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How to Maximize Quality and Minimize Cost by Switching from Component-Based Inspection Systems to All-in-One 3D Smart Sensors

With today's trends driven by open source, crowd funding, shared economies and "maker" movements, it is not surprising that engineers often choose to build their own solutions. Nowhere is this more true than in the world of machine vision and the development of custom solutions for quality inspection or material scanning in optimization machinery.

At first glance, purchasing individual components and building your own solution would appear to be less expensive than buying a fully finished and proven vision sensor. This is because, upon initial examination, there could easily be a 10x price difference between the two, which is the obvious motivator that starts engineers down the the path to building "do it yourself" (DIY), component based solutions.

The reality of DIY, however, is much different than initial appearances might suggest. In the real world, total cost of ownership (TCO) of an all-in-one smart sensor is actually far lower than designing and building your own.

When you compare a DIY solution to a proven product, the focus is often limited to a comparison of acquisition price. However, the hardware list price is only one of several cost components when calculating TCO. Additional costs that engineers are often blind to include accessories (cables, power supplies, external controllers, and so on), software development (development of firmware, 3D acquisition, 3D calibration, runtimes, measurement tools, user interfaces, communication protocols, and so on), installation time, in-field calibration and recalibration, and longer term service and repair.

When you consider these additional costs a more accurate picture of TCO begins to emerge. (It is worth noting that in the case of a 3D smart sensor, all the TCO costs outside of the initial list price are either zero or marginal compared to a component-based DIY approach).

TOTAL COST OF OWNERSHIP

LIST PRICE	$$$$	$$
ADDITIONAL COMPONENTS	–	$$
SOFTWARE DEVELOPMENT	–	$$$$
INSTALLATION	$	$$$
CALIBRATION EFFORT	–	$$$$
MAINTENANCE	–	$$
TOTAL COST	$$$$$	$$$$$$ $$$$$$ $$$$$

On top of the hidden TCO costs that are rarely factored into a final decision based on list price, there are several other key issues you need to take into consideration. (1) Is the decision to take the DIY approach made with the intent of becoming a sensor supplier? Or, (2) Is the business focused on a vertical market for which a sensor is one of many components in a larger solution?

The reason these questions matter is because in many cases, businesses will stretch beyond their core competencies—attracted by improving margins in a DIY effort for a sensor—and as a result miss their core focus on producing a competitive machine vision solution that offers unique value benefits to the customer.

Another point to address is this: (3) Has your business considered the effects of ramping up production for this new DIY product, offering service and repair, redesigning when components become obsolete, putting in quality control systems, managing new suppliers and the supply chain, or designing and building custom assembly and test jigs?

By factoring in TCO and the potential distractions that can occur when engineers drive the company model toward becoming a vendor for a component in a machine instead of building a better machine for their niche markets, it is clear that purchasing proven products that lower TCO is generally the better approach.

Logically this leads to a discussion of how smart 3D sensors deliver everything you need to install an inspection solution within a larger machine, so the customer can focus on what they do best.

The overall cost of integrating a 3D smart sensor and getting to market with a company's unique solution is far lower when you factor in time-to-market, lost opportunity costs while developing DIY solutions, and the longer term commitment required to keep DIY solutions functional and competitive.

Not only do 3D smart sensors minimize cost of ownership, they also maximize the quality of the product and assemblies being inspected. When an organization invests in 3D smart sensor technology, they are not only acquiring the ability to scan—they are also getting embedded features like built-in measurements tools and control decision protocols that are able to leverage data and deliver feature rich decision making.

Finally, in the DIY approach the software engineering and time required to add an additional layer of "smart" processing is calculated in man years. This is where the true cost savings are delivered from choosing proven smart sensor technology.

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