Digitization in the Real World

Lessons Learned from Small and Medium-Sized Digitization Projects

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Apollo 13.0: Digitizing Astronaut Jack Swigert's Apollo Documents

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Abstract:

The Kansas Cosmosphere and Space Center and Fort Hays State University Forsyth Library joined together in 2008 to digitize the personal archive of Apollo 13 astronaut John L. (Jack) Swigert. The documents (1966-1970) include blueprints and proofs of the Apollo Operations handbook Malfunction Procedures, which Swigert was called upon to revise in the aftermath of the Apollo 1 disaster in early 1967. The partnership between the KCSC and Forsyth Library has been fruitful in the area of public relations and dissemination of digital collections online. Some of the obstacles related to the partnership have yielded positive results. As a result of the partnership we created a standard for uniform file names for Forsyth's Digital Collections, in adopting and customizing Goddard Core, a variation of Dublin Core, and in developing an External Partnership Protocol to improve future collaborative projects.

Keywords: Apollo Operations, Best practices, Collaboration, CONTENTdm, Digitization, Dublin Core, Goddard Core, Handbook, Malfunction procedures, Museum-library partnership, Space exploration.

Introduction

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.

--T.S. Eliot, Four Quartets

While orbiting the moon in 1968, Apollo 8 astronaut Bill Anders photographed Earthrise, one of the iconic images of the Apollo missions. Fragile and tiny, the earth appears "almost as a disk" in a dark void and concretely shows that humans are more miniscule than imagined (Brooks, Grimwood & Swenson, 1979, p. 277). Although later missions would overshadow Apollo 8, including the successful moon-landing of Apollo 11 and the successful failure of Apollo 13, the lasting legacy of this mission was a sudden appreciation for the Earth itself (Brooks et al., 1979, p. 366). The irony that a photograph of the Earth would become one of the most lasting images of the Apollo Program was not lost on the astronauts. Anders later remarked, "We came all this way to explore the moon, and the most important thing is that we discovered the earth" (Dordain, 2009, para. 6).

This image, later adopted by environmentalists, eventually contributed to the general zeitgeist that the mundane should take precedence over impractical dreams. Indeed, once an American had walked on the moon—as much a display of American real-politik might as a display of American ingenuity—public and political interest in the Apollo Program waned. By 1973 its funding was on its last legs and never again would the Apollo Program send an astronaut to the moon (McKie, 2008) (Brooks et al., 1979, p. 366). Yet if media coverage is any indication of an issue's timeliness, the 40th anniversary of the successful moon landing in 2009 proves that the spirit of the time remains vital. General interest in space exploration remains high among specialists and the general public alike. Furthermore, the improvement of digital technology is allowing us unprecedented access to the primary materials of important historical events, making the discoveries of the time even more immediate as they appear online. In essence, this is an exciting time to revisit the solid-state era of the Space Race of the 1950s, '60s and '70s through the power of digital technology.

In its partnership with the Kansas Cosmosphere and Space Center (KCSC) to digitize the papers of John L. (Jack) Swigert, Fort Hays State University's Forsyth Library has had the privilege to work with documents of great importance to American and world history. At the same time we find ourselves looking inward and realize that an emphasis on the "mundane" still proves to be important. As a result of our work, we realize the need for a strong foundation in the development of sound policies and best practices that can work in reality. As the Apollo astronauts discovered, the point of a journey is not always to arrive; it's to find out where you've been.

Background

The Kansas Cosmosphere & Space Center (KCSC):

Second only to the Smithsonian's Air and Space Museum in terms of collection size, the Kansas Cosmosphere and Space Center (KCSC), located in Hutchinson, Kansas, is one of the leading collectors of space artifacts in the United States; the items collected, many of which have flown in space, provide a complete overview of rocketry and space history from its origins in Nazi-era Germany, to the Space Race of the 1950s and 1960s, and to the era of détente between Russia and America in the 1970s. Items housed include complete German V-1 and V-2 rockets, a Redstone Nuclear Warhead, a Titan rocket, a Russian Vostok Spacecraft, The Mercury 7 Liberty Bell spacecraft, and the Apollo 13 Command Module. Their holdings also include the largest collection of Russian Space Program artifacts outside of the former Soviet Union (Kansas Cosmosphere, 2009).

FHSU, Forsyth Library & FLDCI

Forsyth Library is a small academic library serving the needs of Fort Hays State University's 11,000 full- and part-time students and

275 faculty & staff members. Roughly 4,000 of those students are traditional on-campus undergraduate and graduate students. The other 7,000 students study through FHSU's Virtual College, an online degree program. The library is central to the Virtual College and provides assistance to those students in the form of a dynamic web presence that facilitates off-campus access to our OPAC, databases, and digital collections. This digital content includes the digitized Swigert documents, our Master's Thesis Collection, letters from Benjamin Franklin and historic glass-plate negatives collections. Our first collection of materials was digitized in 2004. The Forsyth Library Digital Collections Initiative (FLDCI) was established in 2008 in order to facilitate the development and preservation of digital content. Under the development of this framework of guidelines, we have been able to create full-fledged digitization partnerships both within our university, including the Sternberg Museum, and Graduate School, and externally with institutions in Kansas. Our modest digital collections are positioned to grow exponentially in the next few years, and the establishment of the FLDCI promises to simplify the growth process.

Partnership Details

The partnership between the Kansas Cosmosphere and Space Center and Forsyth Library began tentatively in 2003 with the proposal made by library director John Ross to digitize materials held by the KCSC. The primary goal for this first joint partnership was to scan, catalog and upload images from the Mercury Project Missions into an online content management system. The digitization team included the KCSC archivist, Kiersten Latham, Forsyth Library cataloger, Jerry Wilson, and Forsyth Library Archivist, Patty Nicholas. By the end of November 2004 the majority of images, which included photographs of the Mercury spacecraft, astronauts, and engineers, had been scanned.

Early enhancements to the project began with the use of Dublin Core, which would later influence the presently used scheme. The second development was the decision to purchase CONTENTdm as the vehicle for the online dissemination of digital content.

CONTENTdm was eventually purchased and installed for use in May 2005. However, personnel changes at the KCSC and time limitations for Forsyth Library staff impacted both the development of image metadata and digitization. Consequently, no digital images from the Mercury Project were placed online until the project was revisited in March, 2010.

In early 2008, in consultation with the new president and CEO of the KCSC, Chris Orwoll, and the new Collections Manager, Meredith Miller, another partnership was proposed by Forsyth Library director, John Ross, with the aim to digitize the archive of Apollo 13 astronaut John L. (Jack) Swigert. It was Swigert who had helped to revise the Apollo Operations Handbook Malfunction Procedures after the Apollo 1 disaster of January 27, 1967. This collection of 10 archival boxes, each dedicated to a single spacecraft system, included unique unpublished materials, and represented an opportunity to refuel our partnership. As soon as copyright clearance was secured, we were given the green light to proceed.

During the three years that elapsed between the two projects, CONTENTdm had been successfully implemented by Forsyth Library Systems Technician, Heath Bogart, and was being used for Forsyth Library Archives collections. Two digitization team members had been added to improve the organization and workflows of the suddenly burgeoning digitization projects, including new Cataloger and Digital Content Specialist, Sherry Severson, and new Digital Collections Librarian, Andrew Weiss. From August 2008 through May 2010, the entire collection of materials in Swigert's archive was digitized, and 95% of these items were fully cataloged using Goddard Core, an elaboration of the Dublin Core metadata scheme developed by NASA's Goddard Museum.

Digitization Goals

This collection will help researchers and lay-people alike to see the program as a work-in-progress, something which can get lost as the Apollo mission becomes cemented in history. Our wider goal is to develop a collaboration model that will establish a set of procedures to use between a small academic library and a major museum. We believe this will eventually contribute to the foundation of a larger digitization project involving all phases of national and international space exploration extending from World War II to the mid-1970s.

Apollo Mission Background:

If we die, we want people to accept it. We're in a risky business, and we hope that if anything happens to us it will not delay the program. The conquest of space is worth the risk of life.

- Gus Grissom (Barbour, 1969, p. 125)

Along with John F. Kennedy's May 25, 1961 speech committing the United States to the "Space Race," arguably the most important date in the Apollo Program occurred on January 27th, 1967. On that tragic day, Virgil "Gus" Grissom, Ed White, and Roger Chaffee, became the first astronauts to die in the American Space Program. Their Command Module suddenly caught fire while the three were inside conducting a "Plugs Out" launch pad test one month before their scheduled mission (Bilstein, 1996, p. 340). Because of design flaws, the hatch could not be opened by the astronauts or blown open externally. The shocking part of the accident was that it occurred where none was expected: on Earth. Though a terrible disaster, the Apollo 1 accident fundamentally changed the Apollo Program and, in essence, prevented further accidents from happening while in space (Brooks et al., 1979, p. 214-225).

After the accident of January 27th, a full investigation was conducted in order to arrive at the cause of the accident. During the investigation each piece of the Command Module was removed, using an identical copy of the Command Service Module (#014) as a guide, the engineers at NASA and contractor North American Aviation, Inc. (NAA) narrowed the cause down to two main factors. The first factor: the tests were being done in excessively high oxygen pressure, increasing the potential for fire. The second factor: too much Velcro was being used to tie wiring together. The combination of these two factors along with the spark from a faulty wire and the flaw in the hatch design, ironically implemented as a safety precaution, was ascertained as the cause of the accident (Orloff, 2004, para. 61) (Brooks et al., 1979, p. 214-225).

The investigation marked a turning point in the development of the Apollo Program. In the early 1960s, when the mission to the moon became a national priority, NAA and NASA had agreed to a two-tiered project. Tier one would develop a Block I spacecraft (1962—1968), which was to be used for unmanned boilerplate missions and sub-orbital rocket testing, and tier 2 would develop a Block II spacecraft (1964—1973), which was to be used for manned earth- and lunar-orbital flights and the moon-landing missions (Brooks et al., 1979, p. 229). The two phases overlapped between the years 1964 through 1968, but once the Apollo 1 accident occurred, Block I was phased out, being used only for unmanned Apollo 4, 5 and 6 missions until early 1968 (Brooks et al., 1979, p. 232). In order to redesign Block II, both engineers and astronauts were called upon to completely review the blueprints, diagrams and procedures for every aspect of the Apollo spacecraft. Included among these specialists was Astronaut John L. (Jack) Swigert, who reviewed the Apollo Spacecraft Malfunction Procedures for the Command Module (CM), the Lunar Module (LM) and the Service Module (SM).

Jack Swigert joined NASA in 1966 after a long career as an engineering test pilot in the 1950s and 1960s for North American Aviation (NAA). He served with NASA until 1977, and was most famous for his participation in the April 11-17, 1970 Apollo 13 mission, which was famously dubbed a “successful failure,” after the crew were able to return safely to Earth despite multiple malfunctions within their spacecraft (Brooks et al., 1979, p. 378). In the aftermath of the Apollo 1 disaster, Swigert worked to redesign the Apollo Block II Spacecraft’s Malfunction Procedures.

Swigert’s role in the process of redesigning the Apollo spacecraft is reflected in the documents that he saved. The collection of documents starts with the 1966 Block I Apollo Operations Handbook, which contains his own corrections and notes, and ends with diagrams and unpublished blueprints of the Block II spacecraft through July and August 1969. However, the bulk of the documents deal with the Malfunction Procedures for the Block II spacecraft.

Digitization & Partnerships

Despite the ultimate goal of creating a larger "Digital Repository of Space Exploration" with the KCSC, Forsyth Library has had to deal with the less glamorous internal issue of "keeping house." Dealing with the reality of a digital project required that we put aside our ambitious dreams and put in place the tools needed to complete the project. This necessitated an honest look at our shortcomings and a fresh look at what we had to change or, in some cases, completely reinvent. In this section, we will examine the real-world applications and adaptations we had to consider, and the innovations we had to develop, in order to complete our project.

Partnership Practicalities

As mentioned, the wider goal for the partnership between Forsyth Library and the KCSC is to develop a "Digital Repository of Space Exploration," which would house and preserve the digital versions and corresponding metadata of the archival collections held by the KCSC. Collections initially involved would include the Jack Swigert Archive and the Mercury Project Collection. Further expansion of the repository would include the KCSC's collection of Soviet Soyuz-era documents, their compilation of the history of rocket development from WWII, and the museum's new digital photographs of artifacts and objects such as space suits, equipment, and other paraphernalia.

The first attempt at collaboration, the partnership to digitize Mercury Project documents and materials, was discontinued due to internal issues between 2004 and 2005. However, a few basic tenets of the partnership carried over to the second collaboration, including the decision to use Dublin Core, the basic division of labor, and the assumption that digitization costs such as labor, equipment and supplies would be covered by Forsyth Library.

For the 2008 partnership, it was determined that Forsyth library would be responsible for the creation of digital images; a basic lending contract agreement would be drawn up for each time materials were transferred to Forsyth Library; and the data generated by the digitization would be temporarily housed at Forsyth Library on its local PCs and backed up on its section of the university's server. The digitized images would then be uploaded into CONTENTdm, a proprietary content management system designed for libraries and other cultural institutions. During the image uploading phase, the project staff at Forsyth would input the necessary Dublin Core metadata. On the administrative side, the KCSC would be responsible for creating a "splash page" for the new digital collection as well as handling general Public Relations for the project. During the course of digitization, the two institutions would meet and discuss the progress of digitization.

Partnership Benefits

Both of our institutions have extensive public-relations networks that allow us to effectively disseminate the message about our joint project. For example, the KCSC has been able to link our CONTENTdm site to its home page, which sees considerable traffic from specialist historians, hobbyists, and primary and elementary schools. The KCSC also played a central role the 40th anniversary commemorations of the Apollo 11 moon landing in the summer of 2009. The project's profile is enhanced by the close relationship between former NASA astronauts such as Neil Armstrong and Charlie Duke, who donated Swigert's materials. Being aligned as a "sister" site to the Smithsonian's Air and Space Museum as well as NASA's Goddard Museum further increases the PR potential.

On the FHSU side, the university has an extensive and powerful public relations department as well as dedicated faculty members who speak at conferences, grant interviews to news outlets, and publish materials related to the Swigert collection project or similar space-exploration topics. Through the FHSU website, we are able to attract college students, differing from the patrons the KCSC usually attracts. Our central role as information hub at the university allows us to create intimate relationships with professors on campus and to embed the library and the KCSC further within the curriculum.

Partnership Obstacles

During the early development of our collaboration, it had not been disclosed to us that the Swigert Collection was not fully archived. An archivist at the KCSC had begun working on the Swigert Collection but had left in 2005 without being replaced. As a result, we needed to make some executive decisions about the materials; one major question was how to develop a file naming scheme for both physical and digital collections using documents not fully-archived. Related to this, the contents of the collection were not entirely known until we received the boxes at the library. This required us to spend time developing a naming scheme to keep track of the documents we were handling. In the absence of an archivist on staff at the KCSC and a subject specialist at Forsyth, we have had to become versed in the structure of the Apollo Operations Handbook's Malfunction Procedures and the electrical and power systems diagrams it references. These difficulties impelled us to create stop-gap solutions that ultimately led to some of our permanent policies. These policies allow us to navigate between the ideals of established best practices and the hard realities of internal and external staff limitations, limited funding, and minimal access to necessary technological expertise and/or equipment.

Developing Uniform File-Names

Since the collection had not been properly archived prior to receiving the documents, we had to develop a way to link each physical document to its digital counterpart. Documents had been partially assessed in 2000 by a private appraisal company. During that time, they assigned documents to general archival boxes based on the spacecraft system with which they were aligned. Since there were nine spacecraft systems, there were nine boxes devoted to individual systems and one box for the original Apollo Operations Handbook and other miscellaneous documents that defined the nomenclature of the system blueprints and diagrams; also included was the appraiser's finding aid. The documents were crammed into the boxes without much thought for organization, our first step in archiving was to place documents in folders, respecting the physical context by keeping the original order in which they appear, as well as the intellectual context by keeping groups of bound documents together. We then assigned numbers to each folder, designated as f(x), and numbers to each document, designated as d(x). For example, the very first document in the Electrical Power Subsystem box would have the title assigned f1d1, referring to its position in the group. The next challenge was to use these document titles to create a conceptual bridge between the real document and its digital counterpart while following the best practices of digital file naming.

In order to keep file names from exceeding the recommended number of 31 characters, we had to develop a system of abbreviations that would locate the file names within the context of our collections and would be used as a referential name rather than as a descriptive name. Our rationale for this emphasis on the referential aspect was that metadata would provide the description of the digital file. File names would follow the pattern as shown in Figure APOL-1. Rather than describing a document's intellectual content, we focused on the document's physical context. For example, the Master TIFF version of the very first document found in the EPS box, named f1d1, would have the digital file name of: kcas204_eps_f1d1.tif; its compressed-for-web-jpeg counterpart would be: kcas204_eps_f1d10w.jpg. Occasionally, a document would need to be scanned or photograph in parts, which would require the use of a part designator; in the example above, the optimized TIFF version of the same document would have <p20.tiff> added at the end of the file name.

The overall effect of this new naming protocol has streamlined our ability to track digital data. Its success has compelled us to change all of our previously digitized materials' filenames, and develop patterns for naming all future digitization projects. With a few alterations we are able to use this file-naming tree for any internal or external digital collection we develop at FHSU.

Uniform File-Naming Convention for Swigert Collection

Naming Tree Part	*Part Definition*	*Applied to Swigert Collection*	*Abbreviation*
Institutional Name	[Parent organization]	[Kansas Cosmosphere]	kc
Part of Object ID	[Collection]	[Apollo 1 Investigation]	as204_
Part of Object ID	[Box within Collection]	[Electrical Power Subsystem]	eps_
Part of Object ID	[Folder within Box]	[Folder number x]	f[x]
Part of Object ID	[Document within Folder]	[Document number x]	d[x]
Part Designator	[Part within Document]	[Part number x]	p[x]
Part Designator	[Reverse of document]	[Reverse Side]	r
Version of Object	[File Optimized for Use}	[Optimized File]	o
Version of Object	[File altered for web use]	[Web-ready]	w
File Extension Name	[File Format]	[File Extension: i.e. .jpg / .tif etc.]	.[xxx]

EXAMPLES		
	kcas204_eps_f1d1ow.jpg	22 characters
	kcas204_eps_f1d1p2o.tif	23 characters

A few rules of thumb:
Use lower case letters of the Latin alphabet; numerals 0 thru 9
Avoid punctuation marks; except underscores / hyphens
Include part designator after object ID
Keep File names less than 31 characters (including file extensions)
Be as referential as possible--not descriptive; let metadata describe the item

Figure APOL-1: Table showing uniform file-naming conventions for Swigert Collection; ©2009, Andrew Weiss.

Adopting Goddard Core

During the first partnership from 2003-2004, the primary members of the Mercury Project digitization effort decided upon using

Dublin Core as the main metadata scheme. Dublin Core was chosen because of its use by multiple institutions in both museum and library circles. Research further revealed that Dublin Core was being heralded as part of the discipline's best practices. Dublin Core was subsequently agreed upon as the basis for the Swigert documents as it "represents the lowest common denominator for creating metadata to facilitate maximum accessibility across a broad spectrum of institution types" (North Carolina ECHO, 2009).

During the course of the digitization process and the initial testing of the images put into CONTENTdm, it was discovered that simple, unqualified Dublin Core would be insufficient for our needs. A thorough cataloging of each document was considered ideal; unfortunately, many of the documents proved to be extremely complex in terms of both intellectual content and physical context.

The interplay of content and context also added to the meaning of each document. For example, many of the documents were bound together in sets arranged in numerical order that refer to specific symptoms of the spacecraft's malfunction procedures. The Electrical Power Subsystem (EPS) malfunction procedures show what should appear in the gauges on the Apollo Spacecraft's control panel indicating to an astronaut whether the power systems are normal or abnormal.

Adding to the complexity of these documents are notes, drawings, and comments written on the blueprints and proofs; there are also papers and redrawn diagrams attached to them that cover over the original base. Furthermore, the documents are often signed and dated by various people, including Swigert and other engineers involved with reviewing the Malfunction Procedures. The circumstances in which the documents were drafted or marked also add to the complexity of their meaning. These were some of the documents used in the AS-204 (Apollo 1) investigation held between January 27th and March 21st, 1967, revealing the review process for the Block I and Block II spacecraft.

Given complexities such as multiple dates, authors and uses, it was deemed that a basic Dublin Core scheme would not be sufficient.

The next step was to consider alternatives to the Dublin Core scheme that would not stray far from best practices, and that could be used by both institutions, and yet would explain the significance of these documents with the required level of granularity.

Our final choice was Goddard Core, which was developed by NASA's Goddard Museum; it is an extension of Dublin Core and an ideal bridge between the library world and the space museum community (Goddard Library, 2005).

Goddard Core differs from unqualified Dublin Core by featuring a little more granularity. For example, Goddard Core allows one to utilize the following subdivisions for Dublin Core Element Subject :

Subject.employee
.organization
.missionsProjects
.disciplines
.instrument
.functions
.industries
.uncontrolled

The problem with multiple dates has been anticipated by the development of these subdivisions:

Date.created
.available
.modified

Using the more granular modifications of the Date field allow us to handle the more complex documents in the collection that went through various phases of modification during the AS204 investigation and subsequent creation of the new Block II versions of the space craft Malfunction Procedures.

One of our intentions with this project has been to use CONTENTdm as the nexus to our cataloging process; we see this as a chance to open up the cataloging process to multiple participants both within Forsyth Library and externally at the KCSC. We are not "rocket scientists," but we have access to those who are specialists in this field. The KCSC has access to the Smithsonian as well as former NASA astronauts and employees who are familiar with these types of documents. We envision a multi-faceted, multi-participant cataloging process with CONTENTdm at the center of this activity.

In order to help us reach our goal of a more cooperative cataloging process, we added a few customizations to Goddard Core to tailor the scheme to meet the unique needs of the Swigert Collection.

Our customizations dealt primarily with improving the granularity of the DC Element <Description>. We felt that since the <Description> field was too broad, we would need to add subdivisions that would convey not only a general explanation of the document, but would also provide the transcription of the handwritten notes on each document, as well as explain the significance of the document with respect to its placement within NASA and the Apollo Space program. In order to accomplish this task we have added to the granularity of DC <Description> thus:

Description.abstract
.freetext
.analysis

<.abstract> gives a brief summary of the content of the document, explaining the meaning of EPS or certain other important terms found in the document; <.freetext> presents the transcriptions of the handwritten notes, dates & signatures, allowing them to be searchable in a database; finally, <.analysis> allows the expert or outside consultant to remark upon the historical context or significance of the document. Interoperability will be slightly compromised should all three subdivisions become conflated into a singular <Description> element in unqualified Dublin Core. However, for the purposes of our own project, we feel the possible loss of interoperability is outweighed by the collaborative potential of the customization.

Dublin Core - Goddard Core / FLDCI Customization Mapping		
Dublin Core	*Goddard Core Customization*	*FLDCI Customization*
TITLE	.alternate	
SUBJECT	.employee	
	.organization	
	.missionsProjects	
	.disciplines	
	.instrument	
	.functions	
	.industries	
DESCRIPTION		.abstract
		.freetext
		.analysis
CREATOR & CONTRIBUTOR	.employee	
	.code	
	.contract	
	.missionsProjects	
	.organization	
	.instrument	
DATE	.created	
	.available	
	.modified	
TYPE	.information	
IDENTIFIER	.persistent	
	.url	
COVERAGE	.projectPhase	
	.chronology	
	.spatial	
RELATION	.hasVersion	
PUBLISHER	.organization	

NOTE: DC Elements FORMAT / RIGHTS / LANGUAGE / SOURCE not changed

Figure APOL-2: Goddard Core. © 2009, Andrew Weiss.

Creating an External Partnerships Protocol

Along with the two innovations mentioned above, the most important development of our partnership with the Kansas Cosmosphere has been the creation of our External Partnerships

Protocol, which is intended to better anticipate the needs of Forsyth Library's digitization projects with regard to outside institutions. Entering into our partnership with the KCSC, a number of grey areas existed that we did not quite anticipate or iron out completely until after the project had begun. For the sake of future projects, we decided to codify our procedures in order to facilitate future partnerships.

The protocol is based partly on our experiences with another digitization partner, the Stafford County Historical Society Museum, for whom we are digitizing an extensive collection of glass-plate negatives. The protocol is made up of two separate missives. One is a series of steps outlining the full life-cycle of a partnership; the other is a series of guidelines and policies that clearly define terminology, policies and partner roles.

For the step-by-step procedures, we have outlined the following steps:

2) Meet Potential Partners; these meetings are meant to establish a willingness to participate and to negotiate framework agreements and partner obligations.
3) Determine Project Viability; both partners evaluate their collections using the Digital Collections Project Planner devised by us for objectively evaluating a target collection. Having both sides evaluate the project helps us to see any similarities as well as any differences in what is valued in a collection.
4) Determine the project's priority and place it within the Project Pipeline.
5) Pilot Testing; using a representative sample of materials we determine if any special needs, such as scanning or handling oversize documents, might arise during digitization or online dissemination;
6) Project Oversight: once digitization begins, we establish schedules for regular meetings to update partners. We also work on tweaking workflows, assessing digitization benchmarks and quotas, and perform quality control of images.

7) Post-project Wrap-Up, which involves checking that materials have been digitized; we also create a project summary to explain the results of the project and to enumerate any problems that occurred during the project. We finally seek avenues for PR.

A series of guidelines and policies, which exists to inform the step-by-step procedures, is the second part of the protocol. In it we define minimum standards for our partners and what roles and actions are assigned to them. The guidelines include:

1) Preparation Work, which outlines our requirements for cleaning and general handling of materials, requirements for safe storage and transport, requirements for metadata, and our recommendations for creating unique file names;
2) Digital Preservation, which outlines our methods of digital storage, and our policy for "weeding" the data once the project has been completed and files transferred;
3) Assumption of Responsibility for Damaged Materials, which outlines the liability for any materials damaged or mishandled during the project;
4) Assumption of Costs, which outlines our standard cost per image fees, the costs assumed by us and the costs assumed by our partners, and the services costs will provide;
5) Copyright, which outlines our policy of using only materials that have complete copyright clearance, and also explains our position that the onus of copyright clearance falls entirely on the partner supplying the source materials.

Both parts of the External Partnerships Protocol fit within our overall digitization initiative, the Forsyth Library Digital Collections Initiative (FLDCI), and provide us with a valuable aspect to our burgeoning digital framework. The External Partnerships Protocol functions in counterpoint to our Internal Collections and Intra-departmental Protocols, which outline our procedures and policies for digitizing collections from the library's Archives and Special

Collections and establishing partnerships to digitize materials from various departments at the university.

Conclusion:

We have been fortunate to work in close contact with the Kansas Cosmosphere and Space Center. Our experience in developing the Swigert Collection for a digital audience has taught us the value of communication between partners. We have also met the challenges of the project by creating solutions that have a positive effect on both our KCSC partnership and our overall Forsyth Library Digital Collections Initiative (FLDCI). The development of a uniform file-naming convention for the Swigert Collection had a direct impact on our other digital collections, helping to rein in haphazard naming by staff members in multiple departments. Adopting and customizing Goddard Core helped us to move a step closer to collaborative cataloging, a major goal for this under-staffed institution. Finally, Forsyth Library was able to develop a clear External Partnership Protocol to help us anticipate issues with future partnerships. We now view the obstacles in the KCSC-Forsyth Library partnership as nothing less than opportunities to create a solid and lasting digital collections framework.

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