Creating Knowledge Services for Modern Technical
Project Organizations: The REAL Knowledge Approach

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I. Key Stakeholders Identified an Issue

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

Aerospace Safety Advisory Panel, 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…"

II. Organizing for Project Knowledge

- Strategy

- Community

- Governance

- Roles and Responsibilities

- Tools

Knowledge Strategy

Goal: *Where does the NASA technical workforce go to find and use the critical knowledge required now and in the future to achieve mission success in a highly complex and unforgiving environment?"*

Pillars

Enable accessibility, findability, searchability, & visualization of data, information, and systems.	Facilitate opportunities through better communications and processes for sharing and networking.	Establish best practices for capturing & retaining, sharing & applying, discovering & creating knowledge.	Establish maturity model for knowledge effectiveness to measure and validate.

Philosophy: A federated approach
Respect local customs & enhance organizational norms

Knowledge Community: CKOs / POCs

NASA now has an agency CKO as well as local CKOs at 10 centers, 4 mission directorates, and several cross-agency support organizations (e.g., Acquisition).

This community meets twice a year and has quarterly teleconferences to work together on shared challenges.

Expanded Knowledge Networks

- Agency CKO
- Local CKOs/POCs
- Communities of practice
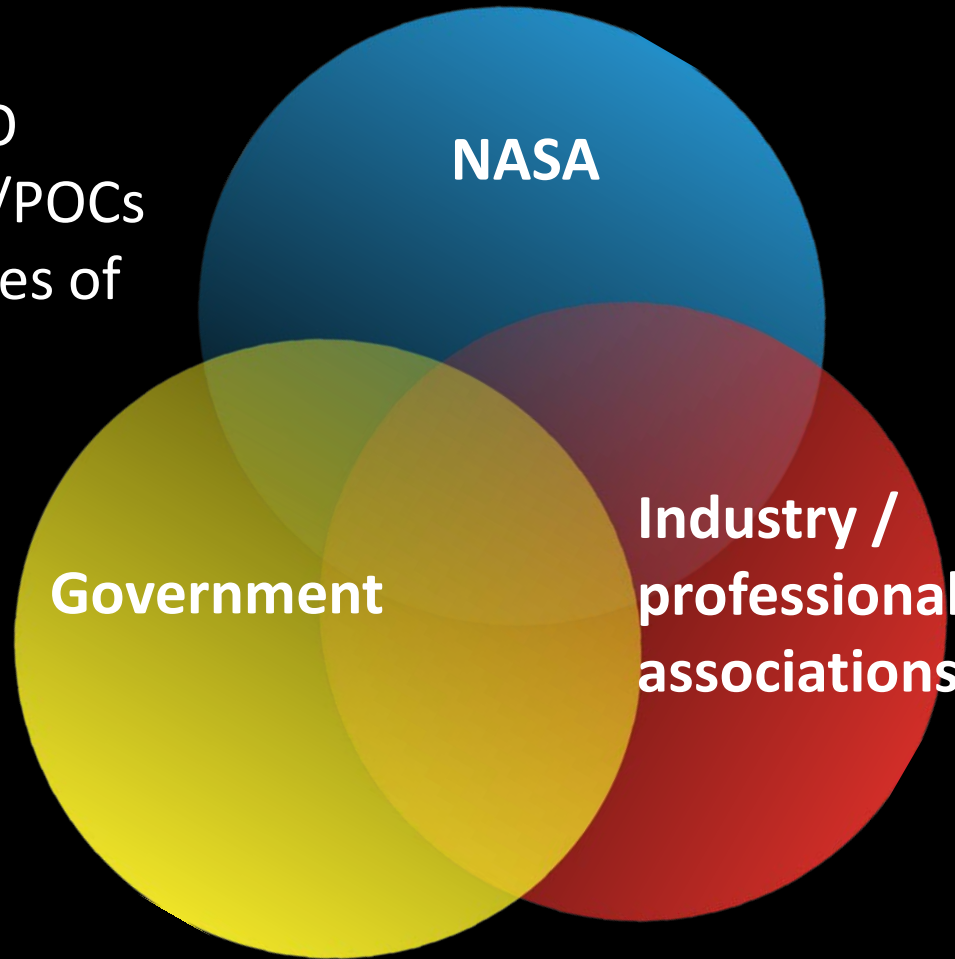
- Federal KM Working Group

NASA

Government

Industry / professional associations

- PMI
- APQC
- International Astronautical Federation

Policy and Governance

NASA adopted a new knowledge policy in November 2013. Key features:

- Federated approach to governance

- Roles and responsibilities

- Six activity categories – a common vocabulary

Roles: CKO at NASA

Given the complex nature of knowledge at NASA, the agency has adopted a *federated model* for coordination of knowledge activities.

The NASA CKO functions as a *facilitator* and *champion* for knowledge.

Knowledge Map

- Online resource at km.nasa.gov
- Information hyperlinked and sortable by:
  - Organizations
  - CKOs/points of contact
  - Knowledge categories (see next slide)

Knowledge Categories

Case Studies / Publications

Face-to-Face Knowledge Services

Online Tools

Knowledge Networks

Lessons Learned / Knowledge Processes
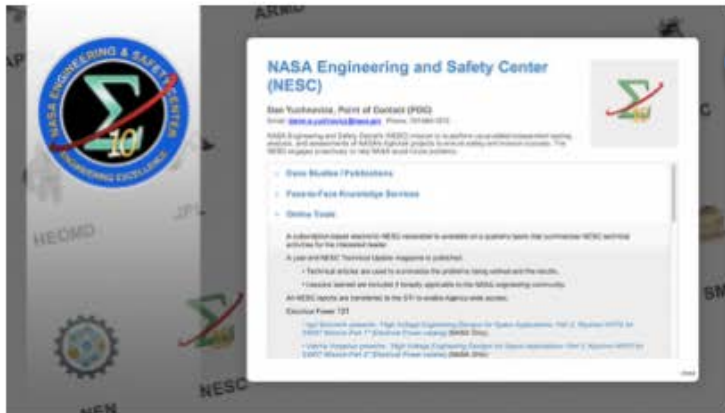
Search / Tag / Taxonomy Tools

Knowledge Categories in Context

Tacit

Explicit

Individual

Social

workshops / forums

hands-on opportunities

networks

communities of practice

mentoring

coaching

training courses

digital learning

search for documents / multimedia
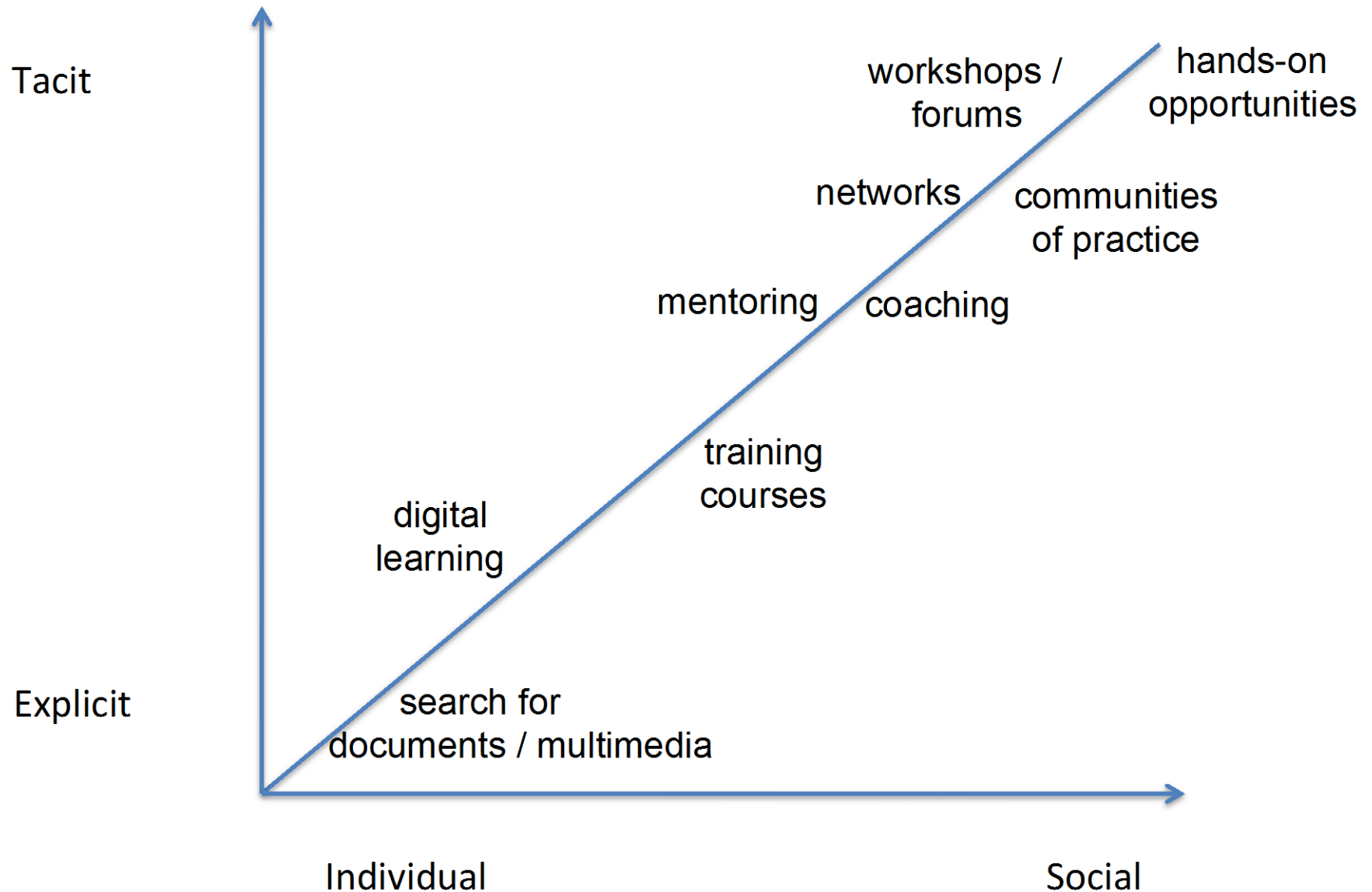
National Aeronautics and Space Administration's
KNOWLEDGE MAP
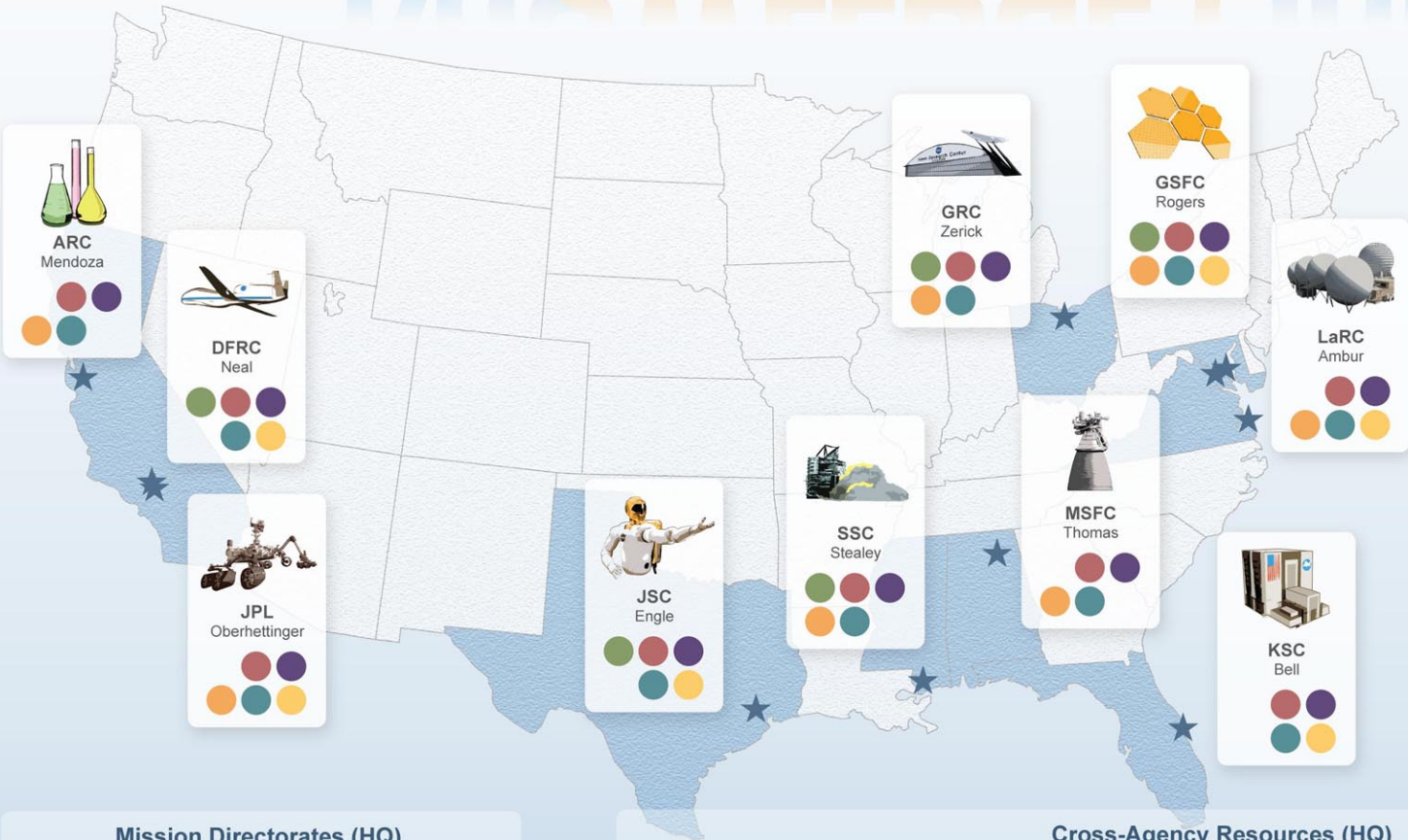
ARC
Mendoza

DFRC
Neal

JPL
Oberhettinger

GRC
Zerick

GSFC
Rogers

LaRC
Ambur

JSC
Engle

SSC
Stealey

MSFC
Thomas

KSC
Bell

Legend

- 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
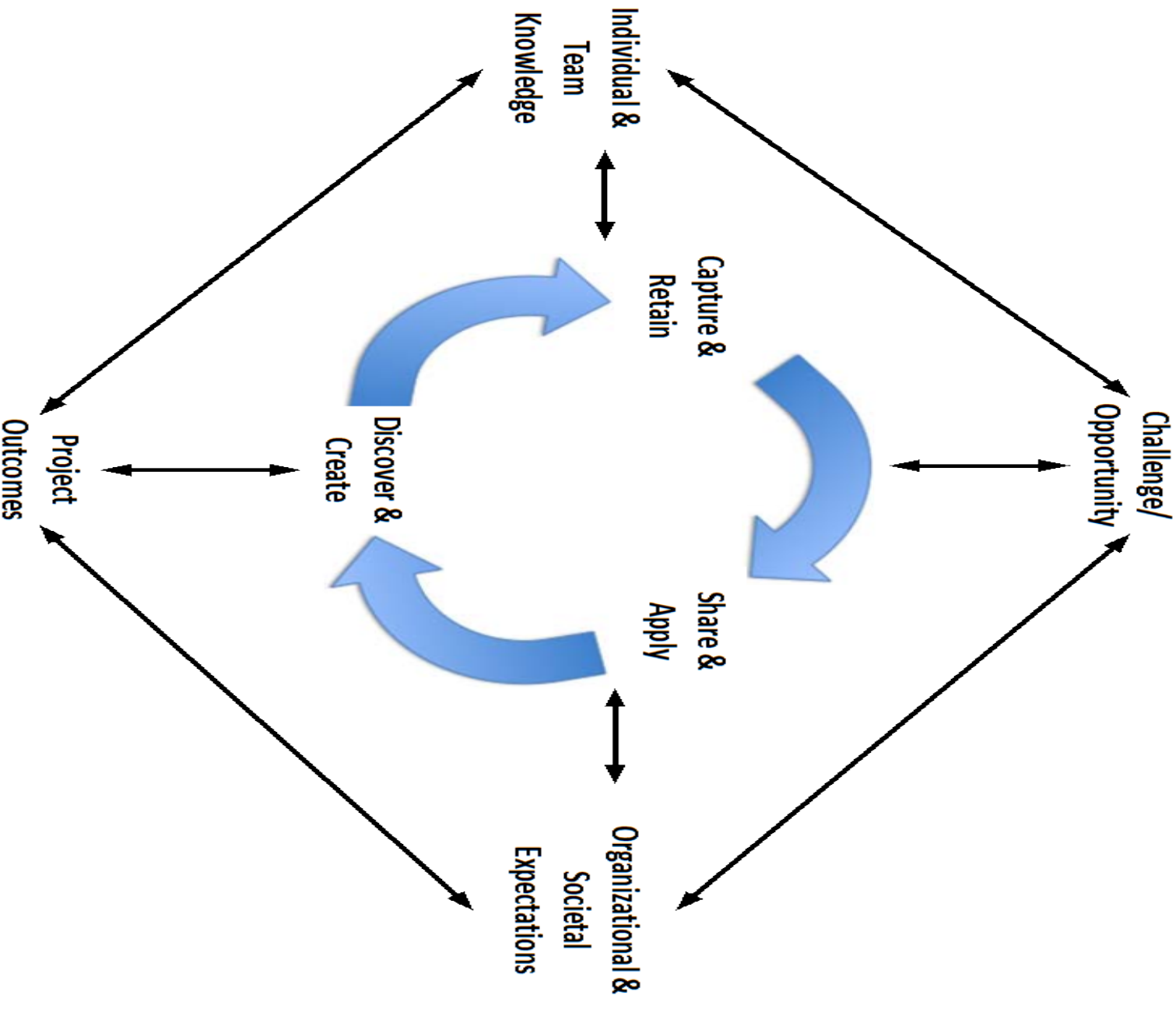Leo

OP
Moses

STI
Bierman

km.nasa.gov

Links, resources, and updates

CKO communications

III. Building on the Foundation

Robust Engagement through Active Lessons (REAL) Knowledge Flow

Individual & Team Knowledge

Challenge/ Opportunity

Project Outcomes

Organizational & Societal Expectations

Capture & Retain

Share & Apply

Discover & Create

Knowledge Effectiveness = People + Systems

Networks, alliances, and communities of practice

Accessible information, user-friendly services

PEOPLE

EFFECTIVENESS

SYSTEMS

Culture of openness and sharing

Infusion of lessons learned, mishaps, and best practices
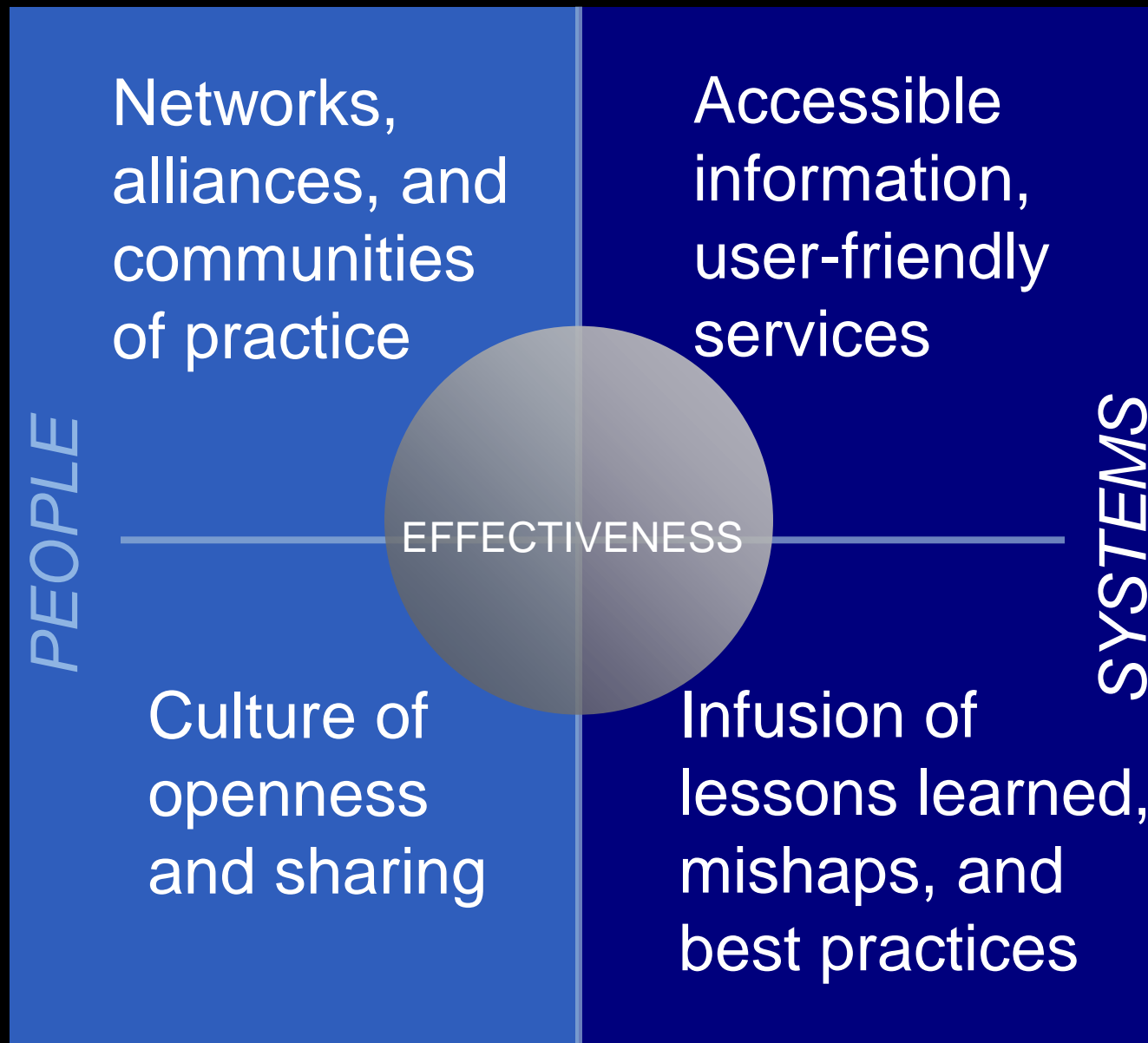
NASA's Existing Capabilities and Gaps

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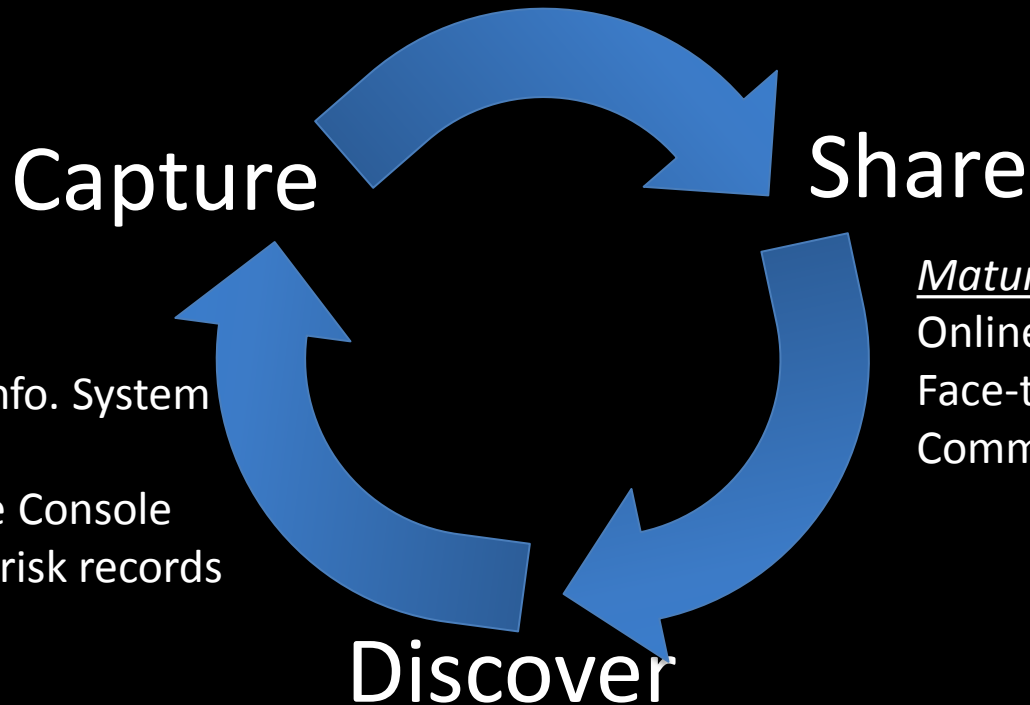
Mature capability:
Case studies
Lessons Learned Info. System
Videos
Shuttle Knowledge Console
Knowledge-based risk records

Share

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

Discover

Inadequate capability:
Search – enhanced ability to discover
Culture – expectation to discover
"Nudges" – reminders to discover
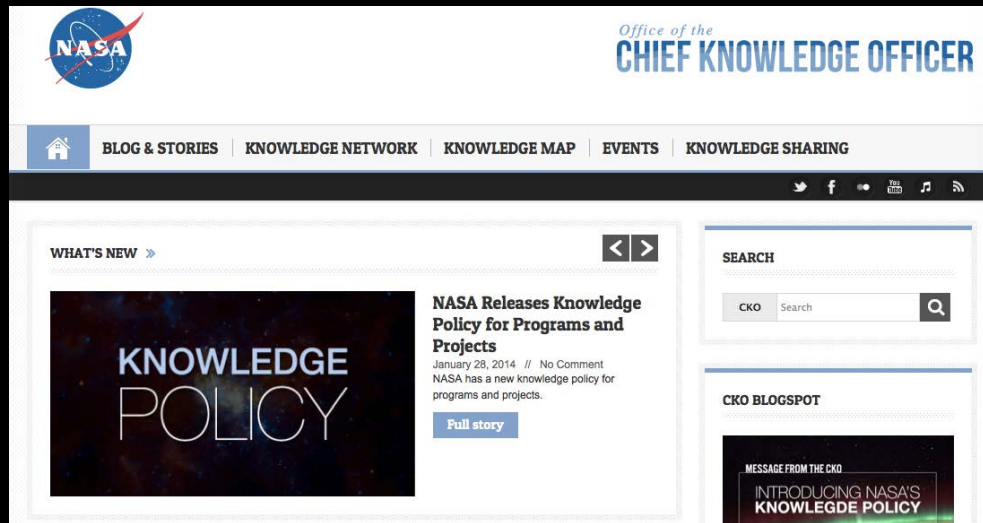
Critical Knowledge Base Elements

1) **People**: Do people with decision-making authority enable the flow of knowledge or constrict it?

2) **Processes**: Do processes utilize a risk-based approach to program/project control that enables flexibility and innovation?

3) **Technical excellence**: Does the organization have the expertise it needs?

4) **Knowledge services**: Is knowledge shared through activities ranging from document and video libraries to face-to-face events?

Top Priorities for Knowledge at NASA

- Executing identification of critical knowledge across NASA
- Digital strategy
  - Improved search capability top practitioner priority
- Learning materials for knowledge expertise
- Measures of knowledge maturity

Find Us Online

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