BROWNFIELD TO GREENFIELD – UNDERSTANDING THE TRANSITION

ModProd 2019

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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 environment
  - Large risks
- **Centralisation** is key to efficiency and understanding of progress
- Development performance is difficult to assess
  - 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 independent 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

UK

UK leadership

USA

USA leadership

FRANCE

FRANCE leadership

SWEDEN

SWEDEN leadership

GERMANY

GERMANY leadership

autocratic

primus inter pares

hierarchy, consensus

STRUCTURED INDIVIDUALISM
CONCLUSIONS

• Starting over is an opportunity to introduce 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!