Fundamentals for HVE & HVE-2D

Fundamentals for HVE and HVE-2D – Parts I, II, III, IV and V

Instructor: Eric Hunter, P.E.

Time:
Part I - Monday, 8:45 AM
Part II - Monday, 1:30 PM
Part III - Tuesday, 8:30 AM
Part IV - Tuesday, 1:30 PM
Part V – Wednesday, 8:30 AM

We recommend that students who are new users (1 year or less) of HVE/HVE-2D take this series of classes.

Description:

This workshop series is designed for the new user who wants a basic understanding of how simulation programs help them investigate vehicle crashes and loss-of-control scenarios. Through a combination of lecture and hands-on computer labs, the student will learn how *HVE*-compatible simulation programs model vehicle behavior using physics-based calculation routines to predict vehicle trajectories based upon user entered vehicle and environmental factors, initial conditions and driver inputs.

EDSMAC4 will be used extensively in these workshops.

Topics to be covered include:

- Anatomy of a Simulation
- Inputs
- Outputs
- Tire Model
- Tire Force Calculations
- Friction Circle
- Calculation Method
- Vehicle Connections
- Collision Modeling
- Driver Controls
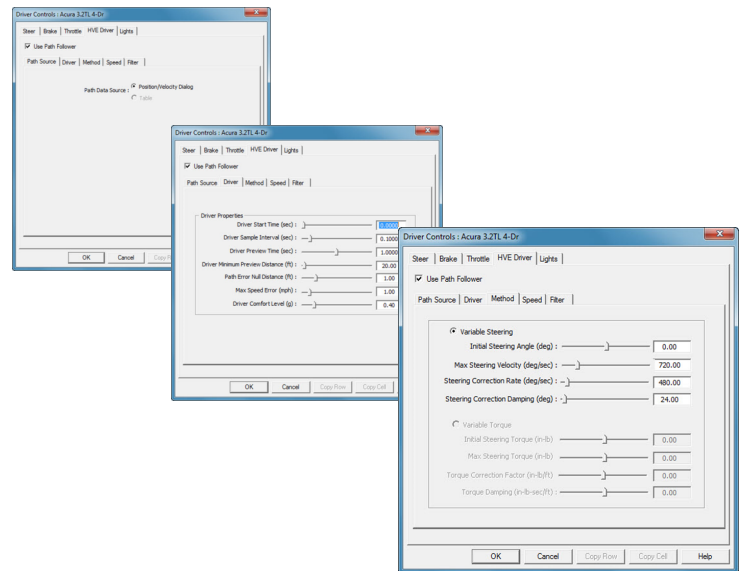
Each student should bring their own laptop computer to use for hands-on simulation exercises, such as single vehicle path modeling, two vehicle collision analysis, multi-vehicle collision analysis and articulated vehicle modeling. Students should be generally familiar with the use of the Vehicle, Environment, Event and Playback Editors in their *HVE/HVE-2D* software, as they will be used extensively in creating and executing *EDSMAC* and *EDSMAC4* simulations.

Each part of the workshop series builds upon experiences from the previous part, so students should plan to attend from start to finish. Upon completion of the workshop, the student will have gained a general understanding of how simulation programs work, and also a greater insight into their use for real-world applications.

Students are strongly encouraged to bring their computers to work through examples in these series of workshops.

Advanced HVE

Simulation Case Studies & Advanced Methods for HVE - Parts I, II, III, IV and V

Instructor: James P. Sneddon

Times:
Part I - Monday, 8:45 AM
Part II - Monday, 1:30 PM
Part III - Tuesday, 8:30 AM
Part IV - Tuesday, 1:30 PM
Part V – Wednesday, 8:30 PM

> We recommend students complete the Fundamentals for HVE and HVE-2D class before
> taking this series of classes.

Description:

This track focuses on applying HVE tools to real-world scenarios. Through in-depth case studies, attendees will explore advanced simulation techniques, vehicle and scene modeling, impact analysis, and multi-event reconstruction. Attendees will also simulate pre-crash trajectories using CDR data and compare the simulated collision pulse with the values reported by the ACM. Ideal for professionals looking to deepen their expertise in complex reconstructions.

Attendees of this workshop series should be familiar with the use of all the editors (Human, Vehicle, Environment, Event and Playback) of the *HVE* simulation environment, as they will be used extensively in the workshops. *HVE* users will be using the SIMON (with DyMESH), *EDSMAC4* and *EDCRASH* physics models.

Each workshop builds upon experiences from the previous workshop, so students should plan to attend all parts. It is highly recommended that each student brings their own laptop computer to use during the workshops.

Upon completion of the workshops, the student will have a solid understanding of how to use the actual vehicles and roadways in their simulations and reconstructions. They will also have greater insight into the capabilities of the physics models for real-world applications, which will help improve their accuracy, efficiency and workflow as a user.

Students are strongly encouraged to bring their computers to work through examples in these series of workshops.
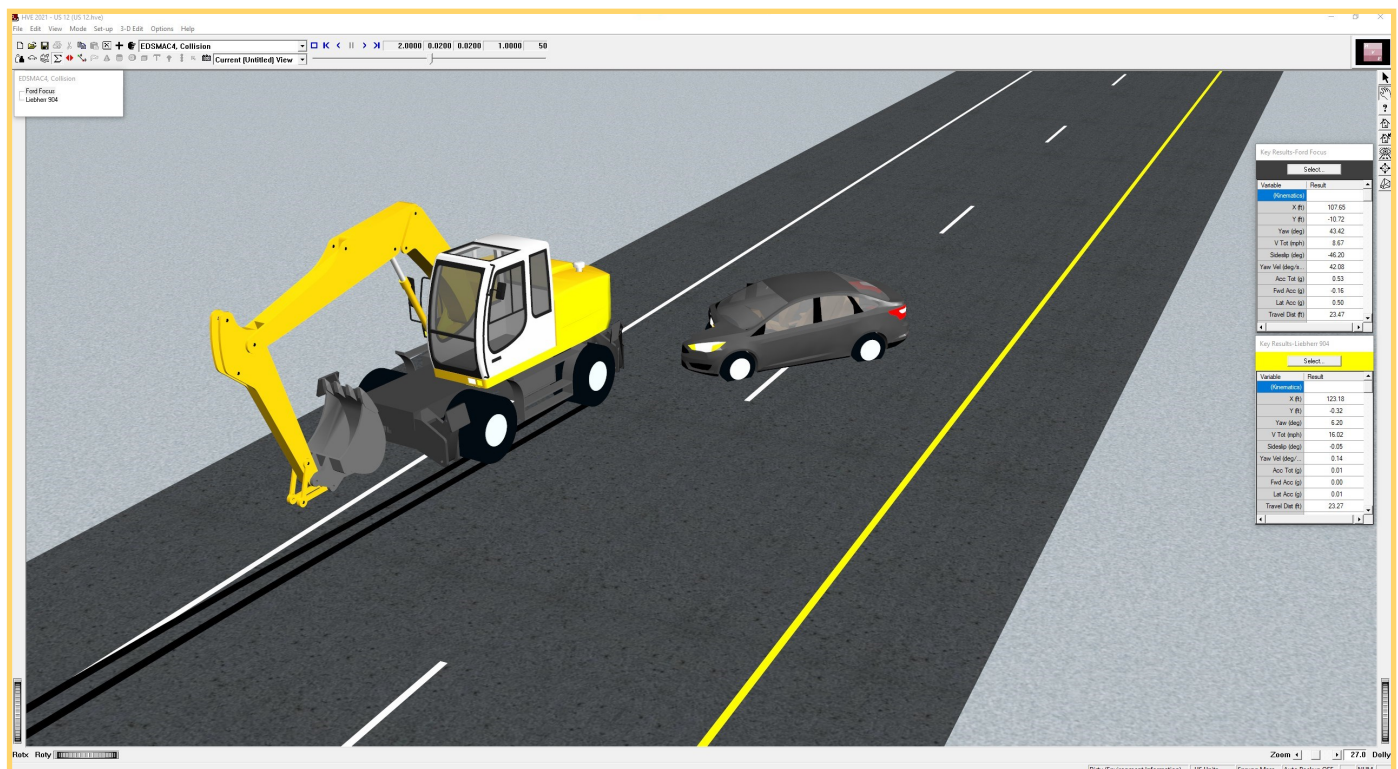
Advanced *HVE*

Beyond the Core - Parts I, II, III, IV and V

Instructors: Anthony D. Cornetto, III, P.E., Wesley Grimes, P.E.

Times: Part I - Monday, 8:45 AM
             Part II - Monday, 1:30 PM
             Part III - Tuesday, 8:30 AM
             Part IV - Tuesday, 1:30 PM
             Part V – Wednesday, 8:30 PM

> **We recommend students complete the Fundamentals for HVE and HVE-2D class before taking this series of classes. See the "Prerequisites" section of this Description for further requirements**

Description:

This advanced workshop series is designed for **experienced HVE users** who wish to extend the capabilities of their simulation studies through comprehensive **pre-processing, simulation execution, and post-processing workflows**.

Participants will:

- Use the **HVE Tools Blender add-on** to prepare and export **3D environments and vehicles** into the HVE format.
    - ♦ Source models may originate from Blender, other 3D software, or even from HVE itself (via FBX export), modified in Blender, and re-imported back into HVE.
- Create full HVE simulations using the developed environments and vehicles.
- Apply advanced post-processing techniques by importing **FBX exports** and **HVE variable output data** into Blender using HVE Tools.
- Incorporate **RaceRender** into the workflow to synchronize simulation results with video, apply data overlays, and produce presentation-ready deliverables.
- Produce high-impact visualizations, camera-matched sequences, and customized outputs for technical and non-technical audiences.

By the conclusion of the series, attendees will have a deeper understanding of how to elevate the **quality, realism, and impact** of their simulation work from start to finish. *Additional related topics may also be introduced, depending on time and participant interest.*

Learning Objectives

Upon completion, students will be able to:

- Acquire, process, and integrate point cloud and aerial data into **HVE environments**.
- Prepare and export **environments and vehicles** from Blender into HVE using the HVE Tools add-on.
- Round-trip models between HVE and Blender for editing and refinement.
- Develop and execute HVE simulations using custom environments and imported vehicles.
- Import **HVE simulation animations (FBX)** and **HVE variable output data** into Blender for advanced post-processing.
- Integrate **RaceRender** into the post-processing pipeline for synchronized video, multi-camera editing, and professional data overlays.
- Confidently apply a **complete workflow**: from raw data acquisition environment/model preparation simulation execution post-processing and visualization.

Advanced *HVE*

Beyond the Core - Parts I, II, III, IV and V (Continued)

Instructors: Anthony D. Cornetto, III, P.E., Wesley Grimes, P.E.

Description (continued):

Prerequisites

This is an **advanced-level workshop**. Attendees should:

- Be proficient in all **HVE editors** (Vehicle, Environment, Event, and Playback).
- Have significant experience using **EDSMAC4, SIMON,** and the **DyMESH 3D collision model**.
- Bring a laptop computer capable of running **HVE, Blender, and RaceRender** for hands-on participation.

Outcome

Participants of the *Beyond the Core* workshop series will:

- Possess the skills to independently build **HVE environments** and properly prepare models using Blender.
- Be able to design, create, and run **advanced simulations** using custom environments and imported objects/vehicles.
- Confidently import simulation **animations and variable data** back into Blender and RaceRender for visualization, video integration, and reporting.
- Understand how to maximize the impact of their work through **professional-grade post-processing outputs**.
- Have a solid grasp of the **complete HVE workflow**, from raw data acquisition to final presentation.
- Be prepared to explore **additional advanced topics** as time permits, providing further insight into extending HVE workflows.

Students are strongly encouraged to bring their computers to work through examples in these series of workshops.

HVE White Paper Session

HVE White Paper Session

Moderator: Terry D. Day, PE
Time: Wednesday, 1:30 PM

Description:

This session is an opportunity for *HVE* users to showcase their skills to other *HVE* users, as well as to non-*HVE* users who may require the services of a consultant. The following subjects may be addressed in the presentations:

- *HVE* Case Studies
- Innovative Tips and Techniques Using *HVE*
- Any Application of *HVE* Showcasing its Capabilities (especially events involving important 3-dimensional vehicle behavior)

Papers from each year's *HVE* White Paper Session are made available to download directly from the Library section of the EDC website, thereby expanding the awareness of the work beyond just the attendees of the *HVE* Forum.

Tips, Tricks and Tech Support Session

Tips, Tricks and Tech Support

Instructors: Anthony D. Cornetto, III, P.E. and Danny Peralta
Times: Wednesday, 8:30 AM

Description:

This workshop series is designed for all users seeking general advice on improving their HVE capabilities and answers to common technical support questions. The goal is for the users and instructors to have an open discussion where everyone can share their experiences with HVE. Mr. Peralta, having provided users with tech support for over 17 years, will be sharing solutions to some of the typical tech support questions. Mr. Cornetto will be sharing some of his "tips and tricks" as an HVE user with 20+ years of experience.

Example topics: Importing custom vehicle geometries, Environment maps, Texture maps, Using 360 imagery, Resolving Excessive Wheel Deflection and Max Suspension Force errors, Extending numeric limits within HVE, Data driven video overlays, Google Maps elevation data, USGS TNM Download and EarthExplorer.

SIMON Model Overview

Instructor: Terry D. Day, P.E.
Time: Thursday, 8:30 AM

Description:

The *SIMON* (SImulation MOdel Non-linear) vehicle simulation model was built by EDC from the ground up. *SIMON* incorporates not only new, object-oriented design technologies, it also is the first model to use all of *HVE*'s advanced features. The following materials are covered:

- Basic Model Overview - The student learns about the basic features incorporated into the *SIMON* program.
- Vehicle Dynamics Model - The student learns how a truly 3-dimensional vehicle dynamics model is designed and implemented.
- *SIMON* Extended Options - The student learns about options for performing single vehicle and articulated vehicle simulations, and for performing true 3-dimensional collision simulations using EDC's patented *DyMESH* technology.
- *SIMON* Output - The student learns about all the output parameters produced by SIMON, and how to debug and improve simulation results by evaluating the output parameters.
- Examples - This workshop provides numerous examples of the use of *SIMON* for vehicle handling and collision "studies. A special emphasis is placed on reviewing and understanding *SIMON's* output variables to improve analysis and interpretation of complex events and maneuvers.

Upon completing this workshop, the student will understand *SIMON's* general design assumptions and feature set.

DyMESH

Instructor: Terry D. Day, P.E.
Time: Thursday, 1:30 PM

Description:

The purpose of this workshop is to acquaint the student with the capabilities of the updated *DyMESH* collision model. The following material is covered:

- Basic *DyMESH* Version 4 Overview - The student is exposed to the basic modeling approach used by *DyMESH* Version 4, and how *DyMESH* calculates forces between vehicles.
- Modeling of Wheel Impact - The student learns how *DyMESH* calculates forces acting on a vehicle's wheels.
- Differences Between Version 3 and Version 4 - A discussion of changes in Version 4 and how those changes affect results.
- *DyMESH* Integration into *SIMON* - The student learns how *DyMESH* Version 4 is incorporated into the *SIMON* model to provide a complete simulation of a collision event.
- *DyMESH* Output Parameters - The outputs resulting from a collision simulation are presented and explained.
- *DyMESH* Validation - Validations are presented providing examples of the use of *DyMESH* for vehicle vs. vehicle and vehicle vs. barrier crashes.

The Theory Series, Continued

HVE BrakeDesigner, ESS and Traction Control

Instructor: Terry D. Day, P.E.
Time: Friday, 8:30 AM

Description:

In this workshop the student will learn the theoretical basis and practical application of the *HVE* Brake Designer. Specifically, the course will cover:

- Free-body analysis of various brake types
- Overview of the new heavy truck disc brake model (air brake)
- Temperature (thermodynamic) model for a drum brake
- Recently introduced temperature (thermodynamic) model for a disc brake
- Using the *HVE* interface to simulate a complete brake system, from the brake pedal to the wheel brake assemblies
- Examples using the *HVE* Brake Designer for parametric studies and ways to accurately simulate a failed brake system
- The student attending this workshop will also learn about the *HVE* ABS and ESS Simulation Models. Specifically, the course will cover:
- An overview of ABS/ESS and current ABS/ESS methodologies
- A detailed discussion of the *HVE* ABS and ESS Simulation Models user interface and how various parameters are used.
- The updated model for displaying skidmarks from tires on ABS/ESS-equipped vehicles
- Examples comparing maneuvers with ABS/ESS-equipped and non-ABS/ESS-equipped vehicles

Upon completing this workshop, the student will have the background and practical knowledge necessary to incorporate custom brake and ABS/ESS simulation models into their *HVE* vehicle simulations.
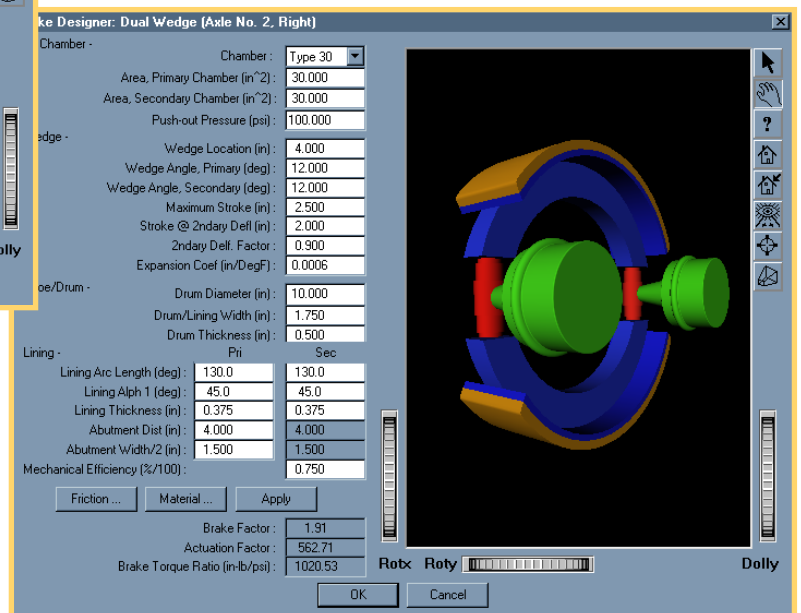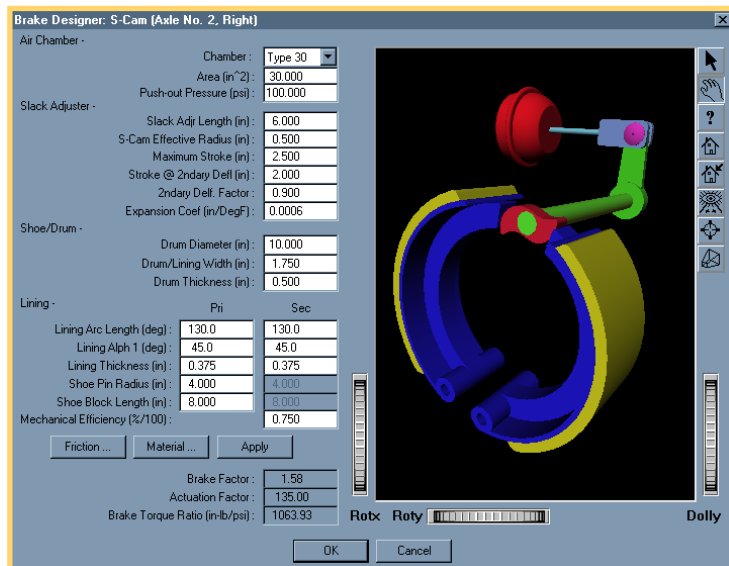
Building Environment Models

Advanced 3-D Environments, Part I, II & III

Instructor: James P. Sneddon
Times: Part I - Thursday, 8:30 AM
              Part II - Thursday, 1:30 PM
              Part III–Friday, 8:30 AM

Description:

The purpose of this workshop is to extend an HVE User's abilities to build detailed three-dimensional terrain models for their simulation studies. A terrain model will be built of a real-world roadway from point cloud data acquired with a three-dimensional scanner. Rhinoceros and Blender 3D modeling software will be used in conjunction with the 3-D Editor to create an environment model. The same methods can be applied to a total station survey. **It is highly recommended that each student installs an evaluation copy of Rhinoceros and the Blender 4.5 LTS on their laptop computer.**

The following material is covered:

- Review of actual site and identification of key elements
- Planning terrain model requirements
- Discussion of surveying and data collection methods
- Creating a three-dimensional terrain model from a point cloud
- Add additional roadway markings such as center lines and fog lines
- Establishing mesh density and surface normal orientation
- Importing 3-D Environment from 3rd party CAD or COGO software
- Quality checking the finished terrain model using simulations of vehicles driving on the surface

Upon completing the Advanced 3-D Environments workshops, the student will understand the methodology used to build a environment model and be able to acquire point data themselves using a 3D scanner or total station, or work with a surveyor to develop a model for their use in *HVE*. Additionally, the student will be familiar with the processes required to build detailed models of any roadway or terrain required for their own detailed simulation studies.

Building Vehicle Models

Building Vehicles

Instructor: Daniel Peralta
Time: Thursday, 1:30 PM

Description:

This workshop introduces the processes and standards EDC uses to build vehicles for *HVE*. The following material is covered:

- The process used by EDC to obtain the necessary vehicle data as well as the format required by the *HVE* Vehicle Data structure. A sample Vehicle Data File is reviewed in detail.
- How to prepare custom vehicle geometries for use in HVE and an overview of how custom vehicle geometries can be created from scratch
- Creating custom vehicles by editing the data of a class specific generic as well as the process of saving this customized vehicle into the User database for use in future cases
- Adding functional lights and an undercarriage texture to custom vehicle geometries

Upon completing this workshop, the student will have a good outline to follow for building *HVE* and *HVE-2D* compatible vehicles as well as the necessary tools for customizing the appearance and data of an existing vehicle.

Using The 3-D Editor

3-D Editor: Functionality, Friction Zones, Overlays & Importing Models

Instructor: Daniel Peralta
Time: Thursday, 8:30 AM

Description:

This workshop will expose the student to the features and capabilities of both the Environment Editor and its 3-D Editor. The Environment Editor is used to create 2D Aerial Photo Environments as well as import 2D and 3D terrain files. The 3-D Editor allows you to enhance an imported environment model by assigning friction factors, applying textures, or even adding functioning traffic signals. When necessary, the 3-D Editor can also be used to create simple environment models.

The following material is covered:

    Navigating the 3-D Editor
    Editing imported environments
    Supported file types
    How to prep environment models to successfully import them into *HVE*
    How to import and scale 2D aerial images
    Applying a sky image and the HVE sky dome
    Adding friction zones and how they are used by HVE
    How to use the Scissors tool to extract portions of a mesh and decrease its polygon count.
    HVE Overlays (a.k.a. Layers)
    What happens when overlapping surfaces exist (i.e., tunnels, bridges, road lanes) and how HVE determines which surface
        to pay attention to and which to ignore

Simulation Movies

Video Creator and Movies

Instructor: Daniel Peralta
Time: Friday, 8:30 AM

Description:

This workshop introduces students to the HVE Video Creator and its capabilities for producing high-quality AVI videos and still frames from simulation data. Participants will learn how to control camera perspectives, combine multiple events into a single video, and create both real-time and slow-motion videos. The session also explores how to export HVE content for use in external applications such as Blender for advanced rendering and post-production.

Topics covered include:

- Using the Camera Dialog to define and control video perspectives

- Combining multiple HVE simulations into a single cohesive video

- Creating HD simulation videos in real-time or slow motion using the Video Creator

- Exporting HVE scenes into Blender for enhanced visual rendering

- Editing the Language.Overrides.rsc file to adjust the number of significant digits shown in simulation results

By the end of this workshop, students will be able to generate professional-quality simulation videos, extract still frames, and present multi-event crash sequences. They'll also be equipped to enhance their visual output using external rendering tools.

2026 *HVE* Forum Travel Information

The 2026 *HVE* Forum will take place March 2 - 6, 2026, at the Harrah's Hotel Tower. To receive the special hotel room rate of $199 + taxes per night, visit www.edccorp.com and use the 2026 *HVE* Forum Hotel Room Reservation Link on the 2026 *HVE* Forum page (the room rate includes $20 per resort fee). Reserve your room while space is available in the room block. The room block will expire on February 6, 2026. It is strongly recommended to make your reservations as soon as possible.

Hotel Details:

Address: Harrah's Hotel Tower
228 Poydras Street
New Orleans, LA 70130

Website: www.caesars.com

Online Reservations: **EDC 2026 HVE Forum**

About The Hotel:

The Harrah's Hotel Tower is nestled in a quaint part of the New Orleans on the border of the Warehouse district and the French Quarter with the Mississippi River just a few steps away.

On-site amenities include:

- Free Wi-Fi through the hotel
- Ruth's Chris Steakhouse on-site restaurant,
- Manning's is adjacent to Harrah's and there are several other restaurant options at Caesar's "Casino (there is an underground passage to the Casino from Harrah's)
- Fitness facilities
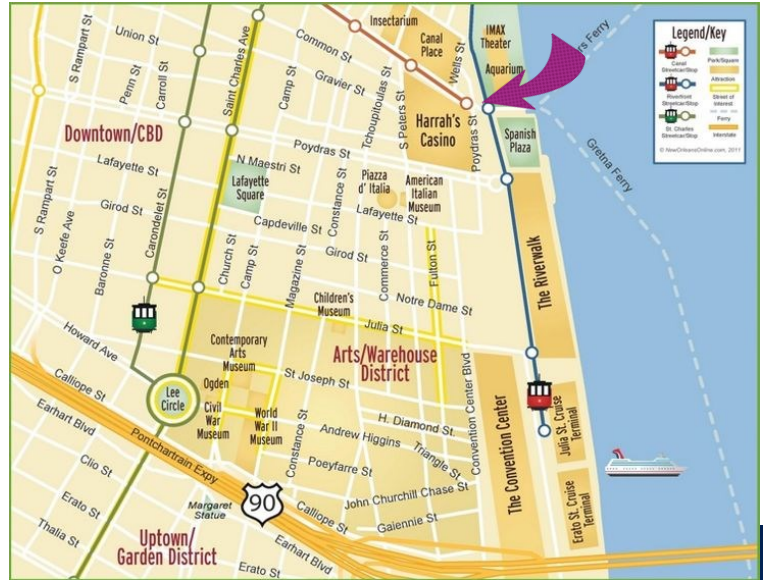- Discounted Self Park
- 24-hour Business Center

Hotel Parking:

- Self parking: $20/day

Airport & Ground Transportation Suggestions:

- Louis Armstrong New Orleans International Airport (MSY)
   Distance from Hotel: 16.1 miles via I-10E
- Taxi Fare (estimated) - Approximately $35-45
- Uber/Lyft Fare (estimated) - $44

Other Hotels Nearby:

If you find that your choice of room at the Brice is not available, please call EDC Customer Service for other hotels in the area.

See y'all in New Orleans!