

CONGRESO INTERNACIONAL DE **V** DISEÑO E INGENIERÍA NAVAL

Marzo 15 - 17 de 2017



Flexible Design as an Acquisition Opportunity



BMT Defence Services

Ian H. Wakeling MSc CEng MRINA APMP RCNC

Customer requirements – the design challenge

- **Performance.** Every Navy has their own bespoke requirements, derived specifically from policy which their warships need to achieve; tailored capabilities, environmental and threat requirements etc.
- **Cost.** Uncertainty over budgets and cost / requirement decisions.
- **Time.** The required in-service date may limit the time available for design and build of a warship.

Responses to the design challenge

1. Bespoke designs to specific requirements

- High cost;
- Long design time;
- Limited numbers;
- Configured exactly to the requirements.



2. Variant of an existing design

- Capability not optimised to new requirements;
- Additional costs in converting an existing design to new legislation or standards;
- Additional build complexity – existing design optimised to be built in another shipyard;
- Reduced design time required.



3. Flexible baseline design

- Adaptable to closely meet new requirements;
- Design cost and development is reduced;
- The design can be tailored for the budget available.



Flexibility in warship design means...

- Ability to change equipment and capability during design, build, and through-life with minimum disruption to the schedule, and without incurring significant extra risk and cost;
- Ability to adopt a range of build strategies;
- Ability to adopt a range of Combat System acquisition strategies;
- Ability to comply with different standards, rules and legislation;
- Ability to provide varying levels of survivability tailored for the roles, threats and budget;
- Ability to re-use a significant proportion of the design in different projects for different customers.
- **It is not** just space, weight and power margins for 'fit to receive' equipment;
- **It is not** just space to accommodate modular weapons or mission equipment.



Why have a flexible warship design



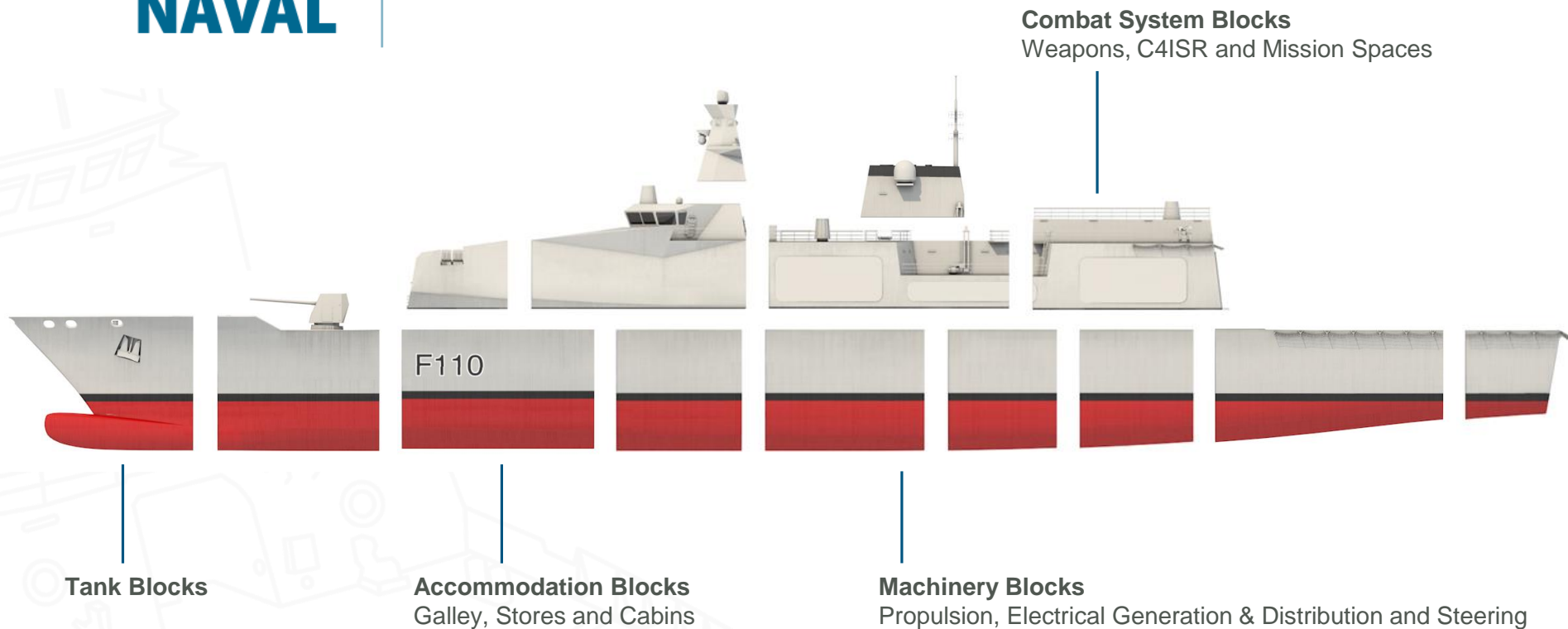
- A flexible design provides the ability to adapt closely to the requirements of different Navies, without posing a risk, cost or schedule penalty to each Navy;
- Minimises the risk associated with building the design in different/multiple countries and shipyards, outside of the country for which the design was originally created;
- Provides the opportunity to include different capabilities within a single class, maximising commonality across the fleet and able to adapt to meet the evolving roles and threat environment over time.

How to achieve a flexible design



- Functional configuration of design, through the use of capability-focused zones:
 - Reduces the design modifications required for capability and equipment changes;
 - Simplifies build by limiting service connections and interfaces across block boundaries;
 - Allows for the fit of the Combat System to take place later in the build schedule of the ship, reducing the integration risk.

The flexible design – functional configuration



The flexible design – capability flexibility



Capability Area	Example Options within a flexible baseline design
Length Overall	<ol style="list-style-type: none"> 1. Minimum size for genuine worldwide open ocean operations to control overall cost. 2. Stretchable to incorporate additional or bespoke capability.
Beam	<ol style="list-style-type: none"> 1. Minimum size for genuine worldwide open ocean operations to control overall cost.
Propulsion	<ol style="list-style-type: none"> 1. Simple propulsion system for low cost. 2. Options for choice of propulsion equipment allowing competition and customer choice
Medium Calibre Gun System	<ol style="list-style-type: none"> 1. 57mm 2. 76mm 3. 127mm 4. Plus automated magazine for the above solutions.
Stern Arrangement	<ol style="list-style-type: none"> 1. Low cost open quarterdeck. 2. Variable Depth Sonar. 3. Stern Ramp with Interceptor RHIB.
Vertical Launch Silo (VLS)	<ol style="list-style-type: none"> 1. 24 missile VLS. 2. 48 missile VLS. 3. 24 missile VLS with 8-cell strike length VLS.

How to acquire the flexible design

Different Customers = Different Acquisition Strategies

Prime Contractor/Shipbuilder Competition

- Flexible Design provides good baseline for bids – compared to new design that brings higher risk;
- Flexible Design simplifies adaption of design for new customers – compared to adapting an existing normal design;
- Flexible Design offers savings across multiple customers;
- Flexible Design allows construction in multiple locations in country and overseas.

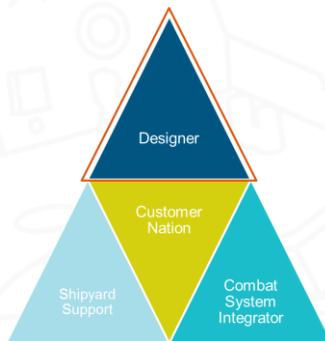
How to acquire the flexible design

Different Customers = Different Acquisition Strategies

Separate Design and Construction Contractors (Technology Partner and Shipbuilder)

Enables Construction Competition/Contract against robust design baseline

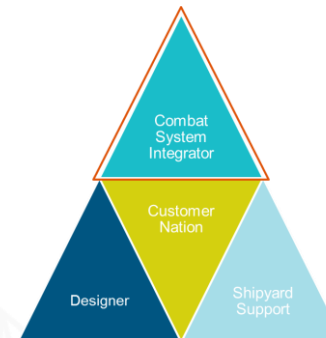
- Flexible Design allows shipbuilder to select/compete equipment – compared to being tied to equipment in existing design;
- Flexible Design supports modular build strategies;
- Flexible Design allows optimisation to meet customer requirements – joint working with customer (learning and technology transfer opportunities);
- Flexible Design allows separate selection of Combat System – Ship and Combat System Designer joint working with customer (learning and technology transfer opportunities);
- Flexible Design not tied to an individual shipbuilder allowing best practice build to be implemented – Leading Shipbuilding Consultancies can advise without building it themselves.



Design Phase



Production Phase



Integration Phase

How to acquire the flexible design

Different Customers = Different Acquisition Strategies

Spiral Development

Adding Capability at later date or on later ships: de-conflicting platform and combat system development, allowing flexibility in the funding profile.

- Flexible Design minimises effort for fitting systems later;
- Flexible Design minimises design and installation costs for different variants;
- Maximises commonality across the fleet.



Benefits of the flexible design

Easily Optimised to meet Customer Requirements

- Combat System Selection;
- Ship Equipment Selection;
- Survivability;
- Environment.

Reduced Costs for Variants and Upgrades

- Facilitates Spiral Development.

Supports any Acquisition Strategy

- In particular separating Design and Construction Contracts and Spiral Development;
- Technology Partner (Platform Designer, Combat System Integrator, Shipbuilding Adviser) working with Customer and Shipbuilder(s).



Flexible Design as an Acquisition Opportunity

Questions



CONGRESO INTERNACIONAL DE
V DISEÑO E
INGENIERÍA
NAVAL

Marzo 15 - 17 de 2017