Integrating the Healthcare Enterprise

IHE Patient Care Device
Technical Framework Supplement

Medical Equipment Management
Location Services
(MEMLS)

Rev. 1.3 – Trial Implementation

Date: November 9, 2017
Author: IHE Patient Care Device Technical Committee
Email: pcd@ihe.net

Foreword

This is a supplement to the IHE Patient Care Device Technical Framework 7.0. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

30   This supplement is published on November 9, 2017 for trial implementation and may be available for testing at subsequent IHE Connectathons. The supplement may be amended based on the results of testing. Following successful testing it will be incorporated into the Patient Care Device Technical Framework. Comments are invited and can be submitted at http://www.ihe.net/PCD_Public_Comments.

35   This supplement describes changes to the existing technical framework documents.

"Boxed" instructions like the sample below indicate to the Volume Editor how to integrate the relevant section(s) into the relevant Technical Framework volume.

Amend Section X.X by the following:

Where the amendment adds text, make the added text **<u>bold underline</u>**. Where the amendment
40   removes text, make the removed text **~~bold strikethrough~~**. When entire new sections are added, introduce with editor's instructions to "add new text" or similar, which for readability are not bolded or underlined.

General information about IHE can be found at www.ihe.net.

45   Information about the IHE Patient Care Device domain can be found at ihe.net/IHE_Domains.

Information about the organization of IHE Technical Frameworks and Supplements and the process used to create them can be found at http://ihe.net/IHE_Process and http://ihe.net/Profiles.

The current version of the IHE Patient Care Device Technical Framework can be found at http://ihe.net/Technical_Frameworks.

50

CONTENTS

100

105

110

Introduction to this Supplement

This supplement affects volumes 1 and 2 of the PCD Technical Framework. The supplement adds a new profile, new actors, new triggers, and a new transaction. This supplement defines a profile for the communication of equipment and people location information in the absence of patient observations, alerts, or event notifications.

The IHE Working Group (WG) that created and maintains this profile (PCD MEMLS WG) is aware of IEEE WG P1847 Location-Based Services (LBS) for Healthcare. The results of ongoing interactions with this IEEE WG are expected to impact this profile from time to time. Additionally, some content from this profile should be assumed to be available for utilization in the deliverables of the IEEE WG.

Open Issues and Questions

Staff location tracking is about more than the technology which can accomplish it. This effort will focus predominately on equipment location, but will provide a means of communicating location information of people. Enumerating all that can be accomplished with that information and all of the issues around those accomplishments is outside the scope of this effort.

Identification of some observation identifications (MDC & REFID) are not be currently defined in Rosetta Terminology Mapping (RTM) or in IEEE 11073-10101 Nomenclature and so a submission will be required. After values are assigned they are likely to appear in the Rosetta Terminology Mapping Management System (RTMMS) prior to being balloted for an update to the standard. Once assigned official values implementations are required to use the assigned values.

Closed Issues

Communication of the same information that this profile communicates as observations in conjunction with the data, alert, and event use cases associated with existing PCD profiles can be accomplished using the observation documentation found in this profile as additional observations to existing transactions in association with existing actors without the requirement for vendor adoption of this new profile. The justification for this additional profile is the definition of a new actor type (LS) which is distinct from existing actors as well as the trigger condition which is unrelated to any device associated patient.

Other methods for communication of location information exist in the operating environment (SNMP, vendor proprietary SOAP/XML, etc.) today, are expected to continue to exist, but are not expected to integrate with medical device data communication.

History of Document Changes

This section provides a brief summary of changes and additions to this document.

Date	Document Revision	Change Summary
2017-11-09	1.3	Updated for approved CPs, housekeeping corrections, and explanation that MDCs and REFIDs need to be standardized and that they will appear first in RTMMS.
2015-10-14	1.2	Updated for approved CPs and housekeeping corrections.

150   # General Introduction

> *Update the following Appendices to the General Introduction as indicated below. Note that these are not appendices to Volume 1.*

Appendix A – Actor Summary Definitions

> *Add the following actors to the IHE Technical Frameworks General Introduction list of actors:*

155

The Location Observation Reporter (LOR) produces observations.

The Location Observation Consumer (LOC) consumes observations.

Actor	Definition
Location Observation Reporter (LOR)	The profile actor that sends Location Services observations of location for devices or people and data from Location Services tags
Location Observation Consumer (LOC)	The profile actor that receives Location Services observations

160   The Location Observation Reporter (LOR) is a new and distinct observation source actor and is likely to be a Location Services system (LS) also recognized by the underlying technology used for equipment and people tracking, such as Radio Frequency Identification (RFID) or Real Time Location Services (RTLS). But it may also be an actor in a different profile (DEC DOR, ACM AR, IPEC DOR), assuming the location tracking and reporting capability is embedded into the
165   medical device or the location observation is merged with the medical device data in a gateway system prior to it being sent to the observation consumer. The Location Observation Consumer (LOC) may also be an actor in a different profile (DEC DOC, ACM AM, IPEC DOC).

Appendix B – Transaction Summary Definitions

> *Add the following transactions to the IHE Technical Frameworks General Introduction list of*
170   > *Transactions:*

Report Location Observation (RLO) (from LOR to LOC)

_____

Transaction	Definition
Report Location Observation [PCD-16]	If the location observation information is sourced from an external to device tag and reporting system, then the device to which it is attached has the potential of being unaware of its presence and would likely not contain device associated patient information. Then, the observation will be sourced by the LS and not the medical device. This transactions contains an observation of the location of a device or person or information about the Location Services tag, such as environmental (temperature, humidity, gases, etc.) or operator interactions (buttons, pulls, accelerometers, etc.).

Glossary

175   *Add the following glossary terms to the IHE Technical Frameworks General Introduction
Glossary:*

Glossary Term	Definition
Computerized Maintenance Management System (CMMS)	This is the system which the hospital makes use of to maintain its inventory of medical devices, their identification, their status, their software, firmware, and hardware versioning information and history. This is a system for which reception of device location observation is well suited as a means of identifying the last known location of equipment in need of servicing, repairs, or version upgrades.
Global Positioning System (GPS)	This is the system of orbiting satellites that are constantly broadcasting extremely high accuracy time information, combined with ubitiquous receivers and software associated with the receivers that upon correlation of the received data can identify with reasonably high accuracy the location of the receiver in 3D space by latitude, longitude, and altitude.
Location Services (LS)	This is a collection of software applications and services which utilize tag tracking information to provide the last known location of the tags as well as any environmental or operator interactions with the tags.
National Marine Electronics Association (NMEA)	This is a worldwide, self-sustaining organization with the commitment to enhance the technology and safety of electronics used in marine applications.
Radio Frequency Identification (RFID)	This is the technology whereby tags will transmit their unique identification either periodically (active) or when energized by an energy field (passive). This identification transmission can be correlated by multiple receives to identify the location of the tag.
Real Time Location Services (RTLS)	This is an aspect of Location Services whereby the last known location of devices or people can be communicated to other systems.

180

_____

180 # Volume 1 – Profiles

Copyright Licenses

Add the following to the IHE Technical Frameworks General Introduction Copyright section:

NA

Domain-specific additions

185   None

Add Section X

X Medical Equipment Management Location Services (MEMLS) Profile

190   Existing profile transaction observation information does not include detailed device and people
location identification which can be sourced by embedded location sensing components or
through location sensing tags external to equipment and these tags can also provide additional
information such as button presses and environmental information such as temperature and
humidity. Additionally, there are no defined actors or transactions for providing location
195   information from other than medical devices to other than an EMR or an alert manager.

Specific triggers, transactions, and source actors in existing profiles do not exist for the sole
purpose of communication of location information in the absence of patient observations, alerts,
or event notifications. The absence of the communication of this information outside of patient
observations, alerts, or event notifications reduces the effectiveness of Location Services (LS)
200   solutions and impacts the effectiveness of people interactions with equipment and systems by not
providing for location information or location specific events.

This profile is a combination of profile types as it defines workflow through use case
specification and transport through its described use of the HL7[®1] and IEEE 11073 standards for
information communication.

---

[1] HL7 is the registered trademark of Health Level Seven International.

___

205 ## X.1 MEMLS Actors, Transactions, and Content Modules

This section defines the actors, transactions, and/or content modules in this profile. General definitions of actors are given in the Technical Frameworks General Introduction Appendix A at http://www.ihe.net/Technical_Frameworks.

Figure X.1-1 shows the actors directly involved in the MEMLS Profile and the relevant
210 transactions between them. If needed for context, other actors that may be indirectly involved due to their participation in other related profiles are shown in dotted lines. Actors which have a mandatory grouping are shown in conjoined boxes.

```
        ┌─────────────────────┐
        │         LOR         │
        └─────────────────────┘
                    │
                   RLO
               [PCD-16] ↓
                    │
        ┌─────────────────────┐
        │         LOC         │
        └─────────────────────┘
```
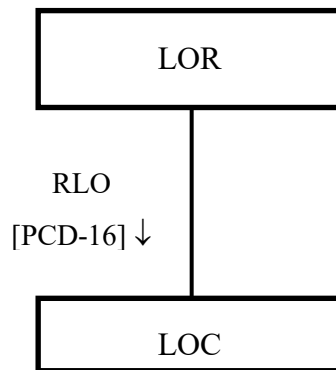
Figure X.1-1: MEMLS Actor Diagram

215 Table X.1-1 lists the transactions for each actor directly involved in the MEMLS Profile. To claim compliance with this profile, an actor shall support all required transactions (labeled "R") and may support the optional transactions (labeled "O").

Table X.1-1: MEMLS Profile - Actors and Transactions

Actors	Transactions	Optionality	Reference
LOR	RLO [PCD-16]	R	PCD TF-2: 3.16
LOC	RLO [PCD-16]	R	PCD TF-2: 3.16

220 ### X.1.1 Actor Descriptions and Actor Profile Requirements

Most requirements are documented in Transactions (Volume 2) and Content Modules (Volume 3). This section documents any additional requirements on profile's actors.

___

X.1.1.1 Location Observation Reporter (LOR)

225

230

The Location Observation Reporter (LOR) may also be an observation transaction sending actor in other IHE PCD profiles, such as a DEC DOR, an ACM AR, an IPEC DOR, or a MEMDMC DMIR. This could be the case if the location tracking tag is either embedded in the sending actor or if the tag is external and a gateway system is being used to merge the location information with observations associated with other IHE profiles. If the tag is external the medical device may have no awareness of its presence or if the observations are unique to location services and are not associated with patients. The location services specific nature of the observations produced by the Location Observation Reporter is the justification for this unique profile.

X.1.1.2 Location Observation Consumer (LOC)

235

It is highly likely that the Location Observation Consumer may also be an observation transaction receiving actor in other IHE PCD profiles. If the observation is simply to be recorded it is likely to be a DEC DOC or IPEC DOC Actor. If the observation is to be acted upon, it is likely to be an ACM AM Actor. If the location observation is to be used for equipment management, the LOC Actor is likely to be a MEMDMC DMIC Actor (a CMMS).

X.2 MEMLS Actor Options

240

Options that may be selected for each actor in this profile, if any, are listed in the Table X.2-1. Dependencies between options when applicable are specified in notes.

Table X.2-1: MEMLS - Actors and Options

Actor	Option Name	Reference
LOR	No options defined	--
LOC	No options defined	--

X.3 MEMLS Required Actor Groupings

There are no required actor groupings.

245

X.4 MEMLS Overview

MEM LS is focused on getting location tracking or tag related observations into medical records and into equipment management systems.

X.4.1 Concepts

250

Location information is pertinent to medical device observations as it provides a means of locating the patient currently associated with that equipment. This can be additional observation information added to existing transactions without the use of this profile. This profile focuses on those uses of location tracking information or tag associated information independent of any

patient currently associated with the equipment, such as for equipment management, and tag auxiliary information such as button presses or environmental observations like temperature and humidity.

255

If the end result of receipt of such information is the generation of Report Alert [PCD-04] transactions in association with the ACM Profile then the sending system is considered to be an AR with additional types of alerts and observations.

X.4.2 Use Cases

260 ### X.4.2.1 Use Case #1: Communication of location observations in conjunction with other non-location related transactions

This is the addition of location observations in the same transaction with non-location related transactions, such as DEC [PCD-01], ACM [PCD-04], IPEC [PCD-10], and MEMDMC [PCD-15].

265 ### X.4.2.1.1 Location Added to Other Observations Use Case Description

This presumes that the reporting piece of equipment or system is location aware and so has the location information to include in with its other observations. This can be accomplished either by embedding the location tracking capability into the equipment or by using a gateway external to the device and to the location tracking system to merge the information into a single device
270 observation plus location observation message.

X.4.2.1.2 Location Added to Other Observations Process Flow

A producer (DEC DOR or IPEC DOR or ACM AR or MEMDMC DMIR) is producing an observation (evidentiary data, alert, or event) and is location aware and includes location as an observation in with the rest of the observations. The device or system is made location aware
275 either through an embedded location tag or by querying an external system that is aware of the location of a tag physically external to the device or system producing the observation. Such transactions are outside the scope of this profile and are addressed by the existing DEC, ACM, IPEC, and MEMDMC Profiles.
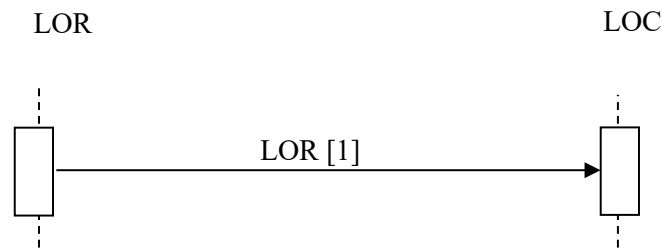
280

Figure X.4.2.1.2-1: Basic Process Flow in MEMLS Profile

Main Flow:

An observation, alert, or event has occurred and a device or system will be producing a profile related transaction [(PCD-01], [PCD-04], [PCD-10], or [PCD-15]). The device or system is location aware and will include location as an additional observation in the transaction.

285 **X.4.2.2 Use Case #2: Communication of location observations in conjunction with LS specific events**

This is the addition of location observations in the same transactions with location related transactions, such as DEC [PCD-01] and ACM [PCD-04]. These are LS specific and not patient specific.

290 **X.4.2.2.1 Location Event Observations Use Case Description**

This presumes that the reporting piece of equipment or system is location aware and so has the location information to include in with its other observations.

X.4.2.2.2 Location Event Observations Process Flow

A producer (DEC DOR or ACM AR or IPEC DOR or MEMDMC DMIR) is producing an LS
295 specific observation (evidentiary data, alert, or event) and is location aware and includes location as an observation in with the rest of the observations. The device or system is made location aware either through an embedded location tag or by querying an external system that is aware of the location of a tag physically external to the device or system producing the observation.

300

LOR   LOC

LOR [1]
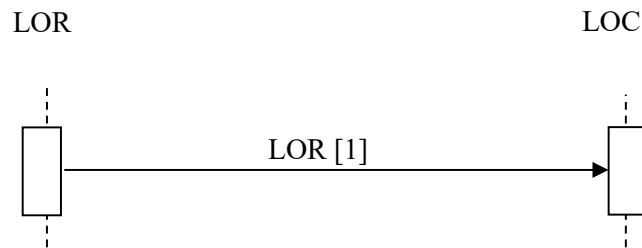
305

Figure X.4.2.2.2-1: Basic Process Flow in MEMLS Profile

X.5 MEMLS Security Considerations

During the Profile development there were no unusual security or privacy concerns identified.
There are no mandatory security controls but the implementer is encouraged to use the
310 underlying security and privacy profiles from ITI that are appropriate to the transports such as
the Audit Trail and Node Authentication (ATNA) Profile. The operational environment risk
assessment, following ISO 80001, will determine the actual security and safety controls
employed.

X.6 MEMLS Cross Profile Considerations

315 An LOR is likely to also be a DEC DOR, an IPEC DOR, an ACM AR, or MEMDMC DIOR.
There is no grouping required.

An LOC is likely to also be a DEC DOC, an IPEC DOC, an ACM AM, or MEMDMC DIOC.
There is no grouping required.

320

Volume 2 – Transactions

Add Section 3.16

3.16 Report Location Observation (RLO) [PCD-16]

3.16.1 Scope

325

This transaction is used to report location observations for equipment or people.

3.16.2 Actor Roles

The LOR sends the RLO to the LOC.
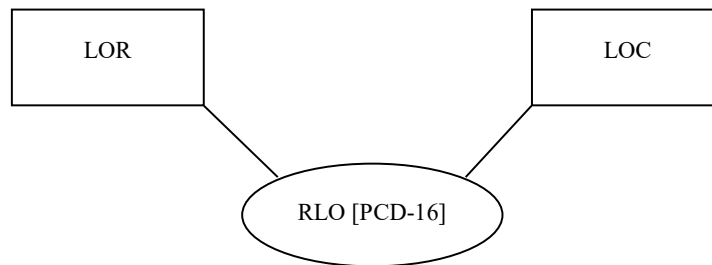
330

Figure 3.16.2-1: Use Case Diagram

The Roles in this transaction are defined in the following table and may be played by the actors
shown here:

335

Table 3.16.2-1: Actor Roles

Role:	Producer
Actor(s):	The following actors may play the role of Producer: Location Observation Reporter (LOR)
Role:	Consumer
Actor(s):	The following actors may play the role of Consumer: Location Observation Consumer (LOC)

3.16.3 Referenced Standards

HL7 v2.6, Chapter 7 Observations and v2.7, Chapter 7 Observations for the PRT segment

340 IEEE 11073-10101 with additional MDC/REFID values not yet in the standard (as identified by MDCX indicated value of zero and the interim REFID values).

Identification of some observation identifications (MDC & REFID) are not be currently defined in Rosetta Terminology Mapping (RTM) or in IEEE 11073-10101 Nomenclature and so a submission will be required. After values are assigned they are likely to appear in the Rosetta Terminology Mapping Management System (RTMMS) prior to being balloted for an update to 345 the standard. Once assigned official values implementations will be required to use the assigned values.

3.16.4 Interaction Diagram
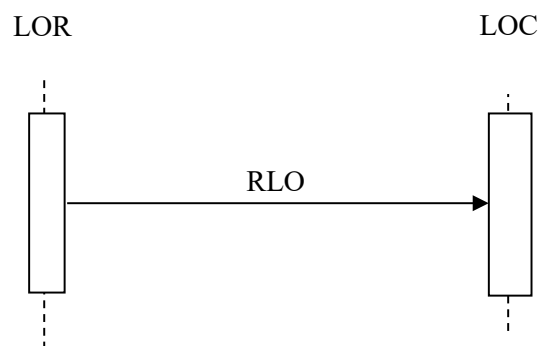
3.16.4.1 Report Location Observation (RLO)

350 The observations are mapped to OBX (equipment) and PRT (people or equipment) segments and contained under the OBX segment which identifies the observation type (person or equipment).

A single transaction should report about one piece of equipment or one person.

More than one sending actor instance can send to the same receiving actor instance.

3.16.4.1.1 LS Observation Types

355 Location observations can be reported in one or more types.

- Named Location (hospital named hierarchical location or simple name string)
- Base + (X/Y/Z) offset plus accuracy indications

___

- GPS plus accuracy indications

360

Named locations are preferred for communication of a location to a person. Base + offset is used to communicate location to another LS system for moving pushpins on active maps or floor layouts. GPS is good for absolute location retrospective analysis or for locations outside structures.

365 The Base reference for base + offset location observations is typically a mutually agreed base map, such as an electronic architectural diagram file for an area within a building, such as a care unit on a floor within a hospital building.

3.16.4.1.2 HL7 Conformance Statement

The conformance statement for this interaction described below is adapted from HL7 version 2.6
370 with use of the Participation Information (PRT) segment from HL7 version 2.7.

Table 3.16.4.1.2-1: [PCD-16] Transaction Conformance

Publication ID:	R01
Type:	Unsolicited
Publication Name:	IHEPCD-16ReportLocationObservation
Trigger:	See Section 3.16.4.1.4 Trigger Events
Mode:	Immediate
Response:	ORU^R01^ORU_R01
Characteristics:	Sends defined location observation data
Purpose:	Report Location Observation from LOR to LOC
Based on Segment Pattern:	R01

3.16.4.1.3 Report Location Observation [PCD-16] (ORU^R01^ORU_R01) Static Definition

375 The Report Location Observation [PCD-16] message is used to communicate location observation data from a Location Observation Reporter (LOR) to a Location Observation Consumer (LOC).

Common HL7 segments are defined in PCD TF-2: Appendix B. Sections below discuss considerations specific to [PCD-16].

380

___
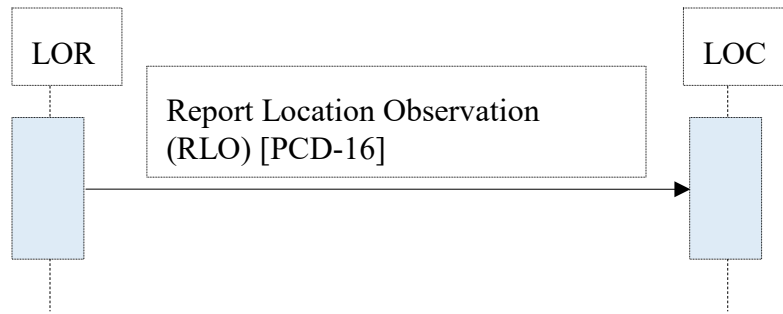
Figure 3.16.4.1.3-1: Basic Process Flow for MEMLS Profile (reference)

Table 3.16.4.1.3-1: ORU^R01^ORU_R01 HL7 Attribute Table

Segment	ORU Message	Usage	Card.	HL7 Ref
MSH	Message Header Segment	R	[1..1]	2.15.9
PID	Patient Identification Segment	CE	[0..1]	3.4.2
PV1	Patient Visit Segment	CE	[0..1]	3.4.3
OBR	Observation Request Segment	R	[1..n]	7.4.1
OBX	Observation Result Segment	R	[1..n]	7.4.2
[PRT]	Participation Information Segment	O	[0..n]Note 1	7.4.4 (V2.7)

385   Note 1: Use of PRT is required for communicating the location of people. If operating in a backward compatible manner for
        equipment location observations this can be accomplished using OBX-18 Equipment Instance Identifier instead of the
        PRT segment.

Table 3.16.4.1.3-2: ORU^R01^ORU_R01 Static Definition

ORU^R01^ORU_R01	Device Management Information Observation Message
MSH	Message Header
[{SFT}]	Software Segment
{	--- REPORT LOCATION OBSERVATION_begin
[	--- PATIENT begin
PID	Patient Identification
[	--- ASSIGNED PATIENT LOCATION begin
PV1	Assigned Patient Location
]	--- ASSIGNED PATIENT LOCATION end
]	--- PATIENT end
{	--- LOCATION_OBSERVATION begin
OBR	Location Observation Identification
[{	--- OBSERVATION begin
{OBX}	Location observations relative to OBR
[PRT]	Participation identifies person or equipment
}]	--- OBSERVATION end
}	--- LOCATION_OBSERVATION end
}	--- REPORT LOCATION OBSERVATION end

3.16.4.1.4 Trigger Events

The HL7 trigger event is an ORU^R01^ORU_R01.

Trigger identifications in the OBR used by the MEMLS Profile are not yet in the IEEE 11073-10101 standard. These will be submitted for inclusion in the first available update to the standard. In the interim, MDC will be identified as MDCX, codes values will be zero, and interim REFID strings will be utilized. Once the standard has been updated to include the identifications, MEMLS actor implementations will be required to utilize the standardized MDC/REFID values.

In the following table *object* refers to an item with an associated LS tag, either a piece of equipment (device) or a person.

Table 3.16.4.1.4-1: IEEE 11073 Proposed Trigger Identifiers

#	Reference	Description
1	0^MDCX_EVT_LS_DEVICE^MDC	Report of equipment location
2	0^MDCX_EVT_LS_PERSON^MDC	Report of person location
3	0^MDCX_EVT_LS_MOVEMENT^MDC	Object is moving
4	0^MDCX_EVT_LS_BOUNDARY^MDC	Object has crossed a boundary

#	Reference	Description
5	0^MDCX_EVT_LS_COLOCATION^MDC	Objects detected as collocated within a configured proximity
6	0^MDCX_EVT_LS_DWELL^MDC	Object has not moved for longer than a configured time period
7	0^MDCX_EVT_LS_TAMPER^MDC	LS tag is being tampered with or possibly removed
8	0^MDCX_EVT_LS_INTERACTION^MDC	Operator interaction with LS tag (button press, pull, or open)
9	0^MDCX_EVT_LS_ENVIRONMENT^MDC	Report of environmental value detected by LS tag (temperature, pressure, humidity)
10	0^MDCX_EVT_LS_BATTERY	Report of LS tag battery status

More sophisticated location services events can be derived from the above defined events using the observation attributes associated with the event message. For example a Mother-Baby mismatch, equipment collocation implying a patient to equipment binding, or arrival of a clinician to a room location which results in a change to a nurse call dome light. It is not within the scope of this profile to define the algorithms by which such sophisticated events are determined to have occurred or the actions which would result from such an occurrence.

Typical application purposes for deployment of LS solutions are achievable using the above set of triggers. Additional triggers typically aren't required. The triggering event is the underlying event that is the foundation for the application purposes. The table below offers some suggestions.

Table 3.16.4.1.4-2: Application Purposes Mapped to Available Triggers

#	Application Purpose	Based Upon Available Triggers
1	Mother-Baby mismatch detection	Colocation
2	Infant abduction	Boundary or Colocation
3	Patient – equipment binding	Colocation
4	Clinician entering room or being near patient affecting equipment	Boundary or Colocation
5	Privacy/security, authentications and violations	Colocation or Boundary
6	Positive Patient Identification/Device Association	Colocation
7	Specimen tracking	Location observation, Movement, Boundary
8	Staff tracking (other than clinical)	Location Observation
9	Staff needing assistance	Dwell, Interaction, Tamper
10	Refrigerator/freezer monitoring	Environment
11	Violation of controlled environment	Environment
12	Infection prevention and control	Colocation (of staff to wash station)
13	Human resources log in/out for payroll	Colocation, Boundary
14	Communication device asset management	Location observation, Boundary

#	Application Purpose	Based Upon Available Triggers
15	Delivery arrivals (pharmacy, supplies)	Location observation, Boundary
16	Closed Loop Medication Administration	Location observation, Colocation
17	Code/Nurse Calls	Location observation, Colocation
18	Food services workflow	Location observation, Boundary, Colocation
19	Automated/guided vehicle arrival/departure	Colocation
20	Supplies tracking	Location observation, Colocation
21	Transfer center workflow	Location observation, Colocation, Boundary

3.16.4.1.5 Message Semantics

415   The message is an HL7 observation. The content of the message is governed by HL7, IHE PCD Technical Framework and this profile. The objects for which the observations are being reported are governed by IHEE 11073.

The MDS, VMD, CHAN, and METRICs are to be reported per the IHE PCD Technical Framework.

420   The HL7 version 2.7 Participation Information (PRT) segment is required as a child of the location type identifying OBX segment to identify the person in person associated location observations. For backwards compatibility if the location observation is equipment associated then the PRT segment need not be used and OBX segment field Equipment Instance Identifier OBX-18 can be used to identify the unique instance of the equipment. As of HL7 version 2.7 use

425   of Equipment Instance Identifier OBX-18 is retained for backward compatibility and equipment identification has been moved to the PRT segment. Therefore use of the PRT segment for equipment location observations is considered forward looking. This applies to both MEMLS use cases (LS observations in other profiles, such as DEC, ACM, and IPEC and LS observations in the MEMLS Profile).

430   Indicating Observation Result Status (OBX-11) as a value of R (Results entered – not verified) establishes an expectation that someone will manually verify the value of the observation. Review and verification of MEMLS Profile specific observations is not expected as they change over time and requiring someone to review and certify them is a workload with little return for the effort. Therefore MEMLS observations shall indicate a value of F (Final) in Observation

435   Result Status (OBX-11).

3.16.4.1.5.1 Proposed additions to IEEE 11073-10101

There are a number of location services associated observation identifications used by the MEMLS Profile which are not yet in the IEEE 11073-10101 standard. These will be submitted for inclusion in the first available update to the standard. In the interim MDC will be identified as
440   MDCX, codes values will be zero, and interim REFID strings will be utilized. Identification of some observation identifications (MDC & REFID) are not be currently defined in Rosetta Terminology Mapping (RTM) or in IEEE 11073-10101 Nomenclature and so a submission will be required. After values are assigned they are likely to appear in the Rosetta Terminology Mapping Management System (RTMMS) prior to being balloted for an update to the standard.
445   Once the standard has been updated to include the identifications MEMLS actor implementations will be required to utilize the standardized MDC/REFID values.

The following table contains the proposed attribute identifiers for use in OBX segment instances with the attribute identifier in OBX-3 Observation Identifier.

Table 3.16.4.1.5.1-1: IEEE 11073 Proposed Attribute Identifiers

#	Reference	Description
1	0^MDCX_LS_LOCATION^MDC	Location observation for equipment or person
2	0^MDCX_LS_ATTR_NAME^MDC	Named alias for LS associated identifier
3	0^MDCX_LS_ATTR_REF_NAME^MDC	Base reference for relative offsets
4	0^MDCX_LS_ATTR_COORD_X^MDC	X offset for base plus relative offset location (horizontal, positive right)
5	0^MDCX_LS_ATTR_COORD_X_ACCURACY^MDC	X offset accuracy
6	0^MDCX_LS_ATTR_COORD_Y^MDC	Y offset for base plus relative offset location (vertical, positive up)
7	0^MDCX_LS_ATTR_COORD_Y_ACCURACY^MDC	Y offset accuracy
8	0^MDCX_LS_ATTR_COORD_Z^MDC	Z offset for base plus relative offset location (vertical positive outward)
9	0^MDCX_LS_ATTR_COORD_Z_ACCURACY^MDC	Z offset accuracy
10	0^MDCX_GPS_ATTR_LATITUDE^MDC	GPS latitude (positive is North of the equator) in degrees
11	0^MDCX_GPS_ATTR_LONGITUDE^MDC	GPS longitude (zero is prime meridian, positive is to the West) in degrees
12	0^MDCX_GPS_ATTR_ALTITUDE^MDC	GPS altitude (positive is above mean sea level) in meters
13	0^MDCX_GPS_ATTR_ACCURACY^MDC	GPS latitude and longitude accuracy in degrees
14	0^MDCX_GPS_ATTR_ALTITUDE_ACCURACY^MDC	GPS altitude accuracy in meters
15	0^MDCX_GPS_ATTR_HEADING^MDC	GPS heading (North is zero degrees with increasing values to the East) in degrees
16	0^MDCX_GPS_ATTR_SPEED^MDC	GPS speed in meters per second
17	0^MDCX_LS_ATTR_ADDRESS^MDC	Postal address (XAD data type)
18	0^MDCX_LS_ATTR_PHASE^MDC	Phase of the location observation (start, present, continue, end)

450 Communication of the location of a person or piece of equipment by structured location as in,
building, floor, point of care, room, bed, etc. is communicated using a separate instance of an
OBX segment with OBX-3 Observation Identifier containing 0^MDCX_LS_LOCATION^MDC
and OBX-5 Observation Value containing the observed location in the format defined by the
HL7 Person Location (PL) Data Type (see HL7 version 2.6 Chapter 2A Section 2.A.53 PL -
455 Person Location) and indicating PL in OBX-2 Value Type.

HL7 Component Table – PL – Person Location

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	SEC. REF.
1	20	IS	O	0302	Point of Care	2.A.36
2	20	IS	O	0303	Room	2.A.36
3	20	IS	O	0304	Bed	2.A.36
4	227	HD	O		Facility	2.A.33
5	20	IS	O	0306	Location Status	2.A.36
6	20	IS	C	0305	Person Location Type	2.A.36
7	20	IS	O	0307	Building	2.A.36
8	20	IS	O	0308	Floor	2.A.36
9	199	ST	O		Location Description	2.A.74
10	427	EI	O		Comprehensive Location Identifier	2.A.25
11	227	HD	O		Assigning Authority for Location	2.A.33

For definitive works always refer back to the originating version of the standard to make sure
you're using up to date information.

460 Communication of equipment name shall be in a separate OBX segment occurrence with an
observation containment identifying MDC/REFID in OBX-3
(0^MDCX_LS_ATTR_NAME^MDC is proposed until an RTMMS defined value is available)
with the equipment name as the observation value in OBX-5 Observation Value.

3.16.4.1.6 Expected Actions

465 In response to the receipt of the message the receiver will generate an HL7 acknowledgement to
advise the sending of the status of the receipt of the message that was sent.

As a result of receiving the observation the receiver can store the information for later retrieval
or the information can be used to trigger the production of transactions in other IHE profiles,
such the generation of an ACM alert.

3.16.5 Security Considerations

470 During the Profile development there were no unusual security or privacy concerns identified.
There are no mandatory security controls but the implementer is encouraged to use the

475 underlying security and privacy profiles from ITI that are appropriate to the transports such as the Audit Trail and Node Authentication (ATNA) Profile. The operational environment risk assessment, following ISO 80001, will determine the actual security and safety controls employed.

Volume 2 Namespace Additions

Add the following terms to the IHE General Introduction Appendix G:

The following OIDs have been allocated to the MEMLS Profile.

480 Specific IHE-PCD Transactions: 1.3.6.1.4.1.19376.1.6.16.9 / 1.3.6.1.4.1.19376.1.6.1.16.1 [PCD-16].

The 1.3.6.1.4.1.19376.1.6.1.16.1 will appear in MSH-21 to identify the [PCD-16] transaction.

Specific IHE-PCD Conformance Profiles: 1.3.6.1.4.1.19376.1.6.6.16.1 [PCD-16]

485 # Appendices

Appendix A – Transaction Examples

These are the transaction examples for this profile.

A.1 Report Location Observation for equipment

The Report Location Observation (RLO) for equipment is the report of an observation of the
490 location of a piece of equipment and the reason for the report. As this observation transaction is
associated with Use Case #2 of this profile there would be no patient specific information
contained in the PID or PV1 segments.

MSH|^~\&|Argus RFID System^00095F56787^EUI-64|Guard RFID
Solutions|HEMS|EQ2|20140213165004.434-0800||ORU^R01^ORU_R01|132449|P|2.6||||||||
495 IHE_PCD_MEMLS_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.16.1^ISO

PID|1|||||||||||||||||||||||||||||N

PV1|1|N

OBR|1|||0^MDCX_EVT_LS_ DEVICE ^MDC|||20140213165004.434-0800

OBX|1|PL|0^MDCX_LS_ATTR_LOCATION ^MDC|<PCD data source dot notation>|^^^Fraser
500 Health^^^South BuildingS^Floor 1^Emergency Department|||||||F|||20140215181304.697-
0500|||||10006^THNAME^^~112212000001^TAGNO^^

OBX|2|ST|0^MDCX_LS_ATTR_NAME^MDC|LOC|IV Pump
2012078|||||||F|||20150127110822.229-0800

OBX|3|NM|0^MDCX_LS_ATTR_COORD_X^MDC
505 ||5350|263441^MDC_DIM_CENTI_M^MDC|||F|||20140215181304.697-
0500|||||10006^THNAME^^~112212000001^TAGNO

OBX|4|NM|0^MDCX_LS_ATTR_COORD_Y^MDC
||16430|263441^MDC_DIM_CENTI_M^MDC|||F|||20140215181304.697-
0500|||||10006^THNAME^^~112212000001^TAGNO

510 OBX|5|NM|0^MDCX_LS_ATTR_COORD_Z^MDC
||0|263441^MDC_DIM_CENTI_M^MDC|||F|||20140215181304.697-
0500|||||10006^THNAME^^~112212000001^TAGNO

OBX|6|ST|0^MDCX_LS_ATTR_REF_NAME^MDC|Fraser ED|||||||F

OBX|7|NM|0^MDCX_GPS_ATTR_LATITUDE^MDC|26.0795|262880^MDC_DIM_ANG_DE
515 G|||||F

OBX|8|NM|0^MDCX_GPS_ATTR_LONGITUDE^MDC|80.2287|262880^MDC_DIM_ANG_D
EG |||||F

OBX|9|NM|0^MDCX_GPS_ATTR_ALTITUDE^MDC||263424^MDC_DIM_X_M |||||F

520

OBX|10|NM|0^MDCX_GPS_ATTR_ACCURACY^MDC||262880^MDC_DIM_ANG_DEG
|||||F

OBX|11|NM|0^MDCX_GPS_ATTR_ALTITUDE_ACCURACY^MDC||263424^MDC_DIM_X
_M |||||F

OBX|12|NM|0^MDCX_GPS_ATTR_HEADING^MDC|NaN|262880^MDC_DIM_ANG_DEG
|||||F

525 OBX|13|NM|0^MDCX_GPS_ATTR_SPEED^MDC|0|264960^MDC_DIM_X_M_PER_SEC|||||F

The base referenced latitude and longitude can be agreed between systems in advance in which case the full lat/long information is optional in the individual location observations so as to reduce the volume of data communicated over time.

530 If lat/long are passed and the additional attributes are not known they are also optional, particularly if the lat/long is of a stationary location, such as a reference point for X/Y/Z coordinates in an LS system.

The X/Y/Z coordinates are a new data type and so some definition is in order.

X starts at zero at the left and progresses to the right
Y starts at the bottom and progresses upwards
535 Z starts at the bottom and progresses upwards

The units of measure are specified in the observed value.

If the Z coordinate is not supported it is optional and need not be sent with each observation.

540 The base point reference name MDCX_LS_ATTR_REF_NAME ("Fraser ED" in this example) defines an agreement between systems that is external to the communication of individual location observations. This agreement would also likely include a graphical image file representing the structural area of the building and the format of the file. It would be wasteful of communication bandwidth and processing power to communicate this on every location observation.

545 While this message contains many OBX segments relating to X, Y, Z, and baseline offsets as well as GPS coordinates most messages making use of an OBX using the PL data type to indicate a named location is sufficient and the additional OBX segments are optional.

A.2 Report Location Observation for people

550 The Report Location Observation (RLO) for equipment is the report of an observation of the location of a person and the reason for the report. This would be similar to the previous example except that it would additionally include a Participation Information (PRT) segment beneath the OBX segment as the means of communication of the person location. As this observation transaction is associated with Use Case #2 of this profile there would be no patient specific information in the PID and PV1 segments.

555 MSH|^~\&|Argus RFID System^00095F56787^EUI-64|Guard RFID
Solutions|HEMS|EQ2|20140213165004.434-0800||ORU^R01^ORU_R01|132449|P|2.6|||||||||
IHE_PCD_MEMLS_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.16.1^ISO

PID|1|||||||||||||||||||||||||||||N

PV1|1|N

OBR|1|||0^MDCX_EVT_LS_ PERSON ^MDC|||20140213165004.434-0800

560 OBX|1|PL|0^MDCX_LS_ATTR_LOCATION ^MDC|<PCD data source dot notation>|^^^Fraser
Health^^^South BuildingS^Floor 1^Emergency Department ||||||F|||20140215181304.697-
0500|||||10006^THNAME^^~112212000001^TAGNO^^

PRT|1|AD||RO|^Smith^John|Patient|1|Fraser_Health|^^^Fraser_Health^^^North_Building^Floor
_1^LnD|^^112204006564^GuardRFID|20160204143332.4658-0800

565 The value in PRT-2 Action Code is AD indicating ADD. The value in PRT-4 Participation is RO
indicating Responsible Observer.

Volume 3 – Content Modules

570   None

5 Namespaces and Vocabularies

Add to Section 5 Namespaces and Vocabularies

575   None

6 Content Modules

Not applicable. CDA®2 is not being produced.

Volume 3 Namespace Additions

580   *Add the following terms to the IHE Namespace:*

None

585

---

2 CDA is the registered trademark of Health Level Seven International.

Volume 4 – National Extensions

Add appropriate Country section

590 **4 National Extensions**

None at this time