

DSDM Atern Case Study: An Agile approach to Software Systems Development for the Highways Agency

Carl Grice, Software Development Manager (Keynetix) - March 2010

Government agencies are constantly striving to develop software systems that support business objectives, deliver measurable benefits and provide good value for money. To achieve these goals there is a need for project management frameworks that balance governance with agility.

Background

The project was to deliver the next phase of enhancements to the Highways Agency National Geotechnical and Drainage Asset Management Systems. The online Geographical Information System has been developed by Mott MacDonald in partnership with Keynetix. This was a seven month project with fixed end date and allocated budget. The aim was to scope, develop and integrate over thirty work packages into the existing system, including tools for data capture, quality assessment and asset reporting.

The rationale for adopting a more Agile approach

A key factor to the success of previous projects undertaken for the Highways Agency was the teams ability to respond quickly to change. Although the team were familiar with Agile concepts and techniques they tended to be applied in an informal and often ad hoc manner when compared to the more disciplined application of PRINCE2.

The challenge:

- Formalise and Standardise the use of Agile Techniques
- Integrate Agile Principles and Practices into the existing PRINCE2 method
- Provide structure and flexibility throughout Product Delivery
- Avoid a document driven methodology with duplicated effort.

The Highways Agency generally mandate the use of PRINCE2 on major ICT projects, and it was a requirement for this project. Applying PRINCE2 has many benefits and provides established mechanisms for project organisation, monitoring and control. However, in order to remain a generic method PRINCE2 focuses on project governance and management and does not extend to cover techniques for product delivery. Although instilling a more Agile mind set throughout all aspects of project management has advantages, it is the application of Agile principles and techniques within software product delivery that has been proven to add measurable value.

Following a review of the most popular Agile methods DSDM Atern was identified as the best placed method to integrate with PRINCE2, meet the needs of the team and quality criteria of the client. A summary of the factors affecting the teams decision to adopt DSDM Atern were:

- **Business Focused** - DSDM Atern is considered a structured Agile method, sharing many similarities to PRINCE2. Both methods focus heavily on the Business Case and ensuring that all projects maintain continued Business justification. They can be configured on a project-by-project basis and the "Level of Ceremony" tailored to suit different circumstances.

- **Empowerment and Collaboration** - The team had many years experience working together establishing efficient channels of communication, encouraging lean documentation and rapid decision making in keeping with Agile principles.
- **Proven track record** - The integration of DSDM to manage the delivery of products within a PRINCE2 environment is both well documented and supported by the DSDM Consortium. Resources and publications were available to provide guidance on implementation.
- **Change is inevitable** - From experience the management team know that the details of a solution will emerge as a project progresses and products evolve. The team understand that changes to the scope of products, priorities and schedule are inevitable and that change needs to be handled efficiently.

Keith Richards Consulting (KRC) supported Keynetix throughout this Agile transition. They have considerable experience helping organisations adopt Agile approaches and integrating DSDM with other methods. KRC provided Agile training and consultancy for Keynetix and helped the development managers achieve DSDM certification.

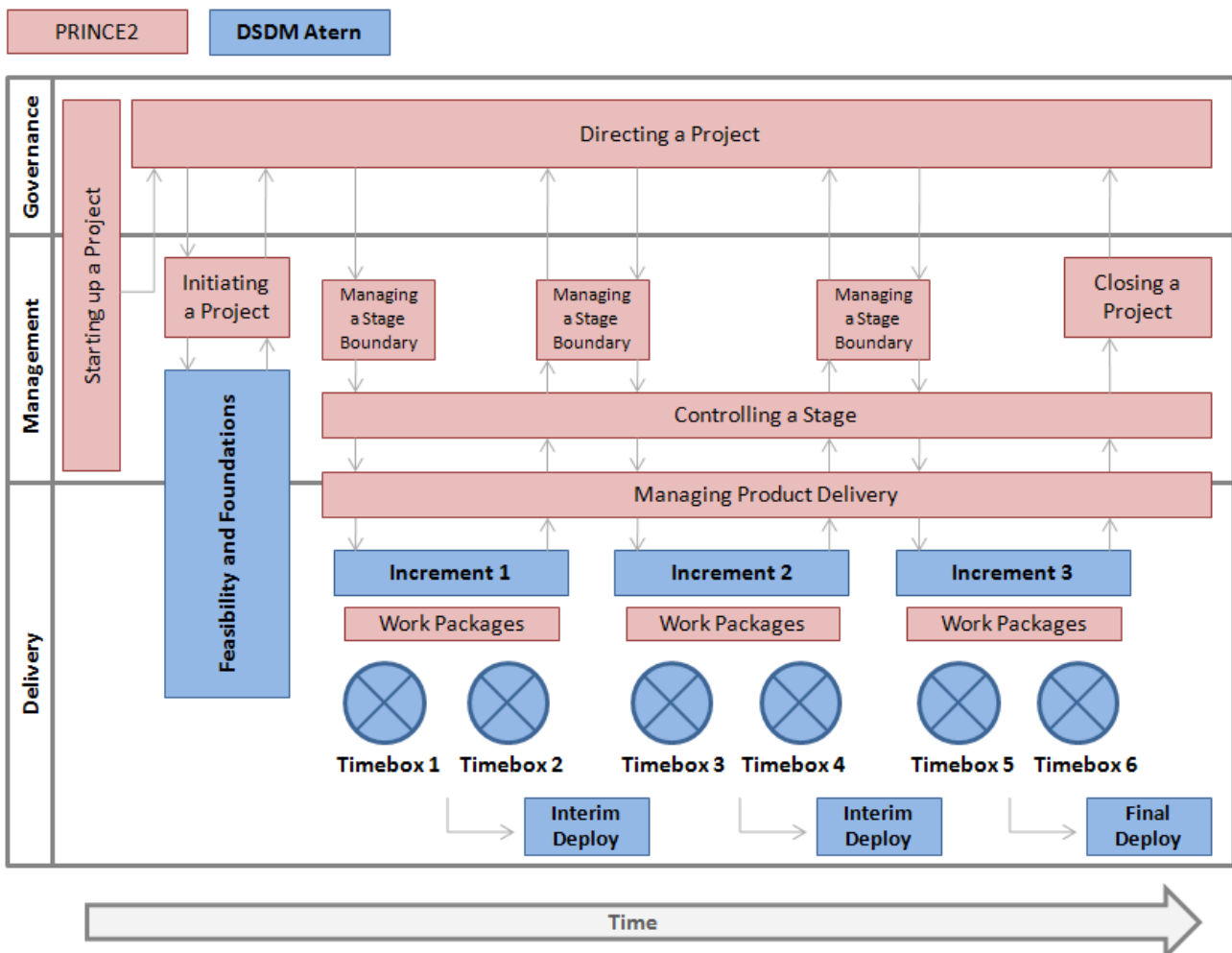
Mapping DSDM Atern to PRINCE2

The key PRINCE2 Principles, Processes and Products were used, in line with client requirements. The core PRINCE2 Organisational Structure remained unchanged but was enhanced using the defined DSDM Atern roles and responsibilities for the product delivery team. The PRINCE2 Work Packages provided the crucial link to tightly integrating PRINCE2 with DSDM Atern.

- **Plan** - During the PRINCE2 Initiating a Project process the Product Descriptions and high level requirements were baselined in the PRINCE2 Project Initiation Document (PID). An outline Delivery Plan was included highlighting which Work Packages would potentially be delivered during each Increment. (An Increment Timebox has a fixed end date and consists of one or more Development Timeboxes. Each Increment refers to the delivery of a complete and meaningful subset of the solution.)
- **Monitor** - Throughout the project the team constantly referenced the business case and business drivers captured in the PID, to ensure all decisions regarding scope and prioritisation of Work Packages aligned with the ongoing needs of the business. During each Increment the development team would work with the business representatives to break down the high level requirements and produce a detailed Prioritised Requirements List (PRL) for each Work Package. The PRL was regularly reviewed and re-prioritised to ensure that the scope of work was acceptable and could be delivered within the fixed budget and time constraints.
- **Review** - At the end of each Increment, User Acceptance Testing would be performed by the business representatives to ensure that all Work Packages meet the required Quality and Acceptance Criteria as agreed with the client. Completed Work Packages were signed off for deployment to the live environment during the PRINCE2 Managing a Stage Boundary process. Lessons Learnt were captured to provide key areas of improvement in subsequent Increments.

The diagram below outlines how DSDM Atern was mapped onto the PRINCE2 processes and shows

how the project consisted of an initial Feasibility and Foundations Phase, followed by three, two month Increments, each consisting of two, one month Exploration and Engineering Timeboxes. Each DSDM Atern Increment mapped to a PRINCE2 Stage. Work Packages were authorised for development and inclusion in the next Increment during the PRINCE2 Managing a Stage Boundary process.



Implementing the DSDM Atern Techniques

- **MoSCoW Prioritisation** – Must Have, Should Have, Could Have, Wont Have (this time). Prioritisation was applied at all levels throughout the project lifecycle to control the scope of the project. All high level Work Packages and all lower level Work Package requirements had a MoSCoW priority assigned. The priorities were regularly reviewed and re-prioritised to provide flexibility and ensure that at least a Minimum Usable Subset of requirements would be delivered on-time. This prioritisation process was actively supported by the client as it provides the mechanism to control development costs and align work packages with business objectives.
- **Iterative Development** - No solution is built perfectly first time. During each Timebox the solution development team would go through a number of iterations. Breaking down requirements for each Work Package and working with the business representatives to ensure the required products were being built correctly.
- **Modelling and Prototyping** - During early Iterations, diagrams, interface mock ups and

screen shots were used to increase understanding. Online demonstrations of prototypes or evolving solutions were often performed to provide rapid feedback to the team and give wider stakeholders an early opportunity to validate that the solution is progressing as envisaged.

- **Timeboxing** - The duration and end date of each Timebox was fixed. Work Package requirements were allocated to each Timebox and prioritised during each Timebox Kick Off workshop and reviewed for completion during each Timebox Close Out workshop.

Applying the DSDM Atern Principles (Key Observations)

- **Focus on the Business Need** – Key to a successful project is to deliver the right products, at the right time, to meet the ongoing needs of the client. From the initial controlled project start and throughout the development of each product all prioritisation and scheduling decisions were driven by the Business Case and communicated to the team through the business representatives.
- **Never Compromise Quality** – The overall Acceptance Criteria for the project was baselined with the client during the Atern Feasibility and Foundations phase. Quality was not a variable during the project, instead scope would be modified to meet deadlines and ensure deliverables always achieved the required level of quality.
- **Collaboration and Communication** – It is vital that documentation does not drive the process and instead kept lean and purposeful. Rich communication channels were encouraged to increase efficiency and decision making speed. Facilitated Workshops were regularly held using various visual aids. Where possible face-to-face communication or remote meetings helped reduced the need for unnecessary documentation.

The Outcome

Upon completing the project the team had successfully delivered twenty two work packages onto the live environment and de-scoped the remaining lower priority items for consideration in future phases. Implementing a combined framework enabled the following:

- **Predictable Budget** – By fixing the project deadlines and actively managing the scope of each Work Package during Increments, the project delivered on-time and within budget.
- **Controlled Risks** - The staged delivery plan and Timeboxed development meant that the client and users realised early benefits. Issues were identified early to maximise replanning time which greatly reduced the overall project risk.
- **Increased Client Confidence** - Constant involvement of the client and key stakeholders throughout the project ensured the correct products were developed that matched expectations. There were no last minute surprises or costly reworking of functionality.
- **Flexibility and Quality Assurance** - Requirements prioritisation against the Business Case at regular review points and Iterative development enabled the team to deliver a set of fit for purpose products to meet the business needs.

Although an upfront investment of effort was required to develop this combined method, we are already seeing returns. We now have a scalable, enterprise level project framework that provides Governance, Control, Quality Assurance and Agile Product Delivery.

Testimonials

“This project presented our team with a challenging list of work items to be completed in a relatively short time frame, within the framework of core client business objectives. The use of DSDM Atern has proven to be an invaluable means to meet the client requirements. The nature of the project is such that change is inevitable, but through the use of DSDM Atern we have been able to manage this change in a flexible manner, without compromising the quality of the products delivered. Key to the success of the use of DSDM Atern within the PRINCE2 framework has been this flexibility, the excellent communication both within our team and with the client, and the use of MoSCoW analysis and fixed Timeboxes which have ensured that the core elements of work packages have always been delivered on time. The use of DSDM Atern is now central to how we work, and we will continue to use the methodology for future project phases.”

Dr Chris Power, PRINCE2 Project Manager (Mott MacDonald)

“As a major UK infrastructure owner, responsible for the strategic road network of England, the Highways Agency relies on asset management systems such as the HAGDMS and HADDMS to inform key strategic and operational decisions.

The HA standard project management requirement is PRINCE2, however this method was found to be inflexible at work package level when developing our asset systems. The innovative adoption of DSDM Atern (in association with PRINCE2) by our delivery team has allowed the HA to maintain the required level of corporate governance, whilst delivery of development tasks to fixed timescales and budgets has been successfully achieved. It is possible that the different approach used by DSDM Atern could be used successfully to deliver civil engineering projects, especially in the maintenance arena, where budgets are fixed.”

David Patterson, System Owner & Project Sponsor (Highways Agency)

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