



Lessons Learned about Lessons Learned

(How Best to Remember the “Unforgettable”)

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Mission Success Starts With Safety

Safety Quote of the Day

“No one wants to learn by mistakes, but we cannot learn enough from successes to go beyond the state of the art.”

Henry Petroski

To Engineer is Human

6 Feb 07



Lessons Learned: NASA History

- Since early days, centers have kept lessons learned databases (little sharing across centers)
- Projects have kept lessons learned books (little sharing across projects)
- Sporadic attempts throughout NASA history to consolidate and share: mostly failed (*You can take a horse to water, but...*)
- In the 90s, OSMA developed Lessons Learned Information System (LLIS) to consolidate and share
 - *Included mishap investigation lessons*
 - *Available to all of NASA for input and analysis*
 - *Soon after launch, considered by many to be “outdated” technology*
 - *Transferred to Chief Engineer for “improvement”*
- Typical Complaints
 - *Can’t get people to enter new lessons*
 - *Can’t get people to read them*
 - *Not user friendly*
 - *Why not use latest “searchable databases”*



Mishap Investigation Reports

- For some years NASA mishap investigation policy called for list of “lessons learned” in addition to findings and recommendations
- Idea was to transfer lessons directly into LLIS for agency benefit
- Typical finding: *Root cause: Center discontinued firefighting training for lab technicians due to budget cuts*
- Typical lesson learned: *Lack of firefighting training for lab technicians can lead to mishap*
- Boards rightly complained that creating a separate “lessons learned” report is redundant and unnecessary
- Boards should not be asked to expand the scope of their findings beyond the scope of their investigations



Bottom Line #1 for Lessons Learned

Lessons learned are best used when incorporated into our policies, requirements and procedures

- **Lessons learned are experiential by definition; they should carry more weight than simple “good ideas”**
- **Mishap lessons learned should carry more weight than “success lessons learned” (remember Petroski)**
- **Following up on mishap action response should carry more weight than recording lessons in a database**
- **Don’t forget to link the lesson with the new policy, requirement, procedure...NASA has a tradition of questioning the rules...make the answer available!**



Bottom Line # 2 for Lessons Learned

Include with policies, requirements, flight rules, procedures, ready reference to relevant lesson(s) learned

- **NASA engineers are notoriously skeptical of rules (this is actually a good thing for risk-taking agency)**
- **NASA engineers sometimes treat “rules” as agenda items for discussion**
- **Ready access to rationale (lessons learned) is mandatory in the NASA environment**
 - **Saves time**
 - **Makes up for personnel turnover**
 - **Could even prevent AC-67 scenario**



AC-67 Mishap: A lesson about lessons

- **Good thing: ops team questioned Launch Commit Criteria (LCC) rationale**
- **Bad thing: absent actual rationale, ops team assumed wrong rationale**
- **Mishap Board recommended team training and updating LCCs**
- **Corrective action plan called for inserting rationale next to LCCs**
- **JSC Mission Ops follow up: insert rationale with flight rules for real time access**





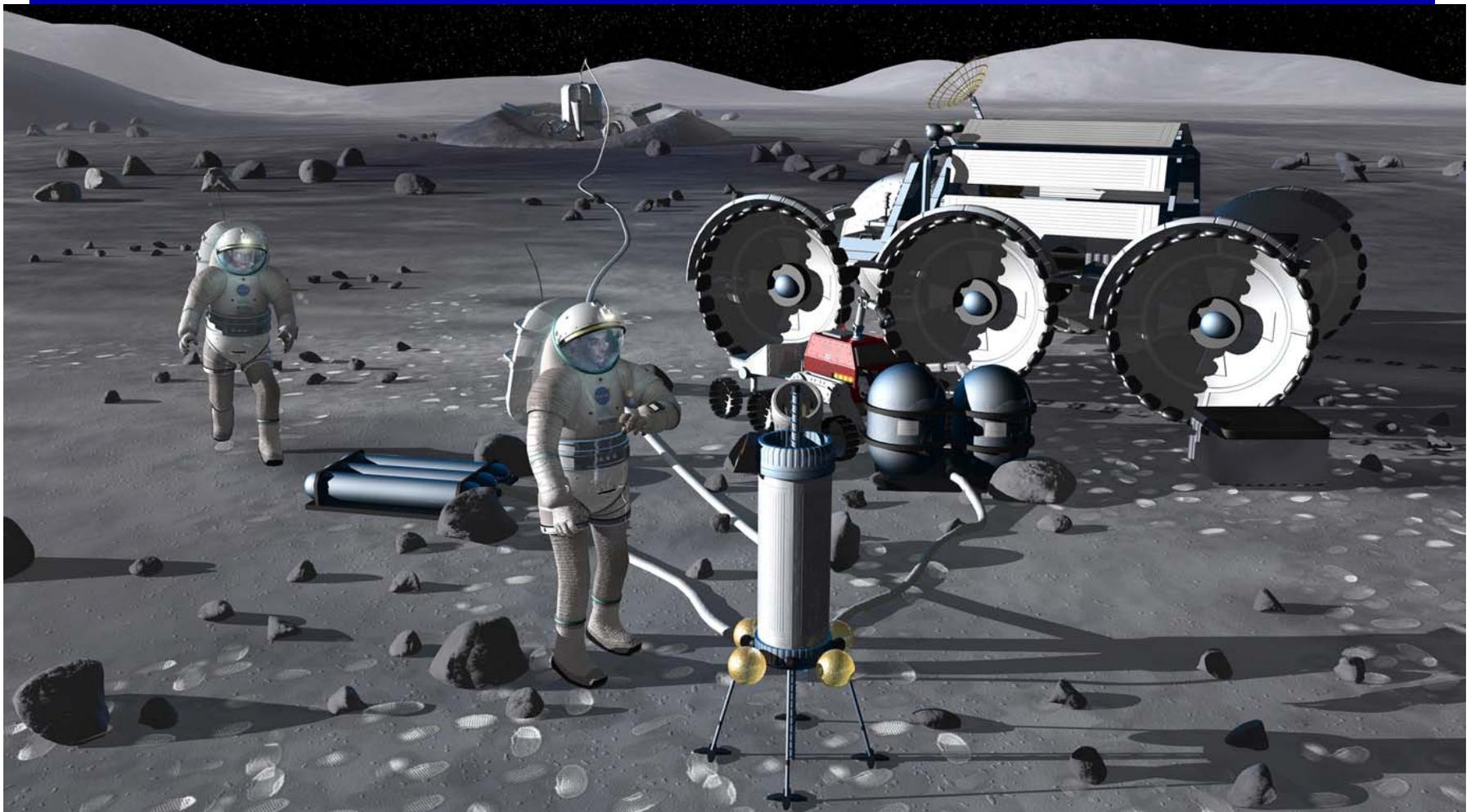
Suggestion:

- **When mishaps, close calls, failures, etc. occur, aggressively follow up with corrective actions**
- **Nearly all corrective actions will result in new or modified policies, procedures, requirements, etc.**
- **Include (link) rationale with all policies, technical requirements and critical procedures**
- **As part of rationale, reference mishap, close call and failure investigation report findings**
- **Refer to the rationale when discussing updates or waivers to policies, requirements and procedures**
- **Any “leftover” lessons learned that are missed by the above probably are not very important! Add them to LLIS!**



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GITTERDUNN...



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