



**Santa
Monica
StudioTM**

A cinematic still from God of War showing Kratos standing in a misty forest. He is wearing his signature brown leather armor and holding his axe. To his left, a tree trunk features a prominent yellow handprint. The scene is atmospheric, with soft lighting and falling leaves.

Keyframes and Cardboard Props

God of War's Cinematic Process

Warning: Spoilers for God of War ahead!



(For video examples, please watch the recording)

Introduction: A New Beginning

- Seamless, immersive player experience
- A camera that never cuts
- How do we do that?!
- Step-by-step with “Flying Boat Jump”

Order of Operations

- Creative Director
- Writers
- Director of Photography
- Animation Director
- Animation Lead
- Animators
- Cinematic Artists
- Integration
- Producers
- Outsource coordinator





Streamlining Production for No Cuts

- Previsualization
- On Set
- Scene Assembly and Polish

Previsualization





Previously, on God of War...

- All layout done in Maya
- Simple camera language with one main rule: keep camera alive
- Use cuts to show details and character reactions
- Not much attention paid to lens choice
- Problem: this method did NOT work with no cuts!

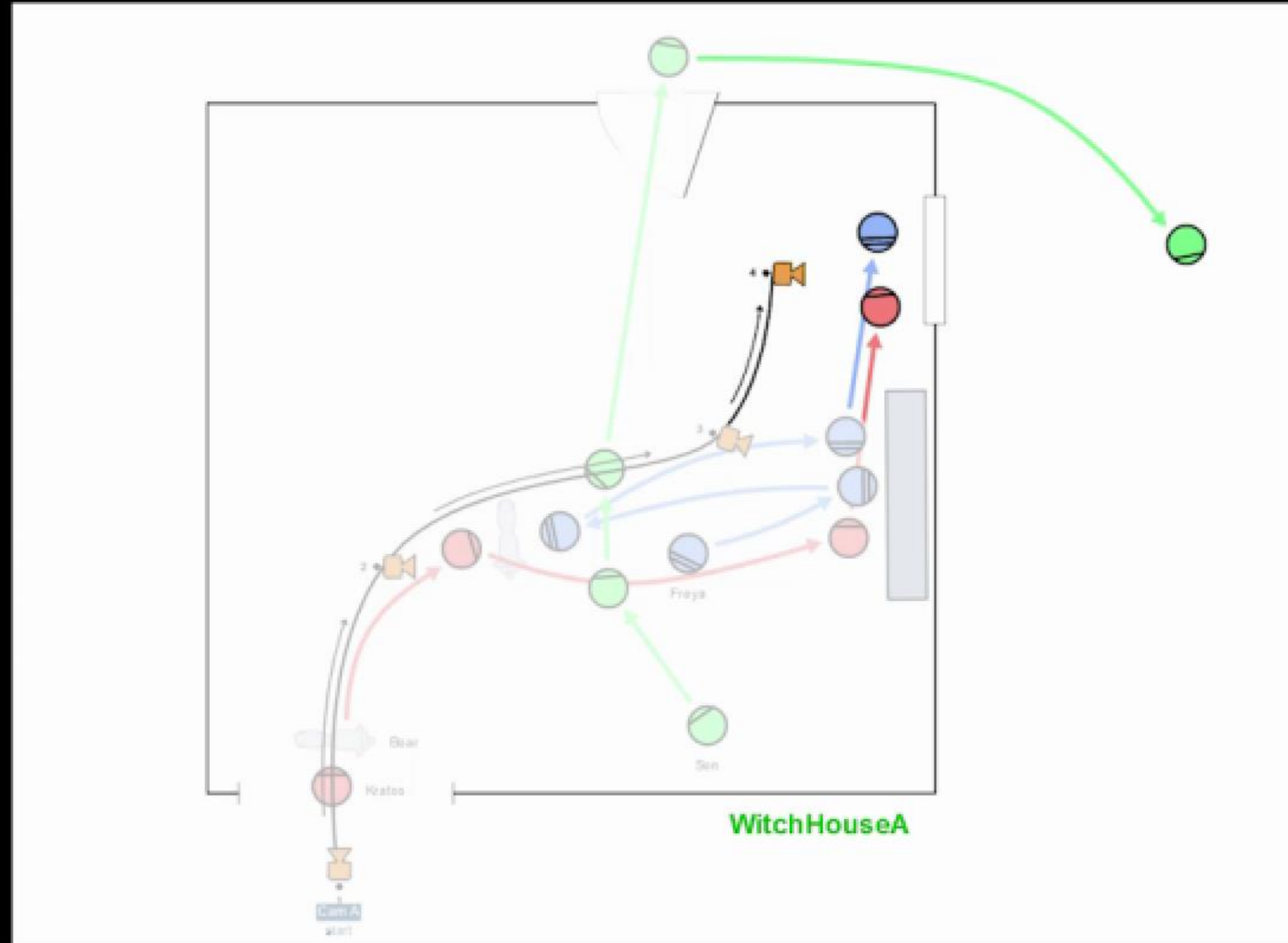


Failure points from early tests

- Freezing characters in place, forcing camera to swing around and traverse great distances with no motivation
- Trying to get reaction shots but no way to get to them naturally
- Awkward camera moves, not grounded the way a cam operator would behave
- Time consuming process without great results
- Needed someone with experience in staging who could tackle one-ers with sophistication



The Previs Process: Staging

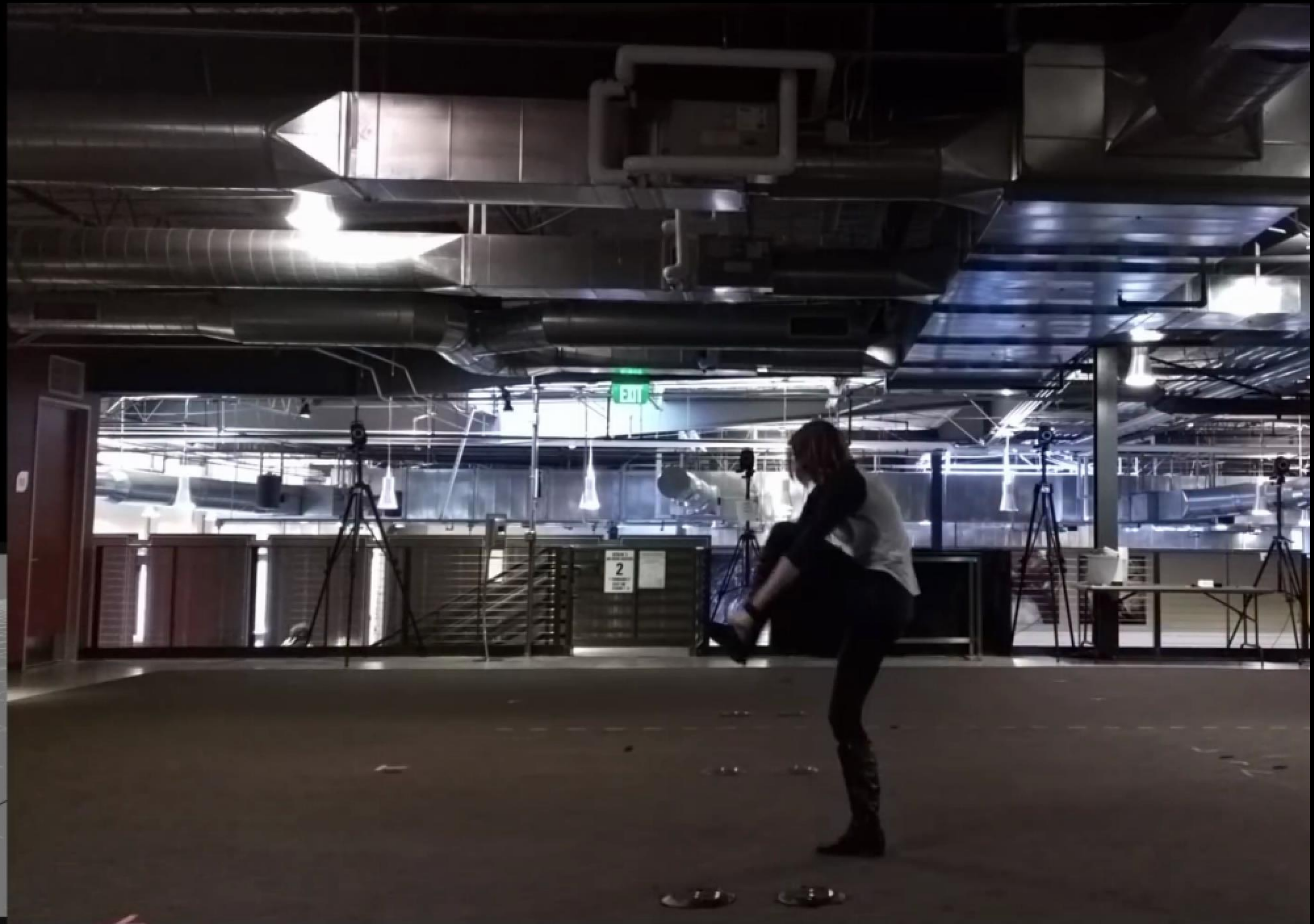
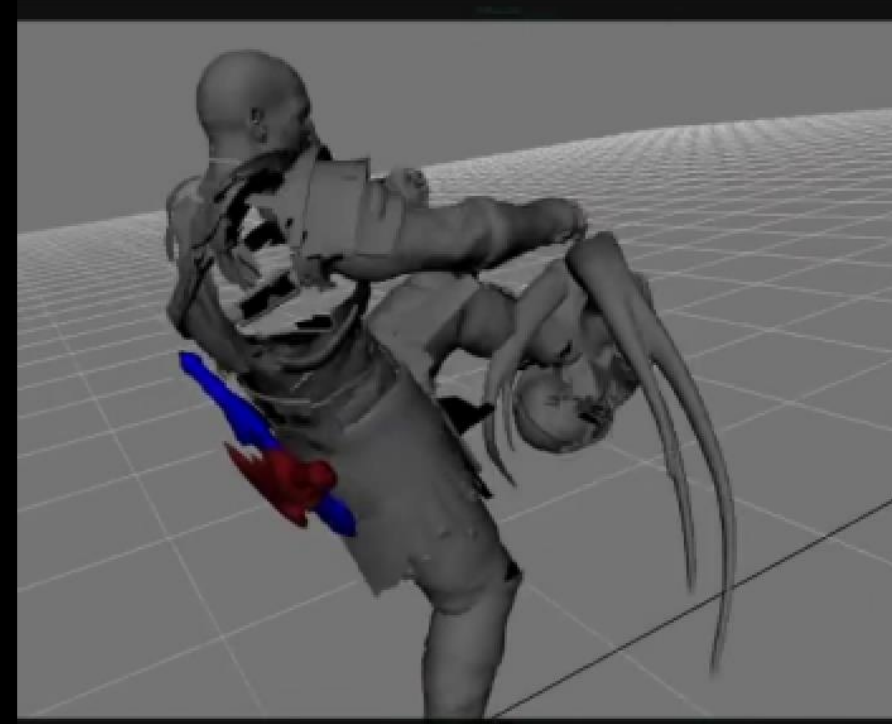


- Thinking about staging as a complex dance between actors and camera
- Using top-down diagrams to plan scenes

The Previs Process: Live Action Reference

Common uses in games:

- See how body mechanics work
- Get sense of timing
- Works great for gameplay, how to use for cinematics?



The Previs Process: Live Action Reference

Benefits:

- Easily test “documentary” style camera
- Very little setup time
- Quick reviews and iterations
- Surprising human interactions
- It's fun!



The Previs Process: Live Action Reference

Challenges:

- Memorizing lots of lines
- Learning complex choreography
- Trying to establish accurate timing
- How to deal with characters of differing sizes?
- How would the principal cast react to our acting?



The Previs Process: Rough Mocap

Benefits:

- Work with characters of varying sizes
- See actual sets and props to scale
- More accurate plans for principal shoot days
- Data can be sent to the stage for shoot prep
- Prototypes can be put in-game

The Previs Process: Rough Mocap

Challenges:

- Learning how to operate a mocap system!
 - Technical difficulties with VICON stage, VCam, and software
- Slow iteration time
- Diverting resources (animators)
- Temp actors = Less animator creative input

Flying Boat Jump Rough Mocap

- Checking composition with BG, ghosts, Atreus, to see how busy it is



The Previs Process: Creating “Business”

- Opportunities for camera to look away from characters
- Motivation for getting characters to move through space
- Non-verbal insights into a character’s personality



The Previs Process: Sets and Props

- For previs, scrounging for materials from trash, mail room, etc.
- Mocap markers on temp props to track during previs



The Previs Process: Traditional Layout

Benefits:

- You can do ANYTHING – super epic moments!

Challenges:

- Super time consuming to create/iterate
- Establishing real-world timing is tricky





On Set

On Set: History

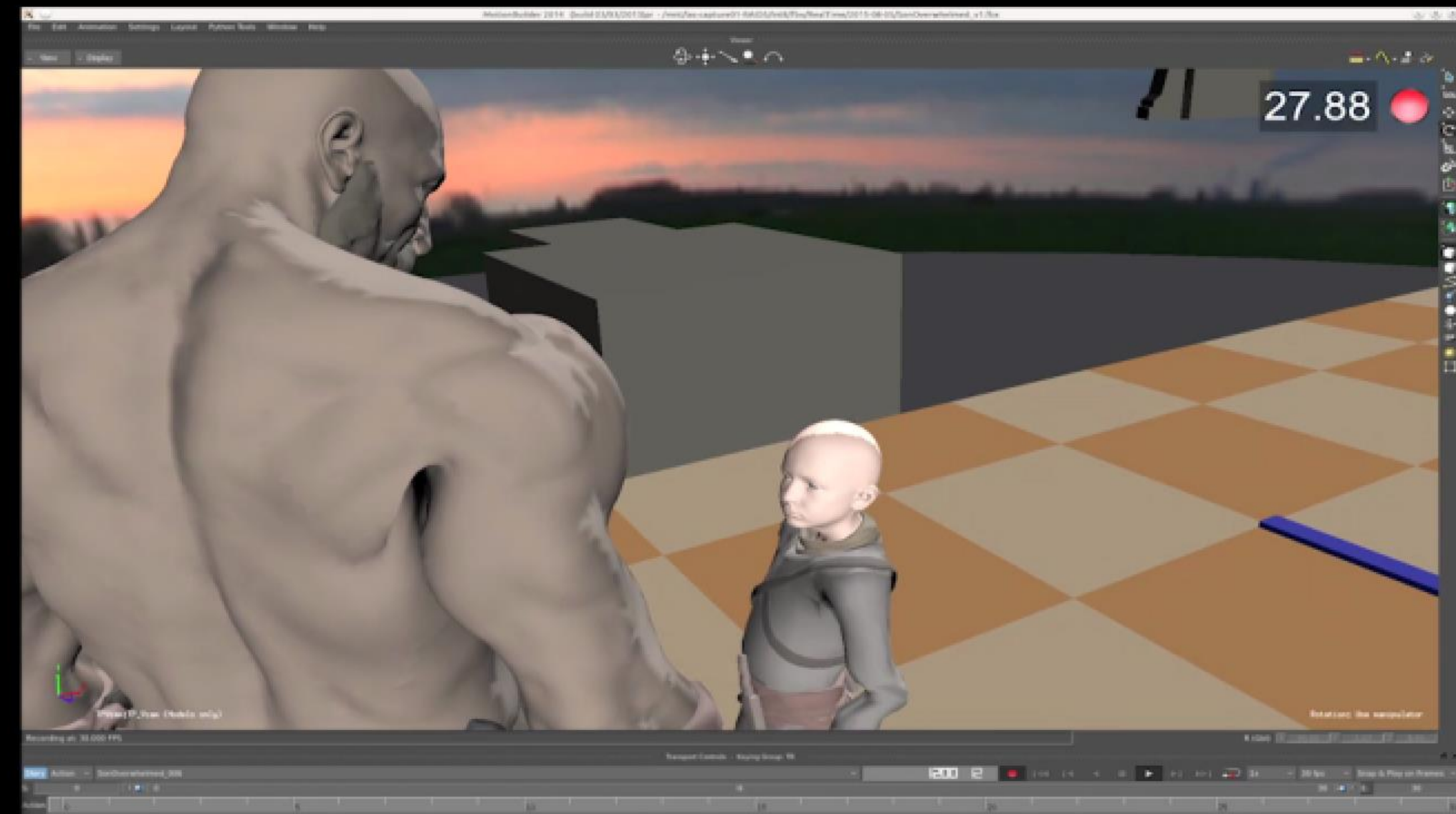
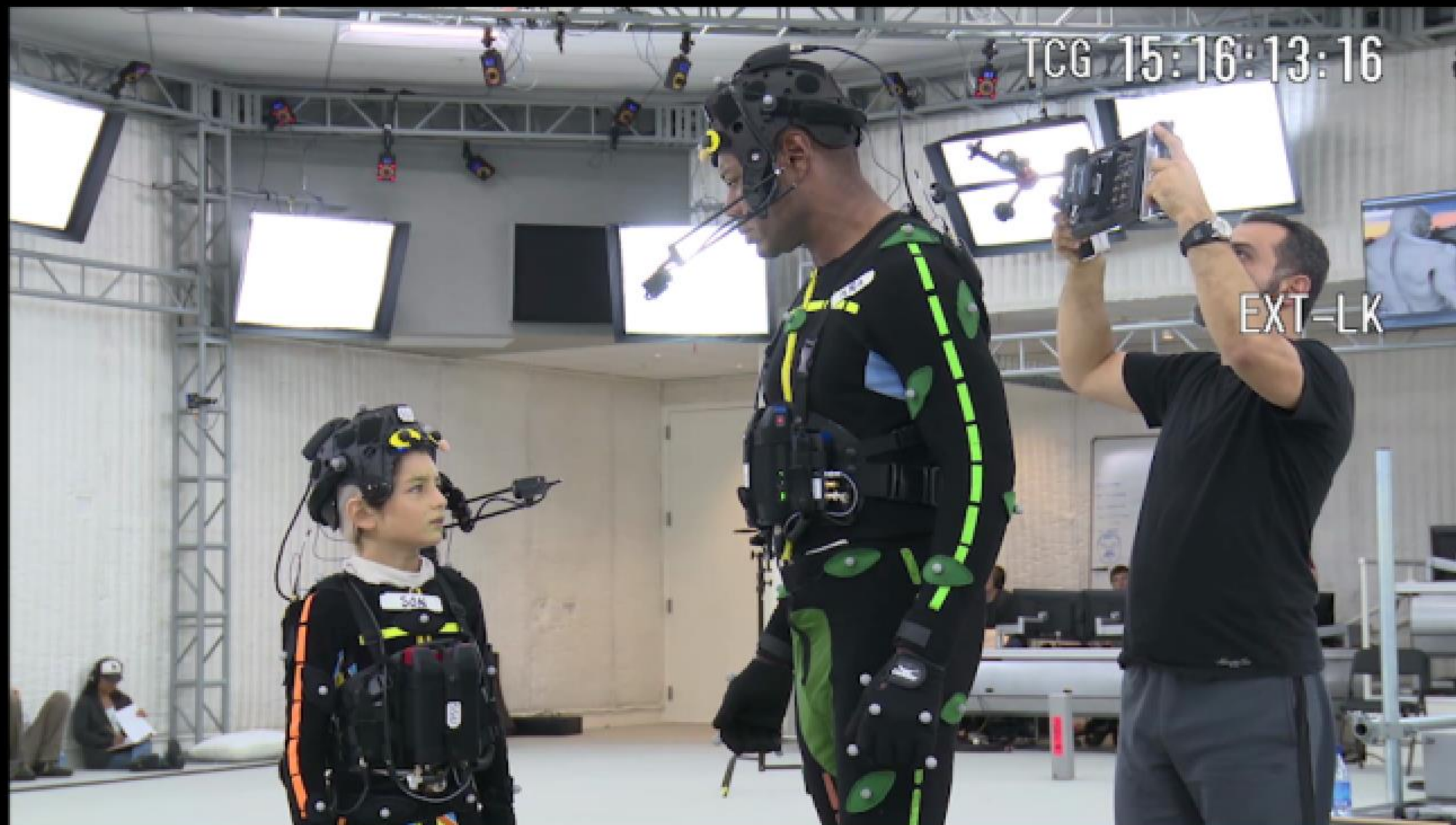
Previously, on God of War...

- Set construction, rehearsal, even shooting all on the same day
- No virtual camera
- Some room for choreography experiments

On Set: No “Winging It”

No cuts means no improv!

- GOW's one attempt at winging it ended up with many of the same failure points as our early Maya layout tests
- Unmotivated cameras, frozen staging, ended up unusable



Doing a proper previs pass allowed for:

- More thought into lensing, composition, actor choreography
- Information gathering on entrances/exits/context for scene



On Set: No “Winging It”

“Tech Day”

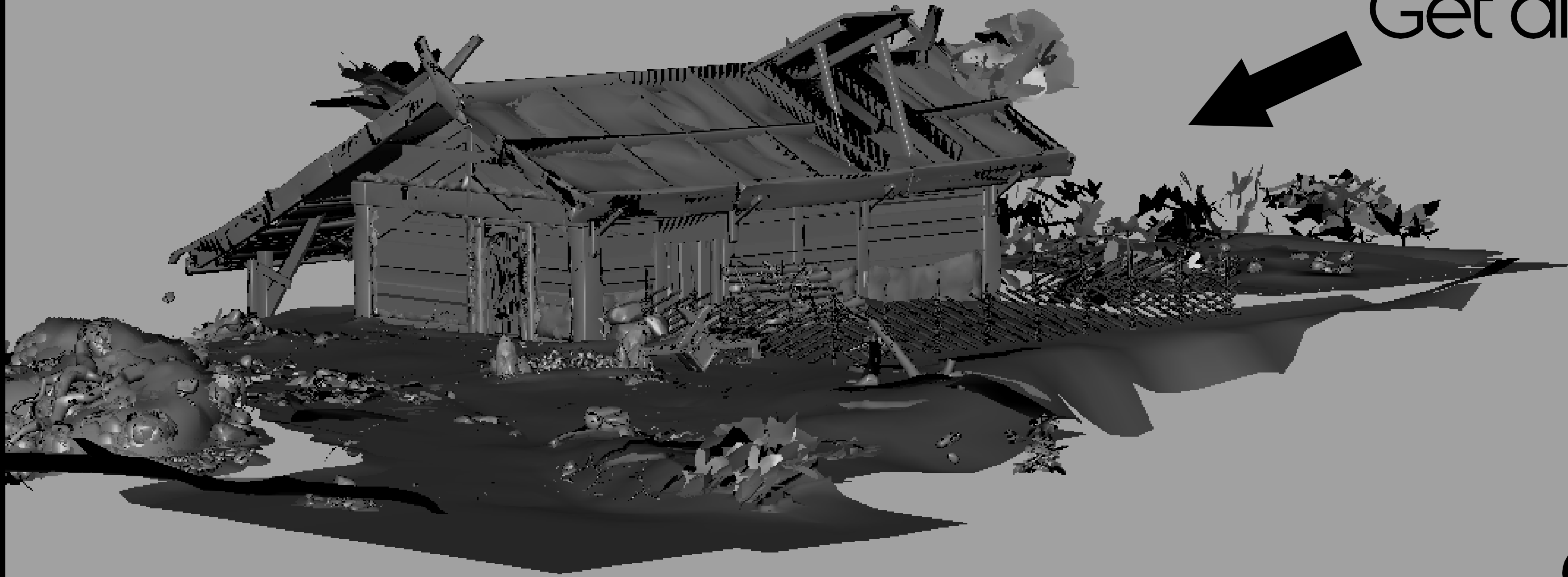
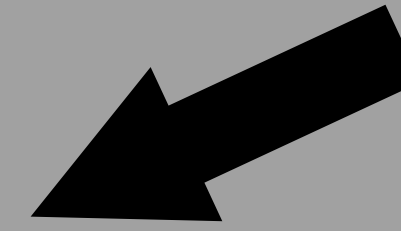
- Review exported data and videos from previs process
- Discuss/review props needed for shoot day
- Divide up volume space and determine set construction
- Lay down tape for major choreography beats
- Go over shot list and finalize any last minute details

On Set: No “Winging It”

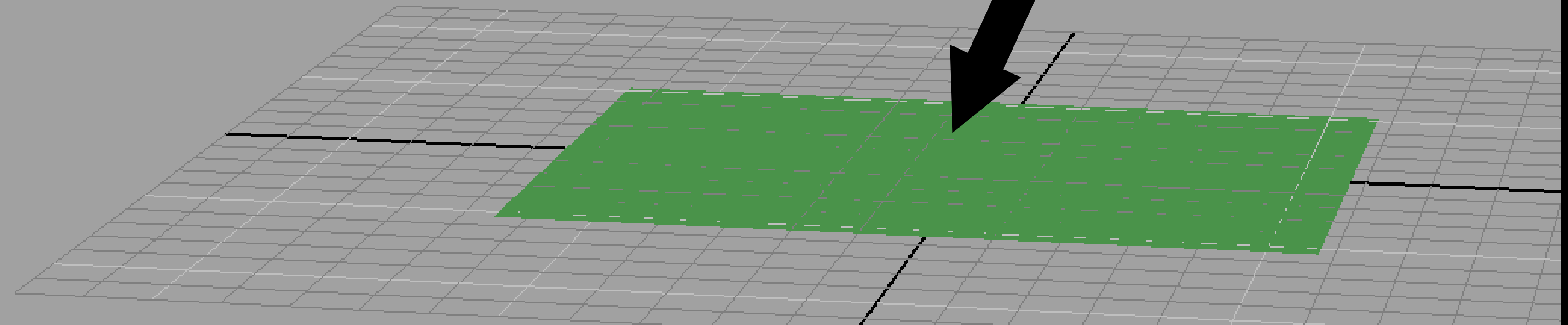
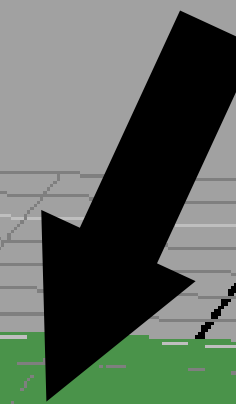
Getting assets to the stage for tech day

- Tech art assist: Maya2Mobu tool
 - Allowed animators to export proprietary rigs from Maya into MotionBuilder at correct scale and orientation without needing to bake anims
- Pain point: Exporting environments to Mobu
 - Manual process of converting proprietary reference nodes into geometry to be compatible with Mobu, then moving geo from world space to origin for mocap stage

Get all of this...



...Over here!



On Set: Cooks in the Kitchen

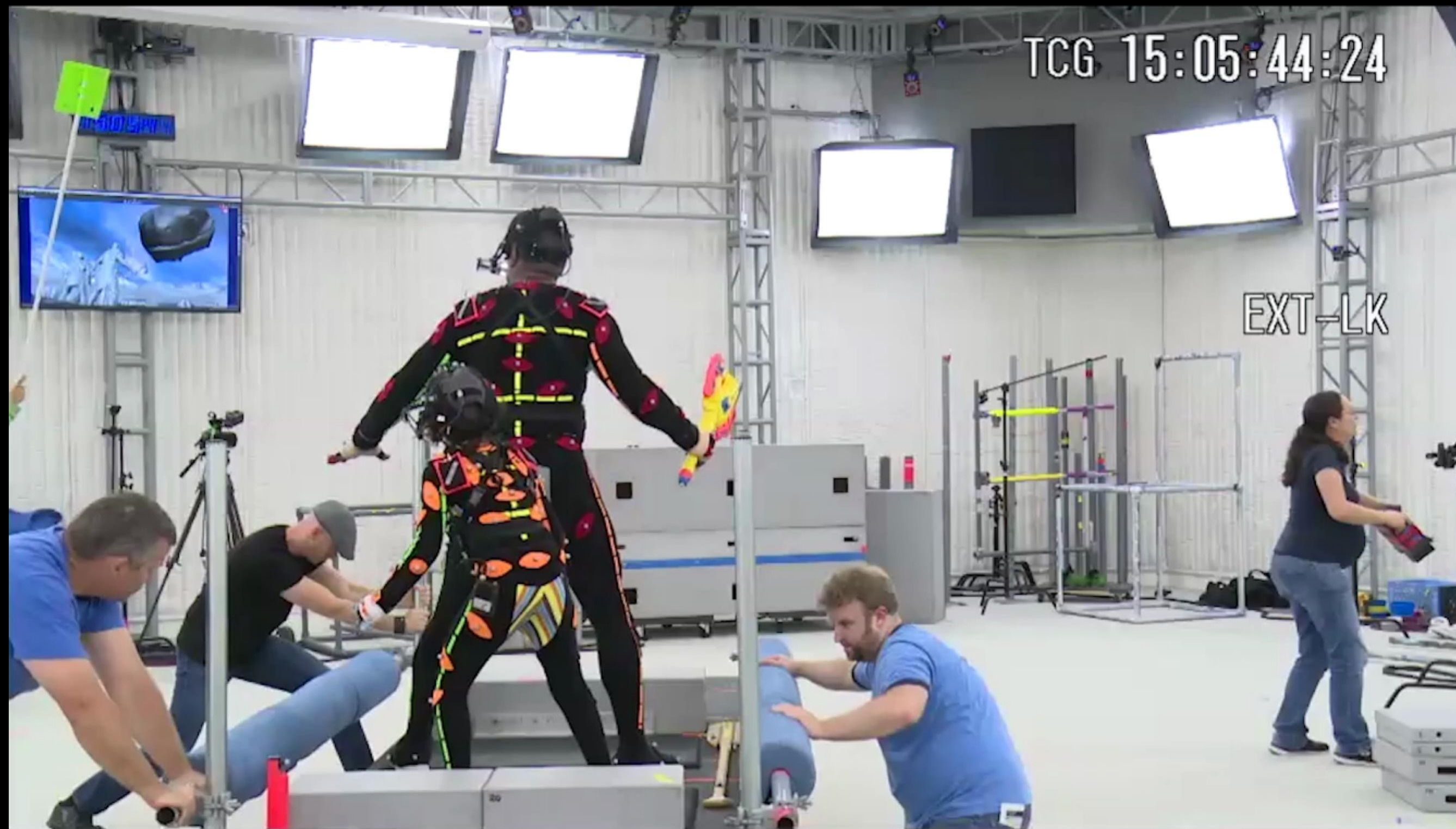
- Director and Writers → • Performance notes
- Director of Photography → • Staging notes
- Animation Director → • Body mechanics
- Animation Lead
- Producers
- Dialogue Coordinator
- Stage Crew
- Animators (oh my!)

Filtering feedback through spokespeople so actors don't get overwhelmed by too many voices

On Set: Cooks in the Kitchen

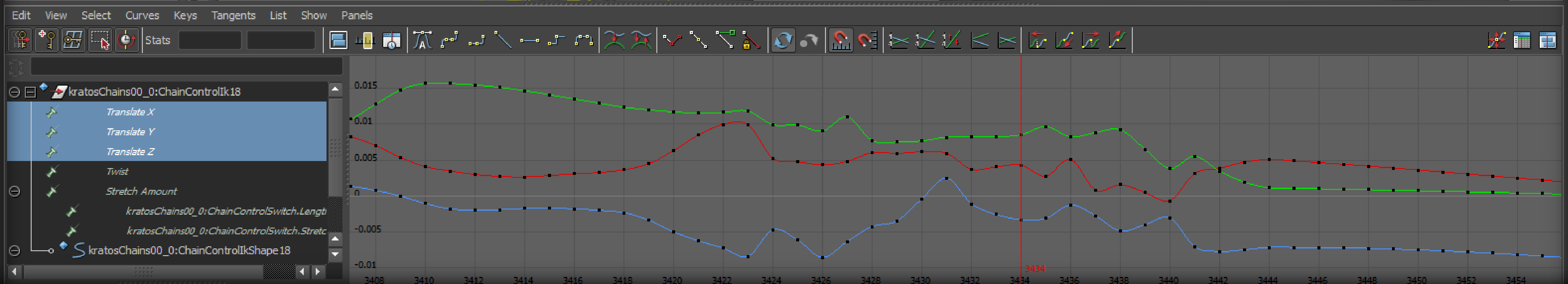
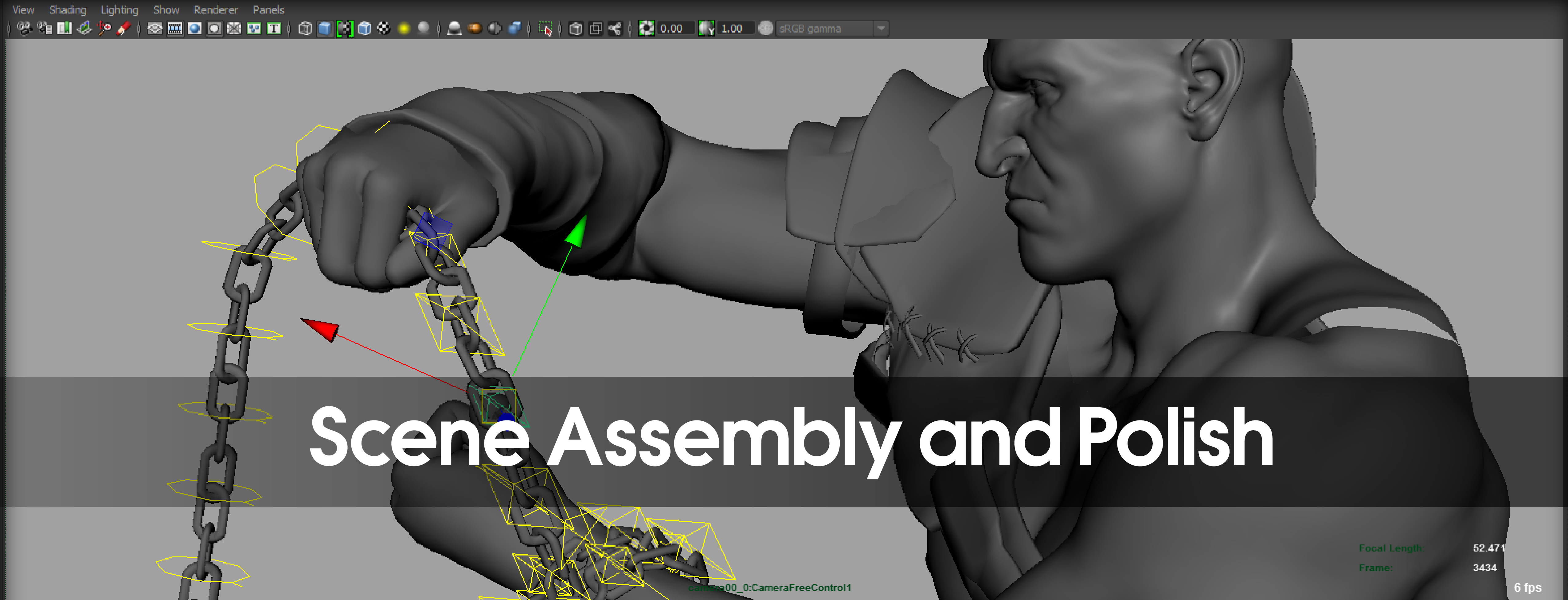
Animator stagehands

- Present previs videos
- Inform others of entrances/exits/key poses/props
- Assist with stand-in work
- Take notes on any relevant info coming out of the shoot



Working with multiple mocap spaces

- Impossible to build a snake prop to scale
- Using a marked puppet snake off to one side, aligning data real-time
- From virtual camera, snake and actors are composed correctly
- Green reference pole allows actors to get eyelines



Scene Assembly: Editing

What? Editing a one-r?

- Multi-volume scenes for large environments
- Unintentional mistakes on-set (actor flubs)
- Inserts for clarity or script rewrites
- Timing passes
- Changes to level design or environment art

Scene Assembly: Editing

Challenges:

- Limitations of Maya – Blending takes together is hard!
 - MotionBuilder Story tool
 - Anim layers, constraints
- Choosing where to edit – the “best” blend
 - Character position, pose
 - Camera position
 - Bonus if characters are off-screen!

Camera Animation Track Content SM_CAM

Character Track : Character Son:SonAI

Character Track : Character Son:SonAI Track Content Son:SonAI etc...

Character Track : Character FreshZeus:Zeus00

Character Track : Character Gow3Kratos:Kratos

Audio Track 1 Destination Speakers (Realtek High Volume 0.00

Animation Track 2 Track Content Null 2 etc...

Character Track : Character SonImport:SonAI

Take 8

SonClip.fbx 2 (read-only)

SonClip.fbx 3 (read-only)

SonClip.fbx 4 (read-only)

RageZeus.fbx 3 (read-only)

RageZeus.fbx 12 (x 1.058934) (read-only)

RageKratos.fbx 20 (x 1.058934) (read-only)

UnholyUnion_Beatdown3rd_UnholyUnion2_Observers_087_L.wav

Take 4 (c)

KidRunClip.fbx (read-only)



Scene Assembly: Editing

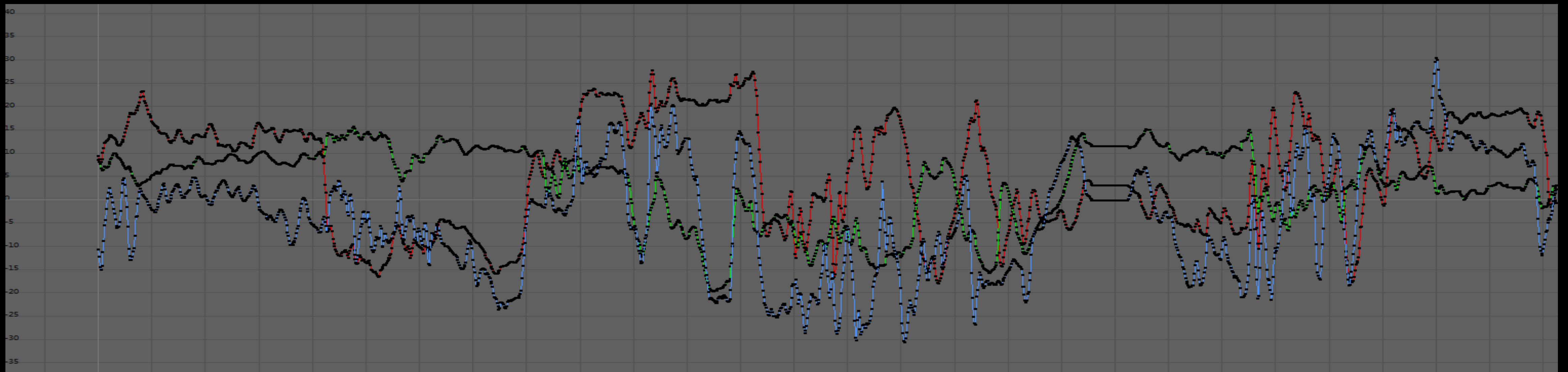
Results



- Over 50% of cinematics required major editing, reshoots, merges
- ALL cinematics required at least some minor edits to accommodate finalized environments, pose matches, etc.
- How can we get that percentage down?
 - Tools
 - Communication!

Scene Assembly: Animation!

- Do the fun stuff! Cool creatures, crazy stunts
- Do the not-so-fun stuff... ropes, chains, vines, etc.
- Keeping track of the big picture for one-ers
 - Working on layers could have ripple effects through whole scene



Scene Assembly: Animation

Stats

- Internal team size: 7 animators at peak production
- Outsource teams: 2 vendors for body cleanup, 1 vendor for facial solving
- Internal animators divided ownership of all scenes including outsourced ones

Scene Assembly: Animation

Challenges

- Contractor roll-off and ownership transfers
 - Over 100 Cutsscenes!
- Tracking the sheer amount of content, scope creep

Polish: The “Buttery Smooth” Pass

Troubleshooting seamless transitions between gameplay and cinematics

- Pose matching: establish standard poses and communicate changes immediately
- Matching velocity of gameplay navigation into cinematic
- Metrics for any interactible objects

Polish: Armor Variants

No cuts = No armor swaps!

Problems

- Obstructing faces
- Penetrations

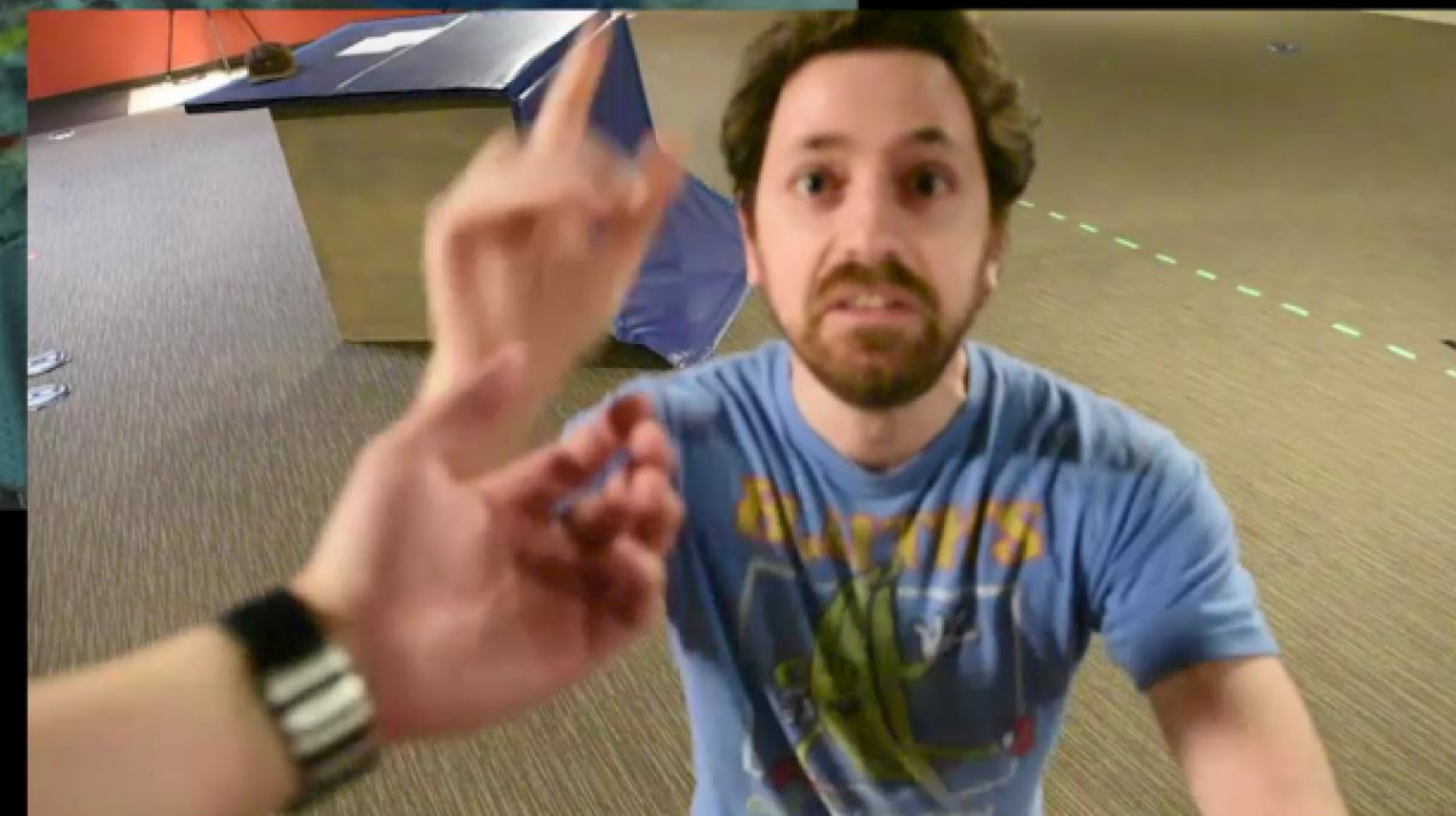
Solutions

- Slight body adjustments
- Cheat to camera
- Plead with character art



A cinematic still from the movie "The Call of the Wild". A young boy, Buck, with short brown hair and striking blue eyes, looks up in awe. He is wearing a blue tunic with a yellow collar and a large, ornate bow is strapped to his back. A giant, weathered hand reaches down towards him, its fingers spread. The background is a misty, mountainous landscape. The text "Wrap-Up" is centered over the image.

Wrap-Up



Although we encountered many challenges on the path to realizing the vision of a no-cut narrative language, overall we felt our new pipeline helped us achieve success. Our final cinematics looked pretty close to our previs, even when they were shot in live action, and we were able to create smooth blends between gameplay and cinematics.



Thank you!
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 psyham

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