

# Knowledge Base Article

I worked at The Old Globe Theatre for many years. For this article, I imagine that the Globe had a knowledge base that employees use to document things like special effects creation and the building of unusual props or scenery. The knowledge base helps artisans looking for instructions, and gives marketing folks interesting stories to share. This article is about the creation of the rocket special effects for the musical *October Sky*. Its intended audience is craftspeople who already have some familiarity with theatre.



*Rockets of October Sky on display*

## Introduction

The Rocket Team, directed by Markus Marquette and Paul Rice and composed of props artisans, carpenters, painters, and technical personnel, created nine special effects rockets for *October Sky*. Our goals were:

- Make the rockets look realistic without using pyrotechnics.
- Show a clear progression of the Rocket Boys' building skills.
- Create an effect that is sustainable, reliable, and safe.

We used puppets, compressed air, and carbon dioxide to create rocket magic.

## Basic design: launch pads

We fire most of the rockets from a launch pad designed for them. All four launch pads are basically a crate, a five-sided box open at the bottom. The crates have thin steel plates in at least two corners. The steel plates match slots in the stage floor, and the actors place the crates on stage with the steel in the slots. This system ensures that the launch pads are always in the same place. In the next section, we discuss why this is important. After the crate is in place, a crew member under the stage opens a

trapdoor below the crate. The crew member can then operate the puppet rockets and make connections for the compressed air without the audience seeing.

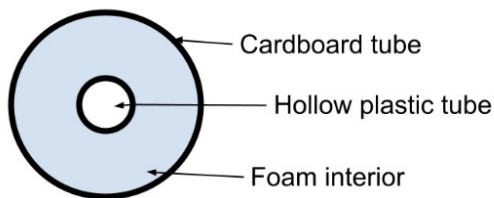
### **Basic design: rocket catcher**

The last two rockets actually fly, so they need something to stop their flight safely. That's the job of our rocket catcher, installed in the grid above the stage. The rocket catcher has a rectangular frame with several overlapping layers of small corrugated plastic strips. The plastic strips are flexible enough to allow the rocket to pass through on its way up, but sturdy enough to keep the rocket from falling back down. As a failsafe, a crew member stands next to the catcher and closes a trapdoor as soon as the rocket passes through. Then the crew member can retrieve the rocket and take it downstairs to safety, noting on the way whether there's any damage to the fins or nose cone that we need to repair. The flying rockets need to fly into the rocket catcher every time they're launched. That is why the launch pad placement is important. If the rockets don't fly the same way every time, they might hit scenery and fall back down to the stage. A falling rocket ruins the effect and although the rockets are light, they might startle or hurt someone.

### **Puppet rockets: Auk IV, V, and VI**

Auk IV, V, and VI are all puppet rockets. The drawing shows a cross-section of these rockets. We built them from a cardboard tube with a foam interior and central plastic tube. They have hard foam nose

**Puppet Rocket Interior Cross-section**



*Cross-section of the puppet rockets*

cones and soft foam fins, and a weight at the bottom. The weighted bottom keeps the rocket stable when the crew member under the deck whisks the rockets through the crate into the area beneath the deck. At the moment of "launch," a blast of CO<sub>2</sub> shoots from a tube in front of the rocket, and a crew member pulls the rocket down into the space below the stage. The CO<sub>2</sub> performs the double role of looking like exhaust and masking the rockets' disappearance.

### **Flying rockets and their launch pads: Auk VIII and IX**

Auk VIII and IX are the last rockets launched in the musical. They both have bodies made of plastic tubing, foam inserts, and central core tubes ending in a plastic cap. Both have cast foam nose cones and hard plastic fins. Auk IX is slightly taller and wider. The diameter of its core shaft is also a little bigger to accommodate a larger launch stem. Auk VIII and IX are both fired at high pressure using accumulators, and both have accompanying CO<sub>2</sub> blasts. Unlike the previous rockets, these two actually fly. They don't need CO<sub>2</sub> clouds to mask their disappearance, so the gas is expelled from behind the rocket. The air pressure is high enough to shoot the lightweight rocket into the rocket catcher about 30 feet above the stage. The launch pads for the two rockets are almost identical; both are steel structures with a perforated top to let fog out and a back that is open to let the CO<sub>2</sub> escape. Plywood panels inside hide the hookups for air and CO<sub>2</sub> and provide a place to mount lighting effects. The launch pad for Auk IX has a slightly longer launch stem with a larger diameter so that there's more air to power the bigger rocket.