BAE SYSTEMS
INSPIRED WORK

Future Aircraft Technology Needs

Brian Oldfield

Technologist Advanced Structures
BAE Systems – Military Air & Information

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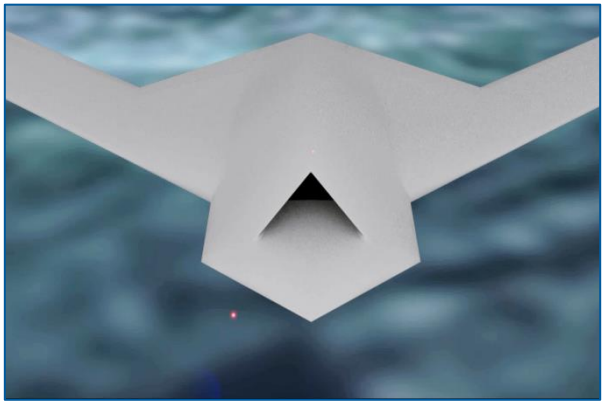
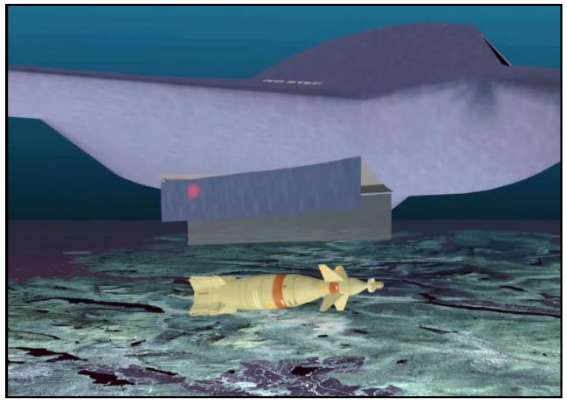
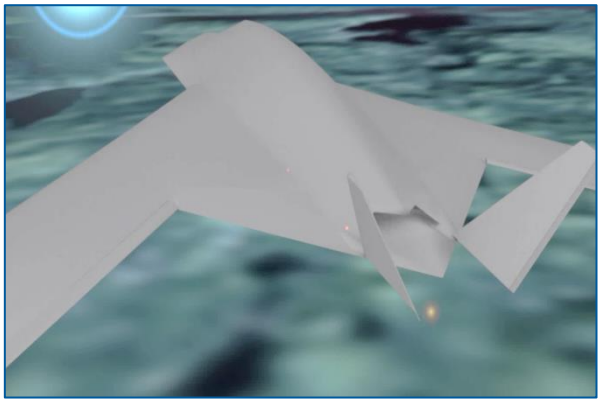
Introduction

- BAE Systems
- Technology Trends
- Approach
- Future technology - examples









BAE Systems Military Aircraft and Information (MAI)

- Design, development, manufacture and in-service support of fixed-wing military and training aircraft
- Provides training, support and information services for the UK RAF and other customer air-forces worldwide



Problem is….. How do we access the right technology for the future?

What technology do we need ?

- Need to be selective on where we invest.
- Can't just take a new technology and fly it.
- New technologies need to be qualified before they can be flown, which is both expensive and time consuming.

How do we keep our products competitive throughout their lifetime?

- Our aircraft typically are in service for up to 50 years after they were first designed.

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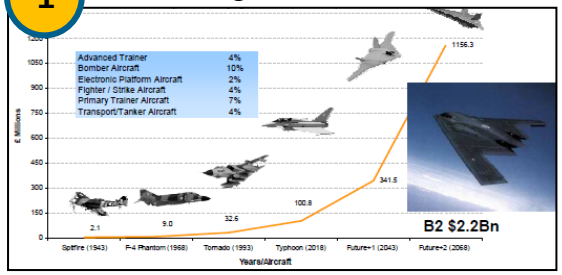
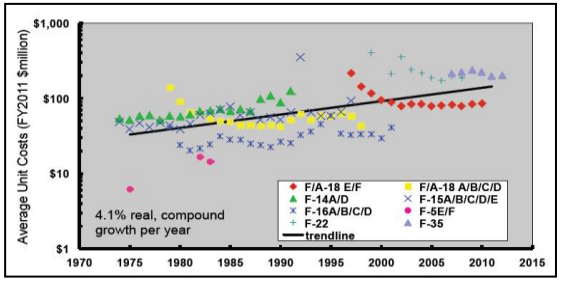
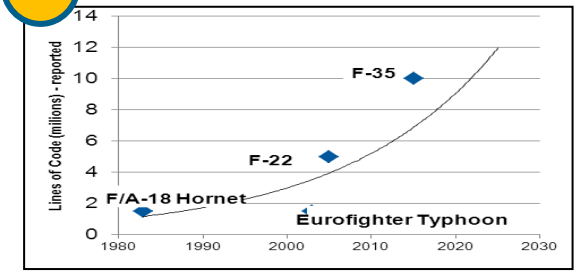
Key Trends in the Military Air Sector

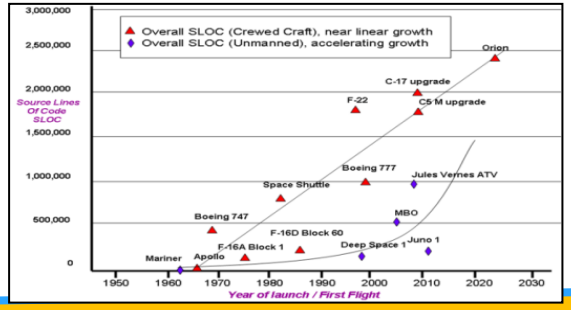
1 Increasing Costs





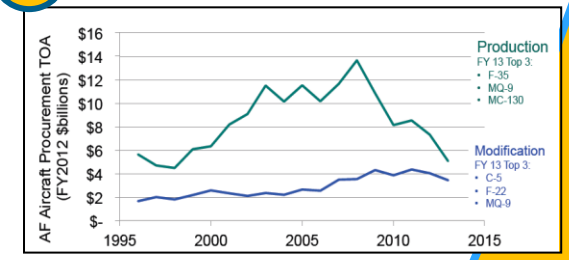
2 Increasing Capability & Complexity



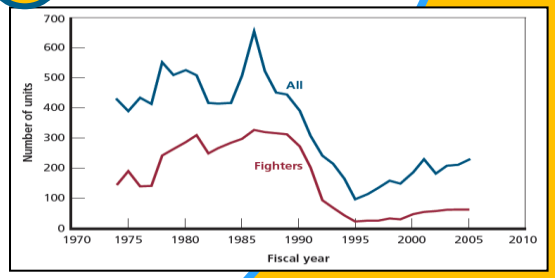


1. Rising Costs
2. Increasing Capability & Complexity
3. Budgetary Changes & Pressures
4. Reducing Volumes
5. Increasing Aircraft Lifespans

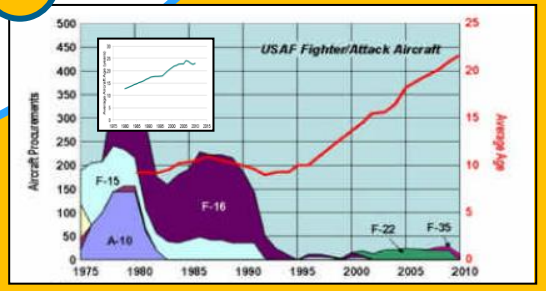
3 Increasing Modification Funding Decreasing Production Funding



4 Reducing Volumes



5 Ageing Fleet



USA data – likely typical for Western Powers

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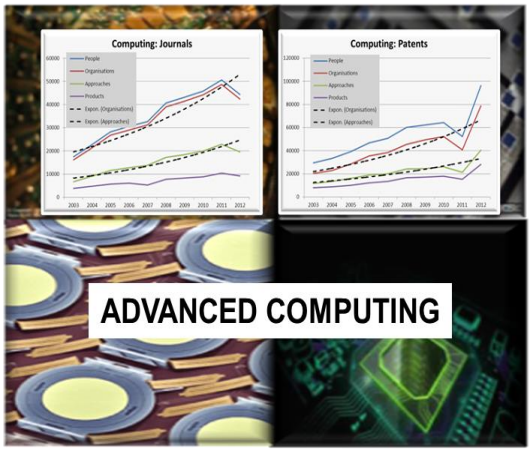
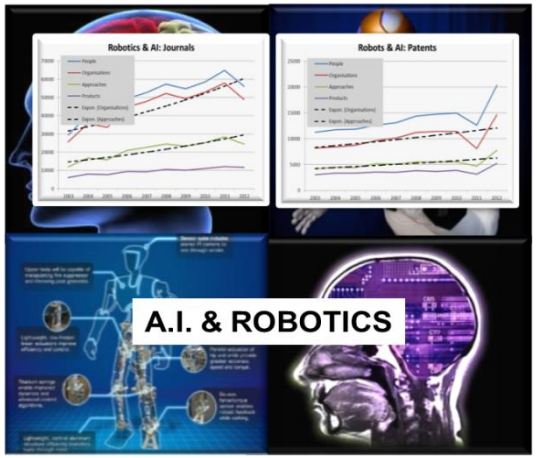
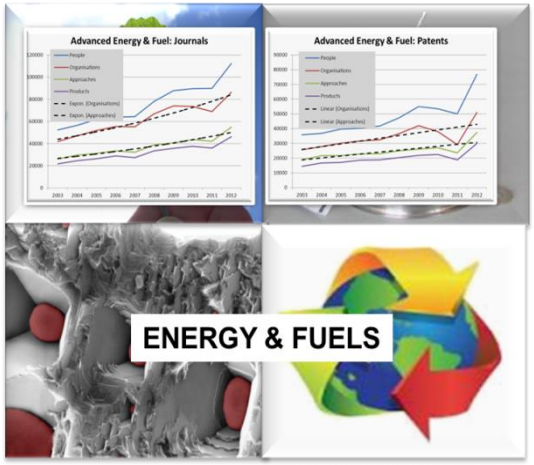
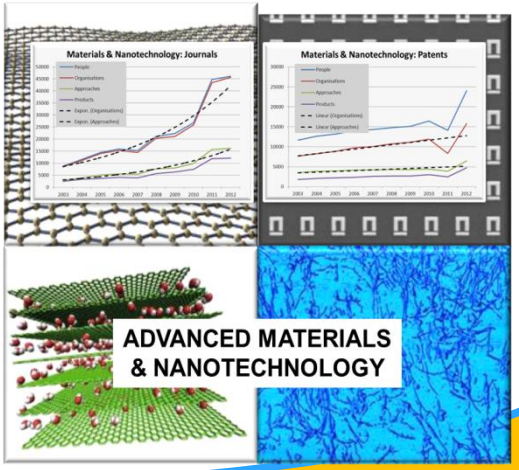
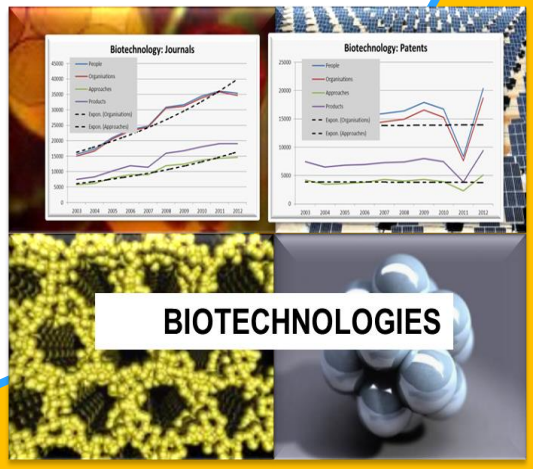
Top 5 World Changing Technologies (10 to 20 years)











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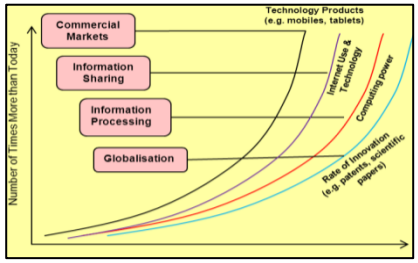
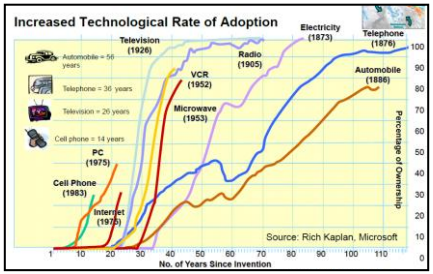
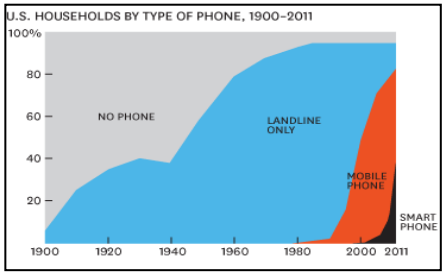
We are living in Exponential Times!

Technology Development Commercial Lead

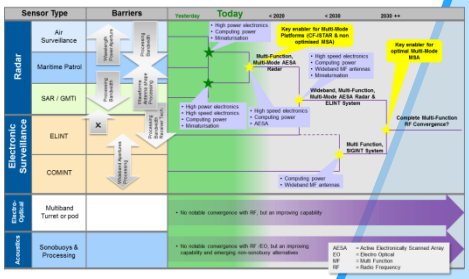


Increasing Rate of Adoption

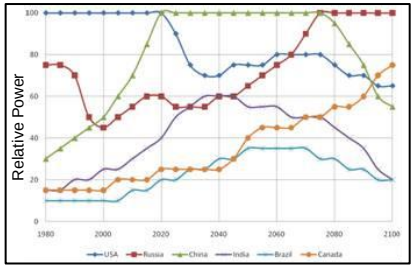




Increasing Multi-functionality

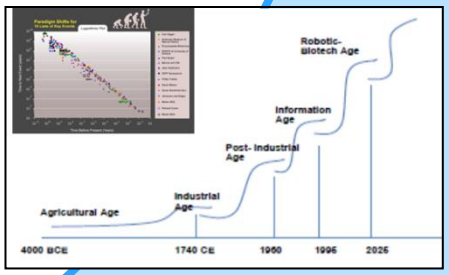


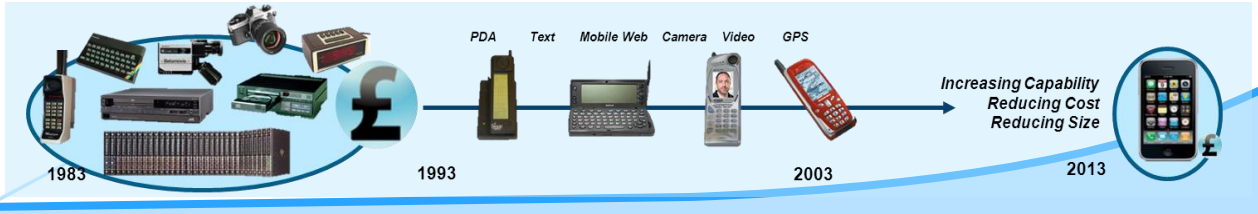
Significant Political Change



- **The pace of change and its affect upon humanity is accelerating**
- **Increasing rate of knowledge creation**
- **The tempo of change raises challenges**
- **Rapidly emerging threats & opportunities**
- **Demands business and product agility**

Paradigm Shifts





- Desktop PC equivalent to Supercomputer in 10 years
- Desktop PC more processing power than Human Brain
- Quantum Supercomputers more powerful than all the World's Computers in 10 years
- New Materials with incredible properties are designed from the electron up
- Robots replace the manual labour force in the 2030s
- Everything is connected to everything

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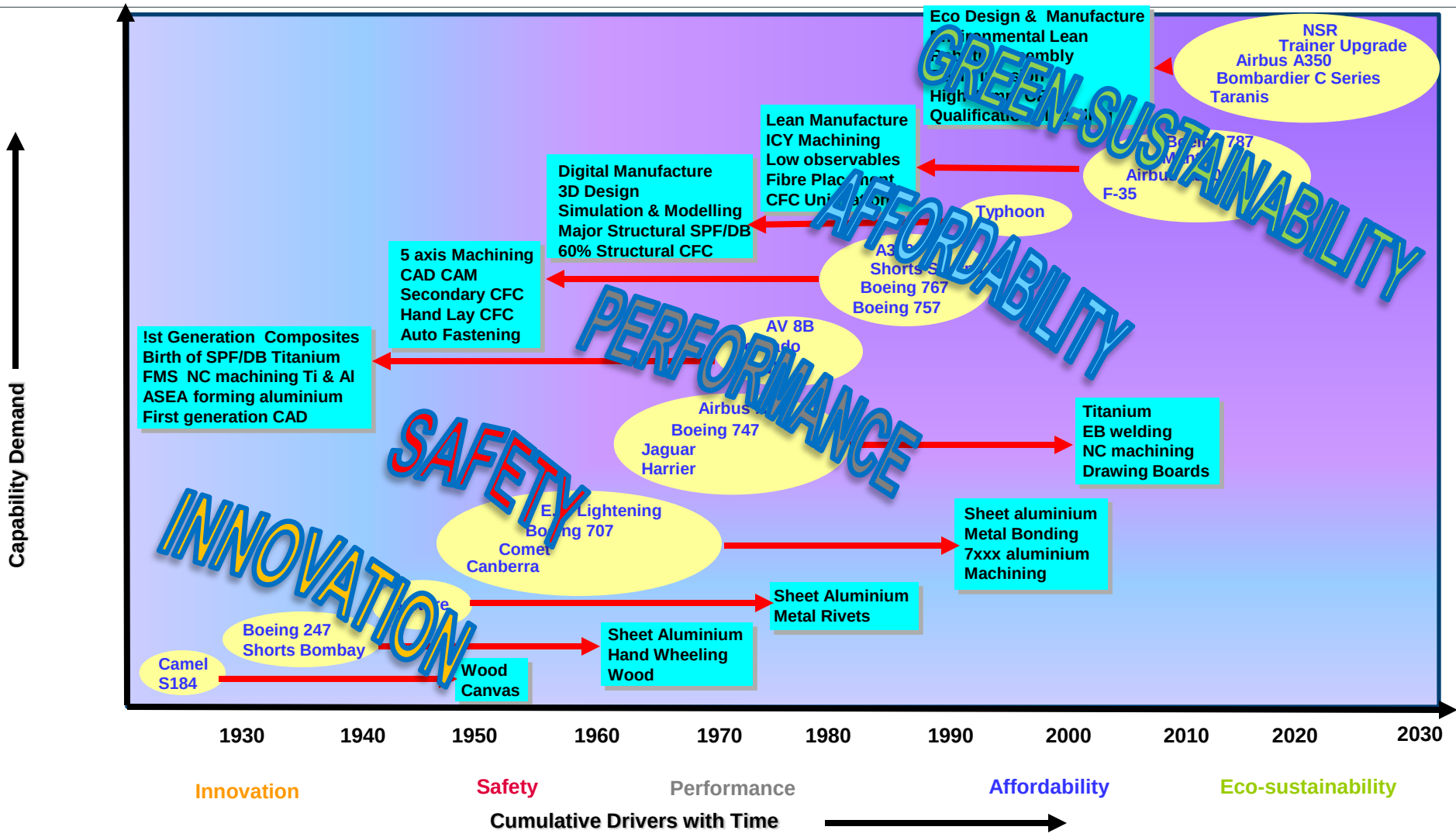
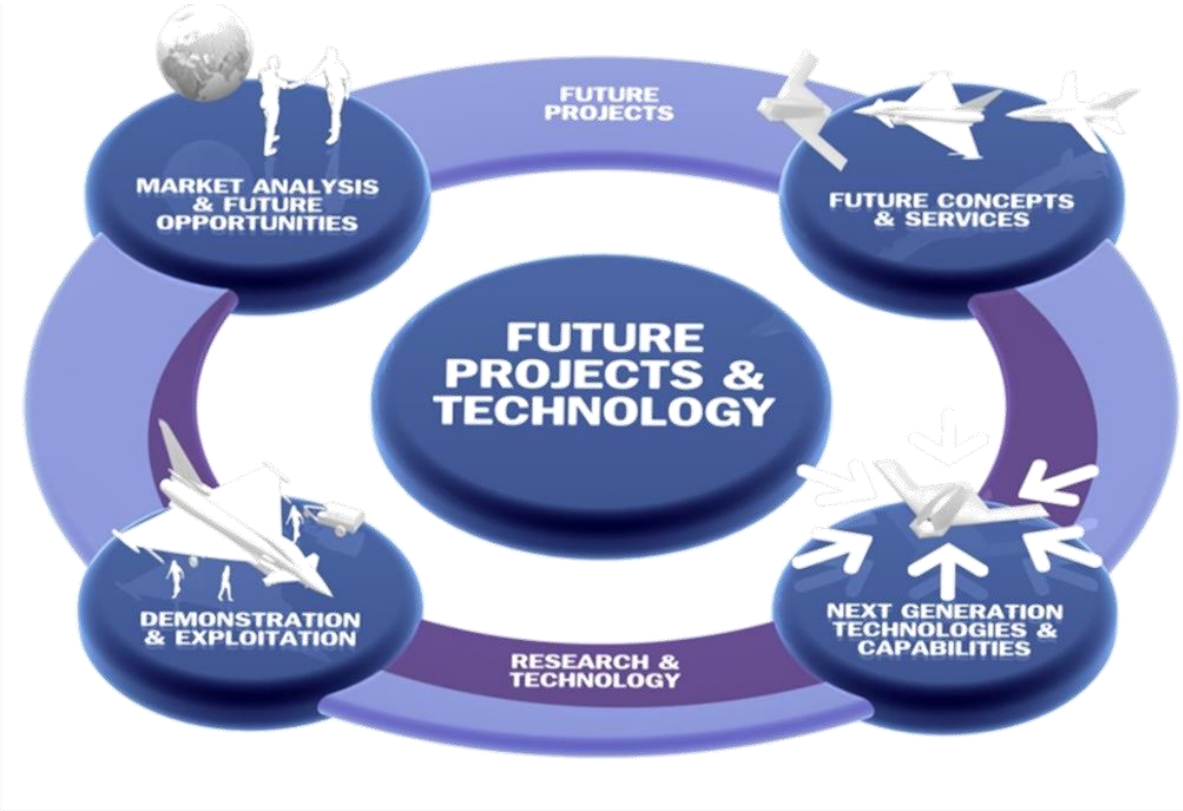
HISTORICAL AIRFRAME CAPABILITY DRIVERS



Future Products and Technology



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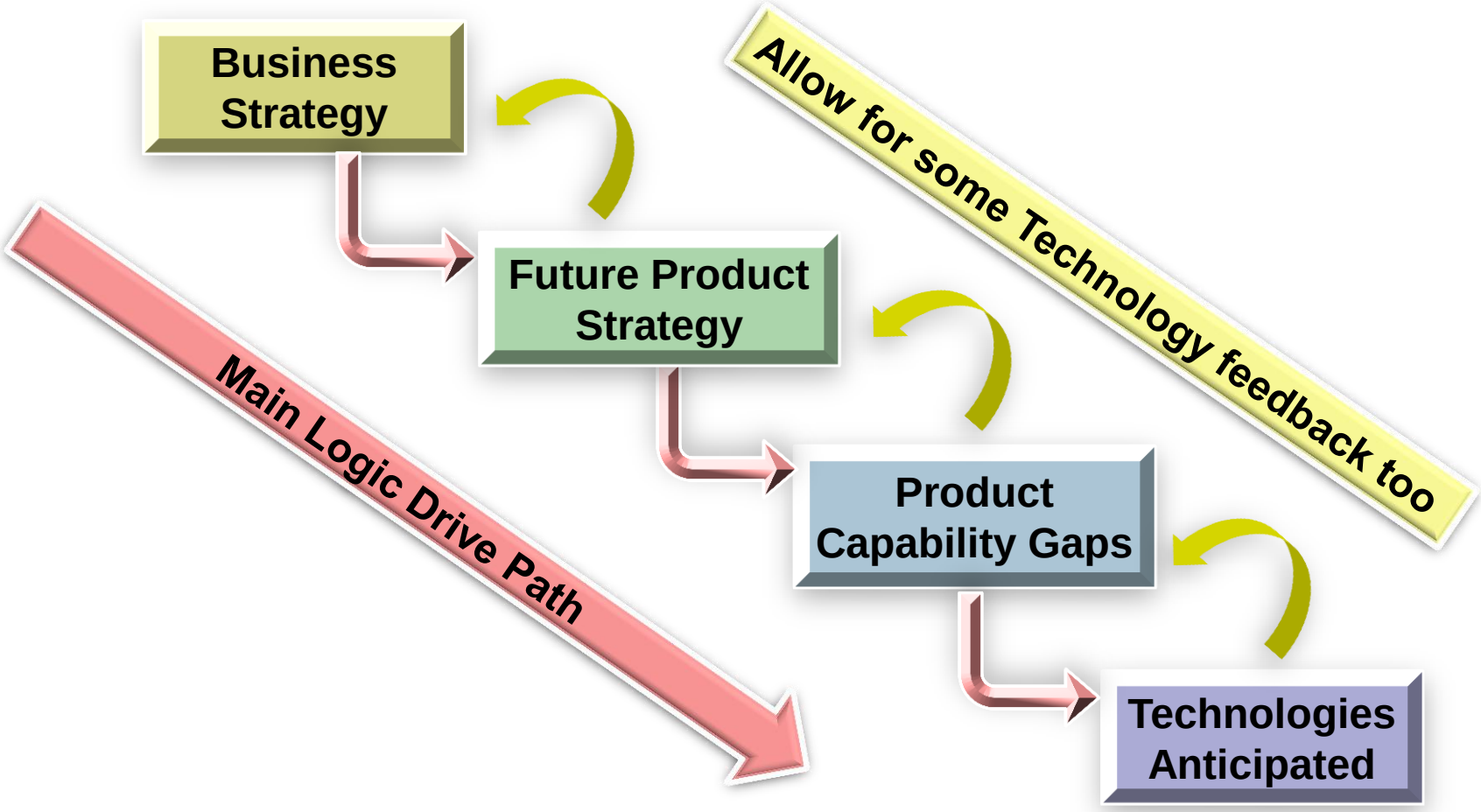
Predicting Technology Requirements: Business Model



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Predicting Technology Requirements: Future Products

Business Strategy

Future Product Strategy

Product Capability Gaps

Technologies

TYPHOON FUTURE CAPABILITY

Typhoon Capability Enhancements — 2020's

UCAV

Large UCAV & UAVs — 2020-30

6TH GEN FIGHTER

6th Generation Fighter — 2030 +

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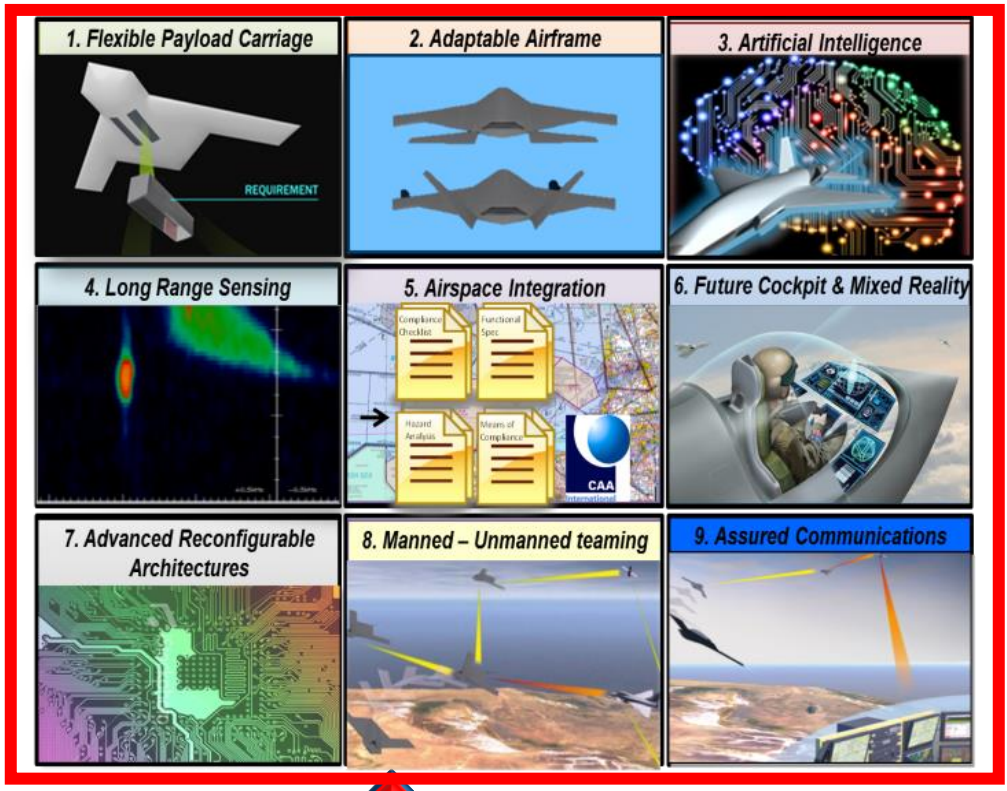
Predicting Technology Requirements: R&T Programme

Business Strategy

Future Product Strategy

Product Capability Gaps

Technologies



***FutureWorks* R&T Programme**

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ADAPTABLE AIRFRAME

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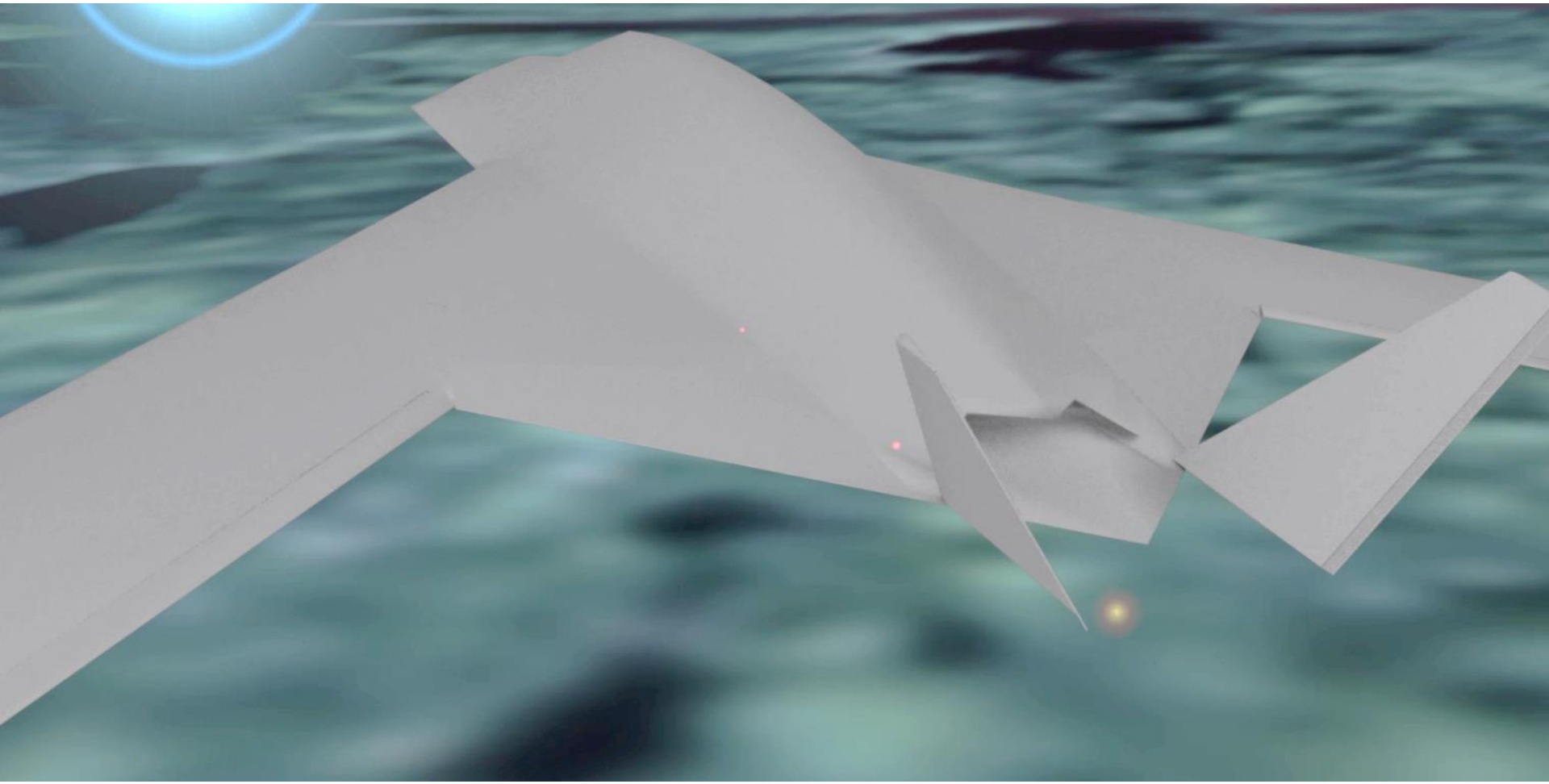

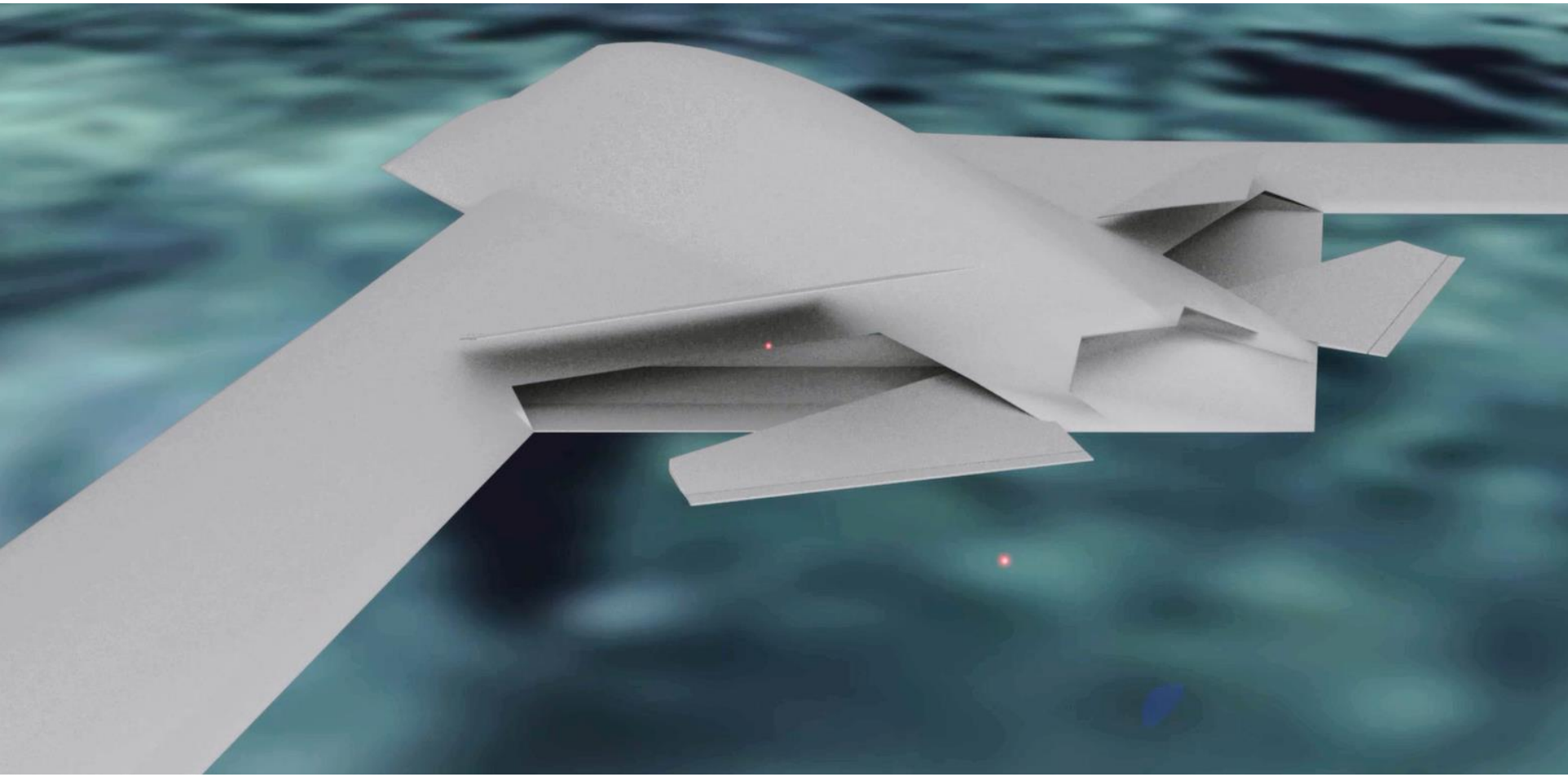

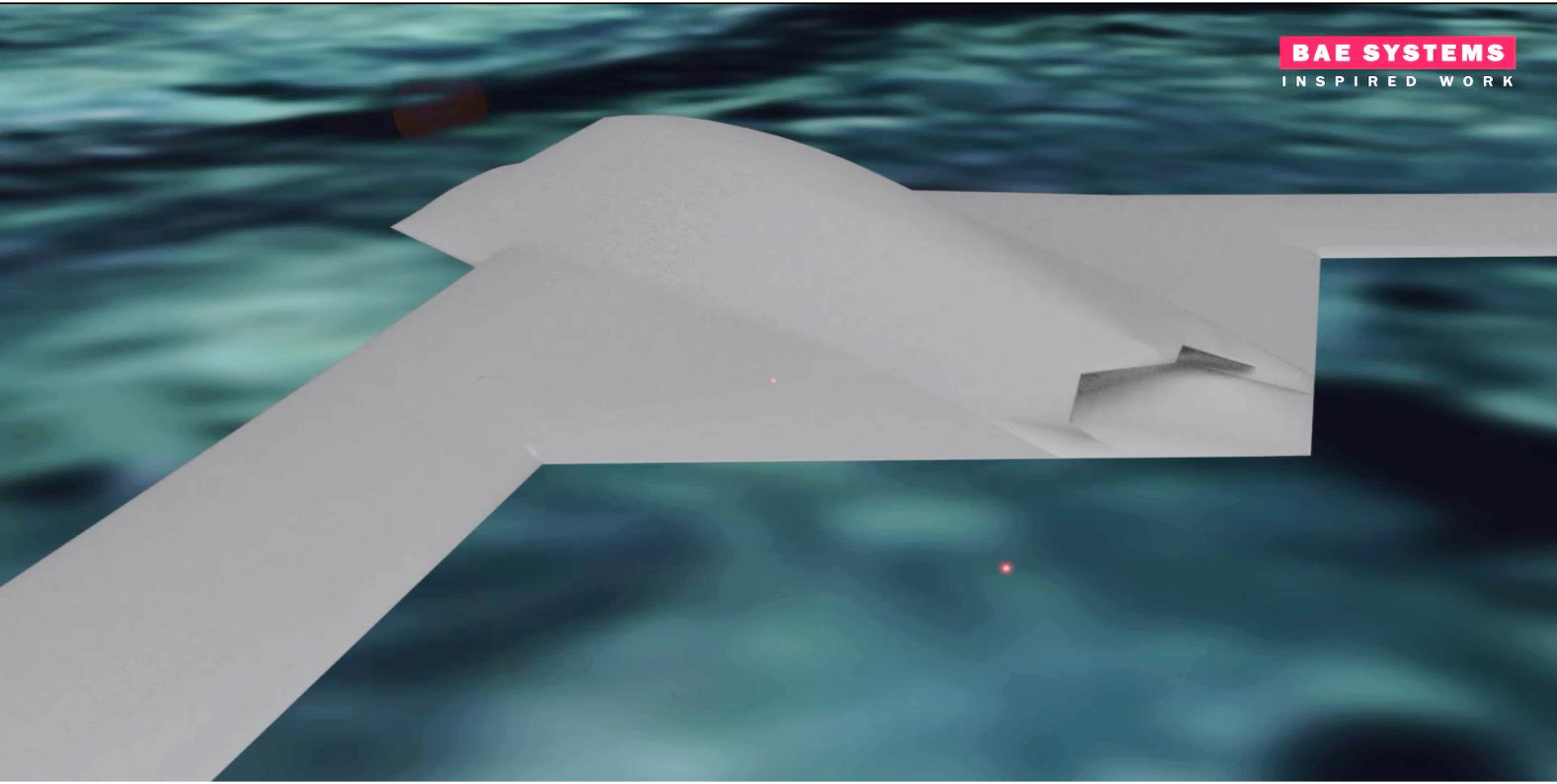

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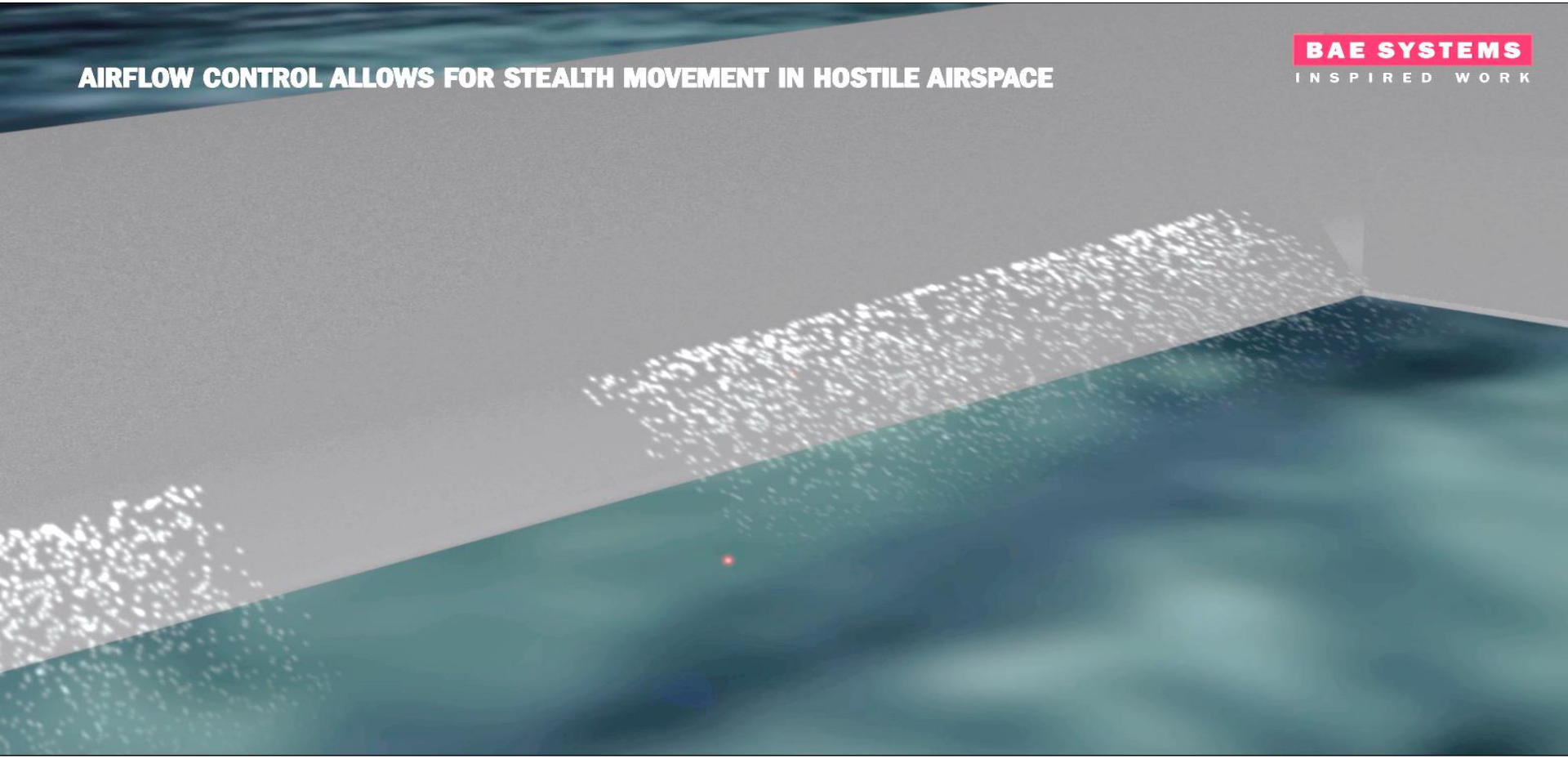

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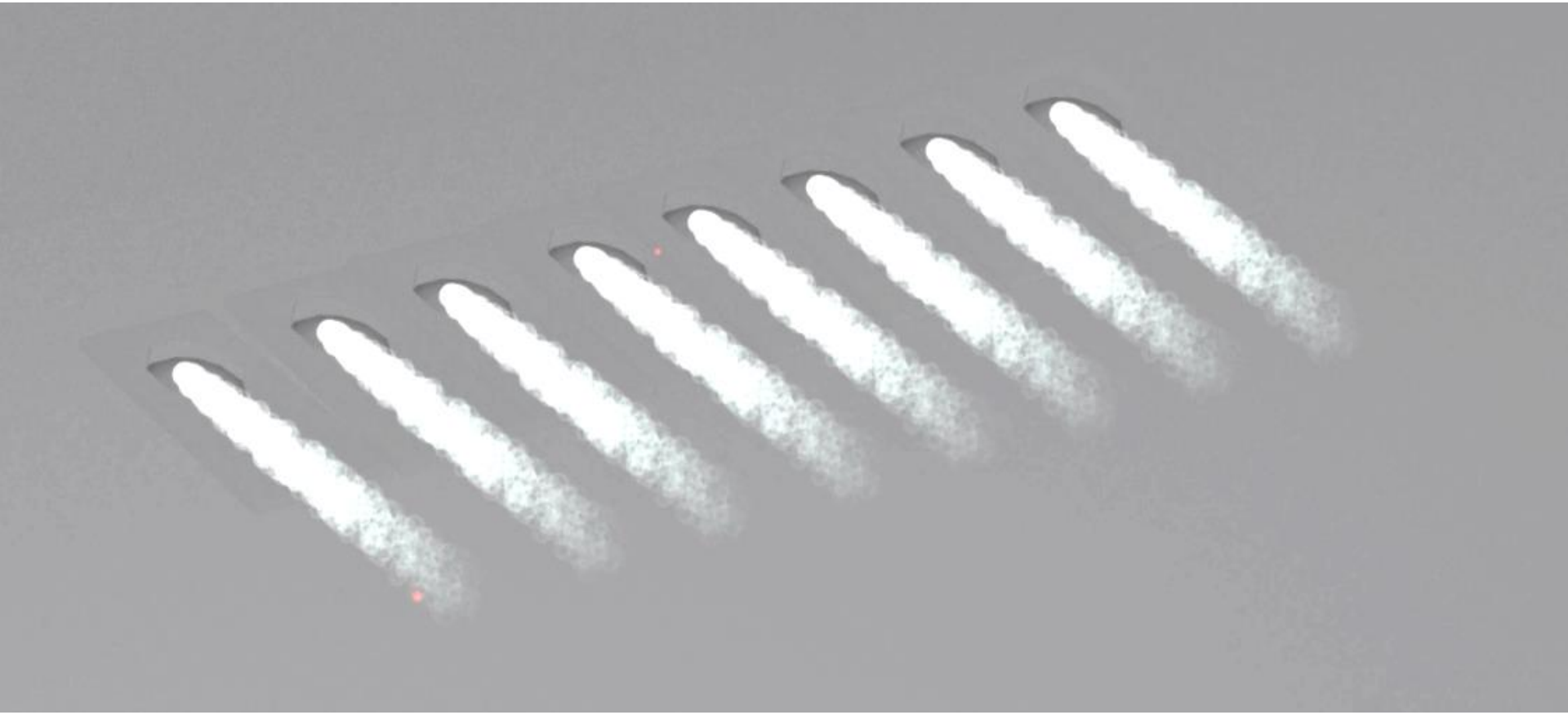

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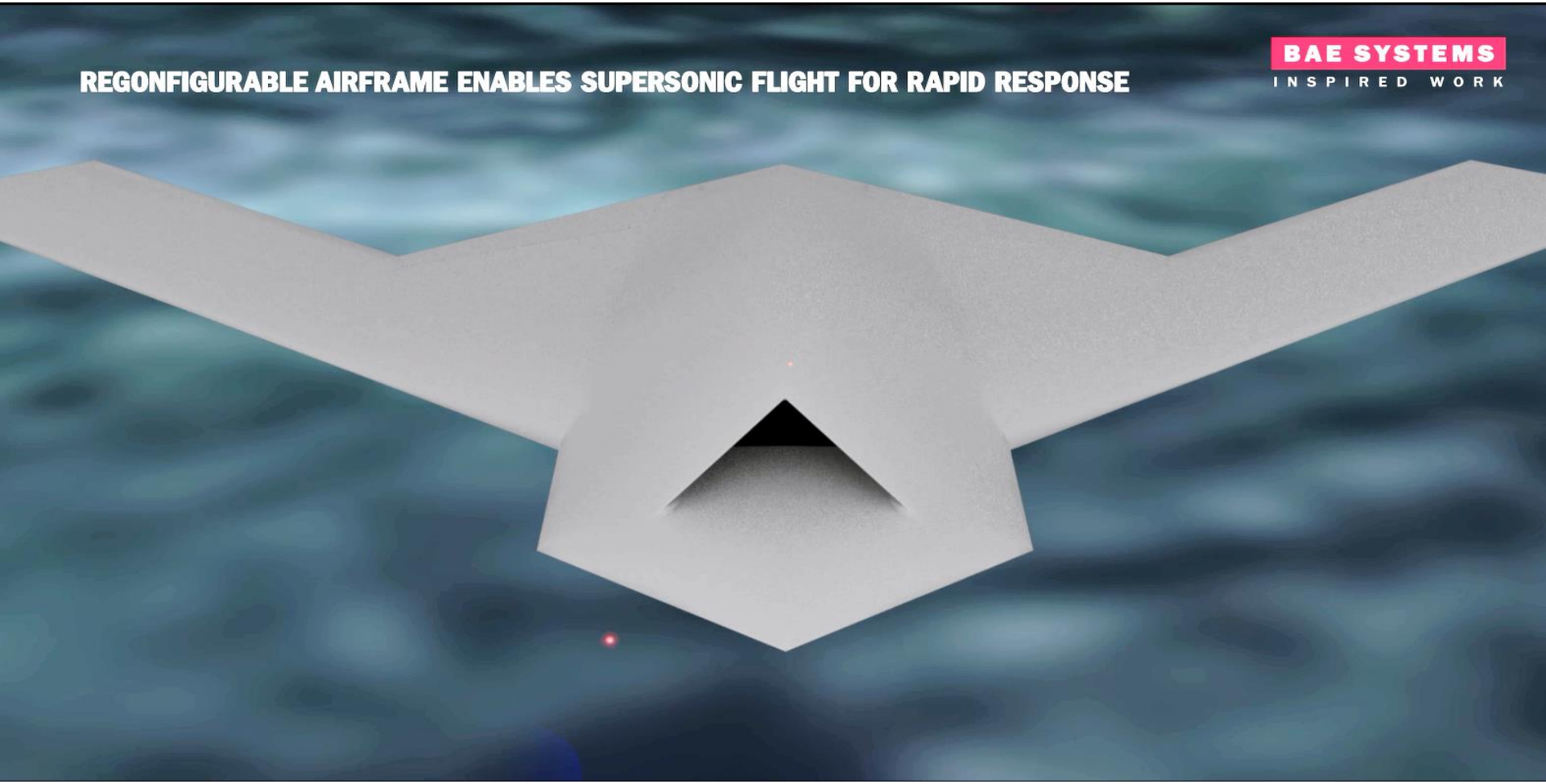

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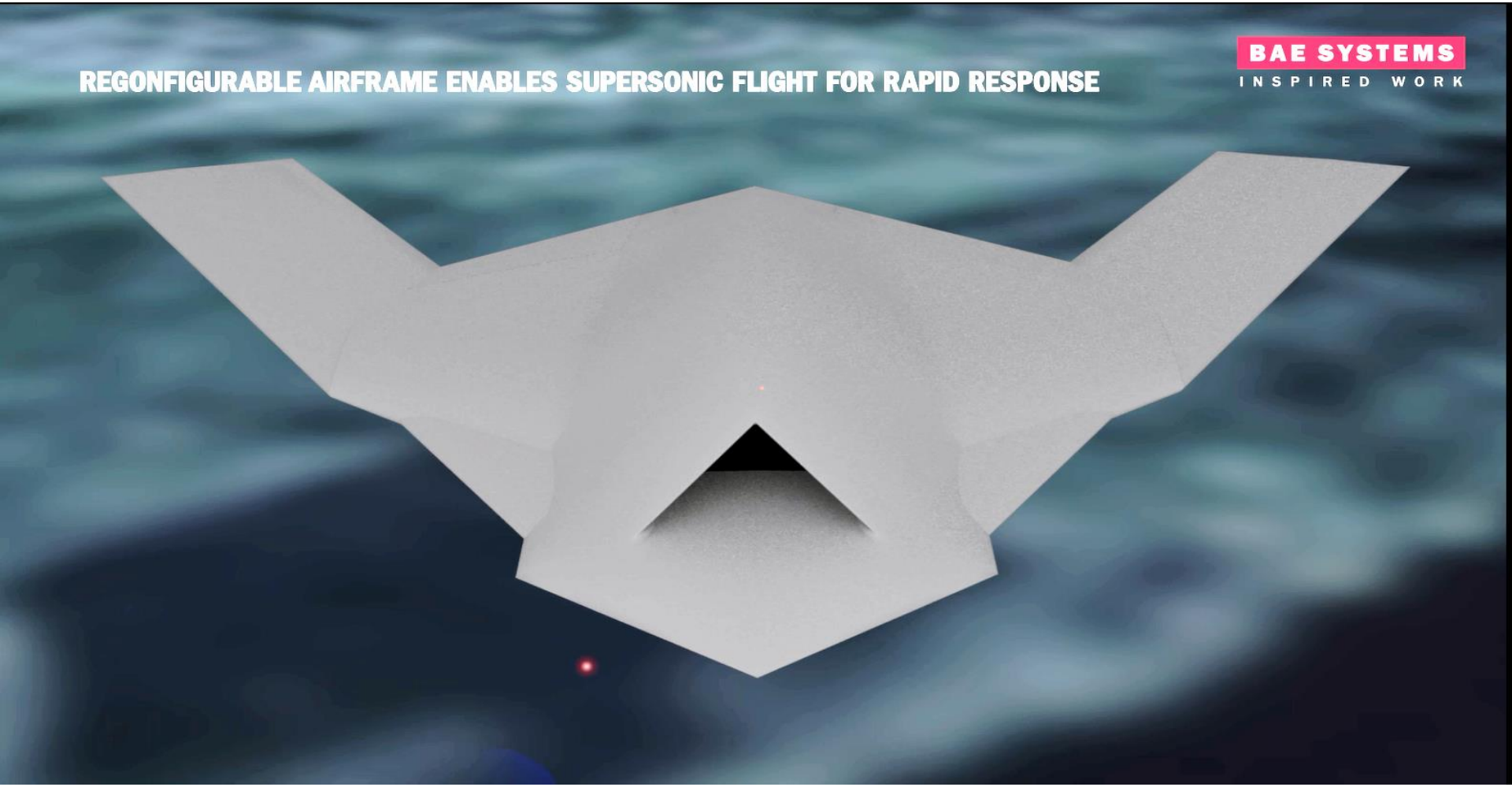

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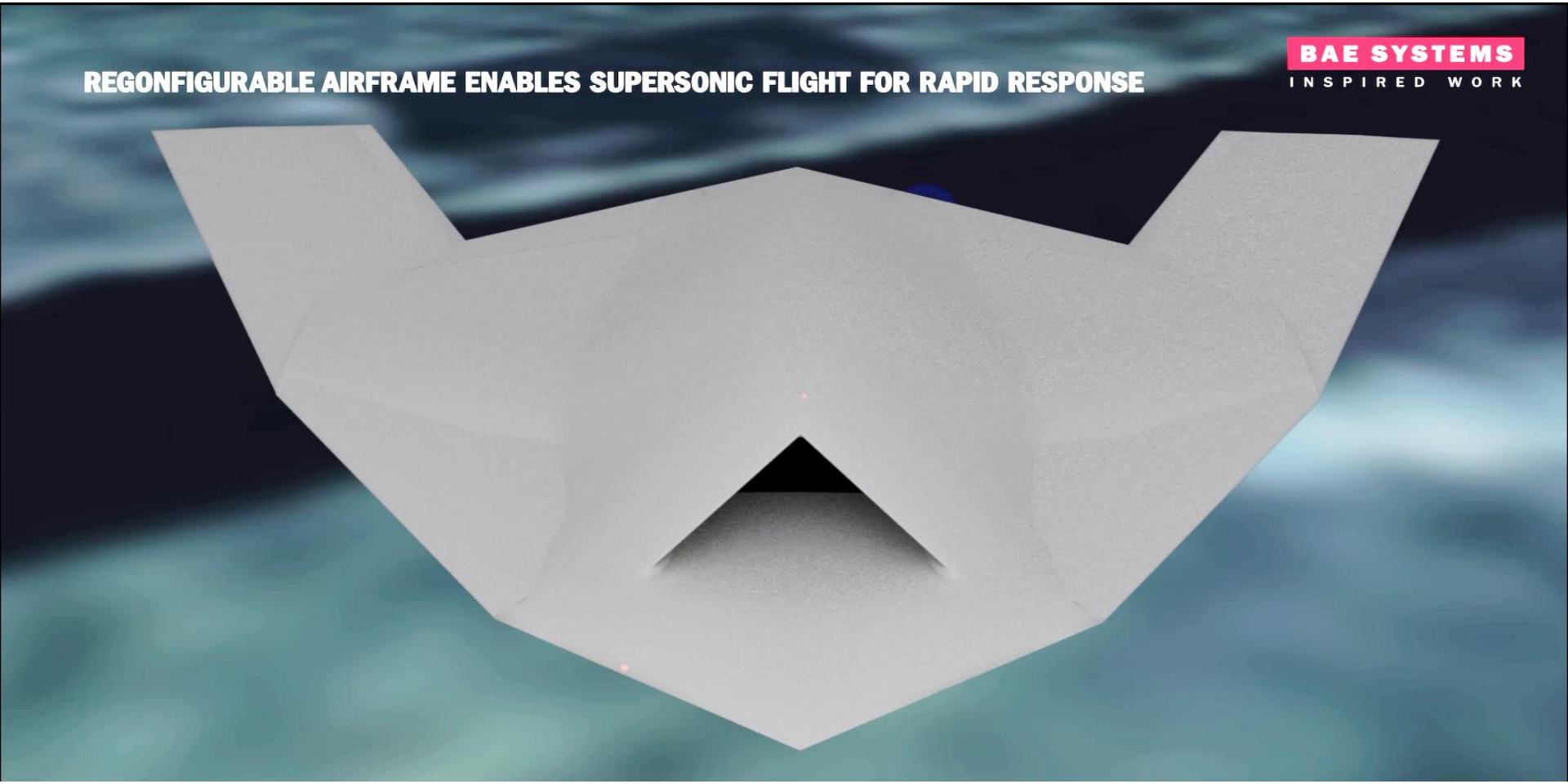

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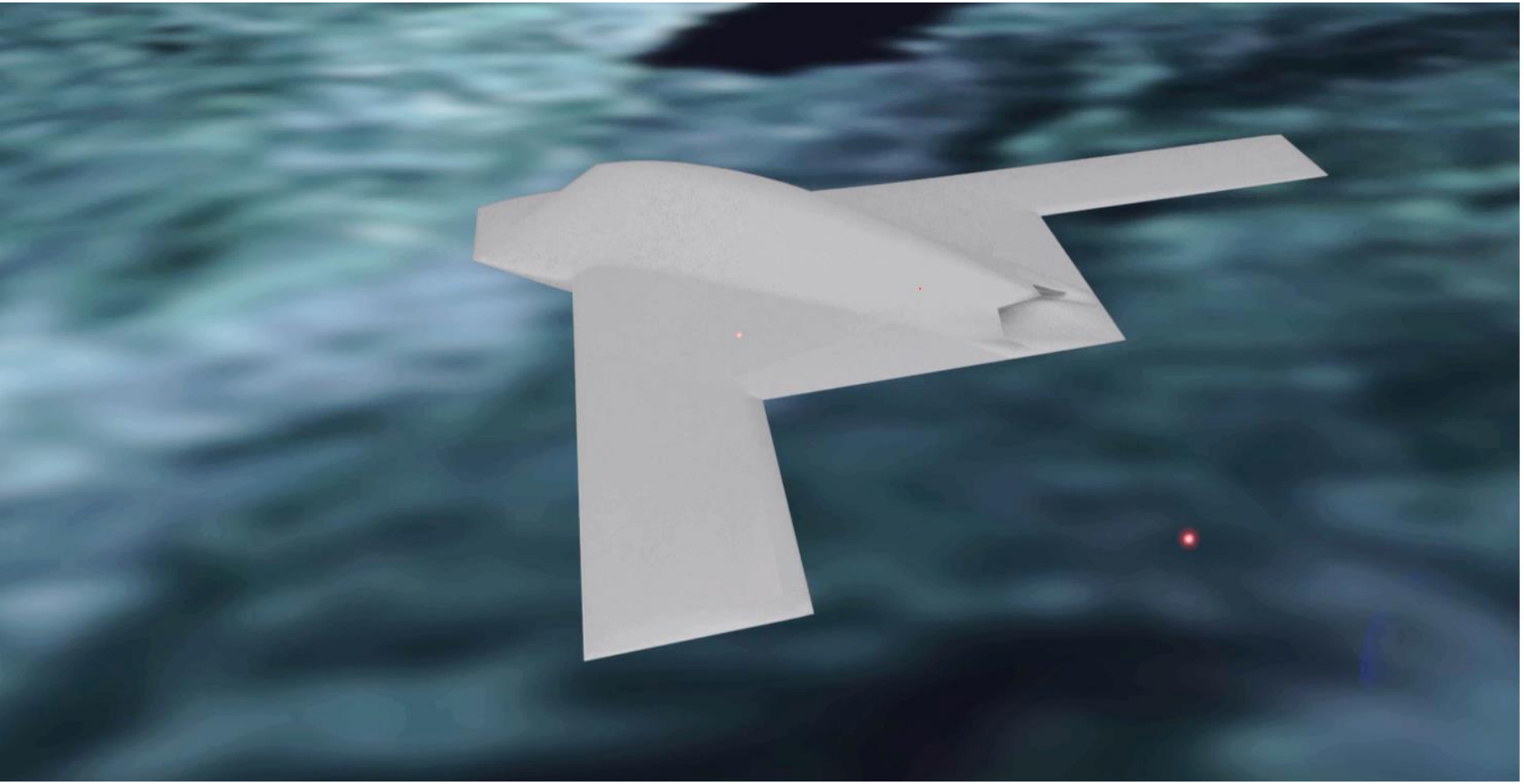

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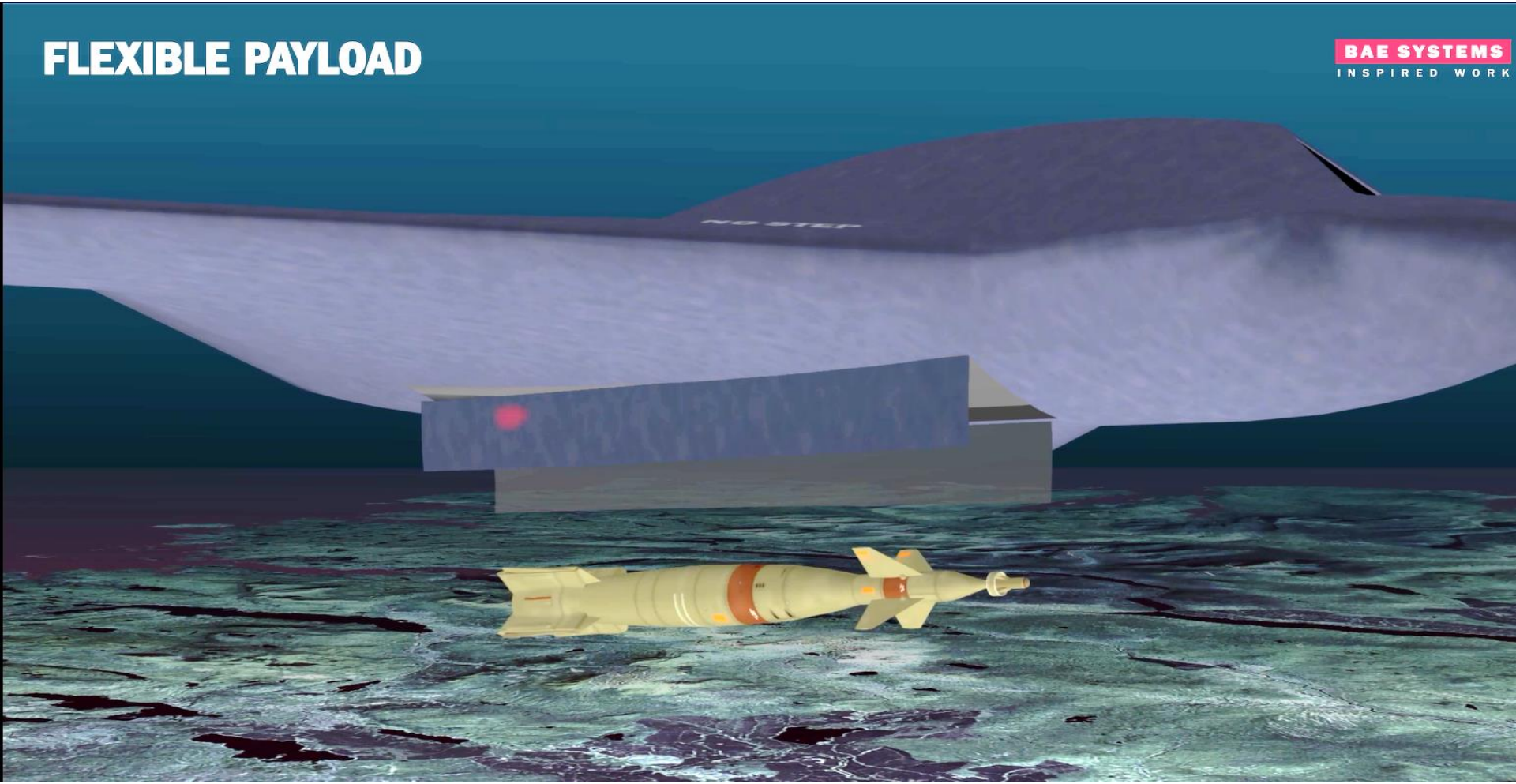
FLEXIBLE PAYLOAD CARRIAGE



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FLEXIBLE PAYLOAD

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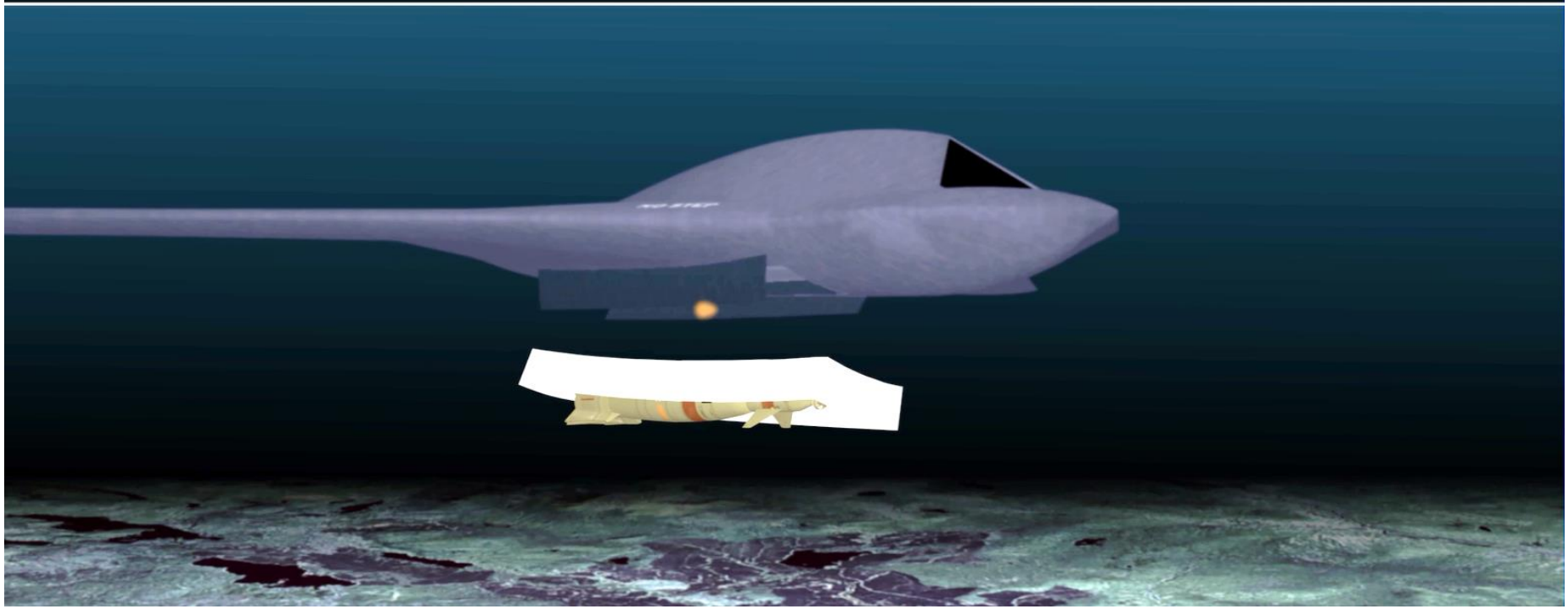
WEAPONS



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FLEXIBLE PAYLOAD

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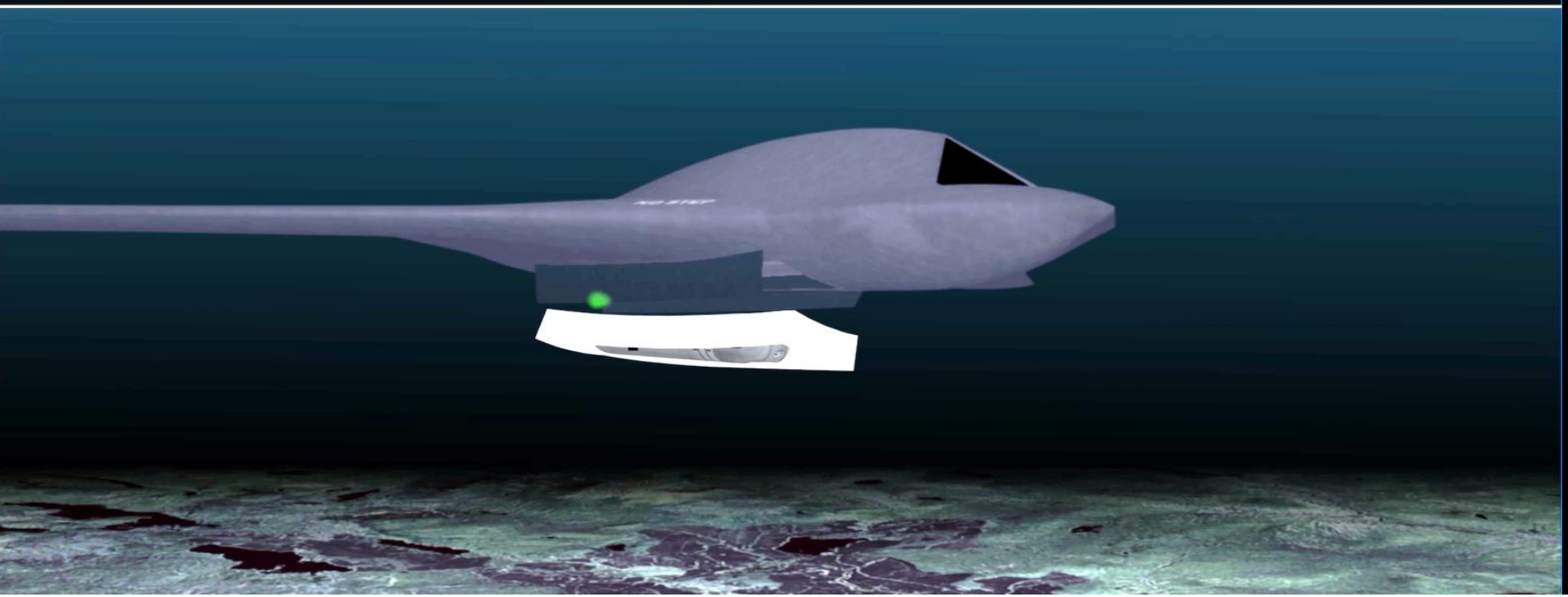
SENSORS



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FLEXIBLE PAYLOAD

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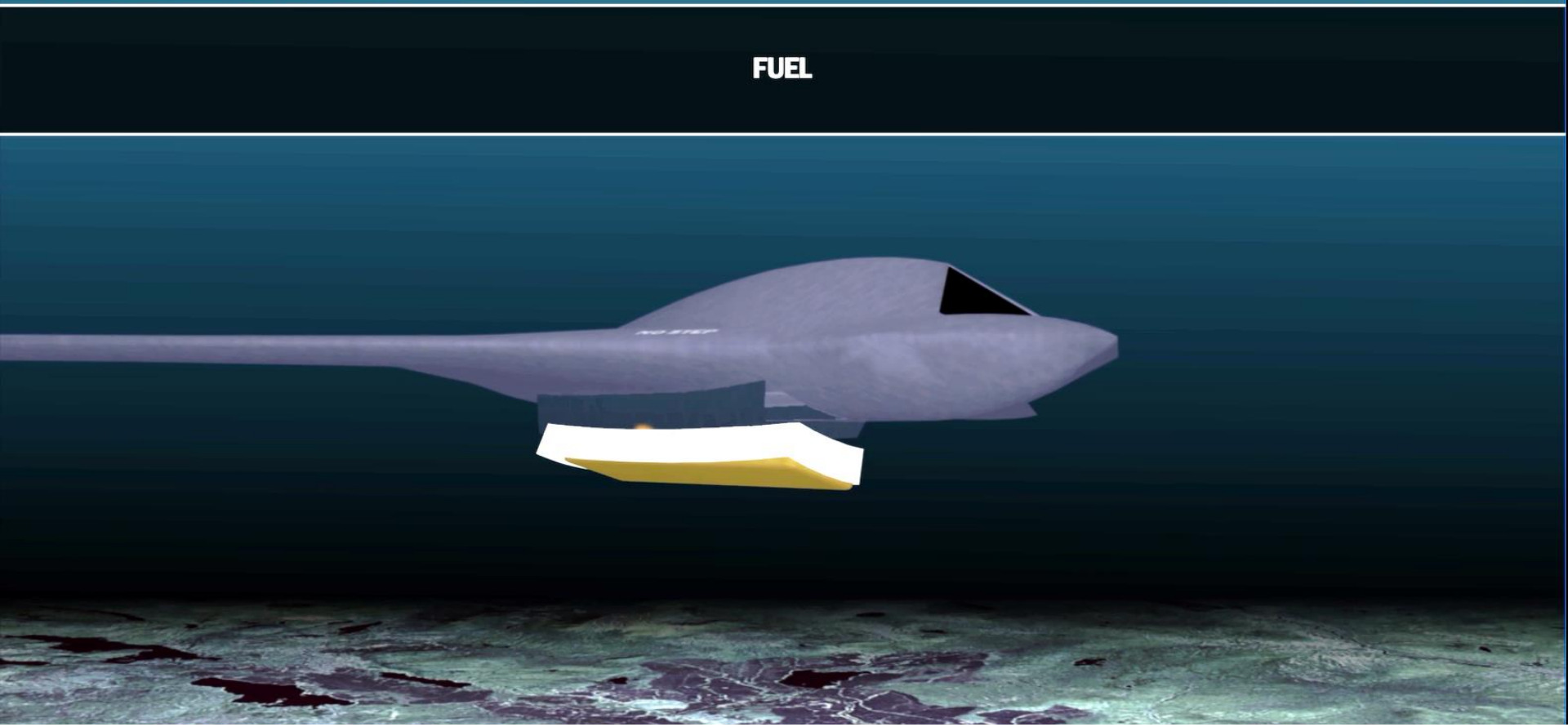

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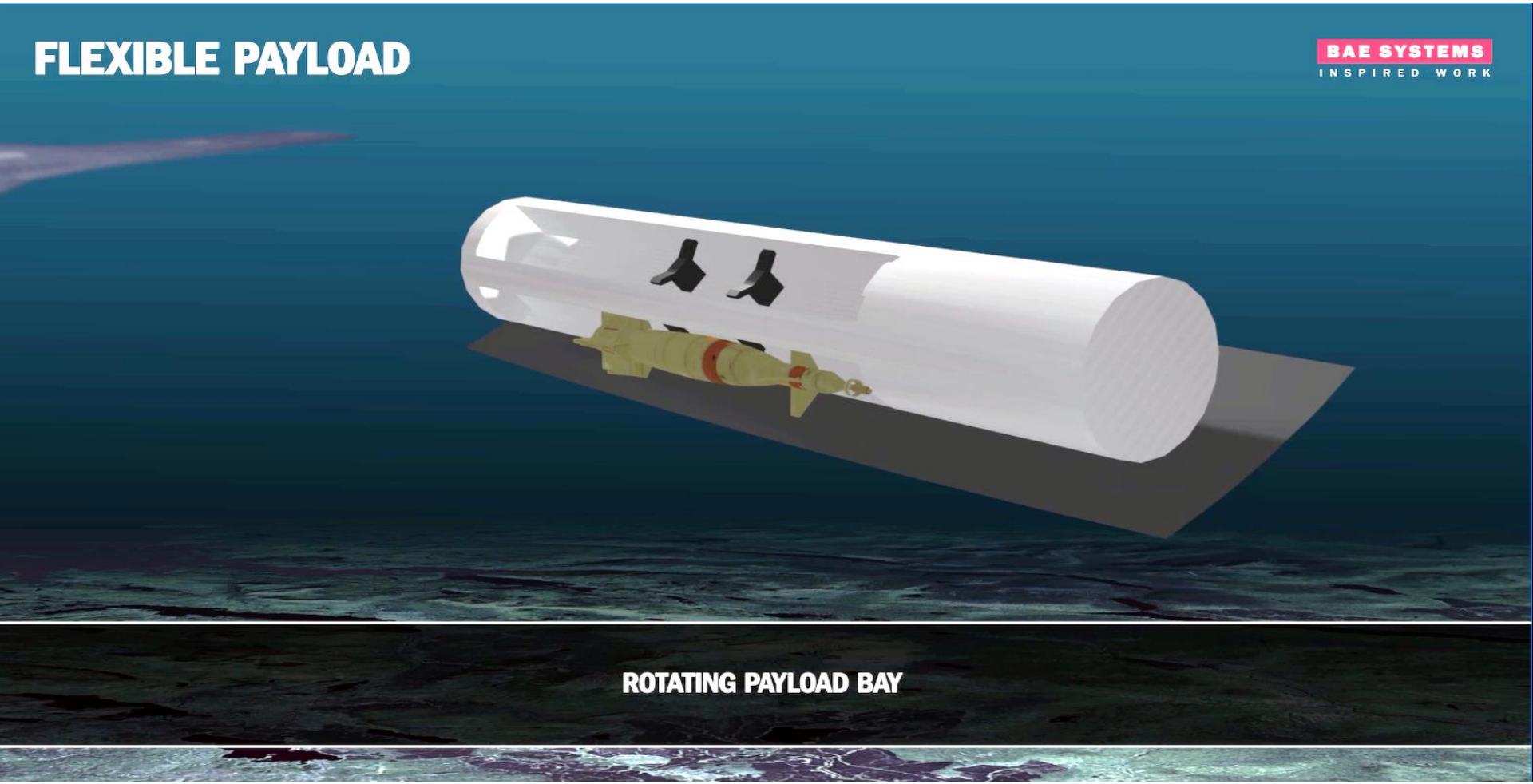

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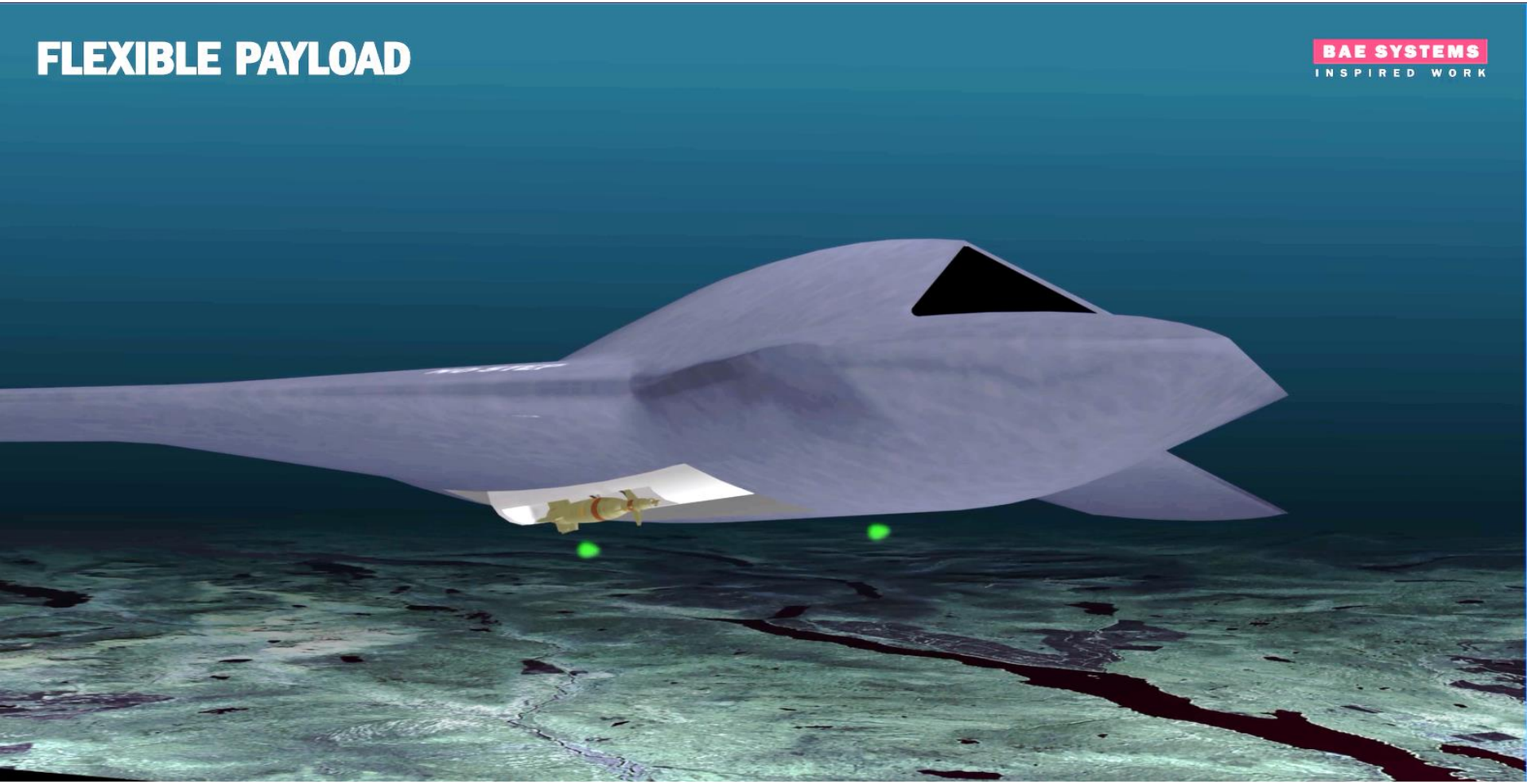

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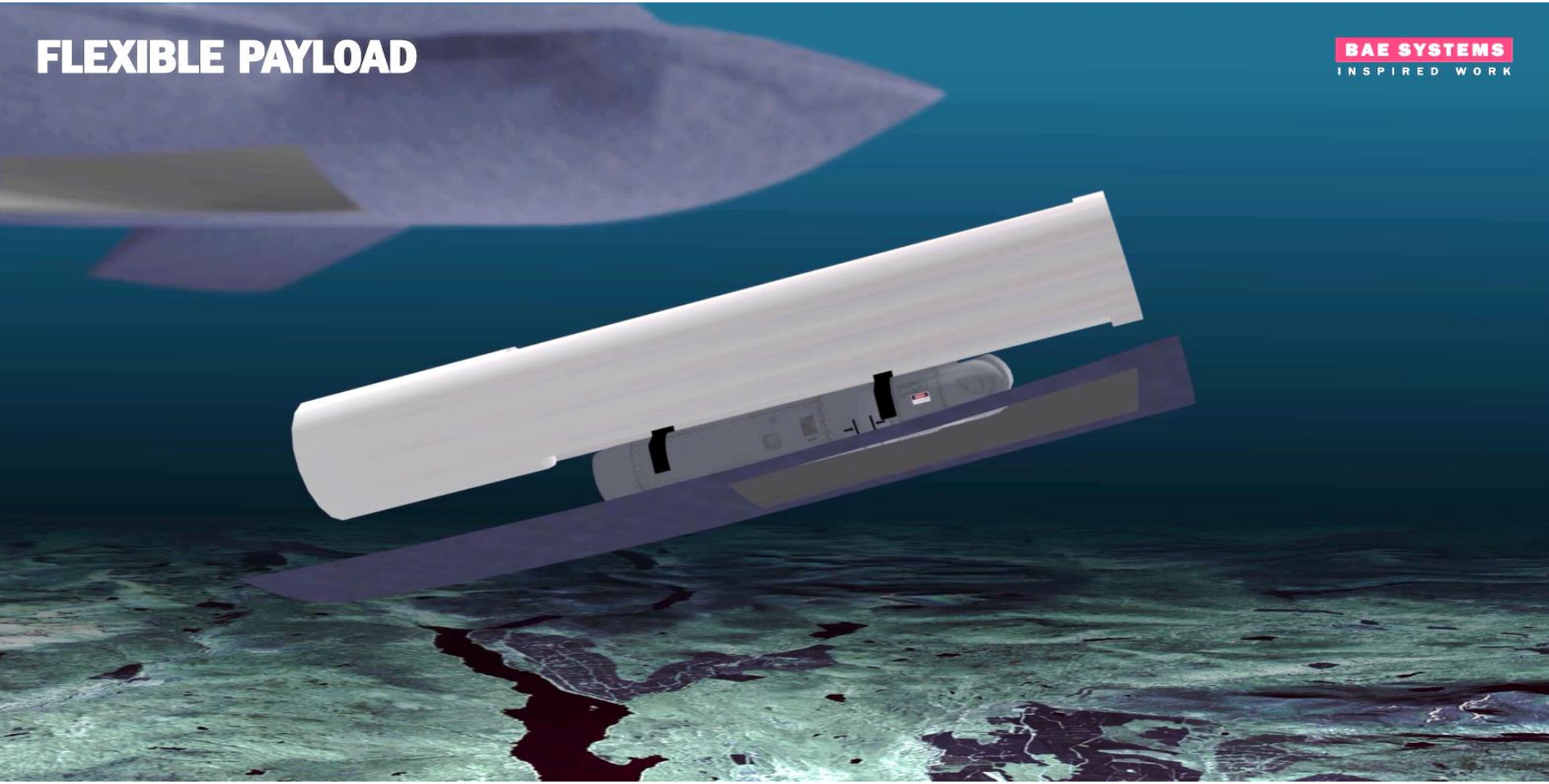

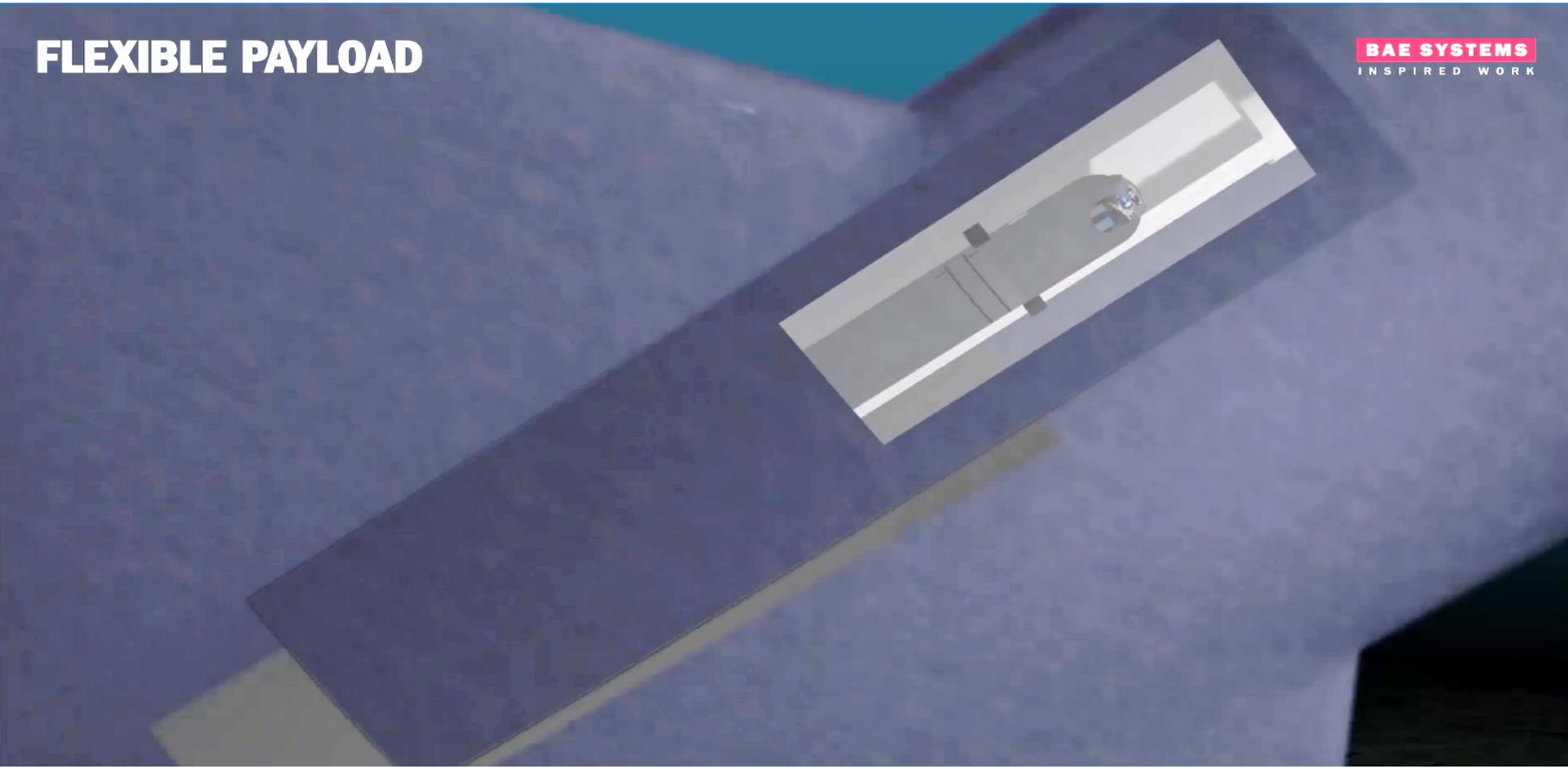

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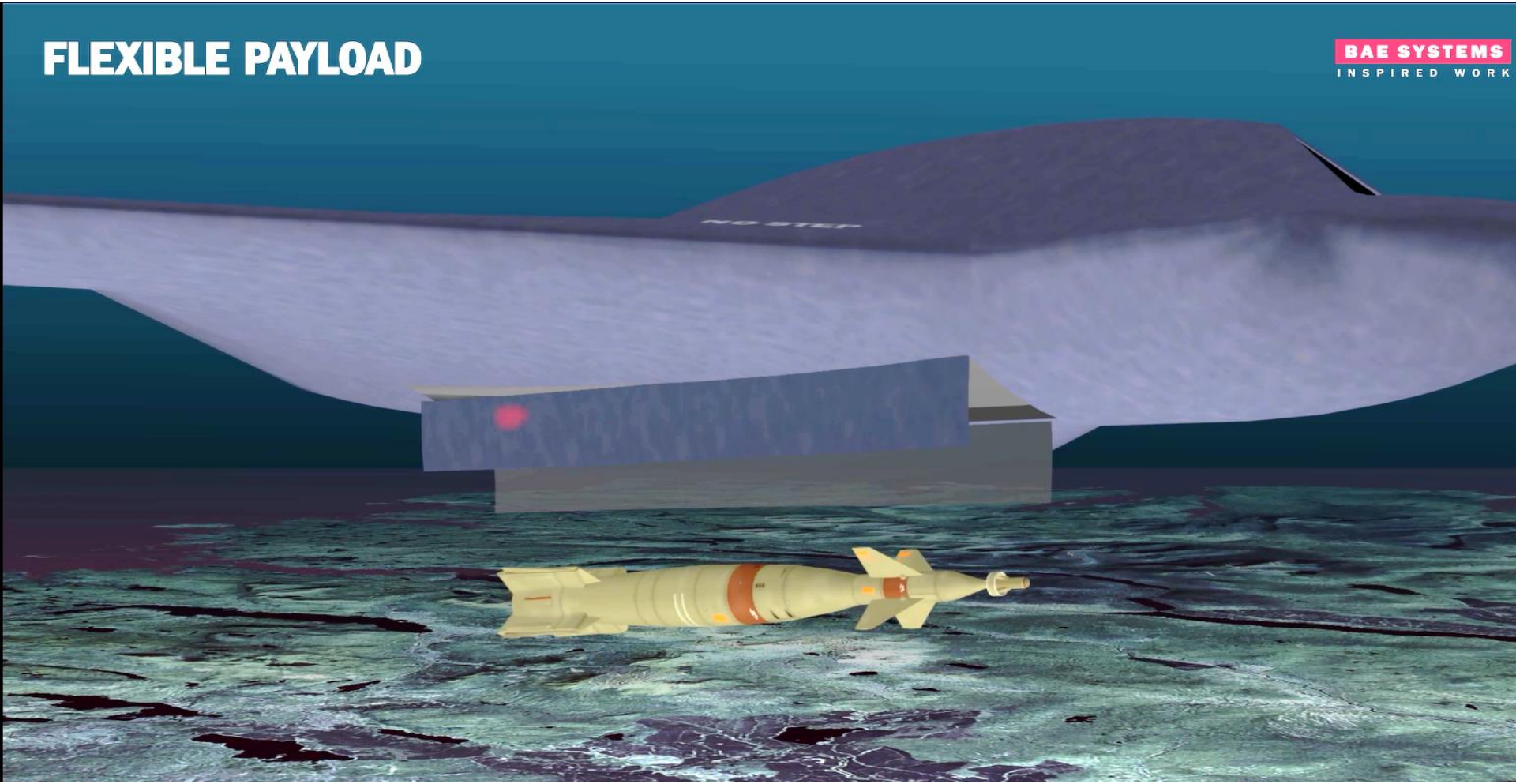

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Thank You