FAQ's regarding Use of Machine Vision Consulting & Engineering Services

This is a companion publication to our "FSI Machine Vision Consulting, Engineering & Lab Services" brochure, and covers a few of its topics in greater depth.

Why use consulting services on Machine Vision Applications that don't appear to need it? Isn't that unnecessary or overkill?

Machine vision is fundamentally different from other industrial automation and instrumentation fields. Despite advances of machine vision technology, machine vision initiatives and projects that proceed too slowly, too expensively or unsuccessfully, remain the norm. The main problem for this failure rate is mistakenly using approaches based on experience in other automation fields. Here are 5 misconceptions about machine vision which even automation experts fall prey to:

Misconception #1 The "vision system" e.g. smart camera or other vision unit will "do" the application if installed properly.

"Vision systems don't do vision, people do vision," and "the vision unit is merely a tool" are not merely the preachy platitudes that they sound like; they are structural statements about how vision is fundamentally different than other industrial automation and instrumentation fields.

Misconception #2 The important information for defining the application is the general nature of what is being done, such as the type of product being inspected.

In this area, the "small" items are big, and the "big" items are small. The "small" points such as the range of scenarios that the solution must encompass, required accuracy of the measurement process, minimum size of defects that must be detected, etc., are the end points of important, complex decision-making, and will vary the difficulty and cost by orders of magnitude. The project will fail if these "small points" are not recognized and handled properly.

Misconception #3 Sufficient and sufficiently good help is available for free from equipment sales persons.

The usual observations like "you get what you pay for" and the abundance and value of free bad advice apply, but beyond that, even expert advice on the tools is just about the tools, not the overall picture. An unusually wide range of technological, scientific and managerial fields come into play with machine vision. Settling for whatever comes for free in the "cost of sales" of the tools is generally a false economy.

Misconception #4 Developing an application and mission specification is a small, or secondary task, and there's not much benefit from involving vision experts at that early phase.

Investing in developing the application and mission specifications usually provides an over 1000% return on investment, and often means the difference between success and failure. This is the end result of various considerations and people "coming together" in two respects. This first is a mission and application definition that accomplishes the goals while remaining cost effective. Large cost variations arise from small looking, but important changes. This requires that vision expertise be involved at each stage of the specification process to provide continuous immediate feedback on the cost ramifications of choices being considered. Secondly, this avoids common misunderstandings between stakeholders or managers *within the facility or company,* as well as all other parties such as implementer and vendors.

Misconception #5 Lighting, optics and the physical arrangement of these and the workpiece with respect to each other are secondary items; the main job of lighting is to "light it up", and doing lighting consists primarily of picking the lighting hardware.

Well, we guess that's three misconceptions, but they're related. These arise from mistakenly thinking that machine vision is similar to human vision. Lighting, optics and the physical arrangements are the most expert and difficult portion of machine vision.

What fields are needed for full strength machine vision project and solution expertise?

1. All of the areas (such as vision units and their programming) commonly considered to be the scope of machine vision.
2. Equipment engineering and manufacturing fields such as processing architecture, OS's, imaging and image transfer technology, interfaces, electronic engineering etc.
3. Additional scientific fields such as the physics of light, and it's interaction with sources, optics and surfaces, sciences of the full electromagnetic spectrum including X-Ray and infrared, physics of laser emissions, materials and others.
4. A range of additional technical fields such as optics, electronic design, opto-electronics.
5. Practical industrial plant floor savvy, especially with respect to tough industrial environments, and ownership/ maintenance considerations.
6. Managerial, and project management.

Tell me more to convince me that FSI Technologies Inc. is really strong in all of these areas

1. Our corporate culture and roots. FSI has been a trusted manufacturer of factory automation products and solutions since 1959. Senior management has always been scientific engineers with a focus on new technologies, and a business of making them work well for our customers. A common thread of approximately 2/3 of these products has been electro optics. Our roots include being pioneers in photoeyes, optical encoders, and, in the late 90's, were one the pioneers of taking "stratospheric pricing" and "seldom works" out of the vernacular of machine vision.
2. FSI's APS™ (Assured Path to Success™) method of providing machine vision solutions circumvents the limitations that other suppliers have in acquiring diverse expertise and bringing it to bear for every customer. Component-only (e.g. smart camera) suppliers are usually limited to superficial involvement in the applications. Suppliers of turnkey and complete integration solutions have fuller involvement in the application, but due to the large scope/ man-hours of work per project, have usually done far fewer projects, and even fewer by any given individual. FSI operates in the happy middle ground. Our APS™ scope has leveraged us into having solved the toughest aspects of 1000's of applications, thus allowing for concentrations of expertise that can easily be applied to each of our customers.

Our various publications, both FSI publications and articles written for highly respected magazines provide another free sampler. A variety of these are available for viewing and free downloads at www.fsinet.com. This also lists machine vision courses offered by FSI covering very basic through very advanced topics, as well as in-depth white papers covering many of the more challenging technical areas.

We are very familiar with purchasing and project specifications, including for factory automation and instrumentation projects. Is the "Application and Mission Specification" that you refer to really different from these?

Yes, it's very different. Completely different factors (such as those described under Misconception #'s 2 & 4) are of primary importance in machine vision, and the specification process must focus on those.

Conversely, attempts to specify some of the details more commonly included in purchasing / project specs can cause wasted money or degradation of the solution without providing additional value.

FSI Also Provides Machine Vision Systems and Solutions. Doesn't that mean that FSI is too biased to be doing consulting work for something it may later be a supplier on?

Aside from our 48 year reputation and ethics, the inherent differences of machine vision automatically assure that this will not be the case. All of the important results of this work (as described earlier in this publication) are in areas that are fundamentally and inherently generic in nature rather than attributes that may be unique to particular potential vendors.