



Acadia[®] II Product Guide

Real-Time, Low-Power Video Processors

Enhance Perception and
Situational Awareness
in Any Condition



The Acadia® II SoC is a state-of-the-art solution for integrated vision processing.

Built around advanced vision technology pioneered at SRI Sarnoff, Acadia® II was developed to support the warfighter and performs real-time video enhancement, stabilization, multi-sensor video fusion, tracking and image feature detection. Equipped with an integrated ARM®11 Quad MPCore™, Acadia II functions as a CPU for the entire system. It is a low-power, low latency vision solution using a real-time signal processor. Advanced localized processing supports not only embedded surveillance solutions, but also meets low-power, portable vision processing needs.

Architecture

Service-oriented architecture (SOA) provides a rich set of configurable independent accelerated vision services. Chosen services may be connected to form a custom service network to address unique data processing needs.

Pre-Processing

Pre-processing service corrects and enhances received images. These include non-uniformity correction (NUC), histogram, RGB control, noise reduction, lens distortion correction, video orientation changes, multiple channel alignments and contrast enhancement.

Primary Applications

Primary capabilities include fusion, stabilization, moving target indication (MTI), motion-based tracking, and exclusive AdapTrac™ target tracking.

Post-Processing

Post-processing service allows various display resolution, on-screen graphics (OGL), picture-in-picture (PIP), gamma correction, and CameraLink and NTSC outputs.



Hardware

Acadia II is available in multiple stand-alone hardware platforms that offer a variety of options for embedded systems.



A2-SoC
Acadia II System-on-a-Chip



A2-SoM
Acadia II System-on-a-Module



A2-CVS
Acadia II Compact Vision Systems

Software Developer Kit (SDK)

The Acadia II SDK enables rapid development of video processing applications accelerated by the Acadia II. It includes software components to support the following functions.

- CHAMP sample application that may be configured via XML to perform video pass-thru, fusion, stabilization, MTI, or AdapTrac functions
- User interface development: XML-based application configuration, application development, sample code, sample WorkBench projects, CHAMP source code
- GUI tools: lens distortion calibration, channel alignment, video recording
- Firmware tools: Mini-DVR, post-capture recorder, re-program boot loader
- The SOA provides a rich set of configurable independent accelerated vision services
 - Pre-processing service: NUC, histogram, RGB, noise reduction, lens distortion correction, video orientation, and multiple channel alignments
 - Primary capabilities: fusion, stabilization, MTI, and tracking
 - Post-processing service: allows various display resolutions, OGL, PIP, gamma correction, CameraLink and NTSC outputs



Applications and Capabilities

Acadia II is a low-power, high-performance solution for advanced vision processing applications. Its customizable features enhance ordinary video, enabling users to optimize image clarity and deliver actionable information. With an integrated ARM11® Quad MPCore™, Acadia II supports user-designed applications in addition to its robust feature set.

AdapTrac



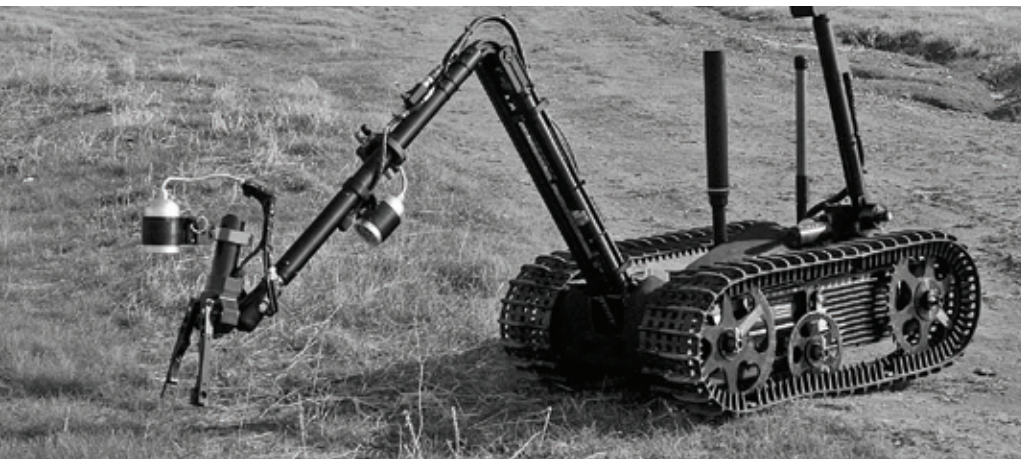
Acadia II AdapTrac is a powerful object/target tracker that is capable of tracking targets that move, stop, pause, or are temporarily occluded by other objects in a scene. The tracking sensor can be fixed or moving, making the application equally suited for tracking objects from air/ground vehicles, handheld/rifle sights, or static surveillance platforms.

AdapTrac also provides real-time object coordinate information that can be used to guide air or ground vehicles toward the target, direct a pan-tilt sensor gimbal to visually track an object of interest, or assist in processor aided fire control.

Stabilization



Acadia II Stabilization turns shaky, unclear video into actionable information by reducing video defects due to uncontrolled camera motion. By automatically processing adjacent video frames in real time, this stabilizer eliminates unwanted shake or blur and provides crisp and clear images. Its programmable motion models also allow users to adjust motion parameters for specific applications.



Unlike competitors' systems, any or all of the Acadia II applications will run on any Acadia II platform.



Moving Target Indication (MTI)



Acadia II MTI registers global scene motion between frames while stabilizing video to remove camera movement. Moving objects, as determined by the object tracking application running on the ARM®11 Quad MPCore™, are typically indicated via the on-screen display module with a box surrounding them. Metadata describing the size, position, and trajectory of objects is generated and stored or distributed as needed.

MTI also performs motion detection and object tracking in which moving or stationary objects are identified and continuously tracked.

Contrast Normalization



Acadia II Contrast Normalization provides the visual benefits of both high and low contrast video in one feed. It ensures that the operator is observing the highest level of detail and resolution of 8- to 16-bit imagers when displayed on 8-bit monitors, viewing scopes, and eye pieces.

Fusion



Acadia II video processing technology can fuse together feeds from multiple sources such as visible, thermal infrared, laser, radar, LIDAR, SAR (synthetic aperture), MMW (millimeter wave) or hyper-spectral sensors. This fusion technology can take key information from different sensors and fuse it into a single, easy-to-interpret view.

Extended dynamic range and depth of field enhance the clarity and precision of the image while highlighting details that would typically not be visible to the naked eye. SRI Sarnoff's fusion capabilities provide users with the best possible imagery—for enhanced perception, even in changing conditions.



Acadia II Hardware Suite

The Acadia II hardware suite offers image processing solutions for any development timeline. This industry-leading technology can be applied whether you build around the chip, integrate the mezzanine board, or simply plug sensors into the existing board set. Unlike competitors' systems, any or all of the Acadia II applications will run on each platform.

Common Installation Options

- *Weapon-mounted sights*
- *Handheld range and target finders*
- *Remote operated weapons*
- *Vehicle situational awareness*
- *Unmanned air and ground platforms*
- *EO/IR camera systems*

Acadia II offers multiple platforms to accommodate designers throughout various stages of development.



Acadia II System-on-a-Chip (A2-SOC)

The A2-SOC is the foundation of Acadia II technology and the most customizable hardware solution. It is ideal for applications with size, weight and power restrictions.

- *Designed for demanding applications*
- *Ultimate SWaP reduction*
- *Typically <1W*
- *Low-cost processing solution*
- *Complete reference design kit provided*
- *Engineering assistance available*
- *Requires customer-designed interface to sensors and system*

	Quad ARM11 MPCore	SDK/BSP
A2-SOC	●	●
A2-SOM	●	●
A2-CVS	●	●

Acadia II Platform Characteristics Comparison



Acadia II System-on-a-Module (A2-SOM)

The A2-SOM is a stand-alone product that enables OEMs to integrate this powerful module as an embedded asset within another system. The A2-SOM contains the A2-SOC and its main system components.

- *DDR2, Flash, USB Phy, power regulator*
- *Low-power solution 1W-2W*
- *Significantly reduces design effort*
- *Provides testing chip interface*
- *Engineering assistance available*

Acadia II Compact Vision Systems (A2-CVS)

Acadia II Compact Vision Systems are embedded packages for rapid integration into OEM systems. With direct interface to sensors and displays, they are the fastest path to an image processing solution.

- *Direct interface to NTSC and CameraLink cameras*
- *Host of I/O including SPI, I2C, UARTS*
- *Compact size and weight*
- *FPGA available for custom programming*

Lowest Power	Most Configurable	Interface to Carrier Board	Multi-Platform Modularity	Integrated Memory	Shortest Design Phase	FPGA Access	Standard Camera Interface
●	●						
		●	●	●			
				●	●	●	●



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