Using HeliSIM Course Syllabus

Session duration: **Classroom 4 days***

***Note:** This syllabus covers only a portion of the course. The other part of the course is a development workshop taught by a software engineer.

Main Objective

In this course, you will learn how to effectively use HeliSIM and receive a global overview of its capabilities and data structures.

Upon completion of the course, you will be able to define and modify Flight Models, and test them using the HeliSIM tools.

Target Audience

This is an ideal course for users and developers with basic PC knowledge that want to learn how to use HeliSIM.

Prerequisites

This course assumes basic PC knowledge.

Format

This Instructor-led course is taught through a series of lectures and hands-on exercises in which you learn how to use all of the components of the tool.

Topics Covered

- Introduction to HeliSIM
- HeliSIM Components
- Licenses and Documentation
- HeliSIM 3D Viewer
- Runtime Perspective
- Setup, Plots, Tests and Communication and Control
- Modeler Perspective
- Flight Model, Engines and Additional Loads
- Equation Editor
- Curve Panel
- User Parameters, User Curves and User Dataset
- Replacing User's module
- Communicating with Shared Memory
- Pilot input devices

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Detailed Description

Lesson 1: Introduction to HeliSIM

- About HeliSIM
- Course goals
- Block diagram
- HeliSIM components
- HeliSIM installation
- HeliSIM folders
- Licenses
- License Types
- Documentation and Help
- The HeliSIM 3D Viewer
- Starting the 3D Viewer
- Training package installation
- EXERCISE 1-1: Flying an helicopter
- EXERCISE 1-2: Flying an helicopter (Training folders)
- Keyboard Commands

Lesson 2: Run-Time Perspective

- Run-Time perspective
- Perspective description
- Title Bar
- Menu Bar
- Perspective toolbar
- Simulation Control toolbar
- Run-Time Control
- Configuration panes
- Setup
- Plots
- Tests
- Communication and Control
- Projects and profiles
- Saving a Project
- Project Settings
- About profiles
- Profile shortcut menu
- Using different folders for the exercises
- EXERCISE 2-1: Adding turbulence
- EXERCISE 2-2: Doing a TEST Flight

- EXERCISE 2-3: Making a flight test
- EXERCISE 2-4: Creating a Trajectory Profile

Lesson 3: Modeler Perspective

- Modeler perspective
- Perspective Description
- Equation Editor
- Component Coordinates Editor
- Curve Panels
- User Parameters, User Curves and User Datasets.
- User Parameters
- User Curves
- User Datasets
- HeliSIM Coordinate Systems
- Axes of an helicopter
- Aircraft Design Coordinate system
- Supported reference frames
- Simulation model Overview
- Using different folders for the exercises
- EXERCISE 3-1: Creating a User Dataset
- EXERCISE 3-2: Creating a User Curves
- EXERCISE 3-3: Creating a User Parameter
- EXERCISE 3-4: Creating a User Dataset, two User Curves and two Control Surfaces
- EXERCISE 3-5: Modifying the Yaw Coeficient
- EXERCISE 3-6: Summary Exercise

Lesson 4: HeliSIM Development

User Modules

- What is a User Module?
- How does it work?
- Shared library user modules
- Shared library daemon functions list
- Shared library permanent functions list
- Shared library system list
- Shared library subsystem list
- Permanent function API (Hlsim_Api_Perm_Fct)
- Daemon function API (Hlsim_Api_Dmon_Fct)
- System model API (Hlsim_Api_System)
- System Model Load Structure
- Subsystem Model API (Hlsim_Api_Subsys)
- Subsystem Model Load Structure .

- EXERCISE 4-1: Replacing a HeliSIM default system
- EXERCISE 4-2: Adding a new HeliSIM default system
- EXERCISE 4-3: Replacing a subsystem
- EXERCISE 4-4: Create a user module using Global Data
- EXERCISE 4-5: Creating and Accessing Private Data
- EXERCISE 4-6: Creating subsystems
- EXERCISE 4-7: SAR and RAP Examples

Lesson 5: Communication

- Shared Memory
- Export Buffer
- Coded definition
- nCOM definition
- Installing pilot control devices
- Using different folders for the exercises
- EXERCISE 5-1: External App Reading from Shared Memory
- EXERCISE 5-2: Pilot Input Devices