

EDSA[®]

Professional Power System Design and Simulation

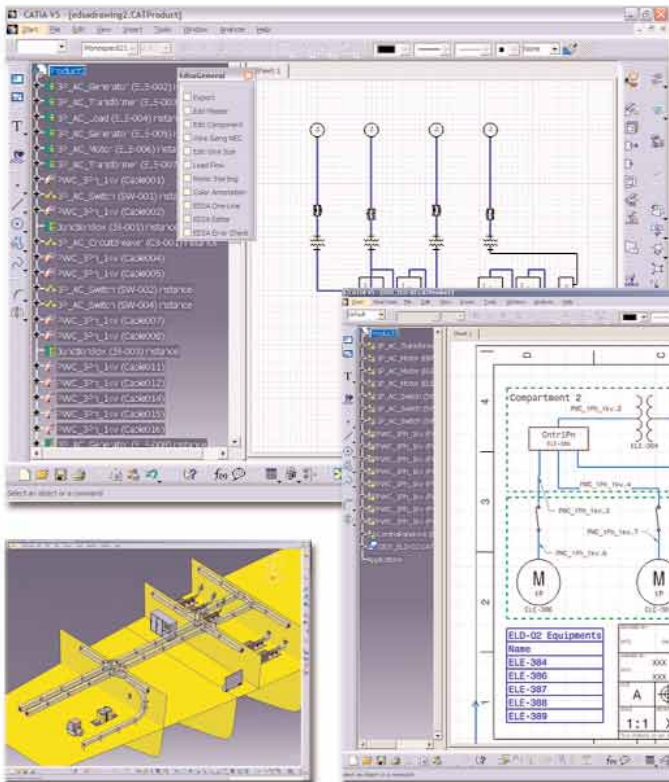
for CATIA[®] V5



Elegance of CATIA® V5 with the Power of EDSA®

EDSA CAA for CATIA V5 is a complete, highly sophisticated CAD/CAE system specifically designed for power system design and simulation within the CATIA V5 environment. EDSA CAA for CATIA V5 can be applied to the design and analysis of any type of power system and adapted to meet exactly the specific requirements of every **electrical distribution and transmission system**, both in engineering and operation and maintenance.

A full electrical model serves as the main information vehicle for power system design and simulation information. The model contains associative and parametric relationships, material definition, static and dynamic attributes, and manufacturing and installation data. This **model is created once** and increases in fidelity as the design matures and progresses from concept through detail.



The model may be stored in a **full ODBC** format with the most recent design information available to all users so that genuine cooperative working is possible.

The 2D EDSA CATIA Document can directly link with the CATIA 3D environment - delivering a truly visual modeling and simulation platform.

APPLICATIONS:

- POWER SYSTEM DESIGN
- POWER FLOW ANALYSIS
- FAULT ANALYSIS
- PROTECTION COORDINATION
- WIRE SIZING
- ARC FLASH SIMULATION
- TRANSIENT STABILITY
- VOLTAGE STABILITY ANALYSIS
- GRID STABILITY SIMULATION
- POWER QUALITY ANALYSIS
- RELIABILITY ANALYSIS
- OSHA COMPLIANCE



Full connectivity and interactivity between 3D and 2D layouts

REPORTING:

- BUILT-IN PROFESSIONAL REPORT WRITER
- ADOBE ACROBAT PDF ENGINE BUILT-IN
- INPUT DATA REPORT GENERATION
- BILL OF MATERIALS REPORT GENERATION
- MAN HOUR COST ESTIMATION
- TOTAL PROJECT COST ESTIMATION

An important reduction in the design cycle can be expected mainly due to powerful tools to perform and control design modifications and the impact of such changes from an engineering viewpoint.

EDSA CAA for CATIA V5 has been conceived as an integrated solution to solve, in a practical way, all design demands in modern power systems. EDSA's Modular package approach offers the possibility of a progressive implementation which allows our clients to spread their investment.

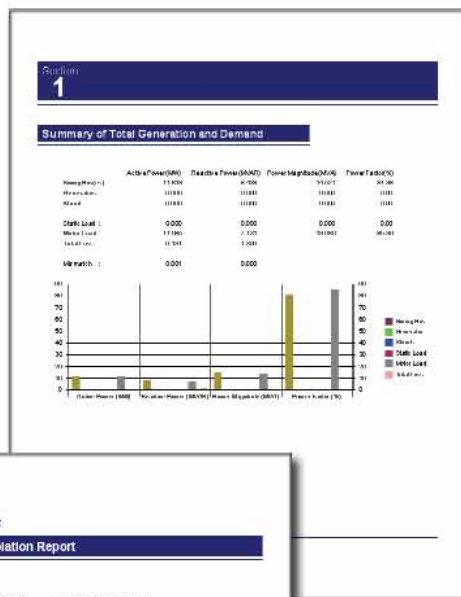
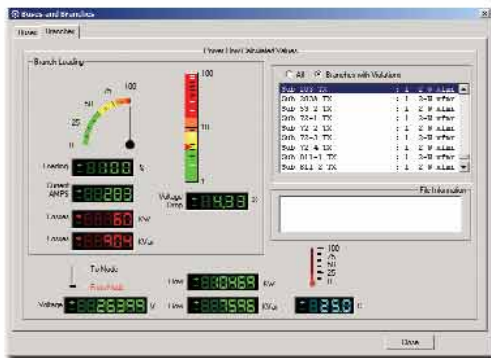
Complete Electrical Design and Simulation for CATIA® V5

EDSA accurately simulates how a power system will function in its intended environment - design engineers can explore the electrical performance of design alternatives. With the insight gained from EDSA CAA software, users can improve designs early in the development cycle, when changes are easier and less expensive to make.

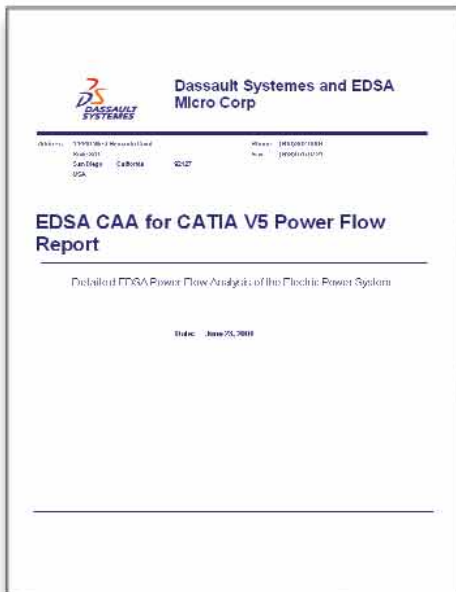
Precise representations of CAD Electrical One-Line geometry, and unique CATIA V5 technology provide fast, accurate solutions automatically - solutions that help to improve power system quality and reliability, while decreasing costs associated with power failures, harmonic disturbances and power system instability.

The benefits derived from the application of EDSA CAA can be seen in both the engineering and production areas of a power system. With EDSA, engineers have at their disposal, the most advanced and comprehensive analysis tools ever created. EDSA's complete solution system allows engineers design power systems that operate safely under all service conditions and are selective in order to consider the continuity of service in emergency situations.

Evaluate, understand, and optimize the static and dynamic electrical performance of your designs in a real-world environment.



- VOLTAGE CONTROL
- ANSI/IEEE
- IEC
- NEC
- METRIC & ENGLISH
- BUILT-IN LIBRARIES
- 50,000+ DEVICES
- AUTO-ONE-LINE
- ERROR CHECKING
- NO VOLTAGE LIMITS
- NO IMPEDANCE LIMITS
- NO FREQUENCY LIMITS
- UNLIMITED BUSES
- VIOLATION REPORTING
- REAL-TIME SIMULATOR



EDSA has no limitations in Impedance, Frequency, or Voltage levels and offers a truly ubiquitous modeling environment.

Robust reporting features, coupled with real-world instrumentation simulators provide engineers with exception detail and efficiency in communicating the expected behavior of the power distribution system.

Sophisticated, Presentation Quality reports can be generated in seconds.

Built-In Professional Report Writer Wizard walks users step by step through the process of generating sophisticated reports with a few mouse clicks.



EDSA[®] CAA for CATIA[®] V5

Fully Integrated Electrical Power System Analysis

EDSA is designed to provide engineers with a very strong, efficient, and fast tool for selecting, comparing, and coordinating protective devices. With EDSA, engineers can **design a selective protection system** which ensures isolation of the faulted area and the least amount of destruction to equipment with a minimum disturbance to the network.

Coordination specialist can **work in stand-alone mode** with no need for a power system model, or the full electrical EDSA CATIA can serve as the main information vehicle for power system coordination information - in this mode, results of **load flow and short circuit simulations are automatically transferred** to the EDSA model.

EDSA's state-of-the-art **Auto Selection Technology** is capable of automatically selecting equipment and settings for you that achieve selective coordination. However, EDSA can be set to only partially participate in the selection and setting process, **or you can do all necessary selections and settings with no assistance** from the program. No other coordination program provides this level of intelligence, ease-of-use, and precision.

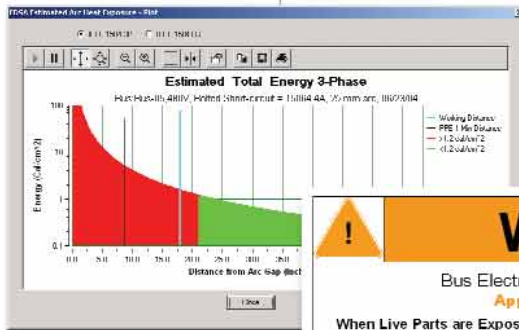
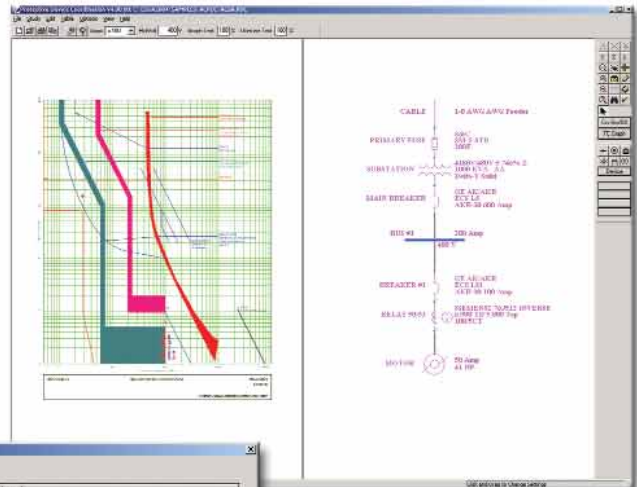
The **automatic selection** process observes the established practices and standards. When equipment selection is completed, **EDSA's PDC program calculates the necessary parameters, and then selects appropriate settings.** The user is notified if selective coordination cannot be achieved using the selected equipment within the calculated parameters.

ARC Heat Exposure Simulation Built-In Integrated NFPA-70E 2004/IEEE 1584

EDSA CAA for CATIA V5 includes a highly sophisticated simulator for determining required protective clothing when working on live electrical equipment.

OSHA and the National Fire Protection Association have mandated that all facilities perform Arc Heat Exposure simulations in order to safeguard their technicians from Arc Blasts that may cause severe injury or death.

EDSA users can easily meet NFPA and OSHA requirements through the application of EDSA's Arc Heat Exposure simulation program. A wizard guides the user through each step of the process. Results can be viewed in native Excel format, and plotted. Moreover, complete custom label generation is only a mouse click away.



WARNING

Bus Electrical Shock and Flash Hazard
Appropriate PPE Required

When Live Parts are Exposed (Restricted Shock Hazard Distance = 12 inch)

Volts	480	Max Short Circuit kA	15.1
-------	-----	----------------------	------

PPE Based on 17.9 inch Working Distance
(Arc Flash boundary, PPE required within 21 inches)

Clothing Level	1	Face Shield	X
Glove Class	00	Eye Protection	X
Insulated Tools	X	Hair/Beard Net Not Allowed	X

Required Not Required

Project: ARCHEAT Equipment Name: Bus-05



An easy to follow Wizard guides the user through the steps of conducting an Arc Flash study and print labels.



Advanced Real-Time Simulations

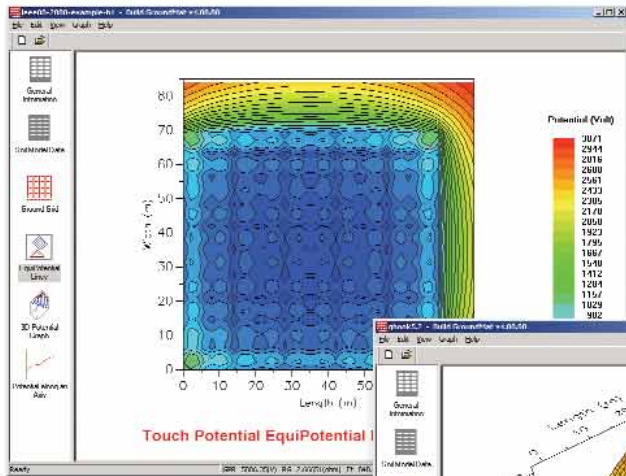
Using the most **advanced finite-difference algorithms**, EDSA delivers an extremely powerful tool to CATIA users for the design of substation grounding in order to provide safe conditions for personnel operating in and around a substation. Accidents to personnel result from Grounding Potential Rise (GPR) of the ground system during fault conditions on the connected power system. With EDSA, V5 users can **easily and rapidly design grounding systems**

that limit the potential rise of the substation ground mat to an acceptable value for any possible fault condition; and limit the resulting step, touch, and transfer potentials in and around the substation to an acceptable value.

The software uses the **conductance matrix approach** and IEEE80-2000 is used for computation of maximum allowable touch and step potentials

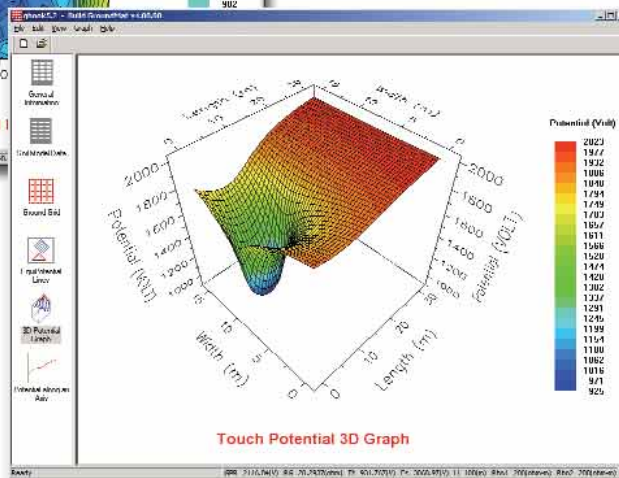
EDSA delivers the **rich toolsets needed by power system specialists** to meet all areas of design, analysis and simulation needs.

- Static simulations
- Dynamic studies
- Protection studies
- NFPA-70E
- Harmonics Analysis
- Cable pulling
- Wire Sizing



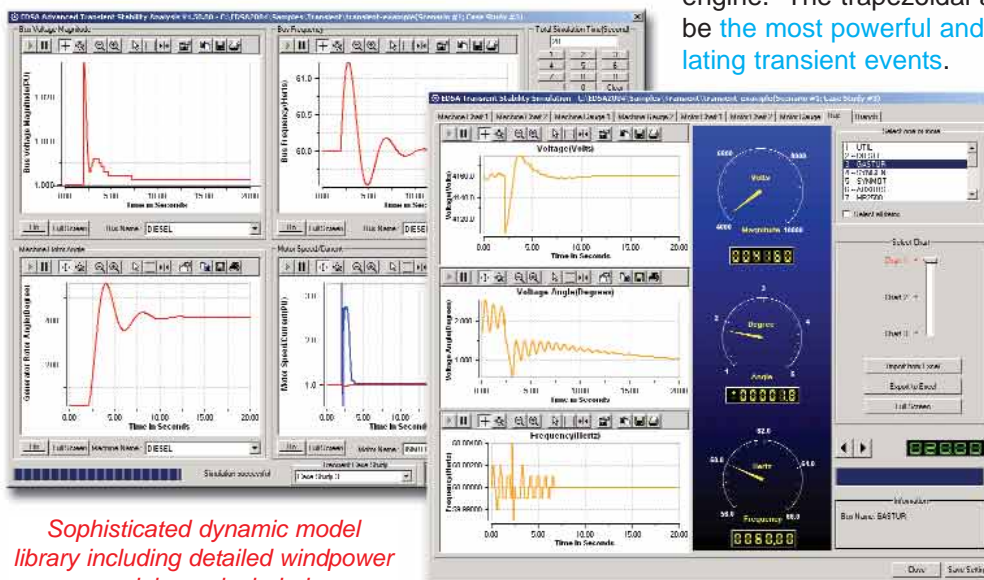
Users are treated to advanced plotting, reporting and 3D charting tools in EDSA CAA for CATIA V5.

Multi layers of earth types; Rectangular, square or arbitrary shaped grids are all supported.



EDSA delivers a powerful, and hyper-accurate transient stability simulation solution specifically designed for detailed **dynamic simulations** of power systems. This robust tool allows power system specialists to **simulate all known phenomena and disturbances**. This best-of-breed solution is based on an advanced **trapezoidal** simulation engine. The trapezoidal algorithm is considered to be **the most powerful and accurate means of simulating transient events**.

The trapezoidal algorithm is considered to be **the most powerful and accurate means of simulating transient events**.



- ULTC Simulation
- Extensive Library
- (LOOP) Simulation
- (LOCA) Simulation
- AVR Failure
- Fast Bus Transfer
- Slow Bus Transfer
- Machine Tripping
- Branch Tripping
- Machine Tripping
- Branch Addition
- Load Shedding
- Fault Simulation
- Relay Simulation
- Windmill Simulation
- MG Set Simulation
- Motor Starting
- Generator Startup

Sophisticated dynamic model library including detailed windpower models are included.

Detailed graphic reporting with real-time plotting.

From 2D to 3D to Real-Time

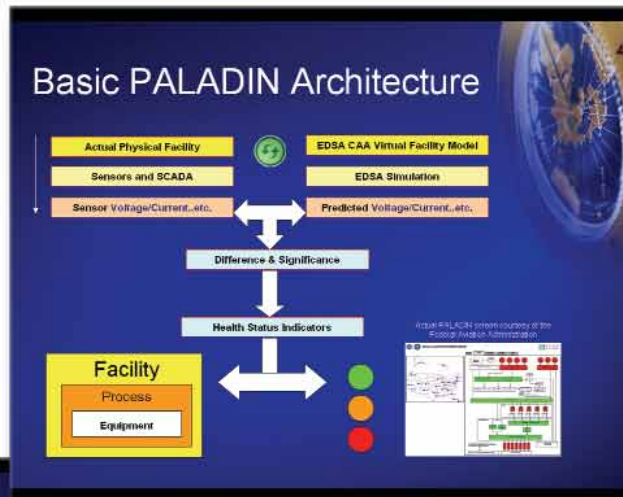
PALADIN® Real-Time Health Monitoring & Control

Paladin® was initially developed under contract for the US Department of Defense. and delivers an intelligent umbrella of safety over any electrical distribution and transmission system responsible for powering mission critical facilities and operations. Paladin is a joint EDSA and General Atomics solution. Paladin technology is deployed and operational throughout the FAA's Air Route Traffic Control Centers, protecting the National Air Space, and is being deployed at many major mission critical facilities worldwide.

Within Paladin resides a hyper-accurate logical model of the physical power distribution system (based on EDSA

CAA CATIA V5 one-line diagram). This model is always synchronized and calibrated to the actual power system. As the configuration and topology of the power system changes (switches open or close, loads come on or are turned off), so does that of the logical model.

In the background, Paladin is continuously conducting a detailed analysis of the power system based on its actual, current topology. Paladin compares its predicted values (from the logical model) against the real-time sensor readings, and then "looks" for unexpected deviations which are clear indicators of real health problems.



Hyper-Accurate Predictions

Detailed Logical Model Embedded and Transparent to end-user.

Automatic Calibration of Logical Model equipment normal performance settings to Actual equipment normal performance sensed.

Automatic and Continuous Synchronization of Logical Model status to actual Facility status.

With the ability to accurately predict expected system performance and behavior, alarming and health status indicators moves to a new level of accuracy and robustness.

Better than 99.95% Accuracy in Prediction

Actual PALADIN screen courtesy of the United States Federal Aviation Administration

Actual Status | Paladin Predicted Status



Current SCADA technology deluges users with thousands of lines of information per second on sensed data. It is nearly impossible for facility operators, managers and technicians to digest all of the sensory data and have an accurate understanding of its relevance to the overall status and health of their mission critical power system operations. Exasperating the situation is the fact that no means for the intelligent prediction of failures is available with existing solutions. Many facilities relying only on SCADA technology operate in a reactionary mode - responding to failures and catastrophic power losses, rather than predicting and preventing them from occurring in the first place.

Paladin solves these current limitations by providing intelligent, best-of-breed analytical filters which provide a means for large sets of electrical power system sensory information to be summarized into an easy to comprehend, visual "heatmap" display for the end user. Paladin acts as an on-board electrical power system expert - insulating the end user from the complexity of a power system database - and intelligently filtering power system sensory data; in real-time, into an easy visual presentation designed to help managers, owners and operators understand at a glance the current health of their power system(s).

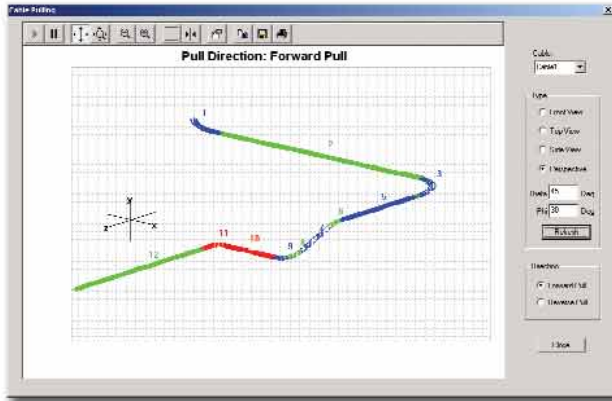
Paladin greatly streamlines system self status via a green/orange/red color scheme for easy visualization of the system health and performance, allowing for instantaneous understanding of the power system status to both technical and non-technical data consumers.



Robust Suite of Tools for CATIA®

EDSA includes a highly integrated harmonics analysis and filter design solution specifically designed for **power quality and harmonic mitigation** engineers. Harmonic analysis is required when devices that generate harmonics, such as rectifiers, arc furnaces, AC/DC drives etc, are present or anticipated to be added to the power system.

Digital computer simulation is the most convenient, and perhaps more economical, way of tackling the problem of harmonic analysis. EDSA's digital simulations are centered on system-wide approaches utilizing the notions of system impedance and/or admittance matrices, backed by elegant and **powerful numerical calculation techniques**.

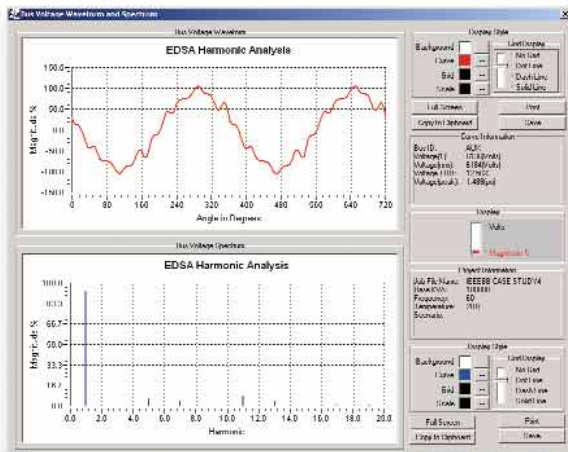


Advanced Cable Pulling Simulation tools are available to CATIA V5 users.

EDSA can calculate **bus voltage THD for all buses, & branch current THD for all branches** of a power system when a harmonics source, or several harmonics sources are presented. Also **branch current RMS values & transformer K-factors** can be obtained.

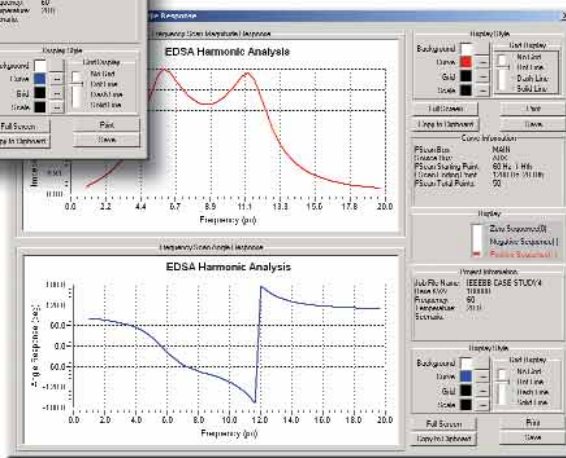
The simulation results are presented in time-domain waveform and in frequency-domain spectrum. They can be displayed in text or graphic formats.

EDSA offers **the only Harmonics solution in the world capable of automatically recommending filter sizes and locations**.



Rich plotting and graphing tools compliment EDSA's power quality and filter design solutions.

This **first-of-a-kind technology** relieves engineers from the tedious task of guessing filter sizes and locations or going through multiple iterations in order to achieve the desired filtering effect.



- IEEE 519
- MIL Spec 1599
- Current Source
- Voltage Source
- Built-in Library
- PQ Meter Import
- Interharmonics
- THD Analysis
- Auto Filter Design
- FFT Simulation
- Thyristor Simulation
- Skin Effects
- Frequency Scans

The solid EDSA architecture provides a strong, reliable platform for continued growth and innovation. It benefits from the many years that EDSA and Dassault have been developing technology to satisfy customer and developer needs in the design automation market.

System Pre-Requisites:

- CATIA V5 R12 service pack 3 or better
- CATIA V5 DI2
- CATIA V5 ELD



Salient Features:

- Fault Analysis ANSI/IEEE
- Wire Sizing NEC/IEC
- Ground Grid Design
- Cable Ampacity Studies
- Arc Flash Simulation
- Bill of Materials
- Fault Analysis IEC
- Protection Coordination
- Transient Stability
- Cable Pulling in 3D
- System Reliability
- Man/Hour Cost Estimation
- Power Flow Simulation with Automatic Voltage Control
- Motor Starting & Performance
- Control Logic Design and Simulation
- Power Quality Analysis and Filter Design
- Voltage Stability
- Project Cost Estimation

EDSA Micro Corporation

<http://www.edsa.com>

San Diego, CA 92127

Phone: (858) 675-9211 Fax: (858) 675-9724