



# Actin<sup>®</sup> Software Development Toolkit

A robotics control and tasking framework built to meet the varied requirements of industrial, commercial, collaborative, and consumer robotic systems.

## HIGHLIGHTS

- General kinematics and dynamics model that can represent any robotic mechanism and joint type
- Extensible real-time control framework that integrates motion constraints and optimizations for dynamic robot response to changing environments
- Robotic system tasking toolkit for simplifying complex programming tasks

With Actin powering your robotics solutions, you can look forward to

- Faster time-to-market
- Reduced software development costs
- Reduced risk
- Unparalleled control

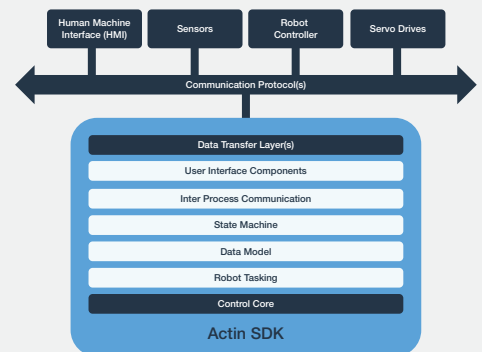


Actin is the leading commercially available SDK for real-time control and simulation of industrial and collaborative robotic systems. It simplifies robotic control applications through its powerful components and methods for simulating and controlling complex mechanisms.

Actin supports advanced features not found in other commercial solutions, such as collision avoidance, interactive control, and collaborative robot features for any number of axes. Unlike open source or research solutions, Actin is built to support mission-critical applications and run on embedded systems.

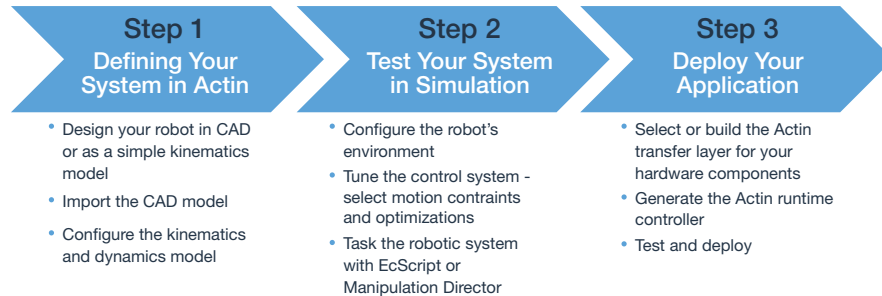
Actin enables and simplifies the programming of complex robotic motions used in a wide variety of applications, ranging from autonomous oil exploration, to robotic bin picking, to surgical robotics. In addition to being hardware agnostic, Actin users are not constrained by operating system. Actin's control framework technology extends beyond controlling individual robot motions to orchestrating groups of robots to perform coordinated tasks in real-time.

Actin is backed by Energid's unrivaled expertise in architecting, developing and deploying software applications for complex robotic systems. The Energid team can help bring a new robotic product to market quickly.



# From CAD Design to Deployment, Actin Has You Covered

With the Actin C++ control toolkit, roboticists are free to focus on what the robot does and where the end effectors and tools should be, not on how they get there.



- Design your robot in CAD or as a simple kinematics model
- Import the CAD model
- Configure the kinematics and dynamics model

- Configure the robot's environment
- Tune the control system - select motion constraints and optimizations
- Task the robotic system with EcScript or Manipulation Director

- Select or build the Actin transfer layer for your hardware components
- Generate the Actin runtime controller
- Test and deploy

## HIGHLIGHTS

### General kinematics and dynamics model

- Inverse and forward kinematics and dynamics
- Kinematically redundant mechanisms
- Open and closed kinematic chains
- Fixed and mobile base manipulators
- Kinematic model generation from CAD

### Motion control framework

- Dynamic collision avoidance
- Joint limit and singularity avoidance
- Strength optimization
- Dynamic response to sensor data
- Adaptive tasking
- Part relative tool paths and external TCP paths

### Robotic system tasking framework

- Drag and drop task programming
- Motion scripting interface
- Complex tool path control
- Coordination of many robots and axes

### Easy integration with robots, sensors, and actuators

- Desktop applications for Windows, Linux, OS X
- Real-time control on VxWorks, RT Linux, RTOS32, RTX64
- Support for EtherCAT and CiA 402 standard drives
- Support for many common manufacturers
- Distributed processing support – DDS, TCP/IP, UDP, and more

Robotic System Tasking	Control	Simulation
<b>Graphical Programming</b> Designers and engineers can use Actin's Manipulation Director graphical user interface to intuitively compose tasks for a system of robots. No programming skill is needed.	<b>Dynamic Motion Control</b> Actin motion control responds and adapts in real time based on the perceived environment using an efficient constraint-optimization engine. The robot end-effector is driven to reach a target constraint based on the selected motion optimizations.	<b>CAD Integration</b> Using the Actin SolidWorks plugin, you can convert any mechanism for Actin control and simulation. Mass properties can be taken from CAD for dynamic simulation.
<b>Motion Scripting</b> Use a simple real-time scripting interface called EcScript to task the robotic system through common commands for position control through waypoints, joint frame sequences, coordinate transformations, variables, and much more.	<b>Motion Constraints</b> Actin supports general constraints on any link of the robotic mechanism and includes, 3D Point, 3D Orientation, 3D Pose, 2D Point, Planar, Free-spin-in-Z, Linear Constraint and the ability to construct your own.	<b>Kinematic Simulation</b> Actin can simulate the coordination between multiple robots of any type or manufacturer as well as attachments to other simulated robots, tooling, and objects, ideal for simulating tool changing systems and manipulating objects and grasping.
<b>Global Path Planning</b> Reduce the burden of programming waypoints through constrained environments by letting Actin's global path planning navigate from a start to a stop end-effector pose.	<b>Motion Optimizations</b> Any time a robot has more degrees of freedom than is required by the task, Actin can optimize the motion. These optimizations can include collision avoidance, joint limit avoidance and others.	<b>Dynamic Simulation</b> Analyze the torque required by each actuator of a robot to perform a task. Test and refine the design all before hardware is purchased or built.

## About Energid

Established in 2001 and headquartered in Cambridge, Massachusetts, United States, Energid develops advanced real-time motion control software for robotics. Energid's general robot control and tasking framework, Actin®, is built to meet the rigorous requirements of industrial, commercial, collaborative, and consumer robotic systems. Energid licenses Actin as a cross-platform software toolkit and provides integration services to help its customers get to market quickly.

