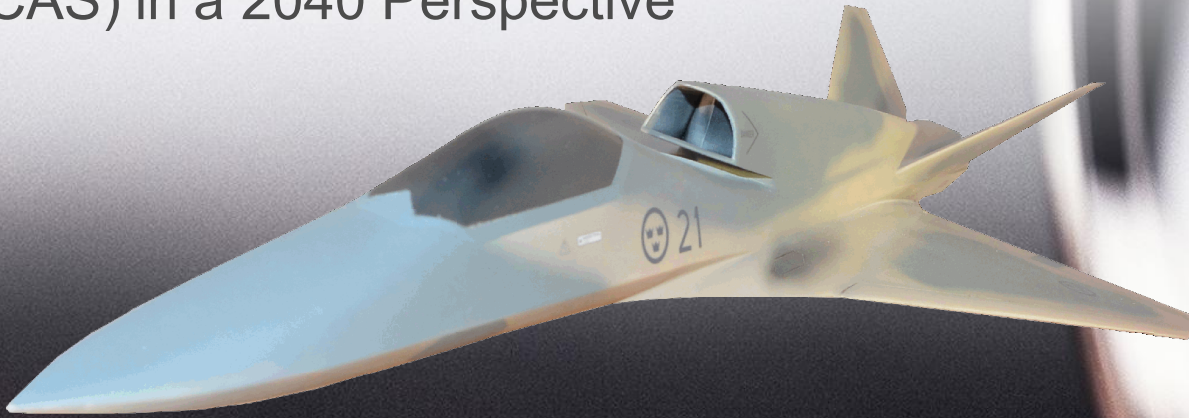


AEROSPACE TECHNOLOGY CONGRESS 2016

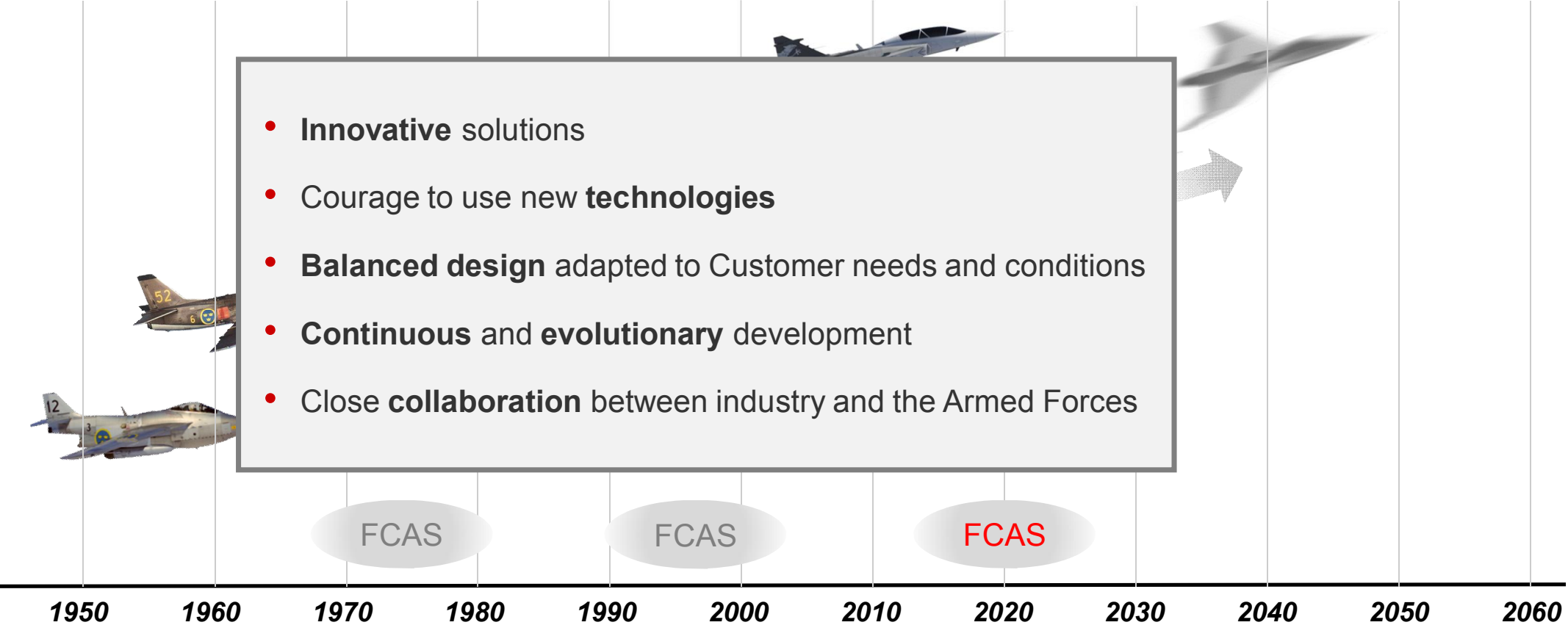
Exploration of Future Combat Air System
(FCAS) in a 2040 Perspective



Stefan Andersson, Program Manager Future Combat Air System
Saab Aeronautics

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HISTORY OF COMBAT AIR SYSTEM DEVELOPMENT

- 
- **Innovative** solutions
 - Courage to use new **technologies**
 - **Balanced design** adapted to Customer needs and conditions
 - **Continuous** and **evolutionary** development
 - Close **collaboration** between industry and the Armed Forces

FCAS

FCAS

FCAS

SAAB FCAS PROGRAM

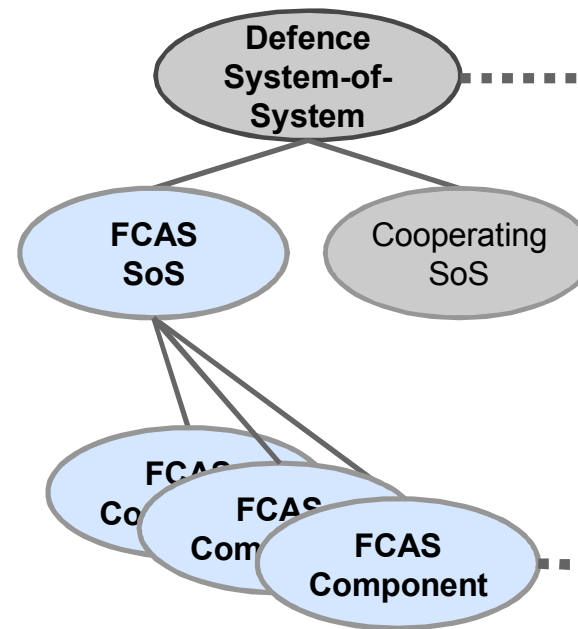
- A Saab initiative for defining capabilities and products for Sweden and Export in three time perspectives: 2025, 2035 and 2045
- Ongoing program since January 2014
- Iterative and evolutionary approach
- In line with the Swedish parliamentary investigation, Air Defense 2040 (2014)
- Provide options for:
 - Gripen upgrades
 - New combat air system products
 - Enhancements and/or new products in other Business Areas
- Focus on System-of-System (SoS) capabilities



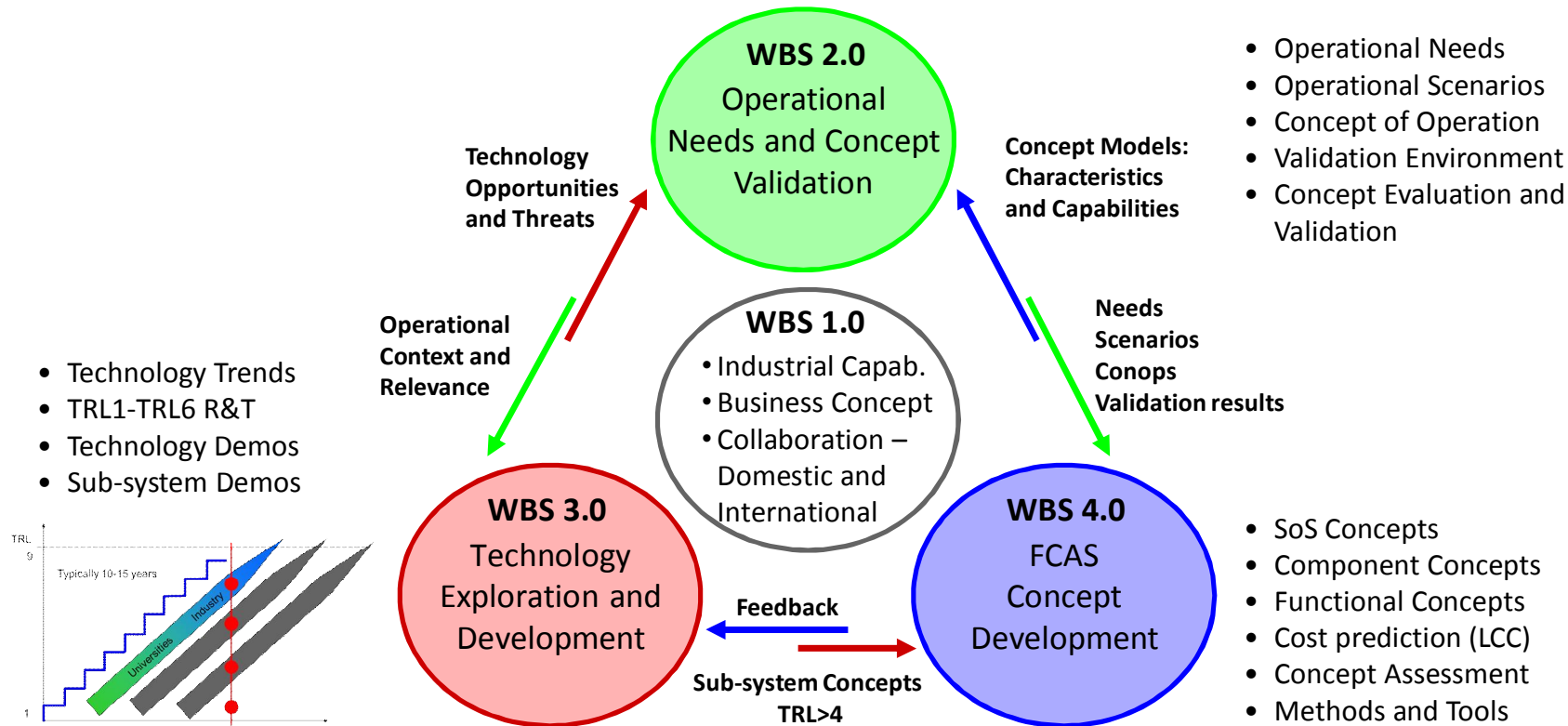
SCOPE

Systems of systems, **FCAS SoS**, solutions comprising:

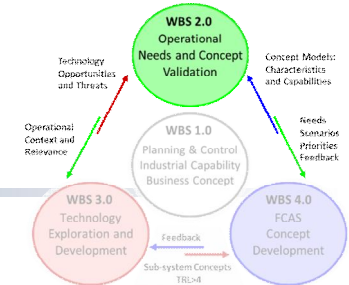
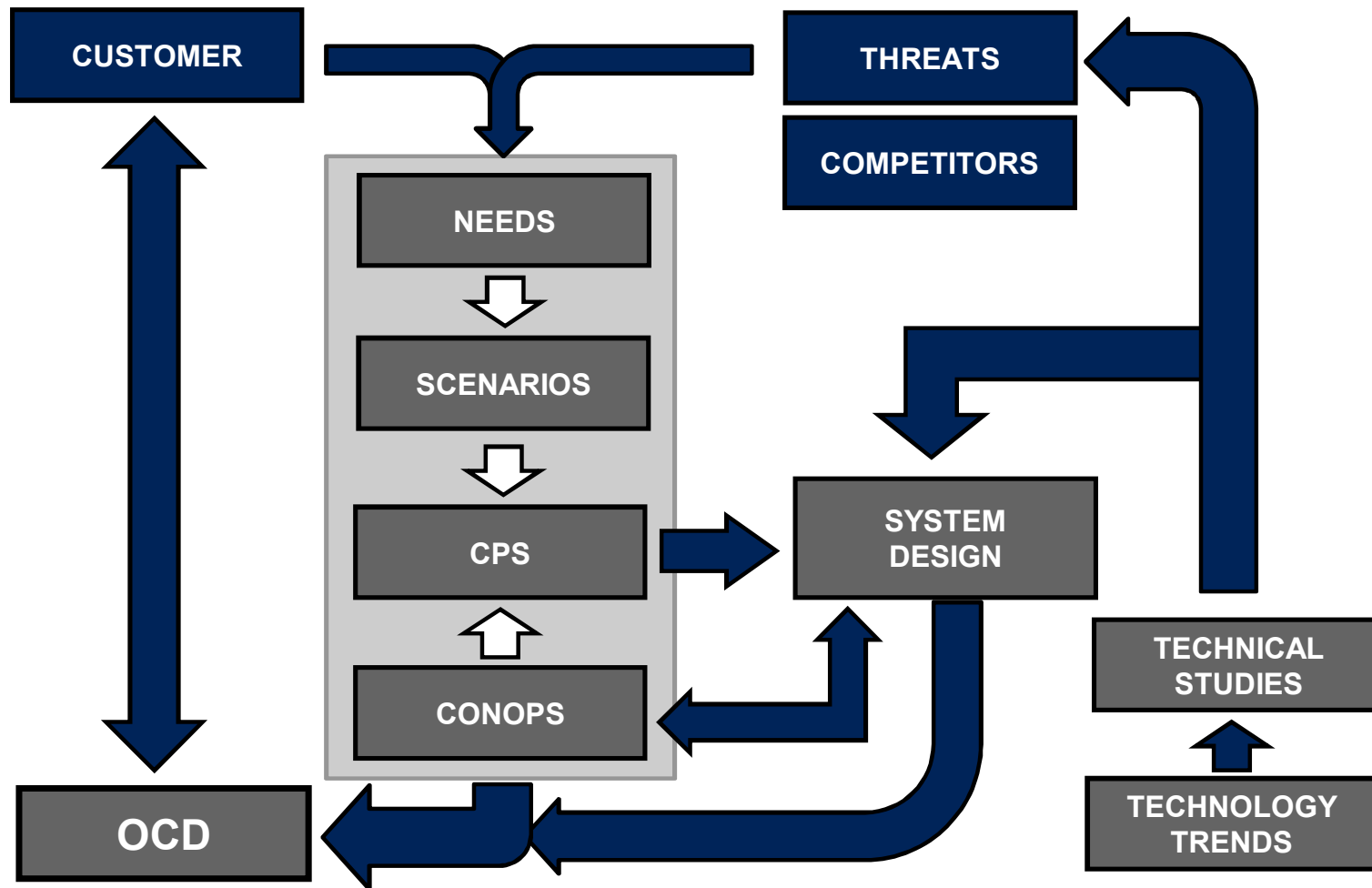
- **Aircraft systems, s.c. FCAS Components**
- **Operation Support Systems and Training solutions**
- **Logistics and operation support**
- **Enabling systems**, such as Development, V&V and Manufacturing systems
- Integration with the complete **Defence System-of-Systems**
 - Air, Land and Naval forces incl. surveillance systems
 - Air, Land and Naval command and control systems (C2)
 - Space and cyber systems/forces
 - Air traffic control (ATM)



SAAB FCAS PROGRAM SET UP



OPERATIONAL ANALYSIS PROCESS



FORESEEN **OPERATIONAL NEEDS**

Key Capabilities

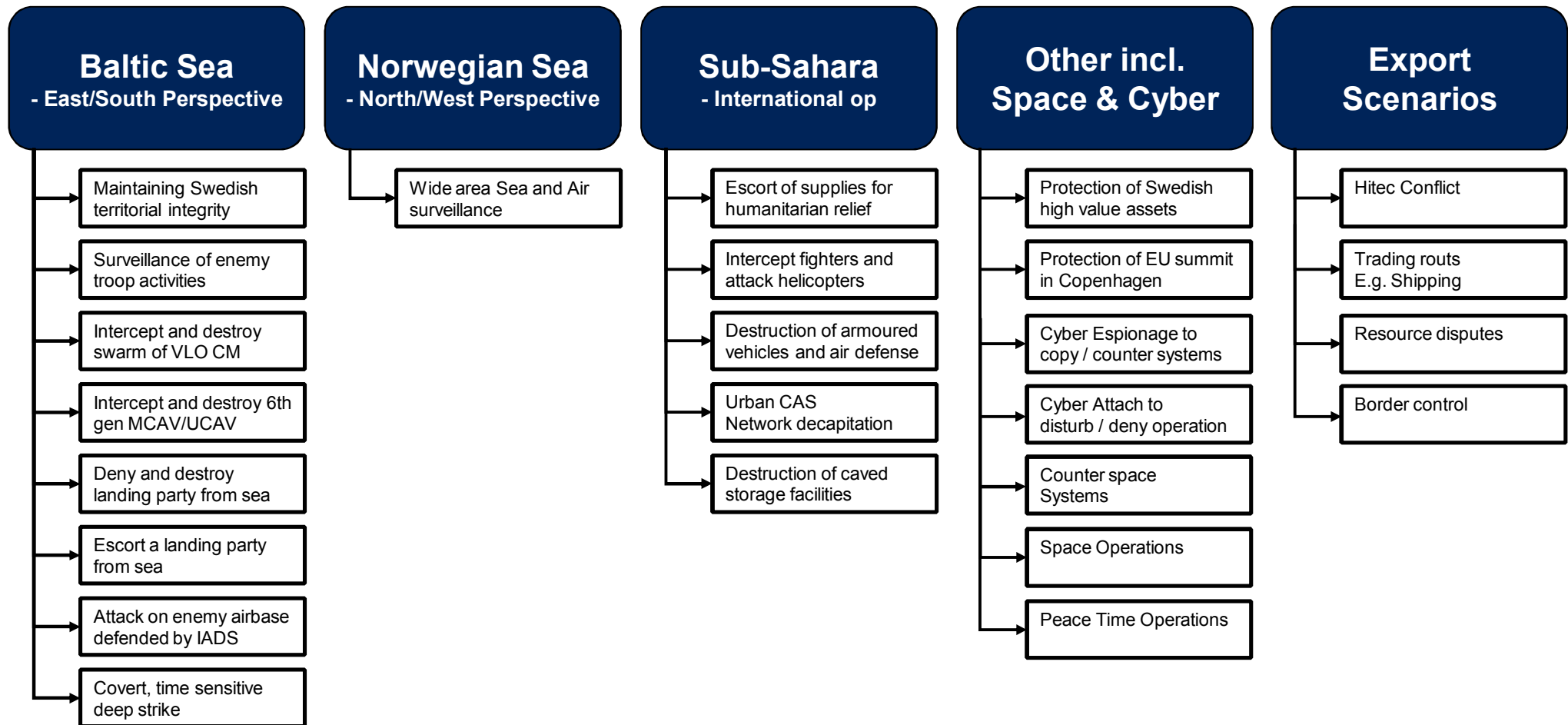
- Seamless collaboration across all domains (SoS)
- Secure Information and robust networking
- Covert and silent - if needed
- Adaptable and resilient
- Superior situational awareness

...for the future battlefield

- Complex, cluttered, deceptive, high tempo
- Wider arena and operational depth
- Targeted attacks against civil infrastructure
- High velocity / long range / energy weapons



SCENARIOS AND MISSIONS



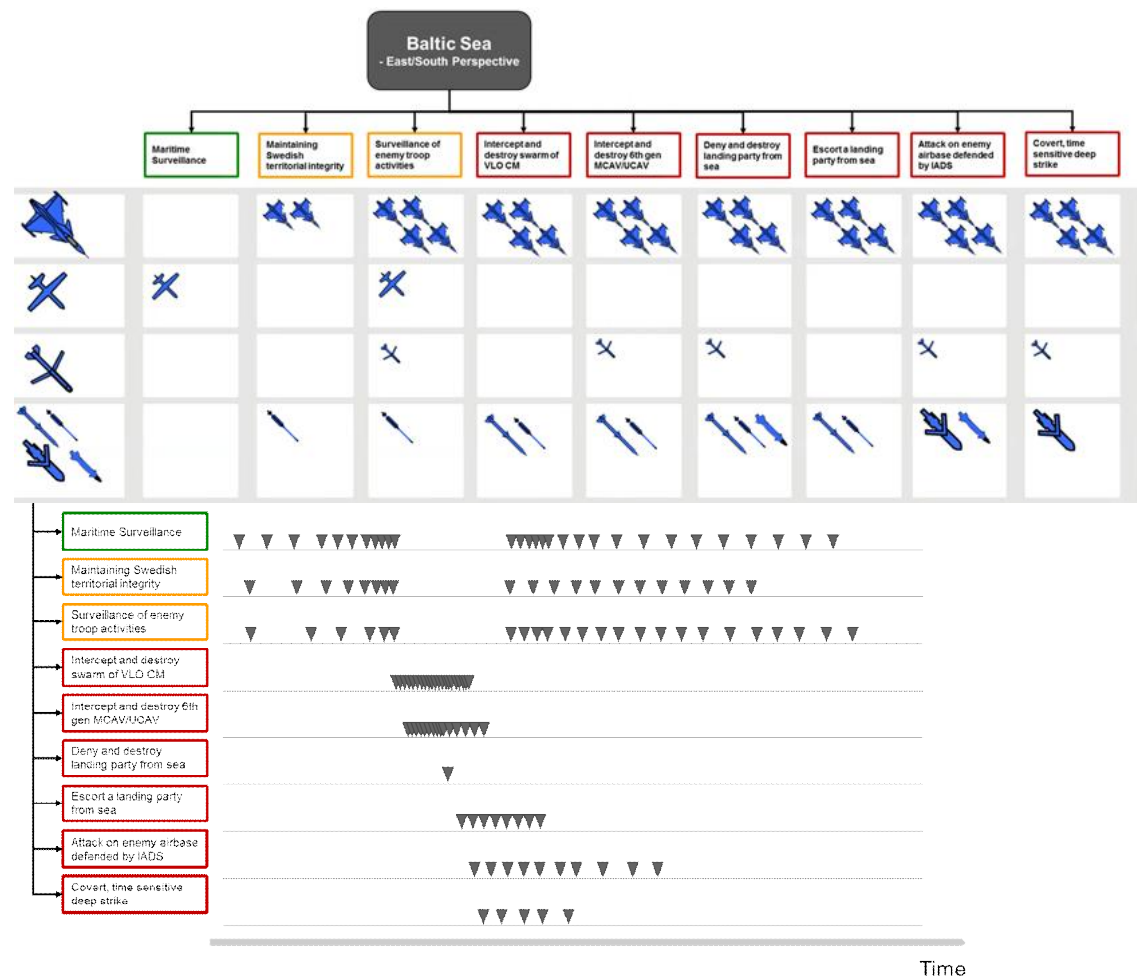
CONCEPT VALIDATION - CAMPAIGN ANALYSIS

Purpose

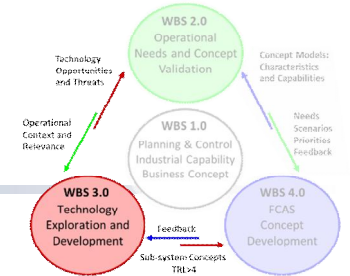
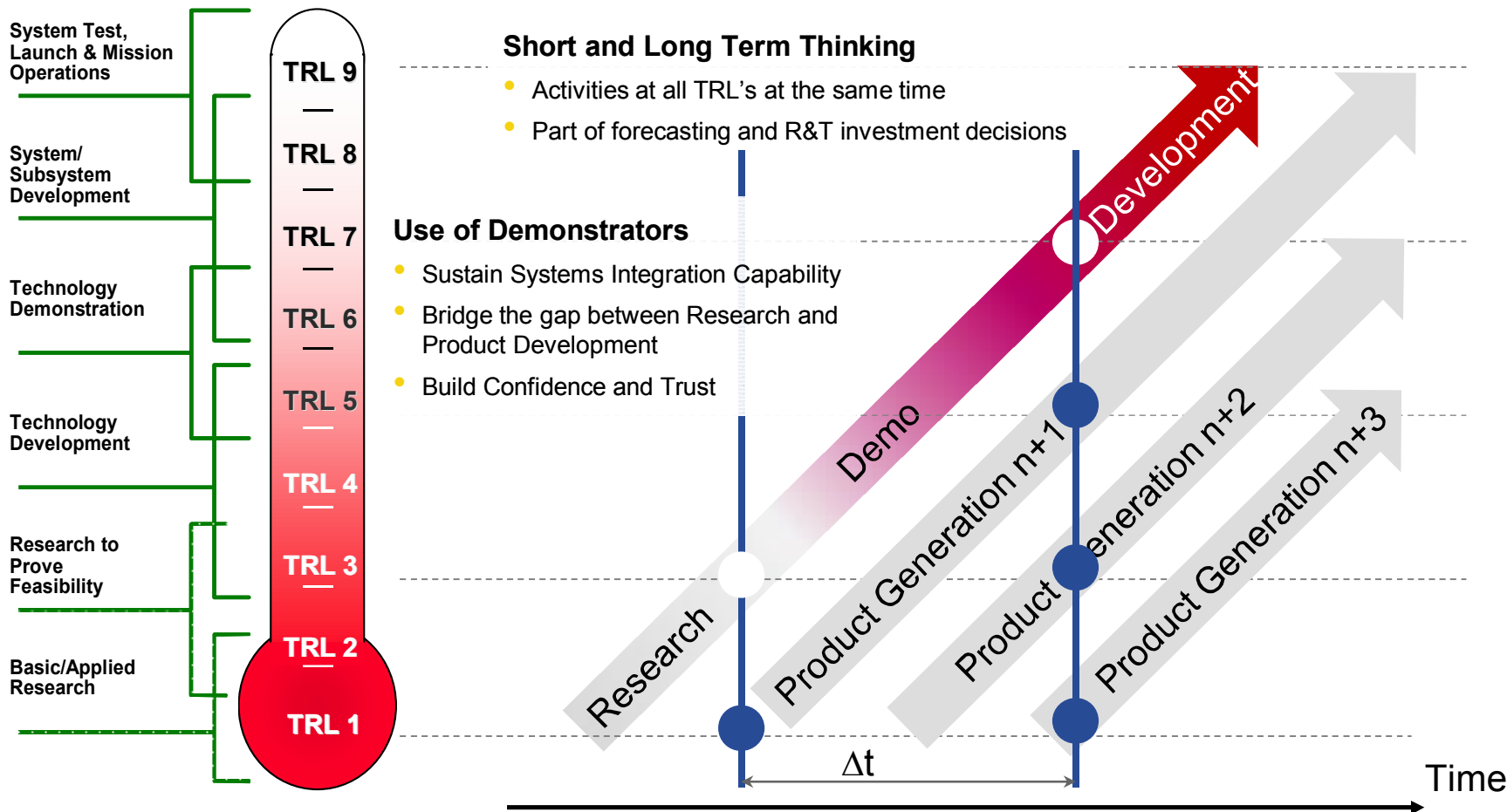
- Investigate impact on Support Activities and Life-Cycle Cost (LCC)
- Exercise method and tools
- Learn about life-cycle aspects of FCAS

Method

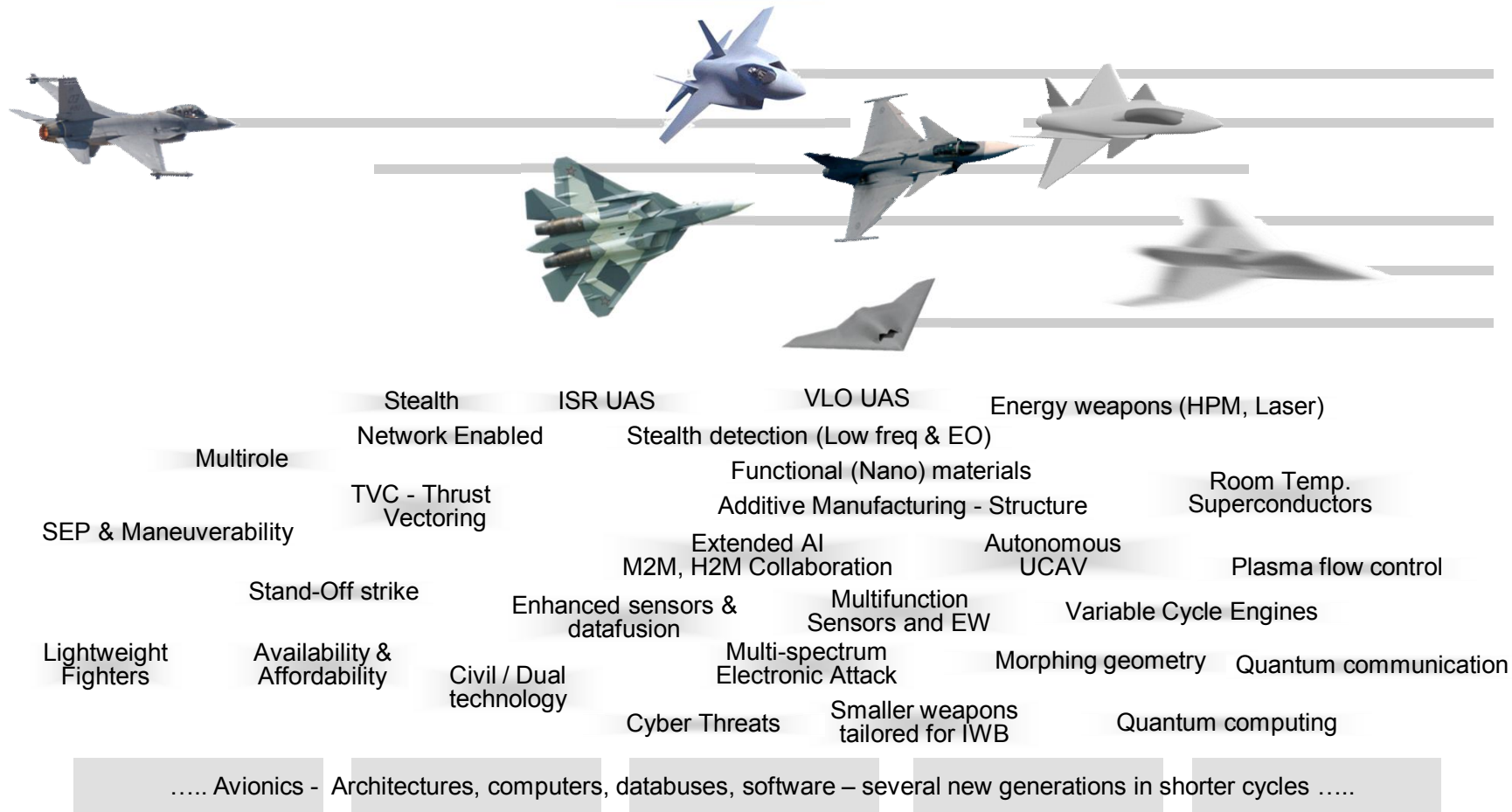
- Based on FCAS SoS concepts and CONOPS
- Simulations of a FCAS SoS and its Support System during a campaign
- Provide input (activities and consumables) to LCC calculations



EXPLORING AND DEVELOPING TECHNOLOGIES



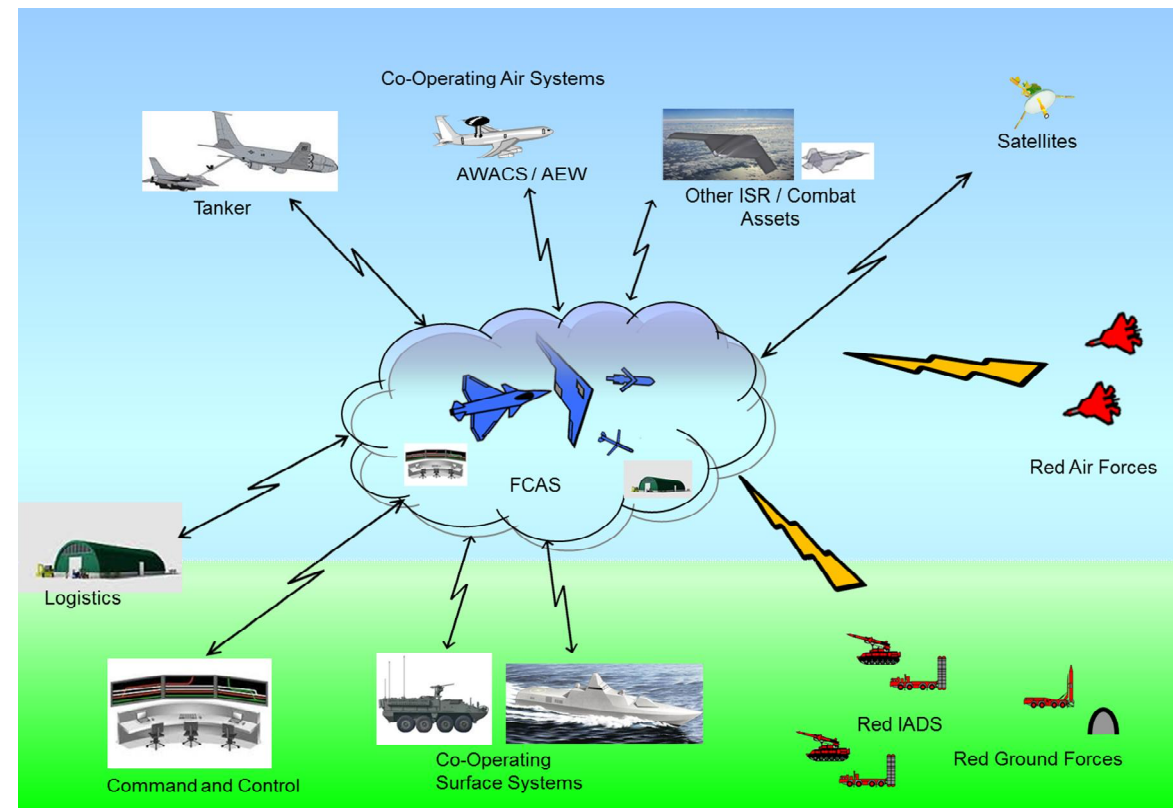
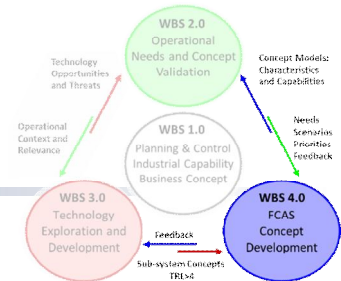
TECHNOLOGY TRENDS - OPPORTUNITIES AND THREATS



FCAS CONCEPT DEVELOPMENT

System of system (SoS) perspective

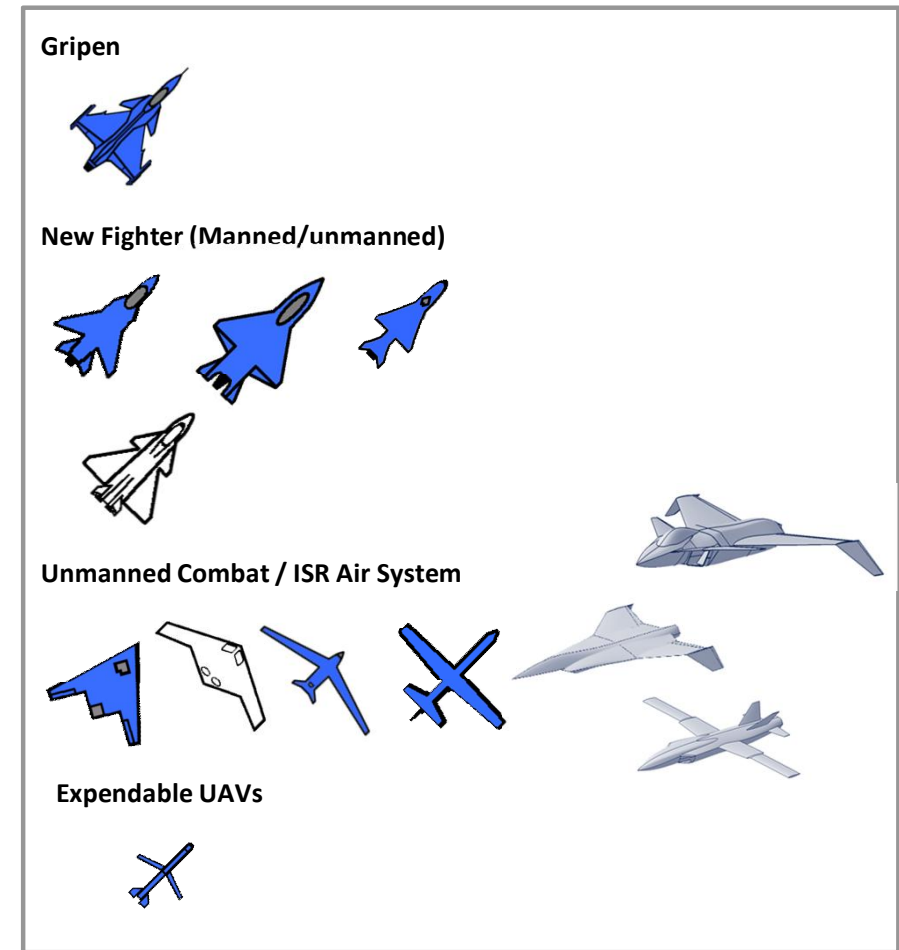
- Capabilities are based on operational needs and doctrines at a global level
- Capabilities are achieved by components and their interaction
- Need for common architectural framework
 - SoS capabilities
 - SoS services
 - SoS components and interfaces
 - SoS evaluation criteria (MOP, MOE)
- FCAS SoS is designed w.r.t the total SoS



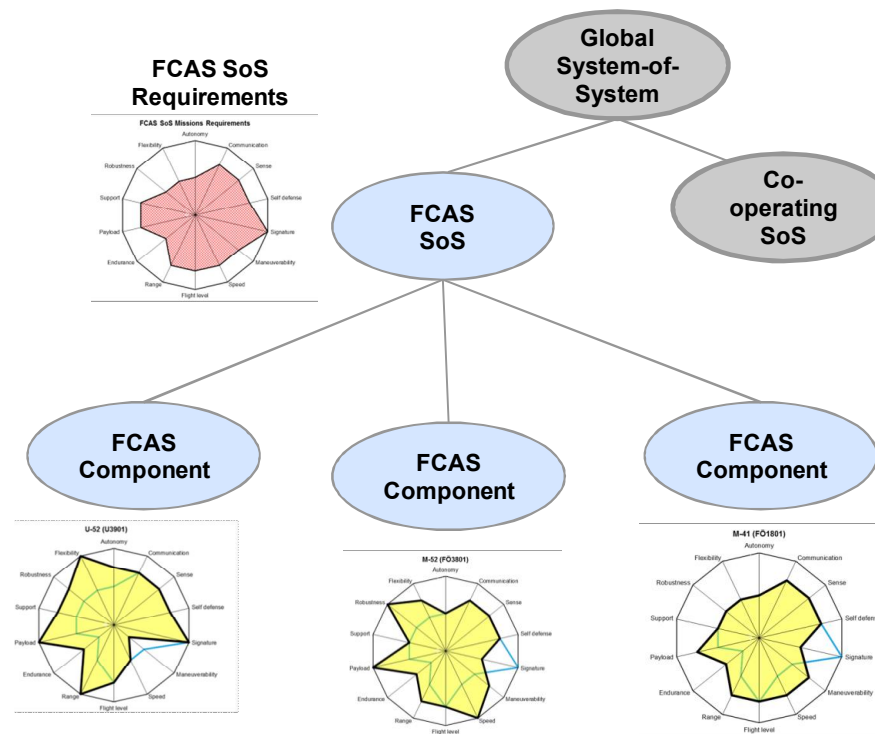
FCAS COMPONENTS - AIRCRAFT CONCEPTS

- Manned / optional unmanned aircraft systems
 - Gripen E/F, M etc
 - Small Multirole Fighter
 - Medium Multirole Fighter
 - Medium VLO Multirole Fighter
- Unmanned aircraft systems
 - Extra Small Unmanned Fighter
 - MALE (ISR/AEW UAV)
 - ISR UCAV
 - XLarge VLO UCAV
 - VLO UCAV
- Expendable UAV (ADDER/MALD)

Example of configurations to evaluate and understand future options.

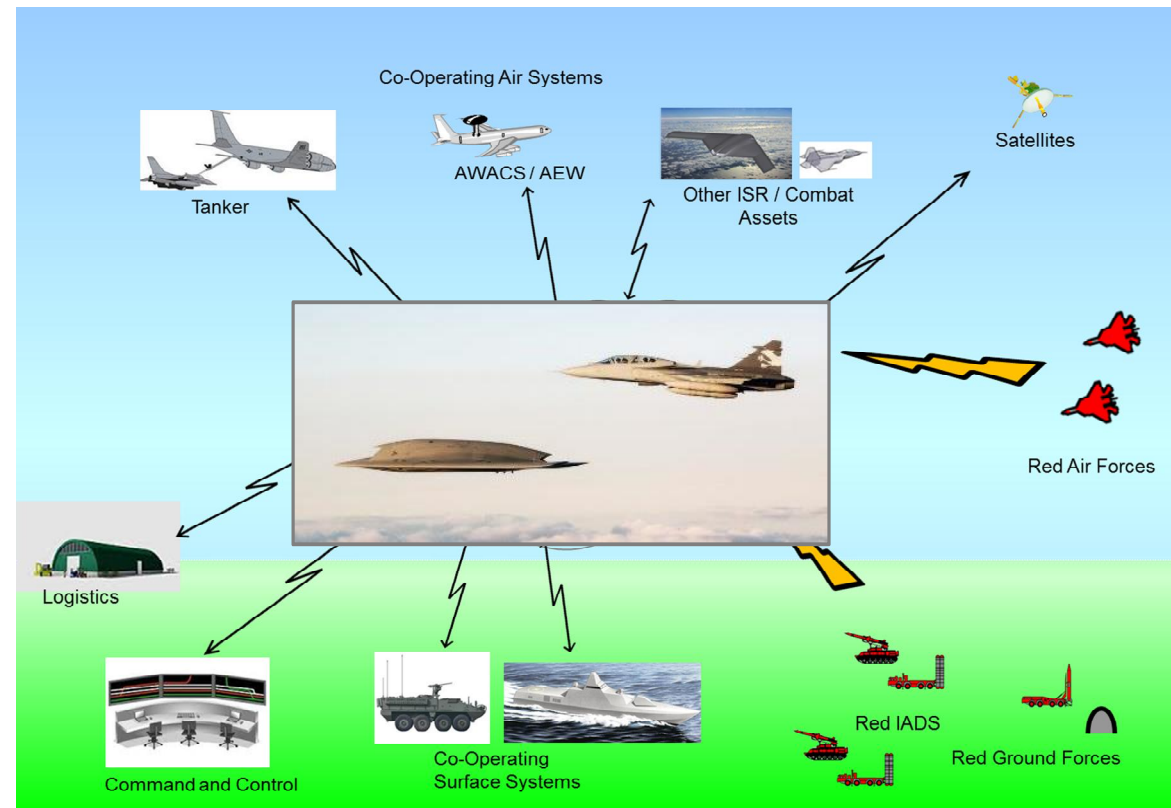


COMBINING COMPONENTS INTO **FCAS SoS CONCEPTS**



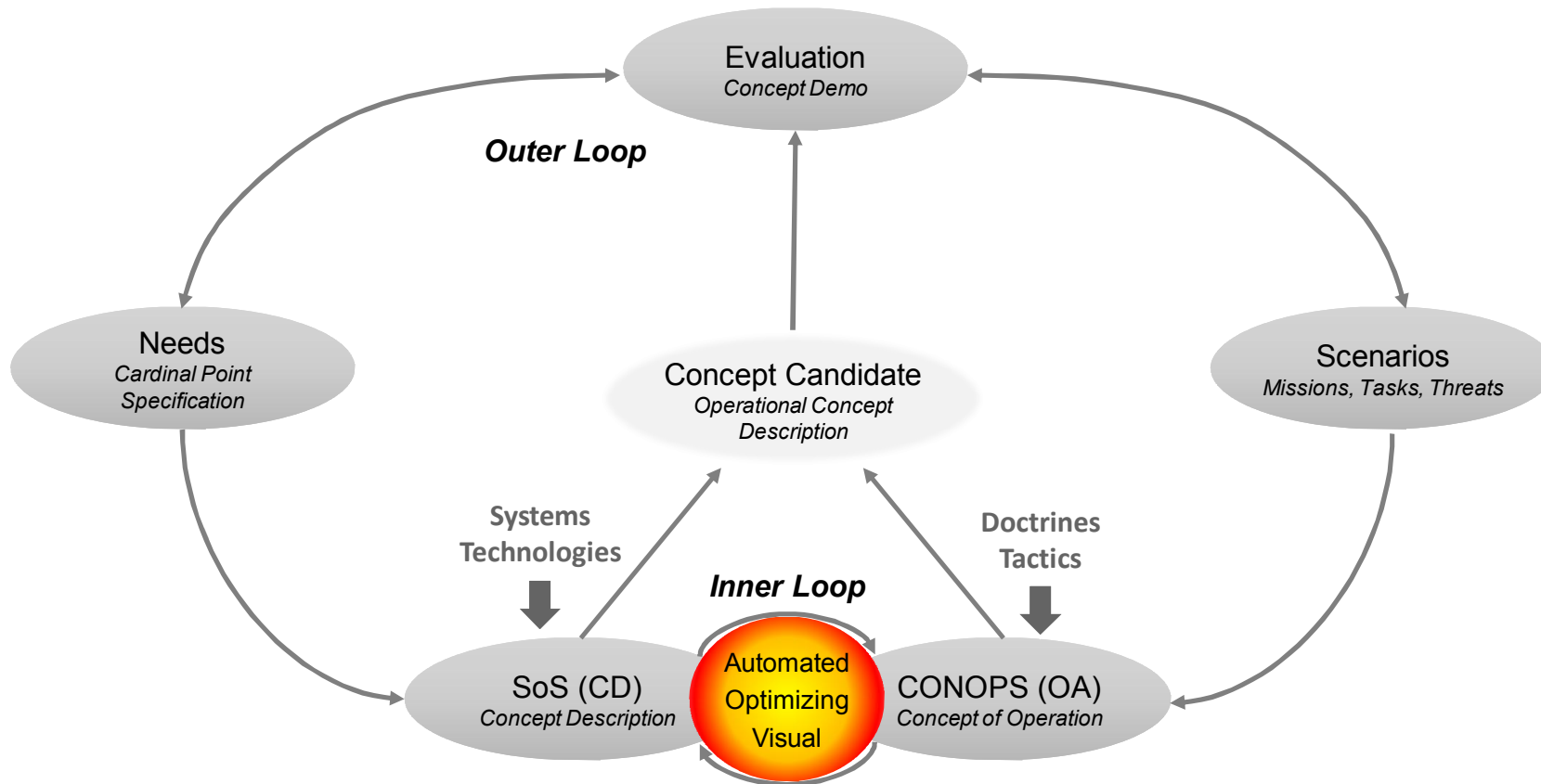
FUNCTIONAL CONCEPTS - ACROSS COMPONENTS

- Collaborative behavior
 - Manned systems
 - Manned and unmanned systems
 - Unmanned system
- Use of AI
 - Decision support
 - Autonomous systems
 - Cognitive sensors, radios etc
- EW and Multi-function sensors
- Covert and robust communication
- Navigation and time
- Weapons, Precision Engagement
- Training

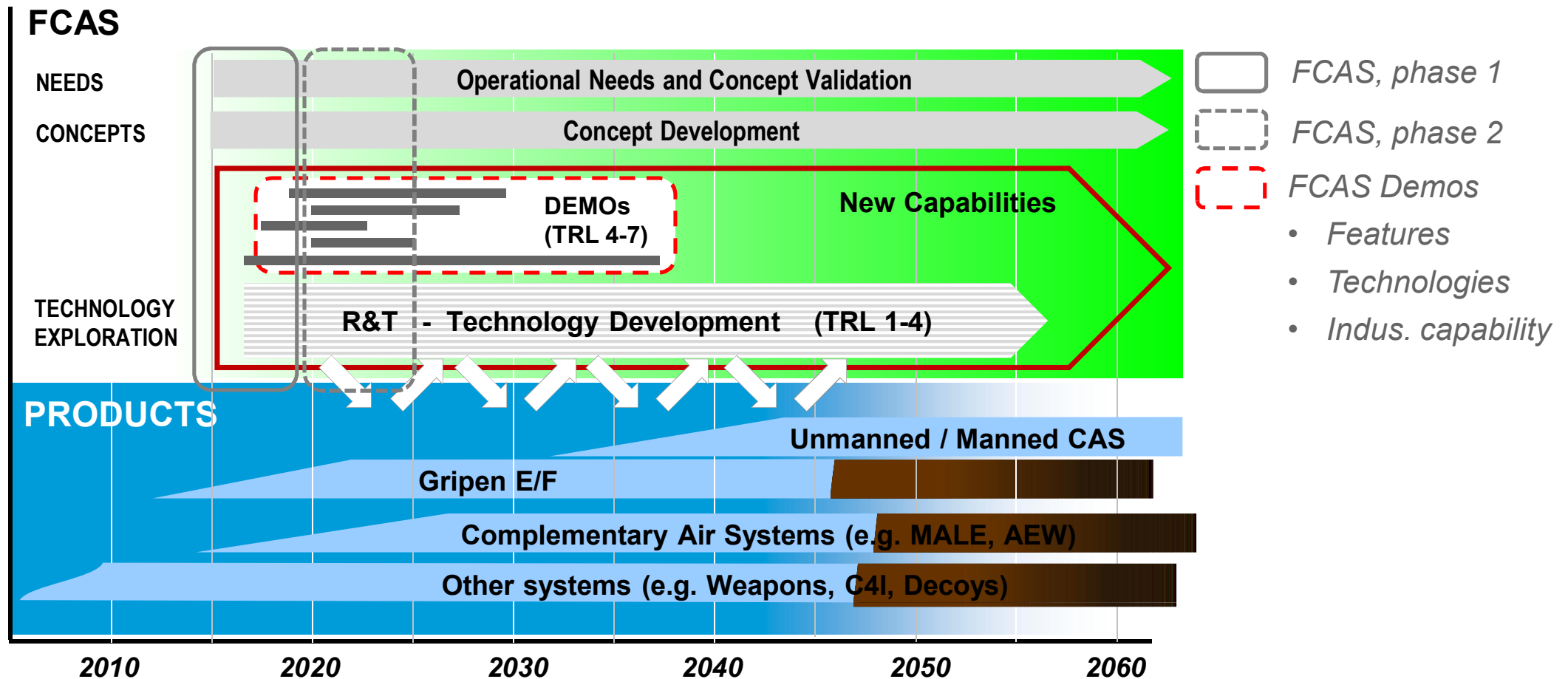


NEXT STEP I - **FASTER**

FCAS Concept Design Space Exploration



NEXT STEP II - DEMOS



THANK YOU !
QUESTIONS ?

