

# NOTES ON THE ECHO POPA DRONE



## “Arsenal Of Freedom”

Season 1 Episode 21

Original Air Date: April 11, 1988

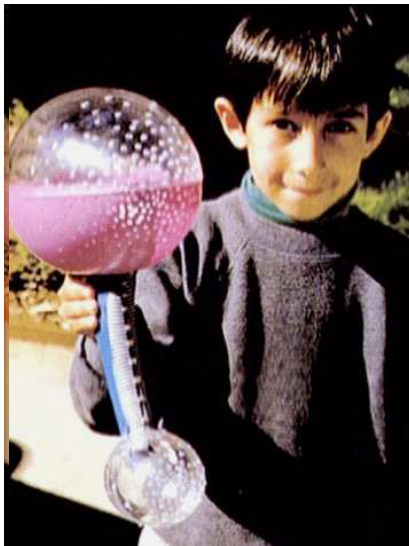
**Dan Curry** Visual Effects Supervisor/Producer/Second Unit Director

In this episode, the crew investigates the disappearance of the USS *Drake*. They travel to the planet Minos, where an away team and the ship are separately attacked by the demonstration of an automated weapons system.



Originally a sculptor was hired to create the drone robot weapon to be used on the episode. The prop turned out to be too large, heavy, and unwieldy to be easily handled and kept getting snagged on the branches of the many trees on the jungle set and was abandoned.

Out of time and with budget exhausted the producers asked me to create something we could use quickly. I had the idea of a shape that hovered with a larger artificial intelligence and weapons unit with a single projection below containing a phaser-like weapon that would also function as a stabilizer.



Fortunately I found objects with the sleek shapes I was looking for. I used a plastic Easter egg, a shampoo bottle with part of it cut away, a piece of ribbed cover for electrical wires and cables, and a L'eggs panty hose container.

Here is my son, Devin, age 6, holding the unpainted model. I then applied a coat of grey primer and then airbrushed several coats of subtly iridescent metallic colors, mostly gold with hints of magenta, green and blue.



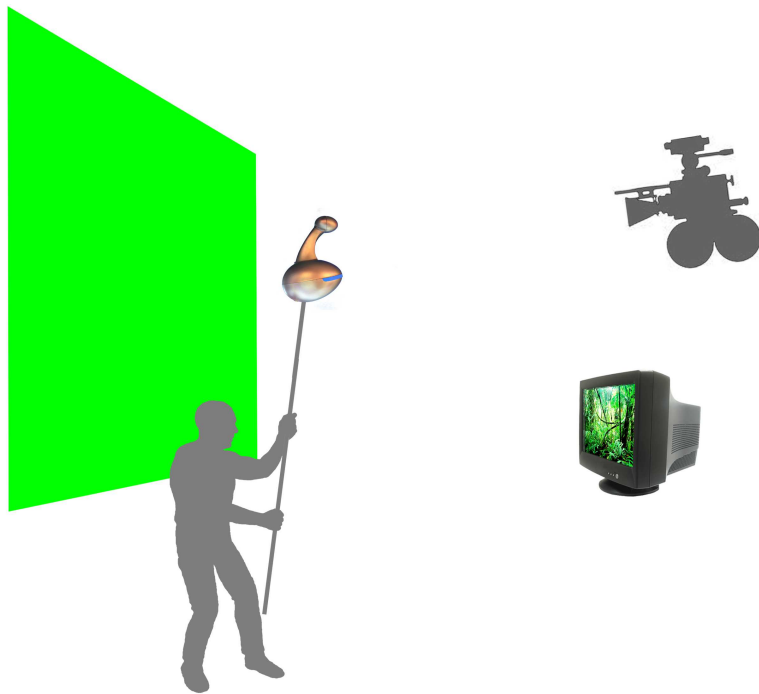
The final airbrushed paint job.

Blue tape was used on the as sensor and weapons ports. This allowed for extracting chroma keys so we could animate moving lights on the top part to give the Echo Popa some life and a separate matte for the lower part so it could fire phasers. The blue would be in contrast to the green screen enabling separate keys.



To photograph the Echo Popa I decided to forgo using motion control as I wanted a more organic and nimble sense of motion for the drone. Relying on years practicing Tai Chi for smooth motion, I decided to hand puppeteer the Echo Popa. Because the top was more massive than the lower extremity it was easier to shoot the drone upside down using matching lenses on the 35mm film camera also inverted. Watching the dailies on a monitor while shooting enabled me to see how the drone related to the background scenes and the action of the

actors.

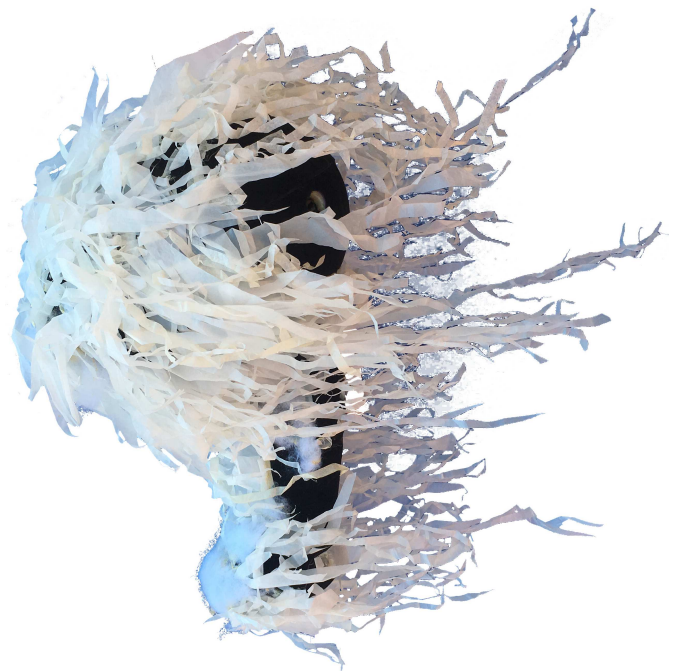


## ***RE- ENTRY OF ORBITAL ECHO POPA DRONE***

In this episode the Enterprise was threatened by a large orbiting drone weapon that had an invisibility cloak and impossible to locate. Geordi realized that by luring it into the planet's atmosphere its re-entry heat friction would be visible and the Enterprise could destroy it.



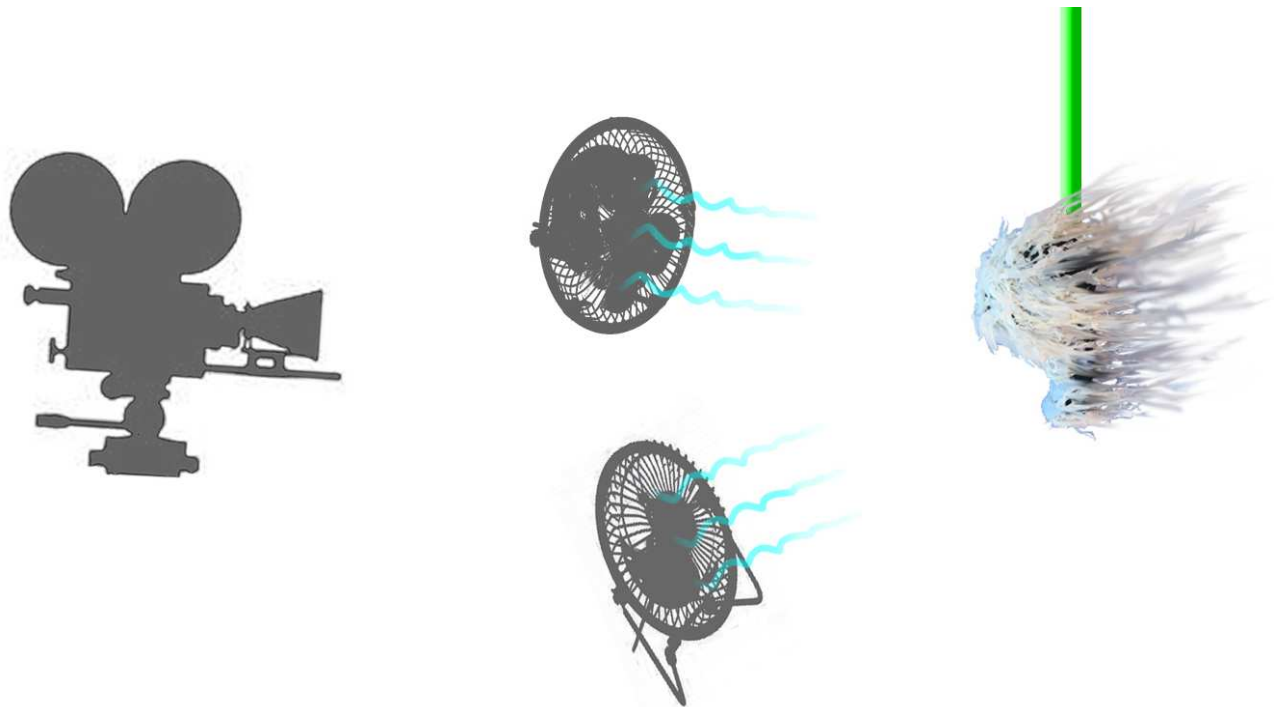
Computer animation did not yet exist, so to create the illusion of re-entry hot gasses I made a duplicate of the Echo Popa model and covered it with black flocking and glued slivers of a white plant bag onto it. To represent the oval force field shield surrounding the Enterprise heated up by friction with the atmosphere, I employed the same technique using another plastic Easter egg flocked in black with white plastic streamers.



Model used as Force Field Shield for re-entry scene.



We set each model up on our motion control rig at Image G and then used fans to cause the streamers to flap around wildly. By keeping the shutter on the camera open for 3 seconds per frame there was considerable motion blur, resulting on film the kinetic behavior of super hot gasses flowing around an invisible object.



In compositing we took the raw dailies and converted them into a black and white traveling matte through which was keyed a blurred fire element with the flames rotated to be parallel to the object's direction of travel. The fire element was obtained by photographing newspapers burning in an old barbecue in the parking lot.

*Dan Curry*