CHAPTER 8 THE OPERATIONAL AND SUPPORT LIFE CYCLE PHASE OF PRODUCTS SYSTEMS

8.1 INTRODUCTION

For purposes of convenience, the Disposal phase is included in this chapter.

After commissioning the Products System or Product, the SANDF accepts it into operational service. The Project Officer hands over the Products System or Product to the PSM, who accepts it into service. This Operational/Support phase of the life cycle may extend beyond 20 years. The User System Manager is responsible for force provision and application. The PSM is in turn responsible for providing the User System Manager with sufficient combat-ready Products Systems.

The Products System will in all probability be upgraded during the Operational/Support life cycle phase. Upgrades are necessary to enhance the Products System's capability in the face of evolving or new threats or to improve its supportability or reliability. The life of an item resembles the so-called "bathtub" curve shown in Figure 69 below. Initially the item suffers high "infant" failures for a short period after its release to service. The reliability then stabilises until the Product reaches the end of its life cycle. At this time a Product replacement or upgrade will restore the reliability to acceptable levels again.

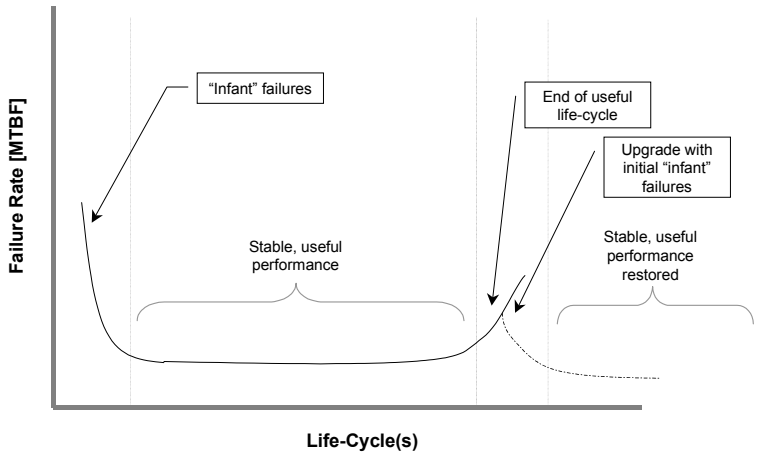

Figure 69: The "Bath-Tub" Curve during the Product's Life cycle.

Upgrades can be more cost-effective than replacing Products Systems. In the USA this has become the most common way for new technology to enter into service (Reppy 1992: 76). Upgrades generally need to follow the phases of the acquisition process to ensure and confirm their quality. Engineering expertise is essential for efficient and effective development or upgrade of Products or Products Systems.

8.2 ENGINEERING EFFORT

Although the development phases are complete when the Products or Products Systems enter service, some level of engineering expertise is still necessary. This expertise is concerned with the following functions:

- Ensuring the integrity of Products Systems.
- Developing new or superior capabilities.
- Integrating upgraded capabilities.
- Assessing the effectiveness of Products for operations.
- Directing capability development.

CHAPTER 9 and CHAPTER10 describe these functions more fully.

8.3 PRODUCTS SYSTEMS SUPPORT

After commissioning and acceptance, the PSM is responsible for managing the combat readiness and cost-effectiveness of the Products System. The PSM is also involved in the Commissioning to ensure the integrity of the Products System and the associated support system. The User contracts the PSM to supply combat-ready Products Systems at an agreed rate and configuration(s). The PSM manages the Products that constitute the Products Systems. This includes contracting support to ensure the combat-readiness required by the User System Manager.

Although the PSM's main duties occur during the Operate and Support phase, they also include activities through all the life cycle phases. The extent of the PSM's activities over the life cycle are shown in Figure 70. The PSM is required to contribute to the formulation of support requirements. During the acquisition phase, the PSM will assess the development of the support system and participate in the commissioning phase with the rest of the acquisition project team.

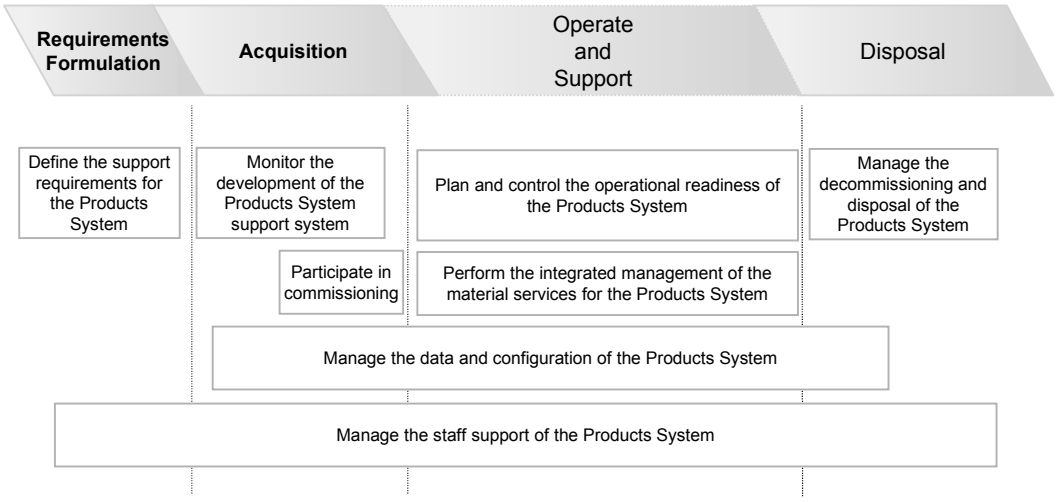

Figure 70: PSM Life cycle Activities (SA Army 1998: E.2).

The PSM contracts out support to organisations both within and outside the SANDF. The SAAF considers the support of Products Systems to consist of the following twelve logistic elements:

- Infrastructure and facilities
- Maintenance and technical support
- Material supply and management
- Personnel and training
- Technical publications
- Operating management system
- Reliability and maintainability
- Design expertise
- System expertise
- Logistics support analysis (LSA)
- Logistics support plan (LSP)
- Configuration management

8.4 THE PRODUCTS SYSTEM SUPPORT PROCESS

The User System Manager contracts the Products System Manager (PSM) to provide combat-ready Products Systems. The User System Manager executes the operation. The extent of the operation determines the level of force required to achieve the objective. From this requirement, the PSM is contracted to provide a certain number of combat-ready Products Systems to the User Systems Manager (USM). The PSM requires the following information to be able to plan and provide the combat-ready Products Systems to the USM:

- The number of Products Systems to be deployed.
- The Products Systems deployment rate.
- The configuration(s) required.
- The duration of the operation.
- Commencement date and time group of the operation.

With this information the PSM plans the operation's support. The PSM's human resources include the supply support, maintenance and administrative personnel. The PSM's physical resources include Line Replaceable Units (LRU), lower level configuration items (CI) associated with the Products, support equipment and facilities. The Technical Services of the ETF have the competence to deal with the maintenance tasks.

In two-level support system, the Products Systems are supported at Organisational Level (O Level) and Depot Level (D Level). Additional levels of support such as Intermediate Level (I Level) are used for some Products Systems, but tend to increase support costs.

The Products System support process includes the management of Products Systems and the associated support equipment and facilities. Figure 71 presents a conceptual view of the logistics and maintenance aspects of the process.

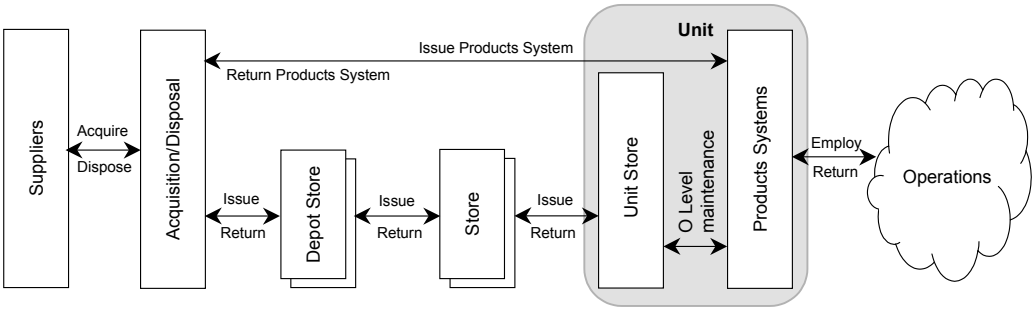

Figure 71: A Products System Supply and Support Materiel Value Chain.

Figure 72 shows a conceptual presentation of the flow of information during the Products System support process.

8.4.1 ORGANISATIONAL LEVEL SUPPORT

At O Level, the support personnel are responsible for ensuring that the Products Systems are combat-ready. This includes the following responsibilities:

- Maintain an adequate LRU stock level in the unit's store.
- Configure the Products System as required for the operation.
- Test the functions of each Product of the Products System.
- Correct malfunctions.
- Repair damage.
- Exchange damaged or malfunctioning LRUs for serviceable items from the unit's store.
- Exchange the unserviceable LRUs for serviceable items, from the store of the next level in the support organisation. (In some cases this could be the D Level organisation.)
- Prepare the Products System for use.
- Certify the combat-readiness of the Products System.
- Hand over the combat-ready Products Systems to the User.

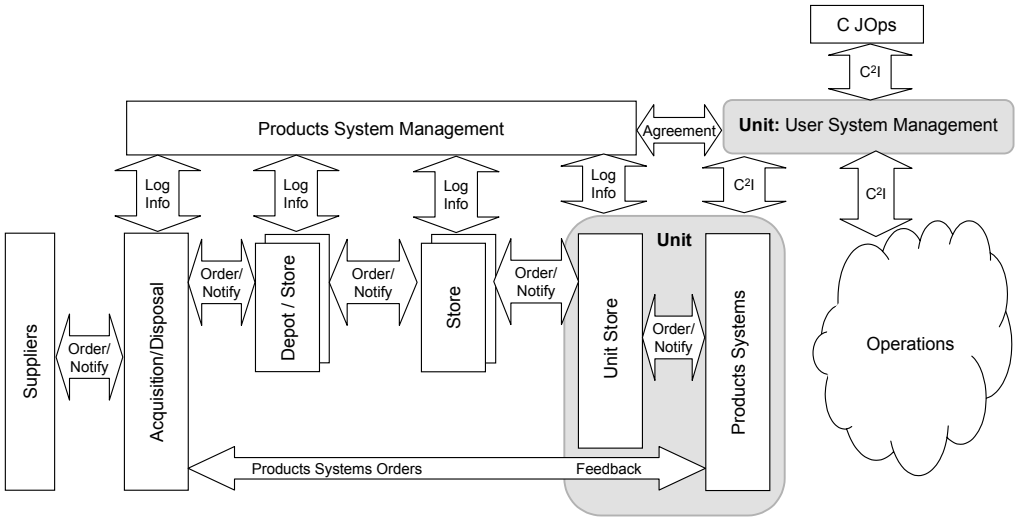

Figure 72: An Information Flow Diagram for a Products System Supply and Support Value Chain.

A. INPUT

The PSM requires the following information from the User System Manager to manage the support of the Products System:

- Budget available to support the Products System.
- Products System configuration(s).
- Spares.
- The above-mentioned requirements of the USM to conduct the operation.

B. OUTPUT

The required number of combat-ready Products Systems, in the agreed configuration(s), sustained for the period of deployment.

8.4.2 INTERMEDIATE LEVEL SUPPORT

At I Level, the support personnel are responsible for ensuring that a sufficient number of LRUs are serviceable and available for use on Products Systems to ensure operational availability.

8.4.3 DEPOT LEVEL SUPPORT

At D Level, the support personnel are responsible for ensuring that an adequate number of Configuration Items are serviceable and available for use on Products Systems.

8.5 PRODUCTS SYSTEM DISPOSAL PHASE

At the end of each Product's life cycle, it is phased out of service. This is a significant life cycle phase, especially in the case of Products such as small arms, explosives and other hazardous items. The capacity for disposal should be designed into the Products System during the Acquisition phase. An example of this principle is the self-destruction of an air-to-air missile if it fails to complete its mission of detonating near a target aircraft within a prescribed time. The launcher would not like to encounter the missile later after it had missed the target.

Certain Products such as small arms are rendered unserviceable to prevent the undesired possibility of their ending up in the wrong hands after disposal.

The Disposal phase typically entails the following main activities (SA Army 1998: R2):

- Perform the Phase-Out study to confirm the validity of the decision and the influence on defence capabilities.
- Plan the process for decommissioning the Products System.
- Manage the decommissioning process in line with the decommissioning plan.
- Manage disposal of equipment and associated data of the Products System by the supply support function.