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Production Context

Context & Guidance

Context is essential—these details serve as a guide and can vary depending on production requirements and creative intent. For further learning, GEM encourages exploring a series of insightful module guides and videos to deepen understanding of virtual production workflows.

What Is In-Camera VFX?

In-Camera Visual Effects (ICVFX) harnesses display surfaces—most often LED walls with dynamic content—to produce a finished visual effect within the camera during the shoot, reducing or eliminating post-production tasks. This technology enables filmmakers and crew to create immersive settings, natural lighting, realistic reflections, and backgrounds that deliver immediate creative cues and authenticity.
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Approaches to In-Camera VFX

- **2D In-Camera VFX:** Utilizes pre-rendered or live-action footage projected at a fixed perspective on display surfaces. It's ideal for scenarios like plate-based driving shoots, where controlled, repeatable environmental backgrounds enhance realism and outcome.

- **3D In-Camera VFX:** Uses real-time engines (for example, Unreal Engine) with camera tracking to synchronize live virtual scenes and produce final-pixel imagery on set. This allows creative control and real-time adjustments to backgrounds and foregrounds without final rendering beforehand.

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- **2.5D In-Camera VFX:** Blends 2D and 3D techniques; distant elements are pre-rendered while interactive foreground layers remain fully adjustable, offering a balance of complexity and flexibility.

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Traditional vs. Virtual Production Car Shoots

Method	Description	Pros	Cons
On-location process shoots	Use trailers and real environments; require logistics and permits	Authentic lighting, scenery	Logistical complexity; continuity issues
Green/blue screen	Shoot in studio, composite backgrounds later	Simpler setup	Post-production compositing; quality varies
Interactive Lighting	Use LED panels for live lighting/reflections with green/blue screens	Enhanced realism, fewer post fixes	Requires careful setup

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In-Camera VFX	Display dynamic backgrounds via LEDs, producing final image during capture	Real environments, direct cues	Requires LED infrastructure

Crew, Roles, and Workflow

A successful ICVFX shoot involves a spectrum of traditional and new roles, including Director of Photography, Virtual Production Supervisor, Production Designer, DIT (Digital Imaging Technician), VFX Supervisor, Editorial, Production Supervisor, Gaffer, Post Supervisor, Media Server Operator, LED Technician, and Virtual Art Department (real-time/game engine artists).

Each role is critical in designing content, setting up LED volumes, and ensuring visual effects play out as intended on set. New workflows, such as ingesting content for LED playback or pre-lighting setups, require close collaboration and early scheduling adjustments.

Timeline and Best Practices

Executing ICVFX requires:

- Early assessment of objectives (sequences, effects, practical vs. digital elements)

- Kickoff and coordination between creative and technical leads

- Stage and technical visualization (techvis) to lay out camera moves and setups before shoot day

- Permits and approvals for all on-set infrastructure

- Ingestion, organization, and prepping content for display

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- Detailed pre-light and run-throughs to optimize setups quickly

- Efficient shoot days with rapid resets and feedback loops

Daily reviews and QC checks are crucial to identify and address artifacts or issues early, minimizing post-production fixes.