



# **HOPE: An On-Line Piloted Handling Qualities Experiment Data Book**

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## *HOPE: Hyperlinked Overview of Piloted Evaluations*

# Motivation

- Desire access to experimental data, in context, by multiple investigators to understand trends during conduct of experiment
- Central collection of all experimental data
- Easy searching and browsing of data
- Multiple ways to view data subsets – by pilot, task, configuration
- Hyperlinks to associated pilot comments and experimental numerical metrics from different viewpoints
- Ease of software development with unit testing for confidence

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# Background

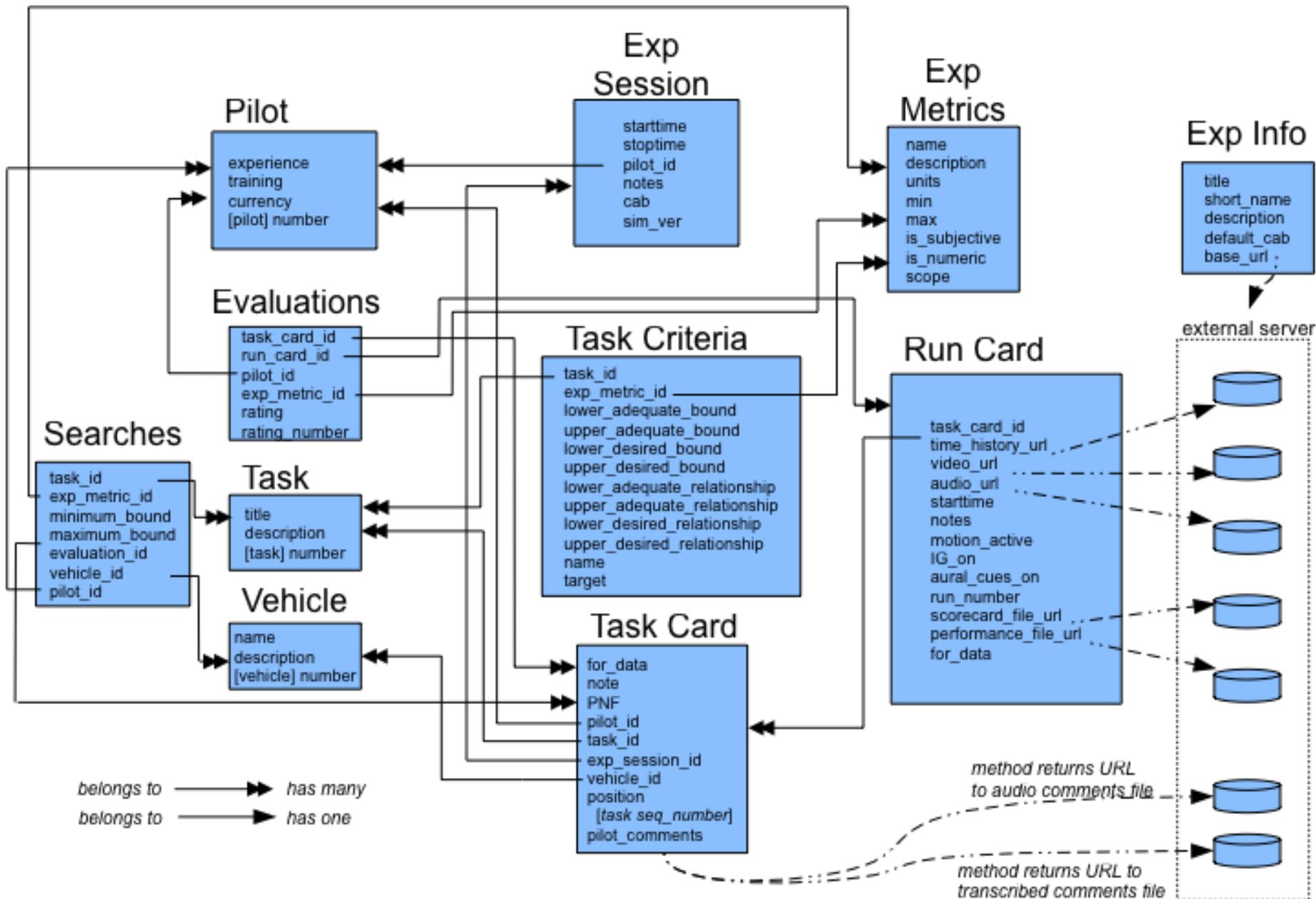
- Both authors developed early Web repository of High-Speed Civil Transport flying qualities research in 1990s
  - Supported multiple simulation facilities, multiple partners
- Early time-history data search tool was a web form/CGI script that allowed selection of data runs of various tasks, pilots
- Spacecraft Handling Qualities (SHaQ) project funded by NASA Exploration Missions Directorate in 2007 to develop handling quality design guidelines for future COTS and NASA spacecraft
- Good application for a web-based tool for collecting and sharing the experiment data

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# Software Tools

- Ruby-on-Rails chosen as development environment
- SQLite 3 chosen as database engine
- Ruby is an open-source, object-oriented, multi-platform, scripting language with built-in support for testing
- Rails is a Ruby-based open-source, multi-platform framework for providing a Web-based GUI to edit and query a relational database (supports many database formats)
- SQLite 3 is an open-source, multi-platform, simple SQL database engine

# Hyperlinked Overview of Piloted Evaluations (HOPE) Database Schema



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# Features

- Web-based application for multiple user simultaneous access
- Stores numerical metrics, experiment log, pilot information, transcribed comments and information about vehicle configurations and evaluated tasks
- Provides links to more voluminous time history data, audio and video recording server
- Provides both read-only and read/write privileges to individual accounts
- Limited search capability (at present)
- Multi-platform SQLite/Ruby-on-Rails
- Customizable/extensible (thanks to Ruby)

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# Project Status

- Retroactively used for two spacecraft docking handling qualities studies
- Supported real-time data capture during lunar-landing handling qualities study
- Currently being used for autopilot interface study (ground-sim)
- Will be used on upcoming supersonic flexible aircraft handling qualities study at LaRC
- 3,000 lines of custom code (excluding comments)
- 400 lines of test code
- 50+ different views (web pages)

# Demonstration

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# Concluding Remarks

- Ties all simulation results together in one virtual location
- Allows a team of people to simultaneously conduct the experiment, review trends in the data, enter transcriptions, etc.
- Hyperlinking within HOPE simplifies analyzing the data when it's time to write the report
- Free and customizable with signed license agreement
- Available on written request: [bruce.jackson@nasa.gov](mailto:bruce.jackson@nasa.gov)

