

# Victory DoE

Victory Design of Experiments

SILVACO

## 개요

Victory DoE는 TCAD 시뮬레이션 프로젝트를 자동화하여 실험을 수행하고 데이터를 분석하는 UI 기반 소프트웨어 솔루션입니다. 사용자가 시뮬레이션 데크 편집, 디버깅, 시각화를 완전히 제어할 수 있는 실바코의 DeckBuild 환경과 호환되도록 설계되었습니다. 또한 Victory DoE는 시뮬레이션 효율을 높여주는 최첨단 DoE 알고리즘을 제공합니다.

## 특징

- Victory DoE의 시뮬레이션 데크는 DeckBuild와 호환
- Victory DoE의 DOE 기능과 결합하여 DeckBuild를 유연하게 활용
- UI 기반의 시뮬레이션 프로젝트
- 프로젝트 간에 쉽게 탐색할 수 있는 직관적인 사용자 인터페이스
- 시뮬레이션 프로젝트를 플래그, 시간, 주석, 파일 크기 등의 다양한 방식으로 정렬하여, 다중 프로젝트 구성에 도움
- 하나의 Victory DoE 툴을 통해 여러 프로젝트를 동시에 관리
- 시뮬레이션 결과는 실바코의 고유 형식과 csv 형식으로 저장
- Victory Visual (실바코의 TCAD 결과 시각화 툴)과 완벽하게 통합
- 시뮬레이션 동안 실시간으로 구조를 시각적으로 표현 가능
- LSF (Load Sharing Facility) 지원

## Dashboard View

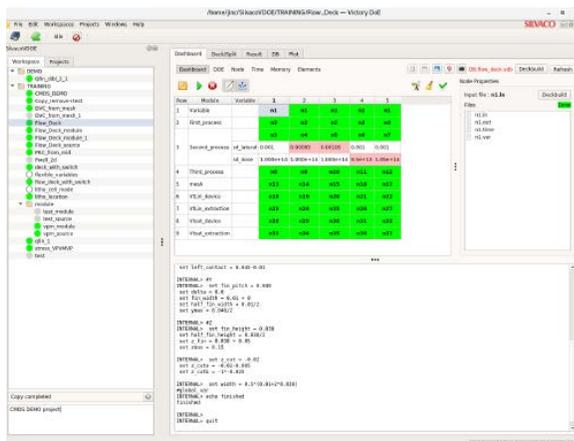
- Controls simulation progress, structure visualization, debug, and add / delete simulation conditions
- Monitors the simulation progress by reviewing output and structure files
- Displays simulation time for all nodes. Displays maximum memory usage and maximum number of nodes during simulation
- Enables addition and deletion of simulation conditions
- Modification of the "golden-deck" and re-run of the project

## Simulation Project Workspace

- Manages simulation projects, which are organized like directory structures
- Supports multiple workspaces
- For each project, users can assign a flag and attach comments
- All essential file management tools are provided: copy (clean), paste, archive, clean project, lock, etc.
- Allows users to perform search and sort based on the file name, time, flag, file size, ...etc.
- Shared workspace enables a collaborative workflow in which multiple users share projects
- Simulation examples are available through default example workspaces

## Golden-deck and DOE Table

- Victory DoE uses the "Golden-deck" concept, where a main deck is chosen as the DOE target file
- Deck / Split View to construct a simulation project by assigning the Golden-deck with as supplemental file
- Define DOE input variables and create DOE tables
- Drop-zone for managing the deck and supplemental files
- Any set commands in the Golden-deck can be DOE inputs
- Simulation version and number of threads are automatically assigned as split variables
- Users have the option to lock the simulation version per project
- DOE tables can be created manually or automatically using the DOE builder



Victory DoE 메인 화면



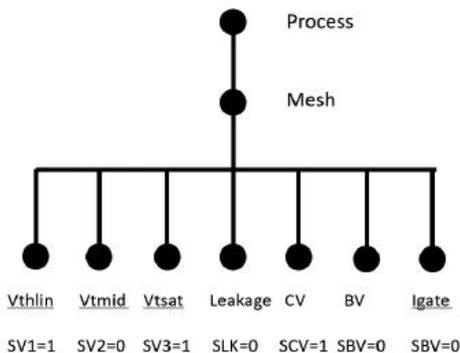
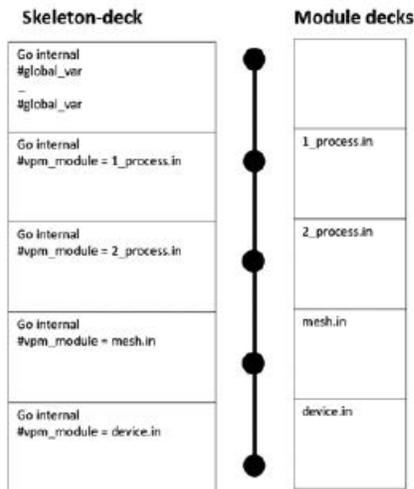
## Special Project Flow

### 1. Skeleton with multiple modules

- Inspired by the conventional software development flow in which a project is comprised of multiple modules. Each module can run independently so that it can be plugged into other projects
- The goal of the skeleton-deck is to build a deck using modules
- Splits are performed on modules
- Modules can be processing recipes or device characterization (IVs, CVs)
- Ideal for collaborative work environment (no requirement of "deep" TCAD simulation knowledge)

### 2. Switch function with superset golden-deck

- This flow is coming from the requirement that engineers want to have a single superset golden-deck and use only a portion of the flow. Examples may include a conventional CMOS project having NFET, PFET, Vtlin, Vtsat, breakdown, leakage, CV curves, etc. This method is advantageous in keeping the golden-deck golden
- Victory DoE offers a switch function with which users run a portion of the golden-deck more efficiently



Schematics of Special Simulation Flow (A) Skeleton/module Flow  
(B) Switch Feature on the Single Golden-deck Flow

## Simulation Version Control

- Victory DoE provides straightforward management of simulator versions
- All Silvaco simulation tool versions are displayed in a simple table format
- Ability to lock the simulation tool version for each project

Versions Control — Victory DoE

App	Version	Date	
1	internal	1.0.0.R	Feb-17-2022
2	clever	3.11.30.A	Jun-13-2023
3	VP	8.19.0.A	Jun-06-2023
4	VD	1.23.0.A	Jun-16-2023
5	VM	1.10.0.R	May-11-2023
6	VRCX	1.3.0.R	Jun-01-2023
7	DB	5.2.21.R	Jun-12-2023
8	devedit	2.8.26.R	Jan-26-2016
9	VV	1.6.2.R	Jun-22-2023
10	Athena	5.26.2.R	Aug-09-2022
11	Atlas	5.35.1.C	Dec-15-2022
12	VA	1.7.1.A	Feb-09-2023
13	UT4	0.20.0.A	Jun-22-2023
14	UT	30.3.0.R	Mar-25-2014

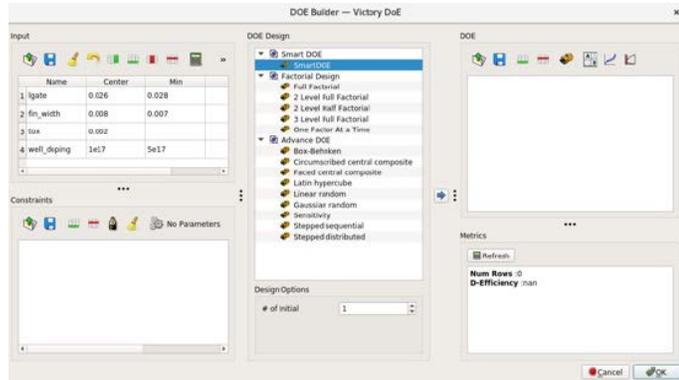
Local Version Lock  On  Off

Module	Inputs	Sim	Version	Thread	Precision
1	SACOX	0	VP	8.9.0.A	4
2	STI_FILL	-1	VP	8.19.0.A	4
3	PWELL	-1	VP	8.19.0.A	4
4	NWELL	-1	VP	8.19.0.A	4
5	Well_anneal	-1	VP	8.19.0.A	4
6	extract	-1	VP	8.19.0.A	4

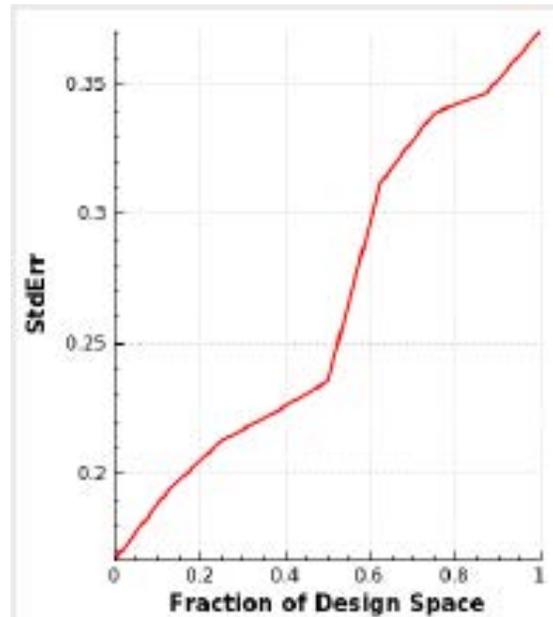
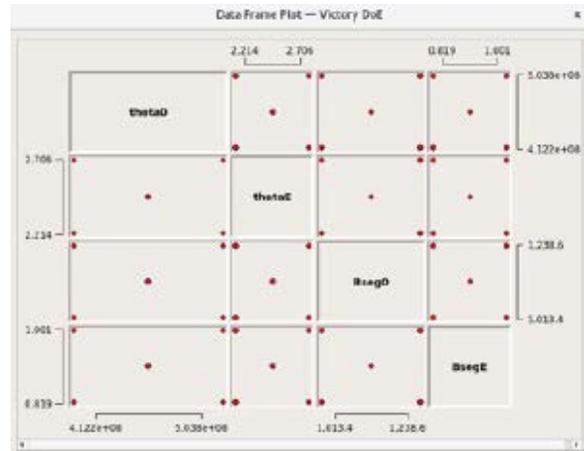
Simulation Tool Version Control (A) Global Version Control (B) Local Version Control

## DOE Builder

- Generate DOE table from various DOE algorithms
- Option to add Augmented and Constraints DOE features
- Provides state-of-the-art DOE algorithms such as computer-generated DOE from D-optimization algorithm
- Visualization of DOE table
- DOE builder supports Fraction of Design Space (FDS) plot
- Power analysis of DOE is conducted in the DOE builder



DOE Builder



(A) DOE plot (B) Fraction of Design Space Plot

# SILVACO

HEADQUARTERS  
4701 Patrick Henry Drive, Bldg #23  
Santa Clara, CA 95054



Rev 071823\_01

NORTH AMERICA  
BRAZIL  
EUROPE

sales@silvaco.com  
br\_sales@silvaco.com  
eusales@silvaco.com

JAPAN  
KOREA  
TAIWAN  
SINGAPORE  
CHINA

jpsales@silvaco.com  
krsales@silvaco.com  
twsales@silvaco.com  
sgsales@silvaco.com  
cn\_sales@silvaco.com

WWW.SILVACO.COM