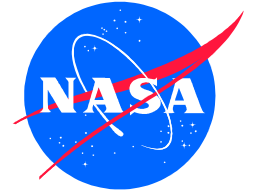


National Aeronautics and Space Administration



SECTION 504 COMPLIANCE REVIEW REPORT



St. Louis Science Center

St. Louis, Missouri

Office of Diversity and Equal Opportunity

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1. Executive Summary

This report reviews compliance by the Saint Louis Science Center (“Center”) with Section 504 of the Rehabilitation Act of 1973 (“Section 504”).¹ Section 504 prohibits discrimination against qualified individuals with disabilities by Federal fund recipients. As a Federal fund recipient, the Center needs to comply with these requirements in all of its programs or activities. In addition to triggering this requirement, NASA’s grants directly affect public exhibit and educational spaces central to the Center.

Based on the information detailed in this report, NASA has determined that the Center is in substantial compliance with NASA’s Section 504 regulations. In order to be in full compliance with NASA’s Section 504 regulations, SLSC needs to address a number of issues identified in this report, including accessibility at the Center from several perspectives. In general, the SLSC fared relatively well compared to other museums and science centers.

The following summarizes: 1) Compliance Requirements: Required actions to correct policies, procedures, practices, and facilities that do not currently meet Section 504 compliance standards, 2) Compliance Recommendations: Suggested actions to enhance or strengthen policies, procedures, practices, and facilities that have achieved basic Section 504 compliance, that have been or will be addressed, and 3) Promising Practices: Actions that demonstrate both an advanced level of Section 504 compliance and informal education program delivery that can be shared with and emulated by other science museums:

Compliance Requirements

- **Architectural Issues.** The last third of this report includes a list of a number of architectural barriers at the Center. The Center must consider either removing these barriers or making programmatic changes to ensure that these barriers do not limit access to people with disabilities.
- **Website and Mobile App Accessibility.** The Center needs to make important accessibility changes to its current website. Some of these barriers effectively block access to major sections of the website content. Notably, the “accessibility” page is inaccessible to blind visitors or users with disabilities that require keyboard navigation. The Center also needs to provide more specific information for users with disabilities on its website, such as the Center’s nondiscrimination policy, grievance procedure, etc. The Center’s mobile app also has several accessibility issues that should be remedied soon.

¹29 U.S.C. 794 (2012).

Compliance Recommendations

- **Effective Communication.** The Center needs to make a number of small improvements in how it meets Section 504's effective communication requirement. Specifically, it needs to review whether captioning or other alternatives to speech are provided at all exhibits and how alternative formats to written documents (e.g., braille, large print, etc.) are made available to visitors with disabilities. Most importantly, however, the Center needs to develop a clear and well-publicized process for requesting sign language interpreters.
- **Section 504 Coordinator and Accessibility Committee.** The role of Section 504 Coordinator needs to be bolstered. Given the immense challenges of coordinating a myriad of accessibility requirements, better resources and training need to be made available to the Section 504 Coordinator. Also, the Accessibility Committee needs to be convened quickly and often within the Center, as too many promising practices and training opportunities are isolated to particular sections of the Center and should be shared globally.
- **Self-Evaluation and Transition Plan.** The Center needs to conduct a more thorough self-evaluation once its Section 504 Coordinator and Accessibility Committee are in place and operational. It should ideally conduct a thorough Section 504 self-evaluation every few years and treat its transition plan as a living document to guide it through future accessibility challenges and opportunities.
- **Nondiscrimination Policy.** While the SLSC has developed and published the policy (as part of its grievance procedure), this policy should be prominently visible to all visitors — ideally on all brochures and printed materials and on the Center's website and disseminated broadly by posting the policy from time to time on its social media platforms (i.e., Twitter, Facebook, Instagram).

This list of potential issues should not give the impression that the Center is failing in meeting the needs of its visitors with disabilities. To the contrary, there are a number of areas where the Center exceeds regulatory requirements and implements promising practices in meeting the needs of visitors. The following summarizes just some of these promising practices.

Promising Practices/Exceeds Compliance Requirements

- **Planetarium Accessibility for Visitors with Visual Impairments.** Visitors who are blind or who have visual impairments appear to be well-accommodated at the Center's planetarium. The planetarium's program *The Little Star that Could* and its partnership with the Lighthouse for the Blind stand out as prominent examples of the Center's dedication to meeting the needs of visitors with disabilities.
- **Outreach and Partnership in YES and Camp Programs.** Both of these programs offer St. Louis-area high school and younger students with amazing opportunities to germinate and develop a passion for science. In doing so, they have developed their

own partnerships with disability groups that can be highly beneficial to the rest of the Center, particularly in the area of training.

- **Effective Communication in OmniMax and Planetarium Programs.** The Center appears to do a great job at providing captioning and assistive listening for its visitors in these venues. The OmniMax Theater's exploration of video description to aid blind and low-vision visitors is also commendable.

As noted above, these promising practices remain isolated within the silo of their particular programs. Opening these partnerships and opportunities throughout the Center may be a very easy way to improve both compliance with Section 504 and opportunities for visitors with disabilities at the Center.

On January 22, 2016, NASA published notification in the Federal Register that it has revised its Section 504 regulations. The revised Section 504 regulations took effect on February 22, 2016. In the revised regulations, NASA adopted the 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design (2010 Standards) as the sole accessibility standard for new construction and alterations to buildings and facilities that receive Federal financial assistance from NASA. However, the 2010 Standards as the sole accessibility standard will not take effect until January 23, 2017. Between February 22, 2016 and January 22, 2017, SLSC may choose between the 2010 Standards and the Uniform Federal Accessibility Standards (UFAS) as the standards for new construction and alterations in the manner prescribed in the revised Section 504 regulation. NASA notes that the NASA Section 504 regulations cited and regulatory text quoted throughout this report are from the original, unrevised version of Section 504 that existed prior to its revision on January 22, 2016. On January 22, 2016 NASA notified SLSC of the revised regulation. NASA expects SLSC to comply with all requirements of the revised Section 504 regulation going forward. NASA's monitoring of SLSC's efforts to meet the compliance requirements and implement recommendations listed below will be evaluated according to the revised Section 504 regulations.

2. Background

The Center is a science center and planetarium located in St. Louis, Missouri. Construction on the planetarium (known as the James S. McDonnell Planetarium) began in 1961 and was opened to the public in 1963. The Center acquired the planetarium in 1984, extensively renovated the facility, and reopened it in 1985. The Center's main building (located opposite the planetarium over Interstate 64) was constructed between 1989 and 1991. A large and impressive enclosed pedestrian bridge connects the planetarium and the Center over Interstate 64. The Center owns the grounds and facility for the main building at 5050 Oakland. The Center owns the planetarium building and leases the land surrounding the planetarium from the City of St. Louis.²

²Information Request Response Provided by St. Louis Science Center (June 6, 2014).

In addition to the planetarium and main building, the Center also leases nearby space for the Taylor Community Science Resource Center (“Taylor Center”), which the Center uses for its outreach programs including its YES (Youth Exploring Science) program, a STEM program that introduces local area high school students to educational and career opportunities in the sciences.³

The Center attracts almost 1 million visitors annually (938,368 in 2013), with the vast majority being general public visitors (848,713 in 2013) and the remainder comprising school groups, special events, etc. The Center also runs offsite programs that engage a substantial number of other individuals (approximately 55,680 in 2013).⁴

As of May 16, 2014, the Center employed 128 fulltime employees and 53 part-time employees. This number swells during the summer months. The Center hires 10 to 12 people (mostly teachers) for the summer camps program, 20 college interns, and 50 unpaid junior interns. In addition, there are about 200 paid part-time YES students who work only 4 hours a week at the Center during the school year but who work 20 hours a week during the summer helping lead its *Summertime Science* program.⁵

The Center has an annual budget of approximately \$22 million.⁶ Approximately half of this comes from local ZMD (St. Louis Metropolitan Zoological Park and Museum District) taxes.⁷ The remaining half comes from earned revenue and fundraising activities.⁸

Earned revenue includes visitor activities (about 67% of total earned revenue and comprising OmniMax ticket sales, gift shop and cafeteria sales, special exhibit sales, etc.) and educational programs (about 33% of total earned revenues and encompassing camps, overnight programs, etc.). Admission to the Center and planetarium, however, is free.⁹

Fundraising activities include a broad range of sources, from individual memberships to grants. Grants (from government, corporations, and foundations) constitute only about 10% of all fundraising revenue.¹⁰

³Information Request Response Provided by St. Louis Science Center (June 6, 2014). In addition, the Center also owns separate warehouse space that is not used for public programming.

⁴Information Request Response Provided by St. Louis Science Center (June 6, 2014).

⁵Interview with Deb Washington and Halcyone Brown (Aug. 12, 2014), SLSC later clarified that juniors and seniors in the YES program complete internships onsite or at partner locations. Freshmen and sophomores are more closely involved with *Summertime Science* (12/7/15).

⁶Interview with Barb Boyle and Bruce Shelley (Aug. 12, 2014).

⁷Specifically, a portion of the money collected from St. Louis County and City property taxes are distributed to the ZMD board to allocate between the St. Louis Science Center, the Missouri Botanical Garden, the Missouri History Museum, the St. Louis Zoo, and the St. Louis Art Museum. Information Request Response Provided by St. Louis Science Center (June 6, 2014).

⁸Id; Information Request Response Provided by St. Louis Science Center (June 6, 2014).

⁹Information Request Response Provided by St. Louis Science Center (June 6, 2014).

¹⁰Information Request Response Provided by St. Louis Science Center (June 6, 2014).

2.1. NASA's Compliance Review of the Center

In 2014, NASA began its review of Section 504 practices at the Center. This culminated in a site review on August 12-13, 2014, which included an architectural review of the Center as well as an exhaustive set of group interviews with the following representatives from the Center (some SLSC staff may have left SLSC or may have been promoted or reassigned to other positions within SLSC):

- Bert Vescolani (CEO and President)
- Christian Greer (Chief Education Officer)
- John Lakey (Planetarium Director)¹¹
- Bill Kelly (Senior Planetarium Educator)
- Anna Green (Planetarium Educator)
- Deb Washington (Managing Director of Human Resources)
- Halcyone Brown (Associate Director of Human Resources)
- John Wharton (Managing Director of Facilities)
- Therese (Terri) Edney (Senior Director of Information Systems and Section 504 Coordinator)
- Brad Robertson (Director of Security)
- Barb Boyle (Chief Financial Officer and Chief Operating Officer)
- Bruce Shelley (Grants Administration)
- Jackie Mollet (Managing Director of Visitor Services)
- Becky Donovan (Supervisor of Special Exhibits)
- David Giola (Manager and Chief Projectionist of OmniMax)
- Cynthia Skaggs (Managing Director of Marketing and Communications)
- Danielle Stewart (Digital Marketing Coordinator)
- Joe Seidler (Senior Director of Design and Galleries)
- Chris Lucas (Exhibit Production Manager)
- David Frances (Director of Exhibit Production and Exhibit Electronics)

¹¹ Mr. Lake is no longer employed at St. Louis Science Center, Anna Green is now the Planetarium Director (12/7/15).

- Siinya Williams (Senior Director of Educational Outreach)
- Tim Mulhall (Senior Educator)
- Frieda Smith (Senior Director of Camps, Programs, Galleries)
- Pam Braasch (Director of Educational Programs)
- Paul Freiling (Director of Engineering and Robotics Education)
- Michelle McGruder (Assistant Manager of Visitor Services)

This report is based on our findings from this NASA site visit (including interviews, documents, and a physical review of the Center) as well as documents provided by the Center. Throughout this review process, the Center has been welcoming and forthcoming with a focus toward full compliance with Section 504 and promoting the best possible experience for program participants with disabilities. This report will address the current status of the Center and upcoming projects, any deficiencies, and highlight promising practices identified.

2.2. Section 504 and the Center

The Center receives Federal financial assistance from NASA. The NASA grant (NNX14AD08G) will be used to build and support interactive exhibits highlighting the Martian lander project as well as workshops and lectures about Mars exploration.¹² In addition, the Center also receives Federal financial assistance from the Institute of Museum and Library Services (award number LG-30-12-0724-12) and the National Science Foundation.¹³ Accordingly, all of the Center's programs, services, and activities fall within the scope of Section 504.

3. Discussion

Section 504 prohibits discrimination on the basis of disability. Specifically, Section 504 requires that,

*No otherwise qualified individual with a disability... shall, solely by reason of her or his disability, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance...*¹⁴

¹²Information Request Response Provided by St. Louis Science Center (June 6, 2014).

¹³Information Request Response Provided by St. Louis Science Center (June 6, 2014).

¹⁴29 U.S.C. § 794(a) (2008).

This “program access” requirement has been adopted by the NASA nondiscrimination regulations,¹⁵ which itemize specific prohibitions against forms of discriminatory conduct. This section will review how the Center currently makes its programs, services, and activities accessible to people with disabilities by dividing its analysis into three sections.

- **General Program Access.** This section discusses how programs are made accessible on a day-to-day basis at the Center.
- **Policies and Procedures.** NASA’s Section 504 regulations require that grantees adopt specific policies and procedures. This section reviews compliance with these requirements.
- **Architectural Accessibility.** At the time of the onsite visit, Section 504 required that all new construction and alterations conform to a specific set of architectural guidelines known as the Uniform Federal Accessibility Standards (UFAS)¹⁶. Further, all spaces used for the Center’s programs, services, and activities need to be held in accessible areas.¹⁷ This section will review the accessibility of these locations.

3.1. General Program Access

This section addresses general program access at four levels:

- **Program Access for General Visitors to the Center.** This section includes the accessibility of programs at the Center’s main facility and planetarium.
- **Program Access at Camps and Other Special Programs.** This section addresses the accessibility of the Center’s various camps and its YES Program for high school students.
- **Emergency Evacuation.** This section provides a snapshot of how the needs of people with disabilities are met in emergency situations.

¹⁵14 C.F.R. § 1251.103 (2008).

¹⁶UFAS is available at <http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/ufas>. As of February 22, 2016, NASA grantees must follow the revised NASA Section 504 regulation at 14 C.F.R. § 1251.103 <https://www.federalregister.gov/articles/2016/01/22/2016-00610/discrimination-on-the-basis-of-disability-in-federally-assisted-and-federally-conducted-programs-and#h-22> that provides a choice of accessibility. Because there has been no new construction or alterations at the Center since the receipt of NASA funding, our review will instead focus on architectural barriers that limit program access.

¹⁷ Because there have been no new construction or alterations during the time of NASA’s funding, the architectural review in this report focuses on architectural barriers that may affect overall program access at the Center. In this regard, the Department of Justice regulations permit the use of Uniform Federal Accessibility Standard (UFAS) as a “safe harbor” under the program access requirements of Title II of the ADA Title II for facilities that have not undertaken new construction or alterations after March 15, 2012. 28 C.F.R. § 35.150(b)(2)(i). Because the program access requirements under Title II and Section 504 are virtually identical, UFAS effectively serves as a “safe harbor” for program access under Section 504. This report focuses only on the Center’s *program access* obligations. Under Section 504 that is the result of NASA funding, the Center must remember that it also has additional obligations under the ADA’s *new construction and alterations* requirements for all new construction and alterations commenced after January 26, 1992. 28 C.F.R. § 35.151; 28 C.F.R. §§ 36.401-406.

- **Effective Communication.** This section focuses more specifically on how the communication needs of individuals with sensory disabilities are met.
- **Website and Mobile App Accessibility.** Closely related to the *Effective Communication* section, this portion of the report addresses the accessibility of the Center’s website.

3.1.1. Program Access for General Visitors to the Center

In general, the Center has done an exceptionally good job at ensuring program access in a number of areas. To accomplish this, the Center’s Visitor Services team closely monitors visitors to the Center, anticipating the needs of visitors with disabilities. For instance, when visitors with mobility impairments buy tickets to the OmniMax Theater, they are advised to take an elevator to the third floor entrance to the theater (the second floor entrance to the theater is inaccessible). Simultaneously, OmniMax Theater personnel patrol outside the theater’s entrances to ensure that no patrons with mobility impairment are at the wrong entrance. This awareness regarding the needs of visitors with disabilities carries over to many other areas of the Center and reflects a number of promising practices identified by NASA that can serve as models for other institutions.

Among the promising practices identified are:

The Little Star that Could: In 1986, the planetarium created a program focused on young children that fosters an early interest in science. Over 60 planetariums worldwide now feature the show and it has been translated into several languages. In 2008, it was reproduced as a full-dome digital planetarium show and is available in both the 4:3 standard format and in full-dome. In 2011, Anna Green, currently an educator at the planetarium, was in graduate school focusing on museum studies. As a school project, she adapted *The Little Star that Could* toward students who are blind and low-vision. A large part of the original presentation used colors to represent different temperatures of stars. Ms. Green created plush models of stars, using different fabrics with different textures (e.g. denim, velvet, etc.) to represent the same information conveyed by colors. She filled the model stars with rice that could be heated in the microwave. This program was an immediate hit and has developed into an accessibility program funded by the Lighthouse for the Blind.¹⁸ The program now incorporates iPads to stream the presentation to low-vision students. The next grant from the Lighthouse for the Blind will include braille guides for the planetarium and directional beacons, with a goal of expanding throughout the Center. Part of the grant also includes obtaining braille and large-print printers.¹⁹ These printers were primarily designated for use by the planetarium, but they will be used increasingly to improve program access in other areas of the Center and even by other organizations in the ZMD.

¹⁸The Center’s relationship with the Lighthouse for the Blind occurred after Frieda Smith (the Center’s Senior Director of Camps, Programs, Galleries, and Planetarium) met with the director of the St. Louis Federation of the Blind. This meeting was facilitated by the fact that Deb Busch, a visually-impaired volunteer at the Center, attends the same church as Ms. Smith. Interview with Frieda Smith, Pam Braasch, and Paul Freiling (Aug. 13, 2014).

¹⁹Interview with John Lakey, Bill Kelly, and Anna Green (Aug. 12, 2014).

Tactile Model of the Planetarium: The Center has also created a fully tactile model of the planetarium used as part of its tours of the facility. While the planetarium itself is relatively accessible, the unusual shape and size is difficult to describe verbally. The planetarium found that a physical model that could be touched enables a much clearer explanation to some audiences. While this tactile model was originally intended to help audiences who are blind and low-vision, the planetarium has found that this model is particularly helpful for visitors with Autism Spectrum Disorder. In one instance, a nonverbal child became so excited by the exhibit that he started to describe the display to other people.²⁰

“White Glove” Tours: To improve program access for children with disabilities, the Center also offers “white glove” tours, enabling participants to touch select exhibits that are behind display cases.²¹ After the onsite review, the Center informed NASA that due to the new casework around the capsules as of 2015, a tactile 1:10 scale model of each capsule was created including ADA-approved large-print text and braille descriptors.²² This enables children who are visually impaired, or who have other disabilities where touch would meaningfully augment their experience, to engage with an exhibit and ignite an interest in science.

Service Animals: The information gathered during the course of the NASA review suggests that the Center has little difficulty accommodating the needs of visitors with service animals. At one time, the Center may have worked with a service dog organization and, in general, they do not question visitors who bring animals if that animal has any indicia of possibly being a service animal.²³ They only turn away people who try to bring their pets inside the Center or Planetarium.²⁴

“Secret Shopper” Program: The Center has had success using a secret shopper program to improve its overall customer service— and looks to include accessibility as an integral part of this program. The Center’s gift shop and cafeteria are run by outside vendors. The cafeteria vendor runs a secret shopper program, in which employees playing the role of visitors assess the level of customer service at the cafeteria. This feedback has helped the Center improve its services; they have now separately contracted with a different vendor to provide the same secret shopper services outside of the cafeteria. In general, the feedback they get from both secret shopper programs is positive but not perfect. The Center is now interested to see whether either contractor can have a person with a disability as part of the secret shopper program.²⁵

²⁰Interview with John Lakey, Bill Kelly, and Anna Green (Aug. 12, 2014).

²¹Interview with John Lakey, Bill Kelly, and Anna Green (Aug. 12, 2014).

²²Edit to draft report by Anna Green (Aug. 25, 2015)

²³Interview with Brad Robertson (Aug. 12, 2014); Interview with Jackie Mollet and Michelle McGruder (Aug. 13, 2014).

²⁴Interview with Jackie Mollet and Michelle McGruder (Aug. 13, 2014).

²⁵Interview with Barb Boyle (Aug. 12, 2014); Interview with Jackie Mollet and Michelle McGruder (Aug. 13, 2014).

Comment Card Program: The Center also encourages good program access through the use of its comment cards. As noted elsewhere in this report, while these comment cards are inadequate as part of a Section 504 grievance process, the manner in which the Center uses the comment cards suggests that the Center is proactively reaching out to the public through the comment card program, anticipating the needs and interests of its visitors.²⁶ Comment cards are distributed directly to visitors by one of three groups of staff:

- 1) Research & Evaluation (R&E) staff (paid and volunteer) walking throughout the facility;
- 2) Guest Services staff selling tickets at any of the ticket kiosks; and
- 3) Guest Services staff collecting payment at the parking booth as cars exit the parking lot.

Cards are returned to the Research and Evaluation Department for tabulation and analysis. An SLSC R&E staff person informed NASA that there are two colors marked on the cards indicating: 1) Which group of staff distributed the card (R&E staff, ticket kiosk, or parking booth); and 2) The month that the card was distributed. When cards are returned, R&E staff can compare the dates written on the cards with the actual attendance and look for patterns in ratings related to attendance, but that happens after the fact. Anywhere from 50 to 250 cards are designated to be distributed each day. The amount designated is generally based on anticipated attendance. During our visit to the Center, we were given a comment card (with a green dot at the bottom) by a Center representative outside the front door.

Accommodations for Visitors on the Autism Spectrum: To accommodate the needs of visitors on the autism spectrum, the Center has also recently started opening its new special exhibits venue (Boeing Hall) early for special “low-sensory” days.²⁷ This allows visitors with disabilities to enjoy the special exhibits with a minimal stress and external stimulation.

Accommodations in Wayfinding for Visually Impaired Visitors: The Center has also experimented with different Wayfinding technologies. For instance, the Center has a braille map of its facility, and visitor services occasionally chaperones people with disabilities to relevant destinations within its facility.²⁸ The Center is also exploring the use of iBeacons, to track users. This wireless technology “announces” features within a short region of the device and enables the Center’s Research and Evaluation Department to better understand visitor interaction with different elements at the Center.²⁹

²⁶Interview with Jackie Mollet and Michelle McGruder (Aug. 13, 2014).

²⁷Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014).

²⁸Interview with Joe Seidler, Dave Francis, and Chris Lucas (Aug. 13, 2014); Interview with Jackie Mollet and Michelle McGruder (Aug. 13, 2014).

²⁹Interview with Joe Seidler, Dave Francis, and Chris Lucas (Aug. 13, 2014). Implementation of iBeacons at the Center, however, is largely dependent on the budget available to the Center’s Marketing and Communication Department. In addition, the Center may consider exploring wayfinding technologies used in other organizations. For instance, AXS by EO

With regard to resource sharing, NASA found, through our onsite interviews, that different teams at the Center knew about innovative programs in their own portion of the Center, but little about innovations elsewhere. For instance, the planetarium has had great success in making its educational programs more accessible to children with vision impairments, but relatively few of these lessons have been extended to the rest of the Center. The planetarium staff has, for example, helped make braille labels for the Center and other organizations within the ZMD, but simple strategies used at the planetarium could be better shared within the Center. For instance, white glove tours could help make visual exhibits more readily available throughout the Center. Similarly, useful tactile representations (as in the *Little Star that Could* presentation) might be extended to other exhibits focused on children. In addition to potentially facilitating overall learning through different modalities for all audiences, using touch in presentations may make it easier to meet the needs of specific disabled audiences and thus achieve higher levels of program access.

3.1.2. Program Access at Camps and Other Special Programs

The Center runs a number of activities outside of the exhibits and ordinary visitor programs.

The Center operates a YES (“Youth Exploring Science”) program for high school students 14 years and older, with 175 youth currently enrolled in the program.³⁰ YES students learn science as a way to develop skills for college and life. During their first year, YES students learn basic skills and specific science-related information. After their first year, students spend 20 hours a week during their first summer leading the Center’s *Summertime Science* program, a multi-week science camp for younger students. Throughout their later years in the YES program, students work four hours a week in the school year and 20 hours a week in the summer in community internships.

The Center appears to have little trouble meeting the needs of students in the YES program.³¹ Application packets for the YES program go out to the Center’s community partner organizations in November. The application packet asks about disabilities and accommodations. The Center’s community partners select students for the YES program in December. These prospective students then do an orientation program. By early December (when applications are received or when applicants arrive for orientation), the Center’s staff already knows which YES applicants have disabilities. The program then starts in early January. Thus, they have adequate lead time for meeting the needs of YES students with disabilities. For instance, they have been able to easily accommodate students with

Guidage (<http://eo-guidage.com/eng/>) uses WiFi and Bluetooth to create an “indoor GPS” to help users with disabilities to navigate buildings. In addition, ClickandGoWayFinding Maps (<http://www.clickandgomaps.com>) are highly-specific maps that can be downloaded to mobile devices or printed ahead of time. Lastly, Altix Vision (<http://www.altix.pl/index.php?lang=8>) creates tactilely discernible maps that provide sound output to describe key portions of facilities and guide visitors to their destinations.

³⁰Interview with Siinya Williams and Tim Mulhall (Aug. 13, 2014).

³¹Interview with Siinya Williams and Tim Mulhall (Aug. 13, 2014).

asthma by limiting allergen exposure. They have also been able to meet the needs of a student with attention deficit disorder by more closely monitoring his condition.³²

In addition to the *Summertime Science* program, the Center also runs a number of other camps, overnight activities, and other onsite and offsite activities. With the exception of the YES program, all of these programs are overseen by the Educational Programs Section (the Section). In the past, the Section has had little trouble meeting accommodation requests because they usually has a lead time of at least one week in meeting accommodation requests.³³ For instance, the team recalled that they accommodated a request by a parent of an autistic student requesting to have him moved up a grade and have his aide attend the camp with him. They also met requests for interpreters (both for different languages and for sign language interpreters). In meeting these requests, the Human Resources Department was able to help because they document linguistic specialization at the Center.³⁴

With respect to the Section, it has worked with the following organizations to meet the needs of its participants:

- **Easter Seals.** The Center has worked with Easter Seals to help address the needs of children with disabilities who take part in the *Summertime Science* program. Easter Seals also provides training to all Educational Programs team members who work with YES students.³⁵
- **Oasis.** The Center also works with Oasis, a local senior organization, whose members also take part in the *Summertime Science*. They also partner with McCormick House, a nearby senior living facility. YES students help at McCormick House and learn with seniors in shared projects, such as gardening. Oasis also provides training to all Educational Programs team members who work with YES students.³⁶
- **Life Skills.** The Center works with a group called Life Skills in helping meet the needs of children with autism at the Center's camps. Life Skills trains instructors every year at the Center. This is important because about 15% of the campers are autistic. Campers at the Center sometimes come with their own aides (who are typically provided by the state).³⁷

³²Interview with Siinya Williams and Tim Mulhall (Aug. 13, 2014).

³³Interview with Frieda Smith, Pam Braasch, and Paul Freiling (Aug. 13, 2014).

³⁴Interview with Frieda Smith, Pam Braasch, and Paul Freiling (Aug. 13, 2014). Requests for accommodations currently go through Human Resources or to the Visitor Services department. In the future, she may also use Terri Edney in her role as the Section 504 Coordinator.

³⁵Interview with Siinya Williams and Tim Mulhall (Aug. 13, 2014).

³⁶Interview with Siinya Williams and Tim Mulhall (Aug. 13, 2014).

³⁷Interview with Frieda Smith, Pam Braasch, and Paul Freiling (Aug. 13, 2014).

As with its ordinary visitor programs, the Center's camps and related programs have a number of promising highlights not readily known about or shared with the rest of the Center, that we believe is due to the aforementioned lack of resource/knowledge sharing between Center units. During our onsite interviews, none of the witnesses recalled knowing about the partnership with and training provided by Easter Seals, Oasis, or Life Skills. Visitors with disabilities and older visitors could potentially be served better if the Center extended potentially the training provided by Easter Seals, Oasis, and Life Skills beyond the camps program.

3.1.3. Emergency Evacuation

NASA found that the Center has procedures in place for emergency evacuation of visitors with disabilities. The Center hires two to three new security personnel each year. Each new security officer is trained in evacuation procedures and in the use and operation of emergency evacuation stair chairs (wheelchairs specifically designed for use on stairs).

At the time the Center was constructed, evacuation elevators were neither readily available nor part of building or accessibility codes. These elevators are fundamentally different from normal elevators insofar as they require a separate smoke-free airshaft and a dedicated electrical system. Where such elevators are not required or available, accessibility standards may require designating areas of rescue assistance where people with disabilities can await assistance from emergency services personnel. The Center has designated several areas near the landings of specific stairwells as areas of rescue assistance. These stairwells have dedicated stair chairs available to facilitate the evacuation of people with disabilities. In total, the Center has three stair chairs: two in the main Center building and one in the planetarium.³⁸

The Center's security team also provides emergency egress and safety training to other employees at the Center.³⁹ Because employees have different levels of interaction with the public, different training is provided to different individuals at the Center. For instance, both Anna Green and Bill Kelly, who direct presentations in the planetarium⁴⁰, David Giola, Becky Donovan, and other members of the Visitor Services team⁴¹, and Michelle McGruder (and possibly other members of the Visitor Services team who can serve as "Managers on Duty"⁴²) have received training in using the stair chairs.⁴³ In general, these personnel are primarily responsible for escorting people with disabilities to a safe set of stairs and for

³⁸Interview with Brad Robertson (Aug. 12, 2014).

³⁹Interview with Brad Robertson (Aug. 12, 2014).

⁴⁰Interview with John Lakey, Bill Kelly, and Anna Green (Aug. 12, 2014).

⁴¹Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014).

⁴²The Center always has a "Manager on Duty" available during business hours while the Center is open. The manager on duty acts as the central point of contact for other personnel at the Center. Interview with Jackie Mollet and Michelle McGruder (Aug. 13, 2014).

⁴³Interview with Jackie Mollet and Michelle McGruder (Aug. 13, 2014).

radioing security so they can bring a person with disabilities safely down with a stair chair; in general, it is responsibility of the Security Department to use the stair chair to evacuate people with disabilities.⁴⁴

The Center’s security team also works in close coordination with the Center’s Visitor Services team. In general, the Visitor Services team monitors where people with disabilities are located within the facility.⁴⁵ In the event of an emergency, the Visitor Services team is responsible for ensuring that people with disabilities are safely escorted out of the building or are brought to a designated area of rescue assistance where they will contact the Security team to be assisted out of the building.

3.1.4. Effective Communication

A key component to effective program access is ensuring effective communication with program participants. This section analyzes this vitally important requirement. The NASA regulations provide that,

Recipients shall take appropriate steps to ensure that no individual with a disability is denied the benefits of, excluded from participation in, or otherwise subjected to discrimination in any program or activity receiving Federal financial assistance because of the absence of auxiliary aids for individuals with impaired sensory, manual, or speaking skills.⁴⁶

This “effective communication” requirement means that Federal fund recipients must take steps to ensure that people with disabilities are not excluded based on disabilities that affect communication. This requirement may include providing sign language interpreters, transcripts, or braille or audio information.⁴⁷ Because meeting the “effective communication” requirement is essential for program participants in deriving equal opportunities and benefits from the Center’s programs, it is essential for meeting the Center’s overall program access requirements under Section 504. Further, Section 504 requires that recipients take appropriate steps to ensure that communication with their program participants (i.e., museum visitors, camp attendees) are available to program participants with impaired vision or hearing.⁴⁸

The Center appears to do a good job at providing effective communication at its popular planetarium and OmniMax Theater shows. The planetarium provides open captioning for

⁴⁴Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014).

⁴⁵Interview with Brad Robertson (Aug. 12, 2014).

⁴⁶14 C.F.R. § 1251.103(b)(3).

⁴⁷ The term “auxiliary aids” is defined in the NASA Section 504 definitions at 14 C.F.R. § 1251.102 (e). <https://www.federalregister.gov/articles/2016/01/22/2016-00610/discrimination-on-the-basis-of-disability-in-federally-assisted-and-federally-conducted-programs-and#h-22>

28 C.F.R. § 39.103.

⁴⁸14 C.F.R. § 1251.103(b)(8).

some⁴⁹ of its planetarium shows. These captions are displayed on two central screens readily visible to the audience. In addition, they also can provide scripts to participants who make their needs known ahead of time. The planetarium also has assistive listening devices (ALDs) that capture everything that goes through the main sound system.⁵⁰ SLSC informed NASA that the planetarium uses five base units and three ear pieces for its assistive listening devices (which permits three complete units at any given time). These have been provided to visitors since, as a best estimate, 1995 (but confirmed to be the mid-90s). They are Williams Sounds PPA Receivers; Receiver Model # R7-4 and are the exact same as the ones used in the OMNIMAX Theater. They were purchased together and some were installed in the Planetarium.⁵¹ The OmniMax Theater also includes several forms of accommodations to ensure effective communication⁵². In each case, people with disabilities tell the usher upon entering the theater of their needs, and they are provided the appropriate accommodation. The OmniMax Theater has 14 FM-based ALD receivers. Unlike planetarium presentations, the movie experience may be disrupted by providing open-captioning that is visible to all patrons. Thus, the OmniMax Theater has 35-40 plexiglass mirrors that can be used for rear window captioning. Normally, they have little trouble providing captioning as long as the film has an associated caption file. Captioning for most movies is done by WGBH Boston.⁵³ In addition, the Center's Visitor Center team has a budget item for the equipment needed to provide descriptive audio in the FY2017 budget. This technology provides a secondary audio track that audibly describes visual content of movies— thus enabling blind visitors to take part in the movie experience.⁵⁴

The Center is less consistent or successful at providing other forms of effective communication. Specifically, the following measures would help the Center meet its effective communication obligation better:

- **Improved Captioning in Exhibits.** While the Center has a number of video monitors associated with its exhibits, it has not provided open captioning at many of these exhibits.⁵⁵

⁴⁹ The Center further clarified post-onsite that some shows now in the archives have this option when requested. Live shows require an interpreter, which is accommodated when requested far enough in advance (Anna Green 8/26/15).

⁵⁰Interview with John Lakey, Bill Kelly, and Anna Green (Aug. 12, 2014).

⁵¹ Follow-up report provided by SLSC (March 4, 2016).

⁵²Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014).

⁵³The last time a movie did not have the appropriate caption file was *The Rocky Mountain Express* movie shown several years ago. This movie had a caption file but used a different and incompatible technology. In this case, the only accommodation that could be made was to provide an ALD. The Center does not have scripts available for their movies.

⁵⁴Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014). In general, audio description only requires a separate .wav sound file from IMAX that is played in synchronization with the movie. It is unclear if this budget item will be approved.

⁵⁵Interview with Joe Seidler, Dave Francis, and Chris Lucas (Aug. 13, 2014).

- **Better Use of Alternate Formats.** The planetarium has braille material as well as large-print material available to visitors.⁵⁶ The Center also has a braille map,⁵⁷ which blind users are offered or that can be reserved ahead of time.⁵⁸ In addition, the Center has a few children’s books available in braille.⁵⁹ On the other hand, the Center does not provide other materials in braille and does not have documents available in large print or other alternate formats.⁶⁰ The Center has indicated that it intends to provide more materials in alternate formats as “guided by program reviews conducted by the Accessibility Committee.”⁶¹
- **Need for Clear, Well-Understood Process for Requesting Sign Language Interpreters.** The Center needs a clearer and more effective way for visitors to obtain sign language interpreters. The planetarium staff indicated that they receive requests for sign language interpreters once or twice a year and that they contact Visitor Services to arrange for an interpreter.⁶² However, during our interview with the Visitor Services team, they indicated that they could not recall ever being asked to provide a sign language interpreter.⁶³ While the OmniMax Theater team has never had a request for a sign language interpreter in the last ten years, they noted that they can get sign language interpreters from the Central Institute for the Deaf.⁶⁴ At the same time, the OmniMax Theater team noted that they have a spotlight that has been used in the past with sign language interpreters brought in by other groups. Internally, the Center is somewhat better at making reasonable accommodations for its employees and provides a sign-language interpreter for one of its deaf employees for all of its staff meetings by allocating a portion of its budget for interpreters.⁶⁵ This information suggests that there is considerable confusion

⁵⁶In fact, their success has enabled them to reach out to other planetariums and to other ZMD facilities. For instance, Ms. Green has just worked with the St. Louis Zoo to provide durable braille labels. The planetarium has a thermal-based braille machine but has just received two other braille machines capable of creating double-sided braille and braille images. Interview with John Lakey, Bill Kelly, and Anna Green (Aug. 12, 2014).

⁵⁷Interview with Joe Seidler, Dave Francis, and Chris Lucas (Aug. 13, 2014).

⁵⁸Interview with Jackie Mollet and Michelle McGruder (Aug. 13, 2014). This map was created by Deb Busch, a blind volunteer at the Center. Interview with Joe Seidler, Dave Francis, and Chris Lucas (Aug. 13, 2014).

⁵⁹Section 504 Self-Evaluation for the St. Louis Science Center, p. 10 (June 13, 2014).

⁶⁰Interview with Cynthia Skaggs and Danielle Stewart (Aug. 13, 2014); Section 504 Self-Evaluation for the St. Louis Science Center, p. 10 (June 13, 2014).

⁶¹Section 504 Self-Evaluation for the St. Louis Science Center, p. 12 (June 13, 2014).

⁶²Interview with John Lakey, Bill Kelly, and Anna Green (Aug. 12, 2014).

⁶³Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014); Interview with Jackie Mollet and Michelle McGruder (Aug. 13, 2014).

⁶⁴Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014).

⁶⁵Interview with Deb Washington and Halcyone Brown (Aug. 12, 2014). The Human Resources staff has used an independent contractor for its sign language interpreting but has also obtained interpreters from the Southern Illinois University.

about how to arrange for a sign language interpreter at the Center. In addition, because the Center has no documented process for obtaining a sign language interpreter, visitors and patrons are effectively discouraged from obtaining the level of effective communication that Section 504 intends. Thus, a significant number of deaf and hard of hearing visitors may be effectively shut out of programs because they do not know how to request a sign language interpreter or that this option was even available to them.

3.1.5. Website and Mobile App Accessibility

Section 504's program access requirements, as well as the requirement to provide effective communications, include a recipient's deployment of electronic media, such as its website. While neither the Rehabilitation Act nor the Americans with Disabilities Act currently require organizations to follow specific design standards in *all* cases, website accessibility may be required for program access in *some* cases. Where an organization provides information to program participants, it is required to make that information available in a usable accessible format (e.g. large-print, braille, etc.) and this may *require* that web versions of that content are accessible.⁶⁶

The Center provides information about accessibility features at the Center on its website. Finding this information, however, is not straightforward. From the main site (www.slsc.org), a visitor needs to select the following links to find the accessibility page:

- Visit
- Planning Your Visit
- Shopping, Dining, Amenities
- Accessibility

At the time of the onsite portion of this review, the only information provided on this page indicated that the Center is accessible, that ramps and elevators serve the OmniMax Theater and planetarium, that rear-window open-captioning is available in the OmniMax Theater, and that a limited number of strollers and wheelchairs are available at no charge. Since the onsite review, the Center provided information on its Section 504 non-discrimination policy, the identity of the Section 504 Coordinator and her SLSC contact information, the SLSC Section 504 grievance procedure, and information on how to request accommodations. NASA nevertheless recommends that the Center should augment its accessibility page with additional information that would help the Center better meet the

⁶⁶See, e.g., *Martin v. MARTA*, 225 F. Supp.2d 1362 (N.D. Ga. 2002); U.S. Department of Justice, *Accessibility of State and Local Government Websites* (available at <http://www.ada.gov/publicat.htm#anchor-website>). In *Martin*, the court held that program access was violated when a public transit authority failed to provide schedule information in an accessible format (one such "format" was through its website). While *Martin* is an ADA Title II case, the program access requirements for ADA Title II entities are virtually identical to those for Section 504 recipients.

In general, web accessibility standards have changed. An excellent resource for web developers in web accessibility is the Web Content Accessibility Guidelines, available at <http://www.w3.org/TR/WCAG/>.

requirements of Section 504. For instance, as noted elsewhere in this report, this page should include practical information about the Center. This can include:

- Description of how to request a sign language interpreter
- Specific accessibility features (e.g. *Little Star that Could* or low-sensory Wednesdays)

The Center has indicated its intent to better publicize accessibility resources and to make this information available to visitors.⁶⁷

In order to be a useful tool for people with disabilities, however, the Center's Website needs to be accessible. The current website was launched in 2013 and is built around a template-based content management system.⁶⁸ This system enables the Center's Marketing and Communication team to update or add content through a set of web-based forms. The advantage to this system is that it requires no knowledge of HTML (hypertext markup language) or other coding expertise. This advantage comes at the cost of making it much harder or impossible to add special coding to make that content accessible. For instance, in some template pages, alternate text for images can be added and in other instances, it cannot be added.⁶⁹ The ability to add alternate text is critical to users with disabilities because a screen reader user would be unable to discern what an image represents without it. The Center does not currently have plans to make changes to the CMS system supporting its website.⁷⁰ The Center also has not had an accessibility review performed on its Website, but they have occasionally used free accessibility tools to roughly gauge the accessibility of their site.⁷¹

As part of this review, the Center's site was evaluated using an enterprise-level automated accessibility testing tool (HiSoftware Compliance Sheriff) and briefly reviewed using assistive technology (notably, the JAWS screen reader tool, used by over 70% of blind computer users, and NVDA, a free and highly popular screen reader). In general, our review indicated that the site was relatively readable using assistive technology, presented information with appropriate color contrast ratios, and was responsive to system and browser settings.

⁶⁷Section 504 Self-Evaluation for the St. Louis Science Center, p. 2 (June 13, 2014).

⁶⁸Interview with Cynthia Skaggs and Danielle Stewart (Aug. 13, 2014). From a technical perspective, the Center's website is based on a template-based content management system (CMS) using the open source Drupal CMS platform. This system was not developed by the Center's information services team. Interview with Terri Edney (Aug. 12, 2014). Instead, it was developed by an external contractor (inFuz) that was later acquired; any modifications to the underlying infrastructure would require an entirely new contract. Interview with Cynthia Skaggs and Danielle Stewart (Aug. 12, 2014).

⁶⁹Interview with Cynthia Skaggs and Danielle Stewart (Aug. 13, 2014).

⁷⁰Interview with Cynthia Skaggs and Danielle Stewart (Aug. 13, 2014).

⁷¹Interview with Cynthia Skaggs and Danielle Stewart (Aug. 13, 2014).

The most significant issue with the Center’s Website is that the headings (e.g. Visit, Learn, and Get Involved) are not keyboard accessible.⁷² Because users who are blind cannot use a mouse and must rely on keyboard navigation, this barrier has the ironic outcome of making the Center’s accessibility page completely inaccessible to blind visitors. In addition, because the “search” feature is also unreachable through the keyboard and is not labeled as a search field, there is no feasible way for a blind user to search for the Center’s accessibility page.

In addition, our review found a number of other less significant accessibility issues. For instance,

- The strip of social media sharing link buttons in the bottom right is not keyboard accessible.
- The “Connect with Us” table, which contains links to social media (usually a 2x3 grid of buttons that link to Facebook, Twitter, etc.) are not truly tables with data designed to be looked up in rows and columns. Rather, these tables are used to force a specific layout.⁷³
- Some elements using the FRAME, IFRAME, or OBJECT tags should provide *title* attributes so that assistive technology can describe these sections of the screen and allow for quicker navigation.
- Header tags, such as the use of the H4 tag on <http://www.slsc.org/amazing-science-demonstrations>, should not be used to force a specific style. Headers should be used in numerical order on the page to present a specific hierarchy of information.

In addition to their Web site, the Center also has a mobile app available on both the iPhone and Android platforms.⁷⁴ To create the app, Terri Edney worked with developers at AT&T. The app is for planning a visit to the Center based on the type of visitor and their interests. The app includes several cutting-edge features. For instance, the app includes an augmented reality view, allowing visitors to get a textual overlay of information by pointing their Android or Apple phone at different locations from inside the Center. It also includes a QR code reader that enables visitors to get detailed information by pointing their phone’s camera at QR codes printed on signage within the facility. In addition, the app allows for demographic information to be collected by the Research and Evaluation Department. The Center is thinking about making the app more robust as well as creating a separate app for the Education Department.

⁷²When a menu is displayed by hovering the mouse over the heading, the resulting menu can be navigated through the keyboard. This suggests that one relatively easy fix would be changing the code so that any action that is triggered by a mouse hover is also triggered on change of keyboard focus or detection of a keypress (e.g. enter key).

⁷³When tables are used for layout purposes, the preferred accessibility strategy is to use cascading style sheets (CSS) to present the desired layout and not use a table altogether. Alternately, the designer can follow the Accessible Rich Internet Application (ARIA) guidelines and specify *role=presentation* in the table so that modern assistive technology can describe the content accurately to a user.

⁷⁴Interview with Terri Edney (Aug. 12, 2014).

The app is built around a Web-based app that reformats information provided on a mobile Web site for the Center. This site uses a set of template-created pages parallel to (but different from) the Drupal-based CMS system used for the Center’s main site. Terri Edney controls the pages accessed by the app and says that it permits much finer control of page content. This allows her, for instance, to specifically add HTML and CSS coding to pages. This would also allow her to add accessibility features (such as alt attributes on image tags) to enhance accessibility. On the other hand, the system also allows her to add XML and JavaScript, which may complicate accessibility. Terri admitted, however, that working in these more problematic technologies is not something that she normally does.⁷⁵

The NASA team performed a brief review of the app, which we reviewed on both the Apple and Android platforms. In general, there were significant barriers for users with disabilities. For instance, both the “Build a Plan” and “View All Exhibits” features were very difficult or impossible to use through the Apple and Android accessibility features. In addition, many of the buttons or controls (e.g., back, skip forward, skip back, etc.) were improperly or inadequately labeled, so users with disabilities would have to guess about their functionality. Also, the YouTube videos accessed from within the app are not captioned.

3.2. Policies and Procedures

Section 504 and the NASA implementing regulation require grantees to adopt policies and procedures that help effectuate Section 504 compliance. In addition, Section 504 requires grantees to provide notice of these policies and procedures. A number of these requirements will be discussed in the section.

3.2.1. Section 504 Coordinator and Accessibility Committees

The NASA Section 504 regulations require grantees to designate a responsible employee for coordinating their compliance with Section 504.

(a) Designation of responsible employee. A recipient that employs 15 or more persons shall designate at least one person to coordinate its efforts to comply with this part.

Section 504 provides relatively little specific guidance for implementing this requirement. Technical assistance materials developed for comparable requirements under Title IX of the Education Amendments of 1972 and Title II of the ADA, however, provide additional assistance. References to Title IX below are intended to shed light on policy guidance issued by the Departments of Justice and Education in a context similar to Section 504 (i.e., a civil rights law intended to ensure equal opportunities in federally funded programs).

The Department of Justice and NASA regulations under Title IX of the Education Amendments of 1972 include roughly similar requirements for a designated responsible employee (DRE) and grievance procedures. Outside the formal regulatory process, the

⁷⁵Interview with Terri Edney (Aug. 12, 2014).

Department of Education has developed technical assistance material to further inform grant recipients of how to fulfill their Title IX obligations.⁷⁶ The Department of Justice has recommended that fund recipients abide by these recommendations⁷⁷ and has summarized the responsibilities and job requirements for the DRE. These responsibilities include,

- Providing consultation and information to potential complainants;
- Distributing and receiving grievance forms;
- Notifying parties, scheduling hearings, moderating procedures, monitoring compliance and timeliness, maintaining records, and training staff regarding grievance processes; and
- Providing ongoing training and technical assistance.

The core competencies of the DRE include,

- In-depth knowledge of Section 504 and general related knowledge of Federal and state non-discrimination laws;
- Knowledge of the recipient's grievance procedures and personnel policies/practices; and
- Ability to prepare reports on compliance activities, make recommendations to appropriate decision makers, diagnose and mediate differences of opinion.

According to the Department of Justice, for the DRE to be effective,

- The functions and responsibilities of the DRE must be clearly delineated and communicated to all levels of the entity, employees, and program participants; and
- The DRE must be provided all information and authority and access necessary to enforce compliance requirements.

Because these requirements are not specifically included as part of the Section 504, they should be used as rough guidelines for Section 504 compliance and not as strict requirements.

Shortly after being notified that it was being selected for a compliance review, the Center identified Therese (Terri) Edney, Senior Director of Information Services, as its first Section 504 Coordinator. Ms. Edney volunteered for the position of Section 504 Coordinator to work more closely with the disparate groups within the facility and because she wanted to

⁷⁶Department of Education (Office of Civil Rights), Title IX Grievance Procedures: An Introductory Manual (2d ed. 1987), available at <http://www.eric.ed.gov/>.

⁷⁷Department of Justice, Questions and Answers Regarding Title IX Procedural Requirements, available at <http://www.usdoj.gov/crt/cor/coord/TitleIXQandA.htm>.

know accessibility requirements better.⁷⁸ She has a strong background in project management.⁷⁹ Nevertheless, she has some serious challenges that both she—and the Center as a whole—face.

NASA learned during the onsite phase of the review that Ms. Edney has relatively little knowledge of disability rights laws, such as Section 504 of the Rehabilitation Act and the Americans with Disabilities Act, although she joined the Great Plains ADA Center in 2014, and the resources offered by this organization will provide her with additional training and knowledge/resource sharing. NASA also suggests that training by organizations like the National Association of ADA Coordinators would likely serve her since accessibility is a complicated area that requires a good understanding of the needs of many different types of disabilities. It also requires understanding how a complex set of laws and regulations (at the Federal, state, and local level) all overlap, work together, and sometimes conflict.

Second, during our interviews, relatively few individuals recognized Ms. Edney as the Section 504 Coordinator. As noted elsewhere in this report, one issue facing the Center is the relative lack of coordination and knowledge sharing between different sections of the Center. A successful Section 504 Coordinator needs to bring together and coordinate these activities so that sound practices are shared throughout the Center. In this regard, NASA typically recommends that museums and science centers develop and implement Section 504 groups that reach across organizations within the larger institution, such as an Accessibility Committee to assist Ms. Edney in her effort to establish a responsive and nimble accessibility program. During our interviews, Ms. Edney indicated an interest in forming an accessibility committee soon within the Center. An informal list of committee members would be:

- Barb Boyle (CFO),
- Cynthia Skaggs and Danielle Stewart (Marketing),
- Michael Schoenweis (Exhibits),
- John Wharton (Facilities),
- Chris Allen (Design and Signage),
- Deb Washington (Human Resources), and
- Brad Robertson (Security).

⁷⁸Interview with Terri Edney (Aug. 12, 2014).

⁷⁹Interview with Barb Boyle (Aug. 12, 2014). In addition, Ms. Edney holds an MBA in International Business. She also worked previously as a Senior Consultant for Arthur Anderson and as a Software Developer for FirstSoft, Inc. Section 504 Self-Evaluation for the St. Louis Science Center, pp. 3-4 (June 13, 2014).

Other people may include other several employees and volunteers with disabilities and other people from outside the Center.⁸⁰

The Center already recognizes the benefits of having a strong accessibility committee. As outlined in its Section 504 Self-Evaluation,

No policies at the Science Center currently require the designation of a 504 Coordinator or the institution of a regular Accessibility Committee. These will be some of the first policies reviewed to ensure long-term commitment to 504 compliance and accessibility. This team will then review existing policies and issue recommendations to enhance existing policy and fill any identified gaps. This initial review recommends the Committee examine needs such as:

- *Extending accessibility protections beyond employees to include volunteers, visitors, and other stakeholders who engage with the Science Center.*
- *Establishing a grievance policy (and related procedure) to ensure all stakeholders have the opportunity to voice concerns regarding accessibility in Science Center activities.*
- *Reviewing offsite program venues to ensure accessibility for all participants.*
- *Initiating organizational policy to adhere to ADA building statutes.*
- *Instituting an accessibility archive to track accessibility-related actions and policies over time.*
- *Ensuring regular review of policies to maintain high standards for accessibility.⁸¹*

These are certainly important goals and are particularly important for helping the Center meet the policy and procedural requirements set forth in the Section 504 regulations. In addition, however, an Accessibility Committee can help in a number of other areas:

- **Sharing and Coordinating Knowledge and Resources.** While the Section 504 regulations and related technical assistance material do not require the formation of an accessibility committee, having such a committee is particularly compelling for an organization like the Center. As noted above, our review of the Center indicated that it provides program access at a high level, but these efforts are stove-piped within their particular departments and are not shared (or even known) outside of their fairly narrow teams. In addition, to helping frame and develop basic policies at the Center, an accessibility committee would enable these teams to share their

⁸⁰Interview with Terri Edney (Aug. 12, 2014).

⁸¹Section 504 Self-Evaluation for the St. Louis Science Center, p. 5 (June 13, 2014).

experiences and lessons, pool resources, and make the entire Center optimally accessible for visitors with disabilities. For instance, the planetarium staff make their programming and facility available to blind visitors through Anna Green’s work with the Lighthouse for the Blind; an accessibility committee would help the Center prioritize other areas that could be helped most effectively by this partnership. In addition, the team overseeing the camps and overnight activities at the Center has strong partnerships with the disability community through its work with Easter Seals and Life Skills (an autism advocacy and support organization) and with the aging community (through its work with Oasis), yet the lessons learned and best practices have not been fully shared with the rest of the Center. Expanding these connections throughout the Center may also help Ms. Edney meet the new challenges of being the Center’s Section 504 Coordinator more effectively.

- **Development of Disability Training.** A Section 504 Coordinator, along with a robust accessibility committee, could also help organize and develop better training on disabilities for its staff. Based on our interviews, few people at the Center—with the possible exception of the Center’s Human Resource staff⁸²—receive any regular training focused on disabilities. For the rest of the Center’s staff, there is no training specific to disabilities.⁸³ At the same time, the Center provides an abundance of training to its staff on other topics. For instance, the Center provides diversity and sexual harassment training to all new employees. It also provides basic safety training (e.g., evacuation, active shooter, tornado training).⁸⁴ Members of the Visitor Services also go through the St. Louis Convention and Visitor Center (CVC) training.⁸⁵ Unfortunately, while outside groups do perform training at the Center on disabilities, the training is available only to the affected workgroups in the Center. Again, coordinating information through a central accessibility committee and Section 504 Coordinator could facilitate better knowledge sharing. For instance, during our interviews, we asked about training by outside groups at the Center and witnesses recalled a host of different, non-overlapping groups. The Center has indicated that it is moving to an online modular training program (called “BizLibrary”), which it hopes will make training units more accessible to employees and volunteers.⁸⁶ Part of this training should include modules relating to accessibility, and the content of those modules should be guided by the accessibility committee. At the same time, online training can never replicate the experience of live training and the Center would likely improve its overall level of program access

⁸²As part of their job duties, the Human Resources personnel are relatively well-trained about many aspects of disability rights. For instance, Deb Washington (Managing Director of Human Resources) has received a number of training sessions at conferences.

⁸³ Recently, these have focused on changes when the ADA Amendments Act was passed. Interview with Deb Washington and Halcyone Brown (Aug. 12, 2014).

⁸⁴ Interview with Bert Vescolani and Christian Greer (Aug. 12, 2014).

⁸⁵ Interview with Bert Vescolani and Christian Greer (Aug. 12, 2014).

⁸⁶ Interview with Bert Vescolani and Christian Greer (Aug. 12, 2014).

by extending its partnership with different disability-related groups to the Center as a whole. In addition, some alternatives to traditional training that have proven successful by other grantees include:

- *Disability Panel Presentations.* Other grantees have reached out to disability and arts access community groups and organizations to share their views in panel presentations with their staff. Learning from people with different disabilities, or those who regularly work with individuals with disabilities—each with different first-hand experiences—is a tool that reduces abstract principles to the practical application to and impact on people’s lives.
- *Disability Awareness Training.* Understanding legal obligations is clearly important for compliance, but an understanding of how individuals with disabilities interact with their environment is critical to achieving and maintaining Section 504 compliance in the context of that interaction (i.e., museum floor with exhibits). Direct experiential disability awareness training led by a trainer with a disability, or the provision of a near-experience for the trainees (i.e., use a wheelchair to navigate a museum) breaks down these barriers immediately.

3.2.2. Non-Discrimination Policy

To further ensure that program access, NASA’s Section 504 regulations include a requirement to provide notice of its nondiscrimination policies. Specifically,

(a) A recipient that employs 15 or more persons shall take appropriate initial and continuing steps to notify participants, beneficiaries, applicants, and employees... that it does not discriminate on the basis of disability in violation of section 504 and this part. The notification shall state, where appropriate, that the recipient does not discriminate in admission or access to, or treatment or employment in, its programs and activities. The notification shall also include an identification of the responsible employee designated pursuant to §1251.106(a)...⁸⁷

At the time of the onsite visit, the Center did not have a notice of non-discrimination policy for its visitors. Since the onsite visit, NASA found that SLSC has developed a non-discrimination policy, contained in its grievance procedure and published on its Web site. The non-discrimination policy can be found with the Section 504 grievance procedure, which is located at “Accessibility” sub-tab, under the “Shopping, Dining, Amenities” tab in the “Planning Your Visit” section of the SLSC website. This policy states:

It is the policy of the Saint Louis Science Center not to discriminate on the basis of disability. The Saint Louis Science Center has adopted a grievance procedure which provides for prompt and equitable resolution of complaints which allege any action prohibited by Section 504 of the Rehabilitation Act, the Americans with Disabilities Act

⁸⁷14 C.F.R. § 1251.107.

(“ADA”), and applicable state law. These laws prohibit retaliation against an individual who files a complaint regarding disability discrimination, files a grievance under this procedure, or cooperates in the investigation of such complaint or grievance. In accordance with the disability laws, persons who are qualified individuals with disabilities as defined by law may request reasonable accommodations which afford them equal opportunity to access, use, and/or participate in the programs, activities, and facilities available at the Saint Louis Science Center. Employees requesting reasonable accommodations should contact the Human Resources Department. The Saint Louis Science Center will provide those reasonable accommodations unless they would present an undue financial or administrative burden or make a fundamental alteration to the nature of the program or activity. If a requested accommodation presents an undue burden or makes a fundamental alteration, the Saint Louis Science Center will attempt to propose alternative solutions and/or accommodations which do not create such hardship or make such alteration. The Saint Louis Science Center will work in good faith with the person requesting the accommodation to determine the availability of an acceptable alternative. Visitors who wish to request a reasonable accommodation, or who have questions about that process, should contact: - See more at: <http://www.slsc.org/shopping-dining-amenities#sthash.NlXyzvrO.dpuf>

A review of the SLSC’s accessibility Web page also confirmed that it has identified an SLSC staff member (Ms. Edney) as the Section 504 Coordinator, with the address, telephone number, and email address to contact her.

While the Center’s non-discrimination policy conforms to Section 504 regulatory requirements, NASA recommends, if not done already, disseminating the policy and notification of the Section 504 Coordinator more widely, such as by postings throughout the Center, in other documents, and in electronic and social media. A truncated version of this notification can be used as necessary for brochures and other print media.

Grievance Procedures

The NASA Section 504 regulation also requires grantees to develop adequate grievance procedures.

(b) Adoption of grievance procedures. A recipient that employs 15 or more persons shall adopt grievance procedures that incorporate appropriate due process standards and that provide for the prompt and equitable resolution of complaints alleging any action prohibited by this part. Such procedures need not to be established with respect to complaints from applicants for employment or from applicants for admission to postsecondary educational institutions.

These regulations are based on the Department of Justice Section 504 regulations. These regulations and accompanying materials provide only general details about the requirements for a grievance procedure; the Department’s Title IX enforcement manual merely states, “Title IX regulations do not specify a structure or format for the grievance

procedures. Instead, each recipient must develop grievance procedures that most effectively provide for prompt and equitable resolution of complaints.”⁸⁸ Again, the Department of Education’s Title IX technical assistance material provides more useful benchmarks for an adequate grievance procedure.⁸⁹ While recognizing that institutions may be required to adopt unique grievance procedures, the Department of Education material does outline information the basic information sought in a complaint process:⁹⁰

- the name, address, and signature of the complainant;
- a sufficient description of the alleged discrimination to let the organization know what occurred;
- the identity of the injured party;
- the name and address of the institution alleged to have discriminated;
- the approximate date(s) on which the alleged discrimination took place; and
- sufficient background information to permit the organization to commence an investigation.

At the time of the onsite visit, SLSC did not have a formal grievance or complaint procedure for its visitors. The Center had informed NASA that a grievance procedure would be created and implemented in the future. In a review of SLSC’s Web site subsequent to the onsite visit, NASA found that SLSC has published and implemented a grievance procedure. The grievance procedure is located at the “Accessibility” sub-tab, along with the Section 504 non-discrimination policy and SLSC Section 504 Coordinator contact information.⁹¹ NASA has reviewed the grievance procedure, and it has the elements detailed in the Department of Education guidance above.

NASA found that the Center primarily relies on a “comment card” system for receiving complaints, though the Center clarified in its post-onsite review of this report that the comment cards are a system for collecting feedback from visitors about their overall experience, including both complaints and compliments. The cards are distributed directly to a random selection of visitors. The Center informed NASA that the Center’s Research and Evaluation team assesses feedback with a focus on resolving issues and improving services. The Research and Evaluation team enters the data into SPSS (statistical analysis software). Monthly, quarterly, and annual reports are generated that present the comments coded by tone and topic. These reports are available on the shared network drive⁹².

⁸⁸Questions and Answers Regarding Title IX Procedural Requirements, available at <http://www.usdoj.gov/crt/cor/coord/TitleIXQandA.htm>.

⁸⁹Department of Education (Office of Civil Rights), Title IX Grievance Procedures: An Introductory Manual (2d ed. 1987).

⁹⁰Id. at p. 16.

⁹¹ <http://www.slsc.org/shopping-dining-amenities>.

⁹² Draft report comment from Elisa Israel (August 2015).

The Center clarified post-on-site that, in general, individual comments are not forwarded to specific staff unless the comment describes a serious staffing issue or the visitor has requested a response and provided contact information. The comment cards are not intended to be available on request; this information is collated in the above-referenced reports. All staff have access to the monthly reports, which include the verbatim comments. Staff can review these reports and determine if/how to respond to any issues.⁹³ From there, the comments are distributed to the responsible team and addressed at that level.⁹⁴ If a complaint involves the Center as a whole, it goes to the Visitor Services team.⁹⁵ In addition, visitors can obtain a comment card by asking anyone working on the floor to provide one.⁹⁶ These comment cards, however, fail to seek the detailed information envisioned by the Title IX Enforcement Manual. Instead, the comment cards merely ask for a 1-4 rating of satisfaction, a space for a few comments, and the date of the visit. On the other hand, the comment cards are postage prepaid so visitors do not have to complete the cards immediately.

Dear Science Center Visitor,

We want you to have a good visit to the Saint Louis Science Center. As part of our continuing efforts to see how we are doing, would you please tell us if your experience at the Science Center was:

(Check ONE box)

Below 1 2 3 4 Above
Expectations ← → Expectations

We would also be pleased to have any comments you may wish to make:

Drop in any Mailbox.
Postage Free Date of Visit ____/____/____ Thank you

Figure 1. Basic Comment Card Used at the Center

Both the Educational Outreach team (that oversees the Center’s YES program) and its Educational Programs team (that oversees the Center’s other camps and scout programs) use different types of comment cards. These comment cards are larger and either beige or green. (In contrast, the regular comment card is a smaller white comment card.) Unlike the smaller white cards, the larger beige and green cards capture much more information.⁹⁷ The beige and green comment cards capture almost identical information; the beige card is for adults whereas the green card is for children. Information collected from these cards is

⁹³ Draft report comment from Elisa Israel (August 2015).

⁹⁴ Interview with Bert Vescolani and Christian Greer (Aug. 12, 2014); Interview with Barb Boyle (Aug. 12, 2014); Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014).

⁹⁵ Interview with Barb Boyle (Aug. 12, 2014).

⁹⁶ Interview with Barb Boyle (Aug. 12, 2014). Within the OmniMax Theater, complaints can also be orally conveyed to ushers who will work with attendees to address the problems immediately. Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014).

⁹⁷ Interview with Siinya Williams and Tim Mulhall (Aug. 13, 2014); Interview with Frieda Smith, Pam Braasch, and Paul Freiling (Aug. 13, 2014).

also analyzed by the Center’s Research and Evaluation team. Each card, however, is designed for general program assessment and improvement and does not seek the kind of complaint-related information needed for a grievance process.

ADULTS: Tell us what you think!

No, not at all Only a little Quite a lot Yes, definitely!

Did you, or others in your group, learn content and/or skills from this program?

Did you enjoy this program?

Did this program make you want to try another experience with science or technology?

Did this program reinforce or increase any positive attitudes you have towards science or technology?

Please describe what you got out of this program:

How could we improve this program?

Your age: Under 5 6 – 10 11 – 13 14 – 17 18 – 24 25 – 34 35 – 44 45 – 54 55 – 64 65+

Including today, how often have you tried a Science Center program or visited the Science Center? (Check one.)
 1st time ever 1st time in last 12 months 3-4 times/year 5+ times/year

To receive Science Center information and invitations to participate in our surveys, please give us your e-mail:

I am... Male Female Science Center Member? Yes No ZIP _____

Figure 2. Adult Comment Card for Programs

KIDS: Tell us what you think!

Not at all Only a little Quite a lot A whole lot!

How much did you learn from this activity?

How much did you like this activity?

How much did this activity make you want to try another science activity?

How much did this activity help you like science?

Please tell us what you got out of this activity.

How could we make this activity better?

Your age: Under 5 6 – 10 11 – 13 14 – 17 18 – 24 25 – 34 35 – 44 45 – 54 55 – 64 65+

Including today, how often have you tried a Science Center program or visited the Science Center? (Check one.)
 1st time ever 1st time in last 12 months 1-2 times/year 3-4 times/year 5+ times/year

Does your family have a Science Center membership? (circle one) Yes No

I'm a ... Boy Girl My ZIP code is ... _____

Figure 3. Child Comment Card for Programs

In addition to the comment card process, the Center also has a general Web site address for receiving comments.⁹⁸ In addition, it receives inquiries and comments through different social media channels (e.g., Twitter, Facebook, etc.). On a monthly basis, the Center receives approximately 200 emails, 25 comments on Facebook, and 15 on Twitter.⁹⁹ About 35 to 50% are actual comments (most are simply questions) and these comments are forwarded directly to the relevant department. Comments received through the Web site or other digital means, however, are not logged into the Center’s spreadsheet used for comment card responses.¹⁰⁰ While email and social media permit complainants to provide much more detailed information about their complaints, they fail to elicit the specific details needed for a complete investigation and resolution of the complaint.

To bolster the Center’s grievance process, the Center needs to develop a form that is readily available from Visitor Services seeking the detailed information called for in the Title IX Enforcement Manual as described above. It also needs to have a documented grievance process that gives complainants a clear understanding of how the Center will investigate and resolve these complaints. This process, and the complaint form, need to be readily available, including being posted prominently on the Center’s Web site. As noted earlier in this report, the comment cards are a good way for improving overall program access at the Center; however, the comment cards alone are inadequate for forming the basis of a Section 504 grievance process.

The information gathered during the course of this review suggests that the Center has received some complaints regarding accessibility, with a mix of suggestions for improvement to the Center’s level of accessibility, including assertions that a particular

⁹⁸Interview with Barb Boyle (Aug. 12, 2014).

⁹⁹Interview with Cynthia Skaggs and Danielle Stewart (Aug. 12, 2014).

¹⁰⁰Interview with Cynthia Skaggs and Danielle Stewart (Aug. 12, 2014).

program feature or service was inaccessible, or that information on accessible services was not made available. Addressing both of these issues can improve program access while helping to ensure compliance with Section 504. The witnesses that we interviewed recalled a complaint relating to disabilities. One complaint involved the family restroom in the lobby. While the bathroom met the accessibility requirements, a volunteer with a disability was unable to use it. Another complaint involved a long walk from parking to the main entry to the building. This will eventually be solved when the Center creates a new entrance on the south side of the building.¹⁰¹ Because the OmniMax Theater has a dedicated accessible entrance, the most frequent complaint at the theater comes from people with disabilities who were not told to go to the accessible entrance on the third floor.¹⁰²

In addition, the Center's information response request included the following complaints and recommendations:

- "I suggest adding motorized assistance for the moveable exhibits [in the Special Exhibits section]."
- "As a handicapped adult, I would like to see more seating in the exhibits."
- "We are members. Our visit was to see OmniMax film Jerusalem. My husband was in a wheelchair and we were lucky to have a place to sit. You need more room for wheelchairs and walkers."
- "I was disappointed that the parking spots for visitors with disabilities were part of the \$10/park lot and located far from the entry. This was difficult to navigate. Thanks for your time."
- "Saw Jerusalem. No closed caption for deaf. No information on accommodations for disabled – saw an old woman trying to climb all the stairs. Too sad."
- "The elevator (inside) a little confusing about what floor to get off on for wheelchair access to the OmniMax Theater."
- "Need more seating on 3rd floor outside Omni."

As noted earlier, a grievance process is a procedural requirement under the NASA Section 504 regulations for grant recipients. Having a clear grievance process, however, is more than a pro forma requirement; it enables complaints to be addressed in a meaningful way and reduces the chances that legitimate complaints are not filed because complainants believe that they will be ignored or not taken seriously. While the lack of complaints may reflect the overall good accessibility of programs at the Center, it may also suggest that

¹⁰¹Interview with John Wharton (Aug. 12, 2014); Interview with Barb Boyle (Aug. 12, 2014).

¹⁰²Interview with Jackie Mollet, Becky Donovan, and David Gioia (Aug. 12, 2014). In general, ushers and ticket sales personnel try to identify people with disabilities and notify them quickly that they need to go to the third floor for the accessible entrance. Sometimes, they can't reach them in time and the complaint isn't about reaching the accessible entrance but getting there in time for the beginning of the show.

complainants do not believe that complaints will be taken seriously in light of the absence of a clear grievance process. Developing and publicizing such a process would help ensure that all complaints are voiced.

3.2.3. Self-Evaluation and Transition Plan

NASA's Section 504 regulations require fund recipients to conduct a self-evaluation within three years of becoming a recipient.¹⁰³ Further, these Section 504 regulations require fund recipients to create a transition plan for taking the necessary steps for ensuring program access.¹⁰⁴

The Center performed a Section 504 Self-Evaluation¹⁰⁵ between May-June 2014 after it had been notified of its selection for a site review. A copy of this self-evaluation was provided to the NASA team prior to the site visit in August 2014.

The information gathered during this review suggests the Center may have had a number of other evaluations in the past. Many years ago, the Association of Science-Technology Centers (ASTC) may have reviewed the Center's accessibility.¹⁰⁶ More recently, Paraquad, a disability and advocacy center adjoining the Center's main building, has also performed accessibility reviews of the Center.¹⁰⁷ Paraquad also has regular group visits to the Center and to the OmniMax Theater.¹⁰⁸ Diane Miller, a former employee who founded the YES program at the Center, was involved in assessing the accessibility of the Taylor Center. At the time, she formed a committee to do a review of the facility (unfortunately, we were not able to interview Diane, as she left the Center in April 2013).¹⁰⁹ The Center has asked Paraquad, a local school for the deaf¹¹⁰, and the Lighthouse for the Blind to review prototypes and new designs for accessibility as each of these organizations bring groups of visitors to the Center.¹¹¹ These self-initiated reviews have yielded improved program access at the Center. For instance, their work with Paraquad led to the modification of an

¹⁰³14 C.F.R. § 1251.105(c).

¹⁰⁴14 C.F.R. § 1251.301(d).

¹⁰⁵This self-evaluation was based on the Section 504 Self-Evaluation Workbook (OMB number 3135-0101), available from the National Endowment for the Arts at <http://arts.gov/open-government/civil-rights-office/section-504-self-evaluation-workbook>.

¹⁰⁶Interview with Joe Seidler, Dave Francis, and Chris Lucas (Aug. 13, 2014).

¹⁰⁷Interview with Barb Boyle (Aug. 12, 2014); Interview with John Wharton (Aug. 12, 2014). This relationship developed when the Center sold property to Paraquad (the property for the Center's central facility adjoins Paraquad's property). The transferred property is subject to a joint use agreement and so the two entities coordinate and event planning on a regular basis. Interview with Barb Boyle (Aug. 12, 2014).

¹⁰⁸Interview with Jackie Mollet, Becky Donovan, and David Giola (Aug. 13, 2014).

¹⁰⁹Interview with Siinya Williams and Tim Mulhall (Aug. 13, 2014).

¹¹⁰ The Center clarified in its review of the draft report that this may be the Central Institute for the Deaf in St. Louis. (August 25, 2015)

¹¹¹Interview with Joe Seidler, Dave Francis, and Chris Lucas (Aug. 13, 2014).

earthquake exhibit that greatly improved program access. Specifically, on the ground floor of the facility, the Center had a raised platform above a device that would shake the platform so that visitors could experience what an earthquake would be like. This raised platform was inaccessible and placed at a sufficient height to make accessibility extremely difficult. Based on feedback from Paraquad, the Center installed a grab bar adjacent to the platform that shook much like the platform. This modification permitted the same overall experience as the shaking platform in a safe and easily accessible manner.¹¹²

The Center's insurance carriers also perform or require reviews on a regular basis, and often these reviews touch on accessibility.¹¹³ John Wharton, Managing Director of Facilities, has undertaken several surveys alongside architects at various times.¹¹⁴ Most of these accessibility reviews were confined to facilities specifically altered and did not include path of travel alterations; however, some of the more recent projects have included path of travel changes. For instance, in 2007, there was a review in which some key elements (e.g., signage) were included.¹¹⁵ A similar review was also undertaken by Ross and Baruzzini, a local architecture firm, during which it was determined that the Center needed addition visual strobe alarms, a fact that will not be repeated in the architectural accessibility section below, but was found to be true by NASA inspectors.¹¹⁶ In addition, each time a temporary exhibit comes to the Center, the exhibit is reviewed by the Center's Director of Security (Brad Robertson) as well as the Center's insurance carrier and the local Fire Marshal.¹¹⁷ These reviews occasionally include accessibility features of the exhibit and the spaces serving that exhibit.

While not required by the Rehabilitation Act, the Americans with Disabilities Act (ADA) imposes "path of travel" requirements on the Center whenever an alteration is undertaken by a public entity or private-sector organization serving the public (so-called "public accommodations"). The ADA's path of travel obligation is a detailed requirement set forth in the Department of Justice's ADA regulations.¹¹⁸ When entities like the Center make alterations to their facilities, they are also required to make additional accessibility upgrades to the areas serving the altered areas. For instance, if the Center makes alterations to a section housing exhibits, it may be required to make changes to areas along the route serving the altered area (including parking and approaches from exterior routes) as well as the restrooms, telephones, and drinking fountains serving the altered area.

¹¹²Interview with Joe Seidler, Dave Francis, and Chris Lucas (Aug. 13, 2014).

¹¹³Interview with Deb Washington and Halcyone Brown (Aug. 12, 2014).

¹¹⁴Interview with John Wharton (Aug. 12, 2014).

¹¹⁵This was primarily deferred maintenance review with a focus on code compliance—primarily using the International Building Code (IBC) and the American National Standards Institute (ANSI) requirements—but it also touched on accessibility. Interview with John Wharton (Aug. 12, 2014).

¹¹⁶Interview with Brad Robertson (Aug. 12, 2014).

¹¹⁷Interview with Joe Seidler, Dave Francis, and Chris Lucas (Aug. 13, 2014).

¹¹⁸ 28 C.F.R. § 35.151(b)(4)(public sector); 28 C.F.R. § 36.403 (2014)(private sector); see also, 42 U.S.C. §12183(b).

Further, these entities are required to remove architectural barriers as described above with a cost cap of up to 20% of the total cost of the alteration for these upgrades before the costs are considered “disproportionate” to the cost of the alteration.

While the Center is continually subject to different reviews, it needs to augment its current Section 504 self-evaluation and transition plan as necessary. As a best practice, organizations should regularly update their self-evaluations and transition plans so that the needs of visitors with disabilities receive primary consideration. For organizations like the Center, exhibits are constantly changing and new programs are continually being created. Because technology changes, there are always new ways of providing program access to the Center’s visitors. Finally, accessibility standards and guidelines also change. The only way to meet these challenges is to treat the transition plan as a “living” document. Further, the self-evaluation should be consulted at least annually with the alignment of budgetary considerations for meeting program access needs.

3.3. Architectural Accessibility

During its onsite review, NASA conducted a review of SLSC’s buildings, facilities, grounds and equipment required to be accessible to individuals with disabilities who use or participate in the Center’s programs, services and activities. Only those portions of the Center’s facilities accessible to the public were evaluated and space used exclusively by SLSC staff, such as office space, was not evaluated.

On August 25, 2015, SLSC responded in its comments to the draft report that a number of architectural barriers have been changed or removed due to changes in exhibit space. SLSC also informed NASA that its staff had conducted their own review of the barriers listed below and found that a number of the barriers to be in compliance with UFAS standards. In March 2016, SLSC provided photos¹¹⁹ of barriers they determined to be compliant, while also confirming that they used a Cen-Tech 24” Digital Level with Laser to assess each slope they found to be compliant. Any changes to or removal of barriers found by the review team, as well as barriers the SLSC determined comply with UFAS, will be noted in this section in **bold text** or in footnotes for each barrier.¹²⁰ While NASA stands by the accuracy of its measurements, NASA will not recommend or require corrective action of these specific barriers at this time. However, as long as SLSC is a NASA grant recipient or has applied for future NASA grants, NASA reserves the right to conduct a subsequent follow-up visit to SLSC perform a final determination of the barriers the SLSC claims are compliant with UFAS.

The architectural barriers based on programs offered in specific portions of the facilities and based on the NASA team’s site inspection are as follows:

¹¹⁹ NASA has the SLSC-provided photos on file but have not included them in this report in order to maintain report format integrity

3.3.1. Approach to Science Center Main Entrance & Accessible Parking

1. While the 22 designated accessible parking spaces in the main Science Center parking lot provide an adequate number to ensure program access, the following specific parking related barriers were found:

a. The 8-10 designated accessible parking spaces surrounding the area drain in this asphalt parking lot have surface slopes that exceed (up to 8.1%) the maximum 2.0% per UFAS 4.6.3 (see Figure 4). **SLSC found that three measurements of many yielded results above the allowable 2.0%. These measures showed 4.9%, 4.20%, and 2.2%. Measurements were unable to replicate the 8.1% indicated in the draft report.**



Figure 4. SLSC Accessible Parking with 8.1% Slope

b. The curb ramp that connects the accessible parking and the approach walk to the main entrance of the Science Center has a running slope steeper (at 9.3%) than 8.3% required by UFAS 4.7.2. **SLSC informed NASA that the running slopes for this curb ramp is 5.6% between the detectable warning mat and sidewalk and 4.9% on the detectable warning mat.**

c. The passenger loading zone in front of the main Science Center entrance has surface slopes that exceed (at 2.9%) the maximum 2.0% per UFAS 4.6.5.

2. The approach to the Science Center main entrance from the sidewalk and bus stops along Oakland Avenue (running north of the Science Center and parallel to the interstate) has steep (up to 5.4%) cross slopes in excess of 2.0% along the walkway connecting the public sidewalk and the walkway adjacent to the curved entry driveway in violation of UFAS 4.3.7¹²¹ (see Figure 5).



Figure 5. Approach with 5.4% Cross-Slope

3. The school bus pull-out between the Science Center main entrance and the parking lot lacks a curb ramp as required by UFAS 4.6.5 (see Figure 6).



Figure 6. School Bus Loading Area

3.3.2. Science Center-Main Lobby and General Circulation 1st Floor

1. Where retractable tape stanchions define queuing areas or block off elements, the extended tape is not cane detectable per UFAS 4.4. Note that as a "promising practice" the Science Center has addressed this issue in the Life Science Lab by installing two levels of retractable tape barriers that are cane detectable.
2. The group check-in counter (at 44") has no lowered portion for transacting business with group representatives who use wheelchairs as required by UFAS 7.2.

¹²¹ SLSC informed NASA that this portion of sidewalk and the curb ramp were constructed by the Missouri Department of Transportation (MODOT) in 2006 as part of a highway project funded by the Federal Highway Administration. NASA recommends that SLSC consult with MODOT on any modifications necessary to achieve program access.

3. The square 4-person tables set out in the balcony area overlooking the lower level lack adequate toe/knee space per UFAS 5.1 and 4.32 because of the base configuration. Provide 5% of the tables that are accessible.
4. The wall mounted fire extinguisher boxes are not cane detectable per UFAS 4.4.
5. The yellow railing surrounding the Energizer Ball Machine in the main lobby projects into the adjoining circulation routes in a manner that is not cane detectable per 4.4 (see Figure 7).



Figure 7. Rail at Energizer Ball Machine

6. The plaques on each side of the Child Mummy exhibit (near Life Science Lab) are not cane detectable per UFAS 4.4.

3.3.3. Science Center-Explore Store on 1st Floor

1. The checkout counter (at 43") has no lowered portion for transacting business with those who use wheelchairs as required by UFAS 7.2.
2. The underside of the light soffits along the walls opposite to and to the right of the checkout counter do not offer (at 75 1/2") the minimum required 80" head height per UFAS 4.4 (see Figure 8).



Figure 8. Low Soffit in Explore Store

3.3.4. Science Center-1st Floor Food Court

1. The new dining tables in the dining area lack adequate toe/knee space per UFAS 5.1 & 4.32 because of the base configuration. Provide 5% of the tables that are accessible.

3.3.5. Science Center-1st Floor Human Adventure Gallery

1. The wall mounted fire extinguisher/firehose box is not cane detectable per UFAS 4.4.
2. The protruding square tube viewing box off the "Illusive Ring" exhibit projects further than 4" into the circulation route at 32 1/2" AFF in violation of UFAS 4.4.
3. The protruding edge of the table at the "Ladle Rat, Rotten Hut" exhibit projects further than 4" into the circulation route at 28 1/2" AFF in violation of UFAS 4.4.
4. The protruding edge of the table at the "Brain Analogies" exhibit projects further than 4" into the circulation route at 28 1/2" AFF in violation of UFAS 4.4.
5. The protruding edge of the table at the "Motion Pictures" exhibit projects further than 4" into the circulation route at 28 1/2" AFF in violation of UFAS 4.4.
6. The protruding edge of the truncated pyramid frame at the "Mirrorly a Window" exhibit projects further than 4" into the circulation route at 28" AFF in violation of UFAS 4.4 (see Figure 9).



Figure 9. Typical Barrier for Blind Visitors

7. The protruding edge of the C-shaped table near the "Color Table" exhibit projects further than 4" into the circulation route at 28 1/2" AFF in violation of UFAS 4.4.
8. The protruding edge of the table at the "Color Table" exhibit projects further than 4" into the circulation route at 28 1/2" AFF in violation of UFAS 4.4.
9. The protruding edge of the tabletop at the "Peripheral Vision" exhibit projects further than 4" into the circulation route at 29 1/2" AFF in violation of UFAS 4.4.

10. The protruding edge of the extended viewer at the "Seeing Distance" exhibit projects further than 4" into the circulation route at 28 1/2" AFF in violation of UFAS 4.4.

11. The protruding edge of the table at the "Stereoscopic Vision" exhibit projects further than 4" into the circulation route at 28 1/2" AFF in violation of UFAS 4.4 (see Figure 10).

12. The protruding edge of the tables at the "Puzzling Collection" exhibit projects further than 4" into the circulation route at 28 1/2" AFF in violation of UFAS 4.4.



Figure 10. Another Example of Barrier of the Blind

3.3.6. Science Center-1st Floor Boeing Hall - Dinosaurs in Motion Exhibit

1. The wall mounted fire extinguishers are not cane detectable per UFAS 4.4.
2. The angled handle that controls the movements of the T-Rex exhibit is not cane detectable per UFAS 4.4.
3. The 40 1/2" high photo service counter has no lowered portion for wheelchair customers (UFAS 7.2) and the outside corners of the cantilevered counter are not cane detectable per UFAS 4.4.
4. The 39 1/4" sales counter has no lowered portion for wheelchair customers as required by UFAS 7.2.

3.3.7. Science Center-1st Floor Life Science Lab

1. The accessible lab sink in the lab classroom lacks insulation on the hot water and drain pipes underneath as required by UFAS 4.19.4.

2. The white wall mounted safety equipment storage cabinet in the lab classroom is not cane detectable per UFAS 4.4.
3. The wall mounted fire extinguisher in the lab classroom is not cane detectable per UFAS 4.4.
4. The leading edge of the large stainless steel cantilevered hand wash sink in the Activity Bench Lab is not cane detectable per UFAS 4.4 (see Figure 11).



Figure 11. Hand Sink not Cane Detectable

3.3.8. Science Center-1st Floor Accessible Family Restroom

1. The accessible lavatory lacks insulation on the hot water and drain pipes underneath as required by UFAS 4.19.4.
2. The bottom of the reflecting surface on the mirror over the lavatory is higher (at 41 3/4") than the maximum 40" specified in UFAS 4.19.4.
3. The 3/4" deep recessed diaper changing station handle will require tight grasping to operate in violation of 4.17.4.
4. The toilet seat is mounted higher (at 19 1/2") than the maximum 19" specified in UFAS 4.16.3.
5. Until future renovations dictate accessibility modifications in the inaccessible men's and women's public restrooms adjacent to this restroom, install new signs there stating that accessible restroom facilities are offered in this Family Restroom.

3.3.9. Science Center-Lower Level General Circulation Issues

1. The higher of the two drinking fountains opposite the public restrooms on this lower level is not cane detectable as required by UFAS 4.4.
2. The wall-mounted bag holding the evacuation chair for wheelchair users on the north side of the elevator tower is not cane detectable as required by UFAS 4.4.
3. The two informational plaques around the circular rail at the Woody T-Rex exhibit opposite the elevator are not cane detectable as required by UFAS 4.4.
4. The wall-mounted fire extinguishers are not cane detectable per UFAS 4.4.

3.3.10. Science Center-Lower Level Dig Site Exhibit Issues

1. The two informational plaques around the rail at the T-Rex exhibit next to the Dig Site are not cane detectable as required by UFAS 4.4.
2. The TV monitor on the exterior wall of the Lab structures (next to the Dig Site) is not cane detectable as required by UFAS 4.4.

The checker-plate portion of the ramp leading into the Dig Site exhibit is steeper (at 12.9%)¹²² than the maximum allowable 8.3% (UFAS 4.8.2) and the semi-circular bench at the top limits to the top landing is less (at 28") than the minimum 60" depth required by UFAS 4.8.4 (see Figure 12).



Figure 12. Ramp with 12.9% Slope

3.3.11. Science Center-Lower Level Paleo Lab Issues

1. The white letters of the sign on the glass to the right of the entry door do not contrast adequately and there is no wall-mounted tactile sign with comparable accessible text as required by UFAS 4.1.2(15).

3.3.12. Science Center-Lower Level Ecology & Environment Past Exhibit

1. The TV monitor (Mississippi River Facts) on the wall to the right as one enters this exhibit is not cane detectable as required by UFAS 4.4.
2. The TV monitor (Active Volcanoes) on the wall to the left as one enters the earthquake portion of this exhibit is not cane detectable as required by UFAS 4.4.
3. The three informational plaques in front of the "Pennsylvanian" exhibit are not cane detectable as required by UFAS 4.4.

¹²² SLSC measured the ramp and determined that it had a slope of 13.17%

3.3.13. Science Center-Lower Level Build-a-Dino Store

1. This review does not include the Build-a-Bear run tenant space as accessibility issues inside are generally believed to be associated with the tenant.

3.3.14. Science Center-Lower Level Center Stage Issues

1. The 4" high ramp up to the stage lacks edge protection required by UFAS 4.8.7 (see Figure 13).



Figure 13. Stage Ramp Lacks Edge Protection

3.3.15. Science Center-Lower Level Experience Energy Gallery

1. The Plexiglas "Experiencing Energy" exhibit sign on the wall to the left as one enters this gallery is not cane detectable as required by UFAS 4.4.
2. Some display tables (Measuring Energy, See-Thru Generator, Powered by the Sun, See-Thru Battery, Hand Battery) have a cantilevered portion at one end that is not cane detectable as required by UFAS 4.4.
3. The wall-mounted fire extinguisher box is not cane detectable per UFAS 4.4.
4. The TV monitor (EVIE: Unplugged) on the wall to the right as one exits the exhibit is not cane detectable as required by UFAS 4.4.

3.3.16. Science Center-Lower Level Meeting Rooms A-B

1. The entry door to the smaller of the two meeting rooms near the elevator (meeting rooms A-B) lacks (at 3") the minimum 18" latch-side, pull-side maneuvering clearance due to the placement of a structural column, in violation of UFAS 4.13.6 (see Figure 14).



Figure 14. Column Blocks Meeting Room Door

3.3.17. Science Center-Lower Level Classroom by Experiencing Energy Exhibit

1. The wall-mounted fire extinguisher is not cane detectable per UFAS 4.4.

3.3.18. Science Center-Lower Level Public Restrooms

1. The men's restroom has the following architectural barriers to program access:
 - a. The room identification sign (on the face of the door) lacks tactile characters required by UFAS 4.1.2(15).
 - b. The coat hooks in the entry vestibule are higher than 54" per UFAS 4.25.3.
 - c. There is no insulation on the hot water and drain pipes of the lavatories required by UFAS 4.19.4.
 - d. The vertically mounted diaper changing station has a handle higher (at 60 1/2") than the maximum allowable 54" per UFAS 4.27.3.

- e. The accessible toilet stall door lacks accessible pull hardware on the inside of the door and the coat hook on that door is higher than 54" per UFAS 4.17.5 & 4.22.7.
- f. The accessible toilet seat is mounted higher (at 19 1/2") than the maximum 19" specified in UFAS 4.16.3 (see Figure 15).
- g. The 42" long side grab bar is positioned less than 54" to the forward end as required by 4.17.6.



Figure 15. Seat Height 19-1/2" AFF

- h. The toilet paper dispenser (at 48") is further from the rear wall than 36" per UFAS Fig. 30(d).
 - i. The wall-mounted paper towel dispenser is not cane detectable per UFAS 4.4.
2. The women's restroom has the following architectural barriers to program access:
- a. The room identification sign (on the face of the door) lacks tactile characters required by UFAS 4.1.2(15) (see Figure 16).



Figure 16. No Tactile Signage

- b. The coat hooks in the entry vestibule are higher than 54" per UFAS 4.25.3.
- c. There is no insulation on the hot water and drain pipes of the lavatories required by UFAS 4.19.4.
- d. The vertically mounted diaper changing station has a handle higher (at 60 1/2") than the maximum allowable 54" per UFAS 4.27.3.

- e. The accessible toilet stall door lacks accessible pull hardware on the inside of the door and the coat hook on that door is higher than 54" per UFAS 4.17.5 & 4.22.7.
- f. The accessible toilet seat is mounted higher (at 19 1/2") than the maximum 19" specified in UFAS 4.16.3.
- g. The 42" long side grab bar is positioned less than 54" to the forward end as required by 4.17.6.
- h. The toilet paper dispenser (at 48") is further from the rear wall than 36" per UFAS Fig. 30(d).
- i. The wall-mounted paper towel dispenser is not cane detectable per UFAS 4.4.

3.3.19. Science Center-2nd Floor Cyberville Institute of Technology¹²³

- 1. The TV monitor (BC: The Abacus) on the wall to the left as one enters the exhibit is not cane detectable as required by UFAS 4.4.
- 2. The interactive terminal at "Behavior Station" sits on a table that lacks the minimum 27" high knee space for a wheelchair user to pull under (has stools on which others sit) per UFAS 4.32.3 (see Figure 17).
- 3. The overhanging sides of the counter holding the controls at the "Model Train" exhibit are not cane detectable as required by UFAS 4.4
- 4. The counter and left-side wall-mounted display at the "Bitworks" exhibit are not cane detectable as required by UFAS 4.4
- 5. The TV monitor on the wall to the right as one exits the exhibit is not cane detectable as required by UFAS 4.4.
- 6. The TV monitors on the wall Kinect interactive exhibit are not cane detectable as required by UFAS 4.4.



Figure 17. Table Lacks 27-Inch Knee Space

¹²³ The Center informed NASA post-onsite that Cyberville has been entirely renovated since the site visit. It is now the Makerspace gallery. (Comment to draft report by Chance Grannan – 8/26/15.)

7. The circular (3-D modeling stations) table in the middle of the Cyberville Graphics room is not cane detectable as required by UFAS 4.4.
8. The 25" high knee space under the "Mindball" table is less than the minimum 27" required by UFAS 4.32.3.

3.3.20. Science Center-2nd Floor Discovery Room Issues

1. The hot air hand drier on the concrete column is not cane detectable as required by UFAS 4.4.
2. The short ramp up to the tepee display/play area is steeper (at 14.5%) than 8.3% and has 1/2" high lips at the top and bottom of the ramp in violation of UFAS 4.8.2 and 4.5.2¹²⁴ (see Figure 18).



Figure 18. Steep Ramp at Tepee Area

3.3.21. Science Center-2nd Floor Lego Mindstorms

1. This area within Cyberville had no architectural barriers.

3.3.22. Science Center-2nd Floor Academy of Science Offices

1. The administrative offices of the Academy of Science is a tenant and no accessibility review was conducted in this tenant space.

3.3.23. Science Center-2nd Floor Public Restrooms

1. Until future renovations dictate accessibility modifications in the inaccessible men's and women's public restrooms on the 2nd floor, install new signs there stating that accessible restroom facilities are offered at the 1st floor family restroom.

¹²⁴ The Center informed NASA post-onsite that since the onsite visit, the Discovery Room has since been renovated, and this ramp has been removed. (Comment to draft report by Chance Grannan – 8/25/15.)

3.3.24. Science Center-2nd Floor OmniMax Theater

1. Where the stainless steel barricades and retractable tape stanchions that define queuing areas or block off some approach/egress routes, the barricades and extended tape are not cane detectable per UFAS 4.4.
2. The 315-seat OmniMax Theater offers a spot-lit area for live sign language interpreters, has 14 FM radio-style assistive listening headsets, and 35 "reverse caption" mirrors for those who are deaf or hard of hearing, but additional signage letting customers know of the availability of these features would ensure program accessibility in the most integrated setting appropriate to the nature of the service.
3. The 315-seat OmniMax Theater offers 2 pairs of wheelchair seating options approached from the mezzanine level, but the guard rail support posts limit (offering only 52" clear) the minimum 66" width for each pair of wheelchair seating areas. Note that the low walls only allow 61" clearance for each seating location (see Figure 19).

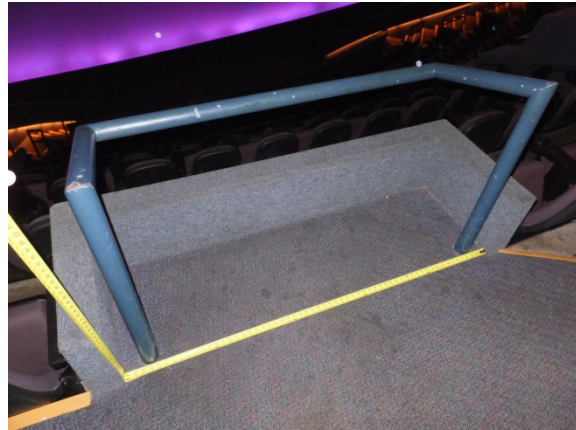


Figure 19. Narrow Wheelchair Seating in OmniMax

4. The accessible seating spaces are located on a mid-level area near the two top exit doors (used by wheelchair users as the main accessible entrances too) and dispersed for the best sightlines available given the age and layout of the theater. Along the route to the accessible backdoor entrances, a disabled customer would take the main elevator located closest to the ticket booths in the Main Lobby and turn right to ascend a curved ramp (slopes 7.8% - 8.0%) with three ramp runs which have the following accessibility barriers:

- a. On each of the three ramp runs, there is a handrail provided on only one side of the ramp rather than handrails on each side of the ramp runs as specified by UFAS 4.8.5 (see Figure 20).
- b. The wall-mounted "Elevator" sign along the outside wall of this ramp run does not offer (at 75 1/2") the minimum 80" head height required per UFAS 4.4.



Figure 20. Ramp to OmniMax Lacks Handrail

- c. Just beyond the top landing, there is a wall-mounted TV monitor and metal electrical box that are not cane detectable as required by UFAS 4.4.

5. Each of the two 64"-wide rear double-doors used for wheelchair customers to access the 4 wheelchair seating locations in the theater offer less (at 29 3/4") than the minimum 32" clear passage width for a single leaf of the double doors open at any given time per UFAS 4.13.4. There was a docent available at the time of my survey that said she and her colleagues would happily open the other door if needed by a disabled customer who was having trouble getting through only one door (see Figure 21).



Figure 21. OmniMax Accessible Entrance Doors

3.3.25. Science Center-2nd Floor Snack Bar at OmniMax ©Theater Lobby

1. The dining tables in the dining area of the snack bar lack adequate toe/knee space per UFAS 5.1 & 4.32 because of the base configuration. Provide 5% of the tables that are accessible.

3.3.26. Science Center-3rd Floor Administrative Office & Rooftop Deck

1. The 42 3/8" high reception service counter has no lowered portion for transactions with wheelchair users as required by UFAS 7.2.
2. The retractable tape stanchion in the outer lobby of the office (to close off that lobby for OmniMax performances after Center hours) is not cane detectable per UFAS 4.4.
3. The white wall-mounted AED device box between the elevator and the outer office lobby is not cane detectable per UFAS 4.4.
4. The conference room (Area 51) entry door has inaccessible round-knob hardware in violation of 4.13.9.
5. Rooftop deck off the executive office lobby, which is rented for gatherings, had no UFAS barriers.

3.3.27. Bridge/Tunnel Issues from Planetarium to 2nd Floor of the Science Center

1. The retractable tape stanchion in the "Experience Flight" simulator area is not cane detectable per UFAS 4.4.
2. The 3 "Experience Flight" simulators require use of steps to participate with no real way to make them wheelchair accessible. The "mission control" stations in the same area are accessible.
3. The 42" high service counter serving the "Experience Flight" simulators lacks a lowered portion for wheelchair users (UFAS 7.2) and the overhanging counter is not cane detectable per UFAS 4.4.

4. The wall-mounted fire extinguisher box in the tunnel leading from the planetarium to the bridge and opposite the entrance opening to the "Experience Flight" area is not cane detectable per UFAS 4.4.
5. The angled orange Plexiglas displays along the walls of the tunnel leading from the planetarium to the bridge are not cane detectable per UFAS 4.4 (see Figure 22).



Figure 22. Displays Not Cane Detectable

6. The wall-mounted boxes in the tunnel leading from the planetarium to the bridge at the "Why is Space so Expensive" exhibit are not cane detectable per UFAS 4.4.
7. The two expansion joints at the beginning and end of the bridge have level changes greater than 1/2" without ramped slopes limited to 8.3% per UFAS 4.5.2.

8. The west ramp option, of the two ramps at the planetarium end of the bridge, has steep cross-slopes (3.3%) in the upper ramp run in violations of UFAS 4.3.7, but the east ramp option is acceptable. Install directional signs at the top and bottom of these two ramps showing a symbol of accessibility with an arrow pointing to the accessible east ramp (see Figure 23).



Figure 23. Left (East) Bridge Ramp is Accessible

9. On the bridge, the yellow L-shaped supports for the radar speed devices are not cane detectable per UFAS 4.4.
10. The ends of the two green guard rails along the bridge end in a manner by which they are not cane detectable per UFAS 4.4.
11. The ramped portion (8.0%) of the bridge connection closest to the OmniMax snack bar lacks handrails on each side as required by UFAS 4.8.5.

3.3.28. Approach to Planetarium Main Entrance & Accessible Parking

1. While the current 6 designated accessible parking spaces in the main planetarium parking lot provide an adequate number to ensure program access, the following specific barriers were found:



Figure 24. Planetarium Accessible Parking

- a. All 6 designated accessible parking spaces in this asphalt parking lot have surface slopes that exceed (at up to 7.7%) the maximum 2.0% per UFAS 4.6.3 (see Figure 24).
 - b. The 34" high post mounted signs in front of these designated accessible parking spaces are not high enough to ensure visibility with a vehicle parking in the space, as required by UFAS 4.6.4.
 - c. The access aisles serving 3 of the 6 accessible parking spaces are not connected to the sidewalk in front of those spaces by an accessible curb ramp and the curb ramp serving the other 3 accessible parking spaces has cross-slopes (up to 3%) that exceed the maximum 2% allowed by UFAS 4.3.7, as does the walkway just north of the existing curb ramp (3.9% cross-slope).
2. The passenger loading zone in front of the planetarium entrance has a curb ramp with a running slope (at 10.1%) that exceeds the maximum allowable 8.3% per UFAS 4.7.2. **In March 2016, SLSC provided pictures to NASA that indicate that this ramp has a slope of 5.3% as well as a detectable warning mat on the face of the curb ramp.**
 3. On the right as one approaches the planetarium entrance doors, there is a stand pipe connection along the wall that is not cane detectable per UFAS 4.4.

3.3.29. Planetarium Ground-Level Issues¹²⁵

1. The higher of the two drinking fountains located between the two public restrooms on this level not cane detectable per UFAS 4.4.

¹²⁵ The Center informed NASA post-onsite that the planetarium ground level has been renovated since the site visit and several elements have been removed from this area of the Center's facility, which have been removed from this report. (Comment to draft report by Chance Grannan - 8/25/15.)

2. The "Create your own Laser Show" control station at the counter in the "Planetarium Memories" area is not cane detectable per UFAS 4.4. **This has been removed by SLSC post-site visit.**
3. The 40" high service counter in the "Planetarium Memories" area has no lowered portion for wheelchair users as required by UFAS 7.2. **This has been removed by SLSC post-site visit.**

4. The retractable tape stanchion behind the accessible box office sales counter is not cane detectable per UFAS 4.4.
5. The white wall-mounted AED device box near the "Explore the Universe" exhibit is not cane detectable per UFAS 4.4.
6. The two "leaning rails" and the Tinsley Telescope are not cane detectable per UFAS 4.4 (see Figure 25). **This has been removed by SLSC post-site visit.**



Figure 25. Leaning Rails and Telescope

3.3.30. Planetarium Gift Shop Issues

1. The 41 1/2" high sales and service counter has no lowered portion for wheelchair customers (UFAS 7.2) and the outside corner of the cantilevered counter is not cane detectable per UFAS 4.4.

3.3.31. Planetarium Restrooms on Ground Floor

1. The Men's restroom has the following architectural barriers to program access:
 - a. The room identification sign lacks tactile characters required by UFAS 4.1.2(15).
 - b. The flush handle of the accessible urinal is higher (at 45 1/2") than the maximum allowable 44" per UFAS 4.18.4.
 - c. The height of the accessible lavatory is 5/8" higher than the maximum 34" allowed by UFAS 4.19.2.

- d. The work surface of the unfolded diaper changing station is mounted higher (at 40") than the maximum allowable 34" per UFAS 4.27.3.
 - e. The accessible toilet stall door lacks accessible pull hardware on the inside of the door and the coat hook on that door is higher than 54" per UFAS 4.17.5 & 4.22.7.
 - f. The accessible toilet seat is mounted higher (at 19 1/2") than the maximum 19" specified in UFAS 4.16.3.
 - g. The toilet paper dispenser (at 48") is further from the rear wall than 36" per UFAS Fig. 30(d).
2. The women's restroom has the following architectural barriers to program access:
- a. The room identification sign lacks tactile characters required by UFAS 4.1.2(15).
 - b. The work surface of the unfolded diaper changing station is mounted higher (at 40") than the maximum allowable 34" per UFAS 4.27.3.
 - c. The accessible toilet stall door lacks accessible pull hardware on the inside of the door, is not positioned diagonally opposite the toilet (UFAS 4.17.3), and the coat hook on that door is higher than 54" per UFAS 4.17.5 & 4.22.7.
 - d. The accessible toilet seat is mounted higher (at 19 1/2") than the maximum 19" specified in UFAS 4.16.3.
 - e. The toilet paper dispenser (at 48") is further from the rear wall than 36" per UFAS Fig. 30(d).
3. The unisex-accessible family restroom has the following architectural barriers to program access:
- a. The room identification sign (on the face of the door) lacks tactile characters required by UFAS 4.1.2(15).
 - b. The work surface of the unfolded diaper changing station is mounted higher (at 40 1/2") than the maximum allowable 34" per UFAS 4.27.3.
 - c. The bottom of the reflecting surface of the mirror over the lavatory is higher (at 41 1/2") than the maximum allowable 40" per UFAS 4.19.6.
 - d. There is no insulation on the hot water and drain pipes of the lavatory required by UFAS 4.19.4.
 - e. The handle of the paper towel dispenser is mounted higher (at 60 3/4") than the maximum allowable 54" per UFAS 4.22.7.

- f. The accessible toilet seat is mounted higher (at 19 3/4") than the maximum 19" specified in UFAS 4.16.3.
- g. The 42" long side grab bar is positioned less than 54" to the forward end as required by 4.17.6.
- h. The height of the deadbolt lock on the interior side of the room entry door is higher (at 60") than the maximum 48" per UFAS 4.13.9.

3.3.32. Planetarium on the 2nd Floor

1. The planetarium (with 147 movable seats) lacks assistive listening headsets for the hard of hearing per UFAS 4.1.2(19)(b). **SLSC informed NASA in March 2016 that the planetarium uses five base units and three ear pieces for our assistive listening devices (which permits three complete units at any given time). They are Williams Sounds PPA Receivers, Receiver Model # R7-4, and are the exact same as the ones used in the OMNIMAX Theater. They were purchased together and then some were installed in the planetarium.**

3.3.33. Boeing Space Station Exhibits on the 2nd Floor

- 1. The underside of the monumental stair near the elevator that serves the Star Bridge exhibits above is not protected and is not cane detectable per UFAS 4.4 (see Figure 26).
- 2. The TV monitors in this exhibit are not cane detectable per UFAS 4.4.
- 3. The projecting elements at the "Crew Related Systems," "Science in a Box," "Microgravity in Space," and "First Aid in Space" exhibits are not cane detectable per UFAS 4.4.



Figure 26. Underside of Stair Not Cane Detectable

- 1. The coat hooks in the classroom lack a lowered place for wheelchair users to hang their coats per UFAS 4.25.3. **This has been removed by SLSC post-site visit.**
- 2. The computer carrel with three workstations has a counter that projects more than 4" into the circulation route above 27" and is not cane detectable per UFAS 4.4.
- 3. The roll-up shutter coil next to the NASA Galactic Center Region display is not cane detectable per UFAS 4.4.

3.3.34. Planetarium Restrooms on 2nd Floor

1. The men's restroom has the following architectural barriers to program access:
 - a. The room identification sign lacks tactile characters required by UFAS 4.1.2(15).
 - b. The accessible toilet seat is mounted higher (at 19 3/4") than the maximum 19" specified in UFAS 4.16.3.
 - c. The accessible toilet stall door lacks accessible pull hardware on the inside of the door, and the coat hook on that door is higher than 54" per UFAS 4.17.5 and 4.22.7.
 - d. The work surface of the unfolded diaper changing station is mounted higher (at 40") than the maximum allowable 34" per UFAS 4.27.3.
2. The women's restroom has the following architectural barriers to program access:
 - a. The room identification sign lacks tactile characters required by UFAS 4.1.2(15).
 - b. The work surface of the unfolded diaper changing station is mounted higher (at 40") than the maximum allowable 34" per UFAS 4.27.3.
 - c. The accessible toilet stall door lacks accessible pull hardware on the inside of the door, is not positioned diagonally opposite the toilet (UFAS 4.17.3), and the coat hook on that door is higher than 54" per UFAS 4.17.5 and 4.22.7.
 - d. The accessible toilet seat is mounted higher (at 19 3/4") than the maximum 19" specified in UFAS 4.16.3.
 - e. The toilet paper dispenser (at 45") is further from the rear wall than 36" per UFAS Fig. 30(d).

3.3.35. Boeing Star Bridge Exhibits on the Mezzanine Level

1. The underside of the curved structural members that define the outer limits of the Star Bridge display are not cane detectable per UFAS 4.4. (see Figure 27).
2. The projecting elements at the "Remote Manipulator Area" and "Magnetic Puzzle Games" exhibits are not cane detectable per UFAS 4.4.



Figure 27. Less than 80" Height at Curved Structure