KM Strategic Planning
The Deliberate Approach vs. the Emergent Approach

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• JPL is the lead NASA Center for the unmanned exploration of the solar system
  – JPL has 38 missions now in development or operation

• A Federally Funded Research & Development Center (FFRDC)
  – 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 and 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
How We Made the Case for KM at JPL

1. Today, corporate investment in intellectual capital may exceed that in physical capital (equipment and facilities)

2. Restoring knowledge that we fail to retain is costly
   – Also risky, because the heritage knowledge had already been proven in ground test and spaceflight

3. Uniquely, JPL can’t obtain lost knowledge from elsewhere
   – Who else designs Mars landings, autonomous spacecraft?

4. Critical expertise may be lost due to employee turnover
   – NASA engineers over age 50 outnumber <35 by four to one

5. Value of a “quick win” likely exceeds cost of KM program

6. Because NASA told us to…
Approaches to Strategic Planning

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

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<th>Deliberate KM Strategy(^1)</th>
<th>Emergent KM Strategy(^1)</th>
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<td>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.</td>
<td>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.</td>
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<td>Suited to larger companies with substantial KM resources?</td>
<td>Suited to small companies with very limited KM program resources?</td>
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**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

“Quick Wins”

- Opportunities driven by emerging needs (i.e., “emergent”) may produce *quick wins* that overshadow results from planned (i.e., “deliberate”) activities. Recent examples:
  - **Open Access Initiative.** Access to a JPL project library by non-project JPL staff is often blocked by the PM. The JPL CKO and CIO are teamed to change this practice.
  - **Daily Mars Surface Ops Planning.** Assisting Mars Operations in reducing the 9 hours required to plan a “sol” of Curiosity rover activity.
  - **Phase D-to-A Roundtable.** Helping spacecraft operators communicate operations constraints to spacecraft developers to encourage greater automation of mission operations.
Institutionalizing & Sustaining KM

- Place CKO within the product organization, not the IT organization (i.e., for JPL = Office of the Chief Engineer)
- Prepare JPL KM strategic plan
  - Identify (1) what knowledge is critical, (2) gaps in capturing/retaining/sharing it, (3) activities needed to address gaps
- Recognize pre-existing “KM-ish” activities
- Baseline industry best practices (including NASA’s)
- Obtain buy-in and publicize JPL KM program
  - Both leadership & grass roots (e.g., via semi-annual KM newsletter, “quick win” achievements, OCKO website)
- Effect cultural change and close knowledge retention gaps
- Metrics: track valid measures of KM program maturity
Close Gaps in Knowledge Capture/Retention

• **Deliberate approach.** Examples of specific KM activities to close knowledge capture/retention/sharing gaps:
  – Continue JPL’s robust lessons learned process (Lessons Learned Committee has met weekly since 1984)
  – Improved access to archived technical knowledge
    • e.g., create Entry, Descent, And Landing Repository (EDL-R)
  – Pause & Learn sessions for project managers
  – Lunch & Learn sessions for project system engineers
  – Mentoring and apprenticeship (e.g., Phaeton program)
  – Increased JPL employee participation in *JPL Wired* wiki
  – *Elastic Search* enables search across multiple repositories
  – *JPL Tube* tool for video capture & transcription of tacit knowledge

• CKO serves mainly as a champion and a facilitator of KM