Field Testing

If you think fishing stories can get carried away, electro-optical (EO) field testing stories do not take a back seat. During infrared system night testing in Nettuno, Italy, I personally saw a wild boar chase a colleague to the point that she fell down and broke her collar bone. At another field test in Huntsville, Alabama, I saw a co-op student get three days off without pay for kicking solid rocket fuel remnants with his cowboy boots. This occurred after an ultraviolet sensor test on a booster rocket that exploded on a static test stand (it was not supposed to).

I have a love-hate relationship with EO field testing. I love the excitement of actually measuring phenomenology or EO system performance in the field. I hate freezing, baking, and the boredom of long hours between tests in the middle of the night and in the middle of nowhere. All told, I have measured targeting system performance, atmospheric and smoke transmission, turbulence levels, target signatures, infrared band comparisons, source quantities, seeker performance (captive and flight tests), rocket emissions, and even dirt emission characteristics.

Recently, I noticed a young engineer in charge of a field test and he was very nervous about the test. He told me that he really wanted to do well and felt he had been given great responsibility and trust by his superiors. He was having trouble sleeping at night getting ready for the test. Typically, these tests are very expensive and the results may drive contract decisions in the tens of millions to hundreds of millions of dollars. I gave him some advice that I called "rules of field testing" and they are:

1. Testing is for experimentation and/or decision-making purposes. Take only the data that you need for the experiment and/or decision. A test engineer friend of mine had a sign on his desk with this rule on it. Time and money are wasted if you do not follow it and, worse, you may get sidetracked to the point where you do not obtain your primary data.
2. Make darn sure that you back up the obtained data and store it in two locations immediately after you take the data and before you leave the test site. A great deal of data has been lost because this rule was not followed.
3. Do the best that you can (good test plan, good schedule, etc.), but do not worry. I can assure you that something will go wrong (it is rare if it doesn't).
4. Contingency planning is everything. A computer will break. It will rain. Power will give out. Bring an extra data collection computer. Plan an extra day for rain. Bring a generator and extra tools. Duct tape is the king of all field collections. Flash lights are the queen. Don't get upset and don't sweat it. Just bring two of everything if you can.
5. One person is in charge. Make sure everyone participating knows it (i.e., the test director). I've seen a great deal of wasted time due to colleagues arguing about what to do next after an incident not on the plan and supervisors who show up and undermine the person responsible for test success. If you are a supervisor, you can show up and observe, but stay out of the way.
6. Do not try to piggyback secondary data collections on important field tests. While I've seen a few of these result in success, I've seen too many compromise the primary field test.
7. Try to have fun. Don't get me wrong here. Do not provide distractions during test setup and data collections. However, a great deal of testing is waiting between collections. Groups who do field testing for a living bring barbeque grills, cookout food, footballs, Frisbees, and crossword puzzles.

There are many secondary rules, such as bring lots of cold weather gear when it is freezing and watch out for chiggers in the summer. The ones listed above are the important ones.

There was one story I heard from multiple engineers in Huntsville, Alabama, of a field test technician who kept taking pieces of solid rocket fuel home (pieces collected from rocket failures). He put them in a 55-gallon drum out in his cornfield. On a 4th of July, he blew himself up when he tried to light the drum. I don't know if it was true. Field test stories are a lot like fishing stories. Follow rule #2 and you won't have to tell the story about the data that got away.

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Editor

P.S. I strongly encourage participation in field testing if you have an opportunity. The best EO engineers I have met have experience in field testing, laboratory testing, and theory.