



**CITY OF HOUSTON
HOUSTON AIRPORT SYSTEM
REQUEST FOR PROPOSALS (RFP)
SOLICITATION NO.: RFP # H37-OCULED-2023-13
OCULUS LED DISPLAY SYSTEM PROVIDER
FOR HOUSTON AIRPORT SYSTEM (HAS)**

Date Issued: December 9, 2022

Pre-Proposal Virtual Conference: December 20, 2022, 1:00 P.M., CST
Microsoft Teams Tele-Conference:
<https://bit.ly/3F7MnIJ>

Questions Deadline: January 3, 2023 @ 2:00 P.M., CST

Proposal Due Date: February 9, 2023 @ 2:00 P.M., CST

Solicitation Contact Person: André Morrow, C.P.M., CPPB
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Project Summary: This Request for Proposals (RFP) is to acquire the Oculus LED display system technology and related manufacturer-specific processors, power supplies, installation, and warranty. The LED display system provider will be qualified for permanent, large scale, architecturally integrated direct view LED installations.

NIGP Code: 801-66; 906-26, 52, 93

MWBE Goal: 0%

DocuSigned by:
A blue ink signature of Jedediah Greenfield.
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Jedediah Greenfield
Chief Procurement Officer
City of Houston

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PART I: SOLICITATION

1.0 GENERAL INFORMATION

1.1 Introduction

1.1.1 The City of Houston (City), Houston Airport System (HAS), assisted by Technology and Multimedia Systems Specialty Engineer Consultants, intends to engage a LED provider for the Oculus in the new International Central Processor (ICP) of the George Bush Intercontinental Airport (IAH) as part of the Terminal Redevelopment Program (ITRP).

The IAH Terminal Redevelopment Program (ITRP) will provide an overall modernized facility and improved passenger experience. A significant impact on the passenger experience is the Oculus, one of the most visually engaging and visible components of the architectural environment in the new International Central Processor (ICP). This significant large-scale, uniquely designed media feature includes a sophisticated display and control system.

The Oculus is composed of direct view LED display technology, and its supporting video, structural, electrical, and communications systems. The media features will include a range of specialized non-standard design elements – for example, curved display surfaces, multi-screen composite display surfaces, and angled display surfaces. An agreement with the successful vendor will require the vendor to provide design, manufacturing, installation, integration, calibration, warranty, and maintenance of the Oculus display technology.

1.1.2 The selected provider will be required to interface with HAS Technology, HAS, and its business partners, such as airlines, other tenants, concessions consultants/contractors (architectural and engineering firms), vendors and or service providers for completion of the assignment(s) and to do so in accordance with the City Charter and the Code of Ordinances of the City of Houston and applicable state and federal regulations. The firm, and its sub-consultants, must be able to perform all or part of the services as requested.

1.2 HAS Background

1.2.1 HAS provides a safe and dynamic air services network that fosters economic vitality for the transportation industry and the greater Houston region. HAS operates three major airports: (1) George Bush Intercontinental Airport (IAH), (2) William P. Hobby Airport (HOU), and (3) Ellington Airport (EFD).

1.2.2 IAH is a large hub airport, and in calendar year 2019, 45.2 million passengers travelled through IAH. IAH is an important international gateway providing services to all 6 inhabited continents and offers more destinations to Mexico than any other airport in the US. IAH is the busiest connecting hub for United Airlines.

1.2.3 HOU is a medium hub airport, and in calendar year 2019, 14.4 million passengers travelled through HOU. In October 2015, HOU opened its new international terminal and now provides services to 62 domestic and 11 international destinations. HOU serves as an important domestic and international hub for Southwest Airlines.

1.2.4 EFD is a former U.S. Air Force base that is now operated as a joint civilian-military airport serving businesses and general aviation and is home to the Houston Spaceport.

1.3 The vision for HAS is to establish Houston as a five-star global air service gateway where the magic of flight is celebrated. HAS is seeking Proposals from firms who will partner with HAS to provide a unique media feature that will enhance passenger experience and serve our airline and retail partners.

2.0 PRE-PROPOSAL CONFERENCE

2.1 A virtual Pre-Proposal Conference via Microsoft Teams will be held at the date, time, and location as indicated on the first page of this RFP document. Interested Proposer(s) should plan to attend. It will be assumed that potential Proposer(s) attending virtual meeting have reviewed the RFP in detail and are prepared to raise any substantive questions not already addressed by HAS.

2.2 The purpose of this conference is to allow potential proposers an opportunity to present questions and obtain clarification relative to any facet of this solicitation. While attendance at the conference will not be a prerequisite to submitting a proposal, proposers who intend to submit a proposal, are encouraged to attend. Make sure you have a copy of the solicitation for reference during the virtual Pre-Proposal Conference. Any changes resulting from this conference will be issued in a written Letter of Clarification (LOC) to the solicitation. Verbal responses will not alter the specifications and terms related to this solicitation.

Questions are due on Tuesday, January 3, 2023, 2:00 P.M., CST. Please include the phrase H37-OCULED-2023-13 QUESTIONS: Oculus Led Display System Provider for HAS” in the subject line and provide all applicable contact information.

2.3 Communication regarding the Pre-Proposal Conference must be received in writing and directed only to:

Andre’ K. Morrow, C.P.M., CPPB
Sr. Procurement Specialist
Houston Airport System
Supply Chain Management
Phone: 281-233-1046
andre.morrow@houstontx.gov

3.0 SOLICITATION SCHEDULE

3.1 The following schedule has been established for this solicitation process. HAS reserves the right to modify the schedule during the solicitation process. Changes/updates will be posted on HAS’ website via Letter(s) of Clarification.

3.2 HAS reserves the right to extend the due date for this Request for Proposal (RFP) as deemed necessary and in its best interests. Any postponement of the due date will be issued as a Letter of Clarification (LOC) to this RFP. The submission of a Request for Proposal does not, in any way commit HAS to enter into an agreement with any Proposer. HAS reserves the right to reject any or all Proposals for any reason.

Table 1: Solicitation Schedule	
Description	Date
Advertisement of Solicitation	12/09/2022
Virtual Pre-Proposal Conference	12/20/2022
Deadline for Submittal of Questions	01/03/2023
Letter of Clarification(s) Posted on HAS Website	01/12/2023
Response to RFP Due Date	02/09/2023
Oral Presentations (<i>if required</i>)	03/02/2023
Submit to Council for Approval (<i>Estimated</i>)	03/28/2023

PART II: GENERAL SOLICITATION INFORMATION

4.0 GENERAL INFORMATION

4.1 Background

4.1.1 The Houston Airport System (HAS) has embarked on the IAH Terminal Redevelopment Program (ITRP) to provide an overall modernized facility. The ICP construction is well underway, with Oculus a main component of the design, highlighting the aesthetic beauty and openness of the architecture.

4.1.2 HAS and its partners for this project are seeking proposals from qualified firms for the LED technology solution of the Oculus. As part of this Request for Proposal (RFP), the Proposer shall provide the LED technology, including tiles, processors, and power supplies, system design, installation, integration with the Content Management System (CMS) used to manage and display content, calibration, warranty, and all other required services for the design, implementation, and ongoing maintenance and support of the commissioned system.

4.2 The HAS Vision

4.2.1 This project is intended to provide an immersive and unique experience for passengers travelling to the Houston area, including all required functionality to support airport tenants in the dynamic IAH environment.

4.2.2 The key to this Contract's success is to support HAS's vision to establish Houston as a five-star global air service gateway where the magic of flight is celebrated. Proposers shall embrace the following HAS core values as they relate to the planning, design, implementation, and support of the Oculus at HAS:

Table 2: HAS vision	
Relationships	Service
<ul style="list-style-type: none"> • We work together with integrity and treat every individual with courtesy and respect. 	<ul style="list-style-type: none"> • We WOW our customers through a “can do” attitude and respond quickly to meet and exceed their expectations.
<ul style="list-style-type: none"> • We honor our commitments and behave in a manner that earns trust. 	<ul style="list-style-type: none"> • We find ways to bring fun and joy into our work and bring customers along for the ride.
<ul style="list-style-type: none"> • We promote collaboration and teamwork across the organization. 	<ul style="list-style-type: none"> • We respond promptly and effectively.
<ul style="list-style-type: none"> • We are reliable and trustworthy; we honor our promises and commitments. 	<ul style="list-style-type: none"> • We show respect, compassion and let people know we care.
<ul style="list-style-type: none"> • We are open, positive, and constructive in our feedback. 	<ul style="list-style-type: none"> • We willingly provide the necessary time and effort to meet the customer’s needs.
<ul style="list-style-type: none"> • We treat people as they want to be treated. 	<ul style="list-style-type: none"> • We are flexible and adaptive in a dynamically changing business environment.
<ul style="list-style-type: none"> • We take responsibility for our actions. 	<ul style="list-style-type: none"> • We display enthusiasm and passion for our work.
<ul style="list-style-type: none"> • We lead by example 	
Innovative	Excellence
<ul style="list-style-type: none"> • We have the courage and willingness to consider new and unconventional ways of thinking. 	<ul style="list-style-type: none"> • We strive for quality and skillful execution without compromise.
<ul style="list-style-type: none"> • We assume responsibility for learning new things. 	<ul style="list-style-type: none"> • We use the power of total employee involvement to achieve our organizational goals.
<ul style="list-style-type: none"> • We embrace new ideas. 	<ul style="list-style-type: none"> • We foster a culture of shared values that gets things done.
<ul style="list-style-type: none"> • We listen with an open mind. 	<ul style="list-style-type: none"> • We take calculated risks needed to achieve results.
<ul style="list-style-type: none"> • We are future-focused; “I’ve always done it this way” does not exist in our vocabulary. 	<ul style="list-style-type: none"> • We look for new and more effective ways to do business.
<ul style="list-style-type: none"> • We recognize change as an opportunity. 	<ul style="list-style-type: none"> • We encourage continuous improvement.

5.0 PROJECT DESCRIPTION

5.1 Great travel experiences start when passengers leave their homes and arrive at the airport. To make their journey more memorable and highlight the economic and residential growth of the Houston area, Houston Airport System has embarked on the IAH Terminal Redevelopment Program (ITRP) to provide an overall modernized facility with additional gates, capacity to support air service growth, better use of space, enhanced connectivity an improved passenger experience. A large impact on the passenger experience is the Oculus, one of the most visually engaging and visible components of the architectural environment in the new International Central Processor (ICP). This unique media feature – which will include large-scale, uniquely designed media features, a centralized control system, and an inventory of original multimedia content – is an integral part of the new ICP, propelling HAS into the future of air travel and immersive experiences.

5.2 At time of writing, the design of the Oculus shape and placement within the ICP has been finalized.

5.3 Requirements outlined in this RFP are for the design, manufacture, installation, integration, calibration, warranty, and maintenance of the Oculus display technology, and any coordination services required between HAS, their chosen Owner's Authorized Representative, the Content Management System integrator, and the Content Production Company.

A capable team shall be provided to support the work of HAS in achieving the intention and design requirements of the Oculus. Specialized knowledge and industry experience is expected.

5.4 Roles and Responsibilities

5.5 HAS engaged an Owner's Authorized Representative (OAR) to coordinate, manage, and act as executive producer of the Oculus project from design through operational system. As the owner and entity responsible for the operations of the Oculus, all final approvals on any design and installation work must come from HAS.

5.6 HAS or its designated OAR will be the principal point of contact for ensuring that the intent of the Oculus design is executed throughout the project and will provide oversight for the work effort through final acceptance of the Oculus.

5.7 HAS and/or its designated OAR will also be the principal point of contact for coordination and any issues related to the Content Management System (CMS) and CMS integration. The CMS, procured and installed as part of a separate contract, will store and manage the multimedia content for the Oculus. The CMS contractor, engaged under the CMS contract, will be responsible for supporting the Content Production Company (CPC) in addressing technical matters and ensuring technical compliance for full integration of all content capsules and content inventory.

5.8 The OAR will work directly with HAS to address all building systems connectivity and coordination related to required infrastructure (power, data, communications), and will coordinate the installation of the display technology with HAS in alignment with the ITRP ICP construction schedule and requirements related to the base building.

- 5.8.1 HAS will be the point of contact for any coordination efforts required with ITRP for these efforts and any additional requirements, such as adherence to all safety regulations, codes, and standards.
- 5.9 The LED display system provider is responsible for the entire display technology system, from the LED tiles to the LED processor, including commissioning of all equipment. The LED display system provider will coordinate with the OAR for scope activities related to the CPC and the CMS integration as outlined in the Scope of Work.
- 5.10 The CPC, engaged under a separate contract, is responsible for the creative direction and capture of design intent, capsule production, and validation of an adequate content inventory based on collaboration and final approval from HAS. The CPC shall coordinate with HAS and/or their OAR for scope activities related to the LED display system provider and the CMS integration as outlined in the Scope of Work.

6.0 ESTIMATED PROJECT TIMELINE

- 6.1 The Oculus is timed to coincide with the opening of the IAH ICP and must be substantially complete with the ITRP terminal opening currently anticipated for May 2024. Once awarded, the Contractor shall coordinate the schedule for deployment with ITRP and HAS throughout the course of this project.

7.0 SPECIFICATIONS/SCOPE OF SERVICES

- 7.1 SCOPE OF WORK – The Contractor shall perform the general Scope of Work described herein and as further discussed in Attachment A – Specifications/Scope of Work.

PART III: PROPOSAL REQUIREMENTS AND SELECTION CRITERIA

8.0 EVALUATION AND SELECTION PROCESS

- 8.1 Proposals are expected to meet the evaluation criteria outlined in this section, which encompass the design intent and objectives of HAS for the Oculus media installation in the new terminal ICP. The LED display technology and integration process proposed in the response will represent a critical component of the success of the project.
- 8.2 Evaluation Summary – Responsive Proposals that meet the Minimum Qualifications will be evaluated. HAS, at its sole discretion may choose to develop a shortlist of proposers for further consideration. Shortlisted Proposers may be scheduled for a structured oral presentation and/or interview. Such presentations will be at no cost to HAS. At the end of the oral presentation and/or interview, the evaluation of the shortlisted Proposers will be completed. The Houston Airport System will utilize the scoring methodology shown in Table 3 to evaluate this RFP.
- 8.3 Selection Process – The award of this contract will be made to the Proposer offering the services that best meets the needs of HAS. HAS may make investigations, as it deems necessary, to determine the capabilities of the Proposer to successfully render the Scope of Services anticipated in this RFP. The Proposer shall furnish HAS such data as HAS may require for this purpose. HAS reserves the right to reject any Proposal if the evidence submitted by, or the investigation of, a Proposer fails to satisfy HAS that a Proposer is deemed qualified to provide the services contemplated in this RFP.

- 8.4 Evaluation Scores – Respondents meeting the Minimum Qualifications of this RFP shall be scored as follows:

Table 3: Evaluation Criteria Point System	
Evaluation Criteria	Max Score
Company Profile	5
Relevant Experience and Demonstrated Ability to Deliver Similar Installations	15
Technical Design/Approach	30
In-house Capabilities	10
Project Plan and Installation	15
Warranty & Maintenance	10
Proposal Pricing	15
Total	100
Minimum Qualifications/Experience	Pass/Fail
MWBE Compliance	Pass/Fail
Financial Capabilities (Separate Envelope)	Pass/Fail
Hire Houston First (Bonus Points)	5

- 8.5 Local Preference Points – To be eligible for the preference, a company must be designated as a City Business (CB) or Local Business (LB) under the Hire Houston First Program prior to submittal of proposal. Proposers must provide Declaration of Hire Houston First Designation with proposal submission. At the conclusion of scoring Proposals, Hire Houston First preference points shall be distributed in such a way that grants the highest number of points to a City Business (CB) and the next highest number of points to a Local Business (LB).
- 8.5.1 Note: At the conclusion of scoring Proposals, preference points shall be distributed in the following manner:
- 8.5.1.1 5 Points: For Proposer firm designated as a Hire Houston First “City Business” (CB);
- 8.5.1.2 3 Points: For Proposer firm designated as a Hire Houston First “Local Business” (LB);
- 8.5.1.3 0 Points: For proposer firm not designated as either a “City Business” (CB) or a “Local Business” (LB).
- 8.6 Evaluation Criteria – The purpose of these criteria is to assess the degree to which Proposers are qualified, possess the knowledge, and have the capability to provide the Scope of Services outlined in this RFP. Proposals must adequately address each and will be evaluated on the following criteria:

8.6.1 **Company Profile (5 Points)**

8.6.1.1 Provide documentation confirming that the Proposer has been in the business of designing, manufacturing, installing, and maintaining direct view LED displays and all supporting processing equipment, implementation services, and support services for use in transient public places with minimum congregation for a minimum of five (5) years. The Proposer shall demonstrate experience as the industry leader for technological innovation and highlight any key competitive advantages of the LED solution related to quality and performance.

8.6.1.2 Describe the organization of the proposing team. Include the point of contact to HAS and the OAR. Specify the project manager for the project. Include the names and brief resumes of key individuals who would be responsible for specific tasks in the Scope of Work. Include an estimate of time available for the individuals to dedicate to this project. Describe the ability of the firm and proposed project team to initiate the services defined in the Scope of Work in a timely manner, including the approach for appointing a team member in the event of absence of a proposed team member. Indicate any anticipated partnerships and work that may be subcontracted.

8.6.1.3 Provide the location of the company headquarters and any other global offices. Include the address and the number of personnel and their titles for each location. Clearly label the headquarters and offices in North America.

8.6.1.4 Provide documentation supporting the annual sales (in US dollar amount) for specifically direct view LED display products over the last five (5) years. Include the sales figures for the six (6) largest projects in the US. Include the sales figures for the six (6) largest projects globally.

8.6.2 **Relevant Experience and Demonstrated Ability to Deliver Similar Installations (15 Points)**

8.6.2.1 Houston Airport System (HAS) desires to select a business partner that has demonstrated experience installing large, architecturally integrated media features for transient public places. The Proposer shall provide at least three (3) examples of projects, that it has completed, where the LED technology is architecturally integrated with existing building features, including any sub-frames and specially designed finishes or details. At least one (1) of the provided examples must primarily exhibit a curved surface. Include the name of the project, project details, any images or drawings, description of structural attachments, explanation of how the design specifically served the space, and any custom elements created. Include the contact information for the Project Owner, including their name, title, and current contact information.

8.6.3 **Technical Design/Approach (30 Points)**

8.6.3.1 The Proposer shall provide documentation to confirm that the proposed LED product meets all the requirements for the Oculus as noted in Attachment A – Specifications/Scope of Services. The response shall confirm how all the technical requirements of the RFP will be met, with attention to the approach to meeting the complex curved display surface of the Oculus to achieve seamless transitions between panels with different radii. The response will identify any specification requirements that cannot be met by the proposed solution. Include a description and any supporting diagrams for clarification.

8.6.3.1.1 The Proposal shall provide cut sheets and specifications for proposed LED tile within the required pixel pitch range. Indicate the pixel pitch to two (2) decimal places. Describe, with illustrations, the method of front accessibility. Confirm the horizontal and vertical pixel spacing.

- 8.6.3.1.1.1 The Proposer shall demonstrate its acceptable use of flexible or rigid (curved or flat) LED tiles: Flexible or rigid LED tiles may be proposed, including a combination of both. Rigid tiles can be either flat or custom curved. The Contractor shall be required to maintain the overall curvature of the Oculus as depicted in Attachment A – Specifications/Scope of Services. Any divergence from a smooth curve should not be perceptible to the viewer at the minimum viewing distance.
- 8.6.3.1.1.2 If Proposer offers more than one product with these specifications, provide cut sheets and responses to all items in 8.6.3.1 of this RFP and 4.0 of Attachment A – Specifications/Scope of Services for all products, and include recommended choice and rationale for the selected products.
- 8.6.3.1.2 Indicate proposed pixel pitch suitable for a minimum viewing distance of 15ft with no perceptible pixels on a curvilinear display of concave configurations. Indicate the minimum radius for the proposed LED panels.
- 8.6.3.1.3 The Oculus is a complex curved elliptical surface made up of multiple radii and angled at approximately 30-degrees towards the floor. The resulting shape is an approximated truncated elliptical cone made up of three radii with the smallest radius being 9ft. The Proposer shall describe the approach to this design challenge. Describe, with drawings, the techniques and mechanisms used to install LED tile displays on complex, curved surfaces with varying radii of curvature. Describe any issues specific to angled concave surfaces and explain how such issues can be addressed.
- 8.6.3.1.3.1 The Proposer shall provide relevant details and concerns regarding the mixing of LED pixel pitches, including but not limited to the contrast variations, texture variations, structural or mechanical issues, and any other issues based on Proposer prior experience.
- 8.6.3.1.3.2 The Proposer shall provide images and drawings of any previous experience, if any, with LED tile displays installed on complex curved surfaces with varying radii of curvature and angled down.
- 8.6.3.1.4 The Proposer shall describe any LED product customization capabilities and explain any limitations to the customization. Given the curvature of the Oculus, indicate the estimated quantity or percentage of customized panels required. Identify what portions or sections of the overall display could utilize identical customized tiles and recommend quantities for local shelf stock. Propose a management strategy for the customized spare parts.
- 8.6.3.1.4.1 Consideration will be given to companies whose products are less customized and more off-the-shelf, in relation to how it reduces cost for maintenance and tile refurbishment.
- 8.6.3.1.5 The Proposer shall provide information on the LED power supply, whether it is integral to the module or if there is an option to power from an external or remote power supply. If the latter, indicate the maximum feasible distance between the LED tile and power supply. Provide information on quantity of tiles per power supply or power source.
- 8.6.3.1.6 The Proposer shall identify all communications and low-voltage infrastructure requirements (copper/fiber) between LED processor(s) and proposed video tiles, including the quantity of cabling required per quantity of tiles, making modifications as needed for any limitations or requirements unique to the proposed architecture (distance, etc.). If necessary, the requirements shall include the expansion of the existing IAH/HAS common network to provide network connectivity to field-mounted devices. Refer to Attachment A – Specification/Scope of Services for

further information on communication cabling requirements. Highlight any differences between the specifications and the proposed design.

- 8.6.3.1.7 Proposer shall identify all electrical power infrastructure requirements supporting the proposed LED tiles and any proposed supporting equipment located both local to the Oculus (field-mounted) and within communication equipment rooms. Recommend power distribution requirements, including outlet positioning, as necessary, along multiple locations/curvature of Oculus, if the overall size, shape, or electrical characteristics are differing. Include power needs required per quantity of tiles, making modifications as needed for any limitations or requirements unique to the proposed architecture (distance, etc.). If necessary, provide power requirements for any field-mounted equipment beyond the LED panels. Refer to Attachment A – Specification/Scope of Services for further information on electrical requirements. Highlight any differences between the specifications and the proposed design.
- 8.6.3.1.8 The Proposer shall specify the diode used in the proposed product and describe the method of quality batching, noting if batching is done by the Proposer. If several brands of diodes are available as options, identify and indicate rationale for choice (quality, cost, etc.).
- 8.6.3.1.9 The Proposer shall indicate LED tile(s) redundancy capabilities, including redundant data and power feeds. Indicate how the baseline and optional requirements for redundancy will be met. Refer to Attachment A – Specifications/Scope of Services for further information on redundancy requirements.
- 8.6.3.1.10 The Proposer shall provide any supporting documentation or evidence that reflects the capabilities of the proposed LED display technology, including but not limited to white papers, test results, or certifications.
- 8.6.3.1.11 In addition to the written responses above, Proposers are required to submit Attachment E – Required Specifications Response Form with complementary information pertaining to the LED tile technology.
- 8.6.3.2 The Proposer shall provide documentation to confirm that the proposed LED processing product meets all the requirements for the Oculus design as noted in Attachment A – Specifications/Scope of Services. The response shall confirm how all the technical requirements of the RFP will be met, with attention to adequately syncing and blending images as required. The response will identify any specification requirements that cannot be met by the proposed solution. Include a description and any supporting diagrams for clarification.
- 8.6.3.2.1 The Proposer shall provide cut sheets and specifications for proposed LED processor(s) suitable to the demands of the Oculus. If Proposer offers more than one product with these specifications, provide cut sheets and responses to all items in 8.6.3.2 of this RFP and 5.0 of Attachment A – Specifications/Scope of Services for all products, and include recommended choice and rationale for the selected product.
- 8.6.3.2.2 The proposed technology must have the capacity to accept multiple high resolution video inputs and combine them to form a continuous image with no distortion. . The Proposer shall d the processor capacity, including maximum pixel dimensions and the synchronization protocol used to sync multiple processors.
- 8.6.3.2.3 The proposed technology must be able to accept a sync signal and integrate multiple video inputs to form a continuous image on a large display surface. The Proposer shall describe the time synchronization techniques used across the entire proposed solution.

- 8.6.3.2.4 The proposed technology must be able to support network-based third-party control. Describe the capability related to third-party control and provide any API documentation.
- 8.6.3.2.5 The proposed technology must minimally support 4K/UHD @ 60fps inputs with one-to-one pixel mapping from video signal to LED display. Provide any specifications and documentation related to signal transmission.
- 8.6.3.2.6 The Proposer shall describe the capability of the technology to dynamically dim LED tiles based on the fluctuations in ambient lighting conditions. Provide the specifications relating to dynamic control of brightness. Provide details on the ambient light sensor and related monitoring or control systems external to the LED processor.
- 8.6.3.2.7 The proposed technology shall have High Dynamic Range (HDR) capabilities that maintain image dynamic range across all brightness levels. The Proposer shall describe the capability of the LED controller to manage color gamut, adjust dynamically based on external conditions, and present sufficient color/grayscale gamut necessary to display a high-quality image with no visible banding. Provide any specifications and documentation related to high dynamic range and dynamic color, contrast, and brightness control.
- 8.6.3.2.8 The Proposer shall describe the capability of the proposed LED solution (LED tiles and processors) to support potential live interactive content as it relates to latency. The proposed solution shall be capable of adjusting overall latency to accommodate high-latency devices or inputs. Provide any specifications or documentation related to low latency and ability to adjust latency.
- 8.6.3.2.9 The Proposer shall describe the capability of the proposed LED solution (LED tiles and processors) to support pixel-level brightness and chroma calibration. Provide any specifications or documentation related to pixel-level brightness and chroma calibration.
- 8.6.3.2.10 The Proposer shall describe the remote access capabilities of the proposed solution. Provide any specifications and documentation highlighting any remote access capabilities as it relates to brightness and gamma control.
- 8.6.3.2.11 The Proposer shall describe the proposed technology input types, their quantities and video parameters (resolution, frequency, bit depth, chromatic subsampling) per output.
- 8.6.3.2.12 The Proposer shall describe the proposed technology output types, their quantities and video parameters (resolution, frequency, bit depth, chromatic subsampling) per input.
- 8.6.3.2.13 The Proposer shall describe the minimum communications infrastructure requirements (copper/fiber) between LED processor(s) and proposed LED tiles. Recommend device locations and cabling infrastructure. Include drawings and specifications of related equipment and cabling. Indicate unitized cabling requirements, quantity and types of cabling required per quantity of tiles. Indicate limitations or requirements unique to the proposed architecture (distance, etc.). Refer to Appendix A – Specifications/Scope of Services for potential equipment locations and configurations.
- 8.6.3.2.14 The Proposer shall describe the LED processor(s) redundancy capabilities including redundant inputs/outputs, redundant and hot-swappable power supplies, and output loops for processor-to-processor redundancy. Indicate any equipment that will require uninterruptible power supply (UPS). Indicate how the baseline and optional requirements for redundancy will be met.

8.6.3.2.15 Other key criteria in evaluating the LED products shall include, among other factors, overall design and fabrication quality.

8.6.3.2.16 In addition to the written responses above, Proposers are required to submit Attachment E – Required Specifications Response Form with complementary information pertaining to the LED processing technology.

8.6.4 In-House Capabilities (10 Points)

8.6.4.1 The Proposer shall provide documentation confirming that the Proposer has the capability to supply approximately 2000 square feet of proposed direct view LED product and display assembly. Include a description of the facility capacity. Include locations of facilities in and out of North America. Describe any competitive advantages occurring in facilities relating to fabrication, product testing, and tile refurbishment.

8.6.4.2 The Proposer shall provide an estimation of the lead time for the fabrication of the proposed LED products for the Oculus.

8.6.4.3 The Proposer shall have demonstrated ability to prepare shop drawings in Revit for large format, direct view LED installations. Provide examples of shop drawings prepared for previous projects where architectural integration was an essential component. Describe the in-house personnel to be involved with creating shop drawings for the Oculus, including any structural, mechanical, electrical, and systems engineering and technical support and their roles in review and production of shop drawings.

8.6.4.4 The Proposer shall have demonstrated ability to provide structural engineering, fabrication, and installation of any tertiary structures required to support the display technology and its physical connection with the ICP base building. Provide examples of capability and technique, including and professional experience and credentials of in-house personnel. If external partnerships are used, include a description of their involvement and any previous affiliation.

8.6.4.5 The Proposer to provide capability to perform in-house factory acceptance testing and quality control of LED tiles and processors. Describe the facilities where the testing will take place. Include location, scale, and testing equipment to be used. Include a description of the quality control techniques and a timeline for the process for all proposed technology.

8.6.4.6 The Proposer will be asked to provide mockups as part of a presentation to HAS and the OAR to validate aspects of the proposed technology. Indicate services and capabilities to provide mockups for review. Include examples of display and architectural mockups used for previous similar projects, including specifically for curved surfaces. Include examples of mockups used for testing functionality of display technology, including viewing angle, contrast, and color depth.

8.6.4.7 The Proposer shall provide product prototyping to validate aspects of the proposed technology. Describe two (2) different prototypes used for previous projects. Include any illustrations or images of prototypes along with the finished products after installation.

8.6.4.8 The Proposer may be asked to provide customized products for the specialized design of the Oculus. Describe two (2) examples of custom products used on previous projects to fit a specialized design. Include any illustrations of custom products, LED tiles, support structures, or housing and images of the display after installation.

8.6.5 Project Plan and Installation (15 Points)

- 8.6.5.1 The Proposer shall describe how the project and implementation process will be managed to ensure that all required timeline, quality control, and budget requirements are met. A high-level narrative shall be provided that addresses overall project management approach from design through commissioning.
- 8.6.5.2 The Proposer shall coordinate with the OAR and CMS contractor on the network design packages to verify any required minor changes due to constraints of the display technology to be successful installed within the ICP base building. Describe the capability and technique of the proposed team to provide electrical, structural, and telecommunications input. Describe any additional technical services that have been proven valuable in past similar projects.
- 8.6.5.3 The Proposer shall provide quality assurance throughout the project. Describe the quality assurance measures taken and the frequency which it is performed, including but not limited to factory acceptance of diodes, assembled display, video signal chain, integration with base building, installation, and integration with the CMS.
- 8.6.5.4 The Proposer shall provide installation of all components of the display technology, including LED panels, substructures, sensors (if required), access panels for maintenance, and attachments to base building. Describe installation capabilities and management approach for a complete installation. If external partners are used, describe their involvement and any previous affiliation.
- 8.6.5.5 The Proposer must have experience with integrating media display processors and network connections, coordinating with systems integrators and control engineers. Describe any integration experience, capabilities, and approach for a complete Oculus installation. Describe any adjustments to be made for future integration of audio or motion capture sensors. If external partners are used, describe their involvement and any previous affiliation.
- 8.6.5.6 The Proposer will be required to verify all electrical connections and suggest any minor changes due to limitations of display technology architecture and shape before installation. Describe the firm's capabilities to support the electrical installation and proposed collaboration approach.
- 8.6.5.7 The Proposer will be required to evaluate the environmental lighting conditions and their variances to determine the optimal display technology performance. Describe how evaluation of display technology optical performance and contrast management is accomplished within the architectural setting at every stage of the process, from design and engineering, through mockups, fabrication, and on-site adjustments.
- 8.6.5.8 The Proposer will be required to calibrate the display technology after fabrication and at different stages of the product lifespan. Describe the factory calibration process. Describe the on-site calibration process. Describe the calibration process for replacement tiles in a functioning environment at different stages of the product lifespan.
- 8.6.5.9 The Proposer may be asked to facilitate installation by fabricating cabinets or modular frames at an off-site facility. Describe any off-site/on-site integration experience for similar projects.

8.6.6 Warranty and Maintenance (10 Points)

- 8.6.6.1 Warranty Plan – The Proposer shall submit with their Proposal a warranty plan with costs covering all proposed products. Include standard warranties along with timeline and pricing. Include premium warranties along with timeline and pricing.

The Proposer shall also submit with their proposal, information that will allow HAS to evaluate the Proposer's warranty program to ensure reliable operations and a cost-effective approach. Consideration will be given to warranty lengths above and beyond the duration noted herein.

- 8.6.6.2 Each member of the proposing team shall be certified by the manufacturer of the system as being trained in the installation of the portion of the overall system that the team member is installing. Refer to the required response format for additional information regarding personnel experience requirements
- 8.6.6.3 The Proposer shall provide factory authorized service in the event of product failure to support requirements of all hardware and software included in the RFP in Attachment A – Specifications/Scope of Services. Describe the service facility serving Houston, Texas, including the location and any relevant details. Describe the response options. Describe the refurbishment process, along with timeline and pricing.
- 8.6.6.4 The Proposer shall provide operations and maintenance services after commissioning of the system. Describe the recommended operations and maintenance approach, including any preventative maintenance services. Include information that will allow HAS to evaluate the Proposer's maintenance program to ensure continued reliable operations after the completion of the initial warranty period. Include standard terms and conditions. Include options for extended or premium services. If external partners are used, describe their involvement and any previous affiliation.
- 8.6.6.5 The Proposer shall describe any real-time, remote status monitoring and reporting tools and capabilities to observe tile and equipment performance on a live system.
- 8.6.6.6 The Proposer will be required to maintain an adequate inventory of spare parts throughout the project lifespan. Describe the approach to replacement parts. Include the number of spare parts to installation. Include the recommended number of spare parts, by equipment type, to keep during operations. Include any methods for maintaining quality of spare parts.
- 8.6.6.7 The Proposer shall describe the approach to maintaining and replacing legacy equipment and display technology.
- 8.6.6.8 The Proposer will be required to ensure a seamless image of the Oculus. Describe the approach to maintaining tile seam lines over time.
- 8.6.7 **Proposal Pricing (15 Points)**
- 8.6.7.1 The Proposer shall complete the Cost Proposal Form provided in Attachment B – Required Pricing Response Form based on the information provided in this RFP and Attachment A – Specifications/Scope of Services.
 - 8.6.7.1.1 Pricing shall include all products and services required to design, fabricate, deliver, install, program, commission, test, and warrant the Oculus display technology.
 - 8.6.7.2 The inventory and details included in the pricing form serve as a basis for comparing value proposals only and do not necessarily reflect the final list of equipment to be used for the project. The final list of all inventory and equipment, including customized products, shall be determined during the design phase of the project in collaboration with HAS, the OAR, the CMS contractor, and the CPC.
 - 8.6.7.3 The Proposer shall provide the following pricing:
 - 8.6.7.3.1 The Proposer's best base product price for LED tile product in 1.5mm and 2.5mm pixel pitch for the indicated size.

- 8.6.7.4 Options and Alternates – The Proposer shall submit a detailed narrative of any recommended options and alterations proposed as compared to the functional design requirements included in the RFP Functional Specifications. This narrative should clearly delineate the proposed modifications and include the reason(s) for the proposed modification as well as detailing any cost, interface, or integration impacts.
- 8.7 Exceptions – Provide a “Matrix of Exceptions” to the requirements of the RFP. Identify the requirement, describe the nature of the deviation, and provide an explanation or an alternative. The Proposer’s “Matrix of Exceptions” shall be for all of the articles and sections of the RFP and technical specifications of the RFP. If no deviations are identified and HAS accepts Proposer’s proposal, Proposer shall conform to all of the requirements specified therein.

9.0 MINIMUM QUALIFICATIONS (PASS/FAIL)

- 9.1 The Proposer shall have been in the business of designing, manufacturing, installing, and maintaining direct view LED displays and all supporting processing equipment for use in transient public places for a minimum of five (5) years.
- 9.2 The MWBE goal is 0%. This RFP is exempt from providing MWBE participation.

10.0 FINANCIAL CAPABILITIES (PASS/FAIL)

- 10.1 The Proposer is required to submit, in a separate, sealed envelope, clearly marked "Financial Statements", one (1) stamped "Original" and one (1) copy of its Financial Statements with its Submittal.
- 10.2 The Proposer shall submit audited financial statements for the last two years. If audited financial statements are not available, please submit tax returns for the two previous years and two years of unaudited financial statements.

11.0 INTERVIEWS/ORAL PRESENTATIONS

- 11.1 Following the evaluation of the written proposals, HAS may interview short-listed Respondents at its sole discretion. Submission of a proposal does not guarantee the right to an interview. HAS reserves the right to accept or reject any or all Proposals in response to this Request for Proposal (RFP). Additional information will be provided to those Respondents being interviewed, should this step be required.
- 11.2 The evaluation committee may arrive at a short list of proposers. These short-listed proposers may be scheduled for a structured oral presentation and interview and will be further evaluated based on the proposal and presentation. Short-listed proposers may receive clarifying questions from the evaluation committee in advance of their presentation and interview. Should oral presentations be required, invited proposers may be asked to revise their proposal to reflect things revealed or explicated in the oral presentation and interview. Please note that HAS is not responsible for costs associated with oral presentations and interviews.

12.0 SELECTION PROCESS AND CONTRACT AWARD

- 12.1 Submission of Proposals in response to this RFP indicates Proposer’s acceptance of the selection process and the evaluation criteria described herein.
- 12.2 Responses will be evaluated by an Evaluation Committee consisting of City of Houston personnel. The Evaluation Committee may include non-voting, non-City personnel to observe the process. Selection will be based on the Evaluation Criteria described in Sections 8.0 thru 11.0.

12.3 Step ONE of the selection process:

12.3.1 Based on the number and quality of Proposals to this RFP, the evaluation committee may form a short list of proposers whose proposals provide the most desirable methods for providing the services. In developing the short-list, the committee will consider, among other things, the criteria described in Section 8.0. The Houston Airport System will utilize the consensus scoring methodology to evaluate this RFP.

12.3.2 NOTE: If a clear, first-place proposer is identified, the proposers will be notified of such, and there will be no Step TWO. If no oral presentation/interview is required by the evaluation committee, the initial scores will become the final scores. However, in the event the evaluation committee identifies no clear, first-place Proposer, the evaluation committee may request oral presentations/interviews for short-listed Proposers identified in Step ONE.

12.4 Step TWO of the selection process:

12.4.1 Proposers will be notified in writing of the date/time and location of their presentation if they have been chosen for further consideration.

12.4.2 After the oral presentations/interviews (if required) are completed, final scores will be established by the evaluation committee. The scores from the oral presentations/interviews will serve as the FINAL scores. Scores from the first round (Step ONE) will not be added or averaged as part of the final scores.

12.4.3 The City reserves the right to request clarifying information from and ask additional questions of any individual proposer at any time during the evaluation process. The City also reserves the right to contact any references provided by the Proposer within its Response.

12.5 Step THREE of the selection process:

12.5.1 After Step TWO (or Step ONE if no oral presentation/interview is required), the City will begin contract negotiations with the highest ranked Proposer(s) based upon the sample contract form attached to this RFP. As part of its Step ONE submittal, proposer shall provide the City with any comments it has regarding the sample contract. If negotiations result in agreement, the proposed contract will be submitted to the City Council for approval.

12.5.2 Notwithstanding the foregoing, the City makes no representation that an award will be made as a result of this RFP. The City reserves the right to award a contract for all or any portion of the project requirements addressed in this RFP, award multiple contracts, or to reject any and all proposals if deemed to be in the best interest of the City and to re-advertise. In addition, the City reserves the right to waive any formalities or technical inconsistencies or delete any requirements from this RFP when deemed by the City to be in its best interest. HAS reserves the right to cancel this RFP, accept or reject, in whole or in part any or all Proposal(s) received in the best interest of the HAS.

12.5.3 Any failure by the Proposer to acquaint itself with the available information will not relieve it from the obligation of entering into a contract with the City should it be the successful Proposer. The City shall not be responsible for any conclusions or interpretations made by the Proposer of the information made available by the City in this RFP or independent of this RFP.

PART IV: PROPOSER QUALIFICATIONS/SUBMITTAL PROCEDURES

13.0 MINIMUM QUALIFICATIONS

13.1 Refer to Section 9.0.

14.0 REFERENCES

14.1 The Proposer shall provide a minimum of three (3) qualified reference sites where the Proposer acted as the single entity responsible for the implementation, installation, configuration, testing, and on-going support for architecturally integrated direct view LED displays.

15.0 RESERVED

16.0 SUBMITTAL PROCEDURES

16.1 Provide ten (10) printed copies of the Proposal (numbered x of xx), including one (1) printed original signed in BLUE ink, and marked as "Original" on the outside cover. Additionally, provide ten (10) complete copies on a memory stick (USB Thumb drive) labeled with the appropriate Solicitation name and number that includes a complete copy of all information in the printed original. Please submit all items in a sealed envelope or package bearing the assigned Title and RFP Number to:

Cathy Vander Plaats
Aviation Procurement Officer
Houston Airport System
Supply Chain Management
18600 Lee Road
Humble, Texas 77338

16.2 The envelope or package should clearly identify the name and address of the Proposer and indicate the contents as "Response to H37-OCULED-2023-13: Oculus Led Display System Provider".

16.3 The deadline for the submittal of the Response to the Houston Airport System (HAS), Supply Chain Management Office is no later than the date and time as indicated on the first page of the Solicitation document. Failure to submit the required number of copies as stated above may be subject for disqualification from the proposal process.

16.4 Proposers may elect to either mail or personally deliver their Response to the Supply Chain Management Office. HAS bears no responsibility for submitting Proposals on behalf of any Proposer. Proposer(s) may submit their Proposals to the Supply Chain Management Office any time prior to the stated deadline.

16.5 In the event that there are discrepancies among the various Proposals submitted, the "Original" Response signed in BLUE ink shall govern.

16.6 All proposals must be labeled on the outside of the envelope or box with the Proposer's name and the name of the Solicitation. Proposers should follow the required format in preparing their Proposal in order to enable HAS to efficiently evaluate the Proposals.

16.7 Each copy of the Response shall be bound using GBC or other semi-permanent binding method, to ensure that pages are not lost. Pages shall be no larger than letter-size (8 1/2" by 11") or folded to that dimension, twice letter size (11" by 17"). A tabbed divider shall separate each section (defined below). Document text should be in Arial (or similar standard sans serif font) 10 point or Times New

Roman (or similar standard serif font) 12 point, but must be consistent throughout the document.

- 16.8 At least one copy must carry the original signature of an officer or individual having legal authority to enter into agreements on behalf of the Proposer. The deadline for submission is on Thursday, February 9, 2023, 2:00 P.M. (CST). Each envelope or package should be clearly marked "Response to H37-OCULED-2023-13 Oculus Led Display System Provider for HAS." Proposals received after this date and time will be returned unopened and not considered.

17.0 PROPOSAL OUTLINE AND MINIMUM CONTENT REQUIREMENTS

- 17.1 Each Response shall be organized in the following order and tabbed appropriately:

- 17.1.1 **Outside Cover**

- 17.1.1.1 This shall contain the RFP number and title "H37-OCULED-2023-13 Oculus LED Display System Provider for HAS," the name of the Proposer, and the submittal date. Remember to label the original documents as "ORIGINAL" on the outside cover.

- 17.1.2 Table of Contents

- 17.1.3 **TAB 1 - Transmittal Letter**

- 17.1.3.1 Submit a one (1) page letter transmitting the Proposal to Cathy Vander Plaats, Houston Airport System. The transmittal letter shall state, "This Proposal is valid for 180 days," and that the signer of the document is authorized by the Proposer to sign the document.

- 17.1.3.2 Letter shall contain the names and roles/responsibilities of all individuals proposed for the Team, and the Proposer must certify that each Key Personnel of the Team was selected based on demonstrated competence and qualifications.

- 17.1.3.3 The letter must include a statement committing the availability of the key personnel.

- 17.1.3.4 One copy of the transmittal letter shall contain the original signature of the team lead. NOTE: Acknowledge receipt of all RFP Letter(s) of Clarifications, if any, in this Transmittal Letter.

- 17.1.4 **TAB 2 – Description of Firm**

- 17.1.4.1 Provide a general description of the firm, including systems, services, and staffing offered, number of employees, office locations, and the number of years in business.

- 17.1.5 **TAB 3 – Executive Summary**

- 17.1.5.1 The Executive Summary should provide an overview of the qualifications necessary to accomplish the project, which includes a narrative statement of the Proposer's understanding of the Project and key points in their Proposal. At a minimum, the Executive Summary must contain the following information:

- 17.1.5.1.1 Complete legal name of the Proposer, the name of the legal entities that comprise the Proposer, and all proposed subcontractors. The Proposer must provide the domicile where each entity comprising it is organized, including entity name, brief history of the entity, contact name, address, phone number, as well as the legal structure of the entity and a listing of major satellite offices. If the Proposer is made up of more than one firm, the legal relationship between these firms must be described.

- 17.1.5.1.2 Prepare narrative statements that describes the Proposer's understanding of the work involved in performing the Scope of Work that is described in the Functional Specification.
- 17.1.6 **TAB 4** – Response to Company Profile as described in Section 8.6.1.
- 17.1.7 **TAB 5** – Response to Relevant Experience & Demonstrated Ability to Deliver Similar Installations as described in Section 8.6.2.
- 17.1.8 **TAB 6** – Response to Technical Design/Approach as described in Section 8.6.3.
- 17.1.9 **TAB 7** – Response to In-House Capabilities as described in 8.6.4
- 17.1.10 **TAB 8** – Response to Project Plan and Installation as described in Section 8.6.5.
- 17.1.11 **TAB 9** – Response to Warranty and Maintenance as described in 8.6.6.
- 17.1.12 **TAB 10** – Response to Proposal Pricing as described in Section 8.6.7.
- 17.1.13 **TAB 11** – Response to Minimum Qualifications as described in Section 9.0.
- 17.1.14 **TAB 12** – Response to Financial Capabilities as described in Section 10.0.
- 17.1.15 **TAB 13** – Provide all the Forms to be submitted with the Proposal as described in Section 19.0.

PART V: GENERAL TERMS AND CONDITIONS

18.0 GENERAL TERMS AND CONDITIONS

18.1 DRUG DETECTION AND DETERRENCE PROCEDURE

- 18.1.1 Please complete the related drug detection and deterrence procedures City Required Documents (Exhibit G).

18.2 INSURANCE REQUIREMENTS

- 18.2.1 The selected Respondent shall obtain and maintain in effect during the term of the Agreement, insurance coverage as set out below, and shall furnish certificates of insurance, in duplicate form, prior to the beginning of the services hereunder. All such policies except Professional Liability, Workers' Compensation and Employer's Liability shall be primary to any other insurance and shall name the City as an additional insured. All liability policies shall be issued by a company with a Certificate of Authority from the State Department of Insurance to conduct insurance business in Texas or a rating of at least B + with a financial size of Class VI or better according to the current year's Best's rating. The selected Proposer shall maintain the following insurance coverages in the following amounts:
 - 18.2.1.1 Professional Liability insurance \$1,000,000 per occurrence; \$2,000,000 aggregate.
 - 18.2.1.2 Automobile Liability insurance (including non-owned and hired auto coverage) \$1,000,000 combined single limit per occurrence.
 - 18.2.1.3 Commercial General Liability insurance including Contractual Liability insurance: \$1,000,000 per occurrence; \$2,000,000 aggregate
 - 18.2.1.4 Workers' Compensation in the amount set by statute.
- 18.2.2 Defense costs excluded from face amount of policy Aggregate limits are per 12-month policy period unless otherwise indicated.

18.2.3 All insurance policies required by the Contract shall require on their face, or by endorsement, that the insurance carrier waive any rights of subrogation against the City. Respondent shall give thirty (30) days advance written notice to the City before they may be canceled or materially changed. Within such thirty (30) day period, the selected Respondent shall covenant that it will provide other suitable policies in lieu of those about to be canceled or materially changed, so as to maintain in effect the coverage.

18.3 FAIR CAMPAIGN ORDINANCE

18.3.1 The City of Houston Fair Campaign Ordinance (Section 18-36 of the City Code of Ordinances) makes it unlawful for a contractor to offer any contribution to a candidate for City elective office during a certain period of time prior to and following the award of the contract by City Council. The term "contractor" includes sole proprietors, partners of partnerships, and all officers, directors, and holders of ten percent or more of the outstanding shares of corporations. A statement disclosing the names and business addresses of each of those persons will be required to be submitted with the Response. A blank copy of "Contractor Submission List - City of Houston Fair Campaign Ordinance" (Form A) is included in this RFP in Exhibit E (See Chapter 18 of the Code of Ordinances, Houston, Texas, for further information).

18.4 PAY OR PLAY PROGRAM

18.4.1 The requirements and terms of the City of Houston Pay or Play policy, as set out in Executive Order 1-7, are incorporated into the Agreement for all purposes. Contractor has reviewed Executive Order No. 1-7 and shall comply with its terms and conditions as they are set out at the time of City Council approval of the Agreement.

18.4.2 Review Document 00840: Pay or Play Program; and fill out Documents 00630 and 00631 for submittal.

18.5 DELINQUENT TAX

18.5.1 Prior to consideration by City Council, evidence must be submitted by each owner/operator(s) demonstrating that no delinquent taxes are owed to the City of Houston. Complete form attached as Exhibit D (Affidavit of Ownership).

18.6 MISCELLANEOUS

18.6.1 All Proposals submitted in response to this RFP are the property of the City and are not available for public review or debriefing by any Proposer until after selection and approval of an Agreement by City Council. All information submitted becomes public record and subject to the Texas Public Information Act including information marked proprietary or confidential.

18.6.2 Any cost associated with the submittal of a response to the RFP will be solely the expense of the Respondent.

18.6.3 This RFP is not to be construed as a contract offer or as a commitment of any kind; and receipt by the City of a response by a Proposer in no way obligates the City in any manner whatsoever.

18.6.4 Copies of City Ordinances and Policies noted in the RFP may be obtained from the City Secretary's Office, Plaza Level, City Hall Annex, Room 101, 900 Bagby, Houston, Texas 77001.

18.6.5 It is believed that this RFP contains all the information related to the project that is needed to prepare an adequate response. However, any questions or requests for information that are deemed necessary should be made in writing and e-mailed no later than 2:00 p.m. CST on January 3, 2023, to Andre' Morrow, Senior Procurement Specialist – Houston Airport System, Supply Chain Management, Andre.Morrow@houstontx.gov. Responses to all questions will be in writing and will be published on the HAS website, www.fly2houston.com.

18.7 NO CONTACT PERIOD

18.7.1 Neither bidder(s) nor any person acting on bidder(s)'s behalf shall attempt to influence the outcome of the award by the offer, presentation or promise of gratuities, favors, or anything of value to any appointed or elected official or employee of the City of Houston, their families or staff members. All inquiries regarding the solicitation are to be directed to the designated City Representative identified on the first page of the solicitation. Upon issuance of the solicitation through the pre-award phase and up to the date the City Secretary publicly posts notice of any City Council agenda containing the applicable award, aside from bidder's formal response to the solicitation, through the pre-award phase, written requests for clarification during the period officially designated for such purpose by the City Representative. However, nothing in this paragraph shall prevent a bidder from making public statements to the City Council convened for a regularly scheduled session after the official selection has been made and placed on the City Council agenda for action, or to a City Council committee convened to discuss a recommendation regarding the solicitation.

18.8 EQUAL OPPORTUNITY EMPLOYMENT

18.8.1 The City of Houston Ordinance Section 15-17 establishes Equal Employment Opportunity Contract Compliance requirements for all City of Houston contracts involving the expenditure of Fifty Thousand Dollars (\$50,000) or more. Any contract that results from this RFP will provide that the failure to carry out the requirements set forth in the City of Houston Equal Employment Opportunity Program shall constitute a breach of contract and may result in termination of the agreement or contract. In addition, the City may take any such additional remedy as deemed appropriate.

18.9 PROTEST

18.9.1 Protests should be filed in accordance with the City of Houston Administrative Policy (A.P. No. 5-12) <https://www.houstontx.gov/adminpolicies/5-12.pdf>.

18.10 ANTI-BOYCOTT OF ISRAEL

18.10.1 Vendor certifies that Vendor is not currently engaged in and agrees or the duration of the contract not to engage in, the boycott of Israel as defined by Section 808.001 of the Texas Government Code.

18.11 EXECUTIVE ORDER 1-56 ZERO TOLERANCE FOR HUMAN TRAFFICKING IN CITY SERVICE CONTRACTS AND PURCHASING

18.11.1 The City has a zero tolerance for human trafficking, and, per Executive Order 1-56, City funds shall not be used to promote human trafficking. City vendors are expected to comply with this Executive Order and notify the City's Chief Procurement Officer of any information regarding possible violation by the vendor or its subcontractors providing services or goods to the City. The Executive Order is available on the City's website: <http://www.houstontx.gov/execorders/1-56.pdf>.

18.12 PRESERVATION OF CONTRACTING INFORMATION

18.12.1 "The requirements of Subchapter J, Chapter 552, Government Code, may apply to this (include "bid" or "contract" as applicable) and the contractor or vendor agrees that the contract can be terminated if the contractor or vendor knowingly or intentionally fails to comply with a requirement of that subchapter." (<https://statutes.capitol.texas.gov/Docs/GV/htm/GV.552.htm#552>).

CITY REQUIRED DOCUMENTS

PART VI: CITY REQUIRED DOCUMENTS AND ATTACHMENTS

19.0 FORMS TO BE SUBMITTED WITH PROPOSAL

- Exhibit A – Offer and Submittal
- Exhibit B – References
- Exhibit C – List of Subcontractors
- Exhibit D – Contractor Ownership Disclosure Ordinance & Affidavit of Ownership
- Exhibit E – Fair Campaign Ordinance
- Exhibit F – Statement of Residency
- Exhibit G – Drug Detection and Deterrence Procedures
- Exhibit H – Pay or Play Acknowledgement Form
- Exhibit I – Anti-Collusion Statement
- Exhibit J – Conflict of Interest Questionnaire
- Exhibit K – Bidder’s MWBE Participation Plan – Document 00470
- Exhibit L – Pre Bid Good Faith Efforts - Document – Document 00471
- Exhibit M – Bidder’s MWSBE Goal Deviation Request – Document 00472
- Exhibit N – Insurance Requirements
- Attachment B – Required Pricing Response Form
- Attachment C – Required Submittal Checklist
- Attachment D – Sample Agreement
- Attachment E – Required Specifications Response Form

20.0 FORMS TO BE SUBMITTED AFTER RECEIPT OF NOTICE OF INTENT TO AWARD *(To be provided by the recommended firm)*

- Exhibit O – Affidavit of Compliance with Affirmative Action Program
- Exhibit P – Certification of Compliance with Pay or Play Program (POP-2) Program
- Exhibit Q – Pay or Play Program List of Subcontractors (POP-3) Program
- Exhibit R – Contractor’s Revised MWBE Participation Plan – Document 00570
- Exhibit S – Record of Post-Bid Good Faith Efforts – Document 00571
- Exhibit T – Plan Deviation Request Form – Document 00572
- Exhibit U – Performance Bond
- Exhibit V – Statutory Payment Bond

ATTACHMENT A SPECIFICATIONS/SCOPE OF SERVICES

1.0 General Requirements

1.1 Great travel experiences start when passengers leave their homes and arrive at the airport. To make their journey more memorable and highlight the economic and residential growth of the Houston area, Houston Airport System (HAS) has embarked on the George Bush Intercontinental Airport (IAH) Terminal Redevelopment Program (ITRP) to provide an overall modernized facility with additional gates, capacity to support air service growth, better use of space, enhanced connectivity, and an improved passenger experience. A large impact on the passenger experience is the Oculus, one of the most visually engaging and visible components of the architectural environment in the new International Central Processor (ICP). This unique media feature – which will include large-scale, uniquely designed media features, a centralized control system, and an inventory of original multimedia content – is an integral part of the new ICP, propelling HAS into the future of air travel and immersive experiences.

At time of writing, the design of the Oculus shape and placement within the ICP has been finalized.

Requirements outlined in this Request for Proposals (RFP) are for the design, engineering, shop drawings, installation, programming, calibration, commissioning, warranty, and maintenance of the Oculus display technology, any architectural finishes, and any coordination services required between HAS, the Director of HAS or any person designated by the Director to perform one or more of the Director's duties under this Agreement (the "Director and/or designee"), their designated Owner's Authorized Representative (OAR), the Content Management System (CMS) integrator, and the Content Production Company (CPC).

This project is intended to provide a curved, direct view LED display with optimum specifications for the IAH ICP, with the purpose of enhancing the passenger experience.

A capable support team shall be provided to support the work of HAS in achieving the intention and design requirements of the Oculus. Specialized knowledge and industry experience is expected to support multiple areas of the project.

1.2 The Contractor shall provide the following services:

1.2.1 Project management and coordination with the Director and/or designee, other system contractors, and any project representatives

1.2.2 Development and maintenance of a detailed project schedule for all phases including design, fabrication, delivery, integration, testing and other project activities

1.2.2.1 Project design, coordination, installation, testing, and commissioning shall align to the ICP construction schedule

1.2.3 Workshop attendance to confirm functional requirements of the display technology (i.e., ventilation, lighting requirements, structural support, electrical power, data infrastructure, and similar)

- 1.2.4 Workshop attendance to address design options and technical issues in coordination with the OAR and other system contractors
- 1.2.5 Workshop attendance to support the CPC with content conceptualization and the CMS contractor with design development in support of proposed content
- 1.2.6 Coordination of requirements for power and data to support installation of any performance monitoring equipment, ambient light monitors, and any future installation of sensors or audio equipment
- 1.2.7 Support to the OAR in evaluating and confirming facility requirements for display technology functionality, including any structural or infrastructure requirements, such as power, data, and communications
 - 1.2.7.1 Coordination with the OAR and HAS, in their coordination with the architects and ITRP, for the seamless integration of the display technology with the existing architectural elements of the building, including any structural elements and design finishes
- 1.2.8 Coordination with the Oculus CMS contractor and CPC to:
 - 1.2.8.1 Support the content design and development work being performed by a third-party
 - 1.2.8.2 Support the content management work being performed by a third-party
 - 1.2.8.3 Support seamless content delivery to the Oculus, incorporating all playback specifications and video processing parameters
- 1.2.9 Optimization of display technology performance based on passenger viewing distances and circumstances
- 1.2.10 Manufacture of shop drawings and design plans in accordance with HAS requirements
- 1.2.11 Development of project plans including but not limited to:
 - 1.2.11.1 Installation plans and schedules
 - 1.2.11.2 Quality assurance plans
 - 1.2.11.3 Commissioning schedule
 - 1.2.11.4 Testing plans
 - 1.2.11.5 Training plans
- 1.2.12 Submittal of project documentation for review by the OAR including but not limited to:
 - 1.2.12.1 Component submittal documents
 - 1.2.12.2 Shop drawings, design plans, and installation plans
 - 1.2.12.3 As-built drawings
 - 1.2.12.4 Operations and maintenance documentation
- 1.2.13 Pulling and upkeep of required permits and licenses

- 1.2.14 Mockups or prototypes will be required as part of the decision process to confirm functional or physical aspects of the proposed display technology, including the seamless appearance of the curved tile transitions, and to outline techniques for overcoming the specific design challenges as it relates to the Oculus placement within the ICP. Mockups can be of a section that integrates multiple products, assemblies and sub-assemblies, sections of the LED display wall, or full-size assemblies for testing and verifying required performance.
- 1.2.15 LED fabrication/manufacturing, delivery, installation, configuration, programming, testing, and integration
- 1.2.16 Design and installation of a tertiary structure to support and attach individual LED tiles to the base building
- 1.2.17 On-site integration, testing, and adjustments in alignment with the ICP construction schedule
- 1.2.18 The Contractor shall supply all software and hardware necessary for the system to function as required. In addition, the Contractor shall provide all cabling components for the interconnection of system equipment and connection to Contractor provided LED processing equipment and controllers in the designated IDF.
- 1.2.19 Maintenance and support services as specified in the RFP documentation Attachment A – sections 17 and 18.
- 1.2.20 System warranty and warranty management
- 1.2.21 Operations and maintenance training
- 1.2.22 The Contractor shall deliver as-built drawings and documentation according to specifications found in HAS CAD/Geospatial Data Standards and documentation
- 1.3 The Contractor shall provide the highest standards of service prevailing in the industry. These standards will be achieved by continuous improvement through open communication with HAS and the OAR, regular management reviews, and industry guidelines.
- 1.4 At any time throughout the contract term, the dynamic environment in which HAS operates may require the addition or deletion of devices, peripherals, etc. The Contractor shall be required to adjust its solution to address these needs at the direction of HAS in order to ensure a high level of service is provided at the facilities operated by HAS.
- 1.5 Contractor shall be responsible for providing safe, cost effective and high-quality services using qualified and properly trained employees and shall carry out all the responsibilities under this contract with the fact that he/she has been covenanted a public function which he/she performs as an independent contractor for the City. All services shall be in accordance with the highest standards prevailing in the industry, as well as applicable codes, rules, regulations, laws, and practices governing the said services. For more information, the specifications applicable to this contract may be found on the fly 2 Houston website at <https://www.fly2houston.com/biz/resources/building-standards-and-permits>.

2.0 Oculus Physical Specifications

- 2.1 The following section outlines the Oculus design and architectural specifications.
- 2.2 The Oculus is an elliptical shaped cylinder, in the form of a truncated cone, made up of direct view LED panels. It will be integrated into the space separating the lower-level arrivals and upper-level departures of the ICP.



Figure 1 - Oculus rendering, this is an architectural rendering, not necessarily indicative of type of content desired

- 2.3 Oculus dimensions and viewing angles
 - 2.3.1 The surface area of the Oculus is approximately 2000ft². The height of the screens is approximately 9ft and is angled down at approximately 30 degrees.
 - 2.3.2 The Oculus design is based on three separate concave radii, as depicted in the drawing set at the end of Attachment A. Assuming a 30-degree angle to the floor, the top and bottom radii that make up the Oculus are as follows:
 - 2.3.2.1 Short End = 9ft top, 12.5ft bottom
 - 2.3.2.2 Transition Section = 25.8ft top, 29.3ft bottom
 - 2.3.2.3 Middle Section = 86.4ft top, 89.9ft bottom
 - 2.3.3 Based on an average height of 5'6", multiple viewing distances have been considered for the optimal viewing experience.

- 2.3.3.1 The pixel pitch required for the ideal resolution is based on a minimum viewing distance of 15 feet.
- 2.3.3.2 Although the downward angle of the Oculus lends itself to maximum viewing from the lower arrivals level, consideration should be taken for viewers on the departures level (upper level).
- 2.4 The Oculus has been designed to be an integral of the architecture of the terminal. The chosen LED display system provider is expected to provide input on the structural requirements for the proposed LED display technology and to ensure an aesthetically pleasing integration.
- 2.5 The Contractor is responsible for validating the exact surface area and dimensions of the Oculus based on the proposed display system as changes to the above requirements may arise as a result of design collaboration discussions between the Contractor, the OAR, HAS, and the CMS contractor, to be determined during the design phase of the project.
- 2.6 Refer to the drawing set at the end of Attachment A for details on the shape and viewing angles of the Oculus and for additional information.

3.0 Content Development and Management

- 3.1 A Content Production Company (CPC), to be chosen through a separate RFP, will provide the creative content to be displayed on the Oculus. At the time of release of this RFP, the following specifications were given to the CPC for production of content for the Oculus:
 - 3.1.1 LED display input(s), and related content being developed by the CPC, shall support seamless and time-synchronized display of singular content covering the entirety of the uniquely shaped Oculus.
 - 3.1.2 In the event that content must be broken out into multiple video inputs, the entirety of the system, including content management, content distribution, and LED displays, shall be capable of frame-to-frame synchronization and pixel-to-pixel mapping to achieve a seamless appearance once displayed.
 - 3.1.3 Capability to support input video sources with a minimum resolution of 4K/UHD at 60Hz, 10bit color depth, uncompressed codec, and minimum 4:2:2 chroma subsampling. If available, provide optional support for 4:4:4 chromatic subsampling from source to LED tiles. Ability to support 4:4:4 shall not limit other input source specifications.
 - 3.1.4 System shall support high dynamic range (HDR10 or similar)
 - 3.1.5 System shall have a color gamut of 100% NTSC or better
- 3.2 A Content Management System (CMS) contractor, to be chosen through a separate RFP, will provide the network and management equipment required to connect the display technology described in this RFP to the HAS system.
 - 3.2.1 Refer to the drawing set at the end of Attachment A for additional information on the current CMS design. Details to be finalized with the CMS contractor during design development.

4.0 LED Tile Specifications

4.1 The LED tiles and display assembly must meet the following specifications:

4.1.1 Front accessible, indoor, SMD LED tile product in the 1.5-2.0mm pixel range for the viewing distances as noted in section 2.0, with a minimum distance of 15ft

4.1.2 Fit the complex concave surface described in 2.0 with a minimum radius of 9ft

4.1.2.1 To achieve the minimum radius of 9ft, multiple pixel pitches of the same LED tile product line may be utilized, if necessary, with the requirement to maintain a smooth and seamless overall display surface.

4.1.2.2 Less customized and more off-the-shelf products are preferred as it relates to a reduction in cost for maintenance and tile refurbishment.

4.1.3 Viewing angle: minimum horizontal viewing angle of 160 degrees and minimum vertical angle of 170 degrees

4.1.4 Color depth: minimum color depth of 10 bit / with high dynamic range (HDR10 or similar)

4.1.5 Image refresh rate: 3840 Hz or greater

4.1.6 Contrast ratio: 6000:1 or greater

4.1.7 Color gamut: wide color gamut of 100% NTSC or better

4.1.8 Minimum Brightness: 700 nits

4.2 In addition to the above requirements and those listed in RFP section 8.6.3, the Contractor shall provide the following specifications for the proposed technology:

4.2.1 Average brightness

4.2.2 Individual tile dimension

4.2.3 Module weight

4.2.3.1 Due to the unique nature of the Oculus, customized LED tiles are anticipated. Provide typical tile dimensions and weight sufficient to convey the average physical specifications of custom tiles.

4.2.4 Maximum enclosure depth

4.2.5 Maximum and average power consumption

4.2.6 Maximum and average heat generation

4.2.7 Range of operating temperatures

4.2.8 Ventilation and heat dissipation clearance and options for supplemental ventilation

4.2.8.1 Unless otherwise defined, the product should be passively ventilated using ambient air and should not overheat and fail. Supplemental mechanical ventilation will require approval from HAS and the OAR.

4.2.9 Color temperature accuracy across different brightness levels (0%, 30%, 60%, 100%)

4.2.10 Life expectancy

4.2.11 For the complete list of requirements, see Attachment E – Required Specifications Response Form.

5.0 LED Processing Specifications

5.1 The LED processors and transmission equipment must be able to adequately execute the following:

5.1.1 Accept multiple high resolution video inputs and combine inputs to form a continuous image to support full resolution of the Oculus with no distortion

5.1.2 Accept a sync signal and integrate multiple video inputs to form a continuous image on a large display surface

5.1.3 Support network-based, third-party control

5.1.4 Support 4K/UHD at 60 frames per second inputs with one-to-one pixel mapping from video signal to LED display

5.1.5 Support input video sources with a minimum resolution of 4K/UHD at 60Hz, 10bit color depth, and minimum 4:2:2 chromatic subsampling, HDCP 2.2 support and EDID management, with sufficient inputs to support the full resolution of the Oculus.

5.1.5.1 If available, provide optional support for 4:4:4 chromatic subsampling from source to LED tiles. Ability to support 4:4:4 shall not limit other input source specifications including resolution, frame rate, HDR, and/or color depth.

5.1.6 Support dynamic dimming of LED tiles based on fluctuations in ambient lighting conditions.

5.1.7 Support High Dynamic Range (HDR) capabilities (HDR10 or similar) that maintain image dynamic range across all brightness levels. The LED solution (LED tiles and controllers) shall have the ability to manage color gamut, adjust dynamically based on external conditions, and present sufficient color/grayscale gamut necessary to display a high-quality image with no visible banding.

5.1.8 Deliver a smooth image and exhibit low latency throughout the entire video distribution pipeline, adjusting overall latency to accommodate high-latency devices or inputs.

5.1.9 Support pixel-level brightness and chroma calibration

5.1.10 Support remote access to brightness and gamma control

5.1.11 Color gamut: 100% NTSC or better

5.1.12 Deliver a smooth image and exhibit low latency throughout the entire video distribution pipeline, adjusting overall latency to accommodate high-latency devices or inputs.

5.2 LED products are expected to be, among other factors, of expert design and high fabrication quality.

6.0 System Redundancy Requirements

6.1 While the Oculus is not critical to the operation of the airport it is nonetheless critical to the passenger experience and reputation of the Houston Airport System. The resulting design of the LED displays, active system equipment, and passive infrastructure shall deliver an operational system with limited vulnerability to partial or full system failure.

6.1.1 Minimally the proposed solution shall meet the baseline redundancy requirements identified below. In addition, respondents shall provide an add-option to provide a solution meeting the optional redundancy requirements. RFP respondents shall provide detailed descriptions of how the baseline and optional requirements will be met.

6.1.1.1 RFP respondents are encouraged to submit/highlight additional redundancy capabilities beyond those identified below.

6.2 Baseline Requirements:

6.2.1 The failure of a single LED tile shall not impact the operation of any adjacent/connected LED tiles. In the event of a LED tile failure the surrounding display tiles shall continue to operate.

6.2.2 LED processor(s) must have redundancy capabilities, such as redundant inputs/outputs, redundant and hot-swappable power supplies, and output loops for processor-to-processor redundancy.

6.3 Optional Requirements:

6.3.1 Full redundancy for all critical system components and infrastructure providing video content and control to the display wall and between individual tiles. The loss of a single unit shall not negatively impact the operational capacity of the overall system.

6.3.2 Support redundant media inputs. In the event of a failure of the primary media server the system shall automatically and seamlessly switch to the backup server.

6.3.2.1 Media servers and content to be provided by others.

7.0 Electrical Specifications

7.1 As part of design development and coordination, the Contractor is expected to:

7.1.1 Provide suggested LED panel/tile electrical characteristics (volts, amps, phase, watts)

7.1.2 Recommend power distribution requirements, including outlet positioning, as necessary, along multiple locations/curvature of Oculus, if the overall size, shape, or electrical characteristics are differing

7.1.3 Provide typical details of suggested wiring, both between LED panels and back to the electrical source

7.1.4 Provide power requirements for any field-mounted equipment beyond the LED panels (i.e., media converters, time sync equipment, etc.)

- 7.1.5 Provide power requirements for equipment cabinets/components located remote from display area
- 7.2 Provide electrical power distribution including conduits, cabling, and other electrical components required for a fully functional Oculus in compliance with the approved design and any regulations/codes
 - 7.2.1 Provide electrical distribution, including conduit, cables, cable pulling, cable termination, and other power distribution components required to ensure connection from the LED display and any related active field-mounted equipment to designated power distribution panels. The electrical distribution shall result in a fully functional Oculus as indicated on an approved design and in compliance with HAS regulations, codes, and standards.
- 7.3 Provide all interface wiring / components between panels and back to power source.
- 7.4 Provide required spare parts for any electrical power
- 7.5 The following are descriptions of the planned electrical power infrastructure available to support the Oculus and related equipment.
 - 7.5.1 Dedicated 225A, 3 phase 208/120V electrical distribution panel (L1B1-V) in Electrical Room F.C101.4. Includes one (1) 3" empty conduit routed up the wall in the electrical room.
 - 7.5.2 Space for three dedicated equipment cabinets in IDF B.06. Cabinets to be provided by CMS Contractor.
 - 7.5.3 Existing UPS 2 phase 208/120V electrical distribution panel (UBE2) supporting IDF B.06 with 19 open single pole breaker positions
 - 7.5.4 Refer to the drawing set at the end of Attachment A for additional information. The drawing set provided is the most up to date at the release of this RFP. The LED display design is not final and the chosen contractor is expected to coordinate with the OAR to make modifications as necessary to accommodate the chosen LED display technology for the fabrication of required shop drawings.
- 7.6 All IDF/MDF power to be fed from Uninterruptible Power Supply (UPS) supported panels and circuits in the event of a power failure. UPS and related distribution panels provided by others and considered existing. Coordinate load on UPS with ITRP. Unless noted otherwise, all power distribution outside of the telecommunication spaces shall be considered normal power not supported by emergency generator or UPS.
 - 7.6.1 The proposed design and resulting system architecture shall take into account the lack of UPS-supported power distribution supporting field mounted equipment, including the LED tiles. Any field-mounted equipment must be invulnerable to sudden power loss and return to normal operation under 30 seconds and without human intervention upon resumption of power.
 - 7.6.2 If a soft shutdown is required for specific field-mounted equipment, the Contractor shall provide adequate uninterruptible power supplies (UPS) to support the orderly shutdown of this equipment in addition to the base building UPS that will be

provided in the IDF. This shall be coordinated with ITRP during the design phase of this project.

- 7.6.3 All decisions regarding UPS loads must be coordinated with and reported to the OAR, HAS and ITRP.
- 7.7 Electrically powered equipment shall be UL or other Nationally Recognized Testing Laboratory (NRTL) approved.
- 7.8 The Contractor shall notify HAS and the OAR of any partnerships hired to complete the installation of this portion of the scope of work and shall be responsible for the management of the electrical installation from the LED tiles to the LED processors.

8.0 Low Voltage Specifications

- 8.1 As part of design development, installation, and coordination, the Contractor is expected to:
 - 8.1.1 Provide suggested LED panel/tile communications cabling requirements (cable type, quantity, termination location, etc.)
 - 8.1.2 Provide typical details of suggested wiring, both between LED panels and back to the communication equipment room or local active video distribution and control equipment.
 - 8.1.3 Provide communication cabling requirements for any field-mounted equipment beyond the LED panels (i.e., media converters, LED processors, time sync equipment, etc.)
 - 8.1.4 Provide communication requirements for equipment located within cabinets in the communications equipment room(s).
 - 8.1.5 Coordinate all IAH/HAS common network connection requirements with HAS IT.
- 8.2 Provide communication and low voltage distribution including conduits, cabling, and other components required for a fully functional Oculus in compliance with the approved design and any regulations/codes
 - 8.2.1 Provide communication and low voltage distribution, including conduit, cables, cable pulling, cable termination, and other communication distribution components required to ensure connection from the LED display and any related active field-mounted equipment to head end equipment located in communication equipment room. The distribution shall result in a fully functional Oculus as indicated on an approved design and in compliance with HAS regulations, codes, and standards.
 - 8.2.1.1 Contractor shall be responsible for all equipment, cabling, and pathways connecting the field-mounted equipment, including the LED tiles, to head end equipment in the designated communications equipment room IDF B.06. This includes fiber and/or copper data cabling as well as extending IAH/HAS common network out to field devices as needed.
 - 8.2.1.2 Contractor shall be responsible for providing a means of mounting all field-mounted equipment. Equipment supporting the Oculus display shall be hidden from view and blend in with surrounding architecture. Coordinate any additional mounting locations and requirements with ITRP Contractor.

- 8.2.2 Provide communication and low voltage distribution, including conduit, cables, cable pulling, cable termination and other communication distribution components from IAH/HAS network equipment in IDF B.06 to any networked equipment located in three (3) dedicated equipment cabinets in IDF B.06. Equipment cabinets to be provided and installed by the CMS Contractor.
- 8.3 Provide required spare parts for any data distribution
- 8.4 The following are descriptions of the planned communication infrastructure available to support the Oculus and related equipment.
 - 8.4.1 One (1) 4" empty conduit routed from the vicinity of the Oculus opening to IDF B.06 on the lower level.
 - 8.4.2 Three dedicated equipment cabinets in IDF B.06.
 - 8.4.3 Existing IAH/HAS network connectivity available in IDF B.06.
 - 8.4.4 Refer to the drawing set at the end of Attachment A for additional information. The drawing set provided is the most up to date at the release of this RFP. The LED display design is not final and the chosen contractor is expected to coordinate with the OAR to make modifications as necessary to accommodate the chosen LED display technology for the fabrication of required shop drawings.
- 8.5 The Contractor shall notify HAS and the OAR of any partnerships hired to complete the installation of this portion of the scope of work and shall be responsible for the management of the communication infrastructure installation from the LED tiles to the LED processors.

9.0 Tertiary Structure Design

- 9.1 As part of the design portion of the work, the Contractor shall:
 - 9.1.1 Design a tertiary structure to support and attach individual LED tiles
 - 9.1.1.1 The primary structure will be the base building ICP and will be provided as part of the construction work of ITRP
 - 9.1.1.2 The secondary structure, also provided by ITRP, will attach to the base building and support the mounting equipment of the display technology
 - 9.1.1.3 The tertiary structure is defined as any structural elements required to support the LED tiles and their attachment to the secondary structure
 - 9.1.2 Incorporate operational requirements (e.g., maintenance access) into the design
 - 9.1.3 Provide loads, connections, or routing means and calculations for review and approval by HAS. Where approved design changes are made, updates to this data must be submitted.
 - 9.1.4 Provide calculations validating the structural components, including flexibility and rigidity
- 9.2 To provide these services, the Contractor shall participate in design workshops with HAS and/or their OAR to develop, review, and finalize all functional and technical requirements. The final project plan shall conform to all HAS IT and ITRP requirements.

9.3 Provide detailed engineering shop drawings stamped by a licensed Engineer, authorized to work in the State of Texas.

9.4 Refer to the drawing set at the end of Attachment A for more information.

10.0 Drawings

10.1 The Contractor is responsible for adhering to requirements pertaining to drawing creation and submittal, including:

10.1.1 Reviewing and updating drawings based on ongoing technical advice as it pertains to the design and integration of their product.

10.1.2 Preparation of shop drawings for the Oculus coordinated through the OAR, the ICP construction documents, and the architectural space.

10.2 All drawings should be completed using Revit and delivered in Revit and AutoCAD files.

11.0 Mock-Ups

11.1 Mockups are full size physical assemblies, constructed at an off-site location. Mock-ups shall consist of a section or part of the feature, demonstrating specific aspects of design intent.

11.2 Mock-ups shall be constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, material qualities and methods of execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances.

11.3 Mock-ups shall not be used for final installation or be used as samples; nor are they to be provided in lieu of sample submittals. Unless otherwise indicated, approved mock-ups will establish the standard by which the Work will be judged.

11.4 All Mock-up shall be:

11.4.1 Constructed at an approved facility in the Houston area for review and approval by the OAR, and Director and/or designee

11.4.2 Incorporated into the proof-of-concept pre-installation testing phase of the project

11.4.3 Fully integrated sections of the Oculus consisting of multiple products, assemblies and sub-assemblies

11.4.4 Full-size, physical assemblies of a section or sub-assembly of the feature, suitable for testing and verification of required performance per specified requirements

11.5 Provide mock-up of the Oculus, including the surrounding frame that make up the tertiary structure and LED tiles at the assembly location as indicated in the drawing set at the end of Attachment A. Diagrams are illustrative of section(s) of the Oculus to be mocked up for reference only, and must be updated using final approved shop drawings to demonstrate the following requirements of the design intent:

11.5.1 Fit within the architectural space, specifically the placement and transition between the LED display and surrounding interior surfaces, from both top and bottom.

Simulate architectural finishes. Simulate wall and floor to demonstrate fit and transition

- 11.5.2 Section between varying concave curvature radii including the steel edge of the displays, sub-frames, and all visible hardware viewed from the side and below, meets the design intent
- 11.5.3 Attachment of LED tertiary substructure to the truss including all visible hardware/attachments and internal attachments
- 11.5.4 Attachment of LED display to tertiary substructure
- 11.5.5 Electrical distribution system, including junction boxes, access for cable pulls, structural reinforcements, and any other component
- 11.5.6 Low voltage distribution system, including junction boxes, access for cable pulls, structural reinforcements, and any other component
- 11.5.7 LED power and data cabling and related hardware attachment to substructure, cable and conduit support, and proposed connections to power and data infrastructure
- 11.5.8 Wire management between tiles and from tiles to proposed connections to power and data infrastructure
- 11.6 After approval of physical LED tile installation mock-up, LED display system provider shall deploy the integrated mock-up, with a section of the LED tile or sample LED wall, to demonstrate the following requirements of the design intent:
 - 11.6.1 A clear and consistent image, using test content provided by the Content Production Company
 - 11.6.2 A seamless appearance of the image as it relates to concavity and tilted LEDs when displaying test content
 - 11.6.3 No noticeable seams in the concave LED at transition points between varying curvature radii using test content
 - 11.6.4 Evaluation of viewing angles at key vantage points with test content
 - 11.6.5 Evaluation of color blending (absence of pixelization) at distances representative of passenger departure and arrival viewing positions with test

12.0 Installation

- 12.1 The Contractor shall be responsible for providing the following related to the LED installation:
 - 12.1.1 Fabrication of the LED tiles and delivery of all display technology equipment and cabling to an authorized on-site location in alignment with an approved schedule and the ICP construction schedule.
 - 12.1.2 Installation of a tertiary structure to support and attach individual LED tiles to the base building.
 - 12.1.3 Installation of LED panels and other supporting hardware by a professional licensed to work in the state of Texas.

- 12.1.4 All required hardware components and cables to provide connection between devices and the CMS that are required for a complete, fully functional system.
- 12.1.4.1 CMS Contractor shall provide all necessary patch cords and cables to connect media sources to the LED processors.
- 12.1.5 Rack mounting and cabling of all LED processors in ICP computer equipment rooms.
- 12.1.5.1 Alternative mounting locations and infrastructure architectures may be proposed by bidders. Contractor shall be responsible for all additional works necessary to support alternative infrastructure.
- 12.1.6 All required equipment beyond the structural, electrical, and IT technology demarcation points indicated on the Oculus drawings to achieve quality integration at installation.
- 12.2 The Contractor shall verify system operability and proper installation via completion of all required test plans.
- 12.3 All installation work shall be performed in a manner that will minimize disruption to the airlines, HAS, and the travelling public. The Contractor shall coordinate with the OAR to schedule any work in public areas during times that minimize impact to operations.
- 12.4 The Contractor is responsible for following all safety rules and guidelines as it pertains to an active construction site. Coordination through the OAR will be required to maintain compliance with rules enforced by the construction contractor.
- 12.4.1 All personnel requiring access to the job site shall complete a mandatory minimum of 10 hours of OSHA safety training before access will be permitted. This training will be provided by ITRP and will not be at a cost to the Contractor. Coordination with the OAR and ITRP shall be required.
- 12.5 The Contractor shall be responsible for any changes to the LED display technology components if requirements are identified during coordination efforts with ITRP.
- 12.6 The Contractor is responsible for blending of finished edges with the surrounding architecture to achieve seamless integration of the display technology with the existing architectural elements and design finishes.
- 12.7 Refer to Section 23 – General Installation Requirements for additional requirements.

13.0 Integration

- 13.1 The Contractor shall provide all LED processor display programming, configuration, data distributors, and support services required for a fully functional Oculus.
- 13.2 The Contractor shall configure and program the LED processors as required to apply the required pixel mapping, communicate with control signals from the CMS, communicate the appropriate video signals, and any other service required to fully support the technology and integration with the CMS, including but not limited to adjustments for lighting and environmental conditions.

- 13.3 On-site Oculus-specific calibration is required to determine capabilities and constraints of the system. If the system does not perform as expected, the Contractor shall manage all required testing and refinement of the display technology.
- 13.4 The Contractor shall perform all necessary coordination with third party vendors, such as the CMS contractor and CPC to ensure all components are properly implemented.
- 13.5 The Contractor shall provide on-site staff for the integration of the display technology with the CMS. Project management and required expertise is required to test and adjust all CPC created capsules in accordance with the opening of the ICP and most current project schedule, and with the other chosen vendors. Some on-site testing shall have to be completed during non-business hours and/or on weekends.

14.0 Testing and Commissioning

- 14.1 Commissioning of the Oculus shall be managed and coordinated with the CMS contractor, the CPC, and the OAR. Prior to the start of commissioning, a schedule shall be submitted to the OAR and HAS for review and approval.
- 14.2 The Contractor is responsible for project management and testing of all required LED products for a fully operational system, including tiles, processors and equipment terminating in the designated IDF.
- 14.3 Field testing protocols should be submitted for review and approval by HAS.
- 14.4 Preliminary tests should be conducted before applying to HAS for official tests.
- 14.5 The following tests are expected to be performed:
- 14.5.1 Proof of concept/factory acceptance testing for all fabricated LED products, with prior approval of the testing procedure from HAS to confirm the equipment has been manufactured in accordance with all drawings, specifications, and requirements.
- 14.5.1.1 Refer to Section 11 – Mock-Ups for further information on pre-installation proof of concept testing and demonstration.
- 14.5.2 Functionality and Performance Site Acceptance Testing for an assembled and complete solution, including any acceptance testing and validation of physical dimensions and specified criteria. Participation in on-site Site Acceptance Testing is to be coordinated with the ICP construction schedule and is mandatory following commissioning of the Oculus display technology.
- 14.5.2.1 Performance verification testing includes testing of the entire multimedia system, including the LED display technology, Content Management System (CMS) (by the CMS contractor) and content (by the Content Production Company) following installation and commissioning of all LED display technology, CMS and content.
- 14.5.2.2 As part of Site Acceptance Testing, the Contractor is required to do a full calibration of the LED display technology, including but not limited to display stability, brightness, color, and edge-blending. The system will not be accepted until all requirements for a seamless display have been met.

14.5.3 Participation in an operational testing period of approximately two (2) weeks is required as endurance testing, during which time the Content Management System (CMS) and produced content will be adjusted in accordance with calibration requirements of the Oculus. Some testing may occur after the official opening of the ICP.

14.6 Refer to Section 25 – Testing and Acceptance Requirements for further information.

15.0 Support, Recommendations, and Coordination

15.1 The Contractor shall provide all necessary project management, recommendations, and coordination with the OAR, the CMS contractor, and the CPC to support the work of HAS in achieving the intention and design requirements of the Oculus. Specialized knowledge and industry experience is expected to provide the following:

15.1.1 Recommendations for adjustments on the provided drawing set based on the LED display technology product specifications:

15.1.1.1 For the shape of the Oculus (e.g., seamless curvature of displays; options for sub-frame attachment, etc.).

15.1.1.2 For integration of design components (e.g., attachment to existing structures, compliance with regulations, etc.).

15.1.2 Determinations of technical functionality (e.g., contrast optimization; luminous output requirements; dynamic luminance control; power requirements)

15.1.3 Confirmation of functional requirements of the display technology infrastructure (i.e., ventilation, lighting requirements, structural support, electrical power, data infrastructure, and similar).

15.1.4 Confirmation of infrastructure requirements - such as power, data, and communications – to the OAR in relation to the proposed display technology and product specifications.

15.1.5 Coordination of integrated design components, including any architectural finishes, to ensure seamless integration of the Oculus into the environment.

15.1.6 Coordination and creation of shop drawings with all construction documents.

15.1.7 Coordination with the Oculus CMS contractor and CPC.

15.1.8 During installation, commissioning, and testing of the CMS by the CMS contractor and content integration by the CPC, the LED display system provider is expected to ensure functional connectivity and correct operation of the LED display technology, providing appropriate on site personnel and project management.

15.1.9 Validation of optimal display technology performance based on passenger viewing distances and circumstances.

15.1.10 Coordination and installation that must align to the ICP construction schedule.

15.1.11 Protective measures and precautions required to ensure that the LED display technology will be without deterioration or damage at time of substantial completion.

15.1.12 Other coordination as required.

16.0 Personnel

16.1 The Contractor shall assign a project manager that reports to HAS to support the specific coordination requirements associated with the LED installation.

16.2 All personnel assigned to work under the Agreement shall have the required certifications where required. Personnel shall also hold a current and valid license for the work they are engaged to perform.

16.3 If Contractor is not able to find qualified personnel, contractor must submit resumes and references of suggested personnel for HAS to approve.

17.0 Operations, Maintenance, and Turnover

17.1 All operational manuals, warranties, service agreements, including maintenance and operational support agreements are expected to be handed over to HAS within 15 days of successful completion of the operational testing period. Training required on the operation, care, and maintenance of the display technology and any related operational requirements must be given to the HAS operational team.

17.2 Upon acceptance of the display technology, the Contractor shall begin:

17.2.1 Warranty as specified in the Agreement and approved Warranty Plan

17.2.2 Maintenance and support services as specified in the approved Maintenance Plan

17.3 All equipment, software licenses, and appurtenances shall be the property of HAS once substantial completion of each installation has been completed.

17.4 Contractor shall be responsible for providing safe, cost effective and high-quality services using qualified and properly trained employees and shall carry out all the responsibilities under this contract with the fact that he/she has been covenanted a public function which he/she performs as an independent contractor for the City. All services shall be in accordance with the highest standards prevailing in the industry, as well as applicable codes, rules, regulations, laws, and practices governing the said services.

18.0 Warranty

18.1 Provide standard warranty agreements for review and acceptance with a total of three (3) years parts and labor at no cost to HAS. Provide extended warranty options in one (1) year increments

18.2 The starting point for the warranty shall be from final system acceptance.

18.3 Hardware Warranty

18.3.1 All hardware shall have a minimum warranty of three (3) years.

- 18.3.2 Hardware warranty replacement and repair shall be considered inclusive of all labor, materials, shipping, rentals, and hardware necessary to service the defective equipment and return the system back to fully operational status.
- 18.3.3 The warranty shall allow for replacement or repair of failed items at the discretion of HAS.
- 18.3.4 Warranty hardware replacement for items not included in spare parts shall be delivered to the Airport within 72 hours.
- 18.3.5 Warranty hardware replacement for items included in spare stores shall be delivered to the Airport within ten (10) business days.
- 18.3.6 Warranty hardware refurbishment for items included in spare stores shall be delivered to the Airport within ten (10) business days.
- 18.3.7 All LED tiles should be refurbished when possible.
- 18.3.8 Individual pixels shall be covered under the warranty and not subject to a percentage of failure and/or failure rate relative to the overall pixel quantity. An individual pixel failure shall constitute a warranty replacement or repair.
- 18.3.9 During the warranty period, replacement parts are not to be taken from stock when feasible but replaced immediately if it is unavoidable.
- 18.3.10 Refurbished parts shall be placed into shelf stock.
- 18.3.11 Certain repairs can be done in a designated area on site with prior approval from HAS.
- 18.3.12 If any equipment experiences a rate of failure over 25% it is considered a defective part and must be entirely replaced.
 - 18.3.12.1 Rate of failure is defined as a percentage of failure of a set of devices over a duration of two (2) months. For example, if a given part installed in ten locations fails more than three times or more in the noted duration, all ten devices shall be replaced. Failures are counted per device or per instance of an individual device failure.
 - 18.3.12.2 Exemptions may apply to devices that have system-wide quantities at or below four.
 - 18.3.12.3 Rate of failure replacement shall not supersede or inhibit applicable warranty service for a given individual device. Any individual device failure shall be replaced or refurbished under the applicable warranty terms regardless of rate of failure.
 - 18.3.12.4 Individual components or devices shall not be refurbished more than two (2) times during the warranty period. Any equipment or device, including LED tiles, failing more than two times shall be replaced with new.
- 18.3.13 Warranty plans must involve strategies to limit impact to the overall system. As such, warranties for LED tiles may differ from other equipment, such as LED processors. Contractor shall clearly identify any difference between warranty of specific devices and equipment compared to the overall system and warranty requirements as stated herein.

18.4 System Failure Definitions

- 18.4.1 Inoperative: A device shall be considered inoperative when the device does not perform its intended function(s) within defined performance criteria. Response services shall include inspections and necessary tests to determine the causes of equipment or software malfunction or failure. The failure services shall include the furnishing and installation of components, parts, or software changes required to replace malfunctioning system elements.
- 18.4.2 Operational Failure – Defined as a user interface end device that is inoperative. Operational failure may impact the ability of the end user to modify operations of the Oculus but does not cause any direct failure of the Oculus to display content.
- 18.4.3 Critical Failure – Defined as a redundant head end component that is inoperative or when a system failure results in ten percent (10%) or less LED tiles being inoperable. A Critical Failure does not impact the remainder of the Oculus to display content and operate normally. Additionally, the fourth and subsequent occurrence of an operational failure with the same root cause shall be deemed a critical failure.
- 18.4.4 Emergency Failure – Defined as a head end failure that results in the Oculus display being inoperative or when more than ten percent (10%) of the display tiles are inoperative. Additionally, the fourth and subsequent occurrence of a critical failure with the same root cause shall be deemed an emergency failure. A formal report shall be submitted to HAS on the cause and resolution of the problem. Resolution shall not be considered formally complete until written approval is provided by HAS.
- 18.4.5 Pixel Failure – Defined as a failure of an individual pixel on any given LED tile. There shall be no minimum percentage of failed pixels necessary to constitute warranty replacement and/or refurbishment of the affected LED tile(s). The manufacturer warranty for the LED tiles shall cover individual inoperable pixels and not be limited to a minimum pixel failure rate.

19.0 Out of Scope

- 19.1 The Contractor is not responsible for the following items:
- 19.1.1 Design or construction of the communications rooms that will be used to house the Oculus LED display technology equipment. However, dedicated equipment cabinets and any unique mounting equipment to support installation in the cabinets shall be provided by the Contractor.
- 19.1.2 The cabling infrastructure (with the exception of network patch cords) that will be used to interconnect LED panels and processor components with the Content Management System and related media servers. This includes all fiber optic backbone cabling, copper backbone cabling, horizontal cabling, communications room hardware, termination blocks, patch panels, and telecommunication outlets. However, the Contractor shall be responsible for performing coordination with the OAR to ensure the physical connectivity requirements are in place and identifying any new requirements for cabling installations.
- 19.1.2.1 The Contractor will be responsible for providing all necessary patch cords to connect relevant equipment to the IA/HAS common network.

- 19.1.3 Design or construction of the IAH/HAS common network including backbone connectivity to the communication room and active network equipment providing fiber and/or copper data ports available to Oculus networked equipment. However, coordination by the Contractor shall be required to identify equipment network requirements and ensure adequate network connections and bandwidth are available. In addition, the Contractor shall be responsible for providing any and all network connectivity required by remote/field mounted devices outside of communication equipment rooms.
- 19.1.4 Design or construction of the electrical distribution panel and related UPS supporting the communications rooms. However, coordination by the Contractor shall be required to identify equipment power requirements and to ensure adequate power is available.
- 19.1.5 Design or construction of the electrical distribution, including conduit, cables, cable pulling, cable termination and other power distribution components from existing UPS panel in IDF B.06 to three (3) equipment cabinets.
- 19.1.5.1 Each cabinet will be fed from two separate 208VAC 30A branch circuits, each capable of supporting the full load of the cabinet.
- 19.1.5.2 Each cabinet will include two (2) HAS standard power distribution units (PDU) per cabinet, each fed by a dedicated 208VAC 30A circuit.
- 19.1.5.3 Branch circuit and resulting per-cabinet power capacity are preliminary. LED display system provider shall coordinate with the CMS Contractor and ITRP Contractor to finalize requirements.
- 19.1.6 Design or construction of electrical distribution panel (L1B1-V) in Electrical Room F.C101.4 supporting the Oculus LED tiles and other related field-mounted equipment. However, coordination by the Contractor shall be required to identify field-mounted equipment power requirements and to ensure adequate power and circuit breaker space within the panel(s) is available.
- 19.1.7 The CMS Contractor shall be responsible for the providing equipment cabinets in IDF B.06 meeting HAS IT standards and including Power Distribution Units (PDU) supporting all Oculus equipment. The LED display system provider shall be responsible for coordinating head end equipment cabinet and power requirements.
- 19.1.8 The creative development of content, capsule power production, post-production, and creation of content inventory.
- 19.1.9 Management of the multimedia content, integration of content capsules and content inventory into the content management system, video playback servers, and CMS control and monitoring equipment.

20.0 System Standards

20.1 General

- 20.1.1 The standards in the following sections apply to the entire LED display technology and its associated systems unless otherwise noted.
- 20.1.2 Each individual system and application provided shall meet these standards as a minimum.

20.1.3 The LED display technology shall properly present a full spectrum of media content using dynamic scanning technology and present a stable, clear image.

20.2 Functionality

20.2.1 The Contractor shall ensure that the LED display technology operates as intended in the environment, that it does not overheat and fail.

20.2.2 The Contractor shall provide all protections against product malfunction due to overheating, including but not limited to temperature sensors, hardware and software solutions, governors, and programming.

20.3 Materials

20.3.1 Cabling shall match requirements of HAS codes and standards. Any deviation will require written approval.

20.3.2 The Contractor shall provide any hardware required to attach LED products if not already integrated.

20.3.3 Fasteners shall be in compliance with code and HAS standards. No fasteners should be visible to the furthest extent possible.

20.4 The installation of the display technology in view of the public shall be aesthetically pleasing and integrate with the existing architecture.

21.0 Project Submittal Requirements

21.1 General

21.1.1 The Contractor shall keep accurate and detailed records of progress on the project during all stages of development and implementation.

21.1.2 The Contractor shall notify HAS in writing of any anticipated changes to the project schedule, including information where schedule slippage may occur or has already occurred, and the Contractor's recommendation to mitigate or eliminate delays.

21.1.2.1 The Contractor shall provide status updates and progress reports as requested by the Director and/or designee noting any key work performed since previous update, upcoming key work to be performed, completion of any milestones, and updates to key phases of development and implementation.

21.1.3 The Contractor shall submit for review and evaluation by the Director and/or designee, product sheets of each major product and item. The Contractor shall not purchase or install an item prior to receipt of written approval from the Director and/or designee.

21.1.4 Major Items required for submittal are identified in the following sections. This list is not considered complete but is a representative sample of the major items required. Unless noted otherwise, a minimum of four (4) hardcopies and one (1) digital copy of all documentation shall be provided

21.2 Design Submittals

21.2.1 The Contractor shall provide finalized design technical criteria for the LED display technology, before the final Oculus network and infrastructure design is completed, for incorporation into the design.

- 21.2.2 The Contractor shall provide manufacturer shop drawings stamped by a Texas registered engineer for structural engineering requirements associated with the display technology and in accordance with HAS requirements.
- 21.2.2.1 Shop drawings are required to show finished dimensions and required clearances, radii, material finishes, electrical connections, mechanical fasteners and attachments along with fastener sizes and types, joint locations, and relationship to supports.
- 21.2.2.2 LED shop drawings must include physical and pixel dimensions for each LED tile product used. If any equipment provided has been customized or modified, provide a description and illustration for all customizations.
- 21.2.3 The Contractor shall prepare mechanical submittals as required indicating impact to the building and processes used for installation, including any related submittals required for coordination with the ICP base building. Plans should clearly show supporting calculations and be of sufficient detail to permit a complete understanding of the work.
- 21.2.4 The Contractor shall provide a complete product submittal, including all parts, equipment, materials, and related accessories along with shop drawings.
- 21.2.4.1 The Contractor shall include all product specifications, cut sheets, performance charts, and illustrations of the physical properties of the equipment within 7 business days after submittal and as requested by the Director and/or designee.
- 21.2.5 Final Design submittals include, but are not limited to:
- 21.2.5.1 Logic diagrams
- 21.2.5.2 Location plans illustrating equipment locations
- 21.2.5.3 Engineering drawings, stamped by a licensed Engineer, where applicable
- 21.3 Implementation Documents**
- 21.3.1 Unless otherwise outlined, implementation documents shall be submitted and maintained throughout the project or as requested by the Director or designee. These shall include, but not be limited to:
- 21.3.1.1 Installation and coordination plan
- 21.3.1.2 Factory Acceptance Test Plan
- 21.3.1.3 Functionality and Performance Site Acceptance Testing Test Plan
- 21.3.1.4 Endurance Test Plan
- 21.3.1.5 Acceptance Plan
- 21.3.1.6 End User Training Plan and Materials: Supply training plan and materials as defined in this specification.
- 21.3.2 Contractor shall submit a Project Baseline Schedule to be approved by HAS. The Baseline Schedule shall not change unless approved by HAS. The Baseline Schedule will be utilized for payment processing according to milestones completed. See Fee Schedule - Attachment B.

21.3.3 If Contractor does not meet the Project Baseline Schedule HAS shall apply Liquidated Damages as outlined in Section 34.

21.4 As-built Documents

21.4.1 At project closeout, provide HAS with as-built documentation in a timeframe as directed by the Director.

21.4.1.1 As-built shall include finalized equipment locations, room routing notes, and installation details. The as-built shall not be redlined copies, but be finalized Revit and AutoCAD drawings according to HAS specifications found in the HAS CAD/Geospatial Data Standards. The as-built shall build on the initial design details and further developed based on specific installation details.

21.4.1.2 A minimum of two (2) hardcopy sets and an electronic copy set of as-built documentation and drawings shall be provided. Acceptance of as built documentation shall be part of final system acceptance process.

21.4.2 Format of all documentation shall be approved by the Director and/or designee.

21.4.3 The Contractor shall submit certification that all work is in compliance with codes as required by HAS, including equipment manufacturing, fire ratings, field-testing and inspection.

21.5 System Administration Documentation

21.5.1 All manuals shall be provided in an electronic format. The format shall be a .pdf document that is searchable (i.e. the .pdf document will have recognized text that allows searches to be performed and is not a scanned image).

21.5.1.1 The Contractor shall provide system hardware and equipment part's list.

21.5.1.2 The Contractor shall provide training, warranty, support and maintenance plans.

21.5.2 Maintenance Manuals

21.5.2.1 All operational manuals, warranties, service agreements, including maintenance and operational support agreements are expected to be handed over to HAS after the operational testing period is completed successfully. Training required on the operation, care, and maintenance of the Display Technology and any related operational requirements must be given to the HAS operational team.

21.5.2.2 Manuals including maintenance instructions and other descriptive material as received from the manufacturers shall be provided that will enable designated personnel to maintain and test equipment.

21.5.2.3 As applicable, this documentation shall include descriptions, specifications, theory of operation, layout drawings (showing component types and positions), and back-panel and assembly wiring diagrams.

21.5.2.4 Instructions shall be provided for preventive maintenance procedures that include examinations, tests, adjustments, and periodic cleaning.

21.5.2.5 The manuals shall provide guidelines for isolating the causes of hardware malfunctions and for localizing faults.

21.5.2.6 The manuals shall provide instructions on the use of any specialized test equipment needed for hardware maintenance.

21.6 Quality Assurance Documents

21.6.1 The Contractor shall provide a quality assurance plan that describes the approach to maintain overall system quality throughout the project.

21.6.2 Equipment and materials: The Contractor shall provide standard products when possible, where there is routine manufacture of each of the required equipment types and shall be the manufacturer's latest standard design.

21.6.3 Provided products shall meet the following requirements:

21.6.3.1 Items of the same classification shall be identical. This requirement includes equipment, modules, assemblies, parts, and components

21.6.4 Any necessary structural work shall require final structural calculations to be validated by a structural engineer licensed in the State of Texas and will be based on shop drawing construction and fabrication details.

21.7 Warranty Documents

21.7.1 The Contractor shall provide a joint written warranty of the manufacturer(s) and the installer(s), on a single document. The warranty shall warrant complete installation of the equipment, system, and software to be free from defects in materials and workmanship for a period of no less than three (3) years.

21.7.2 Warranty shall list Houston Airport Systems (HAS) as the Owner. Contractor is to manage warranties on behalf of HAS.

21.7.3 The starting point for the warranty shall be from final system acceptance.

21.7.4 The Contractor shall provide extended warranty options in one (1) year increments.

21.7.5 All warranty elements, including durations and effective dates, apply to all goods and services provided under this Agreement.

22.0 Other Requirements

22.1 Spare Components and Parts Replacement: The Contractor shall provide, at the outset of the onsite testing, a store of consumables and spare parts as required. Those consumables and spare parts shall be available to the Contractor for use during the equipment demonstration test, warranty periods, and extended support period in order to maintain system response time criteria.

22.2 The Contractor shall replenish the store as it is used, so that at the end of the test and warranty periods, the store shall be equal to that initially provided. Based upon the maintenance experience of the warranty period, the Contractor shall recommend, at the end of the warranty period, any changes in spare component and small part stores that may prove to be appropriate. The Contractor shall maintain the spare component store during any extended support period.

22.3 Special Equipment: The Contractor shall supply a list of special tools, test equipment, and outside inventory required for this project. The Contractor may recommend specific items to facilitate long-term support of the system.

23.0 General Installation Requirements

23.1 General

- 23.1.1 System installation and construction methods shall conform to the requirements of HAS and local codes.
- 23.1.2 Where undefined by codes and standards, the Contractor shall apply a safety factor of at least 2 times the rated load to all fastenings and supports of system components.
- 23.1.3 The Contractor shall install all system components in accordance with the manufacturer's instructions, NEC, ANSI-C2 and shall furnish all cables, connectors, terminators, interconnections, services, and adjustments required for a complete and operable system.
- 23.1.4 Grounding shall be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.
- 23.1.5 For equipment mounted in drawers or on slides, provide the interconnecting cables with a service loop of not less than two feet and ensure that the cable is long enough to allow full extension of drawer or slide.
- 23.1.6 The Contractor's Quality Assurance Inspector shall conduct a visual inspection of all installations to verify that the installations are in accordance with HAS's and manufacturer's specifications. Records of the inspections signed and dated by the Quality Assurance Inspector shall be provided to the Director and/or designee. The Director and/or designee shall be notified at least 5 days prior to the inspection by the Contractor of any inspection(s) and the Director and/or designee may elect to participate in any inspection(s).
- 23.1.7 The Contractor shall be responsible for the patching of the horizontal cable runs at the equipment and within the associated communications room.
- 23.1.8 All products shall be new, undamaged, and covered by the original manufacturer's warranty and licensed as applicable to meet project intent.
- 23.1.9 Products shall be shipped, handled, and stored as recommended by the manufacture.
- 23.1.10 The Contractor shall furnish and install products in accordance with manufacturer's recommendations and as illustrated in the project drawings.
- 23.1.11 Should discrepancies be noted regarding quantities in schedules, specifications and/or on Project drawings, the Contractor shall provide the greater number of units.
- 23.1.12 All installation work shall be performed in a manner that will minimize disruption to the airlines, HAS, and the travelling public. The Contractor shall coordinate with the Director and/or designee to schedule any work in public areas during times that minimize impact to operations and existing business functions.
- 23.2 Delivery and Storage
 - 23.2.1 The Contractor shall coordinate product delivery from storage (if necessary) to installation locations with the Director and/or designee.

- 23.2.2 Store products in accordance with manufacturer's instructions, within the Contractor's staging area and with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.
- 23.2.3 Storage of equipment is subject to additional requirements. The Contractor is expected to coordinate all paperwork, bonds, and required documentation with the Director and/or designee in accordance with delivery and the approved construction schedule.
- 23.3 Hardware Installation
- 23.3.1 The Contractor shall install and inspect all hardware required in this Specification in accordance with the manufacturer's installation instructions. Final placement of hardware is subject to Director and/or designee's approval.
- 23.3.2 The Contractor shall be responsible for any and all loss or damage in the shipment and delivery of all material.
- 23.3.3 The Contractor shall place materials only in those locations that have been previously approved. Any other locations shall be approved, in writing, by HAS.
- 23.3.4 The Contractor shall provide all tools and test equipment required to install, verify, and test the installation and to determine that it meets the specifications. The Contractor shall furnish all necessary materials required to implement and to achieve the required work performance.
- 23.4 System Start-up
- 23.4.1 The Contractor shall not apply electrical power to the system until after:
- 23.4.1.1 System and components have been installed and inspected in accordance with the manufacturer's installation instructions.
- 23.4.1.2 A visual inspection of the system components has been conducted to ensure that defective equipment items have not been installed and that there are no loose connections.
- 23.4.1.3 All system grounding and transient protection systems have been verified as properly installed and connected, as indicated.
- 23.4.1.4 Power supplies to be connected to the system and equipment have been verified as the correct voltage, phasing, and frequency as indicated.
- 23.4.1.5 Satisfaction of the above requirements shall not relieve the Contractor of responsibility for incorrect installations, defective equipment items, or collateral damage as a result of the Contractor's work/equipment.
- 24.0 Testing and Acceptance Requirements**
- 24.1 General**
- 24.1.1 Phases of Testing and Acceptance – The Contractor shall prepare, submit for review, and execute test plans to demonstrate system completion and performance. Except as otherwise specified, the Contractor shall test all components, connections, and subsystems comprising the total system as a

complete operational system. The phases of testing and acceptance will include the following:

- 24.1.1.1 Proof-of-Concept Test / Factory Acceptance Testing
- 24.1.1.2 Functionality and Performance Testing (preceded by system installation)
- 24.1.1.3 Endurance Testing (preceded by successful functionality and performance testing)
- 24.1.2 The Contractor shall coordinate all testing activities with HAS and their designated OAR.
- 24.1.3 Test Plan/Procedure: The Contractor shall provide electronic copies of the test plan/procedures for each testing phase for the review and approval of HAS. The test plan for each phase of testing shall detail the objectives of all tests. The tests shall clearly demonstrate that the system and its components fully comply with the requirements specified in the contract drawings and specifications. Test plans shall contain at a minimum:
 - 24.1.3.1 Functional procedures including use of any test equipment
 - 24.1.3.2 Test equipment is to be identified by manufacturer and model
 - 24.1.3.3 Interconnection of test equipment and steps of operation shall be defined
 - 24.1.3.4 Test records shall include test equipment serial number, calibration date and calibration certification of test equipment. All calibrations shall be current.
 - 24.1.3.5 Expected results required to comply with specifications
 - 24.1.3.6 Record of test results with witness initials or signature and date performed
 - 24.1.3.7 Pass or fail evaluation with comments
- 24.1.4 The test procedures shall provide conformity to all system requirements. Satisfactory completion of the test procedure is necessary as a condition of system acceptance.
- 24.1.5 The Contractor shall review all formal test procedures prepared by the Contractor and deliverable under the contract to assure the tests cover all requirements and that there is a conformity between the conducted test, the test results and Specification requirement.
- 24.1.6 The Contractor shall provide HAS the opportunity(s) to participate in and observe any or all of tests.
- 24.1.7 Test Reports: The Contractor shall prepare, for each test, a test report document that shall certify successful completion of that test. An electronic copy of the test report shall be submitted to HAS for review and acceptance. The test report shall be submitted to HAS within 5 days after the test has been completed. The test report shall contain, at a minimum:
 - 24.1.7.1 Commentary on test results
 - 24.1.7.2 A listing and discussion of all discrepancies between expected and actual results and of all failures encountered during the test and their resolution

- 24.1.7.3 Complete copy of test procedures and test data sheets with annotations showing dates, times, initials, and any other annotations entered during execution of the test
- 24.1.7.4 Signatures of persons who performed and witnessed the test
- 24.1.8 Test Resolution: Any discrepancies or problems discovered during these tests shall be corrected by the Contractor at no cost to HAS. The problems identified in each phase shall be corrected and the percentage of the entire system that must be re-tested shall be determined by the Director and/or designee before any subsequent testing phase is performed.

24.2 Factory Acceptance Testing / Proof of Concept Testing

- 24.2.1 Test Setup Equipment: Equipment shall be actual products or identical models of products to those designated to be delivered and installed at the site. The following equipment shall be setup and used for conducting pre-delivery test:
 - 24.2.1.1 Operator equipment associated with system.
 - 24.2.1.2 End devices and displays associated with system.
 - 24.2.1.3 Software associated with system.
 - 24.2.1.4 Sufficient content, content delivery equipment, and LED video processor equipment and signal transmission to provide a fully integrated system model.
- 24.2.2 Refer to Section 11 – Mock-ups for further proof of concept testing requirements.
- 24.2.3 Preparation: Ensure that development of system is complete, required approvals of submittals have been obtained, and sufficient equipment procured to completely demonstrate and test system.
- 24.2.4 Time: Prior to deployment of any equipment to the field. Conduct on weekdays during standard business working hours.
- 24.2.5 Location: Contractor’s offices or other location approved by HAS.
- 24.2.6 Items to be tested shall be set up and performance verified prior to arrival of the Director and/or designee at test site.
- 24.2.7 Test: The purpose is to test the complete system and demonstrate that all specified features and performance criteria are met. All requirements of the specification shall be tested including, but not limited to:
 - 24.2.7.1 Functionality including reporting and response
 - 24.2.7.2 System capacity
 - 24.2.7.3 Hardware interaction
 - 24.2.7.4 Hardware and software interaction
 - 24.2.7.5 Demonstrate report generation
- 24.2.8 Acceptance:

24.2.8.1 Acceptance of system to perform sufficiently and provide specified functions shall be determined by HAS witnessing the factory acceptance test. In addition to HAS, testing shall be witnessed by up to six (6) additional HAS representatives.

24.2.8.2 If system does not perform satisfactorily, the Contractor shall make corrections and modifications and schedule new test. Compliance is at the sole discretion of HAS.

24.2.9 Reporting:

24.2.9.1 Record all test procedures and results.

24.2.9.2 Submit report to HAS within 5 business days after completing the test.

24.3 Functionality and Performance Site Acceptance Testing

24.3.1 Complete operational testing of all components shall be witnessed by HAS once all components have been installed and Factory Acceptance Testing / Proof of Concept testing has been successfully completed. Coordination with HAS is required and testing shall not begin until:

24.3.2 All systems have been installed and individually and jointly tested to ensure they are operation properly

24.3.3 Written authority has been received from HAS

24.3.4 Testing:

24.3.4.1 As part of performance verification, test all components of the system. The tests shall demonstrate system features.

24.3.5 Verification:

24.3.5.1 Verify correct operation of the required system functionality as defined in the project work.

24.3.6 Adjustment, Correction, and Completion:

24.3.7 Acceptance of system to perform sufficiently and provide specified functions shall be determined by HAS.

24.3.8 If the system does not perform satisfactorily, the Contractor shall make corrections and modifications and schedule new test with HAS

24.3.8.1 Completion: Functionality and performance verification test shall be complete when testing or retesting of each component has produced a positive result and has been approved in writing by HAS.

24.3.9 Reporting:

24.3.9.1 Describe operational tests performed, equipment used, test procedures, results, and personnel performing tests

24.3.9.2 Record in a table all test results, deficiencies, and corrective measures

24.3.9.3 Submit report to the Director and/or designee

24.3.10 Termination:

24.3.10.1 Performance verification test shall be terminated by the Director and/or designee if:

- 24.3.10.1.1 Individual systems, system components, subsystems, or cabling infrastructure fail to perform as specified
- 24.3.10.1.2 It is determined that a system or sub-system is missing any components or installation ins not complete
- 24.3.10.2 Upon termination, corrective work shall be performed, and performance verification test rescheduled with the Director and/or designee.
- 24.3.10.3 Retesting shall be performed by the Contractor at no additional expense to HAS.
- 24.3.10.4 Contractor shall continue to perform corrective actions and retest until system passes all tests to the satisfaction of the Director and/or designee

24.4 Substantial Completion

- 24.4.1 Once system is fully installed, operational, and in use the system will be considered Substantially Complete. Written notice of Substantial Completion will be provided to the Director and/or designee.
- 24.4.2 Endurance Testing shall not commence until written notice of Substantial Completion is received.

24.5 Operational / Endurance Testing

- 24.5.1 Endurance testing shall verify that all technology hardware can withstand the typical processing load it is expected to endure for a given period. The test shall measure the response of the overall system under conditions that simulate typical-to-heavy daily use for the specific (14) fourteen-day window with all observations recorded during the full period of the test.
 - 24.5.1.1 During the endurance testing period, the Content Management System (CMS) and produced content may be adjusted in accordance with calibration requirements of the Oculus.
- 24.5.2 The contractor shall develop, document, and submit specific testing procedures for approval prior to initiating the test. The test procedure documentation shall clearly indicate how typical usage load will be simulated and applied to the system and define the performance metrics to be measured and recorded.
- 24.5.3 Provide personnel to operate/monitor the system 24 hours per day, including weekends and holidays during Endurance Testing.
- 24.5.4 Start test after:
 - 24.5.4.1 Successful completion of Functionality and Performance Testing
 - 24.5.4.2 Correction of deficiencies has been completed.
 - 24.5.4.3 Receipt of written notice of Substantial Completion and approval to commence Endurance Testing is received from the Director and/or designee.
- 24.5.5 Monitor all systems during Endurance Testing. Coordinate monitoring with the Director and/or designee.
- 24.5.6 Recording: Record data on approved forms to provide a continuous log of systems performance. Include:

- 24.5.6.1 Date and time for all entries
- 24.5.6.2 Name of individual making entry
- 24.5.6.3 Environmental conditions
- 24.5.6.4 Airport activities in process
- 24.5.6.5 Description of all alarm annunciations, responses, corrective actions, and causes of alarms. Classify as to type of alarm.
- 24.5.6.6 Description of all equipment failures, including software errors
- 24.5.6.7 Description of all maintenance and adjustment operations performed on system
- 24.5.6.8 Daily and weekly tabulations
- 24.5.6.9 Entries of performance data shall be reviewed by the Director and/or designee
- 24.5.7 The Director and/or designee may terminate testing at any time when the system fails to perform as specified. Upon termination of testing the Contractor shall commence an assessment period as described in Stage II.
- 24.5.8 Time: 24 hours per day for 14 consecutive calendar days (8 hr./day Contractor system engineer available onsite during testing period)
- 24.5.8.1 If system experiences no emergency, critical failures, or recurring operational failures (defined as the same operational failure more than three (3) times during fourteen (14) days), proceed to Final Inspection and Acceptance.
- 24.5.9 Adjustment, Correction, and Maintenance:
 - 24.5.9.1 During Endurance Testing make corrections to system only after obtaining written approval of the Director and/or designee
 - 24.5.9.2 During Endurance Testing, perform required maintenance on systems including provision of replacement parts.
- 24.6 Final Inspection and Acceptance**
 - 24.6.1 After Endurance Testing is complete, review tabulated records with the Director and/or designee.
 - 24.6.2 Contractor will not be responsible for failures caused by:
 - 24.6.2.1 Outage of main power in excess of backup power capability provided that automatic initiation of all backup sources was accomplished and automatic shutdowns and restarts of systems performed as specified.
 - 24.6.2.2 Failure of any HAS furnished power, communications, and control circuits provided failure not due to Contractor furnished equipment, installation, or software.
 - 24.6.2.3 Failure of existing HAS equipment provided failure not due to Contractor furnished equipment, installation, or software.
 - 24.6.3 When performance of system does not fall within the above parameters, determine cause of deficiencies, correct, and retest.
 - 24.6.4 Submit final report of Endurance Testing containing all recorded data.

24.6.5 Final System Acceptance:

24.6.5.1 An initial cleaning of the LED tiles and any other public facing objects installed as part of this RFP is required before the system can be fully accepted.

24.6.5.1.1 If the ICP is already open and accepting passengers, coordinate with HAS for access and acceptable working hours.

24.6.5.2 Upon successful completion of Endurance Testing, initial cleaning, and completion of end user training, a written notice of Final System Acceptance will be provided by the Director and/or designee.

24.6.5.3 Final System Acceptance will mark the beginning of the system Warranty and Maintenance period.

25.0 Training

25.1 Immediately following the Endurance and Operational Testing Period the Contractor shall provide training to the HAS/IAH Operational Team on the operation, care and maintenance of the LEDs as integrated media features, including any operational requirements related to the integrated elements and structures supporting the displays (e.g. access). All operational manuals, warranties, service agreements including maintenance and operational support agreements will be turned over to HAS at this time.

26.0 Basic Services

26.1 Maintenance and Support Services

26.1.1 Remote Access

26.1.1.1 An acceptable approach to providing the required maintenance and support service is through the provisioning of remote access. If the Contractor desires to provide remote access support, all current HAS security policies and procedures shall be followed.

26.1.2 Other Service Requirements

26.1.2.1 The Contractor shall conduct a full equipment inventory including spare components and parts for replacement bi-annually during the warranty period or as requested by the Director and/or designee and provide HAS a full accounting of all parts.

26.1.2.2 If HAS recognizes the contractor is not maintaining adequate stock of spare components and parts for replacements, the Contractor, at no additional cost to the City, shall replenish the stocks within 5 business days.

26.2 Preventative Maintenance Services

26.2.1 The Contractor shall perform Preventive Maintenance (PM) on all systems covered under the Agreement.

26.2.2 A preventative maintenance plan, to be submitted to HAS for review and approval upon commissioning of the system, shall detail how and when the preventative maintenance services will be conducted on the Oculus display technology.

- 26.2.3 At a minimum the Preventive Maintenance shall include but is not limited to the following:
 - 26.2.3.1 Cleaning of LED tiles and other public facing elements
 - 26.2.3.2 Equipment monitoring, performed at predefined intervals, that indicates any abnormal status conditions
 - 26.2.3.2.1 Equipment monitoring can include but is not limited to automatic monitoring, remote system checks, and full system walkthroughs
 - 26.2.3.3 Reporting of any abnormal activity to HAS
 - 26.2.3.4 Backup and archiving of any relevant data
 - 26.2.3.5 System software updates
 - 26.2.3.6 Replenishing of any consumable items
 - 26.2.3.7 A regular inspection and cleaning of the Oculus display technology, tertiary structure, and any other customer facing elements
 - 26.2.3.8 Quality control that will assure HAS that the Oculus functions in accordance with the highest standards prevailing in the industry
- 26.2.4 The Contractor shall ensure preventative maintenance services on the Oculus LED technology are conducted in accordance with standards and procedures recommended as required by the Original Equipment Manufacturer (OEM) for keeping the system in First-Class condition.
 - 26.2.4.1 Preventative Maintenance services and associated parts, labor, sub-contracted services, and other associated costs shall be considered included in the operations and maintenance cost unless specifically allowed under a provision of this contract.
 - 26.2.4.2 Appropriate personnel shall be trained by Contractor to implement the preventative maintenance services.
- 26.3 Response Time
 - 26.3.1 Contractor must provide 24/7/365 (including Holidays) remote help desk support.
 - 26.3.1.1 Where applicable, an acceptable approach to providing the maintenance and support service is through the provisioning of remote access. If the Contractor desires to provide remote access support, all current HAS security policies and procedures shall be followed.
 - 26.3.1.2 The Contractor shall respond to all requests within the following Response Times. The determination of the request classification shall be in the sole judgement of the Director and/or designee.

Table 4: Response Times				
Response Time Matrix				
Type	Time To Respond Remotely	Time To Respond during peak hours	Time to Respond during off-peak hours	Time To Restore
Operational Failure	15 Minutes	4 Hours	8 Hours	24 Hours
Critical Failure	15 Minutes	1 Hour	2 Hours	24 Hours
Emergency Failure	5 Minutes	30 Minutes	1 Hour	24 Hours
Peak hours are from 0500 until 0100 24/7/365				
Off-Peak Hours are from 0101 until 0459 24/7/365				
Remote Support shall be 24/7/365				

27.0 Other Work / Services Request

27.1 General

27.1.1 Within the general scope of the Agreement, Other Work/Services may be required for system and equipment to meet desired conditions and/or services not covered in the Agreement. Other Work/Services shall be performed in accordance with all provisions of the Agreement and any special provisions issued with authorization for work that are consistent with the Agreement. Other Work/Services shall be provided by Contractor on an "as needed" basis and then, only after receipt of a written Other Work/Services Request ("OSR"), signed by the Director and/or designee. Contractor shall perform Other Work/Services to the same standards identified for Basic Services.

27.2 Performing Other Work/Services

27.2.1 Other Work/Services shall be performed in accordance with all provisions of the Agreement and any special provisions issued with the Other Service/Request (OSR).

27.2.2 Before issuing an OSR, the Director will first issue a written notice to the Contractor detailing the specific OSR to be performed by the Contractor.

27.2.3 Other/Work Services include, but are not limited to, the following:

27.2.3.1 Repair or replace components damaged by vandalism, force majeure, or other third parties.

27.2.3.2 Provide labor and material to modify or upgrade equipment in accordance with revisions to governing regulations; recommendations by consultants, engineers, or other professionals; or HAS requirements.

28.0 Security and Badging

- 28.1 The Contractor shall refer to www.fly2houston.com/biz/resources/badging for all HAS badging related information, questions, badging application forms, office hours, etc.
- 28.2 All onsite personnel are required to meet the requirements in order to obtain an HAS badge with CBP access and maintain an active status for the badge.
- 28.3 All onsite personnel are required to meet the requirements in order to obtain and HAS badge with SIDA and Air Operations Area (AOA) access and maintain an active status for the badge. AOA driving privileges are not required.
- 28.4 The Contractor shall comply with all applicable Federal rules governing security at the Airport, as may be amended from time to time.
- 28.5 All on-site personnel of the Contractor, including subcontractors, are required to undergo a fingerprint-based criminal history records check.
- 28.6 The Contractor will be required to provide Customs Border Protection Security Access at IAH and HOU airports, which will require the Contractor to purchase a Customs Security Bond for employees requiring access to CBP Security areas.
- 28.7 Costs for the fingerprint-based criminal history records check are reflected in the cost of the badges. Contractor must pay for the cost of badges, including replacements thereof. Contractor personnel losing badges will be charged for lost badge in addition to replacement badges at the then current rate.
- 28.8 Contractor acknowledges that fines or penalties associated with non-compliance with security regulations must be reimbursed to HAS.

29.0 Transportation and Parking

- 29.1 The Contractor shall provide vehicles for onsite personnel for their employee's use and shall park its vehicles in areas designated by the Director and/or designee at its own cost, if any. HAS will provide a limited number of Contractor parking spaces at no charge. All transportation activities and related costs of Contractor, or its sub-contractors, necessary to perform under the Agreement shall be provided by Contractor. All of Contractor's and its sub-contractor's company vehicles shall be clearly identified according to FAA and HAS guidelines and regulations with at a minimum company decals and or magnetic signs as required by the Director and/or designee.

30.0 Personal Protective Equipment

- 30.1 The Contractor shall provide all the essential and necessary personal protective equipment (PPE) for each member of the on-site personnel and any substitute personnel. The personal protective equipment that shall be provided shall include, but not limited to, hard hats, steel-toed boots, work vests, and safety glasses. It is the responsibility of the Contractor to verify the required PPE before arriving on-site.

31.0 Forced Majeure, Third Party Damage or Vandalism

- 31.1 Any instance of force majeure that is proven by the Contractor and verified by HAS shall be replaced through the Other Work Services section.
- 31.2 Any instance of third-party damage or vandalism that is proven by the Contractor and verified by HAS shall be replaced through the Other Work Services section.

32.0 Invoicing

- 32.1 Contractor shall submit its invoices electronically in accordance with the specifications and shall invoice for work accepted by an HAS representative.
- 32.2 The City shall certify the correctness of each invoice and arrange for payment. The invoice must be identified by the agreement name and agreement number. Certification and/or payment does not preclude the City from indicating that a certification or payment was incorrect. In addition, it does not preclude the City from recovering excess payments.
- 32.3 All work shall be scheduled with HAS representatives and shall be accomplished during the hours scheduled. HAS shall have the right to request work to be performed during regular and non-regular hours.
- 32.4 No payment for services shall be payable by HAS for any services for which the Contractor fails to complete all the scheduled work as specified or fails to obtain an approved work schedule prior to beginning work.
- 32.5 Contractor shall be compensated at the agreed price located in Attachment B (Cost Proposal Form).
- 32.6 Invoices submitted for services performed as the result of Other Work/Services shall include a copy of the Director’s written request.
- 32.7 Invoices submitted for services performed as the result of Change Orders shall require copies of the applicable Change Order attached to the original invoice.
- 32.8 Contractor shall provide separate monthly invoices for any completed work at each location and Airport.
- 32.9 Invoice Requirements
 - 32.9.1 The Houston Airport System shall only accept invoices submitted electronically along with required support information. Each invoice should be in a PDF or TIFF format. Multiple invoices can be submitted in a single email with one invoice per file. Requirements are as follows:
 - 32.9.1.1 Submit invoices in “PDF” or “TIFF” format.
 - 32.9.1.2 Submit to has.accountspayable@houstontx.gov.
 - 32.9.2 Contractor shall make timely payments to all suppliers and/or sub-contractors that furnish labor, materials and/or furnishings related to the Agreement.

33.0 Interlocal Agreement

33.1 Under the same terms and conditions hereunder, the Contract may be expanded to other government entities through inter-local agreements between the City of Houston and the respective government entity that encompass all or part of the products/services provided under this contract. Separate contracts will be drawn to reflect the needs of each participating entity.

34.0 Liquidated Damages

34.1 Liquidated Damages will be assessed throughout the contract term. Prior to implementing Liquidated Damages, the Contractor and HAS will come to an agreement on the dollar amount of Liquidated Damages. Dollar amount will be agreed up on during RFP negotiations.

34.2 If Contractor does not meet the Project Baseline Schedule approved by HAS. Section 9.3.2 of Attachment A. Cost shall range between \$250 and \$500 per day per delay.

34.3 If Contractor does not meet the items in the Response Time Matrix (Table 4) Section 26.3 of Attachment A. Cost shall range between \$250 and \$500 per hour per occurrence.

34.4 Any other Liquidated Damages agreed during RFP negotiations.

ATTACHMENT B COST PROPOSAL FORM (See Attachment)

INSTRUCTIONS: Provide the cost structure for all requirements in Attachment A - Specification/Scope of Services. Fill in only the yellow highlighted squares. All costs should be in USD\$, excluding taxes.
ONE ORIGINAL COPY SHALL BE PRINTED, SIGNED, AND SUBMITTED

Overview (Table 1)	
System	Proposed Cost
1. Display Technology (Tiles, Processors, Cabling, Cabinets, etc.):	\$0.00
2. Project Coordination, Design, Installation and Commissioning:	\$0.00
3. Warranty and Maintenance:	\$0.00
4. Total Proposed Price:	+ \$0.00

HAS reserves the final authority on which systems shall be installed which will determine the final price prior to each implementation.

1. Display Technology (Table 2)			
Display Technology	Pixel Pitch (mm)	Value	
Square footage of flat LED tile, including spares			Square Feet
Cost of flat LED tile per square foot			USD \$
if more than one size pixel pitch is to be used:			
Square footage of flat LED tile, including spares			Square Feet
Cost of flat LED tile per square foot			USD \$
Square footage of curved LED tile, including spares			Square Feet
Cost of curved LED tile per square foot			USD \$
Square footage of customized LED tile, including spares			Square Feet
Cost of customized LED tile per square foot			USD \$
TOTAL Cost of LED Tiles, including spares:		50.00	USD \$
Display Technology		Value	
LED Processors/Controllers, including spares			USD \$
Cabling, Data Distribution, Power Supplies			USD \$
Subframes, Cabinets			USD \$
TOTAL Cost of LED Processors and Required Infrastructure, including spares:		50.00	USD \$
TOTAL Cost of Display Technology (LED tiles + processors and equipment):		50.00	USD \$

2. Project Execution (Table 3)		
Development and Production Requirements	Cost	
Engineering drawings, stamped structural drawings, shop drawings		USD \$
Project Management		USD \$
Mockups, Prototyping		USD \$
Acceptance Testing		USD \$
Packaging, Freight, and Delivery		USD \$
Storage		USD \$
Installation, Integration, Commissioning		USD \$
Coordination with CMS system for functional connectivity, Calibration, Adjustments, Content Integration Coordination		USD \$
Operational Testing with Turnover and Training		USD \$
TOTAL Cost of Project Execution:	50.00	USD \$

3. Warranty & Maintenance (Table 4)			
Warranty & Maintenance Items	Timeline (years)	Cost	
Standard LED Tile Warranty			USD \$
Extended LED Tile Warranty			USD \$
Standard LED Processor Warranty			USD \$
Extended LED Processor Warranty			USD \$
Operations & Maintenance			USD \$
TOTAL Cost of Warranty and Maintenance:		50.00	USD \$

SIGNATURE OF AUTHORIZED SIGNATORY

DATE OF SIGNATURE

NAME AND TITLE OF SIGNATORY

ATTACHMENT C
REQUIRED SUBMITTAL CHECKLIST
(See Attachment)

ATTACHMENT D
SAMPLE AGREEMENT
(See Attachment)

ATTACHMENT E
SPECIFICATIONS RESPONSE FORM
(See Attachment)