FIELD GUIDE / ANIMATION SUPERVISION

# On-Set VFX: What We Actually Need

An Animation Supervisor's guide for Directors, Producers, DPs, VFX Supervisors, and on-set crews.

## CONTENTS



## 01 Introduction - Why This Guide Exists

On-set Visual Effects Supervisors are highly skilled professionals - but they typically do not come from an animation background. Most have built their careers in lighting and compositing, which means their instincts and priorities on set are naturally oriented toward light reference, plate photography, and compositing data. This is entirely understandable, and that expertise is invaluable. However, it means that animation-specific requirements - the reference cameras, the MoCap protocols, the locked-off coverage that animators and motion editors depend on - can be overlooked, under-resourced, or misunderstood as less critical than they are. That gap in awareness, repeated across enough productions, is one of the most consistent and costly sources of preventable rework in VFX post production. **This guide exists to close that gap.**

Every missed reference camera, every motion capture take compromised by undisclosed electrics - these are not post problems. They are **production decisions with a post invoice.** A matchmove artist working blind, a MoCap cleanup artist wrestling with corrupted data, an animator without usable performance reference - these are all symptoms of the same cause: decisions made on set without understanding their post consequences. The costs are real: re-capturing a motion capture performance, once the crew has wrapped and the performer has moved on, can run from tens of thousands to well into the millions when you factor in facility hire, crew, performer fees, travel, and all the downstream work that must be redone.

The goal of this guide is simple: **efficiency and quality.** Getting it right on the day costs almost nothing extra. Getting it wrong costs everything.

Asking an animator to deliver high-quality work on schedule without these requirements in place is the equivalent of asking a compositor to match the lighting in a plate with no light reference, or asking an environment artist to

replicate an on-set location precisely with no LiDAR data. The parallel is exact. Every discipline in post depends on what was - or was not - captured on the day. These requirements are not options. **They are necessities.**

> **! CRITICAL**
>
> A note to Producers: When a VFX Supervisor or Animation Supervisor requests additional reference cameras, dedicated MoCap time, or specific on-set data capture, these are not wish-list items. They are the foundation on which the entire post animation pipeline is built. Declining them to reduce shoot-day costs does not eliminate those costs - it defers them to post, where they arrive multiplied.

*"If it wasn't captured on the day, someone in post is going to have to invent it. And that's the most expensive kind of creativity."*

- Common wisdom, every VFX animation department

## 02 The Director's Role in VFX Success

The Director is the creative authority on a production - the captain of the ship. But every ship depends on the people who keep it running. On a VFX production, those people include the VFX Supervisor, the Animation Supervisor, the MoCap Supervisor, and the on-set technical teams. A Director who understands, respects, and actively supports the work of these teams will get a better result on screen. A Director who does not will get a more expensive one.

The VFX and animation departments exist entirely in service of the Director's vision. CG characters, creatures, environments, and performance-captured performances are all tools for realising that vision. But those tools have technical prerequisites. The time taken on set to meet those prerequisites is not time taken away from the creative work - it is the creative work, at a technical level.

> **> DIRECTORS**
>
> **Listen to your VFX Supervisor's recommendations.** When the VFX Supervisor asks for setup time, additional cameras, or a technical pass, there is a specific downstream reason. A Director who is aligned with their VFX team from day one will have fewer surprises and more creative options when it matters most.

**Take the time for MoCap and stunt performers.** A Director who takes the time to speak with a MoCap performer - to share the character's emotional arc, their physical manner, the dynamics of a specific scene - will get a performance that animators can build upon. A MoCap performer briefed only in generalities will deliver generalities. The same applies to stunt performers whose work will be augmented or replaced by CG.

> **> DIRECTORS**
>
> **Be clear about what is live action and what is CG - and how they interact.** Before every effects-heavy shooting day, the Director, VFX Supervisor, and Animation Supervisor must be aligned on exactly which elements will be captured in-camera, which will be entirely CG, and how live-action performers and CG characters will interact. Ambiguity on this question is one of the most expensive ambiguities in film production.

| DIRECTOR - PRE-SHOOT ALIGNMENT |
| --- |
| [ ] Pre-production meeting held with VFX Supervisor and Animation Supervisor for every effects-heavy scene |
| [ ] Clear decisions made and documented: which elements are live action vs. CG for each shot |
| [ ] CG character interactions mapped - eye lines, physical contact points, scale relationships |
| [ ] Time scheduled to speak personally with MoCap and stunt performers before capture |
| [ ] Character briefing notes prepared for MoCap performers - emotional context, physicality, key beats |
| [ ] VFX setup time built into the schedule, not improvised around it |

## 03 The Director of Photography - Cameras, Data & Communication

The Director of Photography controls the visual language of the film. On a VFX production, these decisions have direct technical implications for the post pipeline. The most important principle for any DP working with VFX: **nothing changes without communication.** Reference cameras, survey markers, and MoCap systems are calibrated to the spatial state of the set at a specific point in time. When something changes and that change is not communicated to the VFX and MoCap teams, the calibration is broken silently.

**! CRITICAL**

Never move a reference camera, survey marker, or MoCap-related equipment without first notifying the VFX Supervisor and MoCap Supervisor. A moved reference camera can invalidate all matchmove data gathered from that position. Survey markers anchor the spatial relationship between the real set and its 3D reconstruction - moving them without logging the change means the 3D model no longer matches the physical space. If equipment must move, it must be communicated, logged, and the system must re-calibrate before shooting resumes.

The DP's lighting decisions also directly impact MoCap data quality. High-powered lighting rigs, dimmer boards, and certain ballasts generate electromagnetic interference that degrades MoCap tracking data. A brief conversation between the DP, Gaffer, and MoCap Supervisor before the lighting rig is powered up is all it takes to identify and avoid these conflicts.

*** BEST PRACTICE**

The DP and VFX Supervisor should meet before each shooting day to review the shot list together - discussing camera movement, lighting changes, and set changes for each effects shot. This allows the VFX team to plan their data capture requirements around the DP's plan, not discover conflicts on the floor.

| DP - VFX COMMUNICATION REQUIREMENTS |
| --- |
| [ ] Pre-shoot meeting with VFX Supervisor to review all effects shots and camera plans |
| [ ] No reference cameras or survey markers moved without notifying VFX and MoCap Supervisors first |
| [ ] All camera moves, reframes, and repositions logged in camera report with timecodes |
| [ ] Gaffer briefed on MoCap EMI sensitivities - lighting rig plan shared with MoCap Supervisor before power-up |
| [ ] Dimmer board changes and ballast additions communicated to MoCap Supervisor in advance |
| [ ] Lens data (focal length, T-stop, distortion profile) recorded for every setup |
| [ ] Timecode sync confirmed between main unit and all reference cameras at start of each day |

## 04 The Producer's Role - Investment, Not Expense

Producers carry the financial and logistical responsibility of the production. It is natural, and correct, for a Producer to scrutinise costs. But there is a category of cost on a VFX production that is consistently misread as unnecessary overhead, when in reality it is precisely the opposite. The on-set data capture requirements described in this guide are not extras. They are the infrastructure of the post pipeline. Cutting them does not reduce the work - it relocates it to post, where it becomes significantly more expensive.

> **$ PRODUCERS**
>
> Every requirement in this guide exists to make a highly complex post production process as cost-efficient as possible while delivering the highest quality possible. These are not competing goals - they are the same goal. Proper on-set capture is the single most effective cost-control measure available to a VFX production.

Consider the economics plainly: additional reference cameras might cost a few hundred dollars on the day. An unsolvable matchmove can mean weeks of VFX artist time, schedule delays, and potentially a re-shoot. A 30-minute LiDAR scan is a modest line item. Rebuilding an environment from scratch because there is no scan data can cost multiples of that across an entire sequence.

| PRODUCER - VFX BUDGET CONSIDERATIONS |
| --- |
| [ ] VFX data capture requirements reviewed and approved in pre-production - not negotiated on the day |
| [ ] Reference camera package budgeted as a standard VFX line item, not an optional add-on |
| [ ] MoCap setup, calibration, and wrap time included in the shooting schedule |
| [ ] LiDAR scanning assessed for every location or set with significant environment work in post |
| [ ] VFX Supervisor has authority to call a technical hold when data integrity is at risk |
| [ ] Re-shoot costs understood as the direct consequence of inadequate on-set capture |
| [ ] Animation Supervisor consulted in pre-production on all scenes requiring performance animation |

## 05 Reference Cameras for Matchmove & Animation

Matchmoving - the process of recreating a camera's exact position, rotation, and lens characteristics in 3D space - is the invisible foundation that holds every VFX shot together. If a CG character or element does not perfectly track with the plate camera, the shot fails regardless of the quality of the animation or rendering. A matchmove is only as

good as the reference data it is built from.

Reference cameras also serve animators directly. When an animator studies a performance - checking timing, verifying physical behaviour - they need a clean, stable, objective record of what the performer actually did. That is only possible with locked-off reference cameras covering the action from multiple angles.

**! CRITICAL**

One or two reference cameras is not enough. Matchmove requires spatial triangulation across multiple vantage points. Two cameras provide a thin, often ambiguous data set. The minimum recommendation is **four reference cameras** - ideally six or more for wide or complex environments. Think of it as surveying: the more fixed observation points you have, the more accurate and reliable your spatial reconstruction will be.

Reference cameras serve matchmove artists, environment artists, and animators simultaneously. Every one of those departments is blocked - or working with invented data - without adequate reference coverage. The cost of additional cameras on the day is negligible against the cost of a matchmove that cannot be solved.

| REFERENCE CAMERA REQUIREMENTS |
| --- |
| [ ] Minimum 4 cameras; 6+ for wide or complex environments |
| [ ] All reference cameras on locked-off tripods - positions taped and logged |
| [ ] Camera positions surveyed and measured relative to key set markers |
| [ ] Lens focal length and distortion data recorded for every camera |
| [ ] Cameras rolling continuously - not just for hero takes |
| [ ] Sync slate or timecode visible in every camera frame |
| [ ] Survey / tracking markers placed throughout the set in a non-repeating pattern |
| [ ] Scale reference (1.8m pole or measurement board) visible during reference captures |
| [ ] Colour chart in at least one reference camera frame per setup |

## 06 Locked-Off vs. Handheld Reference

A reference camera must be **locked off on a tripod.** This is not a preference - it is a technical requirement. A reference camera that moves defeats its own purpose.

**! CRITICAL**

Handheld reference cameras are worse than useless for animation and matchmove. When a camera operator moves, their movement is superimposed onto the performer's movement. An animator trying to isolate a performance - a hand gesture, a head turn, a weight shift - cannot separate the two signals. What looks like a dynamic performance may simply be camera shake. The matchmove team is equally affected: a camera whose position was not fixed cannot be solved as a fixed data point.

The purpose of a locked-off reference camera is to give post a stable, objective record of what happened in physical space. A handheld camera gives you a record of what two people did: the performer, and the operator. Post needs to see only the performer.

*** BEST PRACTICE**

If a locked-off angle is impractical due to set constraints, a camera on a fluid head with a levelling base is acceptable - but the operator must remain completely still during takes. Mark all tripod feet with tape so the camera can be returned to the exact position if moved. Any repositioning must be logged with a timecode note.

Reference cameras should **not be moved between takes** unless communicated to the VFX team, logged in the camera report, and - if MoCap is active - cleared with the MoCap Supervisor.

## 07 LiDAR, Survey Data & IBL Light Probes

Three categories of on-set data capture are routinely underestimated or skipped, to significant cost in post: LiDAR scanning, survey marker data, and IBL light probe capture. Each serves a different post discipline, and the failure to capture any one of them creates a specific and expensive problem downstream.

**LiDAR Scanning** creates a precise, millimetre-accurate 3D model of a physical location or set. For environment and layout artists in post, this scan is the ground truth. Without it, artists are rebuilding the space from photographs and guesswork - slower, less accurate, and far more expensive in revisions. A scan that takes one to two hours at the end of a shooting day can prevent weeks of environment rework in post.

**Survey Data** - the measured, documented positions of tracking markers, cameras, and key set features - is the coordinate system that connects the physical world to the digital one. When survey data is missing, matchmove artists have to solve geometry they should be given. Scale errors compound across a sequence. Survey data is cheap to capture and catastrophically expensive to lack.

**IBL Light Probes and HDRI Capture** are the responsibility of the VFX Supervisor and compositing pipeline - not the animation department. However, their absence directly impacts the quality of every CG element in the frame. A chrome ball and grey ball capture the specular and diffuse lighting environment at the performer's position. A 360-degree HDRI panorama captures the full lighting environment for physically-based rendering. Without these, CG elements are lit against an approximation of reality. The principle is identical across every discipline: the quality of the output is bounded by the quality of the on-set data.

**$ PRODUCERS**

LiDAR scanning, survey capture, and light probe photography are modest line items. The post costs they prevent are not. Any production considering cutting these should ask: what is the cost of rebuilding this environment, re-solving this geometry, or re-lighting this sequence from scratch? The answer will exceed the capture cost many times over.

| LiDAR, SURVEY & IBL REQUIREMENTS |
|---|
| [ ] LiDAR scan of set or location scheduled at end of each shooting day with environment work in post |
| [ ] Photogrammetry capture as alternative or supplement where LiDAR is unavailable |
| [ ] Survey markers placed in a deliberate, non-repeating pattern - all positions measured and logged |
| [ ] Scale reference photographed against key set features |
| [ ] Chrome (specular) ball and grey (diffuse) ball captured at performer position for every lighting setup |
| [ ] 360-degree HDRI panorama captured at camera height for every significant lighting change |
| [ ] HDRI bracketed at minimum 7 stops of exposure for full dynamic range |
| [ ] Lighting notes - instrument type, position, colour temperature, intensity - recorded per setup |
| [ ] All scan, survey, and probe data stored on dedicated VFX data drive, separate from picture |

## 08 On-Set Motion Capture - Crew Communication

On-set motion capture is among the most expensive single elements of a VFX production. A MoCap day - facility, crew, suits, processing, performer fees - can run to tens of thousands of dollars before post even begins. Compromised data means a re-shoot. A re-shoot means reassembling all of that, often at a premium. **There is no budget line for fixing MoCap in post.** The entire crew must understand this.

The MoCap Supervisor must be treated as a primary technical stakeholder on the day - equivalent in authority, within their domain, to the DP or the VFX Supervisor. Their requirements are not requests. They are production requirements that directly determine whether the day's work is usable.

**! CRITICAL**

Electromagnetic interference from high-powered lighting rigs, dimmer boards, and electrical distribution is one of the most common and most preventable causes of degraded MoCap data. Grips, electricians, and gaffers must communicate their full rigging plan to the MoCap Supervisor **before** any equipment is powered on. By the time interference problems are visible in the MoCap data, the take is already compromised.

| MoCap - CREW COMMUNICATION BY DEPARTMENT |
|---|
| [ ] Director: Brief MoCap performers on character, scene context, and performance requirements before capture |
| [ ] DP / Gaffer: Share full lighting rig plan with MoCap Supervisor before power-up |
| [ ] Grips / Electricians: No power changes or dimmer adjustments during an active MoCap take without clearance |
| [ ] Sound: All RF wireless systems declared to MoCap Supervisor before use |
| [ ] AD: MoCap system warm-up and calibration time (30-60 min) built into the schedule |
| [ ] AD: "MoCap hot" called before every take - equivalent to "camera rolling" |
| [ ] Art Department: No metallic set dressing added or moved after MoCap calibration without approval |
| [ ] All departments: No RF walkie-talkies within the MoCap volume during takes |
| [ ] All crew: No one enters the MoCap volume during a take unless a suited performer |

## 09 The VFX Supervisor's Responsibility to MoCap

The VFX Supervisor is the shepherd of the entire VFX data pipeline on the day. It is their responsibility - not an assumption - to ensure the MoCap Supervisor has everything they need, that the crew has been briefed, and that the conditions for a successful capture have been established before the first take.

*** BEST PRACTICE**

Before the shoot, the VFX Supervisor should meet with the MoCap Supervisor to walk through the shoot environment, the full lighting and electrical plan, the schedule, any special movements or stunt requirements, and the data handoff process for post. There should be no surprises on the day. A one-hour pre-production meeting costs nothing. A MoCap re-shoot costs a great deal.

Motion capture data is extraordinarily difficult to repair in post. A corrupted take, a volume calibration that drifted, a performer who was not fully suited before action - these are not recoverable situations. Cleanup, if possible at all, can mean weeks of additional technical animation work that was never budgeted.

**! CRITICAL**

Getting the best possible performance on the day is the only goal. MoCap is not a safety net. You cannot fix it in post. If the data is not clean when it comes off the floor, it is compromised - and the cost of that compromise, in re-shoots, cleanup, and additional animation work, will be measured in weeks and potentially hundreds of thousands of dollars.

| VFX SUPERVISOR - MoCap OVERSIGHT |
|---|
| [ ] Pre-shoot tech survey conducted with MoCap Supervisor at location |
| [ ] MoCap system volume mapped against camera positions and set layout |
| [ ] DP, Gaffer, and Key Grip briefed on MoCap sensitivities |
| [ ] Performer suit-up time scheduled - not improvised around other setups |
| [ ] Performer movement rehearsals conducted before MoCap hot |
| [ ] Data wrangling and backup protocol confirmed before shoot begins |
| [ ] MoCap Supervisor has direct communication line to 1st AD at all times |
| [ ] Post-shoot data review with MoCap Supervisor completed before crew wraps |

## 11 Additional Recommendations

**Witness Camera on the Performance.** Animators need a dedicated witness camera on the performer's face and upper body during key takes. Facial performance, eye line, and subtle physical behaviour are what an animator returns to again and again. This camera should be tight on the upper body, on the performer's best side, and locked off.

**Eye Line Reference for CG Characters.** When live-action performers act opposite CG characters or creatures, a clear physical eye line target must be established on set at the correct scale and height. This must remain consistent across all takes. The VFX Supervisor and Animation Supervisor should agree on this before the shoot day.

**Stunt and Creature Work.** When performers are executing actions that will be replaced or augmented by CG, have the Animation Supervisor on set, or reviewing dailies the same day. A performance problem caught early is a

pickup shot. A performance problem caught in post is a re-shoot.

> *** BEST PRACTICE**
>
> Keep a dedicated VFX data drive on set - separate from the main picture data - for all reference material: reference camera footage, LiDAR scans, tracking marker surveys, light probe captures, and MoCap data. Losing it means reconstruction from scratch, at full cost. Treat it with the same care as the picture negative.

## 12 Master On-Set VFX Checklist

Use this as a pre-shoot verification checklist. The Producer, Director, and VFX Supervisor should all be aligned on each item before principal photography begins for any effects-heavy shooting day. If an item cannot be met, that risk must be acknowledged in writing - not quietly accepted and discovered in post.

| CREATIVE & PRODUCTION ALIGNMENT |
|---|
| [ ] Director, VFX Supervisor, and Animation Supervisor aligned on all live action vs. CG elements |
| [ ] CG character interactions mapped - eye lines, contact points, scale |
| [ ] Director has briefed all MoCap and stunt performers on character and scene context |
| [ ] VFX setup time scheduled into the day |
| [ ] Producer has approved all VFX data capture requirements |

| REFERENCE CAMERAS |
|---|
| [ ] Minimum 4 reference cameras confirmed, positioned, and taped |
| [ ] All reference cameras on locked-off tripods |
| [ ] Lens data recorded for each camera |
| [ ] Timecode sync confirmed across all reference cameras and main unit |
| [ ] Camera positions surveyed and logged |
| [ ] Tracking markers placed in set - positions measured and documented |
| [ ] Scale reference visible in set during reference captures |
| [ ] DP briefed: no reference cameras moved without notifying VFX team first |

| LiDAR, SURVEY & LIGHT PROBES |
|---|
| [ ] LiDAR scan scheduled at end of shooting day where environment work is required in post |
| [ ] Survey marker positions logged with measurements |
| [ ] Chrome ball and grey ball kit in camera package |
| [ ] 360-degree HDRI camera confirmed and operator briefed |
| [ ] Probe and HDRI capture scheduled for every lighting setup change |
| [ ] Lighting notes template distributed to Gaffer and Best Boy |

| MOTION CAPTURE |
|---|

| |
|---|
| [ ] MoCap Supervisor briefed on full shoot schedule and locations |
| [ ] Pre-shoot tech survey completed - EMI sources identified and mapped |
| [ ] DP, Gaffer, and Key Grip briefed on MoCap sensitivities before lighting rig power-up |
| [ ] Volume calibration time in the schedule (30-60 minutes) |
| [ ] Performer suit-up time scheduled |
| [ ] RF inventory reviewed with MoCap Supervisor |
| [ ] Data wrangling and backup protocol in place |
| [ ] "MoCap hot" protocol established with 1st AD |
| [ ] End-of-day data review with MoCap Supervisor confirmed before wrap |

| CLEAN PLATES |
|---|
| [ ] Clean plate shot list confirmed with VFX Supervisor |
| [ ] Clean plate captured for every shot with elements to be removed in post |
| [ ] Set fully cleared before each clean plate take |
| [ ] Camera, lens, and lighting identical to hero take |
| [ ] Clean plates logged against corresponding hero takes in camera report |

| GENERAL VFX PREP |
|---|
| [ ] Eye line targets in place for all CG character interactions |
| [ ] Witness camera positioned and locked for key performance takes |
| [ ] VFX data drive designated and confirmed with data wrangler |
| [ ] Animation Supervisor reviewing dailies same-day (or on-set for critical work) |

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*This guide reflects working practices developed across live-action VFX productions. The underlying principle is consistent: the cost of thoroughness on the day is modest. The cost of inadequate capture - in re-shoots, rework, schedule overruns, and compromised quality - can run from hundreds of thousands to millions of dollars. Capture more, not less. Storage is cheap. Re-shoots are not.*