ACTi

Physical Security End-to-End Solution Provider

White Paper | High Frame Rate Cameras

HIGH FRAME RATE CAMERAS

A practical white paper for capturing critical evidence in fast-moving surveillance scenes

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Contents

Document purpose

This white paper explains what high frame rate cameras mean in professional video surveillance and how they should be specified, deployed, and evaluated. It is written for system integrators, consultants, security managers, facility managers, and procurement teams that need usable evidence in fast-moving environments such as traffic, gaming, logistics, cash handling, transportation, and perimeter response.

The document references ACTi public product information for the High Frame Rate Cameras category and ACTi corporate information. It avoids model-specific naming so the content remains useful even as individual part numbers or product generations change.

Reading guide

Use Sections 3 and 4 to define requirements, Section 5 to map use cases, Section 6 to check architecture, and Section 7 to align ACTi form factors with project needs.

1. Executive Summary

Fast incidents often fail conventional surveillance because the critical moment occurs between recorded frames or becomes difficult to interpret during playback. A vehicle passing through an intersection, a hand movement at a gaming table, a package moving on a conveyor, or a brief access-control event may require more temporal detail than a standard frame rate can provide.

ACTi describes high frame rate cameras as cameras that capture more frames per second than the human eye can perceive, enabling clear visibility in fast-moving environments. ACTi also states that cameras recording at 60fps or above qualify as high frame rate video cameras, with the purpose of preserving critical details for forensic playback, slow motion, and frame-by-frame analysis. [1]

For system integrators, high frame rate cameras create differentiation when proposals are designed around evidence quality, not only camera count or nominal resolution. For consultants and end users, the correct specification should define the moving target, target speed, required frame rate at the selected resolution, shutter speed, lighting condition, field of view, storage retention, playback workflow, and operator response process.

Core message

High frame rate should be specified as a motion-evidence outcome. Frame rate, resolution, shutter speed, WDR, low-light sensitivity, IR, lens choice, compression, bandwidth, storage, playback, export, and operator workflow all affect whether video can support real investigation and response.

Key takeaways

- 60fps and above is the practical threshold for high frame rate surveillance, while 120fps can support faster motion and deeper slow-motion review. [1]
- High frame rate is most valuable in fast-action scenes where a critical detail may appear for only a fraction of a second.
- Higher frame rate does not automatically solve motion blur; shutter speed, lighting, lens, exposure, and compression must also be planned.
- Frame rate must be confirmed at the required resolution, because some cameras support higher fps only at selected resolutions or stream profiles.
- Storage, bandwidth, and VMS/NVR performance must be sized for the selected fps, bit rate, codec, retention period, and number of cameras.
- Frame-by-frame playback, slow-motion review, precise timestamping, and evidence export are essential parts of a high-frame-rate project.

Procurement principle

Do not specify high frame rate only as a datasheet number. Specify the scene speed, evidence objective, fps at required resolution, shutter, lighting, bit rate, retention, playback, export, and operator workflow together.

2. About ACTi Corporation

ACTi Corporation is the writer and publisher of this document. ACTi is a Taiwan-based international company founded in 2003 and serving customers in more than 100 countries. ACTi states that it has more than 20 years of security-industry experience and has been a pioneer in video-based security technology development and innovation. [2]

ACTi positions itself as a physical security end-to-end solution provider. Its ecosystem includes IP cameras, recording platforms, VMS, access control, central management, system health management, AI-enabled video technologies, and third-party system integration. [2]

This broader ecosystem matters for high-frame-rate projects. A camera may capture fast motion clearly, but the project succeeds only when video is recorded, retained, displayed, slowed down, searched, exported, and acted upon correctly.

Why ACTi is relevant to high-frame-rate projects

ACTi strength	Project relevance
End-to-end system scope	High-frame-rate cameras can be planned together with NVR, VMS, CMS, clients, access control, alarms, third-party systems, and health management instead of being treated as isolated devices.
Clear video as a foundation	ACTi states that clear video is the basis of its solution evolution because smart technology depends on high-quality source video. [2]
AI-enabled platform	High temporal and image quality can improve the practical value of analytics such as detection, tracking, counting, classification, recognition, and identification. [2]
Compliance and project fit	ACTi public pages reference compliance considerations such as NDAA, TAICS, and vertical-market requirements. [1][2]

3. Definition of "High Frame Rate Cameras"

A high frame rate camera is a video surveillance camera that captures more temporal samples per second than conventional surveillance cameras, helping preserve fast-moving details for live monitoring, slow-motion review, frame-by-frame investigation, and evidence export. In ACTi public product language, any camera recording at 60fps or above qualifies as a high frame rate video camera. [1]

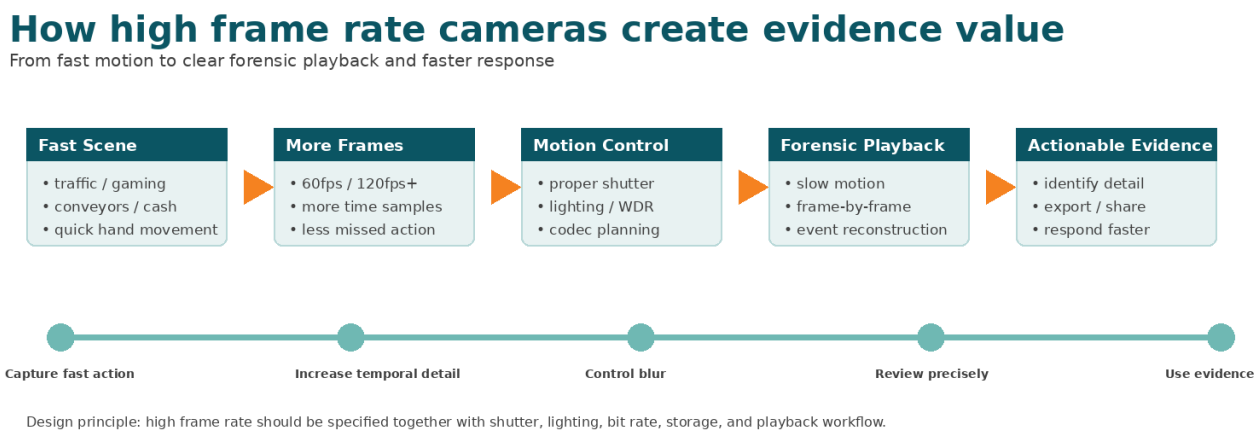
In project terms, high frame rate is not just an fps number. It is the ability to capture a moving event with enough temporal detail, image clarity, exposure quality, and playback accessibility for the intended security or operational decision.

ACTi highlights high frame rate cameras for traffic monitoring, casinos, and fast-action scenes. The public page also lists frame rate up to 120fps, Extreme Low Light Sensitivity and WDR, optical zoom up to 40x, IR distance up to 250 meters, built-in analytics with people and vehicle detection/classification/recognition, specialized environmental models, and a wide range of compliance options. [1]

High frame rate cameras vs. related concepts

Term	Meaning	Common misunderstanding
High frame rate camera	Camera selected to preserve time-sensitive evidence in fast-moving scenes, typically 60fps or above.	It is not only a faster camera; the full system must support the higher data rate and playback workflow.
High shutter speed	Exposure setting that reduces motion blur by using shorter exposure time.	Frame rate and shutter speed are related but not the same. High fps can still look blurry if shutter speed is too slow.
High-resolution camera	Camera with more pixels for wider coverage or finer spatial detail.	More pixels do not automatically capture fast motion; temporal detail still depends on fps and shutter.
Slow-motion playback	Playback method that spreads recorded frames over a longer viewing time.	Slow motion is useful only when the original recording contains enough frames and enough clarity.
Frame-by-frame analysis	Review method for investigating precise moments, movements, or sequence of events.	Frame-by-frame review also requires accurate timestamping, storage integrity, and export workflow.

Visual concept



Design note

A high-frame-rate camera increases the number of temporal samples, but useful evidence depends on the complete chain: the scene must be lit, exposed, encoded, transmitted, recorded, retrieved, slowed down, and exported without losing the details that justified the higher fps in the first place.

4. Core Technical Concepts

Camera selection should begin with the motion problem. The goal is to preserve usable detail at the time, speed, distance, lighting condition, and operator workflow that matter to the project. The following concepts help teams avoid under-designed specifications.

Concept	Practical meaning
Frame rate and temporal sampling	Frame rate determines how many images are captured each second. 60fps gives twice as many samples as 30fps; 120fps gives four times as many samples as 30fps when the same event duration is recorded.
Frame rate at selected resolution	Confirm the actual maximum fps at the required resolution and stream profile. A camera may support high fps at one resolution and a lower fps at another.
Shutter speed and motion blur	Shorter shutter speed reduces blur, but it also requires more light. High fps should be paired with exposure planning so each frame remains sharp enough.
Lighting, WDR, and low-light sensitivity	Fast shutter and high fps can reduce per-frame exposure time. WDR, low-light sensitivity, IR, white light, or scene lighting may be needed to keep frames usable.
Lens and pixels on target	Frame rate captures time detail; lens and resolution capture spatial detail. Both are required for identification-quality evidence.
Compression and bit rate	Higher fps typically increases bandwidth and storage demand. H.265/H.264 profile, bit rate control, GOP length, and quality settings should be validated.
Playback and export workflow	The VMS/NVR must support smooth playback, slow motion, frame-by-frame review, accurate timestamps, and evidence export at the required quality.
Analytics readiness	People, vehicle, object, face, or license-plate analytics depend on enough frame quality, target size, and scene consistency. More fps can help track fast movement but cannot compensate for poor image quality.
System health and maintenance	Higher data rates make network, storage, and recorder health more important. Monitoring, alerts, and preventive maintenance reduce evidence-loss risk.

Specification interpretation

A 120fps camera can still fail if the shutter is too slow, the scene is too dark, the target is too small, compression is too aggressive, or operators cannot retrieve footage efficiently. Conversely, a well-designed 60fps system can outperform a nominally faster system when lighting, lens, bit rate, storage, and playback are properly matched to the scene.

Capability matrix

Scene challenge to high-frame-rate capability matrix

Match the motion problem with the full camera and system settings required for usable detail

Scene challenge	What can go wrong	Capabilities to specify
Fast vehicles	Plate, vehicle direction, or incident moment is missed	60fps / 120fps+, shutter planning, WDR, sufficient pixels-on-target
Gaming tables / cash handling	A critical gesture appears only briefly	High fps, synchronized timestamping, frame-by-frame playback
Production lines / logistics	A fault or unsafe action happens between normal frames	High fps, proper exposure, event tagging, reliable retention
Entrances with backlight	Motion is captured but faces or objects are washed out	High fps plus WDR, exposure control, lens and mounting optimization
Night or mixed lighting	Higher frame rate creates darker frames if exposure is not planned	Low-light sensitivity, IR, lighting design, noise control, bit-rate planning

Procurement note: test representative scenes before finalizing FPS, resolution, shutter, lighting, compression, recording, and display settings.

How to use this matrix

Use the matrix during site survey and proposal design. Each fast-motion problem should be translated into a camera requirement, a network/recording requirement, and an operator-review requirement. This reduces the risk of specifying a high fps camera while leaving the rest of the system unable to preserve or use the captured detail.

5. High-Value Applications

High frame rate cameras are most valuable where video is expected to support rapid incident review, precise event reconstruction, compliance-sensitive investigation, or operational decision-making. ACTi references traffic monitoring, casinos, and fast-action scenes as core examples for this category. [1]

Application	Operational value	Typical locations
Traffic and transportation	Capture moving vehicles, pedestrian events, lane behavior, and fast incidents with more temporal detail for review.	Intersections, gates, parking entrances, toll areas, loading zones, transit stations
Casinos and gaming	Support frame-by-frame review of hand movement, chips, cards, cash exchange, and disputed incidents.	Gaming tables, cash cages, entrances, restricted areas, surveillance rooms
Cash handling and service counters	Preserve fast handover, dispute, and transaction details where a key action may happen quickly.	Banks, retail counters, hotels, reception desks, self-service areas
Logistics and production lines	Review fast object movement, package handling, process errors, unsafe actions, and conveyor incidents.	Warehouses, manufacturing lines, sorting systems, loading docks
Critical infrastructure and perimeters	Improve review of fast intrusion, vehicle approach, gate movement, or incident sequence.	Utilities, ports, industrial plants, government sites, campuses
Public safety and city surveillance	Support evidence review for fast-moving events across public areas and multi-camera monitoring environments.	Streets, plazas, public buildings, schools, transport nodes

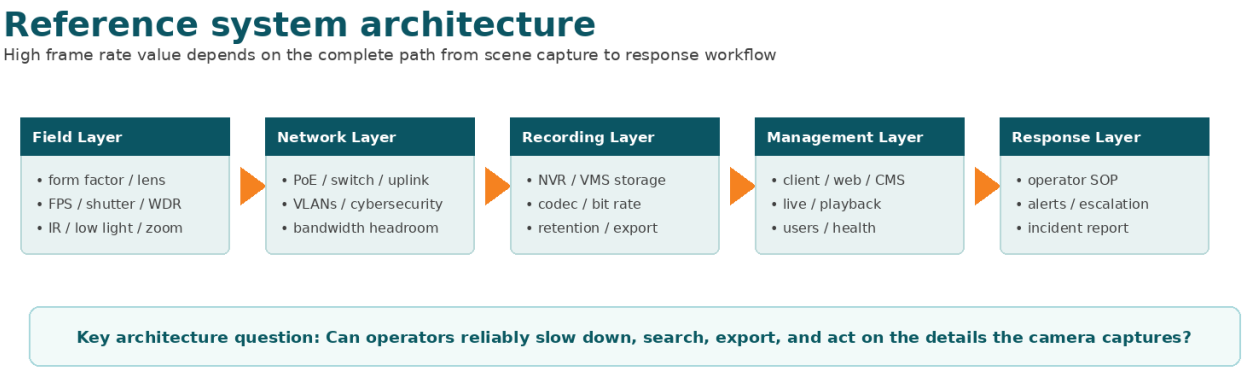
Value by stakeholder

Stakeholder	Main benefit
System integrator	Stronger differentiation when proposals are built around motion evidence, not only camera count or unit price.
Consultant	Clearer specification language for fps, shutter, lighting, WDR, low-light, pixels-on-target, bit rate, retention, and playback.
Security manager / operator	More reliable slow-motion review, frame-by-frame analysis, export, escalation, and incident reconstruction.
Procurement team	A more defensible buying decision based on application fit, compliance readiness, and total evidence workflow.

6. System Architecture

High frame rate should be designed as a system architecture. The camera creates the source frames, but the full solution must preserve those frames through transmission, recording, storage, viewing, slow-motion playback, search, export, and response. If any layer is under-designed, the project may lose evidential value.

Reference system architecture



Architecture layers

Layer	Role in high-frame-rate surveillance
Field layer	Camera form factor, sensor, lens, zoom, focus, WDR, IR, shutter, frame rate, mounting height, viewing angle, target distance, weather exposure, and maintenance access.
Network layer	PoE, switching, uplink capacity, fiber or wireless links, VLANs, latency, cybersecurity controls, remote access, and bandwidth headroom for higher fps streams.
Recording layer	NVR or VMS storage, bit rate, codec, frame rate, retention period, redundancy, backup, playback performance, and export workflow.
Management layer	Client software, web access, CMS, TV wall, user permissions, multi-site monitoring, event review, and system health management.
Analytics layer	People, vehicle, object, face, or license-plate analytics; analytic performance depends on sufficient image quality, target size, and scene design.
Response layer	Operator SOPs, alerts, access-control action, guard dispatch, escalation, incident reporting, evidence export, and audit trail.

Architecture warning: A camera that looks excellent in a datasheet can still underperform if the network bit rate, recording profile, display layout, storage retention, or operator search workflow is poorly planned.

7. ACTi Product Portfolio Overview

ACTi positions its High Frame Rate Cameras category as a portfolio for fast-moving environments. The public page highlights cameras for traffic monitoring, casinos, and fast-action scenes, with product families across multiple form factors. [1]

At portfolio level, ACTi highlights frame rate up to 120fps, Extreme Low Light Sensitivity and WDR, optical zoom up to 40x, IR distance up to 250 meters, built-in analytics with people and vehicle detection, classification and recognition, high-resolution anti-corrosion and anti-explosion models, and compliance options such as NDAA and TAICS. [1]

Portfolio categories

Category	Where it fits	Use-case fit
Box cameras	Flexible camera style where lens choice, enclosure, and installation design can be adapted to the project.	Special lens requirements, controlled entrances, production monitoring, indoor/outdoor housing designs.
Bullet cameras	Directional outdoor form factor for visible deterrence and focused coverage of specific areas.	Traffic approaches, gates, driveways, loading docks, parking edges, perimeter points.
Dome cameras	Lower-profile form factor often used where appearance, ceiling mounting, or vandal resistance matters.	Lobbies, corridors, casinos, retail areas, public entrances, indoor/outdoor fixed views.
Hemispheric and fisheye cameras	Wide-area situational awareness where one camera can cover broad scenes.	Retail floors, halls, transportation areas, public spaces where overall scene context matters.
PTZ cameras	Wide-area monitoring with optical zoom, positioning control, and long-distance observation capability.	City surveillance, campuses, airports, industrial sites, parking, public spaces.
Body-worn cameras	Mobile evidence capture where video follows an operator, guard, or field worker.	Security patrols, enforcement, field service, incident response, mobile operations.
Environmental and compliance-ready options	Selections where corrosion, explosion-risk environments, NDAA, TAICS, cybersecurity, or regional availability must be confirmed.	Industrial sites, government projects, critical infrastructure, public sector, regulated enterprise projects.

Portfolio-level capabilities to confirm

- Required form factor, mounting method, field of view, target speed, target distance, and lighting condition.
- Required frame rate at the selected resolution, shutter speed, WDR, low-light performance, IR distance, lens type, zoom range, and actual evidence quality.
- Recorder/VMS compatibility, bit rate, codec, retention, playback, frame-by-frame review, export workflow, CMS, and remote access requirements.
- Environmental casing, operating temperature, anti-corrosion or anti-explosion needs, vandal resistance, and maintenance access.
- Built-in analytics requirements and whether the scene can support reliable detection, classification, recognition, counting, or tracking.
- Cybersecurity and compliance requirements such as NDAA, TAICS, firmware policy, secure access, and regional availability.

Project note: Product availability, detailed specifications, compliance status, recorder compatibility, and regional part numbers should be confirmed from the latest ACTi product pages, datasheets, firmware release notes, and quotation documents before project submission.

8. Related Keywords and Terminology

The following keyword reference groups collect common terms related to high frame rate surveillance, fast-action evidence, traffic monitoring, gaming security, system architecture, and project procurement.

Core topic keywords

high frame rate camera, high frame rate security camera, high frame rate surveillance camera, 60fps security camera, 120fps security camera, high fps IP camera, fast action security camera, motion evidence camera, forensic playback camera, slow motion surveillance camera, frame by frame security camera

Motion and evidence keywords

fast moving object camera, motion clarity surveillance, clear motion video camera, high shutter speed surveillance, temporal detail camera, event reconstruction camera, incident review camera, evidence export workflow, video evidence review, frame accurate playback

Traffic and transportation keywords

traffic monitoring camera, vehicle monitoring camera, license plate capture camera, intersection surveillance camera, parking entrance camera, toll gate camera, transportation security camera, roadway surveillance camera, vehicle approach camera, smart traffic surveillance

Gaming, cash, and retail keywords

casino surveillance camera, gaming table camera, cashier surveillance camera, cash handling camera, bank counter camera, retail counter camera, service desk camera, transaction dispute video, high frame rate casino camera, hand movement surveillance

Technical specification keywords

fps security camera, frame rate vs shutter speed, high fps vs resolution, bit rate planning, storage planning, H.265 high frame rate, H.264 high frame rate, GOP length, low light high fps camera, WDR high frame rate camera, IR high frame rate camera

Form factor keywords

box camera, bullet camera, dome camera, PTZ camera, fisheye camera, hemispheric camera, body worn camera, outdoor bullet camera, fixed dome camera, zoom camera, vandal resistant camera, weatherproof security camera, anti-corrosion camera, anti-explosion camera

Analytics and intelligent video keywords

AI security camera, built-in analytics camera, people detection camera, vehicle detection camera, object classification camera, face recognition camera, license plate recognition camera, people counting camera, object metadata camera, auto tracking camera

System and architecture keywords

IP camera system, NVR camera system, VMS camera system, CMS surveillance, remote security monitoring, multi-site surveillance, system health management, security camera bandwidth planning, video retention planning, frame by frame playback

Procurement and project keywords

security camera specification, high frame rate camera specification, camera selection guide, surveillance camera white paper, camera for system integrators, camera for consultants, camera for end users, NDAA security camera, TAICS security camera, ACTi high frame rate camera

Common question phrases

what is a high frame rate camera, when do I need a 60fps security camera, when do I need a 120fps security camera, how does frame rate affect surveillance video, does higher fps reduce motion blur, what is the difference between frame rate and shutter speed, how much storage do high frame rate cameras need, how to choose a camera for fast moving vehicles, how to specify frame by frame playback, how to design high frame rate surveillance for casinos

Source notes

Ref.	Source
[1]	ACTi Corporation, "High Frame Rate Cameras," official product category page. URL: https://www.acti.com/products/high-frame-rate-cameras. Accessed: June 11, 2026.
[2]	ACTi Corporation, "About ACTi," official corporate page. URL: https://www.acti.com/corporate/about. Accessed: June 11, 2026.

Revision note: This document is a marketing and technical education white paper. It is not a regulatory certification, safety standard, or final project design. Always validate target speed, viewing distance, field of view, lens choice, frame rate, shutter, WDR, lighting, IR, recording settings, storage, and operator workflow in the target scene before deployment.

Prepared by ACTi Corporation

For high frame rate camera projects, confirm camera type selection, lens, lighting, recording platform, compliance requirements, mounting accessories, and regional availability with your ACTi sales contact or authorized system integrator.

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