

**Integrating the Healthcare Enterprise**



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**IHE Patient Care Device  
Technical Framework Supplement**

10

**Medical Equipment Management  
Location Services  
(MEMLS)**

15

**Trial Implementation**

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**Please verify you have the most recent version of this document. See [here](#) for Trial Implementation and Final Text versions and [here](#) for Public Comment versions.**

## Foreword

30 This is a supplement to the IHE Patient Care Device Technical Framework 5.0. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is published on October 14, 2015 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  
35 [http://www.ihe.net/PCD\\_Public\\_Comments](http://www.ihe.net/PCD_Public_Comments).

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.

<i>Amend Section X.X by the following:</i>
--

40 Where the amendment adds text, make the added text **bold underline**. Where the amendment 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.

45 General information about IHE can be found at: [www.ihe.net](http://www.ihe.net).

Information about the IHE Patient Care Device domain can be found at: [ihe.net/IHE\\_Domains](http://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](http://ihe.net/IHE_Process) and <http://ihe.net/Profiles>.

50 The current version of the IHE Patient Care Device Technical Framework can be found at: [http://ihe.net/Technical\\_Frameworks](http://ihe.net/Technical_Frameworks).

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## Introduction to this Supplement

115 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.

120 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

125 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.

## 130 Closed Issues

135 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.

140 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.

## 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

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

The Location Observation Reporter (LOR) produces observations.

The Location Observation Consumer (LOC) consumes observations.

Actor	Definition
LOR	Location Observation Reporter
LOC	Location Observation Consumer

150

The 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 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 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 LOC may also be an actor in a different profile (DEC DOC, ACM AM, IPEC DOC).

155

### Appendix B - Transaction Summary Definitions

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

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

Transaction	Definition
RLO	Report Location Observation. 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 and the observation will be sourced by the LS and not the medical device.

165 **Glossary**

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

<b>Glossary Term</b>	<b>Definition</b>
CMMS	Computerized Maintenance Management System
GPS	Global Positioning System
LS	Location Services
NMEA	National Marine Electronics Association
RFID	Radio Frequency Identification
RTLS	Real Time Location Services

## Volume 1 – Profiles

### 170 Copyright Licenses

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

NA

### Domain-specific additions

None

175

*Add Section X*

### **X Medical Equipment Management Location Services (MEMLS) Profile**

180 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 information from other than medical devices to other than an EMR or an alert manager.

185 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) solutions and impacts the effectiveness of people interactions with equipment and systems by not  
190 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® and IEEE 11073 standards for information communication.

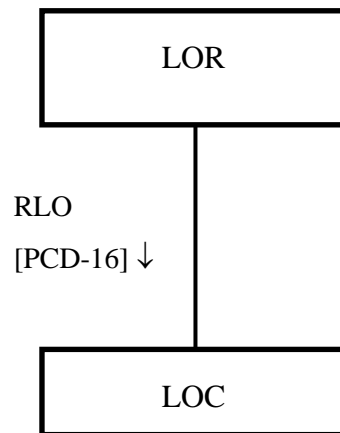
### **X.1 MEMLS Actors, Transactions, and Content Modules**

195 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](http://www.ihe.net/Technical_Frameworks).

Figure X.1-1 shows the actors directly involved in the MEMLS Profile and the relevant transactions between them. If needed for context, other actors that may be indirectly involved



200 due to their participation in other related profiles are shown in dotted lines. Actors which have a mandatory grouping are shown in conjoined boxes.



**Figure X.1-1: MEMLS Actor Diagram**

205

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”).

210

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

Actors	Transactions	Optionality	Reference
LOR	RLO	R	PCD TF-2: 3.Y1
LOC	RLO	R	PCD TF-2: 3.Y1

### 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.

215

#### X.1.1.1 Location Observation Reporter (LOR)

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

220 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 LOR Actor is the justification for this unique profile.

### **X.1.1.2 Location Observation Consumer (LOC)**

225 It is highly likely that the Location Observation Consumer (LOC) 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**

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**

<b>Actor</b>	<b>Option Name</b>	<b>Reference</b>
LOR	No options defined	--
LOC	No options defined	--

235

## **X.3 MEMLS Required Actor Groupings**

There are no required actor groupings.

## **X.4 MEMLS Overview**

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

### **X.4.1 Concepts**

245 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.

250 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

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

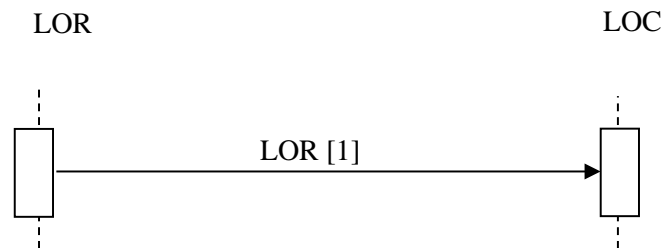
255 This is the addition of location observations in the same transaction with non-location related transactions, such as DEC PCD-01, ACM PCD-04, IPEC PCD-10, and MEMDMC PCD-15.

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

260 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 observation plus location observation message.

##### X.4.2.1.2 Location Added to Other Observations Process Flow

265 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 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, 270 IPEC, and MEMDMC Profiles.



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

Main Flow:

275 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.

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

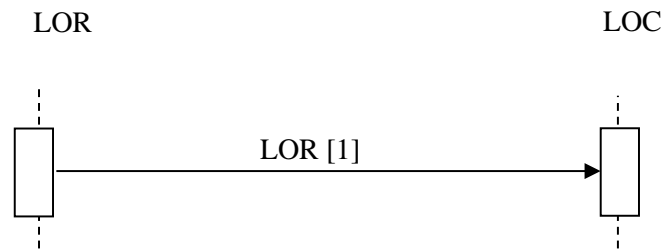
280 This is the addition of location observations in the same transactions with location related transactions, such as DEC PCD-01 and ACM PCD-04. These are LS specific and not patient specific.

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

285 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**

290 A producer (DEC DOR or ACM AR or IPEC DOR or MEMDMC DMIR) is producing an LS 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.



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

## **295 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 underlying security and privacy profiles from ITI that are appropriate to the transports such as

300 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**

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

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

310

## Volume 2 – Transactions

*Add Section 3.Y*

### 3.Y Report Location Observation (RLO) [PCD-16]

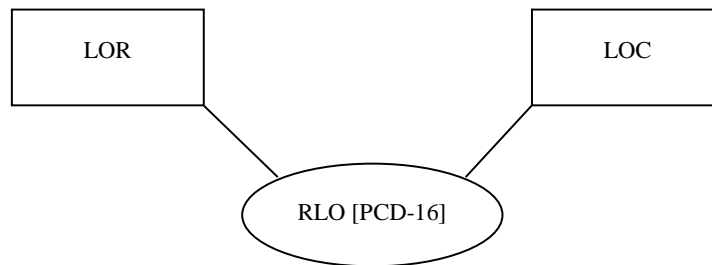
#### 3.Y.1 Scope

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

315

#### 3.Y.2 Actor Roles

The LOR sends the RLO to the LOC.



**Figure 3.Y.2-1: Use Case Diagram**

320

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

**Table 3.Y.2-1: Actor Roles**

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

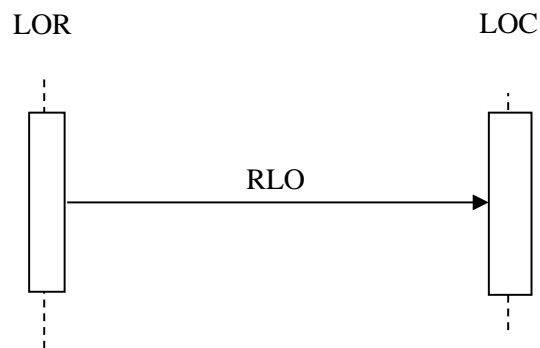
325

### 3.Y.3 Referenced Standards

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

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).

### 330 3.Y.4 Interaction Diagram



#### 3.Y.4.1 Report Location Observation (RLO)

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).

335 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.Y.4.1.1 LS Observation Types

Location observations can be reported in one or more types.

340 Named Location (hospital named hierarchical location or simple name string)

Base + (X/Y/Z) offset plus accuracy indications

GPS plus accuracy indications

345 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.

350 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.Y.4.1.2 HL7® Conformance Statement

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

355

**Table 3.Y.4.1.2-1: PCD-16 Transaction Conformance**

<b>Publication ID:</b>	<b>R01</b>
Type:	Unsolicited
Publication Name:	IHEPCD-16ReportLocationObservation
Trigger:	See 3.Y.4.1.3 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.Y.4.1.3 PCD-16 Report Location Observation (ORU^R01^ORU\_R01)Static Definition

360 The PCD-16 Report Location Observation 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 Appendix B of the PCD Technical Framework (TF). Sections below discuss considerations specific to PCD-16.

365





**Figure 3.Y.4.1.3-1: Basic Process Flow for MEMLS Profile (reference)**

370

**Table 3.Y.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)

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.Y.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

375

### 3.Y.4.1.4 Trigger Events

The HL7® trigger event is an ORU^R01^ORU\_R01.

380 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.

385

**Table 3.Y.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
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

390 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.

395 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.Y.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

#	Application Purpose	Based Upon Available Triggers
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
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

400

### 3.Y.4.1.5 Message Semantics

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.

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

410 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 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).

415 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 Result Status (OBX-11).

420

### 3.Y.4.1.5.1 Proposed additions to IEEE 11073-10101

425 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 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.

430

**Table 3.Y.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)
11	0^MDCX_GPS_ATTR_LONGITUDE^MDC	GPS longitude (zero is prime meridian, positive is to the West)
12	0^MDCX_GPS_ATTR_ALTITUDE^MDC	GPS altitude (positive is above mean sea level)
13	0^MDCX_GPS_ATTR_ACCURACY^MDC	GPS latitude and longitude accuracy
14	0^MDCX_GPS_ATTR_ALTITUDE_ACCURACY^MDC	GPS altitude accuracy
15	0^MDCX_GPS_ATTR_HEADING^MDC	GPS heading (North is zero degrees with increasing values to the East)
16	0^MDCX_GPS_ATTR_SPEED^MDC	GPS speed
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)

### 3.Y.4.1.6 Expected Actions

435 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.Y.5 Security Considerations

440 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 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  
445 employed.

## Volume 2 Namespace Additions

<i>Add the following terms to the IHE General Introduction Appendix G:</i>
--

The following OIDs have been allocated to the MEMLS Profile.

450 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)

## Appendices

### 455 Appendix A – Transaction Examples

These are the transaction examples for this profile.

#### A.1 Report Location Observation for equipment

460 The Report Location Observation (RLO) for equipment is the report of an observation of the 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|||||||  
IHE_PCD_MEMLS_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.16.1^ISO
```

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

PV1|1|N

OBR|1|||0^MDCX\_EVT\_LS\_DEVICE ^MDC|||20140213165004.434-0800

470 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^^

OBX|2|ST|0^MDCX\_LS\_ATTR\_NAME^MDC|LOC|IV Pump  
2012078|||||F|||20150127110822.229-0800

475 OBX|3|NM|0^MDCX\_LS\_ATTR\_COORD\_X^MDC  
||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

480 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|||||F

OBX|8|NM|0^MDCX\_GPS\_ATTR\_LONGITUDE^MDC|80.2287|||||F

485 OBX|9|NM|0^MDCX\_GPS\_ATTR\_ALTITUDE^MDC|||||F

OBX|10|NM|0^MDCX\_GPS\_ATTR\_ACCURACY^MDC|||||F

OBX|11|NM|0^MDCX\_GPS\_ATTR\_ALTITUDE\_ACCURACY^MDC|||||F

OBX|12|NM|0^MDCX\_GPS\_ATTR\_HEADING^MDC|NaN|||||F

OBX|13|NM|0^MDCX\_GPS\_ATTR\_SPEED^MDC|0|||||F

490 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.

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  
495 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

Z starts at the bottom and progresses upwards

500 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.

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  
505 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.

## A.2 Report Location Observation for people

510 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 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.

515



## Volume 3 – Content Modules

None

520

## 5 Namespaces and Vocabularies

*Add to Section 5 Namespaces and Vocabularies*

None

525

## 6 Content Modules

Not applicable. CDA® is not being produced.

### Volume 3 Namespace Additions

<i>Add the following terms to the IHE Namespace:</i>
--

530

None

535

## Volume 4 – National Extensions

*Add appropriate Country section*

### **4 National Extensions**

540 None at this time