Apollo Lunar Module: How a Complex and Novel Design Project Evolved Over Time and Across Perspectives

Robin Adams
Purdue University, rsadams@purdue.edu

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Apollo Lunar Module: How a complex and novel design project evolved over time and across perspectives
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Apollo Lunar Module:
How a complex and novel design project evolved over time and across perspectives

Robin Adams, Ph.D.
Associate Professor of Engineering Education

Hadi Ali
Graduate Student, Engineering Education
the question
scenes from the HBO miniseries From The Earth to The Moon, executive produced by Tom Hanks for Imagine Entertainment.

Why is this a unique opportunity….no precedent, historically situated, emergent – with systems theory – crossing technical, social, human, political, economic
What do we mean by system thinking?
The story – is one of emergence and evolution of the overall configuration of the Apollo LM – from a symbol (ascent and descent stages) to a series of prototypes. Evolution in purpose and goals (what did the race to space really mean technologically and socially?), tin can to human-centered design, of capabilities (no precedent, radical transfer)

Backdrop

Historical / social / political – “race to space”, Global competition, public morale
Systems thinking and design thinking emerged as professional identities and research methodologies in early 60s
No precedent – majors technological and scientific advancements
We’re still in the thick of the data...focus here on the story of collaborating with archivists
26 May 2011

Shelly Kelly, AIC, archivist: Prof. David Boyle, a primer on archival research, will be printed in 2011 with expected archival research guides. We have spent the last 11 months scanning a large percentage of the documents to make them available via PDF. A good deal of the documents will take place sometime this year, likely June 25. We have a scheduled agreement for the Apollo and Skylab series documents.

A very likely that most of the original Apollo, Skylab, and Skylab series documents will not be available for research purposes. A large percentage of the documents will not be available for research purposes. That is because the original Apollo and Skylab series documents, made available via PDF. A good deal of the documents will take place sometime this year, likely June 25. We have a scheduled agreement for the Apollo and Skylab series documents.

The final delivery of all Apollo, Skylab, and Skylab series documents would be a good time going over documents to the National Archives in the archives. A trip is scheduled for mid-August range. We will be able to review the documents as part of the staff. We will continue scanning PDF copies.
The data includes
- Chronological files on development of the Apollo LM
  - From 1945 to 1978
  - Letters, memoranda, and meeting minutes
  - Operations and systems handbooks
  - Photographs
  - Flight readiness reviews
  - Configuration control board minutes

Documenting the design, fabrication, and testing modifications through to the final Apollo mission

About 3,700 files and 7.9 GB
This room was so cold to maintain the integrity of the documents, and to minimize their deterioration over time. Following the archives protocols, I told the archivist which box I needed after checking the specific document and its location in the indexed database, and then the archives brought the box for me.
what stories do we have?

A place to work, scan documents...
I took pictures of the label of each box I checked documents from, to know and record where the document I picked was located (also for future reference).

The page “OUT” next to the laptop in the upper picture was used as a place holder for a document that I took out from the box. As a protocol, I was only taking one document at a time from the box.

The lower picture shows the folder and the laptop that were my index to locate documents in the archived collection.

You can see gloves under the folder that I was requested to use, especially when dealing with photographs.
A letter from a top NASA manager calls the LM the “bug” in this correspondence, because it resembles one!
building the story
• Method: Integration of historical and design research

• Using LM chief engineering Tom Kelly’s book (Moon Lander: How we developed the Apollo Lunar Module) to identify major iterations indicative of systems thinking

• Connecting with NASA’s Jet Propulsion Lab (JPL) on oral history and knowledge management projects

• Paper accepted - AIAA SPACE 2012 Conference & Exposition, 11 - 13 September 2012
  - Configuration Control Board (CCB) Activities during the Development of the Apollo Lunar Module: Insight into the "Art" of Systems Engineering
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Thank you!

Robin Adams, Ph.D.
rsadams@purdue.edu

Hadi Ali
hwali@purdue.edu