Since the invention of aviator’s night vision imaging systems (ANVIS), there have been many technological advances that have increased the reliability and functionality of the night vision goggles (NVGs) used by aviators. However, different standards don’t always mean a new version is superior to a previous one. For example, identifying the ANVIS-9 as superior to the ANVIS-6, based on the fact that nine is higher than six, is simply false.

To explain, let’s begin with the terms ANVIS 6 or ANVIS-9, which the helicopter industry commonly references when identifying which NVGs they either have or want. First, the technically correct nomenclature is actually AN/AVS-6 or AN/AVS-9. This military nomenclature is derived from the Joint Electronics Type Designation System (JETDS), more commonly known as MIL-STD-196E. The JETDS used to be called the Joint Army-Navy Nomenclature System (AN System) and was first adopted in 1943.

As spelled out by MIL-STD-196E, the purpose of JETDS is to “standardize the preparation of requests for nomenclature and the assignment of type designations for electronic items,” such as radars, radars, weapon control systems, electronic countermeasures, flight control and aircraft navigation aids, lasers, and fiber optics and associated equipment (such as NVGs). Today, military forces in the United States, Canada, New Zealand, Australia and the United Kingdom use MIL-STD-196E as their common nomenclature system.

The three letters used after AN within the JETDS identify the following key points about each designated item: “where it is,” “what it is” and “what it does.” So, while AN is obviously “army” and “navy,” the AVS part of AN/AVS-6 and AN/AVS-9 refers to: A for “piloted aircraft”; V for “visual and visible light”; and S for “detection/range and bearing, search.” The 6 and 9 are the model numbers of specific types of equipment.

### SO, WHAT’S THE DIFFERENCE?

The first NVGs designed specifically for flight operations were for the U.S. Army. Their designation was AN/PS-9. This has since progressed to AN/AVS-6(V)1, 1A, 2 and 3. The original (V)1 and 2 versions had a simple interpupillary distance (IPD) adjustment for both monoculars, an objective lens on each monocular, which only turned two-thirds of one turn to go from infinity to close focus; and an eyepiece lens on each monocular with 18 millimeters of eye relief (distance from the lens to the user’s eye). The (V)12 designation was the same as the (V)1, but it had an offset fore-and-aft slide assembly on the pivot and adjustment shelf specifically for Bell AH-1 Cobra pilots; this version is now obsolete.

The current enhanced features of (V)1, 3A and 3 include 25-mm diameter (up from 18 mm) eyepieces for increased eye relief, independent IPD (eye span) adjustment for each monocular, a more stable mounting point to accommodate various types of flight helmets, and an increased fore-and-aft adjustment capability.

The newest NVG version used in the U.S. Army is AN/AVS-6(V)3. However, through the Army’s aviation safety action messages, all (V)1 and (V)3 NVGs have been upgraded to the (V)3 configuration. The most notable current improvement is the objective lens now goes from infinity (approximately 110 feet) to close focus in just under 360 degrees (i.e., one-turn fine focus). This version also has a new, contoured, low-profile power pack and numerous advancements and variations of image intensifier tube technology.

While the U.S. Army currently uses the designations AN/AVS-6(V)1, 1A, 2 and 3, the AN/AVS-9 designation was requested by the U.S. Air Force to denote its ANVIS model, which is much like the AN/AVS-6(V)3 it preceded. The notable initial differences between the AN/AVS-6 and AN/AVS-9 were the inability of the AN/AVS-6 to mount to fixed-wing pilot helmet systems and the bulky power pack mounted to the back of the helmet that interfered with the ejection capability of fighter jets. Also, the objective lens assembly on the AN/AVS-6 translates fore-and- aft, while the AN/AVS-9 translates when adjusting for close focus of the viewed scene. The U.S. Army requires an objective lens that translates instead of rotates in order to accommodate mounting the AN/AVS-7 heads-up display (HUD) that attaches to the objective lens. Having a rotating objective lens would mean the HUD symbology rotates when focusing the NVGs.

That is… those are the differences between ANVIS-6 and ANVIS-9. However, it’s worth pointing out that there are numerous model variances within ANVIS-9 in regards to helmet mounts, battery packs, objective lens classes, objective lens focus, and HUD compatibility.

Okay, so what should I be concerned about? Performance and compatibility.

### NIGHT VISION: DEFINING THE DIFFERENCES

In this first of our regular series of educational and safety-related night vision columns, we try to clear up some misconceptions and help explain what to look for when getting your goggles and creating your night vision systems.

by Adam Aldous & David Luke/nvgsafety.com
night vision
three-color multi-function displays.
cockpit lighting as viewed through
light being emitted in the 625- to
red lighting, primarily to allow for
range. The use of the 665 limit,
ongoing loss of visual acuity for
below 665 nanometers, hence
Class B emits light up to about
NVIS are compatible is critical.
in this instance, the unfiltered
the automatic-gain-control in
ANVIS-9 NVGs. Making sure
the NVGs and the rest of the
665 nanometers. A Class-B
objective lens filters all light
above 625 to 665 nanometers, which enables the use of some red light-
allows the use of blue, green and some yellow lighting.

Top NVG Class-B modified aircraft lighting as viewed through Class-A objective lenses.

In general, there are three key components to NVGs — the eye-piece lenses, the objective lenses and the image intensifier tubes — that are combined in numerous configurations to determine the performance of the system. Several factors can be used to measure performance, the most notable is visual acuity (visual clarity). The image intensifier tubes are key performance components for visual acuity, however, the eye-piece and objective lenses contribute a bit, as well. (An important note for consideration is that numerous variations of image intensifier tubes are currently available under different performance level classifications.)

The four key points to take away from our first night vision column are:

1. Don’t be misled by the common misconception that ANVIS-9 is better than ANVIS-6. The main difference is that ANVIS-9 objective lenses rotate on most models, while ANVIS-6 objective lenses translate, to accommodate the use of an HUD symbology can be viewed (hence the Leahy Green reference).

IMPORTANT TAKEAWAYS
The four key points to take away from our first night vision columns are:

1. Don’t be misled by the common misconception that ANVIS-9 is better than ANVIS-6. The main difference is that ANVIS-9 objective lenses rotate on most models, while ANVIS-6 objective lenses translate, to accommodate the use of an HUD. The numbers are not an indication of performance. 2. Always evaluate the performance specifications of the image intensifier tube. (This point is true only for the U.S.,