

## **THE 100-YEAR STARSHIP STUDY**

### **Strategy Planning Workshop Synthesis & Discussions**

This document provides a synthesis of discussions, without personal attribution, of the Strategic Planning Workshop hosted by the Defense Advanced Research Projects Agency (DARPA) and NASA's Ames Research Center for the 100-Year Starship Study.

The workshop was held in Northern California on January 11-12, 2011.

### **Background**

#### *100-Year Starship Study & Workshop Goals*

The 100-Year Starship Study is a project seeded by DARPA and NASA Ames to develop a sustainable model for persistent, long-term, private-sector investment into the myriad of disciplines needed to make long-distance space travel viable.<sup>1</sup> The goal is to develop an investment vehicle – under the patronage and guidance of entrepreneurs, business leaders, and technology visionaries – which provides sustained investment over a century-long time horizon, together with the agility to respond to the accelerating pace of technological change.

On January 11-12, 2011, DARPA and NASA Ames convened a Strategic Planning Workshop, which brought together 29 visionaries with diverse backgrounds, from engineers to authors. Over the course of two days, participants discussed the requirements for seeding research that would enable interstellar flight.

The workshop sought to frame questions related technological, financial, and organizational strategy for a long-term technology organization. Participants considered the connections between economics, politics, social trends, and technological progress, as well as the organizational characteristics that could navigate these domains with the flexibility and robustness required to endure.

---

<sup>1</sup> Information about the 100-Year Starship Study can be found at:

[http://www.darpa.mil/NewsEvents/Releases/2011/2011/02/09\\_100-Year\\_Starship\\_Study\\_Strategic\\_Planning\\_Workshop\\_Held.aspx](http://www.darpa.mil/NewsEvents/Releases/2011/2011/02/09_100-Year_Starship_Study_Strategic_Planning_Workshop_Held.aspx)

[http://www.darpa.mil/NewsEvents/Releases/Releases\\_2010.aspx](http://www.darpa.mil/NewsEvents/Releases/Releases_2010.aspx) (download PDF at: 2010/10/28 - DARPA/NASA Seek to Inspire Multigenerational Research and Development)

---

**Disclaimer:** The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

Discussion addressed a wide range of issues, including motivations for human visitation of other star systems, the risks involved, the economic and socio-political obstacles, and the type of governance structure needed. Other topics, such as the importance of having short-term achievable goals, identifying a destination for a starship, bringing together a core group of experts/enthusiasts, interest groups and private funding, and the continued importance of science and technical education for the world's youth were also discussed at length.

The workshop concluded with unanimous acknowledgement that many unanswered questions remain and a great deal of work lies ahead. Planning is underway for follow-on activities, and the study is scheduled for completion by the end of 2011. Organizers and participants agreed that spirited discussion throughout 2011 will undoubtedly ensue.

### *Long-Term Projects & Motivation*

In the year 2000, the Nobel Foundation celebrated its hundredth anniversary. Founded as an endowment, “the interest on which shall be annually distributed in the form of prizes to those who, during the preceding year, shall have conferred the greatest benefit on mankind,” the Nobel Foundation has had a profound impact— arguably with leverage far beyond its comparatively modest finances— on discovery, innovation, and imagination across a spectrum of disciplines.

The next century is rich with interesting technical challenges relevant to the exploration of our solar system and beyond. However, just as Alfred Nobel could never have imagined the physics, chemistry, or medicine of a century later, it will be difficult to predict the breakthroughs that will revolutionize our ability to travel in deep space. Instead, the 100-Year Starship effort will focus on agile financial mechanisms to sustain innovation. An endowment could be envisioned with minimal (or zero) government subsidy or control; grants, scholarships, prizes, and contracts can be awarded to worthwhile undertakings, in science, engineering, humanities, and the arts, in pursuit of attaining interstellar flight; and a renaissance of wonder can be stoked in the youths of successive generations.

---

Disclaimer: The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

## WORKSHOP DISCUSSIONS

The workshop began framing the technological, financial, and organizational questions for a long-term technology funding organization. Over the course of two days, participants discussed the issues associated with seeding research that would enable interstellar flight.

### Why Explore Beyond Earth's Atmosphere

Workshop participants spent extensive time exploring the drivers and motivating factors for long-term exploration of space. This began with several questions, including: what are the most important drivers to support the long-term vision of interstellar travel by humans? Why should we go to the stars?

The group identified five key factors as high-level motivations for the exploration of distant space:

- *Human survival*: ideas related to creating a legacy for the human species, backing up the Earth's biosphere, and enabling long-term survival in the face of catastrophic disasters on Earth.
- *Contact with other life*: finding answers to whether there is other life in the universe, whether "intelligent" life exists elsewhere in the galaxy, and at a basic level, whether we are alone in the universe.
- *Evolution of the human species*: exploration as a human imperative, expansion of human understanding and consciousness through space exploration.
- *Scientific discovery*: breakthroughs in scientific understanding of the natural universe, a pursuit for knowledge.
- *Belief and faith*: a search for God or the Divine, a need to explore beyond Earth's atmosphere as a part of natural theology or as found through religious revelation.

These drivers for exploration were identified through group discussion as the most significant, high-level reasons why human societies and individuals would undertake the exploration of space over long timescales and distances. Most other reasons discussed by the group were identified as subordinate to one of these five. The distinction between whether a social group "would" versus "should" support space exploration on the basis of each of these drivers is a matter of perspective or investigation for each of the five drivers. For example, a particular individual might support long-term space exploration for only one or two reasons within this set; a social majority could favor exploration on the basis

---

Disclaimer: The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

of a different factor, and individual, large-scale financial contributors or endowment providers might support exploration on the basis of yet another driver in this set.

*Survival* was identified as a driver for space exploration through the potential to ensure human survival in the face of planetary-wide catastrophes (including asteroid impacts and mass extinction events) and to potentially provide non-terrestrial repositories for biosphere backups. *Contact* with other life was identified as a fundamental driver for human exploration of space through the potential to provide answers to whether life is unique to Earth, and whether humanity is “unique” as the only intelligent life in the galaxy. *Evolution* was discussed extensively within the context of whether the need to explore is a fundamental characteristic of the human condition; similarly, expansion of a human presence into and beyond the solar system could be a means to enabling new facets of human consciousness and understanding of the nature of intelligent life. *Discovery* was discussed as exploration driven by the motivation for scientific discovery and an increased understanding of the natural universe. Finally, *Belief* was discussed as a motivation for the exploration of space on the basis of religious thought and belief; one participant observed a distinction in the definition of natural theology, which could be identified as the knowledge of God obtained through any process apart from Divine revelation. In this sense, exploration of outer space could be motivated by either a study of natural theology or as a need found through revelation.

Group discussion and interest focused extensively on *Evolution* and *Contact* as strong drivers for interstellar exploration by humans. Perspectives on this driver included a set of ideas ranging from exploration as a human imperative and a part of the human experience to a possible evolution of human consciousness that would be concomitant with embarking on interstellar exploration. By majority, the group felt early funding sources could be particularly engaged by the opportunity for discovery and spin-off technologies, survival of the species, and exploration as a human imperative – collected broadly into *Discovery*, *Survival*, and to a somewhat lesser extent, *Evolution*. Similarly, there was consensus that *Contact* with discovery of other life in the universe could be a catalyst for broad social engagement with and support for the exploration of deep space.

There was broad agreement that all high-level drivers for long-term human exploration would include direct human involvement in the discovery, exploration, and expansion process. This appears to be fundamental to motivations captured in each of the drivers.

---

Disclaimer: The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

## What a Long-Term Organization Could Focus on Accomplishing

The group explored potential milestones, and associated timescales, that could help catalyze and sustain society-level support for exploration of deep space. Possible milestones included those that could have either direct or indirect involvement of a potential organization that results from the 100-Year Starship Study. These milestones represent a selection of opportunities to build support for and engage broader participation in the long-term goal of visiting other star systems. These milestones themselves do not constitute a ratified go-forward plan, but rather represent the thought process of the workshop, and the realization that these activities would not necessarily be undertaken by DARPA or NASA, but rather by the long term organization spawning from this study.

### *Milestones Brainstorming & Initial Discussion:*

- *In less than five years:*
  - o Prove other Earths exist
  - o Social involvement to create a world view of hope
  - o Blockbuster movie (grossing more than \$500M) that provokes public involvement and imagination
  - o 100-Year Starship organization: create a credible organization plan, pursue endorsements
  - o 100-Year Starship organization: 100 high-profile supporters of the 100-Year Starship goals in a public advertisement
- *In less than ten years:*
  - o Land humans on Mars
  - o Communication via quantum entanglement (faster-than-light communication)
  - o Generation of life from computer code, without cellular systems
  - o Development of ability to sink carbon (i.e., green or recycling efforts) on Earth faster than we're creating it (with implications for "terraforming" other rocky planets or moons)
- *In less than 20 years:*
  - o Image of another 'close Earth'
  - o Telepresent probe on the surface of Europa
  - o Capability to discover non-Earth-based life
- *In less than 25 years*
  - o Bounce a signal off an exoplanet
- *In less than 30 years:*

---

Disclaimer: The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

- Non-propellant satellite to Oort Cloud

The precise role for a 100-Year Starship organization was not defined in these discussions – rather the group acknowledged a need for involvement, directly or indirectly, in supporting these milestones, pushing for their achievement within the timescales above, and channeling the social inertia that results from each milestone into achieving the next.

Several views were shared by a majority of participants:

- First, a long-term goal of interstellar travel does not require near-term attention to who might embark on such a journey. For now, the focus should instead be to enable the long-term technological capability for interstellar travel, as well as the social interest and imagination that are required to drive that technology innovation.
- Second, direct human involvement, or some equivalent, will be necessary to make any long-term achievement sustainable. Part of the workshop’s introduction was a discussion of space exploration as a manifestation of the “Heroes Journey.” There was general agreement that a human element is necessary (though not itself sufficient) for sustainable support, i.e., pure robotic probe exploration was insufficient.
- Third, once an Earth-like planet is found (i.e., a place outside our solar system that is capable of supporting life), societies and individuals will be more likely to have a visceral reaction in support of interstellar travel. Such a destination would be where we could aim to travel.

#### *Discussion of Multi-Generational Projects & the Need for Near-Term Milestones*

Many participants concluded that multi-generational organizations and projects are rarely successful. There are, however, notable examples throughout history where projects longer than a single generation have succeeded. There was broad agreement that these undertakings could be examined further for lessons on multi-generational undertakings.

Several individuals provided examples of multi-generational projects that appear to have been accomplished without the use of publicized, near-term milestones to sustain funding support. Many of these examples, however, had a political or religious mandate or equivalent source of authority that removed the need for

---

**Disclaimer:** The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

support-sustaining measures. Some participants also observed that many large projects of antiquity associated with multi-generational undertakings, with a few exceptions like cathedrals, were built within a single generation.

The group discussed whether an organization seeking long-term accomplishments requires the definition and achievement of near-term goals. Many people presented views that near-term milestones increase the probability of longer-term results. This perspective holds that a concrete milestone, which is simultaneously achievable, visible, and constructive is a prized organizational tool that can bring fundraising and investment. In their achievement, these near-term milestones can cause a tremendous amount of energy, excitement, additional capitalization, and continued community endorsement.

Multiple participants noted that individuals often care most about issues that affect them and their children directly; milestones more than 8-10 years away see precipitous decline in support, because most individuals discount strongly things that are not immediately or personally relevant. Some in this discussion also suggested it may be worth more to look ahead at new types of organizations and financial models than at historical precedent and approaches that shaped multi-generational undertakings in the past.

#### *Involvement of Science Education*

A majority of the group emphasized the role of science education as a critical part of all long-term technology endeavors. The continued importance of science and technical education for the world's youth were discussed at length.

Participants suggested there are multiple factors to examine when considering science education and science literacy. Specifically, participants believed a key issue is that many teachers in the United States have not taken university-level science classes. They also believe a goal should be to make teachers feel comfortable with science, and with teaching science. Similarly, there is an inter-generational philosophy to change: many individuals who aren't comfortable with science seek to push learning science wholly onto the next generation; the goal instead should be to have teachers and mentors for students who are comfortable with teaching science, and who engage in activities with students to continue exploring scientific ideas throughout childhood and adolescence.

Science literacy was also highlighted as an important, related issue. This includes having more science-literate federal and state representatives.

---

**Disclaimer:** The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

## How: Organization Strategy & Funding

Workshop participants spent the final sessions of the workshop exploring possible organizational structures of a long-term research funding organization. This began with several questions including, what does the organizational and financial structure to govern and fund research look like? What is the role of the governing body of the long-term research foundation?

The group did not present a majority opinion on whether a '100-Year Starship organization' would be most effective under a for-profit versus nonprofit organizational model. Rather, agreement centered on the need for further analysis of which model would be most effective – and that either model, once decided upon, could be incorporated relatively quickly.

Discussion focused instead on governance issues that would be common to either model. A majority of participants agreed on three immediate-term issues associated with the creation of a new organization or foundation of this nature: intellectual property (IP), credibility, and leadership and governance.

*Proactive Management of Intellectual Property:* There was near-consensus on the need to secure IP associated with a potential 100-Year Starship organization in the near future. In the immediate-term and on an interim basis, several participants proposed "marking" all variants of 100 Year Starship and 100YSS as registered with DARPA. [Editor's note: DARPA has filed registration paperwork for all marks associated with 100 Year Starship]

*Building Credibility:* A majority of the group felt it would be important to establish credibility early in the life of a new organization by involving accomplished, public figures. One method to achieve this could be a *founder's conference*, proposed for later in 2011. Participants also observed that it would be necessary to find a group of key individuals willing to devote their time and resources to starting this organization.

*Scientific Leadership and Risk-Taking Culture:* A majority of the group highlighted the need to identify strong scientific leadership and enable a risk taking culture within any new organization. Two examples where tremendous progress has been made in relatively recent technological and social breakthroughs are the semiconductor and biotechnology industries. One participant observed that nearly all of the early projects of a prominent biotechnology firm failed. Every

---

Disclaimer: The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.



time in the process of failing, however, the firm discovered something that was a breakthrough for a related issue. Ultimately, the firm not only succeeded but also led in the creation of an entire industry. Participants noted this began with the creation of a *culture of risk taking; strong, enlightened scientific management*; and a local *community* that wanted to do something different. Some government funds and particular expertise were involved, but with substantially less important impact than the small groups of people who had the vision to build something new, and scientific management to enable this organizationally.

In addition to these three issues, some participants observed the need to identify opportunities for mutually beneficial alliances with existing organizations that possess similar goals.

#### *Near-Term Goals: First Year*

There was near-consensus on the goal of building publicity, holding a larger planning workshop as an open conference, and engaging the support of leaders in science, technology and business. The group suggested 100 high-profile supporters participate in an advertisement (for example, by purchasing a full-page advertisement in the Sunday edition of the New York Times that could appear under the banner “100 humans, 100 years from now, to the stars”). Identifying the individuals who might lend their names to this statement also was believed to be a worthwhile exercise. This would be an achievable goal for within the next year.

Additional near term activities discussed within the founding of a new organization and within the next five years included obtaining endorsements, developing a strategic plan, social engagement, engaging with the film industry, holding a focused discussion with potential funders at a Technology Entertainment and Design (TED) (or similar) event, and producing a white paper on interstellar life. Some group members also proposed seeking the involvement of anthropologists in the 100-Year Starship Study to consider the history of cultural migrations.

#### *Funding Sources*

A large majority of the group proposed a financial structure for any new organization that would be nearly or fully independent of government funding. While early investment by the U.S. government could be necessary or useful, the group agreed to focus on pursuing a financial structure that would be largely independent of government fiscal and political cycles, enabling longer-term

---

Disclaimer: The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

stability. An endowment, with a yet-to-be-determined governance structure, is likely to be the preferred alternative.

Two types of funding sources, outside government investment, were discussed as potential (and non-mutually exclusive) options:

*Large-Scale Donors & Endowment Contributors:* Individuals capable of donating significant sums of money are considered a primary source of seed capital for building an endowment. Group discussion focused on the motivations and structures involved in receiving large financial contributions from individual donors. Several group members proposed that a recipient organization could seek to build a peer group among donors, strongly establish the value of the organization's goals in public fora, and minimize the risk of poor publicity or embarrassment to all donors in the event of a failure to achieve the organization's goals.

*New Methods of Commerce & Crowd Funding:* Mobile and information technologies have enabled fundraising via small contributions from many individuals. *Crowd funding* (or *crowd sourced capital*) has been demonstrated already for political campaigns and disaster relief efforts. Several participants expressed significant interest in utilizing crowd funding approaches. (One example was mentioned as the opportunity to contribute \$10 via SMS at the end of a blockbuster movie). A compelling crowd funding program offers two opportunities, including a source of seed money and a sense of ownership in the contributing public's mind. The sense of ownership could provide support for future efforts.

## **Additional Observations**

### *Specific Recommendations and Comments*

- One participant suggested setting up a dialogue site to collect additional ideas from the workshop participants throughout the year.
- Several participants suggested that DARPA and NASA formulate a Request for Information (RFI) in the near-term. This could solicit input regarding options for an organizational structure and business model. [Editor's note: DARPA and NASA Ames will release the RFI in April 2011]
- Several participants recommended beginning a dialogue with the larger scientific, engineering, financial, and business communities. Talking with

---

Disclaimer: The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

the financial community in particular could provide practical knowledge to make these goals achievable. Likewise, discussion with all communities could identify additional benefits to society that would accrue in the process of accomplishing these goals.

- Several participants observed the importance of getting a broader, more diverse group of individuals involved in founding discussions. There are many ideas that are still missing.
- The group shouldn't underestimate how much the adventure could compel ordinary people. Several individual noted there's probably many more ways that the public at large could participate.

---

Disclaimer: The views and opinions expressed in this workshop synthesis are those of the workshop participants and do not necessarily reflect the official policy or position of any agency of the U.S. government. Examples provided within this article are only examples. Assumptions made within the workshop are not reflective of the position of any U.S. government entity.

# The 100-Year Starship Study

Strategic Planning Workshop 1/11/11 - 1/12/11

Background for Attendees (Ed: revised for format)

## **The 100-Year Starship Study**

“Almost all the nations that have exercised a powerful influence upon the destinies of the world, by conceiving, following out, and executing vast designs, from the Romans to the English, have been governed by aristocratic institutions.”

--Alexis de Tocqueville, *Democracy in America*, Vol. I, Ch. XIII

The human history of exploration and grand designs – from Ferdinand Magellan to John Harrison to Roald Amundsen – has been a history of patronage and persistence. Indeed it was sustained investments over decades and sometimes centuries that ultimately yielded the marine chronometer, a passage to India (or several), circumnavigation of the globe, discovery of the poles, and drilling into the Earth’s mantle. For the past half century, the great domain for human exploration has been the cosmos. In a break with the past, however, space exploration has been principally a government-driven enterprise. While not without its spectacular successes, this has not proved – and nor would history suggest otherwise – an especially promising model for long-term investment into the fundamental challenges associated with a sustained foray into space. Neither the vagaries of the modern fiscal cycle, nor net-present-value calculations over reasonably foreseeable futures, have lent themselves to the kinds of century-long patronage and persistence needed to definitively transform mankind into a space-faring species.

While the year 2000 may have marked the symbolic milestone of a new millennium, it was also a landmark year of a very different ilk and pervasive import. It was the hundred-year anniversary of the Nobel Foundation. Founded as an endowment, “the interest on which shall be annually distributed in the form of prizes to those who, during the preceding year, shall have conferred the greatest benefit on mankind,” the Nobel Foundation has had a profound impact – arguably with leverage far beyond its comparatively modest means – on discovery, innovation, and imagination across a spectrum of disciplines.

- What if, then, we imagine ourselves, one hundred years from now, going to the nearest stars?
- What if we commit ourselves to spending the next century tackling the key technological, socio-political, and economic problems that stand in the way?
- What if we strive to inspire the next five generations – and rekindle the human spirit of exploration, discovery, and wonder?
- What are the means by which we realize this vision?

The 100-Year Starship Study is a project seeded by the Defense Advanced Research Projects Agency (DARPA) and the NASA Ames Research Center to develop a viable and sustainable model for persistent, long-term, private-sector investment into the myriad of disciplines needed to make long-distance space travel viable. The goal is to develop an investment vehicle, an endowment – that to the patronage and guidance of entrepreneurs, business leaders, and technology visionaries – which provides the stability for sustained investment over a century-long time horizon, concomitant with the agility to respond to the accelerating pace of technological change.

It is easy to focus singularly on the meaty technical challenges posed by interstellar spaceflight as we conceive of it today. From overcoming the tyranny of the rocket equation, to the construction of an O'Neill colony, the technological horizon is replete with interesting problems. However, just as Alfred Nobel could never have imagined the physics, chemistry, or medicine of a century later, so we are well-advised to temper our pretenses to predict the future. Instead, we seek to focus on the flexible yet robust mechanisms: by which an endowment can be created and sustained, wholly devoid of government subsidy or control; by which grants, scholarships, prizes, and contracts can be awarded to worthwhile undertakings – in the sciences, engineering, humanities, or the arts – in pursuit of the vision of interstellar flight; and by which a renaissance of wonder can be stoked in the youths of successive generations.

The kick-off for the 100-Year Starship Study, on the symbolic date of 1/11/11, is meant to be a first gathering of visionaries to commence and steer a year-long effort to develop the business model, write the charter, and put in place the organizational construct needed to effect the long-term dream. Over the course of our few hours together we hope to explore the “machinery” of the 100-Year Starship business stratagem, and test our approach through a series of strategic wargaming exercises. These quick vignettes will help us understand the alternative courses of economics, politics, social trends, and technological progress, to ensure that the resultant mechanisms possess the requisite flexibility and robustness to endure. To that end, we pose the following questions:

- What is an appropriate definition for a “starship”?
- What are the economics of a 100-year endowment? What is the risk environment over this time horizon?
- What are the socio-political-religious obstacles to such an endeavor?
- What governance structure should it have? What is the balance between stability and agility? What is the time horizon for effecting macro level changes in the business construct?
- What are the parameters and attributes for selecting projects for investment?
- A spirited discussion will undoubtedly ensue. Please bring your passions and dreams!

## Agenda

Tuesday, 1/11/11

1200-1245 Welcome (Worden)  
    Stage setting (Neyland)  
    Introductions  
    Why Humans Go to Space? (Lemke)  
1245-1315 Agenda dynamic discussion for day 1 – the key questions (Diamandis)  
1315-1415 Strategy Session A  
1415-1445 Session A results discussion (Diamandis)  
1445-1515 Strategy Session B  
1515-1530 Break  
1530-1600 Strategy B results discussion (Diamandis)  
1600-1700 Strategy Session C  
1700-1730 Session C results discussion (Diamandis)

Wednesday, 1/12/11

0800-0900 Format for small group discussion (Diamandis)  
0900-1000 Small group discussion  
1000-1030 Small group report out and discussion (Diamandis)  
1030-1100 Break  
1100-1200 Initial draft charter (Neyland/Eremenko)  
1200-1300 Next steps (Neyland/Worden)

## Technical/Programmatic Strategy Questions

- What are the most important drivers to successfully support the long-term vision of interstellar travel by humans?
- How does the technical portfolio change over the time horizon?
- Are there big milestones along the way?
- How do we measure success?
- What are our next steps?

## Socio/Political Strategy Questions

- Why should we go to the stars?
- Who should go? And why them versus others?
- How are they selected?
- What should they take?
- Will they (or others) return?
- What are our next steps?

## Organization/Foundation Strategy Questions

- What does the organizational and financial structure look like to govern and fund research?
- What is the role of the governing body of the long term research foundation?
- Who belongs to the governing body and for how long?
- How is their membership determined?
- Who decides what research gets supported and how do they decide?
- How are transient changes in approach/ politics nulled and longer term changes propagated?
- What are our next steps?

## Strategy Sessions

### *Strategy Session A: Ideas & Planning*

Break into three teams. Each team will address one of the sets of questions below. The objective will be to identify effective near- and far-term strategies and scenarios.

### *Strategy Session B: Counter-arguments*

Rotate to a new team. The new teams will identify obstacles to achieving the visions described in the debriefs of one of the other teams. Specifically, what are the challenges to accomplishing the goals, objectives, and ideas as presented in the debriefs? What assumptions did the previous team make that will negatively affect the outcome?

### *Strategy Session C: Robust Results*

Rotate to a third team. The final strategy session will be to build upon the strongest ideas and overcome the concerns and risks presented by the previous teams. Using the knowledge from the previous presentations, develop robust strategies and solutions which will provide a framework for the long term research organization.