Space Education for Human Communities Living on Mars

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Preface

This is a follow-up essay to our "An Imagined Order" essay in the Summer 2019 issue of the *Journal of Space Philosophy* (Vol. 8, No. 2). That essay offered a generic approach to Space human communities. This one focuses on humans planning social societies on Mars.

It should be noted that the discourse that follows is based upon what might generally be recognised as Western thought and values. It is certainly not beyond being contested by alternative perspectives. However, the thought-lines of the authors start from a well-known source of cultural influence, notably social theories with their perspectives on the human condition. We are very aware that life on Mars might well present an entirely new paradigm of existence, yet to be discovered through lived experience.

It is an enormous topic for creative and imaginative minds, not least because at present there are no human settlements on Mars. The research-based evidence of lived experience is limited to space stations and long-stay communities in remote environments on Earth (such as Antarctica). This means that we must depend on the powers of imagination and interpretation, both our own, from science-fiction, and from scholars who have thought about these things. We must draw upon whatever sources we can discover to make sense of a big topic that is yet to happen. A good way to approach the topic is to regard our thinking and writing as a contribution to the ontology and existential realities of living on Mars, the very stuff of Space Philosophy and the vision of the Kepler Space Institute (KSI).

Some immediate questions spring to mind. What would it be like living on Mars? How would people live together? What kind of social order is likely to take shape? Specifically, what kind of governance and legal framework is desirable to live in such a remote and alien environment? How would ordinary civilian life be experienced and self-managed in a personal and community setting? And what role should Space Education play in integrating people into what comprises the social order, that is, the functional competencies of economic and military activity, the roles and responsibilities of citizenship, the cultural norms of community life and the cultivation of personal identity and the inner-directed self?

These and other questions drive the learning agenda of the program. Consider it a novel learning journey to be enjoyed as an adult education of the imagination.

Introduction

At the outset of this learning program, two important points should be made. First, in keeping with the teachings of a great adult educator, the American Malcolm Knowles

(1913-1997),[1] we believe that people of mature age, usually with a wealth of lived experience and an abundance of practical knowledge, from the workplace and life generally, learn best when they can be largely self-directed. Given that our learning program is essentially an exploratory one, we can only imagine what kind of social order will be established and how people will live as individuals and with each other. It might be helpful to acknowledge that these themes can be traced back to Aristotle and through to social theory-builders of more recent times.

Second, as program directors we can do little more than pose the questions that should concentrate your mind on the broad direction and framework of ideas that pave the way for your own exploratory learning. Our task is to construct a conceptual framework and to ask the kind of questions that stimulate your imagination and produce your own ideas. We are in no position to tell you anything. Our questions reflect concerns that others might share about the kind of social system that is likely to emerge when Space is in effect colonised by human beings, leading to the establishment of living communities. We regard Mars as the most likely planet to be settled and therefore treat it as a probable case study.

To get straight to the point, anticipating the time when human beings from Earth start to build a new frontier by establishing permanent settlements in Space, Mars in particular, we ask questions about the nature of living communities in such an extreme environment. Let us explain the basic scenario while posing the questions that form the core of the learning program for "An Imagined Order…."

We believe it is one thing to occupy Space stations with trained experts and by extension to establish the high levels of human resource capability required to build what is likely to become a military-industrial complex (MIC) on Mars.[2] It is far more challenging to settle ordinary people and families, *civilians* rather than members of the disciplined ranks of military and corporate human resource personnel. We believe that the problems of social order, at both the community and individual psychological levels, will truly begin when families and an assortment of other civilians settle on Mars and attempt to continue lives that are drawn from Earth-bound recipe knowledge and lived experience, and they then encounter a totally different environment. Until such time, it is possible to imagine a social order commanded and controlled totally by the MIC, with no other concerns than to carry out functional tasks and to stay alive.

Our focus is upon the existential situation of whatever comprises the civilian community living in Mars settlements. They represent in tangible form the problems we have on Earth of living together in harmony and meeting all the complex psychosocial needs that go with being human. In the context of imagined (and eventually real) Space communities, our notions of a social order are immediately challenged.

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[1] S. M. Knowles, E. F. Holton, and R. A. Swanson, *The Adult Learner* (Waltham, MA: Butterworth-Heinemann, 1998).
[2] P. Johnson, *Eisenhower: A Life* (New York: Viking, 2014).

In such an extreme environment, everyday life is bound to be governed by the functional prerequisites of survival and adaptation,[3] and it is likely to be dominated by what J. K. Galbraith called a governing techno-structure. A complex interrelationship of technical systems must be designed to sustain the life support system of systems that underpin a living community. In such a context, people living in Space communities would probably be constantly aware of the life-sustaining properties of technical systems, and largely controlled by them through the governing structures and processes they impose on human life. It is probably an understatement to describe the system of systems that support life in Space as complex, as the uncertainties of being in an alien environment would be a constant reminder of the fragility of life. Into this scenario we insert the *social* aspect of technical systems that support entire living communities in Space.

Our simple point is that in such a whole Space community, at least initially more like a total institution, people must live with and adapt to an extreme way of life. Will it be possible to remain human and to retain something of the ordinariness of everyday life? Will it be possible for a civil society to emerge to balance the domination of the MIC by forming democratic government under a civil legal framework? Will it be possible to uphold human values that have a moral and sustainable basis? Will it be possible to maintain a personal identity, developed through life-on-Earth experiences, in an extreme environment governed and controlled by advanced and complex technical systems?

Maybe the questions are hopelessly naïve, for whenever one reads science fiction, the social order is usually characterised as authoritarian, robotic and dystopian, far from individualism and the liberal humanism we often associate with civil society. We do not have answers, but we believe the questions about the social aspect of a complex sociotechnical system in Space communities are important ones to think about and explore through the imagination.

We are encouraging you not only to explore a feasible design for living community in Space, but also to devise an ideal-type construction that can inspire others to follow your mind steps. This is the stuff of a grand narrative that engages others in a long conversation. We believe that KSI is a visionary pioneer, which is made more powerful through the contributions of those that follow its learning programs. Further, we treat the early iterations of the learning program as a work in progress. This is in expectation that adult learners like you are bound to make valuable contribution through your own insights and interpretation to what is truly an exploration of ideas at the frontier of what is known.

You may ask why we have adopted such an open-ended and non-directive approach. One good reason is that an important feature of research is that a glimmer of an idea is often the starting point for the long learning journey. It simply grows in the mind and becomes a building block for patient desk and field research, combined with inner-directed curiosity and the desire to create knowledge. Your engagement with this program may generate the spark for your own research topic in due course. Meanwhile, enjoy the

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[3] T. Campbell, *Seven Theories of Human Society* (New York: Oxford University Press, 1981), referring to the work of T. Parsons. Campbell gives an extended commentary on the contribution to social theory of Aristotle, A. Smith, T. Parsons, M. Weber and A. Schultz.

learning process of using your curiosity and imagination for creative thinking and patient research.

The notes that follow are written from a lay perspective. We are genuinely curious about the social aspects of living in Space, but not very technically informed. These general musings are intended to get you started thinking about two big philosophical questions. First, *what kind of moral and sustainable living community is possible as a long-term, ordered and established society in the alien environment of Space?* Second, *how can the leading ideas of Space education play an important role in ensuring that humans can adapt through an educational and learning system designed to enable community living in an extreme environmental context?*

We provide no off-the-shelf answers, but instead we challenge you to think, write and produce an imaginative blueprint for understanding and practical action, to use an old image. Our questions are big, difficult to answer and undoubtedly challenging to an inquiring mind. Our leaning is toward the *social* aspect of living communities and *psychological* existence in a completely different environment most of us will not have experienced before.

To focus your thoughts, we have produced a simple framework. First, we invite you to consider what rules for living should underpin any kind of society that permits long-term human survival. KSI emphasises the need for a moral order and a social structure that is sustainable. How should these worthy principles be converted into everyday values and norms of behaviour that any living community should follow? Second, we go further to ask how it is possible to live at the individual, inner-psychological level, in enclosed proximity and essential collaboration with others in a strange physical environment with a huge emphasis on survival and disciplined group behaviour. Almost certainly, such a social order is bound to challenge our notions of personal autonomy and freedom. We elaborate further on these thought-lines.

Thinking About Social Systems and Individual Needs
First, it is clear that for any human community to exist in Space, we must design an integrated social and technical system that is fit for purpose and that can not only survive in an alien environment, but also function as a complete society on a long-term basis.

We invite you to write your ideas about how this should be constructed and maintained. We encourage you to be imaginative and bold in your thinking, while keeping close to and informed by those who have written on the subject, whether in the realm of science-fiction or in scholarly discourse.

Our thinking, like most others, is influenced by what we know and understand about human society, usually drawing on what we have read and our lived experiences. In that way, we make simple assumptions about the general nature of society. We do this first by focusing attention on structure and function, such as the economy (the production and exchange of goods and services), polity (governance and the making of decisions that affects everyone), social order (an underpinning system of law, normative rules and values for living communities, preferably on some basis of democratic consensus), social

culture (for social cohesion and integration, maintaining the continuities of everyday life, the special roles of family and kin, beliefs and religious practices, education, leisure and so on). For those familiar with social theory the model above is known as structural-functionalism,[4] with more elaboration to follow later.

Our core assumption is that something like what we know as society will be transferred to Space, and a new habitat formed on a similar basis, at least at the beginning of settlement on Mars. What will happen next is for us all to wonder about. Indeed, if we are to honour a grand narrative and imagined order, it is quite possible that the construction of society in Space will be of a very different kind. That is for you to imagine.

It is a big ask, as the ideal-type model must be more than a specialised space station. The community will be characterised as a highly skilled workforce dedicated to scheduled tasks as a disciplined team for set periods of time. Any living community would need such a technically competent workforce to maintain the physical system. A whole society, however, is more than that. Somehow, all that we know about living communities on Earth must be transported and relocated into the environment of Space and expected to continue as a whole society on Mars.

As many know from lived experience, human society is a messy social construction seemingly given to dysfunction and discord rather than acting as a smoothly working social system. We may dream of a cohesive and integrated society based on consensus, but we know the realities of social division and conflict. These typically arise through inequities and other divisions by economic class, cultural identity (such as race, gender, religion) and differences in access and possession of political power to change the course of events and to make things happen. Moreover, we all know that human beings come in many different psychological types and dispositions, which can mess with the best-laid plans. Can they be overcome in a social system that by necessity must live together in harmony or else disintegrate and be destroyed? We briefly return to this theme shortly.

Second, we focus on individual human needs and how they fit in with a social system that must be designed to survive in an alien environment. The Australian social researcher Hugh Mackay wrote a book entitled *What Makes Us Tick*?[5] which neatly identifies some core psychological drivers that make us what we are. There is a need for love and affection, to have a sense of place and belonging, to connect with others and be taken seriously, to have something to believe in and live for, to improve and achieve and so on. These are the essential emotional experiences of being human, and they cannot be ignored in favour of a cognitive model of humankind. Again, the thinking above belongs to another kind of social theory, usually known as social action and phenomenology, also to be explained later.

What this implies is that in addition to emphasising the social aspect of complex technical systems, and by so doing drawing on classical, macro-level theories of social systems, we pay equal attention to what is called phenomenology as a perspective on human

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[4] Campbell, *Seven Theories of Human Society*, referring to the work of T. Parsons.
[5] H. Mackay, *What Makes Us Tick?* (Sydney: Hachette Australia, 2010).

behaviour. We do this because wherever human beings find themselves, including Mars, they remain individuals who constantly perceive, experience, interpret and strive to make sense of the social world they share with others. It is difficult enough living with others in Earth-bound communities, but it is likely to be more challenging fitting in to the social order of life on Mars. At least we may ask what it would be like as an individual living in such an extreme physical environment, dealing with the regimes of total and everyday systems designed to manage safety and security, being a member of whatever form community takes and just being oneself.

The KSI assumption is that whenever the dream of permanent human settlement becomes reality, human beings will be able to transfer the complete package of individual wants and needs to community living in Space. By necessity, for the sake of survival, there may well be a collective normative requirement for an extraordinary form of individual self-discipline. It is to be imagined how much the norms of social order will intrude on personal freedom. This is another open question.

What is clear is that whatever design emerges for living communities in the context of Space, it will be a complex and adaptive social system, comprising structures and functions that is likely to be more omnipresent than we know through lived experience and call human society. Moreover, because of the special adaptive behaviour requirements (an elaborate kind of health and safety mindset), it is necessary to devise ways and means of accommodating our individual psyche, the complex bundle of moving parts we like to call wants and needs that drive behaviour and give us individual identity. How can they be met in an environment far away from Earth and with no relationship with Nature to provide existential comfort?

As an important starting point for considering the inner life of living in Space, without doubt NASA and other national space exploration agencies have examined in detail the psychological effects of being on space stations and all other extreme environments to test and appraise the limits of human endurance. The NASA website gives access to such studies, which are available to the general public.

Taking social system and individual human needs together, any living community in Space must attend to how things would function in human terms. It is one thing to achieve technical mastery of Space and quite another to create and maintain living communities in a context where everything that sustains human life is transported and embedded as a continuous life support system. While that feat of technical mastery is being achieved, and maintained, ordinary life should carry on, the countless everyday interactions and social relations that hold together, like a seamless web, our experience of living community. We invite you to explore these open-ended ideas and give us your thinking. There are no right and wrong answers, but your ideas should pass the common-sense test of being plausible to reasoning minds.

Introducing Some Key Concepts That Focus Attention on the Existential Realities of Living on Mars
Behind the ideas that have so far comprised an overview of the social aspects of living on Mars, in some kind of community setting, it is useful briefly to allude to important

concepts that will help you to think about and design your own ideal-type model of a social order. This entails some brief definitions and descriptions with key references should you decide to explore further and deeper.

An *ideal-type concept* refers to a hypothetical construct in which the prominent features of a social group or organisation are used to highlight a pure or ideal form, usually to illustrate an abstract generalisation. In the context of this learning program, the imaginative design of a social order for Mars is likely to be an idealised model. In practical reality, it might be different, possibly because actual life on Mars might determine a different shape and form from the idealised version.

In the context of this learning program, you are encouraged to think and design a social order for living on Mars in ideal-type terms.

Social systems with special reference to the structural-functionalist model: the British economist and philosopher Adam Smith (1723-1790) was a leading thinker in depicting society as a natural mechanism that functions purposefully to survive and adapt through economic activity and the sharing of core values that underpin a moral order to maintain continuity and foster change. The comparison with a natural organism is obvious, with the addition that human beings are naturally drawn consciously to consider their actions and the social constructions that follow in moral terms.

Two centuries later the American sociologist Talcott Parsons (1902-1979) developed a complete ideal-type structural-functionalist model of society, primarily to explain the nature of social order in which people choose to make mainstream values and norms work by their own volition. Years later his general theory was heavily criticised and largely discarded, mainly on the grounds it was deterministic and outer-directed, ignoring the myriad ways people make society work through their own subjective interpretations of reality (more later).

In the context of this learning program, the idea of functional prerequisites and the AGIL model as developed by Parsons allows us to understand the workings of the MIC and the dominance of the technostructure on Mars.

The AGIL model in simple form depicts society as having to perform four functional prerequisites as the basis of survival and adaptation:

A: *adaptation*, in which the social system produces goods and services (economic activity) within an environment. Defence systems might be considered another means of social survival when political rivals clash.

G: *goal attainment*, in which the social system mobilises its human resources, tools of technology and other resources to achieve outcomes. This is the soft side of economic activity through change management strategy and practice.

I: *integration*, in which concerted effort is made to ensure the various parts of the social system work together in support of both hard and soft parts of the economy, such as the institutional role of education in knowledge and skill transfer, socialisation into the cultural

values and norms and selection according to ability and motivation. Organised religion might be considered as another means of cultural transmission. The rule of law would certainly count.

L: *latency* refers to the cultural and psychological means the social system uses to uphold and maintain the ways things are organised and managed by fostering a collective commitment to the values and goals that hold things together. This ascribes an important role and function to the sociocultural aspect of human communities.

The obvious point to make is that in all probability, whatever settlement takes shape and form (structure) on Mars, the functional activities will be predominantly about economic production, typically by extractive industries mining for required natural resources. Moreover, the military will be stationed on Mars to protect the mining industry as well as for other strategic purposes. In addition to necessary attention to ensure the economic system works effectively, there is an equal functional imperative to succeed in the complex process of survival and adaptation to a challenging external environment.

It is important to note that the holistic theory (and the ideal-type model) of a social system and its natural organism allusion was a dominant mode of sociological discourse in the United States and elsewhere until the 1960s, but it fell out of the limelight thereafter. But for our purpose, it still holds up as a plausible way of approaching how to approach the building of the foundations for a functioning settlement on Mars.

Military-Industrial Complex
In his farewell address, President Dwight D. Eisenhower expressed his concerns at the economic cost of the arms race, itself a consequence of the cold war, which was at a bitter stage, and the threat it posed to liberal democracy and governance. In a much-quoted warning, he stated:

> In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist. We must never let the weight of this combination endanger our liberties or democratic processes.[6]

Eisenhower was not thinking of human life on Mars, but we regard his statement as a call to awareness of the power of the MIC and the need to consider the nature of social order. For those of us conditioned by the values of liberal democracy, Eisenhower's words have a powerful impact. Maybe there is no room for an American liberal democracy and other features of what Europeans would recognise as social democracy on Mars. We cannot simply assume that living community on Mars will be a simple replica of what is known and understood on Earth.

In our times, other models of governance exist, most notably than that of China, which is emerging as a superpower. As one journalist noted, China is "an authoritarian,

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[6] Eisenhower's farewell address, broadcast on January 17, 1961.

paternalistic system, reinforced by mass surveillance, that ostensibly guarantees the well-being and safety of citizens in return for their political acquiescence and public silence."[7]

Without passing judgement on the relative effectiveness or political and cultural history of an alternative model of governance, we can see that there is a clear connection to what might become the ruling order of the MIC on Mars. As indicated earlier, life on Mars is entirely dependent on technological systems that work effectively to keep the community alive and able to function. The governance of a dominant technostructure would provide the functional fit with the entire system of systems with human compliance a prerequisite for survival and adaptation. This model is like the space communities of science-fiction literature and a stark warning of the dangers to social order identified by Eisenhower.

The question that arises is whether the nature of governance is of importance in the context of the special conditions that apply to Mars. It is a matter of political choice and beliefs about what kind of social order is best suited to the needs of humankind. This accords with the values and vision of KSI, and it is therefore appropriate to develop it further. This is done by paying attention to the idea of civil society and related social theories that provide an alternative perspective in the main body of the text.

Civil Society
The idea that society is not only a functional and utilitarian system, designed to ensure survival, continuity and adaptation, but also a moral and ethical one owes much to the writings of Aristotle, notably through the construct of civic and political community (what he called *polis*) in the context of a city-state. The idea of citizenship also stems from the writings of Aristotle. A civil society is essentially an ideal-type model of government and law, in which the virtues of moral goodness and excellence in human behaviour are considered universal values to be aspired to and upheld by all citizens as a matter of duty. It has been a powerful and lasting ideal underpinning liberal democracies.

Aristotle's idea of a civil society was an elitist one, in which the high-born and the powerful economic and military interests within the city state became the leaders and decision-makers. While being a system governed by a constitution and rule of law, it is hardly a democratic model, as defined eloquently by Abraham Lincoln centuries later. In fact, it could easily emerge as the main model of the social order on Mars, with the dominance of the professional technical class (as modern day, elite aristocrats?) with their deep knowledge and skills of designing and managing the complex systems that make life possible on Mars. In effect, the MIC could be the rule of law and governance on Mars.

It follows that the idea of citizenship is a narrow one, more on the side of the technical class than an open-ended, cosmopolitan and predominantly civilian ideal, of which more shortly.

A modern vision of a civil society is different with more emphasis on *social capital* as the glue that holds society together.[8] In her lecture series in 1995, Eva Cox, the Australian social theorist, advanced an argument for what she termed *A Truly Civil Society*, drawing

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[7] S. Tisdall, "China—Boxing Clever," *Guardian Weekly*, October 25, 2019, 14.
[8] E. Cox, *A Truly Civil Society* (Sydney: ABC Books, 1995).

on ideas and social values that belong to a long tradition of liberal-humanism. Cox promotes the idea that a civil society is a more developed social construct than elite rule by powerful minorities. Instead, she stresses the importance of community-level social integration based on the values and practices of mutual trust, reciprocity, collaboration and voluntary action, which together amount to social capital to complement the other types of financial, physical and human resources. This represents a grassroots or bottom-up perspective of the community, the city-state or, in the context of Mars, the purpose-built human settlement.

For Cox, the ways and means of a civil society is a natural form of democratic participation within a community that too easily fragments and that becomes dominated by powerful elites (what we might now call the political and corporate class). The writings of Cox and others like her belong to a romantic tradition in which great store is set on people power emerging from communities characterised by close-knit social relations and broadly shared norms and values. They provide an alternative vision of a social order that is close to an ideal-type of a civil society. They correspond to the KSI vision and values too.

The Idea of Citizenship
To some extent, the idea of citizenship overlaps civil society, as briefly explained above. With so many constructs in social theory, there is a tendency to create ideal-types, with more than a hint of romantic idealism. A modern version relies far less on Aristotle's idea of an elite of the great and good self-selecting as leaders of thought and action on behalf of the city-state. It has increasingly become, since the French Revolution, a comprehensive ideal for political action in which empowered groups based on cultural, gender, racial and other identities mobilise in pursuit of an agenda for change. Citizenship is regarded as a universal right and a claim to a natural stake in the political order. At one end of a continuum of the citizenship ideal are narrow and sectional interests asserting a wide range of rights to an even loftier vision of cosmopolitan citizenship, which would presumably be valid on Mars as much as across the nation-state divides on Earth. We will develop this point later.[9]

Social Action and Phenomenology
In the final overview of social theory concepts and ideal-type models, there is an alternative to the dominance of social systems. Several schools of thought under the broad heading of social action theory represent a different way of understanding human behaviour in social relationships in what is commonly called society.

Using the structural-functionalist perspective as an illustration, the model implies that human beings and group behaviour is largely outer-directed. The idea of society is not much more than a deterministic system of commands and controls that we are socialised from birth into compliance with to meet the functional requirements of society (the AGIL model). Political economy is another way of ensuring that the social order is predominantly organised around productivity, as a means of survival and adaptation. Organised education, religion, media and other systems of cultural transmission all play their part in ensuring the system is fit for purpose by directing and controlling our everyday

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[9] Campbell, *Seven Theories of Human Society*.

lives. We learn to become model citizens and we are worked on ceaselessly to contribute to achieve functional fit between all the moving parts of society through our social relationships and purposeful interactions, underpinned by shared norms and values.[10] The social order is comparable to natural organisms that have inhabited Earth for millennia. Humans, as social group animals, are relatively late arrivals, but like other living species, we have a remarkable capacity to survive and adapt to all kinds of environments. As an ideal-type model, it is almost perfectly suited to creating a social order on Mars.

Such a deterministic, outer-directed model is comparable with so much science-fiction writing, in which human behaviour, notably the way humans interact through a very top-down social order, is for some a militaristic, robot-like and dystopian horror story. Something is not right about the nature of social relationships in both social theory-building and sci-fi literature. The model has little to contribute to understanding the human need for inner direction and personal autonomy, giving a sense of freedom to choose a path in life. Hence, we turn to social action theories, particularly phenomenology, as an alternative way of understanding society through individual social actions.

The starting point for understanding the nature of social being as individual action is the idea that relating and interacting with others is a continuous activity throughout life. It is an inner-directed process engaging conscious awareness of others communicated through tacit knowing, such as spoken language, signs and symbols, and in the recognition of norms and values that influence social relationships.[11] The process involves perception and subjective interpretation of what is going on, and it becomes a pattern of social behaviour that enables the individual to make sense and meaning of the myriad social worlds that comprise interactions with others. It is a constant activity, and it involves checking with and getting feedback from others in order to stay in tune. There is strong motivation to gain acceptance and recognition from others in various groups. If things work well, there is a balance between inner direction, which provides personal autonomy, and the need to comply with the outer direction through the norms and values within wider society.

In a nutshell, the model of society that emerges is one built from the everyday actions of millions. It is grounded in the common-sense behaviour of members of society mediated through social relationships, as all involved have to make their way in the world through meaningful interactions recognised by others. Essentially, phenomenology is based on the idea that lived experience, perception and the subjective interpretation of what is commonly called social reality are the building blocks of society. This understanding of how society is built and maintained is a far cry from the top-down determinism of classic social systems models, and it allows scope for individual actions that reflect our personality and other differences, as well as for consensual behaviour learned through the norms and values shared by all members of groups, large and small, mainstream and minority.

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[10] J. Hassard, *Sociology and Organization Theory*, Cambridge Studies in Management (Cambridge: Cambridge University Press, 1993). This is a commentary on structural-functionalist theory and the contribution of T. Parsons.
[11] Campbell, *Seven Theories of Human Society*, referring to the work of A. Schultz.

The capacity to define the situation for oneself brings into focus what it means to have personal freedom, which is a valued commodity in most lives. Immediately it may be assumed that life on Mars will be governed right down to the micro level by a deterministic system of systems, mainly in the interest of safety and security. What would it mean for that sense of personal autonomy we take for granted in everyday life on Earth? This is a deep philosophical question, essentially about the nature of being, that is, what does it mean to be human on Mars?

A useful approach to the idea of personal freedom is from the social philosopher Isaiah Berlin, who suggested two kinds: negative and positive freedom.[12] Negative freedom is that psychological inner space, which is an exclusively private domain in the mind and is accountable to nobody else. Without such a private mental space the individual feels cramped and unable to participate fully in the social world outside the inner-directed self with a strong form of individualism.[13]

Positive freedom is a variant of the idea of an active form of cosmopolitan citizenship in which the individual is fully engaged in the political discourse of community affairs using knowledge and experience, personal social capital, rational thought and action intended to address problems and seek solutions. At its best, it is democracy at work with the battle of ideas on an equal basis without fear of forces that might easily oppress and retain power. There is no need to underscore the idealism reflected in both kinds of freedom, but in the context of life on Mars, it might become a strong, alternative ideal-type model to follow.

Recap: The Ontology and Existential Reality of Living on Mars
We have deliberately introduced, albeit in a brief and condensed way, some leading ideas that focus one way or another on social theories and ideal-type models that provide a philosophical aspect to the prospect of living on Mars. Almost certainly, when humans do create settlements on Mars, Earth-bound ideas about the kind of social order to accompany the activities of the MIC will predominate. Even so, it could be that the nature of existence on Mars is so profoundly different as a lived experience that the idea of being human will change. We can only guess, but Space Philosophy at this juncture is just that: a reaching out of creative thinking and imagination. Moreover, we have taken up the vision and values of KSI and converted them into leading questions and thought-provoking arguments supported by concepts, models and theories drawn from classical sociology.

Before continuing with the essay, it is useful to remind ourselves of the essence of these social constructs. The emerging argument is that the life support sociotechnical, system of systems designed for living on Mars will be an astonishing feat of technical mastery. The MIC will dominate what humans do on Mars, and with it will go a social system of governance of such detailed, outer control over their lives that the nature of being will be closer to that of a robot. It is a stark and unattractive scenario, especially if one holds beliefs and values about human rights to the inner-directed self, usually expressed as

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[12] See P. Watson, *A Terrible Beauty: A History of the People & Ideas That Shaped the Modern Mind* (London: Weidenfeld & Nicholson, 2000), which contains valuable insights into the ideas of J. K. Galbraith, I. Berlin, D. Riesman and others who helped in the writing of this essay.
[13] Watson, *A Terrible Beauty*, referring to the wok of D. Riesman.

individual autonomy and personal freedom that come from the ideals of liberal humanism that can be traced back to the Enlightenment.

It is possible, of course, that the MIC may not impose its form of top-down governance, but the determinism built into social and technical systems makes that prospect unlikely. If humans are to have a social and personal life that resembles what is a common lived experience on Earth communities, then it is necessary to create a civil society with all the trappings of democratic participation in the creation and maintenance of a social order fit for humans, not just fit for instrumental and rational purposes.

Expressed in simple terms, life on Mars is either to become a controlled and commanded social order characterised by deterministic systems or another venture in what it is like to be human, accompanied by all the kinds of personal freedom noted earlier, in a totally different environment, like nothing on Earth.

We continue with the essay, which eventually leads to questions about the design, role and purpose of Space Education.

Thinking Further About Human Society as Living Community in Space
There is a long history of imaginative literary and science fiction writing about human beings living in the alien environment of Space, with at least one trilogy focused on Mars.[14] We can all marvel at the scientific and technical mastery of spaceship travel and exploration, together with the disciplined, team-based work of those living in space stations. We are reaching the stage of human accomplishment at which it now seems feasible to consider the practical possibility of non-specialist living communities, ideally in sustainable and ordered permanent settlement in Space, notably Mars. That is certainly the visionary assumption of KSI, driven by a passion to ensure that whatever form human society takes, it is founded on shared values and core rules for living all can voluntarily embrace.

Undoubtedly, there is a long road ahead in perfecting the complex and technical aspects of building a sustainable infrastructure as a platform for human life for whole communities in Space. However, that is not the primary focus of this learning program. Instead attention is concentrated on the social aspects of a complex technical system to support human life. We need to think about transferring what is presently known and understood about living communities on Earth and creating sustainable human settlement in the alien environment of Space. This process may well entail revisiting the designs for living communities to assist their capability for adaptation for living in Space. How much change to what we know, value and believe about living communities will be required? While the technical mastery of that process is achieved, big questions arise about how such human communities should function; what we commonly refer to as a whole society. More specifically, we need to pay extra attention to the role of education as a system, designed to produce a quality learning environment from early childhood through to continuing and lifelong provision into old age. More about these matters follows later.

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[14] K. S. Robinson *Red Mars* (New York: Spectra, 1992); K. S. Robinson, *Green Mars* (New York: Bantam Books, 1993); K. S. Robinson, *Blue Mars* (New York: Random House, 1996).

As a general observation, the fictional social construction of human communities in Space is hardly a recommendation for the kind of society in which most people would want to live. As seen on TV and movie screens and read in science fiction, human society is typically run as authoritarian, military-style dictatorships, modelled on a dystopian society or like an imperial or feudal colony. Such images are most unattractive, and nothing like the liberal social democracies many have lived in. Is there anything of value to be learned from sci-fi literature that would help us to comprehend how human should live, ideally as free-thinking citizens carrying forward what might be called the best of civilisation on Earth? This is a different kind of new frontier thinking, and imaginative thinking from literature sources may not be much help. This is for you to decide, based on what you have read and what has inspired you.

There are also real-life examples of specialist and continuous communities, typically managed as impressive team-based organisations, to be found in the harsh environment of Antarctica and in working space stations. By they are just that, a community of highly trained and disciplined workers undertaking specialist tasks with a fixed-term contract to perform set roles and responsibilities. They are extraordinary communities, and certainly not the everyday ones we are all familiar with wherever we live on Earth.

Before engaging in further leaps of human imagination of an idealised society, we should pause to contemplate the reality of the living community on Earth. Even a cursory reading of Yuval Noah Harari's latest book, *21 Lessons for the 21st Century*[15] alerts us to the manifold challenges of human societies. The book explores the big themes of technology disruption, environmental degradation and extreme capitalism forcing human adaptation to constant and threatening changes that few are adequately prepared to embrace. The mass uncertainty that follows impacts everyone, notably in securing the core essentials of everyday life, such as having a decent work future and a healthy life balance. Moreover, growing disillusionment with the nature of the political process and governance has disrupted faith in finding democratic solutions to the quest for social fairness and justice. Political populism fosters the myopia of inward-looking nationalism, and the spread of global terrorism creates an unease that these and other issues are barely manageable. As we are propelled forward, we collectively lack confidence in long-standing traditions and institutions to meet the challenge of change. This dark and dismal scenario, the future the author claims we are in now, is hardly a secure foundation for contemplating, planning and implementing a bold design for establishing living communities in the alien environment of Space. At least the writings of Harari and others on the threats to societies as we know them warn against being naïve and simplistic as the vision of inhabiting Mars becomes a workable reality.

At the same time, the vision of KSI is of a future that may be both technically and socially realisable. The vision is one of hope and passionate belief that human beings have the capability to create and maintain new societies, even in the alien environment of Space. Maybe the extreme nature of the environment is the kind of collective challenge that humans need to construct an ideal-type society.

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[15] Y. N. Harari, *21 Lessons for the 21st Century* (London: Jonathan Cape, 2018).

Assignment 1: Your First Thinking and Writing Task

At this juncture, we pause from our musings and pay attention to yours. We invite you to trawl selectively through the *fictional* literature (commonly called sci-fi) on Outer Space exploration and human settlement and identify examples you consider worthy of recognition for the quality of imagination and the elegance of writing. Travel back as far as you like, when science-fiction writing made an appearance and took hold of the popular imagination. Bring your reading into the present and taking all that you have read (and seen), describe how human settlement in Outer Space, what we call society and living community, is imagined and created. What kind of society is depicted? Is it like what we know on Earth or something else? Could ordinary people live in such a society, without becoming like robots and having no individual identity? Explain what you have found, and then compare with the vision of KSI. Can we seriously learn from fictional imagination? Where is reality in the fictional literature?

Write between 1,000 and 2,000 words summarising your findings and analysis. Ensure that you have cited the sources you drew upon to create your own interpretation. Please submit your assignment as a portfolio at the conclusion of the program. Regard everything you write as a work in progress.

If possible, share your thoughts as they take shape through your reading and thinking with fellow students. Remember, we are all on a journey of discovery

Assignment 2: Investigating the Serious Scholarly Literature on Human Settlement in Outer Space.

This is a challenging academic task. You need to identify the *scholarly*, research-based and philosophical literature that has gone beyond science fiction to examine how humans live in alien environments. For instance, a very readable 2019 publication accompanying a much-praised BBC series,[16] explores the solar system and has a chapter on Mars, the sister to Earth. Another useful starting point might be the communities from many nations that live for long periods in Antarctica. They must have deep and extensive experience of how such isolated communities live with each other. Going a step further, what is known about human life on space stations? What holds these specialised communities together? What can be learned from such actual experience and incorporated into your ideal-type model for living community in Outer Space? Has anyone, in the KSI network and beyond written about the possibilities of human settlement in Space? How plausible are their thinking and designs for living?

Our advice in starting to explore this aspect of living communities in Space is to search for authors who have paved the way with their own ideas and have taken the long journey into public scrutiny through publication. The KSI in-house *Journal of Space Philosophy* is an excellent starting point, for it expresses the core vision and values and seeks to apply them in meaningful ways.[17] One author to take special note of is Yehezkel Dror, for he has left a trail of leading ideas that might well provide a foundation for your own

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[16] A. Cohen and B. Cox, *The Planets* (London: Collins, 2019).
[17] Krone, Bob, Editor-in-Chief, *Journal of Space Philosophy*, keplerspaceinstitute.com/jsp/.

explorations. There are bound to be others reaching out with their ideas that might ignite your own.

Write between 1,000 and 2,000 words summarising your findings and analysis. Ensure that you have cited the sources you drew upon to create your own interpretation. Please submit your assignment as a portfolio at the conclusion of the program. Regard everything you write as a work in progress.

Again, if possible, share your thoughts as they take shape through your reading and thinking with fellow students. Remember, we are all on a journey of discovery

Thinking about Space Education
Thinking about the social aspects of living communities in Space leads to the special focus of this learning program, which is with leading ideas about Space Education. If communities are to live in Space, Mars as a starting point, there is surely an imperative need for a system of education and training to transfer knowledge and to develop special competencies designed to make everyday living possible. Moreover, as living on Mars will be regarded as a new learning experience, it is a challenge to design an education system that is a best practice model for human development. This is where Quality Space Education makes an entrance into our thinking.

As contextual background, Space Education comprises several types of learning activity. First, there is a growing body of general knowledge for public education promoted through the media and specialised agencies, no doubt responsible for the popularity of all aspects of Space exploration and for the sheer adventure and awe. Second, educational bodies of all kinds and stages have devoted varied interest in and attention to Space Education, which must compete with mainstream learning programs. Third, specialised agencies such as NASA are responsible for the training and development of Space industry personnel with links to universities and research institutions to provide knowledge and educational support. Even more specialised are those agencies that train and prepare astronauts and high-skills workers on space stations. Probably several training programs are already preparing personnel within the MIC to create settlements on Mars. It is the latter group and the civilians who may follow that concentrate our attention on Space Education, that is, those who are going to live on Mars.

Before attending to Space Education as a concept, it is useful to be reminded of the key feature of formal education as an organised system. This usually means a whole society system, typically directed and controlled by government and often incorporating private sector institutions, in democratic societies for sure. Use your imagination to create an educational system designed for living communities on Mars. It should start at birth, continue as a lifelong learning process and be available to all, regardless of social position in an imagined Mars community. In other words, the design of the education system should be on inclusive principles, for civilians as much as the members and families of the MIC.

In the most general terms, the purpose of an educational system is to transfer knowledge and learned culture from one generation to the next and between all strata and groups of

society (social classes, racial and ethnic groups and so forth). The intention is that such a system of cultural transmission serves to integrate all kinds of people and subcultures into the recognisable form of a cohesive whole society unified under the banner of a nation state (remember the AGIL model of structural-functionalist social systems theory). All that the society knows, the accumulated knowledge and skills that enable it to function in economic, political and many other ways, must be passed on and learned to maintain continuity and to adapt to a changing world. This process is not just about transferring selected and valued knowledge and skills, but also socialising new generations into the cultural values and normative order of society.

With increasingly complex economies with high-order knowledge and skill requirements, the educational system must also devise ways and means of selecting by ability to supply capable human resources. Selection by merit often competes with other forms of self-selection by wealth and social advantage. Expressed another way, it is well known that equal access and opportunity in educational systems, whether by social class, race or ethnic identity, does not exist, especially in poor countries and poor regions within rich countries. One safe assumption is that any living community on Mars must ensure that the competencies for survival and maintenance of a complex social-technical system are selected and developed through well-designed education and training.

Problematically, merit selection by ability is not an exact science, and it is often characterised by relative failure to identify and nurture the kinds of intelligence that schools and education generally are intended to foster. These matters truly worry educators and policy makers, hence the emergence of Quality Education to identify and address them.

The concept of Quality Education is both aspirational and inspirational. It has emerged as one of the big ideas that international bodies like to embrace and promote as a universal strategy for improving all aspects of education as a system of provision for all ages. However, it is more than strategic thinking about access and equity to educational provision and a fair system of resource allocation. The idea of Quality Education has clearly inspired educators to think about and design improved ways and means of making teaching and learning more effective, with outcomes that meet both societal and individual needs. We shall concentrate more attention on teaching and learning matters than on system improvement, as they reach to the core of our lived experience of education in our early years and beyond into adulthood and old age.

It is useful to highlight the leading ideas of Quality Education as a prompt for your own thinking. These should be linked to what Quality Education would mean in conceptual and practical terms within the special context of living communities on Mars. We continue our musings about this theme, which is at the heart of Space Education.

In the imagined context of living communities on Mars, both survival and adaptation are imperatives to ensure that all members of society learn to live in an alien environment. There is much to learn from the accumulated knowledge and skills of those who have lived on space stations and isolated communities on Earth. This kind of learning must begin at birth and continue as a lifelong process. There is a need for a system of lifelong

education designed to ensure that everyone knows how to survive and possesses the skills to adapt to everyday living, quite possibly under conditions of constant threat of disaster. We might term this as basic Space Education.

The question to ask is whether educational systems on Earth are fit for purpose for such extreme conditions. In such an environment, learning must surely be concentrated on (1) functional knowledge for survival and adaptation, (2) learning to live together under very challenging social and individual psychological conditions, (3) acquiring and continuously supporting social attitudes and behaviour that pose no serious threat to the social order and (4) developing intellectual, creative and other human talents that enable individuals to experience self-actualisation, that is, being the best one is capable of being. Any education system that can perform to such a high level of expectation is what quality means. It is a tall order, and most education systems on Earth fall short. It is better to assume that there is at least room for improvement, which is why Quality Education is a useful cue to think afresh about what an ideal-type educational system should be like.

Concentrating attention not on a total system, but on the core activities of teaching and learning, whether in a traditional classroom or workplace or another setting where knowledge and skill transfer is undertaken, some leading thinkers have emerged to point the way forward. There are scores of ways and means of making teaching and learning effective, and many advocates. Those of us who have faced a group of learners, typically of mixed ability, motivation and attention span, know how difficult it is to be an effective teacher or learning facilitator, to use a fashionable term in adult learning. Our choice is limited to one educator who articulates the aspirations of Quality Education in the complex process of enabling the learning of others through a best practice approach to teaching. We refer to the work of Robert Marzano, especially his book *The New Art and Science of Teaching*.[18]

There will be countless numbers of good teachers who follow Marzano in setting goals for learners, give feedback and assist them to deal with new knowledge and new learning experiences so that they develop a conceptual grasp and a sense of ownership, actively engage with students in the learning process and maintain good working relationships, and generally inspire them to aim high through hard work and application. This requires a high level of awareness by the teacher or facilitator to ensure that learning follows a developmental pathway, as it is easy to lose momentum and to stray off track. For both learners and their helpers, it is well known that gaining new knowledge is mostly hard work, but it is often inspired by the motivation to succeed. In that sense, Marzano reminds us that the conditions and process for good teaching and learning are accessible and manageable.

At that juncture, it is important that the educational system designs an institutional framework that is based on and adequately supports the various expressions of Quality Education. Emphasis should go on teaching and learning and the variety of forms it can take in the complex process of knowledge and skill transfer. The idea of Quality Education should not be confined to what is often called the school age years, but it should begin

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[18] R. J. Marzano, *The New Art and Science of Teaching* (Bloomington, IN: Solution Tree Press, 2019).

earlier and continue as a system of lifelong education. There is nothing unreasonable about a comprehensive education and training system available and accessible to all, except for gaining traction politically and economically as a universal human right.

We know of the long road ahead in establishing an ideal-type model of Quality Education on Earth; therefore, the question arises, is it any more achievable in living communities in Space and on Mars? What spirit and form would Quality Education take in such an extreme environment? These two open questions should be addressed in your third assignment.

A possible guide to your thinking comes from the writings of another American academic, Howard Gardner of the Harvard Business School. In *Five Minds for the Future*,[19] he identifies qualities of mental development that depend on a sound educational upbringing in family and home, school and community, workplaces and elsewhere throughout the lifetime journey. In that way he embraces all kinds of education and training as a lifelong process. His ideas are relevant to designing a Quality Space Education.

In summary, Gardner writes about the cognitive and affective qualities of mind development that together enable people to adapt to a changing world. The first mind for the future is the capacity to practice a *disciplined* mind, which involves the mastery of subject knowledge and knowing how to apply it as a continuous learning process. The second mind is the *synthesizing* one, meaning the competence to connect ideas and to make sense of them in inventive ways. The process involves constructing narratives, the ordering of knowledge and ideas through taxonomies and other kinds of condensed explanations, engaging with complexity where the rules of linear thought fail to work, confidence in thinking thematically and theoretically while using metaphor to convey ideas. This kind of mind is required for multidisciplinary knowledge development rather than a single subject focus. The third mind is the *creative* kind, and it forms a close link with the synthesizing one, typically expressed as the ability to think outside the box and to engage in lateral thought as much as a linear form. Such capability accords well with the knowledge-based economy and the use of AI and other advanced tools of computer technology. All three minds depend on cognitive capability and require extensive education and training throughout life.

The two other kinds of mind are more about personal qualities and the capability to communicate effectively with others through inter-personal relationships. The fourth mind is the *respectful* one and the fifth an *ethical* one. The respectful mind is necessary for living with cultural and inter-group diversity by accepting differences and making the experience a positive one, in keeping with the ideal of cosmopolitan citizenship. The ethical mind is sensitive to the needs of others, and it places self-interest lower than doing the right thing, as a good civilised person should. These qualities of mind cannot be left only to the school to socialise and develop; they are also a family and communitywide responsibility.

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[19] H. Gardner, *Five Minds for the Future* (Cambridge, MA: Harvard Business School, 2007).

In any kind of learning context, it would be hard to disagree with Gardner's *Five Minds for the Future* scenario and core argument. His ideas are very appropriate for any society that embraces change and modernity. However, in our view, his ideal-type model falls short of an important element that goes further than high-level competence, which is what Gardner advances as minds for the future. The education quality we are searching for is not as easy to locate as learning and knowledge subject matter, but it exists as a kind of spirit that should pervade the system. One line of argument we have promoted is that living on Mars could easily become closer to the life of a robot than is suited to a full-fledged human being. We have in mind understanding human behaviour, with all the complications of character, personality, attitude and other ways and means that lived experience is shaped and moulded through the various ages and stages to produce individual differences and diversity. Life on Mars could be relentlessly boring with insufficient cultural stimulus to make living interesting as well as challenging. This comes back to designing an applied teaching and learning approach and process that fosters the spirit of individualism, whether it accords with the wishes and norms of the authorities or not. This is much more than competence development, but what it is and how it should be transmitted is elusive.

What is clear is that Space Education on Mars should not be a copy of the systems that dominate education and training on Earth. The existential reality is going to be different, and that kind of unknown quality should be the foundation for Space Education rather than Earth-bound conventions.

Write between 1,000 and 2,000 words summarising your thoughts. Ensure that you have cited the sources you drew upon to create your own interpretation. Please submit your assignment as a portfolio at the conclusion of the program. Regard everything you write as a work in progress. Share your ideas with fellow students as they take shape.

Summary
We have deliberately adopted a non-technical approach to what are open questions that any lay person might ask about the possibilities of creating moral and sustainable living communities in Space, with special attention to Mars as the most likely place for human settlement. Our musings have also involved some repetition, in a natural desire to emphasise the thought lines we consider important. Sorry.

We have assumed that sometime in the future, the dream of living communities in Space becomes an everyday reality. No doubt we will marvel at the science and technical mastery that has created the dreams of science fiction writers and countless experts in a concerted multinational endeavour. KSI has rightly identified the imperative to ensure that such a bold vision is framed by principles and practices that provide a moral and sustainable social order. This must be to enhance the immense technical requirements for survival in an alien environment, but also to prevent social chaos and disintegration through conflict and division. Moral principles and sustainable values exist for a purpose, and in Space, there may be little room to deviate from a well-constructed social order.

To be more specific, your imagined order must surely address what rules for living should be made explicit and form a continuous awareness of the imperative for survival on terms

and conditions that avoid destruction. This implies a social order based on consensus, but what form should it take? Is it what many of us know as liberal democracy? Should the people have some say in who governs and how they are governed, or should government take a different form?

Without ignoring such broad-ranging questions of political philosophy, we must also attend to severely practical matters. A big issue of sustainable principle would be how to manage waste. There would be scores of other sustainability-type matters to be raised and resolved. Leaping to another level, how are humans to be sustained spiritually? It is not essential to believe in God, but an absence of the comforts of nature and the wild to our spiritual lives must be considered a problem to be addressed. These and other matters underscore what we mean by an imagined social order that supports body, mind and spirit, and how things should work at all levels of human consciousness in a challenging and alien environment.

Into your blueprint, we invited you to consider the important role of education and training, with special reference to how such a system would operate in a Space community and environment. Just like our thinking about an ideal-type social order as well as an educational one, we are painfully aware of the shortcomings of systems on Earth. This prompts the question whether in creating living communities Outer Space, it is necessary to think afresh and to produce a completely different social and educational order, not a copy of the Earthly ones.

Into such a complex setting, we invite you to think about the nature of such a social and educational order and to provide your own interpretive blueprint. Freely use your creative imagination, but also connect with those who have also thought about these matters and engage in a discourse with their writings.

That is what we are asking you to do in the three linked assignments, which should give expression to your thinking and provide an annotated bibliography of the works of other authors you found useful. Consider yourselves pioneers in the KSI learning community, for others may well seek to learn from you.

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Editors' Notes: All the reality of human Space settlements remains in the future. We know it will happen. We also know that how it happens will be the critically important success variable for the future improvement and survival of humanity. Dr. Barry Elsey and Dr. Amina Omarova here give the Space community an original and complex discussion and guidance for graduate-level research, planning, and designing of future Space communities on Mars. It will be a prime research document for KSI scholars. Dr. Elsey is the Dean of KSI's Department of Space Education, with a distinguished career of Supervising doctoral degree candidates. Dr. Omarova was one of his successful candidates. *Bob Krone and Gordon Arthur.*