DOCUMENTING OF GEOLOGIC FIELD ACTIVITIES IN REAL-TIME IN FOUR DIMENSIONS: APOLLO TEMPORAL DATA MANAGEMENT AS A CASE STUDY FOR TERRESTRIAL ANALOGS AND FUTURE EXPLORATION
MANAGING THE FLOOD OF SPACE PROGRAM DATA

SILOED DATA

APOLLO 11, 17

Administration

Data

Connectedness

VOICE TRANSMISSIONS
VIDEO TRANSMISSIONS
16MM FILM
70MM STILL PHOTOGRAPHY
LUNAR SAMPLE COLLECTION
ALSEP – HEAT FLOW
ALSEP – LACE (ATMOSPHERE)
ALSEP – EJECTA & METEORITES
ALSEP – SEISMIC
ALSEP – GRAVIMETER
MANAGING THE FLOOD OF SPACE PROGRAM DATA

SILOED DATA

APOLLO 11, 17

Voice Transmissions
Video Transmissions
16mm Film
70mm Still Photography
Lunar Sample Collection
ALSEP - Heat Flow
ALSEP - Ejecta & Meteorites
ALSEP - Seismic
ALSEP - Gravimeter

PRESENT DAY

Crew Interviews
Sample Analysis
Academic Papers
LRO - LROC
LRO - Crater
LRO - Diviner
LRO - Lymann-Alpha Mapping
LRO - Neutron
LRO - Laser Altimeter
LRO - Mini-RF
INTERCONNECTING APOLLO DATA

1. Establish a temporal thread across each Apollo mission’s disparate datatypes

2. Create an intuitive software interface
DATA ORGANIZATION

ESTABLISHING A TEMPORAL THREAD ACROSS DISPARATE APOLLO DATATYPES
APOLLO 11, 17

VOICE TRANSMISSIONS
VIDEO TRANSMISSIONS
16MM FILM
70MM STILL PHOTOGRAPHY
ALSEP - HEAT FLOW
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MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
December 1972
INTUITIVE SOFTWARE INTERFACE

APOLLO17.ORG
Cernan: There you go. Wait a minute.

Schmitt: It's all right. I got you reaching for the flag.

Cernan: How's that?

Schmitt: That's very good, Gene. Let me get it in stereo.

Cernan: [inaudible]

Schmitt: That's beautiful.

Cernan: This has got to be one of the most proud moments of my life. I guarantee you. Let you get a close in one and we'll trade cameras.

Schmitt: Houston, I don't know how many of you are aware of this, but this flag has flown in the WCC since Apollo 11. And we very proudly deploy it on the Moon, to stay for as long as it can, in honor of all those people who have worked so hard to put us here and to put every other crew here and to make the country, United States and mankind, something different than it was.

Schmitt: Houston, I don't know how many of you are aware of this, but this flag has flown in the WCC since Apollo 11. And we very proudly deploy it on the Moon, to stay for as long as it can, in honor of all those people who have worked so hard to put us here and to put every other crew here and to make the country, United States and mankind, something different than it was.

Cernan: Okay, Robert, where you were. Stay to the right.
Online videos, photos let you 'relive' final Apollo mission

Follow the last moon men on their incredible journey

Astronauts oversleep, too: follow Apollo 17 live!

The last mission to the moon: a real-time journey across the moon's surface.

Revive la misión Apolo 17 en tiempo real: 43 años después

钾从科学

阿波罗17号月球之旅：阿波罗17号在实时

方法

摘自：http://apollo17.org/
Apollo 17 - 002:37 - 000:00 V2.2

-00:00:00 Public MARK. T-minus 1 minute and counting. Now in the final minute of the Affairs countdown. At T-minus 45 seconds Gene Cernan will make the Final guidance alignment - this is the...

-00:00:44 Public MARK. T-minus 45 and Gene Cernan made the final guidance alignment. Affairs that's the last action taken by the crew aboard the space vehicle. Now approaching the half minute mark. T-minus 30. T-minus 30 seconds and continuing on now - continuing on at T-minus 28 seconds...

-00:00:28 Mission 30 to go. Control

-00:00:28 Cernan Okay. Robert. We're ready and we're GO up here.

-00:00:25 Public MARK. T-minus 25. We'll get a final guidance release at the T-minus Affairs 17 second mark. T-minus 17, final guidance release. We'll expect engine ignition at 8.9 seconds...

-00:00:21 Mission Minus 20. Control

-00:00:10 Public 10 ... 9 ... 8 ... 7 ... ignition sequence started - all engines are Affairs started - we have Ignition C, 1, zero - we have a liftoff.
POST-MISSION DATA SOURCES
CONCEPT EXTENSION - APOLLO 11, JULY 2019

APOLLOINREALTIME.ORG/11
APOLLO 30-TRACK TAPES

- Recorded within the MOCR throughout each mission
- 60 tracks of concurrent audio (two 30 track recorders)
- Apollo 11 ~11,000 hours of audio
### APOLLO 11 AS-506 3RD FL  
#### HISTORICAL RECORDER #1  
06-09-69  

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APOLLO 11 IN REAL TIME

A real-time journey through the first landing on the Moon
This website consists entirely of original historical mission material
-00:00:53:18

-04:01:01 Public T-minus 60 seconds and counting. We have passed T-minus 60. It's been a very smooth countdown. We have passed the 30-second mark. Our transfer is complete. We're on internal power with the launch vehicle at this time.

-04:00:42 Public 48 seconds away from the Apollo 11 liftoff. All the second stage motors are now pressurized. 39 seconds and counting. We are still with Apollo 11.

-04:00:31 Public 38 seconds and counting. Astronauts report, "It feels good." T-minus 12 seconds, and counting. T-10 seconds. Guidance is internal. 12, 11, 10, 9, ignition sequence starts. 8, 7, 6, 5, 4, 3, 2, 1, zero.

-04:00:00 Public All engines running. In service.

-04:00:01 Public LIFTOFF. We have a lift off, 32 minutes past the hour. In service.

-04:00:00 Armstrong Roger. Clock.

-04:00:00 Public Lift off on Apollo 11. In service.

-04:00:11 Public Tower cleared! In service.

-04:00:20 Armstrong Roger. We got a roll program.

Aldrin: Okay. It's taut now.
Aldrin: I think you're pulling the wrong one.
109:27:50. Armstrong: I'm just - Okay. I'm ready to pull it down now. There was still a little bit left in it.
109:28:02. Aldrin: Don't hold it quite so tight.
109:28:17. Armstrong: Looking up at the LM. I'm standing directly in the shadow now. Looking up at Buzz in the window. I can see everything quite clearly. The light is sufficiently bright, backlighted into the front of the LM, that everything is very clearly visible.
109:28:57. Aldrin: Okay. I'm going to be changing to -
109:30:23. Public: The surgeon says that -
109:30:24. Armstrong: The camera is installed on the MOC bracket. -
109:30:30. Public: The surgeon says the crew is doing well. Data is good, crew is doing it well.
109:30:35. Armstrong: - and I'm storing the LEC on the secondary strut.
109:30:34. Armstrong: I'll step out and take some of my first pictures here.
109:31:07. Mission: Roger. Neil, we're reading you loud and clear. We see you getting
If you haven’t discovered it yet, you can watch the Apollo 11 Moon Mission in "real-time" on apollo11inrealtime.org. It is a real treat to watch this with other ppl, so we are going to communally viewing the best parts in a special event at the SPI Kidzum on July 20.

#Apollo50 I’ve judged digital entries from @nytimes @TexasTribune @CNN and more, but this is the absolute best digital interactive I’ve seen in my entire life. Dozens of channels of audio, 11,000 hours of video. Curated to EASILY watch, apollo11inrealtime.org/11/ by @BenFeist
Want to fall into an endless time suck in which you will marvel, wonder, and stand in awe?

Apollo 11 in Real-time
A real-time interactive journey through the Apollo 11 mission. Relive every moment as it occurred in 1969.
apolloinrealtime.org
APPLICATION TO NEW OPERATIONS

TRAINING, ANALOGS, AND FUTURE MISSIONS
APPLICATION TO NEW OPERATIONS - POTRILLO MARS ANALOG MISSION

USING CHRONOLOGY TO ORGANIZE LARGE VOLUMES OF REAL-TIME DATA

LIBS - LASER SPECTROSCOPY
X-RAY FLUORESCENCE
LIDAR
FLIR
HYPERSONICAL MAPPING
AERIAL MAPPING
FIELD GEOLOGY OBSERVATIONS
APPLICATION TO NEW OPERATIONS

NEUTRAL BUOYANCY LAB

- Real-time displays of analog runs
- Video, Audio, Suit telemetry
ARTEMIS

CONNECTING WITH HUMANITY ON FUTURE MISSIONS
THANK YOU

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