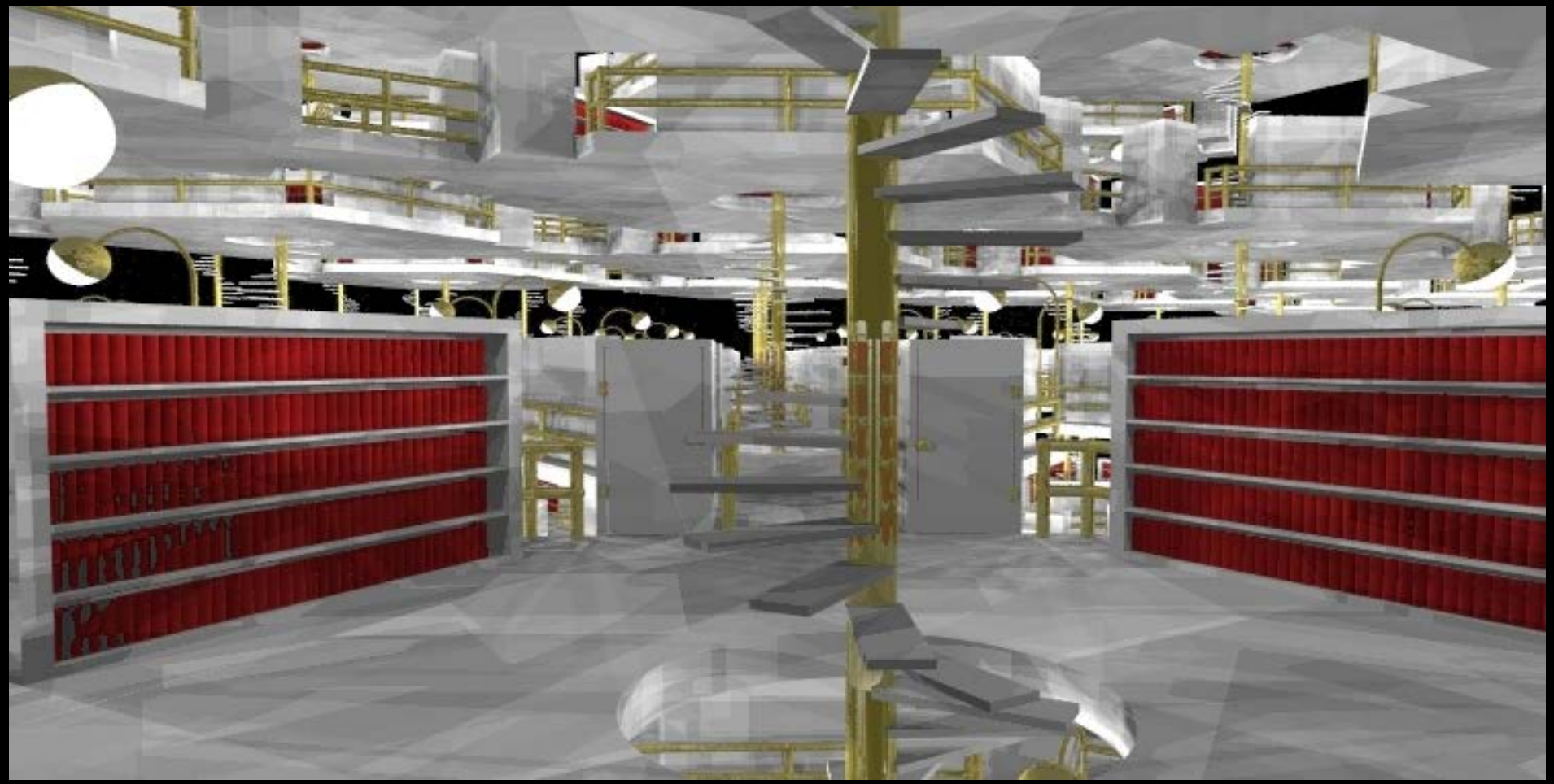
High Performance Teams on Science Projects:
Successful Strategies and Lessons for Building an Engaged and Talented Team

Dr. Edward J. Hoffman
Knowledge Engagement
PMI, Strategic Advisor
Columbia University, Executive in Residence
May 1, 2017

Shared Experience Poll

- Organizational strategies are always changing
- Unclear individual and team competencies and capabilities
- Organizational talent has difficulty finding critical knowledge quickly
- Managers support policies aligning to their interests, leading to silos
- It is always a challenge to work across organizational systems and boundaries
- Organizational politics and expectations are a problem for project success
- Administratively burdensome processes and procedures
- Data is everywhere but knowledge is scarce
- There is reluctance to share knowledge and insights

The Library of Babel – Jorge Luis Borges




Challenge/
Opportunity
Outcomes
Societal
Context
Knowledge
Capture
Business Success
Organizational
Expectations &
Culture
Knowledge
Sharing
Discovery &
Innovation
Individual &
Team Talent

Thoughts on Challenge and Opportunity

Challenge & Opportunity

Projects, Products, Entrepreneurship

	Complex Project-Based Organization	*Mass-Production Organization*	*Entrepreneurial Organization*
Product	One-and-only	Scalable manufacture	Permanent beta
Problems	Novel	Routine	Hackable
Technology	New/invented	Improved/more efficient	Frugal
Cost	Life cycle	Unit	-> Zero marginal
Schedule	Project completion	Productivity rate	Iterative
Customer	Involved at inception	Involved at point of sale	Involved in testing
Knowledge Need	Innovation	Continuous improvement	Bootstrap + innovation

Challenge & Opportunity

Innovation Spans Generations

X-15 → Space Shuttle

Introduced: 1958 — Retired: 2010

One of the X-15's many innovation legacies that it passed to the Shuttle was unpowered landing — both reentered the atmosphere as gliders

Thoughts on Organizational Expectations & Culture

Expectations & Culture

Strategic Imperatives

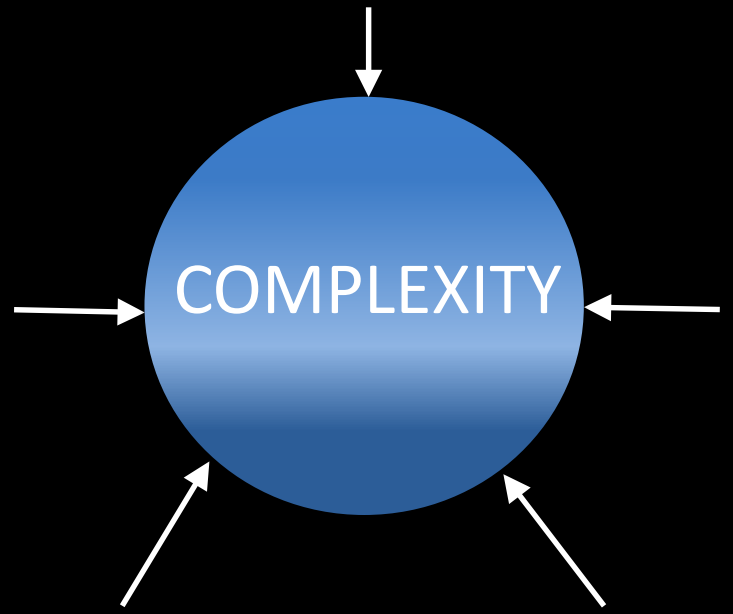
Expectations & Culture

Strategic Imperatives

CONTEXT	FOUNDATIONAL NEEDS	WORKING PRINCIPLES	RISK MITIGATION APPROACHES
Project world	Leadership	Problem-centric approach	Certification
Digital technology	Knowledge	Accelerated learning	Portfolio management
	Talent management	Frugal innovation	
	Governance, management, and operations	Transparency	

Expectations & Culture - Complexity

Confusing, vague, and poorly defined priorities, strategies, lines of authority, governance, policies, roles, responsibilities, support



Multiple customers, stakeholders, and partners at multiple levels of interest, involvement, responsibility

Increasing amounts of data and information for process input, throughput, output

Technical complexity and system integration issues within & across multiple disciplines and systems

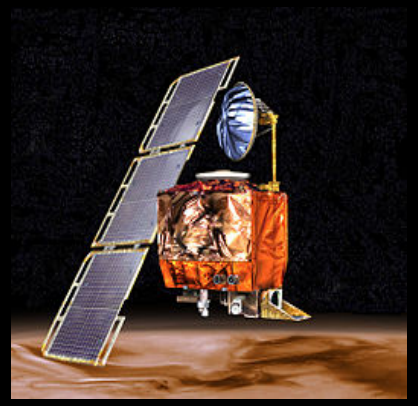
Multiple overlapping, conflicting, outdated processes and procedures involving multiple POCs across multiple levels & across multiple oversight & advisory entities

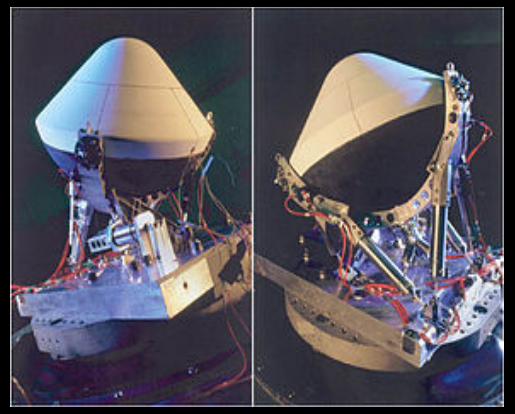
Expectations & Culture
Management Requirements

- Support and extend Knowledge Services gains for the NASA Technical Workforce towards improved accessibility, searchability, findability, and visualization
- No additional cost
- Least administrative burden
- Formal, rigorous, iterative, and Senior Leader supported
- Integrated, reinforcing, and actionable
- Measurable and objective

Expectations & Culture

Learning from Failure





Building and Maintaining Teams

Teams Have Preferences

Project Success & Failure

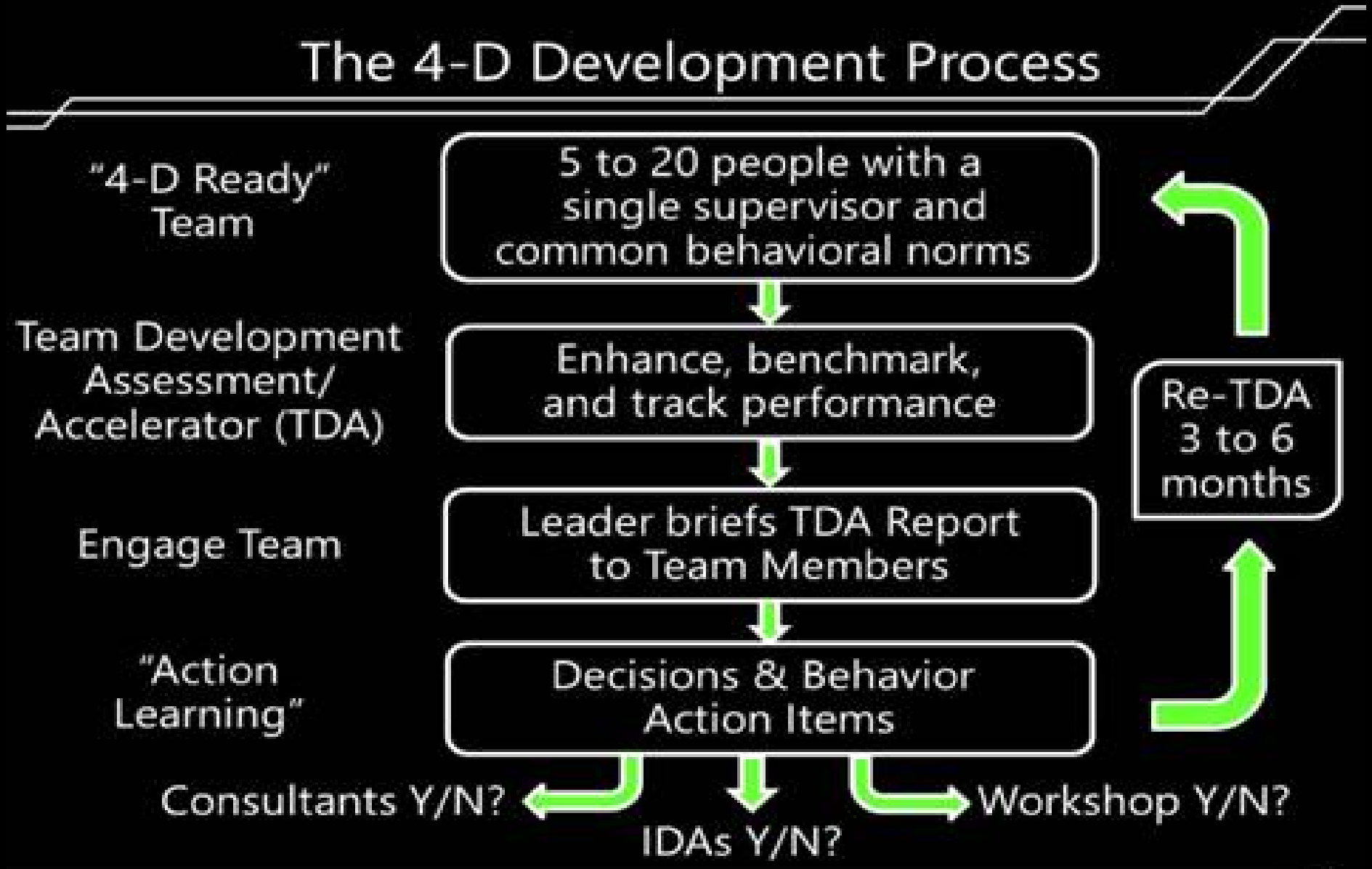
Failures: Challenger, Hubble, Columbia, Crash at Tenerife…

Successes: Gamma Ray Observatory, Mars Pathfinder, Maven, STEREO…

Vacant Dimensions, particularly emotional-side

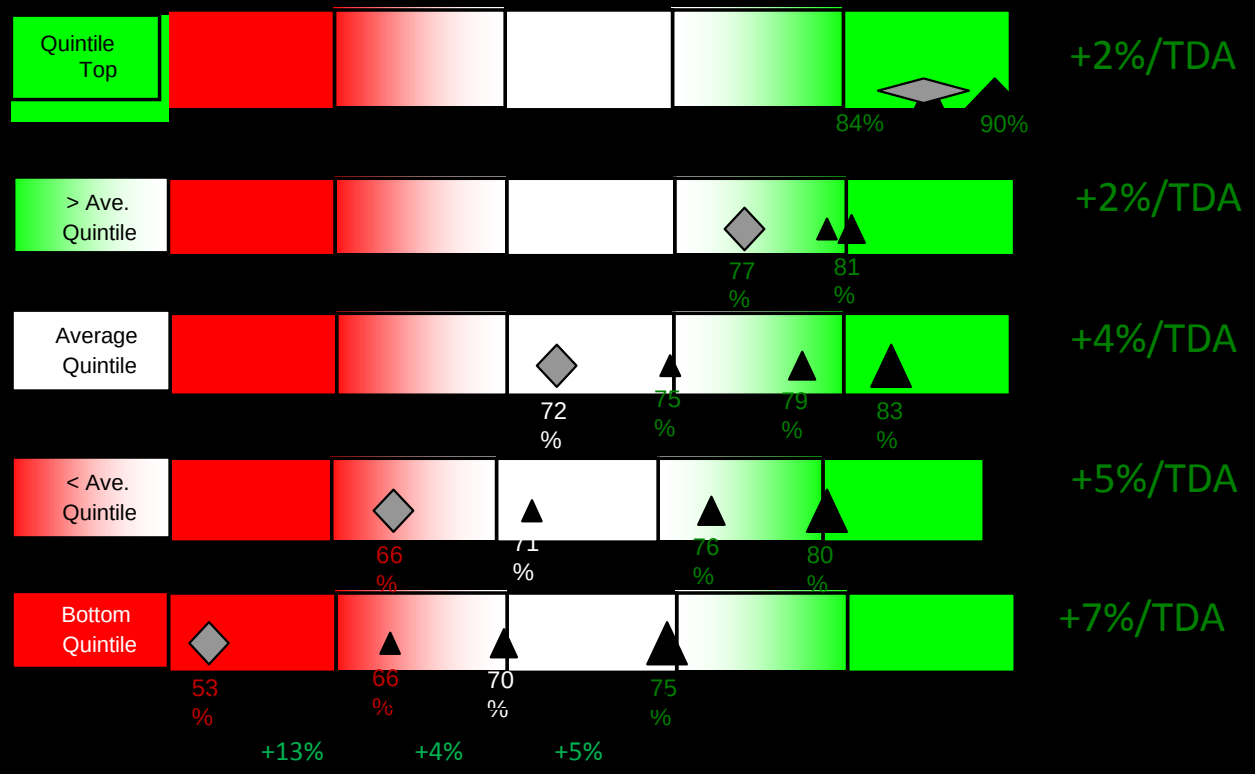
All Dimensions filled, more on the emotional-side

Building and maintaining high performance teams



Team Assessments *Drive* Performance Enhancement

*Team p*erformance increased ~4% per TDA cycle!



Grouped the teams by the quintile they began in

Context Shifting Worksheet – Take Action

Your (Troubling) Situation – succinctly stated

The Outcome(s) that you desire/require

Limiting Mindset: Experienced Emotions & Red Story-lines

Liberating Mindset: Expressed Emotions & Green Story-lines

Express Authentic Appreciation	Address Unfortunate Realities
Address Shared Interests	Be 100% Committed
Appropriately Include Others	Avoid Blaming or Complaining
Rigorously Keep All Your Agreements	Clarify Roles, AccountabilityYour & Authority

Summarize Your Action Items

Confirm Adequacy of Actions

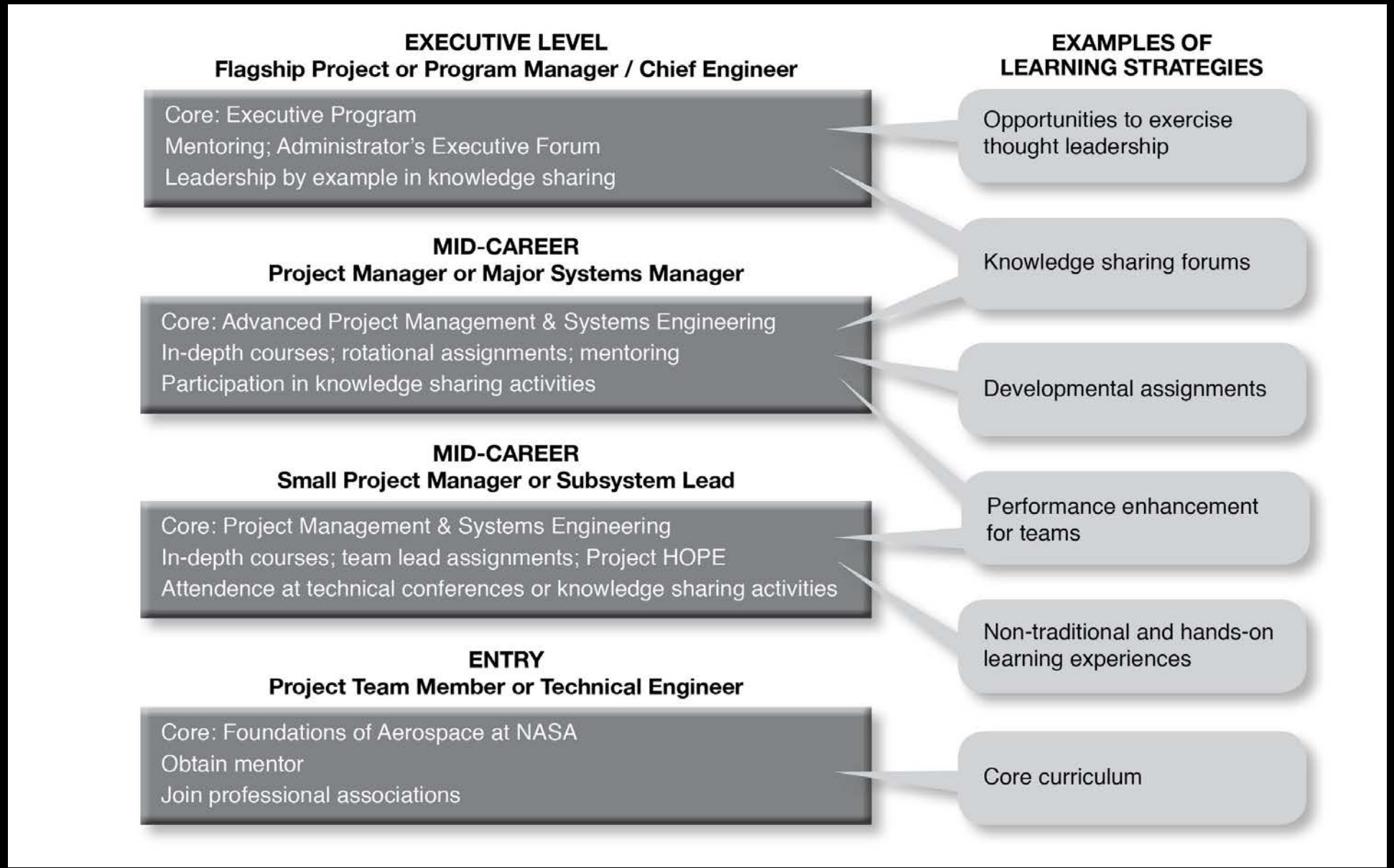
Thoughts on Individual and Team Talent Development

Talent Development

The 4 A's

Talent Development

A Career Development Framework

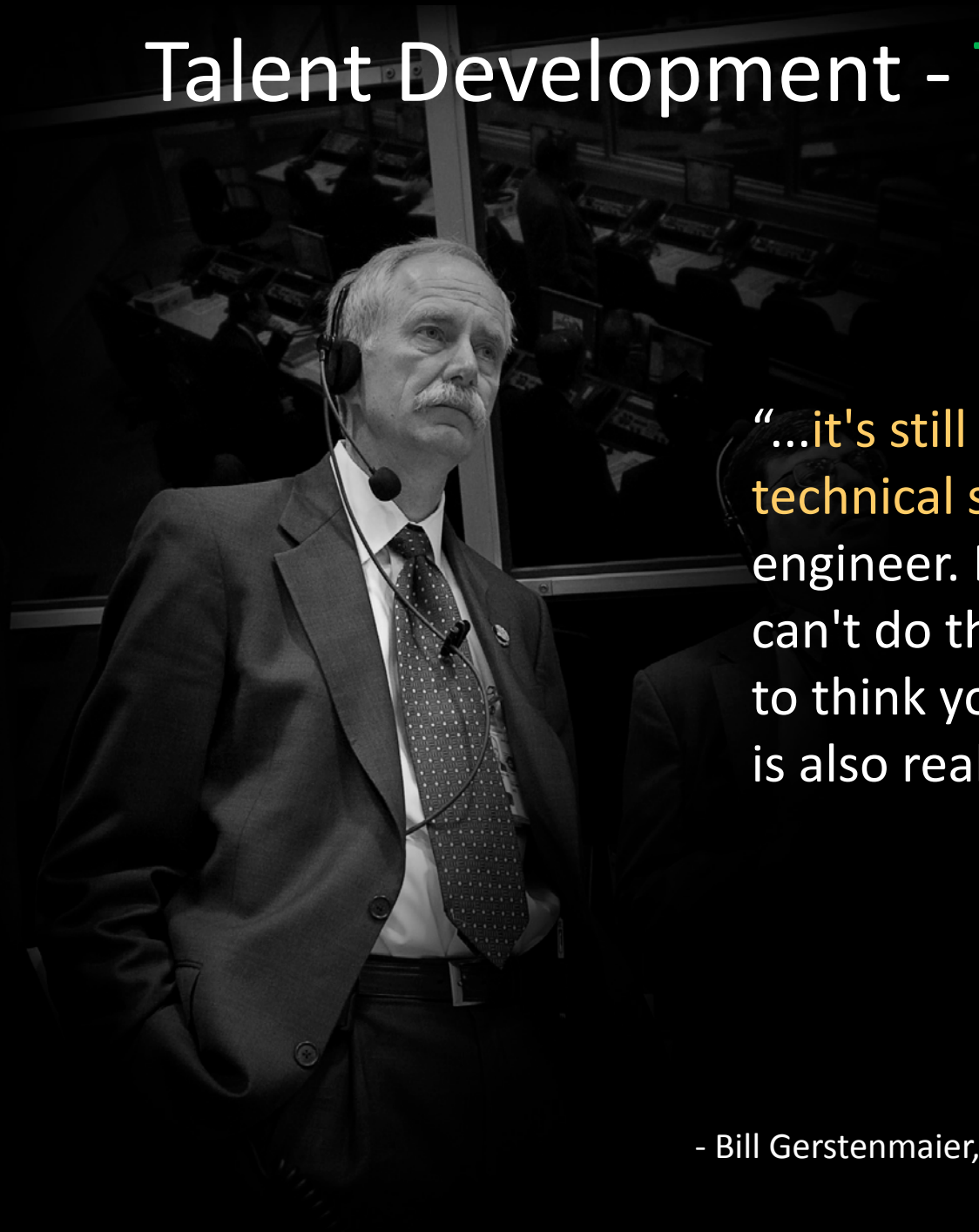


Talent Development

Transferring Knowledge

Chris Scolese, GSFC Center Director

Talent Development - Technical



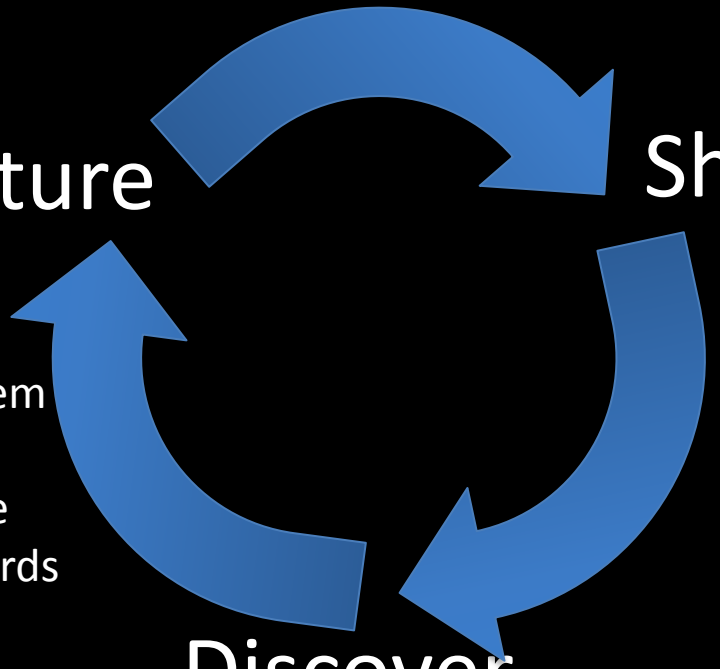
"...it's still hard to give up the technical side. I am a recovering engineer. But I recognize you just can't do that stuff anymore and to think you still have those skills is also really wrong…
"

- Bill Gerstenmaier, HEOMD Associate Administrator

Thoughts on Knowledge Services (not Knowledge Management)

Knowledge Services

Core Processes



Capture

Mature capability:
Case studies
Lessons Learned Info. System
Videos
Shuttle Knowledge Console
Knowledge-based risk records

Share

Mature capability:
Online tools and portals
Face-to-face events
Communities of practice

Discover

Mature capability:
Search – enhanced ability to discover
Culture – expectation to discover
Nudges – reminders to discover

Knowledge Services

Message from Stakeholders

GAO 2002: "…fundamental weaknesses in the collection and sharing of lessons learned agency-wide."

ASAP 2011: "…recommends NASA establish a single focal point (a Chief Knowledge Officer) within the Agency to develop the policy and requirements necessary to integrate knowledge capture…"

OIG 2012: "…inconsistent policy direction and implementation for the Agency's overall lessons learned program."

Knowledge Services

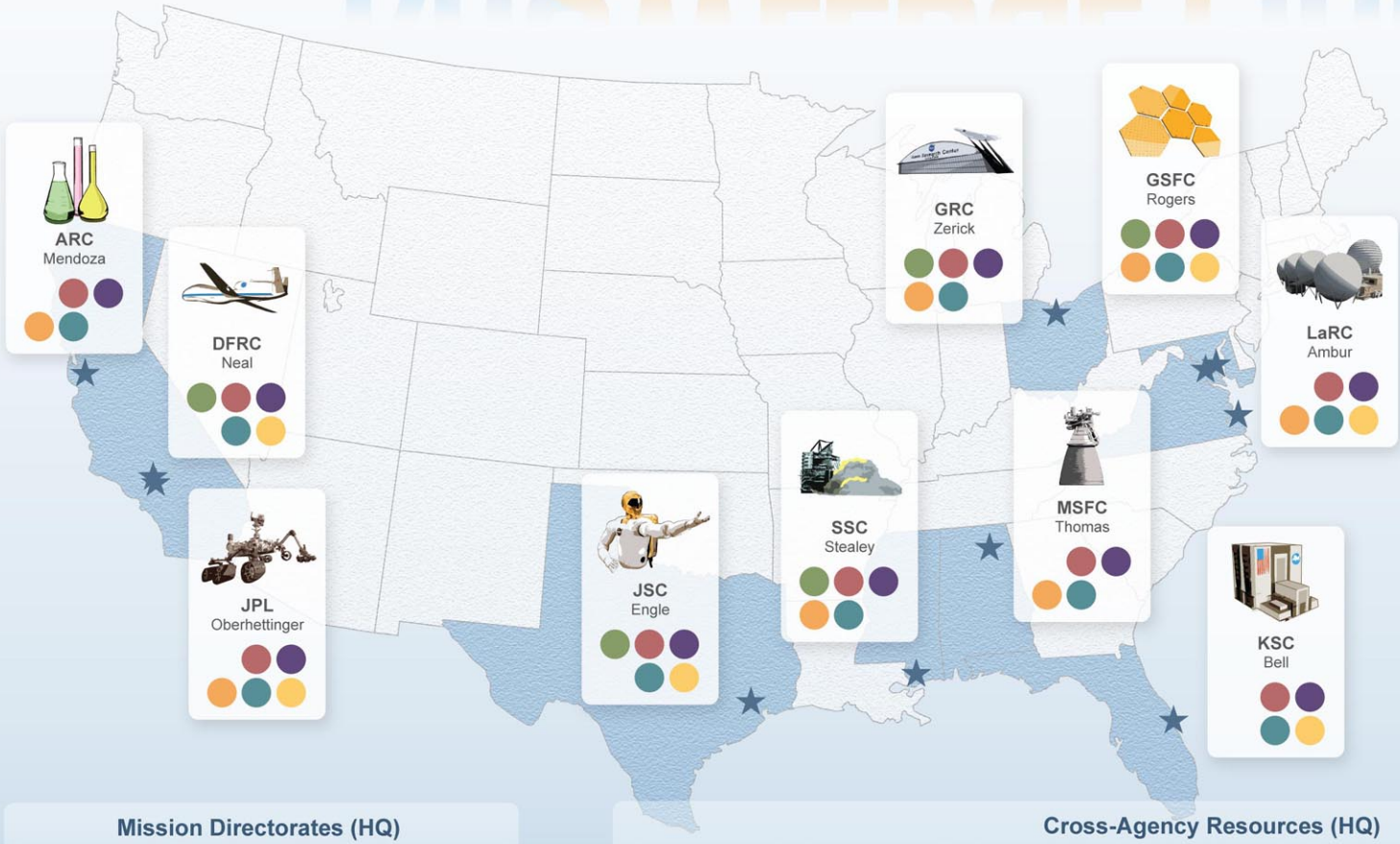
Policy and Governance

NASA collaboratively developed and adopted a new knowledge policy in November 2013

- Federated approach to governance
- CKOs appointed at Centers, Mission Directorates, Functional Offices, with Roles and Responsibilities
- Tools such as the first NASA Knowledge Map to form a common vocabulary and the km.nasa.gov portal to focus communications and distribution

National Aeronautics and Space Administration's

KNOWLEDGE MAP



- Case Studies/ Publications
- Face-to-Face Knowledge Services
- Online Tools
- Knowledge Networks
- Lessons Learned/ Knowledge Processes
- Search/Tag/ Taxonomy Tools

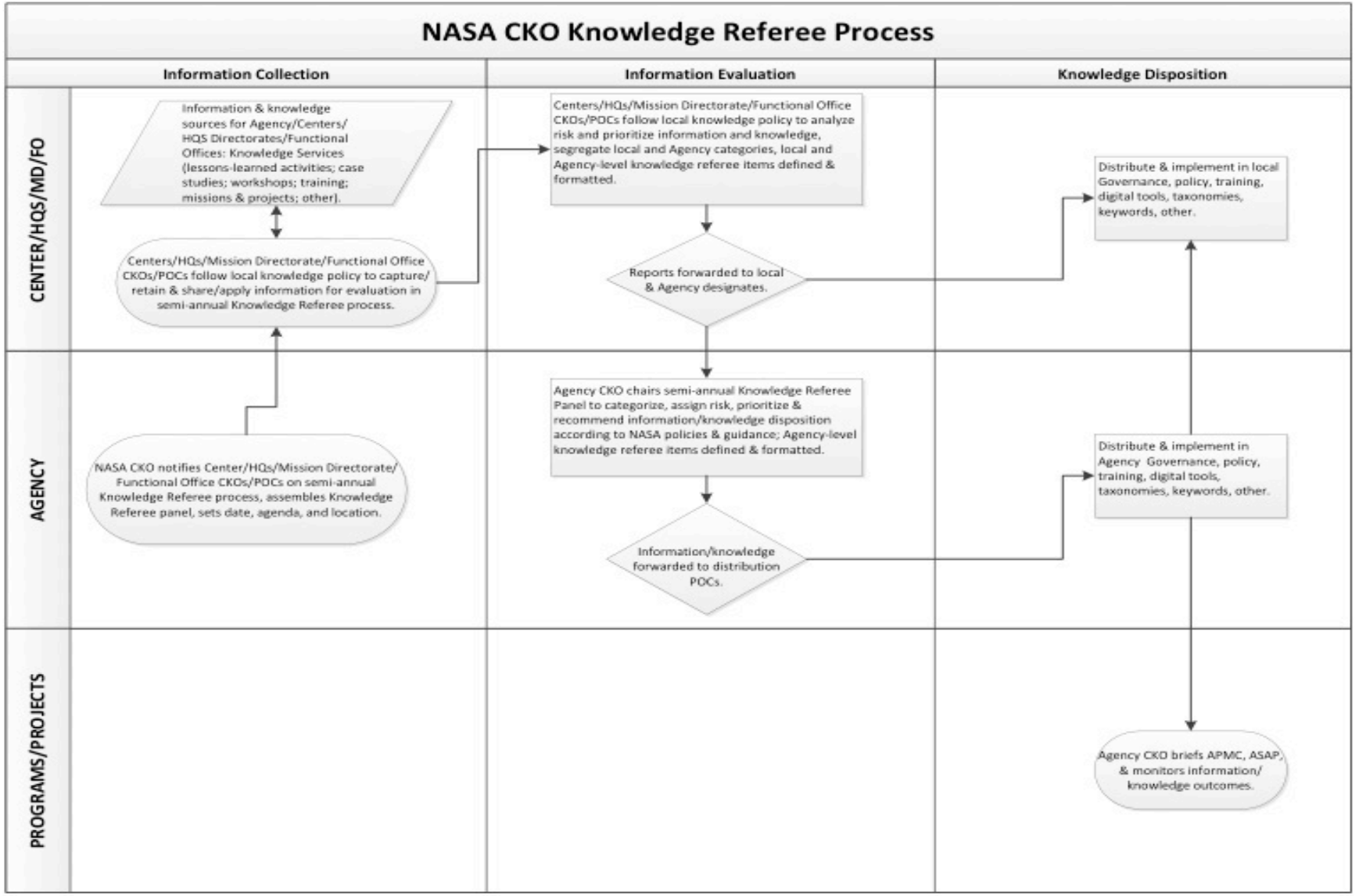
Mission Directorates (HQ)

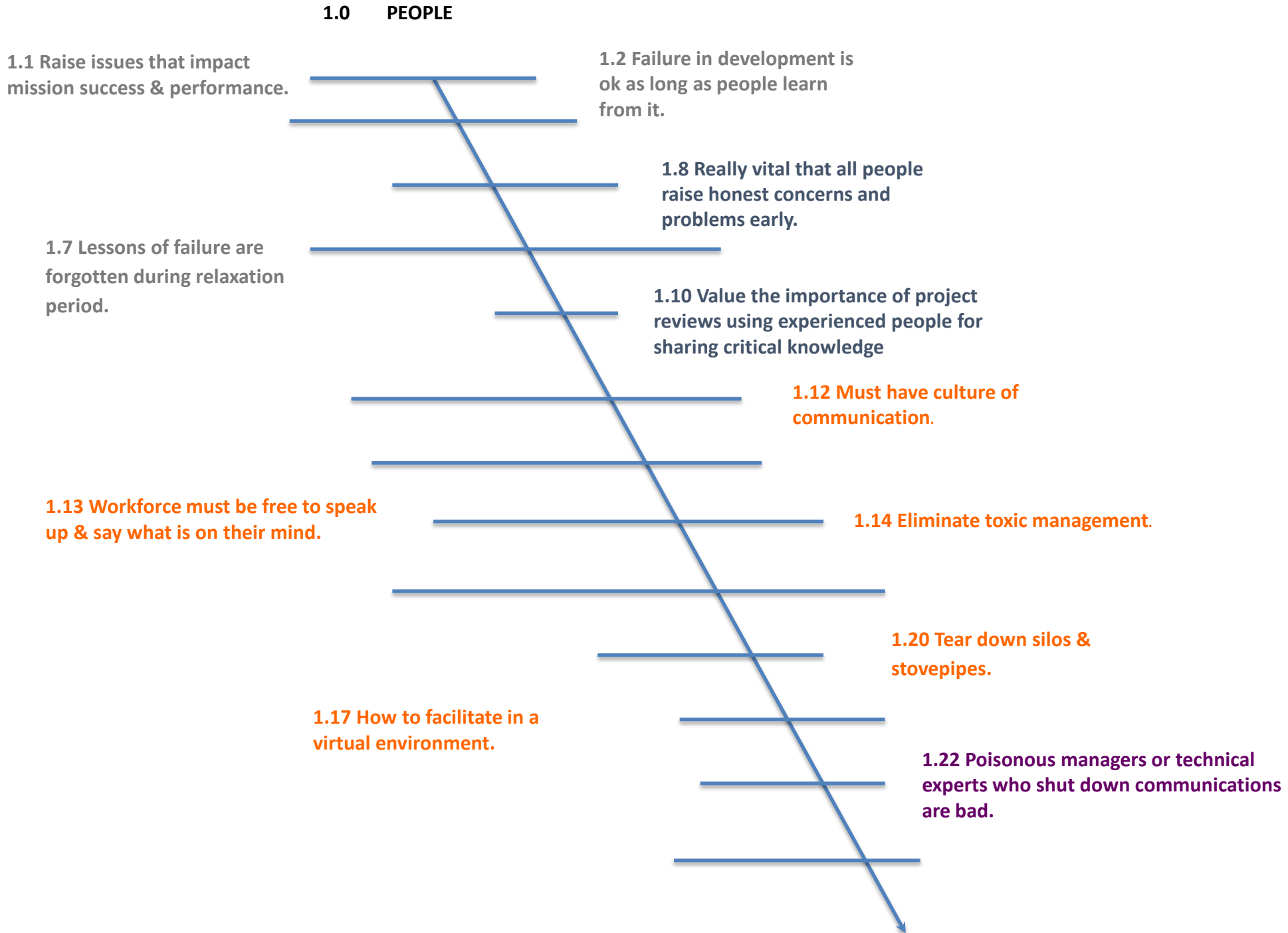
- ARMD — Minor
- HEOMD — Lengyel
- SMD — Albright

Cross-Agency Resources (HQ)

- APPEL — Hoffman
- NESC — Yuchnovicz
- NEN — Topousis
- NSC — Lipka
- OHCM — Leo
- OP — Moses
- STI — Bierman

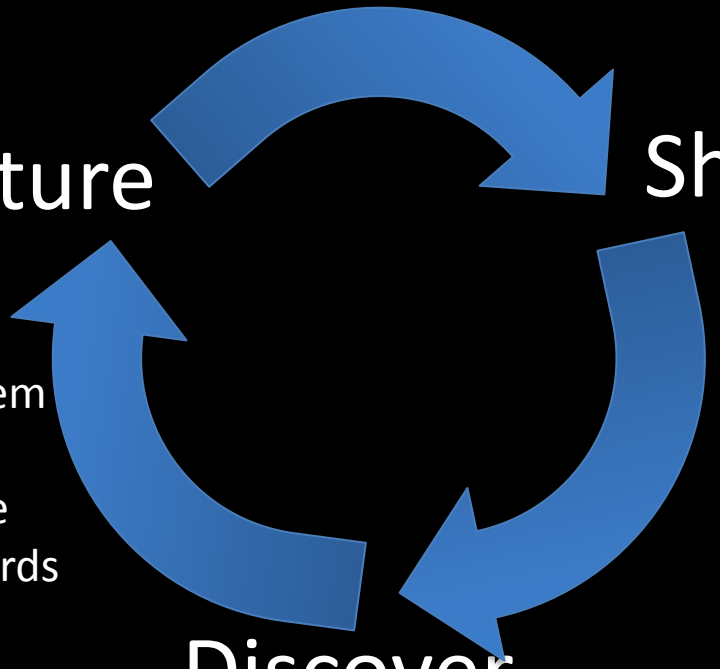
Expectations & Culture - Critical Knowledge




1.0 PEOPLE
1.1 Raise issues that impact mission success & performance.
1.2 Failure in development is ok as long as people learn from it.
1.8 Really vital that all people raise honest concerns and problems early.
1.7 Lessons of failure are forgotten during relaxation period.
1.10 Value the importance of project reviews using experienced people for sharing critical knowledge
1.12 Must have culture of communication.
1.13 Workforce must be free to speak up & say what is on their mind.
1.14 Eliminate toxic management.
1.20 Tear down silos & stovepipes.
1.17 How to facilitate in a virtual environment.
1.22 Poisonous managers or technical experts who shut down communications are bad.

Leadership & Management

NASA's Gaps in Core Knowledge Processes



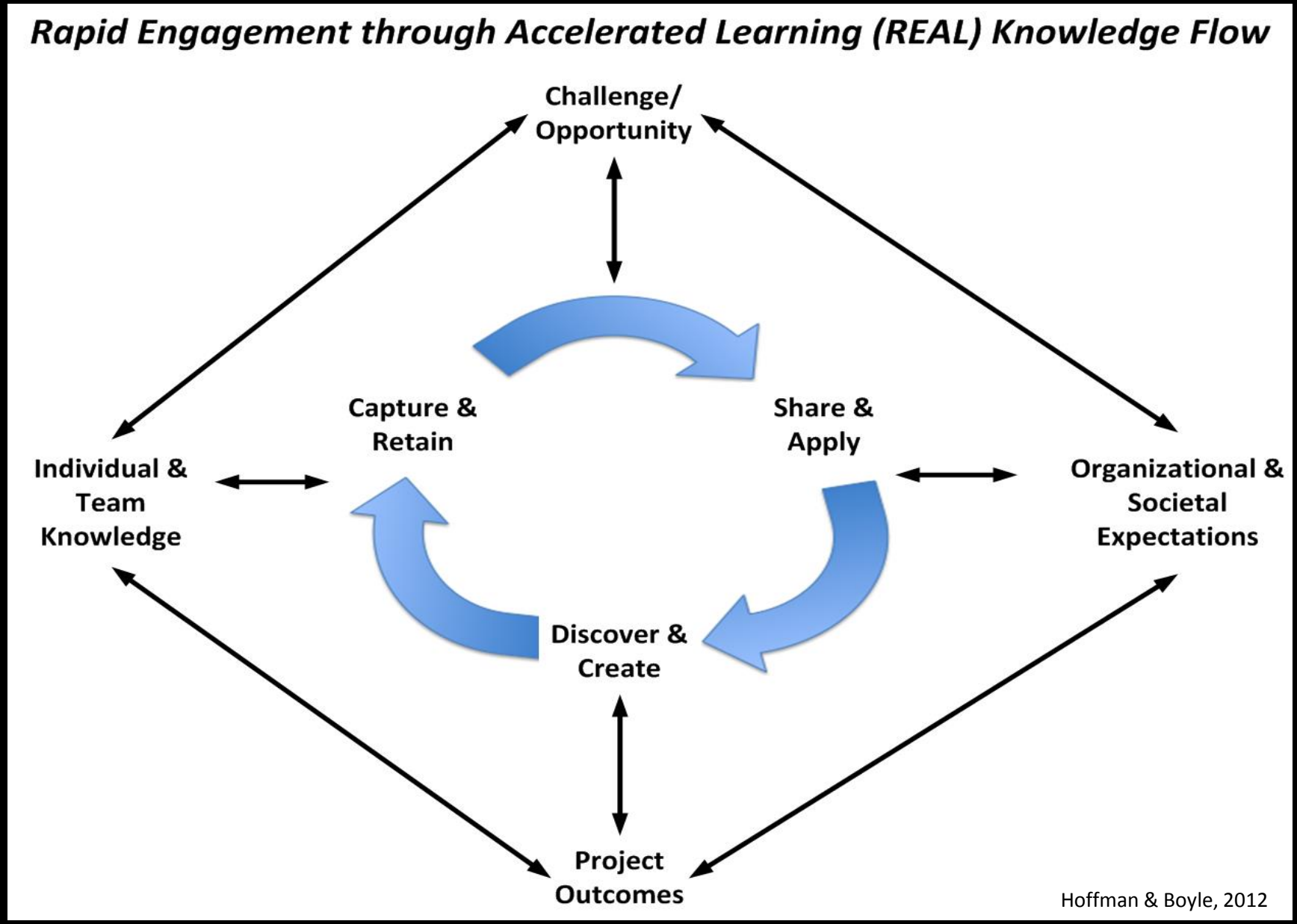
Mature capability:
Case studies
Lessons Learned Info. System
Videos
Shuttle Knowledge Console
Knowledge-based risk records

Mature capability:
Online tools and portals
Face-to-face events
Communities of practice

Inadequate capability:
Search – enhanced ability to discover
Culture – expectation to discover
Nudges – reminders to discover

Leadership & Management - Challenges

- How do we find and search our knowledge?
- What are our Critical Knowledge priorities?
- What are the metrics and measures that capture effectiveness and efficiency in the core knowledge processes?
- Who do we optimize Knowledge Services for accelerated learning, engagement, and managing complexity?
- Can an understanding of biases and heuristics that drive organizational and societal expectations help organizations make better decisions and design better knowledge services?


Rapid Engagement through Accelerated Learning (REAL) Knowledge Flow
Challenge/ Opportunity
Capture & Retain
Share & Apply
Individual & Team Knowledge
Organizational & Societal Expectations
Discover & Create
Project Outcomes
Hoffman & Boyle, 2012

Questions

Email:

edhoffma@gmail.com

Linked In:

https://www.linkedin.com/in/ed-hoffman-5033554