

traditional two-man sniper-spotter team began in Iraq in 2005 and 2006 after a number of those teams were overrun by large masses of insurgents, Plaster said. "Because of this, the Army and Marines started reinforcing their teams."

In Iraq, snipers were mostly shooting at much closer range than in Afghanistan and frequently fought in urban environments, or city outskirts. In addition to killing enemy gunmen, American snipers in Iraq were crucial in the effort to disable IEDs.

Warrant Officer James Miller said that he and his small kill team spent months monitoring the road intersections where insurgents placed bombs. "A guy jumps out of the car, drops something off, and drives away really fast. What you end up shooting is the item. We would shoot the wires off of the thing."

He estimates that his team disabled about 15 IEDs during one three-month period. Miller, who is now retired in Kentucky after 21 years of Army service, said that he would often stay in place, hidden amid foliage and debris, for 72 hours at a stretch. During that time, he and his team would be in contact communication with headquarters. "You've got e-mail, text, camera systems — it's just like the commander is right there with you," he said.

A constant challenge for snipers is keeping alert and engaged while remaining invisible to the enemy for days on end.

Joe LeBleu, a sniper in Iraq in 2003 and 2004 who wrote a book about his experience entitled "Long Rifle," described how he and his spotter would divide the landscape into a grid and memorize each piece. They also gave nicknames to the goat herders who wandered across their field of vision.

Other snipers sketch the landscape in notebooks, to ensure that every detail registers in their mind.

They are constantly on the lookout for anything out of place. "A sniper learns to look at corners, the edges of trees, the edge of boulders and hillocks, because a bad guy is going to be down snug and trying to aim around the edges," said Plaster, who has written a manual for snipers.

FOR GENERATIONS, American snipers relied on Kentucky windage and Tennessee elevation — that is, instinct.

Snipers are experts at gauging distances. When Miller arrived in Iraq in 2006, he tape-measured the average size of truck tires in Iraq, which are smaller than those in America. He kept those and other measurements on a card with him at all times, so that

he would be able to calculate distances based on how small these common objects appeared at different ranges.

At long ranges, there is no room for error. Enemy fighters can appear little more than stick figures even when viewed through a scope. At about 800 yards the naked eye "can make out the silhouette and the weapon, but you're not getting anything about their face," said Milo Afong, a sniper who served in Iraq and wrote a book called "Hunters." "Through scope, you can see if they're wearing the terrorist face mask, but you still can't really make out too much."

In the desert, veteran snipers say the tendency is to underestimate distances, meaning that bullets will often fall short. And the heat will change the arc of a bullet. "As the temperature rises, your bullet would rise as well," Miller explained.

In Afghanistan, wind presents its own set of challenges. A sniper shooting across a valley to an enemy fighter on the opposing ridge might have to contend with multiple gusts of wind blowing at various speeds and in various directions. There is no exact science.

"The most important thing is to look at the wind closest to your target," LeBleu said. "You look at the wind by your target's feet and what the wind is doing to the bushes near his hands."

But the military is now churning out equipment intended to minimize human error in longer distance shooting. Some snipers carry laser range finders — basically binoculars that size up the distance of an object and are available in sporting good stores for deer hunters and golfers.

Researchers at the Pentagon are currently at work on a computer system that will measure all the

crosswinds between a sniper and target and suggest how far the shooter should adjust his aim horizontally. The program is called the "Advanced Sighting System," but is colloquially known as the "One Shot" program.

The equipment that is changing most in Afghanistan is the choice of rifles and ammunition. Snipers are increasingly carrying top-grade cartridges guaranteed for consistency — the bullets, primers and brass all come from the same lot, so as to minimize microscopic differences from one round and the next.

Yet snipers in Afghanistan and Iraq say the equipment they are most comfortable relying on is their eyes and their dope books.

With good data on wind and distance, Ranstad said of his record shot, "You could do it every day."



Future of snipers

The Pentagon's inventors at DARPA want sniper and spotter scopes that will help a shooter to rarely miss a shot. With the "One Shot" research program, the military is seeking a sniper scope that uses laser optics to determine the crosswinds between the sniper and the target. A computer in the scope would assist the sniper in compensating for the various winds. At present, snipers and spotters look at vegetation and heat emissions off the ground to determine which way the wind is blowing.

The military is hoping that the system will produce a 60% chance of hitting in a single shot a target under a mile away in moderate winds. Lockheed Martin has been awarded a contract for the project. The military hopes to have the scopes by 2011.

Nicholas Ranstad, who holds the record for the longest US sniper kill at 6,775 feet and the "dope" book he uses to perfect his shots.

Over there

Where are troops are this Memorial Day

Deployed in combat zones	225,000
Iraq	90,900
Afghanistan	92,100
Other areas	42,000
Non-combat countries with largest US troop presence:	
Germany	56,222
South Korea	28,500
Japan	47,000
Italy	9,700
UK	9,700

US military at a glance

	Total	Enlisted	Officer	Female
Army	549,015	473,396	75,619	73,568
Marines	201,219	179,751	21,468	13,225
Navy	330,218	273,799	51,973	56,606
Air Force	331,508	266,405	65,103	64,046
National Guard forces				
			Total	In combat
Army National Guard			365,000	44,461
Air National Guard			105,000	11,998

Source: Department of Defense