


# Windwords

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## Curious About Ultrasonic Anemometers?

### The Evolution

Credit for the first sonic anemometer should be given to Carrier and Carlson (Croft Laboratories, Harvard University), who in 1944 described a "true air speed indicator" for use on a blimp. Wind velocity would be obtained from measurements of the phase difference between signals received by two microphones placed upwind and downwind from a continuous source of sound. The instrument was never completed.

In the early 1950s the idea was extended to measure horizontal winds using a single sound source and four microphones, equidistant from it at four cardinal directions on the compass. Again, nothing came of those efforts.

This was a time of great interest in the structure of the boundary layer. Scientists in different countries were conducting experiments with whatever sensors they could devise over the flattest open terrain they could find, to collect data they could analyze.

### It Actually Worked

In the 1960s one young scientist, [Jagadish Chandran Kaimal](#), developed one of the first working ultrasonic anemometers. It used four sonic transducers in each of the axes, N-S, E-W and Up-Down. One transmitted North to a receiver opposite of it and one transmitted South to a receiver opposite of it. Likewise, another set performed the East, and another set the West.

Then there was the vertical axis where one set performed the UP axis and one set the Down axis. This made possible true orthogonal samples of the air movement. This probe had to be oriented to the NORTH to get the true accurate measurements. The measurement path was spaced at 25cm.

The electronics to perform this operation, receiving and processing, was massive considering that at the time, "stone knives and bear skins" (*thank you Mr. Spock*) were the only means available to do the job.

### Moving on

Over the years, Transistors and Integrated Circuits took the place of Tubes and the Kaimal Probe Design was changed with the help of Applied Technologies. In 1976 the "K" (Kaimal)

Probe was born. In the beginning, it still required 4 transducers in each axis to transmit and receive the signals and the electronics were housed in a fairly large weatherproof enclosure. The electronics used the new IC's at the time, but they were all large chips in sockets and on a variety of PC boards. The box also included several power supplies including a high voltage supply for the transmitters.

Through the years, Applied Technologies found transducers that would both transmit and receive, and the 4 transducers became 2 for each axis. At the same time the microprocessor was added to the electronics which eliminated a lot of circuits, so the probe design was minimalized and the measurement path shrunk to 15cm. We kept the N-S, E-W and UP-DOWN orientation maintaining the true orthogonality of the probe design. The electronics became more efficient, the speed of transmission increased, and the power requirements decreased.

## Applied Technologies, Inc. Now

As the technology got better, so did the "K" Probe, which eventually became the probe that started [Applied Technologies](#), and which is still one of the only **Truly Orthogonal** probes on the market. The electronics are now housed inside the probe and the probe no longer needs to be oriented to the NORTH. The output from the probe can be displayed directly on a datalogger or computer.

Other probe designs were created for various purposes still maintaining the orthogonal design, I.E. our "K" Probe, "Sx" Probe, "Vx" Probe, and the 10cm "V" Probe. Each of these probes were designed for specific scientific work. All of our probes have proved excellent for Flux Measurements and are the only probes that will give you a true vertical measurement that doesn't need to be corrected because of objects being in the vertical path.

The "K" Probe



The "Sx" Probe



The "Vx" Probe



The "V" Probe



Come to the website to see more detail about the various [probe designs](#) and read more about the [history of the Ultrasonic Probes](#).

## Funny

### Mostly True

I find it ironic that the colors red, white, and blue stand for Freedom, until they're flashing behind you.

Today a man knocked on my door and asked for a small donation towards the local swimming pool, so I gave him a glass of water.

I'm great at multi-tasking, I can waste time, be unproductive, and procrastinate all at once.

If you can smile when things go wrong, you have someone in mind to blame.

Never tell your problems to anyone, because 20% don't care and the other 80% are glad you have them.

Doesn't expecting the unexpected mean that the unexpected is actually expected?

Take my advice – I'm not using it.

My wife and I were happy for twenty years, then we met.

I hate it when people use big words just to make themselves sound Perspicacious.

Hospitality is the art of making guests feel like they're at home when you wish they were.

Television may insult your intelligence, but nothing rubs it in like a computer.

I bought a vacuum cleaner six months ago and so far, all it's been doing is gathering dust.

Every time someone comes up with a foolproof solution, along comes a more-talented fool.

Behind every great man is a woman rolling her eyes.

If you keep your feet firmly on the ground, you'll have trouble putting on your pants.

Ever stop to think and forget to start again?

When I married Mr. Right, I had no idea his first name was Always.

My wife got 8 out of 10 on her driver's test, the other two guys managed to jump out of her way.

There may be no excuse for laziness, but I'm still looking.

Women spend more time wondering what men are thinking than men spend thinking.

Give me ambiguity or give me something else.

He who laughs last thinks slowest.

Women sometimes make fools of men, but most guys are the do-it-yourself type.

I was going to give him a nasty look, but he already had one.

Change is inevitable, except from a vending machine.

The grass may be greener on the other side, but at least you don't have to mow it.

I like long walks, especially when they're taken by people who annoy me.

I was going to wear my camouflage shirt today, but I couldn't find it.

If at first you don't succeed, skydiving is not for you.

Sometimes I wake up grumpy, other time I let her sleep.

If tomatoes are technically a fruit, is ketchup a smoothie?

No matter how much you push the envelope, it'll still be stationery.

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