We Don’t Dare Forget How to ‘Stick a Landing’ on Mars

Pre-Congress Workshop A

KM Australia 2016

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Outline

"We Don't Dare Forget How to ‘Stick a Landing’ on Mars"

1. Introduction: The context of critical knowledge at JPL and NASA

2. Strategic Planning: The deliberate approach vs. the emergent approach

   Breakout: Which approach is used (or would work best) at your company, and why?

3. Find out what we know: How do you determine what knowledge is truly critical for capture, retention, and sharing?

   Breakout: What knowledge at your company is key to retaining your most essential capabilities?

4. Gap analysis: How do you determine where the gaps exist in effective knowledge capture?

   Breakout: Report on what your company is doing to husband intellectual capital; list three possible gaps where your company is not capturing key knowledge effectively.

5. Seek to "make better use of what we know:” What processes, technology, organizational structures, and specific action items might be effective in improving the retention and sharing of intellectual capital.

   Breakout: Brainstorm activities that might work at your workplace

6. Continuous improvement process. If we have time remaining in the workshop, talk about metrics.

   Breakout or general discussion: What metrics do you think are useful is assessing KM process maturity?

Introduction

- Why use the NASA Jet Propulsion Laboratory (JPL) as an "extreme" example of KM?

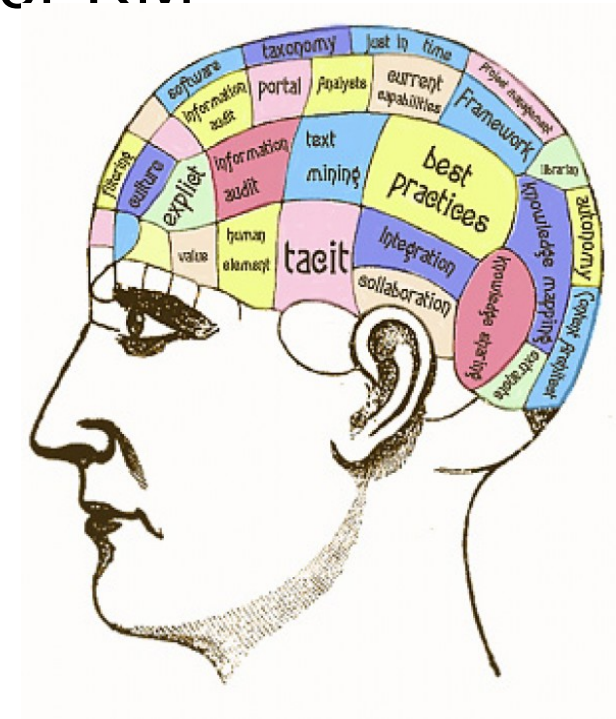
- Does knowledge have an objective value?
- Knowledge at NASA

NASA/Caltech Jet Propulsion Laboratory (JPL)

- JPL is the lead NASA Center for the unmanned exploration of the solar system
  - JPL has 47 space missions now in development or operation
- A Federally Funded Research & Development Center
  - JPL is managed by the California Institute of Technology (Caltech), a private university
  - The JPL facilities are owned by NASA
  - So JPL is both a NASA Center <u>and</u> a NASA contractor
- We maintain a mix of in-house and subcontracted projects
  - In-house permits us to maintain technical capabilities
  - Major system contractor (e.g., Lockheed Martin) for systems that are lower risk, missions that have been done before

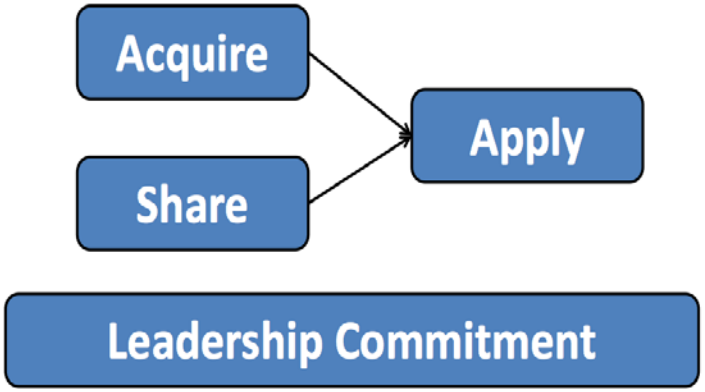
Strategic Planning

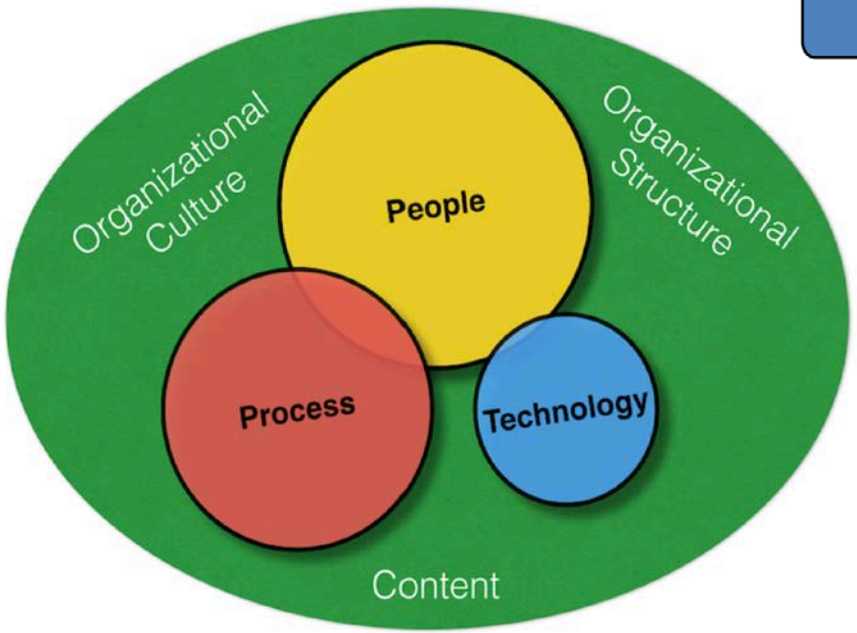
- Purpose of strategic planning
- How the plan will be used
- Making the business case for KM
- The NASA KM initiative



Governance

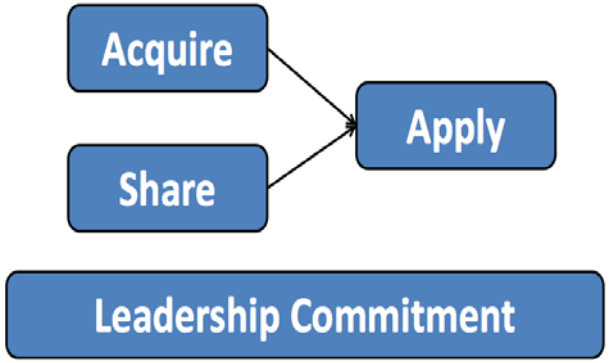
- Federated approach
- CKO role
- Reporting





KM Program

- KM objectives
- Vision statement
- Program attributes/guiding principles
  - Purpose driven
  - Institutional support
  - Building upon what exists
  - Risk-informed
  - Agile
  - Partnering
  - Focus
  - Product-based
  - Quick wins
  - Vision



Approaches to Strategic Planning

- **Value:** A strategic plan provides focus and elicits consensus for the institutional KM program

Deliberate KM Strategy[1]	Emergent KM Strategy[1]
• The enterprise's KM strategy requires deliberate and systematic efforts. KM practices, tools and methods are imposed top-down based on a rationale analysis of needs, resources, and objectives. • Suited to larger companies with substantial KM resources?	• The enterprise's KM strategy is not completely planned and deliberated in advance. Methods and tools are adopted where found to be effective and found to be compatible with business practices. • Suited to small companies with very limited KM program resources?
JPL Experience	
• JPL ended up with both. You need a formal plan, but emergent/unanticipated KM needs bubbled up, driving valuable opportunities that couldn't be ignored	

[1]Ettore Bolisani, Enrico Scarso, and Malgorzata Zieba, "Emergent Versus Deliberate Knowledge Management Strategy: Literature Review and Case Study Analysis," Proceedings of The 16th European Conference on Knowledge Management, University of Udine, (Italy) September 3-4, 2015.

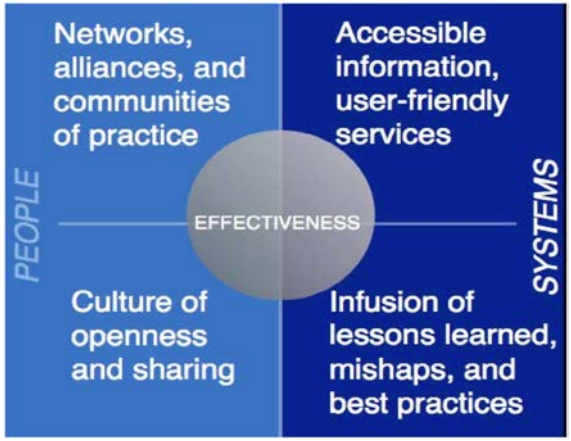
Breakout Session #1

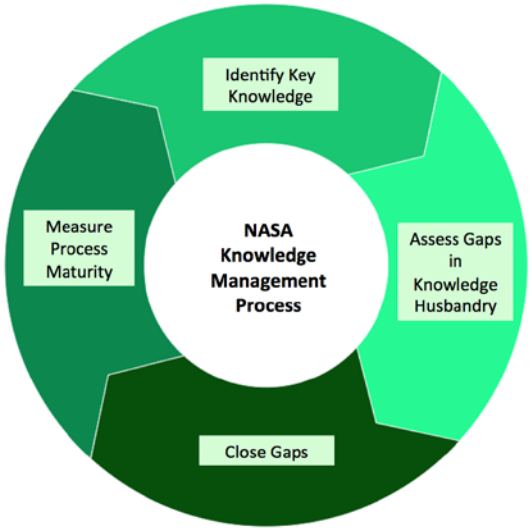
Approaches to Strategic Planning

- Which approach to KM—”Deliberate” or “Emergent” — is used (or would work best) at your company, and why?

KM Strategic Plan Elements

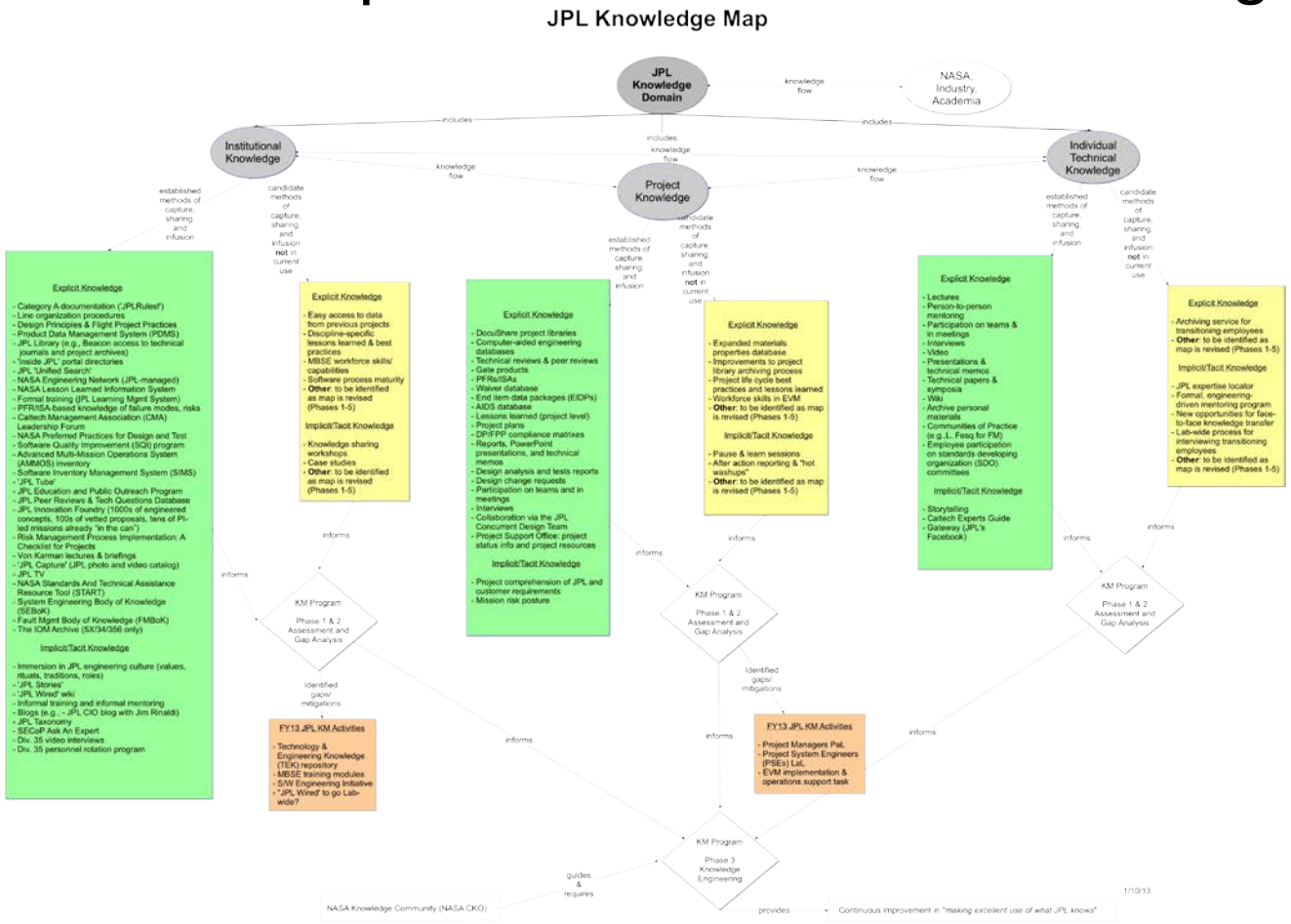
- **<u>Task 1</u>:** Find out what we know
- **<u>Task 2</u>:** Evaluate existing KM processes & identify knowledge retention/transfer gaps
- **<u>Task 3</u>:** Seek to "make better use of what we know"
- **<u>Task 4</u>:** Conduct intra-Agency coordination
- **<u>Task 5</u>:** Continuous Improvement Process



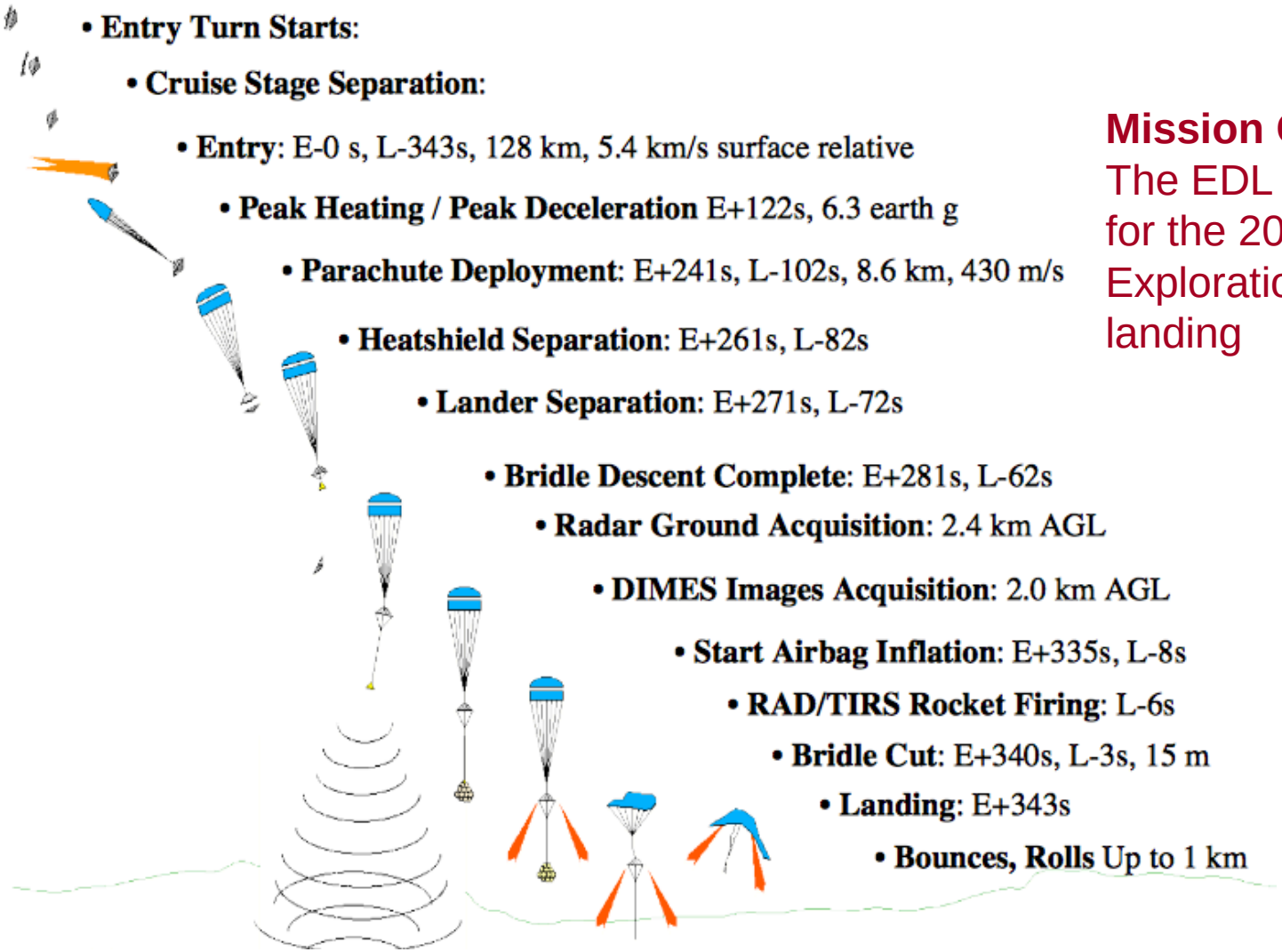


Find Out What We Know

- How do you determine what knowledge is truly critical for capture, retention, and sharing?



Entry, Descent, and Landing (EDL)

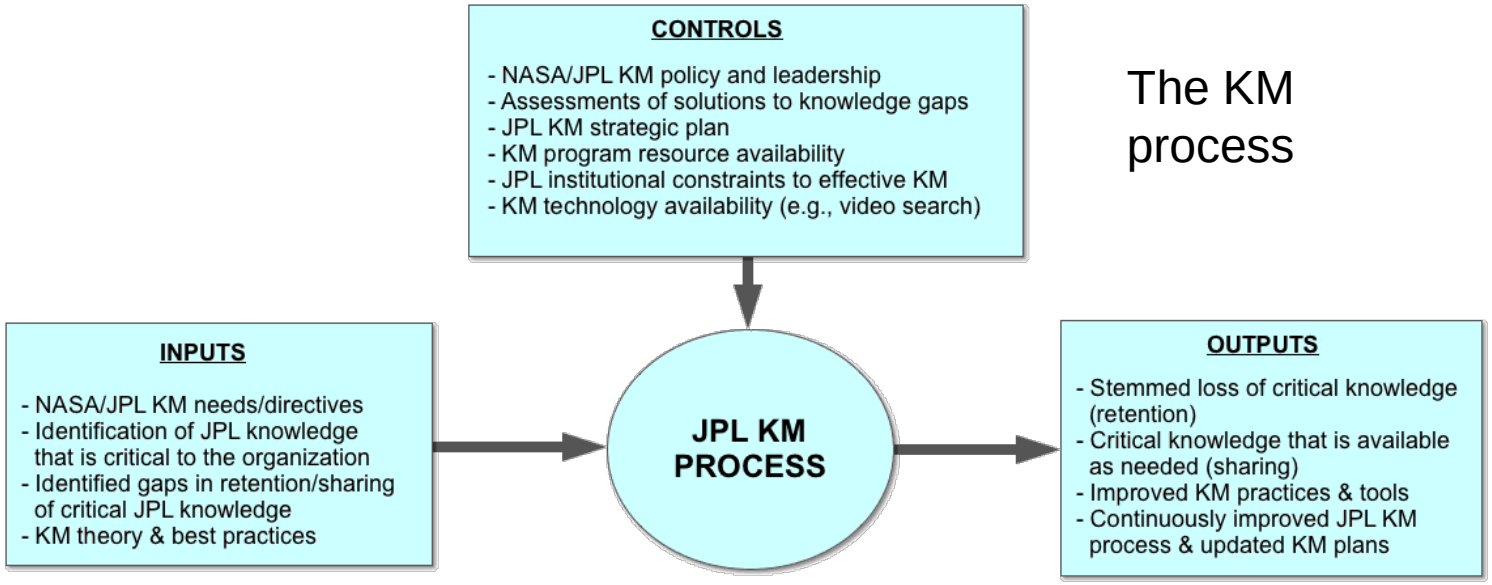


Mission Complexity: The EDL sequence for the 2004 Mars Exploration Rover landing

Breakout Session #2

Identify Critical Knowledge

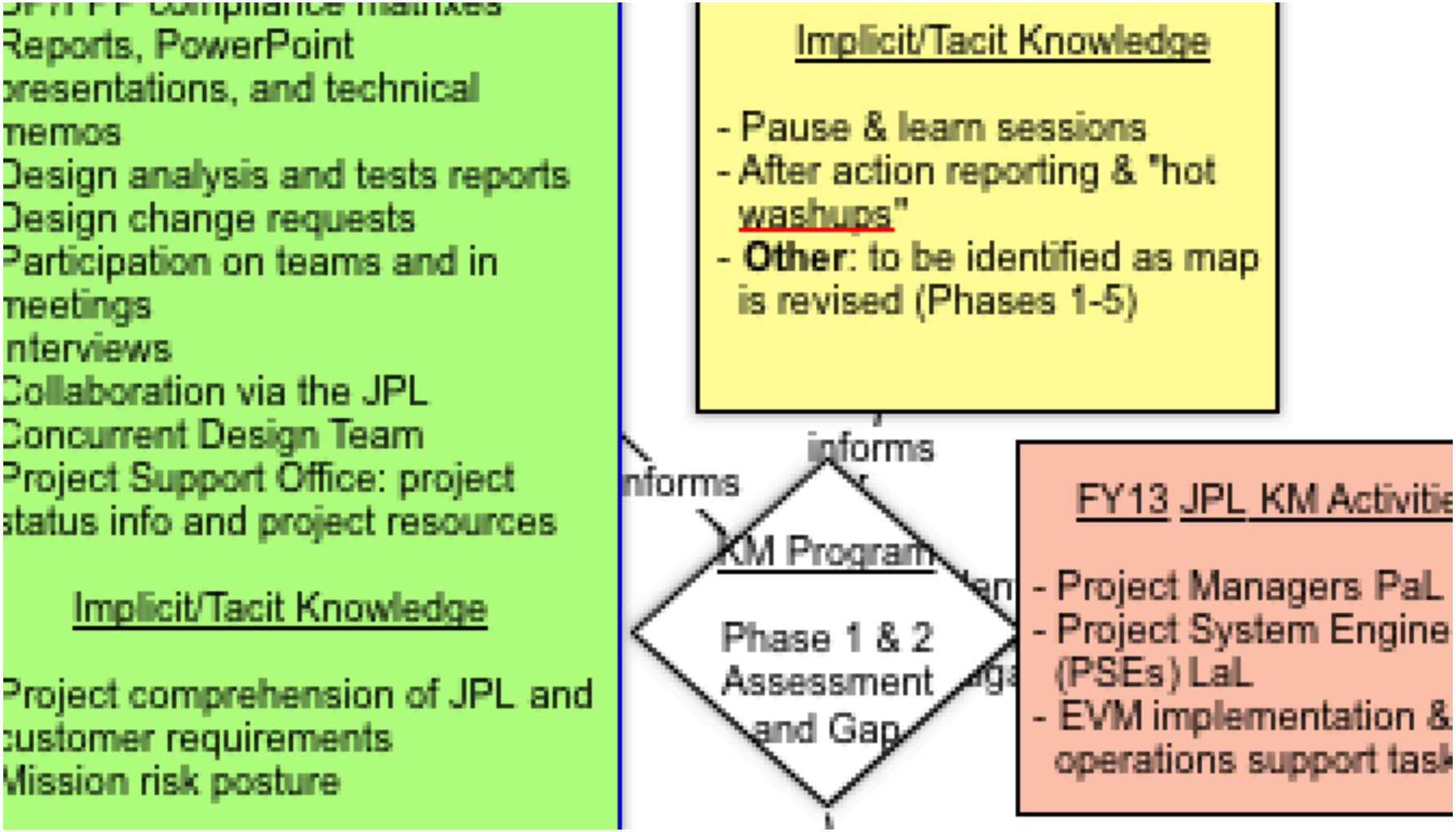
- What knowledge at your company is key to retaining your most essential capabilities?



The KM process

Gap Analysis

- How do you determine where the gaps exist in effective knowledge capture?



Breakout Session #3

Identify Gaps in Knowledge Retention/Sharing

- Report on what your company is doing to husband intellectual capital for reuse; list three possible gaps where your company is not capturing key knowledge effectively.

Seek to “Make Good Use of What We Know” *

1. Implement processes, technology, organizational structures, and specific action items to improve the retention and sharing of your intellectual capital.
2. Identify related resources, deliverables, schedules, and responsibilities needed to close the knowledge retention/sharing gaps
3. Highlight key dependencies such as personnel availability, KM program/budget approval, and risks.

*What processes, technology, organizational structures, and specific action items might be effective in improving the retention and sharing of intellectual capital?

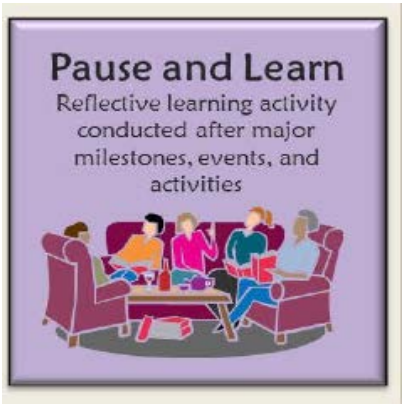
KM Program Design/Implementation (Cont.)

4. Outline steps required within your leadership/planning process to advance the KM agenda, and initiate action.
5. Determine whether the organizational and engineering culture can best benefit from KM efforts to (1) capture specific critical knowledge, versus (2) facilitate *social capital*.
6. Initially, assure long term senior management support for KM by focusing on core tasks that will bring limited but assured, high visibility benefits.

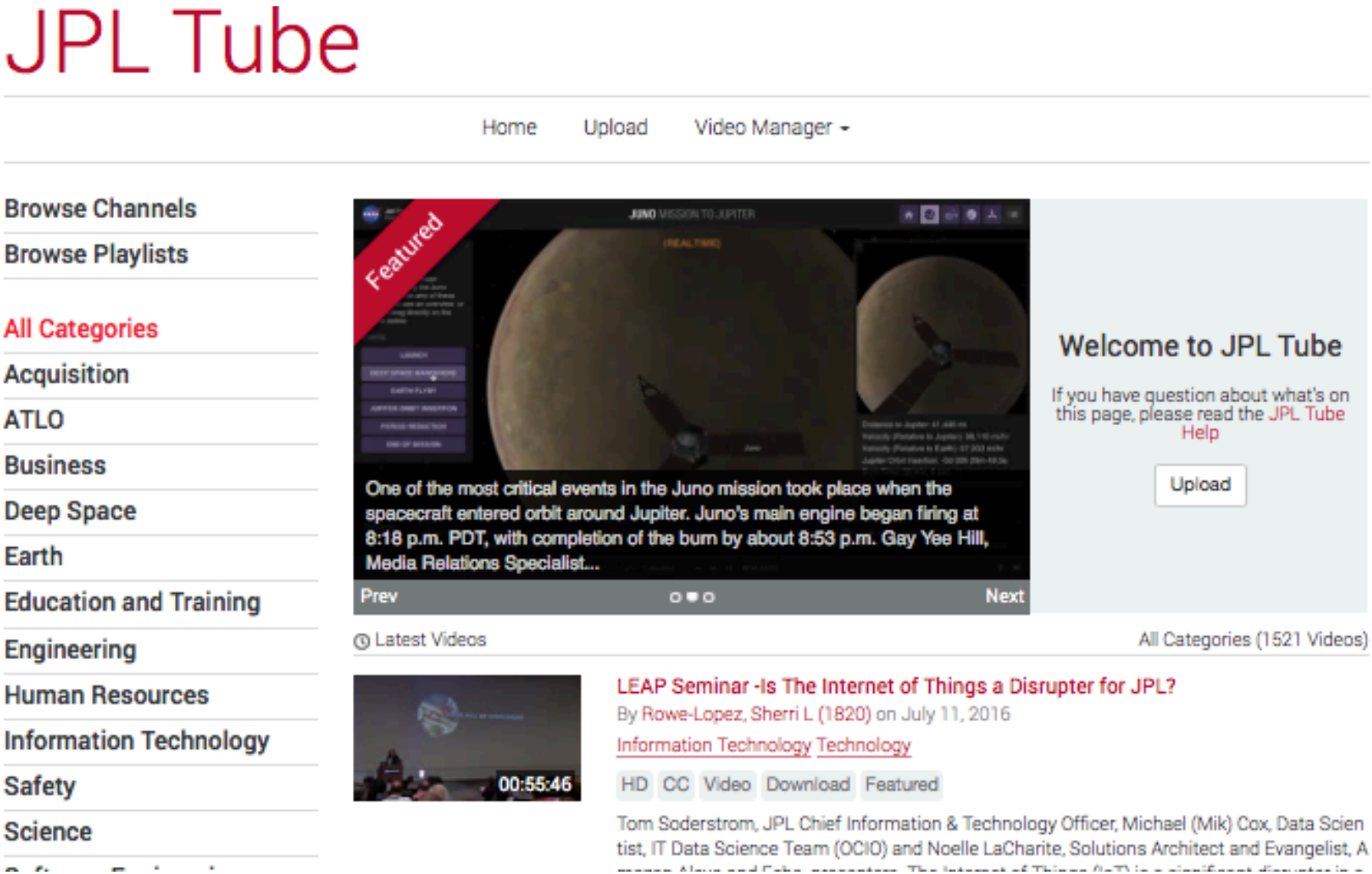
Typical KM Activities

- Formal lessons learned process
- Retiree out-briefing, seminars, technical interchange capture
  - JPL Tube

- Mentoring and apprenticeships
- Maintain knowledge repositories
- Pause and Learn (PaL) or “Take 15”
- “Quick wins”



JPL Tube Case Study



Breakout Session #4

KM Program Design/Implementation

- Brainstorm activities that have worked (or might work) at your workplace.
- Why? What aspects of your institutional culture make such activities effective? What aspects tend to make other typical KM activities ineffective?

Backup Slides

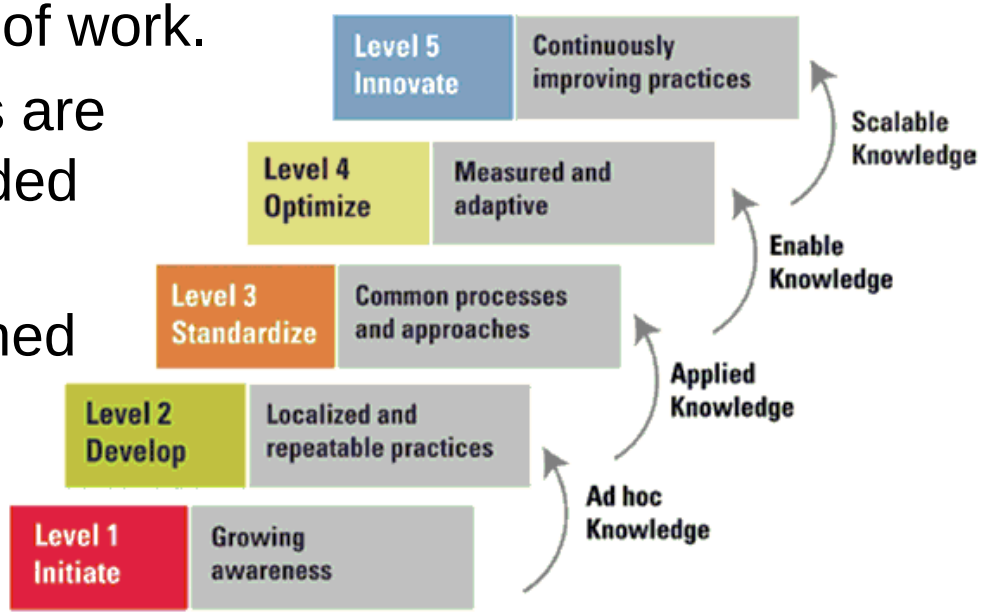
Continuous Improvement Process

- "*What gets measured gets managed*" *
- Establishing a "continuous and formal effort" requires tracking continuous improvement in the maturity of your KM process
- But metrics may be difficult to track because the product—knowledge—is intangible.
- Hence, CKO must rely on indirect measures of KM program effectiveness

*Peter Drucker

APQC* KM Maturity Model

- **Level 1.** Knowledge sharing and transfer is informal and ad hoc.
- **Level 2.** A KM strategy is developed to build buy-in, secure resources, and establish oversight of the program.
- **Level 3.** Standard KM processes and approaches are embedded in the flow of work.
- **Level 4.** KM initiatives are enhanced and expanded enterprise-wide.
- **Level 5.** KM is combined with other business processes to enable breakthrough innovation.



*American Productivity & Quality Center (APQC)

15 Accelerators of KM Maturity

1. Document the KM strategy and roadmap
2. Create a formal business case outlining the expected benefits and impact of applying KM to business opportunities
3. Conduct financial analysis and document benefits to show the value of KM investments
4. Engage senior leaders and the business units in setting and aligning the strategy
5. Secure champions and resources from the business units
6. Charter a cross-functional steering or advisory committee
7. Complete knowledge maps to identify gaps and needs
8. Build a strong partnership with IT to support the KM toolkit

15 Accelerators (Cont.)

9. Standardize knowledge flows and approaches to capture and retain individual knowledge
10. Standardize content management structures and workflows
11. Put a change management strategy in place to support the KM strategy and approaches
12. Create a formal KM communication plan to raise awareness of KM and share success stories
13. Define KPIs and measure both satisfaction and impact
14. Regularly assess, benchmark, and analyze KM efforts and trends
15. Assess KM maturity and capabilities over time

Source: APQC

Breakout Session #5

- **Breakout or general discussion**: What metrics do you think are useful is assessing KM process maturity?