

[www.ife.no/steams](http://www.ife.no/steams)

*We connect STEAMS to your simulator  
and help configure STEAMS for your simulator tags.*

# Simulator Training Evaluation and Monitoring System – STEAMS

STEAMS is a software product to record and play back simulator sessions. It integrates audio, video, screen content, data logs, instructor-initiated malfunctions, operator actions and plant responses into a combined, synchronized stream for post-scenario replay and analysis.

STEAMS provides quick and easy means to search and find interesting sequences of a recorded session, and immediately synchronizes all data sources to the selected time. This makes STEAMS superior to traditional video-based recordings.

## APPLICATIONS

STEAMS is applicable to simulator-based training in nuclear, petroleum, power, and other industries. STEAMS supports tasks such as

- in-scenario or post-scenario debriefs
- performance assessments and qualification exams
- learning from recorded best-practice operations
- document compliancy during scenario-based simulator testing

## PROJECTS

Together with [Exitech Corporation](#), IFE installed STEAMS and connected it to customers' simulators at

- [Farley nuclear power plant](#), Alabama, USA
- [Comanche Peak nuclear power plant](#), Texas, USA
- [Cook nuclear power plant](#), Michigan, USA

STEAMS is based on well-proven prototypes used by IFE's researchers to assess operating crew performance in HAMMLAB studies for the NEA Halden HTO Project since 2011.



*Image from recorded session during STEAMS acceptance testing at Comanche Peak power plant*

## KEY FEATURES

During playback, STEAMS presents

- audio from selected devices, with individual volume control
- video from selected cameras
- searchable lists of operator actions, plant alarm & event responses, and instructor-initiated malfunctions and notes
- trend plots of searchable process parameter values
- images captured from selected operator control screens and plant process computer screens

The user can play & pause, and easily select any specific time from a recorded scenario by dragging a slider, selecting from searchable lists of events, or clicking on trend plots. STEAMS immediately synchronizes all data sources to the selected time and is ready to play.



*Operator using STEAMS during self-assessment after completing a simulator session*



IFE has more than 30 years of experience in studying operator crew behavior and performance in complex operating environments to ensure safe, reliable and efficient operation. We study human-machine interaction and crew collaboration, and integrate the knowledge gained into methods for safety analysis, new designs and support systems. Read more about our simulator-based research facility at [www.ife.no/hammlab](http://www.ife.no/hammlab)

STEAMS is developed based on experiences and prototype tools from HAMMLAB.

## SYSTEM OVERVIEW

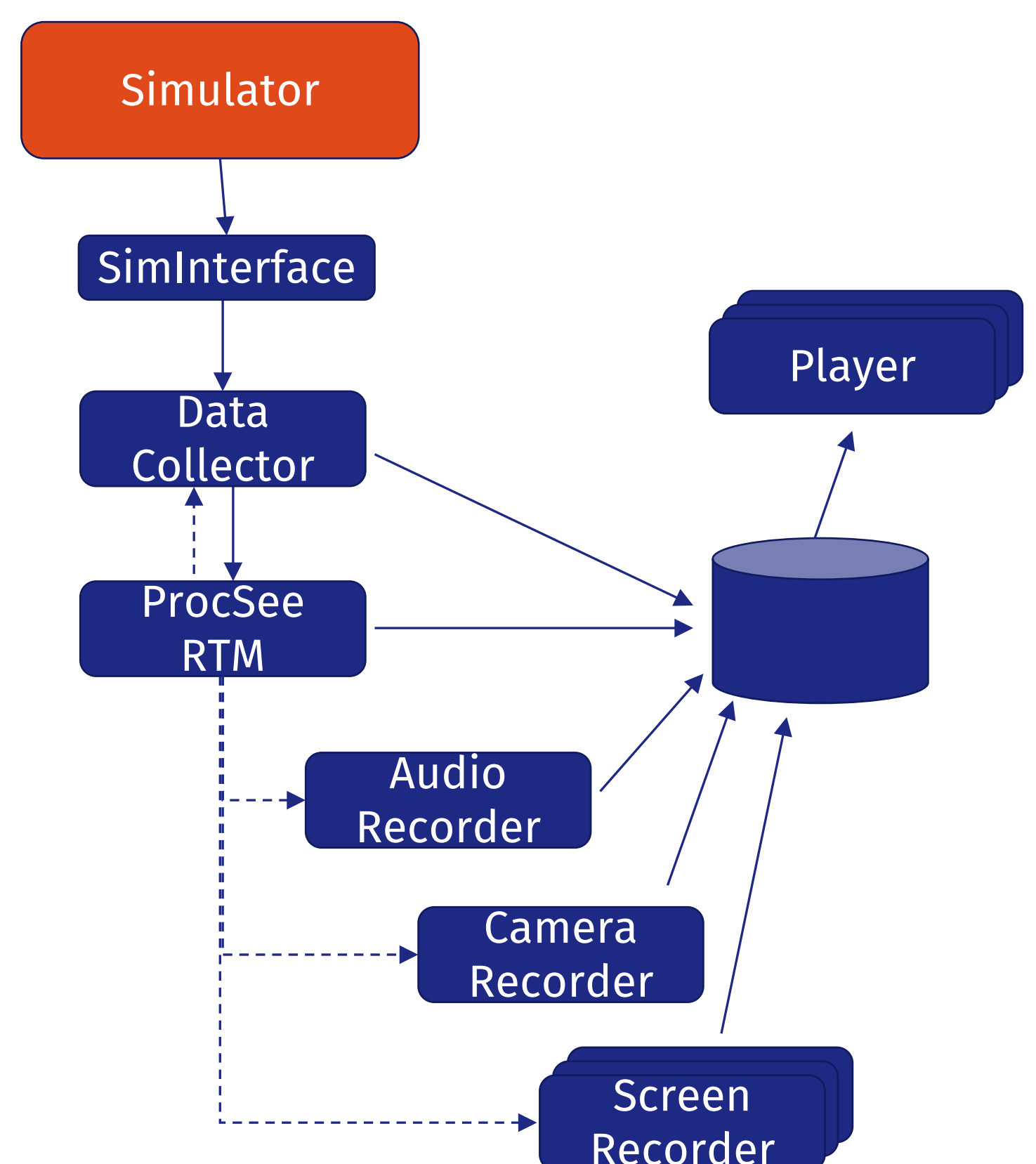
STEAMS includes the following modules:

- **Player** is a desktop application performing the playback of recorded data. A multi-monitor PC is recommended to provide sufficient screen space for watching multiple camera- and screen recordings in parallel.
- **SimInterface** extracts variable values from the simulator and sends to the Data Collector. It accesses simulator variables through shared memory, TCP/IP, OPC or other means provided by the simulator vendor.
- **Data Collector** connects to SimInterface and subscribes for values for the selected set of simulator tags. Stores the values for trend plots.
- **ProcSee RTM** performs two main tasks:
  - Provides the HMI to monitor and control the recording of sessions. The instructor's commands to start and stop a recording is immediately forwarded to all other modules.
  - Evaluates conditions to determine if operator-, process- or instructor-events occurred. If an event condition is determined, the event text details are stored. The set of conditions and the corresponding event text details are configurable by the customer.
- **Audio Recorder** records from audio devices and stores individual audio files.
- **Camera Recorder** captures and stores images from cameras at regular intervals whenever changes are detected.
- **Screen Recorders** capture and store the contents of selected operator control screens and plant process computer screens at regular intervals whenever changes are detected.

## DATA STORAGE

Recorded data is stored to a folder selected by the instructor at the start of the session. Folders are tagged by date, time and additional parameters selected by the instructor; such as operating crew and simulator scenario.

The data store may be a portable hard drive, a local disk on the recording computer or the company's central file server.



*STEAMS modules and how they relate.  
Solid lines denote data flows; dashed lines  
denote control flows.*