The Institute of Asset Management

Strategy and Planning

Asset Management Decision-Making

Lifecycle Delivery

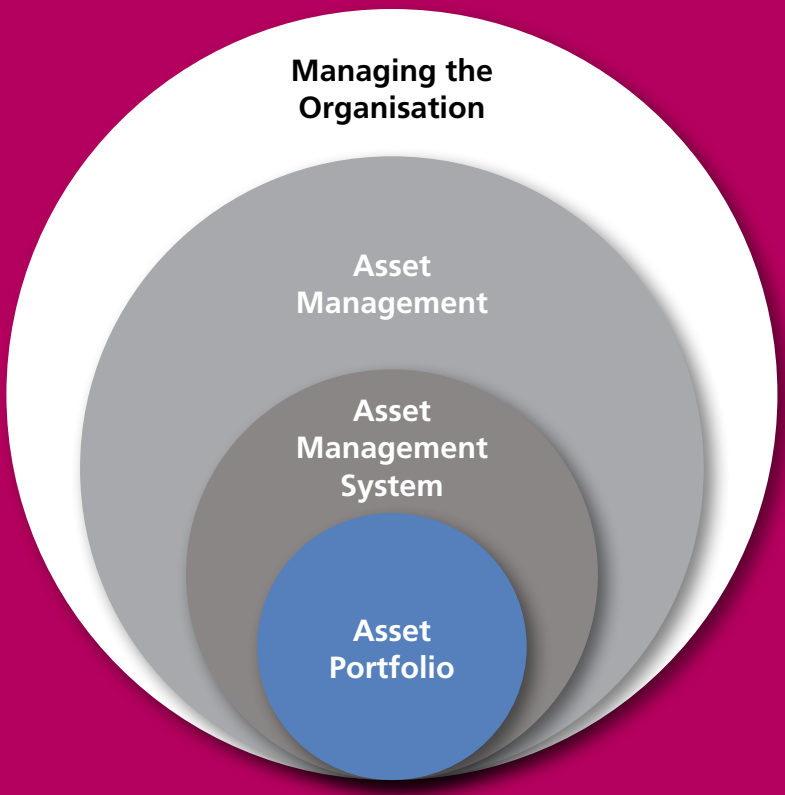
Configuration Management

Asset Information

Organisation and People

Risk and Review

Version 1 April 2019



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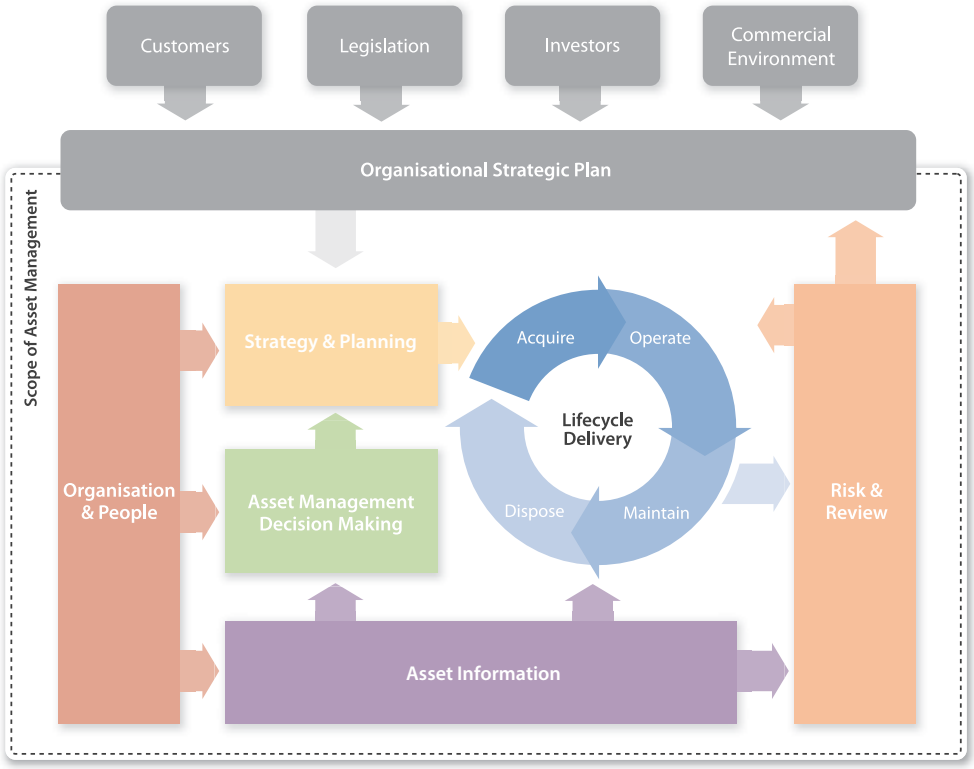
The scope of Asset Management



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2. Asset Management Strategy & Objectives
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4. Strategic Planning
5. Asset Management Planning

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7. Operations & Maintenance Decision-Making
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1 Introduction

This Subject Specific Guidance (SSG) is part of a suite of documents designed to expand and enrich the description of the Asset Management discipline as summarised in the IAM's document 'Asset Management – an anatomy' (referred to throughout this document as 'The Anatomy').

1.1 Purpose of the SSGs

This document provides guidance for good asset management. It is part of a suite of Subject Specific Guidance documents that explains the 39 subject areas identified in "Asset Management – an anatomy", also published by the Institute of Asset Management. These subject areas are also acknowledged by the Global Forum for Maintenance and Asset Management as the "Asset Management Landscape".

PAS 55 and ISO 55001 set out requirements which describe ***what*** is be done to be competent in asset management, however they don't offer advice on ***how*** it should be done. The SSGs are intended to develop the next level of detail for each subject in The Anatomy. They should therefore be read as guidance; they are not prescriptive, but rather intended to help organisations by providing a consolidated view of good practice, drawn from experienced practitioners across many sectors.

The SSGs include simple as well as complex solutions, together with real examples from different industries to support the explanatory text because it is understood that industries and organisations differ in scale and sophistication. In addition, they are at different stages of asset management; some may be relatively mature while others are at the beginning of the journey.

Accordingly, there is flexibility for each organisation to adopt their own 'fit for purpose' alternative practical approaches and solutions that are economic, viable, understandable and usable. The underlying requirement for continual improvement should drive progress. This SSG is about helping those applying configuration management get it right as they prepare to improve their configuration management application.

The SSGs are a core element within the IAM Body of Knowledge and they have been peer reviewed and assessed by the IAM Expert Panel. They align with the IAM's values that relate to both the development of excellence in the asset management discipline and provision of support to those who seek to achieve that level of excellence.

It's the creative and innovative interpretation of Standards combined with your unique service operating model that defines your operation and organisation.

This will not be written in a Standard, it will be the organisation's intellectual property.

It's how you think, the organisation's values, your added value and the way you will engage over the asset life cycle that will differentiate you.
Carl Waring: K-Division – 2018

Accordingly, there is flexibility for each organisation to adopt their own 'fit for purpose' alternative practical approaches and solutions that are economic, viable, understandable and usable.

1.2 Navigating & Using this document

In place of case studies (which may be added in future versions) this SSG uses fictional examples throughout the document to provide insights into configuration management. It does this by using examples in different sections that provide different views on related situations.

1.3 Terminology[1]

CM	Configuration Management
Configuration	Interrelated functional and physical characteristics of a product or service defined in configuration information.
Configuration information	Requirements for product or service design, realisation, verification, operation and support.
Configuration baseline	Approved configuration information that establishes the characteristics of a product or service at a point in time that serves as reference for activities throughout the life cycle of the product or service.
Configuration Item	1. Entity within a configuration that satisfies an end-use function. 2. Collective term for a component, document (datasheet/drawing), assembly, software, firmware, product, Building Information Modelling (BIM) information, service or capability.
Configuration status accounting	Formalised recording and reporting of configuration information, the status of proposed changes and the status of the implementation of approved changes.

1.4 The Case for Configuration Management

Imagine that you are a car designer and ***manufacturing company***. What would your CM Plan cover? With just one model range you might have 2 or more engine sizes, one or two fuel types (we'll ignore hybrids, electric and gas powered for now), one or more body styles (e.g. saloon, wagon (estate), hatchback, or two or 4-wheel drive), and several headlight styles. And this is before you get to body colours and interior trims. To what level would you want to manage the configuration of the design and manufacture? How would you organise the CM activities that support your objectives? What types of reports do you want or need, what will be recorded and where will it be stored, who has responsibility for CM activities and what activities are they responsible for? Will the CM activities support legislative and regulatory constraints?

Now let us consider the ***owner*** of a fleet of vehicles produced by this manufacturer. All the vehicles have the same engine size, fuel type, body style, headlight style, interior and transmission. Does the fleet owner get any benefit from applying CM to this fleet? Probably not, but if the fleet owner then kits out each vehicle with role specific equipment e.g. some as ambulances, others as people carriers and others as firefighting vehicles, they may want to apply some level of CM to the fleet to control changes to the role equipment and to know which vehicles are allocated to a particular role. In this situation what would the CM Plan look like? Certainly different to the car designer and manufacturer's CM Plan whilst having some similarities.

For example, who has responsibility for CM activities and what are they responsible for? There will still be a need to record and report changes to the configuration, but the detail will be different. Would the fleet Owner care about changes to the base vehicle? Does he need to liaise with the manufacturer to ensure that the role of the equipment is not affected by manufacturer changes to the base vehicle?

If a standard/common component needs to be replaced in a vehicle the fleet owner may not need to include it in their configuration management plan. Even if they decide to include major items that item may have multiple subcomponents which the fleet owner has no interest in tracking, but which might vary over time as original equipment manufacturer (OEM) vendors change during the manufacturing process, so these will be included in the CM plan for the manufacturer for events such as recalls.

What is important varies depending on your roles and responsibilities, so two different stakeholders may have different views on configuration management of the same asset. It is exactly because roles and responsibilities can vary, even within an organisation

1. Source: international standard ISO 10007:2017(E)

that is using the same asset or the same types of assets, that configuration management can be so critical.

The examples in this SSG may focus on physical assets but configuration management is broader than this. As any system integrator or software developer will know, configuration management and change management are vital tools to successful development, deployment, and support of information systems. This is an area where configuration management is becoming increasingly important due to the embedded intelligence in many assets today. Smart devices present the dual challenge of managing the traditional physical aspects of the asset but also the embedded firmware that can add remote configuration and performance options. Making sure that the firmware levels on these devices are managed is important and as suppliers deliver newer assets that are the 'same' type, but where the firmware levels may be newer, thus presenting more configuration challenges for both supply chain management and asset use.

Throughout history right up to the present day there are numerous examples where the application of configuration management would have likely been beneficial and avoided negative outcomes. The application of a Configuration Management system or approach would have resulted in different outcomes, in some examples they would potentially have changed the course of history. Applied sensibly at the correct level of resolution the application of Configuration Management can provide an organisation with a level of control to provide confidence that their assets will fulfil the functions they desire when they want them to.

One of the earliest examples of getting it wrong was the Spanish Armada's planned invasion of England in 1588. The Spaniards replaced the cannons on all their ships, with much larger ones with a larger bore. Yet whilst they changed the cannonballs at the station, they failed to take into account their stock in the hold and subsequently ran out of cannonballs when they went to war! A good example of when a change is inadequately reviewed by all stakeholders before being implemented.

On Thursday 6th December 2018 O2 suffered a day of disruption to its data networks which affected approximately 25 million users ranging from individuals to multi-nationals to the National Health Service. Disruption manifested through: loss of ability to make calls; send and receive messages and emails; and access the internet. The financial impact will include compensation packages to its customers. Ericsson, a software supplier to O2, undertook an initial root cause analysis that had indicated that the "main issue was an expired certificate in the software versions installed with these customers".

Identification of the software as a **Configuration Item**, with the associated "time restricted certificates" identified as associated attributes, would have meant that as part of the routine **Configuration Status Accounting** and **Configuration Audit** activities this problem would have been identified and then resolved. Updating of the software would have been completed using **Configuration Control** processes resulting in the issue encountered not happening.

2 What does Configuration Management mean?

2.1 High Level Definition of the SSG Topic Area

The concept of configuration management is embodied in its definition; and that is how an organisation goes about configuration to get the best out of its assets. The central part of this concept is that some assets can be configured in multiple ways and these configurations can vary (change) over time. This creates operational, maintenance, planning and supply chain challenges to name but a few.

The approaches to managing these challenges should be aligned and the benefits of a structured approach generate value, as depicted below (adapted from Andrew Wall[2]) in Figure 2.1.

Some contracts may require that assets are delivered in predefined configurations and the capability for assets to be reconfigured is a design issue so this is a topic that covers the entire life cycle for some assets. The possible configuration itself may vary from asset to asset. Some may be physical configuration changes and some may be functional, i.e. determined by settings in firmware for example. Some configuration may be limited by policy.

The fact that some assets are configurable and that increasing digitisation is bringing more flexibility (and configuration requirements) to more and more assets means that organisations will benefit from policies and procedures in place to manage this configurability. It is this concept that this SSG addresses.

Modifying certain assets, such that their behaviour is adapted to fit specific circumstances, creates benefits. Maintaining these benefits are why we need to manage configuration carefully. Benefits may include:

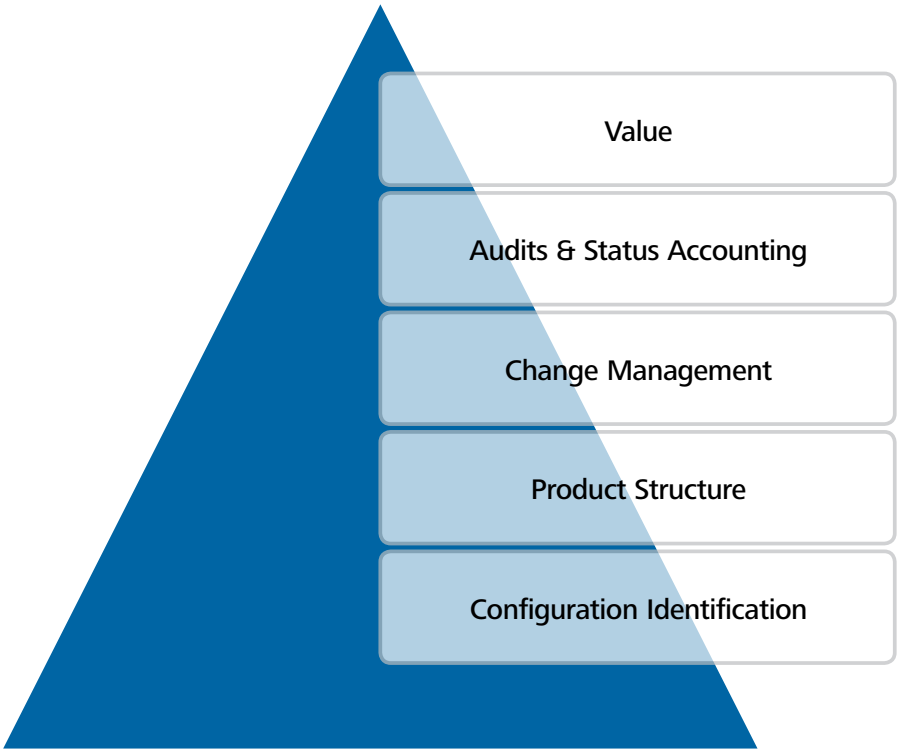

Figure 2.1

2. https://www.linkedin.com/pulse/20140625080557-200404330-following-on-from-the-gm-ignition-switch-discussion-why-we-need-good-configuration-management/ accessed 24 June 19