



## OCM of land-based equipment: towards an industrial asset management system?

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**Maintenance management, the result of much research in recent years, is currently evolving in the private sector towards a global system of industrial asset management, focused on the life cycle and including support, called asset management.**

**The implementation of these new standards within the military institution could significantly improve the objectives of the land equipment MCO.**

In an increasingly constrained budgetary environment, the military institution has been engaged for several years in a process of continuous improvement in the maintenance of its equipment and facilities. However, despite rationalisation efforts and changes in methods, operational readiness remains unsatisfactory and the prospects for future developments are hardly encouraging. The observed growth in MCO costs even goes so far as to call into question the 2014-2019 financial trajectory provided for in the military programming law.

In this context, and in order to prospect for relevant solutions to reconcile the operational objectives and the economic imperatives of our defence tool, it is interesting to analyse the methods implemented in the private sector to meet the new requirements of the industrial world.

Indeed, these new requirements seem to be converging with those of defence. They are characterised in particular by an increase in the lifespan of major industrial equipment in an increasingly competitive economic environment, requiring cost control, particularly support costs, in order to sustain activities by guaranteeing their profitability.

By providing appropriate responses to these new requirements, asset management is now becoming an essential part of companies' operations. It could also provide armies with effective tools to control the budgetary management of armament operations.

Asset management: new standards illustrating the recent orientation of the private sector towards maintenance markets

Two examples can be used to illustrate the current trend in the world of industry:

- The positioning of large groups in the maintenance sector first of all reveals a new strategic vision. This is particularly the case in the energy, tertiary, rail and aeronautics sectors.

- Air France is now counting on maintenance as a growth driver. In difficulty in its carrier business, the airline is developing its maintenance activity, the only beneficiary, to take advantage of the strong growth in Asia and Africa linked to the development of local airlines.

- Originally a simple manufacturer of rolling stock for the SNCF, ALSTOM transport has developed its service branch; it is now committed to the development of its maintenance activity. Today it is committed to global contracts including the sale of trains or metros to rail operators worldwide and the maintenance of these assets for periods of up to 30 years.

These high-visibility global contracts guarantee regular revenues for companies, but require control of ownership costs, particularly maintenance costs, right from the project design phase and throughout the project life cycle.

- The concept of Industry 4.0, which corresponds to a new way of organizing production resources, reveals new ambitions. The objective is the implementation of so-called "smart factories", capable of greater adaptability in production and more efficient allocation of resources, thus paving the way for a new industrial revolution. The technological bases of Industry 4.0 are the [Internet of Things and cyber-physical systems \(systems](#) where computer elements collaborate to control and command physical entities). Programs around the factory of the future are accelerating in France and Europe, as illustrated by the Bosch factory in Rodez, where the transformation undertaken since 2012 has affected all services, from production to finance and logistics, and now concerns maintenance. With this system, Bosch will be able to carry out a new generation of predictive maintenance: not only will the machines anticipate breakdowns, but they will also diagnose the probable causes of these breakdowns, reducing costs and intervention times.

Combining new technologies such as connected objects, RFID chips, virtual reality, big data or artificial intelligence, maintenance of the future or maintenance 4.0 marks the advent of predictive maintenance, and illustrates the ambitions of companies to control the availability of strategic assets in order to optimize their exploitation.

There is therefore a new strategic vision and ambitions in the industry today in terms of availability, quality, image, durability and profitability.

To meet these new requirements, it has become necessary to optimise trade-offs between risks and costs over the entire life cycle of strategic assets. To meet these new requirements, the optimisation of trade-offs has become a necessity for companies in

recent years and will lead to the implementation in 2014 and 2015 of standards defining the characteristics of industrial asset management, also known as asset management.

There are four such standards, which notably define a management system and a maintenance process associated with asset management:

- Standard NF ISO 55000 of 18 July 2014: Asset management - overview, principles and terminology.
- Standard NF ISO 55001 of 18 July 2014: asset management - management system - requirement
- Standard NF ISO 55002 of 18 July 2014: Asset management - management system - guidelines for the application of ISO 55001.
- Standards NF EN 16646 of 07 February 2015: maintenance - maintenance in the context of physical asset management.

Asset-management: from standards to guidelines that are fully in line with the specific framework of armament programmes as they are currently conducted.

Decomposition of the life cycle of an asset. It is generally accepted that maintenance costs represent 60 to 70% of the Life Cycle Cost (LCC), one of the major challenges of asset management.

Breakdown of the life cycle of an asset. It is commonly accepted that maintenance costs represent 60 to 70% of the Life Cycle Cost (LCC), which is one of the major challenges of asset management.

However, asset management is not the new name for maintenance, nor is it intended to replace maintenance in operational condition (MCO). It primarily responds to a need for governance on the part of companies by relying on existing management methods.

In both civilian and military circles, the main aim of OCM is to improve the availability and performance of strategic equipment over its lifetime, from the design phase to the disposal phase. As described in Jean-Luc Merchadou's book (published by DUNOD/L'Usinenouvelle), the MCO integrates all maintenance optimisation methods (operational safety, integrated logistic support, logistic support analysis, 5S[1], etc..) and significantly improves the overall cost of ownership. The MCO also includes management methods and tools that are part of a continuous improvement approach based on Lean Six Sigma.

ISO55000 certification implies the implementation of a management system that guarantees the long-term durability of the assets by seeking their profitability (profitability of the euro invested over the entire life cycle).

Extracting value from assets, for tangible or intangible assets, is indeed the central point

of the asset management standard. In this sense, it is based on risk management, an expert discipline in the art of monetising operational risks in order to enable efficient budgetary management of assets.

It certainly seems ambitious to compare a company to a military institution, given the many specificities of the arms business.

However, if one seeks to draw a parallel, and considering that where a company produces goods or services, defence produces capabilities. Operational capabilities, one notices that the characteristics of the military institution are similar to those of a large corporation or a large industrial group.

The Ministry of Defence can be compared to a general directorate, the EMA to an industrial directorate and a financial directorate. The DGA can be compared to a procurement department, the DGA to a purchasing department, the army headquarters to production divisions, and the support organisations SIMMT, SSF and SIMMAD to maintenance departments. For defence, the assets therefore represent military equipment and installations.

As a result, we therefore find the same difficulties within defence as we do within a company, particularly in terms of internal communication when it comes to maintenance.

As Mr de Azevedo, Managing Director of the company ASSETSMAN, pointed out at a colloquy at ENSAM in May 2015, maintenance is still too often perceived solely as an item of expenditure. Asset management (A-M) aims to decompartmentalise what we find in companies today: the buyer buys, the operator operates, the maintainer maintains, and when we no longer know how to maintain, we say to ourselves: "Damn, we may have to renew". The aim of A-M, which combines maintenance and finance methods, is to provide communication between the different areas, to provide cross-functionality in order to try to get the best return on an investment, not only in terms of direct costs, but also by valuing the risks linked to the loss of earnings.

Despite the efforts undertaken in the private sector, real difficulties remain. They are often linked to the inability of the maintenance departments to put forward the monetisation of operational risks in a language that can be understood by the financial departments or by the Directorates-General. These difficulties are found throughout the life of assets or property.

The new standards therefore provide the private sector with solutions to improve asset management, and could equally improve the conduct of armament operations within defence.

A support integration that uses an iterative process to match proposed activities with available resources through an asset management plan to reflect available resources and the assigned timeframe

Of course, defence cannot have the same objectives in terms of profitability as a private

company, in particular because of the imperatives of the Defence Industrial and Technological Base (DITB), or the unpredictability of external operations.

However, as they are conducted today, armaments operations suffer from two major shortcomings: perfectible budget planning and insufficient consideration of maintenance over the entire life cycle of the equipment.

As the Court of Auditors' latest report of September 2014 on the maintenance of military equipment in operational condition points out, despite the increase in expenditure, the results obtained in terms of equipment availability are still insufficient in relation to operational requirements.

While the reasons for these difficulties are known, the consequences for the MCO of the decisions taken in terms of equipment investment choices, territorial locations and government policy towards the defence industry are not sufficiently measured and taken into account.

In particular, the Court of Auditors recommends action in six areas which are fully in line with asset management standards.

The examples of failures in the implementation of lean[2] in the private sector illustrate how fundamental it is indeed to put a company's "corporate" objectives into perspective with the policy of cost rationalisation. As M. Lorino, professor at ESSEC, in an article dated 30 October 2014 in L'Usine nouvelle entitled " Dérives du lean:[why the method deviated from the original principles](#)" [3]. [the search for](#) short-term profitability is generally incompatible with long-term sustainability objectives, which are the objectives that asset management aims to define.

This example, which highlights the urgent need to communicate the different silos of a company in a common economic language[4], could just as well be illustrated by the MCO of land equipment, whose resources have been reduced under budgetary constraints without necessarily seeking an alignment with the objectives of availability of our operational capabilities.

Admittedly, the over-use of equipment, due to the many commitments in external operations, partly explains the poor results of the defence MCO; however, the lack of a common economic language could also be illustrated by the MCO for land equipment, whose resources have been reduced under budgetary constraints without necessarily seeking to align them with the objectives of availability of our operational capabilities. *nomene* has been amplified by an overstretched system at the outset[5] and illustrates the lack of governance in the exploitation phase of military assets.

In asset management, asset management is defined as "the coordinated activities of an organization with the goal of realizing value from assets".

It is therefore a broader vision and a more ambitious scope than simply maintaining physical equipment or maximising returns from a portfolio of financial assets. This definition covers all types of assets, both physical and intangible, individual components or complex systems, and all activities involved in the life cycle of the asset - from the

initial identification of needs or opportunities, to the development of the asset itself, to the design and implementation of the asset management system.s to responsible asset management, through acquisition/creation, operations or activities of use, care and maintenance responsibilities, renewal or disposal and remaining contingent liabilities.

Asset management requires in particular the definition of an asset management policy and strategy, as well as the implementation of an asset management plan.

In addition, the implementation of an approach based on integrated management systems enables an organization's asset management system to be supported by a number of tools, such as the followingOther existing management systems, such as quality, environmental, health and safety, and risk management subsystems. Building on existing systems can reduce the effort and expense required to develop and maintain an asset management system. It can also improve integration across disciplines and coordination between functions.

In his reply, the Minister of Defence broadly subscribed to the analysis of the latest report of the Court of Auditors, particularly at the heart of the latter, concerning the control of support costs: "The primary objective is to better characterise the physical-financial link and to make the budgetary programming of the MCO more reliable. The analysis of the consequences (physical and financial) will be systematised when the budget programmes are updated (P146, P178). It should make it possible to strengthen the coherence between acquisition and support.

In this context,asset management could therefore provide the military institution with a unifying management tool, adapted to its objectives and budgetary imperatives.

All the more so as in the private sector, ISO 55000 should rapidly become established in major calls for tenders. Of course, like all standards, it is not currently mandatory. "But the same thing could happen as with ISO 9001 on quality management. When it came out, it was considered a simple compendium of best practices and quickly became indispensable," says Hervé Salomon, an expert in asset management in the Veolia group's technical and performance department.

There is no doubt, therefore, given the characteristics of our armament operations, the economic situation and the outlook, defence should also adopt the asset management system.

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Coming from the EMIA, Major Pascal MEUNIER spent a first part of his career in the Engineer Army, before joining the equipment notably at the 7th and then the 4th<sup>equipment</sup> regiment. During this period, he took part in the creation of the detached sections, then in the emergence and implementation of the PEGP. Continuing his schooling within the framework of the technical diploma, he is currently a student in a specialized master's degree at Arts et métiers Paristech.

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To go further:

- "Physical asset management: with an introduction to ISO55000 second edition". Nicholas Anthony John Hastings. Spring 2014 Edition
- "Asset management excellence: optimizing equipment life-cycle decisions". John D. Campbell,Andrew K.S. Jardine,Joel McGlynn. CRC Press
- "Physical asset management for the executive" Howard W. Penrose. Success by Design publishing

- "Guide to industrial asset management: if machines could talk..." By Celsode Azevedo / [Dunod](#) 2009

This subject may also be completed by consulting the website of the French Institute for Industrial Asset Management and Infrastructure (IFRAMI).

1] The 5 S's method is a Japanese management technique aimed at the continuous improvement of the tasks carried out in companies. Developed as part of the [Toyota Production System](#) (TPS), it takes its name from the first letter of each of five operations, each of which is a set of simple principles or watchwords (source: Wikipedia):

- Seiri (??, ranger): delete the unnecessary
- Seiton (??, order): to situate things
- Seiso (??, cleaning): (making) sparkle
- Seiketsu (??, clean): Standardize the rules
- Shitsuke (??, education): follow and progress

2] Optimised management method, which was the subject of an article in issue 39 of CESAT's March 2015 issue of Cahiers du CESAT.

[3] [www.usinenouvelle.com/article/derives-of-the-year-why-method-is-original-principles-scared-of-principles-originals](http://www.usinenouvelle.com/article/derives-of-the-year-why-method-is-original-principles-scared-of-principles-originals)

4] In an article published in Les Échos on March 8, 2015, entitled "La maintenance, une fonction à mieux insérer", economist Jean-Yves Archer described maintenance as a function that is too often treated by silos and not in an inserted manner, to the great displeasure of its management parameters. His analysis leads us to define effective maintenance as a matter of decompartmentalisation and an inserted function.

5] In 2004 the Court of Auditors published a report analysing the crisis in the availability of equipment observed at the beginning of the decade 2000. It explained this situation by structural causes linked to the organisation of the MCO within the Ministry of Defence, the nature of the stock of equipment to be maintained and the sharp reduction in equipment maintenance credits at the end of the 1990s.

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