Laser System Integration (System Integrator's View)

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General Challenges for Integrators

- Assessing suitability of process
- Stability of product line and interfaces
- Assessing and managing component risk
- Conflicts of stability and innovation
- Product life cycle
Real Time Integration

What is "real time?"

Predicability

Safety and redundancy.

Interactions of the motion system, control system, and laser

Importance of early real-time assessment and setting expectations.
Eye and Skin Safety Issues

Old System (Still in common use)
Class I inherently safe
Class II blink reflex safe
Class IIa short exposure safe
Class IIIb unsafe with optics
Class IV unsafe if unprotected

Revised System
Class 1 safe unless magnified
Class 1M blink reflex safe
Class 2M unsafe with optics
Class 3R safe if view restricted
Class 3B unsafe if not diffused
Class 4 unsafe if unprotected

Integrator needs to do site survey to advise on safety.

Warnings, stickers and training material may be supplied.
Choosing the Right Laser

Suitable power, shape, and duty cycle

Ease of diagnosis, repair, availability of spares.

Continuity of interface.

Architecture for functional growth

Use the laser vendor as a resource. They know a lot!
Process Considerations

Helping the customer "own the process"

advising on...
Part Fit
Part Alignment.
Controlling heat distortion
Cover Gas Placement

Develop a wide weld process window around specifications

Supporting dual R&D and production uses of the machine
Laser is just part of the solution

To use laser effectively, we need...

1. The right kind of problem to solve

2. The right kind of process control including...
   facilities
   environment
   laser
   motion system
   fixturing and handling

3. The right training and support.
Summary

1. Understand the process, and process flexibility
2. Understand the importance of part preparation
3. Understand the training and maintenance requirements

Work with the integrator until 1,2,3 are achieved.