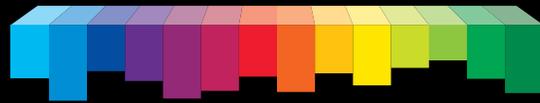


technicolor



M P C



MIKROS

POST-PANDEMIC  
FILM / EPISODIC  
PRODUCTION

A MODULAR SELECTION OF  
TECHNOLOGY-BASED SOLUTIONS

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# RESTRICTED-ACCESS SETS

## REDUCED VFX CREW

In the interest of reducing the on-set headcount, replacement of the VFX witness camera crew and gear by an unmanned system is an attractive option. With proper lead-time for set-up and calibration, the VFX team's footprint can be significantly reduced. Whereas the function and work product of the witness cam team is absolutely invaluable and necessary for the efficient functioning of the overall VFX effort, the proposed solution facilitates the removal of these crewmembers and their equipment from the shooting space. In consultation with the Art and Construction Departments, and the Cinematographer, an array of miniature HD cameras can be installed and pre-rigged within and around the set or location. Fewer technicians are required for the operation of this camera array, relative to the conventional approach, and their control of the system can be managed remotely.

## REMOTE CAMERA

Spatially separating the camera crew from the camera itself, and thereby adding distance between them and the cast has been possible for years. However, the current production climate has added a compelling new reason to do so. The paramount importance of, and mandate to, accommodate social distancing on set, has made these remote control options a key to establishing a safer production environment. Telescopic camera cranes, motorized pan and tilt heads, and wireless zoom and focus motors enable the Dolly Grip, Camera Operator, and First AC, respectively, to all accomplish their work without being anywhere near the camera. The sole remaining near-camera function, the Second AC's arcane task of slating, is long overdue for expulsion from the routine process of rolling camera. Modern digital cinema cameras all have the capability of recording and embedding the pertinent data displayed on a slate (and much more), within the metadata of each and every digital frame. The Second AC can, through a hand-held input device, enter the requisite take information, and simultaneously fill out their camera reports, all without stepping in front of the camera. This thereby eliminates the assistant's need to encroach upon the actors' personal spaces. This system can also share data with the Script Supervisor, Sound Mixer, and DIT.

## PERSONAL VIDEO ASSIST

Local area wireless networking technology makes possible the secure broadcasting of the main unit's video assist feed to tablet computers (iPads). Such technology allows key crew members to have an individual, portable means of viewing what is being shot, or has been shot, without crowding around a communal monitor. By eliminating "video villages", productions can eliminate the most intransigent congregational hotspots. Crewmembers, whose job requires their ongoing viewing of the shoot in progress, are thereby free to watch the on-camera proceedings at a safe distance from the rest of the crew.

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# CONTROL THE UNPREDICTABLE

## ATMOSPHERIC FX

On-set practical atmospheric effects such as rain, snow, and smoke, add time to the shoot day as well as require additional crew be present. These effects are often difficult to manage and control, and therefore can yield inconsistent results from take to take. Such inconsistencies lead to continuity mismatches, which are usually rectified through visual effects augmentation or removal. By committing, upfront, to achieving these atmospheric effects solely through visual effects, productions can speed the shooting day, reduce on-set crew, and garner savings in VFX.

## PYROTECHNICS

Digital technology has advanced to the point of making possible the creation of hugely impressive and realistic renderings of dramatic pyrotechnic events completely within the visual effects realm. Whether using miniatures and practical elements, or the latest in CG simulation tools, or combinations thereof, far more creative and logistical control can be afforded the filmmakers relative to full-scale on-set physical effects. Far too often, compromises necessitated by safety concerns, and time constraints placed upon the physical effects team, yield results that require VFX supplementation or alteration. A primarily VFX solution offers more artistic control and reduced principal photography complexity. Through careful planning and thoughtful utilization of Pre-Viz, truly spectacular destruction — whether it is fire, explosions, or other large-scale ruination — can be achieved without the danger, unpredictability, and time commitment associated with on-set pyrotechnics effects.

## VIRTUAL STUNTS

The development of believable, photo-real digi-doubles has opened the door to extreme, yet physics-based stunt work made possible through visual effects. Gone can be the days of time-consuming rigging, long resets, and schedules bogged-down by tedious yet necessary safety measures. It is unfortunately not uncommon for the resultant stunts to require VFX augmentation, cleanup, and sometimes, wholesale replacement. A more versatile solution is to perform and photograph the live stunts away from the main unit and setting, in favor of a more controlled, off-set Action Unit dedicated to the stunt work alone. This Stunts/VFX team approach provides the optimal conditions for safe and convincing stunt performances, which are then composited into the scene thru VFX. Some stunts require such extreme physicality as to make any human performance inherently impossible or compromised. These cases are best solved through VFX simulations that accurately represent all of the real-world forces at play, and motivate the action of the digi-double based on true physics and realistic biomechanics.

## SPLIT SCREENS

In light of social distancing mandates and preferences, it may be problematic to expect actors to cohabitate some shooting spaces in customary ways. Current technology can facilitate shooting actors individually for assembly into composite shots by VFX in post-production. These split-screens are now far more easily achieved than in the recent past. Main unit-friendly repeatable camera platforms (in place of cumbersome and arcane motion control rigs) now allow precise repeat-pass camera motion using familiar equipment that does not significantly slow the shoot-day's progress. Time-code synced video playback facilitates live, on-set viewing of composited multiple passes for purposes of performance and timing evaluation.

## DIGITAL DOUBLES

Considering the catastrophic impact that a key cast illness could levy on a production; visual effects can provide a measure of recourse for certain limited exigencies. At the outset of principal photography, key talent can be digitally scanned with their approved hair, make-up and wardrobe, for the purposes of creating a digital likeness. The digital scans are securely archived and only brought into play in the unfortunate event that the actor is unable to complete principle photography or any necessary additional photography. If and when the need arises, these digital scans serve as the raw materials and foundation from which the actor's digital doppelganger will be constructed. The resultant photo-real CG incarnation of the unavailable actor is subsequently animated, rendered and inserted into the scenes for which they could not appear.

## CROWDS

The well-established capabilities of VFX to create extensive crowds are now an even more valuable tool in the modern filmmakers kit. Whether filling the seats of a stadium, arena, or auditorium, or populating an urban street scene with thousands of pedestrians, VFX crowd-generating capabilities give productions the flexibility to reduce or even eliminate background headcounts. This reduction is multiplied by the corresponding lessening of the requisite support infrastructure that always must accompany large numbers of extras. The savings afforded, and the control gained, by populating such expansive scenes digitally are compounded by the benefit of avoiding lost takes caused by inappropriate background behaviors or actions. Depending on the precise requirements of a given utilization, crowds can be created through the use of photographic elements captured independently of the main unit, or through the creation of purely CG ones.

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# VIRTUALIZATION

## VIRTUAL SCOUTING

Recent and ongoing advances in computer graphics technology now make possible the ability to “visit” distant locations virtually. By eliminating the need to transport HODs to multiple potential sites, the majority of which will be dismissed as unsuitable, productions now have the option to eliminate days of unproductive travel and the associated risks.

Rather than sending the traditional scouting party out on these wasteful and fraught field trips, a photogrammetry unit of three or four individuals is dispatched to the potential sites. Unlike the conventional scout team that is always rushed, this dedicated survey team is solely tasked with data gathering at these locations and is afforded the time necessary for the requisite, thorough documentation.

Photogrammetric modeling tools enable accurate 3D digital reconstruction of the targeted environment. Being built from full color, high-resolution photographs, this CG model comes complete with real-world texture maps of the entire area. Upon completion of the digital reconstruction of the targeted site (achievable in a matter of days), the virtual location becomes available for “scouting”.

Game engine technology provides the robust real-time navigability needed for responsive interaction between the scouting party and the setting. Through a variety of more or less immersive viewing options, the participants are able to individually, or in groups, “walk the set”. These options include: VR headsets, video-wall displays, conference room monitors, and individual web-based viewports. In all of these cases, navigation of the environment is unbridled by real-world limitations. The viewer enjoys full freedom of movement within and around the space, driven via a conventional game controller or keyboard and mouse.

Additionally, the variations of natural lighting, determined by time of year and time of day, as well as potential cloud cover, can all be simulated and explored based on the scheduled shoot days.

## PREP-VIZ

The compartmentalization of the many departments involved in large-scale motion picture production often does lead to inevitable disconnects in the overall creative process. Issues that derive from such segmentation of effort are often not apparent until the day of shooting. Stories abound of directors walking onto a set on the first day of shooting and being dissatisfied by a particular feature or aspect of the set that wasn't foreseen. Often, this surprise is the result of the set having been completed the night prior. Likewise, upon seeing cast members in wardrobe, on set, under the DP's lighting, the Director determines that the color pallet of a particular costume clashes with the set. Such last-minute realizations occur too often even on well-planned productions.

A parallel deficiency similarly results from the dearth of input from production departments to the Pre-Vis team. This shortage inevitably leads to Pre-Vis output being not nearly as representative of the final film as it might be.

Setbacks such as those described above, and many others, can be ameliorated by the incorporation of departmental prep work within a centralized Prep-Vis infrastructure. Translating these departments' designs and plans into the virtual realm, will reduce the incidence of otherwise unforeseen potential calamities by visualizing such situations weeks in advance. This preview thus enables remedies to be affected prior to the start of principal photography.

In order to maximize the potential utility of the Prep-Vis operation, the team's infrastructure is scalable and modular. It is not an all-or-none proposition. The determination of which of the many departments will engage with Prep-Vis is flexible, respectful of, and responsive to the individual production's appetite and budget.

Prep-Vis serves two distinct functions. The first sees production departments contributing their prep-work in service of conventional Pre-Vis. This creative transference yields Pre-Vis sequences that more closely reflect the ultimate look of the film instead of more common Pre-Vis in which too many creative decisions are made by the Pre-Vis team, in a vacuum. The second avenue is independent of traditional Pre-Vis, and solely for the purpose of visualizing the various departments' designs and plans in the context of, and integrated with, other departments' work. This function applies to scenes and sequences that otherwise do not require or benefit from traditional Pre-Vis. Such sequences still benefit from a virtual preview of various departments' work juxtaposed with each other's.

## SET EXTENSIONS

The utility of and cost-saving advantages of strategically employed set extensions are well established and have been leveraged on all manner of film productions for years. The current production climate has amplified and magnified the usefulness that this type visual effect offers.

With the tremendous potential of seamless, photo-real set extensions in mind, it is useful to envision the possibilities afforded to reduce and/or eliminate a significant amount of company travel. Now, rather than transporting cast and crew to distant locations, partial sets may be constructed within the primary production locality, and the remainder of the un-built sets and surrounding environments can be completed through tried and true VFX processes.

Whether the desired location is urban or rural, contemporary or historical, the savings realized by the elimination of location fees, lodging and per diem expenditures, easily offset the expense of building partial sets. The time and costs saved by avoiding air travel is further complemented by the significant reduction of risk.

## IMAGE-BASED LIGHTING

In situations that call for such partial sets to be exterior, yet shot on stage, new lighting hardware and software capabilities are helping to solve the age-old problem of replicating daylight indoors. Through the use of fully color and intensity controllable LED lighting fixtures, in conjunction with high-dynamic range sky-dome imagery, it is now possible to accurately reproduce any manner of real-world skylight in the totally controllable confines of a modern sound stage.

## VIRTUAL LOCATION ENVIRONMENTS

Recent advances in digital cinema technology are affording new possibilities in the realm of environmental substitution. Like the aforementioned set extensions, these technologies enable productions to shoot away from the intended apparent location. But unlike traditional VFX approaches to set extension work, it is now possible to visualize these virtual environments through the camera, and in some implementations actually capture finished composite shots in-camera. Although such advanced processes do require additional upfront asset creation, creative commitment, and commensurate schedule accommodations, the benefits and efficiencies afforded are manifold.

## SIMULCAM

Whereas blue and green screens have been used effectively for environment substitution thru VFX for generations, until recently it was up to the filmmakers to envision the intended environment in their mind's eye during the shoot. Nowadays, live camera-tracking tools in concert with game-engine real-time rendering, allow for proxy versions of the eventual environment to be visible through viewfinder as the camera is rolling.

## DIGITAL PROCESS PROJECTION

Radical advances in the quality and intensity of digital projection technology have breathed new life into the moribund process of on-set front-projection. Freed from the old artifacts associated with film projection (gate-weave, image dirt & limited dynamic range, among others) high-luminosity, 4K digital projection can deliver stunning background imagery of remarkable clarity. The environments presented thusly may be plate-based, purely synthetic CG, or a hybrid of the two. Like its antiquated film-based precursor, the beauty of the front projection process is that the final composite imagery exists in front of the camera.

## LED-WALL STAGE

The latest advance in live virtual environment technology, and perhaps the most versatile, leverages the phenomenal recent improvements LED display capabilities. Though not without its own specific limitations, these large-scale imagining walls can surround a limited practical set with vast and expansive virtual environments. As with digital projection, the source imagery can be of photographic origin, wholly computer generated, or a hybrid. In either case, real-time game-engine rendering in concert with live camera tracking can impart the displayed environmental imagery with appropriate and accurate perspective shifts.