Helium is expensive but is more commonly used in the United States while hydrogen is more common in Europe. Helium provides slightly less lift than hydrogen but is the more stable gas. (See subsection titled Flying in Inversions on page 11-7 for a discussion of stability.) Balloon systems must not be prone to generating static electricity if they are to be used with hydrogen.

There are at least six factors to consider when choosing a lifting gas. These are:

1. Compatibility with the balloon system being used
2. Cost
3. Lifting capacity
4. Availability
5. Locale of flight
6. Inherent gas stability

Normally, the gas selection process starts with the type of balloon. Hydrogen can be used if the balloon system is hydrogen compatible, hydrogen is available, and local ordinances allow its use. If one of these conditions is not satisfied, as is often the case in the United States, then helium is the likely choice. If a very short training or pleasure flight of several hours is planned, the more economical alternative of ammonia or methane (natural gas) may be considered.

When inflating or landing with hydrogen or methane, care must be taken to ensure that no flame or material with the potential to generate sparks is present in the launch locale. Lighted cigarettes, cigars, nylon clothing, cell phones, and other electronic devices are examples of forbidden items. Only essential personnel should be allowed in the launch and landing areas. For long, competitive flights, the increased stability of helium is a factor in its favor.

Components of the Gas Balloon

Gas balloon systems can be broken into four parts:

1. Envelope to contain the lifting gas
2. Gondola for carrying pilots and equipment
3. Support system to connect the envelope to the gondola
4. Other equipment

Envelope

The maneuvering valve *[Figure 11-4]* is at the apex of the envelope. It allows for the controlled release of a small amount of gas to initiate a descent. It is usually spring actuated and controlled via a line that runs from the valve down through the envelope into the gondola. On some balloons, a gas tight parachute top may be used instead of a valve. The envelope is also equipped with either a rip panel or deflation port for rapid, total deflation during high wind landings. More information on proper use of the valve and deflation ports is provided in the section The Practice of Gas Ballooning, page 11-8.

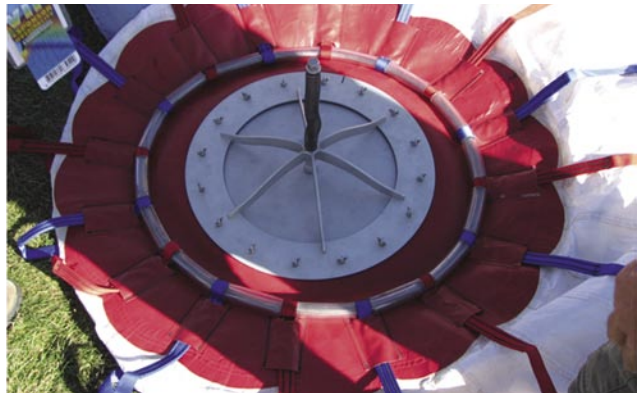

Figure 11-4. *Maneuvering valve on quick fill gas ballon.*

Gondola

The gas balloon's gondola *[Figure 11-5]* is typically somewhat larger than ones used for sport hot air ballooning, with four by five feet being a typical size. A foldable cot or sleeping pad normally runs along the long side of the gondola and a "kick-out" panel in the side wall at one end of the cot may be used to provide additional legroom for sleeping.

Figure 11-5. *Typical gondola layout.*

A trail rope is slung on the outside gondola along with much of the remaining support equipment. The trail rope is typically about 150 feet of natural fiber rope, one inch in diameter and weighs about 40 pounds. Its use is described in the landing paragraph.

Support Cabling

The connection between envelope and gondola may be made of rope, flat tape, or steel cable. The total strength of the