SAAB
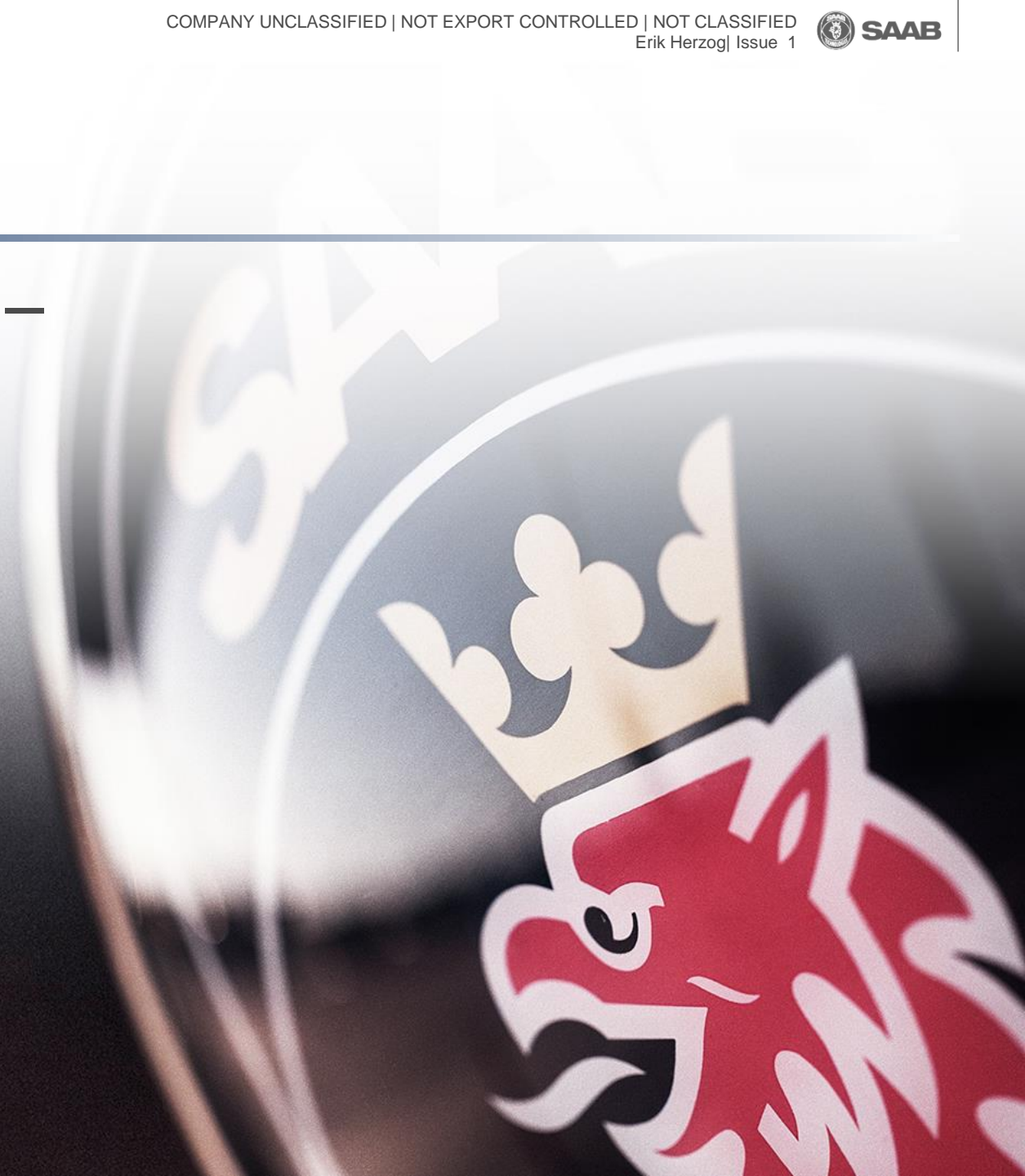
BROWNFIELD TO GREENFIELD – UNDERSTANDING THE TRANSITION

ModProd 2019

Erik Herzog, Ph.D., CSEP
SAAB Technical Fellow – Systems Engineering

FIELD THEORY

- Today, the term **brownfield project** is used in many industries, including software development, to mean to start a project based on prior work or to rebuild (engineer) a product from an existing one.

- In many disciplines a **greenfield project** is one that lacks constraints imposed by prior work. The analogy is to that of construction on greenfield land where there is no need to work within the constraints of existing buildings or infrastructure
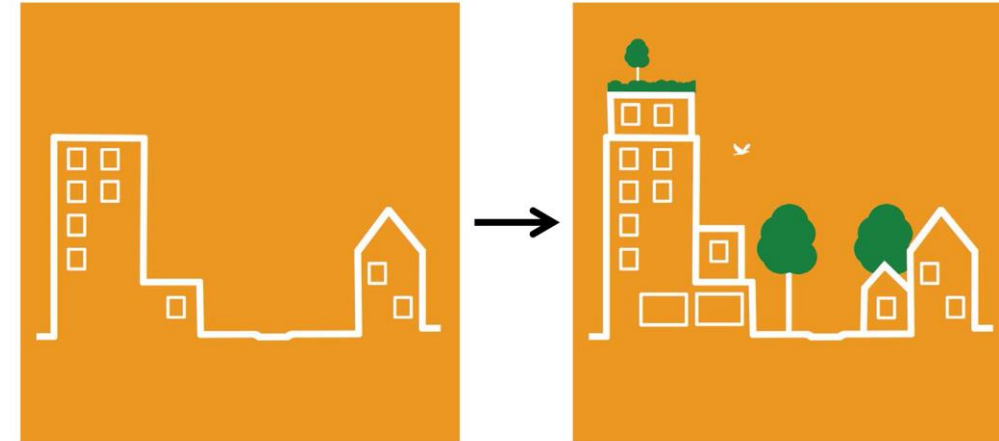
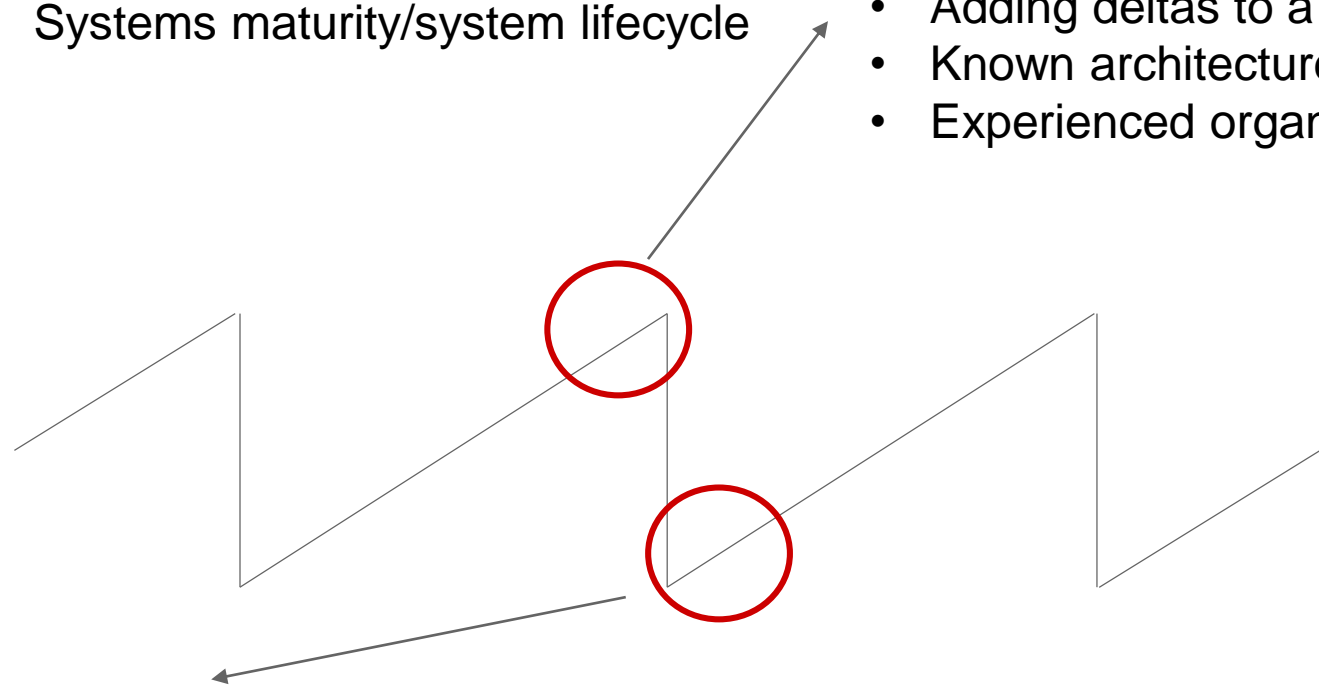# SAAB AERONAUTICS – DEVELOPMENT PROJECT EXAMPLES

Gripen E

Globaleye

TX

Gripen C/D MS20

TRANSITION FROM BROWN TO GREENFIELD

Systems maturity/system lifecycle

- Adding deltas to a highly mature system
- Known architecture and constraints
- Experienced organisation – in terms of brownfield development

- No baseline system available
- New architecture, constraints are not known
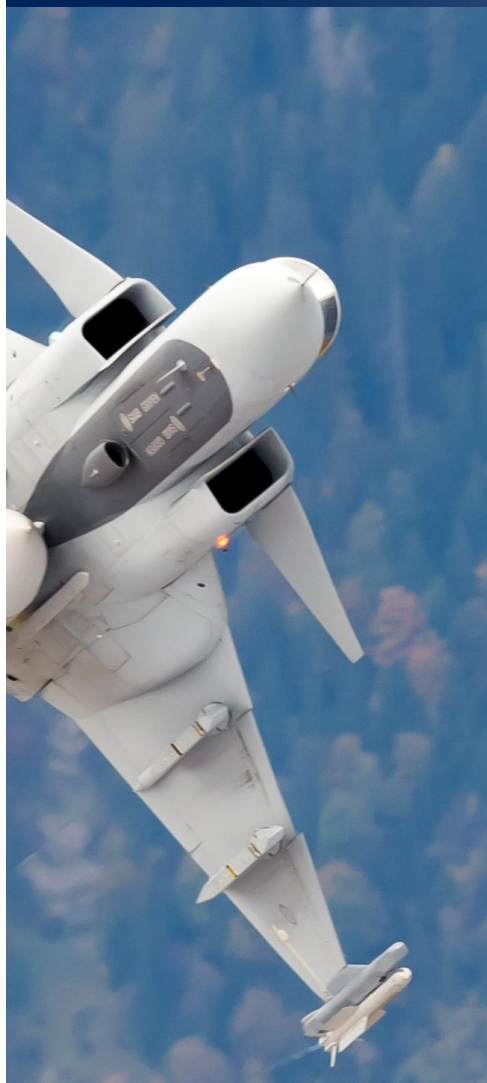- Inexperienced organisation - in terms of greenfield development

UNDERSTANDING SOME ASPECTS OF THE TRANSITION

CONCEPT STUDIES

Brownfield

- The system, with its merits and deficiencies is well known and understood

- New capabilities need to interact with a known set of existing ones

- Given what is available there are **not so many free variables** when investigating concepts

- Consequently
    - Studies can be made brief and there is little merit in evaluating multiple alternatives

Greenfield

- Little knowledge of the characteristics and reasonable expectations on future capabilities

- Capability interfaces must be carefully designed

- Given what is open there are **many free variables** when investigating concepts

- Need to consider variation between concepts

- Consequently
    - Studies must be thorough and evaluating multiple alternatives

PROCESS AND MEASUREMENTS

Brownfield

- Process has been executed multiple times

- Few synchronisation points

- **Experienced** teams and small solutions spaces
  - Limited risks

- **Delegation** is key to efficiency

- Inherently known performance
  - Value of process measurements is limited

Greenfield

- First time execution

- Multitude of synchronisation points

- **Inexperienced** teams in the new envirnment
  - Large risks

- **Centralisation** is key to efficiency and understanding of progress

- Development performance is difficult to asses
  - Explicit measurement key to assessing progress

ARCHITECTURE AND ARCHITECTS

Brownfield

- Architecture is set – for and for bad
  - Merits and constraints are known

- **Little need for an indenpendent architecture function**
  - Architectural decisions can be delegated to development teams

- Most probable the architecture is broken
  - But everyone has to live with it!

Greenfield

- Need to set the architecture and make every team conform to it

- Need to constantly evaluate progress and performance
  - And take necessary corrective actions

- **Architecting is a central element in development**

- Unproven architecture – risk for ugly surprises
  - But it is not broken yet

INTEGRATION

Brownfield

- New functionality added are largely independent of other concurrent development efforts
  - Large stable core

- Little or no need for a centralised integration strategies

- **Local integration planning**

Greenfield

- No, or little core, lots of interdependencies

- Integration planning and sequencing is essential
  - Anatomies or similar essential for understanding relationships

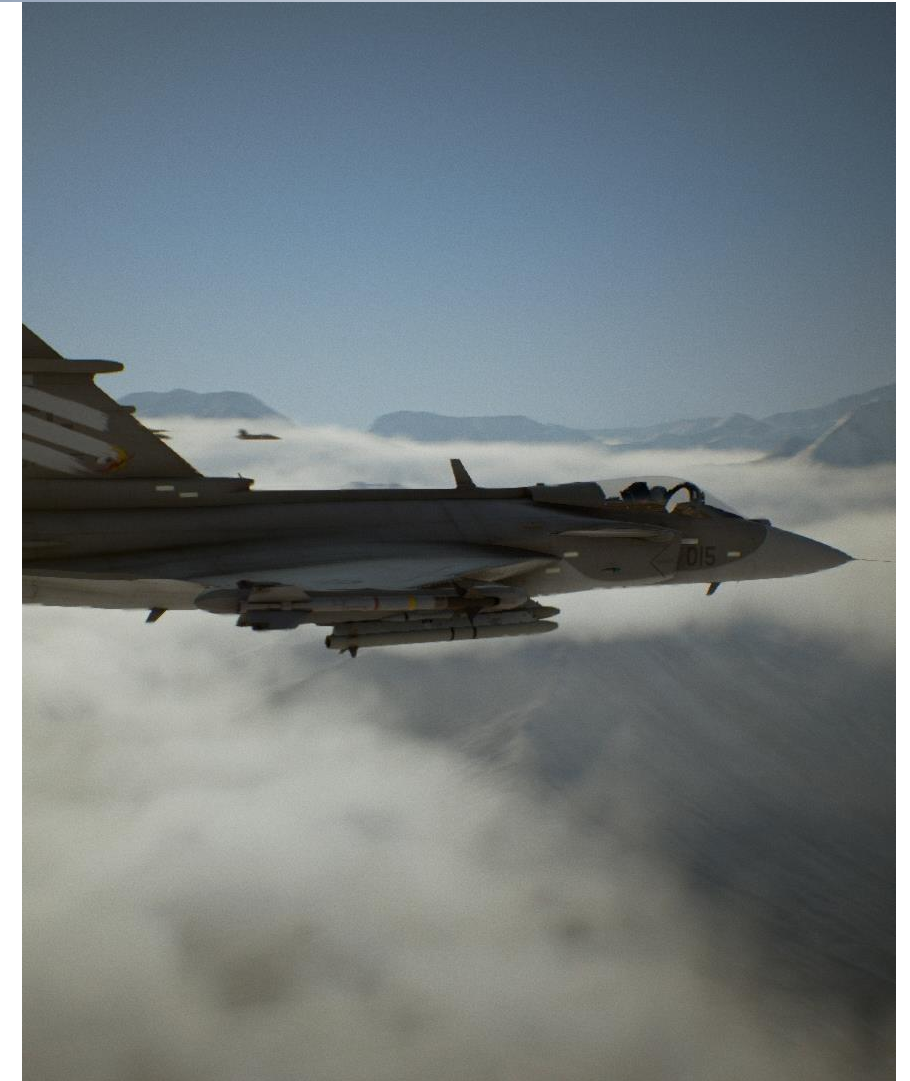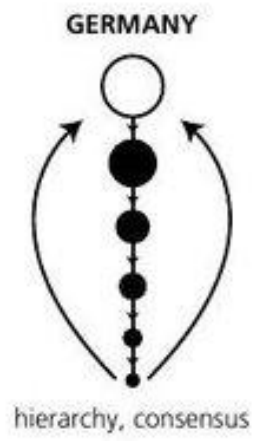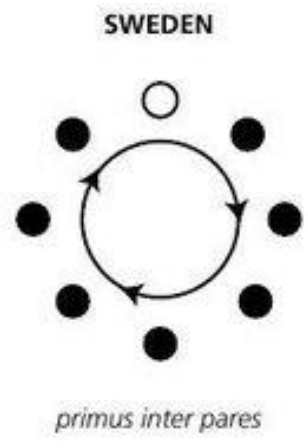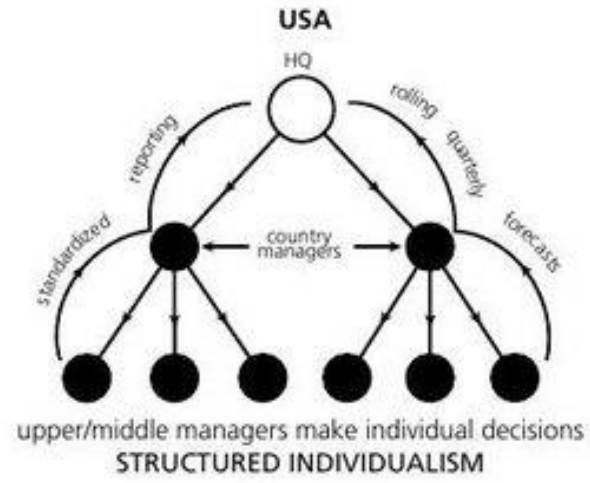- **Central integration planning**

TACIT KNOWLEDGE AND TRAINING

Brownfield

- Gradual adjustment of development methodology

- Knowledge is in the wall

- Training is **only for the newbies**

Greenfield

- Disruption in development methodology

- There are no wall

- Training is a mechanism to build the new consensus
    - **Mandatory for all roles**

LEADERSHIP STYLES

CONCLUSIONS

- Starting over is an opportunity to introduct new tools and methods

- But the real investment must be in individuals and in the organisation to effectively manage the transition to the **Green fields**

- Because **greenfield** development is radically different compared to **brownfield** development

- For Greenfield development **MBSE** is a desirable subset of the necessary **Systems Engineering** competences

THANK YOU FOR YOUR ATTENTION!