Research: Space Strategic Planning Theory

By Bob Krone

Abstract
Strategic planning is the most complex and sensitive function undertaken by organizations – public and private. It both changes an organization and creates new destinies. Five years ahead is a usual time an Earth business will forecast its future. It is rare to have national decision makers commit their planning to any time period. Space planners have much different concepts of time. Their missions require a long period of research, followed by another long period of construction, followed by another long mission period. This article adapts validated existing Earth strategic planning theory to the special planning requirements of Space. The Kepler Space Institute leadership stakes the claim that this is the first Space strategic planning theory model. Those with counterclaims, please e-mail them to BobKrone@aol.com.

Why Go?
Debates over the larger question of the need for human space exploration and habitation have occurred for decades. Completely answering that question is a goal for this *Journal of Space Philosophy*. The short answer to the question is that eventual human survival depends on building civilizations in space. Our planet's resources are limited. There are natural and human-made threats to earth-bound people that increase in probability over time. The need for increased quality of life, and the prevention of erosion of today's qualify of life, for people on Earth demands the capture of resources known to be in Space. Science and technology have advanced to make human settlements in Space feasible within the 21st Century. The positive answers to *why go?* we have. The answers to the *how?* and *when?* questions are now being formulated. The conclusion of Space scholars and practitioners is that the most critical variable for humans successfully creating settlements in space is effective leadership and governance.

Space Strategic Planning Theory[1]

> Strategic planning, done right, provides the greatest possible insurance *against* failure and *for* long term organizational success.

A spaceship without a pre-planned destination has no chance of survival. Strategic planning is still not universally accomplished by Earth public and private organizations, but major corporations, health services, the military services, schools, and some national governments attempt it. Strategic planning is relevant for every public agency,

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[1] Strategic planning theory for Earth organizations fills libraries and can be found on the Internet. For four decades, I have taught, consulted, and published on strategic planning as one of my higher-education subjects. My complete resume and curriculum vitae can be found at: www.bobkrone.com/node/103. I have developed the model adapted for Space here throughout my career and I taught it as recently as August 2014, online to graduate business students at the Pacific Adventist University, Port Moresby, Papua New Guinea.

private company, non-profit organization, and even families and individuals. Done right, it provides the greatest possible insurance against costly failures and the best chance for long term success. Leadership for Space missions, exploration, and development must do it.

The general theory for the Space strategic planning process is outlined in Figure 1.

THE STRATEGIC PLANNING PROCESS

■ Values Analysis
■ Task Force Creation for Research
■ Document Past Performance
■ Project Future External Environment
■ Assess Internal Capabilities & Resources
■ Compare Performance with Top Performer and average of competition
■ Create Alternative Strategies & Goals
■ Schedule Decision Conference
■ Finalize the Plan
■ Implement, Evaluate, Improve the Plan
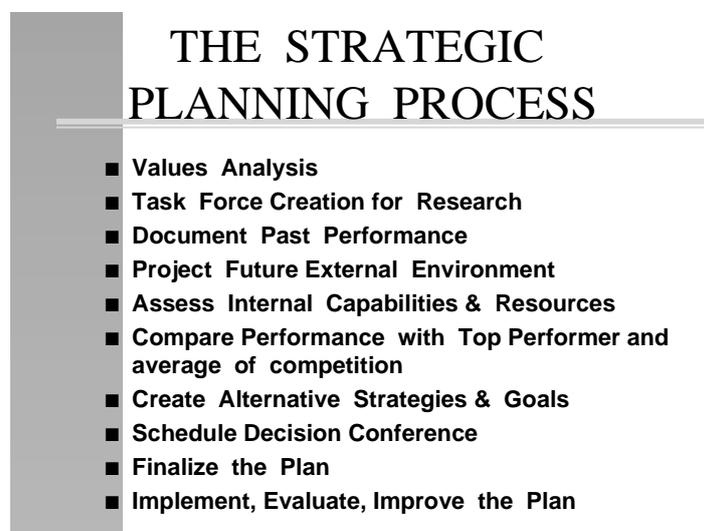
Figure 1: The strategic planning process.

The steps in the strategic planning process, as shown in Figure 1, seem to be in a logical sequence beginning with values, proceeding through research and analysis to the creation of alternatives, then to a decision conference, writing the final plan, and, finally, to implementing the plan, evaluating it, and making improvements. The process in actuality does not neatly track through those steps. All of the steps must be accomplished, but they do not occur linearly one after the other. Several steps will be in progress simultaneously. At times, the process may seem to reverse, go in apparently endless cycles, or even stop at various roadblocks.

Strategic planning creates a new destiny. It will be the most complex and sensitive analysis undertaken by any Space entity. The process will seem messy – or even impossible – as it must be undertaken by the very people who carry the greatest responsibility for current operations. A strategic planning committee should be composed of top performers, managers, leaders, and thinkers. All of those professionals are already overloaded. The challenges are many. The effort is necessary. The rewards will be huge.

The next sections describe very briefly what happens in each step of the strategic planning process.

Values Analysis
Values are principles or things preferred. Three essential questions to answer in strategic planning are: "Who are we?" "What do we prefer?" and "Where should our planning take us in the future?" A consensus for answers to those three questions must emerge before any detailed planning is done.

If it becomes impossible to reach a consensus on "What we truly believe and prefer," a self-destructive diverse opinion undercurrent will override the process from the beginning and a great amount of time, energy, and resources will be expended on research toward goals that are in conflict with the real values held.

An extremely simplified example may help. I was asked to help an arts organization to decide on programs for the next year or two at a Board of Directors meeting. I listened for an hour as board members argued for their various pet programs. There was no agreement and the frustration level was obviously rising. At that point I asked them to postpone discussions of individual programs and for each board member to state briefly what he or she deeply believed to be the primary mission of the group. That took thirty minutes and demonstrated that there was general agreement on the basic values of the organization. I then asked them to come to agreement on the board's three top values. That was easily done. Then I suggested that they now link their future programs to those three values. Fifteen minutes later the meeting ended with agreement on programs.

Do not be misled by that simple illustration to thinking that solving your Space organization's strategic planning needs can be done that easily. In my example there were no values conflicts and no values compromises required by members of the board. The projects themselves were trivial by comparison. They were just starting to think about the trees instead of the forest.

A more typical example was when La Sierra University, in Riverside, California, began its strategic planning process in 1992 after its separation from Loma Linda University. I facilitated Ideas Unlimited[2] workshops with groups of faculty, administrators, students, alumni, and the Board of Trustees with the goal of building an initial values database. The targeting I used asked the groups to write their sincerely held preferences for the long-range future of La Sierra University. That values database became a reference for the next three years of research, discussions, and analysis, which resulted in the board-approved 1995 strategic plan for the university

We must know, and have consensus, for our core values to create a valid strategic plan.

Task-Force Creation
Information requirements are so large for strategic planning that research and analysis teams are created. There are other reasons for creating these task forces. Since everyone is impacted by the results of strategic planning, the widest possible participation in the process is needed. When strategic planning efforts are completed, it is not uncommon for participants to conclude that the process of interactive communications across functions of the school, company, or agency were as valuable an outcome as the written plan. The cross-department learning to reach consensus on destiny-of-the-firm-type decisions produced a new environment of mutual understanding.

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[2] Ideas Unlimited is a group survey method validated since its creation in 1926. See Dr. Bob and Sue Krone, *Ideas Unlimited: Capturing Global Brainpower* (West Conshohocken, PA: Infinity, 2007).

The eight task forces that are usually formed are shown in Figure 2. The use of task forces is a powerful brainpower accelerator for strategic planning and serves the function of consensus-building within the strategic planning committee. Active participation by people representing every constituency in the organization and every part of the system brings the necessary expertise and viewpoints to bear on problems. It serves an even more important function of moving the outcomes of your planning process closer to being a *Pareto optimum.* The name comes from the late 19th-century Italian scholar and author, Vilfredo Pareto. A Pareto optimum is achieved when a strategy, policy, or decision results in many people being better off and none being worse off than before. That is rarely achieved in strategic planning for complex organizations, where change usually benefits some and hurts others. Keeping the Pareto optimum as a goal for decision making, however, will stimulate the planning process to search for ways to avoid hurting people. Reducing the numbers of the disadvantaged increases the percentage supporting the changes and thus the probabilities of successful implementation. Unknowns and uncertainties for the future of humans in Space make it highly unlikely that a Pareto optimum will ever be achieved, but there will be tangible benefits to keeping it as a consideration during planning.[3]

STRATEGIC PLANNING TASK FORCES

- ■ **Mission and Values**
- ■ **Human Resources**
- ■ **Internal Capabilities**
- ■ **External Environment**
- ■ **Financial Management**
- ■ **Quantitative Methods**
- ■ **Qualitative Methods**
- ■ **Technology and Communications**
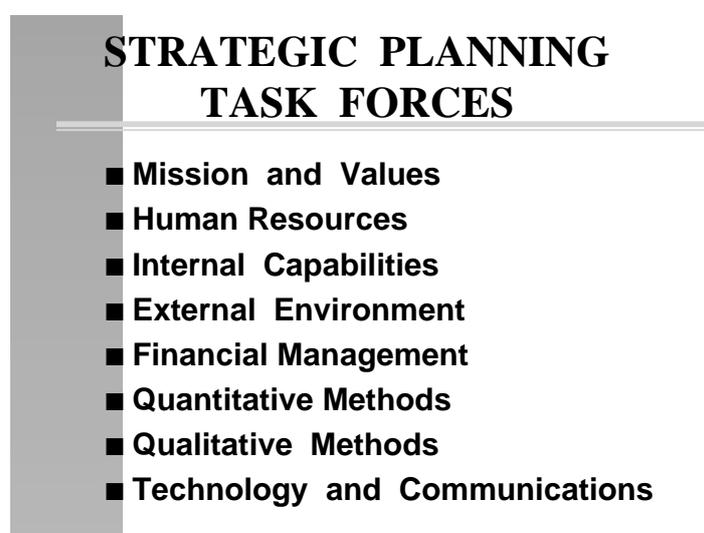
Figure 2: Strategic planning task forces.

Document Past Performance

What sort of performance needs to be documented for strategic planning? There may be no evidence of past performance for the specific Space project. But the strategic planning committee must be satisfied that the system's capabilities, strengths, and weaknesses have been fully described. This is the beginning of the *internal analysis*

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[3] Italian philosopher, sociologist, and economist, Vilfredo Frederico Damaso Pareto (1848-1923) is best known for his contributions to income distribution and analysis of individual choice. Three of his concepts continue to be validated and extensively used today. They are (1) the Pareto principle, (2) the Pareto chart, and (3) the Pareto optimum. The Pareto principle is known better as the 80-20 rule: research has shown that 80% of the effects result from 20% of the causes. That rule has held well for most of Earth's organizations. The Pareto chart was developed from Pareto's writings by pioneers of the quality control movement after WWII. The Pareto chart is now widely used in industry and organizational management to represent the time spent performing various tasks. It is a vertical bar graph which helps to determine which problems to solve in what order. The Pareto optimum, described here, is the concept most applicable to strategic planning.

required for strategic planning. The basic goal for any strategic planning is to match internal capabilities with external opportunities. That model is presented in Figure 3.

STRATEGIC PLANNING BASIC MODEL

OPPORTUNITIES   =   CAPABILITIES
(External)   (Internal)

Past & Current   Resources Performance

Project Future   Project Future

Figure 3: The basic strategic planning model.

Project Future External Environment

Future forecasting for Earth entities has become increasingly difficult with the acceleration of change in local, national, and global environments. For Space it falls into the *fuzzy gambling* category.[4] Since strategic planning creates long-range destiny-type decisions and goals for the organization, future forecasting uncertainties must be appreciated, although the requirement cannot be ignored. The analysis should estimate which variables will remain stable and which will change (and in which direction at what speed). Growth situations, resources, markets, and constraints should be projected. Perhaps the most important part of a Space future external environment analysis is the consideration of paradigm changes, natural phenomena, and major discontinuities. For Space there is also a larger probability of what Herman Kahn called *The Butch*, which is a fundamental error in quantitative or qualitative analysis and calculation.

A note on selecting a future time period for analysis: this article refers to the global Space community.[5] Space systems have huge economic, social, and political impacts on the Earth's nations and their people. Space projects must consider long-term research, planning, and implementation. For instance, an excellent current study of the world's energy needs shows that without developing space-based solar-power systems, the world's energy needs cannot be met in the second half of the 21st

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[4] *Fuzzy gambling* is a term invented by Professor Yehezkel Dror, the co-founder and leading scholar for the policy sciences, beginning in the 1960s. He defined it as follows: "Because of pervasive uncertainty and inconceivability in most domains of policy making and all domains of future weaving, governments engage necessarily in 'policy gambling,' that is, fuzzy gambling for high stakes. The notion also applies to the default option of continuing past policies despite changing circumstances." See Yehezkel Dror, *The Capacity to Govern* (Portland, OR: Frank Cass, 1994), xiv. The concept applies in all space strategic planning.
[5] By the Space community I mean the entire, huge spectrum of people, groups, agencies, and businesses throughout the world devoting their time and talents to Space projects and learning.

century. Strategic planning by relevant solar energy corporations needs to project analysis out to 2100.[6]

Assess Internal Capabilities and Resources
The skills, knowledge, motivation, and creativity of people plus the investment in personnel development should be documented. The property, plant, and equipment; assets and investment position; financial position; communications and technology; process flows; profitability; waste reduction programs; research and development strengths; resources available through the Board of Directors; customer satisfaction; and retention programs should be included in the analysis. Current liabilities, long-term debt, legal actions, and stockholders' equity (if applicable) should also be assessed. This analysis allows the building of a profile of organizational strengths and limitations. The quality sciences are the best knowledge sources for identifying and measuring these variables.[7] Due to the risks inherent in Space missions, quality management has been fundamental to planning going back to the Sputnik launch.

Compare Performance with Top Performer and Average of the Competition
This is a basic theory component for Earth-based systems that may not have application for Space missions until a set of businesses occur that are competing with each other for a similar goal. At this time, in 2014, asteroid mining might be such a mission, but it is too early to have multiple performers for comparison. Top performers in an industry are doing things well. We need to know what those things are and whether we can apply them to our situation. We need to know industry averages to compare with our system's performance. Performance is evaluated using profitability, revenue generation, finance generation, investment position, cost position, and achievement of goals. Above all, it is necessary to evaluate continually to determine if performance is consistent with values, neutral to them, or in conflict with them for both internal operations and external dealings with customers and constituents. A valid vision statement and mission statement are prerequisites to making that kind of performance evaluation.

Create Alternative Strategies and Goals
The strategic planning committee should develop alternative strategies and goals because of a universal phenomenon involved with organizational decision making, which is that top decision makers want options. They are suspicious when given only one choice to approve or disapprove. For the planning of Space programs, top leadership may have been involved throughout the development from idea to concept to strategic plan. It is probable that alternative strategies will have been considered and abandoned fairly early in the process. However, the proposal may have to be given to government or private funding organizations that have not been involved with the entire planning process.

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[6] See especially the intensive research of James Michael "Mike" Snead at spacefaringinstitute.com and his "The American Energy Crisis and Solution – Space Solar Power," *Journal of Space Philosophy* 3, no. 1 (Spring 2014): 20-65.
[7] The American Society for Quality (www.asq.org) is the source. Over the past 15 years, I have written essays on the *quality classics*, those theories, concepts, models, and tools that have been validated as quality improvement devices. See www.asq711.org and click on *Quality Classics*.

Schedule a Decision Conference

The *decision conference* is where the alternatives get concentrated attention and a final strategic mission or goal is selected. When all parties of the planning process have completed their research, or when events in the environment force closure, the decision conference is scheduled. In attendance should be the decision cluster (i.e., President, CEO, Vice Presidents, Department Heads), the members of the strategic planning committee, and any other system stakeholders whose inputs will be important. The chair of the strategic planning and task force leaders present the following in summary briefings:

* draft new vision and mission statements;
* the results of the research and analysis;
* priority recommended strategies, goals, and objectives;
* impacts of those alternatives (projected benefits and costs);
* recommendations for decisions by leadership.

Discussions and debates occur. The decision conference often takes two or three days for the issues to be covered thoroughly and a consensus to be reached. If basic conflicts occur within the decision cluster, the strategic planning committee may be directed to do new research and analysis to be presented at a second decision conference. This process continues until agreement is reached on strategic directions and associated objectives for the organization. Contingency strategies should be identified if assumptions and projections of the planning process prove to be inaccurate.

Finalize the Plan

The final written plan is accomplished under the supervision of the chair of the strategic planning committee and should contain:

* vision statement;
* mission statement;
* major strategic decisions;
* priority and alternative goals and objectives;
* programs and courses of action with assignment of responsibilities;
* resource allocations and projected financial statements.

Implement, Evaluate, and Improve the Plan

Completion of the strategic plan is a major milestone for the organization, but it represents only a portion of the total effort. Implementing the plan, evaluating that implementation, and subsequently revising the plan will determine success or failure. There are two main reasons driving that conclusion.

The first lies in the four characteristics of our age: complexity, novelty, uncertainty, and adversity. Unless we are very lucky, one or more of those characteristics will cause us to rethink some part of the plan. That reason has its origin in the system environment. The second reason stems from internal system functioning. Even though every effort at participative involvement in the strategic planning process is made, when provisions of the plan are implemented it affects everyone in the organization. Some people in the system may object, rebel, or even sabotage parts of the plan that they see as a threat

to them personally or to their department or function. Planning responsibility lies primarily with leadership. Putting the plan to work requires everyone's cooperation.

The failure of strategic planning can have three root causes. Causes #1 and #2 will flow from the two reasons described in the previous paragraph. Cause #3 can come from Herman Kahn's *The Butch* – mentioned above and defined as an error in basic assumptions, logic, or analysis that invalidates findings reached from research and goes unnoticed through the decision point. Good strategic planning will prevent that cause of failure.

Judging the Worth of Strategic Planning
How do we evaluate our strategic planning efforts over time?

The benefits of good strategic planning can be enormous. Those benefits and goals flow from the process involved in working toward a strategic plan as well as from the plan itself. Figures 4 and 5 depict this truth.

TWO MAJOR BENEFITS; ONE OVERALL GOAL

■ There is high value in both:

The Process → [ ]

And The Plan

THE GOAL IS:

Superior Performance, within agreed values
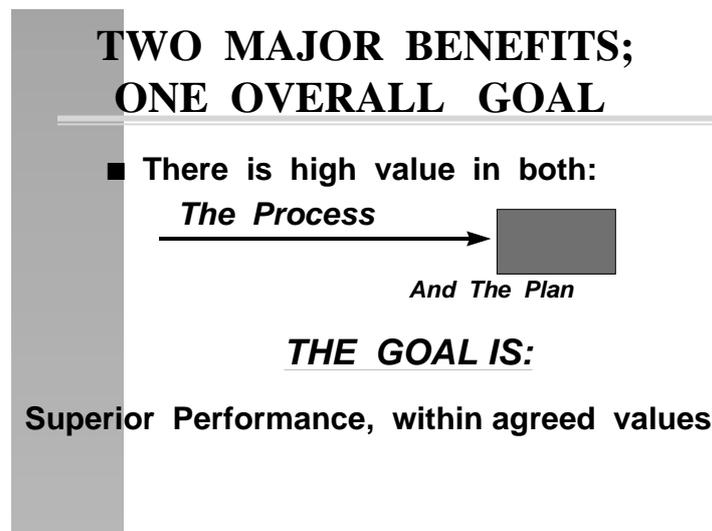
Figure 4: Benefits and goal of strategic planning.

The Value of the Process of Strategic Planning

- **New understandings, awareness, and appreciation.**
- **Cooperation increases; conflict decreases.**
- **Negative fantasies addressed.**
- **New administrative climate.**
- **New decision-making culture.**
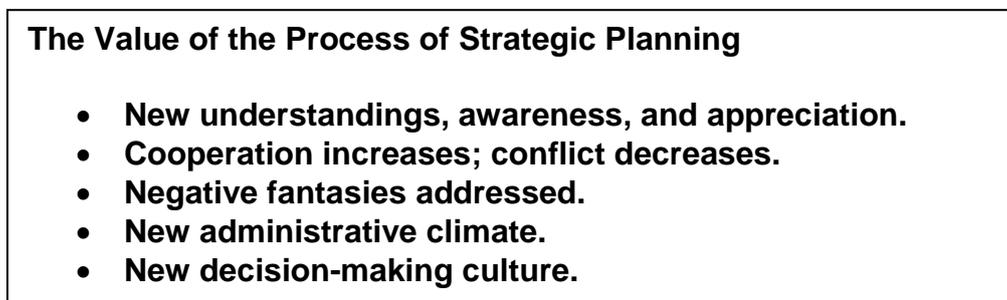
Figure 5: The value of the process of strategic planning.

These benefits of the strategic planning process can be huge value-added events for an organization. People accustomed to thinking only about their own functional areas gain an appreciation for what happens in other areas. Coming to agreement on long-term goals for the company facilitates cooperative efforts where turf battles previously existed. Negative fantasies are the erroneous, bad visions of the future that people generate when uncertainty and anxiety prevail. Going through the process of strategic

planning can replace those negative fantasies with positive goals and ways to reach the goals – especially when positive things happened initially. Doubts may still exist, but there is a philosophic approach for consideration.

When in doubt, chose optimism, then manage wisely to achieve a self-fulfilling prophecy.

Both optimism and pessimism can be self-fulfilling prophecies when faced with uncertainty. If people believe it cannot be done and act on that belief, it is fairly certain that their pessimism will produce that self-fulfilling prophecy. The same will occur if they chose optimism, then act wisely to make things happen.

Creating a positive administrative climate is the responsibility of organizational leadership. No leadership role has more influence on success or failure than the building of a working culture that motivates people to achieve superior performance and self-development. That kind of culture can be a by-product of the strategic planning process. Similarly working through the research and analysis of strategic planning often exposes weaknesses in the decision-making system of the organization. If that were the only benefit of an organization's strategic planning, it would be worth the effort.

These benefits of the strategic planning process tend to be less obvious than the benefits that flow from the final written strategic plan, which are summarized in Figure 6.

THE VALUE OF THE STRATEGIC PLAN

- Authoritative source for actions
- Mission, values & roles explicit
- Change has a facilitator
- The cost of quality better defined
- Departure point for operating plans
- Performance can be measured
- People have a beacon to the future
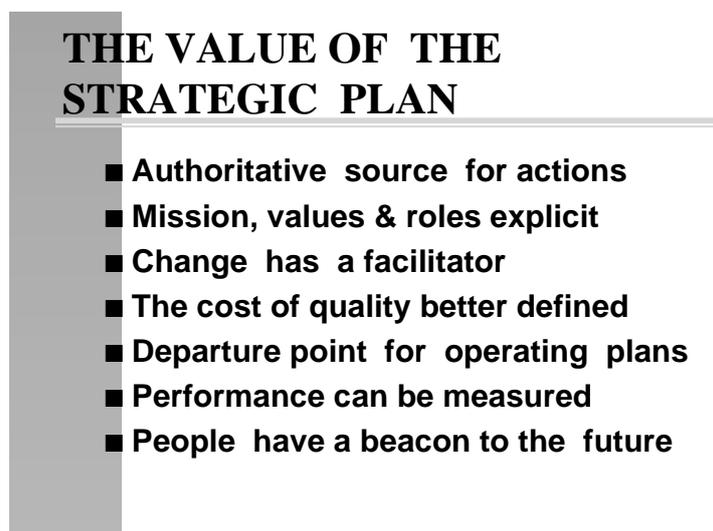
Figure 6: The value of the strategic plan.

These benefits can easily be related to strategic planning needs. The term "cost of quality" comes from the quality sciences and means the costs being borne by the organization for poor quality of policymaking, products or services.

The overall benefit of strategic planning is shown in Figure 7.
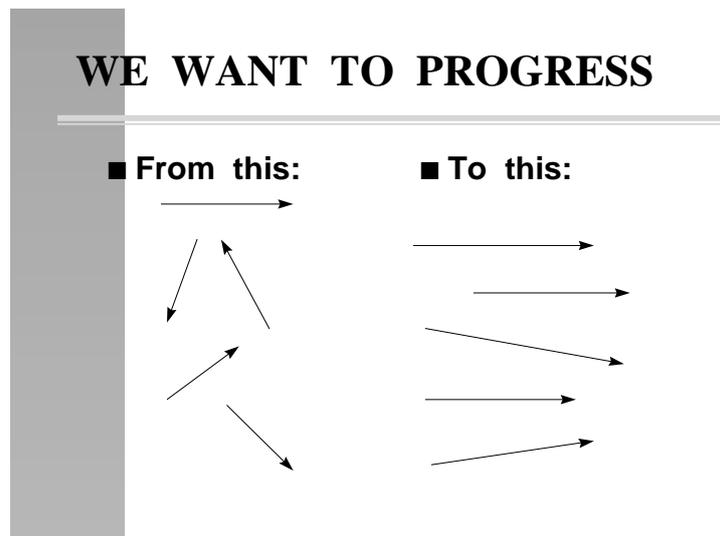
Figure 7: Strategic planning overall goal.

Teamwork is needed in the system to avoid the waste, costs, frustrations, setbacks, inefficiencies, and failures that occur when business degenerates to *ad hoc* actions, jumping from one crisis to another. Using coordinated strategic and operating plans that establish interrelated objectives and best courses of action to pursue a vision is a formula for excellence. Achieving that formula is one of the great challenges of leadership.

The Barriers and Pitfalls
Figure 8 summarizes the difficulties and pitfalls involved in this complex challenge. Space professionals reading this article will have real-world memories from their own experience of the eight bullet points. For this theoretical model, delving into details is not necessary. Space mission planning and execution will expand this list, which was generated from Earth-based organizations.

STRATEGIC PLANNING BARRIERS & PITFALLS
- **Rushing to judgment**
- **Deterministic paradigms & Intolerance**
- **Compromising core values**
- **Human Factors & Politics**
- **Poor measurement criteria or standards**
- **Secrecy & Sub-optimization**
- **Neglecting time as a variable**
- **Viewing the plan as "*the end*"**
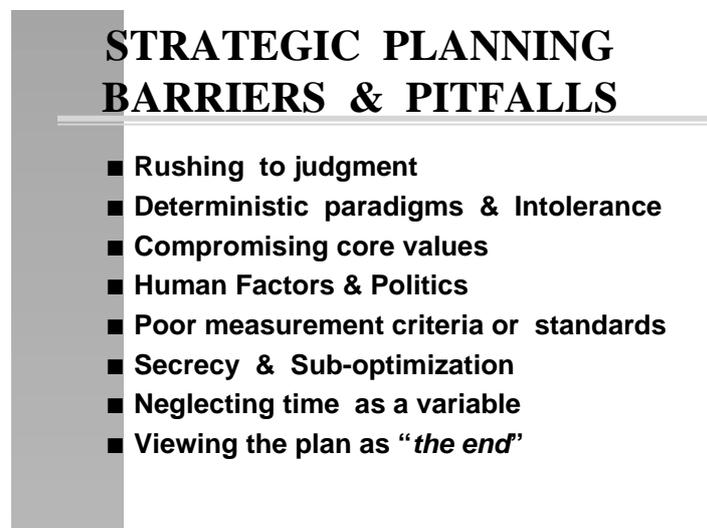
Figure 8: Strategic planning barriers and pitfalls.

The <u>most important barrier</u> to Space strategic planning is not in Figure 8. It is the vacuum of qualified global leadership, which is the subject of the feature article of

this Fall 2012 issue of the *Journal of Space Philosophy*: "Leadership Will Be Key: Applying Yehezkel Dror's Avant-Garde Politician: Leadership for a New Epoch." I urge readers to absorb the article and to read Yehezkel Dror's 2014 classic book. He has a uniquely radical model to overcome this huge barrier.

Findings, Conclusions, and Recommendations
This article has provided a theoretical model for Space strategic planners. Space literature is, in 2014, blessed with a multitude of future plans for human exploration, development, and settlement of Space by our leading astronauts and space scholars. The Moon and Mars now have detailed plans which are available to national decision makers.

It was Leonardo de Vinci (1452-1519) who made the universally true statement that "Learning is the only thing the mind never fears, never exhausts and never regrets. It is one thing that will never fail us." To the degree that leadership can create policies, plans, and decisions that make many better off and none worse off, their success over time will be assured. Corporations and governments have the same need – to improve their capacity to govern. Trends over the past three decades show that societal, client, and customer needs on Earth have been exceeding capacity to govern both nationally and internationally. Humanity's learning must continue to avoid catastrophic failures – even extermination. The Space Epoch awaits us. Without new wisdom for strategic futures, there will be no positive self-fulfilling prophecies for humanity.

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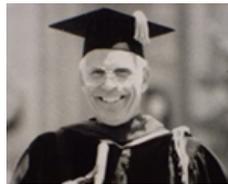
About the author: Dr. Bob Krone is the Co-Founder and President of the Kepler Space Institute and Editor-in-Chief of the *Journal of Space Philosophy*.

Editor's Notes: It is a truism that those who fail to plan, plan to fail. However, it is useful to have a theoretical model of what can go wrong and how to overcome it. While this model is applied to Space here, it clearly has much wider applicability and can therefore be applied in a wide range of fields. *Gordon Arthur*.