Knowledge Management at NASA Goddard Space Flight Center

1. Strategic Role & Importance of KM
2. Approach to KM & KM Architecture
3. Goddard Action Components

Edward W. Rogers GSFC Code 300 Tel: 301 286-4467

Why KM is Important

- The NASA workforce is changing to new demographics and diverse career paths
- NASA works on the cutting edge meaning that our employees have unique knowledge from their experience at NASA
- We are expected to use the lessons we learn along the way to effectively manage the inherent high risk of human exploration of space
- It is our mission is to share what we learn about the universe and how we learned it with the public
- The President's Management Agenda directs us to pay attention to knowledge management.

NASA Knowledge Management

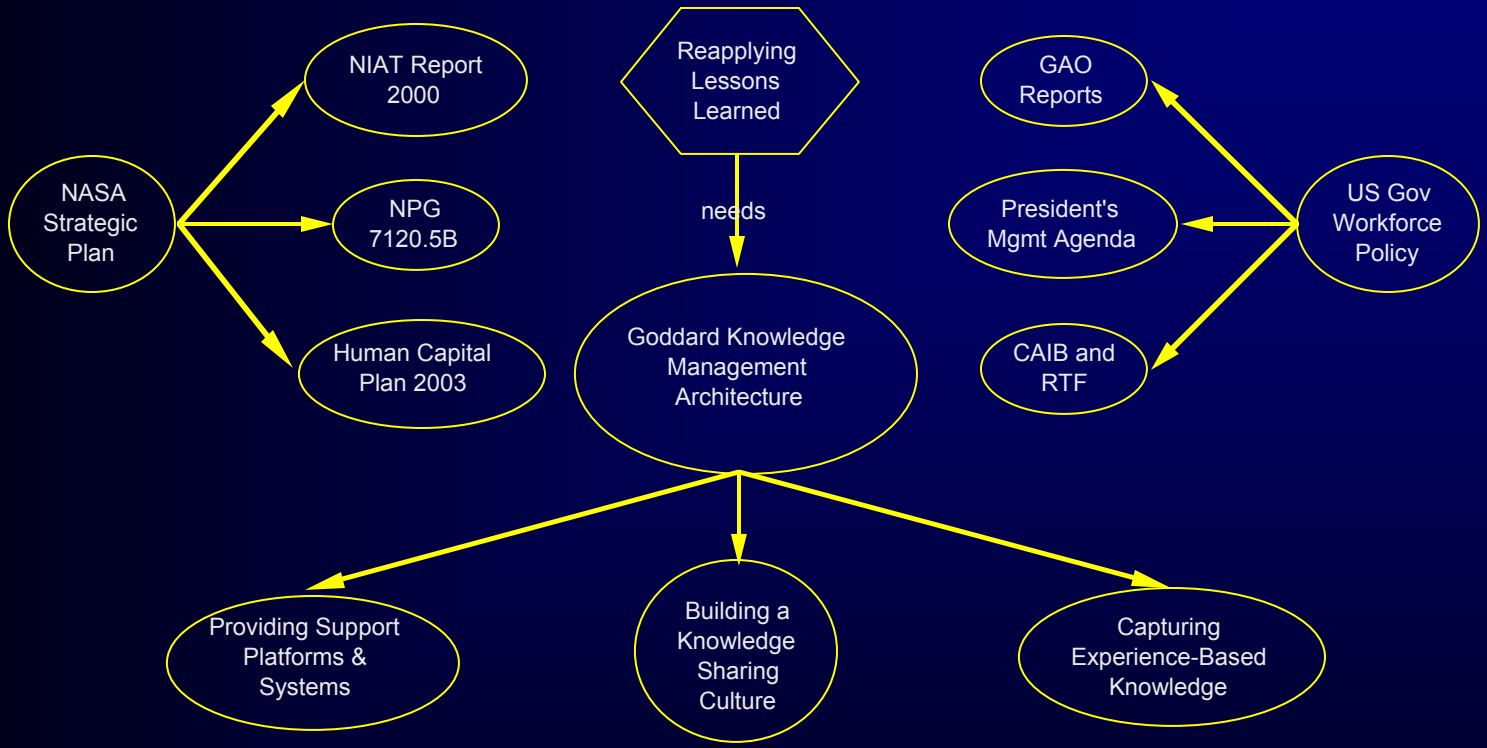
NASA is constantly challenged
to capture and integrate our lessons learned
to effectively manage the risk
involved in space exploration.

"Knowledge management systems are just one part of an effective strategy that will help generate, capture and disseminate knowledge and information that is relevant to the organization's mission."

The President's Management Agenda

Context for GSFC KM Initiatives

KMProcess



The Knowledge Function

Opportunity & Tools

Inflow of Human Capital

Loss of Human Capital

Customer Need Focus

Organization Interaction Coefficient

(Rate of Knowledge Discovery − Rate of Knowledge Loss) = Potential Knowledge Utilization

Openness & Sharing

Innovation & Creativity

Knowledge Decay

Project Execution

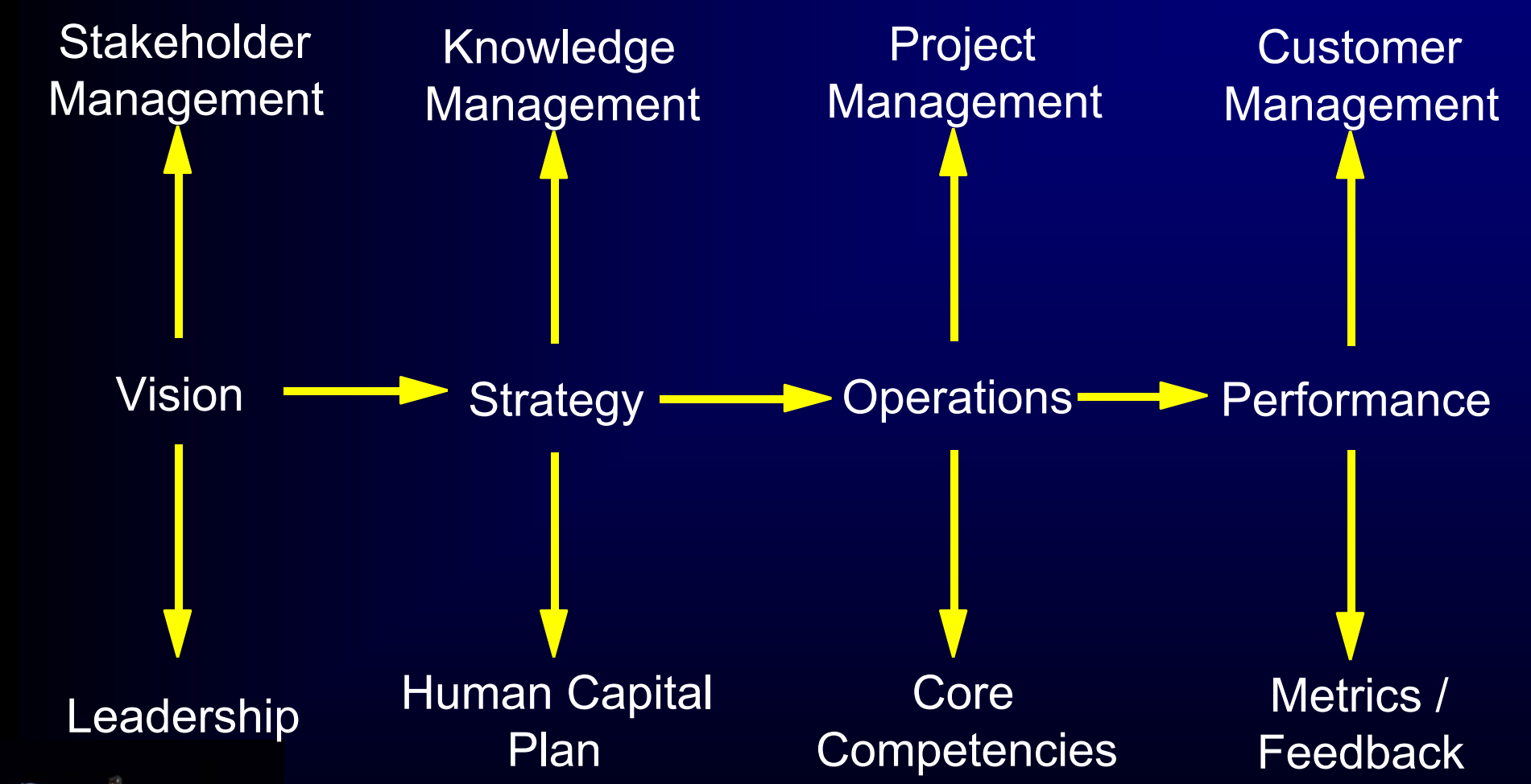
Knowledge Sharing Gaps

- Legacy systems are limited in scope and are generally not scalable
  - Over reliance on direct face to face contact
  - Tend to function only within project/program circles and not across enterprises or centers
- New generation of workforce is highly IT and computer literate but legacy knowledge sharing behaviors are not built around these platforms
- Legacy systems are not self-sustaining so that as the projects wind down, the knowledge sharing activities wind down and knowledge networks are dropped.
- Legacy systems are not reproducing as the workforce matures and the informal systems decay with departures

NASA KM Strategic Goals

- To sustain NASA's knowledge across missions and generations
  - KM will identify and capture the information that exists across the Agency
- To help people find, organize, and share the knowledge we already have
  - KM will efficiently manage NASA's knowledge resources
- To increase collaboration and to facilitate knowledge creation and sharing
  - KM will develop techniques and tools to enable teams and communities to collaborate across the barriers of time and space

KM as Resource Deployment



Strategic Alignment of KM Architecture

Strategic Goals	KM Goals	KM Architecture	KM Components
Generate,communicate, & share knowledge internally and externally	Capture share and generate knowledge to stimulate innovation and achieve results and mission success	Systematically record critical knowledge	1. Building Center Document Management and Archiving Process 2. Connecting Center Knowledge Bases with Search and Index Capability 3. Establishing partners at Universities to build at the leading edge of tools and processes 4. Building Forums to Share Knowledge on-line, real time and across projects 5. Equipping project personnel with KM skills and tools
	Improve productivity, by embedding KM processes into daily work activities	Create a unified knowledge network to find knowledge.	
Ensure a vital workforce and promote human capital.	Increase collaboration for expanding partnerships and generating new work	Build & nurture a knowledge sharing culture	
	Increase a sense of community for continued people retention		

Need for a Transition Plan for KM Today

- The state of the workforce in 2010 and beyond will be significantly different than the workforce today due to large numbers of legacy workers exiting the workforce.
- New systems must be put in place now to both preserve existing knowledge and to establish new systems for continued knowledge sharing and application.

Approach to Knowledge Management at the Goddard Space Flight Center

NASA KM Team Approach

- NASA KM Team Focused on Three Pieces of a KM Architecture to Provide a KM Support Role:
  - *Process*: Oriented on the way in which people do their day-to-day work in the organization (the *how* and *why*)
  - *Services*: Focused on who will help people share their knowledge and who will maintain tools and processes (the *who*)
  - *Systems*: Are the IT infrastructure and tools necessary to deliver the processes and services efficiently and effectively to the end users (the *what* and *where*)

Goddard Approach to KM Through Knowledge, People & Value

- Knowledge Management is about increasing the effectiveness and the efficiency of the ways the organization USES KNOWLEDGE.
- Of all the activities we choose to do, those which lead to human learning offer the greatest potential return because the fully engaged human mind will appreciate in value more than any earthly object.
- Goddard should make the right kind of investments that further the appreciation of human capital and enable the application of collective organizational knowledge.

Meeting the KM Challenge

IT and KM Infrastructure

NASA & GSFC Human Capital Plan

Opportunity & Tools

Inflow of Human Capital

Loss of Human Capital

Customer Need Focus

Organization Interaction Coefficient (Rate of Knowledge Discovery − Rate of Knowledge Loss) = Potential Knowledge Utilization

Project Success !

Openness & Sharing

Innovation & Creativity

Knowledge Decay

Project Execution

KM Forums, Championing

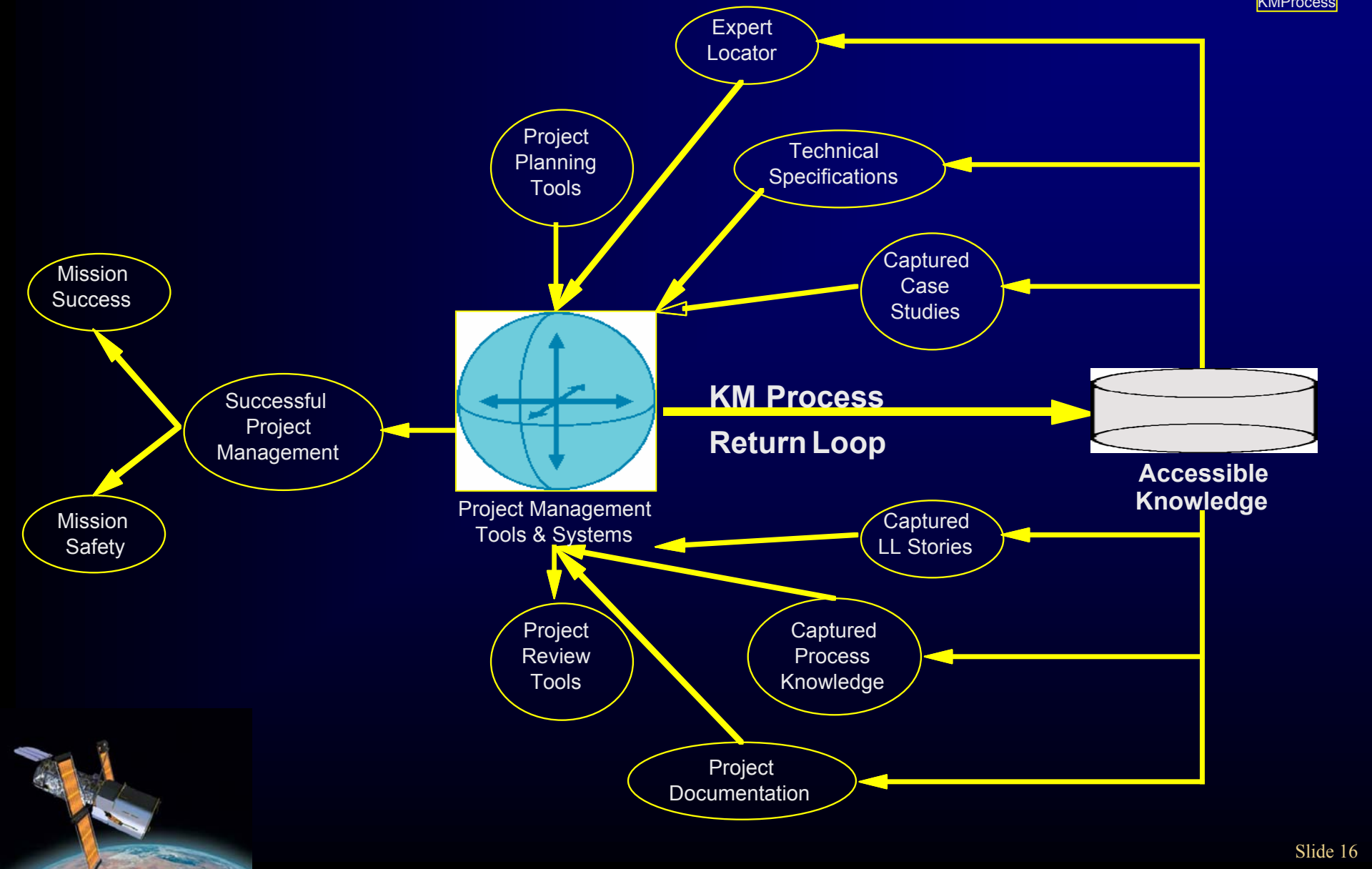
Knowledge Documentation
Knowledge Preservation
Knowledge Archiving

KM Effectiveness is NOT Measured by Tool Deployment

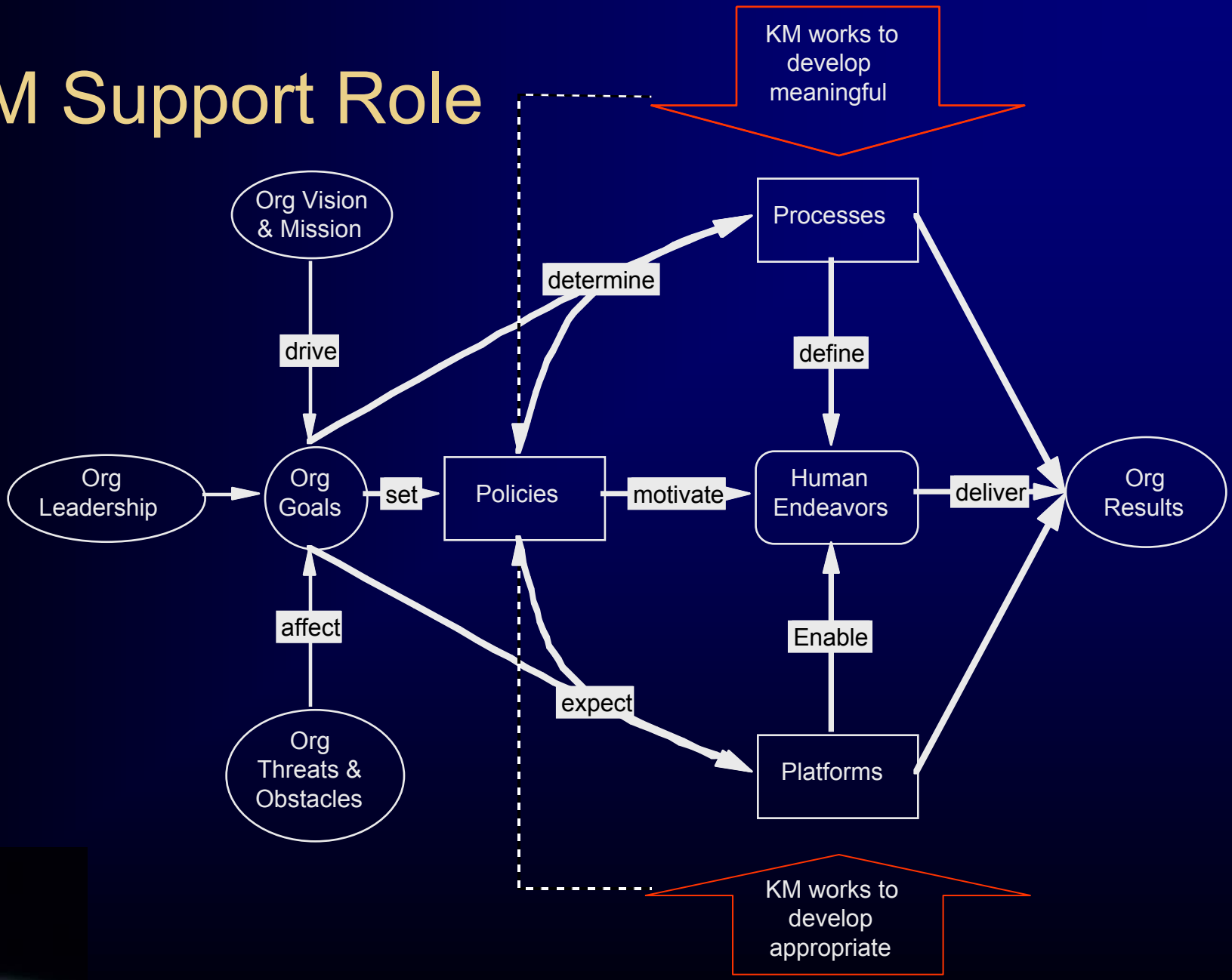
- It's raining dictionaries and shovels
  - Throwing tools does not help but tools are a necessary part of the solution
  - People adopt tools when a need for them is perceived
- Change the hunting metaphor
  - We are not "capturing" knowledge after all it's usually connected to somebody
  - We are cultivating knowledge by feeding and caring for its hosts to make knowledge more useful

KM Builds a Knowledge Return Loop

KMProcess



KM Support Role



KM at Goddard Has a Good Start

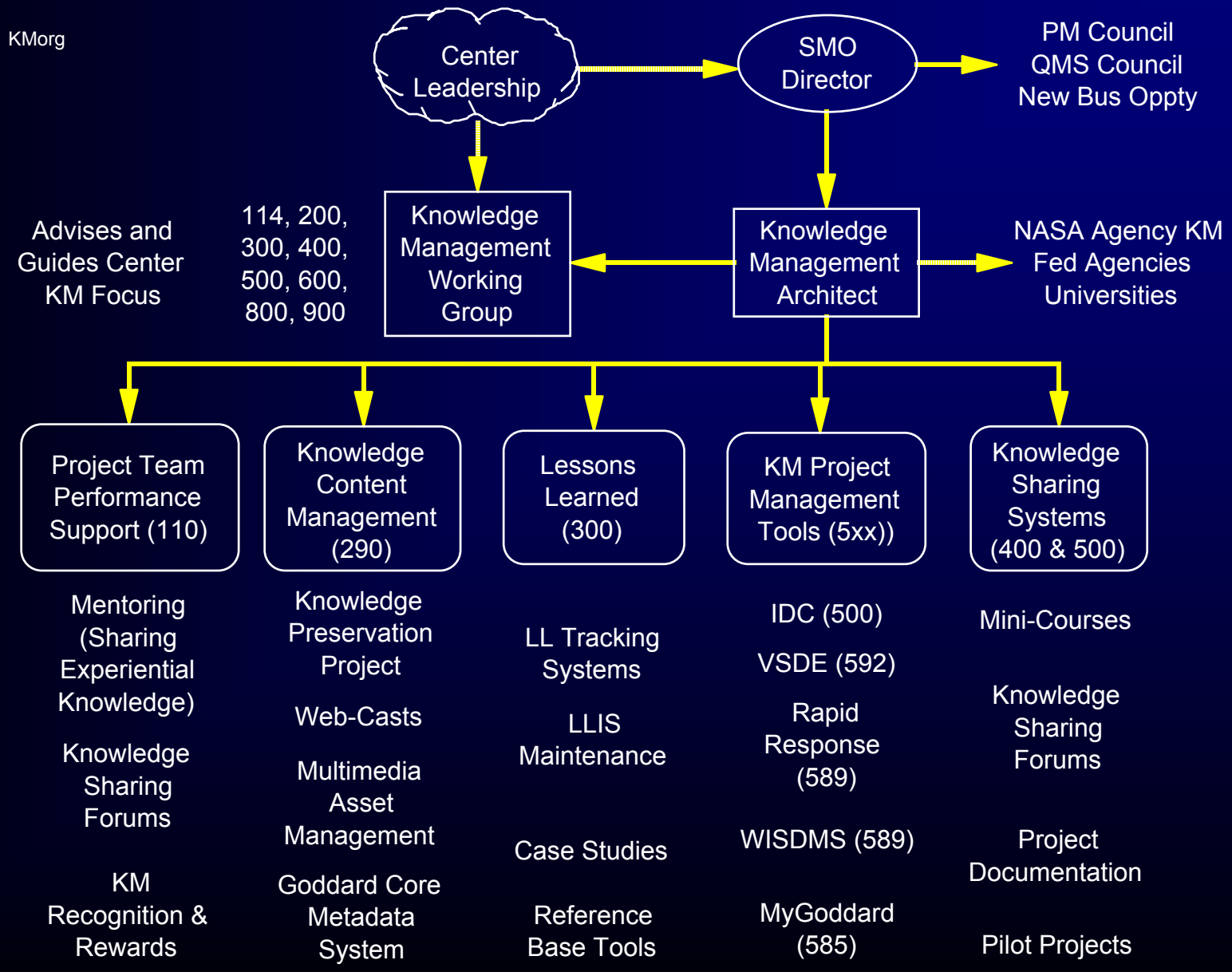
- ***Knowledge Management Architect (KMA)***

  The role of the KMA is to develop the approach and set priorities across the center for implementing the changes needed to build an effective and efficient knowledge management system. The KMA is equal parts champion, advocate, educator and planner of KM at Goddard.

- ***Knowledge Management Working Group (KMWG)***

  The purpose of the KMWG is to communicate, promote and coordinate continuous and sustained improvements in Knowledge Management at Goddard; and to ensure the appropriate visibility of KM-related achievements and challenges across the Center.

KM Organization for GSFC



Role for the Knowledge Management Architect at Goddard

- Craft and communicate a clear vision and plan for KM at GSFC: the need, the means & the goal
- Help equip with the necessary tools
  - IT Infrastructure
    - Easy, secure access and search
    - Simplified documentation and storage
  - Organization
    - Processes and policies to support KM
    - Rewards and performance evaluations
- Help transition the workforce
  - Model and walk the KM talk
  - Inspire beyond the change process

Two Fold Focus of the GSFC KM Office

- To Increase the Effectiveness and Efficiency of Knowledge Use at GSFC
  - By deploying Policies to Drive KM
  - By deploying KM tools and Platforms
  - By modeling (training) KM behavior in projects
- To measure KU efficiency and effectiveness
  - To demonstrate utility of KM
  - To keep KM activities focused on adding value

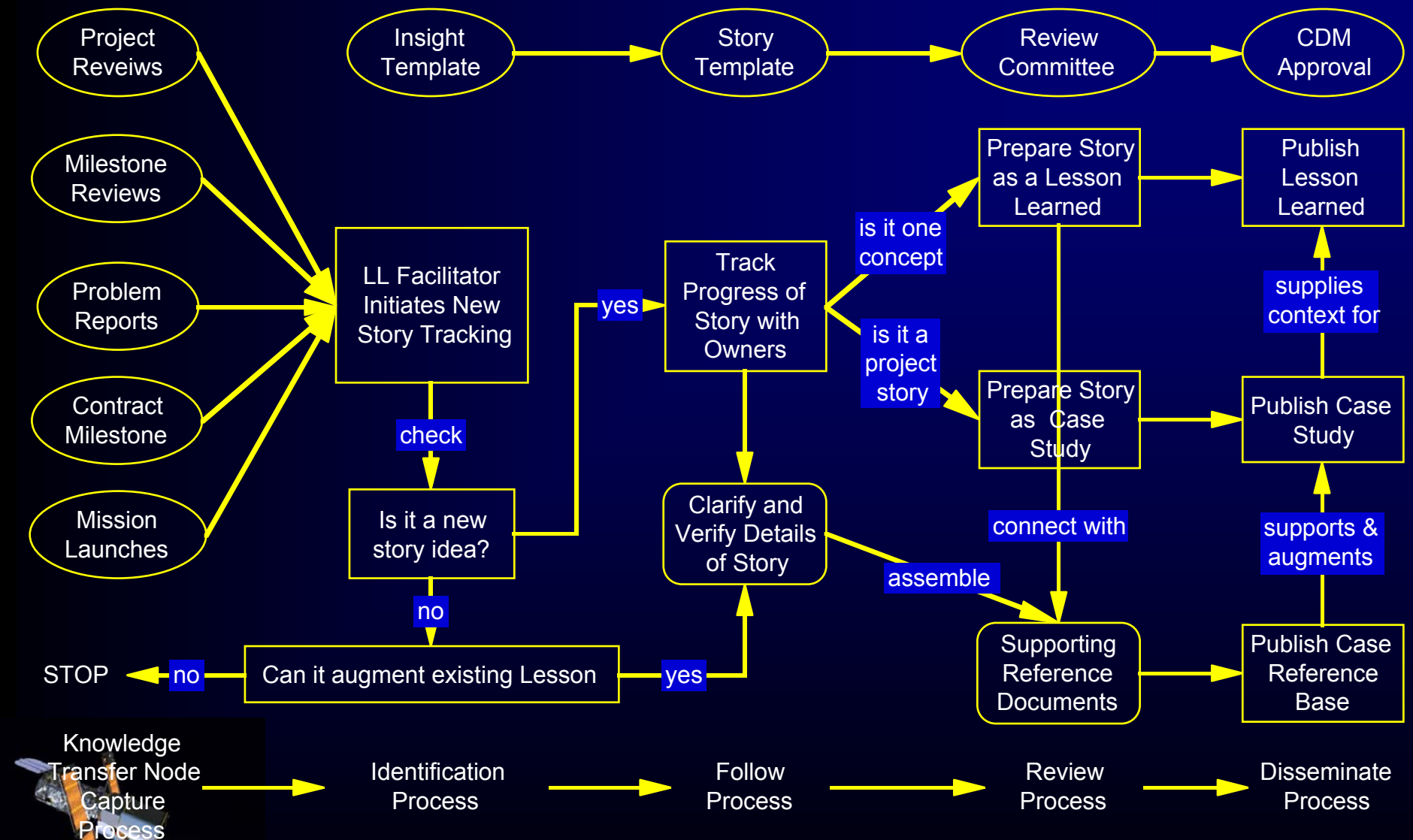
Just in Time Change Management

- Choose Projects that Need KM Help
  - Recognized Need for KM Action
  - Resources to Address KM Needs
  - Time to be Able to Craft Robust Solutions
- Choose Projects that will Impact Goddard
  - Innovative and Influential Project Leaders
  - Tools and Learning that can be Shared
  - Lead with Success, Not Tools
- Use KMWG as Sounding Board on Ideas
  - Present Center Successes and Problems Monthly
  - Focus on Adoption of that which Works
  - Bring Outside Experts as Needed

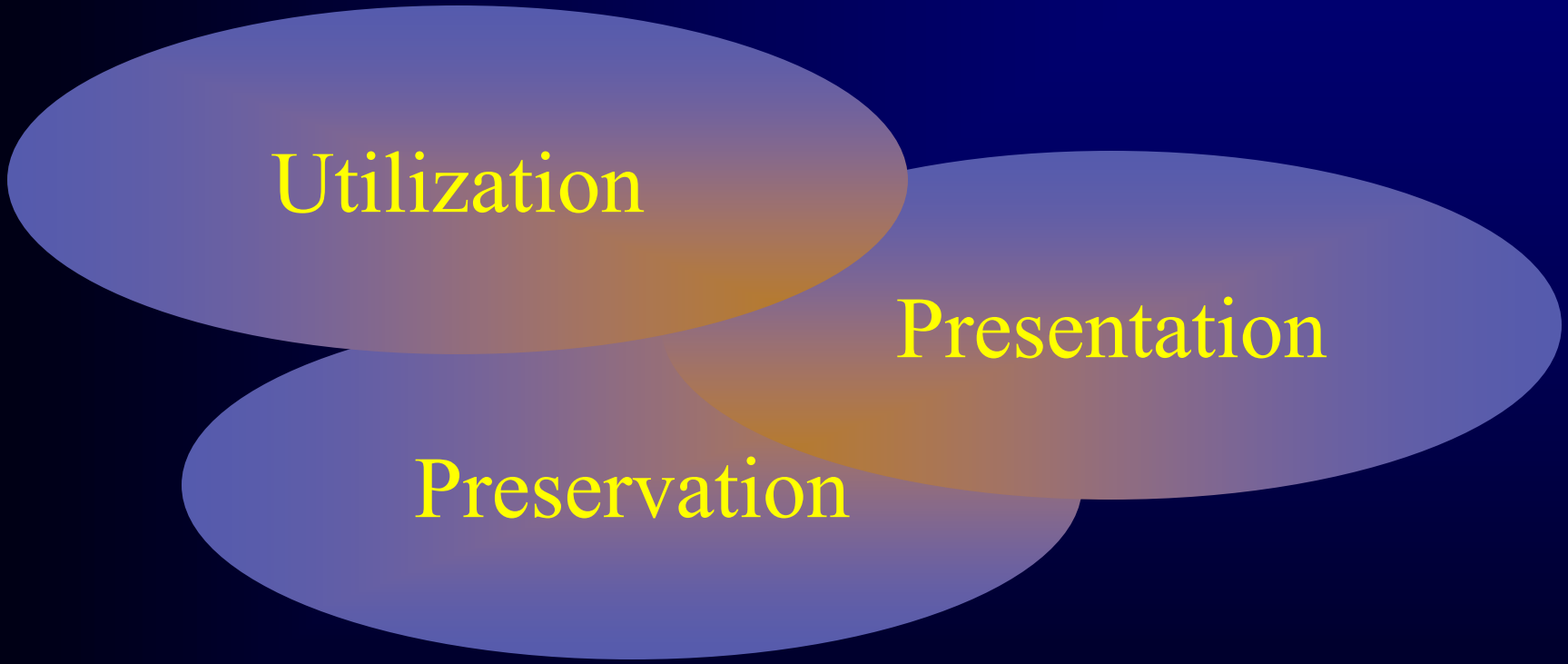
KM Change Pathway: Using Library FTEs to Build KM Smart Project Support

- Technical Reference Experts in Project Formation
  - Perform Single Point Knowledge Searches
  - Perform as Knowledge Experts in Design Processes
- Project Technical Reference Expert
  - Upgrade Role from Document Management to Knowledge Management for Project Librarians
  - Project Teams to Include KM Designate from Inception through Close Out to Manage Knowledge Flow
- Utilize Library FTE to Help Launch KM Initiatives by Deploying Their Skills to:
  - Begin Knowledge Nugget Tracking (LL Candidates)
  - Perform Knowledge Preservation (Catch Up)
  - Project Reference Document Management (Libraries)
  - Train Tech. Reference Experts and KM integrators for the Projects

Process Flow for Contextual LL



KM Architecture Pillars



Preservation

- Internal Project Knowledge Notes
  - Knowledge is not lost in process (people moves etc.)
  - Configuration Management Plus (Archivable)
- Preservation of Project Life Story
  - Record Knowledge when Team is Still Intact
    - Preserved knowledge is meaningful & applicable
    - Context and story telling is preserved
  - Knowledge is not lost at project end
    - Electronic Records are Preserved by Library
    - Project Life is Accessible and Searchable

Presentation

- Flow of Key Knowledge Sideways
  - Knowledge Transfer Nodes (Reviews, Problems)
  - Reapplication of Knowledge During Project Life
- Single Searchable Sources (Library Plus)
  - Meaningful Categorization of Information
    - Project Material is Readily Available for Searching
    - Preserved Material is Indexed in Goddard Context
  - Technical Reference Experts
- Coordinated Knowledge Flow Points
  - Simple Authentication, Access & Accuracy
  - Seamless Control and Release Procedures

Utilization

- HR Policies and Activities to Motivate KM
  - Rewards and Modeling of Sharing Behavior
  - Training in Using KM Tools
- Division and Center Forums Promoting Sharing of Knowledge (Push Features)
- Transitional Processes to Move from Traditional to Electronic Communications
  - Webcast forums
  - Video Capture and Search

Knowledge, People & Value

- Assets
  - What you gather
  - What you learn
- Actors
  - Owners & Hosts
  - Doers & Builders
- Application
  - Search & Presentation
  - Appeal and Relevance
- Knowledge
  - Recording & Storage
  - Archives/Preservation
- People
  - Cooperation to Share
  - Motivation to Learn
- Value
  - Access & Availability
  - Utility and Application

Lessons from GSFC KM

- Understand your own knowledge functions and organizational culture
- Develop an architecture that integrates Human Capital, Strategy and Operations
- Plan to deliver value in the midst of organizational change