Birth OF A Security Product


Photo courtesy Pelco

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AT A GLANCE

- Customer demands, competitive environment, cost and uniqueness all play a role in which ideas are pursued
- Functions, features and return on investment are key determinates during the design phase
- Before a product is mass produced, a prototype is thoroughly tested before manufacturability and compliance issues are addressed
- Although the production cycle may end, support is necessary for years as legacy products remain in the field

Like many of today's modern technological conveniences, electronic security products typically require a year or more to get from the drawing board to the stock room. They are the result of countless hours of brainstorming, research, development, testing, production, marketing and support. How do manufacturers do it? Take a journey with a mythical product to find out.

Every motion sensor, DVR, card reader, control panel or any one of thousands of other electronic security and fire/life-safety devices in existence today was once just an idea put forth by one of our industry's manufacturers. Most installers and end users take these products for granted as useful devices to be sold and used. However, each of them undergoes a long, rigorous process of research, development, testing, production and marketing.

Most manufacturers would agree — particularly if you talk to their customers or marketing and sales folks — that the time and cost involved in bringing a new product to market is substantial. Larger suppliers often have a gauntlet an idea must run in order to ultimately become a product. Smaller

companies, on the other hand, are often surprised by the ramifications of skipping such "unnecessary" steps. Yet, if you were a fly on the wall at their meetings, you would likely hear a common plea: "Can't we do this any quicker?"

To shed some light on how this all works, we'll take a product through the entire process. We'll explore the elements that go into a product design, and the millions of dollars and years of work involved for even fairly simple technology products.

To accomplish our task, we'll create a fictional product. Since DVRs are popular now, incorporate hardware and software in their design, and are going through rapid innovation, we'll go with one of them. Our manufacturing company will be a fictional but established player, with the infrastructure to design, build, distribute and support their products. Finally, we'll stick to available technology — no holograms, nanotechnology, smoke, mirrors or magic will be used in the making of our product!

S.W.A.G. POINTS

Keeping It Real

Before we get started, keep one thing in mind. As scientific as this process may appear, there are a few areas where it breaks down. We'll identify these areas as SWAG points. SWAG is a popular acronym in engineering circles and is defined in the urban dictionary (www.urbandictionary.com) as "scientific (or silly) wild-assed guess."

Please note that the steps identified as SWAG points, and much of the development process defined here, really applies more to new products than to incremental improvements to existing products. It's a lot easier to predict how well the newest version of an existing product will sell, and the test burden on a product improvement is far less extensive and risky than on a product containing brand new, untested software and technology.

Idea Defined Based on Customers, Competition, Cost, Uniqueness

To design our product, we'll first need to define it. Paradoxically, this step is both the simplest and the most difficult. It is simple because we already have a pretty good idea of what we're going to do. We know what business we're in (electronic security) and the kind of product we want to make.

Our customers have repeatedly told us what they'd like to see in our new DVR, and we have a rich field of competitors to mine for ideas. We know what price point we need to hit, what our capabilities are, and what it takes to put together a first-class product. So what is so difficult about defining a product?

With few exceptions, companies like ours don't want to create "me-too" products. This means we need something of a crystal ball to predict the features our product will need when it finally hits the market, to avoid it becoming obsolete too quickly. We'll need some "secret sauce" that makes our product stand out and gives customers a reason to select it. And we'll want our product to be marketable for as long a period as possible; the longer it remains marketable, the more of our investment can be amortized.

Keeping our product marketable is a tremendous challenge. "Ten years ago, we saw products having 10- to 20-year lifecycles," remarks Dave Smith, vice president of marketing for Pelco in Clovis, Calif. "Five years ago, it was around five to 10 years. With the current pace of technological innovation, today's product designs can be expected to be obsolete in as little as two to three years."

Other manufacturers agree, some placing the product lifetime at as little as one year.

"Determining the market needs and ultimately the features required are generally the most critical and hardest to predict," says Bret McGowan, vice president of marketing at Vicon Industries in Hauppague, N.Y. "Product development takes a long time and attempting to forecast the needs of the market at the time a product will actually be released requires a significant understanding of the trends in the market so that when it comes out, it's not behind the curve."

To define our idea, we'll generate a Market Requirements Document, or MRD. This document will be a best estimate of what features the market is looking for, how much folks are willing to pay for these features and the amounto market share our company can reasonably expect if we bring such a product to market. The MRD is used to make a financial case for the product; if we're going to spend millions of dollars to build something, by golly we'll need to see a return on that investment.

S.W.A.G. POINT No. 1:

MRDs More Romance Novel Than Nonfiction

While it may keep the accountants happy, the MRD and associated return on investment (ROI) numbers are, in most cases, absolutely worthless. This document is generally written by someone with a stake in the product and often has overly ambitious numbers built on suspect data that can never be confirmed.

How do you attribute a dollar value to a feature that does not exist? How can you predict market share when you don't know what your competitor will be doing? How will disruptive technologies change the market, either against or in favor of your product? These variables are impossible to nail down, requiring a leap of faith at this point — whether or not anyone will openly admit it.

Functions and Features Come Into Play When Defining the Product

Once the market requirements have been identified and the ROI has been examined and approved, it is time to define what the actual product will do. The *Product Definition Document*, or PDD, is exactly that; a written definition of what features the product will have and how it will

Weighing the Build vs. Buy Proposition

With the rapid rate of change in the electronic security industry, most companies have more products on their wish list than they have time or resources to develop. This can lead to a crossroads; should we postpone some of these ideas until we're able to handle them internally, or look to an outside partner?

Working with an outside development partner usually takes two paths. An original equipment manufacturer (OEM) relationship generally allows a company to pick from an existing product line, making minor cosmetic changes and perhaps fine-tuning a few features. The vast majority of outsourced equipment procurement, including many name-brand cameras, monitors and DVRs, falls into this category.

A second category represents a true development and manufacturing partnership. In these cases, almost all of the steps outlined in this article are followed, but they are split between two companies and across geographies. The end result is a unique product, often containing jointly developed intellectual property. Products developed in this manner can often be brought to market quicker, and for lower cost since much of the engineering work is performed in countries with lower labor costs than the United States.

The downside can be orphaned products, as relationships change and manufacturers change outside development partners. While this is not an issue with products such as cameras and monitors where interoperability is not a factor, it can be a problem with DVRs and other IP-based products. These often form the building blocks of larger systems, and compatibility — both backwards and future — can be critical.

work. This document will serve as the blueprint for our product going forward.

A PDD is usually a "living document," frequently revised during the development lifecycle withinput from the various groups that will work on the product. It will gain more detail as we wind our way through the development process. Larger companies have mastered this part of the process, while many smaller companies see it as needless paperwork.

Ironically, a PDD is of even greater importance to a smaller company. Like any blueprint or map, following a PDD will ensure as few distractions or "side trips" as possible and avoid escalating features that consume precious time and resources. A large company can sometimes afford to get sidetracked if there are enough resources available to straighten out the course. A small company, on the other hand, once sidetracked may never recover.

As part of the PDD, engineering involvement is required. A series of negotiations are required to ensure that the features being defined are practical, can be developed in time to market the product, and fit into the product's cost target. While many companies define this as a linear process following a logical order of steps, it is much more of a collaborative effort. The end result should be a document that defines the product and a cost in time and development resources.

S.W.A.G. POINT No. 2:

Closer to Science Fiction Than Documentary

The figures put forth in the PDD for the associated product costs are fiction as well, and most of the people involved freely admit this. How can anyone predict how long it will take to do something they have never done before, how many people it will take to do it and what it will cost when finished? A variety of "fudge factors" are put into place to manage these estimates based on similar experiences in the past.

One well-known company used to have an overly simplified method of estimating development time and cost that was often more accurate than the most carefully thought-out plan. It would simply assume that a product — regardless of size or complexity — would cost $2 million and take two years to develop. As a rule of thumb, it was hard to beat.

Engineers Develop the Prototype That Undergoes Internal Testing

Now that a picture of our product has emerged, it's time to start the real work. Our engineering group will develop the product, both hardware and software, until a working prototype emerges. There will inevitably be surprises, both pleasant (a new chip or component allows greater performance for lower cost) and painful (a key feature will take longer or cost more to implement).

Some companies outsource the engineering and development of portions of their product lines (*see sidebar on page 55*), but the steps involved remain the same.

"We are the development team behind product names that are instantly recognizable," states Greg Stone, marketing director for DynaColor USA in Irvine Calif. "Our OEM business is based on partnering with other companies and giving them exactly what they want. We're completely committed to the success of the products we build, regardless of the name on the box."

The end result of this engineering process will ultimately be several fully functional and working prototypes. Once these are built, the internal test process begins. The testing process seems endless, and usually continues until well after the product has been released.

"With today's software-based products, and especially with those that work over networks, the biggest challenge is product software and network testing," explains Smith. "There are an endless combination of environments that products can be put in and ways they can be used. Identification and elimination of software bugs prior to launch is an art."

Photo courtesy American Dynamics

The Product Definition Document (PDD) is a written definition of what features a product will have and how it will work. The PDD serves as a blueprint for the product going forward.

In fact, it is inevitable that some bugs or problems will not be discovered until after a product has been installed and is working for a while.

"Water intrusion problems on outdoor domes is a good example," says Ed Hamilton, senior program manager for American Dynamics in Boca Raton, Fla. "Wit all of the different environments and installation techniques out there, it can be quite a while before we see a problem that can be replicated in the lab. Solving the problem is often the easy part."

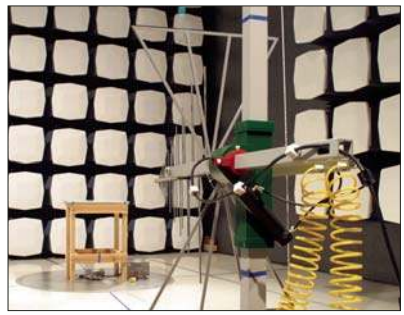

Photo courtesy Pelco

To check electromagnetic compatibility (EMC), products are typically sent to test chambers, such as "The Wave Cave" pictured here from within Pelco's facility, to verify compliance to global RF emissions and immunity standards.

Once testing of the prototype is complete, the design is generally reviewed again for manufacturability and compliance issues. Products that will be manufactured in large quantities will often undergo a factory launch process, where pilot builds are made to set up, train and test factory readiness.

Somewhere during this phase, a production quality version of the product will be built and distributed to a limited audience for final testing. This step is known as a "beta test" in the software world, but goes by a variety of names in our industry. Tech support will usually work with the product at this point, although many companies get them involved far earlier in the process.

Likewise, some sales training may occur at this point, but not always. At Vicon, for example, "Beta release usually comes before sales training, since almost all Beta phases turn up changes to the product," states McGowan.

Some manufacturers insert a final "product validation" step. This is an

internal series of tests that verifies the customer experience is what the manufacturer expects. Packaging is evaluated, and a final pass is taken to ensure the required tools and accessories are included. Manuals, and other supplemental material and documentation are double checked for accuracy. In this way, the entire "out of box" experience is examined for improvement opportunities.

Trade Shows Are Most Popular Venue to Launch New Products

Once our product is complete, it's time to tell the world and make it available to our customers. Most manufacturers launch major products at one of two key industry events; the ISC West show in Las Vegas in the spring or the ASIS show in the fall (this year in Orlando, Fla., Sept. 12-15).

As part of the launch event, sales and technical support people will need to be trained (*see sidebar on page 59*), marketing material and data sheets should be on hand and product should be available.

Photo courtesy Vicon

Once the product has been defined, engineers set forth to create fully functional and working prototypes. At that point, rigorous testing begins and usually continues even after the product has been released.

In actual practice, product availability is not usually what it is cracked

up to be. With two annual launch periods, the date a product must be released is often set in stone, based upon the availability of an industry event to introduce the product.

Unfortunately, all of the variables in product development can cause the actual product shipment date to slip unpredictably. The product that is displayed at the launch event is often one of the working (or semi-working) prototypes, and it is not uncommon for a product to be launched twice (or even three times) before it is actually shipped.

S.W.A.G. POINT No. 3:

Meshing Production With Demand Is a Tough Balancing Act

Manufacturers base product production on complex forecasting models, designed to predict how many of a product will be required to satisfy the various sales channels. Since complex products can require significant lead times for production (particularly if they are built overseas and require transit time), a forecast number that is too small will lead to outages at precisely the time you are trying to build excitement for your product. Conversely, too much of a product will have the accounting folks in an uproar and will often lead to the premature demise of a product, as in "let's kill this turkey."

Products usually require a ramp-up period where sales build as product awareness increases. Once the ramp-up is complete, the product tends to sell at a somewhat predictable rate until market conditions change (a competitor drops its price or a new model is introduced) at which point sales will decline until the product is discontinued. However, pent-up demand can cause a product to fly off the shelves, or a lack of market acceptance can make even the best products languish. As with other SWAG points in this process, most will admit that product forecasting is a best-guess proposition that nobody gets right all the time.

Photo courtesy Pelco

One of the final steps in the product creation process is building production-quality versions that can be "beta tested" in the marketplace. Technical support will usually step in at this juncture to assist in getting rid of any "bugs."

Support Must Be Accounted for Long After Production Ceases

Many people don't realize that a manufacturer's obligation to a product does not end when the product is shipped, or even after it has been discontinued.

"We have systems out there that are more than 15 years old and are still going strong," says Hamilton. "These must always be considered when looking at new products. Will our new dome cameras communicate with older controllers? Can we provide replacement

Where Is Tech Support?

The involvement of the technical support folks sounds like an essential part of product development. Who knows more about the needs of the customers and the problems with current (and competitors') products than the folks who talk to customers firsthand, day in and day out?

Sadly, tech support involvement in the product development process is a hit-or-miss proposition, and many believe it is not getting better. "Our customers see products before we do," states a technical support specialist at a major manufacturer who requested his name not be used. At least one manufacturer has moved its tech support staff to a call center in another country, thousands of miles away from its development teams.

Customers are noticing. "When I talk to a technical support representative who clearly has not worked with the product, and is a few pages behind me in the manual, I know it's time to start looking at other suppliers," says Michael Gauvin, surveillance technical manager at Foxwoods Casino Resort in Masantucket, Conn. "Sometimes, I feel that I should be getting paid to support them!"

The bottom line is that the continuous feedback loop that is supposed to guarantee continuous improvement across generations of products is broken in some companies. How does this help you? When talking to a technical support representative, ask them how much feedback they have in the product development process. If you're satisfied with their answer, take a closer look at other products made by that company; they could be winners. If you get the telephone equivalent of a blank stare, it might be time to examine the alternatives.

parts for installed products once our inventory is depleted? Once you release a product, you own it for life, and that product may have a longer life than you ever thought possible."

Not all of the steps included in this article are identified and followed in this order by all manufacturers, but most would agree with the basic sequence of events and the tasks required. Larger companies will have a team of people working on a product, each with separate and distinct duties. Smaller companies tend to combine tasks and have fewer people working on a given product. Either way, turning an idea into a finished, salable product is a complex process and a lot of work for all involved.

Most of us understand firsthand the costs associated with replacing a faulty or defective product. Repeated trips to the job site, frustrated customers, and projects that never seem to end are symptoms of products that have had a few corners cut in the development process. Although you may not be crazy about how long it takes to get a product to market, you'll likely live with the delays if the end result is what you and your customer need. ■

Photo courtesy Pelco

Even after a product is put into mass production, testing continues to assure it meets standards and expectations. Here, camera components await inspection, packaging and delivery.

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