Future Aircraft Technology Needs

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Technologist Advanced Structures
BAE Systems – Military Air & Information
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.
Key Trends in the Military Air Sector

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

**Increasing Costs**

**Increasing Capability & Complexity**

**Budgetary Changes & Pressures**

**Reducing Volumes**

**Ageing Fleet**

USA data – likely typical for Western Powers
Top 5 World Changing Technologies (10 to 20 years)

- Advanced Computing
- A.I. & Robotics
- Energy & Fuels
- Advanced Materials & Nanotechnology
- Biotechnology
We are living in Exponential Times!

Technology Development
Commercial Lead

Increasing Rate of Adoption

Paradigm Shifts

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

- 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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Future Products and Technology
Predicting Technology Requirements: Business Model

- Business Strategy
- Future Product Strategy
- Product Capability Gaps
- Technologies Anticipated

Main Logic Drive Path

Allow for some Technology feedback too
Predicting Technology Requirements: Future Products

- **Typhoon Future Capability**
  - 2020’s

- **Large UCAV & UAVs**
  - 2020-30

- **6th Generation Fighter**
  - 2030+

**Business Strategy**

**Future Product Strategy**

**Product Capability Gaps**

**Technologies**
Predicting Technology Requirements: R&T Programme

Business Strategy

Future Product Strategy

Product Capability Gaps

Technologies

FutureWorks R&T Programme

1. Flexible Payload Carriage
2. Adaptable Airframe
3. Artificial Intelligence
4. Long Range Sensing
5. Airspace Integration
6. Future Cockpit & Mixed Reality
7. Advanced Reconfigurable Architectures
8. Manned – Unmanned teaming
9. Assured Communications
ADAPTABLE AIRFRAME
AIRFLOW CONTROL ALLOWS FOR STEALTH MOVEMENT IN HOSTILE AIRSPACE
REGONFIGURABLE AIRFRAME ENABLES SUPersonic FLIGHT FOR RAPID RESPONSE
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FLEXIBLE PAYLOAD

WEAPONS
FLEXIBLE PAYLOAD

SENSORS
FLEXIBLE PAYLOAD

ROTATING PAYLOAD BAY
FLEXIBLE PAYLOAD
FLEXIBLE PAYLOAD
FLEXIBLE PAYLOAD CARRIAGE
Thank You