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The RAM arm mount makes positioning the GPS unit of your choice easier than forgetting an important anniversary. (Sadly, one of the few things a GPS cannot do for you: remember.) Central to the RAM setup are rubber-covered spheres—one mounts to the bike and one is part of the cradle that holds the GPS.

For all these times of poor preparation and difficult decision making, isn't it nice to know that technology exists to ease your burden? Yes, it's the GPS, short for Global Positioning System, the brainchild of the U.S. Department of Defense but now the engine of change and situational awareness for drivers, boaters, pilots, hikers and, thankfully, motorcyclists.

Briefly, then: The GPS system as we know it is made up of at least 24 satellites placed in six orbital planes. (New satellites are put up to replace aging units; the first of the so-called Block II satellites was launched in 1989.) They clock along up there at an altitude of 12,600 miles, circling of the earth twice each day. Relative to your position on the ground, these satellites are always in motion. (Unlike, say, the communication satellites for your home dish system, which are geosynchronous.) Apparently, they rarely get tired.

The GPS you hold in your hand is just a receiver; the satellites transmit data that includes, among other things, an extremely precise time hack. The satellites know what time it is to the nanosecond (or thereabouts) so that your $100 GPS doesn't have to. GPS positioning, then, comes from the math. Your receiver must be able to "see" at least three satellites to calculate a position, and needs four to compute your latitude, longitude and elevation. (With three, you get no altitude.) How, then? The receiver computes something called pseudo-range—the distance to each satellite in a straight line—and it gets it by figuring the difference between local time and the time the satellite signals were sent. Thanks to an onboard database and a data stream sent down on the satellite's carrier signal, your handheld knows where the GPS should be in space. By comparing the relative distance from the four (or more) satellites, the GPS calculates your position at the intersection of four (or more) spheres. The more satellites your receiver can "see" and gain information from, the more accurate the position calculation will be.

Early in the development of GPS for civilians, the number of satellites and their position in orbit was a big deal. Now, however, the system is very well developed. Chances are that a consumer-grade GPS with an internal antenna sitting on your desk 10 feet from a window will pick up six of the 10 or 12 satellites theoretically in view at the moment, and calculate a position accurate enough to tell you if you're in bed or in the shower. (Like you couldn't tell otherwise...) It's pretty amazing when you think that the satellites are putting out the equivalent of a 40-watt signal.

We motorcyclists have a further advantage. Ninety-nine percent of the time, the GPS receiver will be positioned out in the open, without the steel roof of a car or the aluminum overhead of an airplane to block the signal. In our tests, every GPS unit received and navigated from its perch between the handgrips with ease, as you would expect. (Some were quicker than others with the first lock-on of the day; however, the difference doesn't amount to much.)

On a bike, reported accuracies were typically on the order of 20 feet or so—a couple of bike lengths, typically. (On the Garmin units, a blue circle appears around the position icon when you've zoomed way in on the maps saying, essentially, that you could be anywhere inside the circle. Moreover, whether or not you actually appear to be on the road depicted on the map, or blazing through the virtual median, is probably more a case of how well the map-matching algorithms are designed than any latent accuracy issues with the GPS.) In addition, virtually all current GPS navigators are configured for WAAS (wide area augmentation system), which improves the accuracy of the position resolution. (It's much the same process used in aviation to allow GPS to create navigation resolution good enough to guide airplanes right down to the runway.) Suffice it to

Three styles of the RAM mount can be used on nearly any motorcycle: The U-clamp bar mount (upper left), the worm-clamp/V-cradle mount (upper right) and the tab mount (left), which is great for sandwiching under many mirror mounts.

say, these things are deadly accurate.

What's more, the latest portable GPS units employ comparatively high-tech processors and a lot of memory. What the manufacturers have done with these tools is create realistic, surprisingly detailed maps of roads and terrain. Moreover, most of these units have sufficient processing power and memory to hold not just the maps but so-called POIs—points of interest. These can be restaurants, museums, gas stations, Starbucks—whatever the GPS manufacturer and/or the data collector thinks are important to you, the world traveler. (And the technology keeps getting better. This summer, Garmin introduced a new unit that can receive XM Satellite signals through a separate antenna. Not only can you get XM Radio on the road, but, for an additional fee, you can have near-real-time weather at your fingertips.)

Where a lot of the newfound computer horsepower is consumed on the latest units is in route management. In the previous generation of portable GPS units, you might have a good, reasonably well-detailed earth map but the box would have no idea how to route you. That is, if you're in Mahwah, New Jersey, and wanted to ride to, say, Rochester, Minnesota (we don't know why you would, it's just an example), the older GPS would simply draw a straight line from start to finish, and tell you it was a trip of about 950 miles. Hmmm. Planning to swim across Lake Michigan? Of course, all of the distance/time calculations would then be based on that distance. No way you're going to make it in about 16 hours—even if that's what the GPS is telling you. In this sense, the early GPS units were good for a very rough estimate of time to destination, getting more accurate as you got closer, but were fairly off the mark with the estimates at the beginning of a long trip. Not a big deal, but if you were looking for Swiss-watch accuracy in trip planning, you'd be disappointed.

Current GPS receivers instead have very capable routing routines built in that, in addition to keeping you actually on the roads, help you decide which route to take: faster, more interesting, avoiding toll roads, whatever. Now your GPS will confirm that an overnight in the Windy City will be required, and that the total trip will cover 1150 miles.

Better even than that is the recent addition of turn-by-turn routing. As you make your way from departure point to destination, the latest GPS units will prompt you with text and/or voice commands. "Turn right in one-half mile," it might say. Right on Gravedigger Road S, you might be