

REPRINT

Title: GETTING WHAT YOU WANT

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“You can’t always get what you want
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You can’t always get what you want
But if you try sometimes you just might find
You’ll get what you need”.

Simple advice from the Rolling Stones. But what does this 70’s philosophy have to do with Sound and Vibration in 1999? Very simple...getting what we want or, at least, what we need to do our jobs.

Our technical community is in a capability vs. financial bind. On one hand, the equipment (shakers, control systems, data acquisition/analysis systems) bought in the 1980’s is, at best, horribly inefficient and, at worst, dying. On the other, shrinking demand and general slow-downs in much of our industry have resulted in a reduction in facility-upgrade funding. The laboratory manager/engineer, charged with the task of producing results at minimum cost, must somehow negotiate the purchase and the implementation of critical enhancements through the company’s system. In large organizations, this will often take several years. Then, as often as not, the hard-fought enhancements fall short of needs. So, the objective of this editorial is to discuss strategies that may help improve the chances that you “get what you need”.

The route to success is already well known. The solution is Doing Your Homework. And here are the assignments:

Assignment #1: The Original Request

Here we are, two years before we expect to get the hardware (really needed today.. another issue). We need to 1) convince management that the equipment is needed and 2) tell them how much it is going to cost. Most people think that the first item is the tough/important one. Actually, a smiling face and golden throat will probably carry the day here. The critical point, that is often glossed over, is the cost estimate. This is the amount of money that will be made available when your political activities bear fruit. Three times out of four, when it comes time to actually specifying/ordering a system, the available funds will be too low. Good luck on going back to the till!!

There are two contributing factors to low estimates:

- Under specification: The traditional process is to call a few of our favorite vendors and give them a 100-word description of what we want. The vendors, doing their best to make themselves look good within the specification, will give a low cost estimate. Then we pick the lowest of the estimates. The logic sounds good—prices are going down for comparable performance, right? We can’t help but be safe two years hence...Right?

Wrong! We really have not thought the requirement through. At this point, we should have a good conceptual design for the system as we would do it with capabilities available now. All of the basic system functions must be defined. At risk of sounding like a high school English teacher, this should be a five page document. It should be passed to potential vendors for suggestions, sanity checks, and cost estimates. It should be modified in response to vendor comments. Don’t forget to include the expected growth in requirements that will happen in the next few years.

This “document” is a work in progress that is expanded and enhanced as we get closer to actual purchase. It becomes the System Specification.

- Bad Political Judgement: You think that we can improve the chances of approval by providing management with a low cost estimate. This is a very bad strategy. Unless you are near some critical dollar breakpoint in your company’s purchase methodology, the actual amount requested has very little bearing on approval. At this stage you should use the HIGH estimate with an inflation factor for anticipated growth in requirements.

Assignment #2: The Request for Quotation/Statement of Work

Your prayers have been answered and you have a zillion dollars to buy your new system. Now comes the hard part. Actually GETTING WHAT YOU NEED. How do you do that? By writing a SPECIFICATION. If you have completed Assignment #1, most of it is done.

There are two objectives to this part of the exercise. Most important: Confirm your understanding of what you really want). Second: pass that information along to potential vendors.

Smith, Strether, "Getting What You Want," *Sound and Vibration*, March 1999.

There are four basic rules for building a specification:

Rule #1 Specify what you want; not how to do it. Treat the system as a black box that has inputs and produces the results that you want. For example, for a data acquisition system, inputs would include number of channels, transducer/signal-conditioner types, required bandwidth, and required accuracy/dynamic range (including how it is to be measured). Outputs might include requirements for run-time displays and error checking, data analysis processes, output file formats..etc. Specify only what is important and useful to you.

Rule #2 Don't over specify. Be reasonable about what you really need for your application. A very common error is to require too high a measurement/control bandwidth. In the acoustic/vibration/shock world, more than 25 KHz is only useful in rare, research-oriented applications. Over specification costs money and may rule out a satisfactory, cost-effective solution.

And, don't specify details that don't really effect your end use. (The exception, of course, is to use some unique detail that will force selection of your favorite system. But, you wouldn't do that, would you?)

Rule #3 Don't specify anything you can't test. This rule is aimed at two targets: First, if you can't verify that a system can perform some operation you can't include it in an acceptance test procedure. Second, if you can't test it you probably don't really care. For instance, it is impossible to prove the accuracy of a data acquisition system to better than 1% except under very special and unrealistic conditions. And 1% is good enough (and probably better than most of the systems out there, regardless of their nominal capabilities).

Rule #4 Include an Acceptance Test procedure in the specification. Be sure that it includes everything that you really care about but don't get too detailed. Specify the parameters to be tested and the allowable values. Allow alternate methods of satisfying requirements. For example, a desired frequency response characteristic may be satisfied by either hardware or analysis methods (or a combination). It is the end result you care about. Be sure that the vendors know that the delivered system must satisfy the tests if they expect to be paid!

Rule #5 Don't "cherry pick." Don't take neat features from each of the vendors to make an "ideal, composite" system. You won't get it.

Following these basic concepts you need to write a specification that describes:

- What you need.
- Something that can be bought.

This should be a "significant" and well-thought-out document. You should expect the vendors to respond accordingly.

Assignment #3: Actually Getting What You Asked For

It is a sad comment to make but there is a alarmingly-long list of systems that were ordered and either nothing was delivered or the provided product did not work. Sometimes the purchase can be canceled or the product returned but, at best, a large amount of time is lost; at worst, the funding disappears.

The problem is in picking a viable vendor. Here are a few suggestions:

- The best recommendation is word of mouth. Call your colleagues. Listen to the success/horror stories. Go to technical meetings and ask around.
- When you get the reply to your specification, expect a "responsive" proposal. It should include a detailed answer to the items in your specification. Beware of vendors that claim to be 100% compliant. Nobody is!
- Require prospective suppliers to provide a list of ALL customers for this, or similar, product lines for the past three years (or for as long as the company has been in business). The list should include customers for both delivered and pending systems. Check them all and expect a few, but not many, "imperfect" references. Nobody does everything right.
- Request a demonstration. Prepare a list of functions that you want to be demonstrated and give it to the vendor before the visit. Capabilities that can't be shown don't exist but the vendor may offer to fill the shortcomings. It is up to you to assess the organization's ability to produce new functions. Again, references and track record are the best indicators.
- **Work with the vendor.** The good vendors can offer insights and suggestions that will improve your system. Take advantage of their skills. The best solutions result from cooperative efforts by all participants.

"You can't always get what you want." If you don't do it right, you may not even get what you need.