the AQUALAB at Seas of Imagination, Vancouver

featuring

MISSION: S

Team #15

Theme Park Design Competition 2020

Innovation Documentation

SPIRIT OF ADVENTURE CREATIVE GROUP

Introduction

The goal of the Aqualab at Seas of Imagination is not to use technology simply because it's new or as an attraction itself, but to use it such that it builds a narrative and engages guests. The technological elements should be secondary to and supportive of the mission to educate and entertain. Likewise, it should respond to critical questions being asked today; how can technology help us reduce the spread of disease in public spaces? how can it help us be more sustainable? and how can it help us engage with visitors of all types?

At the Aqualab at Seas of Imagination:

A near-field communication card enables guests to have a personalized, interactive experience not just in the new addition, but throughout the entire aquarium and beyond, but is not required to enjoy the aquarium to its fullest extent.

A mix of high and low-tech solutions help bring the immersive Aqualab habitats to life and support the goal of education throughout the experience, while remaining accessible and minimizing commonly touched surfaces.

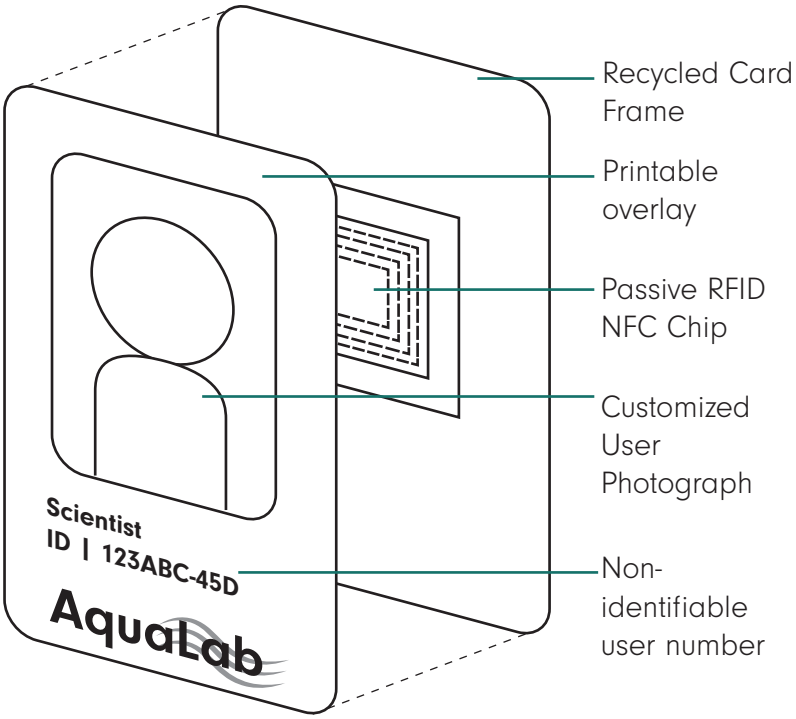
A contemporary ride system coupled with the latest in audio-visual technology brings an exciting narrative that emphasizes the importance sustainability and shares wonder of marine ecosystems.

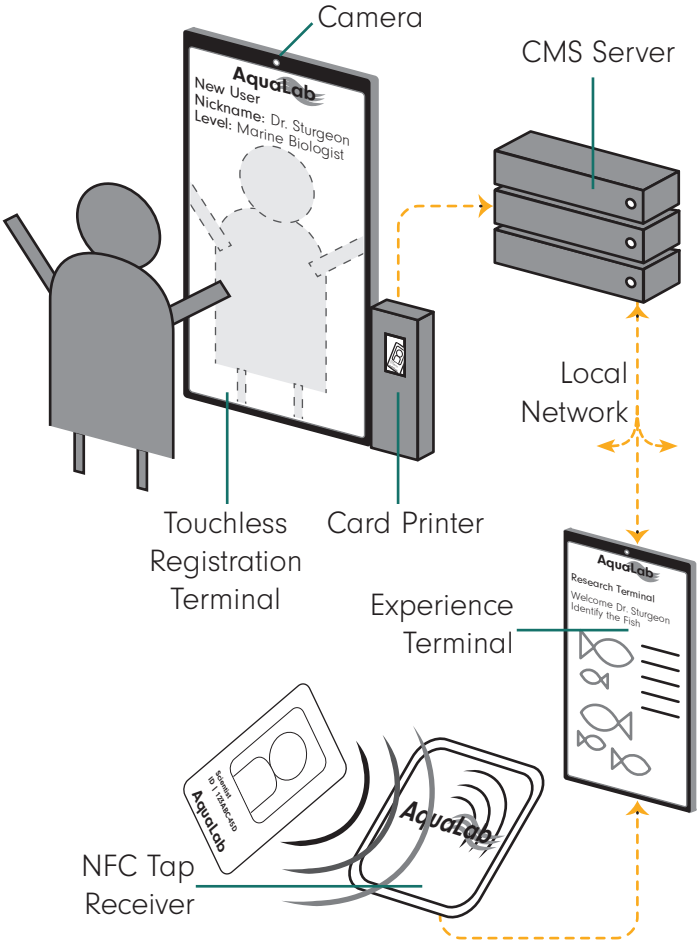
Finally, high-tech elements within the architecture itself help reduce the footprint of the addition. Photo-voltaic panels, extensive natural lighting, passive ventilation and heat-reclamation systems are among the sustainable design features of the Aqualab at Seas of Imagination.

Located partially extended over the shores of the Fraser River, the Aqualab at Seas of Imagination, Vancouver aims to be a LEED Gold facility and an example for sustainable development elsewhere in the themed entertainment industry.

Aqualab Card

A key element of the Aqualab experience is the Aqualab card. The card is a recycled plastic frame approximately the size of a credit card. The front surface is printable by a standard security card printer while embedded inside is a passive RFID NFC chip registered with a unique serial code. A new user can register for a card, which sets up a user account linked with the issued card's unique serial. The registration process and user account contains no identifiable personal information, only a photograph and data collected in the aquarium related to Aqualab card enabled experiences. A guest is encouraged to keep their card for return visits to the aquarium.

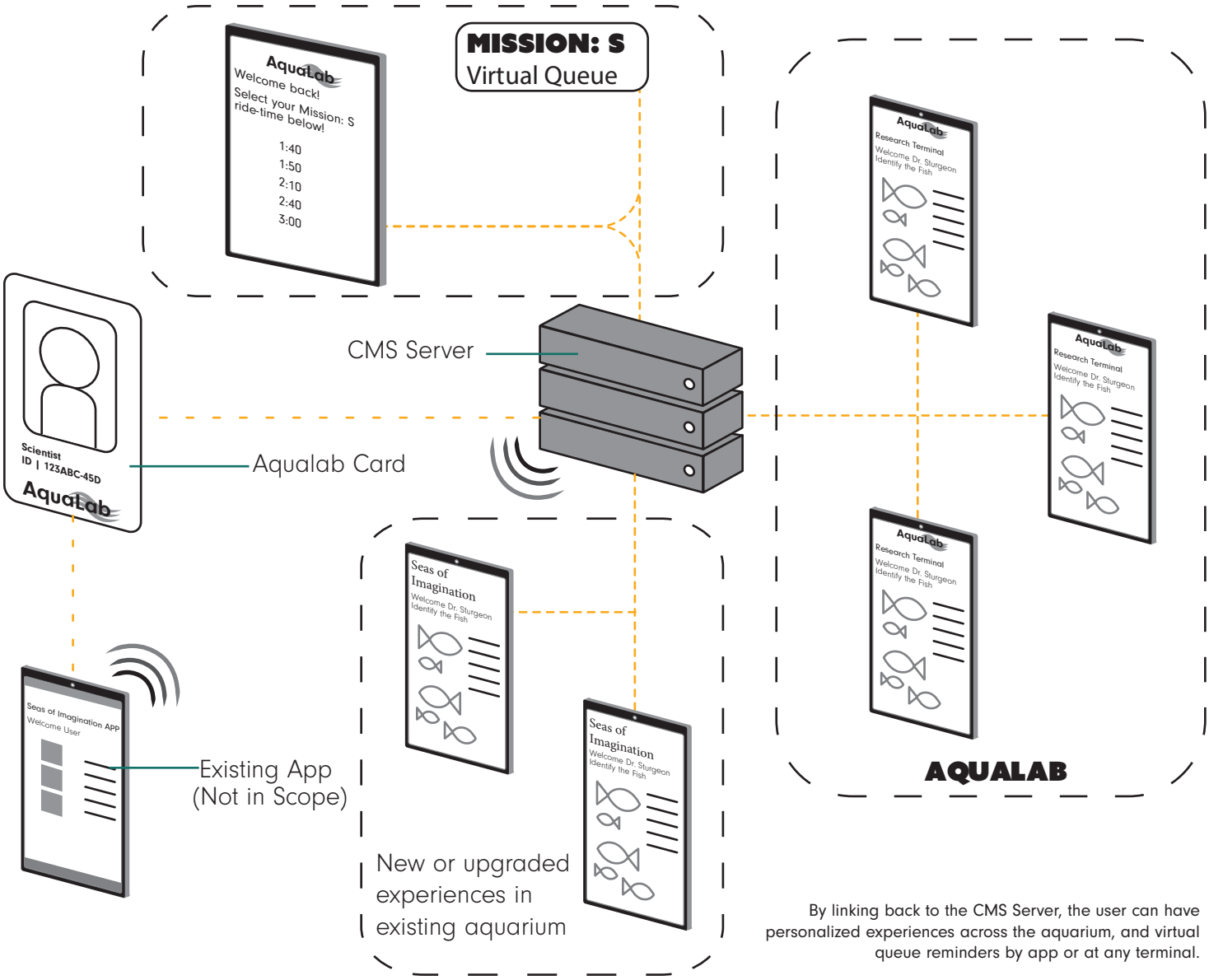




Card registration utilizes a touchless terminal, which allows guests to take and customize a photograph, select a general level of marine science knowledge and (if desired) select a ride-time for Mission: S. The terminal then prints a custom Aqualab card for the guest, and registers the information and unique serial number of the card to the aquarium's content management servers. This updates the virtual queue for Mission: S and activates that card for use with the experiences throughout the aquarium and the Aqualab. Various terminals, screens and experiences throughout the aquarium and Aqualab will feature a prominent NFC tap surface which reads the card's serial number, retrieves the user account from the CMS, and activates the relevant experience based on user score, knowledge level, and other completed activities. By linking back to the CMS in real-time, an experience can adjust content dynamically, produce personalized recommendations for next experiences, and create a unique journey through the aquarium.

The Aqualab card is the guest's key to accessing the existing aquarium high-tech experiences, as well as the new one's as part of the Aqualab expansion. With their card they can select a ride-time for Mission: S and take part in the virtual queue. They can take part in aquarium-wide games and challenges that bring them to new and existing exhibits, helping to link educational experiences. They have access to a system that personalizes their experiences and grows along with them.

It should be noted however that tech-enabled experiences such as this are not always welcomed by all guests. Should a visitor choose not to participate in the Aqualab card system, they should still be able to experience everything. Experiences throughout the aquarium and Aqualab are therefore accessible with or without a card and the Mission: S virtual queue can be registered for in person, and a printed ticket with a return time issued.

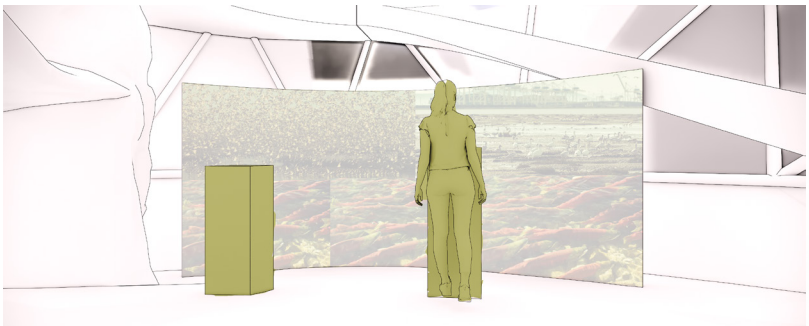


By linking back to the CMS Server, the user can have personalized experiences across the aquarium, and virtual queue reminders by app or at any terminal.

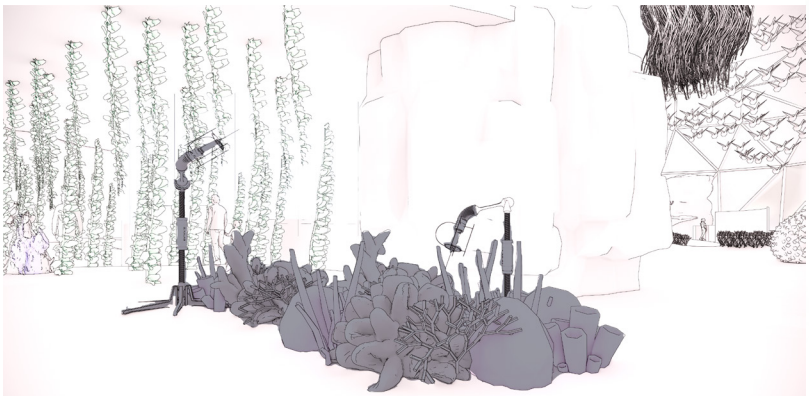
Aqualab Habitats & The Sturgeon Lab

The immersive habitats throughout the Aqualab are designed to take advantage of modern technology, but not be overshadowed by it. First was to create breathtaking, realistic walk-through experiences that featured high quality sets, models and natural-scaping. Next was incorporating dramatic lighting effects that worked with the shell of the structure, combining natural and artificial light in interesting ways. An extensive network of speakers throughout each unique habitat further brings them to life with custom audio tracks matching the environment. Additional effects include scent canons which simulate that distinctive sea-spray as well as atmospheric effects such as fog, haze and mist.

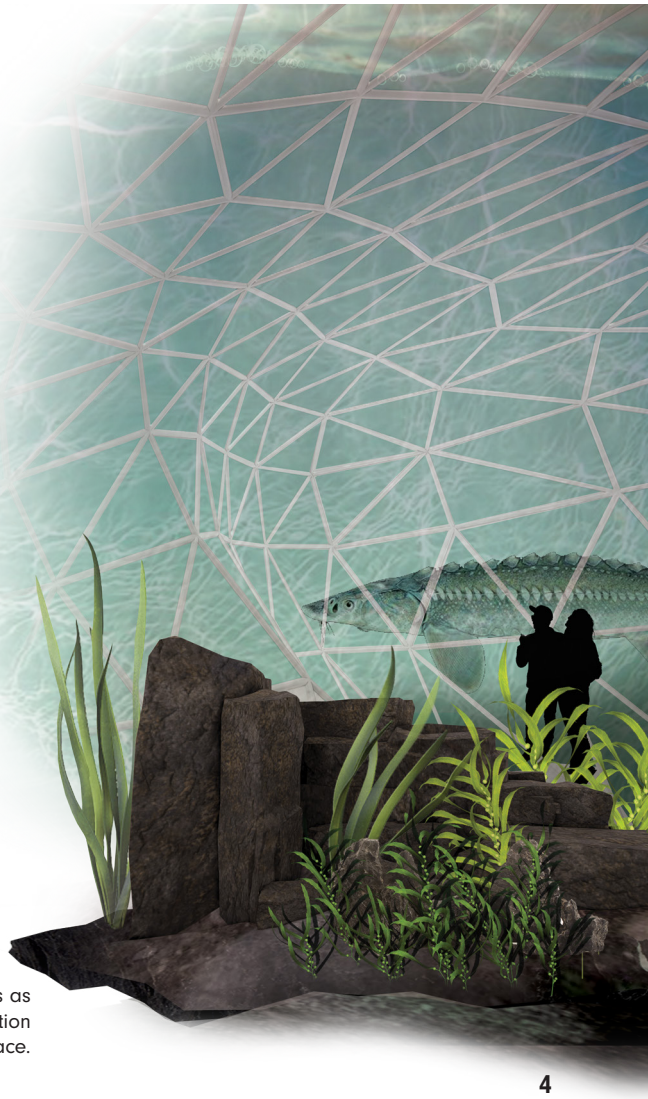
Within each distinct habitat zone are a collection of experiences ranging from the physical and tactile to the cutting-edge of technology. Responsive robot arms hidden within the necks of Elasmosaurus models in the Western Interior Seaway habitat allow guests to experience what scientists believe the strength of these creatures might have been. A massive 3D printer in the Seamount habitat allows users to design, and have printed, a piece of Pacific coast coral which becomes part of a massive crowd-sourced reef. Touchless, motion-responsive screens allow guests to build dams, protect wetlands, and influence urban development to see the impact of human activity in an touchless AR experience in the Fraser River Estuary habitat.



A motion-tracking touchless experience utilizing rear-projected frosted glass panels and full-body motion capture cameras.

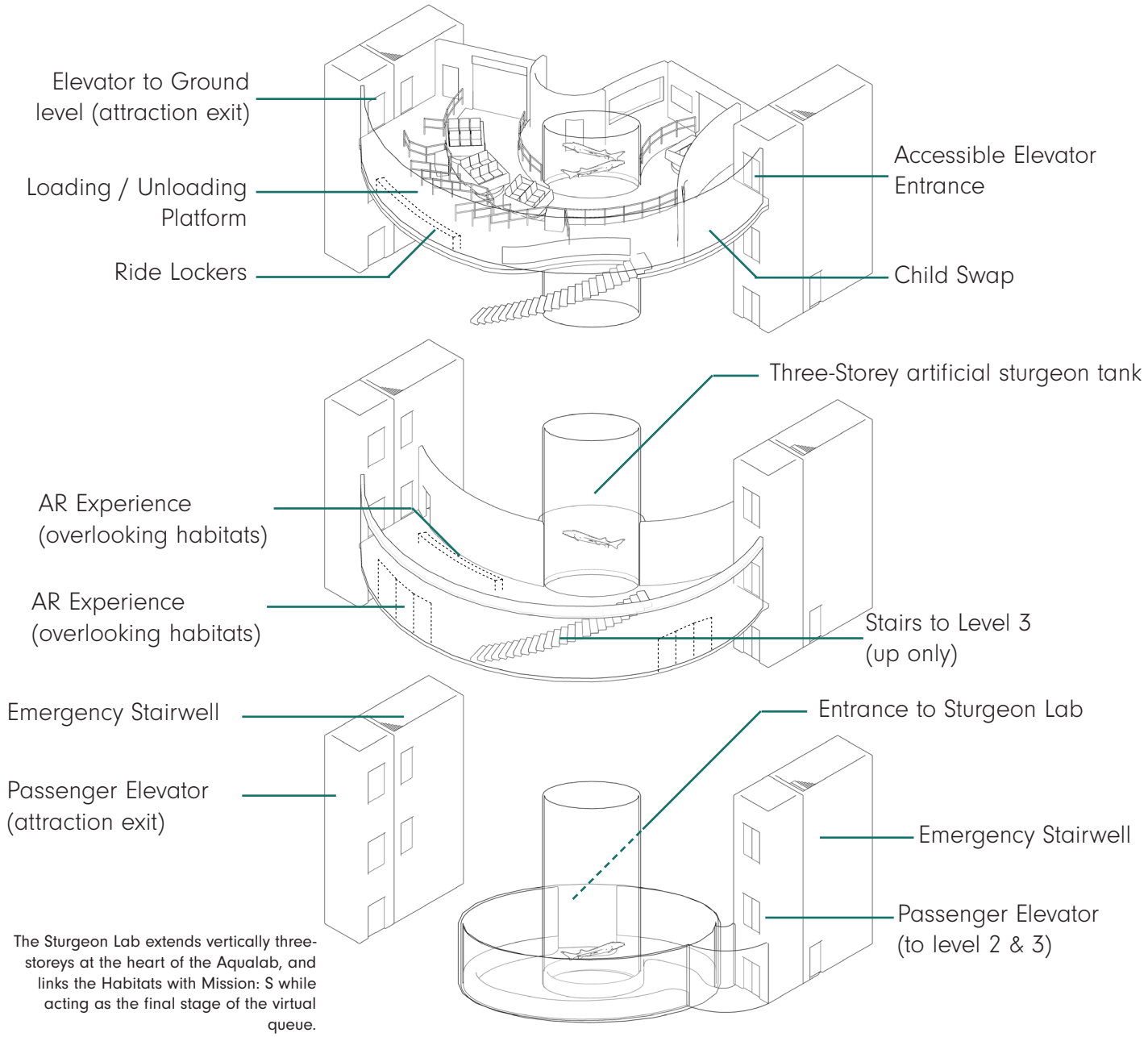


Robotic arms equipped with deposition 3D printing heads utilize a machine-learning system to optimize and place each guest-designed piece of coral



Using partially transparent ETFE panels as the building envelope allows for projection mapping from the interior of the space.

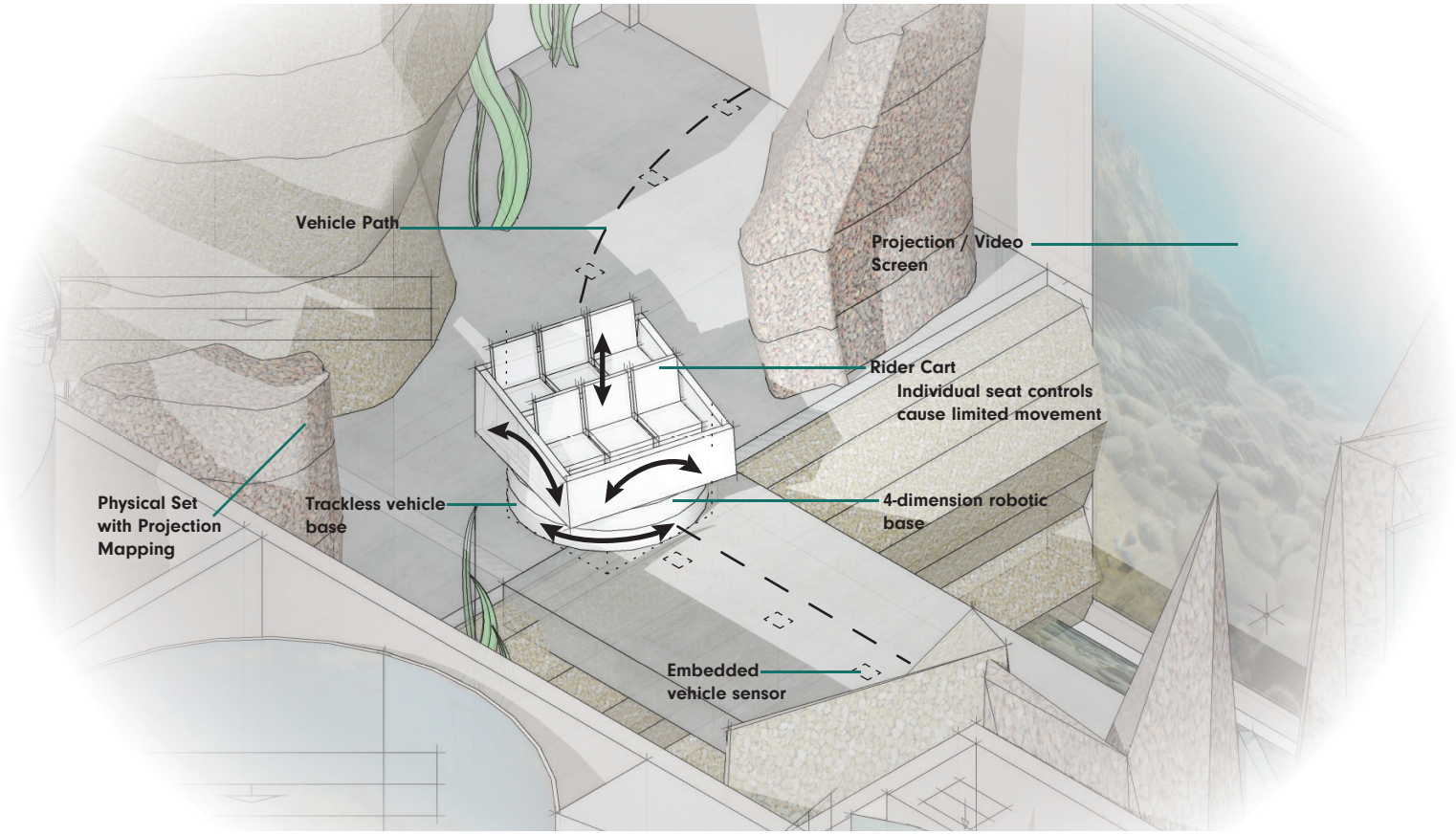
At the heart of the Aqualab is the three-storey Sturgeon Lab. This glass-encased space acts as a final queuing system for guests prior to their ride on Mission: S as well as a narrative link with the habitats and introduction to the ride experience. When a guest's ride-time has arrived, their Aqualab card will grant them access into the Sturgeon Lab. Here they will be guided by Aqualab scientists (ride attendants) to learn about the White Sturgeon, the impact of human development on marine ecosystems, and the important of conservation and sustainability. Guests are free to move around the lower levels of the lab until they are ready to ride Mission: S, where they check-in with an attendant at the entrance to the third-floor loading platform.



The Sturgeon Lab extends vertically three-storeys at the heart of the Aqualab, and links the Habitats with Mission: S while acting as the final stage of the virtual queue.

Mission: S

Mission: S is a trackless, semi-interactive dark ride with 3D cinema screens, projection mapping, and immersive sets and environments. A trackless ride vehicle follows embedded guidance sensors in the floor through a series of sets and scenes, while a multi-axis robotic base below the ride carriage turns, tilts, lifts and spins riders depending on the narrative. The six-person carriage features a seat-belt restraint and a joystick for each rider. At appropriate times, the joystick, when moved left and right, causes the carriage to swing back and forth, simulating a fish moving its tail. Each rider can influence approximately 1/6th of the total possible motion allowed and at select scenes in the experience, this motion will have an effect on displayed video content, making it possible to extend a given scene (up to a limit) if riders are in sync.

The ride path is spread over two levels of the space, with two high-speed elevators enabling one cart at a time to move between each floor. This movement is narratively linked, making for an exciting, unexpected drop or rise. Much of the narrative is delivered through cinema screens linked with the motion of the carriage. Riders, wearing passive 3D glasses, experience moments of immersive 3D video as the cart pulls into a semi-spherical projection dome before seamlessly transitioning to a physical set with projection mapping as the cart moves to the next show scene.

The experience utilizes a variety and screen layouts to achieve narrative goals. From cramped, dark and claustrophobic, to vast, open and bright, Mission: S aims to provide a unique, exciting experience for families, kids and adults.