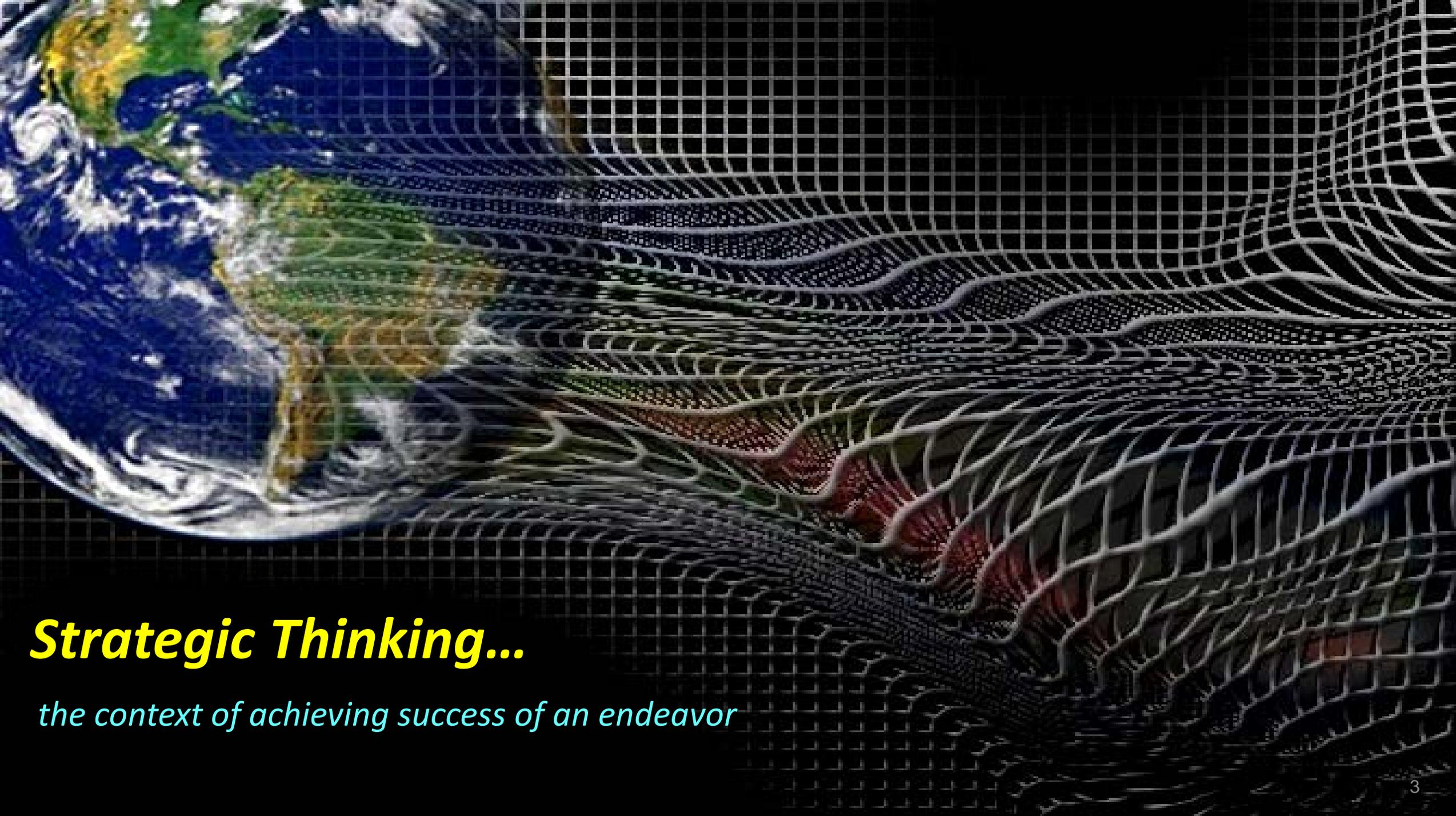# SPACE ENGINEERING

Strategic Thinking Leadership & Project Management

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Strategic Thinking…

the context of achieving success of an endeavor

Strategic planning does not deal with future decisions. It deals with the <u>futurity of present decisions</u>. What we have to do today is to be ready for an uncertain tomorrow.

Peter F. Drucker

Strategic Thinking

- **… is a planning process that applies innovation, strategic planning, and operational planning to develop business strategies that have a greater chance for success. More and more, organizations are learning that past experiences are not always the best basis for developing future strategies.**

- **… is defined as a mental or thinking process applied by an individual in the context of achieving success in an endeavor. As a cognitive activity, it produces thought.**

- **When applied, strategic thinking involves the generation and application of unique insights and opportunities intended to create competitive advantage. It can be done individually, as well as collaboratively among key people who can positively alter a vision or future. Group strategic thinking may create more value by enabling a proactive and creative dialogue, where individuals gain other people's perspectives on critical and complex issues. This is regarded as a benefit in highly competitive and fast-changing landscapes.**

Strategic Thinking

- **Seeing wholes—all of something**
- **Framework for seeing interrelationships rather than things**
- **Seeing patterns of changes rather static snapshots**
- **A sensibility for the subtle interconnectedness that gives living systems their unique character**
- **Seeing the interdependencies**
- **Recognize the dynamic, complex, and interdependent nature of systems**
- **Levels of Strategic Thinking**
  - **Strategic Level: Vision (Organizational Strategy)**
  - **Operational Level: Initiatives (Programs)**
  - **Tactical Level: Implement (Projects)**

Systems Thinking

- Systems thinking is a holistic approach to analysis that focuses on the way that a system's constituent parts interrelate and how systems work over time and within the context of larger systems.

- The systems thinking approach contrasts with traditional analysis, which studies systems by breaking them down into their separate elements.

- Systems thinking can be used in any area of research and has been applied to the study of medical, environmental, political, economic, human resources, and educational systems, among many others.

Systems Thinking

- A system is a set of entities and their relationships, whose functionality is greater than the sum of the individual entities.

- A system is made up of entities that interact or are interrelated.

- A system is a set of entities and their relationships whose functionality is greater than the sum of the individual entities.

- When the entities interact, there appears a function that is greater than the functions of the individual entities.

- Systems simultaneously have characteristics of Form and Function
  - Function is what the system does. Form is what the system is.

- Every system operates as a part of one large system or several larger systems, and each is itself composed of smaller systems. Think holistically about all of these relationships and develop architectures that are in harmony with the larger, smaller, and related systems.

- A complex system has many elements or entities that are highly interrelated, interconnected, or interwoven. Interdependencies...

Concepts of Systems Thinking

1. **Interconnectedness** is that everything is connected or reliant upon something else.

2. **Synthesis** is the combining of 2 or more things to create something new.

3. **Emergence** is that natural outcome of things coming or interacting together.

4. **Feedback Loops** is the constant flow between entities.

5. **Causality** is about being able to understand the way things influence each other in a system.

6. **Systems Mapping** is identification and mapping the elements of 'things' within a system to understand how they interconnect, relate and act in a complex system, and from here, unique insights and discoveries can be used to develop interventions, shifts, or policy decisions that will dramatically change the system in the most effective way.

Innovation

Multi-disciplinary thinking that changes the architecture

- Change the purpose
- Change user behavior
- Change in process
- Change in the business model

Innovation

- Sustaining: an innovation that does not affect existing markets

  - <u>Evolutionary</u>: (Managed) improves a products in an existing market in ways that customers are expecting (fuel injection)

  - <u>Revolutionary</u>: (Protect & Led) discontinuous, radical. Is unexpected, but nevertheless does not destroy existing markets (the automobile). Is a disruption to someone somewhere.

- <u>Disruptive</u>: (Driven) An innovation the creates a new market by applying a new paradigm (Ford Model T, Smart Phones)

Black Swan Event Theory

- An Event that: [examples: 911 towers, SmartPhone, Coronavirus]
  - Is not foreseen by those effected
  - Has a major effect
  - Is viewed (incorrectly) in hindsight as foreseeable.

- Unexpected even in general due to psychological bias of normalcy. A condition that you think tomorrow will be the same—go on forever.

- In business, a Black Swan Event is often created by disruptive innovation and requires innovation to respond.

- What makes an organization or company subject to the Black Swan Event?
  - Too big to fail. Highly stable.
  - Economically Low on Reserves.
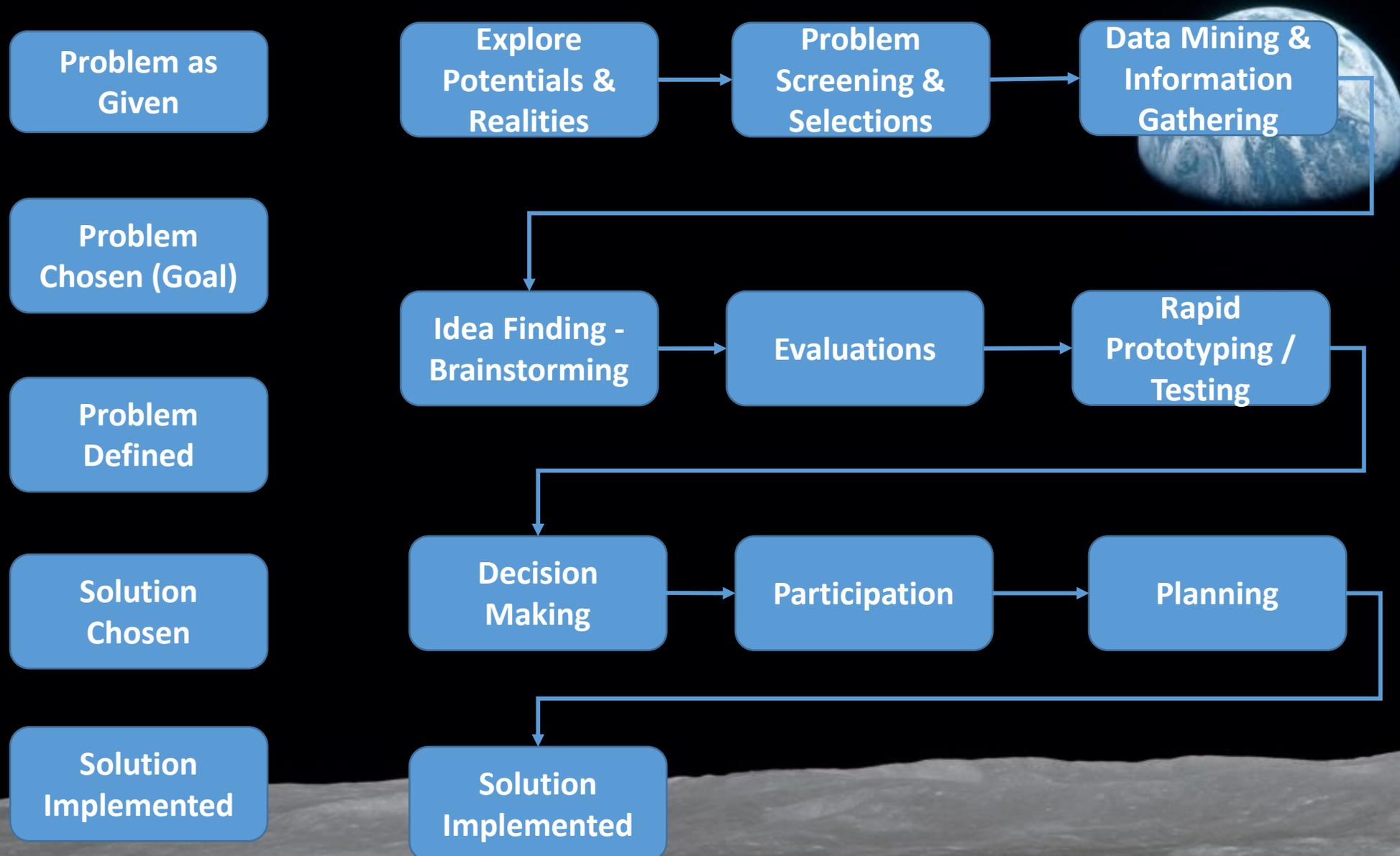 - Lack of Diversity in its underlying products.
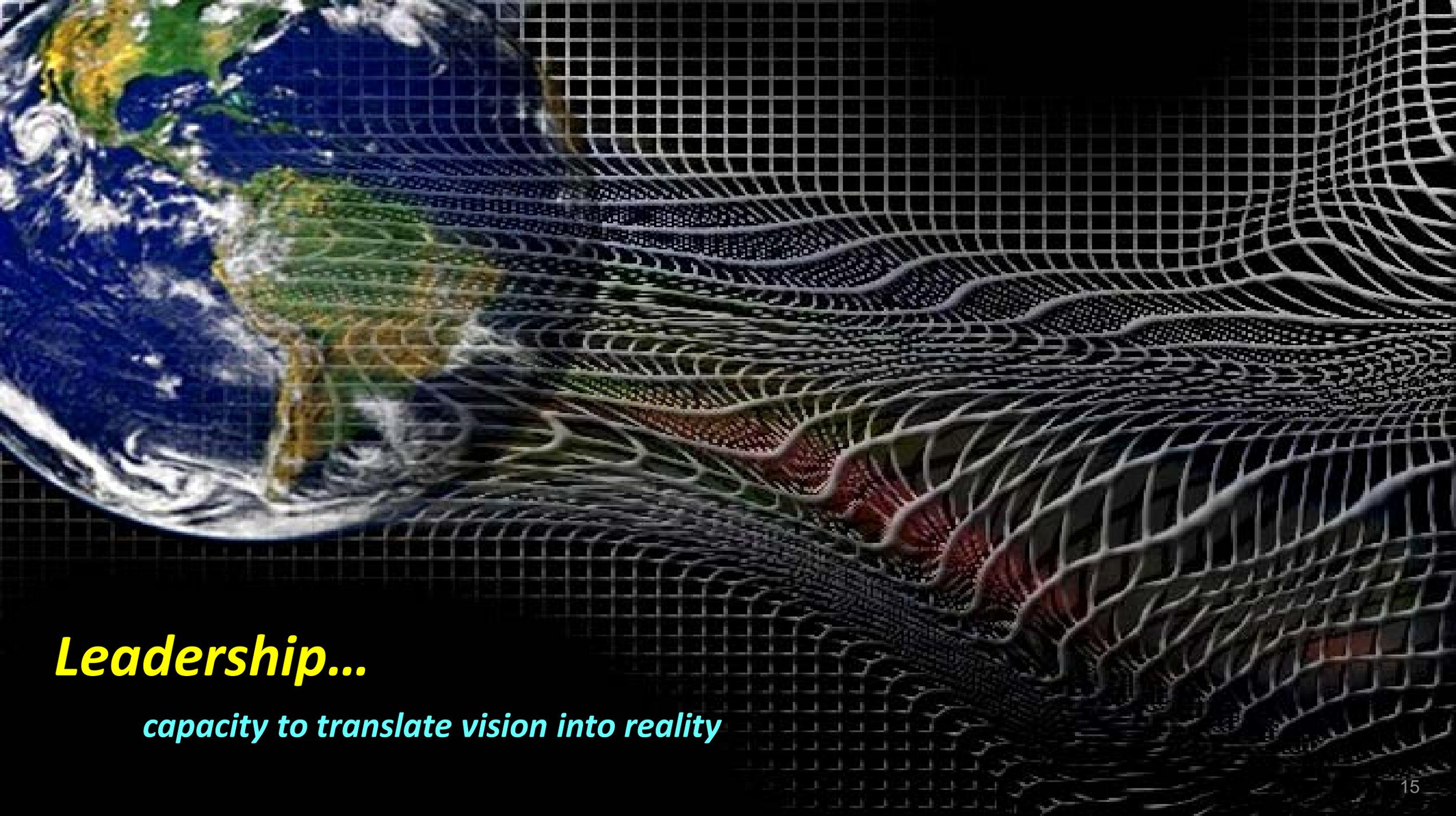
Innovator's Solution

- Fence Innovation Resources
  - Set aside budget resources for innovation
- Protect Innovators
  - From the 'status quo'
- Be willing to cannibalize your own products
  - Before the competition does
- Use different enables.
  - Process, team, organization, tools
- Redefine Problems
- Let Vision drive the solution.

Problem Solving Process

STAGES

| Problem as Given |
| Problem Chosen (Goal) |
| Problem Defined |
| Solution Chosen |
| Solution Implemented |

Explore Potentials & Realities → Problem Screening & Selections → Data Mining & Information Gathering

Idea Finding - Brainstorming → Evaluations → Rapid Prototyping / Testing

Decision Making → Participation → Planning

Solution Implemented

Leadership...

capacity to translate vision into reality

Leadership

…the action of leading a group of people or an organization.

...leadership is the capacity to translate vision into reality.

…is both a research area and a practical skill encompassing the ability of an individual or organization to "lead" or guide other individuals, teams, or entire organizations.

… as "a process of social influence in which a person can enlist the aid and support of others in the accomplishment of a common task".

Project Leadership

- Leading the project team members and stakeholders toward a common project goal

- Getting things done through the project team members

- Leading with respect and trust

- Communicating, motivating and inspiring the project team

- Maintaining the vision, strategy and communicating project performance

- Evaluating performance of the project team.

Project Leadership Qualities

- Inspires A Shared Vision
- A Good Communicator
- Integrity
- Enthusiasm
- Empathy

- Competence
- Ability To Delegate Tasks
- Cool Under Pressure
- Team-Building Skills
- Problem Solving Skills

Team Work

- **The ability to work together toward a common Vision.**

- **The ability to direct individual accomplishments toward organizational objectives**

- **The fuel that allows common people to attain uncommon results**

Team Building

- Open Communications
- Regular Interaction among ALL team members
- Positive Feedback and Rewards based on Performance
- Flex-Time Schedule
- Regularly solicit feedback from customers—customer focused
- Provide appropriate training to increase team member's skills

Key Characteristics of Highly Effective Teams

1. Clear Direction
2. Appropriate Team Composition
3. Commitment to Roles and Responsibilities
4. Effective Communications
5. Adequate Resources
6. Focus on Quality and Customer Satisfaction
7. Innovation and Continuous Improvement
8. Cooperation with Others
9. Appropriate Consequences
10. Positive Results

Tiger Team

- "Tiger Team" was created by the press during the Apollo 13 mishap.
- The 1st Tiger Team was a mission-control team that had to rapidly figured out how to return the astronauts safely back to earth.
- The term "Tiger Team" became known as a temporary expert problem-solving team.
- That and many other successes made Tiger Teams part of NASA culture.
- Tiger Teams are often used on a high profile crisis or rapid result problem-solving efforts.
- Practical methodical understanding - the ability to comprehend how all the parts of the problem fit together to satisfy the requirements of the goal.

Tiger Team Characteristics

- 1 Leader
- Diversity
- Customer Focused
- Risk-Based Decision Making
- Small Team of Subject Matter Experts
  - Additional Support through SMEs
- Co-location
- Enable Brainstorming with Tools
- Roll-up Sleeve Mentality

- Problem Solving
- Result Oriented
- Rapid Prototyping
- Creativity
- Thinking outside the box
- Innovation
- Brainstorming- cooperative building on the ideas of other participants
- Root Cause Analysis
- Risk Analysis
- Benefit Analysis

Tiger Team

- Problems are defined as obstructed goals
- problems have three characteristics
  - present state
  - goal state
  - obstruction
- problem-solving processes combine
  - rational problem-solving (defining the problem)
  - creative problem-solving (finding solutions)
- problem-solving influences teamwork:
  - content and process skill requirements
  - participant selection
  - team leadership structure
- allow the team to physically function at an exceptionally high level of intensity and performance
  - Co-locate
  - Remove Distractions

Tiger Team Tools

- **Root cause analysis**
- **Kepner Tregoe Problem Specification**
- **Fishbone Diagrams**
- **Problem Restatement**
- **Pattern Searching**
- **Benchmarking**

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Leadership Opportunities

- Tiger Teams
- Integrated Design
- Rapid Prototyping Teams
- Technology Development
- Projects
- Integrated Testing
- Situational
- Take Control of a Situation

Project Management…

The best project managers are also outstanding leaders.

Project Management

- *is the discipline of initiating, planning, executing, controlling, and closing the work of a team to achieve specific goals and meet specific success criteria.*
- *A project is a temporary endeavor designed to produce a unique product, service or result with a defined beginning and end (usually time-constrained, and often constrained by funding or deliverable) undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value.*
- *The temporary nature of projects stands in contrast with business as usual (or operations), which are repetitive, permanent, or semi-permanent functional activities to produce products or services.*
- *In practice, the management of such distinct production approaches requires the development of distinct technical skills and management strategies.*

Project Management

…is the application of knowledge, skills (people), tools, and techniques (process) to project activities to meet the project requirements.

Basic Rules:

1. Clearly Stated Objectives & Expectations

2. Planning Expertise through attention to detail

3. Avoid duplication of effort

4. Evaluation of sequence of activities

5. Integrate and Coordinate work flow

6. Monitor & Control

7. One Gate-Keeper (Schedule Management)

Responsibilities:

- Organize, coordinate, and direct the project

- Resolve conflicts between team members

- Lead the project team to project success

- Communicate well-defined requirements and standards to the project team

Project Management

- They have vision, they motivate, they bring people together, and they accomplish great things.
- Project: a temporary endeavor undertaken to create a unique product, service, or result.
- Project characteristics with operations
  - Performed by people/personnel
  - Constrained by limited resources
  - Planned, Executed, and Controlled
- Project Life-Cycle phases
  - Concept phase
  - Development phase
  - Implementation phase
  - Close-Out phase

Project Management

Five factors in the *success of a project*

1. **Agreement among the project team, customer, and management pertaining to the clear goals of the project.**

   - *Arriving at clear goals together can be invigorating and powerful.*

2. **A plan that shows an overall path and clear responsibilities and will be used to measure progress during the project.**

   - *Plan the scope of work and work the plan...*

3. **Constant, effective communication among everyone involved in the project.**

   - *People are your most important resource—they complete the project.*

4. **A Controlled Scope.**

   - *Managing Stakeholder expectations.*

5. **Management Support.**

   - *Removal of organizational obstacles.*

Project Management Phases

1. **<u>Definition Phase</u>**
   a. *State the Project*
   b. *Develop Objectives*
   c. *Develop Work Breakdown Structure*
   d. *Identify Resources Needs/Requirements*

Project Management Phases

2. **Planning Phase**
    a. *Assign Responsibility*
    b. *Sequence Deliverables*
    c. *Schedule Deliverables*
    d. *Schedule Resources*
    e. *Protect the Plan*

Project Management Phases

3. **Implementation Phase**

    a. Start to Implement-Kickoff

    b. Monitor Project Progress

    c. Modify Project. Work the Plan

    d. Closeout and Evaluate. Lessons Learned

Learning Tenets

Tenet: a principle or belief, especially one of the main principles of a religion or philosophy.
5 "learning disciplines"

- *Personal Mastery*
  - Expand our personal capacity which encourages all its team members to develop themselves towards the goals and purpose
- *Mental Models*
  - Reflection, clarifying, improving on how our internal view of the world, and seeing how they shape our actions and decisions
- *Shared Vision*
  - Building a sense of commitment in a group by shared images of the future we seek to create and the actions by which we get there
- *Team Learning*
  - Transforming conversational and collective thinking skills, so that the team can develop intelligence and ability greater than the individual
- *Systems Thinking*
  - A language for describing and understanding the forces and inter-relationships that shape behavior of systems. Helps us to see how to change systems to be more effective and agile to the larger world and society

Management Lessons Learned

- **Lead by example**
- **Creditability. Do what you say you will do.**
- **Technical Truth. Never "Bluff" an Answer. If you don't know— say so. Then go find out the answer.**
- **Show Respect even if you disagree**
- **Confidence. Take control when needed.**
- **Courage. Have the strength of your convictions**
- **Trust. Trust your team.**
- **Integrity. Knowing what you know and what you think. Values.**
- **Dress for Success**
- **Recognize the Political Environment**
- **Build Relationships**
- **Delegate. You can't do it all by yourself.**

Management Lessons Learned

- **Don't be a perfectionist. Micro-manage**
- **Be Humble**
- **Be Mindful and Present. Focus and limit distractions**
- **Listen more than you speak.**
- **Communicate. Clearly and effectively Don't assume**
- **Recognize your strengths and weaknesses**
- **Don't be arrogant or obstinate. That you are always correct or know it all.**
- **There is a time and place to joke around. Not everyone has the same sense of humor. It can come off as flippant or taken out of context.**
- **We succeed together and fail together. No "I" in Team**

Management Tenets (Walt Guy)

- **Communication** is your most difficult task. You must continually work at improving it.

- "**Words**" create impressions/pictures in the mind of the hearer/reader; your success may depend upon your selection.

- "Hard" words stir up passions; "**soft" words cultivate objectivity**; choose carefully and enhance your communication.

- "**Perception**" (factual or not) is "reality" to the one "perceiving."

- **Personal credibility** is your most important attribute; it's hard to acquire, but easily lost. Corollary #1: When you say you'll do something, "Always" do it; "Sometimes" (even "usually") is worse than "never"; because having someone count on you and letting them down is worse than not having them count on you at all. Corollary #2: Choose very, very carefully in whom and in what you will place your trust; your credibility depends upon it.

- Have zero tolerance for any consideration of **reneging on a commitment** (either by yourself or by a subordinate); if you don't honor your commitments, you (and your organization) will have no credibility

Management Tenets (Walt Guy)

- There is an analogy in management to the rule in power, "don't bet anything you can't afford to lose"; and it is: "Don't introduce an option during negotiations, which, if taken, you lose"; remember, if you put it on the negotiation table, you must be willing to have it accepted.

- When you screw up, you give up the "right" to look good – both you and your organization

- When conversing with a person in authority, be sensitive to the differences between their providing an "option," a "suggestion," or "direction."

- Escaping significant "flack" for NOT doing what you are expected to do should never be viewed as "success."

- Conflict occurs when you oppose what your supervisor wishes you to do; to avoid conflict, make your case, then change sides. Corollary: conflict is inevitable, but combat is optional; everyone loses in a battle.

- A critique that affirms that your work is "correct" has no value other than feeding your ego; but a critique that provides you insight into errors you have made, or areas in which you can make improvements, is extremely valuable because it allows you to protect your credibility and enhance your professional reputation.

Management Tenets (Walt Guy)

- If you blatantly ascribe "good intent" to the actions of others, you may positively influence them to respond in kind (regardless of their original intent); and even if they follow through with their "bad intent," you've made them "go public," giving you the higher ground from which to defend. Corollary: you are much more likely to encounter behind-the-scenes "bad intent" than "bad intent" which is spotlighted so that it publicly reveals the perpetrator's lack of professional ethics.

- The most important person in an organization is the "keeper of the vision"; you can't manage effectively without one. Corollary: when you are making decisions, don't fall into the trap of piecemeal decisions, which (without a great deal of discipline on your part) will be sequentially sub-optimized such that the end result may not be the best outcome.

- Don't be dissuaded from pursuing the "correct course of action" until you have exhausted all possibilities; if you lose control, "premature capitulation" is just as disappointing as it sounds, ultimately satisfying none of the participants.

- Do your job; expect (no, insist) on the employees doing theirs

- Don't confuse employee "empowerment" with management "abdication"; it's not an option to empower someone else to do Your job.

Management Tenets (Walt Guy)

- Beware when subordinates ask you to establish which of their assignments has "priority"; it's likely a cop-out.

- A project of indeterminate scope cannot be managed; both "requirements" and "constraints" are mandatory for project management. Corollary: if your planning assumes everything will go right (i.e. no consideration for contingencies), frustration and failure are sure to dog your path.

- A successful plan must be based on your "environment", the elements of which are "people" (both those with whom you work and those who work for you), and "circumstance"; plans that ignore either one are doomed to failure.

- "Dead-end" work is a rabbit trail off the path to "ultimate" progress; diligently avoid it.

- Don't avoid formalizing agreements, decisions, assignments, comments, problems, recommendations, etc. with a written record; it's more than history, it's insurance.

- To obtain the decision you desire, seeking several carefully selected decisions of lesser significance (which, taken as a whole, accomplish your intent) is usually easier than one sweeping decision.

- Don't mistake "activity" for "progress."

Leadership vs. Management

Leaders

- Innovate
- Develop
- Inspire trust
- Have a long-range perspective
- Ask "Why?"
- Challenge the status quo
- Look to what you are capable of in the future

Managers

- Administer
- Maintain
- Control
- Have a short-range perspective
- Ask "How?" and "When?"
- Maintain status quo
- Look to what you can do now

Summary

Strategic Thinking…
… is a planning process that applies innovation, strategic planning, and operational planning to develop strategies that have a greater chance for success.
… is defined as a mental or thinking process applied by an individual in the context of achieving success in an endeavor.

Leadership…
…the action of leading a group of individuals, teams, or entire organizations.
…leadership is the capacity to translate vision into reality.
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… is the application of knowledge, skills (people), tools, and techniques (process) to project activities to meet the project requirements.
… is the discipline of initiating, planning, executing, controlling, and closing the work of a team to achieve specific goals and meet specific success criteria.

Thank you...
...please contact me anytime

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