Teddington IRISmodular technology

The next generation of electronics design

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Defence Considerations

- Any technology deployed in the defence typically must adhere to a common set of principles.
    - **Advanced:** A technical superiority is desired in any theatre to give an operational advantage against adversaries
    - **Robust:** All equipment must be designed to survive the harshest of environments
    - **Operationally maintainable:** Critical systems must have a clear and simple path for repair or replacement in high pressure situations with minimal loss of operational capability
    - **Longevity:** Most equipment service life is measured in decades. Out of service dates are being continually pushed back.
- This combination of principles is not largely compatible. By trying to achieve all of the above, something usually suffers:
    - Obsolescence of components is common and procurement of replacement parts is an expensive and lengthy process – if indeed possible at all
    - Equipment remains in service beyond its design lifetime and the operational impact is not known
    - The technology stagnates and the cost or effort to improve the base levels is prohibitively high. As time goes by, your operational advantage reduces

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Defence Considerations

- Typically, these issues are overcome through major upgrades throughout the life of the equipment
- However, over the lifespan of a warship, for example, the complete replacement of systems to satisfy parts or technical obsolescence issues is not economic and can lead to other unwanted side effects:
    - Changes to physical characteristics (weight, size etc) that can have unwanted effects for vessels
    - Changes to designs can lead to further training requirements for staff, in their use, in their maintenance and in the safety characteristics
    - As more panels enter service, more complex supply chain requirements are required and larger stock holdings of spares to support a more diverse range of products
    - Expense. The service life of vessels is being increased and the obsolescence problem may be encountered for the same part more than once in its service life

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Our Solution

- Becoming a technical partner with Teddington gives you access to our inhouse modular development platform called **IRISmodular**.

- Designed for the most demanding of customers IRISmodular is a design mechanism that fully understands the rules.

  - It does not ignore or fight against them
  - It does not pretend that the problems have been “designed away”
  - IRISmodular recognises and embraces the difficulties
  - IRISmodular builds in the routes to solve the **future unforeseen** obsolescence and technical demands from day 1

IRISmodular – it might not know all of the answers to tomorrow’s questions, but it knows how to find them out!

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Typical Applications

The IRISmodular development platform is typically employed for the following reasons:

- **New products and systems**
  - Customers are embracing the design methodology and utilising the IRISmodular architecture to get products to market far faster than previously possible
- **Obsolescence control**
  - Proactive use of the modular system to replace existing systems where a procurement process has identified risks or issues
- **Reverse engineering**
  - Replacement system where technical support is no longer available
- **Technical upgrade**
  - Where a system is technically out of date. The very nature of the IRISmodular solution not only allows existing functionality to be performed, but opens the doors to a whole host of new technologies, enhanced features, integration with other systems or simply the addition of something brand new

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The IRISmodular Approach

- IRISmodular is a totally flexible and modular processing capability based around cortex microprocessor architecture
- The processing and power requirements are separated into discrete modules that are utilised across the IRISmodular development suite
- The only unique, bespoke and customised component is satisfying the IO requirements. This becomes a separate module dedicated for that application
- The solution is designed to minimise the amount of bespoke development required

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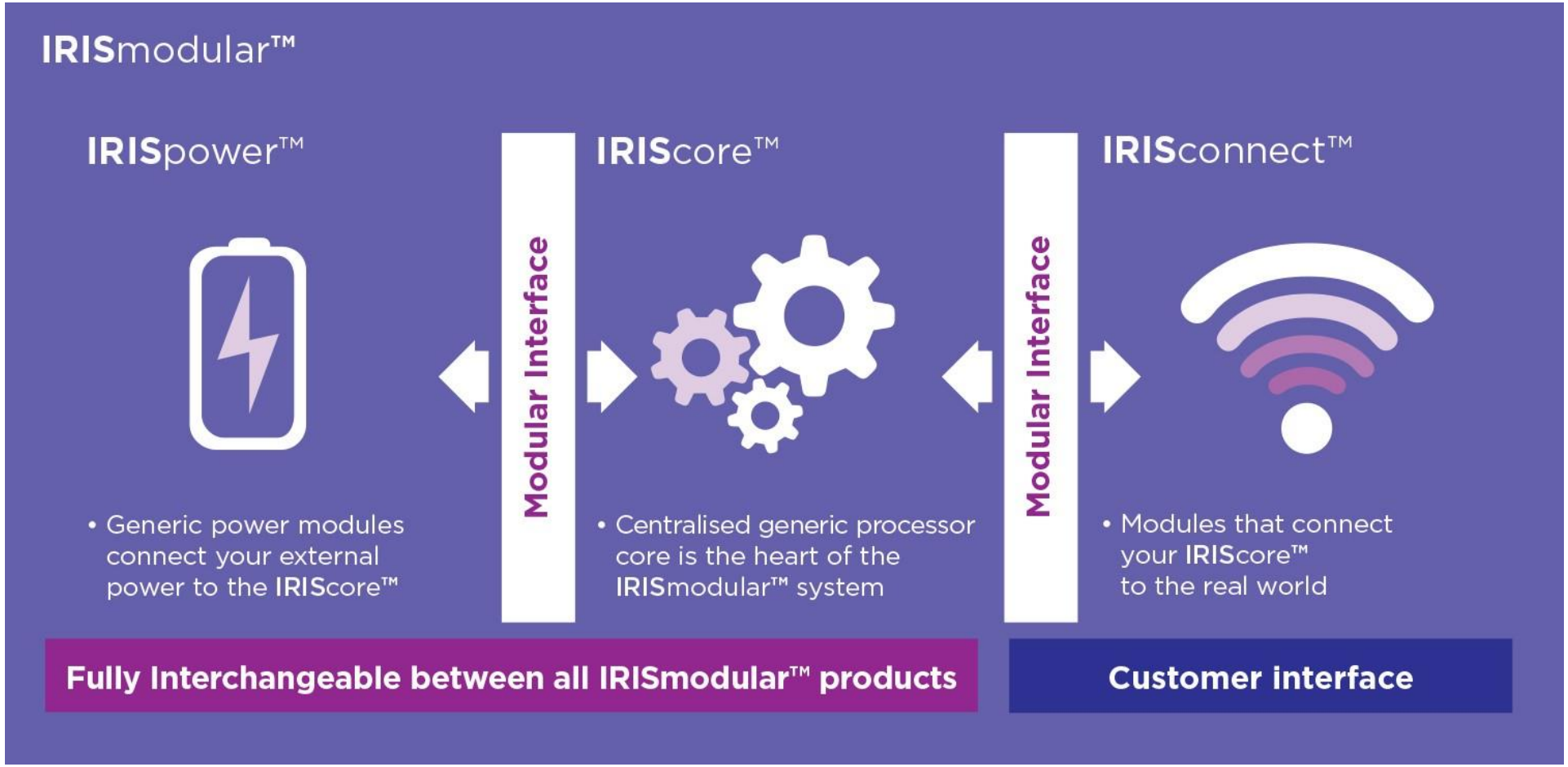
How it works



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The Benefits

Faster to market

- Each IRISmodular module is broken down into discrete development modules that can be very easily integrated in a fully bespoke way to create a solution that is unique to your needs
- Many of the modules that you may need might already be available and ready for integration (E.g. diesel control, GSM, MBUS, power control).
- Development efforts are then concentrated on any bespoke hardware and software requirements on top of the standard IRISmodular platform.

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The Benefits

Technical advancement

- IRISmodular designed systems are easily upgraded to include new features, either through new software or through the development of a new IRISconnect module

Low risk

- Many of the IRISmodular features have already been deployed in a number of different environments
- Teddington has already been through the learning curve on many of these features. It is our aim to make sure that our customers gain an advantage through our experience

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The Benefits

Reduced development costs

- It is likely that 75% of the development has already been completed before you step through our doors. Development costs simply then become the remaining 25%

Reduced system costs

- IRISmodular control systems could reduce ongoing spares and lifetime costs by over 50% compared to conventional solutions

Obsolescence recovery

- The deliberate architecture of the solution means that components might become obsolete, but any impact of an obsolete “critical” component is low

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The Benefits

Improved operational availability

- A damaged or broken module in the IRISmodular system is a simple hot swap component for a spare
- Modules are often swappable between systems. For example, to resurrect a critical system if the IRIScore module is damaged on a diesel control panel, an IRIScore module from an alternative panel (e.g. Chilled water plant) can simply be swapped in its place with no additional programming required
- Teddington has already been through the learning curve on many of these features. It is our aim to make sure that our customers gain an advantage through our experience

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Painting a picture (1)

- Consider an obsolete engine control panel for a warship
  - Many warships are 20 years+ old. Parts for these panels are difficult or impossible to get hold of.
  - Designed for all panel types, makes and uses, re-engineering the control panel to make use of the IRISmodular system:
    - Can be deployed in new panels or as retrofit internals
    - Can increase system resilience through interchangeable core and power modules
    - Is constructed of readily available parts
    - Will minimise stock holding requirements for spares
    - Is a cost effective design and implementation solution compared with conventional systems
    - Provides ongoing flexible upgrade paths for existing IRISmodular systems through simple change of the IRISconnect module

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Painting a picture (2)

- Consider an upgrade to a control system
  - Many legacy systems, while functionally still fit for purpose, might not have all of the features that would improve the operational capabilities of the ship
  - A re-engineered internal “retrofit” component system might allow:
    - All obsolescence and procurement issues to be resolved
    - Retention of the integrity of the existing control panel to minimise the need for retraining
    - The addition of remote panel interfaces, so that other stations can see the status and if necessary control the equipment from remote locations
    - Integration with command and control systems, communications bus or MCAS system
    - Perform duties with other “new” equipment outside the original specifications

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Typical Project Types

- IRISmodular has a very powerful capability. Due to its versatility, it is highly recommended that a proper requirements capture exercise take place before any project is structured

- Typically however, there are 3 approaches that are taken when engaging into an IRISmodular project

  - **Bronze – technical refresh**
  - **Silver – enhanced feature sets**
  - **Gold – new product development**

- For discussion purposes, example solutions for these options can be constructed and are discussed very briefly on the following slides

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Bronze – Technical Refresh

- Replacement of an existing panels internals with the IRISmodular suite would provide a route to solve the immediate obsolescence issues whilst the panel functionality, look, feel and usage could be maintained in its entirety

- The benefit of having the interchangeable IRISpower and IRIScore components, simplifying spare parts needs and added flexibility for in-service failures

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Silver – Enhanced Feature Sets

- A full technology, feature set and panel upgrade
- An IRISmodular solution that keeps all of the benefits of the Silver option, but based on new panels designs. These can be smaller and lighter and would allow relocation of the panels if desired.
- Usage and usability of the panel is usually preserved in this approach
- Additional IO support could be added to allow the remote control and surveillance of systems from other areas. Interfaces into other control systems could be incorporated for a more flexible and joined up control package.

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Gold – New Product Development

- Full system review:
  - A full technology, form, fit, function and feature set review
  - New control system specifications developed
  - Integration with other systems reviewed and specified
  - New features defined and specified
- An full IRISmodular solution that makes use of all IRISmodular benefits including the options for ongoing technical improvements throughout the life of the equipment
- Other built in additional capabilities (examples):
  - Redundant cards to allow for failure recovery
  - Automated training programs
  - Enhanced fault diagnostics

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We would be more than happy to discuss any aspect of this presentation

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