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hybrid event

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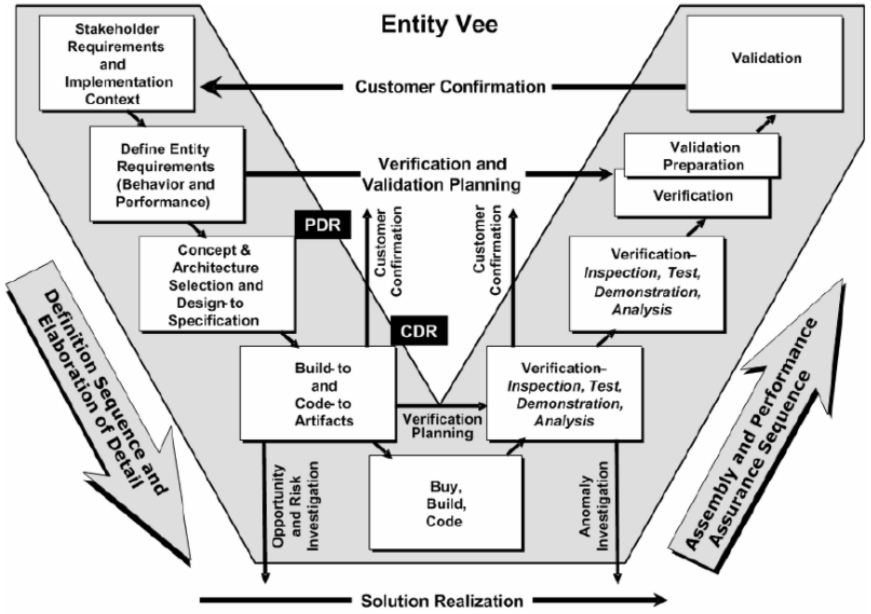
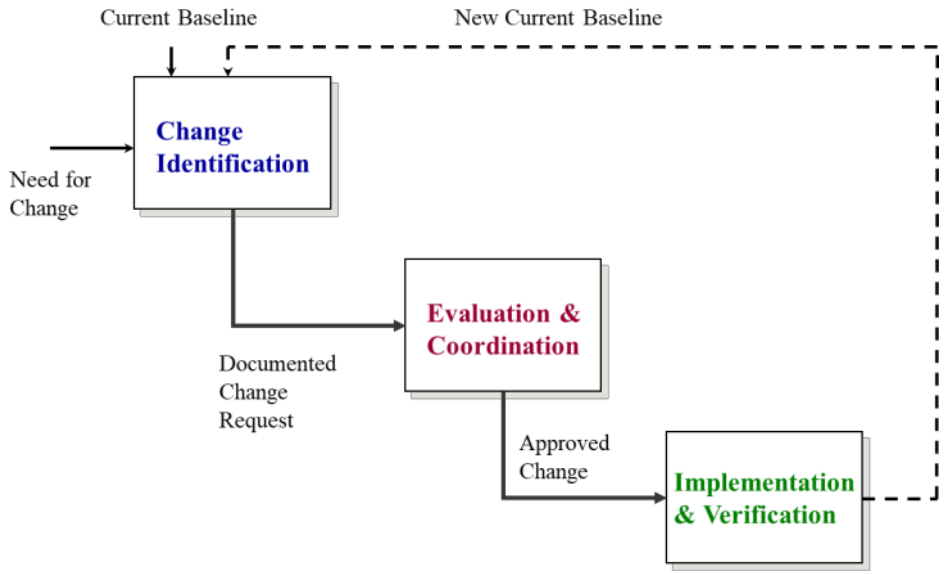
Configuration Management Meeting a 4-box Development Model

# Don't Look Outside the Box

# Once upon a time …



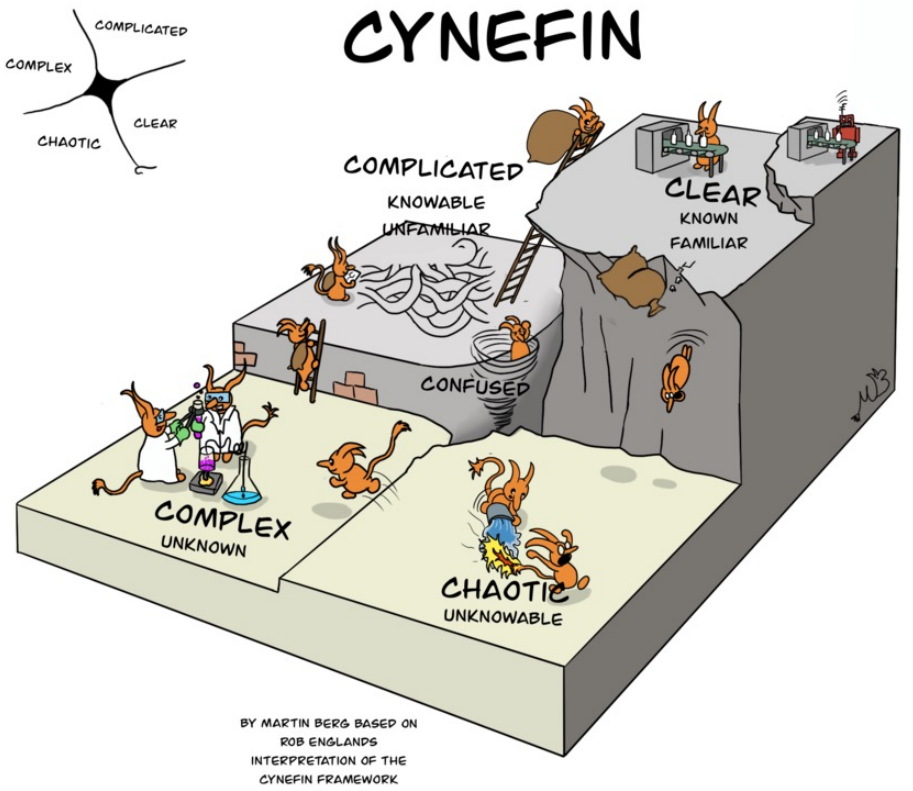




This was development

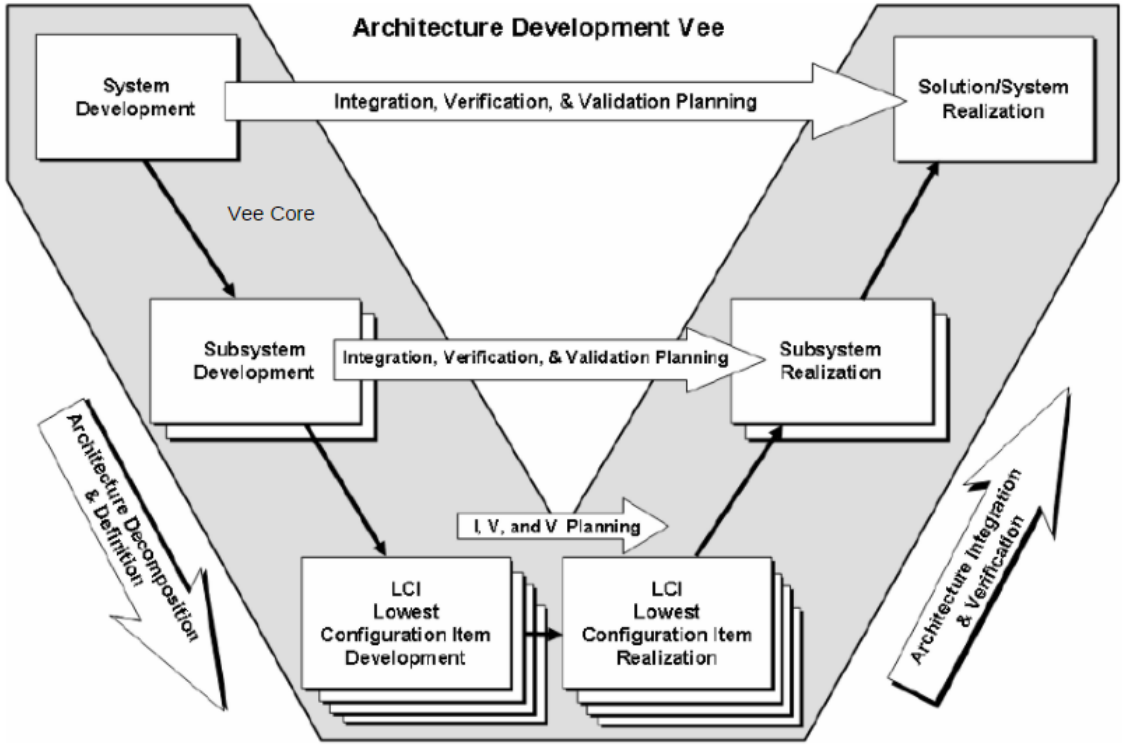
This was Configuration Control

And all was good!

Then we had to accept that complex system development is a non-predictable activity



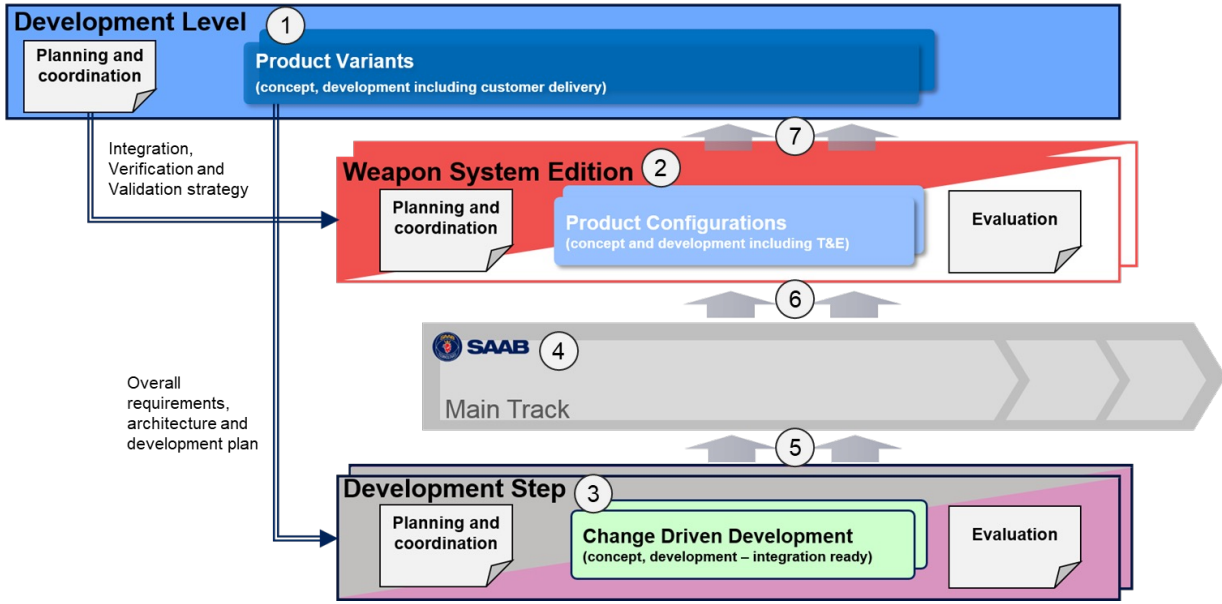
# Vee models under non-predictability



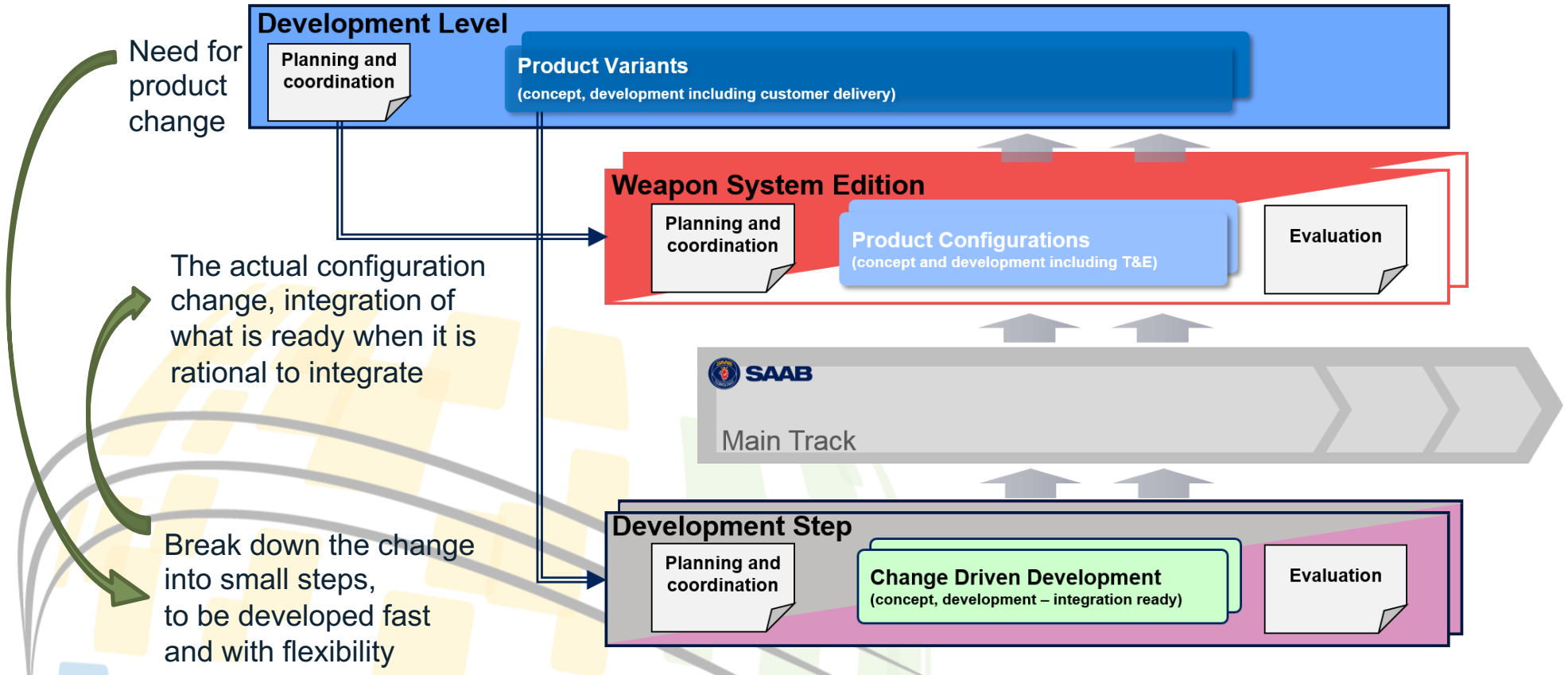
# So we changed to a 4 - box development model

# The 4-Box Development Model

- **Development level**: Customer and authority communication – **Slow!**
- **Weapon System edition**: Integrated products, in test aircraft or simulators – **Flexibility in content!**
- **Development step**: Incremental development of capabilities and components – **Flexibility in approach!**
- **Main Track**: Warehouse for all product data – capturing what is available for integration



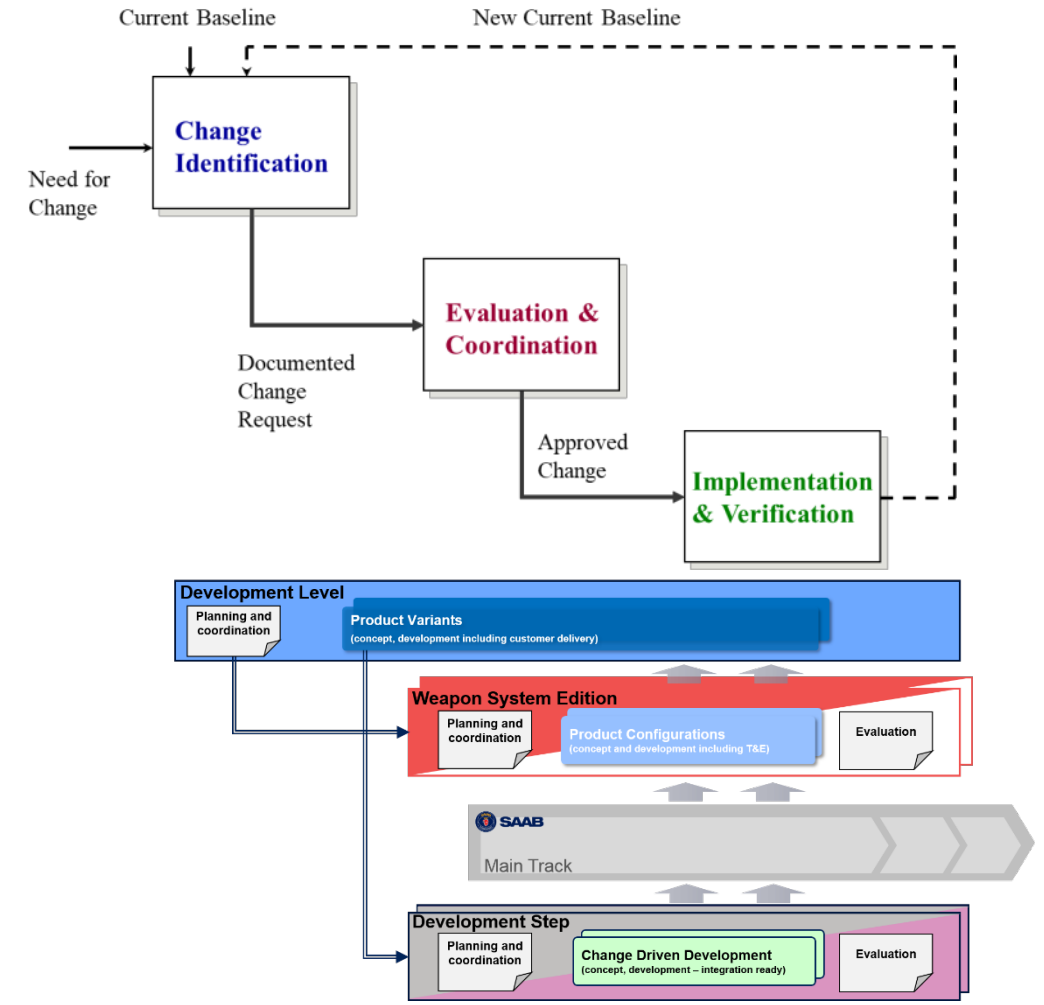
# The 4-Box Development Model



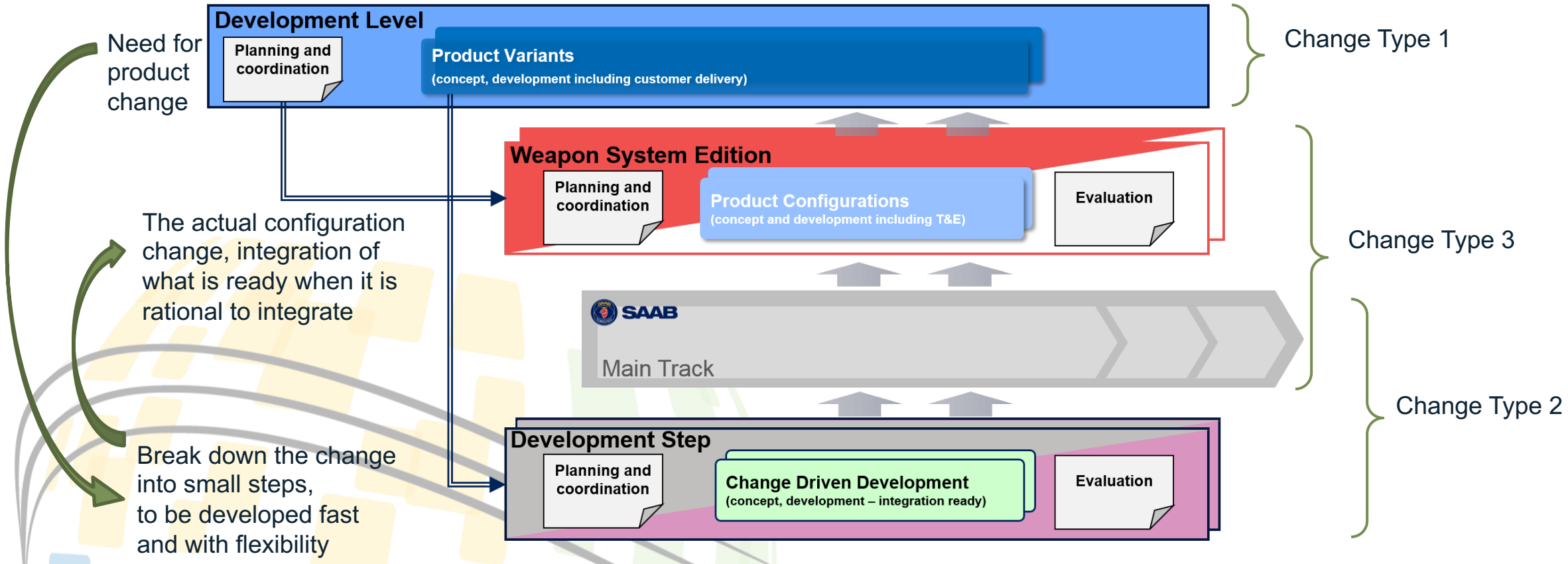
# Consequences for Configuration management

# Configuration Management - Challenges

1. How to manage situations when a **planned change is not completely ready** – when there is a good integration opportunity?
2. What is the **baseline** when there are **multiple changes in progress**?
   - Will the current, ongoing change activities **deliver the desired capability**?
   - Which of the current, ongoing change activities will **actually be completed** when the new, additional change is completed?
3. Configuration change management is performed in all three boxes – **with the same rule set applied** – is this reasonable?



# Four boxes – Three Change types



# Change types comparison

| | Change type 1<br>(Development Level) | Change type 2<br>(Development Step) | Change type 3<br>(Weapon System Edition) |
|---|---|---|---|
| **Change scope** | **Large scope**<br>Focused on end-user capability | **Small scope**<br>Focused on defining activities that can be completed within a short time frame | **Scope depends on what is available for integration**<br>Focused on a configuration item for inclusion in a product configuration |
| **Time horizon** | **Long**<br>Potentially it may take years to realise the desired capability. | **Short**<br>Each change item is scoped for realisation in a short time | **Short**<br>The change item is designed for inclusion in the next product configuration change |
| **Change dynamics** | **Static**<br>Changing the scope of the change item will likely affect contract scope | **Dynamic**<br>Changes of scope are expected as development progresses and more product knowledge is attained | **Static**<br>Change items are defined at a late stage where there is a good understanding of what is available |
| **Board decision maker** | Product and/or program management | Project and/or team leadership | Chief engineer and/or technical manager |



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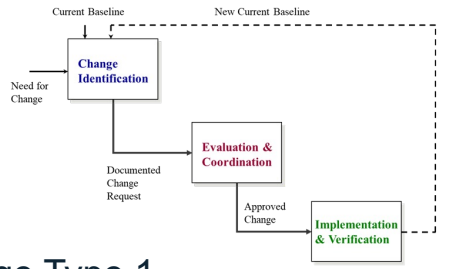
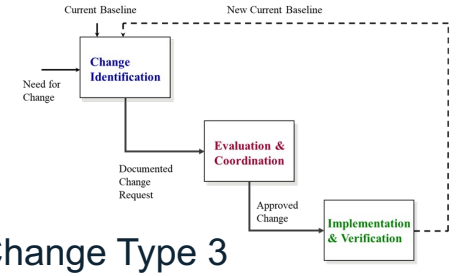
# Four boxes – Three Change types

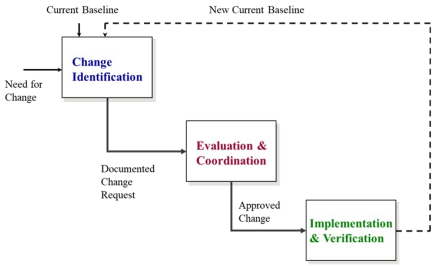



Change Type 1




Change Type 3

Change Type 2




Need for product change

**Development Level**

Planning and coordination

**Product Variants**
(concept, development including customer delivery)

**Weapon System Edition**

Planning and coordination

**Product Configurations**
(concept and development including T&E)

Evaluation

The actual configuration change, integration of what is ready when it is rational to integrate

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Main Track

Break down the change into small steps, to be developed fast and with flexibility

**Development Step**

Planning and coordination

**Change Driven Development**
(concept, development – integration ready)

Evaluation



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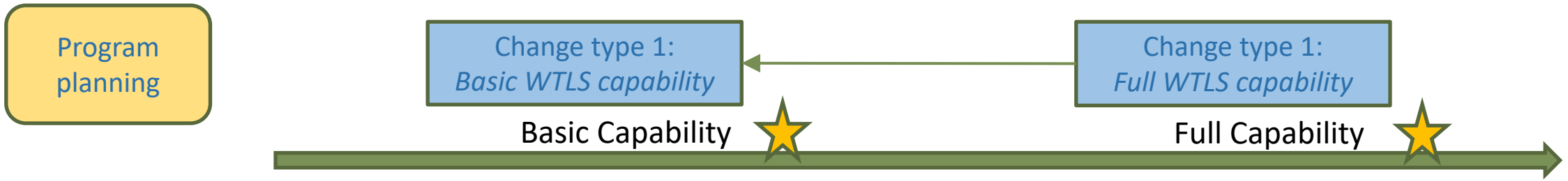
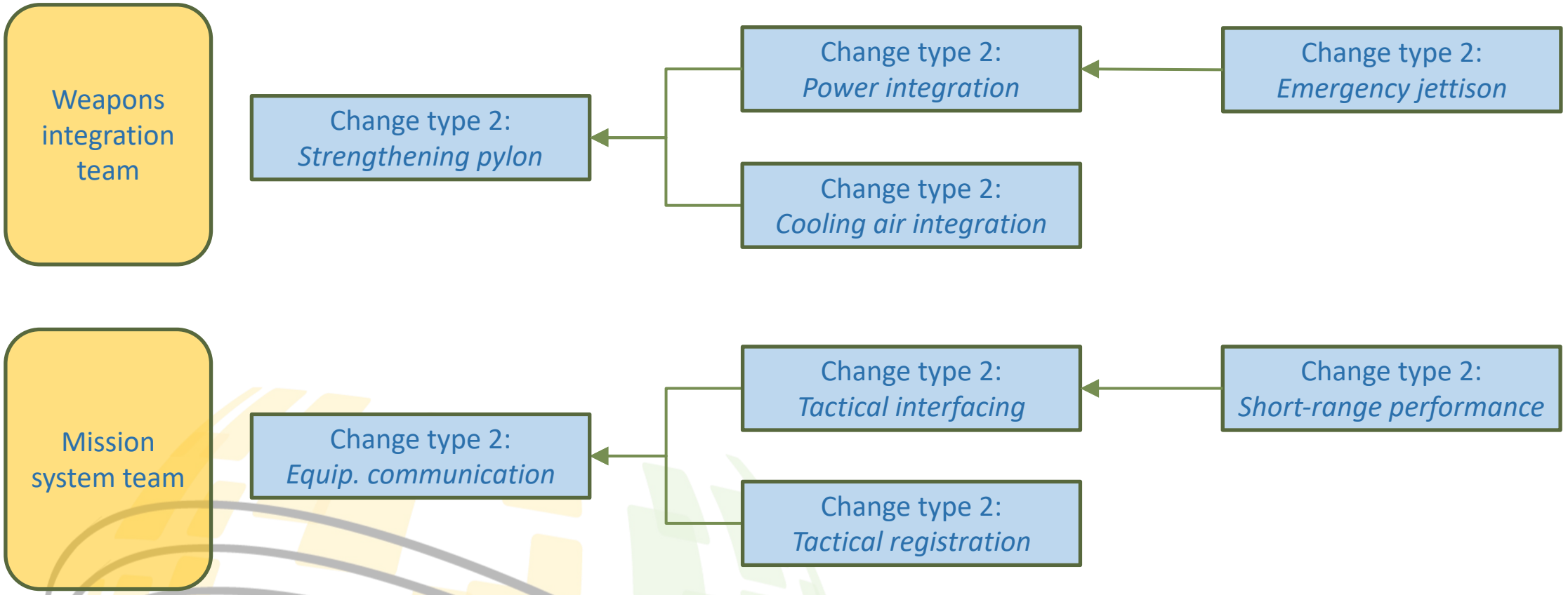
# Example

# WTLS – wing-tip light sabres

# Configuration Planning (initial), change types 1

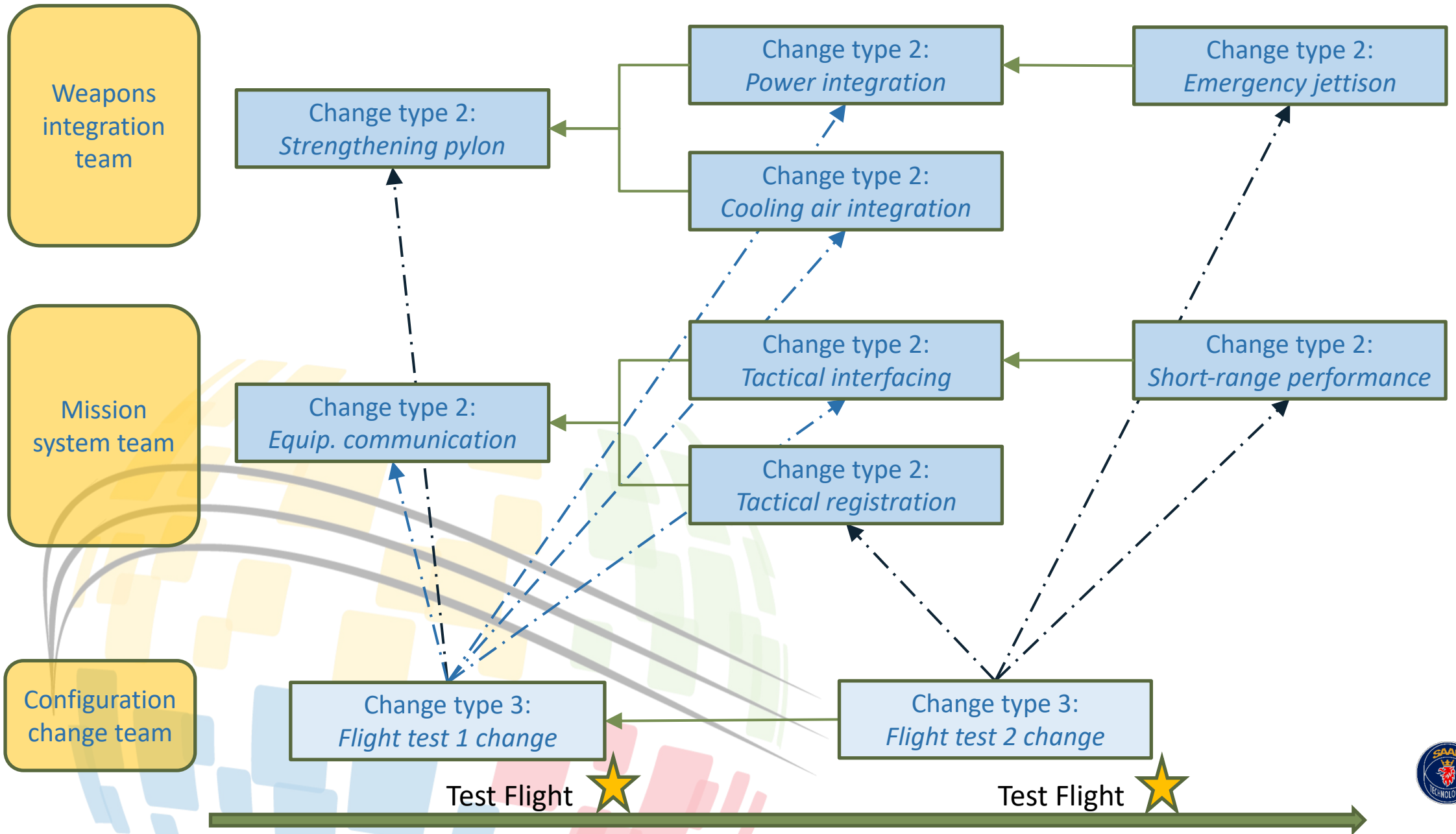


# Configuration Planning (initial), change types 2

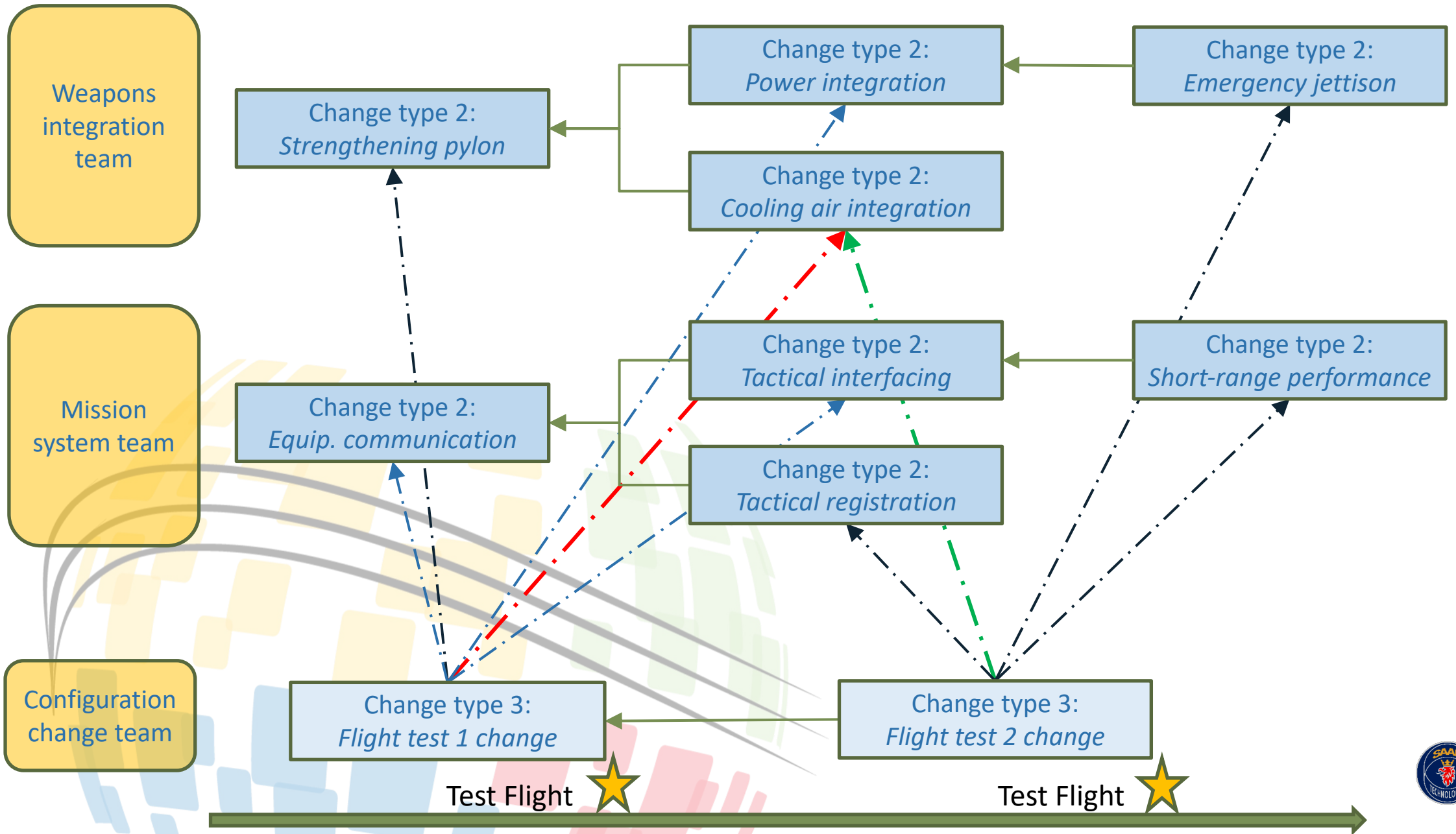


# Configuration Planning (initial), change types 3

# Configuration Planning (initial)



# Configuration Planning (initial, replanning)



# Conclusions

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- At Saab Aeronautics, contemporary Configuration Management practise in poorly aligned with Systems Engineering practise
  - As a consequence Configuration Management is viewed as a rigid administrative add-on
- Our proposal is to extend the Configuration Management vocabulary to three distinct Change types:
  - Distinct scopes
  - Adapted for the change time frames
  - Considering the dynamics of each change
  - Tailored Configuration Control Boards
- This will allow for a more focused and distributed approach to Configuration Management and Complex systems development
- All engineers (and project managers) need to have an understanding of Configuration Management

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