



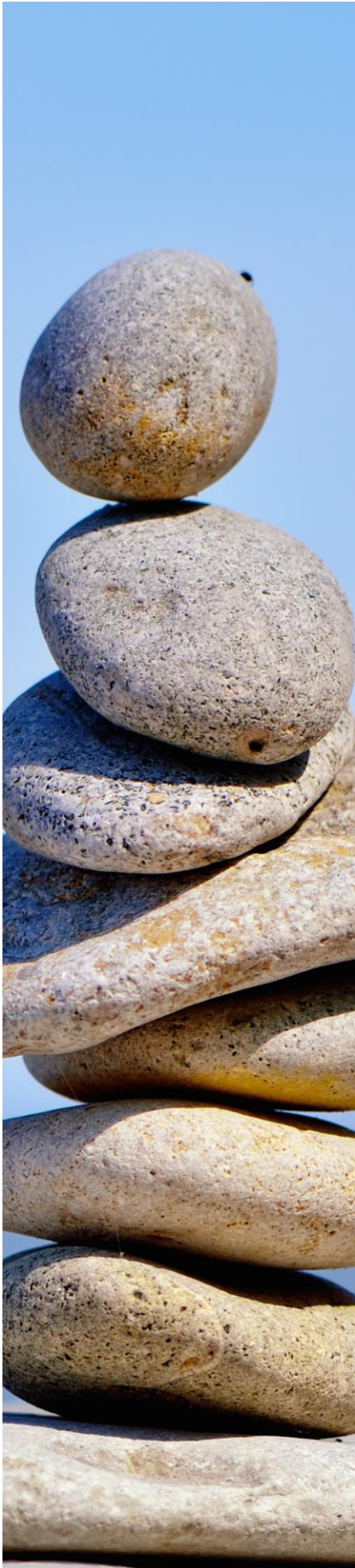
Time versus Tempo: Addressing agile tensions in defence

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Part of a series of papers exploring different
programme and project tensions.



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Introduction

The pursuit of the benefits of agile development in defence acquisition and capability development programmes faces many challenges from the wider environment.

Beyond the buzzword, “Agile” is a philosophy and development framework with benefits to delivering products and capabilities. But - as with any other approach - get the application wrong, or apply it in the wrong environment, and tensions will arise that derail your programme.

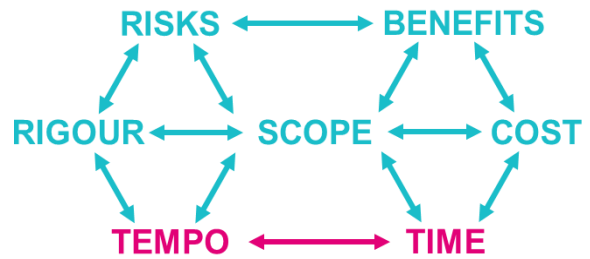
A key tension is that between timescales and iterations: time vs tempo.

The defence procurement & delivery environment, which can be very complex, poses key challenges. Using a hypothetical scenario derived from various work by BMT for the UK Ministry of Defence, different aspects of this tension are analysed and potential approaches are proposed.



Project and programme tensions

Many different tensions exist in a project or programme, all of which affect quality of deliverables. Frameworks and techniques exist to help address the tensions, but can also exacerbate them.



Programme Tensions, from APM Introduction to Programme Management

One tension arises from **time** vs **tempo**; the period in which the project needs to occur, and the number of stages or iterations that are required to deliver the scope. This is heightened where agile development environments are used to deliver capabilities that are required by users in specific timeframes.

Time *noun*

1. The **system** of those **sequential relations** that any event has to any other, as past, present, or future; indefinite and **continuous duration** regarded as that **in which events succeed one another**

In a project or programme context, time is synonymous with **schedule**:

Schedule *noun*

1. a **plan of procedure** ... for a proposed objective, especially with reference to the **sequence of and time allotted for each item** or operation necessary to its completion

Tempo *noun*

1. Characteristic **rate, rhythm or pattern of work** or activity

Tempo is about the rhythm and heartbeat of a project. In agile environments, tempo is also referred to as **cadence**:

Cadence *noun*

1. a **rhythmic pattern of events** that provides the steady **heartbeat of the development process**

When time and tempo are matched, or one is dominant, things can run smoothly. When they don't, the tensions can derail your project or programme.

Scenario: A defence maritime project

The complex and dynamic nature of capability development and integration, particularly in large platforms, causes tensions with changing interfaces and having to meet milestones set in time.

In this hypothetical and simplified scenario an upgraded but significantly different capability is required for naval platforms, and the system is composed of both hardware and software components. Because of a large IT element, and the iterative nature of the development, the programme elects to utilise the Scaled Agile Framework® (SAFe) for its core system development.



Programme phases (SAFe Programme Increments – PI) are established typically consisting of 8 or 9 Iterations (sprints), and PI Planning events are held that include the entire programme, not just the IT development teams, so that the whole of the programme works to the same cadence.



The system is complex with many interfaces to other onboard systems, and changes can only be made to vessels during their set maintenance periods within rigorous test & trials environments. The introduction of the new system will also require changes to onboard ways of working and training of personnel.

“

The Department † wants to speed up procurements by deploying ‘agile’ programme delivery more widely, but this does not sit comfortably with contracting approaches designed to minimise costs, or the Department’s existing culture and skills, and requires better transparency on progress.

Improving the performance of major equipment contracts,
UK National Audit Office (2021)
(† UK Ministry of Defence)

How to balance time and tempo

What challenges may the programme team face from tensions between time and tempo, and how can it respond to these challenges?

The following three examples are tensions that arise and how they could be addressed.



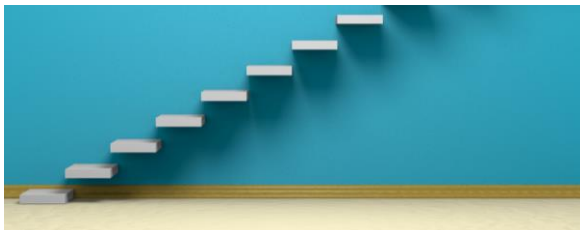
Over the horizon delivery

Long term destinations versus a short term detailed planning view



Delivering an initial capability

Using projects to address the customer's Operationally Viable Product challenge



Continuous capability improvements

Running DevOps alongside large scale capability change management

Over-the-horizon delivery

The challenges of short-term detailed planning versus long-term destinations in an uncertain and changing environment.

In the scenario, the Programme is working in Increments according to SAFe philosophy, which means it has around 16-18 weeks (ie 8-9 iterations or sprints) of short-term detailed plans.

This is **left-to-right planning**, 'laying the track' to run on as we go. Obstacles to avoid or deal with are identified, and immediate opportunities are seized. Priorities are set in conjunction with the customer, and products (or updates) are created by the end of the Increment.

But it takes a long time to step through the stages to make changes to a complex warship. There may be many different complex changes to make, and system information is needed early - between 1-2 years in many cases.

The system delivery end date is driven

by fleet maintenance schedules and vessel availability. Information may be required now for a system that has not been developed yet, and formal test & trials have to be scheduled too.

So this requires **right-to-left planning**, to work back from these fixed 'Olympic moments' (but which may indeed change if the fleet maintenance programme changes).

The planning of each Programme Increment is always required to look beyond the immediate horizon, but maritime customers often require even greater focus on future outcomes.

The onus is therefore on the robustness and use of the long-term **roadmaps** that are developed.

Each track laid ahead is an iteration, whilst looking up to check the direction of travel is forward planning



A strategic vision of the future

A delivery roadmap sets the direction of travel and is executed on a large scale. It provides a strategic handrail for the programme.



Roadmaps are typically associated with technology development, but are equally capable of capturing all aspects of the programme.

- They are developed jointly with customers and other stakeholders so everyone shares the same map
- They identify interfaces, dependencies and logical steps, and articulate the programme complexities
- They highlight where decision points are needed and what options may be available
- They help spot the threats, and visualise assumptions made in the face of uncertainty
- Roadmaps can be used in conjunction with Technology Readiness Levels (although the future is rarely linear)
- Roadmaps help provide **foresight**

“*Roadmaps are generally concerned with longer timeframes than a project plan. They deal with more strategic levels of information, and are often concerned with navigating through areas of high uncertainty. The multi-layered approach differentiates a roadmap from a project plan; this helps to present information in a way that aids understanding of linkages and dependencies between activities and across organisational boundaries.*”

Delivering an initial capability

In Agile philosophy the concept of a Minimum Viable Product (MVP) is the minimum level needed to validate the original hypothesis. But this is not always appropriate.

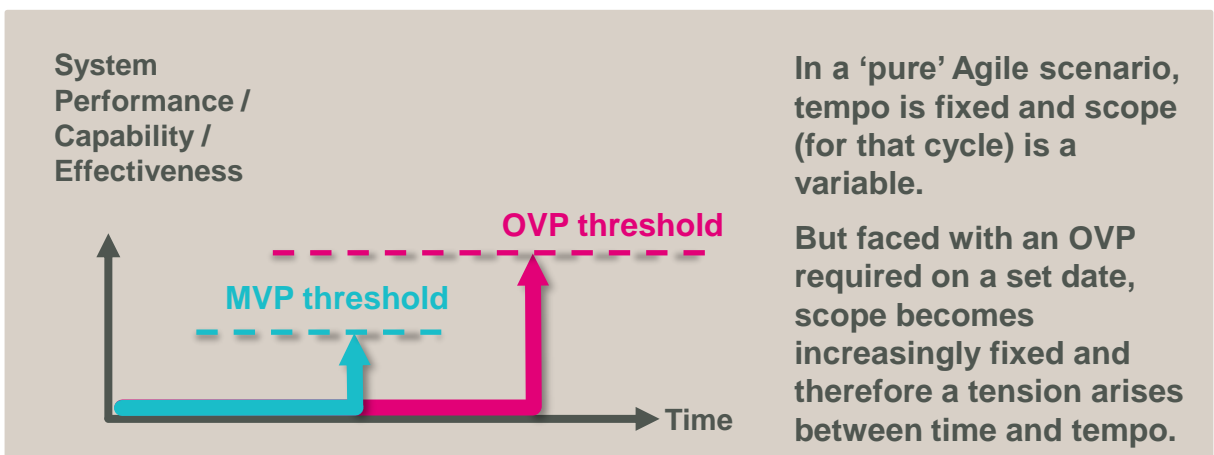


In an Agile environment we want to build fast and build iteratively, learning and refining as we go. The MVP has just enough useful features so that the capability can be used. This can work for a new idea or capability:

- Define a hypothesis (eg increased intelligence at sea)
- Build an MVP (eg a UAV with 30 mins flying time and still images)
- Evaluate the MVP (fast feedback - does it give value)
- Pivot or persevere (do something else or continue)
- Implement new features (eg 1 hour flying time, video)

But in our scenario we are replacing an existing important capability with a large footprint and significant on-board interfaces. There is not a similar freedom in time and money, or an environment to prototype and test all the key interfaces. And we cannot run old and new systems side by side in order to address the risk of capability shortfall. Value can only be created when we replace the existing system, but we cannot do that until the existing capability of that system is met.

There is therefore a capability threshold we need to reach before we can deploy and use the system operationally – an **Operationally Viable Product (OVP)** where the OVP is greater than or equal to the concept of an MVP.



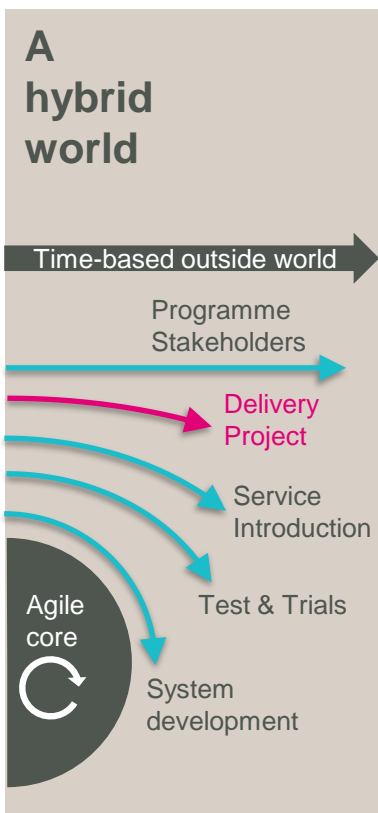
Dealing with initial capability frictions

If the stakeholders are anticipating an OVP at a required time, and the programme is working to a set tempo and MVP, then a hybrid delivery environment is needed to deal with the tensions.



At its core the programme in the scenario is looking to operate to a SAFe model for its engineering development and delivering an MVP. But this is at odds with the external world needing a high level OVP at a set time with significant linear processes to follow in order to deploy.

Therefore, like the layers in an onion, the programme wraps different activities around the core agile environment, leading towards the customers in the outer layer.



The critical penultimate layer that takes up the tension is a **delivery project**, forming a critical buffer that looks to translate between the tempo of the agile core and the timescale of the outside world. It addresses the challenges of the interface with customers, end users, platform approval authorities and other stakeholders.

The 'delivery project' term is recognisable by non-agile stakeholders used to the language and culture of linear activities, but works in an agile world to the same cadence as the rest of the programme and using similar controls and reporting as the rest of the programme.

The delivery project works with the customer to coordinate the wider capability integration and oversees the system delivery onto the vessel. It manages the long-term delivery **roadmap** on behalf of the programme, and translates the customer delivery expectations into the stories and features required by the core system development team and suppliers.

Behind its window to the outside world, the delivery project can support the value streams and Agile Release Trains in line with the rest of the system development SAFe environment.

“

The Department † declares key project milestones as achieved, without the intended capability always being delivered at that point. Departmental guidance permits the declaration of a milestone even if performance does not meet acceptance criteria, or if testing to confirm criteria have been met is incomplete. The Department allows exceptions for a variety of reasons, but the most frequently used in our case studies was that progress was “good enough”, despite criteria not being met. In some cases, this affected the Department’s ability to use the capability in the way intended.

...

There is a risk that the Department’s understandable desire to respond to the challenges of modern capability acquisition, encourages a culture in which capability levels are overstated or opaque. In late 2018, the Department’s acquisition system review identified that its organisational culture prioritised the passing of milestones and securing approvals over the delivery of outputs and outcomes.

Defence capabilities – delivering what was promised,
UK National Audit Office (2020)

(† UK Ministry of Defence)

Continuous capability improvements

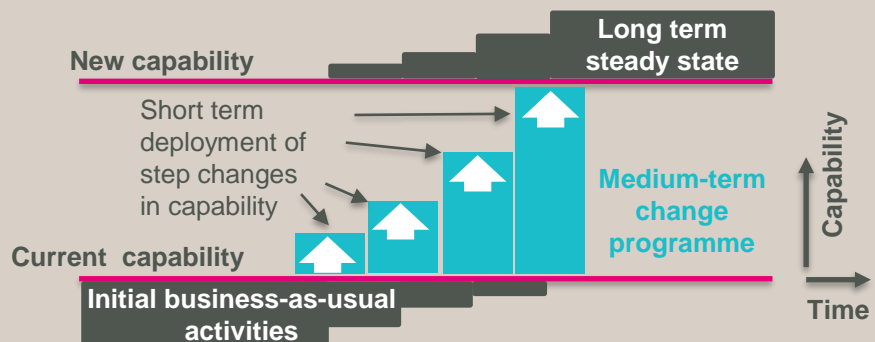
Delivering the initial viable product is only the start. Further capability upgrades will be either required as part of a long term roadmap or will also arise from operational feedback.

The manner in which these upgrades are developed may give rise to time vs tempo tensions. Two common models in particular represent the different perspectives.

Tranches delivering capability increments over time

Where a programme is constructed of a group of projects and activities structured around **tranches** - planned distinct step changes in capability and benefit delivery, enabling and supporting the transition from current to future operations.

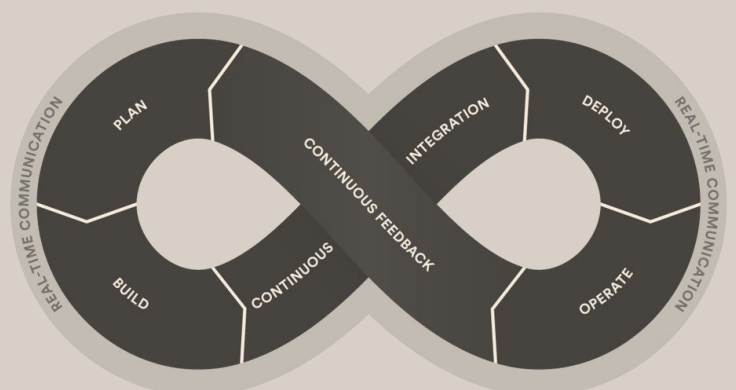
APM Introduction to Programme Management 2nd Ed.



Cyclical continuous improvements using DevOps

DevOps is a collaborative culture & environment that reduces the separation between development and operations, to deliver continuous improvements with faster feedback and time to market.

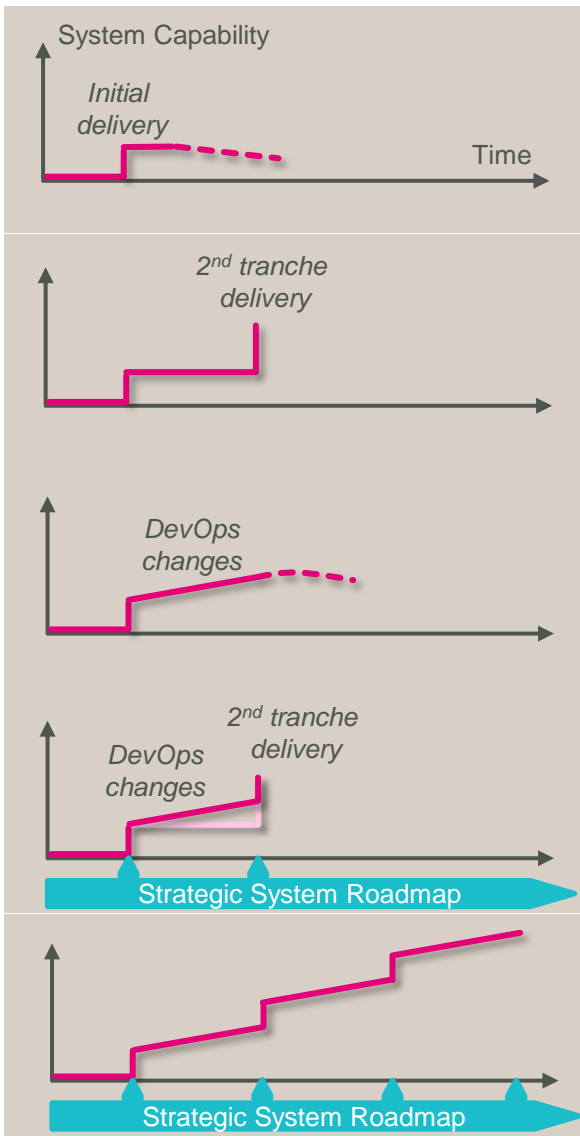
In a DevOps environment changes are made frequently and in smaller batches, with the aim of enabling low-risk releases.



Atlassian.com

A mental model for continuous capability delivery

It is possible to consider a combination of both these models in order to provide continuous capability delivery, and illustrate this by moving through the programme's options after initial delivery.



The initial system delivery is made and the Navy uses the new capability. But without improvements the initial capability achieved may decrease over time.

If the programme were just following a tranche model, the Navy would not see any improvements until the next tranche was delivered

If we undertook DevOps instead we can deliver continuous improvements, but if we don't deliver underlying larger changes we will eventually achieve diminishing returns.

Therefore we also deliver underlying changes, driven by the strategic system development roadmap as well as the feedback received through DevOps that can't be delivered in the current phase.

And the combination of DevOps and capability tranches achieves the benefits articulated in the roadmap whilst providing evergreen updates to end users.

Without timely strategic step changes, DevOps cannot continue to deliver improved capabilities or performance at a rapid pace, and overall system effectiveness reduces or ends up in a cul-de-sac. Without the tempo of continuous feedback and development from DevOps, users have to wait for incremental strategic step changes - and these may not be the right ones by the time they are delivered.

Conclusions

The time-driven defence environment bring challenges to achieving desired benefits from a tempo-driven agile approach.

Identify the tensions in your programme. These can come from unexpected directions so spend time up front to evaluate what framework and approach you wish to take and how that will work in your environment.

Apply Agile development environments when appropriate. However, it is an environment that can exacerbate tensions in a wider non-agile ecosystem, especially in where the left to right development cadence is at odds with the timescales driven by right to left needs.

Agile teams do plan. Good agile teams develop plans as they develop products – inspect & adapt. Project into the future where necessary to help take decisions.

Use your Roadmaps. Work with your stakeholders to communicate the direction of travel, but remember - targets not guarantees. Use them to help prioritise work, identify risks and manage options.

Structure your programme. Use delivery project structures to manage the differences between internal tempo and external time, especially where there are operational thresholds to meet. However, this may introduce organisational tensions, so recognise and address the risks.

Balance big change and little change. A DevOps environment can run within larger scale tranches to ensure continuous improvements in capability to the front line.



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Acknowledgements

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- P6, P7, P8, P10, P14, P15 Images used under licence to BMT Group
- P9 UAV launch, Picture: Royal Navy <https://www.royalnavy.mod.uk/news-and-latest-activity/news/2020/october/09/20201009-drone-trials-on-albion>. The trials are not related to the hypothetical scenario in this document.

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