Electronic Information Environment (EIE)

Service Specification Document/Interface Control Document

Navy Usage Report – External

External – In the above context is intended to reflect that this content is for the In-Service Support (ISS) Contractors who have been contracted to participate in an ISS phase of a Weapon System or Platform that the Department of National Defence has acquired.

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1 Introduction

This document establishes an interface between Canada Electronic Data Exchange (EDE) system and the In-Service Support (ISS) Contractor responsible for maintenance of a fleet subject to Performance Based Contracting (PBC). This interface will be used by Canada to send materiel Usage messages to ISS Contractor. To support the part usage transfer between Canada EDE and ISS Contractor, both systems need to support specific Web Service operations as well as request and response Extensible Markup Language (XML) schemas as described in this document.

1.1 Intended Audience

- ISS Contractor System Designers

- Canada EDE Designers

- ISS Contractor Testers

- Canada EDE Testers

1.2 References

[Ref. 1]   Electronic Information Exchange Business Use Case - BUC 3.49 Navy - Exchange Usage Report Data

[Ref. 2]   PBC Business Process Catalogue Annex M: Navy Supply Process Model - In the Context of Performance Based Contracting (PBC)

[Ref. 3]   Electronic Information Exchange Service Interaction Model

[Ref. 4]   Electronic Information Exchange Materiel Management Service Operational Model – External

2   Business Information

Business Information is based on the EIE Business Use Case for Usage Report Data [Ref. 1].

The Usage Reporting service is used to satisfy two business processes:

1) Reporting of stock usage at Canada supply locations
2) Reporting of stock usage for deployed Pack-Up Kits (PUKs).

Each of these is satisfied through the technical service, Mobility Kit Usage.

The ISS Contractor[1] will be responsible for monitoring the stock level of the Canada storage locations and PUKs. In order to accurately monitor inventory level, Canada will send Usage and Inventory Reports to the ISS Contractor, via EDE on a scheduled basis.

Within Canada, maintenance business processes are supported by two types of information systems, known generically as:

- Canada Maintenance Management System (CMMS)

- Canada Supply System (CSS)

Currently both functions are supported within Canada by the Defence Resource Management Information System (DRMIS).

2.1   Business Processes

Depletion from a Canada Storage location and its underlying supply relationships within Canada or deployed PUK, and replenishment of same, is recorded in CMMS. The data constituting this Usage report will be extracted from CMMS and sent to ISS Contractor via EDE based on a predetermined schedule.

2.2   Business Triggers

The following actions within Canada CSS/CMMS systems, the business triggers, will result in a Usage data being sent to ISS Contractor.

- On a predetermined schedule, Canada will collect materiel usage data identifying movement into or out of each relevant storage location, based on relevant movement types. The ISS Contractor can use this information to track parts usage of ISS Contractor-supplied spares and STTE. Usage data is recorded for the following events:

  - A part is consumed from the Canada storage location[2] or PUK; or

  - A part is returned to the Canada storage location or PUK.

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[1] In this document the terms Industry and ISS Contractor are synonymous. The term ISS Contractor is used during description of the business process to align with the Business Use Cases. The term Industry is used during description of service interactions and service descriptions.

~~Contractor.~~

- ISS Contractor replenishes the Canada storage location or PUK.

- A part within the Canada storage location or PUK is damaged, lost or transferred.

For further information, including cross-references to business processes, please refer to the Business Use Case [Ref. 1].

2.3 Business Error Processing

ISS Contractor will report Business Errors with regards to the data to Canada via the exposed error interfaces, but any resolution may be a manual process.

Note that within Canada, the Ship storage location and PUK Usage Reporting message are sent through the Mobility Kit Usage service. All technical sections of this document refer to Mobility Kit Usage messages, but the content of the message represent Usage reporting for a ship storage location or a PUK.

Technical sections of this document will refer to the Mobility Kit Usage Reporting service, and Mobility Kit Usage Report messages.

3 Business Constraints

Constraints on *Usage* of the Service

1) Canada EDE shall ensure a Mobility Kit Usage message is only processed for an Industry which is properly authenticated and authorized to see maintenance and materiel data for that ship class.

2) Every invocation of a service operation shall be secured using secure credentials such as Public Key Infrastructure (PKI) Certificate.

Constraints on *Behaviour* of the Service

3) The Mobility Kit Usage service shall operate on a predetermined schedule, nominally once a day per Canada storage location or deployed PUK.

4) A Mobility Kit Usage message will only represent one Canada storage location or deployed PUK construct.

5) A Mobility Kit Usage message will address serviceable storage locations only.

6) Industry will report any business processing errors through the Mobility Kit Usage error operation exposed by Canada EDE using a distinct and separate invocation.

7) Mobility Kit Usage messages will be signed using digital certificates between Canada EDE and Industry. Please see Service Interaction Model [Ref. 3] for details.

8) Canada EDE may attempt to repeat operation invocations in response to technical faults. This behaviour is controlled by parameters for each operation. Please see Service Interaction Model [Ref. 3] for details.

4 Service Use Case

The requirements for the Mobility Kit Usage service are defined by one use case with several scenarios.

4.1 Service Context [3]

A high level view of the context of the service is shown in Figure 4-1~~Figure 4-1~~ below. For simplicity this view omits error scenarios. These are discussed in Service Use Case Scenarios.
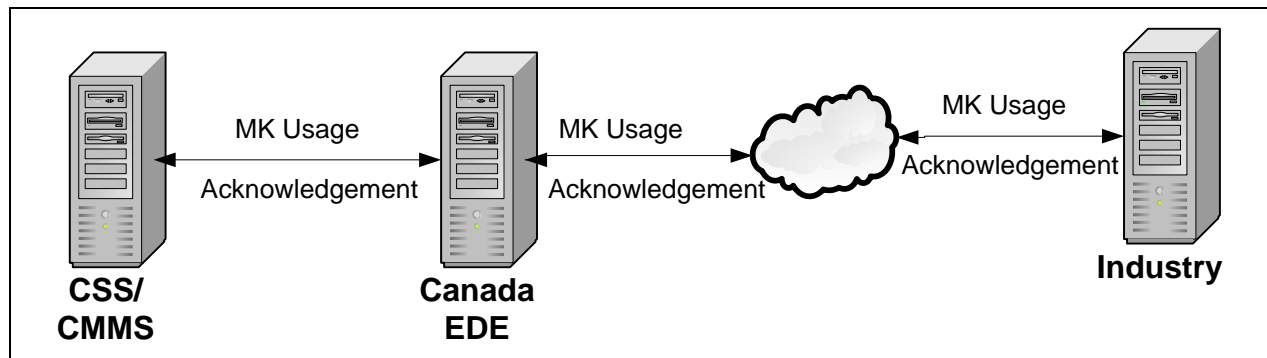

Figure 4-1 Mobility Kit Usage Service Context

The following steps occur:

- CSS/CMMS will periodically collect materiel usage information.
- CSS/CMMS send Mobility Kit Usage message to Canada EDE – Canada EDE accepts the message and returns a 'technical' response.
- Canada EDE sends Mobility Kit Usage message to Industry – Industry accepts the message and returns a 'technical' response.
- Industry backend system performs the required processing including enforcement of pre-established business rules as per agreement with Canada and Industry.

The "technical response" referred to above either (*i*) confirms a party in the exchange has accepted a message for further processing, or (*ii*) contains a fault message. A technical acceptance does not preclude subsequent "business" errors.

4.2 Successful Request and Technical Response

The Mobility Kit Usage Message Flow is shown in Figure 4-2~~Figure 4-2~~. This is the main or "Happy Day" scenario.

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[3] The terms ISS Contractor and Industry are used interchangeably in this document.

Figure 4-2 Mobility Kit Usage Message Flow

Main Flow	
Scenario	"Happy Day:" Canada EDE successfully sends Mobility Kit Usage message to Industry.
Pre-Condition	CSS has collected materiel usage data.
Post-Condition	Mobility Kit Usage message is successfully received by Industry. CSS is advised of successful delivery of message to Industry.
Steps	1) CSS sends Mobility Kit Usage message to Canada EDE.
	2) Canada EDE successfully Authenticates, Authorizes and Validates the message; then starts an internal process.
	3) Canada EDE responds that the message has been accepted.
	4) The Canada EDE system invokes the Industry hosted and exposed SendMKUsage operation.
	5/6) Industry successfully Authenticates the service consumer.
	7/8) Industry successfully Authorizes use of the service/operation.
	9/10) Industry conducts the required validations as per Service Interaction Model [Ref. 3]- Section Technical Delivery Phase
	11) Industry provides technical response to Canada EDE. The response may indicate a status of Success or contain a fault.
	12/13) Canada EDE sends *Technical* Acknowledgement to CSS

Implicit in the above diagram is that a service Consumer may re-try to send a message to the service Provider in the event there is no technical response from the Provider or if the Provider response indicates a technical error. Resend behaviour is governed by parameters in the non-functional requirements of each operation.

4.3 Alternate Scenarios

The following scenarios apply to all uses of the Mobility Kit Usage service.

Alternate Flow 1 (Authentication Failure)	
Scenario	Canada EDE does not provide appropriate credentials to Industry.
Pre-Condition	Canada EDE has invoked the Industry Mobility Kit Usage Service.
Post-Condition	The Industry sends an Authentication Failure fault response
Steps	1) The authentication credentials are either not provided or are incorrect.
	2) The Industry sends an Authentication Failure fault as the technical response.
	3) Canada EDE processes the fault.

Alternate Flow 2 (Authorization Failure)

Scenario	Canada EDE is not authorized to use a service.
Pre-Condition	Canada EDE has invoked the Industry Mobility Kit Usage Service. Industry has completed Authentication successfully.
Post-Condition	The Industry sends an Unauthorized Request fault as the technical response.
Steps	1) The request message does not pass Industry authorization. 2) The Industry sends an Unauthorized Request fault as the technical response. 3) Canada EDE processes the authorization failure.

Alternate Flow 3 (Message Technical Validation Failure)

Scenario	Canada EDE sends a malformed message to Industry.
Pre-Condition	Canada EDE has invoked the Industry Mobility Kit Usage Service. Industry has completed Authentication and Authorization successfully.
Post-Condition	The Industry sends a Malformed Message fault response.
Steps	1) The message does not pass validation as per agreed schema. (Regardless of the number and types of errors). 2) Industry sends schema validation error information as the technical response as the fault message as defined within the exposed interface. 3) Canada EDE processes the schema validation error.

Alternate Flow 4 (Industry Service unresponsive)

Scenario	Canada EDE does not receive technical response within ACK_TIME_INTERVAL.
Pre-Condition	Canada EDE has invoked the operation but does not receive the technical response within the time specified for the Mobility Kit Usage service.
Post-Condition	Canada EDE marks the message as Dead Message.
Steps	1) Canada EDE does not receive any technical response from Industry within the allowed ACK_TIME_INTERVAL. 2) Canada EDE will retry sending the message up to the defined maximum retry count, or Time to Live interval, whichever comes first. If there is no response, then Canada EDE marks the request message as Dead and handles it via the DeadMessageHandlerService.

The Mobility Kit Usage Business Validation Failure Message Flow is shown in Figure 4-3Figure 4-3.

Figure 4-3 Mobility Kit Usage Business Validation Failure Message Flow

Alternate Flow 5 (Business Validation Failure)	
Scenario	Industry business validations fail on one or more Mobility Kit Usage data records.
Pre-Condition	Canada EDE has invoked the Industry Mobility Kit Usage service, the message has passed Authentication, Authorization and Schema Validation and a successful technical response has been received by Canada EDE.
Post-Condition	Industry sends error information to Canada EDE.
Steps	1) The Usage data records failed Industry's business validation process. 2) Industry sends business error information to Canada using the Mobility Kit Usage Error operation.

5 Service Description – Mobility Kit Usage Service

5.1 Service Overview

Mobility Kit Usage service requires interacting web services exposed by Canada EDE System and Industry. Industry will expose a service which Canada EDE will use to send the Mobility Kit Usage message (see Section 7 for message definition). After receipt of the message, Industry will return a technical response back to Canada EDE.

Canada EDE will provide a Mobility Kit Usage Error operation to be used by Industry to report a Technical or Business Fault if errors are found during Industry processing. See [Ref. 4].

5.2 Service Properties

Service Property	Description
Enterprise Service Name (Business)	Mobility Kit Usage Service
Enterprise Service Name (Technical)	MobilityKitUsage_Industry MobilityKitUsage_Canada
Purpose	This service supports the Canada EDE Maintenance process for scheduled and unscheduled maintenance tasks. On a periodic basis, Canada uses this service to send parts Usage messages to Industry for a location or deployed PUK. This service also supports reporting of business errors encountered while processing Mobility Kit Usage messages within the Industry system.
Business Response Time Interval	N/A
Service Domain	Supply Management
Business Owner	ADM (IM)
Service Grouping	Supply Materiel / Mobility Kit Usage
Source Provider	Industry
Target Service Consumers	Canada EDE
Business Process Supported (now)	Perform 1st and 2nd level maintenance • Execute Corrective or Preventive Maintenance
Business Process Supported (future)	None currently identified.
Business Objective Supported	See Section 2: Business Information.

Service Property	Description
Expected life time	The full lifecycle of the subject weapons system using ISSCF.

5.3   Service Operations

Provider	Consumer	Operation
Industry	Canada EDE	SendMobilityKitUsage
Canada EDE	Industry	SendMobilityKitUsageError

5.3.1   SendMobilityKitUsage Operation

This operation is used by Canada EDE to send a Mobility Kit Usage message to Industry. Industry's implementation of this operation will perform authentication, authorization and technical message validation on the Mobility Kit Usage message. Industry will return a status or fault information to the consumer.

If Industry accepts the message for further processing an output message is returned. The content of the output indicates SUCCESS, Industry accepts custody of the message for further processing. If Industry does NOT accept the message, Industry will return one or more fault blocks.

5.3.2   SendMobilityKitUsageError Operation

This operation is used by Industry to send a Mobility Kit Usage Error message to Canada EDE in the event a business error is encountered by Industry backend system. Canada EDE's implementation of this operation will perform authentication, authorization and technical message validation on the Mobility Kit Usage Error message. Canada EDE will return a status or fault information to the consumer.

If Canada EDE accepts the message for further processing an output message is returned. The content of the output indicates SUCCESS, Canada EDE accepts custody of the error message for further processing. If Canada EDE does NOT accept the message, Canada EDE will return one or more fault blocks.

5.4   Message Interaction

As defined in Section 4: Service Use Case, the Mobility Kit Usage service supports a business-asynchronous interaction with a message-passing paradigm. Each Web Service operation must be defined such that the messages required by the system use case (faults in particular, see Section 4.3 Alternate Scenarios) are explicit in the Web Service definition. This implies each Mobility Kit Usage web service operation must be defined with an input, output and fault element.

Message interaction is further described in Electronic Information Exchange Service Interaction Model [Ref. 3].

6 Information Model

This section describes the **business objects** which are used in the Mobility Kit Usage service. The Unified Modeling Language (UML) notation is used. A functional view of the information model is provided in the Usage Business Use Case [Ref. 1], Section 3: Functional Data Definition and an Entity-Relationship diagram (ERD) is provided in Appendix A of this document.

The purpose of this section is to provide a bridge between the functional view of the information model and the concrete details of the design as expressed in an XML Schema.

Note: In the case of the discrepancy between various representations of the information model, the authoritative definition of the information model will always be the XML schema that is defined for the service.

6.1 Mobility Kit Usage

A Mobility Kit Usage Information Model is shown in Figure 6-1Figure 6-1. A Mobility Kit Usage message contains a series of transactions identifying movement of parts associated with a specific Canada storage location or deployed PUK.

The Usage Report (class Mobility Kit Report) is used to manage "goods movement" within the specific Canada storage location or PUK. A Usage Report contains one or more goods movements (class GoodsMovement).

Goods Movement is for a particular part (class PartType) in a Canada storage location or PUK.

Information about individual parts is included (class PartDetail). A PartDetail must be contained in a GoodsMovement.

The field descriptions are elaborated in the Functional view (please see Business Use Case [Ref. 1]).

Figure 6-1 Information Model –Mobility Kit Usage

7 Operation Message Model

This section describes how the business objects described above (Section 6 Information Model) are aggregated for the purpose of reliable information exchange.

All EIE Supply services are request/response and each operation definition includes a distinct input, output and fault message. Message definitions use a common supply message header definition, as well as a common security block definition. Please refer to Electronic Information Exchange Service Interaction Model [Ref. 3] for details on message header and security block definition.

7.1 Mobility Kit Usage Input Message Constructs

7.1.1 Mobility Kit Usage Input Body

As shown in Figure 7-1Figure 7-1, a Mobility Kit Usage input message consists of

- A Message Header;
- A Security Block;
- A Mobility Kit Usage Report (with contained InventoryItems and PartDetail).

In order to uniquely identify data from a business payload, certain elements will be identified as elements that can make up the unique Business identifier for each business object that has been transmitted. These elements will then be used by either the consumer or provider to report any errors associated with the contained business payload.
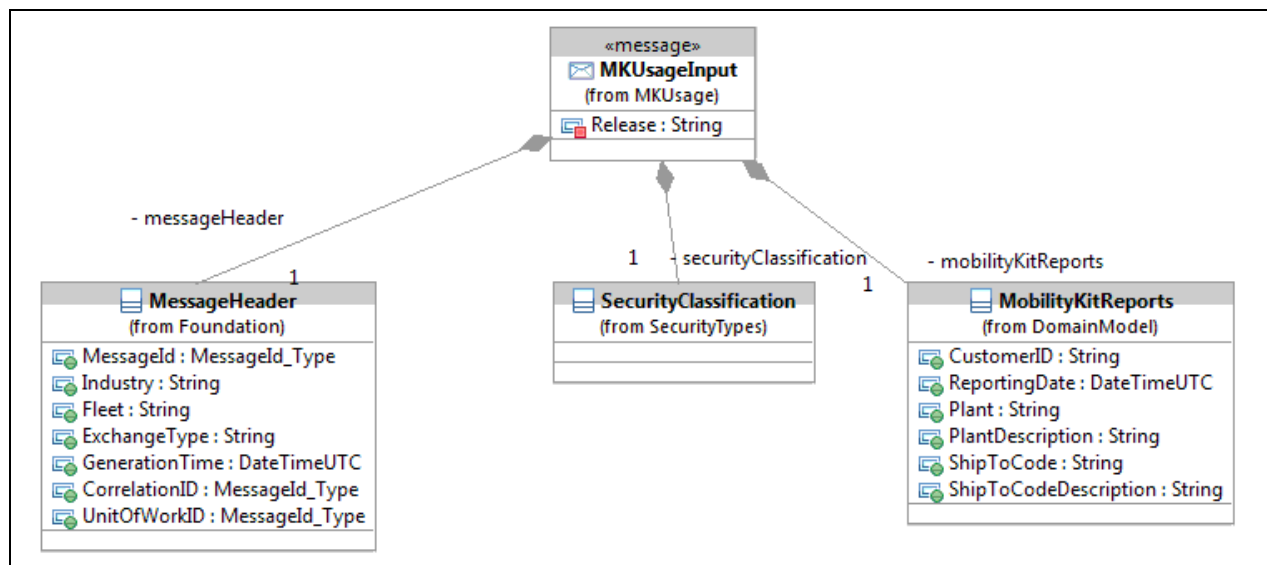

Figure 7-1 Mobility Kit Usage Input Message

For a MobilityKitUsageInputMessage the MessageHeader Correlation ID and UnitofWorkID are not used.

7.1.2 Mobility Kit Usage Output Body

The output of the SendMobilityKitUsage operation is the MobilityKitUsageOutputBody. As shown in Figure 7-2Figure 7 2, the output body consists of:

- A Message Header;
- An MKUsageOutput indicating acceptance; the Mobility Kit Usage message is accepted in its entirety only.

The output message has no security block. The output does not contain any sensitive or protected information.
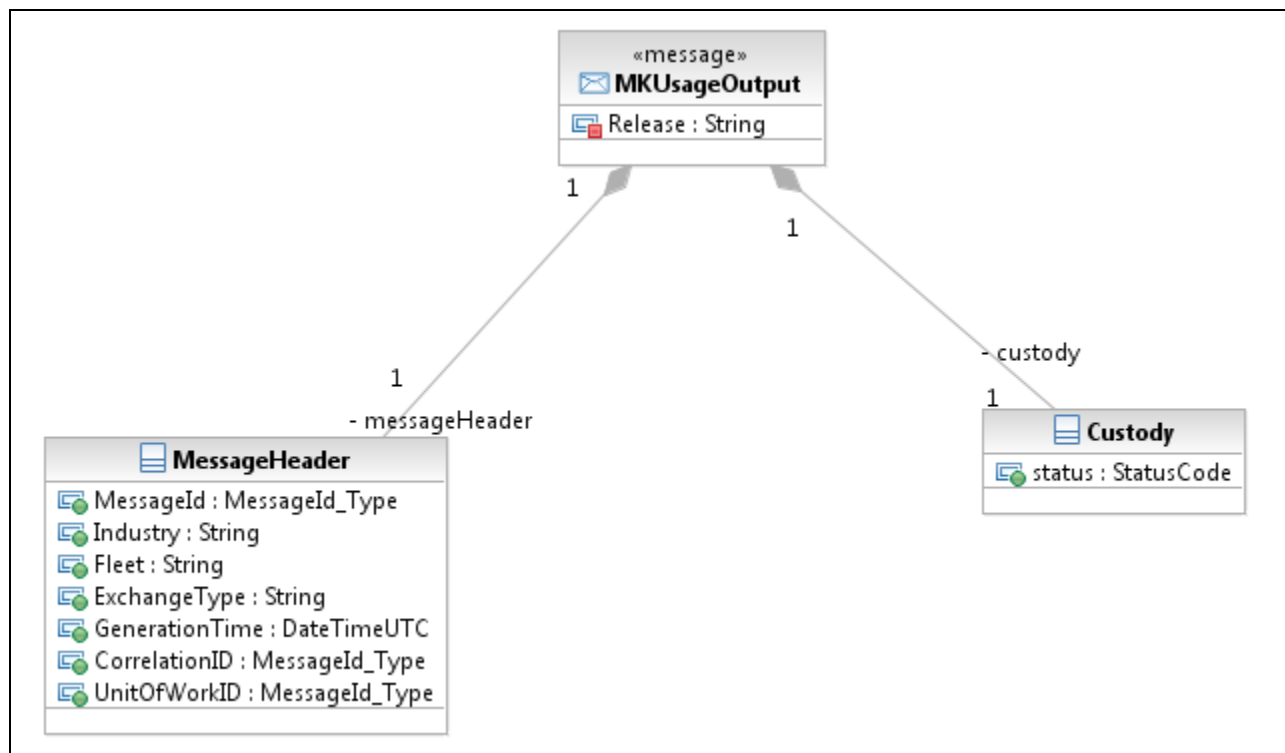
This output body definition is also used in the Mobility Kit Usage Error service.
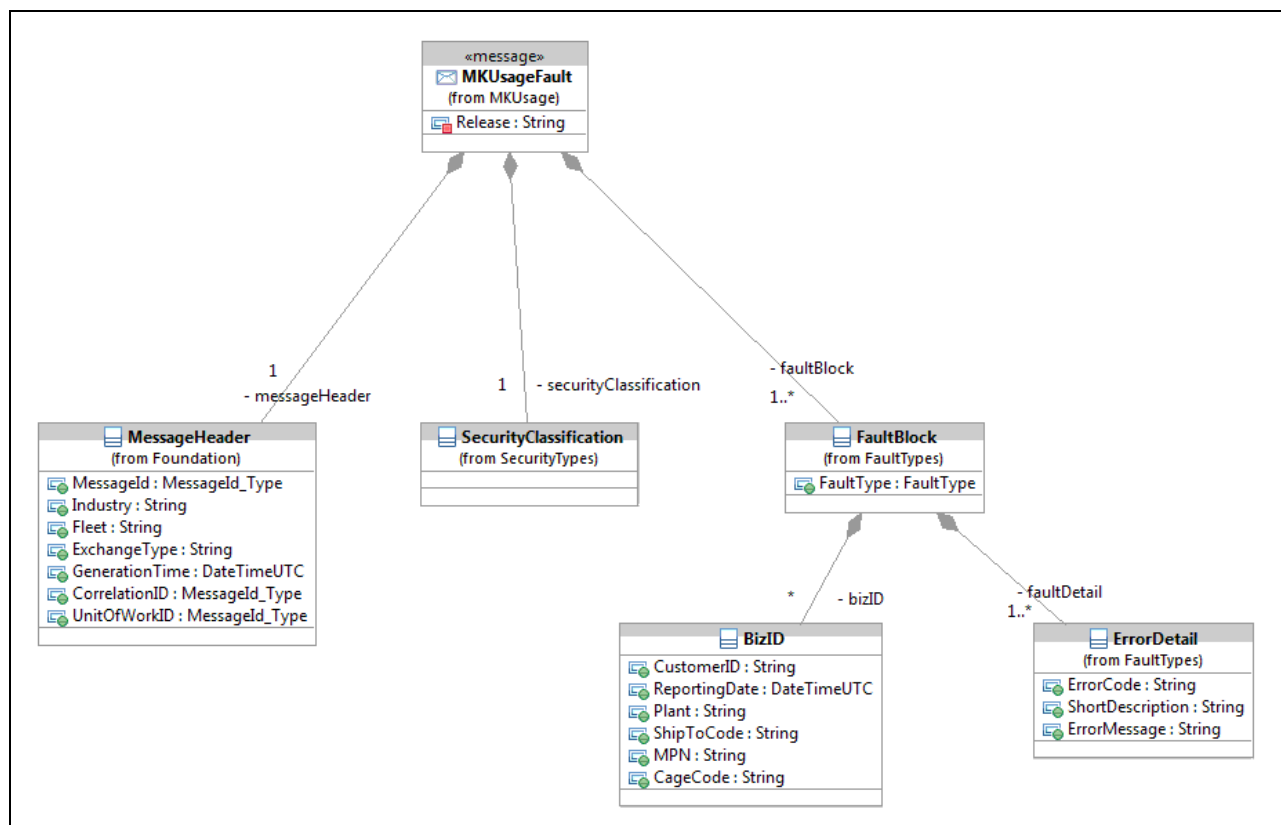

Figure 7-2 Mobility Kit Usage Output Message

For a MobilityKitUsageOutputBody:

- The MessageHeader Correlation ID will reflect the Message ID of the originating Mobility Kit Usage input message.
- The MessageHeader Exchange Type must be set to the Exchange Type of the MobilityKitUsageInputBody.
- The value of the MKUsageOutput 'Custody' evaluates to "success".

7.1.3   Mobility Kit Usage Fault Body

A fault returned by the SendMobilityKitUsage operation uses the MobilityKitUsageFaultBody element. As shown in , the fault message consists of:

- A Message Header;
- A Security Block;
- One or more FaultBlocks.

Each fault block pertains to zero to many business objects, to the level of granularity which the Service Provider can provide. If the system cannot determine a Business Identifier then this is omitted. To report differing faults on more than one business object extra fault blocks can be included in the fault message.

This fault body definition is also used in the Mobility Kit Usage Error service.

Figure 7-3 Mobility Kit Usage Fault Message

For a MobilityKitUsageFaultMessage:

- The MessageHeader Correlation ID will reflect the Message ID of the originating Mobility Kit Usage input message.
- The MessageHeader Exchange Type must be set to the Exchange Type of the MobilityKitUsageInputBody.

7.2   Mobility Kit Usage Error Message Constructs

In the event Industry encounters a business error while processing the Usage report message in their backend supply system, Industry will send Canada a Mobility Kit Usage Error message through the following constructs.

7.2.1   Mobility Kit Usage Error Input Body

As shown in Figure 7-4Figure 7-4, a Mobility Kit Usage Error input message consists of

- A Message Header;
- A Security Block;
- One or more Error body.
  Within the Error Body, at least one BizID must be provided, along with at least one ErrorDetail block.
    - If appropriate, multiple BizIDs may be provided referencing a common error(s).
- If appropriate, multiple errors can be defined within the error body. These errors would apply to all BizIDs defined within the ErrorBody construct.
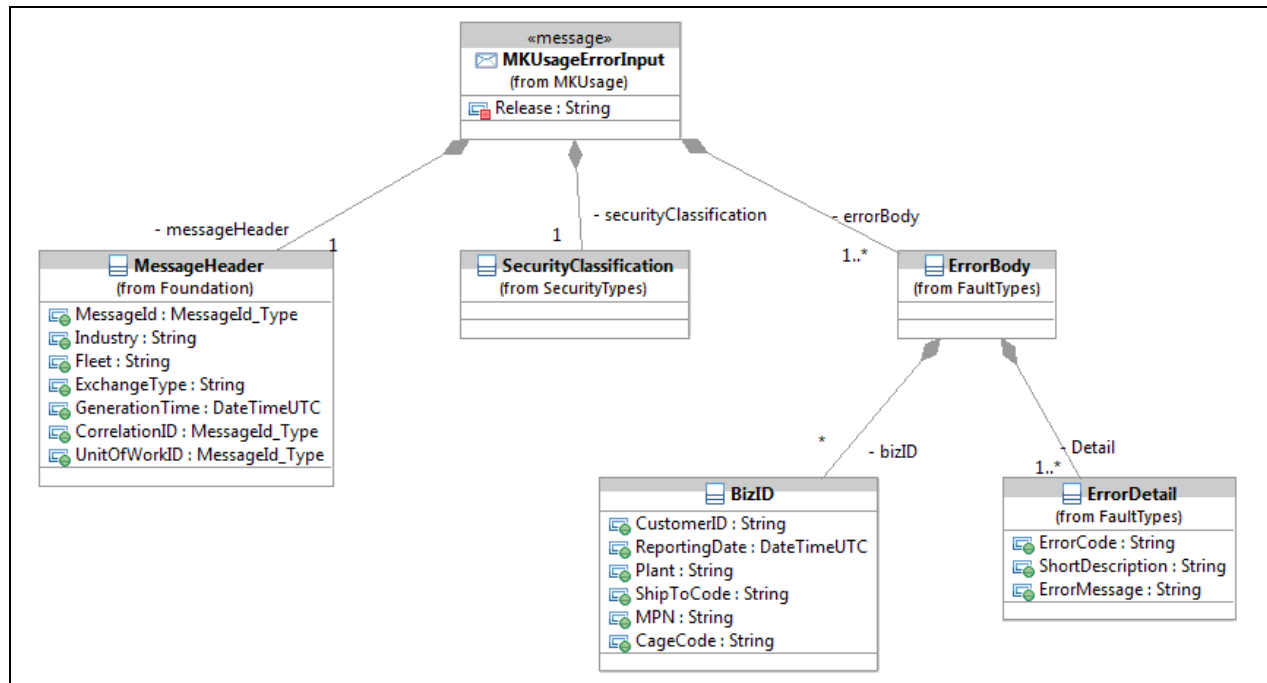

Figure 7-4 Exchange Messages – Mobility Kit Usage Error Input Body

For a MobilityKitUsageErrorInputBody the MessageHeader CorrelationID and UnitofWorkID are not used.

Each error pertains to one or more business objects, to the level of granularity which the Service Consumer can provide. To report differing errors on more than one business object extra error blocks can be included in the error input message.

7.2.2   Mobility Kit Usage Error Output Body

The output of the SendMobilityKitUsageError operation is the MobilityKitUsageErrorOutputBody.

Please refer to 7.1.2 Mobility Kit Usage Output Body for this definition.

7.2.3   Mobility Kit Usage Error Fault Body

A fault returned by the SendMobilityKitUsageError operation uses the MobilityKitUsageErrorFaultBody element.

Please refer to 7.1.3 Mobility Kit UsageFault Body for this definition.

Non Functional Requirements/Technical Details	
Attachment Size	N / A
ACK Time Interval	2 minutes
Retry Time Interval	5 minutes
Number of Retries	5
Biz. Response Time Interval	N/A
Time to Live Span	Nominally 1 hour – if message cannot be delivered within 1 hour, await next delivery period in 24 hours.
Service Op Availability	During core processing hours. 95% available uptime is the goal of the service
Downtime Requirements	The service cannot be used during established maintenance windows, which is currently expected to be for about 2 hours per week. The unavailability window may be accumulated and invoked during major maintenance periods, but ensuring that the overall availability of the service is still maintained.
Dead Message Handling	Alternative communication channel applies for this operation when Canada EDE cannot successfully send Mobility Kit Usage message to Industry.

8.2 Detailed Operation Characteristics – SendMobilityKitUsageError

Industry system will invoke the exposed Canada EDE MobilityKitUsageError service through this operation. A Mobility Kit Usage error message will contain Industry-reported business errors encountered while attempting to process a MobilityKitUsage message generated by Canada.

Refer to MobilityKitUsage_Canada.wsdl for implementation details.

Detailed Operation Characteristics

Interface Definition	Description
Operation Name	Send Mobility Kit Usage Error
Operation Technical Name	SendMobilityKitUsageError
Operation Description	This operation is invoked by Industry to send a Business Error message to Canada EDE. The Business Error describes errors encountered while processing Canada's Mobility Kit Usage message.
Target Operation Provider	Canada EDE
Target Operation Consumer	Industry

Interface Definition	Description
Properties	*Request-Response* message exchange pattern.
Input Message Definition	Please refer to Operation Message Model Section 7.2.1 Mobility Kit Usage Error Input for details.
Output Message Definition	Please refer to Operation Message Model Section 7.2.2 Mobility Kit Usage Error Output for details.
Fault Definition	Please refer to Operation Message Model Section 7.2.3 Mobility Kit Usage Error Fault for details.

Non Functional Requirements

Non Functional Requirements/Technical Details	
Frequency	Based on Service Level Agreements (SLA) to be determined between Canada and Industry on a per ship class basis.
Peak Throughput Time	N/A
Peak Throughput Volume	N/A
Payload Size	~ 5KB per Error
Attachments	None
Attachment Size	N/A
ACK Time Interval	2 minutes
Retry Time Interval	5 minutes
Number of Retries	5
Biz. Response Time Interval	N/A
Time to Live Span	Nominally 1 hour – if message cannot be delivered within 1 hour, revert to secondary delivery channel, which may be manual.
Service Op Availability	During core processing hours. 95% available uptime is the goal of the service
Downtime Requirements	The service cannot be used during established maintenance windows, which is currently expected to be for about 2 hours per week. The unavailability window may be accumulated and invoked during major maintenance periods, but ensuring that the overall availability of the service is still maintained.

Non Functional Requirements/Technical Details	
Dead Message Handling	Alternative communication channel applies for this operation when Industry cannot successfully send Mobility Kit Usage Error message to Canada.

8.3 Service Bindings

8.3.1 SOAP Over http

The implementation of this service will use a Simple Object Access Protocol (SOAP) binding with document style messages and Hyper Text Transfer Protocol (http) transport.

The business objects (Section 6), MessageHeader and SecurityMarkings elements[4] are bound to the SOAP Body element. The SOAP Header is used for EIE adopted WS-* standards-based elements (e.g., WS_Security assertions).

In this binding the http response is used for operations' output or fault messages.

8.3.2 SOAP Over JMS

Not currently supported for this service.

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[4] See the Mobility Kit Usage Service WSDL file for the precise binding

9   Definitions, Acronyms, Abbreviations

Term	Description
ADM (IM)	Assistant Deputy Minister (Information Management)
ADM (Mat)	Assistant Deputy Minister (Materiel)
BUC	Business Use Case
CMMS	Canada Maintenance Management System
CSS	Canada Supply System
DND	Department of National Defence
DRMIS	Defence Resource Management Information System
EDD	Estimated Delivery Date
EDE	Electronic Data Exchange
EIE	Electronic Information Environment
HoP	Hand-Over Point
HTTP	Hyper Text Transfer Protocol
HTTPS	Hyper Text Transfer Protocol Secure
ISS	In-Service Support
JMS	Java Message Service
MP	Maintenance Plan
PO	Purchase Order
SLA	Service Level Agreement
SOAP	Simple Object Access Protocol
STE	Support and Test Equipment
TBD	To Be Defined, To Be Determined
UML	Unified Modeling Language
URL	Uniform Resource Locator
WO	Work Order
WS	Weapon System
WSDL	Web Service Definition Language
XML	Extensible Markup Language
XSD	XML Schema Definition
XSL	Extensible Stylesheet Language

10 Appendix A – Information Model Entity Relationship View

Information Model – Entity-Relationship View

11   Document History

Revision Number	Description	Date
1.0	Initial release for Navy RFP.	23 September 2015