

# How Should Humanity Steer the Future

## *Starship Culture as a Guiding Principle for Human Development*

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One might imagine a point somewhere in the future where the Galaxy is teeming with life descended from present day Earth. Today the human race is exposed to a variety of existential risks<sup>1</sup>, many of which cease to matter as humanity becomes a multi-planet and multi-star species. The means by which this Diaspora into the Galaxy takes place will be by means of the Starship, an idea popularized by over a century of fiction and studied rigorously by a small cadre of visionary scientists<sup>2-5</sup>. When considering a future where humanity has colonized the Galaxy, it is natural to look back and consider what path or pathways connect our present day to that future epoch. In this essay we propose to connect present day society to this future vision through the concept of a “Starship Culture”.

## Introduction

To speak of a Starship Culture at a time where only a dozen humans have been as far as the moon and none have ventured further may seem premature. The challenges presented by interstellar spaceflight are so enormous that a new cultural paradigm is needed to address them. The benefits of adopting a Starship Culture are immediate, not something that only rewards future generations. It’s not about spending more money but altering our individual and collective priorities. It’s about looking at every human endeavor from a different perspective. Look with an awareness that asks – what can I do differently today that brings humanity closer to the stars?

There are many roads to the stars that require many different problems to be solved. Solving these problems will have a strong positive and immediate return to society. A comprehensive roadmap enumerating all the possibilities is beyond the scope of this essay but a few specific examples serve to illustrate the point. One of the earliest starship concepts is the “Bernal sphere”, introduced by JD Bernal in 1929<sup>6</sup> and examined in some detail by others<sup>7</sup>. The concept is that of a world ship, transporting a large, dynamic population over multiple generations from star to star. Such vessels are essentially mobile, self sufficient space colonies. Traveling at less than 1% of the speed of light, the minimum travel time to the nearest star approaches five centuries. Such an undertaking will require expertise in building large deep space structures together with clean power able to operate indefinitely. The scale of power necessary to move such massive structures is orders of magnitude larger than what is available today but has the potential side benefit of powering civilization indefinitely. Most likely, the power source will be fusion, either directly through the fusion reactor<sup>8</sup> or indirectly through fusion derived power harvested from the stars (The sun itself being the prime source for the first

generation starships). Generation ships will be physically isolated for centuries as they slowly travel from star to star. A fully closed ecosystem with 100% recycling is assumed necessary although interstellar space may not be as empty as once thought<sup>9,10</sup>. Communication will be available but limited<sup>11</sup>. Living within the finite physical resources of a world ship, strict population control is essential. The social challenges presented by a world ship challenge us to understand how to build a society that is stable but not stagnant, controlled but free. Is there an optimum size for an isolated population necessary for stability? Understanding the operation of a stable, isolated society will be imperative. Tackling such issues in the context of a Starship Culture, while tied to future, long term goals has the potential for strong near term benefit. A society that can establish a stable, self-contained presence in interstellar space can easily do the same with cities on a planetary surface. If a society is capable of surviving indefinitely aboard a world ship, the long term prospects for survival on a planetary surface seem to be greatly improved.

A variation on the world ship, explored in fiction by David Brin<sup>12</sup> is a vessel that doesn't carry a biological cargo but rather a distilled cyber-essence of the builders. From a starship engineer's perspective, a radically different set of challenges appear. Without the need to transport biological humans and their attendant life support, the mass requirements are likely to be reduced by orders of magnitude. The reduced mass can either serve to reduce the energy needed, or reduce transit times from millennia to decades. Slowing or suspending the clock for the cyber dwellers can effectively reduce the perceived transit time to zero. The problem space shifts from the engineering challenges of massive space colonies to one more rooted in nano and bio technology. For all spaceflight scenarios reducing the mass of the payload generally makes the problems of propulsion easier. Sustained exponential growth (Moore's Law<sup>13,14</sup>) in the density and cost reduction of electronics suggests the advent of personal computers with processing power equivalent to the human mind in the not too distant future<sup>15</sup>. As the tools and methods developed by the semiconductor industry find their way into the biological sciences the possibility of exponential growth in the physical understanding of the mind is a definite reality.

Moore's law has continued for decades despite the lack of any guidance beyond that of Adam Smith's Invisible Hand<sup>16</sup>. When placed in the long range context of developing a Starship Culture, Moore's law gains a purpose beyond developing the next generation of home entertainment. Should a cyber culture prove to be technically feasible, it will likely be something widely developed before its integration into a Starship Culture. Such a transformation would likely serve as a tipping point in humanities interaction with its environment.

The final example to consider involve what can only be considered as speculative physics. Faster than light travel has long been a staple of science fiction but finding plausible methods that don't involve violating one or more pillars of modern science have proven nearly impossible. In recent years, several theoretical possibilities have opened up<sup>17-19</sup> that potentially bypass the limitations of special relativity but they bring with them complications that are nearly as insurmountable. Theoretical and experimental physics both continue to make rapid progress and a crucial understanding that enables the

starships of fiction may yet someday be found. It is of interest to note that the invention of heavier than air flight by the Wright Brothers did not involve the discovery of any new physics but rather just a deeper understanding of physics that had been understood for several decades<sup>20</sup>.

## **The Starship Culture and modern society**

What is the Starship Culture and how does adopting it help society today? When it comes to problem solving, a common expression is “Take care of the small stuff and the big stuff will take care of itself.”. Conversely, one could say: “Take care of the big stuff and the small stuff will take care of itself”. The challenges of interstellar travel are so great that every bit of human talent and ingenuity is required. Patterns of human behavior that destroy and waste this most valuable resource must change. In 2002 and 2003, Nobel laureate Richard E. Smalley developed a list of ten existential threats to humanity<sup>21</sup>. By definition, any of the items on this list pose a threat to humanities potential to become an interstellar species. We will examine each of them in turn to see the synergistic relation between challenges posed by existential threats and the challenges of establishing a Starship Culture.

**Energy:** If you calculate the energy requirements for even the most modest interstellar voyage and compare it with the energy available today you will find that the world’s entire energy production for a year is barely adequate. Solve the energy problem necessary for a Starship Culture and energy for a planetary civilization is no longer a problem. Existing programs for fusion and high efficiency solar cells are already a foundation for interstellar travel.

**Water, Food and the Environment:** The universe is an incredibly hostile place; we need to learn how to live indefinitely in closed habitats if we are to travel to the stars in world ships. To the extent that technology can be developed to make cities self sufficient for water, food and environmental resources we are learning to live between the stars.

**Poverty:** The problem of transitioning society to a Starship Culture is so huge that everyone’s contribution is vital. We need to educate everybody, give them hope. The world’s message to the poor in the Starship Culture is “We need you, please join us”. The poor are seen as opportunity, not as a problem.

**Terrorism:** The Starship Culture seeks to include all of humanity, an ideal that does not support the social and political injustice that often fuels terrorism. The Starship Culture renounces violence as a waste that can not be tolerated in light of the challenges that the Starship represents. Recognizing that all humans play a role in the Starship Culture, many of the conditions that foster terrorism are viewed as social ills that must be addressed and remedied.

**War:** The Starship Culture views war as a waste of human and material resources that do not support the aims of becoming a star faring civilization. The motivations for adopting a Starship Culture are in some ways similar to the motivations for going to

war<sup>22</sup> – can the motivations be redirected away from war and towards establishing a Starship Culture?

**Disease:** There are a variety of medical issues which must be directly addressed by a Starship Culture but in general, the main thrust is that disease destroys human life that needs to survive to go to the stars. We seek not only the survival of the species but of the individual. In many scenarios, it takes centuries for a ship to bridge the space between the stars, do we survive the trip or is it crewed by generations while we live and die onboard?

**Education:** How much education is too much, when facing the challenge posed by the Starship? It's also not only about science and engineering; it's about every aspect of human knowledge and the tools by which we learn.

**Democracy:** This one is tricky. It seems self evident that success is more likely when it is pursued by willing participants but how willing are the later generations on a world ship?. At the same time, freedom is never unlimited, some restrictions are imposed by nature, others by social contract that we mostly agree to abide with because it serves our own self interest. Life in a closed ecosystem imposes constraints that humanity has largely not yet faced. The Starship Culture recognizes that these issues are fundamental problems that need to be addressed and provides a concrete context for doing so.

**Population:** This is a multifaceted issue. When you talk about a closed ecosystem that is equivalent to a population growth of zero in which the number of births equals the number of deaths. In regions of space where resources exceed population, growth can be permitted. The closed ecosystem of a starship between the stars has very limited options for growth which strongly depend on the duration of the voyage. In all cases though, there is a tension between the need to manage population and individual freedom. The Starship Culture demands universal education, a healthy environment, abundant energy. Can a stable population survive in a closed ecosystem indefinitely? This is an open question that cannot be answered until we have closed ecosystems to observe. How large of a population is sufficient? Large space colonies may provide the answer and are likely a required precursor to generation ships crossing interstellar space. There will likely be a progression of colonies that start in the inner solar system near substantial resources with later colonies forming in the outer solar system. These form a natural bridge to generation ships.

Smalley's list is just a subset of the existential lists that have been made over the years. Some are tied to planetary and astronomical events that become increasingly less dangerous to the survival of humanity as the Starship Culture evolves.

## The transition to a Starship Culture

The definition of culture is: "The arts and other manifestations of human intellectual achievement regarded collectively". A working definition for a Starship Culture then is: "The arts and other manifestations of intellectual achievement that collectively binds

humanity throughout the cosmos”. Cultures have come in many forms throughout human history. Books have been the medium which have changed the collective course of human history on many occasions. They have accomplished this by connecting emotionally and intellectually to large fractions of the world’s population in some enduring way. What is unique about these books and how did the memes they encode take root in the human psyche? What do these ideas teach about how to promote a vision of a Starship Culture and make it interesting? The subject of what makes something interesting has been studied in marketing research<sup>23</sup>. There are several key items to look for. How much current thinking will need to be altered if the benefits of adopting a Starship Culture today are true? Are there immediate, near term benefits evident? In the previous section we discussed how a Starship Culture promotes near term benefits. As for current thinking, there are two points to consider. Long term thinking, especially when the cost is in the present but the payoff is in the far future is not very common. The idea that (very) long term thinking can have near term payoffs is one new meme that needs to be adopted. A second, important meme is the idea that the Starship Culture is universal, that all people have an opportunity to participate and benefit.

What influences a person to adopt a culture? Many people are born into one or more. People can participate in more than one culture at a time, think religion, politics and choice of career. Sometimes adopting a new culture means replacing an old one, other times it is adopted in addition to an existing meme. Adopting the Starship Culture is not an overnight endeavor. Everett Rogers diffusion theory of innovation<sup>24</sup> takes the adoption of a new product or idea through five phases: Innovators, Early adopters, Early majority, Late majority, laggards. This essay and others to follow seek to promote the idea of a Starship Culture to the Innovators and Early adopters. For a meme to take root and spread, it needs vectors. In the era of social media, there are many vectors by which a meme can spread. One important factor in the establishment of a new meme is missionaries. It is hoped that among the Innovators and Early adopter who read this, some choose to become missionaries and further spread meme of the Starship Culture. One other vector for spreading a meme is described in Derek Sivers TED talk: “How to start a movement”<sup>25</sup> which introduces the idea of the first follower.

Another possible vector for spreading the Starship Culture meme is via its introduction into the K-12 curriculum. It’s not just a STEM field as solving social problems is clearly a priority as well. One element that would come through though strongly is the idea of applying a scientific approach to problem solving.

What are some of the potential pitfalls to widespread adoption of the Starship Culture? This is not the first time that colonizing the Galaxy has been proposed as a goal for human civilization. The Millennial Project by Marshall T. Savage<sup>26</sup> set forth a detailed blueprint of how this may be accomplished. Twenty years later it has failed to capture the imagination of the public. A small web presence with a handful of contributors is all that can be found. The author has moved on to other things and wants no contact. How will the Starship Culture be different? The Starship Culture is not an attempt to build an organized program with the objective of narrowing down hardware choices and targeting a launch for any particular date. There have been and are multiple efforts that target the

engineering details. It is about creating a social mindset that knows we are going to the stars, promoting activities that support this long range goal while working to eliminate many of the harmful, collective behaviors that drain humanity from reaching its full potential. The Starship Culture is not a program, but a different way of thinking about the future. It's about thinking that we *have* a future.

The Lifeboat foundation is considerably larger than the Millennial Project with many influential members. The concern of the Lifeboat Foundation is with the long term survival of humanity through a program of identifying specific existential risks and potential solutions. A variety of projects have been initiated and the foundation has had some modest success with fund raising (on the order of \$500K). The Lifeboat foundation has identified a broad problem – existential risks to survival, broken the risks down into specific threats and undertaken to address them as technical challenges. From the mission statement and its reference to the Singularity, one could view the Lifeboat foundation as an extension of Ray Kurzweil's strategy of "Living long enough to live forever."<sup>27</sup> In contrast, the strategy of a Starship Culture could be viewed as "Living long enough to colonize the Galaxy." In a sense, they are opposite sides of the same coin – achieve the goal of living forever and colonizing the Galaxy will naturally follow versus set out to colonize the Galaxy and living forever will naturally follow. We would argue that setting out to colonize the Galaxy (the Starship Culture) embraces all of the aims of the Lifeboat foundation while adding what? The unknown. Survival for the sake of survival isn't sufficient and never has been. We live to explore, we explore to live. Some would argue that humanity doesn't have the right to any world beyond our own. One civilization, one star, that's it. Maybe even one world. But... Where is everyone? Something is wrong and we don't understand why. Are we alone? A sunset's beauty only exists in the eye of the beholder. We are the eyes of the universe contemplating its creation. There were likely more than a billion sunsets in the Galaxy today, how many went unseen?

The Lifeboat foundation sees a problem and has a plan. The Starship Culture sees a challenge and has a dream.

The Starship Culture has many fellow travelers, people who share some of its aims without even being aware of its existence. One of the more prominent fellow travelers has this to say<sup>28</sup>:

"Everybody's got their own priorities. In terms of improving the state of humanity, I don't see the direct connection. I guess it's fun, because you shoot rockets up in the air. But it's not an area that I'll be putting money into."

In a separate interview with the Telegraph<sup>29</sup>:

"Gates will deliver the BBC's Dibleby Lecture, taking as his theme the value of the young human being. Every child, he will say, has the right to a healthy and productive life, and he will explain how technology and innovation can help towards the attainment

of that still-distant goal. Gates has put his money where his mouth is. He and his wife Melinda have so far given away \$28 billion via their charitable foundation, more than \$8 billion of it to improve global health.”

These statements by Bill Gates illustrate several points – he doesn’t see space travel as a path to improving the state of humanity but he clearly values the child and his or her right to a healthy and productive life. Does Bill Gates embrace the Starship Culture? Not consciously, he’s never heard of it. Long term, his vision of a right to a healthy and productive life for all children must someday expand to the stars.

## Summary

Many of the pieces outlined (ending war, universal education, equal rights) sound idealistic but that’s what a Starship Culture must be. Idealists who believe that any obstacle can be overcome, that it’s time to stop pussyfooting around and getting serious about fixing what’s wrong here on Earth and turning our vision outward. Somebody on twitter once responded to the question of what are we doing in space when we have so many problems here on Earth with “OK, What’s your timetable?”. Let’s clean up the problems here and get on our way. Enough talk! That is how the Starship Culture sees things. The problems on Earth today are obstacles to be overcome between humanity and the stars. That they are challenges and in some cases huge challenges but from the perspective of a Galaxy wide civilization they will be viewed as just one small part of the struggle that lifted humanity to the stars if they are remembered at all. The practical value of adopting the Starship Culture today is a renewed focus on the things that matter to our long term survival. If we are going to the stars we must survive, which means putting our bad behavior behind us.

Books have changed the course of civilization throughout history. For centuries books were one of the prime vectors of cultural change. While books continue to be important, they have been supplemented and perhaps surpassed by the new media in all its forms. In fact, the immense bandwidth afforded by present day technology becomes as much of a challenge as an opportunity as any given idea struggles to make itself heard.

“We all live in the gutter, but some of us are looking at the stars” Oscar Wilde

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