ATIS-0700009

ATIS Standard on -

CANADIAN LAES LOCATION REPORTING

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ATIS-0700009, *Canadian LAES Location Reporting*

Is an ATIS Standard developed by the **Lawful Interception (LI) Subcommittee** under the **Wireless Technologies and Systems Committee (WTSC)**.

Canadian LAES Location Reporting

Alliance for Telecommunications Industry Solutions

Approved May, 2011

Abstract

The purpose of this Standard is to define LAES capabilities that can be used to report Intercept Subject location information for meeting Canadian regulatory and licensing requirements.

FOREWORD

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between providers, customers, and manufacturers. The Wireless Technologies and Systems Committee (WTSC) develops and recommends standards and technical reports related to wireless and/or mobile services and systems, including service descriptions and wireless technologies. WTSC develops and recommends positions on related subjects under consideration in other North American, regional and international standards bodies.

The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages. The word *may* denotes a optional capability that could augment the standard. The standard is fully functional without the incorporation of this optional capability.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, WTSC, 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, WTSC, which was responsible for its development, had the following roster:

D. Zelmer, WTSC Chair [AT&T]
M. Younge, WTSC Vice-Chair [T-Mobile]
P. Musgrove, WTSC LI Chair [AT&T]
N. Rao, WTSC LI Vice-Chair [Nokia Siemens Networks]
P. Truong, Technical Editor [Ericsson]
C. Underkoffler, ATIS Chief Editor

The WTSC Lawful Interception (LI) Subcommittee, which was responsible for the development of this document, had the following members:

Terry Jacobson, Alcatel-Lucent

Peter Musgrove, AT&T

Pierre Truong, Ericsson

Nisrine Slaymane, RCMP

Janet M. Butkus, CIU/FBI

Scott Williams, CIU/FBI

Margaret Livingston, Tridea Works, Consultant to CIU/FBI

Jean Trakinat, Tridea Works, Consultant to CIU/FBI

Nagaraja Rao, Nokia Siemens Networks

Amar Deol, Huawei Technologies

Ron Ryan, Nortel Networks

Tak Wing Wan, Rogers Wireless

Mark Younge, T-Mobile

Tony Akers, Research In Motion

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Canadian LAES Location Reporting

1   SCOPE, PURPOSE, AND APPLICATION

1.1   Scope

The scope of this Standard is Lawfully Authorized Electronic Surveillance (LAES) capabilities for reporting Intercept Subject location information in Canada.

1.2   Purpose

The purpose of this Standard is to define LAES capabilities that can be used to report Intercept Subject location information for meeting Canadian regulatory and licensing requirements.

The documents that define the Canadian regulatory or licensing requirements are not publicly available. Vendors may request regulatory requirements from the Telecommunications Service Provider (TSP) in Canada. This Standard provides a method of location reporting, but does not specify where such location reporting shall be performed within the network.

1.3   Application

The LAES location reporting capability defined in this Standard may be used in conjunction with the other LAES reporting messages in other Standards (e.g., J-STD-025-B [Ref 1] and ATIS-0700005.2007 [Ref 2]) to report the location of the Intercept Subject.

2   NORMATIVE REFERENCES

The following Standards contain provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the editions indicated were valid. All Standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the Standards indicated below.

[Ref 1] J-STD-025-B, *Lawfully Authorized Electronic Surveillance*[1]

[Ref 2] ATIS-0700005.2007, *Lawfully Authorized Electronic Surveillance (LAES) for 3GPP IMS-based VoIP and other Multimedia Services, May, 2007*[1]

[Ref 3]   3GPP TS 33.108, *Technical Specification Group Services and System Aspects; 3G security; Handover interface for Lawful Interception (LI)*[2]

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[1]This document is available from Alliance for Telecommunications Industry Solutions (ATIS). <http://www.atis.org/index.html>

[2] This document is available from the Third Generation Partnership Project (3GPP) at < http://www.3gpp.org/specs/specs.htm >.

3 DEFINITION, ACRONYMS AND ABBREVIATIONS

3.1 Definitions

Deferred Location Request: location request where one or more LAES Location Reports are required after specific events have occurred. The events may or may not occur immediately.

Immediate Location Request: location request where a single LAES Location Report is required immediately.

Location Area (LA): is defined as an area in which a MT may move freely without updating the Visitor Location Register (VLR). A location area includes one or several GSM EDGE Radio Access Network (GERAN) / Universal Terrestrial Radio Access Network (UTRAN) cells.

Routing Area (RA): is defined as an area in which a MT, in certain operation modes, may move freely without updating the Serving GPRS Support Node (SGSN). A routing area includes one or several GERAN/UTRAN cells. A RA is always contained within a location area.

Service Area (SA): consists of one or more base stations belonging to the same Location Area. Such an area is called a Service Area and can be used for indicating the location of a MT to the core network.

3.2 Acronyms and Abbreviations

3GPP	3rd Generation Partnership Project
ABS	Abstract Syntax
ASN.1	Abstract Syntax Notation One
CDMA*	code division multiple access
CF	Collection Function
DF	Delivery Function
EDGE	Enhanced Data rate for Global Evolution
GERAN	GSM EDGE Radio Access Network
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
IAP	Intercept Access Point
IAS*	internet access and services
IMEI	International Mobile Equipment Identity
IMS*	ip multimedia services
IMSI	International Mobile Subscriber Identity
IP*	internet protocol
ISO*	international organization for standardization
ITU*	international telecommunication union
LA	Location Area
LAES	Lawfully Authorized Electronic Surveillance
LEA	Law Enforcement Agency
LI	Lawful Interception
LR	Location Reporting
MSISDN	Mobile Station International Subscriber Directory Number
MT	Mobile Terminal
NE	Network Element
POC*	push to talk over cellular
RA	Routing Area
RAN	Radio Access Network
SA	Service Area
SGSN	Serving GPRS Support Node
TIA*	telecommunications industry association
TSP	Telecommunications Service Provider

UTRAN	Universal Terrestrial Radio Access Network
VLR	Visitor Location Register
VoIP*	voice over ip
WTSC*	wireless technologies and system committee
WiMAX*	worldwide interoperability for microwave access

EDITORIAL NOTE: Acronyms marked with a * appear in the ANS.1 code in Annex A (A.2.1) in lower case.

4 SERVICE DESCRIPTION

Intercept Subject location information may be available in a network in a variety of network elements, in a variety of forms, and acquired by a variety of methods. A general LAES location reporting method is needed for Canada to provide Intercept Subject location information to law enforcement agencies (LEAs). A LAES Location Report message is defined for this purpose.

The location reporting shall be able to provide the longitude/latitude information of the MT when available at an Intercept Access Point (IAP) as a part of the event being intercepted. The location reporting shall be able to provide the location of the serving base station and sector (cell site identification e.g., address, longitude/latitude of the cell site) when available at an IAP to which the Intercept Subject's MT is connected.

4.1 Shared Radio Access

Figure 1 shows a Radio Access Network (RAN) shared by Operators A and B with an attached MT. The MT is a subscriber of Operator A and is receiving services from Operator A's Core Network. The RAN provides MT location information to Operator A.
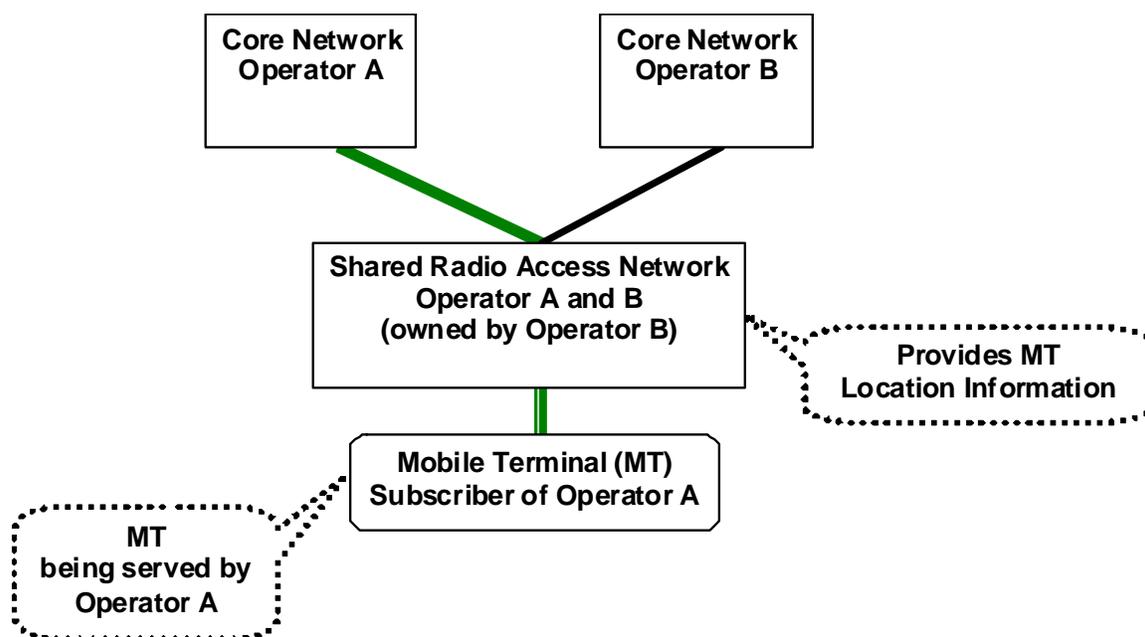

Figure 1: Radio Access Network Sharing

In the above example, Operator A (who has the lawful authorization) performs the interception and location reporting to the LEAs. The interception is performed in such a way that the interception is transparent to Operator B (i.e., Operator B is not aware of the interception).

5 ELECTRONIC SURVEILLANCE ARCHITECTURE FOR CANADIAN LOCATION REPORTING

Lawful Interception (LI) is comprised of five major functions: access, delivery, collection, service provider administration, and law enforcement administration. The relationships between these functions are shown in Figure 2.
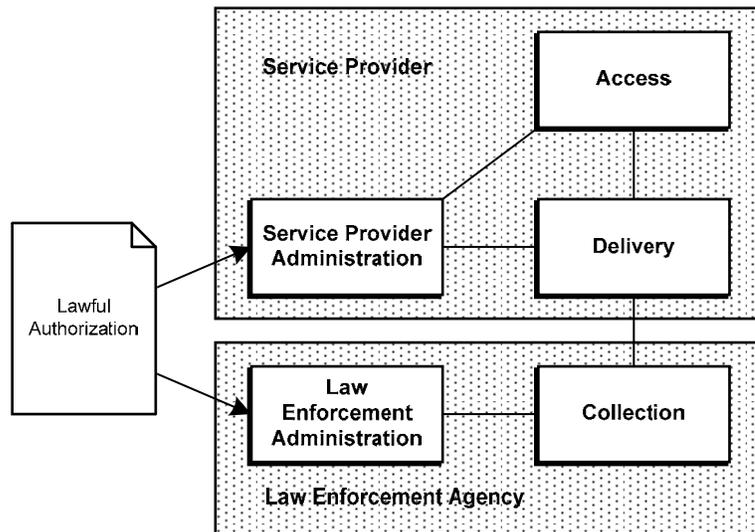

Figure 2: Electronic Surveillance Model

- ♦ The Access Function, consisting of one or more IAP(s).

- ♦ The Delivery Function, consisting of one or more entities, is responsible for delivering intercepted communications to one or more Collection Function(s).

- ♦ The Service Provider Administration Function controls the TSP's Access Function and Delivery Function. The Collection Function is responsible for collecting and analyzing intercepted communications. The Collection Function is the responsibility of the LEA.

- ♦ The Law Enforcement Administration Function is responsible for controlling and configuring the LEA CF. The Law Enforcement Administration Function is the responsibility of the LEA.

The Architecture of the Canadian LAES Location Reporting is implementation dependent and examples can be found in Annex B.

6 LAES LOCATION REPORT MESSAGE

The LAES Location Report message provides the ability to report Intercept Subject location information to the LEAs.

6.1 Triggering events

The LAES Location Report message shall be triggered when the network detects any of the following events:

1. Mobility Management

   ▪ the MT connects (e.g. IMSI Attach, GPRS Attach) to the TSP's network

   ▪ the MT disconnects (e.g. IMSI Detach, GPRS Detach) from the TSP's network;

   ▪ the MT is entering from one location area into another location area in the idle mode (e.g. Location Update, Routing Area Update);

   ▪ the MT periodically provides an update of its location while connected to the TSP's network.

2. MT Positioning Requested by the LEA

   ▪ the network obtains the MT location information (e.g., immediate location request or deferred location request) due to the request of the LEA.

   Immediate Location Reporting

   > An LAES Location Report message shall be generated and sent to the LEA immediately when a request is received from an LEA for an immediate location report. This event reporting is a one-time event and shall be executed immediately after receiving the request from the LEA.

   Deferred (Periodic) Location Reporting

   > An LAES Location Report message shall be generated and sent to the LEA periodically when required by the lawful authorization. The value of the periodic timer that is used for a location report-is negotiated between the LEA and the TSP on a per intercept basis.

An LAES Location Report message generated due to the trigger "MT positioning by LEA request" shall include the location information as "unavailable" if the network is unable to determine the location of the MT (e.g., an MT which is powered down).

An LAES Location Report message generated due to the trigger "MT positioning by LEA request" could result in the network sending one or more messages to the LEA. Also, the location information reported in multiple LAES Location Reports can be different depending on the location information available to the IAPs.

Note that IAP placement and where and when events are detected within the network are implementation dependent.

6.2 LAES Location Report message

The LAES Location Report message is defined as specified in Table 1.

Table 1 – LAES Location Report Message

Information Element	MOC	Conditions
Case Identity	M	Always Provide
IAP System Identity	C	Provide when known.
Intercept Subject Identities	M	Always provide
Time Stamp	M	Always provide.
Location Information	M	Always Provide
Location Report Trigger	M	Always Provide

6.3 LAES Location Report message information elements

1) Case Identity – Identifies the case.

2) IAP System Identity – Identifies the network element containing the IAP.

3) Intercept Subject Identities – Identities of the Intercept Subject observed at the IAP (i.e., International Mobile Subscriber Identity (IMSI), International Mobile Equipment Identifier (IMEI), Mobile Station International Subscriber Directory Number (MSISDN)).

4) Time Stamp – Identifies the date and time of the LAES Location Report event.

5) Location Information – Location information associated with the Intercept Subject. The Location Information consists of the following information fields:

   a) Location Type – The type of the location reported.

   b) Location – The actual location.

   c) Time of Location – The time the location was recorded.

6) Location Report Trigger -   See Clause 6.1 for location trigger types.

Annex A
(normative)

A ABSTRACT SYNTAX NOTATION

This annex is normative and is considered part of this Standard.

This annex describes the Abstract Syntax Notation for reporting location information and the method for delivering the location information to the LEA.

The following object tree and ASN.1 definitions apply to Canadian Location Reporting.
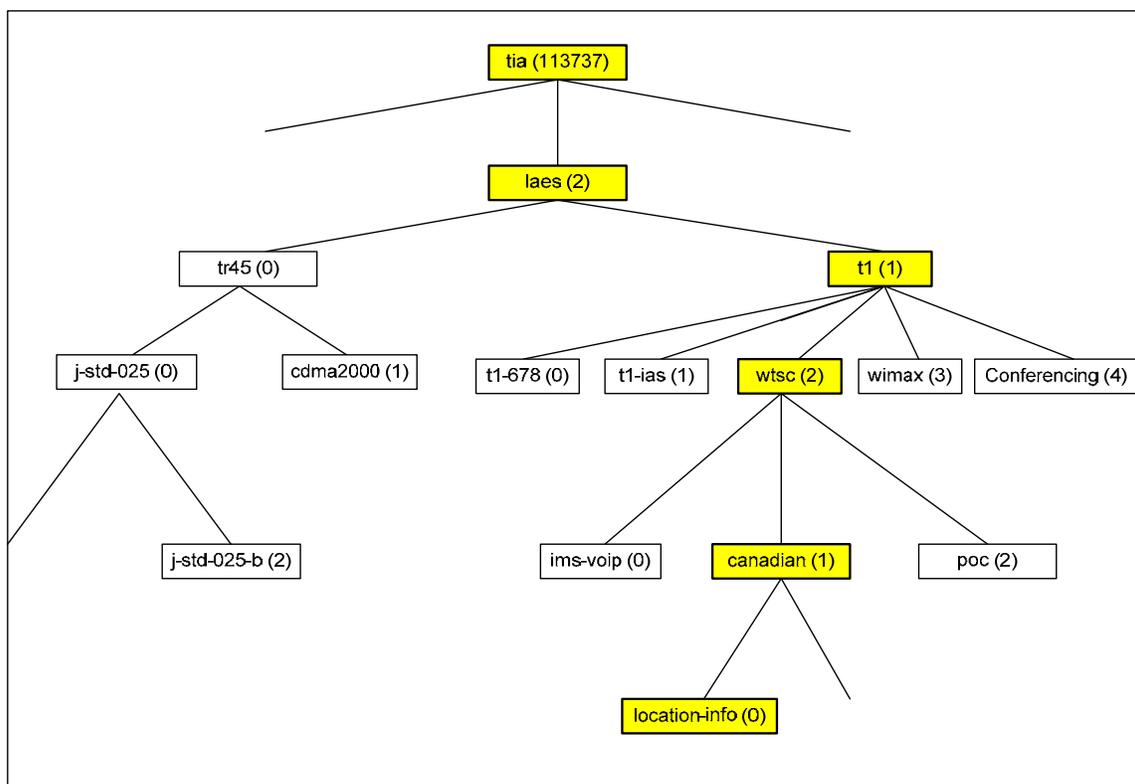
A.1 Object Tree

Figure A.1 - Object Tree

A.2 Location Information Reporting

A.2.1 LAES Location Report Message ASN.1

```
Canadian-Messages-Abstract-Syntax-Module
{iso(1) member-body(2) us(840) tia(113737) laes(2) t1(1) wtsc(2) canadian(1) location-info(0) version-
1(0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

IMPORTS

CaseIdentity,
IAPSystemIdentity,
TimeStamp
FROM Laesp-j-std-025-b              --see J-STD-025-B [Ref 1]
{iso(1) member-body(2) us(840) tia(113737) laes(2) tr45(0) j-std-025(0) j-std-025-b(2) version-1(0)}

Location

FROM UmtsHI2Operations             --see 3GPP TS 33.108 [Ref 3]

{itu-t(0) identified-organization(4) etsi(0) securityDomain(2) lawfulintercept(2) threeGPP(4) hi2(1)
r10(10) version-2(2)};


canadian-messages-OID OBJECT IDENTIFIER  ::=
{iso(1) member-body(2) us(840) tia(113737) laes(2) t1(1) wtsc(2) canadian(1) location-info(0) version-
1(0)}

CanadianProtocol ::= SEQUENCE {
protocolIdentifier   OBJECT IDENTIFIER (canadian-messages-OID),
messages             CanadianMessages
}

CanadianMessages ::= CHOICE {
lAES-Location-report   [0] LAES-Location-Report
}

-- Message Definitions

LAES-Location-Report ::= SEQUENCE {
caseId                 [0]                        CaseIdentity,
iAPSystemId            [1]                        IAPSystemIdentity     OPTIONAL,
interceptSubjecIdentities [2]                     InterceptSubjectIdentities,
timestamp              [3]                        TimeStamp,
location-Information   [4]                        Location-Information
locationTrigger        [5] UTF8String  --See Clause Section 6.1 for location trigger types.
}

-- Information Elements Definitions

Location-Information ::= SEQUENCE
{
locationType           [0] LocationType,
location               [1] Location               OPTIONAL ,
    -- Will not be reported if Location type value is 'unavailable'.
locationTime           [2] TimeStamp              OPTIONAL
    -- Will not be reported if location type value is 'unavailable'.
}


LocationType ::= ENUMERATED

{
baseStationLocation    (0),
-- Include only if location of the mobile device is not known but the location and
-- location time of the base station is known
mobileLocation         (1),
-- Include only if location and location time of the mobile device is known
```

```
unavailable          (2),
-- no location information available.
...
}


InterceptSubjectIdentities  ::= SEQUENCE {
imei                [0] OCTET STRING (SIZE (8))         OPTIONAL,
imsi                [1] OCTET STRING (SIZE (3..8))      OPTIONAL,
msisdn              [2 ] OCTET STRING (SIZE (1..9))     OPTIONAL
}

END  -- Canadian-Messages-Abstract-Syntax-Module
```

A.2.2 Delivery over the communications delivery interface

Delivery of location information should be via the same interface being used for other LAES messages. The specifics of the method for delivery over the communication interface between the Delivery Function (DF) and LEA are determined by TSP and LEA arrangements.

Annex B

(informative)

B IMPLEMENTATION EXAMPLES

This Annex is informative and is not considered part of this Standard.

The following examples depict how the Canadian LAES Location Reporting Abstract Syntax (ABS) defined in this Standard can be implemented with existing Intercept Access Points (IAPs) and ABSs to provide additional location reporting.

B.1 Implementation A

Figure B-1 depicts an implementation (Implementation A) with Intercept Access Points (IAPs) IAP-1 and IAP-2 incorporated in Network Elements (NEs) NE-1 and NE-2. IAP-1 and IAP-2 report 'event' information over a 'd' interface(s) to a LAES Abstract Syntax (ABS) ABS-1 incorporated into a Delivery Function (DF). ABS-1 formats the received 'event' information into LAES 'messages' that are delivered over an 'e' interface to a peer ABS-1 in a Collection Function (CF). ABS-1 may be a one of a number of ABSs available to implementations such as J-STD-025-B [Ref 1] and ATIS-0700005.2007 [Ref 2].
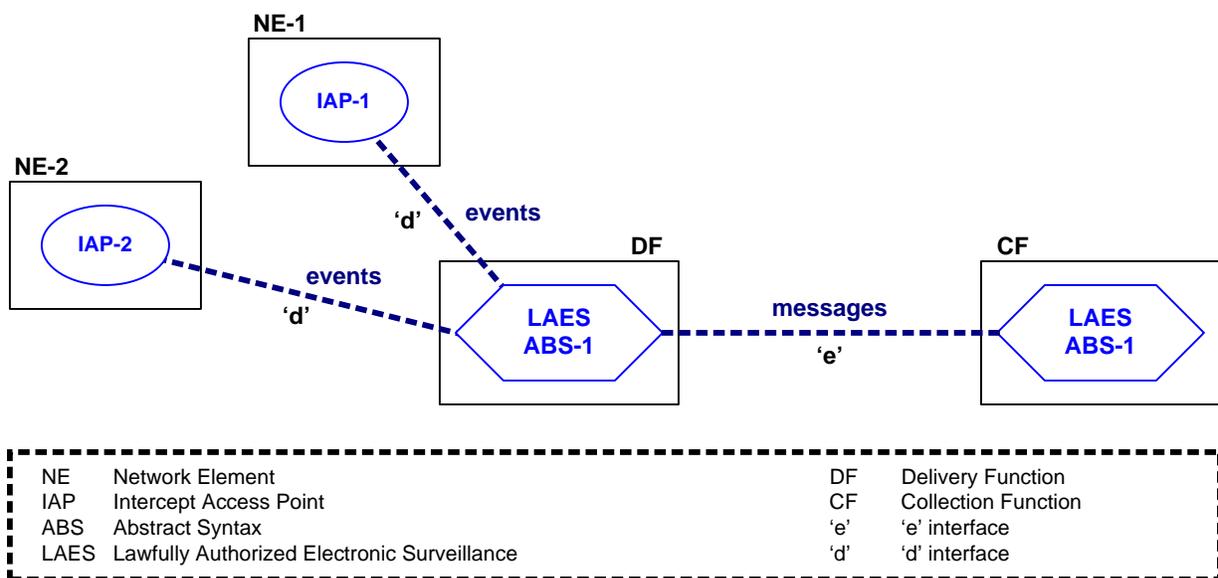

Figure B.1: IAPs and Abstract Syntax

B.2 Implementation B

Implementation B in Figure B-2 depicts how Implementation A from Figure B-1 can be enhanced with Location Reporting IAPs (LR-IAPs) and the Canadian LAES Location Reporting ABS (LR-LAES-ABS), defined in this Standard, to provide additional location reporting information to the LEAs. Location Reporting IAPs (LR-IAPs) LR-IAP-3 and LR-IAP-4 are added to NE-2 and NE-3. LR-IAP-3 and LR-IAP-4 report location 'event' information (LR-events) over a 'd' interface to the LR-LAES-ABS-2 added to the DF from Implementation A. LR-LAES-ABS-2 formats the LR-events received from the LR-IAPs into

Canadian LAES Location Reporting 'messages' for delivery over an 'e' interface to a peer LR-LAES-ABS-2 incorporated in the CF from Implementation A.
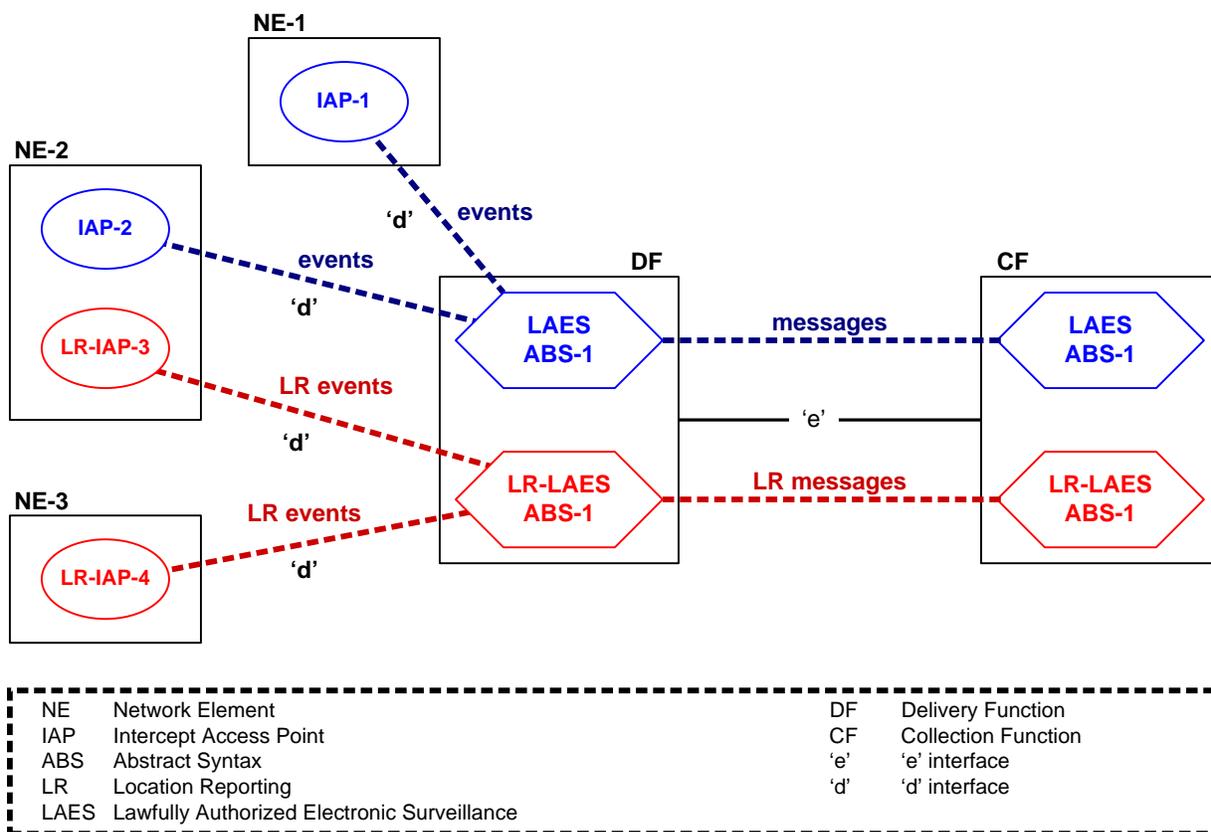

Figure B.2 : Location Reporting IAPs and Abstract Syntax