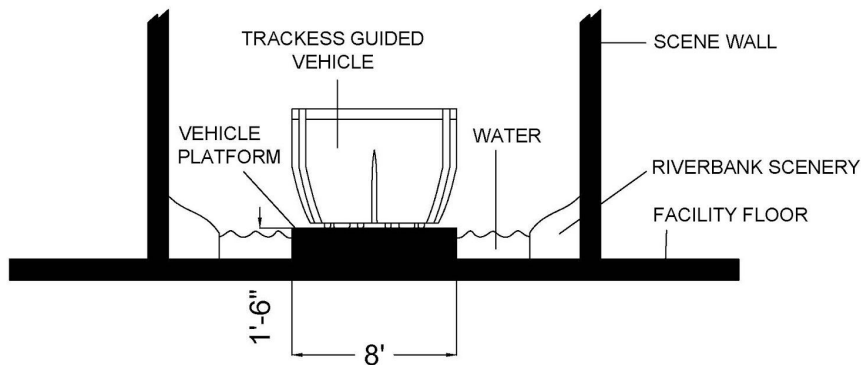


INNOVATION WRITTEN PROPOSAL Team 36

Trackless Guided Vehicle with Break-Apart Design:

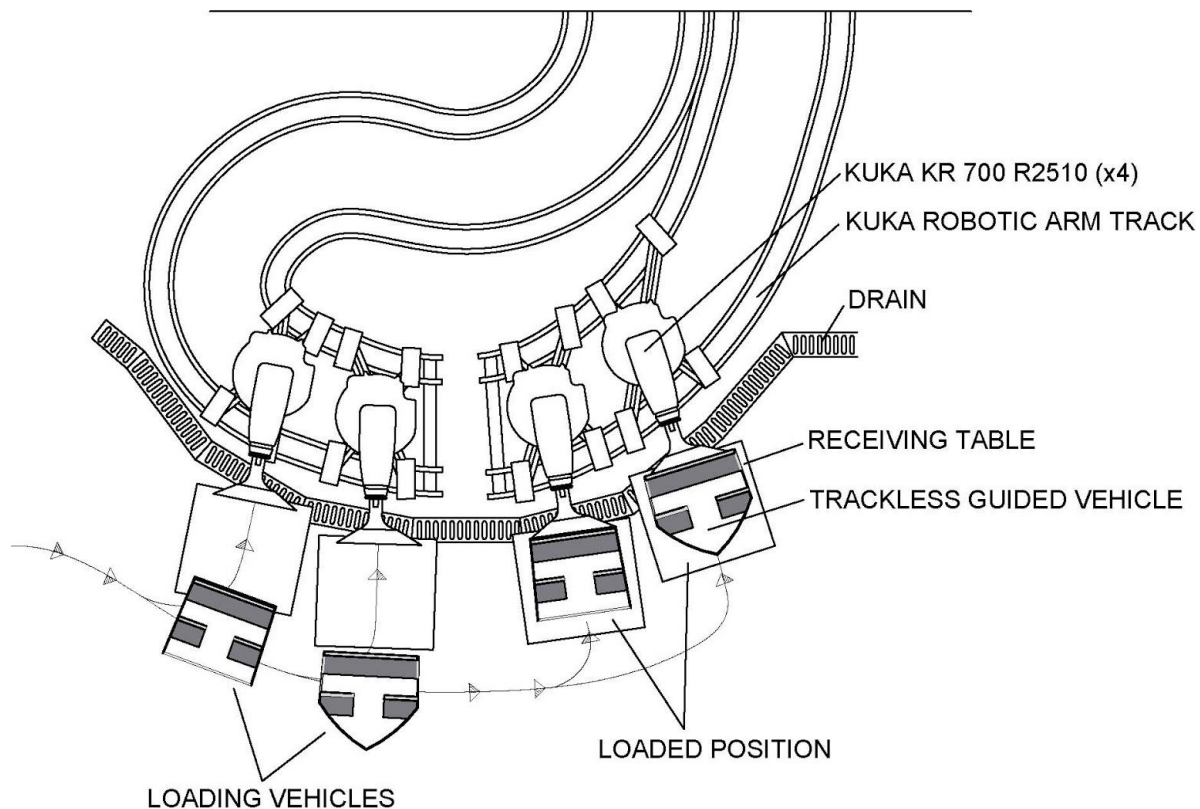
When boarding the river expedition boat, it appears to be an intact boat capable of seating 8 guests. Hidden within the facade though, are two separate carriages and chassis, (as shown on Plates 6-8 of Technical Package). For the first three scenes, the cars maneuver together as if attached. During the “Shipwrecked” scene, the carriages pull away from one another and drive independently throughout the following scenes until they are “reunited” in the sky as they travel on the industrial robotic arms (KUKA). After the KUKA arms have placed the cars back onto the vehicle platform (Fig 1.1) the carriages travel through the final show scene and into unloading as one boat. This separate carriage design allows for the interchange of boat halves and results in a higher up-time with only partial boats in maintenance, and allows for better accommodation of guests in wheelchairs with the “**Limitless passenger carriage**” half.

Water Trough for ride vehicle (Fig.1.1)



KUKA Robotic Arm Connection Table:

During the penultimate sequence of the ride, the vehicle will be propelled onto a platform connected to a KUKA arm (Fig. 1.2). Once on the platform, the vehicle is locked into place before the arm elevates using a travel-on docking lock (modeled after the EZLock Wheelchair Docking System), then raising the vehicle into the night sky. The KUKA arm itself is on a track allowing the platform carrying the ride vehicle to fly through the night sky as the KUKA arm follows its track.



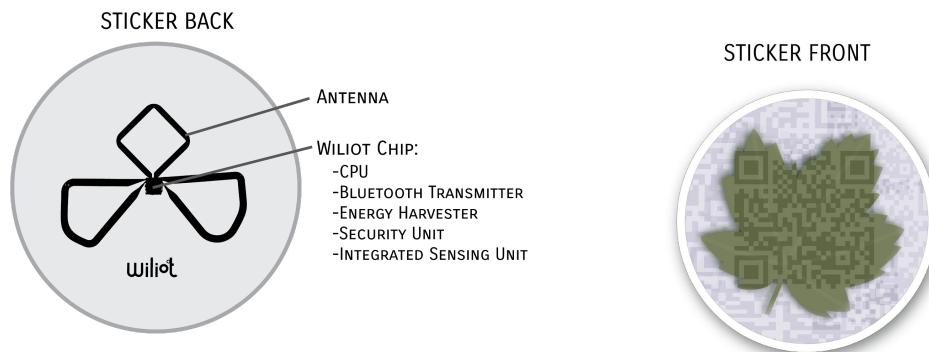
KUKA Loading Table and Track (Fig. 1.2)

Quantum System Integration into Ride Vehicle:

When designing the ride vehicle, guest accessibility was at the forefront. The Quantum is the industry's first and only standalone, fully automated wheelchair securement station. Currently only being used on public transit, the Quantum has yet to be integrated into a themed entertainment environment. At the dock, our alternately-abled guests can enter through the widened door in the **"Limitless Passenger Carriage"** (As shown on Plate 9 in *The Technical Package*) and easily back their wheelchair into the Quantum Gen II Station. The station uses field sensing and will start lowering the gripping arms automatically without guest or team member intervention. During the ride, the Quantum can adjust its grip in real-time to accommodate changes in motion. At unload, the quantum receives an all-clear from the onboard systems and retracts the gripping arms, allowing the guest to depart as easily as they boarded. This system gives every guest the equal opportunity to feel entirely independent as they navigate their own personal expedition.

Real-Time Background Queue:

Upon entering the queue pavilion, guests will receive a sticker that utilizes both Bluetooth technology and QR code technology (Fig. 1.3, 1.4). The sticker is referred to as a QR-coded & Bluetooth Sticker (QRC&B Sticker) throughout this project. The Bluetooth abilities of the sticker will remove the necessity for guests to wait in a traditional line before boarding the ride. Instead, it will mark their spot in a virtual line while they enjoy the exhibits and activities offered in the queueing pavilion. When a guest reaches the front of the virtual line, real-time responsive projection mapping programs (Like ISADORA) will locate guests via Bluetooth coordinates paired with video feedback and will indicate to the guest that they should move to the boarding area of the ride by washing them in an interactive pool of patterns, color, and light. This integration of technologies removes the responsibility of a guest monitoring their place in a physical line. Instead, it allows the guest to fully engage in the exhibits offered in the queueing pavilion until it is their turn to board the ride.



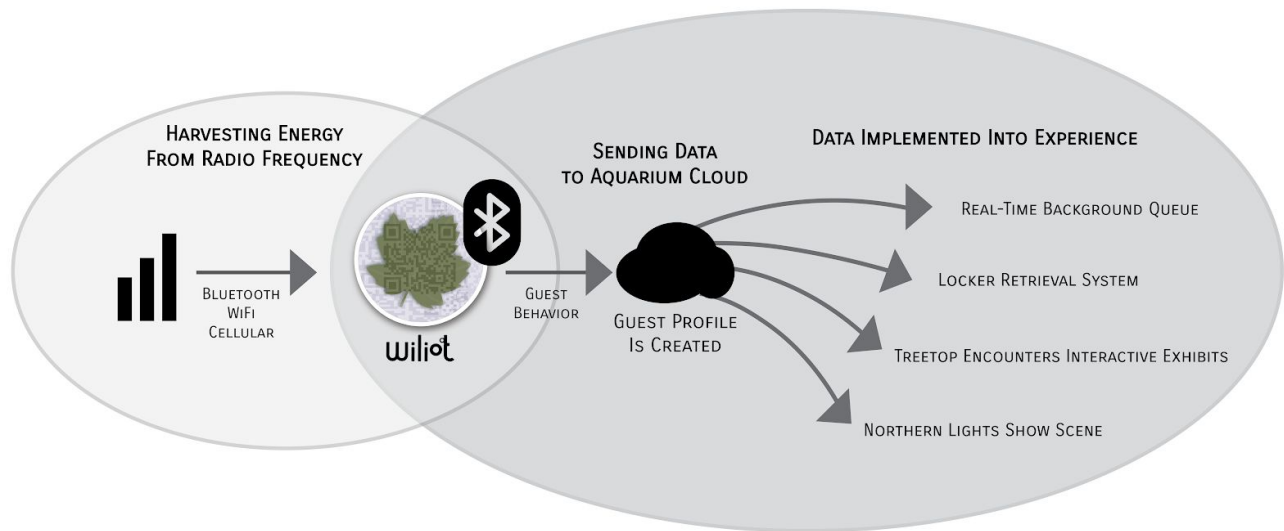
Bluetooth Sticker Components (Fig. 1.3)

QR-Code Sticker Component (Fig 1.4)

Bluetooth Technology: The technology used in this project is based on cutting edge Wiliot Bluetooth technology. The Bluetooth tags are powered using errant radiofrequency energy already in the atmosphere due to cellular, wifi, Bluetooth, and other connectivity technologies (Fig. 1.5). The tags are composed of security systems, energy harvesters, a processor, and sensing unit. The Bluetooth tag emits a wireless signal using a Bluetooth transmitter that can be picked up by Bluetooth receivers throughout the attraction. The tag works using cloud-based processing which adds greater security and accessibility to the technology. The data is accessed using an application programming interface to the cloud.

Bluetooth Personalization - Queuing Pavilion:

Data gathered from the Bluetooth stickers will use explainable artificial intelligence to discern which exhibits the guest found most interesting in order to build a personal interest data profile. Using measures such as time spent in an exhibit, the order in which exhibits are visited, and the amount of movement within an exhibit, artificial intelligence algorithms will gauge the area of highest interest to the guest and then tailor interactive portions of the exhibit to each guest.



Wiliot Bluetooth Sticker Implementation (Fig. 1.5)

Bluetooth Personalization - Ride:

Upon exiting the ride pavilion and boarding the ride, the guest will be assigned one of fifteen possible animals according to their demonstrated interests in the queuing pavilion. This animal will then appear in the Northern Lights section of the attraction. This lighting and media is discussed further in the Development Proposal.

Bluetooth Privacy Concerns:

This project plans to use Wiliot tag and Bluetooth technology in order to gather and process data for the customization of each guest's experience. All communications sent between the Bluetooth tag and the cloud are encrypted using a 128-bit ECB AES encryption scheme. Differential privacy measures would be utilized to maintain the anonymity of the individual wearing the sticker. Additionally, this technology adheres to the European Union's General Data Protection Regulations (GDPR) which is acknowledged to be the strongest data protection measure in the world.

Citations:

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