Standard

Operations Concept Definition

Version 3.0

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Standard governance

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Document history

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Preface

The Asset Standards Authority (ASA) is a key strategic branch of Transport for NSW (TfNSW). As the network design and standards authority for NSW Transport Assets, as specified in the ASA Charter, the ASA identifies, selects, develops, publishes, maintains and controls a suite of requirements documents on behalf of TfNSW, the asset owner.

The ASA deploys TfNSW requirements for asset and safety assurance by creating and managing TfNSW’s governance models, documents and processes. To achieve this, the ASA focuses on four primary tasks:

- publishing and managing TfNSW’s process and requirements documents including TfNSW plans, standards, manuals and guides
- deploying TfNSW’s Authorised Engineering Organisation (AEO) framework
- continuously improving TfNSW’s Asset Management Framework
- collaborating with the Transport cluster and industry through open engagement

The AEO framework authorises engineering organisations to supply and provide asset related products and services to TfNSW. It works to assure the safety, quality and fitness for purpose of those products and services over the asset's whole-of-life. AEOs are expected to demonstrate how they have applied the requirements of ASA documents, including TfNSW plans, standards and guides, when delivering assets and related services for TfNSW.

Compliance with ASA requirements by itself is not sufficient to ensure satisfactory outcomes for NSW Transport Assets. The ASA expects that professional judgement be used by competent personnel when using ASA requirements to produce those outcomes.

About this document

This document specifies the requirements for developing operations concept definitions for new or altered transport systems.

This document was develop by the ASA in consultation with TfNSW divisions and agencies and is the third issue.

This document was updated to reflect feedback obtained from industry. The changes make this document applicable to multimodal transportation. Generic divisions are referred to rather than specific divisions within TfNSW.
Foreword

This operations concept definition (OCD) standard is placed within the context of systems engineering as an integrated methodology to support the TfNSW asset management framework.

This standard forms part of the systems engineering document hierarchy in development by the ASA. It is the child of T MU AM 06006 ST Systems Engineering Standard.

The following documents were referred to in the development of this standard:

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1. **Introduction**

The key activities required during the concept stage of the TfNSW system life cycle are the development of operations concepts, as articulated in an operations concept definition (OCD) and in a maintenance concept definition (MCD).

An OCD along with a MCD are required in order to understand how a new or altered system will be operated, maintained and disposed.

An OCD is used as a strategic guide and reference for projects implementing a system by maintaining focus on how the need or demand will be achieved.

The OCD considers project constraints and priorities of the system over its whole life cycle and is not just an enabler of business requirements. The OCD provides a link between those entities responsible for planning and delivering the system.

In general terms the MCD describes the types of maintenance and maintenance support capabilities for systems.

The OCD and MCD are predecessors to preparing a business case and associated business requirements specification (BRS). BRS guidance is provided in T MU AM 06010 GU *Business Requirements Specification*.

The OCD is a dynamic document that should be reviewed and if necessary changes managed as the need is translated from a concept to a realised system. The OCD and MCD are used to derive the business requirements in the BRS, which is linked to derived solution requirements in the system requirements specification (SRS). The OCD and MCD may be used as the basis for validation throughout the system life cycle and as the point of reference where conflicts between requirements need to be resolved. Business and system requirements are defined and addressed in T MU AM 06007 GU *Guide to Requirements Definition and Analysis* and T MU AM 06004 ST *Requirements Schema*.

2. **Purpose**

The purpose of this standard is to provide a structured, repeatable approach to developing OCDs on transport systems that range from simple to complex for new or altered systems.

The intent of this standard is to provide information to those who develop OCDs and those who interface with OCDs as an input to their efforts.
2.1. **Scope**

This document is a management standard for developing OCDs for TfNSW new or altered transport systems.

It defines key requirements for ensuring that all operations aspects of a transport project are considered and fully defined, prior to the development of a supportable business case.

This standard is supplemented by T MU AM 06008 GU *Operational Concept Definition*, which contains detailed guidance on preparing an OCD.

While this standard describes requirements for defining whole-of-life operation of new or altered assets, it does not describe how life cycle costs are derived. For information on how life cycle costs are derived, refer to T MU AM 01001 ST *Life Cycle Costing*.

2.2. **Application**

This standard applies to the following operations levels:

- transport network level, for example, all transport modes
- transport mode level, for example, heavy rail, buses and ferries
- transport corridor level, for example, B-Line, North Shore Line, Parramatta River ferry, Inner West Light Rail and Parramatta Light Rail
- local sites, for example, transport interchanges, stations, stops, wharves, yards, depots, control centres and junctions

This standard applies to passenger and freight transport projects across all transport modes.

This standard is structured to ensure that its principles can be applied to all modes.

This standard applies to parties responsible for the planning, investment and delivery of TfNSW transport systems including the following:

- TfNSW functional areas responsible for planning, investment, service delivery and asset management
- transport operators and maintainers
- contracted AEOs providing support to TfNSW in preparing an OCD

This standard applies to the plan (concept and specify) stage of the system life cycle, prior to finalising the business case and the requesting of funding from NSW Treasury.

Topics described in this standard should be tailored and scaled to suit the particular needs of each transport project. In this context, where the term 'project' is used in this standard, it may be read to mean a portfolio, program or project as relevant.
3. Reference documents

The following documents are cited in the text. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document applies.

**International standards**


**Australian standards**


**Transport for NSW standards**

T MU AM 01001 ST Life Cycle Costing

T MU AM 06004 ST Requirements Schema

T MU AM 06006 ST Systems Engineering

T MU AM 06007 GU Guide to Requirements Definition and Analysis

T MU AM 06008 GU Operational Concept Definition

T MU AM 06009 ST Maintenance Concept Definition

T MU AM 06010 GU Business Requirements Specification

T MU HF 00001 ST Human Factors Integration – General Requirements

**Other reference documents**


4. Terms and definitions

The following terms and definitions apply in this document:

**AEO** Authorised Engineering Organisation

**BRS** business requirements specification

**INCOSE** International Council on Systems Engineering
5. Operations concept definition development

This standard and the OCD in general shall be supported by a MCD, which addresses topics including maintenance support, spares and product type approvals.

The OCD and MCD shall form a coherent overall picture of how a system or asset will be operated and maintained over the expected life cycle.

For information on how to develop an MCD refer to T MU AM 06009 ST Maintenance Concept Definition standard.

The planning entities of TfNSW shall be responsible for producing the OCD and business requirements that support it in consultation with investment, service delivery and asset management entities.

The OCD shall describe the current operations context for the system.

The OCD shall be prepared iteratively by authorised staff with appropriate competencies.

All authorised and relevant stakeholders shall be consulted during development of an OCD. Operations and maintenance stakeholders shall be consulted during development of an operations level OCD.

Stakeholders with respect to the system boundary shall be consulted during development of an OCD.

Key authorised stakeholders nominated as organisation representatives (as applicable to a proposed new or altered system) may include but are not limited to the following:

- TfNSW functional areas responsible for planning, investment, service delivery and asset management
- transport operators and maintainers
- Asset Standards Authority (ASA), TfNSW
- local councils
- utilities organisations

The OCD shall be reviewed and approved by the authorised and relevant stakeholders.
Operations concepts and associated operations performance capabilities defined in the OCD shall be developed and verified using suitable transport performance modelling tools that are applicable to the transport domain.

The development of individual project and program OCDs shall be coordinated with other OCDs that are in development or that already exist, to ensure that optimisation of one element of the transport network does not adversely affect other elements of the network.

OCD information for all projects and programs shall be coordinated and managed by the relevant TfNSW functional area.

The requirements for each of the OCD elements are described in detail in the following sections of this document. Each OCD elements has dependencies with each of the other elements of the OCD.

6. Operations performance capability

The OCD shall ensure that TfNSW enterprise level goals and objectives are identified and traced to the required operations capabilities, operations concept activities, organisation and assets.

Operations capability metrics shall be defined to support the operations concepts in the OCD.

Operations capability metrics may include, and are not limited to, the following:

- system-level capability metrics, at transport network or mode level
- fleet capability metrics
- stop, wharf, station and transport interchange capability metrics
- infrastructure capability metrics
- control and communications capability metrics
- stabling yard, depot and shipyard capability metrics
- maintenance depot capability metrics
- freight terminal capability metrics

The OCD shall justify the rationale and expected performance capability benefits of a proposed operations change to the transport network.

The assumptions that underpin the rationale and expected performance capabilities shall be identified.
7. **Operations constraints**

The OCD shall describe any constraints applicable to a proposed operations change.

Operations constraints may include, and are not limited to the following:

- service operations hours, for example peak, off-peak, weekend, holiday, special timetables
- operations staff constraints, for example shift durations or planned changes to staff operations at the site
- operations staff facilities, for example size, accommodation, travel distance, services
- easy access or disabled access constraints
- transport interchange access constraints, for example crowd capacity, passenger flow rates
- security issues, for example those identified by risk assessment or notification by external agency or from internal or external incident information
- geographic limits
- flood and drainage constraints
- environmental constraints
- heritage constraints
- asset and infrastructure constraints

There may be additional operations constraints unique to a specific project.

8. **Operations service levels**

The OCD shall adopt a layered approach to transport operations service levels for planning and decision-making. The OCD shall describe the scope and impact of the transport operations service levels.

Operations service levels may include the following:

- Level 1 – Strategic: policy-based, high complexity, network or mode-wide scope, network or mode-wide impacts, long-term change, and non-routine
- Level 2 – Tactical or management: procedure-based, how to achieve policy, medium complexity, medium-term, operations arrangements for achieving service and timetables, routing and regulation
- Level 3 – Operations: routine operations and decisions in each operations area of the transport mode, including degraded and emergency operations, short-term change, and routine
9. Operations assets and facilities

The OCD shall describe current brownfield (previously developed) operations assets and facilities affected by the proposed operations change.

Operations assets and facilities may include, but are not limited to the following:

- fleet stabling facilities, for example stabling yards, depots and shipyards
- fleet assets, for example rolling stock, buses and ferries
- maintenance depot facilities
- infrastructure assets, for example track, bridges, roads, wharves and structures
- station, stop, wharf and transport interchange assets
- control and communications assets, for example radio, signalling and optical fibre network
- electrification assets, for example feeders, substations and overhead wiring
- freight terminal facilities
- customer access, ticketing and wayfinding assets

10. Operations process scenarios

The OCD shall identify and describe relevant operations process scenarios.

Operations process scenarios to be defined in the OCD may include, but are not limited to the following:

- network management operations
- line management operations
- area control operations
- electrical switching operations
- stabling yard, depot and shipyard operations
- fleet depot operations
- heavy rail, light rail, buses, ferries, taxis and road operations
- station, stop, wharf and interchange operations
- freight terminal operations
- Incident management and response operations
- customer access, ticketing, signage and wayfinding operations

The operations process scenarios will typically form the bulk of the OCD.
11. **Operations users**

The OCD shall identify and describe roles and responsibilities of operations users, as applicable in their interactions with the proposed new or altered system.

Operations users to be identified in an OCD may include the following:

- network management operators
- line management operators
- sector, signal and area control operators
- electrical switching operators
- fleet maintenance operators
- stabling yard operators
- fleet depot and shipyard operators
- freight terminal operators
- heavy rail, light rail, buses, ferries, taxis and road operators
- station, stop and wharf operators
- maintainers, including infrastructure, control systems and fleet
- infrastructure delivery projects
- customers, including passenger, freight and other transport network users
- emergency services
- security control, monitoring and contract guard operators
- other transport owners and operators, for example Australian Rail Track Corporation (ARTC) and freight organisations
- regulatory agencies and compliance operations

The OCD shall relate responsibilities, accountabilities and informing of operations users to the operations process scenarios.

The OCD shall consider the implications on operations staff skills and any training or retraining needed due to the operations changes resulting from the introduction of new or altered transport systems.

Requirements for human factors integration are defined in T MU HF 00001 ST *Human Factors Integration – General Requirements*.
12. Operations migration

The OCD shall describe how operations will be safely migrated from existing operations to the future operations, including possible interim operations so far as is reasonably practicable at this stage of knowledge of the changes related to the new or altered assets.

The OCD shall describe arrangements to preserve acceptable levels of safety, timetabled services, efficiency, asset integrity, and service availability during operations migration.

The OCD shall describe how operations will integrate with the existing brownfield operations.

13. Operations interfaces

The OCD shall identify and describe operations interfaces.

Operations interface attributes may include, but are not limited to the following:

- who or which organisations share the operations interface
- how information is communicated and coordinated across the operations interface
- what information is communicated across the interface
- categorisation of the operations interfaces as internal or external to the transport mode

Interfaces with internal or external organisations associated with assets across the interface shall be identified.

The parties associated with the internal and external parties associated with all assets at and across the interfaces should be identified.

14. Operations modes

The OCD shall describe how the system will operate under different operations modes so far as is reasonably practicable at this stage of knowledge of the technology related to the new or altered transport systems.

Operations modes may include the following:

- normal mode
- interim or abnormal mode, for example special sporting events
- degraded mode
- emergency mode, for example incident recovery, security, backup control
- maintenance or possession mode

The OCD shall describe arrangements that will be implemented following an incident or when the service deviates from normal to abnormal, degraded or emergency levels.
The OCD shall describe the incident management organisation required to implement special command and control processes.