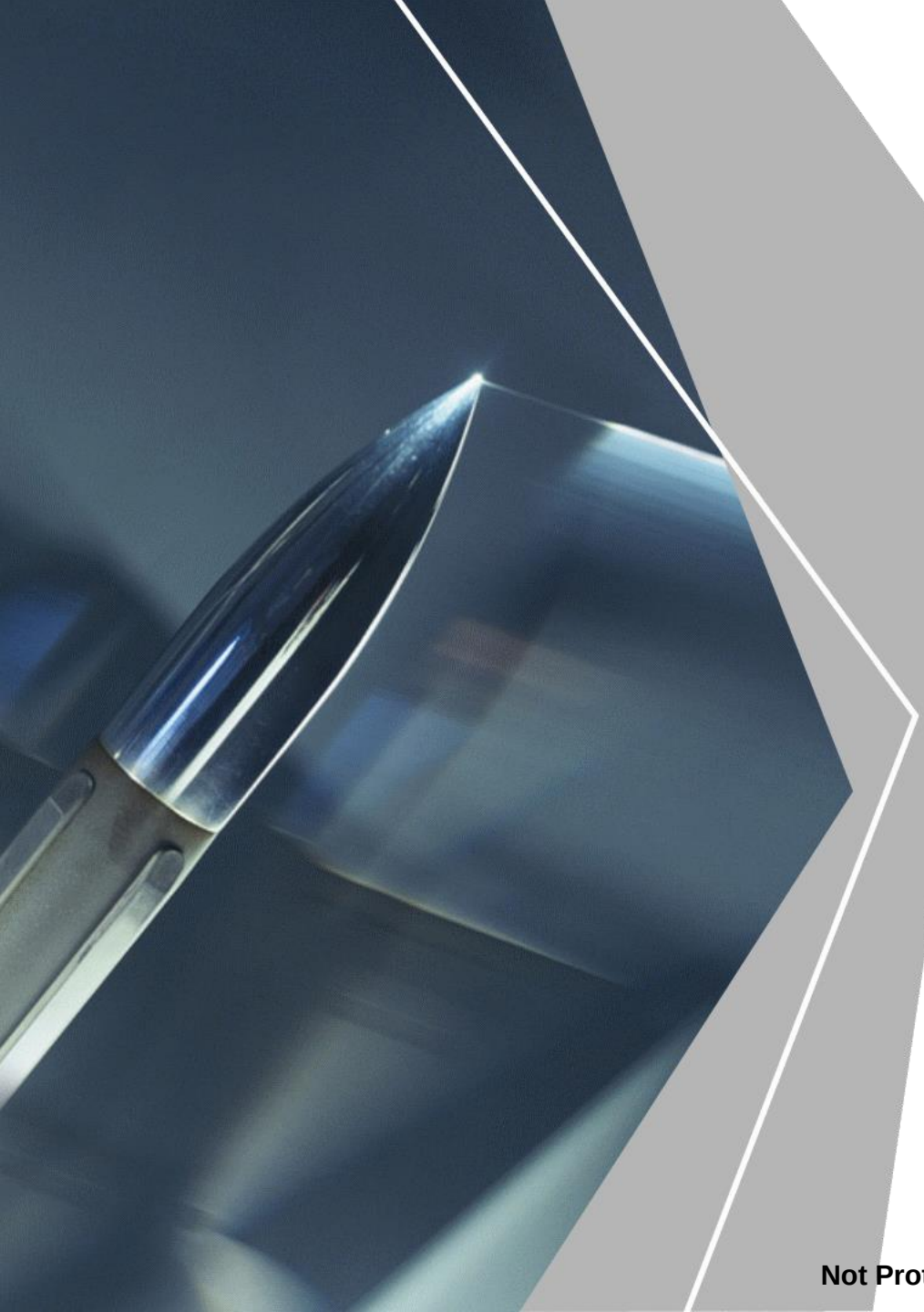

Sea Viper Maritime Missile Defence

Dr. David McDowell
MBDA UK

RUSI Missile Defence Conference
London
12-13 April 2016

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Overview

- **This presentation represents solely an MBDA view of the potential future evolution of the Type 45 Destroyer to include an initial Anti Ship Ballistic Missile Defence capability. It does not reflect the views of the Royal Navy or UK MoD.**
- **The Type 45 Destroyer entered service in 2010; together with Sea Viper (SV), it provides a significant Anti Air Warfare (AAW) capability for the Royal Navy.**
- **Whilst there is no currently funded UK BMD equipment programme, the Strategic Defence and Security Review 2015 made the following statements:**
  - *'We will continue to commit significant funds to the NATO Ballistic Missile Defence (BMD) network, as well as supporting research and development initiatives and multinational engagement through the UK's Missile Defence Centre.*
  - *We will also investigate further the potential of the Type 45 Destroyers to operate in a BMD role.'*

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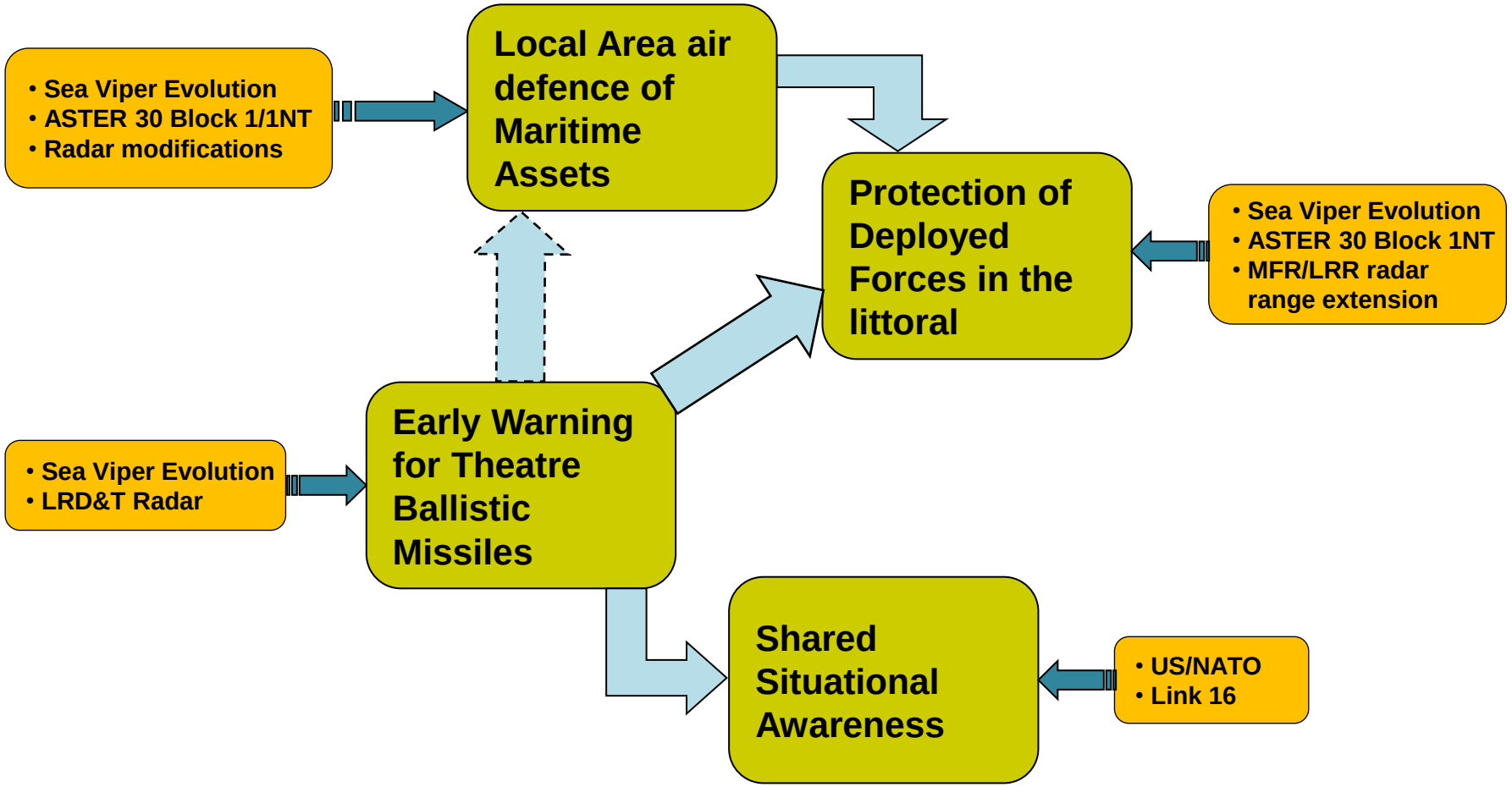
- **On the threat side, seeing emergence of anti-ship ballistic missiles;**

- **Potential utilisation of the UK latest generation of Warship: the Type 45 Destroyer;**

- **Two key force protection roles that the UK may address, based with Type 45:**
  - Local area air defence of maritime assets;
  - Protection of Deployed Forces in the littoral.

UK Options for Maritime Tactical BMD Capability



- **UK, France and Italian MoD funded growth potential studies in the frame of the tri-national PAAMS contract:**
  - To scope System and modifications to PAAMS(S) (Sea Viper) and PAAMS(E) and provide budgetary costings for a capability upgrade against Ballistic Missiles, Cruise Missiles and to provide a Defence of Land Capability – based on ASTER.

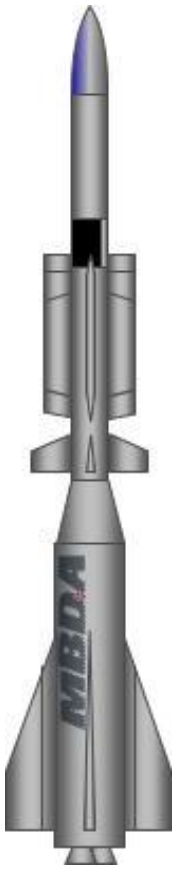
- **SAMP/T now in service with French Air Force and Italian Army, with an AAW and BMD capability using ASTER Block 1 munition;**

- **Contract for the development / industrialisation of ASTER 30 Block 1 NT and upgrade of the SAMP/T Air Defence system was signed Dec 15.**
  - The contract formalises the French contribution to the programme, in a process to maintain long-lasting cooperation with Italy for the development of the ASTER family. An amendment to formalise the Italian contribution is being finalised with OCCAR.

ASTER 30 B1

- Two-stage design;
- Vertical launch;
- Active RF seeker;
- Direct thrust vector control;
- Dual capability: anti conventional / ballistic missile.

- Block 1 proven through successful ballistic missile engagements as part of FR/IT SAMP/T system.



ASTER 30 Bk 1 (AAW & BMD)

Autopilot and seeker S/W updates

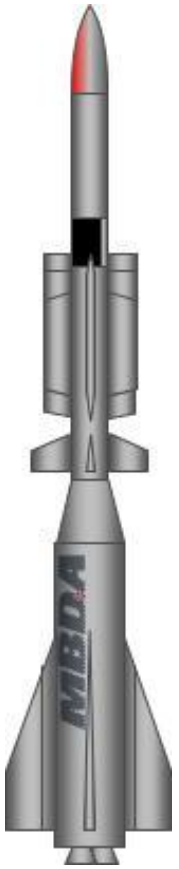
New Dual AAW/BMD Warhead

Demonstrated Hit-To-Kill Capability

ASTER 30 Block 1NT

- Lower layer capability providing enhanced capability and force protection against tactical Ballistic Missiles;
- Improved seeker to increase system capability;
- Maintains dual AAW & BM capability;
- Compatible with existing Sylver A50 launcher.

- Block 1NT development programme commenced 2016; entry into service (Fr) anticipated 2022 onwards.



ASTER 30 Bk 1 NT
(AAW & BMD)
Autopilot and seeker S/W updates
Dual AAW/BMD Warhead
New Seeker
New Autopilot Electronics

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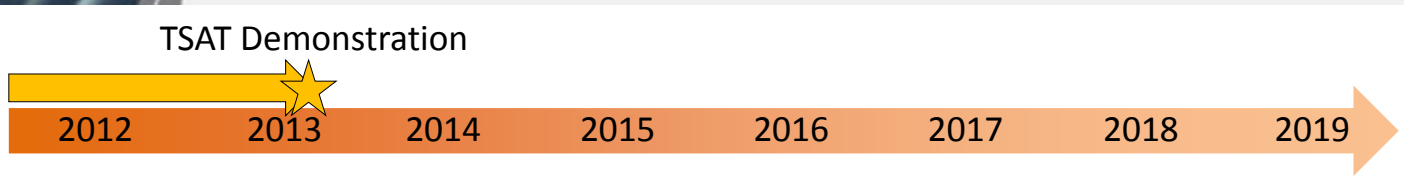

- **T45 Science and Technology (TSAT) Demonstration 2013:**
  - UK participated in US BMDS Exercise: Flight Test Operational-01;
  - Modified Sea Viper System for the purposes of the test and demonstration;
  - Modified Sea Viper System out-performed expectations:
    - MFR acquired and tracked two BM targets through to intercept;
    - C2 successfully captured BM track data and calculated real time estimates of launch and impact point prediction.
  - Successful data capture:
    - Informs MFR and SV C2 research;
    - Basis for the joint Industry proposal for TECC 2015.
  - Used Sea Viper experience & facilities:
    - System Design, Integration and Test, Trial Conduct;
    - Use of PIF and MTF facilities helped to minimise integration time.

Not Protectively Marked

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UK Science and Technology programmes – TECC

- UK participated in multi-nation event, At Sea Demonstration 2015, in Sep / Oct 15;
- Missile Defence Centre (MDC) UK S&T programme – T45 Experimental Concurrency and Cueing (TECC);
- Key TECC objectives:
  - KUR1: Understand and demonstrate concurrent BMD/AAW operation;
  - KUR2: Understand and demonstrate BMD specific interoperability.
- MBDA / BAES delivered a fully integrated Sea Viper and CMS solution – experimental s/w & f/w builds implemented on an operational Type 45 platform;
- Culminated in two successful demonstration events – all objectives achieved, including concurrent tracking and TEWA against AAW / BMD targets, informing:
  - Early Warning for Theatre Ballistic Missiles;
  - Local Area air defence of Maritime Assets.

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Initial Anti-Ship Ballistic Missile defence Capability (IAC) PDRR

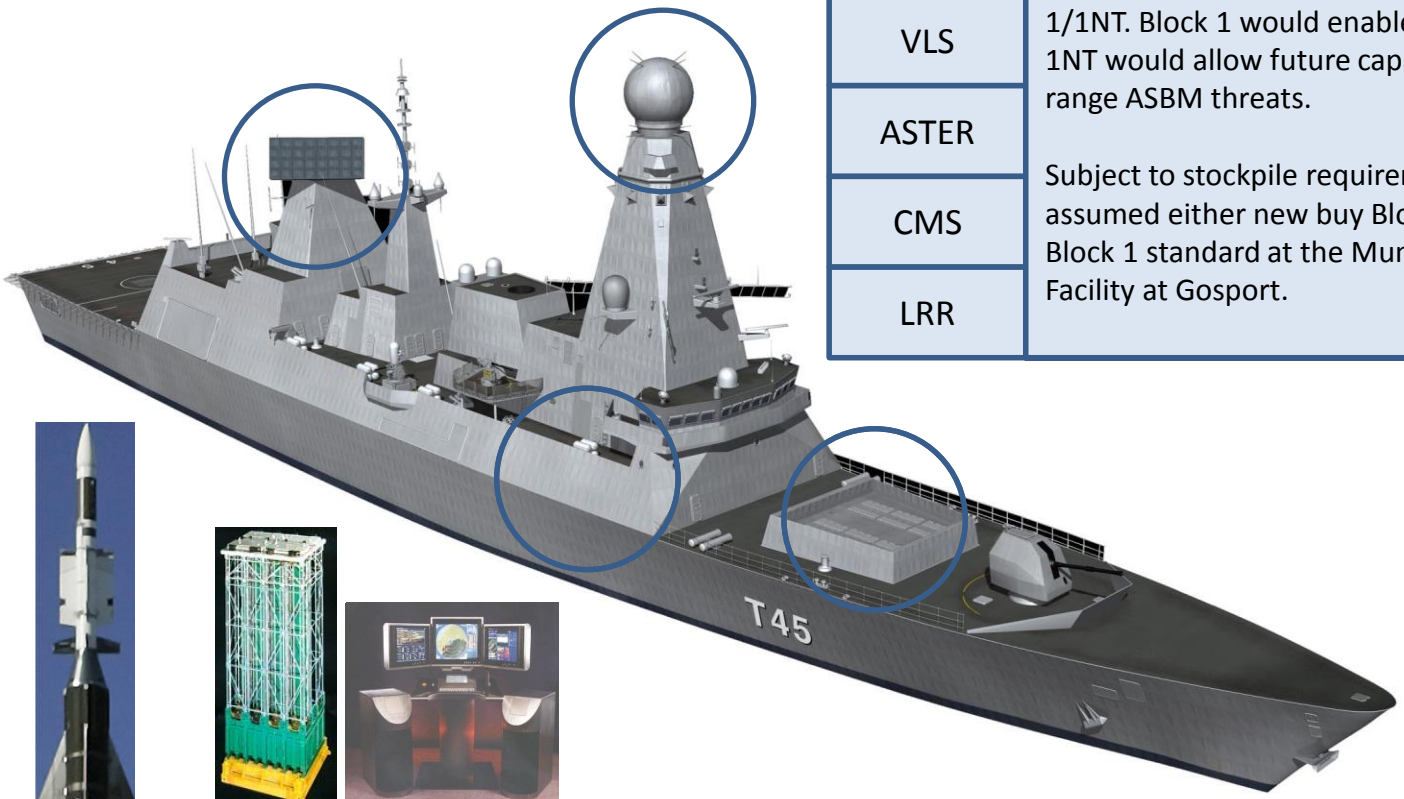
- MBDA completed an 18-month Project Definition and Risk Reduction (PDRR) Study in 2015 to explore the potential for developing an Anti-Ship Ballistic Missile Defence Capability for the Type 45;

- The PDRR study, commissioned by MAWS PT, involved all System and Sub-System Design Authorities (MBDA UK/Fr/It, BAE Systems Maritime Services (MFR DA), BAE Systems Naval Ships (CMS and CS)) as well as other stakeholders (MDC, Royal Navy, Technical Advisors);

- The study prepared for a potential future development activity by assessing the robustness of a proposed system design, identifying risks, and investigating the level of system performance that could be offered;

- The PDRR study delivered the following:
  - A baseline system architecture (captured on next slide) taking into account the view of Stakeholders and capturing User (RN) views at the earliest stages of design;
  - An indication of potential system performance:
    - Good capability against defined short range ASBM threats; equivalent to current AAW performance levels.
    - Existing AAW capability unaffected, but also maintained whilst conducting ASBM defence mission.
  - Defined System/Sub-system and interface requirements;
  - Identified essential pre-requisite activities for future study

Initial Anti-Ship Ballistic Missile defence Capability (IAC) PDRR summary



System	The IAC system solution assessed a navalised variant of the ASTER 30 Block 1 munition, comprising: - Updated seeker software - ASBM specific guidance software merged with existing AAW software The proposed IAC solution is agnostic to ASTER type Block 1/1NT. Block 1 would enable an earlier In-Service Date. Block 1NT would allow future capability growth against medium range ASBM threats. Subject to stockpile requirements, the IAC PDRR study assumed either new buy Block 1 or ASTER 30 retrofitted to Block 1 standard at the Munition Maintenance Installation Facility at Gosport.
MFR	
C2	
VLS	
ASTER	
CMS	
LRR	

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Summary

- **A positive SDSR outcome**
- **Successful Science and Technology test events on Type 45 which build knowledge and inform future work**
- **A potential future UK Maritime ASBM defence capability against short range ASBM threats proposed through the IAC PDRR study**
  - Achieved through software / firmware changes only to the Sea Viper System;
  - Together with ASTER 30 Block 1 munition – now in service with SAMP/T programme.
- **Type 45 based Tactical BMD mission supports phased introduction to achieve:**
  - Local Area Air Defence of Maritime Assets;
  - Protection of deployed forces.
- **ASTER Block 1NT development underway**
  - Supports future capability growth against medium range ASBM threats

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