

REPORT  
ON THE  
SPECIAL VISUAL EFFECTS  
IN  
"ESCAPE FROM NEW YORK"

submitted by

R.J. Kizer  
Project Supervisor  
New World Special Effects Facility  
Venice, CA

January 23, 1982

## INTRODUCTION

When Slam Dunk Productions contracted the New World Special Effects facility to create the visual effects for "Escape from New York," they laid down a few aesthetic and technical parameters, namely, that blue screen matting techniques would not be used to combine live action figures with backgrounds, that wherever possible the finished effect would be first generation, and that the cost be kept way down. To meet those requirements we wound up using front projection (both standard 35 mm and 70 mm background plates), multiple exposures, double exposures, in-camera bi-pack compositing, glass shots, miniatures, motion control camera, optical enlargement, and matte painting.

The following report has three sections, one, an explanation of some of the techniques used on the project; two, a brief description of the specialized equipment, and finally, a shot by shot description of the special visual effects and how they were made.

## TECHNIQUES

### HELD TAKE, IN-CAMERA BI-PACK COMPOSITING

This technique uses the camera as an optical printer and depends upon a camera and track system with reliable repeatability. Mattes are generated via the front light/back light process.

The foreground model is mounted on a stage and lit against black. The camera, loaded with color negative stock, shoots several takes of the model, each one exactly identical in exposure, position, and focus. After a predetermined number of takes have been shot, the exposed color negative is removed from the magazine in a darkroom, wound back to the head, with each take separated out, sealed in a can, labeled, and stored in refrigeration.

The camera is loaded with hi-con raw stock (5369). The lighting units

illuminating the model are turned off and a backlit white panel is set behind the model. The model is now silhouetted against this "white wall." The camera repeats its programmed move, shooting a matte negative that corresponds exactly with the latent images on the color negative.

The exposed hi-con (the female matte, window matte, or matte master) is sent to a commercial laboratory for developing, and from that they make a registered print onto hi-con stock and develop it. This becomes our male matte (key matte, counter-matte, comeback, or hold-out matte).

Meanwhile one of the exposed color negative takes is also sent to a commercial laboratory for developing and printing. This reference print is used for evaluation and for plotting any camera move that the background or compositing camera will have to do.

Once the background is ready, and all tests have been successfully completed, one of the exposed color negative takes (which we refer to as "latents") is loaded into a bi-pack magazine. The male matte is loaded into the other chamber. The magazine is then loaded onto the camera which will shoot the background.

Since the foreground model was shot against black the emulsion surrounding the latent image of the model on the film has not been exposed to light and therefore is ready to receive another image. The male matte serves to block any new light from contaminating the area containing the latent image of the model but allows the other areas to be exposed by the light reflected from the background being photographed.

The color negative is developed and printed with the end result being a first generation composite.

## HELD TAKE GARBAGE MATTING

Some shots require the foreground camera to be farther away from the model that there is white wall to fill frame. A garbage matte is needed to block out the unwanted visual information in the rest of the frame. Because our compositing is not being done on an optical printer with its independent control of exposure and multiple passes of the elements, we had to reduce the number of mattes to one per color element. Our solution is to apply the technique for first generation composites to the making of garbage mattes.

When the foreground camera shoots the matte negative, it shoots two takes. One is held latent. The other is sent in for processing.

The processed matte negative is taken by the rotoscope department and they run it through their animation camera, projecting it down onto a light table. They make a frame count cue sheet and plot those areas of the light table that need to be blocked out with pieces of black paper. The animation camera is loaded with hi-con raw stock and they run the shot, manipulating the black paper according to their cue sheet.

This second matte negative is sent to the laboratory for processing. When developed it looks like a big black shape (usually a square or rectangle) situated on a transparent film. The latent matte negative is then loaded into a bi-pack magazine along with this second processed matte negative. The magazine is loaded onto the animation camera and the film is run while shooting the light table. The latent matte negative is taken to the laboratory for processing and the making of a registered hi-con print therefrom.

## FRONT PROJECTION

There is nothing really unique about our application of this technique.



Our facility has three Scotchlite screens ranging from fifteen feet by forty feet to three feet square. We have several beam-splitters (two-way mirrors, one side transparent glass, the other, a mirror) of varying sizes and a 35 mm projector with a registration movement.

The front projection rig can be mounted on a dolly or on a crane. The projector and camera are locked together via selsyn motors.

#### LYDECKER MINIATURE FLYING RIG

This technique is used when we have to literally fly a model airplane or spacecraft. We use the same basic set-up pioneered by the Lydecker brother in the Forties.

Two parallel wires are run through the wings of the model. The ends of the wires are anchored to the ground at one point, and the other ends are attached to a pole which is held by a crew member. With this pole the operator can make the plane climb, lower itself, or do a partial roll.

Another wire is attached to the nose of the craft and run down to where the two wires are anchored to the ground. There an eyebolt is placed, the wire run through and off to where another crew member will pull the wire. This controls the model's speed.

#### SPECIALIZED EQUIPMENT

##### THE ELICON CAMERA CONTROL SYSTEM ("The Elicon")

The Elicon is a motion control camera unit consisting of a multi-axis, servoed, boom-mounted motion picture camera under the control of a minicomputer.

The camera is a 35 mm Mitchell HS modified with a servo film-drive, capping shutter and follow-focus rack. The camera is mounted on a leveled boom arm which is servoed in azimuth and elevation. The boom arm is attached to

a carriage which rides on a forty foot track.

The version we have also has model pylon with a servoed gimbal.

Also our version is limited to pitch and yaw maneuvers by the boom arm, and yaw and roll maneuvers by the model pylon.

The minicomputer utilizes disk storage and 2 CRT display terminals. All instructions are given to the camera via the minicomputer.

#### THE SECOND MOTION CONTROL TRACK ("The Skotrack")

This track was constructed by our facility to serve as a back-up to the Elicon. It is simply a dolly to which a post and mounting plate have been attached. A chain is attached to the dolly at both ends which in turn runs along motorized gear teeth at either end of a length of dolly track. The gear teeth are driven by stepping motors which get their instructions from pulses recorded on quarter inch tape and played back on a 4-track tape recorder.

This track allowed us to mount any format camera or the front projection rig on the dolly and have it run in a repeatable situation. The track allows to run any length of track we want, it is very portable, and no special training is required to operate it.

We use it primarily for the background or compositing camera in those cases where perspective had to change on the background, or it had to move in a specific fashion and the background set-up is too big to fit on the Elicon stage.



DESCRIPTION OF THE EFFECTS SHOTS

- 1). Ext. Night.  
A jeep drives and stops in front of a concrete wall. The driver speaks into a walkie-talkie. The CAMERA CRANES UP the wall past a plaque which identifies the location as being the Manhattan Island Maximum Security Prison. The CAMERA CRANES UP in darkness. CUT. BEGINNING OF EFFECT: The CAMERA CRANES UP out of darkness and reaches the moonlit top of the wall. There two guards are pacing. In the distance we see the skyline of Manhattan Island, its skyscrapers dark shells against the night sky. Some street lights are visible in the city.

Two techniques were used to make this shot. The background plate was made from a photo-cutout of the city and front projection of water. The final composite was accomplished by standard 70 mm front projection.

The background plate had to show the Manhattan skyline at night, the East River, and street lights on the island.

We sent a crew to New York City armed with a still camera to shoot 4 x 5 photographs of the views we needed. Those that were going to be used to represent New York at night were shot in black and white. Those intended for day scenes were shot in color.

The particular view for this shot was enlarged and printed, cut out, and mounted onto foam core. The foam core was then trimmed to conform to the outline of the photo.

Meanwhile we photographed onto standard format 35 mm motion picture color film, several hundred feet of the Pacific Ocean. We picked a time of day so that we would get the maximum amount of specular highlights on the water. A color registration print was then made from the negative.

The photo-cutout of the city was then mounted before a Scotchlite screen. Black duvatine was hung behind the city to create the black night sky. The 35 mm front projection rig was then set up on the stage. The

35 mm water plate was threaded onto the projector, and then neutral density and color filters were added to give the water the proper night-time appearance.

To create the street lights in the city, tiny "grain of wheat" light bulbs of varying colors were poked through from the back side of the photo-cutout.

This background plate was shot onto standard 65 mm color film. The film was advanced through the camera and the projector one frame at a time.

Two 70 mm prints were then made from the resulting 65 mm negative. One print was for rehearsal purposes, the other for the actual photography.

A ten foot high section of the wall was constructed on our large stage, in front of the fifteen by forty foot Scotchlite screen. Our front projection rig (35 mm reflex camera with anamorphic lens, and a 70 mm projector) was mounted on a Chapman crane.

Where the wall met the floor was feathered off into blackness through lighting.

The actual connection of the effect shot with the live action crane up was left to the discretion of the editor of the film. He could make the period of black between the two shots as long or as short as needed. The join was made by a simple butt cut.

- 2).      Ext. Night  
         LOW ANGLE looking down the wall. On top of the wall are small purple sensor lights glowing in evenly spaced intervals. On the right of the screen is the skyline of Manhattan. A Jet Ranger helicopter moves over the wall and out over the bay.

The basic techniques for this shot were miniature model, photo-cutout, matte painting, front projection, and double exposure.

The helicopter was a scale model built and painted to the specifications provided by Joe Alves, the production designer. It was wired for running lights and contained a motor to turn the rotors. The motor in turn was con-



nected to a variable speed control. Several tests were shot to establish the best speed for the rotor in order to obtain a believable stroboscopic effect on film.

The copter move was programmed into the computer memory of the Elicon. The camera was modified with an old Cinemascope anamorphic adapter lens (this was the only anamorphic adapter we found that would work with our lenses and the Elicon's focusing mechanism).

Since the copter in this shot would not have to move in front of any object, and since the sky was black, we did not need to shoot any mattes. The copter could be composited as a simple superimposition.

The copter was lit against black and several takes were shot of the move. One was submitted to the lab for developing and printing, the rest were held latent.

The Manhattan skyline once again was a black and white photo-cutout mounted on foam core. This time the sky area was painted black. The wall and the rocks along its base was a painting done on the piece of foam core. Holes were poked into the foam core to correspond to the position of the sensor lights which ran along the top of the wall. "Grain of wheat" bulbs were placed in the holes.

The painting/photo-cutout was mounted in front of a Scotchlite screen and we used the same 35 mm water footage to double as the Hudson River.

The streetlights were created by setting up a scroll of black paper directly opposite the projector and on the other side of the beam-splitter of the front projection rig. Holes were poked in the paper and colored with animation ink. This paper was then backlit, and the dots of light were reflected in the glass side of the beam-splitter. By sighting through the camera, the lights were lined up with the skyline.



The 35 mm camera was equipped with an anamorphic adapter and loaded with one of the latent takes of the helicopter.

Because the camera had to slightly pan during the course of the shot, it was mounted at the lenses nodal point. The reference print of the copter was used earlier to map out the number degrees per frame the camera would have to pan. Markings were placed on the positive action gear head on which the camera was mounted.

The shot was done single frame. The latent take in the camera and the water plate in the projector were advanced by single frame motors while the camera was panned manually according to the marks on the gear head. The lights on the wall were turned on and off according to a cue sheet.

- 3). Ext. Night. The East River.  
With Manhattan in view in the background, a small raft holding two men bobs haphazardly on the water.

This shot used held take, split-screen matte, photo-cutout, and superimposition.

The scene was staged for principal photography at Cabrillo Beach in San Pedro and shot night for night. We sent a crew down with a 35 mm Mitchell reflex and an anamorphic lens. The camera was locked down and a flag was set across the top half of the frame to prevent it from being exposed to any stray light. As the stunt people went through their action on the raft we shot a very long take. This was held latent. A test section was submitted to the lab for developing and printing.

Originally our job was to simply add the city of Manhattan in the background. We had ample room to do this at the top half of the frame using a simple split-screen technique.

The city was a photo-cutout. Black duvatine was hung behind it for the

night sky. The streetlights again would be "grain of wheat" bulbs placed on the cut-out.

Further study of our reference print made us uneasy with our set-up. Adding the city was no problem. But because the shot was done night for night, the water was not illuminated at all. The image looked like two men on a raft bobbing up and down in a sea of black. It looked too phony. So we were determined to add some definition to the water.

We loaded the latent take into the camera ( which was equipped with an anamorphic lens), masked the bottom half of the frame, set up the photo-cutout and ran the footage through.

Then we rewound the film back to the head and took down the photo-cutout. We remasked the frame so as to cover the area where the city and the raft was situated. This left exposed a small area in the lower right hand side of the frame. The 35 mm projector and the water footage was set up and projected onto the glass side of the beam-splitter. Black paper was applied to the glass to shape the highlights into a narrow band on the lower right hand side of the frame. We then ran the latent through again. This gave us a small patch of specular highlights on the water which added to the sense of realism.

- 4). Ext. Night. Brooklyn Bridge.  
LOW ANGLE looking up the Brooklyn Bridge as it dead ends into the concrete security wall on the Brooklyn side. The Jet Ranger helicopter moves in front of the bridge and slows down. Its searchlight comes on and peers around the water and the rocks, then switches off. The copter accelerates and flies over the wall.

The version in the release print of the film is a first generation composite combining a matte painting/photo-cutout, front projected water, reflected street lights, in-camera bi-pack of the copter and its matte, spotlight on miniature rocks, and front projection of spotlight on water.



The city was made from black and white photographs we shot in New York. The Brooklyn Bridge and the Wall was a painting. The rocks along the shore in the foreground were a miniature. The helicopter was the same model built for shot #2.

The helicopter was modified only by the addition of a "grain of wheat" bulb at the belly of thecopter to mark the position of the searchlight.

The shot required the camera to pan with the copter, so the painting/photo-cutout had to be wide enough to accomodate both the anamorphic frame and the pan.

First the painting/photo-cutout was made. As before this was mounted onto foam core and the area where the water was to appear was cut away. The sky area was painted black.

The motion control camera operators then studied the background and plotted the move for the helicopter. The copter was photographed and the matte shot and garbage matted all according to the procedures described at the beginning of this report. The copter and its matte were shot in 35 mm anamorphic.

The color reference print of the copter move was studied by the compositing crew in order to calculate the camera move, the frame count for the searchlight, and any other necessary information.

When they were ready, the painting/photo-cutout was placed before a Scotchlite screen. The anamorphic lens on the camera was mounted at its nodal point. Markings were made on the geared head of the camera mount to correspond to the degrees of movement required per frame. The 35 mm projector was set up in its front projection position relative to the camera. The city street lights were created again by reflections of pinholes in black paper on the glass side of the beam-splitter. The lights on the wall

(again "grain of wheat" bulbs poked through the foam core) were clicked on and off according to a cue sheet. And a spotlight was rigged to a boom which was attached to a dolly on a short length of track which had markings along its side. At a certain frame count, this light was switched on and moved across the miniature rocks to create the spotlight from the copter. A latent color negative of the copter and its matte were loaded into the camera. All these elements were combined on the first pass.

Upon completion, the film was wound back to the head. The matte was removed. All the lights on the set were turned off.

A different piece of 35 mm footage was threaded on the projector. This was some extra footage shot at Cabrillo Beach while doing Shot #3. It showed the ellipse of light from an actual helicopter's searchlight playing across the ocean. Since the ocean was totally black this made the ellipse of light self-matting. We blocked out the helicopter and the searchlight beam, re-aligned the projector, and projected this ellipse onto the Scotchlite screen at a specific frame count.

The ellipse of light, on the developed print, appeared to go behind the rocks then come up onto them, then switch off.

NOTE: The full version of this shot required the copter having a searchlight beam as well. We did this, shooting the beam as a piece of animation and optically compositing it at a commercial optical house. The producers decided to use the first generation version.

- 5). Ext. Night.  
A small but powerful jet plane cruises along. The CAMERA moves in to reveal on the side of the plane the Seal of the President of the United States.

At least that was the shot we delivered. The version in the release print of the film eliminated the move in on the Seal, thus eliminating the



the evidence as to why we did the shot the way we did.

Basically it was composited according to the procedures described earlier (Held Take, In-Camera Bi-Pack Compositing). The model of Air Force One was constructed by our model department and equipped with running lights and lighting for the passenger compartment. The move was shot by the Elicon, and the matte was generated via the front light/back light process.

The background was a large miniature, with clouds made of cotton, and set on black duvatine, and tiny bit of city lights (holes poked in black paper backlit) below. The miniature was built in an "L" shape to accomodate the change in perspective as the camera moved in on the Presidential Seal. The compositing crew used the Skotrack to shoot the composite.

The shot in the release print is not first generation. Because of the camera move in on the Presidential Seal, we could not shoot the shot in anamorphic. Nor could we equip the Elicon boom arm with a 65 mm camera. Therefore we decided to shoot it flat, enabling the Elicon to ride focus all the way in. The shot was framed so that all the necessary information fell comfortably within a two perf area of the frame. Once composited, we had the laboratory make a 35 mm registered Inter-positive of the negative, and delivered it to a commercial optical house. They enlarged it and squeezed it for anamorphic reproduction.

If we had known that the move would ultimately be rejected we would have shot the plane and the background in 35 mm anamorphic and delivered a first generation composite.

- 6).       Ext. Night.  
          A guard standing on the wall watches in disbelief as Air Force One flies over him and heads towards Manhattan Island in the background.



The background plate, which was to show the bay, Manhattan Island, and Air Force One, was shot and composited onto 65 mm negative film. It involved an in-camera bi-pack composite in 65 mm. Because we had to shoot the plate in 65 mm, and we did not have the facilities to accommodate 65 mm rotoscoping or garbage matting, and because the Elicon could not be adapted to a 65 mm camera, and because all of our white walls were much too small to fill a 65 mm frame, we were forced to use our large fifteen by forty foot Scotchlite screen as the white wall. We knew we could shoot the foreground color negative of Air Force One with no problem. The Skotrack was reliable enough to use front light/back light to generate the mattes. The trick was to solve the "halo" problem one usually encounters when a camera is moved towards an object mounted in front of a Scotchlite screen.

Our solution was in building a rig to support a series of mushroom bulbs around the outside perimeter of the lens of the camera. A collar made of white cardboard was placed around the lens and served to direct the light from the mushroom bulbs directly along the axis of the lens. The bulbs off course were flagged off to minimize any spill light. This proved to flood out the "halo" that would otherwise have occurred. This approach necessitated our spraying the model plane with a flat black latex paint for the matte pass. This further meant that all other shots involving Air Force One had to be successfully completed first, and that we would have to shoot many more takes of the foreground color negative for protection.

The procedure with the color negative foreground takes was the same as before, only this time the reference take was in 65 mm, and the print was in 70 mm. The 65 mm matte negative was sent to a commercial lab for developing. We then loaded it into the 65 mm camera bi-packed with another piece of 65 mm hi-con raw stock. The camera was run while shooting

27

a white card. Three different exposures were shot. This exposed hi-con (our "print") was sent to the lab for developing. We examined all three takes with a densitometer to determine which matte would work the best.

Manhattan City (a photo-cutout) was set up before the Scotchlite screen. Our standard front projection rig was used, substituting the 65 mm camera for where the 35 mm camera usually was placed. The water plate was threaded into the 35 mm projector. The streetlights again were bulbs poked through the foam core.

The 65 mm camera was loaded with a latent foreground color negative, in bi-pack with the 65 mm matte.

The composited negative was sent to the lab for developing and printing onto 70 mm stock. Several prints were made.

For the final composite a three foot high section of the wall was built on the stage. The front projection rig (35 mm reflex camera with anamorphic lens, and a 70 mm projector) was mounted onto a Chapman crane because we planned to do a slight crane up and move in during the shot.

Several rehearsals were done so that the guard could learn his cues to react to the jet.

- 7). Ext. Night. Air Force One's POV  
We skim over New York harbor heading directly towards Manhattan.

The storyboard called for this shot to appear as if the camera was mounted on the nose of Air Force One.

Given the length of the run and resulting changes in perspective among the buildings, we built the lower tip of Manhattan Island (from the Battery to approximately Wall St.) in miniature. Several cardboard flats completed the skyline further back. The buildings were only finished on the side the camera would see. Photographs of New York and Los Angeles buildings were



printed, cut out, and pasted onto the boxes to give the buildings detail. "Grain of wheat" bulbs were placed on the streets to give the random streetlight appearance. We also built an impressionistic miniature of Brooklyn since it would be visible at the widest part of the shot. The wall was made from a three inch high piece of posterboard topped with tiny lights.

For the water we simply painted the floor with glossy black paint. When the paint was partially dry we took a dry paint roller and rolled it over the paint to stipple the surface. A 10 K light was then placed behind the city at about 12 feet up to create a reflection on the paint. Black duvatine was hung behind the miniature to create the sky.

The camera (equipped with an anamorphic adapter) was mounted on the Sko-track and boomed out in front of the dolly by about four feet. The furthestmost point of the track from the city was elevated by about a foot, and the rest was sloped down unevenly so the dolly would do a slight roll as it moved along.

The dolly speed was programmed and camera was set to run at 2 fps. The stage was then filled with bee smoke to create atmospheric haze.

- 8).       Ext. Night. Air Force One's POV  
          We move through a canyon of skyscrapers and crash into one of the buildings.

The larger size of the miniature buildings we had to construct for this shot forced us to break it down into three separate shots to be inter-cut with live action footage of people in the plane.

The buildings were made out of cardboard boxes and stacked apple boxes. Their facades covered with photographs of building fronts. Some of the facades were made entirely of black paint and white masking tape.

The camera was mounted on the Skotrack and boomed out from the central post on the dolly. The track was elevated in such a way that it ramped down into the buildings in order to suggest the downward movement of the plane. The track was elevated unevenly in places to suggest slight waggling of the plane's wings. With each shot the buildings were raised higher relative to the camera. On the last shot we moved the camera right up to one of the buildings.

The stage was filled with bee smoke and the camera run basically the same way as above.

NOTE: We were not supposed to show the impact of Air Force One. Our instructions were to take the plane just shy of impact.

9). Ext. Night. The Wall  
A lone guard stands at his post. The city is behind him in the distance. Suddenly he looks up and watches several copters, a mixture of Jet Rangers and Huey troop carriers, head into the city.

This shot required a set-up very similar to the one described in shot #6.

The background plate was shot onto 65 mm negative color film. Due to the difficulties in shooting 65 mm mattes, we decided to frame the shot in such a way as the copter did not fly in front of the skyline. That way they became a simple superimposition.

We used the same model of the Jet Ranger that we used before, plus we built a model of a Huey troop carrier. These were set up on the large stage together. The 65 mm camera was mounted on the Skotrack, and we shot three passes per take. One each pass we positioned the helicopters differently thus ending up with six copters in the shot.

We then set up the standard city and water front projection rig and

loaded the 65 mm camera with one of the latent takes of the copters. The composited 65 mm negative was taken to the lab for developing and the making of several 70 mm prints.

We took the same section of the wall we built for shot #6 and placed it on the front projection stage.

The 70 mm front projection rig was mounted on a dolly which in turn was placed on a standard dolly track. During the final "compositing" we dollyed in slightly following the movement of the helicopters.

As in shot #6 several rehearsals were run to get everyone straight on their cues.

10). Ext. Night. View of Manhattan

The glider rushes in overhead and sails out over the bay towards Manhattan Island.

The background of the wall, the city, and the bay used the same set up from shot #2. The glider was shot on the Elicon in 35 mm anamorphic and held latent. It was loaded into the background, compositing camera and the background was shot. No matte was needed as the glider would only be against black sky.

11). Ext. Night. High Shot of the City  
CAMERA is floating over the city when the glider swoops by in a dive and pulls out over the city.

The glider (by the way, a model we constructed) was photographed in 35 mm anamorphic by the Elicon with a matte. One take was printed, the others held latent.

The background was the miniature city we built for shot #7. The compositing camera was mounted on a short length of dolly track. Marks were



placed on the dolly track to indicate the increments of movement per frame. A fog filter was added to the anamorphic adapter on the lens, and the composite was accomplished via in-camera bi-packing. As one person advanced the film in the camera one frame at a time, another individual advanced the dolly.

- 12).       Ext. Night. Docks  
          The glider flies over the docks into the first area of buildings, gliding in between the tall, empty skyscrapers.

The camera angle called for in this shot was a very extreme low angle. We realized that we would have to tilt the camera during the shot in order to include all the background information the director wanted to see. And the glider had to fly in front of one set of buildings and behind another set.

The solution for the tilt was to mount the background of buildings on their side, and mount the compositing camera on its side. The camera could then be dollied back, in effect duplicating the kind of view one would obtain by tilting the camera.

To allow the glider to pass behind the buildings we decided to generate a matte that would be used to block out the glider when it is first shot by the Elicon.

The view of the city was made from photo-cutouts and retouched and mounted on foam core. Registration marks were set on the margins. The nearest set of buildings (the foreground) were then cut out of the whole & mounted on the stage on their side.

Since this was before we got the Skotrack operational, the dolly move had to be made manually a frame at a time. The buildings were silhouetted against white, and a hi-con negative was shot in 35 mm anamorphic.

A male matte was made and given to the Elicon crew. They in turn set up the model glider on their stage for photography. The male matte was loaded in a bi-pack magazine/with raw stock color negative film. Several takes were shot, of which only one was printed, the rest held latent. The glider matte was shot also with the male matte for the buildings in bi-pack with the hi-con raw stock.

Now the background builings were realigned with the foreground buildings, (again, mounted on their side), and a latent color negative of the glider and its hi-con male matte were loaded into the camera.

Again the shot was run through a frame at a time, the dolly being manually advanced.

The street light in the shot was done by a simple small light attached to the photo-cutout.

- 13).      Ext. Night. City Street  
            An empty street downtown. The glider whooshes up the street towards the camera and then banks to its left.

The city background was made from a photograph we took in New York. Additional shadows were painted in to create more of a night-time look. The sky was painted black.

The glider and its matte were shot by the Elicon crew, who also did the composite against the photo-cutout using our standard held take, in-camera bi-pack procedure.

- 14).      Ext. Night. View of the top of the World Trade Center  
            The glider approaches one of the towers.

The glider is simply superimposed against the night sky. The model glider was shot by the Elicon. The buildings were photo-cutouts.

- 15). Ext. Night. Angle showing the roof of the South Tower  
The glider moves away from camera and heads for the roof of the south tower.

The glider and its matte were shot by the Elicon crew.

The tower was a cardboard box. The facade detail was a photograph pasted onto it. The roof detail was a miniature based on photographs we had taken of the live action roof set shot out at Indian Dunes.

The background panorama of the New York harbor, the Verrazano Narrows Bridge, Brooklyn, Staten Island, and New Jersey was simply holes poked through a large sheet of black paper and backlit. Sheets of translucent mylar were scotch taped along the upper edge only to the back of the black paper. Colored animation ink was applied to the holes to give the lights different colors. A fan was set up and angled to create just enough of a breeze to flutter the mylar sheets but not affect the large sheet of black paper. When viewed from the camera side, this gave the lights their atmospheric twinkle.

Since the shot called for the camera to be pushing in on the tower, we decided that the simplest way to do the shot was to move the tower towards the camera. It was mounted on a dolly and track. We did not have to worry about showing any perspective shift in the panorama since it effectively was at infinity.

The compositing was held take, in-camera bi-packing, with another intrepid soul manually moving the tower towards the camera a little bit each frame.

- 16). Ext. Night. Roof of the South Tower  
The glider swoops in and touches down on the roof.

Live action had already shot their life size glider skidding across the



roof set. Their footage had the camera follow panning with the glider as it sped past. One shot had the camera starting behind some sort of utility structure, which pretty much obstructed the view, and then panning as the glider swept past. This became our reference shot.

We built a miniature version of their roof set on a large piece of poured concrete outside of our stage. We matched the detailing exactly to the live action shot, including the utility structure mentioned above. The shot was designed so that the glider would come in touch down, and the camera would pan with it as it rolled along and then the utility structure would enter frame in the foreground.

A larger version of the glider model was constructed and was rigged to fly using the Lydecker system.

Because the live action footage was shot night for night, we had to do the same, and we matched their lighting exactly modifying it only to accomodate the reduced scale.

The shot was done in 35 mm anamorphic and the camera was slightly overcranked to give the glider more of a sense of mass. We knew the sound effects would complete the illusion.

17). Ext. Night Roof of the South Tower  
LOW ANGLE, camera looking up at one of the corners. Suddenly the nose of the glider leaps out over the edge and just as suddenly is jerked back and comes to rest, rocking gently.

The same glider was used from shot #16. A corner of the tower was constructed out of cardboard and painted on the facade detail. The camera was equipped with an anamorphic adapter, and slightly overcranked.

The glider was then physically pushed out and jerked back and rocked by one of the crew.

- 18). Ext. Night. Aerial view looking down on the South Tower  
The glider is perched precariously on the edge of the roof.

The World Trade Center tower was a photograph we had taken from the ground looking straight up. It was simply printed, cut and mounted to look as if the opposite had been the case. The roof was actually on the same plane as the photograph. The other buildings were all taken from photographs we had shot from the top of the World Trade Center. They were retouched to appear more natural for night lighting. The street lights on the ground were "grain of wheat" bulbs poked through the foam core backing.

The glider was a very small model which had a stiff, but thin wire attached to the tail. A crew member off camera gently rolled the wire to rock the glider. The camera was slightly overcranked and equipped with an anamorphic adapter.

- 19). Ext. Day. Central Park  
Wide Shot. As the prisoners run out into the field, we see two helicopters fly out over the park.

This is basically an old fashioned glass shot. We shot alongside the principal photography unit which was shooting closer angled shots of the same action. They provided the extras, the set dressing for the park, and the two helicopters. We provided the skyline.

The skyline was an enlarged color photograph we had taken in New York. The buildings and the tree line at their base were cut out and mounted onto a large sheet of glass which in turn was mounted in a frame and taken out to the location (Sepulveda Dam).

There it was set up and positioned so that the tree line blended with the distant park and therefore created an artificial horizon line. The lamp part of a lamppost in the photo was left in, and a real lamppost at the location



was placed so that the two appeared as one.

A rehearsal established where the extras could and could not go. The helicopters were guided via instructions transmitted by radio from the camera operator. The camera was 35 mm Mitchell reflex with an anamorphic lens which was mounted at its nodal point enabling the camera to be panned and tilted during the shot.

Just prior to shooting a take, quick airbrushing and retouching was done to the buildings on the glass so their shadows would match the shadows at the location.

20). Ext. Night. Low Angle looking up the South Tower of the World Trade Center  
The glider spirals off and falls past the camera.

The glider was the same model used in past shots employing the Elicon camera. Its move was programmed into the computer and the foreground element and its matte were shot using front light/back light procedures. The matte had to be garbage matted using our held take technique.

The tower was a black and white photograph we had shot in New York. It was mounted on foam core and the sky was painted black.

The shot was composited by the Elicon crew using the procedures already outlined: held take, in-camera bi-pack.