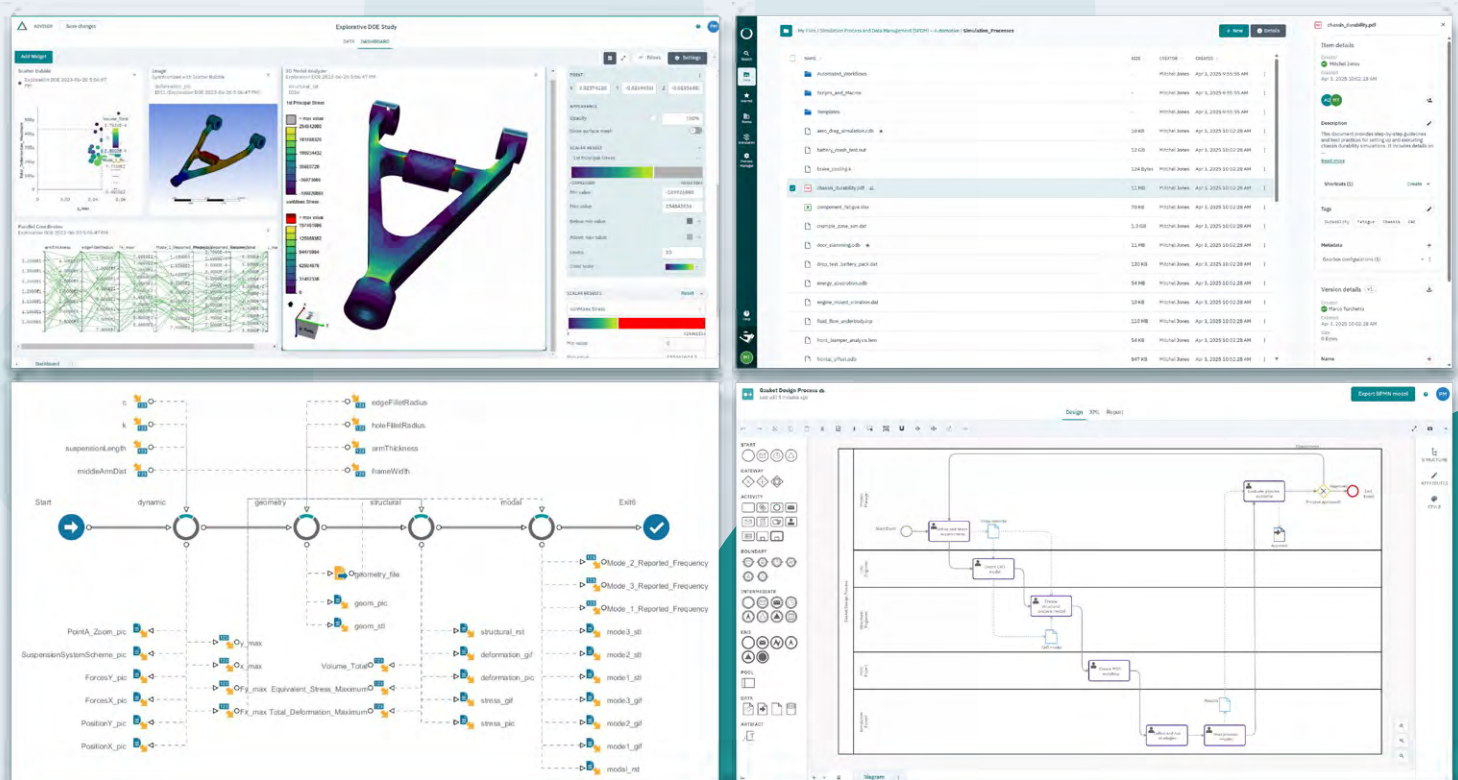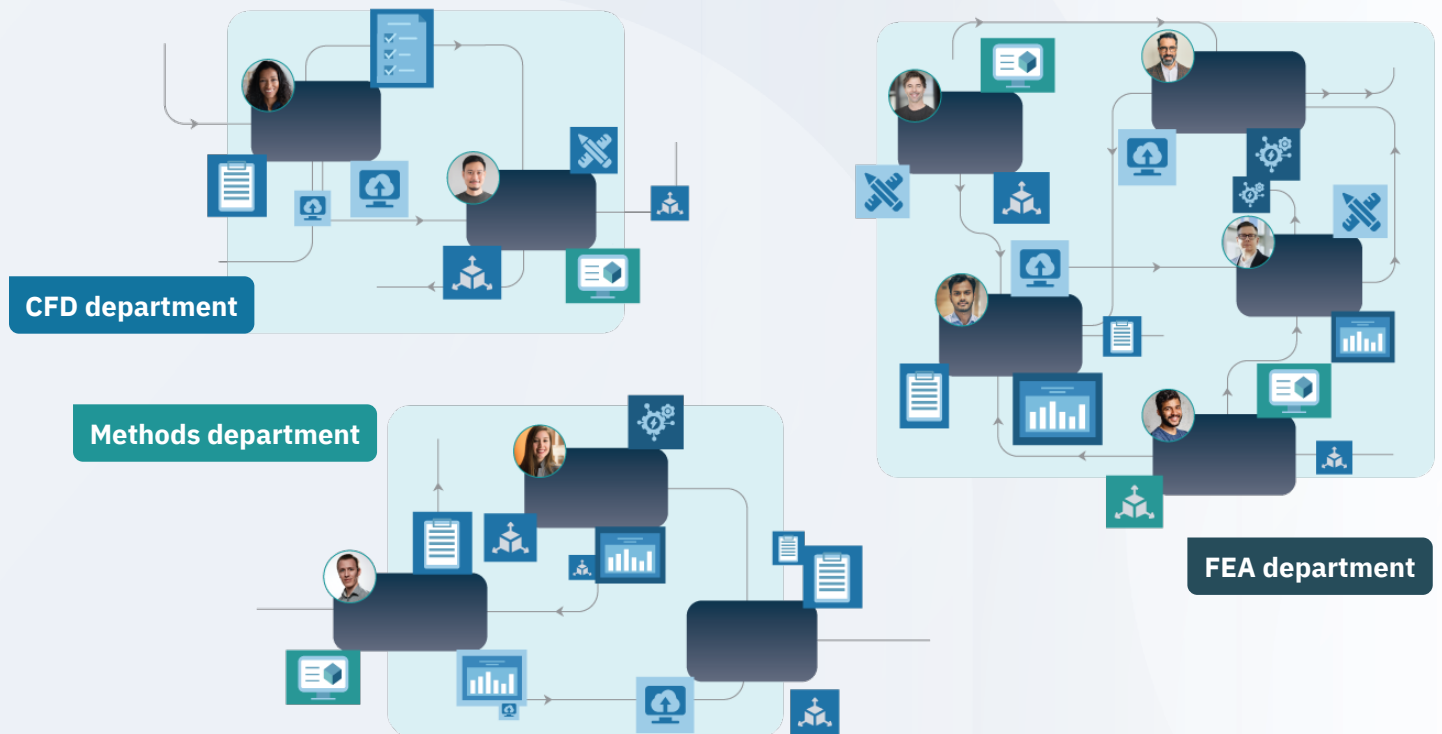# VOLTA

Take full control over the engineering design process. From simulation workflows to high-level business decisions

The digital engineering platform for SPDM and MDO

esteco.com/**volta**

Simulation operational challenges

CFD department

Methods department

FEA department

Siloed departments restrict collaboration
Many engineering teams still share simulation data (such as CAD geometries, CAE models, simulation workflows, reports) via worksheets, email, or shared drives with no version control. Tracing results back to a particular model can include manual interactions, increasing the throughput time.

Undefined engineering design processes
Traditional project management tools make it difficult to trace and reproduce engineering design processes. Tracing where a request for simulation came from, who is in charge of preparing a CAD or performing CAE analysis, and where to access the latest version of this data can be redundantly complex.
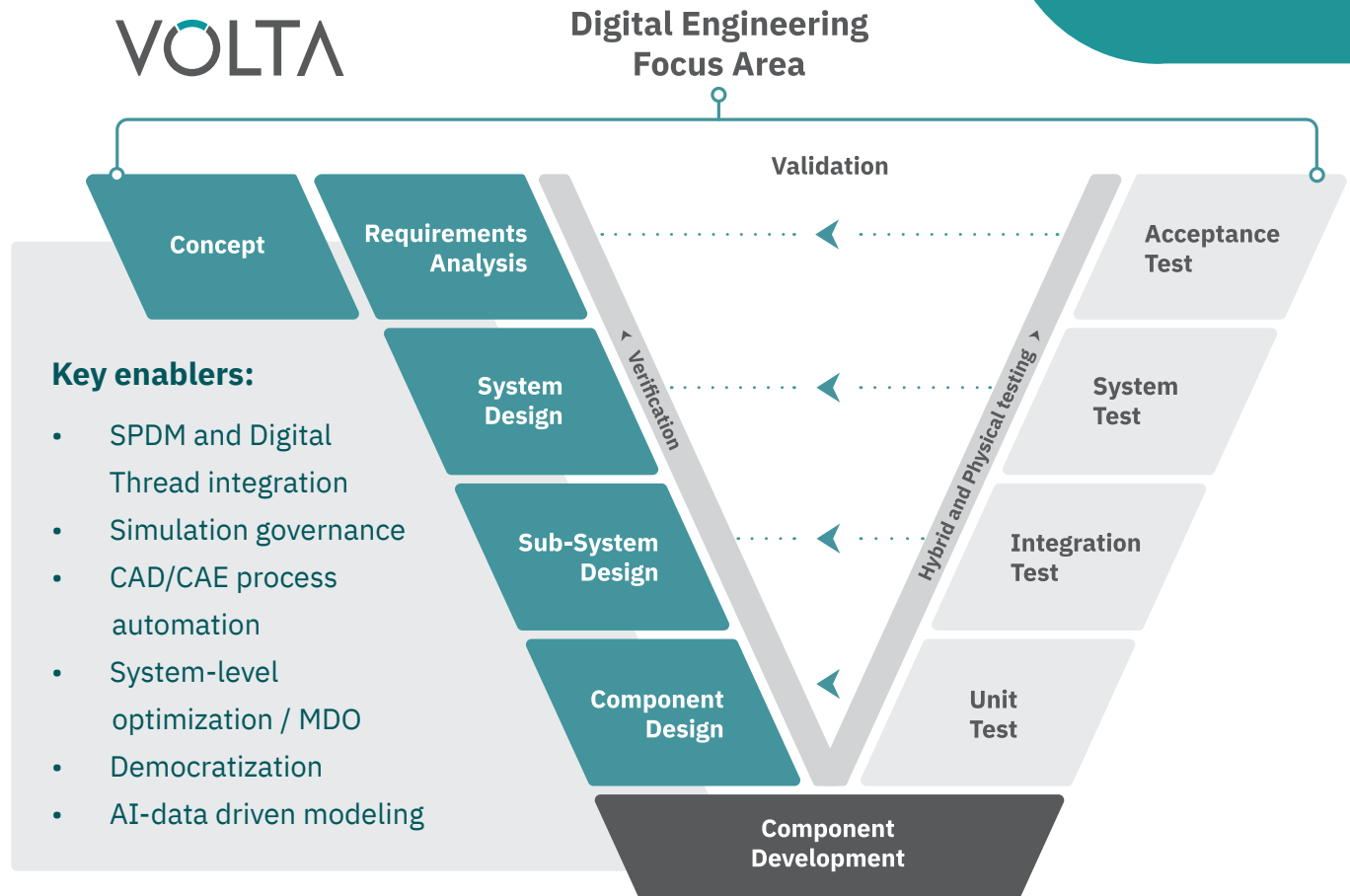
Fragmented access to many vendor-locked tools
Subject matter experts use a myriad of CAD, CAE, and in-house tools within their domain of expertise. This generates multiple simulation workflows which are difficult to track and standardize.

Access to simulation data is limited to domain experts
Simulation throughput is limited by the capacity of a restricted number of experts to perform analysis using their highly specialized desktop application.

Imagine an SPDM solution that...

VOLTA

Digital Engineering Focus Area

Validation

Concept	Requirements Analysis				Acceptance Test
		System Design			System Test
		Sub-System Design			Integration Test
		Component Design			Unit Test
			Component Development		

Verification

Hybrid and Physical testing

Key enablers:

- SPDM and Digital Thread integration
- Simulation governance
- CAD/CAE process automation
- System-level optimization / MDO
- Democratization
- AI-data driven modeling

SPDM and Digital Thread
Enable digital continuity by connecting PLM and SPDM systems to a digital engineering framework like VOLTA platform.

Simulation governance
Version control of the design process: data simulation models and workflows.

CAD/CAE process automation
Automatically run repetitive simulations and avoid the process of manually combining the output from multiple applications.

System-level optimization / MDO
Automate multi-models simulation to optimize the overall system performance, not only individual components.

Democratization
Deliver effective design exploration and optimization capabilities in the hands of non-expert users.

AI Data-driven modeling
Perform Reduced Order Models (ROM) analysis through a simplified run configuration interface.

VOLTA at a glance

Make multidisciplinary simulation, optimization and decision-making available to any engineer to innovate product designs faster.

SIMULATION GOVERNANCE

- User access
- Collaboration
- Versioning
- Traceability
- Knowledge Management
- Company IP Protection

PROCESS DATA MGMT

DATA/MODEL MANAGEMENT
- CAD model
- Simulation model
- Experimental model

BUSINESS PROCESS MANAGEMENT (BPM)
- User Task
- Service Task — BPM linked to simulation workflow

MODEL EXECUTION

SIMULATION WORKFLOW
- Single model automation
- Multi-Model automation

METHODS
- Single run
- DOE
- Optimization/MDO/UQ

INSIGHTS

ANALYTICS
- ROMs
- RSM
- Machine Learning

VISUALIZATION
- Design Charts
- 3D CAE visualization

ENTERPRISE DEPLOYMENT
- Standalone
- Cloud-native

EXECUTION AT SCALE
- Cloud
- Workstation
- HPC

OPEN ECOSYSTEM (Rest APIs)
- Web app creation
- Integration with Digital Thread
- MBSE/PLM

Why VOLTA?

Rapid deployment: standalone or cloud-native

Vendor-neutral SPDM ecosystem

Integrated design optimization

Web environment for global collaboration

MDO becomes a cross-team effort

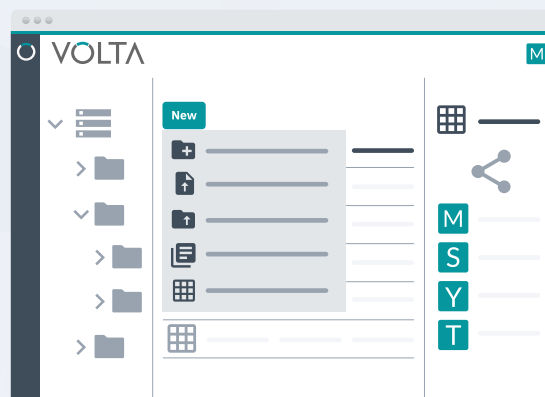**World-class engineering support**

Core capabilities

VOLTA encourages more engineers to leverage simulation from the earliest stages of design.

SPDM empowered with Business Process Management (BPM)

Data Manager

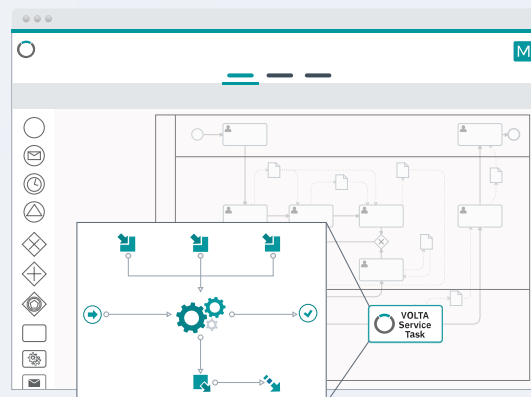Capture, version and share simulation data securely on the web:

- Keep track of all your data, CAD/CAE models, simulation workflows and design space exploration studies.
- Set permissions to access files and protect company IP.
- Access analysis data anytime, anywhere, and from any device.

Modeler

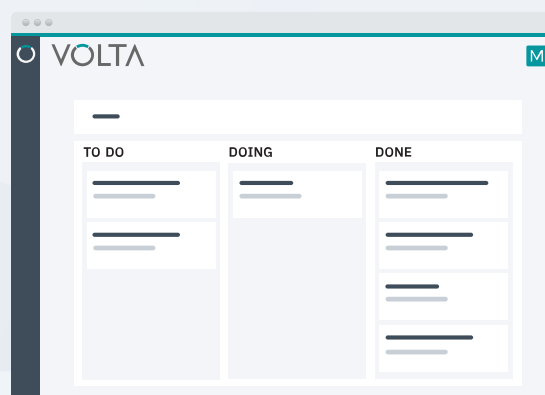Model business processes for simulation-driven design:

- Model business processes for simulation-driven design with BPMN 2.0 workflow editor.
- Manage people interactions and integrate tasks in executable business processes.
- Power up SPDM technology by enabling simulation workflow automation in the business process.

Process Manager

Execute engineering design processes:

- Run processes created in the Modeler environment.
- Manage process sequence and deliver tasks to the right resource at the right time using a Kanban board.
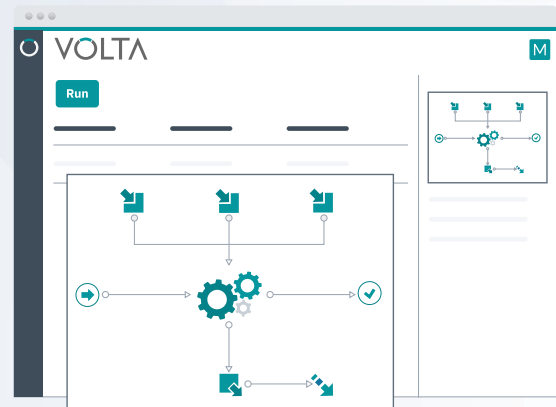- Ensure full traceability to keep track of every action performed during execution.

Model execution

modeFRONTIER technology

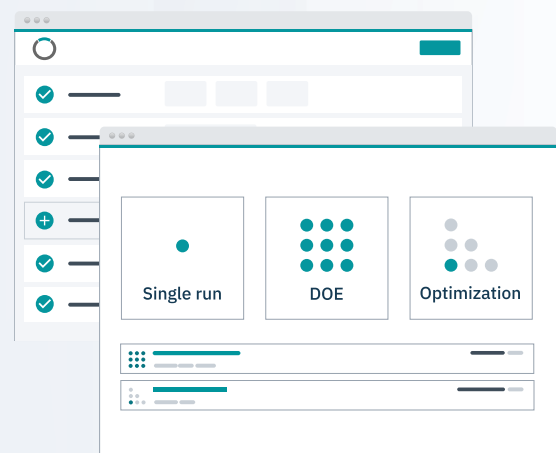Manage multidisciplinary design analysis from a single automated vendor-neutral workflow:

- Integrate any CAD/CAE or in-house software into modeFRONTIER simulation workflows.
- Seamlessly connect modeFRONTIER and VOLTA.
- Upload multidisciplinary workflows to VOLTA and perform system level design space exploration studies.

Planner
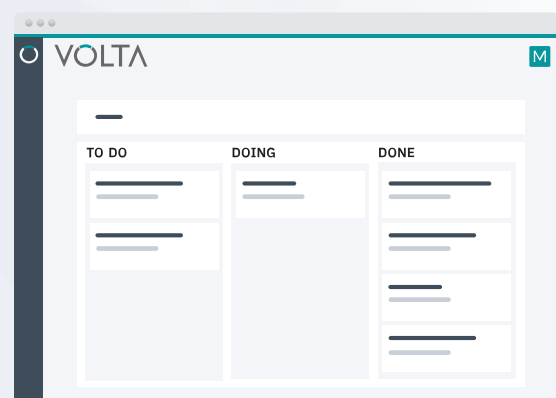
Execute pre-configured simulation:

- Separate simulation workflow from design space exploration strategy.
- Apply multiple design space exploration scenarios on the top of the same simulation workflow.
- Share optimization studies with other team members.

Player

Distribute computational workloads across HPC and cloud environments:

- Smartly use computing resources to reduce lead time.
- Execute simulations in parallel on ICT infrastructures.
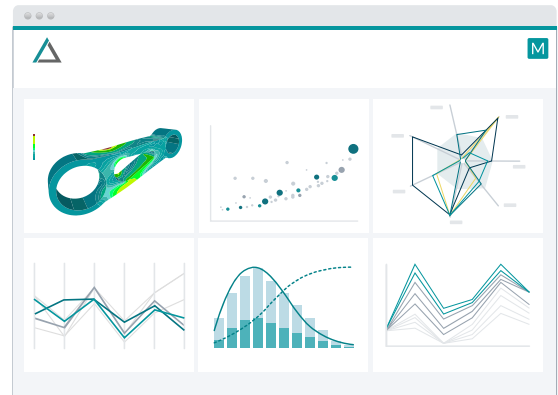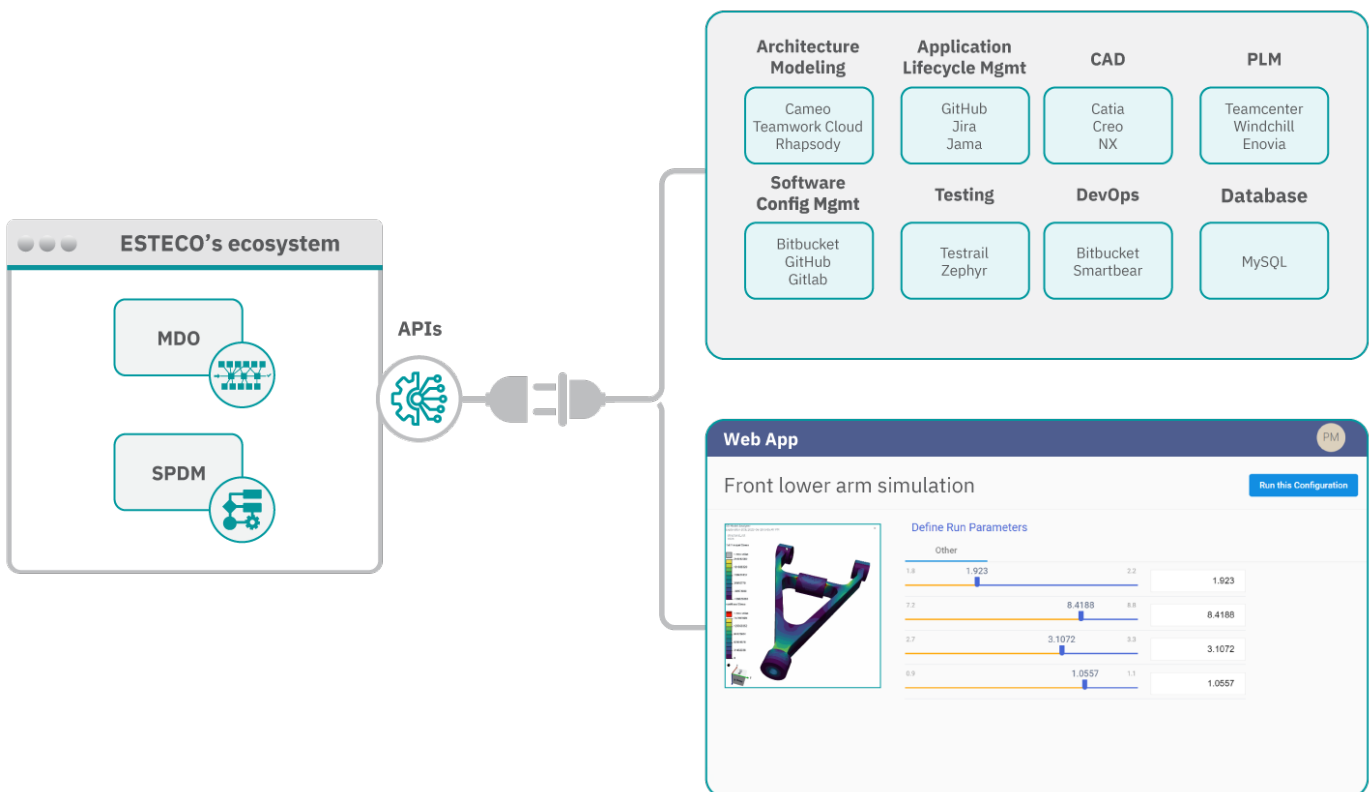- Exploit multi-core workstations, HPC clusters and public clouds.

Insights

Advisor

Create post-processing dashboards for analyzing design space exploration studies:

- Interpret simulation data with a wide array of advanced data analysis tools and web-based interactive charts.
- Enable multiple stakeholders to predict product behavior and share insights.
- Access simulation results and change requests in real time.

Open ecosystem (REST APIs)

Architecture Modeling	Application Lifecycle Mgmt	CAD	PLM
Cameo Teamwork Cloud Rhapsody	GitHub Jira Jama	Catia Creo NX	Teamcenter Windchill Enovia

Software Config Mgmt	Testing	DevOps	Database
Bitbucket GitHub Gitlab	Testrail Zephyr	Bitbucket Smartbear	MySQL

ESTECO's ecosystem

MDO

SPDM

APIs

Web App

PM

Front lower arm simulation

Run this Configuration

Define Run Parameters

Other

1.8	1.923	2.2	1.923
7.2	8.4188	8.8	8.4188
2.7	3.1072	3.3	3.1072
0.9	1.0557	1.1	1.0557

Digital Thread connector

Connect MDO and SPDM capabilities with enterprise Product Lifecycle Management (PLM), Model-Based Systems Engineering (MBSE), and other data management platforms. Maintain a Digital Thread and ensure that the right data is accessible at the right time.

Web app creation (Runbox)

Enable non-expert users to unleash the power of design space exploration with the VOLTA Runbox web app. Simplify access to complex simulation capabilities by building intuitive, low-code applications that streamline decision-making and innovation.

Value-driven partnership with our customers

CUMMINS

"What makes ESTECO stand out is the independent nature of their business and the ability to work with lots of different software vendors to help make those connections seamless and easy for us. A lot of times we look at someone of ESTECO like another Cummins resource who can help us develop and grow in our capabilities."

RAYTHEON

"We're making another big step in Raytheon's digital transformation journey by selecting ESTECO's digital engineering framework, called VOLTA, for our data sharing across the product life cycle."

SLB

"The partnership and training provided by the ESTECO team was a key for one of our research centers where we deployed and heavily used modeFRONTIER and VOLTA to develop one product line of tools which are now manufactured and commercialized."

TOYOTA

"VOLTA automates time-consuming CAE processes. From DOE and surrogate models creation to exploration of Pareto front, post-process and visualization of simulation results. This enables a wider audience of our engineers to perform vehicle performance trade-off studies more easily."

Open Architecture

SPDM
Empowered with
**Business Process
Management**

CAE
**Process Integration
and Automation**

**Simulation
Data Analytics**

**Design
Optimization**

**HPC
& Cloud**

Interested in trying VOLTA hands-on?

Schedule a live demo tailored to your needs.

sales@esteco.com

ESTECO is an independent software company, specialized in numerical optimization and simulation process and data management. With a 25-year experience, ESTECO supports over 300 international organizations (such as Eaton, Ford Motor Company, Honda, Raytheon, SLB, Toyota and Whirlpool), accelerating the decision making process and reducing development time. **esteco.com**