



SECTION 504 COMPLIANCE REVIEW



**U.S. Space and Rocket Center
Huntsville, Alabama**

Office of Diversity and Equal Opportunity

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1. Executive Summary

This report summarizes an extensive review of the U.S. Space and Rocket Center (“USSRC” or “Center”) under Section 504 of the Rehabilitation Act of 1973 by NASA.¹

In general, the Center does a good job at meeting the requirements of Section 504 of the Rehabilitation Act. This report memorializes the Center's successes and identifies areas where additional work can be undertaken by the Center.

1. **Designated Responsible Employee and Grievance Procedures.** The Center meets the formal requirements of Section 504 by designating a responsible employee and establishing a grievance procedure. Some additional changes, however, would further ensure that these requirements are met. For instance, the Center should consider ensuring that the Designated Responsible Employee is closely advised by the Aerospace Division of the Center and should more broadly educate employees and visitors of their rights under Section 504. In addition, reestablishing a disability community that includes representatives from all public-facing sectors of the Center will help further ensure that these requirements are met.
2. **Physical Accessibility.** Despite the challenges created by older portions of its facilities and the geographic terrain of the Center's property, the Center does a good job of providing an overall program access for participants in Space Camp and for visitors to the Center. Nevertheless, the Center has a number of architectural barriers that greatly impede independent access and that should be remediated as part of the Center's overall capital improvement planning. The Center can also take additional steps to better educate visitors with disabilities about steps that they can take to maximize their enjoyment of the Center.
3. **Policies and Procedures.** Over the last 20 years, the Center has done a great job of improving access for people with disabilities. The Center's SCIVIS program serves as a model for the industry and provided additional impetus for the Center to seriously consider the challenges created by disabilities. As a consequence, the Center does a great job of accommodating its visitors, predicting their needs, and imposing eligibility criteria only when necessary. Nevertheless, the Center can take steps to better educate its counselors and visitors. In addition, the Center should continue its work in developing excellent training materials tailored to specific categories of disabilities.
4. **Effective Communication.** The Center responds well to the communication needs of its visitors with disabilities. The Center can, however, take additional steps for ensuring that the visitors and participants understand the choices available to them. Doing so would likely improve the overall access of the Center's programs for users with disabilities affecting communication.

Accomplishing these goals will require leadership and commitment. It will also require organizational skills and the ability to work with people throughout the Center to develop and continually refine logical priorities. To meet this

¹ This review was performed by NASA with the assistance of BayFirst Solutions LLC and its subcontractor Bill Hecker Design LLC.

challenge, this report concludes with a short set of implementation strategies to help the Center develop logical priorities and create clear processes.

2. Summary of Compliance Review

The following chronology summarizes the events relevant to developing this compliance review. This chronology also identifies many of the documents that are important for analyzing the USSRC's compliance with Section 504.

November 21, 2007	Detailed information request sent from NASA to USSRC.
February 9, 2008	USSRC provides a lengthy response, including a description of its programs and facilities and blueprints of several key facilities.
April 1-3, 2008	Site visit to USSRC by NASA team. During this site visit, the team interviewed the USSRC: <ul style="list-style-type: none">○ CEO○ Chief Operations Officer○ Executive Vice President○ Vice President, Aerospace○ Vice President, Human Resources○ Director, Aerospace Programs○ Director of Nursing○ Education Director○ Guest Services Manager

The team also performed a detailed architectural survey of the main USSRC where programs or services for the public are provided.

April 22, 2008	Description of minor deficiencies in the USSRC's new Davidson Center is provided to the USSRC. This "punch list" was provided to enable the USSRC to require its contractor to make the necessary changes, as required under Alabama state law, for newly-constructed facilities.
April 23, 2008	Additional information request sent to USSRC. This request was based on information gathered during the April 1-3 site visit.
April 25, 2008	DVD of all photographs is delivered to the USSRC. This DVD included approximately 2,500 photographs and is essential to enable the USSRC to quickly identify deficiencies in both the April 22 "punch list" and the report of Bill Hecker Design, LLC, attached in Appendix D.
May 15, 2008	Response to April 23 information request provided by USSRC.
August 7, 2008	Additional information provided by USSRC.

Throughout this review, the USSRC has been cooperative and forthcoming with information. This reflects the overall impression of attentive customer service that we saw time and again during our visit to the facility.

3. Analysis

The Center operates as a self-funded state agency, located in Huntsville, Alabama. All of the employees at the Center are Alabama state employees. The Center generates its revenue through school's tours, public tours, and its

various “Space Camp” operations. The Center also makes money through ticket sales for its movies and through merchandise sales. It receives approximately \$500,000 from the state of Alabama -- and this money can only be used for educational purposes. The Center is a leader in providing training for educators -- training approximately 900 teachers every year and providing valuable course material for them to take back to their classrooms as learning guides. The Center also receives some money from a lodging tax from hotels in Madison County (approximately \$850,000 per year) and it also sponsors a special license plate that earns approximately \$150,000 per year. The income allocated by the state is small in comparison to the operating budget for the Center of approximately \$25 million annually. In formulating the budget, the Center identifies its costs (including needed capital improvements) and then bases its charges for Space Camp and ticket sales upon this budget.

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....²

This requirement has been adopted by the NASA nondiscrimination regulations,³ which itemizes specific prohibitions against forms of discriminatory conduct.

The following discussion divides the Center’s response into four subsections where these regulations are applicable. Each subsection includes a summary of our review, a description of promising practices, and a listing of compliance issues and recommendations for additional changes for the Center to pursue.

3.1 Designation of Responsible Employee and Grievance Procedures

The NASA Section 504 regulations make clear that fund recipients must designate a responsible employee and adopt grievance processes.

(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.

(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.

Relatively little specific guidance exists for fund recipients for implementing these Section 504 requirements. The Department of Justice and agency regulations under Title IX of the Education Amendments of 1972 include roughly similar requirements for a designated responsible employee and grievance procedures. Outside the formal regulatory process, the Department of Education has developed technical assistance material to further inform grant

² 29 U.S.C. § 794(a) (2008).

³ 14 C.F.R. § 1251.103 (2008).

recipients of how to fulfill their Title IX obligations.⁴ The Department of Justice recommends fund recipients to abide by these recommendations,⁵ and has summarized the responsibilities and job requirements for the designated responsible employee. 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 designated responsible employee 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 designated employee to be effective,

- The functions and responsibilities of the designated employee must be clearly delineated and communicated to all levels of the entity, employees, and program participants, and
- The designated employee 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.

3.1.1. Discussion

The Center has both an ADA policy statement⁶ and a grievance process,⁷ both of which are contained in the Center's employee manual and made available to all employees. The Center also has a complaint form⁸ to facilitate the filing of grievances by employees. As noted in their February 9 response, the Center has also designated the Vice

⁴ Department of Education (Office of Civil Rights), *Title IX Grievance Procedures: An Introductory Manual* (2d ed. 1987), available from <http://www.eric.ed.gov/>

⁵ see *Questions and Answers Regarding Title IX Procedural Requirements*, available at <http://www.usdoj.gov/crt/cor/coord/TitleIXQandA.htm>.

⁶ A copy of the Center's ADA Policy Statement is attached in Appendix A.

⁷ A copy of the Center's grievance process is attached in Appendix B.

⁸ A copy of the Center's complaint form is attached in Appendix C.

President, Human Resources (VPHR), as its Designated Responsible Employee. These steps are consistent with the wording of NASA Section 504 regulation.⁹

During our April 1-3 review at the USSRC, however, we found that the Aerospace Program team under the Executive Vice President, had particular expertise in meeting the specific needs of people with disabilities. This team, which runs the Center's highly-successful Space Camp program (including the SCIVIS camps devoted entirely to Space Camp attendees with disabilities), works regularly with people with disabilities and has developed special procedures and strategies for accommodating their needs. Until recently, this team met regularly to discuss current issues and successful strategies in accommodating their visitors with disabilities. By contrast, we found that the VPHR's knowledge of disability rights laws is more focused on employment issues. Because NASA is particularly concerned with the overall program access required under Section 504, a member or committee from the Aerospace Program should assist the Center's Designated Responsible Employee.

In August 2008, the Center advised NASA that it was forming a disability committee and that one of the members of this committee would be designated as DRE for the Center. According to the Center, this committee will include the VPHR, the manager of guest services, the directors of Space Camp operations and Nursing, and the counselor training manager. In addition, both the Executive Vice President of the Aerospace Program and Center's Chief Operating Officer will serve as ad hoc members of the committee. This committee will meet quarterly and review policies, procedures, complaints and compliance. This committee will ensure that appropriate actions are taken to address and correct any issues.

Our review did not include meeting with each of the Center's counselors and employees. It was clear, however, that counselors at the Center have a plethora of resources and training material available to them. As acknowledged during our meeting with the Executive Vice President's Aerospace Program team, this material can be easily overwhelming to new employees and that refresher training may be a useful idea.

3.1.2 Promising Practices

As a customer-focused organization, the Center spends considerable resources training its staff and provides four weeks of training for each of its counselors. This dedication to the needs of its visitors is also reflected in the low incidence of complaints by visitors. During our review, we were only able to identify less than a half-dozen complaints, which is remarkably low for an organization that receives approximately one half million visitors each year.

The Center has demonstrated a strong commitment to the needs of visitors with disabilities. Through the special camps that it operates for people with disabilities, its success in integrating people with disabilities into its regular operations, and its close working relationship with the West Virginia Schools for the Deaf and the Blind, the Center has excellent resources available to it. Bringing these resources together with regular committee meetings is an excellent strategy that the Center should reestablish in the future.

The Center has noted that they have had an increasing number of children with disabilities participating in their Space Camp program. They have also seen an increase in the number of students with multiple disabilities. They have also observed an increase in the number of students who are autistic or who have Asperger Syndrome (they noted that two to three autistic students were currently enrolled this week in Space Camp).

The Center originally hired counselors who were focused on a science background. More recently and in response to their changing needs, they have focused on hiring counselors who had a focus on special education and teaching

⁹ 14 C.F.R. § 1251.106-.107.

careers. Some of their counselors have disabilities and others are trained to work with particular types of disabilities. When new counselors are hired, the Center tries to identify particular types of accommodations that they are good at. For instance, the Center will identify counselors with a background in special education or with a proficiency in sign language. The Center also tries to identify those areas that counselors are not good at or prefer to avoid. In so doing, the Center tries to align the needs of Space Camp participants with the special skills and abilities of its counselors.

3.1.3 Compliance Issues

As noted above, relatively little guidance exists for the designation of a responsible employee and the establishment of grievance procedures under Section 504. Because the Title IX recommendations described above have not been formally adopted into NASA's Section 504 regulations, these Title IX requirements serve as only guideposts in developing a Section 504 program. We observed no obvious deficiencies during the course of our compliance review.

Nevertheless, several steps in the short-term would further help minimize the likelihood of any discriminatory impact on persons with disabilities:

1. **Ensure that the Aerospace Division Assists the Current DRE.** Section 504 requires that federal fund recipients ensure that qualified individuals with disabilities are not subject to discrimination in the recipient's programs, services, or activities. The analogous Title IX requirements more clearly identify a need for the DRE to possess expertise in nondiscrimination. The team reporting to the Executive Vice President in the Center's Aerospace Division faces the challenges of meeting the needs of various disabilities on a daily basis and has developed successful strategies for meeting these needs. The disability committee and new DRE (as indicated in the Center's August 7 response) should augment compliance with Section 504 and should be implemented as soon as possible.
2. **Ensure that Employees Better Understand the Grievance Process and the DRE.** The Center has a well-documented set of procedures and policies for its employees. The Center's policy manual is quite extensive and includes a number of different forms. Counselors also engage in a four-week intensive training program, which is based on a training manual that is over 200 pages long. During our visit to the Center, interviewees acknowledged that the training process is overwhelming. While the Center appears to have an adequate grievance process and identification of its DRE, it is not clear whether this is known to all employees. Currently, the DRE is the only person at the Center who receives regular training on disability issues. During our site visit, the Center expressed no objection to the idea of expanding regular disability training (including refresher training on an annual or semiannual basis) to all managers and supervisors who had any responsibility for interfacing with the public.
3. **Ensure that Visitors Better Understand the Grievance Process and DRE.** Unlike employees, visitors to the Center have relatively few resources available to them. During our review at the Davidson Center and throughout our visit to the facility, there were relatively few pamphlets and brochures available to visitors. During our examination, it was not clear whether visitors would have reason to know about the Center's grievance process or its DRE. These deficiencies can be corrected by the Center through providing additional publications, based on brochures currently available from NASA¹⁰ or from publications available from the Department of Justice.¹¹ The Center can also make more resources available on its website that reminds visitors of their rights under Section 504. Another possibility

¹⁰ <http://www.hq.nasa.gov/office/codee/documents/nondiscrimination.pdf>

¹¹ Adaptive Environments Center et al, *ADA Title II Action Guide*, pp. 40-43.

identified during our interviews for providing better notice to the public is to print a description of where to find additional information on the back of its tickets.

3.1.4 Additional Recommendations

Our site visit revealed that the Center does an exceptional job at meeting the needs of participants with disabilities at its Space Camp. Each year, the Center dedicates its facilities to SCIVIS, a Space Camp devoted to students with vision and hearing impairments, and our review indicates that the Center fully meets their students' needs, provides a fully immersive and barrier-free experience, and provides a once-in-a-lifetime opportunity for developing leadership and self-confidence among its participants. In return, the Center also learns about accommodating its participants with disabilities and it carries those lessons learned back to its general Space Camp operations. The Center would likely benefit from sharing these experiences and this awareness throughout all areas of the Center. The Center should consider implementing these recommendations as soon as possible.

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The Center has responded to these opportunities by announcing the formation of an disability committee that comprises members representing all customer facing divisions within the Center. This effort should go a long way to furthering the Center's position as a leader for Section 504 compliance.

3.2 Architectural Accessibility

The NASA Section 504 regulations distinguish between existing facilities and newly constructed or altered facilities. Newly constructed facilities and alterations must be "readily accessible to and usable by" people with disabilities.¹² In general, this means that such facilities and alterations must meet the stringent Uniform Federal Accessibility Standards (UFAS).¹³ By contrast, for existing facilities, NASA fund recipients must ensure that their programs or activities are accessible "when viewed in their entirety."¹⁴ This requirement does not mean that every physical feature of a facility must meet the UFAS standards, but the UFAS standards generally provides a useful benchmark for those portions of a facility that are used for programs, services, or activities.

3.2.1 Discussion

Bill Hecker from Hecker Design LLC performed a thorough architectural review of the facility that included over 2,500 photographs of measurements and architectural elements. A copy of the DVD containing all of these photographs has already been provided to the Center and NASA. Mr. Hecker is one of the nation's foremost experts on accessibility, both from an architectural and programmatic perspective.¹⁵ This report presents the team's review regarding the physical accessibility of the Center including:

- an overall description of the facilities reviewed
- existing deficiencies that interfere with program access
- references to photographs depicting highlighted elements
- short- and long-term solutions that the Center should undertake

¹² 14 C.F.R. § 1251.302(a)-(b).

¹³ 14 C.F.R. § 1251.302(c).

¹⁴ 14 C.F.R. § 1251.301.

¹⁵ A copy of his report is attached in Appendix D.

In general, the Center includes a number of significant architectural challenges. The Main Museum, and any portions of the USSRC, date from the early 1970's and include a number as level changes and inaccessible approaches. Compounding these problems are the changes in grade throughout the facility that make traversing some areas difficult. On a positive note, the biggest attraction at the Center is the Davidson Center, which is a new facility that is almost barrier-free. Another positive note that has likely prevented problems earlier is the Center's accommodating staff that has taken unusual efforts to accommodate the needs of its visitors.

The Center has already begun the process of making accessibility changes, starting notably with a phased accessibility modification plan for its public restrooms. Graham Sisson, Disability Coordinator for the State of Alabama, has conducted an extensive survey of the Center and provided a rough set of recommendations to the Center. The Center's ability to make accessibility changes is significantly affected by its business cycle, which slows between September and February each year and permits alterations without significantly affecting visitors of the Center.

The Guest Services Manager mentioned that she only received one complaint regarding the accessibility of the Center during her tenure (the past 15 months). This complaint concerned the restrooms in the Main Museum and mobility issues and the IMAX theater. This complaint was informally resolved by the Center to the satisfaction of the complainant.

During our visit, the Center's leadership expressed a strong interest in understanding its barriers and for developing both short- and long-term strategies for addressing them. This is a sound strategy, as it ensures program access in the short-term while moving towards a more integrated system that is ultimately better for all visitors.

3.2.2 Promising Practices

In general, the Center is welcoming and accessible for its visitors with disabilities. Given the challenges that it faces, the Center is both creative and forward-looking in developing strategies that make the experience as inclusive as possible.

- **Accessible Transportation Systems.** Before our compliance review, the Center purchased an accessible tramway system (similar to those used at major entertainment venues) to facilitate transporting patrons between its facilities and remote areas in its large parking lots. The Center made special efforts to ensure that this tramway was accessible, which we confirmed by inspecting the tramway during our visit. Our recommendations include leveraging this system to also help alleviate the problems created by the geographic challenges of the Center's terrain. The Center has also committed itself to ensuring that all new buses used for Space Camp are accessible and lift-equipped. The Center has been making special efforts with a local politician to ensure that it can buy lift equipped buses from a local bus manufacturer. The Center also uses a special lift-equipped Econoline van for persons with disabilities. The Center also works with the city of Huntsville to obtain accessible transportation when needed.
- **Picture Frame Seating in IMAX Theater.** The IMAX theater includes special accommodations for people who are wheelchair users. Because IMAX theaters have a very large field of vision, wheelchair users may find it difficult or uncomfortable to view an IMAX presentation in its regular format. Recognizing this need, the Center has created special "picture frame" seating for wheelchair users (12 to 13 seats) that provide a special presentation of movies, but limited to a much smaller field of vision.

3.2.3 Compliance Issues

As noted above, the report prepared by NASA's architectural expert on the review, Bill Hecker, provides an overview of the Center's facility and the specific barriers that exist in various elements of the facility (attached as Appendix D). Rather than repeat this excellent description, this section will summarize its short-term and long term

strategies. The Center can use these lists to develop its capital planning and implementation strategies as efficiently as possible.

3.2.3.1 Short-Term Solutions

In conducting his review, Mr. Hecker identified many short-term strategies for ensuring that the Section 504 requirements of program access were met. Many of these strategies (but not all) are relatively inexpensive or cost-free. The Center should consider implementing the low-cost solutions immediately and incorporate funding for other solutions in its 3-5 year capital improvement planning. Following these strategies will further ensure that the Center is compliant with Section 504. (Note: USSRC has provided responses regarding each of the short-term solutions. These appear in red text).¹⁶

Main Museum Approach Routes

- Allow people with disabilities to use the eastern gift shop entrance.
USSRC Response: Because of the inaccessibility of the main ramp to our existing Museum facility, patrons who are in wheelchairs or have limited mobility, the ticket agent will direct them to the eastern entrance, either USSRC transportation or the individual can transport to the eastern parking lot for entry into the Museum.
- Provide handrails outside eastern doors near the gift shop.
USSRC Response: Adding a pair of accessible handrails at the concrete ramp section (Hecker photo 7376) to the approach just outside the eastern Museum entry doors has been placed into our Capital Program.
- Either:
 - Publicize and provide regular tramway service from the Davidson Center ticket sales area to the gift shop entrance, or
 - Allow people with disabilities to park near the eastern gift shop entrance and buy tickets at that location.

(Hecker Report, pp. 3-4)

USSRC Response: We are evaluating the possibility of having customers purchase tickets to the museum and IMAX at the front lobby gift shop location.

Main Exhibit Space

- Replace the current ramp leading to the German rocket scientist display and the ramp leading to the climbing wall with accessible ramps. (Hecker Report, p. 4)
USSRC Response: Western and Eastern Ramps (Hecker photo 8396, 8943, & 9016) require modifications to comply with UFAS specifications. The western ramp requires an additional handrail and the eastern ramp is steeper than the maximum allowable 8.3% and also lacks accessible handrails. Both of these ramps will be replaced with the future build out of the Museum Master Plan. This is a capital improvement project that once funding is identified will commence. The USSRC has Floor Guides in these areas during all operating hours and they are instructed to assist any wheelchair or limited mobility person.
- Either ensure that people with vision impairments are warned of hazards created by protruding objects, are provided with guides, or are accommodated by providing cane detectable warnings.¹⁷ (Hecker Report, p. 5).

¹⁶ See email from Vickie Henderson, Vice President, Human Resources, to David Chambers, Senior Civil Rights Analyst, Sept. 29, 2008.

¹⁷ UFAS includes specific requirements for cane detectable warnings for protruding objects. See <http://www.access-board.gov/ufas/ufas-html/ufas.htm#4.4>.

USSRC Response: The ticket agent, who has identified a person that is mobility impaired, will state a warning to these individuals at time of ticket purchasing that some displays may present a challenge for cane users and extra caution must be taken. USSRC Museum Guides are available for anyone needing assistance during operating hours.

- Provide alternate descriptions and photographs for elements that require visitors to climb, either adjacent to the exhibit or as part of a binder that can be checked out from the ticket booth or security station (Hecker Report, p. 5).

USSRC Response: Photos of the Mercury, MIR and Apollo capsules (Hecker photo 9033 & 9063) will be provided in an orientation binder that mobility impaired visitors may check out from the ticket booth.

- Add handrails to each side of the ramp from The Space Shop (Hecker Report, p. 5).
- Permit wheelchair users to sit at the railing next to benches at the Time for Challenge Theater by removing one bench and installing edge protection (Hecker Report, p. 5-6).
- Reconstruct the ramp from the early German scientist area to the Army Missile Display (Hecker Report, p. 6).
- Install railing below angled narrative plaques in the Space Lab display area (Hecker Report, p. 6).

USSRC Response: The adding of accessible hand rails on each side of the tunnel is part of the overall handrail capital project.

In The Time for Courage Theater (theater was re-named); we have removed two benches and added an edge protector under the railing system, to accommodate wheelchair users on the upper level to watch The Time for Courage show.

The ramp leading from the Early German Scientist area to the Army Missile Display area will require a major capital project for compliance. This ramp will be replaced with the future build out of the Museum Master Plan. USSRC Museum Guides are instructed to assist wheelchair and mobility assistance customers when needed until this ramp can be reconfigured.

The display case in the SkyLab area creates a protruding hazard for visually impaired visitors. The existing railing system has been removed and plaques are now vertically attached to the display case.

Mezzanine Level
West Display Area

- Provide alternate descriptions and photographs for the Dream, Explore, Search exhibit either at the base of the stairs leading to the exhibit or as part of a binder that can be checked out from the ticket booth or security station (Hecker Report, pp. 6-7).

USSRC Response: A photographic representation of the display is in an orientation binder that mobility impaired visitors may check out when purchasing a ticket to the museum.

Eastern Entrance
Lobby

- Install two handrails on the ramp connecting the lower lobby to The Space Shop (Hecker Report, p. 7).
- Instruct the security guard to permit users with disabilities to enter and possibly purchase tickets (see *Main Museum Approach Routes*, above) (Hecker Report, p. 8).

USSRC Response: The installation of accessible handrails in this area is part of the overall handrail capital project. The on duty Security Guard in the front

lobby is instructed to assist any wheelchair or mobility impaired individual up this accessible ramp until handrails are installed.

Kids Gift Shop

- Ensure that assistance is offered for inaccessible items on high shelving. Ensure that aisles are clear for wheelchair users as displays change. (Hecker Report, p. 8).

USSRC Response: USSRC has eliminated the Kids Gift Shop

The Space Shop

- Provide auxiliary counters or tables for wheelchair users.
- Provide assistance for items located on shelving.
- Ensure that aisles are clear for wheelchair users as displays change.

(Hecker Report, pp. 8-9).

USSRC Response: An accessible table is in place that meets the requirement for a wheelchair user to sign credit cards or checks.

Outpost Teaching Theater

- Provide an assistive listening system and provide notice of this system at ticket sales locations (Hecker Report, p. 10).

USSRC Response: We will be procuring a minimum of two headsets from Boston Light and Sound in FY 2009 that will be tied directly into the audio system. These headsets will be requested when the hearing impaired individual purchases their ticket.

SpaceDome IMAX Theater

- Replace the current ramp with an accessible ramp.
- Install a bench or other cane detectable obstruction under the stairs in the Theater Lobby area.
- Reposition tape stanchions, lowered portion of concessions sales counter, and drink dispensers.
- Replace hardware on elevator's emergency communication cabinet.
- Readjust door thresholds.
- Install signage regarding availability of assistive listening systems in theater.

(Hecker Report, pp. 10-12).

USSRC Response: The ramp leading to the theater that is out of tolerance will be replaced with the future build out of the Museum Master Plan. In the interim, a hand rail on the wall side will be included as part of the overall handrail capital project.

The underside of the stairs has been blocked with benches to prevent a visually impaired cane user from hitting their head. The IMAX ushers have been instructed to ensure the stanchions are spread apart to 48 inches to allow wheelchair users to negotiate the waiting line area. The sales counter is flush and drink machine has been lowered to meet the 46" measurement to cup trigger.

The two east thresholds for the entry doors to the right side of IMAX Theater have been removed and there will be no thresholds in that entry way.

A handle that meets compliance has been installed on the emergency communication cabinet in the IMAX elevator.

A notice has been placed in the Davidson Center ticket window and on the IMAX Theater entry doors identifying the availability of assistive listening system for those who are hard of hearing in the IMAX Theater.

Ultimate Fieldtrip Classroom

- Replace signage (Hecker Report, p. 12).

USSRC Response: This room has been closed and is no longer used as a classroom or opened to the public.

Space Gear Shop

- Provide an auxiliary counter.
- Provide assistance for items located on higher shelving.
- Ensure that aisles remain clear.
- Install handrails on ramp from main exhibit space.

(Hecker Report, pp. 12-13).

USSRC Response: This area is no longer a gift shop. It is now an interactive museum area. The ramp outside this area that requires handrails will be also be put into the overall handrail capital plan.

Galaxy Food Court

- Provide cane detectable warnings for lights on decorative columns.
- Reposition vending machine to eliminate protruding portions.

(Hecker Report, p. 13).

USSRC Response: The lights that were mounted on the decorative columns separating the individual food service counter stations have been eliminated.

The Coke in Space and all vending machines are now aligned so there is no projection into the aisle.

All four person table bases have been rotated to allow wheelchair users to pull under the table.

The inaccurate map has been removed from the map kiosk.

Public Restrooms

- Focus on improving accessibility in restrooms serving the SpaceDome IMAX Theater instead of the basement level restrooms.
- Provide signage to accessible restrooms.
- Make accessibility “punch list” items.

(Hecker Report, pp. 14-17).

USSRC Response: All restroom on the main level of the museum are handicap accessible with the exception of the basement restrooms. Signs have been installed on the approach routes to the basement restrooms directing them to a handicapped accessible restroom. The 2009 printing of the information brochure that is provided to every customer will identify those restrooms with the appropriate symbol.

Regarding the punch list for the Women’s Restroom near the IMAX Theater (Architect providing responses; joint meeting scheduled to get this response)

Regarding the punch list for the Men’s and Women’s Restroom near the SpaceCamp cafeteria (Architect providing responses; joint meeting scheduled to get this response)

All TTY’s have been replaced with video phones that are located at the

Davidson Center. Signs have been placed on all phones directing those who need a video phone directing them to Guest Services in the Davidson Center.

In the long term plan, as renovations occur in each major area, the pay phones will be lowered to meet compliance.

3.2.3.2 Long-Term Solutions

As he was examining the Center's facilities, Mr. Hecker also considered long-term strategies that would improve the usability of the Center for all of its visitors. Also, because many of the short-term solutions rely on special efforts by the staff, adopting some of these long-term changes would ensure program access while also lessening the burden on the Center's staff and visitors. For instance, replacing the main ramp to the Main Museum would be costly, but improve visitor flow and reduce visitor confusion. Most of these long-term changes will require special planning and budgeting over the five-year capital improvement plans for the Center.

Main Museum Approach Routes	<ul style="list-style-type: none">• Rehabilitate the current entrance to the Main Museum by extending the current ramp. (Hecker Report, pp. 3-4)
Lower Level West Display Area	<ul style="list-style-type: none">• Install a new ramp entering the Time for Challenge Theater (Hecker Report, p. 5)
Mezzanine Level West Display Area	<ul style="list-style-type: none">• Relocate the displays on the inaccessible mezzanine to an accessible location (Hecker Report, p. 7).¹⁸
Galaxy Food Court	<ul style="list-style-type: none">• Rotate bases on several dining room tables to further improve accessibility for wheelchair users.• Reposition backlit building plan. (Hecker Report, p. 14).
Public Restrooms	<ul style="list-style-type: none">• Transition to making all restrooms accessible (Hecker, pp. 14-15).

Given Mr. Hecker's expertise on architectural improvements for accessibility and his relatively close proximity to the Center, he has offered to provide free technical assistance to the Center as it makes plans to improve program access. In particular, Mr. Hecker can be an invaluable resource by reviewing cost-effective solutions and by discussing implementation strategies for the Center.

3.2.4 Additional Recommendations

The following additional recommendations may help maximize the Center's accessibility.

1. **Perform Assessment Based on Access Board Guidelines for Recreational Areas.** The Access Board has developed a set of guidelines specific to recreational areas. These sets of guidelines include guidance specific to amusement rides and sporting facilities.¹⁹ While most of these guidelines are not applicable to the highly unusual simulators used by the Center, as the Center goes forward and develops new rides or simulators, they should be mindful of the Access Board's guidelines for recreational areas.

¹⁸ The Center indicated that it already has plans to move all of the exhibits located on the inaccessible mezzanine of the main museum to a more accessible location once other exhibits are moved to the new Davidson Center.

¹⁹ These guidelines are available at <http://www.access-board.gov/recreation/>.

2. **Develop Brochures and Other Guides for Visitors with Disabilities.** The Center is a relatively complex facility that includes many different elements and buildings. Within the buildings, displays are often complicated and involve open displays of highly technical content. To further complicate matters, many of the changes recommended above may require the Center to develop routes of traffic for people with disabilities that may seem unintuitive. To avoid these problems, the Center should consider developing brochures and other guides to aid its visitors with disabilities. For instance, a map or visitor guide specifically geared to the needs of people with mobility impairments would enable visitors using wheelchairs to understand accessible routes throughout the Center. In addition, because many of the exhibits are inherently inaccessible (because of tight confines, required climbing, or other obstacles), alternate material (such as written descriptions, tactile portable displays, or audio descriptions) near inaccessible exhibits or available from the front desk would enable users who cannot otherwise access an exhibit to gain a better appreciation for the exhibit's content.
3. **Be Prepared to Provide Individual Guides.** The Main Museum includes many highly technical exhibits that include large, oddly-shaped equipment. For instance, a large rocket may be located adjacent to a space capsule or propulsion engine. These awkwardly shaped exhibits are not amenable to neat organized displays. Compounding this problem is the fact that the Center's main museum has a large number of displays in a relatively small area (over time, the Center will reduce this overcrowding by moving displays to its new Davidson Center). To avoid these inevitable difficulties, the Center should consider making individual guides available to help assist visitors who are blind or who have vision impairments.

3.3 Eligibility Criteria, Education, and Awareness

Section 504 prohibits discrimination against qualified persons with disabilities. In general, this means that people who would otherwise be qualified to participate in a program cannot be discriminated against based on their disability. This obligation prohibits discrimination in the forms of segregation, denial of participation, discriminatory eligibility criteria, and other possible forms of discrimination. It also requires active steps to ensure equal participation by people with disabilities, such as making reasonable modifications of policies. This section examines the day-to-day operations of the Center and its staff in interacting with visitors. This section considers policies (both written and unwritten) as well as staff training.

3.3.1 Discussion

3.3.1.1 Eligibility Criteria

The Center is unusual insofar as its programs include a number of elements where physical or sensory accessibility may be difficult or impossible to achieve. For instance, both the Center's Space Camp and museum tours include simulators used by astronauts to simulate various challenges of zero gravity and space flight. Operating all aspects of these simulators may require visual/auditory acuity or physical dexterity and endurance that cannot be fully replicated for people with disabilities. The Center imposes specific selection or eligibility criteria for some activities such as,

1. Actively participating on demonstration equipment is limited to participants who weigh no more than 260 pounds.
2. Various activities (Mars Mission, Lunar Lander, Space Shot, and G-Force) include restrictions against small physical stature.

3. The Mars Mission, Space Shot, G-Force are restricted to participants with medical conditions that may be affected by this activity.
4. Persons with heart disease or seizure disorders are not permitted to take part in diving exercises that simulate zero gravity.

During our site visit, we carefully interviewed the Center staff about these restrictions. Each of these restrictions is based on objective data, such as manufacturer load restrictions or industry-accepted safety standards. The equipment used in the simulators is one-of-a-kind equipment that is specially-manufactured to replicate the effects of space travel—and, like any mechanical equipment, has specific load tolerances that need to be observed. As another example, people with seizure disorders or asthma cannot take part in scuba diving operations because of recognized professional scuba standards that identify the risk of cardiac arrest in scuba diving for people with these conditions. Nevertheless, because all students are constantly monitored during diving operations, a large number of students with disabilities have taken part in the program who would not otherwise have the opportunity to scuba dive.

The Center does a good job at ensuring program access to these simulators by suggesting alternatives. Each of the simulators is intended to replicate specific effects of working in outer space. For instance, simulators replicate the effect of weightlessness, disorientation, or high gravity. In most cases, more than one type of simulator is available to replicate these effects. For instance, weightlessness can be simulated either in an underwater dive tank, space shot, or in a free-floating zero gravity chair. When a person's condition makes it impossible for them to use a particular simulator, the staff can suggest alternatives that a participant can safely engage in that replicates the same effects.

In the last several years of its operation, the Space Camp has received only one complaint related to disability. This complaint was from a teacher who was overweight and could not take part in a simulator ride with weight restrictions. When the Center enforced its policy, the teacher felt embarrassed and later noted that the staff had "destroyed the whole experience" for her. Since then, newer forms specifically state weight restrictions to avoid last-minute embarrassment. Additionally, as noted below, however, some additional work may help make it easier for the staff and visitors to understand available alternatives.

3.3.1.2 Nondiscrimination Policies

The Center provides evidence of its nondiscrimination policy in several forms.

- The Center's general ADA nondiscrimination policies are set forth in section 1500.7 of its Personnel Policy Manual.
- The Center also indicates that, "HR Policy and Procedures are posted on the Center's internal website: www.spacecamp.org."

The most promising evidence of the Center's nondiscrimination policy is its Employee Handbook. This handbook includes a broad affirmative action, equal employment opportunity, and equal treatment policy, including physical and mental disabilities. This statement is followed by the Center's harassment policy and a brief description of its complaint process and general grievance procedure. These policies encourage employees to come forward with complaints and assure employees that their complaints will be addressed seriously and will protect their confidentiality, to the extent possible. This is followed by a general description of the Americans with Disabilities Act, focusing only on the employment provisions. The handbook advises employees to contact the Human Resources department for additional information about the ADA.

Although the Center provides its employees with extensive training, it is not clear whether employees actually understand the type of conduct that would be prohibited by the Rehabilitation Act. The Center has demonstrated special understanding of the needs of people with disabilities, so the risk of discriminatory conduct is greatly lessened. Nevertheless, more formal training would help further minimize the risk of discriminatory conduct. It is far less clear whether visitors to the Center understand their rights under the Rehabilitation Act. As noted elsewhere, the Center should make efforts to better inform its visitors of their rights under the Rehabilitation Act.

3.3.2 Promising Practices

3.3.2.1 SCIVIS

The Center is fortunate to have a close working relationship with the West Virginia Schools for the Deaf and the Blind, resulting in the Space Camp for Interested Visually Impaired Students (SCIVIS) Program. This special program offers students with hearing and vision impairments a unique immersive opportunity without the stigma of "special" treatment. Dan Oates has been employed by the West Virginia School for the Deaf and the Blind and for many years and was one of the first participants in the Center's Space Camp program. The SCIVIS program originated when Dan wanted to bring a group of blind students to the Center in 1989. Since then, it has expanded to include 150 to 200 students for each of its two camps (including the Space Camp for the Deaf and Hard of Hearing, described below). To make the SCIVIS program effective, the Center works with approximately 50 to 100 facilitators from around the country to ensure that all of the needs of its participants are met. In addition, a blind engineer from the NASA Marshall Space Flight Center and other visually-impaired speakers visit the SCIVIS program that encourages participants to consider career opportunities in space technology.

The Center also operates Space Camp for the Deaf and Hard of Hearing, which focuses on the specific needs of students with hearing impairments. During this week-long course, students are provided with sign language interpreters, closed-circuit televisions for real-time communications during missions, video phones, TTYs, close captioning, and deaf education teachers.

The Center indicates that they have also worked closely with the Alabama Institute for the Deaf and Blind, the West Virginia Schools for the Deaf and Blind, and the Western Pennsylvania School for the Deaf to provide a "meaningful and inspirational experience" for these students. As described in the program pamphlet,

[p]rogram highlights may include a presentation by blind and/or deaf professionals on career choices and working in the space industry. Enlarged print, sign language interpreters, attention to mobility hazards and other special considerations are extended to put trainees at ease. Blind students also benefit from the latest technology in the field, including tactile Braille displays and synthetic speech for computers.

During our review, it became clear that the special programs run by the Center for students with disabilities was one of the most promising practices and should serve as a model for other NASA grantees with an educational mission. For two weeks each year, the Center completely redesigns its Space Camp facilities to specially accommodate the needs of vision impaired and deaf participants. For its blind and low vision participants, the Center provides Braille embossed overlays for instrument panels, large print manuals for low vision participants, and Braille manuals for blind participants. For its deaf and hearing-impaired participants, the Center provides video connections that enable participants to use sign language to communicate with each other. The programs that the students engage in are identical to the missions run by other Space Camp programs. By enabling them to perform critical missions without the stigma of their disabilities, many students gain confidence that they would not otherwise be able to achieve in a more mainstream environment. This opportunity also enables students from rural communities to meet other students with similar disabilities from around the world, develop friendships, and overcome the isolation that many

have experienced for their entire lives. At the same time, Space Camp counselors develop special sensitivity and skills in accommodating the needs of students with disabilities. The counselors and the Center carries over these lessons learned to its other camps. If students with vision or hearing impairments chooses not to attend a SCIVIS camp, the Center tries to provide the same level of accommodations as the SCIVIS program (because SCIVIS attracts a large number of counselors with special training and students with similar disabilities, however, the Center cannot fully replicate the accommodations or immersive experience available at SCIVIS). During our review, we noted that many students with disabilities take part in the mainstream camps offered by the Center. This suggests that students with disabilities are not segregated by the Center and are not denied the opportunity to fully integrate with students without disabilities.

3.3.2.2 Training

Information provided by the Center indicates that employees (and particularly counselors) are given extensive training, including specific training geared towards the needs of people with disabilities. All employees receive orientation training on the ADA and personnel policies are carefully reviewed with them. Each year, the Center hires a large number of counselors for its Space Camp programs. All counselors receive an unusually long four-week intensive training course that completely reviews their job responsibilities and includes special attention towards the needs of people with disabilities. The Center makes a point of ensuring that its lessons learned from its strong efforts in accommodating people with disabilities carries over in this training. The Center's Director of Nursing, who works in the Aerospace Division of the Center, provides two hours of special needs training that is devoted entirely to the special needs of participants with disabilities. This training is part of a lengthier program that focuses generally on the rights of Space Camp participants.

3.3.2.3 Predictive Sales System

The Guest Services department at the Center estimates that 10-15% of visitors have disabilities. For visitors who arrive as part of groups, the Guest Services sales staff asks about special needs and they find that it is much easier to provide needed accommodations. To the maximum extent possible, the Center tries to accommodate the needs of persons with disabilities in advance of their arrival. For instance, for school groups that arrange their visits in advance, it tries to understand the special needs of their visitors and makes special arrangements ahead of time to ensure that their needs are met. For these visitors, the Center uses a special software program to ensure that resources (including accommodations for visitors with disabilities) are available. In the future, the Center can use this data to help predict needs and ensure that adequate resources are available at all times. A much larger problem is walk-in traffic.

3.3.2.4 Accommodations at All Space Camps

In general, the Center has little trouble accommodating the needs of students when disabilities are identified ahead of time. The Center makes sure to request this information, both in its application materials and in its general medical intake forms that are part of the admissions process. The Center has had more difficulty when parents do not self-identify their children's special needs in the Center has to scramble at the last minute to make accommodations.

All Space Camp participants must sign up at least two weeks in advance of Space Camp. Advertising material for Space Camp advises parents that they make special efforts to accommodate the special needs of participants with disabilities, but advance notice of the special-needs is required on the healthcare form for all participants. The Center has provided a copy of their health intake form that is required for all attendees to Space Camp. The health form requires that students identify all medical conditions, physical or learning disabilities, and any emotional or behavioral problems. In addition, students are required to identify any medication that they are required to take during their attendance. Trainees are also advised that, "during simulator training, individuals may experience up to

three G's gravitational force, strobe or flashing lights, or fluid shifts. Persons with cardiac conditions, severe pulmonary dysfunctions, sensory handicaps or chronic illness may not be able to participate fully in the program."

This advance notice gives the Center time to align participants with the special skills of their counselors. Information from the applications and health intake forms for Space Camp participants are computerized and, before students arrive, counselors receive a detailed printout outlining the special needs for each of their students. Counselors also have the opportunity to receive special handling instructions from parents. Also, the Center allows parents or guardians of children with disabilities to accompany their children (if necessary or requested) free of charge.

3.3.3 Compliance Issues

In many cases, providing specific accommodations to make elements accessible may simply not be possible. For instance, it may not be possible to make a simulator that requires visual acuity fully accessible to someone who is blind. In these cases, alternatives should be explored and created that provide an understanding of the otherwise inaccessible elements. This obligation can be met by providing such accommodations as providing accessible descriptions of what is happening or by creating alternative demonstrations. As noted above, the Center should take additional steps to ensure that accessible descriptions or alternate demonstrations are provided for inaccessible exhibits. For instance, the Center should provide more physical models of equipment that cannot be physically touched and photographic or audio descriptions of equipment located in inaccessible locations. This information should be provided either adjacent to the inaccessible exhibit or in a binder available from the front desk or a security guard.

3.3.4 Additional Recommendations

The uniqueness of the Center's accessibility challenges has two consequences. On the one hand, the Center faces unusual challenges in making its program accessible. On the other hand, overcoming these challenges and achieving maximal accessibility will likely make it a model for the industry. The Center appears to have a strong commitment to accessibility, so moving it towards becoming a best practice should be possible. Several of these recommendations may already be in practice and is based on the limited information provided by the Center. We also understand from the Center's August 7 response, that it welcomes these recommendations and will likely implement them in the short-term.

1. **Publicize Accommodation Processes.** Although the Center appears receptive to providing accommodations, it is less clear if visitors know how to request them. A well-publicized process for requesting accommodations was not identified in the Center's response. Simply put, if a person with a disability doesn't know who to ask for an accommodation, the request will likely either not be made or will be ineffective.
2. **Clearer Identification of Alternative Simulations.** As noted above, in the last several years of its operation, the Space Camp has received only one complaint related to disability. This complaint was from a teacher who was overweight and could not take part in a simulator ride with weight restrictions. When the Center enforced its policy, the teacher felt embarrassed and later noted that the staff had "destroyed the whole experience" for her. The Center was able to replicate this zero gravity experience for her, but only after the fact. The Center has provided a listing of activities at the Center, which includes eligibility requirements that identify conditions that preclude participation in a particular activity. It would be useful for the Center to also identify alternative activities that mimic the same purpose or effects of particular simulators to enable Center staff to quickly identify alternatives that would not create barriers for people with disabilities.

3. **Central Point of Contact and Cheat Sheets.** A related idea is to centralize the point of contact for disability issues for all staff. Hard questions will always come up and having one person always available for immediate response to all staff ensures that policies are uniform and that staff members feel more confident about their job requirements. For instance, the Guest Services program does not have a formal process for requesting a sign language interpreter for visitors to the Center. Centralizing expertise on disabilities within a central organization and developing clear processes would facilitate the process. Also, providing all employees a “cheat sheet” with recommended strategies and the point of contact information enables those employees who only occasionally encounter people with disabilities to have immediate information about appropriate conduct.
4. **Involvement of Disabled Community.** The most knowledgeable stakeholders for deciding what people with disabilities may need are people with disabilities. Usually, disability groups are happy to meet with public entities and businesses interested in improving access. The Center has worked with Graham Sisson, an attorney in Birmingham, who has provided particular expertise in making accessibility changes to the facilities architecture. The Center has also worked with a local rehabilitation agency for specific accommodation issues for its employees. Nevertheless, additional partnering with local disability organizations is a good idea.
5. **Regular Surveys and Assessments.** Conducting regular surveys is one of the only ways to get objective data on the overall success of a program. This includes both occasional professional surveys by competent professionals as well as providing ongoing survey tools about the successes and shortcomings of the Center’s accessibility and attitude towards people with disabilities. Tools such as online questionnaires can provide real-time data and scorecards of a program’s success. Interviewees conceded that the Center could do a better job at providing a mechanism for providing both positive and negative feedback to the Center and should make this information easily available to visitors and students. The Guest Services department has a survey form that they encourage visitors to complete upon leaving the museum. Currently, this form includes no references to disabilities. A larger problem faced by the Center is getting visitors to provide any kind of feedback. The Center has considered providing incentives to obtain feedback, but has not instituted any of these changes.
6. **Publicize What the Center Has Done and Intends to Do.** While mission and value statements are useful, a demonstrated commitment to accessibility (such as a chronology of steps taken) provides more useful information. Also, publicizing future plans for accessibility lessens the appearance of an organization’s indifference to current accessibility challenges and fosters understanding and patience on the part of patrons. The Center should consider providing better information to the general public about accessibility efforts (including planned accessibility changes) on the Center's website or through other public notice. Doing so will enable the public to better appreciate the Center's efforts, engender goodwill with the community of persons with disabilities, and enable all visitors to better appreciate temporary inconveniences (such as alterations and barrier removal).
7. **Focus on Hiring/Recruitment of Counselors Based on Disability Experience.** The Center has noted that they have had an increasing number of children with disabilities participating in their Space Camp program. Responding to this need, the Center has focused on hiring counselors who have a focus on special education and teaching careers. Some of their counselors have disabilities and others are trained to work with particular types of disabilities. The recruitment material for counselors is not currently focused on special education or disabilities. The Center agreed that they could do a better job of culling this information to encourage people with particular expertise in these areas to apply for counselor positions.

8. **Augment Training with Additional Focus on Disabilities.** The counselor training manual provided by the Center forms of integral part of the four week training program for all new counselors. It includes the general procedures for counselors, an extensive description of space exploration history, suggested lesson plans, and a description of various simulators used at the Center. Unfortunately, the written counselor training manual does not include specific suggestions for working with students with special needs. Including this kind of material in the counselor training manual would likely better facilitate the counselor's ability to provide accommodations on an as needed basis. The Director of Nursing provides a thorough introduction to the health needs of Space Camp participants for new counselors. The Center has provided a copy of her PowerPoint presentations used for training new counselors. This training reviews the general health needs of students, medication procedures, injury and illness procedures, a review of common disabilities encountered by the Center, an in-depth review of the different categories of disabilities, and the general procedures to be followed by counselors to prepare for the needs of students with disabilities. In general, this 35-slide presentation appears to be an excellent introduction for counselor training. The Center could augment this training program with role-based tests and tip sheets to ensure that counselors can respond effectively and quickly to special needs on an as needed basis.
9. **Develop Additional Training Modules Tailored to Specific Categories of Disabilities.** The Director of Nursing has created an excellent training module for helping counselors meet the needs of students who have mental illness and autism. This presentation reviews lessons learned for many different categories of mental illness and should help counselors address the particular needs of Space Camp participants in distress. This training module would be particularly helpful for counselors that will likely be supervising students with mental illness. Similar modules for other disabilities (such as vision or hearing impairments, mobility impairments, or cognitive disorders) may enable counselors who are likely to have students with these disabilities better prepare for and anticipate their needs. Having a library of such resources would also help counselors respond quickly and rapidly refresh their skills.

3.4 Effective Communication

The NASA regulations provide that,

Recipients shall take appropriate steps to ensure that no handicapped individual 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.²⁰

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.

3.4.1 Discussion

During our visit to the Center, the Center demonstrated an ability to meet the needs of people who were deaf or hearing impaired. The Center has identified several counselors available on staff who are proficient in sign language interpreting. In addition, the Center maintains relationships with local interpreting services to meet the needs of deaf or hearing impaired visitors when resources demand. In addition, the Center has installed a captioning window in its theater that, when turned on, displays captions for movies that are easily visible by people seated in

²⁰ 14 C.F.R. § 1251.103(b)(3).

designated seating. Furthermore, the Center does have assistive listening systems available in many of its public venues. In addition, all of the video displays throughout the Main Museum are open captioned to ensure that people who are deaf or hard of hearing can easily understand the video production.

The Center includes a large number of written materials as part of its exhibits. During our review, it was unclear how people who are blind or who have vision impairments would be able to meaningfully understand the content of the exhibits. Braille signage of the text in the exhibits is not provided and audio tours are not available. The Center is currently investigating various audio tour systems, which would be able to provide a better experience for all participants and would enable visitors who are blind or visually impaired to better understand the exhibits.

3.4.2 Promising Practices

Although all museums have an obligation to ensure effective communication, relatively few provide open captioning on all of their video displays as accomplished by the Center. Based on its experience with its special camps devoted to students with disabilities, the Center realized a need for ensuring that this content was comprehensible to people with hearing impairments. As a consequence, the Center spent considerable resources captioning its existing content to ensure that it was accessible to people who are deaf or who had hearing impairments.

The Center is also unusual insofar as it provides front window captioning in the IMAX theater. This feature is a small captioning display that is visible only from specific locations—thus enabling deaf individuals to enjoy a presentation without disturbing sighted participants. This feature can accommodate 50 to 60 seats that have line of sight to the captioning display. Then it is requested, the usher takes care of the seating and ensures that patrons who are deaf or hard of hearing are seated in the proper locations.

The Center also does an admirable job of ensuring that its Space Camp is accessible and provides effective communication to its participants. As noted above, the Center makes unusual efforts to ensure that deaf or hearing-impaired participants can communicate effectively with each other and with counselors. In addition, for its blind and vision impaired participants, Center makes special efforts to ensure that complex instrument panels and instruction manuals are fully accessible through Braille and large print, thereby enabling blind and vision impaired participants to fully take advantage of the programs offered at Space Camp. The Center has provided a video describing these special camps, which made clear that participants engage in the same missions and perform exactly the same activities as provided during its other camps.

3.4.3 Compliance Issues

Through the special efforts that it has made in accommodating people with vision and hearing impairments, the Center has demonstrated a clear understanding of the needs of people with disabilities and providing effective communication. However, the Center has not demonstrated that it provides effective notice of the availability of these accommodations. Specifically,

1. **Availability of Sign Language Interpreters.** Although the Center appears to be quite capable of providing sign language interpreters when necessary it is not clear that it provides notice to visitors for the process for requesting an interpreter. The Center has also reached out to private organizations to provide sign language interpreters, because of the overall shortage of sign language interpreters. Typically, they have four to five interpreters on site at any time. During the opening ceremony for the Davidson Center, however, the Center had 1,400 visitors but provided no sign language interpreter. When we inquired about this during our site visit, the Center staff replied that no one had requested an interpreter. The Center conceded, however, that the notice did not include a process for requesting a sign language interpreter or other auxiliary aid or service. The Center should include such a notice in all announcements of public events and should develop a process (which is openly publicized) by which visitors can request sign language interpreters or other auxiliary aids or services.

2. **Notice of Assistive Listening Devices.** UFAS requires that federal fund recipients publicize the notice of assistive listening devices in theaters and other public venues. While the Center provides assistive listening devices in several of its venues, notice is not provided at the ticket sales office or in other public areas.
3. **Notice of Availability of Captioning.** The Center has indicated that it will provide captioning for its movies when requested. However, the process for making this request is not publicized and the availability of captioning does not appear to be widely publicized by the Center. The Center should develop a process for requesting captioning and should publicize this process (e.g. via its website or signage in its ticket sales office).

3.4.4 Additional Recommendations

During our site visit, we asked the Center staff about the opening ceremony for the Davidson Center and the failure to provide auxiliary aids or services. We mentioned the availability of computer-assisted real-time text (CART) services and the Center expressed some interest in understanding this technology. During the Davidson Center opening ceremonies, the Center had record attendance with approximately 1,400 visitors. During the ceremony, there were several public addresses and, given the size of the audience, many of the participants may have been unable to fully understand the presentation. By using a CART system, the Center would have been able to project open captioning of spoken text in real time along with a video projection of the presenter. This would enable all participants (and in particular, people with hearing impairments) to better understand the presentations. The Center should consider investigating CART services for future events as a means of ensuring effective communication. We also understand from the Center's August 7 response, that it welcomes these recommendations and will likely implement them in the short-term.

4. Implementation Strategies

Overall, the Center does a good job at meeting the requirements of Section 504 of the Rehabilitation Act. The Center has an institutional commitment to meeting the needs of people with disabilities and holds disability awareness as a core value. Our compliance review indicates, however, that these efforts could be better organized with clearer processes and lines of authority.

The following steps are intended to help simplify the recommendations outlined in this report. The Center should not consider these steps as a mandatory compliance process.

1. **Provide the DRE with Additional Resources, Coordination, and Authority.** The recommendations in this report require coordination and leadership over a period of years. It requires working with all parts of the Center and support from senior management. The most important step for the Center should be making sure that the DRE is known to everyone at the Center and that she is assisted and advised by others with particular expertise at the Center. It is also important that the successful implementation of these recommendations is an essential job performance requirement for the DRE. The DRE should report directly to the highest levels of the Center's senior management.
2. **Develop an Implementation Strategy that Focuses on Architectural Changes.** The Center's biggest challenge is ensuring that programs are accessible despite its older buildings and sloping terrain. Overcoming these challenges will require capital planning over several years and the DRE must be steadfast in their commitment to seeing these changes through.
3. **Focus on Educating Program Participants and Soliciting Their Feedback.** As noted at several points in this report, the Center could do a better job at providing information to the public about their rights, the

process for requesting accommodations, and the Center's plans for improvements. Although receiving customer feedback is difficult for any organization, the Center should step up these efforts to ensure that it is responsive to the needs of patrons with disabilities. This feedback is important as a measure of the Center's success in establishing correct priorities.

4. **Work with a Disability Committee to Prioritize and Accomplish Other Recommendations.** Most of the other recommendations do not require the careful planning that the architectural changes require. For instance, developing training modules for other specific categories of disabilities will be much easier than designing and constructing a new ramp in a key circulation area of the Center. In addition, which categories of disabilities are higher priorities for developing training modules will likely require input from different people who oversee the Space Camp program and demographic data of Space Camp participants.

Appendix A: ADA Policy Statement (Center Personnel Manual 1500.7)

The Americans with Disabilities Act (ADA) extends civil rights protection to persons with disabilities in such areas as employment, public accommodations, services provided by state and local governments, transportation, and telecommunication relay services. The US Space and Rocket Center is firmly committed to compliance with the American's with Disabilities Act.

Title I of the ADA prohibits employers from discriminating against qualified job applicants and employees who are or become disabled. The law covers all aspects of employment, including the application process and hiring, on-the-job training, advancement and wages, benefits, and employer-sponsored social activities. The purpose of Title I of the ADA is two-fold: (1) to prohibit discrimination against individuals with disabilities, and to bring persons with disabilities into the economic and social mainstream of American life; and (2) to provide enforceable standards addressing discrimination against individuals with disabilities, and to ensure that the federal government plays a central role in enforcing these standards on behalf of individuals with disabilities.

Title II regulates the area of public services (including employment of individuals in state and local government).

Title III's provisions prohibit discrimination on the basis of disability in places of public accommodation and in commercial facilities. Title III requires "new construction" to comply with certain standards accessibility guidelines which have been issued by the Architectural and Transportation Barriers Compliance Board. Title III also requires businesses to modify their existing facilities to ensure that the disabled have full and equal enjoyment of same.

The U.S. Space & Rocket Center does not discriminate on the basis of disability in the admission or access to, or treatment, or employment in, its programs or activities.

Goals and timetables have been established that outline our good faith efforts in providing equal employment opportunity and non-discrimination on the basis of disability. These goals and timetables are reviewed periodically to measure our progress and we commit to making every effort to correct any deficiencies within the specified areas.

The Center has designated the Vice President of Human Resources (VP of HR) as its designated executive to coordinate compliance with the Americans with Disabilities Act and act as the primary responsible for implementing and monitoring the Americans with Disabilities Policy. The Vice President of Human Resources of the U. S. Space & Rocket Center coordinates compliance with the non-discrimination requirements contained in section 35.107 of the Department of Justice regulations. Information concerning the provisions of the American with Disabilities Act, and the rights provided thereunder, are available from the ADA Coordinator at (256) 721-7127. An ADA Question & Answer pamphlet is available in the Human Resources Department.

In addition to the VP of Human Resources, all managers and supervisors are expected to abide by our Policy of promoting equal employment opportunity and non-discrimination in supplying services to guests, customers, and visitors to ensure that compliance is achieved. Non discrimination must be a shared responsibility of all management personnel and must be a part of all personnel and customer decisions at the US Space & Rocket Center.

Appendix B: Grievance Process (Center Personnel Manual 1500.7)

The US Space & Rocket Center has adopted an internal grievance procedure providing for prompt and equitable resolution of complaints alleging any action prohibited by the US Department of Justice regulations implementing Title II of the Americans with Disabilities Act (ADA). Title II States, in part, that "no otherwise qualified disabled individual shall, solely by reason of such disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination" in programs or activities sponsored by a public entity.

MUSEUM

Verbal and immediate complaints by visitors to the museum should be addressed to the Guest Services Manager within the museum at phone extension 109.

CAMPS

Verbal and immediate complaints should be addressed by the Director of Camp Operations at phone extension 188.

If not satisfied with the result, complaints may be addressed to the Vice President of Human Resources, One Tranquility Base, Huntsville, AL 35805; 256-721-7127, who has been designated as the ADA coordinator for ADA compliance efforts.

Complaints to the Vice President of HR should be filed as follows:

- 1) A complaint should be filed in writing, and contain the name, address, and telephone number of the person filing it. Briefly describe the alleged violation of the regulation(s) with any recommended accommodation(s). If the individual prefers, they may complete our internal complaint form (Form # 1500.7A) versus writing a letter.
- 2) A complaint should be filed within 3 business days after the complainant becomes aware of the alleged violation.
- 3) An investigation, as may be appropriate, shall follow a filing of the complaint. The ADA Coordinator in cooperation with the appropriate Vice President shall conduct the investigation. These rules contemplate informal but thorough investigations, affording all interested parties and their representatives, if any, an opportunity to submit evidence relevant to a complaint.
- 4) A written determination as to the validity of the complaint and a description of the resolution, if any, shall be issued by the ADA Coordinator and a copy forwarded to the complainant no later than 7 business days after the filing of the complaint.
- 5) The ADA Coordinator shall maintain the files and records of the US Space & Rocket Center relating to the complaints filed.
- 6) The complainant can request a reconsideration of the case in instances where he or she is dissatisfied with the resolution. The request for reconsideration should be made within 10 business days to the Chief Operations Officer of the US Space & Rocket Center.
- 7) The right of a person to prompt and equitable resolution of the complaint filed hereunder shall not be impaired by the person's pursuit of other remedies such as filing of an ADA complaint with the responsible federal department or agency. Use of this grievance procedure is not a prerequisite to the pursuit of other remedies.

- 8) These rules shall be construed to protect the substantive rights of interested persons, to meet appropriate due process standards, and to assure that the US Space & Rocket Center complies with the ADA and implementing regulations.

If the visitor or employee is unhappy with the result of the grievance procedure, they may file a complaint with the Department of Justice. Procedures to file a complaint with DOJ can be found at www.ada.gov/t3compfm.htm.

Appendix C: Complaint Form (Center Personnel Manual Form 1500.7A)

U.S. Space & Rocket Center
ADA Complaint Form
May 9, 1993
Revised: December 16, 2002

It is the policy of the U. S. Space & Rocket Center, to make our services, facilities, programs and accommodations accessible to all people including people with disabilities. If a disability prevents you from fully using our facility or enjoying our services and programs, we would like your input and ideas on how we can service you better.

1. Please describe the nature of the problem you have encountered.

2. Please describe what we could do to provide better access through reasonable accommodations, auxiliary aids or services.

3. Please describe what we could do to provide access through alternative methods or the removal of barriers.

Name

Address

Phone

Received by:
Response (if required) by :

Date:
Date:

ADA Complaint Form
Human Resources
Form#1500.7A

Created 05/09/1993

Appendix D: Architectural Review

Bill Hecker from Hecker Design LLC was an integral member of the NASA team performing the Section 504 compliance review of USSRC. His report is reprinted here in its entirety. All references to photographs (e.g. “Hecker Photo 7230”) refer to numbered photographs already provided to the Center on DVD that depict the element discussed.

Hecker Design

Limited Liability Company



Bill Hecker, AIA
Accessibility Consultant

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Member National Institute of Building Sciences
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Got Access?

Rehabilitation Act Section 504 Accessibility Report of the **US Space & Rocket Center Museum Facility** *Huntsville, Alabama*

Prepared by: **Bill Hecker, AIA – Accessibility Consultant**
June 12, 2008

A. Introduction

This report is based upon a program accessibility analysis of the main museum ("Museum") at the US Space & Rocket Center (USSRC), a NASA grant recipient.¹ Section 504 of the Rehabilitation Act of 1973 requires that federal grant recipients determine if there are any physical barriers to program participation for people with disabilities.

This analysis included the following steps:

1. Conducting a detailed facility survey by a registered architect who specializes in federal accessibility compliance issues;
2. Completing a review of the program spaces within the Museum facility that are open to the general public based upon interviews with USSRC management;
3. Completing a comparison of the existing facility conditions identified in the survey process to the accessibility requirements for alteration projects required under the Uniform Federal Accessibility Standards (UFAS), which NASA regulations have identified as the applicable Rehabilitation Act accessibility standards;

4. Proposing alternative low cost or no cost strategies for ensuring program accessibility at this Museum;

5. Proposing specific facility modification strategies for ensuring program accessibility at this Museum where low cost or no cost options are not appropriate;

B. The Facility Survey

A detailed accessibility survey was conducted April 1-3, 2008 of the Museum and surrounding public facilities. This report will focus exclusively on the physical barriers to program accessibility faced by individuals with disabilities visiting the portions of the Museum open to the general public. Specific program accessibility issues related to staff areas and facilities used exclusively by the Space Camp participants are not the focus of this analysis. This report also does not focus on physical barriers within the newly-constructed Davidson Center, as these barriers have been separately identified to the USSRC. Of particular interest during the survey process were barriers to physical access that bar or limit individuals with disabilities from approaching the Museum from site arrival points, entering the Museum and using the facilities.

C. Typical Museum Use Patterns

Typically, visitors to the Museum arrive on site in their own vehicles, buy a ticket, view and/or interact with space related Museum displays, watch IMAX movies, learn from live on-stage teaching events, amble about the exterior "Rocket Park", experience space related amusement-park type rides, visit the gift shops, use the public restrooms and have lunch or a snack in the cafeteria. As these are the program activities typically available to the general public and are required to be accessible when those activities are viewed in their entirety, the accessibility analysis process was limited to the areas

of the facility that housed those activities. Specifically this report is limited to a program accessibility barrier review of the following areas serving the Museum: the public parking areas, approach routes from the parking areas, approach routes from the Davidson Center main ticket booth, Museum display areas, IMAX Theater, educational theater, "Rocket Park", gift shops, restrooms and cafeteria.

D. Accessible Parking for the Museum

The site arrival point for those coming in their own vehicles to tour the Museum and Rocket Park is linked to the new ticket booth at the Davidson Center (see Hecker photo 7230) on the west end of the site. Designated accessible parking is provided just outside the ticket booth in this new Davidson Center. Specific accessibility barriers associated with these accessible parking spaces and loading zone arrival points are not included in this report as the building is so new that minor access issues are being addressed at the time of this report by the design and construction team for this facility under a "punch list" process and once these items have been corrected, these parking and loading spaces will be accessible along with the approach route to and the counters at the Museum ticket booth there.

There are existing fully accessible parking spaces on the east side of the Museum (see Hecker photo 7357) to serve those visitors who don't want to buy a ticket for a complete tour of the Museum, but only want to visit the Museum's Gift Shop.

E. Museum Approach Routes

The general public is directed to approach the south (facing Rocket Park) side Museum entrance ramp after buying tickets at the new Davidson Center ticket booth and parking in the Davidson Center lot. The existing route between the Davidson Center ticket booth and the Museum entrance ramp is UFAS compliant, but the actual entrance ramp (see Hecker photo 7517) is steeper (at 11.4%) than the maximum allowable ramp slope of 8.3%, it has no accessible handrails, it has a 1" high lip at the

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bottom transition and it lacks an intermediate level landing. The long range plan for correcting this physical barrier would be to rehabilitate the existing ramp so an accessible ramp is built on top of the existing ramp and new concrete landings were constructed at the bottom and every 30" of vertical rise along the ramp. The "low cost" option to ensure program accessibility is to provide those who have difficulty with inaccessible ramps with a free accessible tram ride (see Hecker photo 9528) to the eastern "Gift Shop" entrance approach walk. That eastern approach walk can be made UFAS compliant by simply adding a pair of accessible handrails at the concrete ramp section (see Hecker photo 7376) of the approach just outside the eastern Museum entrance doors. Another alternative is to allow disabled users who wish to see only the Museum or IMAX movie to park on the east side of the Museum, to enter on the eastern entrance doors and purchase tickets at the security station (see Hecker photo 8766) at the east entrance lobby.

F. Museum Interior Accessibility Issues

1. Main Exhibit Space - The main exhibit space at the top of the existing inaccessible entrance ramp is approximately 28" below the main circulation level of the rest of the Museum and is served by two ramps that connect the higher level displays with the main display area. The western ramp (see Hecker photo 8943) leading up to the German rocket scientist displays lacks accessible handrails on one side and is only 36" wide, so the new handrail system will have to be specially engineered to comply with UFAS specifications. The eastern ramp (see Hecker photo 9016) leads up to the climbing wall, Redstone Arsenal display area and the vast majority of the Museum's program and support areas. This eastern ramp is steeper (at 11.0%) than the maximum allowable 8.3% and also lacks accessible handrails. As this ramp is a critical connector between primary program spaces, it will have to be replaced with an accessible ramp in the near future and assistance should be offered to those who may be seriously challenged by the use of the ramp.

Certain features (see Hecker photos 9034, 9040, & 9053) of some displays create barriers for individuals with disabilities. These features are typically an integral part of the display and alternate programmatic accommodations will be required to ensure equal access to the program when viewed in its entirety. In this space, the MIR Lab, V-2 Rocket and other miscellaneous displays have no way of screening off the projections to ensure blind and visually impaired individuals will not run into the objects – programmatic accommodations will be required in the form of a spoken warning at ticket purchase time stating that the displays may pose a challenge for cane users and extra caution or wayfinding assistance will be necessary. To screen off these objects with cane detectable warnings would fundamentally alter the nature of the historical or scientific element. This is also true for certain displays where mobility impaired individuals will not be able to climb inside or on top of the display to see what is inside – in those cases, photographs of the views one would have if one were to climb inside or on top shall be provided in an orientation binder that mobility impaired visitors may check-out from the ticket booth or security station. This is particularly true for the Mercury, MIR and Apollo capsule displays (see Hecker photo 9033 & 9063), but will also apply to the inaccessible west mezzanine displays.

2. Lower Level West Display Area for “Rocket City Legacy” – The ramp (see Hecker photo 8916) leading up to this raised platform display area from The Space Shop is only slightly steeper than the maximum allowable 8.3% slope, and with alternate accessible approach routes through the Main Exhibit Space, no work is required at this ramp other than add accessible handrails on each side. The circular display windows along the approach to the Time for Challenge Theater are positioned at various heights so all visitors, including children and those who use wheelchair can easily see the displays. The Time for Challenge Theater (see Hecker photo 8926) is set two steps down from the main accessible circulation route and to ensure that wheelchair users are integrated into the fixed seating at this theater, a new ramp will need to be provided in the long-term plan and in the interim, wheelchair users may sit at the railing next to benches placed on the upper level to watch the show.

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Remove one of the benches in the near term and install edge protection within the railing system to prevent wheelchair casters from rolling over the edge and locking the occupant under the railing.

This presentation, like the other video presentations in the Museum has open captions for those who are deaf or hard of hearing.

There is a ramp (see Hecker photo 8955) which leads from the early German scientist area of this display down to the Army Missile Display area and this ramp lacks accessible handrails and was built steeper (at 10.5%) than the maximum allowable 8.3% slope for ramps. As this ramp is critical to a large portion of the western display area it must be rehabilitated so that the length is extended to create a maximum slope of 8.3% and new handrails installed as required by UFAS.

The display case (see Hecker photo 8959) situated in the "Space Lab" display area has angled narrative plaques along the sides that create a protruding hazard for blind visitors. These may be screened off with decorative cane detectable rails mounted 18" above the floor and matching the existing railing system. The rails must be set back from the forward edge of the narrative plaques no more than 4" to be cane detectable.

3. Mezzanine Level West Display Area – The "Dream, Explore, Search" exhibit (see Hecker photo 8964) sponsored by Northrop Grumman is only accessible by stairs and is therefore inaccessible to those who use wheelchairs. A photographic representation of the displays offered on the inaccessible mezzanine level must be provided—for instance, in an orientation binder that mobility impaired visitors may check-out from the ticket booth or security station. Under no circumstances should members of the general public be carried up the stairs by USSRC staff as that process is unsafe and seen by many as demeaning to individuals with disabilities. As technology or resources permit in the future, the USSRC should offer an audio/visual presentation of the displays offered on

the inaccessible level as a programmatic accommodation or consider relocating these displays to accessible locations. An elevator is not required to be installed.

4. Mezzanine Level East Display Area – The exhibit area on the inaccessible mezzanine level (see Hecker photo 9088) is closed to public access and is not used.

5. Lower Level East Display Area – This area (see Hecker photo 9069) houses the Team Redstone exhibit and the Mars Climbing Wall experience. The Army exhibit is accessible and while the rock climbing experience (see Hecker photo 9080) is not accessible to those with mobility impairments, to make an accessible wheelchair ramp up to the top of the rock climbing wall would fundamentally alter the nature of the activity and is not required to be modified as such under the program accessibility provisions of the Rehabilitation Act. The same is true for the Mars Mission Simulator ride discussed in another section of this report, but housed in this area of the Museum.

6. Eastern Entrance Lobby – As mentioned above, since the new ticket booth is in Davidson Center now, this lobby area (see Hecker photo 8760) is subordinated to the ramped entrance into the main Museum Exhibit Space. While it may be used as an accessible alternative in the short run for those who cannot negotiate the steep inaccessible entrance ramp now used as the main Museum entrance approach, it also houses key Gift Shop, classroom and display spaces that are required to be accessible to the general public. The only physical barrier present in this entrance lobby is the lack of accessible handrails on the otherwise accessible ramp (see Hecker photo 8775) connecting the lower lobby portion to The Space Shop further inside the facility. Two new UFAS compliant handrails must be installed on this ramp and given the ramp configuration and the fact that there is an office door (not open to the public) along the south wall of this ramp that would be blocked if the ramp handrails were installed along the surface of the walls, it is preferable to install them about eight feet away from the two side walls rather than actually on the side walls.

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There is also a display of a custom motorcycle in this entrance lobby and an open classroom for lectures which are both accessible to and usable by people with disabilities. A security guard is posted at the bottom of the entrance lobby ramp and directs most visitors to the ticket booth at the new Davidson Center, but should be instructed to allow those who would not be able to use the steep, inaccessible entrance ramp up to the main exhibit space to enter and purchase tickets until that entrance ramp is rehabilitated. Or in the alternative, for those with disabilities who actually purchase their tickets at the main ticket booth at Davidson Center and ride to this entrance lobby on the accessible tram car, this guard should greet and direct the disabled visitors to their desired destinations.

7. Kids Gift Shop – The Kids Gift Shop located within the eastern entrance lobby is accessible and has the only accessible check-out counter in any of the gift shop locations. Offer assistance to those who may not be able to retrieve items on display but outside wheelchair user reach ranges. Circulation within the gift shop is accessible as required by UFAS, but as displays change ensures a minimum 36" clear passage width between displays or a 32" minimum width where there is a constriction that lasts for 24" long or less.

8. The Space Shop – The main gift shop, known as The Space Shop (see Hecker photo 8783), located just beyond the eastern entrance lobby is generally accessible, but the check-out counter (at 38" high) does not have an auxiliary accessible counter upon which those in wheelchairs may sign credit card receipts or write checks. Since each of the counters is actually a glass display case, it is recommended that an additional glass table be used as the auxiliary counter. This table must be at least 34" wide and offer knee space underneath that is 19" deep and 27"-29" high with a writing surface between 30"-34" above the floor. This would allow continued viewing of merchandise displayed in the glass display cases through the auxiliary glass counter. Other creative design

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alternatives that comply with UFAS are also acceptable. An auxiliary service counter must be provided for each inaccessible cash-wrap counter. These auxiliary counters may be placed on the end or sides of the main display case counters as long as the required 30"x48" wheelchair clear floor space is provided per UFAS at the auxiliary counter. Offer assistance to those who may not be able to retrieve items on display but outside wheelchair user reach ranges. Circulation within the gift shop is accessible as required by UFAS, but as displays change ensures a minimum 36" clear passage width between displays or a 32" minimum width where there is a constriction that lasts for 24" long or less.

9. NASA Visitor Center Display – This display area is situated just opposite the eastern entrance lobby approach from The Space Shop and offers the visitor an introduction to the role NASA has played in the US space program and Huntsville in particular. As with other audio visual displays, the video display here offers deaf and hearing impaired visitors open captions on the TV screens that correspond with the audible narrative presented on the video. The only physical barrier in this area of the Museum are two wall mounted, back-lit display boxes (see Hecker photo 8795) which project more than 4" into the circulation route along the main curved exhibit wall and are not cane detectable for blind visitors. A low-cost correction would be to install an 18" high decorative rail beneath these display boxes such that blind visitors will have a cane detectable cue when walking along this curved exhibit wall. This rail could easily match the aesthetic of other rails located within the Museum.

10. Outpost Teaching Theater – This live action, stage based teaching lab (see Hecker photo 8890) has a sloped fixed seating auditorium layout in front of the level cross aisle and 3 tiers of bench seats behind it. There are approximately 177 fixed seats. The sloped floor and side aisles are (at 10.9%) too steep for wheelchair users to easily negotiate and precludes wheelchair seating locations up front near the stage or an accessible route to the stage area in this 1970's era portion of the facility. There is a level cross aisle in the mid-section of the auditorium that links directly to the

entrance and exit doors where 4 wheelchair users may sit with their companions to view the teaching lab shows. There is no assistive listening system in this auditorium for those who are hard of hearing and a UFAS compliant system similar to that provided at the SpaceDome IMAX Theater must be purchased and linked into the audio system used during the performances. A minimum of two headsets must be provided. Notice of the availability of this system must be shown at the new ticket booth in Davidson Center.

11. SpaceDome IMAX Theater – The ramp (see Hecker photo 8805) used to approach the SpaceDome Theater from the Main Exhibit Space must be replaced with an accessible ramp. The existing ramp rises (at approximately 40") more the maximum 30" height without a level intermediate landing as required by UFAS and the existing top landing for the lower ramp run is not (at only 53" long) at least 60" long as required by UFAS. The existing top ramp run also slopes (at 10.5%) steeper than the maximum allowable 8.3% and there are no handrails provided on the wall-side of this existing ramp. Until funds are available to reconstruct this ramp, an interim low-cost remedial solution for the lack of an accessible wall-side handrail must be provided and must comply with UFAS 4.8.5. Additional guidance can be found in the UFAS Retrofit Manual (<http://www.wbdg.org/ccb/ASTAND/ufas2.pdf>) published by the US Access Board who also authored the UFAS Standards.

In the Theater Lobby area (see Hecker photo 8819), the underside of the stair leading to the upper level theater seating is unprotected and not cane detectable to blind visitors. A low-cost solution would be to install a bench underneath the exposed steel stair structure so cane users would know that area is not a walking surface.

The concession stand in this Theater Lobby is generally accessible, but the tape stanchions (see Hecker photo 8820 & 8824) were positioned with the weighted bases too close to one another to

allow wheelchair users to pass through the line to buy popcorn and drinks. The lowered portion of the concessions sales counter (see Hecker photo 8828) currently holds the drink machines which must be relocated to be flush with the left side wall as one is facing the machines to ensure a transaction space on the right side of the machines for wheelchair users, the adjustable feet must be turned until the machines are lowered by 1 inch (46" to the drink dispenser cup trigger) and each drink dispenser must be pushed back 10" from the front edge of this lowered accessible transaction counter to ensure a UFAS compliant transaction area and drink dispensers within the UFAS required wheelchair user reach range.

The SpaceDome IMAX Theater is accessible to wheelchair users via an elevator located to the right of the concessions stand. The only barriers along this route from the concessions lobby to the wheelchair seating spaces within the IMAX Theater are the inaccessible emergency communications cabinet pull (see Hecker photo 8834) in the elevator and the thresholds at the upper level Theater entrance doors. The emergency communications cabinet pull in the elevator requires tight pinching to grasp and open and can easily be replaced by a loop style cabinet pull that complies with UFAS 4.10.14 and 4.27. The existing thresholds (see Hecker photo 8878 - 8880) on the doors through which a wheelchair user would pass to reach the designated accessible wheelchair seating areas inside the Theater from the elevator have inaccessible 3/4" heights and steeper (at 1:1) bevels than allowed under the UFAS provisions. The three thresholds on the outer vestibule doors and the three thresholds on the inner vestibule doors must be replaced with UFAS compliant 1/2" maximum height thresholds having a bevel no steeper than 1:2. A low-cost interim solution would be to only change one of the three outer vestibule doors and the corresponding inner vestibule door thresholds with UFAS compliant thresholds. These accessible doors would then have to be identified by a sign or sticker showing the international symbol of accessibility so visitors who are disabled will know which doors are accessible.

The SpaceDome IMAX Theater has both assistive listening systems for those who are hard of hearing and a "state of the art" reflective captioning system for visitors who are deaf. There is no notice at the Davidson Center ticket booth (see Hecker photo 7234) identifying the availability of these systems as required by UFAS and these signs at the ticket booth and at the Theater entry doors should be installed to alert deaf and hard of hearing visitors. There are 7 wheelchair seating spaces with adjoining companion seats available in this stadium style IMAX Theater which is adequate for Section 504 program access compliance given the fact that this theater was built 6 years before the publication of UFAS, wheelchair users are provided integrated wheelchair seating options and wheelchair seating offers sight lines comparable to those of the general public.

12. The Ultimate Fieldtrip Classroom – This high-tech classroom is fully accessible per UFAS. The only thing that must be changed is the Braille and raised letter "EXIT" positioned on the wall to the left of the classroom entry doors (see Hecker photo 8906). This sign should be replaced with one having Braille and raised letters reading "Ultimate Fieldtrip Classroom" to match the room identification sign provided on the face of the entry doors.

13. The Space Gear Shop – This gift shop (see Hecker photo 9103), known as The Space Gear Shop, located between the Galaxy Food Court and the Main Exhibit Space is generally accessible, but the check-out counters (at 38" high) do not have an auxiliary accessible counter upon which those in wheelchairs may sign credit card receipts or write checks. Since each of the counters is actually a glass display case, it is recommended that an additional glass table be used as the auxiliary counter. This table must be at least 34" wide and offer knee space underneath that is 19" deep and 27"-29" high with a writing surface between 30"-34" above the floor. This would allow continued viewing of merchandise displayed in the glass display cases through the auxiliary glass counter. Other creative design alternatives that comply with UFAS are also acceptable. An auxiliary service counter must be provided for each inaccessible cash-wrap counter. These auxiliary counters may be placed on the

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end or sides of the main display case counters as long as the required 30"x48" wheelchair clear floor space is provided per UFAS at the auxiliary counter. Offer assistance to those who may not be able to retrieve items on display but outside wheelchair user reach ranges. Circulation within the gift shop is accessible as required by UFAS, but as displays change ensures a minimum 36" clear passage width between displays or a 32" minimum width where there is a constriction that lasts for 24" long or less.

The ramp (see Hecker photo 9093) leading down to this gift shop area and the Food Court beyond from the Main Exhibit Space lacks handrails which must be installed along each side of the ramp. The gift shop side handrail may be mounted to the aluminum storefront system or floor mounted a foot or so beyond the face of the glass wall. The opposite side handrail may be installed 54" away from the concrete wall to act as a separation rail between the line for those waiting to ride the Mars Mission Simulator and others simply walking along the circulation route to the Gift Shop and Food Court beyond. These handrails must comply with UFAS 4.8.5.

14. Galaxy Food Court – This dining and food service area is generally accessible to visitors. The only exceptions are lights (see Hecker photo 9149) mounted on the decorative columns separating different food service counter stations which project into the circulation route below 80" and the glass box on the Coke In-Space vending machine (see Hecker photo 9163) which also projects more than 4" into the circulation route without a cane detectable barrier below. A decorative post or U-shaped rail mounted to the surface of the decorative column will act as a "low-cost" cane detectable cue for blind visitors who might otherwise hit their heads. The "no-cost" solution to the Coke vending machine barrier is to switch positions with another adjoining vending machine and set the Coke In-Space vending machine within an alcove created by the two adjoining vending machines such that the face of the glass box does not project into the circulation route anymore.

The food service counters, tables and dispensers within the Galaxy Food Court area are otherwise fully accessible to visitors with disabilities. A "no cost" improvement to the already accessible dining facilities that the management might consider is having maintenance staff to unscrew the X-shaped table bases on 10-15 additional square 4-person tables (see Hecker photo 9148) and rotate the bases such that the tube supports on the floor are centered on each of the sides and reattach the bases to the table tops. This will allow wheelchair users to pull under the tables without having their front casters hit the tube supports as can happen with the existing 4-person tables. The new table base configuration will allow the footrests of wheelchairs to ride over the tube supports holding up the tables and provided a deeper knee space for wheelchair users at more than the minimum number of tables in the Food Court dining room.

While not specifically an accessibility barrier, a general communications barrier at the Food Court area is found on one of the two backlit orientation maps (see Hecker photo 8723) just before a visitor enters the Galaxy Food Court. On one side of the map kiosk, the backlit building plan that faces the wall of the Women's Restroom is printed backwards, making orientation within the Museum very difficult for those who already need assistance with locating exhibits and spaces. The "no-cost" solution is simply to take this inaccurate building map down and replace it with the one on the other side of the kiosk which faces the Space Camp Cafeteria. It is far more likely that Space Campers will have been given a tour of the facilities during their orientation process and may not need the information provided on the building map as first time visitors who are stopping off at the Galaxy Food Court for a meal or snack.

15. Public Restroom Accessibility – The USSRC is in the midst of a long-term restroom renovation project. While there are currently only new accessible Men's and Women's restroom facilities (see Hecker photo 8100 outside the Space Camp Cafeteria and a new accessible Women's restroom (see Hecker photo 8635) near the SpaceDome IMAX Theater, all public restrooms are scheduled for

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accessibility modifications. It is recommended that the USSRC place the highest priority on renovating the Men's restroom (see Hecker photo 8676) that also serves the SpaceDome IMAX Theater in the next round of restroom renovations. It is also recommended that the USSRC abandon the plans to make the Basement Level Men's and Women's restrooms accessible as these are accessed only by stairs from the Main Exhibit Hall and from a very steep (14.5%) pair of ramps leading down from the Rocket Park. Those in the Rocket Park may be directed to the accessible restrooms on the ground floor of the Davidson Center and signs placed at the top of the stairs in the Main Exhibit Hall which lead down to these restrooms directing those with disabilities to other accessible restrooms. Until all public restroom on an accessible route have been modified based upon the USSRC long term plan, it is imperative that signs be placed at the entrances to the inaccessible public restrooms directing Women to the new accessible Women's restroom at the SpaceDome Theater and men to the new accessible Men's restroom near the Space Camp Cafeteria. There are a few "punch list" items for the new renovated public restrooms.

In the new Women's restroom near the SpaceDome Theater the following elements must be modified to comply with UFAS:

1. Notch out the inaccessible plywood knee screen under the lavatory at the far right so it provides the required knee space for the accessible lavatory shown in UFAS 4.19.2 & Fig 31. The current knee screen projects into the minimum knee space required under the lavatory. The pipes under this lavatory are already insulated so as not to burn a wheelchair user who pulls under the lavatory.
2. Install a full height mirror in the restroom to correct the lack of an accessible mirror over the lavatories. Those mirrors have the bottom reflecting surface mounted 2 1/4" higher than the maximum 40" height required in UFAS 4.19.6.
3. Add pull hardware to the inside of the accessible stall door so disabled users can keep the door closed while they operate the accessible sliding latch.

4. In the accessible stall, relocate the trash can outside the accessible stall as it hinders wheelchair transfer and can be placed just outside the stall door under the wall mounted hand dryer to accommodate diaper changing visitors.

5. In the accessible stall, install a new 12" long grab bar between the vertical flush valve pipe and the near side stall partition. Mount at a height to match adjacent grab bars. If no structural blocking is provided for this location, use grab bars available on the following web site which can be mounted into drywall... <http://www.wingits.com/> .

In the new accessible Men's Restroom by the Space Camp Cafeteria the following elements must be modified to comply with UFAS:

1. The new concrete apron at the exterior side of the restroom entrance door is not level as required – it slopes 14.1% and has a 1/2" high lip just before the beginning of the accessible door threshold. This concrete apron will have to be cut out and a new stoop poured flush with the restroom floor which extends out at least 48" into the pavement area and is linked to that pavement surface with a tapered transition sloping no more than 8.3% to ensure an accessible route from the Cafeteria door opposite.

2. Install a full height mirror in the restroom to correct the lack of an accessible mirror over the lavatories. Those mirrors have the bottom reflecting surface mounted 2 1/4" higher than the maximum 40" height required in UFAS 4.19.6.

In the new accessible Women's Restroom by the Space Camp Cafeteria the following elements must be modified to comply with UFAS:

1. The new concrete apron at the exterior side of the restroom entrance door is not level as required – it slopes 8.8% and has a 1/2" high lip just before the beginning of the accessible door threshold. This concrete apron will have to be cut out and a new stoop poured flush with the restroom floor which extends out at least 48" into the pavement area and is linked to that pavement

surface with a tapered transition sloping no more than 8.3% to ensure an accessible route from the Cafeteria door opposite. Link this accessible stoop assembly to the adjacent Men's restroom stoop.

2. Install a full height mirror in the restroom to correct the lack of an accessible mirror over the lavatories. Those mirrors have the bottom reflecting surface mounted 2 1/4" higher than the maximum 40" height required in UFAS 4.19.6.

16. Pay Phones and Drinking Fountains – The existing pay phones are almost all higher than wheelchair users can reach and one pay phone in each major area must be lowered in the long term plan so the coin slot is no higher than 48" above the floor. A TTY is required to be made available to those who are deaf or hard of hearing and signs at each of the pay phones should direct those who need the TTY to security station in the East Lobby where the guard will have a TTY available during business hours.

Drinking fountains are provided through out the facility at heights to accommodate wheelchair users.

¹ This review focuses on the existing Main Museum building of the USSRC, as most architectural issues affecting program access exist in this area. During our on-site review of USSRC, other facilities, such as the Space Camp facilities, were examined. Program access issues in these areas are considered in the final report prepared by BayFirst Solutions. In addition, minor deviations from the applicable architectural standards were identified at the newly constructed Davidson Center and these were provided to USSRC for correction by the USSRC's contractors (these corrections must be made pursuant to Alabama state law).