human behavior in specific space environments, and

under unique social conditions, the better we can avoid errors in judgment and planning. This is important. We must understand the social environment just as well as we understand the physical environment. Failure to do so will likely result in disaster. We need to avoid detrimental predictable patterns of behavior, and identify and mitigate harmful unpredictable patterns of behavior. For instance, the study of a particular space society or analogous ecologies will result in the proper understanding necessary to make predictions about future behavior that can mean the difference between a long sustainable existence and a short-lived catastrophic failure. This understanding must consist of the insights of multiple perspectives combined to present a single and accurate portrayal of social reality. This is what makes this type of exercise so significant. This advice applies to public policymakers, of course, but also to the leaders and managers of private aerospace companies who elect to launch their own human missions into space. For the latter, profits may remain elusive if they fail to heed the significance of astrosocial phenomena. In fact, both the private and public sector would benefit greatly by sharing information as well.

We wrote this section as a way to demonstrate the importance and relevance of astrosociology to all those working in some capacity in the area of space who may have never considered or realized a relationship of their work to astrosociological issues. Perhaps the demonstration of this connection represents the most important aspect of this exercise. In this spirit, we invite – and even challenge – others from various fields and disciplines to think about how astrosociology relates to their work. From there, we would like them to contribute to the astrosociology literature, and in so doing, assist us to develop this important field. The space community and social science communities are both vital to this process. Astrosociologists must help organize the social/behavioral sciences, humanities, and the arts around astrosocial phenomena. Scholars of astrosociology must also establish a formal structure of collaboration and cooperation with the space community.

Astrosociology's social-scientific background ties humanity to space. This human dimension serves as the background shaping other elements of social life that one may relate to space, whether humans exist on Earth or beyond its atmosphere. It should be clear to the reader at this point that one can apply the concept of astrosocial phenomena to a variety of specific areas that focus on the intersection between space and society at all levels of social analysis. In addition, astrosociologists must continue to distinguish the intersecting elements of the Earth environment and the outer space environment in order to define properly specific space ecologies. The “vertical” two-way relationship between the outer space environment and the Earth environment is connected to the “horizontal” relationship between different types of ecologies. Here, astrosociologists are rightly concerned with space ecologies, its analogous regimes on Earth, and the substance of social life between environments. The heterogeneous nature of social life requires us to note this fact and provide an answer to the existence of social life in space, as well as the influence outer space has on society on Earth.

B. Recommendations

Astrosociology bridges the social science community and the space community. Of course, we encourage all individuals interested in astrosocial phenomena from both communities to become involved in astrosociological theory and research. On the macro scale, however, we need to work toward the organization of social scientists with this interest to create an astrosociological subculture. Under these circumstances, a coherent body of knowledge and literature evolves so that interested individuals know about it and the legitimacy of astrosociology increases in fields and disciplines within the social science community, and hopefully beyond. Additionally, we must make this literature known and accessible by those in the space community in order to collaborate on a large and meaningful scale. The field requires input from members of the space community, including contributions regarding its definition from perspectives of those in various fields such as engineering, the planetary sciences, SETI, astrobiology, physics, astronomy, and cosmology. All of these fields possess interconnections with astrosocial phenomena.

The development of astrosociology requires applications of the definition in two major areas. First, the development of astrosociology requires the expansion of the definition of astrosociology through an incorporation of contributions from the physical and natural sciences. The second involves the development of astrosociology through an incorporation of contributions from the social and behavioral sciences, humanities, and the arts. Thus, we must make recommendations for future work in human factors, engineering, and law and policy studies.

The implications of the law and science fiction each require additional investigation. Scholars and researchers from the “other” branch of science not affiliated with the natural and physical sciences have a vital role to play in the future of humanity in space. We must not lose sight of this important fact. Science fiction in particular can act as a container for interdisciplinary speculations since, as Dr. Caroti has pointed out in his contribution, this literary genre is by its very nature committed to speculating within a dramatic context on every potential facet of the human venture in space – law, biology, linguistics, social studies, psychology, physics, and many more. If astrosociologists

pay the appropriate amount of attention to the extraction of raw data from the fictional apparatus of a SF narrative, the information gained in the process would prove invaluable.

The great promise of astrosociology has always been clear from a social-scientific perspective. Humans will migrate into space at some point in growing numbers. A key point to emphasize is that it takes time to create an academic field in a climate of indifference and even some resistance. Despite this, it is even more significant for those who choose to become astrosociological pioneers realize that we actually benefit from the fact that only a few people travel into space at a given time. This will allow us to construct theories and conduct research using the scientific method, and utilize the lessons learned in analogous terrestrial social conditions, to better prepare our species for the long march toward a spacefaring subsistence. To do so, we need to put a social science discipline into place that will focus intently on astrosocial phenomena because they will become more important over time.

A few recommendations for those with a social-scientific inclination come to mind quite easily. We must change the status quo so that mainstream social scientists begin to evaluate and value outer space issues, and astrosocial phenomena, as important topics. Several recommendations become quite evident after participating in an exercise such as this particular effort.

First, within academia, space and astrosociological topics need to be taken seriously by the social/behavioral sciences and the natural/physical sciences alike, and work together on common issues in a formalized collaborative manner. Schools at all levels need to accept astrosociology and emphasize the implications of astrosocial phenomena on the individual, group/institutional, subcultural, societal, and international relations levels of analysis (i.e., micro, middle, and macro levels). Students will need to overcome the lack of astrosociological courses in the beginning, and demand against often-considerable pressure to the contrary that their teachers/professors allow them to write reports, theses, and dissertations about astrosocial phenomena.

Second, we must add others to our exercise so that we may explore and expand the definition of astrosociology by inviting those with other perspectives to participate our multidisciplinary field. Social scientists with various backgrounds in terms of education, personal experience, interests, and work experience should seriously consider contributing to the definition of astrosociology to expand the effort started here. Members of the space community need to begin thinking about astrosocial phenomena – and how they relate to their own perspectives based on their training in the physical and natural sciences that include very little attention to social science issues.

Third, astrosociologists of all disciplines should be sensitive to the distinction between environment and ecology. This distinction plays an important role in dividing the work and theoretical construction of astrosociology via multi- and inter-disciplinary scholarship. To the extent that environments and ecologies intersect, the continuum of the types of investigation into astrosocial phenomena grows with the inclusion of other scholars of varying expertise. The question is whether they need to come to us or us to them. We suspect both will be required.

Fourth, scholars of astrosociology should also be aware that other scholars have written about astrosocial phenomena, although such scholars may not have realized it or qualified astrosocial phenomena in a way astrosociologists would recognize.

Fifth, astrosociologists will almost certainly be required to become at least tolerably versed in as many subfields as possible. We hope this article provides a sample of the types of scholarship and analytical thinking required to be an astrosociologist. Moreover, we strongly believe that scholars in many other fields can contribute to the growth of astrosociology and we have provided many reasons why and how in our discussion above. For example, the field of law and society and even the legal profession itself can make great contributions to astrosociology in discussions about the limits, evolution, and construct of law. Furthermore, the intersection of analysis between law in literature and law as literature helps facilitate the search for astrosocial phenomena and the influences such phenomena have upon generations of human society, today, in the past, and in the future. This intersection has important implications for understanding the rise and affect of space ecologies.

Sixth, as a universal proposition: read. Read a lot—or better yet, read everything you can: anthropology, history, philosophy, science fiction, biology, ecology, space science, astronomy, astrophysics. There is much more to peruse where those came from.

As a final thought, all three authors recommend that all readers of this article keep the implications of the human dimension in mind as they conduct their work, whether they become involved directly with astrosociology or not. The very fact that humans do things like study cosmic phenomena, build space probes, and rocket ships – or hear about asteroids that threaten the Earth and its residents, or benefit from satellites that circle the globe – demonstrates that astrosocial phenomena exist all around us. Even as they affect us, very few of us humans ever leave the Earth's atmosphere. The question is, will astrosocial phenomena become less influential or more so as we move forward with plans to explore, exploit, and settle space as the twenty-first century unfolds? Lastly, we hope that readers of this article will actively think about how astrosocial phenomena affect or might affect their lives or society around them. This includes how their work and world benefit from the study of astrosociological issues and how they would

alter the definition of astrosociology to include their own field or discipline in order to move the development of the field forward in a way that incorporates their contributions.

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