



How to work with Systems Integrators

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Integrators - who are they?



- Your internal R&D resource
- An external equipment builder
- An external R&D service
 - independent
or
 - linked to an inkjet component supplier

TTP is . . .



- 300-strong independent external R&D service company

- Activities:
 - Product Development
 - Technology innovation, concept innovation, prototype development, product development, manufacturing sourcing, product redesign for low cost or performance enhancement
 - Technology Development
 - Creating new technology for our clients
 - Business strategy
 - Technology strategy, business case development, IP strategy

- 1/3 of our work in digital printing

My Goal



- Encourage the use of external R&D services for integration of inkjet equipment and products
- Explain the process of inkjet integration

Who's who



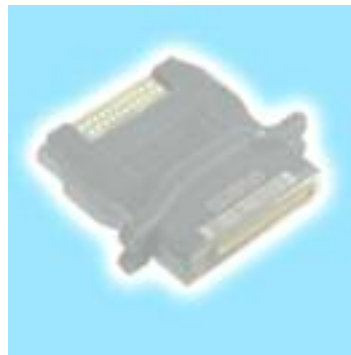
- Ink suppliers
- Printhead suppliers
- Media suppliers

- Printing equipment manufacturers (OEMs)
- End users of printing systems
- Non-graphics inkjet system developers

Why pay for integration?



- Shorten the inkjet learning curve
- High speed data is itself a new technology
- Inkjet components are too flexible



A few Inkjet issues

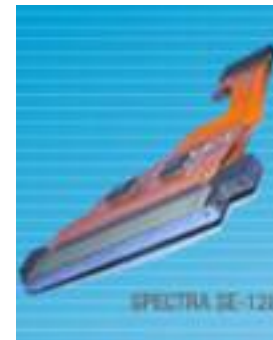


- image data format
- data control at high speed
- availability of printhead-specific driver cards
- printhead choice
- ink choice
- media pre-treatment
- media transport jitter
- substrate location sensing
- encoder jitter
- image correction for target shape
- printer configuration
- interlacing
- curing
- windage
- O₂ inhibition of UV
- exhaust gases
- vibration
- mounting
- servicing
- cleanliness
- PC robustness
- drop placement error
- drop spread
- firing temperature
- ink pre-treatment
- user interface
- fire pulse shaping
- temperature control
- meniscus control

Why pay for integration?



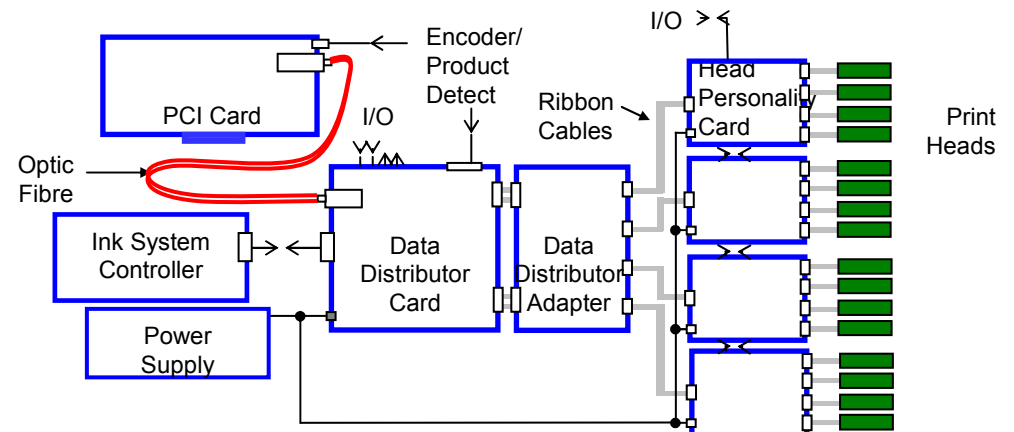
- Inkjet is a body of knowledge to be learned
- High speed data is itself a new technology
- Inkjet components are too flexible



Xaar Peripherals



- Designed for integration not just evaluation
- Supplied by the printhead supplier
- Off-the-shelf Windows application that drives and maintains 1-96 printheads
- High level software adaptable by user
- Contact TTP for variants



What the integrator can do

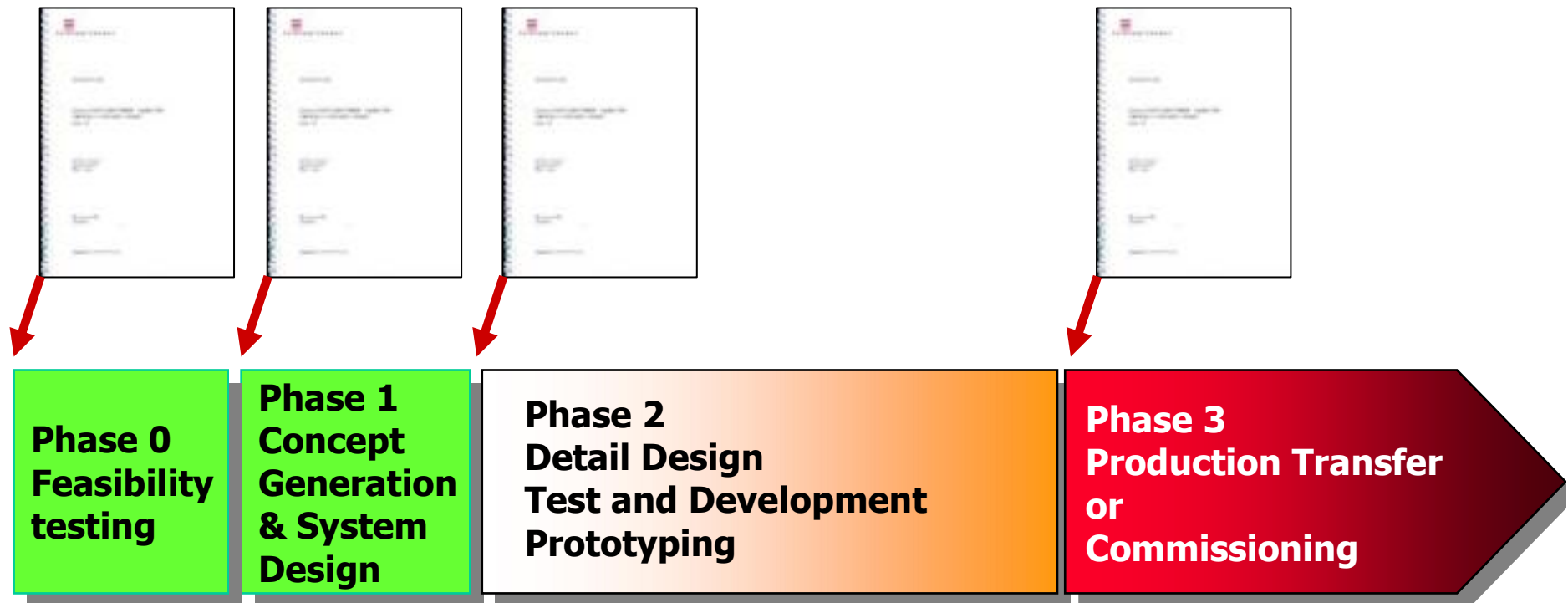


- Can advise on printhead, peripherals, and ink types and system performance
- Can evaluate budgets
- Can plan out a low-risk multi-phase project
 - costs, timescales, deliverables
- Can contract to run the agreed programme of work

What the integrator can do



- Supply a proposal to you, to scope the research, set out the programme of development work, the time scale, costs, and invoicing



What the integrator can't do



- Lend you the money
- Know what you want by telepathy
- Change the laws of physics
- Act as a patent attorney

What you must do



- Have a big enough budget
- Know how you will make money
- Know where you can compromise and where you can't
 - in print quality
 - in the level of integration
- Pick an integrator and other partners who are free to act in the best interest of the project

Advice on running your integrator



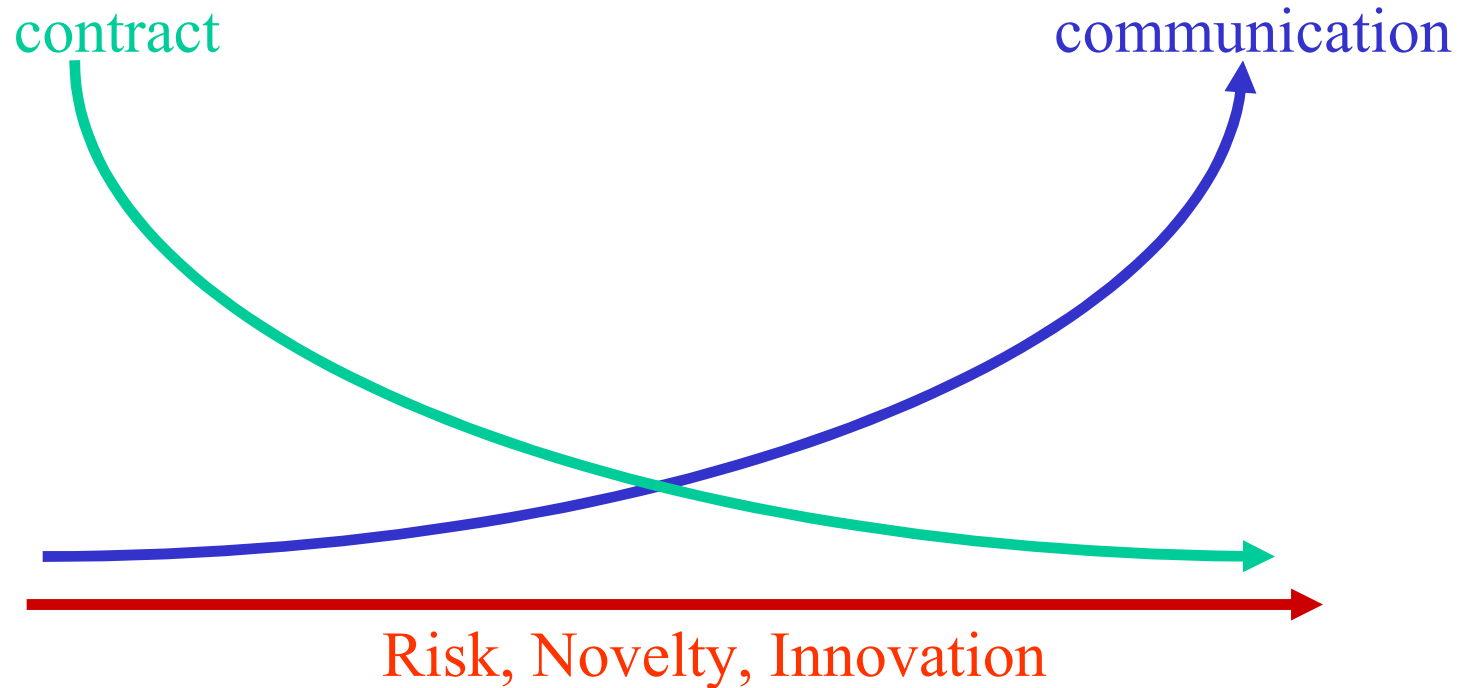
The next four slides contain input from a course by The Creativity Partnership - a TTP spin-off company.

- “Managing external contactors for innovation”
 - Contract,
 - Delegate,
 - Communicate

Contract



- low uncertainty : needs a good contract
- medium/high uncertainty: needs good communication



- Look for a scoping/feasibility study before final cost and time estimates are agreed

Contract



■ Things to consider:

- Your objectives
- Risk Management Strategies
- How to choose the right integrator: some tips:
 - Look for evidence of what they are really good at.
 - Make sure that attractive low price wasn't just because they didn't understand the complexity of what you want.
 - Ask to meet the project leader.
 - Ask for a reference
- Project phasing
- Assessing prices
- IP
- Relationship management
- Cost control
- Deciding when to stop

Delegate



- Don't keep a dog and bark yourself
- Know what your integrator shouldn't do

Communicate



- Share the background (under CDA) not just the specification.
- Review and THINK about the design at regular milestones.
- If you're unhappy: tell them.
- If you're happy: tell them (its cheaper than paying for favours!)

Justifying the investment



■ Digital Printing

- Short runs as a % of output in 2006?
- Flexibility for marketing response
- Savings in working capital due to decorating later in the manufacturing process

■ Functional materials deposition by inkjet

- Enabling technology
- Additive technique instead of subtractive technique
- Lower cost equipment

Alternative Options



- Keep inkjet as a future option
 - no pain, no gain
- Assign internal R&D staff away from other work
 - they'll like the challenge and it'll keep them busy for years
- Wait until one of your suppliers offers you the inkjet system that you want
 - it could be a long wait
 - it's all new to them too
 - you have little control of the specification
 - you get no exclusivity but your competitors might

Postage Franking Inkjet Printer



- Our client's first successful inkjet project
- TTP developed
 - the concept
 - the outline design and project plans
 - the detailed design [excluding vault]
 - the prototypes
 - the manufacturing supply (in Asia)



OEM printer support



- Integration support is available for any type of OEM printers



Soho and office inkjet



CIJ Proofing



CIJ Marking



Direct Thermal



Barcode



Thermal Transfer



Laser marking



Grand format Piezo inkjet

Non-graphics printing



- **Materials Deposition Platform**
more detail at the IMI 3rd Annual Printable Electronics and Displays Conference in Las Vegas Nov 11 2004



Inkjet Evaluation Rig



- Test rig with removable printhead-specific modules
- Support for interleaved Xaar Leopard heads implemented
- Support for interleaved Spectra heads at variable rake angles implemented
- Easily expandable to other printhead types
- Variable power UV cure and IR modules
- 2 colour
- Supports wet on wet and wet on dry printing



Recommendation



- Inkjet systems are complex and while the core components are increasingly better supported the system still requires integration - use an experienced integrator
- Although inkjet technology is always changing, it is not new, and there's no shortage of advice available
- Buying external integration services can help to build internal capabilities
- Ask for a proposal, see what we can do