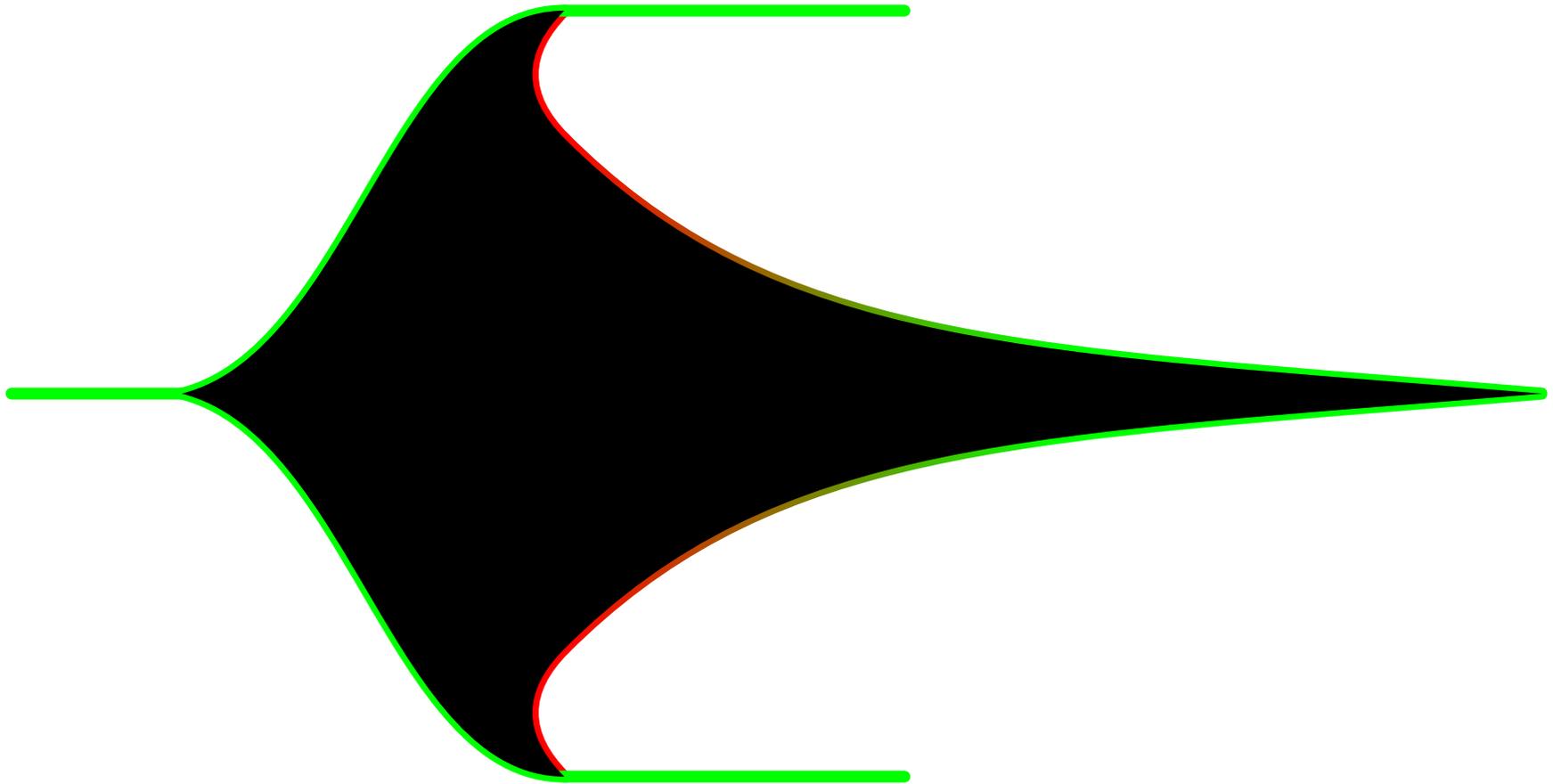
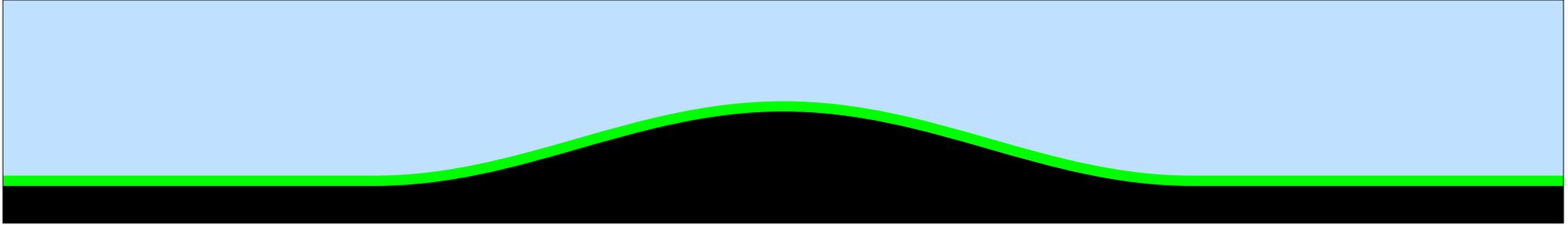


# Cartoon Aerodynamics



# Laminar Flow

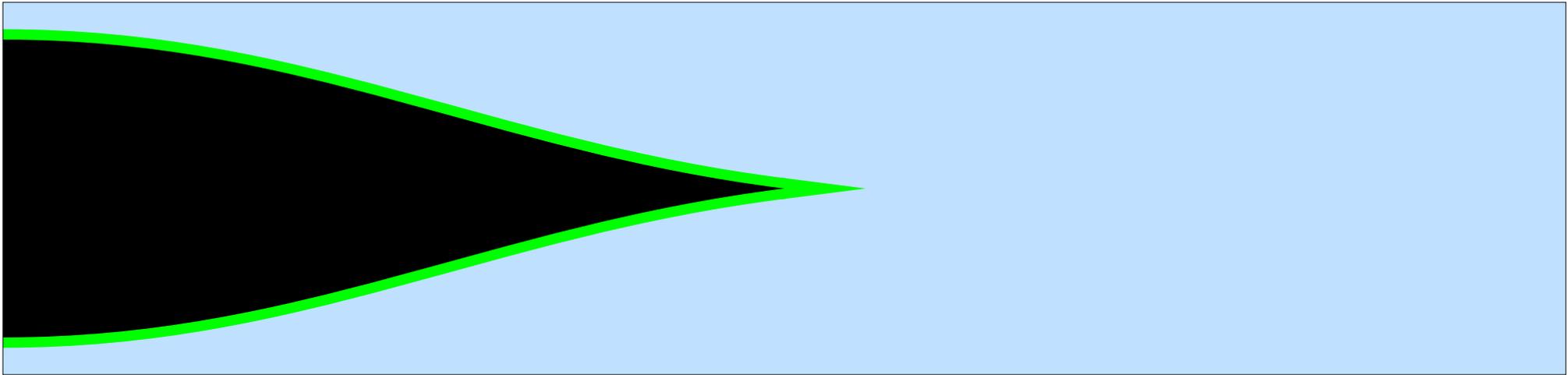
Laminar flow is when air travels smoothly over a surface; it is generally the goal of the study of cartoon aerodynamics. Laminar flow is most easily achieved when the surface is perpendicular to the direction of motion, or nearly so. The following section of fuselage demonstrates laminar flow:



As you can see, the surface is also smooth. Smooth surface, smooth flow - laminar flow. (As long as it's perpendicular.)

So, what about the nose and tail? if laminar flow requires a perpendicular surface, what do you do on the other faces?

The answer is generally a spike or blade. A perfect spike or blade neatly splits the air, allowing laminar flow down each side. The ultimate spikes and blades are still impossible with modern aircraft materials, but they come very close. The following section of nose cone demonstrates laminar flow:

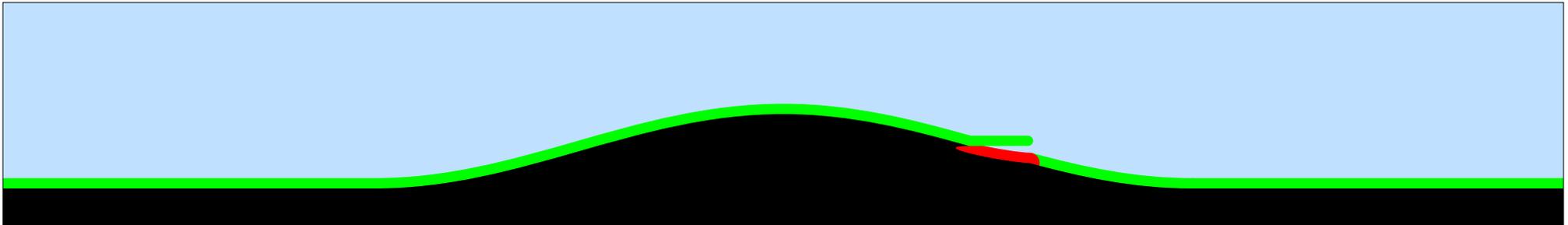


As you can see, this is not a perfect spike - our materials cannot make a perfectly pointed structure. Nevertheless, this plane goes very fast - and has a highly pointed nose cone to show for it.

However, this is the simplest complication of laminar flow - and it has been solved.

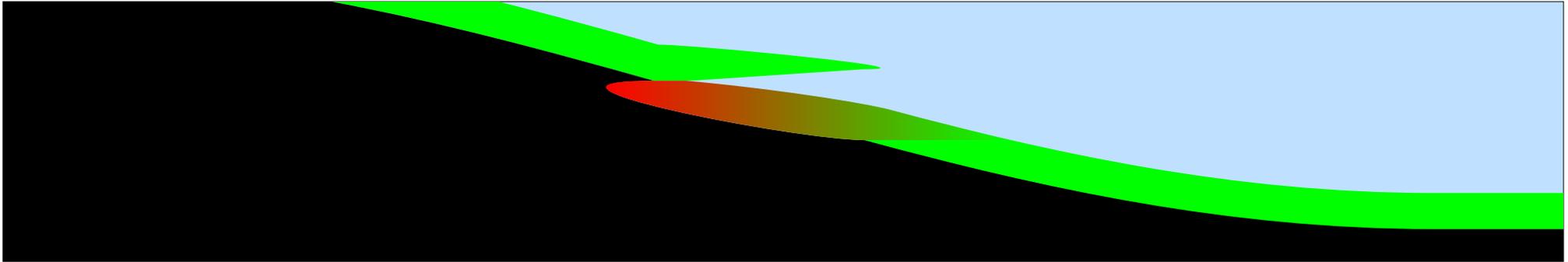
# Restive Flow

Restive flow is when air is caught by a surface; ideally, we would eliminate restive flow entirely from our designs, but in practice we can usually only minimize it. The following section of fuselage has been modified to demonstrate restive flow:



As you can see, that little kink catches a column of air; that air must be dragged along with the aircraft, weighing it down - the more mass you bring with you, the slower you go, and air has mass. So why not eliminate that kink altogether, and avoid its attendant restive flow? Unfortunately, this particular kink is the tip of a light laser, and if a combat aircraft can't bring a few weapons along, what good is it?

That section of fuselage showed another thing you'll see a lot - small, important parts of the aircraft are the main things you need to pay attention to. Let's get a close-up of that laser:



Fortunately, the air is "cleanly" caught. The red (restive) "cushion" supports a column of normal air, which is separated from the rest of the air traveling over the aircraft by a layer of laminar flow. This avoids the dreaded turbulent flow, which can not only slow aircraft down, it can knock them from the sky.