Team One Report

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The purpose of this project was to use a team of students as a resource to create a more complex, involved image. Multiple people working on producing the same image produced more options and allowed for each individual to focus on contributing in their own specific way to the overall success of the image. For our particular teams image, we wanted to do a twist on the common 'popping a water balloon in slow motion' flow video and instead capture an air balloon exploding in a tank of water. Not only does this lend an opportunity to see different types of phenomenon, but also allowed for a more controlled environment to obtain an image. We did a variety of iterations to get the situation that I used in the end. This involved alterations in the setup, type of balloon, and methods for controlling the effects of the environment around us. In the end I chose to focus on the explosion of a mostly circular balloon with a white background, and a reduction of glare and shadows lent by my team members(Joe, Angela, and Chase) holding towels and controlling the system.

This capture involved a balloon tank system, with the balloon fastened to a weight at the bottom of the tank. This allowed us to watch the air rise in an explosive fashion, to counteract the downward force the weight had on it. To block direct light from the sun interfering with the surface of the water we had team members holding towels to cast a shadow over the system. As a result we had a decent amount of light reaching the camera, but none interfering with the representation of the fluid flow. The camera was an iphone placed at ground level and operated by a team member crouching down. This allowed the phenomenon to be captured head on and created a better framing of the balloon. The back of the tank had a white piece of construction paper pasted along it to reduce distraction from the background. All of these steps in the setup lent to the overall picture framing only the fluid flow. The setup can be seen in *Figure 1* below.

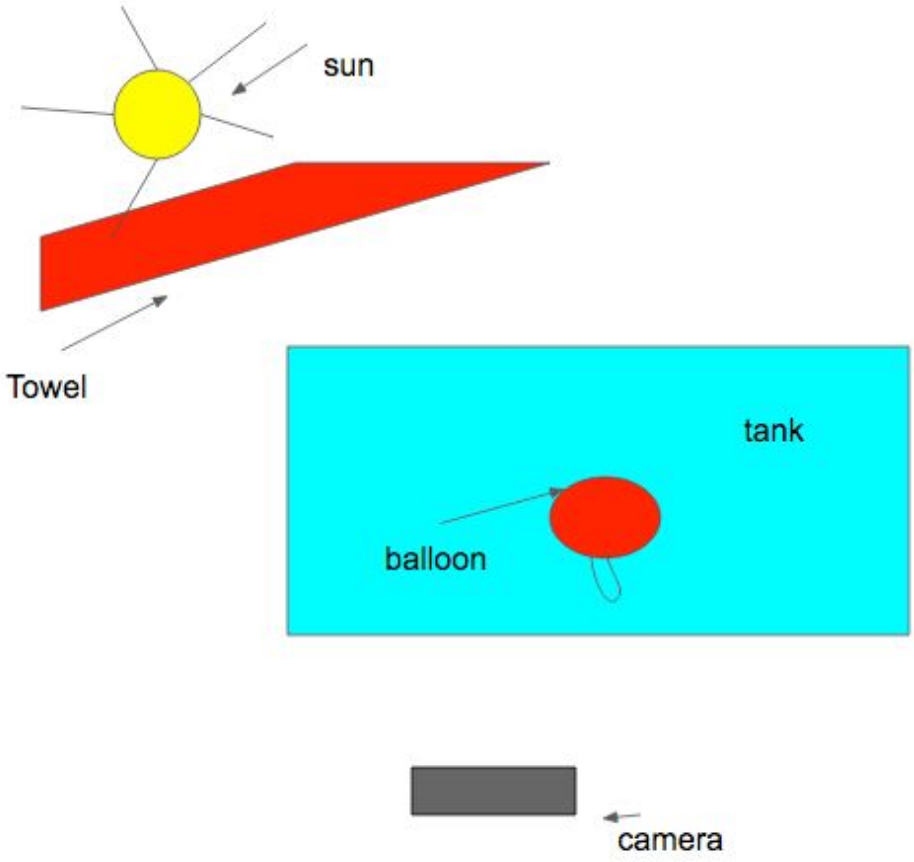

Figure 1

The type of fluid flow in the capture was driven by the buoyant force of the submerged air in the water and also had a vortex like flow that we believe derived from the fact that there was more air displaced in the center conjoined with higher pressure on the air closer to the bottom of the tank forcing the bottom and center up to the top faster and thus producing an inward vortex.

To produce the visual effects shown in the video, changes were made pre and post processing. One of the main changes to the system for the sole purpose of aesthetic enhancement was the addition of drops of food coloring to the top of the tank(concentric with the ballon). Not only did this produce an interesting laminar flow by itself, it also created a

differentiation between the water rising out of the tank and the background. It also made the explosion more intense by coloring the water flying out of the tank. The rest of the constraints of the setup have been described in paragraph three and can be seen in the image above. For our particular experiment we chose a 2 foot by 1 foot tank, and my particular video dealt with a 5 inch diameter balloon; However many other sizes and shapes were tested and successful.

To capture the image, we used an iphone camera. This choice was made because the slo-mo camera we rented out, took videos of poorer quality(something we will change if we recreate the process). We used the slow mo function of the camera and a very short distance from the camera to the ballon, due to the nature of the focal length, to create our image. I put in some effort post processing. I recroped the video to frame only the balloon, removing some of the ceccis noise of the tank. Additional, I turned up the contrast and the saturation to highlight the coloring of the water. Lastly I added music to give the video some emotion and a bit more of an intense tone.

This capture made it clear that working in a group makes it possible to control the environment more effectively and to create more iterations of flow captures in a more timely manner. I liked how the music added to the tone of the video and how it differentiated my work from that of the rest of the team. If I had to recreate this image, I would use a better camera to get a sharper view of the flow. In addition I would do more iterations with the circular balloon to get as symmetrical a vortex as possible, as I find the symmetry more aesthetically pleasing.