



**AERIAL PRODUCTS**
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1-PLY KINGFISHER™ AEROSTAT **USER'S MANUAL**

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SYSTEM OVERVIEW

Welcome to the Aerial Products KingFisher™ User's Manual. The goal of this document is to get you familiar with this specialized aerostat.

The KingFisher™ aerostat is a wise choice for your payload demands and your aerial photography or surveillance requirements. The ability of the KingFisher™ to fly in extreme conditions allows you to be mission-ready and able to fly in 50+ mph wind when blimps and other types of tethered balloons are grounded.

As with all types of airframes, the interaction of the KingFisher™ with the wind is of primary consideration. The Kingfisher™ translates wind velocity into line tension. In other words, as wind speed increases, the amount of pull on the tether line also increases.

Aerostat and payload stability is provided by the wing which has two functions:

1. Steers the balloon into the relative wind
2. Creates static tension on the keel line.

If using the Aerial Products mounting platform, the keel line is used to maximize stability. If supplying your own mounting platform, make sure to use the keel line and line apex (confluence of all the lines) as the primary attach point for the payload. Please see the diagram on page 2 of this document.

There are multiple shapes of KingFisher™— They are available in high-capacity and standard capacity, and each may be constructed as either a 1-ply or 2-ply balloon. This document will provide you with instructions for your 1-ply KingFisher™ aerostat.

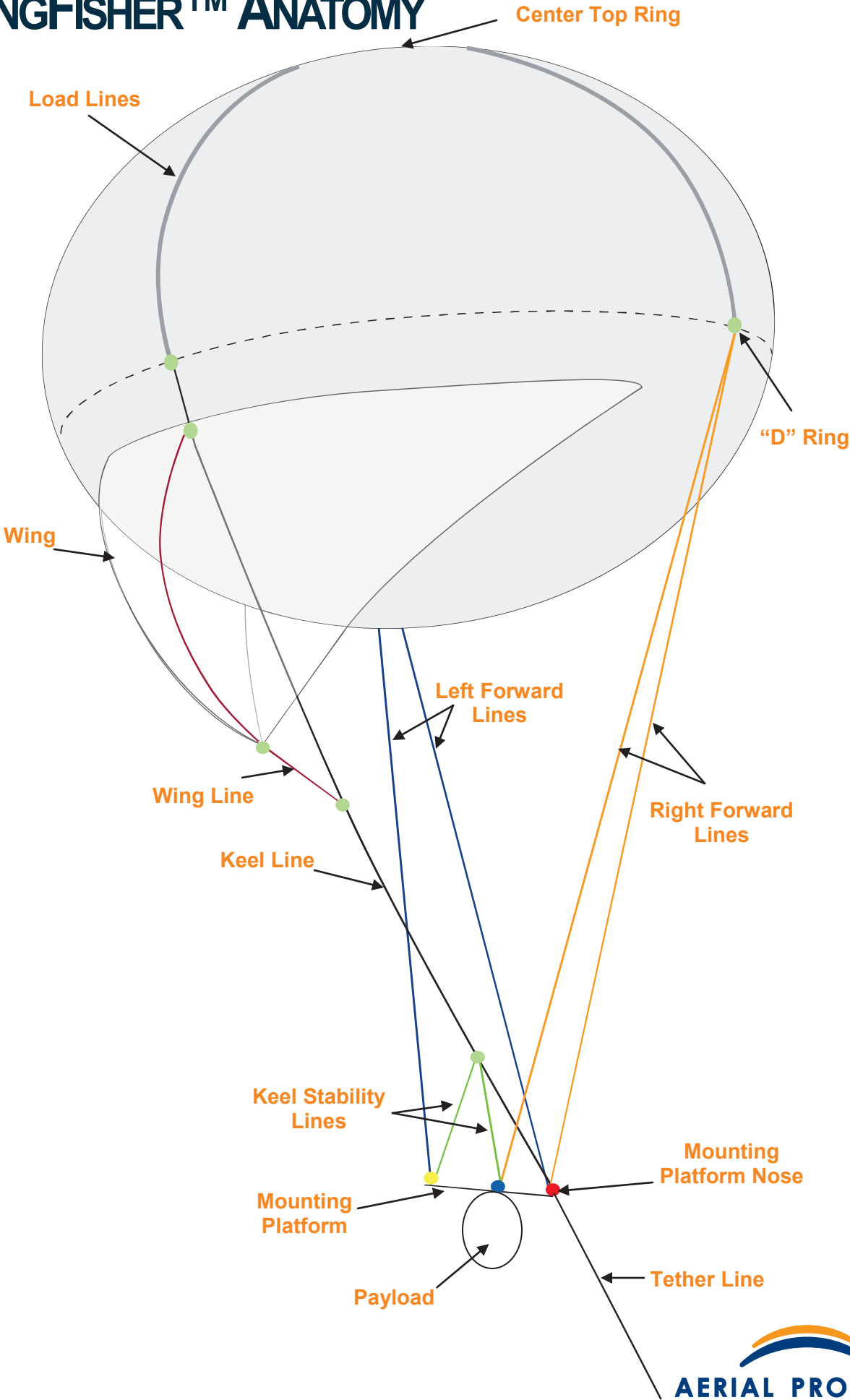
A typical 1-ply KingFisher™ system includes:

- ◆ Quick-disconnect valve
- ◆ Inflation/Deflation sleeve
- ◆ Mounting platform
- ◆ Tether line
- ◆ Fill hose

Options may include:

- ◆ Cut down device
- ◆ Winch
- ◆ Launcher

KINGFISHER™ ANATOMY



SITE PREPARATIONS

Items to Bring to the Site

- ◆ KingFisher™ Aerostat (including your mounting platform)
- ◆ Tether
- ◆ Full Helium tank(s) - Welding Grade only! (see below)
- ◆ Fill Hose
- ◆ Large adjustable wrench
- ◆ Quick links
- ◆ Ground handling lines (thick nylon rope)
- ◆ Tarp
- ◆ Reversible vacuum or leaf blower (if deflating)
- ◆ Spare rigging lines (like the tether line)
- ◆ Payload (along with all necessary parts)

Know Your Location

- ◆ Is the sun going to be on the subject or behind it when you get on site? The time of day for a shot is very important for acceptable lighting conditions. You don't want to show up and have a slow shutter speed or backlighting on the subject.
- ◆ Use Google maps to look for power lines, airports, tall buildings, trees, or other overhead obstacles and plan accordingly.
- ◆ Check the weather! Avoid rain, thunderstorms, snow, etc.
- ◆ Know what kind of wind you will be dealing with: surface and aloft velocity, as well as direction. Know which way your aerostat will float before you send it up. Choose your launch site accordingly. You may need to be upwind of the subject. You can try to shoot in the morning instead of afternoon for better wind conditions.
- ◆ Do you have enough ground space to work with? Parking lots can get crowded, roofs of buildings can have a lot of equipment. Streets can have a lot of traffic.
- ◆ Make sure you know and understand all relevant regulations for your launch site, including proximity to controlled airspace, local laws and military operations areas (MOA).

A Word About Helium

There are three types of helium:

1. 85% Pure Balloon Grade (Good enough for party balloons)
2. 99% Pure Welding Grade
3. 99.9% Pure Research/Medical Grade

Very often welding and balloon grades come from the same source tank. Discreetly check with your supplier to verify they have different compressed gas source tanks.

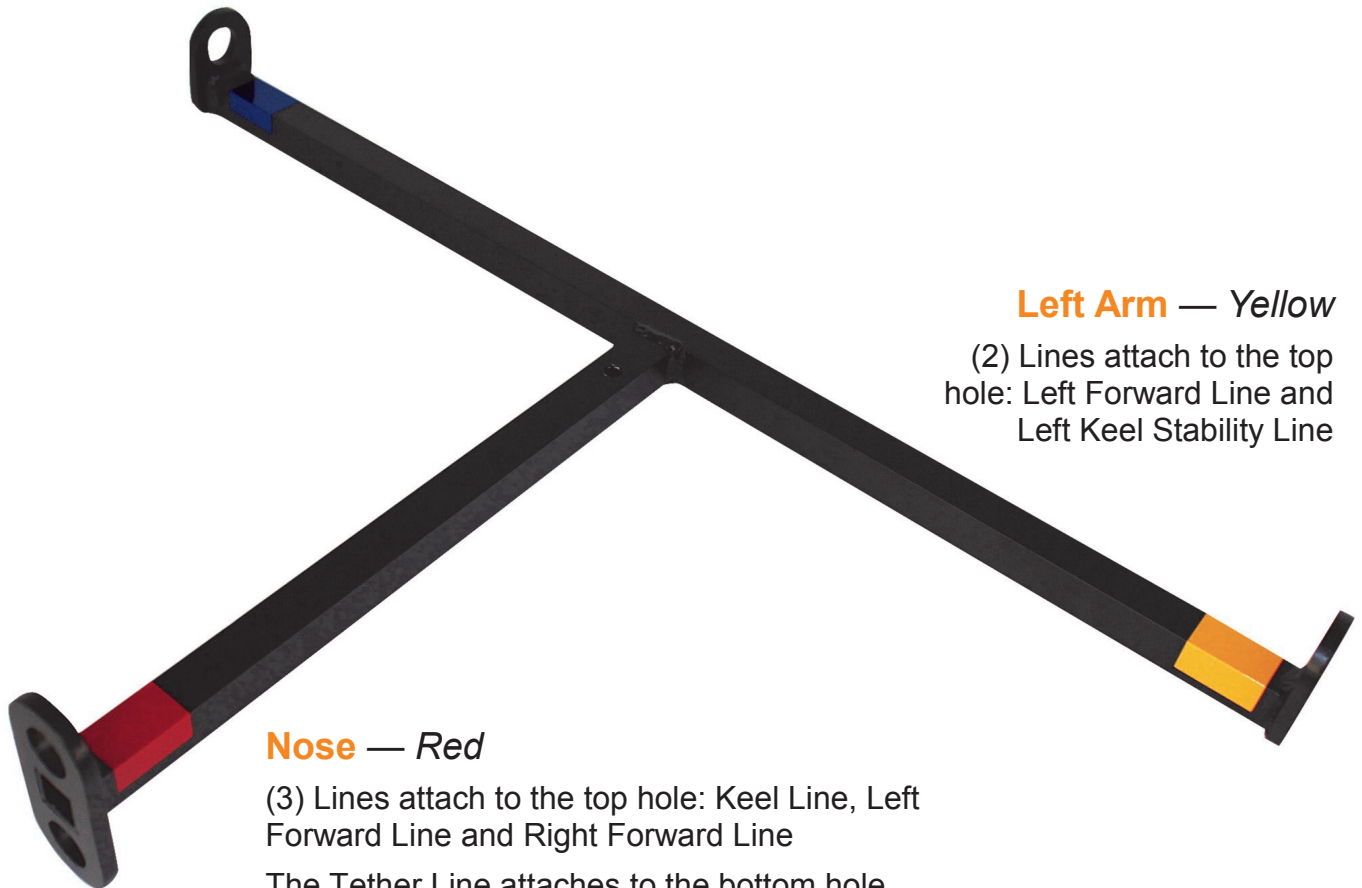
**USE 99% PURE HELIUM
(WELDING GRADE)**

KINGFISHER™ MOUNTING PLATFORM

The KingFisher™ aerostat was designed to work in conjunction with our mounting platform. There are (5) main lines used for rigging the mounting platform. The lines are color coordinated to match their corresponding attachment points. It is recommended that you attach the mounting platform before you begin inflating your KingFisher™.

Right Arm — Blue

(2) Lines attach to the top hole: Right Forward Line and Right Keel Stability Line



Left Arm — Yellow

(2) Lines attach to the top hole: Left Forward Line and Left Keel Stability Line

Nose — Red

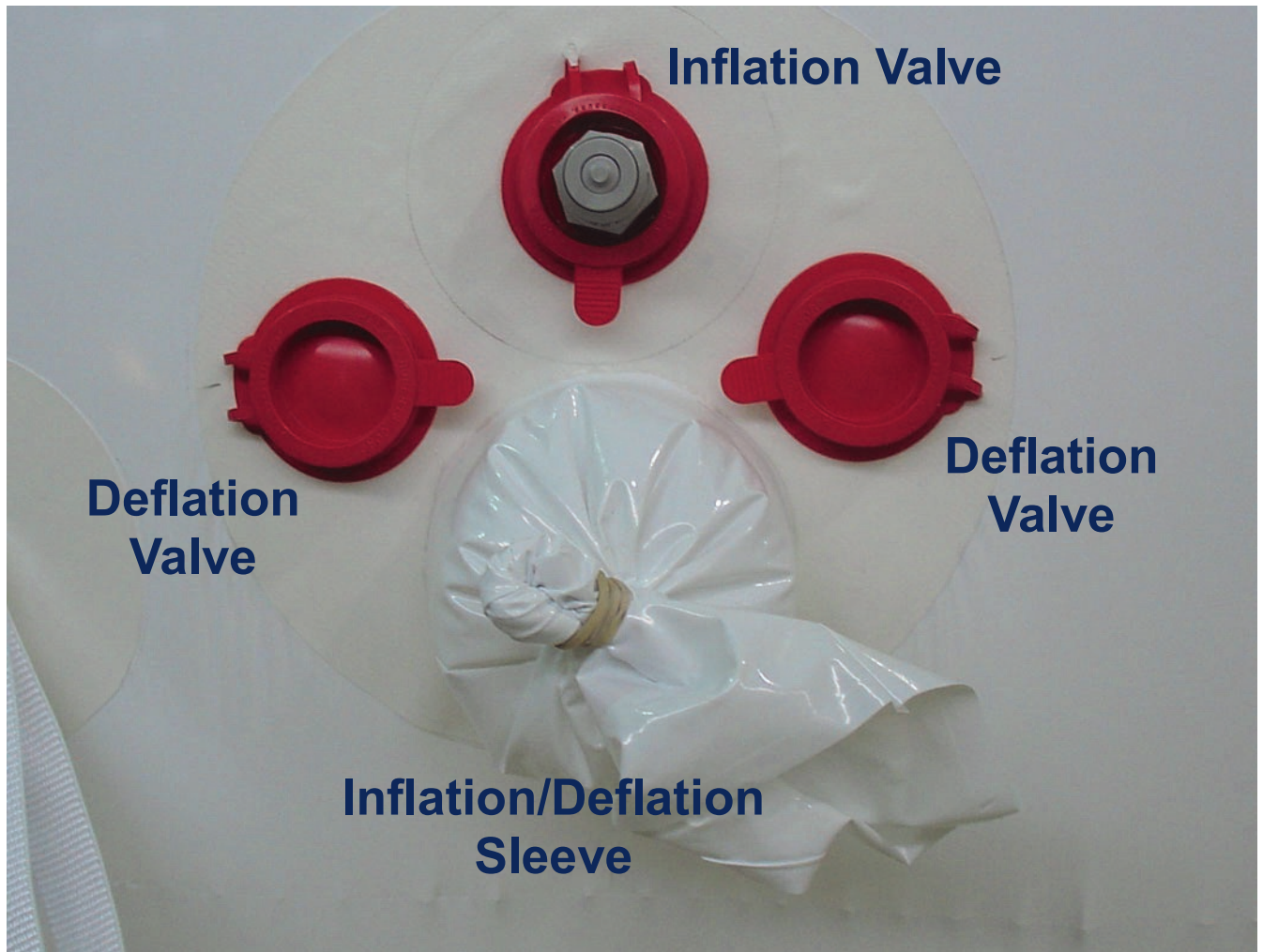
(3) Lines attach to the top hole: Keel Line, Left Forward Line and Right Forward Line

The Tether Line attaches to the bottom hole

No Mounting Platform

If you have chosen to purchase the KingFisher™ without the mounting platform, your aerostat will be equipped with three lines instead of five. These lines converge to a point. You will connect your tether line to this point.

VALVE CLUSTER



Inflation Valve

This valve is designed to conveniently lock the fill hose into place during inflation. Quickly disconnect the hose by pressing the button on the side of the fill hose connector.

Deflation Valve

You can open up these valves during the deflation step to help release the helium quickly. The number of deflation valves varies with the size of the aerostat.

Inflation/Deflation Sleeve

When untied, the sleeve will allow helium to escape at a rapid rate.

Alternatively, some users will fill their KingFisher™ most of the way through this sleeve. They would then tie it off and resume filling through the inflation valve. Be very careful when doing this. If you open the helium too quickly, it can rip or freeze the bladder.

To tie off the sleeve, tightly twist it. Fold it over, and tie a cord or wrap a rubber band around it.

INFLATION/DEFLATION

Inflation Process

1. Locate an area clear of sharp objects.
2. Lay down a clean tarp over the area. If the site permits, inflate, deflate and perform ground handling of the aerostat downwind from the launcher and other equipment. This way if the aerostat moves unpredictably it will not come into contact with equipment
3. Place your KingFisher™ onto the clean tarp. Unfold it with the valve cluster facing up. The top/center ring will be down. All lines should be untangled and laid out as much as possible
4. Verify all valves and sleeves are sealed. (See *Valve Cluster* on previous page)
5. Tie off your handling and tether lines to something heavy or immovable so the aerostat doesn't get away from you. Check the area for cords or other objects (like equipment) that could obstruct the main tether.
6. Attach the mounting platform to the KingFisher™. (See *Kingfisher™ Mounting Platform*)
7. Attach the fill hose to the Helium tank with your adjustable wrench.
8. Test the helium tank valve--Open it just a small amount, then shut it off.
9. Attach the fill hose to the gray valve on the KingFisher™. You will hear a "click".
10. Slowly turn the knob on the helium tank to let gas through.
11. Watch for the balloon to start fill, forming a "bubble". You can slowly turn the knob to let the helium flow a little quicker. **Be careful! Turning the valve too much can damage the bladder!**

In zero wind conditions the process is simple and doesn't require expediency. When inflating or deflating in higher winds this stage can get difficult unless you have help to hold onto the balloon. The material, once it is floating, will start to whip around with the wind and will likely contact nearby equipment if not secured properly.

If inflating in high winds, have an assistant hold onto the handling cord on the bottom of the KingFisher™ while you operate the helium tank(s).
12. Fill the KingFisher™ about 90%. Recheck your lines. The fly lines on the top should not be tangled and must pass through the equator guides. Verify their condition.
13. Wait about 15 minutes for the helium to warm up, then resume filling until the KingFisher™ is firm to the touch. The top fly lines should not be "cutting" into the envelope. Once inflation is complete, turn off the helium.
14. Raise the KingFisher™ just high enough to reach the mounting platform. Verify the stability lines are not tangled or restricted. The mounting platform should be level.
15. Attach your payload. Verify all safety connections are in place. **You don't want the payload to disconnect from the mounting platform!**
16. Go through any necessary steps to get your payload activated.
17. Untie the handling lines. **NOT the main tether!** Raise the KingFisher™ to operational height. As the aerostat is launched it is good practice to monitor the tether line for any damage, nicks or other forms of imperfections. This is very simple if you let the tether run through your index finger and thumb. A slight bump is all you need to identify a potential problem.

Deflation Steps

1. If you stored the tarp after inflation, spread it back out.
2. Bring the KingFisher™ down so you can reach the payload.
3. Deactivate your payload and remove it from the mounting platform. Safely store your payload.
4. Secure your handling lines to facilitate deflation.
5. Lower the aerostat further so you can reach the valve cluster. The KingFisher™ should be hovering above the tarp.
6. Untie and unravel the deflation sleeve and open up all other valves.
7. Let the helium bleed out. (For faster deflation you can use a reversible shop vacuum to remove the helium. **Be careful to not get the balloon caught in the vacuum!**)