



# Virginia Air & Space Center Section 504 Compliance Report



June 2020



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## I. INTRODUCTION

The National Aeronautics and Space Administration (“NASA”) conducted a compliance review of the Virginia Air and Space Center (“VASC” or “Center”) to ensure that, as a beneficiary of a NASA grant, Center program participants have equal access to its benefits, services, and activities regardless of disability. The review was conducted under Section 504 of the Rehabilitation Act of 1973 and NASA’s implementing regulations and policy, which prohibit grantees from excluding from participation, denying the benefits of or subjecting to discrimination individuals with disabilities in its programs, services or activities.<sup>1</sup>

NASA finds VASC noncompliant with Section 504 of the Rehabilitation Act in several areas. The noncompliance includes both procedural requirements, such as coordination and complaints procedures, and program environment, such as effective communication and architectural accessibility. We provide analysis, corrective actions and recommendations below.

### A. Background

The Center, a private science museum located in Hampton, Virginia, also serves as the Visitor Center for NASA Langley Research Center.<sup>2</sup> According to VASC, over 60% of its facility is dedicated to NASA exhibits, including the Apollo 12 Command Module, Gemini Test Capsule, and Mercury 14 spacecraft.<sup>3</sup>

In addition to its exhibit space, the Center also operates a five-story IMAX® Digital 3D Theater, which focuses on documentary space films, popular films, aeronautics, and robotics. VASC dedicates substantial resources to Science, Technology, Engineering, and Mathematics (“STEM”) programs. VASC has a staff of 18 full-time employees, 33 part-time employees, and 10 to 15 volunteers.

### B. Objective and Scope

NASA’s objective is to evaluate the Center’s compliance with NASA Section 504 regulations in the following areas:

- Procedural requirements including: (1) performance of a Section 504 self-evaluation; (2) identification of VASC’s Section 504 Designated Responsible Employee (“Section 504 Coordinator”); (3) existence of grievance procedures; (4) notice to program participants; and (5) existence of a transition plan;
- Program requirements including: (1) ensuring that program participants are not subject to discrimination on the basis of disability; (2) providing effective communication in digital technologies, including the Center website; and (3) ensuring that architectural features comply with requirements.

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<sup>1</sup> Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794); Nondiscrimination on the Basis of Disability, Title 14 of the Code of the Federal Regulations (CFR) Part 1251; NASA Policy Directive 2081.1A, Subject: Nondiscrimination in Federally Assisted and Federally Conducted Programs of NASA - Delegation of Authority.

<sup>2</sup> Letter of February 23, 2018, from Robert Griesmer, Executive Director, VASC, to Stephen T. Shih, Associate Administrator, Office of Diversity and Equal Opportunity, NASA, providing VASC’s *Response to NASA Section 504 Information Request* (“Response”) at p. 1.

<sup>3</sup> *Id.*

The summary charts in the body of the report for these topics present NASA’s findings at the highest level; more technical details can be found in Appendices B and C.

## II. COMPLIANCE ANALYSIS AND FINDINGS

Under each main topic in the review, we have provided regulatory requirements and NASA’s findings of fact. The charts used in each section indicate whether VASC is compliant under Section 504. The review then analyzes VASC’s performance and identifies the corrective actions, where appropriate, that must be undertaken to enable VASC to come into compliance and provides additional recommendations for further improvement.

### A. Section 504 Procedural Requirements

#### i. Compliance Standards

NASA’s Section 504 regulation includes a number of procedural requirements:

- 1) **Self-Evaluation.** Within one year of first becoming a recipient and with the assistance of interested persons, including people with disabilities, recipients must conduct a self-evaluation of its current policies and practices that affect Section 504 compliance and modify its policies and practices to eliminate discrimination against people with disabilities. Upon completion of this report, recipients must retain this report for three years for public inspection.<sup>4</sup>
- 2) **Section 504 Coordinator.** Recipients with 15 or more employees, such as VASC, must designate a Section 504 Coordinator<sup>5</sup> and notify all employees and program participants of the Coordinator’s identity.<sup>6</sup>
- 3) **Grievance Procedures.** Recipients with 15 or more employees must adopt and publish grievance procedures to promptly and equitably resolve complaints alleging violations of Section 504.<sup>7</sup>
- 4) **Notice.** Recipients with 15 or more employees must take specific and continuing steps to notify employees, volunteers, program participants of their rights under Section 504 and the identity of the organization’s Section 504 Coordinator. This notification should also include a statement that the recipient does not discriminate in its programs or activities based on disability.<sup>8</sup>

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<sup>4</sup> 14 C.F.R. § 1251.105(c)(1).

<sup>5</sup> 14 C.F.R. § 1251.106(a).

<sup>6</sup> 14 C.F.R. § 1251.107(a).

<sup>7</sup> 14 C.F.R. § 1251.106(b).

<sup>8</sup> 14 C.F.R. § 1251.107(a).

5) **Transition Plan.** Where a recipient’s facilities do not comply with the requirements of Section 504, the recipient must create a transition plan to implement physical changes to enable access for qualified individuals with disabilities. This transition plan, which must be available for public inspection, requires grantees to:

- Identify barriers that limit accessibility of programs or activities to individuals with disabilities;
- Describe methods for eliminating these barriers in detail;
- Include a schedule for removing these barriers; and
- Identify the person responsible for implementing the transition plan.<sup>9</sup>

Review Criteria: Section 504 Procedural Requirements	Yes	No
<b>1) Self-Evaluation</b>		
• VASC has conducted a Section 504 Self-Evaluation within one year of becoming a grant recipient with interested persons (including people with disabilities).		X
• VASC has modified its policies and practices based on this self-evaluation to ensure that people with disabilities are not subject to discrimination.		X
<b>2) Section 504 Coordinator</b>		
• VASC has designated a Section 504 Coordinator.	X	
<b>3) Grievance Procedures</b>		
• VASC has created a grievance procedure to address complaints alleging violation of Section 504.		X
<b>4) Notice</b>		
• VASC provides to all notice of their rights under Section 504 and that it does not discriminate based on disability.		X
• The non-discrimination notice identifies VASC’s Section 504 Coordinator.		X
<b>5) Transition Plan</b>		
• VASC has identified barriers in VASC’s facilities that preclude compliance with Section 504 and has created a transition plan to rectify these deficiencies.		X

<sup>9</sup> 14 C.F.R. §1251.301(d).

## ii. Assessment

**Self-Evaluation.** VASC is obligated to perform a self-evaluation that must be made available for public inspection and for NASA review upon request. VASC has not performed the required self-evaluation and therefore is noncompliant in this area.

**Section 504 Coordinator.** VASC meets this requirement as it has identified its Chief Executive Officer as its Designated Section 504 Coordinator.<sup>10</sup>

**Grievance Procedures.** The Center lacks a grievance procedure for program participants. While VASC receives feedback through several avenues (e.g. VASC’s “Contact Us” web page, social media, and its “accident and incident” form), it does not have a Section 504 complaint form nor does it have a separate procedure for processing disability complaints.

**Notice.** While VASC has a dedicated page for people with disabilities, (<https://www.vasc.org/disabilities-act/>), the VASC website does not link to this page, as required. VASC also must explicitly state that it does not discriminate against people with disabilities.

**Transition Plan.** VASC does not have a transition plan in place to rectify the accessibility barriers facing disabled people, as required.

## iii. Corrective Actions and Recommendations

**Self-Evaluation.** The Center must conduct a Section 504 self-evaluation within one year of first becoming a recipient and must modify its policies and practices that do not meet Section 504. As the Center has not conducted a Section 504 evaluation, it must do so now in accordance with 14 CFR Section 1251.105(c). The National Endowment for the Arts provides a suggested Section 504 Self-Evaluation Workbook at <https://www.arts.gov/open-government/civil-rights-office/section-504-self-evaluation-workbook>.

**Section 504 Coordinator.** The Center’s identification of a Section 504 Coordinator satisfies its obligations, though we recommend that the Coordinator attend regular trainings or conferences dedicated to disability-related issues. In addition, VASC may benefit from creating an accessibility committee to enhance the Center’s knowledge base.

**Grievance Procedures.** The Center must establish grievance procedures for program participants. While the NASA Section 504 regulations state only that these procedures “incorporate appropriate due process standards” and “provide for the prompt and equitable resolutions of complaints,” NASA and other Federal agencies have found it useful to:

- ensure that the grievance procedures include specific timelines for review and resolution of complaints, identify reasonable deadlines for appealing complaint findings, and ensure that complainants are notified at each stage of the complaint process;

<sup>10</sup> Response, at p. 1.

- publicize the Center’s grievance procedure by posting it publicly on its website and referencing it in publications;
- train Center personnel regarding the availability and location of this procedure;
- establish a grievance procedure to collect at a minimum, the name and address of the complainant, a detailed description of the alleged discrimination, the identity and contact information of the complainant and the dates and time of the alleged discrimination; and
- track all complaints to identify patterns or potential areas for improvement.

**Notice.** The Center must take continuing steps to notify employees and program participants of:

- its non-discrimination policy in its programs and activities; and
- the identity of its Section 504 Coordinator.

While not specifically required under NASA’s Section 504 regulation, NASA recommends VASC make available its grievance procedures, including any necessary forms, as part of this notice and that all employees and volunteers are familiar with this page and able to locate it. In addition, NASA recommends that VASC include their non-discrimination statement and reference to their accessibility web page in all brochures, print media, and electronic communications.

**Transition Plan.** The Center must develop and implement a detailed plan for remediating the barriers identified in this report. This plan must:

- be available for public inspection;
- address any additional barriers the museum discovers during the development of its remediation plan;
- describe in detail methods for eliminating these barriers;
- establish a schedule for removing these barriers; and
- identify the person(s) responsible for implementing the transition plan.

## **B. Section 504 Program Requirements**

### **i. Compliance Standards**

NASA’s Section 504 regulations also include several specific requirements to prevent discrimination against program participants.<sup>11</sup> This section assesses the Center’s efforts to address these requirements.

- 1) **Effective Communication.** The NASA regulations require grantees to provide auxiliary aids and services (e.g. sign language interpreters, assistive listening devices, braille and large print documents, etc.) as well as a general requirement to ensure effective communication with all program participants regardless of disability.<sup>12</sup> In addition, as

<sup>11</sup> 14 C.F.R. § 1251.103(b). In addition, NASA regulations also require recipients to take appropriate steps to ensure effective communication with program participants. 14 C.F.R. § 1251.112.

<sup>12</sup> 14 C.F.R. § 1251.112.

discussed in more detail below, the Center must meet architectural requirements, which include the obligation to provide assistive listening systems in all assembly areas.<sup>13</sup>

- 2) **General Programs.** Federal fund recipients need to ensure that their programs, services, and activities are accessible to people with disabilities. Where barriers exist, recipients must either remove the barriers or provide meaningful alternatives that ensure that the programs, services or activities are still accessible when “viewed in its entirety.”<sup>14</sup> For instance, if an existing exhibit includes an inaccessible element that cannot be made accessible, Section 504 would permit the use of an adjacent accessible alternative that conveys the same content and learning opportunities as the inaccessible element.
  
- 3) **Special Programs.** Science centers and museums often run special programs, both on-premises and off-premises. These programs typically focus on local students in K-12 programs and pre-school participants and provide educational opportunities that foster an interest in STEM topics. Federal fund recipients must ensure that these programs do not exclude or discriminate against participants with disabilities.
  
- 4) **Emergency Response.** Emergency response is a practical reality in today’s world and people with disabilities need to be considered in planning emergency response. In some instances, emergency evacuation plans do not require evacuating a facility immediately. For instance, during a fire, people with disabilities can be relocated to specially designated areas of rescue assistance.<sup>15</sup> Also, “active shooter” plans may include developing “shelters in place” (e.g. rooms with barricaded doors). While not specifically identified in the NASA Section 504 regulations, emergency response should be considered an important part of program access.

<b>Review Criteria: Section 504 Practices</b>	Yes	No
<b>1) Effective Communication</b>		
<ul style="list-style-type: none"> <li>• VASC has responded to all requests for auxiliary aids and services to meet the communication needs of program participants.</li> </ul>	X	
<ul style="list-style-type: none"> <li>• VASC provides effective communication in its lecture halls and theaters through the use of assistive listening devices (ALDs), captioning, audio descriptions...</li> </ul>		X
<b>2) General Programs</b>		
<ul style="list-style-type: none"> <li>• VASC ensures that all programs, services, and activities are accessible to qualified users with disabilities.</li> </ul>	X	

<sup>13</sup> NASA regulations require developing a transition plan for barriers in existing facilities. These regulations also recognize a “safe harbor” for facilities that meet the Uniform Federal Accessibility Standards (UFAS). 14 C.F.R. § 1251.301(e). UFAS requires ALD in all assembly areas, including lecture halls and theaters. 41 C.F.R. § 101-19.6 App. A, available at <https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/ufas>.

<sup>14</sup> 14 C.F.R. § 1251.301.

<sup>15</sup> Modern building codes anticipate emergency evacuation by requiring features like evacuation elevators. These elevators are fundamentally different from normal elevators insofar as they require a separate smoke-free airshaft and a dedicated electrical system. Where such elevators are not required or available, accessibility standards may require designating areas of rescue assistance where people with disabilities can await assistance from emergency services personnel.



<b>3) Special Programs</b>		
<ul style="list-style-type: none"> <li>VASC ensures that all program, services, and activities are accessible to qualified users with disabilities.</li> </ul>	X	
<ul style="list-style-type: none"> <li>Where elements that are part of programs, services, and activities are inaccessible to qualified users with disabilities, VASC ensures that the program, service, or activity is accessible when viewed in its entirety.</li> </ul>	X	
<b>4) Emergency Response</b>		
<ul style="list-style-type: none"> <li>VASC has developed emergency response plans for fire, natural disasters, and other emergencies that include plans specific to persons with disabilities.</li> </ul>	X	
<ul style="list-style-type: none"> <li>VASC's employees and volunteers are regularly trained on these emergency response plans.</li> </ul>	X	

**ii. Assessment**

**Effective Communication.** The Center does not provide captioning or other auxiliary aids or services in its movies. At a minimum, the Center must ensure that assistive listening devices are available in its theaters and lecture spaces.<sup>16</sup>

**General Programs.** The information provided by the Center gives no indication that the Center has denied qualified users with disabilities with access to any programs, services, or activities.

**Special Programs.** VASC provides STEM-based educational programs to local schools. It also offers school field trips, interactive demonstrations and tours, classroom projects, museum outreach, and after-school programs. In addition, VASC also hosts additional special programs, including evening lectures, spring and summer science camps, overnight camps, and teacher training. The Center has not encountered difficulty meeting the needs of program participants because the organizations attending its programs have provided the necessary accommodations.

**Emergency Response.** The Center has basic emergency procedures. These procedures include specific steps to safely evacuate persons with disabilities but fail to include steps for addressing the needs of persons with disabilities in other contexts where evacuation is not necessary (e.g. shelter in place, active shooter, etc.).

<sup>16</sup> 14 C.F.R. § 1251.103(b)(3).

### iii. Corrective Actions and Recommendations

**Effective Communication.** The Center must ensure effective communication in all theaters and lecture halls. This includes installation of assistive listening systems and captioning of movie content.<sup>17</sup> To help ensure that these resources are properly publicized and used as part of its programs, the Center may consider contacting local disability-related resources (e.g. Virginia School for the Deaf and Blind) or partnering with the Virginia School for the Deaf and Blind to improve opportunities for program participants with hearing impairments while augmenting accessibility at VASC.

**Special Programs.** The Center may consider taking steps to ensure that it is prepared to meet the needs of program participants independently and without reliance on organizations attending its program, services and activities to provide the needed accommodations.

**Emergency Response.** The Center should ensure that its emergency procedures are reviewed updated to ensure that the needs of visitors with disabilities are considered, particularly in situations where evacuation is not appropriate.

## C. Digital Accessibility

### i. Compliance Standards

The effective communication requirement includes digital technologies<sup>18</sup>, such as the internet and interactive electronic exhibits. While digital technologies offer tremendous opportunities, they also create the risk that participants with disabilities will be left behind if those technologies are inaccessible.

- 1) **Website Accessibility.** NASA reviewed the Center's website to determine if there are significant communication barriers for people with disabilities. As these barriers deny effective communication, the Center must correct the issues.
- 2) **Other Digital Technology Accessibility.** NASA reviewed the Center's other digital technologies (e.g. kiosks, interactive displays and exhibits, etc.) to ensure that they provided effective communication to program participants. These technologies—along with physical displays and exhibits—can be used to accommodate multiple modes of communication. For instance, a science center may choose to use an interactive touch-panel display and a nearby physical exhibit to convey a lesson. In this case, the Center can make the same lesson accessible through a physical or electronic exhibit.<sup>19</sup>

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<sup>17</sup> Id.

<sup>18</sup> 14 C.F.R. § 1251.103(a)

<sup>19</sup> As a best practice, the Center could also consider evaluating these technologies using WCAG 2.0 A/AA. The Federal government has adopted WCAG 2.0 A/AA for procurements of all digital technologies. 82 Fed. Reg. 5,790 (Jan. 18, 2017).

This section briefly summarizes the overall outcome of this review. More complete details are available in Appendix B.

<b>Review Criteria: Section 504 Effective Communication (Digital Accessibility)</b>	Yes	No
<b>1) Website Accessibility</b>		
<ul style="list-style-type: none"> <li>VASC’s website ensures effective communication to users with disabilities.</li> </ul>		X
<b>2) Other Digital Technologies</b>		
<ul style="list-style-type: none"> <li>VASC’s digital technologies incorporated into exhibits, displays and other interactive elements ensures effective communication to users with disabilities (with or without adjacent displays or fixtures).</li> </ul>		X

**ii. Assessment**

**Website Accessibility.** The Center’s website is the primary and often exclusive source of a patron’s access to information about the Center when planning a visit. VASC’s website is not accessible and includes significant communication barriers to users with disabilities.

As a best practice, we also reviewed the website for conformance with the Web Content Accessibility Guidelines (WCAG) 2.0 A/AA, developed by the World Wide Web Consortium (W3C). While these guidelines are not specifically required, they have become the de facto standard for web accessibility in settlements and consent decrees reached by the Department of Justice, the Department of Education, and private litigants. NASA found that the website did not conform to WCAG 2.0 A/AA standards.

**Other Digital Technologies.** VASC’s use of digital technology is also inaccessible in various areas including:

- Video Displays.** Most video displays do not provide captioning and the accompanying audio is too low to understand. Alternatively, all content in videos can be provided in written text at each exhibit.
- Shuttle Landing Simulator.** Just outside of the Solarium exhibit is the Space Shuttle landing simulator. A patron must be able to crawl into the simulator display to access the video screen, rendering it inaccessible to wheelchair users. The exhibit can be made accessible by providing an adjacent accessible set of controls that replicates the experience in the tight space.
- Ronald Reagan Aircraft Carrier.** Videos included in this exhibit lack captioning. Alternatively, all content in videos can be provided in written text.

### iii. Corrective Actions and Recommendations

**Website Accessibility.** VASC must modify its website to include the accessibility changes identified in Appendix B.

**Other Digital Technologies.** VASC must correct the following deficiencies as soon as practical:

- **Video Displays.** VASC must provide captioning for all videos or other alternatives that ensure effective communication.
- **Shuttle Landing Simulator.** The Center must ensure that the Shuttle Landing Simulator is accessible to users with disabilities.
- **Ronald Reagan Aircraft Carrier.** The Center must provide captioning for all videos or other alternatives that ensure effective communication.

## D. Architectural Accessibility

### i. Compliance Standards

The NASA team undertook a detailed architectural analysis of the Center's facility using the Uniform Federal Accessibility Standards (UFAS) or the 2010 ADA Accessibility Standards for Accessible Design (2010 Standards) for each element in all program areas of the Center's facility. In some instances both standards were used. This section briefly summarizes the outcome of this review. A detailed punch list of deficiencies is provided in Appendix C.

- 1) **New Construction or Alterations.** NASA's Section 504 regulation requires that newly constructed<sup>20</sup> and altered<sup>21</sup> facilities be "readily accessible to and usable by" people with disabilities.<sup>22</sup> For projects built before January 23, 2017, NASA grantees must fully comply with either UFAS or the 2010 Standards. For projects built after January 23, 2017, NASA grantees must meet the 2010 Standards.<sup>23</sup>
- 2) **Existing Facilities.** For existing facilities that have not been altered, NASA grantees must ensure that their programs or activities are accessible "when viewed in their entirety."<sup>24</sup> This obligation means either making the location accessible, relocating an existing program to an accessible location, or providing an equivalent experience in an accessible location.

As a private entity, the Center may have additional accessibility obligations under the ADA including "readily achievable" barrier removal and "path of travel" changes under Title III of the

<sup>20</sup> 14 C.F.R. § 1251.302(a).

<sup>21</sup> 14 C.F.R. § 1251.302(b).

<sup>22</sup> 14 C.F.R. § 1251.302(a)-(b).

<sup>23</sup> 14 C.F.R. § 1251.302(c). UFAS is available at <https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/ufas>.

<sup>24</sup> 14 C.F.R. § 1251.301.

ADA.<sup>25</sup> As these obligations are separate from Section 504, this report does not include a review of these issues.

**ii. Assessment**

<b>Review Criteria: Section 504 Architectural Accessibility</b>	<b>Yes</b>	<b>No</b>
<b>1) New Construction or Alterations</b>		
<ul style="list-style-type: none"> <li>VASC is in compliance with the requirements for new construction and alterations and the requirements for existing facilities.</li> </ul>		X
<b>2) Existing Facilities</b>		
<ul style="list-style-type: none"> <li>VASC’s existing facility is fully accessible.</li> </ul>		X
<ul style="list-style-type: none"> <li>Where architectural barriers exist in existing facilities, VASC ensures that the program, service, or activity affected by these barriers are accessible when viewed in their entirety.</li> </ul>		X

The Center does not comply with the requirements for both new construction and alterations and existing facilities. The Center opened April 5, 1992, and hosts NASA’s Langley Research Center Visitor Center.<sup>26</sup> As the facility was completed after January 18, 1991, it had to comply with the new construction provisions of the UFAS. Any remediation, however, must comply with the 2010 Standards. Portions of this original construction did not comply with UFAS. At the same time, the violations identified above occur in VASC program space and thus affect the ability of program participants to take advantage of VASC programs, services, and activities.

**iii. Corrective Actions and Recommendations**

The Center must ensure that all programs are provided in accessible locations or that accessible alternatives are provided in accessible locations. The Center must correct the architectural barriers identified in Appendix C unless it decides to stop offering programs in the spaces identified in Appendix C.

<sup>25</sup> The ADA’s path of travel obligation is a detailed requirement set forth in the Department of Justice’s Title III regulation, 28 C.F.R. § 36.403 (2010); see also, 42 U.S.C. §12183(b). It requires places of public accommodation to make accessibility upgrades to its existing facility when those upgrades serve primary function areas being directly altered. Furthermore, places of public accommodation are required to spend up to 20% of the total cost of the alteration in making these upgrades before they are considered “disproportionate” to the cost of the alteration.

<sup>26</sup> *Response*, at p. 7.

### **III. CONCLUSION**

NASA does not find the Center in compliance with Section 504 procedural requirements or with program and architectural accessibility requirements, as identified above. Regarding compliance with Section 504 procedural requirements, NASA requires that the Center provide evidence of the completion of the corrective actions identified above within 90 days of the date of this report. Regarding compliance with program and architectural accessibility requirements, NASA requires that the Center provide a written program and architectural accessibility plan to rectify outstanding compliance issues identified above no later than 180 days from the date of this report. This plan must incorporate timelines for resolution of these issues. NASA stands ready to provide civil rights technical assistance to the Center, and staff will contact the Center to follow up on progress made. To the extent that progress is deemed insufficient, we may require the Center to take further action.

## **Appendix A: Methodology**

### **1. Pre-onsite Review Activities**

Prior to the onsite review, VASC provided extensive written material and documentation regarding its compliance with Section 504 in response to NASA's information request. The Center also worked with NASA to arrange a suitable time frame for NASA's on-site visit and coordinated schedules to ensure that the proper witnesses would be available during the time of the on-site visit.

### **2. Onsite Compliance Review Activities**

The NASA compliance team conducted an onsite review of VASC on September 11, 2018. The compliance team interviewed several VASC staff members, primarily the Center's Chief Executive Officer. In addition to these interviews, part of the NASA team conducted a full architectural review of the program spaces at VASC's facility as well as a review of all exhibits (and technology used in these exhibits). The architectural review focused on whether VASC's facility: (1) met the relevant accessibility standards in place at the time of their construction or alteration; and (2) provided overall program accessibility when viewed in its entirety. The technology review focused on overall program access including effective communication. The facts cited in our compliance analysis concerning VASC's Section 504 compliance were obtained from the sources outlined above, unless otherwise specified.

## Appendix B: Web and Digital Accessibility Review

### Accessibility Audit Report – Virginia Air & Space Center

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**Compliance**Sheriff  
By Cyxtera

#### Background

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There are a range of disabilities that can affect computer users, including permanent or temporary impairments to mobility, hearing, sight and cognition. Different people can have different levels of disability and different levels of computer skills. Consequently, it is impossible to anticipate the needs of all users with disabilities in designing online content.

However, there are some guidelines and assessment techniques that can address the most common problems. This document will use [WCAG 2.0 A and AA](#) as its reference for accessibility.<sup>27</sup>

Many people with disabilities cannot access online material directly using a keyboard and mouse alone. However, online material can be read via third party “assistive technology” (AT) programs to make online information more accessible to disabled users.

A popular AT program, used in this review, is “JAWS for Windows;” it reads aloud the user interface, in order to describe controls, graphics and text. Its functionality is generally a proxy for the programmatic accessibility of a program or website (i.e. ability of a 3<sup>rd</sup> party tool to read and interpret content).

#### Assessment Overview

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This accessibility assessment is based on findings from a manual evaluation of web pages using AT, keyboard-only access and various system settings. This accessibility assessment is also based on findings from an automated scan of web pages using Compliance Sheriff™. The intention is to summarize the trends as found by automation and present suggestions for remediation and prioritization.

#### Scope of the Evaluation

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The accessibility audit of the website was done by selecting representative page samples of the site that captures the different page layouts and types of content that exists. While not an

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<sup>27</sup> The Web Content Accessibility Guidelines Working Group, which includes representation from industry, disability communities, accessibility research and government, has developed a set of standards for HTML to make webpages accessible (WCAG 2.0).



exhaustive page-by-page audit, the results demonstrate the overall accessibility of the site and the types of accessibility issue that currently exists. Using this information, existing issues can be addressed by applying the feedback across the entire site. Additionally, best practices can be put into place to avoid introducing future accessibility issues as new content is added and updates to the site design is implemented. Taking into consideration accessibility at design time is always the most cost and time effective approach to creating accessibility web content. The following table outlines the pages selected for this audit:

Item	Description	URL
1	Home	<a href="https://www.vasc.org/">https://www.vasc.org/</a>
2	Tickets	<a href="https://www.vasc.org/visit/tickets/">https://www.vasc.org/visit/tickets/</a>
3	Plan Your Visit	<a href="https://www.vasc.org/visit/plan-your-visit/">https://www.vasc.org/visit/plan-your-visit/</a>
4	Exhibits	<a href="https://www.vasc.org/visit/exhibits/">https://www.vasc.org/visit/exhibits/</a>
5	Adventures in Flight Exhibit	<a href="https://www.vasc.org/exhibit/adventures-in-flight/">https://www.vasc.org/exhibit/adventures-in-flight/</a>
6	Spacecraft Exhibit	<a href="https://www.vasc.org/exhibit/spacecraft/">https://www.vasc.org/exhibit/spacecraft/</a>
7	Educators	<a href="https://www.vasc.org/educate/for-educators/">https://www.vasc.org/educate/for-educators/</a>
8	Scouts	<a href="https://www.vasc.org/educate/scouts/">https://www.vasc.org/educate/scouts/</a>
9	Girl Scouts	<a href="https://www.vasc.org/educate/scouts/girl-scouts/">https://www.vasc.org/educate/scouts/girl-scouts/</a>
10	Become a Member	<a href="https://www.vasc.org/join-support/become-a-member/">https://www.vasc.org/join-support/become-a-member/</a>
11	Purchase a Membership	<a href="https://sales.vasc.org/membership.aspx">https://sales.vasc.org/membership.aspx</a>
12	Apply to Volunteer	<a href="https://vaspace.wufoo.com/forms/z1dt1z6k0v7ii00/">https://vaspace.wufoo.com/forms/z1dt1z6k0v7ii00/</a>
13	Donate Now	<a href="https://sales.vasc.org/donation.aspx">https://sales.vasc.org/donation.aspx</a>
14	Events	<a href="https://www.vasc.org/upcoming-events/">https://www.vasc.org/upcoming-events/</a>
15	Event Page – What On Earth?	<a href="https://www.vasc.org/vasc_events/stem-saturday-what-on-earth/">https://www.vasc.org/vasc_events/stem-saturday-what-on-earth/</a>
16	Employment	<a href="https://www.vasc.org/about/employment/">https://www.vasc.org/about/employment/</a>
17	Employment Application	<a href="https://www.vasc.org/about/employment/employment-application/">https://www.vasc.org/about/employment/employment-application/</a>
18	IMAX Now Showing	<a href="https://www.vasc.org/imax/now-showing/">https://www.vasc.org/imax/now-showing/</a>
19	Contact Us	<a href="https://www.vasc.org/contact-us/">https://www.vasc.org/contact-us/</a>

### About Compliance Sheriff™

Compliance Sheriff™ is an Enterprise Level, Accessibility Compliance Scanning System. This system can scan a website and search the underlying source code for compliance issues. An automated scan was performed using Compliance Sheriff™ focused on WCAG 2.0 Level A and Level AA.

### About Manual Testing

A manual review using the keyboard and mouse to navigate the site was performed. In addition, testing included the use of AT: JAWS for Windows. Part of an accessibility assessment includes manually reviewing pages for testing that cannot be easily automated.

## How to read this report

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Testing in this report emphasized compliance with government and/or industry standards. As is the nature of working with any subjective, broad standard, there is no binary “pass/fail” implied. One cannot say that software or websites are “100% compliant”. One *can* say that they make compliance with standards specifically, and accessibility of their website and services in general, a priority.

Applicable standards will be called out as appropriate. Except where noted, assume that issues presented here are general to the site, and not page specific. Further, these issues can often be addressed systematically via style sheets or by update of common code.

## Context and assumptions

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Unless otherwise noted, major scenarios and user interfaces are working correctly for keyboard access and system settings. The same applies for compatibility with AT such as JAWS for Windows. Also note that unless otherwise stated, the primary browser in use for testing is Chrome and the OS is Windows 10. Assume that issues reported apply to all browsers and AT combinations unless otherwise stated.

The site under test was the NASA Virginia Air & Space Center website (<https://www.vasc.org/>).

## Summary

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### Overview of results

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Overall the automated scan results identified issues that are common to most web sites when it comes to accessibility, such as lack of alt text for images or misapplied alt text that is not descriptive. Manual testing identified additional issues that mostly are related to keyboard accessibility. Additionally, issues have been highlighted to indicate their severity which will allow for prioritization of issue remediation.

The following table provides a breakdown of how many WCAG 2.0 Level A and AA criterion under each Principles are supported based on the review of the sample URL set review.

Principle	Level A	Level AA
<b>1. Perceivable</b>	7/9	2/5
<b>2. Operable</b>	6/9	2/3
<b>3. Understandable</b>	3/5	5/5
<b>4. Robust</b>	0/2	0/0
<b>Total</b>	<b>16/25</b>	<b>9/13</b>

### Detailed Audit Results

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Following are the details audit results from the accessibility audit. These results represent the types of issues that were identified on the website and should not be considered the only accessibility issues that exist. This information should be used to help content creators and developers be aware of various types of issues to avoid introducing them into the site as well as

to review exiting content for similar issues throughout the site beyond the sample pages selected for the audit.

The severity of each issue will be indicated after the issue title. The following provides an explanation of the severity ratings:

- **Blocking** = Will prevent some users from accessing content or accomplishing a task.
- **Critical** = May prevent some users from accessing content or accomplishing a task
- **Major** = Will have a significant impact on user experience and prevents conformance with accessibility guidelines
- **Minor** = May an impact some users negatively but primarily prevents conformance with accessibility guidelines
- **Low** = Not likely to impact users but prevents conformance with accessibility guidelines

Note: Only Success Criterion that failed are included in the audit results below. No failures were identified within the test sample for the following Success Criterion:

- Success Criterion 1.2.1 Audio-only and Video-only (Prerecorded)
- Success Criterion 1.2.2 Captions (Prerecorded)
- Success Criterion 1.2.4 Captions (Live)
- Success Criterion 1.3.1 Info and Relationships
- Success Criterion 1.3.2 Meaningful Sequence
- Success Criterion 1.3.3 Sensory Characteristics
- Success Criterion 1.4.1 Use of Color
- Success Criterion 1.4.2 Audio Control
- Success Criterion 1.4.4 Resize text: (Level AA)
- Success Criterion 2.1.2 No Keyboard Trap
- Success Criterion 2.2.1 Timing Adjustable
- Success Criterion 2.2.2 Pause, Stop, Hide
- Success Criterion 2.3.1 Three Flashes or Below Threshold
- Success Criterion 2.4.2 Page Titled
- Success Criterion 2.4.4 Link Purpose (In Context)
- Success Criterion 2.4.5 Multiple Ways
- Success Criterion 2.4.6 Headings and Labels
- Success Criterion 3.1.2 Language of Parts
- Success Criterion 3.2.1 On Focus
- Success Criterion 3.2.2 On Input
- Success Criterion 3.2.3 Consistent Navigation
- Success Criterion 3.2.4 Consistent Identification
- Success Criterion 3.3.1 Error Identification
- Success Criterion 3.3.3 Error Suggestion
- Success Criterion 3.3.4 Error Prevention (Legal, Financial, Data)

#### **Success Criterion 1.1.1 Non-text Content: (Level A)**

All non-text content that is presented to the user has a text alternative that serves the equivalent purpose, except for the situations listed below.

- **Controls, Input**
- **Time-Based Media**

- Test
- Sensory
- CAPTCHA
- Decoration, Formatting, Invisible

For more information, please see: [Understanding](#) and [How to meet](#)

**1. Some images missing ALT attributes. [CRITICAL]**

All images must contain an ALT attribute. If the image is decorative only the ALT attribute should be left blank, otherwise the attribute should have a text equivalent for the purpose of the image. This is critical not only to allow all users access to the same information but also because image without an alternative text often lead to legal complaints against websites.



Found on page(s):

- <https://sales.vasc.org/membership.aspx>
- <https://www.vasc.org/visit/plan-your-visit/>

**Success Criterion 1.2.3 Audio Description or Media Alternative (Prerecorded): (Level A)**

An alternative for time-based media or audio description of the prerecorded video content is provided for synchronized media, except when the media is a media alternative for text and is clearly labeled as such. For more information, please see: [Understanding](#) and [How to meet](#)

**2. No audio descriptions or media alternatives provided on pages with media content. [LOW]**

The sample test pages that contains prerecorded multimedia did not provide audio descriptions. This issue is being flagged as low because most users will not be impacted by the lack of audio descriptions for the views reviewed.

Found on page(s):

- All pages that contain multimedia

**Success Criterion 1.2.5 Audio Description (Prerecorded): (Level AA)**

Audio description is provided for all prerecorded video content in synchronized media. For more information, please see: [Understanding](#) and [How to meet](#)

### 3. No audio descriptions provided on pages with media content. [LOW]

The sample test pages that contains prerecorded multimedia did not provide audio descriptions. This issue is being flagged as low because most users will not be impacted by the lack of audio descriptions for the views reviewed.

Found on page(s): All pages that contain multimedia

### Success Criterion 1.4.3 Contrast (Minimum): (Level AA)

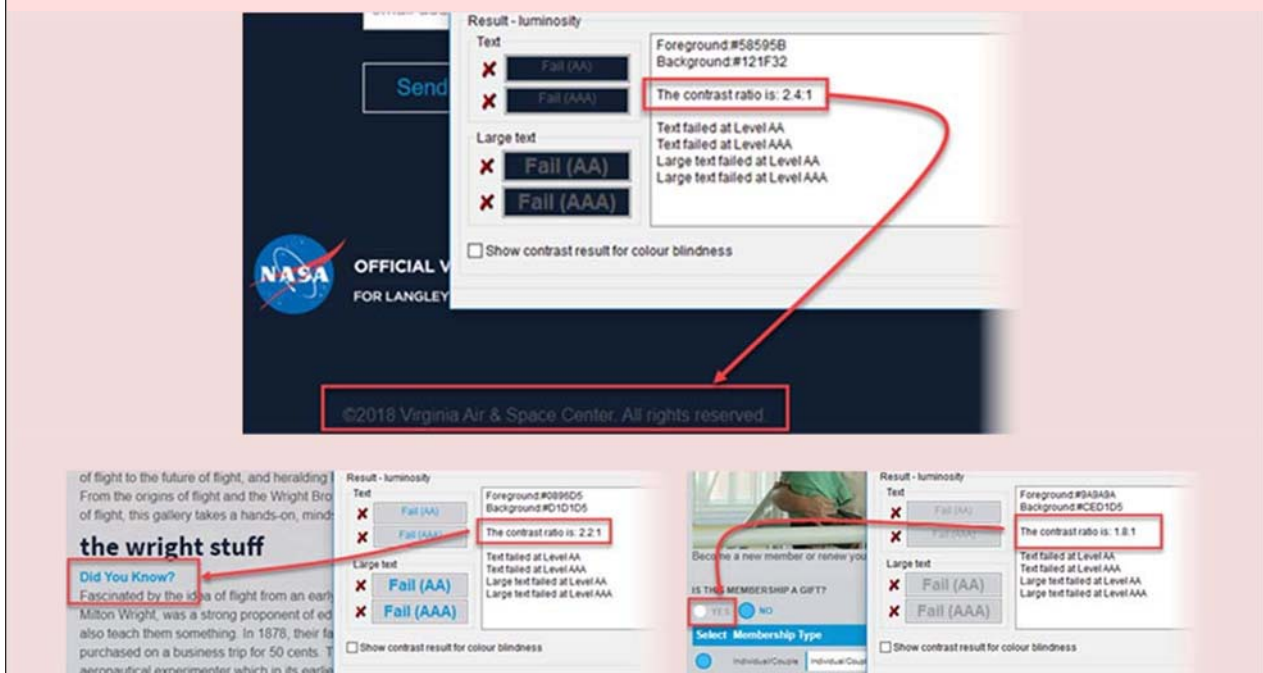
The visual presentation of text and images of text has a contrast ratio of at least 4.5:1, except for the following:

- **Large Text** Large-scale text and images of large-scale text have a contrast ratio of at least 3:1;
- **Incidental** Text or images of text that are part of an inactive user interface component, that are pure decoration, that are not visible to anyone, or that are part of a picture that contains significant other visual content, have no contrast requirement.
- **Logotypes** Text that is part of a logo or brand name has no minimum contrast requirement.

For more information, please see: [Understanding](#) and [How to meet](#)

### 4. Contrast must be at least 4.5:1 for most content. [MINOR]

When content does not fall within the appropriate contrast range many users can have difficulty perceiving the meaning. In most cases this can be minor in nature but in some cases, it could block a user from discerning critical information. This is also a high-risk factor in legal complaints since contrast issues can be easily identified by most accessibility scanners. A sampling of these types of issues is provided in screen captures below. Recommend using an accessibility scanner to identify existing contrast issues and to evaluate future new content for contrast issues before posting live.



Found on page(s):

- All pages in test sample

### Success Criterion 1.4.5 Images of Text: (Level AA)

If the technologies being used can achieve the visual presentation, text is used to convey information rather than images of text except for the following:

- **Customizable** The image of text can be visually customized to the user's requirements;
- **Essential** A particular presentation of text is essential to the information being conveyed.

For more information, please see: [Understanding](#) and [How to meet](#)

### 5. Image of text lacks appropriate text alternative. [CRITICAL]

When images of text are used, it is critical that an ALT text attribute is provided along with an equivalent of what text appears in the image. This ensures that all users have access to the same textual details.



Found on page(s):

- <https://sales.vasc.org/membership.aspx>

### Success Criterion 2.1.1 Keyboard: (Level A)

All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes, except where the underlying function requires input that depends on the path of the user's movement and not just the endpoints. For more information, please see: [Understanding](#) and [How to meet](#)

### 6. Visual indication of current keyboard input focus not provided. [BLOCKER]

Due to the lack of keyboard focus this criterion is considered as failed. A user must be able to discern the focus visually and programmatically to successfully interact with controls on the page using only the keyboard. (See results for Success Criterion 2.4.7 Focus Visible).

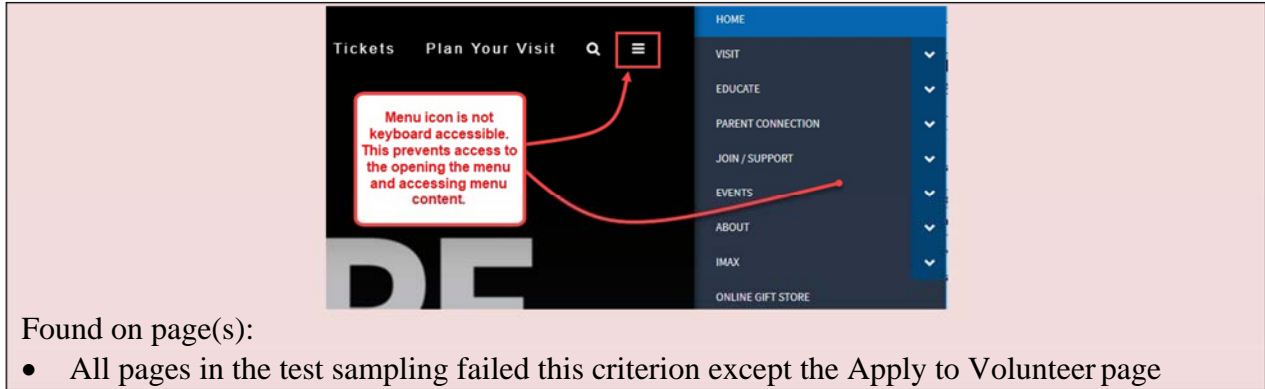
Found on page(s):

- All pages in the test sampling failed this criterion except the Apply to Volunteer page

### 7. Menu icon is not keyboard accessible. [BLOCKER]

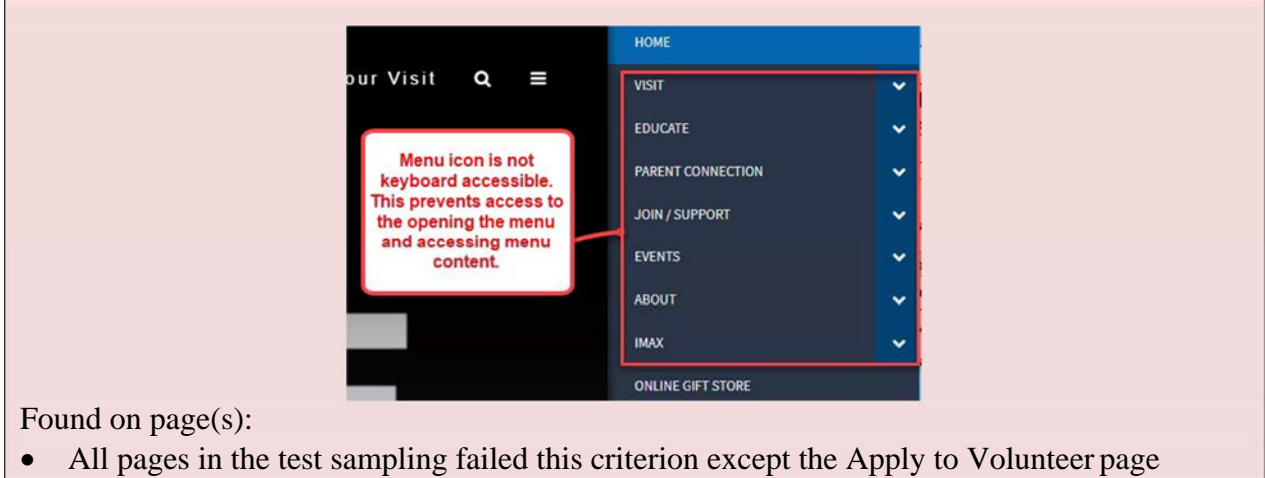
All interactive elements on a page need to be usable with only the keyboard. If an element only works with the mouse, keyboard only users and some assistive technologies will be unable to use those elements. The menu icon cannot be accessed with only the keyboard which blocks a user from expanding or collapsing the menu.





**8. Menu is not keyboard accessible. [BLOCKER]**

All interactive elements on a page need to be usable with only the keyboard. If an element only works with the mouse, keyboard only users and some assistive technologies will be unable to use those elements. With the menu expanded, the expandable and collapsible section of the menu are not keyboard accessible. Since a keyboard only user cannot expand these sections, they will not be able to access the menu items contained in those sections.



**Success Criterion 2.4.1 Bypass Blocks: (Level A)**

A mechanism is available to bypass blocks of content that are repeated on multiple Web pages. For more information, please see: [Understanding](#) and [How to meet](#)

**9. No consistent means of bypassing repetitive navigation provided. [MINOR]**

Bypass blocks can consist of heading tags and skip navigation links. While the website used heading tags on some pages this does not provide the ability for keyboard only user to easily bypass navigation to directly access the main content of the site. This is being flagged as a minor issue because it may impact some users but will not prevent them from using the site.

Found on page(s):

- All pages in the test sample

### Success Criterion 2.4.3 Focus Order: (Level A)

If a Web page can be navigated sequentially and the navigation sequences affect meaning or operation, focusable components receive focus in an order that preserves meaning and operability. For more information, please see: [Understanding](#) and [How to meet](#)

#### 10. Radio buttons and surrounding content receive focus out of logical order. [CRITICAL]

All interactive elements on a page need to be usable with only the keyboard. This include being able to tab to each interactive control with those controls receiving focus in a logical order. On the “Purchase a Membership” page a series of radio buttons and other input controls are presented. When tabbing to those input controls content receives focus out of logical order. This issue is being flagged as a critical issue because it may prevent some users from making use of the form.

The image shows a screenshot of a web form. On the left, there is a question "IS THIS MEMBERSHIP A GIFT?" with two radio buttons: "YES" (unselected) and "NO" (selected). Below this is a blue button labeled "Select Membership Type". Underneath the button is a dropdown menu with "Individual/Couple" selected. On the right, there is a form section titled "Individual/Couple" with two input fields: "FIRST NAME ON MEMBERSHIP CARD" and "SECOND NAME ON MEMBERSHIP CARD", both containing the placeholder text "Enter Info Here".

Found on page(s):

- <https://sales.vasc.org/membership.aspx>

### Success Criterion 2.4.7 Focus Visible: (Level AA)

Any keyboard operable user interface has a mode of operation where the keyboard focus indicator is visible. For more information, please see: [Understanding](#) and [How to meet](#)

#### 11. No visual indication of current keyboard focus provided. [BLOCKING]

Many users interact with web pages without using the mouse. When a visual indication of focus is not provided it is impossible for a keyboard only user to navigate through page and interact with the controls successfully. The default visual indication of focus is often overridden by setting the Outline styles to zero. It is a best practice to instead use styles to ensure that focusable objects and controls are visually discernable as having current input focus. This blocking issue will affect all keyboard only users and many assistive technology users from interacting with the pages.

Found on page(s):

- All pages in the test sampling failed this criterion except the Apply to Volunteer page

### Success Criterion 3.1.1 Language of Page: (Level A)

The default human language of each Web page can be programmatically determined. For more information, please see: [Understanding](#) and [How to meet](#)

#### 12. Language of page not identified. [MINOR]

When the language of a page is not programmatically specified, assistive technologies can have a difficult time presenting information properly and understandably to the user. This is flagged as minor issue because it was found only on one page in the sample test set.



To address this issue, include the LANG attribute within the HTML tag in the page source. To correct this issue the LANG tag must be provided along with the XML LANG attribute like this:

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
```

Found on page(s):

- <https://vaspace.wufoo.com/forms/z1dt1z6k0v7ii00/>

### Success Criterion 3.3.2 Labels or Instructions: (Level A)

Labels or instructions are provided when content requires user input. For more information, please see: [Understanding](#) and [How to meet](#)

#### 13. Radio buttons have no label or title attribute. [CRITICAL]

Providing labels that are programmatically linked to an input control allows for assistive technologies to accurately describe the purpose of the control. While text on screen exists, this text is not programmatically used as a label for the radio button. Using the “label for” tag is the best way to programmatically link a text label with its associated control. This issue is being flagged as a critical issue because it may prevent some users from making use of the form.



Found on page(s):

- <https://sales.vasc.org/membership.aspx>

### Success Criterion 4.1.1 Parsing: (Level A)

In content implemented using markup languages, elements have complete start and end tags, elements are nested according to their specifications, elements do not contain duplicate attributes, and any IDs are unique, except where the specifications allow these features. For more information, please see: [Understanding](#) and [How to meet](#)

#### 14. Pages do not validate without errors against HTML and CSS parsers. [Minor]

For assistive technology and built-in accessibility features of languages such as HTML and CSS to work properly, the code must be structured within the guidelines of those languages. It is recommended as a best practice to validate pages during the creation phase and to address any issues identified before publishing the page. The two validators used for this testing are:

- The W3C Markup Validation Service (<https://validator.w3.org/>)
- The W3C CSS Validation Service (<https://jigsaw.w3.org/css-validator/>)

Found on page(s):

All pages failed to successfully pass the HTML and CSS validation services.

### Success Criterion 4.1.2 Name, Role, Value: (Level A)

For all user interface components (including but not limited to: form elements, links and components generated by scripts), the name and role can be programmatically determined; states, properties, and values that can be set by the user can be programmatically set; and notification of changes to these items is available to user agents, including assistive technologies. For more information, please see: [Understanding](#) and [How to meet](#).

#### **15. Search icon read as a link but opens search field instead of loading anew page. To a user, a link means navigation to a new page where as an element such as a button means to submit or toggle a control. [MAJOR]**

Interactive content on the page must provide a meaningful name, identify its role (e.g. “button”, “checkbox”, etc.) and the value. When using controls to toggle or submit content a button control should be used. The search icon on the page is read out as a link but acts a toggle to display and hide the search edit field. In a situation like this ARIA can be used to assign the proper ‘name’ to the control so the user can better anticipate the resulting action.



Found on page(s):

- All pages in the test sampling failed this criterion except the Apply to Volunteer page

## **Appendix C: Architectural Accessibility**

The following “punch list” of accessibility barriers found in the Virginia Air & Space Center is organized based on different types of barriers to people with disabilities or those related to significant spaces. Under each barrier type, there are specific locations noted so the barriers may be identified easily by those tasked with retrofitting those barriers. Included in the description of the different accessibility barriers are specific UFAS and ADA Standards citations customarily included in NASA accessibility evaluations.

Based on information provided by the VASC, the original opening date for the Center was April 5, 1992 and while this is after the January 26, 1992 effective date for newly constructed buildings under the ADA Title II regulations (building owned by City of Hampton, VA and VASC is a tenant) the facility is also covered as a newly constructed facility under NASA Section 504 regulations because it was constructed after the January 18, 1991 effective date established by NASA. The original facility was required to comply with the new construction provisions of the UFAS accessibility standards and those standards are the basis for this facility compliance review, but remediation work must comply with the 2010 ADA Standards.

### **Restroom Issues**

1. Accessible toilet stall door lacks accessible pull hardware on both sides of the door in the following restrooms as required by UFAS 4.17.5 and ADA Standards 604.8.1.2:
  - a. Lobby Women’s Restroom.
  - b. Lobby Men’s Restroom.
  - c. Cosmic Café Women’s Restroom.
  - d. Cosmic Café Men’s Restroom.
  - e. 2<sup>nd</sup> Floor Women’s Restroom.
  - f. 2<sup>nd</sup> Floor Men’s Restroom.
  
2. The bottom of the reflecting surface of the mirror(s) in the following restrooms are higher than 40” AFF without a full height mirror elsewhere in the restroom per UFAS 4.19.6 and ADA Standards 603.3:
  - a. Lobby Women’s Restroom. (at 40 3/8”)
  - b. Lobby Men’s Restroom. (at 40 1/2”)
  - c. 2<sup>nd</sup> Floor Women’s Restroom. (at 40 1/2”)
  - d. 2<sup>nd</sup> Floor Men’s Restroom. (at 40 1/2”)
  
3. The toilet seat cover dispenser is mounted above the side grab bar in accessible toilet stalls so they interfere with the use of the grab bar by wheelchair users in the following restrooms per UFAS 4.17.6 and ADA Standards 609.3:
  - a. Lobby Women’s Restroom.
  - b. Lobby Men’s Restroom.
  - c. Cosmic Café Women’s Restroom.
  - d. Cosmic Café Men’s Restroom.

- e. 2<sup>nd</sup> Floor Women's Restroom.
  - f. 2<sup>nd</sup> Floor Men's Restroom.
4. The following multi-stall public restrooms which have the sign at the entry door located on the hinge, rather than the latch side of the door as required by UFAS 4.30.6 and ADA Standards 703.4.2:
    - a. Lobby Women's Restroom.
    - b. Lobby Men's Restroom.
  5. The height of the coat hook in the accessible toilet stalls of the following rooms is higher than the maximum 48" AFF specified by UFAS 4.25.3 and ADA Standards 603.4:
    - a. Lobby Women's Restroom. (at 62")
    - b. Lobby Men's Restroom. (at 61")
    - c. Cosmic Café Women's Restroom. (at 62")
    - d. Cosmic Café Men's Restroom. (at 61" but broken off)
    - e. 2<sup>nd</sup> Floor Women's Restroom. (at 61")
    - f. 2<sup>nd</sup> Floor Men's Restroom. (at 61")
  6. The drain and/or hot water pipes under the lavatories are not insulated or otherwise protected in the following restrooms as required by UFAS 4.19.4 and ADA Standards 606.5:
    - a. Cosmic Café Men's Restroom.
    - b. Lobby Women's Restroom.
  7. The wall mounted paper towel dispensers are mounted above the 48" high wheelchair reach range in the following restrooms per UFAS 4.17.6 and ADA Standards 609.3:
    - a. Lobby Women's Restroom. (at 60")
    - b. Lobby Men's Restroom. (at 60")
    - c. Cosmic Café Women's Restroom. (at 58")
    - d. Cosmic Café Men's Restroom. (at 58")
    - e. 2<sup>nd</sup> Floor Women's Restroom. (at 59")
    - f. 2<sup>nd</sup> Floor Men's Restroom. (at 58")

### **Protruding Objects Not Cane Detectable**

The following features in this facility lack a cane detectable element below and project more than 4" into the adjoining pedestrian circulation route above 27" AFF or have the bottom below 80" AFF in violation of UFAS 4.4 and ADA Standards 307:

- a. Three of the four handrails serving the main Lobby stairs project 16" beyond the support posts at 32" AFF.
- b. The wall mounted coat storage rod/shelf flanking the approach route to the Volunteer Office entrance near the Lobby.
- c. The typical stanchions with the retractable tape barriers above 27" AFF throughout the facility.
- d. The angled structural braces for the window-wall on the First Floor between the Lobby and the Cosmic Café.
- e. The underside of the lower stair run and the handrails serving the Observation Deck stair on the First Floor.

- f. The wall mounted TV on the back side of the landing of the Observation Deck stair near the Small Lab.
- g. Typical wall mounted emergency defibrillators project 6 1/2" out from the wall above 27" AFF.
- h. The plexiglass display box at the Apollo 12 Exhibit.
- i. The end of the counter at Wright Problem No. 3.
- j. The underside of the lower stair run and the handrails near the Cosmic Café and at the Orion Flight Test Vehicle Display.
- k. The plexiglass display box at the Wright Brothers wind tunnel Exhibit.
- l. The Kiosks under the tail section of the B-24 Bomber.
- m. The domes at the Exhibit addressing Jet Engines vs. Propeller Propulsion.
- n. The round display exhibits for "Rock'n Roll Airplanes" and "Weight Sample Struts".
- o. The four "Nav" kiosks in the "Be the Astronaut" area.
- p. The front of the capsules at the four "Fly" simulators in the "Be the Astronaut" area.
- q. The five TV's by the game controllers for the Space Challenge Kiosk.
- r. Edge of the curved counter (33" high) of the Design Station for the "Flight Lab".
- s. The "Build-a-Plane" Kiosk by the DC-9 exhibit has portions that are not cane detectable.
- t. The structural support member in the 3<sup>rd</sup> Floor Elevator Lobby.
- u. The underside of the stairs leading to the Upper Observation Deck on the Roof.

### **Accessible Ramp Issues**

1. The ramp (w/ 8.1% slope) leading from the Entrance Lobby to the rest of the facility lacks handrails on the adjacent walls as required by UFAS 4.8.5 and ADA Standards 405.8. This ramp is partially hidden and requires a directional sign nearby for disabled guests to know how to get to the exhibit spaces from the Entrance Lobby.
2. The 14" high stage at "Adventure in Flight" lacks an accessible ramp required by UFAS 4.5.2 and ADA Standards 403.4.
3. The 8" high step at the opening to the "Columbia Simulator" lacks an accessible ramp required by UFAS 4.5.2 and ADA Standards 403.4.
4. The steps at the porch leading from the Cosmic Café to the Exterior Dining Patio and adjacent Maze lack an accessible ramp required by UFAS 4.5.2 and ADA Standards 403.4.

### **Door Maneuvering Clearance Issues**

1. The following doors lack the minimum required 18" pull side, latch side maneuvering clearance to allow a wheelchair user to approach and open the door per UFAS 4.13.6 and ADA Standards 404.2.4:
  - a. Gemini Lab Classroom entrance door on Level 1 (at 13" due to adjacent column).
  - b. Mercury Lab Classroom entrance door on Level 1 (at 13" due to adjacent column).
  - c. Robotics Lab Classroom entrance door on Level 1 (at 13" due to adjacent column).

### **Exterior Approach Issues**

1. The curb ramp at the Passenger Loading Area serving the front porch of the Front Entrance has surface slopes steeper (at 11.0%) than the maximum allowed 8.3% per UFAS 4.7.2 and ADA Standards 406.1.

2. There is no accessible approach route (only exterior stairs) from the 3<sup>rd</sup> Floor Elevator Lobby to the Rooftop Observation Deck and Party Area in violation of UFAS 4.1.2(1) and ADA Standards 206.2.4.

### **IMAX Theater**

1. The 7 designated wheelchair seating locations at the top level of this large screen theater which seats 283, are adequate based on the minimum number required by UFAS 4.1.4(18)(a), but there is no caption system (possibly due to analog technology of film system used) and there is no assisted listening system with adjustable volume headsets for hard of hearing guests per UFAS 4.1.4(18)(b) and ADA Standards 219.

### **Other Issues**

1. The Dining tables serving the Cosmic Café and on the dining patio/Tiki Bar lack accessible table bases that will ensure wheelchair users have access to 5% of the dining tables per UFAS 5.1 and ADA Standards 226.
2. In addition to the lack of an assisted listening system at the IMAX Theater noted above, there are no assistive listening system headsets provided for the other assembly areas with PA systems, such as the Learning Labs, Classrooms, or Science Stage Live per UFAS 4.1.4(18)(b) and ADA Standards 219.
3. The following exhibit areas appear to be infeasible to make accessible due to constraints beyond the control of the operator of this facility and information/experiences offered in these areas should be presented in an alternate accessible format (staff orientation with auxiliary book, alternate video experience, web or app based experience, recording, etc.) for disabled guests who cannot physically access them:
  - a. The A-6 Intruder Exhibit of Cockpit (requires 8 steps to enter);
  - b. MPCV-Orion Exhibit of cockpit (requires 6 steps to enter);
  - c. Simulator in AirTran's DC9 is beyond very narrow hallway;
  - d. Door to AirTran's DC9 has low (72") head height;
  - e. "Fly" Simulators have fixed seats incorporated without wheelchair seat option.
4. The emergency communications system (a "princess" phone) in the main elevator for this facility requires voice communication in violation of UFAS 4.10.14.
5. The double doors leading from the Lobby into the Classroom/Lab area of the facility lack (at only 27 5/8") the minimum 32" clear passage width for one door leaf per UFAS 4.13.4 and ADA Standards 404.2.2.
6. The following rooms lack accessible room identification signage per UFAS 4.1.2(15) and ADA Standards 216.2:
  - a. Small Lab;
  - b. Gemini Lab;
  - c. Mercury Lab; and,
  - d. Robotics Lab.

7. The following service counters lack a lowered accessible portion that is at least 36” long and no higher than 34” AFF per UFAS 7.2 and ADA Standards 227.3:
  - a. Membership Counter (also for Exhibit Ticket holders) at 43 1/2”;
  - b. Information Counter in Entrance Lobby at 40”.
8. The condiment storage area at the Cosmic Café has condiments and utensils stored higher (at 57”) than the maximum 46” reach range limit for a wheelchair user reaching over an obstruction per UFAS 4.25.3 and ADA Standards 904.5.1.
9. The transition between the tile and the vinyl flooring between the Entrance Lobby and the Gift Shop is 1/2” high without the 1:2 maximum sloped bevel required by UFAS 4.5.2 and ADA Standards 403.4.