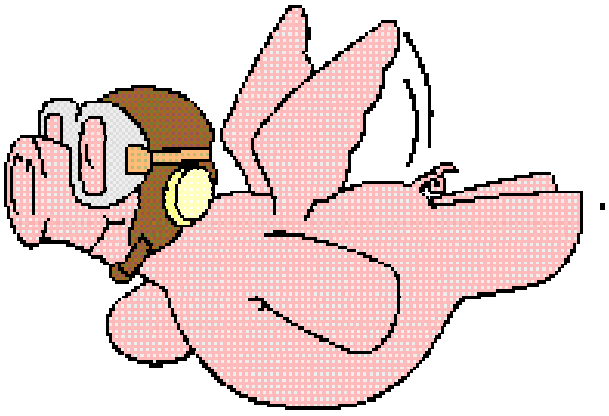
The ATN SARPs



Subvolume Seven

ATN Directory Services (DIR)

Third Edition
(Final Editor's Draft)

Please note that this is the final editor's draft of the "Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN) – ICAO DOC 9705/AN956 - as circulated within the ATNP. This text will be passed to ICAO for publication. However, it should be noted that this text in no way replaces the ICAO version, nor can it be considered to be of equal status. The official definitive version is that published in hardcopy by ICAO and all claims of compliance must be made against that version.

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Errata and Disclaimer

Please note that this document has been prepared from a number of separate files and no attempt has been made to ensure continuity of page numbers. You may therefore find some overlap between page numbers.

This document has been prepared on a “best efforts” basis and no warrantee is offered as to its correctness.

FOREWORD

The material contained in this document was originally developed as the detailed part of the first set of Standards and Recommended Practices (SARPs) for the aeronautical telecommunication network (ATN) which has commonly been referred to as the CNS/ATM-1 Package. It was intended to make the material an appendix to the new Chapter 3 of Annex 10, Volume III, Part I, containing broad, general, stable and mostly regulatory-type provisions (the core part of new ATN SARPs).

In December 1997, the Air Navigation Commission (ANC), while conducting the final review of draft ATN SARPs, agreed that the detailed part of ATN SARPs should be published as an ICAO manual (to be updated annually, if necessary), while retaining its SARPs-style language. The ANC has reviewed the status of the document in light of continuing worldwide ATN implementation. The Third Edition includes amendments from implementors and regulatory authorities, as well as four new Sub-Volumes to answer requirements for further standardization, in the interests of safety, regularity and efficiency of international civil aviation.

This document consists of nine Sub-Volumes:

Sub-Volume I — Introduction and System Level Requirements
Sub-Volume II — Air-Ground Applications
Sub-Volume III — Ground-Ground Applications
Sub-Volume IV — Upper Layer Communications Service (ULCS)
Sub-Volume V — Internet Communications Service (ICS)
Sub-Volume VI — System Management (SM)
Sub-Volume VII — Directory Services (DIR)
Sub-Volume VIII — Security (SEC)
Sub-Volume IX — Registration (REG)

Provisions contained in Sub-Volumes II, III, IV, V, VI, VII, VIII, and IX have been developed in accordance with system requirements specified in Sub-Volume I.

In line with the agreement by the ANC that the document should be updated on a yearly basis (if deemed necessary), the Third Edition has been published to incorporate changes necessitated by continuing validation and actual implementation activities.

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7 ATN Directory Services

7.1 INTRODUCTION

Note.— 7.1 contains introductory material and an overview of the Sub-Volume structure. There are no requirements or recommendations in this section.

7.1.1 The ATN Directory Service (ATN DIR) application allows ATN users to obtain directory information about ATN users, applications, and services participating in the ATN. The ATN DIR is composed of three parts, Directory Information Base, Directory System Agents (DSAs) and Directory User Agents (DUAs).

Note 1.— The ATN Directory Service aims at providing generic directory services over the Aeronautical Telecommunication Network (ATN) Internet. It may in turn be used as a directory system by user-applications communicating over the ATN. This may be achieved e.g. by means of application program interfaces.

Note 2.— ATN Directory Service

a) The ATN Directory Service is provided by the implementation over the ATN Internet Communication Services of the Directory Services specified in ISO/IEC (International Organization for Standardization/ International Electrotechnical Commission) 9594 and CCITT (Consultative Committee of International Telegraph and Telephone) or ITU-T (International Telecommunication Union - Telecommunications Standards) X.500, and complemented with the additional requirements specified in 7. The two sets of documents, the ISO/IEC Directory Services International Standards and the ITU-T X.500 Series of Recommendations (1993 or later) are in principle aligned to each other. However there are a small number of differences. In 7 reference is made to the relevant ISO International Standards, and International Standardized Profiles (ISP) where applicable. Where necessary, e.g. for reasons of interworking or to point out differences, reference is also made to the relevant X.500 Recommendations.

Note 3.— Structure of 7

a) 7.1: INTRODUCTION contains the purpose and structure, and a summary of the functionality offered by the ATN Directory Service.

b) 7.2: System Level Provisions, provides a high level specification of the application and of the environment in which it operates;

c) 7.3: Directory Service Deployment, provides a high level specification of the components required by different implementation strategies;

d) 7.4: Directory Object Class and Attribute Specification contain the definition of the objects and attributes that may be used within the Directory Service;

e) 7.5: Directory System Schema, specifies the contents and structure of the Directory Information Base;

f) 7.6: DUA Protocol Specification, specifies the protocol profiles used by Directory Services.

g) 7.7: DSA Protocol Specification, specifies the protocol profiles used by Directory Services Agents.

Note 4.— The classifications defined in the ISPs apply for expressing conformance requirements - i.e. static capability - in 7. The ISP classifications refine the ISO/IEC 9646-7 classification to include different levels of mandatory support, depending on the level of functionality to be supported by the considered Directory System. These classifications include the following elements, of which the complete definition may be found in each referenced ISP:

a) mandatory full support (m). The support of the feature is mandatory for all implementations.

b) optional support (o). The support of the feature is left to the implementor.

c) conditional support (c). The requirement to support the item depends on a specified condition. The condition and the resulting support requirements are stated separately

d) not supported (n). The implementation of this feature is not allowed in implementations.

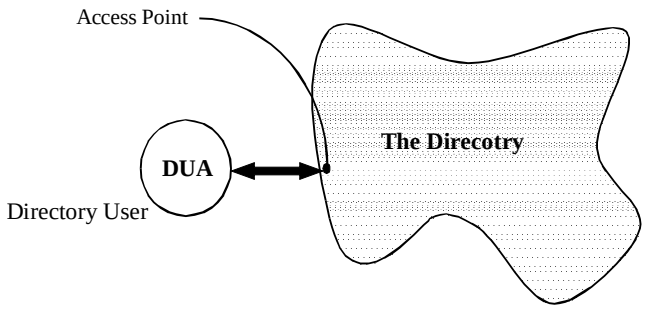
e) out of scope (i). Support of this feature is out side of the scope of this part of the specification.

f) not applicable (-). The item is not defined in the context where it is mentioned. There is no support requirement. The occurrence of "not applicable' is mainly due to the format of the tables in the ISPICS Requirements List.

7.1.2 ATN Directory Service Model

7.1.2.1 The Directory is a collection of systems which cooperate to hold a logical database of information about a set of objects in the real world. The users of the Directory, including people and computer programs, can read or modify the information, or parts of it, subject to having permission to do so. Each user is presented in accessing the information by a Directory User Agent (DUA), which is considered to be an application process. These concepts are illustrated in Figure 7.1.2.1-1.

Figure 7.2.1.1-1 Access to the ATN DIR

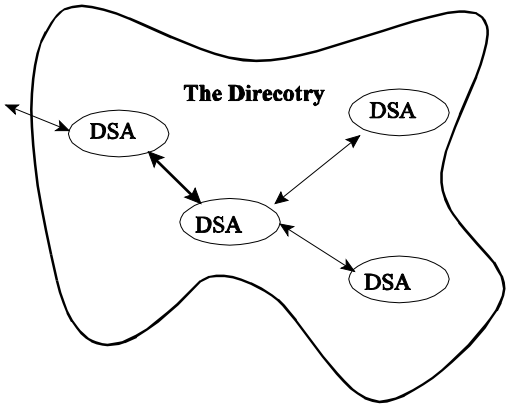


7.1.2.2 The information held in the ATN DIR is collectively known as the Directory Information Base (DIB).

7.1.2.3 The structure of the DIB, called the Directory Information Tree (DIT), defines the hierarchy of record types contained in the directory. Each record type is defined by an ***object class***. ***Object classes*** define the abstract syntax of each record. The fields of each record are defined by ***attributes***. The Directory Schema defines which ***attributes*** are contained in each object class.

7.1.2.4 The functional model of the ATN Directory Service (ATN DIR) is shown in Figure 7.1.2.4-1.

Figure 7.1.2.4-1 Functional Model of the ATN DIR



7.1.2.5 A Directory System Agent (DSA) is an application process which is part of the Directory and whose role is to provide access to the DIB to DUAs and/or other DSAs. A DSA may use information stored in its local database or interact with other DSAs to carry out requests. Alternatively, the DSA may direct a requester to another DSA which can help carry out the request. Local databases are entirely implementation dependent.

7.1.2.6 A set of one or more DSAs and zero or more DUAs managed by a single organization may form a Directory Management Domain (DMD).

7.1.2.7 The DUA interacts with ATN DIR by communicating with one or more DSAs. A DUA need not be bound to any particular DSA. It may interact directly with various DSAs to make requests. For some administrative reasons, it may not always be possible to interact directly with the DSA which needs to carry our the request, e.g., to return some directory information. It is also possible that the DUA can access the ATN DIR through a single DSA. For this purpose, DSAs will need to interact with each other.

7.1.2.8 The DSA is concerned with carrying out the requests of DUAs, and with obtaining the information where it does not have the necessary information. It may take the responsibility to obtain the information by interacting with other DSAs on behalf of the DUA.

7.2 SYSTEM LEVEL PROVISIONS

7.2.1 ATN DIR System Level Requirements

7.2.1.1 The ATN Directory Service shall be implemented in conformance with 7.

7.2.1.2 The systems comprising the ATN DIR shall themselves be comprised of the following functional objects, the general role of which is described in ISO/IEC 9594-1:1995.

a) Directory System Agents (DSAs), and
b) Directory User Agents (DUAs).

7.2.1.3 ATN Directory Service Users shall use the ATN Directory Service at an ATN Directory User Agent (ATN DUA).

7.2.1.4 An ATN Directory System Agent shall include either one or both of Directory Access Protocol (DAP) or Directory Service Protocol (DSP), as specified in 7.6.

7.2.1.5 An ATN Directory User Agent shall include DAP, as specified in 7.6.

7.2.1.6 The ATN Directory Service shall be based on ISO/IEC 9594:1995 (ITU-T X.500:1993) specifications.

7.2.1.7 The ATN DIB shall be organized according to the structure of the ATN Directory Information Tree as specified in 7.5.

7.2.1.8 The contents of the ATN DIB shall be limited to the object classes defined in Section 7.5.

7.2.1.9 The ATN DSA shall support PrintableString in order to ensure a minimum level of interworking.

Note.— The support for PrintableString is a mandatory requirement of ISO/IEC ISP 15126-1.

7.3 DIRECTORY SERVICE DEPLOYMENT

7.3.1 A Directory Service implementation shall consist of one or more DSAs.

7.3.2 A user of the Directory Service shall make use of one or more DUAs.

7.3.3 If a DSA supports user access, it shall implement DAP.

7.3.4 If a DSA supports access to other DSAs, it shall implement DSP.

7.3.5 If a DSA supports shadowing of directory information, it shall implement DISP.

7.4 DIRECTORY OBJECT CLASS AND ATTRIBUTES SPECIFICATION

Note.— Directory object classes define the types of information that may be found in the directory. Separate object class requirements are specified for the DSA and the DUA. The DSA requirements specify the elements that all DSAs must be capable of storing and processing. The DUA requirements specify the minimum requirements placed on DUAs for accessing the DSAs.

7.4.1 DSA Object Class Requirements

Note.— The object classes used within the ATN DSAs are derived from four sources: object classes defined in the base ISO/IEC 9594-7:1995, object classes defined specifically in ISO/IEC ISP 15126-1, object classes defined for use with MHS as specified in ISO/IEC ISP 11189, and object classes specific to the ATN and defined in this Sub-Volume.

7.4.1.1 DSA Standard Object Classes

7.4.1.1.1 ATN DSAs shall conform to the object class definitions of ISO/IEC 9594-7:1995 as generally specified in ISO/IEC ISP 15126-1 and refined in Table 7.4.1.1-1.

Note 1.— Table 7.4.1.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DSA" specifies the static capability of an ATN DSA to contain, convey, and handle the referenced Object Classes.

Note 2.— Table 7.4.1.1-1 contains only the object class requirements. The requirements on the content of each object class is specified in paragraph 7.5.4.

Table 7.4.1.1-1 ISO/IEC 9594-7:1995 Object Classes as Specified in ISO/IEC ISP 15126-1

Ref. No.	Object Class	Base	ISP	ATN DSA	Notes
1	top	m	m	m	
2	alias	m	m	m	
3	country	o	m	m	
4	locality	o	m	m	
5	organization	o	m	m	
6	organizationalUnit	o	m	m	
7	person	o	m	m	
8	organizationalPerson	o	m	m	
9	organizationalRole	o	m	m	
10	groupOfNames	o	m	o	
11	groupOfUniqueNames	o	m	o	
12	residentialPerson	o	m	o	
13	applicationProcess	o	m	m	
14	applicationEntity	o	m	m	
15	dSa	m	m	m	
16	device	o	m	m	
17	strongAuthenticationUser	o	m	m	
18	certificationAuthority	o	m	m	

7.4.1.2 DSA Object Classes Defined in ISO/IEC ISP 15126-1

7.4.1.2.1 The DSAs shall support the object class definitions specifically defined in ISO/IEC ISP 15126-1 section A.6.4.1.2 as indicated in Table 7.4.1.2.1-1.

Note 1.— The ISO/IEC ISP 15126-1 specifies a set object classes not found in ISO/IEC 9594-7:1995. The set of additional supported object classes is the subject of this section.

Note 2.— Table 7.4.1.2.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DSA" specifies the static capability of an ATN DSA to contain, convey, and handle the referenced Object Classes.

Table 7.4.1.2.1-1 DSA Object Classes Defined in ISP 15126-1

Ref. No.	Object Class	Base	ISP	ATN DSA	
1	ispApplicationEntity	-	o	o	

7.4.1.3 DSA Object Classes Defined for Message Handling System (MHS) in ISP 11189 (FDI2)

Note.— ISO/IEC ISP 11189 is an extension to profile ISO/IEC ISP 10616-1. ISO/IEC ISP 10616-1 is the object class profile for ISO/IEC 9594-7:1988 and has been superseded by ISO/IEC ISP 15126-1 due to the publication of ISO/IEC 9594-7:1995. The contents of ISO/IEC ISP 11189 have been verified to be correct in relation to ISO/IEC ISP 15126-1. The verification was performed using ISO/IEC ISP 11189 Amd 1 which incorporates changes needed to conform to ISO/IEC 9594-7:1998.

7.4.1.3.1 ATN DSAs shall support for MHS the object classes defined in ISO/IEC ISP 11189 (FDI2) section A.6.4.1.2 with the syntax defined in ISO/IEC 10021-2, as indicated in Table 7.1.4.1.3-1.

Note 1.— ISO/IEC ISP 11189 defines specific object classes for use by MHS. These object classes are based upon the standard object classes defined in Section 7.4.1.1 and Section 7.4.1.2 and extend those object classes.

Note 2.— ISO/IEC ISP 11189 section A.6.4.1.2 defines the requirements for implementation of the object classes. ISO/IEC 10021-2 defines the required syntax for each object class.

Note 3.— Table 7.4.1.3.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 11189 (FDI2). The columns "Base", "Basic Profile", "Profile DL FG", and "ISP" are extracted from ISO/IEC ISP 11189. The column "ATN DSA" specifies the static capability of an ATN DSA to contain, convey, and handle the referenced Object Classes.

Table 7.4.1.3.1-1 DSA Object Classes Defined in ISO/IEC ISP 11189

Ref. No.	Object Class	Base	Basic Profile	DL Profile FG	ATN DSA	Notes
1	mhs-distributionList	o	o	m	m	
2	mhs-message-store	o	o	-	m	
3	mhs-message-transfer-agent	o	o	-	m	
4	mhs-user	o	m	-	m	
5	mhs-user-agent	o	o	-	m	

7.4.1.4 DSA Object Classes Defined for ATN

Note 1.— The ATN DSA is comprised of a set of specific object classes that are extensions of the basic object classes presented in Sections 7.4.1.1-7.4.1.3. The specific object classes defined in this section defines new object classes and extends the standard object classes by adding additional attributes, deleting mandatory attributes, and mandating optional attributes.

Note 2.— The definition of the attributes comprising each object class is found in Section 7.5.1.

Note 3.— The ASN.1 abstract syntax of the ATN specific object classes is found in Section 7.5.2.

7.4.1.4.1 ATN DSAs shall support the ATN specific object class **atn-AmhsUser.**

Note.— The definition of the attributes contained in the object class atn-AmhsUser is found in Section 7.5.2.

7.4.1.4.2 ATN DSAs shall support the ATN specific object class **atn-OrganizationalUnit.**

Note.— The definition of the attributes contained in the object class atn-OrganizationalUnit is found in Section 7.5.2.

7.4.1.4.3 ATN DSAs shall support the ATN specific object class **atn-OrganizationalPerson**.

Note.— The definition of the attributes contained in the object class atn-OrganizationalPerson is found in Section 7.5.2.

7.4.1.4.4 ATN DSAs shall support the ATN specific object class **atn-OrganizationalRole**.

Note.— The definition of the attributes contained in the object class atn-OrganizationalRole is found in Section 7.5.2

7.4.1.4.5 ATN DSAs shall support the ATN specific object class **atn-ApplicationEntity**.

Note.— The definition of the attributes contained in the object class atn-Application is found in Section 7.5.2.

7.4.1.4.6 ATN DSAs shall support the ATN specific object class **atn-CertificationAuthority**.

Note.— The definition of the attributes contained in the object class atn-CertificationAuthority is found in Section 7.5.2.

7.4.1.4.7 ATN DSAs shall support the ATN specific object class **atn-AmhsDistributionList**.

Note.— The definition of the attributes contained in the object class atn-AmhsDistributionList is found in Section 7.5.2.

7.4.1.4.8 ATN DSAs shall support the ATN specific object class **atn-AmhsUserAgent**.

Note.— The definition of the attributes contained in the object class atn-AmhsUserAgent is found in Section 7.5.2.

7.4.1.4.9 ATN DSAs shall support the ATN specific object class **atn-AmhsGateway**.

Note.— The definition of the attributes contained in the object class atn-AmhsGateway is found in Section 7.5.2.

7.4.1.4.10 ATN DSAs shall support the ATN specific object class **atn-Aircraft**.

Note.— The definition of the attributes contained in the object class atn-Aircraft is found in Section 7.5.2.

7.4.1.4.11 ATN DSAs shall support the ATN specific object class **atn-Facility**.

Note.— The definition of the attributes contained in the object class atn-Facility is found in Section 7.5.2.

7.4.1.4.12 ATN DSAs shall support the ATN specific object class **atn-AmhsMD**.

Note.— The definition of the attributes contained in the object class atn-AmhsMD is found in Section 7.5.2.

7.4.1.4.13 ATN DSAs shall support the ATN specific object class **atn-IdrpRouter**.

Note.— The definition of the attributes contained in the object class atn-IdrpRouter is found in Section 7.5.2.

7.4.1.4.14 ATN DSAs shall support the ATN specific object class **atn-DirectorySystemAgent**.

Note.— The definition of the attributes contained in the object class atn-DirectorySystemAgent is found in Section 7.5.2.

7.4.1.4.15 ATN DSAs shall support the ATN specific object class **atn-Organization**.

Note.— The definition of the attributes contained in the object class atn-Organization is found in Section 7.5.2.

7.4.2 DSA Supported Attribute Types

7.4.2.1 DSA Supported Attribute Types Defined in ISO/IEC 9594-6:1995

7.4.2.1.1 ATN DSAs shall support the attribute types defined generally by ISO/IEC 9594-6:1995 as specified in ISO/IEC ISP 15126-1 section A.6.4.1.2 and refined in Table 7.4.2.1-1.

Note.— Table 7.4.2.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DSA" specifies the static capability of an ATN DSA to contain, convey, and handle the referenced Attributes within object classes to which they apply.

Table 7.4.2.1-1 DSA Supported ISO/IEC 9594-6 Standard Attribute Types as Specified in ISO/IEC ISP 15126-1

Ref No.	Attribute Type	Base	ISP	ATN DSA	Notes
1	objectClass	m	m	m	
2	aliasedEntryName	o	m	m	
3	knowledgeInformation	o	o	o	
4	name	o	m	m	
5	commonName	o	m	m	
6	surname	o	m	m	
7	givenName	o	m	m	*not present in 1988 edition
8	initials	o	m	m	*not present in 1988 edition
9	generationQualifier	o	m	m	*not present in 1988 edition
10	uniqueIdentifier	o	c1	m	*not present in 1988 edition
11	dnQualifier	o	m	m	*not present in 1988 edition
12	serialNumber	o	m	m	
13	countryName	o	m	m	
14	localityName	o	m	m	
15	stateOrProvinceName	o	m	m	
16	streetAddress	o	m	m	
17	houseIdentifier	o	m	o	*not present in 1988 edition
18	organizationName	o	m	m	
19	organizationalUnitName	o	m	m	
20	title	o	m	m	
21	description	o	m	m	
22	searchGuide	o	m	m	
23	enhancedSearchguide	o	m	m	*not present in 1988 edition
24	businessCategory	o	m	o	
25	postalAddress	o	m	m	
26	postalCode	o	m	m	
27	postOfficeBox	o	m	o	
28	physicalDeliveryOfficeName	o	m	m	

Ref No.	Attribute Type	Base	ISP	ATN DSA	Notes
29	telephoneNumber	o	m	m	
30	telexNumber	o	m	o	
31	telexTerminalIdentifier	o	m	o	
32	facsimileTelephoneNumber	o	m	m	
33	x121Address	o	m	m	
34	internationalISDNNumber	o	m	m	
35	registeredAddress	o	m	o	
36	destinationIndicator	o	m	m	
37	preferredDeliveryMethod	o	m	m	
38	presentationAddress	o	m	m	
39	supportedApplicationContext	o	m	m	
40	protocolInformation	o	m	m	*not present in 1988 edition
41	distinguishedName	o	m	m	*not present in 1988 edition
42	member	o	m	m	
43	uniqueMember	o	m	m	*not present in 1988 edition
44	owner	o	m	m	
45	roleOccupant	o	m	m	
46	seeAlso	o	m	o	
47	userPassword	o	m	m	
48	userCertificate	o	c1	m	
49	cACertificate	o	c1	m	
50	authorityRevocationList	o	c1	m	
51	certificateRevocationList	o	c1	m	
52	crossCertificatePair	o	c1	m	

Note.— Conditional c1: if p_strong_rep then m else o.

7.4.2.2 DSA Supported Attribute Types Defined in ISP 15126-1

7.4.2.2.1 The ATN Directory shall support the attribute types defined in ISO/IEC ISP 15126-1 section A.6.4.2.2 as refined in Table 7.4.2.2-1.

Note.— Table 7.4.2.2-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DSA" specifies the static capability of an ATN DSA to contain, convey, and handle the referenced Attributes within the object classes to which they apply.

Table 7.4.2.2-1 DSA Supported Attribute Types Defined in ISP 15126-1

Ref. No.	Attribute Type	Base	ISP	ATN DSA	Notes
1	u1ProfileInformation	-	o	m	
2	applicationEntityOID	-	o	m	
3	transferSyntaxesSupported	-	o	m	

*Note 1.— The Upper Layer Protocol Information attribute type, **u1ProfileInformation**, associates with each application entity the object identifiers of the profiles which are implemented for that application entity.*

*Note 2.— The Application Entity OID attribute type, **applicationEntityOID**, specifies the object identifier which is assigned to the application entity.*

*Note 3.— The Transfer Syntaxes Supported attribute type, **transferSyntaxesSupported**, specifies the object identifier(s) or transfer syntax(es) and/or the encoding rules that the object (an OSI application entity) supports.*

7.4.2.3 DSA Collective Attribute Types Defined in ISP 15126-1

7.4.2.3.1 The ATN Directory shall conform to ISO/IEC ISP 15126-1 section A.6.4.2.3 as indicated in Table 7.4.2.3-1.

Note.— Table 7.4.2.3-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DSA" specifies the static capability of an ATN DSA to contain, convey, and handle the referenced Attributes.

Ref. No.	Attribute Type	Base	ISP	ATN DSA	Notes
1	collectiveLocalityName	o	o	o	
2	collectiveStateOrProvinceName	o	o	o	
3	collectiveStreetAddress	o	o	o	
4	collectiveOrganizationName	o	o	o	
5	collectiveOrganizationalUnitName	o	o	o	
6	collectivePostalAddress	o	o	o	
7	collectivePostalCode	o	o	o	
8	collectivePostOfficeBox	o	o	o	
9	collectivePhysicalDeliveryOfficeName	o	o	o	
10	collectiveTelephoneNumber	o	o	o	
11	collectiveTelexNumber	o	o	o	
12	collectiveTelexTerminalIdentifier	o	o	o	
13	collectiveFacsimilieTelephoneNumber	o	o	o	
14	collectiveInternationalISDNNumber	o	o	o	

7.4.2.4 DSA Attribute Types Defined in ISO/IEC ISP 11189 (FDI2)

7.4.2.4.1 ATN DSAs shall support the attribute types defined in ISO/IEC ISP 11189 (FDI2) section A.6.4.2.2 as indicated in Table 7.4.2.4-1.

Note.— Table 7.4.2.4-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 11189 (FDI2). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 11189, and the column "ATN DSA" specifies the static capability of an ATN DSA to contain, convey, and handle the referenced Attributes.

Table 7.4.2.4-1 DSA Attribute Types Defined in ISO/IEC ISP 11189

Ref. No.	Object Class	Base	ISP Basic	ISP DL FG	ATN DSA	Notes
1	mhs-acceptable-eits	o	o	-	n	
2	mhs-deliverable-content-types	o	m	-	m	
3	mhs-deliverable-classes	o	m	-	m	
4	mhs-dl-archive-service	o	o	m	m	
5	mhs-dl-members	o	i	m	m	
6	mhs-dl-policy	o	i	m	m	
7	mhs-dl-related-lists	o	i	m	m	
8	mhs-dl-submit-permissions	m	i	m	m	
9	mhs-dl-subscription-service	o	i	m	m	
10	mhs-exclusively-acceptable-eits	o	m	-	m	
11	mhs-maximum-content-length	o	m	-	m	
12	mhs-message-store-dn	o	o	-	m	
13	mhs-or-address	m	m	-	m	
14	mhs-or-address-with-capabilities	o	o	-	m	
15	mhs-supported-attributes	o	o	-	o	
16	mhs-supported-automatic-actions	o	o	-	o	
17	mhs-supported-content-types	o	o	-	m	
18	mhs-supported-matching-rules			o	o	
19	mhs-unacceptable-eits	o	o	-	n	

7.4.2.5 DSA Attribute Types Defined by the ATN

7.4.2.5.1 ATN DSAs shall support the ATN specific attribute **atn-AF-address**.

Note.— The definition of the attribute atn-AF-address is found in Section 7.5.3.1.

7.4.2.5.2 ATN DSAs shall support the ATN specific attribute **atn-Cidin-mcf**.

Note.— The definition of the attribute atn-Cidn-mcf is found in Section 7.5.3.2.

7.4.2.5.3 ATN DSAs shall support the ATN specific attribute **atn-Ax-or-primary-Ax-address**.

*Note.— The definition of the attribute atn-Ax-or-primary-Ax-address is found in Section 7.5.3.*3.

7.4.2.5.4 ATN DSAs shall support the ATN specific attribute **atn-secondary-Ax-address**.

Note.— The definition of the attribute atn-secondary-Ax-address is found in Section 7.5.3.4.

7.4.2.5.5 ATN DSAs shall support the ATN specific attribute **atn-mtcu-characteristics**.

Note.— The definition of the attribute atn-mtcu-characteristics is found in Section 7.5.3.5.

7.4.2.4.6 ATN DSAs shall support the ATN specific attribute **atnPerCertificate**.

Note.— The definition of the attribute atnPerCertificate is found in Section 7.5.3.6.

7.4.2.4.7 ATN DSAs shall support the ATN specific attribute **atnDerCertificate**.

Note.— The definition of the attribute atnDerCertificate is found in Section 7.5.3.7.

7.4.2.4.8 ATN DSAs shall support the ATN specific attribute **atn-amhs-direct-access**.

*Note.— The definition of the attribute atn-amhs-direct-access is found in Section 7.5.3.*8.

7.4.2.4.9 ATN DSAs shall support the ATN specific attribute **atn-facilityName**.

Note.— The definition of the attribute atn-facilityName is found in Section 7.5.3.9.

7.4.2.4.10 ATN DSAs shall support the ATN specific attribute **atn-aircraftIDName**.

Note.— The definition of the attribute atn-aircraftName is found in Section 7.5.3.10.

7.4.2.4.11 ATN DSAs shall support the ATN specific attribute **atn-version**.

Note.— The definition of the attribute atn-version is found in Section 7.5.3.11.

7.4.2.4.12 ATN DSAs shall support the ATN specific attribute **atn-amhs-extended-service-support**.

*Note.— The definition of the attribute atn-extended-service-support is found in Section 7.5.3.*12.

7.4.2.4.13 ATN DSAs shall support the ATN specific attribute **atn-global-domain-identifier**.

Note.— The definition of the attribute atn-global-domain-identifier is found in Section 7.5.3.13.

7.4.2.4.14 ATN DSAs shall support the ATN specific attribute **atn-icao-country-code**.

Note.— The definition of the attribute atn-icao-country-code is found in Section 7.5.3.14.

7.4.2.4.15 ATN DSAs shall support the ATN specific attribute **atn-ApplicationEntityName**.

Note.— The definition of the attribute atn-ApplicationEntityName is found in Section 7.5.3.15.

7.4.2.4.16 ATN DSAs shall support the ATN specific attribute **atn-Net**.

*Note.— The definition of the attribute atn-Net is found in Section 7.5.3.*16.

7.4.3 DUA Object Class Requirements

Note 1.— The object classes supported by ATN DUAs are derived from four sources: object classes defined in the base ISO 9594-7:1995, object classes defined specifically in ISO/IEC ISP 15126-1, object classes defined for use with MHS as specified in ISO/IEC ISP 11189, and object classes specific to the ATN and defined in this Sub-Volume.

Note 2.— The object classes defined for ATN DSAs in Section 7.4.1 delineate the type of information stored within the ATN directory service. The object classes defined for ATN DUAs specify the requirements for user access to that information. Necessarily, the specification of the DUA object class requirements is less restrictive than the DSA requirements since DUAs need only be able to retrieve information relevant to its intended use.

7.4.3.1 DUA Object Classes Defined in ISO/IEC 9594-7:1995

7.4.3.1.1 The DUAs shall conform to the object class definitions as generally defined in ISO/IEC ISP 15126-1 Annex B as refined in Table 7.4.3.1.1-1.

Note.— Table 7.4.3.1.1-1 is structured as a PRL derived from the profile specification included in the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DUA" specifies the static capability of an ATN DUA to convey, and handle the referenced Object Classes.

Table 7.4.3.1.1-1 DUA Supported ISO/IEC 9594-7:1995 Standard Object Classes

Ref. No.	Object Class	Base	ISP	ATN DUA	Notes
1	top	m	m	m	
2	alias	m	m	m	
3	country	o	m	m	
4	locality	o	m	m	
5	organization	o	m	m	
6	organizationalUnit	o	m	m	
7	person	o	m	o	
8	organizationalPerson	o	m	o	
9	organizationalRole	o	m	o	
10	groupOfNames	o	m	o	

11	groupOfUniqueNames	o	m	o	
12	residentialPerson	o	m	o	
13	applicationProcess	o	m	o	
14	applicationEntity	o	m	o	
15	dSa	m	m	m	
16	device	o	m	o	
17	strongAuthenticationUser	o	c1	m	
18	certificationAuthority	o	c1	m	

Note.— Conditional c1: if p_strong_rep then m else o.

7.4.3.2 DUA Supported Object Classes Defined In ISO/IEC ISP 15126-1

7.4.3.2.1 The ATN DUAs shall conform to ISO/IEC ISP 15126-1 section B.6.4.1.2 as indicated in Table 7.4.3.2-1.

Note.— Table 7.4.3.2-1 is structured as a PRL derived from the profile specification included in the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DUA" specifies the static capability of an ATN DUA to convey, and handle the referenced Object Classes.

Table 7.4.3.2-1 DUA Object Classes Defined in ISO/IEC ISP 15126-1

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	ispApplicationEntity	-	o	o	

7.4.3.3 DUA Object Classes Defined for MHS in ISO/IEC ISP 11189 (FDI2)

Note.— ISO/IEC ISP 11189 is an extension to profile ISO/IEC ISP 10616-1. ISO/IEC ISP 10616-1 is the object class profile has been superseded by ISO/IEC ISP 15126-1 due to the publication of a later version of ISO 9594-7. The contents of ISO/IEC ISP 11189 have been verified to be correct in relation to ISO/IEC ISP 15126-1.

7.4.3.3.1 ATN DUAs that are supporting AMHS as defined in Sub-Volume 3 shall support the object classes defined for MHS in ISO/IEC ISP 11189 (FDI2) section A.6.4.1.2 and with the syntax defined in ISO/IEC 10021-2, as indicated in Table 7.4.3.3.1-1.

Note 1.— ISO/IEC ISP 11189 section A.6.4.1.2 defines the requirements for implementation of the object classes. ISO/IEC 10021-2 defines the required syntax for each object class.

Note 2.— Table 7.4.3.3.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 11189 (FDI2). The columns "Base", "Basic Profile", "Profile DL FG", and "ISP" are extracted from ISO/IEC ISP 11189. The column "ATN DUA" specifies the static capability of an ATN DUA to contain, convey, and handle the referenced Object Classes.

Table 7.4.3.3.1-1 DUA Object Classes Defined in ISO/IEC ISP 11189

Ref. No.	Object Class	Base	Basic Profile	Profile DL	ATN DUA	Notes
1	mhs-distributionList	o	o	m	c2	
2	mhs-message-store	o	o	-	c2	
3	mhs-message-transfer-agent	o	o	-	c2	
4	mhs-user	o	m	-	c2	
5	mhs-user-agent	o	o	-	c2	

Note.— Conditional c2: If the ATN DUA is supporting AMHS then m else o.

7.4.3.4 DUA Supported ATN Defined Object Classes

Note 1.— ATN DSAs support a set of object classes including ATN specific extensions. The ATN DSA supported object classes are presented in Sections 7.4.4.1-7.4.4.3.

Note 2.— ATN DUAs need to be able to handle information found in the ATN specific object classes.

Note 3.— The specific object classes defined in this section extends the standard object classes by adding additional attributes, deleting mandatory attributes, and mandating optional attributes.

Note 4.— The definition of the attributes comprising each object class is found in Section 7.5.

7.4.3.4.1 ATN DUAs that support the AMHS application shall support the ATN specific object class **atn-AmhsUser.**

Note.— The definition of the attributes contained in the object class atn-AmhsUser is found in Section 7.5.

7.4.3.4.2 ATN DUAs shall support the ATN specific object class **atn-OrganizationalUnit.**

Note.— The definition of the attributes contained in the object class atn-OrganizationalUnit is found in Section 7.5.

7.4.3.4.3 ATN DUAs shall support the ATN specific object class **atn-OrganizationalPerson**.

Note.— The definition of the attributes contained in the object class atn-OrganizationalPerson is found in Section 7.5.

7.4.3.4.4 ATN DUAs shall support the ATN specific object class **atn-OrganizationalRole** .

Note.— The definition of the attributes contained in the object class atn-OrganizationalRole is found in Section 7.5.

7.4.3.4.5 ATN DUAs shall support the ATN specific object class **atn-ApplicationEntity**.

Note.— The definition of the attributes contained in the object class atn-ApplicationEntity is found in Section 7.5.

7.4.3.4.6 ATN DUAs shall support the ATN specific object class **atn-CertificationAuthority** .

Note.— The definition of the attributes contained in the object class atn-CertificationAuthority is found in Section 7.5.

7.4.3.4.7 ATN DUAs that support AMHS shall support the ATN specific object class **atn-AmhsDistributionList**.

Note.— The definition of the attributes contained in the object class atn-AmhsDistributionList is found in Section 7.5.

7.4.3.4.8 ATN DUAs that support AMHS shall support the ATN specific object class **atn-AmhsUserAgent**.

Note.— The definition of the attributes contained in the object class atn-AmhsUserAgent is found in Section 7.5.

7.4.3.4.9 ATN DUAs that support AMHS shall support the ATN specific object class **atn-AmhsGateway**.

Note.— The definition of the attributes contained in the object class atn-AmhsGateway is found in Section 7.5.

7.4.3.4.10 ATN DUAs shall support the ATN specific object class **atn-Aircraft**.

Note.— The definition of the attributes contained in the object class atn-Aircraft is found in Section 7.5.

7.4.3.4.11 ATN DUA shall support the ATN specific object class **atn-Facility**.

Note.— The definition of the attributes contained in the object class atn-Facility is found in Section 7.5.

7.4.3.4.12 ATN DUAs that support AMHS shall support the ATN specific object class **atn-AmhsMD**.

Note.— The definition of the attributes contained in the object class atn-AmhsMD is found in Section 7.5.

7.4.3.4.13 ATN DUAs shall support the ATN specific object class **atn-IdrpRouter**.

Note.— The definition of the attributes contained in the object class atn-IdrpRouter is found in Section 7.5.

7.4.3.4.14 ATN DUAs shall support the ATN specific object class **atn-DirectorySystemAgent**.

Note.— The definition of the attributes contained in the object class atn-DirectorySystemAgent is found in Section 7.5.

7.4.3.4.15 ATN DUAs shall support the ATN specific object class **atn-Organization**.

Note.— The definition of the attributes contained in the object class atn-Organization is found in Section 7.5.

7.4.4 DUA Supported Attribute Types

7.4.4.1 DUA Supported Attribute Types Defined in ISO/IEC 9594-6:1995

7.4.4.1.1 ATN DUAs shall support the attribute types as generally defined in ISO/IEC ISP 15126-1 section B.6.4.2.1 as refined in Table 7.4.4.1.1-1.

Note.— Table 7.4.4.1.1-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DUA" specifies the static capability of an ATN DUA to convey, and handle the referenced Attributes.

Table 7.4.4.1.1-1 DUA Supported Standard Attribute Types

Ref No.	Attribute Type	Base	ISP	ATN DUA	
1	objectClass	m	m	m	
2	aliasedEntryName	o	m	m	
3	knowledgeInformation	o	o	o	

4	name	o	m	o	
5	commonName	o	m	o	
6	surname	o	m	o	
7	givenName	o	m	o	
8	initials	o	m	o	
9	generationQualifier	o	m	o	
10	uniqueIdentifier	o	c1	m	
11	dnQualifier	o	m	m	
12	serialNumber	o	m	m	
13	countryName	o	m	m	
14	localityName	o	m	m	
15	stateOrProvinceName	o	m	m	
16	streetAddress	o	m	m	
17	houseIdentifier	o	m	o	
18	organizationName	o	m	m	
19	organizationalUnitName	o	m	m	
20	title	o	m	m	
21	description	o	m	m	
22	searchGuide	o	m	m	
23	enhancedSearchguide	o	m	m	
24	businessCategory	o	m	o	
25	postalAddress	o	m	o	
26	postalCode	o	m	o	
27	postOfficeBox	o	m	o	
28	physicalDeliveryOfficeName	o	m	o	
29	telephoneNumber	o	m	o	
30	telexNumber	o	m	o	
31	telexTerminalIdentifier	o	m	o	

32	facsimileTelephoneNumber	o	m	o	
33	x121Address	o	m	m	
34	internationalISDNNumber	o	m	o	
35	registeredAddress	o	m	o	
36	destinationIndicator	o	m	o	
37	preferredDeliveryMethod	o	m	o	
38	presentationAddress	o	m	m	
39	supportedApplicationContext	o	m	m	
40	protocolInformation	o	m	m	
41	distinguishedName	o	m	m	
42	member	o	m	o	
43	uniqueMember	o	c1	m	
44	owner	o	m	m	
45	roleOccupant	o	m	o	
46	seeAlso	o	m	o	
47	userPassword	o	m	o	
48	userCertificate	o	c1	m	
49	cACertificate	o	c1	m	
50	authorityRevocationList	o	c1	m	
51	certificateRevocationList	o	c1	m	
52	crossCertificatePair	o	c1	m	

Note.— Conditional c1: if p_strong_rep then m else o.

7.4.4.2 DUA Supported Attributes Types Defined in ISO/IEC ISP 15126-1

7.4.4.2.1 ATN DUAs shall conform to ISO/IEC ISP 15126-1 section B.6.4.2.2 as indicated in Table 7.4.4.2.1-1.

Note.— Table 7.4.4.2.1-1 is structured as a PRL derived from the profile specification from the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are

extracted from the ISO/IEC ISP 15126-1, and the column "ATN DUA" specifies the static capability of an ATN DUA to contain, convey, and handle the referenced Attributes.

Table 7.4.4.2.1-1 DUA Support for Attribute Types Defined in ISO/IEC ISP 15126-1

Ref. No.	Attribute Type	Base	ISP	ATN DUA	Notes
1	u1ProfileInformation	-	o	m	
2	applicationEntityOID	-	o	m	
3	transferSyntaxesSupported	-	o	m	

7.4.4.3 DUA Support of Collective Attribute Types Defined in ISO/IEC ISP 15126-1

7.4.4.3.1 ATN DUAs shall conform to ISO/IEC ISP 15126-1 section B.6.4.2.3 as indicated in Table 7.4.4.3-1.

Note.— Table 7.4.4.3-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DUA" specifies the static capability of an ATN DUA to contain, convey, and handle the referenced Attributes.

Ref. No.	Attrribute Type	Base	ISP	ATN DUA	Notes
1	collectiveLocalityName	o	o	o	
2	collectiveStateOrProvinceName	o	o	o	
3	collectiveStreetAddress	o	o	o	
4	collectiveOrganizationName	o	o	o	
5	collectiveOrganizationalUnitName	o	o	o	
6	collectivePostalAddress	o	o	o	
7	collectivePostalCode	o	o	o	
8	collectivePostOfficeBox	o	o	o	
9	collectivePhysicalDeliveryOfficeName	o	o	o	
10	collectiveTelephoneNumber	o	o	o	
11	collectiveTelexNumber	o	o	o	

12	collectiveTelexTerminalIdentifier	o	o	o	
13	collectiveFacsimileTelephoneNumber	o	o	o	
14	collectiveInternationalISDNNumber	o	o	o	

7.4.4.4 DUA Attribute Types Defined in ISO/IEC ISP 11189 (FDI2)

7.4.4.4.1 ATN DUAs shall support the attribute types generally defined in ISO/IEC ISP 11189 (FDI2) section B.6.4.2.2 as refined in Table 7.4.4.4-1.

Note.— Table 7.4.4.4-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 11189 (FDI2). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 11189, and the column "ATN DUA" specifies the static capability of an ATN DUA to contain, convey, and handle the referenced Attributes.

Table 7.4.4.4-1 DUA Attribute Types Defined in ISO/IEC ISP 11189

Ref. No.	Object Class	Base	ISP Basic	ISP DL FG	ATN DSA	Notes
1	mhs-acceptable-eits	o	o	-	n	
2	mhs-deliverable-content-types	o	m	-	c2	
3	mhs-deliverable-classes	o	m	-	c2	
4	mhs-dl-archive-service	o	o	m	c2	
5	mhs-dl-members	o	i	m	c2	
6	mhs-dl-policy	o	i	m	c2	
7	mhs-dl-related-lists	o	i	m	c2	
8	mhs-dl-submit-permissions	m	i	m	c2	
9	mhs-dl-subscription-service	o	i	m	c2	
10	mhs-exclusively-acceptable-eits	o	m	-	c2	
11	mhs-maximum-content-length	o	m	-	c2	
12	mhs-message-store-dn	o	o	-	c2	
13	mhs-or-address	m	m	-	c2	
14	mhs-or-address-with-capabilities	o	o	-	c2	

Ref. No.	Object Class	Base	ISP Basic	ISP DL FG	ATN DSA	Notes
15	mhs-supported-attributes	o	o	-	o	
16	mhs-supported-automatic-actions	o	o	-	o	
17	mhs-supported-content-types	o	o	-	c2	
18	mhs-supported-matching-rules			o	o	
19	mhs-unacceptable-eits	o	o	-	n	

Note.— Conditional c2: If the ATN DUA is supporting AMHS then m else o.

7.4.4.5 DUA Supported ATN Specific Attribute Types

7.4.4.5.1 ATN DUAs that support the AMHS shall support the ATN specific attribute **atn-AF-address**.

Note.— The definition of the attribute atn-AF-address is found in Section 7.5.3.1.

7.4.4.5.2 ATN DUAs that support AMHS shall support the ATN specific attribute **atn-Cidin-mcf**.

Note.— The definition of the attribute atn-Cidin-mcf is found in Section 7.5.3.2.

7.4.4.5.3 ATN DUAs that support AMHS shall support the ATN specific attribute **atn-Ax-or-primary-Ax-address**.

Note.— The definition of the attribute atn-Ax-or-primary-Ax-address is found in Section 7.5.3.3.

7.4.4.5.4 ATN DUAs that support AMHS shall support the ATN specific attribute **atn-secondary-Ax-address**.

Note.— The definition of the attribute atn-secondary-Ax-address is found in Section 7.5.3.4.

7.4.4.5.5 ATN DUAs that support AMHS shall support the ATN specific attribute **atn-mtcu-characteristics**.

Note.— The definition of the attribute atn-mtcu-characteristics is found in Section 7.5.3.5.

7.4.4.4.6 ATN DUAs shall support the ATN specific attribute **atn-PerCertificate**.

Note.— The definition of the attribute atn-PerCertificate is found in Section 7.5.3.6.

7.4.4.4.7 ATN DUAs shall support the ATN specific attribute **atn-DerCertificate**.

Note.— The definition of the attribute atn-DerCertificate is found in Section 7.5.3.7.

7.4.4.4.8 ATN DUAs that support AMHS shall support the ATN specific attribute **atn-amhs-direct-access**.

*Note.— The definition of the attribute atn-amhs-direct-access is found in Section 7.5.3.*8.

7.4.4.4.9 ATN DUAs shall support the ATN specific attribute **atn-facilityName**.

Note.— The definition of the attribute atn-facilityName is found in Section 7.5.3.9.

7.4.4.4.10 ATN DUAs shall support the ATN specific attribute **atn-aircraftIDName**.

Note.— The definition of the attribute atn-aircraftIDName is found in Section 7.5.3.10.

7.4.4.4.11 ATN DUAs shall support the ATN specific attribute **atn-version**.

Note.— The definition of the attribute atn-version is found in Section 7.5.3.11.

7.4.4.4.12 ATN DUAs that support AMHS shall support the ATN specific attribute **atn-amhs-extended-service-support**.

Note.— The definition of the attribute atn-amhs-extended-service-support is found in Section 7.5.3.12.

7.4.4.4.13 ATN DUAs that support AMHS shall support the ATN specific attribute **atn-global-domain-identifier**.

Note.— The definition of the attribute atn-global-domain-identifier is found in Section 7.5.3.13.

7.4.4.4.14 ATN DUAs that support AMHS shall support the ATN specific attribute **atn-icao-country-code**.

Note.— The definition of the attribute atn-icao-country-code is found in Section 7.5.3.14.

7.4.4.4.15 ATN DUAs shall support the ATN specific attribute **atn-ApplicationEntityName**.

Note.— The definition of the attribute atn-ApplicationEntityName is found in Section 7.5.3.15.

7.4.4.4.16 ATN DUAs shall support the ATN specific attribute **atn-Net**.

Note.— The definition of the attributes contained in the attribute atn-Net is found in Section 7.5.3.16.

7.5 DIRECTORY SYSTEM SCHEMA

Note.— The ATN directory schema includes the object class content rules, the directory schema operational object classes, directory schema operational attributes, and the Directory Information Tree (DIT).

7.5.1 Directory Object Class Content Rules

Note.— Section 7.4 specifies the required support of object classes and attributes for entries in the ATN DIR. This section specifies which attributes are required for each object class.

7.5.1.1 Tabular Description of Object Class Content

7.5.1.1.1 The ATN Directory shall consist of entries as defined by Table 7.5.1.1.1-1.

Note 1.— Table 7.5.1.1.1-1 presents in a tabular format the contents of each required of each object class defined in the ATN Directory Service. Section 7.5.1.2 presents the information using ASN.1 notation.

Note 2.— Table 7.5.1.1.1-1 presents both the static and dynamic requirements for object class contents. The static requirements are listed under the column "Implementation". This column summarizes the information found in Section 7.4 and should show whether an object class is either mandatory or optional and whether particular attribute types are either mandatory or optional. Within the "Data Population" column the attributes marked as mandatory correspond to the ASN.1 syntax as "MUST CONTAIN". Likewise, the attributes marked as optional correspond to the ASN.1 syntax as "MAY CONTAIN".

Note 3.— Each ATN specific object class is defined as a sub-class of a standard object class. The attributes from the standard object class are included in the depiction of the ATN specific object classes. Standard object classes that are subsumed by ATN specific object classes are not included in the table.

Note 4.— The inclusion of any additional standard object classes in an actual ATN DIR implementation is a local issue.

Table 7.5.1.1.1-1 ATN Object Class and Attribute Contents in the ATN Directory

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		Mand.	Opt.	Mand.	Opt.
alias	X.501	x			
aliasedEntryName	X.501	x		x	
applicationEntity	X.521	x			
commonName	X.520	x		x	
description	X.520	x			x
localityName	X.520		x		x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		Mand.	Opt.	Mand.	Opt.
organizationName	X.520	x			x
organizationalUnitName	X.520	x			x
presentationAddress	X.520	x		x	
seeAlso	X.520		x		x
supportedApplicationContext	X.520		x		x
applicationProcess	X.521	x			
commonName	X.520	x		x	
description	x.520	x			x
localityName	X.520		x		x
organizationalUnitName	X.520	x			x
seeAlso	X.520		x		x
atn-AmhsUser (subclass of mhsUser)	ATN 7.5.2.1	x			x
mhs-deliverable-content-length	X.402		x		x
mhs-deliverable-content-types	X.402		x		x
mhs-deliverable-eits	X.402		x		x
mhs-message-store-dn	X.402		x		x
mhs-or-addresses	X.402	x		x	
mhsPreferredDeliveryMethods	X.402		x		x
atn-PerCertificate	ATN 7.5.3.6	x			x
atn-DerCertificate	ATN 7.5.3.7	x			x
atn-extended-service-support	ATN 7.5.3.12	x		x	
atn-amhs-direct-access	ATN 7.5.3.8	x		x	
atn-AF-address	ATN 7.5.3.1	x			x
atn-Cidin-mcf	ATN 7.5.3.2	x			x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		**Mand.**	**Opt.**	**Mand.**	**Opt.**
atn-Ax-or-primary-Ax-address	ATN 7.5.3.3	x			x
atn-secondary-Ax-address	ATN 7.5.3.4	x			x
atn-ApplicationEntity (subclass of X.521 applicationEntity)	ATN 7.5.2.5	x			
commonName	X.520	x		x	
description	X.520	x			x
localityName	X.520		x		x
organizationName	X.520	x			x
organizationalUnitName	X.520	x			x8
presentationAddress	X.520	x		x	
seeAlso	X.520		x		x
supportedApplicationContext	X.520		x		x
atn-facilityName	ATN 7.5.3.9	x			x
atn-aircraftIDName	ATN 7.5.3.10	x			x
atn-PerCertificate	ATN 7.5.3.6	x			x
atn-DerCertificate	ATN 7.5.3.7	x			x
atn-version	ATN 7.5.3.11	x			x
atn-CertificationAuthority	ATN 7.5.2.6	x			
authorityRevocationList	X.509	x		x	
cACertificate	X.509	x		x	
certificateRevocationList	X.509	x		x	
commonName	X.520	x		x	
crossCertificatePair	X.520	x			
description	X.520	x			x
destinationIndicator	X.520	x			x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		Mand.	Opt.	Mand.	Opt.
facsimilieTelephoneNumber	X.520	x			x
localityName	X.520	x			x
organizationalUnitName	X.520	x			x
physicalDeliveryOfficeName	X.520	x			x
postOfficeBox	X.520	x			x
postalAddress	X.520	x			x
preferredDeliveryMethod	X.520	x			x
registeredAddress	X.520	x			x
roleOccupant	X.520	x			x
seeAlso	X.520	x			x
stateOrProvinceName	X.520	x			x
streetAddress	X.520	x			x
telexTerminalIdentifier	X.520	x			x
telexNumber	X.520	x			x
x121Address	X.520	x			x
mhs-deliverable-content-length	X.402		x		x
mhs-deliverable-eits	X.402		x		x
mhs-message-store-dn	X.402		x		x
mhs-or-addresses	X.402		x		x
mhsPreferredDeliveryMethods	X.402		x		x
mhs-deliverable-content-types	X.402		x		x
atn-DirectorySystemAgent	ATN 7.5.2.14	x			
commonName	X.520	x		x	
description	X.520	x			x
knowledgeInformation	X.520	x			x
localityName	X.520	x			x
organizationName	X.520	x			x
organizationalUnitName	X.520	x			x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		Mand.	Opt.	Mand.	Opt.
presentationAddress	X.520	x		x	
seeAlso	X.520	x			x
supportedApplicationContext	X.520	x			x
atn-PerCertificate	ATN 7.5.3.6	x		x	
atn-DerCertificate	ATN 7.5.3.7	x		x	
atn-Facility	ATN 7.5.2.11	x			
locality	X.520		x		x
country	X.520		x		x
atn-FacilityName	ATN 7.5.3.9	x		x	
atn-PerCertificate	ATN 7.5.3.6	x			x
atn-DerCertificate	ATN 7.5.3.7	x			x
atn-ApplicationEntityName	ATN 7.5.3.15	x			x
atn-Aircraft	ATN 7.5.2.10	x			
country	X.521		x		x
atn-AircraftIDName	ATN 7.5.3.17	x		x	
atn-PerCertificate	ATN 7.5.3.6	x			x
atn-DerCertificate	ATN 7.5.3.7	x			x
atn-ApplicationEntityName	ATN 7.5.3.15	x			x
atn-OrganizationalUnit (subclss of organizationalUnit)	ATN 7.5.2.2	x			
businessCategory	X.520	x			x
description	X.520	x		x	
destinationIndicator	X.520		x		x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		Mand.	Opt.	Mand.	Opt.
facsimileTelephoneNumber	X.520	x			x
internationalISDNNumber	X.520		x		x
localityName	X.520	x		x	
organizationalUnitName	X.520	x		x	
physicalDeliveryOfficeName	X.520	x			
postalAddress	X.520	x			
postalCode	X.520	x			x
postOfficeBox	X.520	x			x
preferredDelivery	X.520		x		x
registeredAddress	X.520		x		x
searchGuide	X.520		x		x
seeAlso	X.520	x			x
stateOrProvinceName	X.520	x			x
streetAddress	X.520	x			x
telephoneNumber	X.520	x			x
teletexTerminalIdentifier	X.520		x		x
telexNumber	X.520		x		x
userPasssword	X.520		x		x
x121Address	X.520		x		x
atn-facilityName	ATN 7.5.3.9	x		x	
atn-version	ATN 7.5.3.11	x			x
atnPerCertificate	ATN 7.5.3.6	x			x
atnDerCertificate	ATN 7.5.3.7	x			x
atn-Organization (subclass of organization)	ATN 7.5.2.15	x			
businessCategory	X.520	x			x
description	X.520	x		x	

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		**Mand.**	**Opt.**	**Mand.**	**Opt.**
destinationIndicator	X.520		x		x
facsimileTelephoneNumber	X.520	x			x
internationalISDNNumber	X.520		x		x
localityName	X.520	x		x	
organizationalName	X.520	x		x	
physicalDeliveryOfficeName	X.520	x			
postalAddress	X.520	x			
postalCode	X.520	x			x
postOfficeBox	X.520	x			x
preferredDelivery	X.520		x		x
registeredAddress	X.520		x		x
searchGuide	X.520		x		x
seeAlso	X.520	x			x
stateOrProvinceName	X.520	x			x
streetAddress	X.520	x			x
telephoneNumber	X.520	x			x
teletexTerminalIdentifier	X.520		x		x
telexNumber	X.520		x		x
userPasssword	X.520		x		x
x121Address	X.520		x		x
atn-facilityName	ATN 7.5.3.9	x		x	
atn-version	ATN 7.5.3.11	x			x
atnPerCertificate	ATN 7.5.3.6	x			x
atnDerCertificate	ATN 7.5.3.7	x			x
atn-AmhsDistributionList (subclass of distributionList)	ATN 7.5.2.7	x			
commonName	X.402	x			x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		**Mand.**	**Opt.**	**Mand.**	**Opt.**
description	X.402	x			x
mhs-deliverable-content-types	X.402	x			x
mhs-deliverable-eits	X.402	x			x
mhs-dl-submit-permissions	X.402	x			x
mhs-or-addresses	X.402	x			x
mhs-PreferredDeliveryMethods	X.402	x			x
Organization	X.402	x			x
organizationalUnitName	X.402	x			x
owner	X.402	x			x
seeAlso	X.402	x			x
atn-amhs-extended-service-support	ATN 7.5.3.13	x		x	
atn-PerCertificate	ATN	x			x
atn-DerCertificate	ATN	x			x
atn-Cidin-mcf	ATN	x			x
atn-AF-address	ATN	x			x
atn-Ax-or-primary-Ax-address	ATN	x			x
atn-AmhsUserAgent (subclass of MHS User Agent)	ATN 7.5.2.8	x			
commonName	X.402	x		x	
presentationAddress	X.402	x		x	
description	X.402	x			x
localityName	X.402	x			x
organizationName	X.402	x			x
organizationalUnitName	X.402	x			x
seeAlso	X.402	x			x
supportedApplicationContext	X.402	x			x
owner	X.402	x			x
mhs-deliverable-content-length	X.402	x			x
mhs-deliverable-content-types	X.402	x			x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		**Mand.**	**Opt.**	**Mand.**	**Opt.**
mhs-deliverable-eits	X.402	x			x
mhs-or-addresses	X.402	x			x
mhsUndeliverableEITS	X.402	x			x
atn-amhs-extended-service-support	ATN 7.5.3.13	x		x	
atn-AmhsGateway (subclass of atn-applicationEntity)	ATN 7.5.2.9	x			
commonName	X.520	x		x	
description	x.520	x			x
localityName	X.520		x		x
organizationName	X.520	x			x
organizationalUnitName	X.520	x			x
presentationAddress	X.520	x		x	
seeAlso	X.520		x		x
supportedApplicationContext	X.520		x		x
atn-facilityName	ATN 7.5.3.8	x			x
atn-aircraftIDName	ATN 7.5.3.9	x			x
atn-PerCertificate	ATN 7.5.3.6	x			x
atn-DerCertificate	ATN 7.5.3.7	x			x
atn-version	ATN 7.5.3.11				
owner	X.402	x		x	
mhs-deliverable-content-types	X.402	x		x	
protocolInformation	X.402	x		x	
mhs-deliverable-classes	X.402	x		x	
atn-mtcu-characteristics	ATN	x		x	
atn-Ax-or-primary-Ax-address	ATN	x			x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		**Mand.**	**Opt.**	**Mand.**	**Opt.**
atn-AF-address	ATN 7.5.3.1	x			x
atn-OrganizationalPerson (subclass of X.521 organizationalPerson)	ATN 7.5.2.3	x			
businessCategory	X.520	x			x
commonName	X.520	x			x
description	X.520	x			x
destinationIndicator	X.520		x		x
facsimileTelephoneNumber	X.520	x			x
internationalISDNNumber	X.520	x			x
locatlityName	X.520	x		x	
organizationalUnitName	X.520	x		x	
physicalDeliveryOfficeName	X.520	x		x	
postalAddress	X.520	x		x	
postalCode	X.520	x		x	
postOfficeBox	X.520	x		x	
preferredDeliveryMethod	X.520	x		x	
registeredAddress	X.520		x		x
seeAlso	X.520	x			x
stateOrProvinceName	X.520	x		x	
streetAddress	X.520	x		x	
surname	X.520	x		x	
telephoneNumber	X.520	x		x	
teletexTerminalIdentifier	X.520		x		x
telexNumber	X.520	x			x
atn-facilityName	ATN 7.5.3.9	x		x	
title	X.520	x		x	
uniqueIdentifier	X.520		x		x
userPassword	X.520	x			x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		**Mand.**	**Opt.**	**Mand.**	**Opt.**
x121Address	X.520		x		x
mhsORAddressWithCapabilities		x			
mhs-deliverable-content-length	X.402		x		x
mhs-deliverable-content-types	X.402		x		x
mhs-deliverable-eits	X.402		x		x
mhs-message-store-dn	X.402		x		x
mhs-or-addresses	X.402	x			x
mhsPreferredDeliveryMethods	X.402		x		x
mhsUndeliverableEITS	X.402		x		x
atnPerCertificate	ATN 7.5.3.6	x			x
atnDerCertificate	ATN 7.5.3.7	x			x
generationQualifier	X.520		x		x
givenName	X.520		x		x
initials	X.520		x		x
atn-OrganizationalRole (subclass of X.521 organizationalRole)	ATN 7.5.2.4	x			
commonName	X.520	x		x	
description	X.520	x			x
destinationIndicator	X.520		x		x
facsimilieTelephoneNumber	X.520	x			x
localityName	X.520		x		x
internationalISDNNumber	X.520		x		x
stateOrProvinceName	X.520		x		x
streetAddress	X.520		x		x
organizationalUnitName	X.520	x			x
physicalDeliveryOfficeName	X.520		x		x
postOfficeBox	X.520		x		x
postalAddress	X.520		x		x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		Mand.	Opt.	Mand.	Opt.
postalCode	X.520		x		x
preferredDeliveryMethod	X.520		x		x
registeredAddres	X.520		x		x
roleOccupant	X.520	x			x
seeAlso	X.520	x			x
telephoneNumber	X.520	x		x	
teletexTerminalIdentifier	X.520		x		x
telexNumber	X.520		x		x
x121Address	X.520		x		x
atn-facilityName	ATN 7.5.3.9	x		x	
atn-PerCertificate	ATN 7.5.3.6	x			x
atn-DerCertificate	ATN 7.5.3.7	x			x
mhs-deliverable-content-length	X.402		x		x
mhs-deliverable-content-types	X.402		x		x
mhs-deliverable-eits	X.402		x		x
mhs-message-store-dn	X.402		x		x
mhs-or-address	X.402	x			x
mhsPreferredDeliveryMethods	X.402		x		x
mhsUndeliverableEITS	X.402		x		x
atn-AmhsMD	ATN 7.5.2.12	x			
atn-global-domain-identifier	ATN 7.5.3.14	x		x	
atn-icao-country-code	7.5.3.15	x		x	
atn-IdrpRouter (subclass of device)	ATN 7.5.2.13	x		x	
commonName	X.520	x		x	
description	X.520	x			x
localityName	X.520		x		x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		**Mand.**	**Opt.**	**Mand.**	**Opt.**
organizationName	X.520	x			x
organizationalUnitName	X.520	x			x
owner	X.520	x			x
seeAlso	X.520		x		x
serialNumber	X.520		x		x
atn-Net	ATN 7.5.3.16	x		x	
atnPerCertificate	ATN 7.5.3.6	x			x
atnDerCertificate	ATN 7.5.3.7	x			x
atn-Version	ATN 7.5.3.11	x			x
country	X.521	x			
countryName	X.520	x		x	
description	X.520		x		x
searchGuide	X.520		x		x
device	X.521	x			
commonName	X.520	x		x	
description	X.520	x			x
localityName	X.520		x		x
organizationName	X.520	x			x
organizationalUnitName	X.520	x			x
owner	X.520	x			x
seeAlso	X.520	x			x
serialNumber	X.520	x			x
dsa	X.521	x			
commonName	X.520	x		x	
description	X.520	x			x
knowledgeInformation	X.520		x		x
localityName	X.520		x		x

Object Class	Source	Implementation Specified in 7.4		Data Population Specified by ASN.1	
Attribute		**Mand.**	**Opt.**	**Mand.**	**Opt.**
organizationName	X.520		x		x
organizationalUnitName	X.520		x		x
presentationAddress	X.520		x		x
seeAlso	X.520		x		x
supportedApplicationContext	X.520	x			x
groupOfNames	X.521	x			
businessCategory	X.520	x			x
commonName	X.520	x		x	
member	X.520	x		x	
description	X.520	x			x
organizationName	X.520	x			x
organizationalUnitName	X.520	x			x
owner	X.520	x			x
seeAlso	X.520		x		x
locality	X.521	x			
description	X.520		x		x
localityName	X.520	x			x
searchGuide	X.520		x		x
seeAlso	X.520		x		x
stateOrProvinceName	X.520	x			x
streetAddress	X.520	x			x

7.5.2 ASN.1 Notation of Object Class Definitions

7.5.2.1 The ATN specific object class **atn-AmhsUser** shall be defined by the ASN.1 syntax:

```
atn-AmhsUser        OBJECT-CLASS        ::=     {
                    SUBCLASS OF         {mhs-User}
                    MUST CONTAIN        {atn-amhs-extended-service-support|
                                        atn-amhs-direct-access }
                    MAY CONTAIN         {atn-PerCertificate |
                                        atn-DerCertificate |
```

```
                                    atn-AF-address |
                                    atn-Cidin-mcf |
                                    atn-Ax-or-primary-Ax-address |
                                    atn-Ax-secondary-address
                                    }
                        ID          id-oc-atn-AmhsUser }
```

7.5.2.2 The ATN specific object class **atn-OrganizationalUnit** shall be defined by the ASN.1 syntax:

```
atn-OrganizationalUnit  OBJECT-CLASS    ::=     {
                        SUBCLASS OF     {OrganizationalUnit}
                        MUST CONTAIN    {}
                        MAY CONTAIN     {atn-PerCertificate |
                                        atn-DerCertificate |
                                         atn-facilityName |
                                        atn-version}
                        ID              id-oc-atn-OrganizationalUnit }
```

7.5.2.3 The ATN specific object class **atn-OrganizationalPerson** shall be defined by the ASN.1 syntax:

```
atn-OrganizationalPerson  OBJECT-CLASS    ::=     {
                          SUBCLASS OF     {organizationalPerson}
                          MUST CONTAIN    {atn-facilityName}
                          MAY CONTAIN     {atn-PerCertificate |
                                          atn-DerCertificate }
                          ID              id-oc-atn-OrganizationalPerson }
```

7.5.2.4 The ATN specific object class **atn-OrganizationalRole** shall be defined by the ASN.1 syntax:

```
atn-OrganizationalRole  OBJECT-CLASS    ::=     {
                        SUBCLASS OF     {OrganizationalRole}
                        MUST CONTAIN    {atn-facilityName}
                        MAY CONTAIN     {atn-PerCertificate  |
                                        atn-DerCertificate}
                        ID              id-oc-atn-OrganizationalRole }
```

7.5.2.5 The ATN specific object class **atn-ApplicationEntity** shall be defined by the ASN.1 syntax:

```
atn-ApplicationEntity   OBJECT-CLASS    ::=     {
                        SUBCLASS OF     {applicationEntity}
                        MUST CONTAIN    {}
                        MAY CONTAIN     {atn-PerCertificate   |
                                        atn-DerCertificate    |
```

```
                                    atn-facilityName |
                                    atn-aircraftIDName |
                                    atn-version}
                        ID          id-oc-atn-application }
```

7.5.2.6 The ATN specific object class **atn-CertificationAuthority** shall be defined by the ASN.1 syntax.

```
atn-CertificationAuthority  OBJECT-CLASS    ::=     {
                            SUBCLASS OF     {certificationAuthority}
                            MUST CONTAIN    {}
                            MAY CONTAIN     {atn-PerCertificate |
                                            atn-DerCertificate}
                            ID              id-oc-atn-certificationAuthority}
```

7.5.2.7 The ATN specific object class **atn-AmhsDistributionList** shall be defined by the ASN.1 syntax:

```
atn-AmhsDistributionList    OBJECT-CLASS    ::=     {
                            SUBCLASS OF     {mhs-distributionList}
                            MUST CONTAIN    {atn-amhs-extended-service-support}
                            MAY CONTAIN     {atn-PerCertificate |
                                            atn-DerCertificate |
                                            atn-Cidin-mcf |
                                            atn-Ax-or-primary-Ax-address}
                            ID              id-oc-atn-AmhsDistributionList}
```

7.5.2.8 The ATN specific object class **atn-AmhsUserAgent** shall be defined by the ASN.1 syntax:

```
atn-AmhsUserAgent           OBJECT-CLASS    ::=     {
                            SUBCLASS OF     {Mhs-UserAgent}
                            MUST CONTAIN    {atn-amhs-extended-service-support}
                            MAY CONTAIN     {}
                            ID              id-oc-atn-AmhsUserAgent}
```

7.5.2.9 The ATN specific object class **atn-AmhsGateway** shall be defined by the ASN.1 syntax:

```
atn-AmhsGateway             OBJECT-CLASS    ::=     {
                            SUBCLASS OF     {atn-application-entity}
                            MUST CONTAIN    {owner |
                                            mhs-deliverable-content-types |
                                            protocolInformation |
                                            mhs-deliverable-classes |
                                            mhs-or-addresses |
                                            atn-amhs-extended-service-support |
                                            atn-mtcu-characteristics}
```

```
                                MAY CONTAIN     {atn-Ax-or-primary-Ax-address |
                                                atn-AF-address}
                                ID              id-oc-atn-AmhsGateway }
```

7.5.2.10 The ATN specific object class **atn-Aircraft** shall be defined by the ASN.1 syntax:

```
atn-Aircraft                    OBJECT-CLASS    ::=     {
                                SUBCLASS OF     {top}
                                MUST CONTAIN    {}
                                MAY CONTAIN     {atn-PerCertificate}
                                ID              id-dir-atn-Aircraft  }
```

7.5.2.11 The ATN specific object class **atn-Facility** shall be defined by the ASN.1 syntax:

```
atn-Facility                    OBJECT-CLASS    ::=     {
                                SUBCLASS OF     {top}
                                MUST CONTAIN    {}
                                MAY CONTAIN     {atn-PerCertificate    |
                                                atn-DerCertificate     |
                                                atn-facilityName       |
                                                atn-ApplicationEntityName}
                                ID              id-oc-atn-Facility  }
```

7.5.2.12 The ATN specific object class **atn-AmhsMD** shall be defined by the ASN.1 syntax:

```
atn-AmhsMD                      OBJECT-CLASS    ::=     {
                                SUBCLASS OF     {top}
                                MUST CONTAIN    {atn-Global-domain-identifier |
                                                atn-Icao-country-code}
                                MAY CONTAIN     {}
                                ID              id-dir-atn-amhsMD}
```

7.5.2.13 The ATN specific object class **atn-IdrpRouter** shall be defined by the ASN.1 syntax:

```
atn-IdrpRouter                  OBJECT-CLASS    ::=     {
                                SUBCLASS OF     {device}
                                MUST CONTAIN    {atn-net |
                                                atn-Per-certificate |
                                                atn-Version}
                                MAY CONTAIN     {}
                                ID              id-oc-dir-atn-idrpRouter}
```

7.5.2.14 The ATN specific object class **atn-DirectorySystemAgent** shall be defined by the ASN.1 syntax:

```
atn-DirectorySystemAgent        OBJECT-CLASS    ::=     {
```

```
                        SUBCLASS OF     {DirectorySystemAgent}
                        MUST CONTAIN    {atn-PerCertificate |
                                        atn-Der-certificate |
                                        atn-Version}
                        MAY CONTAIN     {}
                        ID              id-oc-dir-atn-DirectorySystemAgent}
```

7.5.2.15 The ATN specific object class **atn-Organization** shall be defined by the ASN.1 syntax:

```
atn-Organization        OBJECT-CLASS    ::=     {
                        SUBCLASS OF     {Organization}
                        MUST CONTAIN    {atn-facility}
                        MAY CONTAIN     {atn-Per-certificate |
                                        atn-DerCertificate  |
                                        atn-Version}
                        ID              id-oc-dir-atn-Organization}
```

7.5.3 ASN.1 Notation of ATN Specific Attribute Types

7.5.3.1 The ATN specific attribute **atn-AF-address** shall be defined by the ASN.1 syntax:

```
atn-AF-address          ATTRIBUTE   ::=     {
        WITH SYNTAX     PrintableString(SIZE(8))
        SINGLE VALUE    TRUE
        ID              id-at-atn-AF-address}
```

7.5.3.2 The ATN specific attribute **atn-Cidin-mcf** shall be defined by the ASN.1 syntax:

```
atn-Cidin-mcf           ATTRIBUTE   ::=     {
        WITH SYNTAX     INTEGER {

                        opmsg (1),
                        aftn (2),
                        opmet (3),
                        ...}
        SINGLE VALUE    TRUE
        ID              id-at-atn-Cidin-mcf}
```

7.5.3.3 The ATN specific attribute **atn-Ax-or-primary-Ax-address** shall be defined by the ASN.1 syntax:

```
atn-Ax-or-primary-Ax-address            ATTRIBUTE   ::=     {
        WITH SYNTAX     PrintableString(SIZE(5..8))
        SINGLE VALUE    TRUE
        ID              id-at-atn-Ax-or-primary-Ax-address}
```

7.5.3.4 The ATN specific attribute **atn-secondary-Ax-address** shall be defined by the ASN.1 syntax:

```
atn-Ax-address          ATTRIBUTE   ::=     {
        WITH SYNTAX     PrintableString(SIZE(5..8))
        SINGLE VALUE    TRUE
        ID              id-at-atn-secondary-Ax-address}
```

7.5.3.5 The ATN specific attribute **atn-mtcu-characteristics** shall be defined by the ASN.1 syntax:

```
atn-Ax-address          ATTRIBUTE   ::=     {
        WITH SYNTAX     atnMtcuCharacteristics
        SINGLE VALUE    FALSE
        ID              id-at-atn-mtcu-characteristics}

atnMtcuCharacterisitics::=SEQUENCE {
        atn-mtcu-type                                   MTCUtype,
        atn-mcf-type                                    MCFtype  OPTIONAL,
        atn-mtcu-max-text-message-size                  INTEGER,
        atn-mtcu-max-binary-message-size                INTEGER OPTIONAL,
        atn-mtcu-max-message-recipient-number INTEGER,
        mhs-exclusively-acceptable-eits                 EncodedInformationTypes}
MCFtype::=INTEGER {
        opmsg (1),
        aftn (2),
        opmet (3),
        ...}
MTCUtype::=INTEGER {
        basic-ATS-message-service-aftn          (0),
        extended-ATS-message-service-aftn       (1),
        cidin                                   (2) }
```

7.5.3.6 The ATN specific attribute **atnPerCertificate** shall be the PER encoded certificate defined by the ASN.1 syntax:

```
atn-PerCertificate      ATTRIBUTE   ::=     {
                        WITH SYNTAX         {atn-Certificate
                        ID                  id-dir-atn-PerCertificate}
```

Note 1.— The definition of the attribute atn-Certificate is found in Sub-Volume 8.

Note 2.— The definition of atn-PerCertificate indicates the specific encoding of the atn-Certificate using Packed Encoding Rules.

7.5.3.7 The ATN specific attribute **atnDerCertificate** shall be the DER encoded certificate defined by the ASN.1 syntax:

```
atn-DerCertificate      ATTRIBUTE   ::=     {
                        WITH SYNTAX         {atn-Certificate
                        ID                  id-dir-atn-DerCertificate}
```

Note 1.— The definition of the attribute atn-Certificate is found in Sub-Volume 8.

Note 2.— The definition of atn-DerCertificate indicates the specific encoding of the atn-Certificate using Distinguished Encoding Rules.

7.5.3.8 The ATN specific attribute **atn-amhs-direct-access** shall be defined by the ASN.1 syntax:

```
atn-amhs-direct-access  ATTRIBUTE   ::=     {
                        WITH SYNTAX         BOOLEAN
                        ID                  id-at-atn-amhs-direct-access}
```

7.5.3.9 The ATN specific attribute **atn-facilityName** shall be defined by the ASN.1 syntax:

```
atn-facilityName        ATTRIBUTE   ::=     {
                        WITH SYNTAX         PrintableString(SIZE(3..8))
                        ID                  id-at-atn-facilityName}
```

7.5.3.10 The ATN specific attribute **atn-aircraftIDName** shall be defined by the ASN.1 syntax:

```
atn-aircraftIDName      ATTRIBUTE   ::=     {
                        WITH SYNTAX         INTEGER(0..2**24-1)
                        ID                  id-at-atn-facilityName}
```

7.5.3.11 The ATN specific attribute **atn-Version** shall be defined by the ASN.1 syntax:

```
atn-Version             ATTRIBUTE   ::=     {
                        WITH SYNTAX         INTEGER
                        ID                  id-at-atn-version}
```

7.5.3.12 The ATN specific attribute **atn-extended-service-support** shall be defined by the ASN.1 syntax:

```
atn-extended-service-support  ATTRIBUTE   ::=     {
                              WITH SYNTAX         BOOLEAN
                              ID                  id-at-atn-extended-service-support}
```

7.5.3.13 The ATN specific attribute **atn-global-domain-identifier** shall be defined by the ASN.1 syntax:

```
atn-global-domain-identifier  ATTRIBUTE   ::=     {
                              WITH SYNTAX         GlobalDomainIdentifier
                              ID                  id-at-amhs-global-domain-identifier}
```

```
GlobalDomainIdentifier          ::=     SEQUENCE {
                country-name                    CountryName,
                administration-domain-name      AdministrationDomainName
                private-domain-name             PrivateDomainName     OPTIONAL}

CountryName                     ::=     CHOICE {
                x121-dcc-code           NumericString(SIZE(ub-country-name-numeric-length)),
                iso-3166-alpha2-code    PrintableString(SIZE(ub-country-name-alpha-length))}

AdministrationDomainName        ::=     CHOICE {
                numeric         NumericString(SIZE(0..ub-domain-name-length)),
                printable               PrintableString(SIZE(1..ub-domain-name-length))}

PrivateDomainName               ::=     CHOICE {
                numeric                 NumericString(SIZE(1..ub-domain-name-length)),
                printable       ::=     PrintableString(SIZE(1..ub-domain-name-length))}
```

7.5.3.14 The ATN specific attribute **atn-icao-country-code** shall be defined by the ASN.1 syntax:

```
atn-icao-country-code           ATTRIBUTE   ::=     {
                                WITH SYNTAX         PrintableString(SIZE(1..3))
                                ID                  id-at-atn-icao-country-code}
```

7.5.3.15 The ATN specific attribute **atn-ApplicationEntityName** shall be defined by the ASN.1 syntax:

```
atn-ApplicationEntityName       ATTRIBUTE   ::=     {
                                WITH SYNTAX         PrintableString(SIZE(3..8))
                                ID                  id-at-atn-ApplicationEntityName}
```

7.5.3.16 The ATN specific attribute **atn-Net** shall be defined by the ASN.1 syntax:

```
atn-Net                         ATTRIBUTE   ::=     {
                                WITH SYNTAX         PrintableString(SIZE(1..19))
                                ID                  id-at-atn-Net}
```

7.5.4 Specific DIT Structure for Operational Information

Note.— This Section only deals with aspects of the DIT structure concerning administrative and operational information. The form of the DIT that is relevant for administrative entries and subentries and required by the administrative and naming authorities responsible for a given region/domain/subtree is specified with the help of :

- *the Name forms, which define which attributes are used to form the RDN of a subentry*
- *implicit DIT structure rules, which define the hierarchical relationship of administrative entries and subentries.*

7.5.4.1 Name Forms

7.5.4.1.1 DSAs shall support the subentry NameForm as described in ISO/IEC ISP 15126-2, Section A.6.5.1.1.

Note.— Support of this name form by a DSA means that all of the following conditions are fulfilled:

a) the DSA supports the named object class as described in ISO/IEC ISP 15126-2, Section 7.1.

b) the DSA is able to create a subentry of a specified object class, the RDN of which contains all mandatory attributes and zero of more of the optional attributes indicated in the name form.

Ref. No.	Name Form	Base	ISP	ATN Directory	Note
1	subentryNameForm	o	m	m	

7.5.5 Operational Content of Entries and Subentries

7.5.5.1 Object Classes

7.5.5.1.1 ATN DSAs shall conform to the object class definition in ISO/IEC 9594-7 as generally specified in ISO/IEC ISP 15126-2 Section 7.1 and Section A.6.4.1.1 and refined in Table 7.5.5.1.1-1.

Note.— Table 7.5.3.1.1-1 is structured as a PRL derived from the profile specification included in the ISP PICS Proforma found in ISO/IEC ISP 15125-2 (FDY 12). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-2, and the column "ATN DSA" specifies the capability of a DSA to be able to store, modify, and retrieve, via Directory operations, a subentry of its fragment of the DIT, if the subentry is associated with supported object classes.

Table 7.5.5.1.1-1 Operational Content Object Classes from ISO/IEC 9546-7

Ref. No.	Attrribute Type	Base	ISP	ATN DSA	Notes
1	subentry	m	c6	m	
2	subschemaSubentry	o	c3	m	
3	collectiveAttributeSubentry	o	c4	o	
4	accessControlSubentry	o	c5	o	

Note.— Conditional c3: if p_subschema then m else o
c4: if p_collectiveAttr then m else o
c5: if p_AccessControl then m else o
c6: if p_subschema OR P-collectiveAttr OR p_AccessControl then m else o

7.5.5.2 Operational Attributes

7.5.5.2.1 ATN DSAs shall conform to the requirements for checking of attribute contents as described in ISO/IEC ISP 15126-2, Section 7.2.

7.5.5.2.2 Standard Attribute Types

Note 1.— There are several varieties of operational attributes depending on the type of entry to which they belong and their role in the DSA operation.

Note 2.— Some operational attributes do not correspond to directory entries.

7.5.5.2.2.1 ATN DSAs shall support the attribute types defined in ISO/IEC 9594-7 as generally specified in ISO/IEC ISP 15126-2, Section A.6.4.2.1 and refined in Table 7.5.5.2.2.1-1.

Note.— Table 7.5.5.2.2.1-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15126-2 (FDY 12). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-2, and the column "ATN DSA" specifies the static capability of a DSA to support these attributes in directory operations.

Table 7.5.5.2.2.1-1 ISO/IEC 9594-7 Standard Attribute Types

Ref. No.	Attrribute Type	Base	ISP	ATN DSA	Note
1	createTimeStamp	m	m	m	directoryOperation
2	modifyTimeStamp	o	m	m	directoryOperation
3	creatorsName	o	m	m	directoryOperation
4	modifiersName	o	m	m	directoryOperation
5	administrativeRole	o	c6	m	directoryOperation
6	subtreeSpecification	o	m	m	directoryOperation
7	collectiveExclusions	o	c5	o	directoryOperation
8	dITStructureRules	o	c4	m	directoryOperation

9	dITContentRules	o	c4	m	directoryOperation
10	matchingRules	o	c4	m	directoryOperation
11	attributeTypes	o	c3	m	directoryOperation
12	objectClasses	o	c3	m	directoryOperation
13	nameForms	o	c3	m	directoryOperation
14	matchingRuleUse	o	c3	m	directoryOperation
15	structuralObjectClass	o	o	o	directoryOperation
16	governingStructureRule	o	o	o	directoryOperation
17	accessControlScheme	o	c5	m	directoryOperation
18	prescriptiveACI	o	c5	m	directoryOperation
19	entryACI	o	c5	m	directoryOperation
20	subentryACI	o	c5	m	directoryOperation
21	dseType	o	m	m	dSAOperation
22	myAccessPoint	o	o	o	dSAOperation
23	superiorKnowledge	o	m	m	distributedOperation
24	specificKnowledge	o	m	m	distributedOperation
25	nonSpecificKnowledge	o	o	o	distributedOperation
26	supplierKnowledge	o	c7	o	dSAOperation
27	consumerKnowledge	o	c7	o	dSAOperation
28	secondaryShadows	o	c7	o	dSAOperation

Note.— Conditional *c3: if p_subschema then m else o*
c4: if p_collectiveAttr then m ele o
c5: if p_AccessControl then m else o
c6: if p_subschema OR p_collectiveAttr OR p_AccessControl then m else o
c7: if p_shadow then m else o

7.5.3.2.1.1 Operational Attributes of an Administrative Entry

Note.— Unlike a subentry, which is a special kind of entry, an administrative entry is not a special kind of entry. It is an entry holding an ***administrativeRole*** *attribute. However, some operational attributes may only be held by administrative entries. These attributes are not associated with any object class.*

7.5.5.2.2.2 Operational Attributes of a Subentry

Note 1.— The operational attributes of a subentry are used in conjunction with the standard object classes for subentries specified in Section 7.5 as either mandatory or optional attributes.

Note 2.— The operational attributes associated with an object class are:

Operational Attribute	*Associated Object Class*
subTreeSpecification	*subentry*
diTStructureRule	*subschema*
nameForms	*subschema*
diTContentRules	*subschema*
objectClasses	*subschema*
attributeTypes	*subschema*
matchingRules	*subschema*
matchingRulesUse	*subschema*

Note 3.— Other operational attributes of a subentry are not explicitly associated with an object class. These are:

- *prescriptiveACI*
- *entryACI*
- *createTimeStamp*
- *modifyTimeStamp*

7.5.5.2.2.3 Operational Attributes of an Entry

Note.— These attributes are not associated with any object class and are specified in Section 7.5 as either mandatory or optional attributes.

- *createTimeStamp*
- *modifyTimeStamp*
- *creatorsName*
- *modifiersName*
- *collectiveExclusions*
- *structuralObjectClass*
- *governingStructureRule*
- *entryACI*

7.5.6 Content Rules for the Directory System Schema

7.5.6.1 ATN DSAs shall conform to ISO/IEC ISP 15126-2, Section 7.3.

7.5.7 ATN Directory Information Tree (DIT) Structure

Note.— The form of the DIT required by the ATN administrative and naming authorities responsible for a given State or Region is specified with the help of :

- *Name forms, which define which attributes are used to form the RDN of an entry, and*
- *DIT structure rules, which define the hierarchical relationship of entries.*

7.5.7.1 ATN DSAs shall support the name forms specified in ISO/IEC ISP 15126-1 Section A.6.5.1.1 and refined in Table 7.5.7.1-1.

Note.— Table 7.5.7.1-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DSA" specifies the static capability of a DSA to support these attributes in directory operations.

Table 7.5.7.1-1 ATN Name Forms

Ref. No.	Name Form	Base	ISP	ATN DSA
1	countryNameForm	o	c8	m
2	locNameForm	o	m	m
3	sOPNameForm	o	m	m
4	orgNameForm	o	m	m
5	orgUnitNameForm	o	m	m
6	personNameForm	o	m	m
7	orgPersonNameForm	o	m	m
8	orgRoleNameForm	o	m	m
9	gONNameForm	o	m	m
10	resPersonNameForm	o	m	o
11	applProcessNameForm	o	m	m
12	applEntityNameForm	o	m	m
13	dSANameForm	o	m	m
14	deviceNameForm	o	m	m

Note.— Conditional c8: if p_firstlevel then m else o.

7.5.7.2 ATN DSAs shall support the DIT structure found in Table 7.5.7.2-1.

Table 7.5.7.2-1 ATN DIT Structure

Structure Element	Structural Object Class	Superior Structural Element	Naming Attribute	Notes
0	root	-		
1	country	0	countryName	
2	organization	0,1	organizationName	
3	organizationalUnit	2	organizationalUnitName	
4	applicationProcess	2,3,9,10	commonName	
5	applicationEntity	2,3,4,9,10	commonName	
6	atn-ApplicationEntity	2,3,4,9,10	commonName	7.5.2.5
7	atn-CertificationAuthority	2	commonName	7.5.2.6
8	atn-DirectorySystemAgent	2,3,9	commonName	7.5.2.14
9	atn-Facility	2,3	atn-FacilityName	7.5.2.11
10	atn-Aircraft	1,2	atn-AircraftID	7.5.1.1.10
11	atn-AmhsUser	1,2,9,12, 13,17	mhs-or-addresses	7.5.2.1
12	atn-OrganizationalUnit	2	organizationalUnitName	7.5.2.2
13	atn-Organization	0,1	organizationName	7.5.2.15
14	atn-DistributionList	1,2,9,12, 13,17	commonName	7.5.2.7
15	atn-AmhsUserAgent	2,3,9,11,1 2,13,18, 19	commonName	7.5.2.8
16	atn-AmhsGateway	1,2,9,13, 17	commonName	7.5.2.9

17	atn-AmhsMD	1,2,13	atn-global-domain-identifier	7.5.2.12
18	atn-organizationPerson	2,3,9,10	commonName	7.5.2.3
19	atn-organizationRole	2,3,9	commonName	7.5.2.4
20	atn-IdrpRouter	2,3,9,10	commonName	7.5.2.13
21	device	2,3,9,10	commonName	

7.5.7.2 ATN DSAs shall support the DIT structure found in Figure 7.5.7.2-1 and Figure 7.5.7.2-2.

7.5.7.3 In the event of a conflict between the actions implied by the figures and the table above, the table shall take precedence.

Figure 7.5.7.2-1 Root Level DIT Strucure

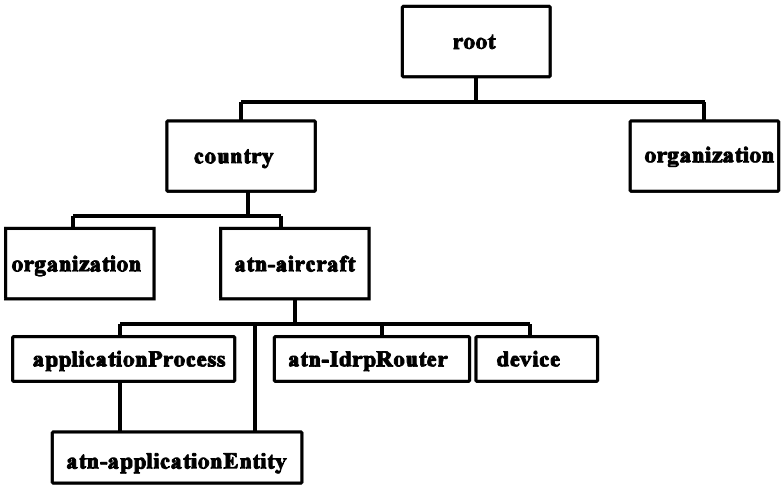
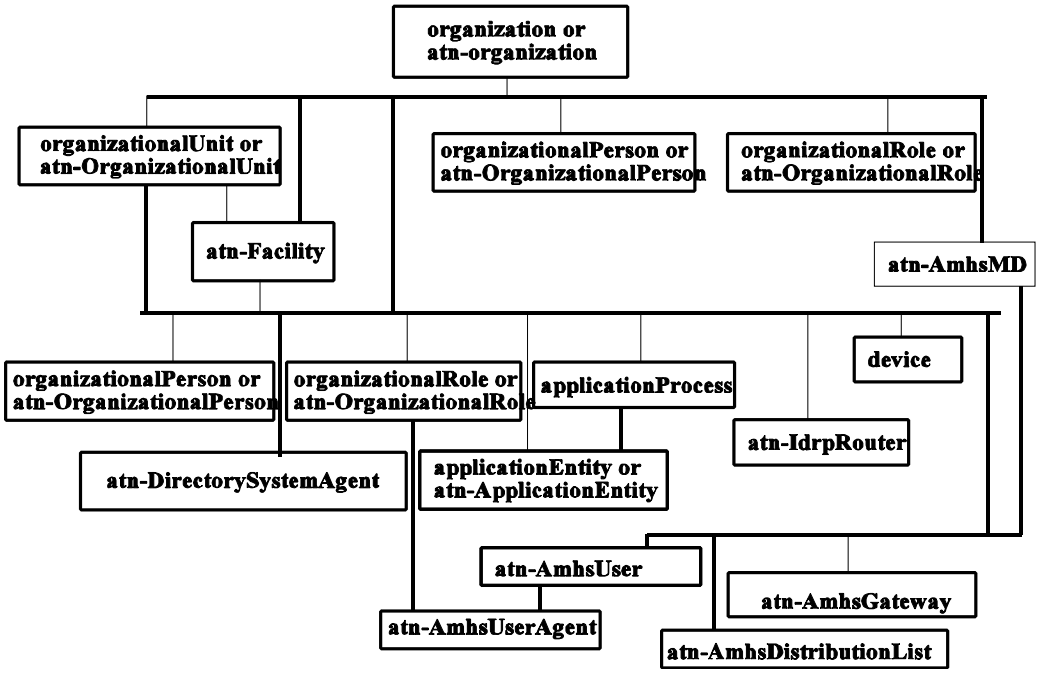


Figure 7.5.7.2-2. Organization DIT Structure



7.5.8 ATN Directory Matching Rules

7.5.8.1 Matching Directory Strings for Equality and Substring

7.586.1.1 Two strings shall match for equality or substring, using a specified matching rule, if and only if:

a) they satisfy the syntax specified for the matching rule,
b) they are identical when semantically compared name-by-name for each graphic character in the strings, subject to rules relating to
   - handling of initial, middle, and final spaces,
   - case, if supported by the used character repertoire,

   as defined for the corresponding matching rule.

7.5.6.1.2 The matching of two strings that contain (unknown) characters in an unsupported character set shall be subject to local options.

7.5.6.1.3 The following character set specific rules shall apply:

Note.— These rules apply for TeletexStrings, BMPStrings, and UniversalStrings.

a) Since "small d with stroke" and "small eth, Icelandic" map to the same capital "capital D with stroke, Icenlandic eth" both corresponding lower case letters shall be taken as matching.

Note.— This avoids TeletexString matching being intransitive.

b) The character "terminal sigma" shall match "small Greek letter sigma", and shall map to the same capital "capital Greek letter sigma".

c) The omega and mu Greek letters in 103 shall match corresponding letters in 126.

d) The "soft hyphen" shall be ignored for matching purposes.
e) the "no-break space" shall be taken as equivalent to an ordinary space.
f) the "ohm sign" and "micro sign" shall match the corresponding Greek letters.
g) the "small sharp s, German" shall match with ss.
h) INCREMENT shall match with GREEK CAPITAL LETTER DELTA.
i) N-ary SUMMATION shall match with GREEK CAPITAL LETTER SIGMA.

7.5.8.2 Specific Matching Rules

7.5.8.2.1 ATN DSAs shall support the matching rules as specified in ISO/IEC ISP 15126-1 Section A.6.5.2 as indicated in Table 7.5.8.2.1-1.

Note.— Table 7.5.8.2.1-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15126-1 (FDY 11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DSA" specifies the static capability of a DSA to support these attributes in directory operations.

Table 7.5.8.2.1-1 ATN DSA Matching Rules Specified in ISO/IEC ISP 15126-1

Ref. No.	Matching Rules	Base	ISP	ATN DSA
1	caseIgnoreMatch	o	m	m
2	caseIgnoreOrderingMatch	o	o	m
3	caseIgnoreSubstringsMatch	o	m	m
4	caseExactMatch	o	m	m
5	caseExactOrderingMatch	o	m	m
6	caseExactSubstringMatch	o	m	m

7	numericStringMatch	o	m	m
8	numericStringOrderingMatch	o	m	m
9	numericStringSubstringMatch	o	m	m
10	caseIgnoreListMatch	o	m	m
11	caseIgnoreListSubstringMatch	o	m	m
12	booleanMatch	o	m	m
13	integerMatch	o	m	m
14	integerOrderMatch	o	m	m
15	bitStringMatch	o	m	m
16	octetStringMatch	o	m	m
17	octetStringOrderingMatch	o	o	m
18	octetStringSubStringMatch	o	m	m
19	telephoneNumberMatch	o	m	m
20	telephoneNumberSubstringsMatch	o	m	m
21	presentationAddressMatch	o	m	m
22	uniqueMemberMatch	o	c1	m
23	protocolInformationMatch	o	m	m
24	uTCTimeMatch	o	m	o
25	uTCTimeOrderingMatch	o	o	o
26	generalizedTimeMatch	o	m	m
27	generalizedTimeOrderingMatch	o	o	m
28	integerFirstComponentMatch	o	m	m
29	objectIdentifierFirstComponentMatch	o	m	m
30	directoryStringFirstComponentMatch	o	m	m
31	wordMatch	o	o	o
32	keywordMatch	o	o	o
33	objectIdentifierMatch	o	m	m
34	distinguishedNameMatch	o	m	m

35	accessPointMatch	o	o	o
36	masterAndShadowAccessPointMatch	o	o	o
37	supplierAndConsumerMatch	o	o	o
38	supplierOrConsumerInformationMatch	o	o	o

Note.— Conditional c1: if p_srong_rep then m else o.

7.5.8.2.2 ATN DSAs shall support the matching rules as specified in ISO/IEC ISP 11189 Section A.6.5.4 as indicated in Table 7.5.8.2.2-1.

Note.— Table 7.5.8.2.2-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 11189 (FDI2). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15126-1, and the column "ATN DSA" specifies the static capability of a DSA to support these attributes in directory operations.

Table 7.5.8.2.2-1 ATN DSA Matching Rules Specified in ISO/IEC ISP 11189

Ref. No.	Matching Rule	Base	ISP Basic	ISP AMR	ISP SMR	ISP DL	ATN DSA
1	oRAddressCapabilitiesMatch	c9	c9	-	-	-	m
2	oRAddressElementsMatch	o	o	m	-	-	o
3	oRAddressMatch	c9	m	-	-	-	m
4	oRAddressSubstringElementsMatch	o	o		m		o
5	oRNameElementsMatch	o	o	m	-	-	o
6	oRNameExactMatch	c9	c9	-	-	m	m
7	oRNameMatch	o	o	m	-	-	o
8	oRNameSingleElementsMatch	o	o	m	-	-	o
9	orNameSubstringElementsMatch	o	o	-	m	-	o

Note.— Conditional c9: if there exists an attribute which uses it as an equality matching rule and that attribute is supported then m else o.

7.6 DUA PROTOCOL REQUIREMENTS

Note.— An ATN DIR user interfaces with the directory through a DUA. A DUA implements the Directory Access Protocol (DAP) for its communication with the directory server, or Directory Service Agent (DSA). The ISO/IEC ISPs for a DUA implementation of DAP are divided into two separate ISPs. ISO/IEC ISP 15125-1 (ADY11) covers the operation of the DAP when interacting with a single DSA. ISO/IEC 15125-2 (ADY12) covers the operation of the DAP when performing multiple interactions with multiple DSAs to perform a single user request.

7.6.1 DUA SUPPORT OF DIRECTORY ACCESS PROTOCOL (DAP)

Note.— The use of the DAP by a DUA which invokes an operation on a DSA and receives a response or an error is specified in ISO/IEC ISP 10615-1 (for 1988) and ISO/IEC ISP 15125-1 (for 1993). This Section further refines the specification in the ISP by limiting the use of DAP to the requirements of the ATN.

7.6.1.1 DUAs shall conform to all dynamic requirements of ISO/IEC 9594-5:1995, (ITU-T Recommendation X.519:1993), as specified in ISO/IEC ISP 151255-1, Section 5.3.

7.6.1.2 DUAs shall accept any protocol conformant response to each operation it supports, including responses containing protocol elements which are unknown or not supported.

Note.— For this purpose, to accept a response means to receive the response without taking the actions associated by the standards with protocol errors, including Presentation, ROSE, and DAP protocol errors.

7.6.1.3 DUAs shall be capable of generating only those protocol elements necessary to accomplish the purpose of the communication.

Note.— A protocol element is not required to be generated in any particular instance of communication, except as specified in the base standard, the ISP, or in this Sub-Volume.

7.6.1.4 DUAs shall only generate operations and protocol elements that are supported, except that the ASN.1 DEFAULT values may be generated in situations in which their presence is semantically identical to their absence.

Note.— DUAs using DAP according to this sub-volume use BER encoding. The generation of DEFAULT values will not have an effect on the encoding choices. If PER encoding is ever used, then this needs to be revisited.

7.6.1.5 DUAs shall be able to accept a received APDU of any size without aborting an association, or rejecting the PDU.

Note 1.—The APDU size for sending and receiving is the size of the sent/received transfer encoding including the ROSE header.

Note 2.— A DUA may send an APDU of any size, but since the DSA is not required to process APDUs over 1 Mb octets in length, a DAP error may result for APDUs greater than that size.

7.6.1.6 **Recommendation:** *A DUA should limit its APDU size to less than 1 Mb octets.*

7.6.1.7 If Abandon is not supported, all operation requests shall include a non-zero timeLimit.

7.6.1.8 General Capabilities

7.6.1.8.1 All general capabilities, as specified in ISO/IEC ISP 15125-1, shall be implemented.

7.6.1.8.2 The ***directoryAccessAC*** application context shall be supported.

7.6.1.8.3 If the DUA supports Abandon operations, it shall support the asynchronous (ROSE class 2) mode of operation.

7.6.1.8.4 DUAs shall support the rules of extensibility as defined in section 7.5 of ISO/IEC 9594-5.

7.6.1.9 Bind Response

Note 1.— The operation of DAP is through interactions between the DUA and the DSA. The first action in an instance of communication is a Bind request which is responded to with a Bind Response. This Section deals with the processing of a Bind Response by the DUA.

Note 2.— The specification of DUA responses to a Bind request with security parameters is contained in this section. Details on the requirements of DUAs to support security is specified in Section 7.6.3.

7.6.1.9.1 When a ***Bind*** with no credentials is issued, a DUA shall be capable of accepting a ***BindResponse*** with no credentials, and of ignoring any credentials in the ***BindResponse***.

7.6.1.9.2 When a ***Bind*** with simple credentials of any form is issued, unsupported protocol elements in the ***BindResponse*** shall be ignored.

7.6.1.9.3 A DUA shall be permitted, but not required, to accept a ***BindResponse*** in which the type of credentials (simple, strong, or externalProcedure) in the ***BindResponse*** is different response from that in the ***Bind***.

7.6.1.9.4 To terminate an association due to rejection of the credentials in the ***BindResult***, a DUA shall ***Unbind***.

7.6.1.10 DUA Support of DAP Operations and Extensions

Note.— The following paragraphs define permitted DAP operations. Each permitted DAP operation is described in a separate section with a PRL table. The lines in the PRLs correspond to the operation with its associated protocol elements and arguments.

7.6.1.10.1 The DUAs shall conform to ISO/IEC ISP 15125-1 as indicated in Table 7.6.1.10.1-1.

Note.— Table 7.6.1.10.1-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 10615-1, and the column "ATN DUA" specifies the static capability of of the ATN DUAs to perform and handle the specified operation.

Table 7.6.1.10.1-1 DUA Support of DAP Operations as Specified in ISP 15125-1

Ref. No.	Operation	Base	ISP	ATN DUA	Predicate Name	Notes
1	DirectoryBind	m	m	m		
2	DirectoryUnbind	m	m	m		
3	Read	o	o	o	*Read	
4	Compare	o	o	o	*Compare	
5	Abandon	cn	c3	c3	*Abandon	see 1
6	List	o	o	o	*List	
7	Search	o	o	o	*Search	
8	AddEntry	o	o	o	*AddEntry	
9	RemoveEntry	o	o	o	*RemoveEntry	
10	ModifyEntry	o	o	o	*ModifyEntry	
11	ModifyDN	o	o	o	*ModifyDN	

c3: If [[Async-DUA] then support of this feature is o.

[1] The Abandon operation can only be supported if the asynchronous mode (ROSE class 2) of operation is supported.

7.6.1.10.2 The DUAs shall conform to ISO/IEC ISP 15125-1 as indicated in Table 7.6.1.10.2-1.

Note.— Table 7.6.1.10.2-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted

from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of of the ATN DUAs to perform and handle the specified operation.

Table 7.6.1.10.2-1 DUA Support of DAP Extensions as Specified in ISP 15125-1

Ref. No.	Operation	Base	ISP	ATN DUA	Predicate Name	Notes
1	subentries	o	o	o		
2	copyShallDo	o	o	o		
3	attributesizelimit	o	o	o	*attrsizelimit	
4	extraAttributes	o	o	o		
5	modifyRightsRequest	o	o	o	*modrightsreq	
6	pagedResultsReques	o	o	o	*pageresreq	
7	matchedValuesOnly	o	o	o	*matchvalonly	
8	extendedFilter	o	o	o	*exfilter	
9	targetSystem	o	o	o	*targetsystem	
10	useAliasOnUpdate	o	o	o		
11	newSuperior	o	o	o	*newsuperior	

7.6.1.11 DUA Support of DAP Protocol Elements

7.6.1.11.1 DUA Support of DAP DirectoryBind Protocol Elements

7.6.1.11.1.1 The DUAs shall conform to ISO/IEC ISP 15125-1 Section A4.3.3.1.1 as indicated in Table 7.6.1.11.1.1-1.

Note.— Table 7.6.1.11.1-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN Directory" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.1.1-1 DAP DirectoryBind Protocol Elements Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes

1	credentials	cn	c4		
1.1	simple	c:cn	c:c4		
1.1.1	name	c:m	c:m	c:m	
1.1.2	validity	c:o	c:o	c:o	
1.1.2.1	time1	c:o	c:m	c:m	
1.1.2.2	time2	c:o	c:o	c:o	
1.1.2.3	random1	c:o	c:m	c:m	
1.1.2.4	random2	c:o	c:o	c:o	
1.1.3	password	c:o	c:o	c:o	
1.1.3.1	unprotected	c:o.n	c:m	c:m	
1.1.3.2	protected	c:o.n	i		
1.1.3.2.1	algorigthmidentifier	c:m	-	m	
1.1.3.2.2	encrypted	c:m	i	c:m	
1.2	strong	c:o	i	i	see 7.6.3
1.2.1	certification-path	c:o	-	-	
1.2.2	bind-token	c:m	-	c:m	
1.2.2.1	toBeSigned	c:m	-	c:m	
1.2.2.1.1	algorithm	c:m	-	c:m	
1.2.2.1.2	name	c:m	-	c:m	
1.2.2.1.3	time	c:m	-	c:m	
1.2.2.1.4	random	c:m	-	c:m	
1.2.2.2	algorithmidentifier	c:m	-	c:m	
1.2.2.3	encrypted	c:m	-	c:m	
1.2.3	name	c:o	-	-	
1.3	externalProcedure	i	i	i	
2	versions	m	m	m	
2.1	v1	m	m	m	

7.6.1.11.2 DUA Support of DAP DirectoryBind Result Protocol Elements

7.6.1.11.2.1 The DUAs shall conform to ISO/IEC ISP 15125-1 Section A4.3.3.1.2 as indicated in Table 7.6.1.11.2.1-1.

Note.— Table 7.6.1.11.2-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN Directory" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.2.1-1 DAP DirectoryBind Result Protocol Elements Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
1	credentials	cn	c4	c4	
1.1	simple	c:cn	c:c4	c:c4	
1.1.1	name	c:m	c:m	c:m	see 7.6.1.11.2.2
1.1.2	validity	c:o	c:o	c:o	
1.1.2.1	time1	c:o	c:m	c:m	
1.1.2.2	time2	c:o	c:o	c:o	
1.1.2.3	random1	c:o	c:m	c:m	
1.1.2.4	random2	c:o	c:o	c:o	
1.1.3	password	c:o	c:o	c:o	
1.1.3.1	unprotected	c:o.n	c:m	c:m	see 7.6.1.11.2.3
1.1.3.2	protected	c:o.n	i	i	see 7.6.3
1.1.3.2.1	algorigthmidentifier	c:m	-	-	
1.1.3.2.2	encrypted	c:m	-	-	
1.2	strong	c:cn	i	i	see 7.6.3
1.2.1	certification-path	c:o	-	-	
1.2.2	bind-token	c:m	-	-	
1.2.2.1	toBeSigned	c:m	-	-	
1.2.2.1.1	algorithm	c:m	-	-	

1.2.2.1.2	name	c:m	-		
1.2.2.1.3	time	c:m	-		
1.2.2.1.4	random	c:m	-	c:m	
1.2.2.2	algorithmidentifier	c:m	-	c:m	
1.2.2.3	encrypted	c:m	-	c:m	
1.2.3	name	c:o	-	-	
1.3	externalProcedure	i	i	i	
2	versions	m	m	m	
2.1	v1	m	m	m	

c4: If [Simple-DUA] then support of this feature is m else o.

7.6.1.11.2.2 DUAs should be capable of returning the name element to the user.

7.6.1.11.2.3 DUAs shall protect the confidentiality of the clear text DSA password.

7.6.1.11.3 DUA Support of Directory Bind Error

7.6.1.11.3.1 The DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.1.3 as indicated in Table 7.6.1.11.3.1-1.

Note.— Table 7.6.1.11.3.1-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.3.1-1 DAP DirectoryBind Error Protocol Elements Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
1	versions	m	m	m	
1.1	v1	m	m	m	
2	error	m	m	m	
2.1	ServiceError	m	m	m	
2.2	SecurityError	m	m	m	

7.6.1.11.4 DUA Support of DAP DirectoryUnbind Protocol Elements

7.6.1.11.4.1 The DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.1.3.

Note.— Directory Unbind has no arguments (see Section 8.2 of ISO/IEC 9594-3).

7.6.1.11.5 DUA Support of DAP Read Protocol Elements

7.6.1.11.5.1 DUAs that support Read operations shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.3.3 as indicated in Table 7.6.1.11.5.1-1.

Note.— Table 7.6.1.11.5.1-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.5.1-1 DAP Read Protocol Elements Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Predicate	Notes
1	ReadArgument	m	m	m		
1.1	toBeSigned	-	-	-		
1.2	object	m	m	m		
1.3	selection	m	m	m		
1.4	modifyRightsRequest	cn	c5	c5		
1.5	CommonArguments	m	m	m	*Comm-Arg	see 7.6.1.11.13
1.6	algorithmidentifier	-	-	-		
1.7	encrypted	-	-	-		
2	ReadResult	m	m	m		
2.1	toBeSigned	-	-	-		
2.2	entry	m	m	m		
2.3	modifyRights	o	c5	c5		
2.3.1	item	c:m	c:m	c:m		
2.3.1.1	entry	c:o	c:m	c:m		
2.3.1.2	attribute	c:o	c:m	c:m		

2.3.1.3	value	c:o	c:m	c:m		
2.3.2	permission	c:o	c:m	c:m		
2.4	CommonResults	m	m	m	*Comm-Res	see 7.6.1.11.14
2.5	algorithmidentifier	-	-	-		
2.6	encrypted	-	-	-		
3	Errors	m	m	m		

c5: If [modrightsreq] then support of this feature is m else o.

7.6.1.11.6 DUA Support of DAP Compare Protocol Elements

7.6.1.11.6.1 DUAs that support Compare operations shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.4 as indicated in Table 7.6.1.11.6.1-1.

Note.— Table 7.6.1.11.6.1-1 is structured as a PRL derived from the profile specification included in xx and consequently from the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.6.1-1 DAP DCompare Protocol Elements Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Predicate	Notes
1	CompareArgument	m	m	m		
1.1	toBeSigned	-	-	-		see 7.6.3
1.2	object	m	m	m		
1.3	purported	m	m	m		
1.4	CommonArgument	m	m	m	*Comm-Arg	
1.5	algorithmIdentifier	-	-	-		
1.6	encrypted	-	-	-		
2	CompareResults	m	m	m		
2.1	toBeSigned	-	-	-		
2.2	name	o	m	m		

2.3	matched	m	m	m		
2.4	fromEntry	o	m	m		
2.5	matchedSubtype	o	m	m		
2.6	CommonResults	m	m	m	*Comm-Res	see 7.6.1.10.14
2.7	algorithmIdentifier	-	-	-		
2.8	encrypted	-	-	-		
3	Errors	m	m	m		

7.6.1.11.7 DUA Support of DAP Abandon Protocol Elements

7.6.1.11.7.1 DUAs that support Abandon operations shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.5 as indicated in Table 7.6.1.11.7.1-1.

Note.— Table 7.6.1.11.7.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.7.1-1 DAP Abandon Protocol Elements Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
1	AbandonArgument	m	m	m	
1.1	invokeID	m	m	m	
2	AbandonResult	m	m	m	
3	Errors	m	m	m	

7.6.1.11.8 DUA Support of DAP List Protocol Elements

7.6.1.11.8.1 DUAs that support List operations shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.6 as indicated in Table 7.6.1.11.8-1.

Note.— Table 7.6.1.11.8.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability to convey and handle the specified protocol elements.

Table 7.6.1.11.8.1-1 DUA List Protocol Elements as Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Notes
1	ListArgument	m	m	m		
1.1	toBeSigned	-	-	-		see 7.6.3
1.2	object	m	m	m		
1.3	pagedResults	cn	c6			see 7.6.1.11.20
1.4	CommonArguments	m	m	m	*Comm-Arg	see 7.6.1.11.13
1.5	algorithmIdentifier	-	-	-		
1.6	encrypted	-	-	-		
2	ListResult	m	m	m		
2.1	toBeSigned	-	-	-		
2.2	listInfo	m	m	m		
2.2.1	name	o	m	m		
2.2.2	subordinates	m	m	m		
2.2.2.1	rdn	m	m	m		
2.2.2.2	aliasEntry	o	m	m		
2.2.2.3	fromEntry	o	m	m		
2.2.3	partialOutcomeQualifier	o	o	o		
2.2.3.1	limitProblem	c:o	c:o	c:o		
2.2.3.1.1	timeLimitExceeded	c:m	c:m	c:m		
2.2.3.1.2	sizeLimitExceeded	c:m	c:m	c:m		
2.2.3.1.3	aministrativeLimitExceeded	c:m	c:m	c:m		
2.2.3.2	unexplored	c:o	c:m	c:m		

2.2.3.3	unavailableCriticalExtensions	c:m	c:m	c:m		
2.2.3.4	unknownErrors	c:o	c:o	c:o		
2.2.3.5	queryReference	c:cn	c:c6	c:c6		
2.2.4	CommonResults	m	m	m	*Comm-Res	see 7.6.1.11.14
2.3	uncorrelatedListInfo	o	m	m		
2.4	algorithmIdentifier	-	-	-		see 7.6.3
2.5	encrypted	-	-	-		see 7.6.3
3	Errors	m	m	m		

c6: if [pageresreq] then support of this feature is m else o.

7.6.1.11.9 DUA Support of DAP Search Protocol Elements

7.6.1.11.9.1 DUAs that support Search operations shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.7 as indicated in Table 7.6.11.9.1-1.

Note.— Table 7.6.1.11.9.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.9.1-1 DUA Search Protocol Elements as Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Notes
1	SearchArgument	m	m	m		
1.1	toBeSigned	-	-	-		see 7.6.3
1.2	baseObject	m	m	m		
1.3	subset	o	m	m		
1.4	filter	o	o	o	*Filter	see 7.6.1.11.18
1.5	searchAliases	o	m	m		
1.6	selection	o	o	o		

1.7	pagedResults	cn	c7	c7		
1.8	matchedValuesOnly	o	o	o		
1.9	extendedFilter	cn	c7	c7		
1.10	CommonArguments	m	m	m	*Comm-Arg	see 7.6.1.10.13
1.11	algorithmIdentifier	-	-	-		see 7.6.3
1.12	encrypted	-	-	-		see 7.6.3
2	SearchResult	m	m	m		
2.1	toBeSigned	-	-	-		
2.2	searchInfo	m	m	m		
2.2.1	name	o	m	m		
2.2.2	entries	m	m	m	*Entry-Info	see 7.6.1.10.8
2.2.3	partialOutcomeQualifier	o	o	o		
2.2.3.1	limitProblem	c:o	c:o	c:o		
2.2.3.1.1	timeLimitExceeded	c:m	c:m	c:m		
2.2.3.1.2	sizeLimitExceeded	c:m	c:m	c:m		
2.2.3.1.3	aministrativeLimitExceeded	c:m	c:m	c:m		
2.2.3.2	unexplored	c:o	c:m	c:m		
2.2.3.3	unavailableCriticalExtensions	c:m	c:m	c:m		
2.2.3.4	unknownErrors	c:o	c:o	c:o		
2.2.3.5	queryReference	c:cn	c:c6	c:c6		
2.2.4	CommonResults	m	m	m	*Comm-Res	see 7.6.1.10.14
2.3	uncorrelatedSearchInfo	o	m	m		
2.4	algorithmIdentifier	-	-	-		see 7.6.3
2.5	encrypted	-	-	-		see 7.6.3
3	Errors	m	m	m		

c6: If [pageresreq] then support of this feature is m else o.
c7: If [extfilter] then support of this feature is m else o.

7.6.1.11.10 DUA Support of Add Protocol Elements

7.6.1.11.10.1 DUAs that support AddEntry operation shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.8 as indicated in Table 7.6.1.11.10.1-1.

Note.— Table 7.6.1.11.10.1-1 is structured as a PRL derived from the profile specification included in the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.10.1-1 DUA AddEntry as Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Notes
1	AddEntryArgument	m	m	m		
1.1	toBeSigned	-	-	-		see 7.6.3
1.2	object	m	m	m		
1.3	entry	m	m	m		
1.4	targetSystem	cn	c8	c8		
1.5	CommonArguments	m	m	m	*Comm-Arg	see 7.6.1.11.13
1.6	algorithmIdentifier	-	-	-		see 7.6.3
1.7	encrypted	-	-	-		see 7.6.3
2	AddEntryResult	m	m	m		
3	Errors	m	m	m		

c8: If [targetsystem] then support of this feature is m else o.

7.6.1.11.11 DUA RemoveEntry Protocol Elements

7.6.1.11.11.1 DUAs that support RemoveEntry operations shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.9 as indicated in Table 7.6.1.11.11.1-1.

Note.— Table 7.6.1.11.11.1-1 is structured as a PRL derived from the profile specification in the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 10615-5, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.11.1-1 DUA RemoveEntry Protocol Element as Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Notes
1	RemoveEntryArgument	m	m	m		
1.1	toBeSigned	-	-	-		see 7.6.3
1.2	object	m	m	m		
1.3	CommonArguments	m	m	m	*Comm-Arg	see 7.6.1.11.13
1.4	algorithmIdentifier	-	-	-		
1.5	encrypted	-	-	-		see 7.6.3
2	RemoveEntryResult	m	m	m		
3	Errors	m	m	m		see 7.6.1.11.12

7.6.1.11.12 DUA ModifyEntry Protocol Elements

7.6.1.11.12.1 DUAs that support Modify operations shall conform to ISO/IEC ISP 15125-1 Section A.4.4.3.10 as indicated in Table 7.6.1.11.12.1-1.

Note.— Table 7.6.1.11.12.1-1 is structured as a PRL derived from the profile specification included in xx and consequently from the ISP PICS Proforma included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.12.11.1-1 DUA ModifyEntry Protocol Elements as Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Notes
1	ModifyEntryArgument	m	m	m		
1.1	toBeSigned	-	-	-		see 7.6.3
1.2	object	m	m	m		
1.3	changes	m	m	m		

1.3.1	addAttribute	m	m	m		
1.3.2	removeAttribute	m	o	o		
1.3.3	addValue	m	o	o		
1.3.4	removeValue	m	m	m		
1.4	CommonArguments	m	m	m	*Comm-Arg	see 7.6.1.11.13
1.5	algorithmIdentifier	-	-	-		see 7.6.3
1.6	encrypted	-	-	-		see 7.6.3
2	ModifyEntryResult	m	m	m		
3	Error	m	m	m		see 7.6.1.10.12

7.6.1.11.13 DUA ModifyRDN Protocol Elements

7.6.1.11.13.1 DUAs that support ModifyDN operations shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.11 as indicated in Table 7.6.1.11.13.1-1.

Note.— Table 7.6.1.11.13.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 10615-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.13.1-1 DUA ModifyRDN Protocol Elements as Specified in ISP 15125-1

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
1	ModifyDNArgument	m	m	m		
1.1	toBeSigned	-	-	-		
1.2	object	m	m	m		
1.3	newRDN	m	m	m		
1.4	deleteOldRDN	o	m	m		
1.5	newSuperior	cn	c9	c9		
1.6	CommonArguments	m	m	m	*Comm-Arg	See 7.6.1.11.13
1.7	algorithmIdentifier	-	-	-		
1.8	encrypted	-	-	-		
2	ModifyDNResult	m	m	m		
3	Errors	m	m	m		See 7.6.1.11.12

c9: If [newsuperior] then support of this feature is m else o.

7.6.1.11.14 DUA Errors and Parameters Protocol Elements

7.6.1.11.14.1 DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.12 as indicated in Table 7.6.1.11.14.1-1.

Note.— Table 7.6.1.11.14.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.14.1-1 DUA Errors and Parameters Protocol Elements as Specified in ISP 15125-1

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
1	Abandoned	cn	c10	c10		
2	AbandonFailed	cn	c10	c10		
2.1	problem	c:m	c:m	c:m		
2.1.1	noSuchOperation	c:m	c:m	c:m		
2.1.2	tooLate	c:m	c:m	c:m		
2.1.3	cannotAbandon	c:m	c:m	c:m		
2.2	operation	c:m	c:m	c:m		
3	AttributeError	cn	c11	c11		
3.1	object	c:m	c:m	c:m		
3.2	problems	c:m	c:m	c:m		
3.2.1	problem	c:m	c:m	c:m		
3.2.1.1	noSuchAttributeOrValue	c:m	c:m	c:m		
3.2.1.2	invalidAttributeSyntax	c:m	c:m	c:m		
3.2.1.3	undefinedAttributeType	c:m	c:m	c:m		
3.2.1.4	inappropriateMatching	c:m	c:m	c:m		
3.2.1.5	constraintViolation	c:m	c:m	c:m		
3.2.1.6	attributeOrValueAlreadyExists	c:m	c:m	c:m		
3.3	type	c:m	c:m	c:m		

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
3.4	value	c:o	c:m	c:m		
4	NameError	cn	c12	c12		
4.1	problem	c:m	c:m	c:m		
4.1.1	noSuchObject	c:m	c:m	c:m		
4.1.2	aliasProblem	c:m	c:m	c:m		
4.1.3	invalidAttributeSyntax	c:m	c:m	c:m		
4.1.4	aliasDereferencingProblem	c:m	c:m	c:m		
4.2	matched	c:m	c:m	c:m		
5	Referral	cn	i	i		See Part 2
5.1	candidate	c:m	-	-		
6	SecurityError	cn	c12	c12		
6.1	problem	c:m	c:m	c:m		
6.1.1	InappropriateAuthentication	c:m	c:m	c:m		
6.1.2	invalidCredentials	c:m	c:m	c:m		
6.1.3	insufficientAccessRights	c:m	c:m	c:m		
6.1.4	invalidSignature	c:cn	i	i		See Part 5
6.1.5	protectionRequired	c: cn	i	i		See Part 5
6.1.6	noInformation	c:m	c:m	c:m		
7	ServiceError	cn	c12	c12		
7.1	problem	c:m	c:m	c:m		
7.1.1	busy	c:m	c:m	c:m		
7.1.2	unavailable	c:m	c:m	c:m		
7.1.3	unwillingToPerform	c:m	c:m	c:m		
7.1.4	chainingRequired	c:m	c:m	c:m		
7.1.5	unableToProceed	c:m	c:m	c:m		
7.1.6	invalidReference	c:m	c:m	c:m		
7.1.7	timeLimitExceeded	c:m	c:m	c:m		
7.1.8	administrativeLimitExceeded	c:m	c:m	c:m		
7.1.9	loopDetected	c:m	c:m	c:m		
7.1.10	unavailableCriticalExtension	c:m	c:m	c:m		

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
7.1.11	outOfScope	c:m	c:m	c:m		
7.1.12	ditError	c:m	c:m	c:m		
7.1.13	invalidQueryReference	c:cn	c:c13	c:c13		
8	UpdateError	cn	c14	c14		
8.1	problem	c:m	c:m	c:m		
8.1.1	namingViolation	c:m	c:m	c:m		
8.1.2	objectClassViolation	c:m	c:m	c:m		
8.1.3	notAllowedOnNonLeaf	c:m	c:m	c:m		
8.1.4	notAllowed OnRDN	c:m	c:m	c:m		
8.1.5	entryAlreadyExists	c:m	c:m	c:m		
8.1.6	affectsMultipleDSAs	c:m	c:m	c:m		
8.1.7	objectClassModificationProhibited	c:m	c:m	c:m		

c10: If [Abandon] then support of this feature is m else o.

c11: If [Read or Compare or Search or AddEntry or ModifyEntry] then support of this feature is m else o.

c12: If [Read or Compare or List or Search or AddEntry or RemoveEntry or ModifyEntry or ModifyDN] then support of this feature is m else o.

c13: If [pageresreq] then support of this feature is m else -.

c14: If [AddEntry or RemoveEntry or ModifyEntry or ModifyDN] then support of this feature is m else o.

7.6.1.11.15 DUA Common Arguments Elements

7.6.1.11.15.1 DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.13 as indicated in Table 7.6.1.11.15.1-1 for those protocol operations requiring the use of Common Arguments.

Note.— Table 7.6.1.11.15.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.15.1-1 DUA Common Arguments Elements as Specified in ISP 15125-1

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
1	serviceControls	o	o	o	*Serv-Ctrls	SeeA.4.3.3.15
2	securityParameters	cn	i	i		See Part 5
3	requestor	o	o	o		
4	operationProgress	o	i	i		See Part 2
4.1	nameResolutionPhase	c:o	-	-		
4.1.1	notStarted	c:m	-	-		
4.1.2	proceeding	c:m	-	-		
4.1.3	completed	c:m	-	-		
4.2	nextRDNToBeResolved	c:o	-	-		
5	aliasedRDNs	o	m	m		
6	criticalExtensions	o	o	o		
7	referenceType	o	i	i		See Part 2
8	entryOnly	o	i	i		See Part 2
9	exclusions	o	i	i		See Part 2
10	nameResolveOnMaster	o	i	i		See Part 2

7.6.1.11.16 DUA Common Results Elements

7.6.1.11.16.1 DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.14 as indicated in Table 7.6.1.11.16.1-1.

Note.— Table 7.6.1.11.16.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.16.1-1 DUA Common Elements as Specified in ISP 15125-1

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
1	securityParameters	cn	i	i		See Part 5
2	performer	o	o	o		
3	aliasDereferenced	o	m	m		

7.6.1.11.17 DUA Service Control Elements

7.6.1.11.17.1 DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.15 as indicated in Table 7.6.1.11.17.1-1.

Note.— Table 7.6.1.11.17.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of ...

Table 7.6.1.11.17.1-1 DUA ServiceControl Elements as Specified in ISP 15125-1

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
1	options	o	o	o		
1.1	preferChaining	c:m	c:m	c:m		
1.2	chainingProhibited	c:m	c:m	c:m		
1.3	localScope	c:m	c:m	c:m		
1.4	dontUseCopy	c:m	c:m	c:m		
1.5	dontDereferenceAliases	c:m	c:m	c:m		
1.6	subentries	c:m	c:m	c:m		
1.7	copyShallDo	c:m	c:m	c:m		
2	priority	o	o	o		
3	timeLimit	o	o	o		
4	sizeLimit	o	o	o		
5	scopeOfReferral	o	o	o		
6	attributeSizeLimit	cn	c15	c15		

c15: If [attrsizelimit] then support of this feature is m else o.

7.6.1.11.18 DUA Entry Information Selection Elements

7.6.1.11.18.1 DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.16 as indicated in Table 7.6.1.11.18.1-1.

Note.— Table 7.6.1.11.18.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.18.1-1 DUA Entry Information Selection Elements as Specified in ISP 15125-1

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
1	attributes	o	m	m		
1.1	allUserAttributes	c:m	m	m		
1.2	select	c:m	m	m		
2	infoTypes	o	o	o		
2.1	attributeTypesOnly	c:m	c:m	c:m		
2.2	attributeTypesAndValues	c:m	c:m	c:m		
3	extraAttributes	o	o	o		
3.1	allOperationalAttributes	c:m	c:m	c:m		
3.2	select	c:m	c:m	c:m		

7.6.1.11.19 DUA Entry Information Elements

7.6.1.11.19.1 DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.17 as indicated in Table 7.6.1.11.19.1-1.

Note.— Table 7.6.1.11.19.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.19.1-1 DUA EntryInformation Elements as Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
1	EntryInformation	m	m	m	
2	fromEntry	o	m	m	
3	information	o	m	m	
3.1	attributeType	c:m	m	m	
3.2	attribute	c:m	m	m	
4	noncompleteEntry	o	m	m	

7.6.1.11.20 DUA Filter Elements

7.6.1.11.20.1 DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.18 as indicated in Table 7.6.1.11.20.1-1.

Note.— Table 7.6.1.11.20.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.20.1-1 DUA Filter Elements as Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
1	item	o	o	o	
2	and	o	o	o	
3	or	o	o	o	
4	not	o	o	o	

7.6.1.11.21 DUA Filter Item Elements

7.6.1.11.21.1 DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.19 as indicated in Table 7.6.1.11.21.1-1.

Note.— Table 7.6.1.11.21.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.21.1-1 DUA Filter Item Elements as Specified in ISP 15125-1

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
1	equalilty	o	m	m	
2	substrings	o	o	o	
2.1	type	c:o	c:o	c:o	
2.2	strings	c:o	c:o	c:o	
2.2.1	initial	c:o	c:o	c:o	
2.2.2	any	c:o	c:o	c:o	
2.2.3	final	c:o	c:o	c:o	
3	greaterOrEqual	o	o	o	
4	lessOrEqual	o	o	o	
5	present	o	o	o	
6	approximateMatch	o	o	o	
7	extensibleMatch	cn	c7	c7	
7.1	matchingRule	c:o	c:o	c:o	
7.2	type	c:o	c:o	c:o	
7.3	matchValue	c:o	c:o	c:o	
7.4	dnAttributes	c:o	c:o	c:o	

c7: Of [extfilter] then support of this feature is m else o.

7.6.1.11.22 DUA Paged Results Elements

7.6.1.11.22.1 DUAs shall conform to ISO/IEC ISP 15125-1 Section A.4.3.3.20 as indicated in Table 7.6.1.11.22.1-1.

Note.— Table 7.6.1.11.22.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-1 (ADY11). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-1, and the column "ATN DUA" specifies the static capability of to convey and handle the specified protocol elements.

Table 7.6.1.11.22.1-1 DUA Paged Results Elements as Specified in ISP 10615-1

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
1	PagedResultsRequest	m	m	m		
1.1	newRequest	o.n	o.2	o.2		
1.1.1	pageSize	c:m	c:m	c:m		
1.1.2	sortkeys	c:o	c:o	c:o		
1.1.2.1	type	c:m	c:m	c:m		
1.1.2.2	orderingRule	c:o	c:o	c:o		
1.1.3	reverse	c:m	c:m	c:m		
1.1.4	unmerged	c:m	c:m	c:m		
1.2	queryReference	o.n	o.2	o.2		

o.2: At least one of newRequest or queryReference must be present for PagedResultsRequest.

7.6.2 DUA Support of Distributed Operations

Note.— The use of the DAP by a DUA which invokes an operation on a DSA and receives a response or an error is specified in ISO/IEC ISP 10615-2 (for 1988) and ISO/IEC ISP 15125-2 (for 1993). This Section further refines the specification in the ISP by limiting the use of DAP to the requirements of the ATN.

7.6.2.1 DUAs shall support the Directory Access application context.

7.6.2.2 DUA Operations in Support of Distributed Operations

Note.— The use of DAP in distributed operations is an extension of the procedures specified in section 7.6.1. The PRLs for distributed operations only include those items that are different than the PRLs found in section 7.6.1.

7.6.2.2.1 DUAs shall conform to ISO/IEC ISP 15125-2 (ADY12) Section A.4.3.2.1.

Note 1.— The PRL for DAP operations are found in Table 7.6.1.9.1-1.

Note 2.— The additional requirements for the support of distributed operations is presented in Table 7.6.2.2.1.

Table 7.6.2.2.1-1 DUA Distributed Operations Specified in ISP 15125-2

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
6	List	o	m	m	*List	
7	Search	o	m	m	*Search	

7.6.2.3 DUA Protocol Elements in Support of Distributed Operations

7.6.2.3.1 DUA DirectoryBind Arguments

7.6.2.3.1.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.1.1.

Note 1.— The PRL for DAP DirectoryBind protocol elements are found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the DirectoryBind Arguments in Table 7.6.1.9.1-1 .

7.6.2.3.2 DUA Directory BindResult Arguments

7.6.2.3.2.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.1.2.

Note 1.— The PRL for DAP DirectoryBind protocol elements are found in Table 7.6.1.9.2-1.

Note 2.— No additional requirements to those specified for the DirectoryBind Arguments in Table 7.6.1.9.2-1 .

7.6.2.3.3 Directory Bind Error Argument

7.6.2.3.3.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.1.3.

Note 1.— The PRL for DAP DirectoryBind Error is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the DirectoryBind Arguments in Table 7.6.1.9.1-1 .

7.6.2.3.4 Directory UnBind Elements

7.6.2.3.4.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.2.

Note 1.— The PRL for DAP DirectoryUnBind Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the DirectoryUnBind Arguments in Table 7.6.1.9.1-1 .

7.6.2.3.5 Read Elements

7.6.2.3.3.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.3.

Note 1.— The PRL for DAP Read Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Read Elements in Table 7.6.1.9.1-1 .

7.6.2.3.5 Compare Elements

7.6.2.3.3.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.4.

Note 1.— The PRL for Compare Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Compare Elements in Table 7.6.1.9.1-1 .

7.6.2.3.6 Abandon Elements

7.6.2.3.6.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.5.

Note 1.— The PRL for Abandon Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Abandon Elements in Table 7.6.1.9.1-1 .

7.6.2.3.7 List Elements

7.6.2.3.7.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.6.

Note 1.— The PRL for List Elements is found in Table 7.6.1.9.1-1.

Note 2.— Table 7.6.2.3.7.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-2 (ADY12). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-2, and the column "ATN Directory" specifies the static capability of the DUA to convey and handle the specified protocol elements. Only those elements different from the PRL in 7.6.1.10.3 are listed.

Table 7.6.2.3.7.1-1 DUA List Protocol Elements as Specified in ISP 15125-2

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
2.2.3	partialOutcomeQualifier	o	m	m		Note

Note.— Support of CommonArguments is a prerequisite for supporting continuation of List operations following a referral or Continuation Reference.

7.6.2.3.8 Search Elements

7.6.2.3.8.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.7.

Note 1.— The PRL for DAP Search protocol elements are found in Table 7.6.1.10.3-1.

Note 2.— Table 7.6.2.3.8.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-2 (ADY12). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-2, and the column "ATN DUA" specifies the static capability of the DUA to convey and handle the specified protocol elements. Only those elements different from the PRL in 7.6.1.10.3 are listed.

Table 7.6.2.3.8.1-1 DUA Search Protocol Elements as Specified in ISP 15125-2.

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
2.2.3	partialOutcomeQualifier	o	o	m	See note

Note.— Support of CommonArguments is a prerequisite for supporting continuation of Search operations following a referral or Continuation Reference.

7.6.2.3.9 DUA AddEntry Protocol Elements

7.6.2.3.9.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.8.

Note 1.— The PRL for AddEntry Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the AddEntry Elements in Table 7.6.1.9.1-1 .

7.6.2.3.3.10 DUA RemoveEntry Protocol Elements

7.6.2.3.10.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.8.

Note 1.— The PRL for RemoveEntry Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the RemoveEntry Elements in Table 7.6.1.9.1-1 .

7.6.2.3.11 DUA ModifyEntry Protocol Elements

7.6.2.3.11.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.10.

Note 1.— The PRL for AddEntry Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the ModifyEntry Elements in Table 7.6.1.9.1-1 .

7.6.2.3.12 DUA ModifyDN Protocol Elements

7.6.2.3.12.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.11.

Note 1.— The PRL for ModifyEntry Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the ModifyEntry Elements in Table 7.6.1.9.1-1 .

7.6.2.3.13 DUA Errors and Parameters Protocol Elements

7.6.2.3.13.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.12.

Note 1.— The PRL for DAP Error and Parametners protocol elements are found in Table 7.6.1.10.3-1.

Note 2.— Table 7.6.2.3.13.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-2 (ADY12). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-2, and the column "ATN DUA" specifies the static capability of the DUA to convey and handle the specified protocol elements. Only those elements different from the PRL in 7.6.1.10.3 are listed.

Table 7.6.2.3.13.1-1 DUA Search Protocol Elements as Specified in ISP 15125-2.

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
5	Referral	cn	m	m	

7.6.2.3.14 DUA Common Arguments Elements

7.6.2.3.14.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.13.

Note 1.— The PRL for DAP Common Arguments protocol elements are found in Table 7.6.1.10.3-1.

Note 2.— Table 7.6.2.3.8.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-2 (ADY12). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-2, and the column "ATN DUA" specifies the static capability of the DUA to convey and handle the specified protocol elements. Only those elements different from the PRL in 7.6.1.10.3 are listed.

Table 7.6.2.3.14.1-1 DUA Common Arguments Protocol Elements as Specified in ISP 15125-2.

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
4	operationProgress	o	m	m		
4.1	nameResolutionPhase	c:o	m	m		
4.1.1	notStarted	c:m	m	m		
4.1.2	proceeding	c:m	m	m		
4.1.3	completed	c:m	m	m		
4.2	nextRDNToBeResolved	c:o	m	m		
7	referenceType	o	o	o		
8	entryOnly	o	o	o		
9	exclusions	o	o	o		
10	nameResolveOnMaster	o	o	o		

7.6.2.3.15 DUA Common Results Elements

7.6.2.3.15.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.14.

Note 1.— The PRL for Common Results Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Common Results Elements in Table 7.6.1.9.1-1 .

7.6.2.3.16 DUA Service Controls Protocol Elements

7.6.2.3.16.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.15.

Note 1.— The PRL for Service Controls Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Service Controls Elements in Table 7.6.1.9.1-1 .

7.6.2.3.17 DUA Entry Information Selection Protocol Elements

7.6.2.3.17.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.11.

Note 1.— The PRL for Entry Information Selection Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Entry Information Selection Elements in Table 7.6.1.9.1-1 .

7.6.2.3.18 DUA Entry Information Protocol Elements

7.6.2.3.18.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.17.

Note 1.— The PRL for Entry Information Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Entry Information Elements in Table 7.6.1.9.1-1 .

7.6.2.3.19 DUA Filter Elements Protocol Elements

7.6.2.3.19.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.18.

Note 1.— The PRL for Filter Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Filter Elements in Table 7.6.1.9.1-1 .

7.6.2.3.20 DUA Filter Item Protocol Elements

7.6.2.3.20.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.19.

Note 1.— The PRL for Filter Item Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Filter Item Elements in Table 7.6.1.9.1-1 .

7.6.2.3.21 DUA Paged Results Protocol Elements

7.6.2.3.21.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.20.

Note 1.— The PRL for Paged Results Elements is found in Table 7.6.1.9.1-1.

Note 2.— No additional requirements to those specified for the Paged Results Elements in Table 7.6.1.9.1-1 .

7.6.2.3.22 DUA Continuation Reference Elements

7.6.2.3.22.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section A.4.3.3.21.

Note 1.— The PRL for DAP Continuation Reference elements are found in Table 7.6.1.10.3-1.

Note 2.— Table 7.6.2.3.8.1-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-2 (ADY12). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-2, and the column "ATN DUA" specifies the static capability of the DUA to convey and handle the specified protocol elements. Only those elements different from the PRL in 7.6.1.10.3 are listed.

Table 7.6.2.3.23.1-1 DUA Continuation Reference Elements as Specified in ISP 15125-2.

Item No.	Protocol Element	Base	ISP	ATN DUA	Predicate Name	Note
1	targetObject	m	m	m		
2	aliasedRDNs	o	o	o		
3	operationProgress	m	m	m		
3.1	nameResolutionPhase	m	m	m		
3.1.1	notStarted	m	m	m		
3.1.2	proceeding	m	m	m		
3.1.3	completed	m	m	m		
3.2	nextRDNToBeResolved	o	m	m		
4	rdnsResolved	o	m	m		
5	referenceType	m	m	m		
6	accessPoints	m	m	m		
6.1	MasterOrShadowAccess Point	m	m	m		
6.1.1	AccessPoint	m	m	m		
6.1.1.1	ae-title	m	m	m		
6.1.1.2	address	m	m	m		
6.1.1.2.1	pSelector	o	o	o		
6.1.1.2.2	sSelector	o	o	o		
6.1.1.2.3	tSelector	o	o	o		

6.1.1.2.4	nAddresses	m	m	m		
6.1.1.3	protocolInformation	o	o	o		
6.1.2	category	o	m	m		d(master)
6.1.2.1	master	c:m	m	m		
6.1.2.2	shadow	c:m	m	m		
6.2	additionalPoints	o	o	o		
6.2.1	AccessPoint	c:m	c:m	c:m		
6.2.1.1	ae-title	c:m	c:m	c:m		
6.2.1.2	address	c:m	c:m	c:m		
6.2.1.2.1	pSelector	c:o	c:o	c:o		
6.2.1.2.2	sSelector	c:o	c:o	c:o		
6.2.1.2.3	tSelector	c:o	c:o	c:o		
6.2.1.2.4	nAddresses	c:m	c:m	c:m		
6.2.1.3	protocolInformation	c:o	c:o	c:o		
6.2.2	category	c:o	c:o	c:o		
6.2.2.1	master	c:m	c:m	c:m		
6.2.2.2	shadow	c:m	c:m	c:m		
7	entryOnly	o	m	m		d(false)
8	exclusions	o	o	o		
9	returnToDUA	o	m	m		d(false)
10	nameResolveOnMaster	o	m	m		d(false)

7.6.2.3.23 DUA Security Parameters

7.6.2.3.23.1 Out of scope.

7.6.2.3.24 CertificationPath

7.6.2.3.24.1 Out of scope.

7.6.2.3.25 Access Control

7.6.2.3.25.1 Out of scope.

7.6.2.3.26 Supported References

Item No.	Reference	Protocol Status	Profile Status	ATN DUA	Predicate Name	Note
1	Self Reference	o	m	m		
2	Superior Reference	o	m	m		

Item No.	Reference	Protocol Status	Profile Status	ATN DUA	Predicate Name	Note
3	Immediate Superior Reference	o	m	m		
4	Subordinate Reference	o	m	m		
5	Non-Specific Subordinate Reference	o	m	m		
6	Cross Reference	o	o	o		
7	Supplier Reference	i	i	i		
8	Consumer Reference	i	i	i		

7.6.2.3.27 DUA Static Requirements Specific to ISP 15125-2

Note.— The following requirements are contained in ISO/IEC 15125-2 and are specific requirements placed on implementations by the ISP.

7.6.2.3.27.1 The DUAs shall conform to ISO/IEC ISP 15125-2 Section .5.2.

7.6.2.3.28 DUA Procedures Requirements Specific to ISP 15125-2

7.6.2.3.28.1 DUAs shall conform to ISO/IEC ISP 15125-2 Section 6.1.

7.6.2.3.29 DUA Support of DSA Responses Requirements Specific to ISP 15125-2

7.6.2.3.29.1 DUAs shall conform to ISO/IEC ISP 15125-2 Section 6.2.

7.6.2.3.30 DUA Referral Procedures Requirements Specific to ISP 15125-2

7.6.2.3.30.1 DUAs shall conform to ISO/IEC ISP 15125-2 Section 6.3.

7.6.2.3.31 DUA Search Continuation Reference Procedures Requirements Specific to ISP 15125-2

7.6.2.3.31.1 DUAs shall conform to ISO/IEC ISP 15125-2 Section 6.4.

7.6.2.3.32 DUA Loop Detection Procedures Requirements Specific to ISP 15125-2

7.6.2.3.32.1 DUAs shall conform to ISO/IEC ISP 15125-2 Section 6.5.

7.6.3 DUA Authentication as DAP Initiator

Note.— The primary DUA conformance requirements are specified in the Directory Standards as profiled in ADY11. The ATN application of this ISP is found in Section 7.x. The profile defined in ISO/IEC 15125-5 covers strong authentication and digital signature. The protocol specifications specify the use of particular elements concerned with the process of simple protected authentication, strong authentication, or digital signatures.

7.6.3.1 DUAs shall comply with the procedures specified in ISO/IEC 15125-5 Clause 5.

7.6.3. The ATN Directory DUAs shall conform to ISO/IEC 15125-5 as specified in Clause 6.

7.6.3.2 The ATN Directory DUA shall implement the security system in accordance with ISO/IEC 15125-5, Appendix A.3.1 as indicated in Table 7.6.3.2-1.

Note.— Table 7.6.3.2-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-5 (ADY41). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-5, and the column "ATN DUA" specifies the static capability of a DUA to convey and handle the specified protocol elements.

Table 7.6.3.2-1 DUA Implementation and/or System as Defined in ISP 15125-5

Ref. No.	Operation	Base	ISP	ATN DUA	Reference/ Predicate	Note
1	Supported Security Levels|-None	o.1	i	o		
1b	|-Simple	o.1	i	o		
1c	|-Protected Simple	o.1	i	o		
1d	|-Strong Authentication	o.1	i	m		
1	|-External	o.1	i			
2	Support of Strong Authentication on Bind Request |-One-way	o	o	o	oneWay	
2b	|-Two-way	o	o	m	twoWay	
2c	|-Three-way	-	-	m		Note 1
3	Support Strong Authentication on Bind Result	o	o	m	strongBindResult	
4	Support Signed Read Request	o	o	m	signReadReq	
5	Support Signed Read Result	o	o	m	signReadRes	
6	Support Signed Compare Request	o	o	m	signCompareReq	
7	Support Signed Compare Result	o	o	m	signCompareRes	
8	Support Signed List Request	o	o	m	signListReq	
9	Support Signed List Result	o	o	m	signListRes	
10	Support Signed Search Request	o	o	m	signSearchReq	
11	Support Signed Search Result	o	o	m	signSearchRes	
12	Support Signed Add Entry Request	o	o	m	signAddReq	

13	Support signed Remove Entry Request	o	o	m	signRemoveReq	
14	Support Signed Modify Entry Request	o	o	m	signModifyReq	
15	Support Signed ModifyDN Request	o	o	m	signModDNReq	
16	DUA support simple protected authenication in the initiator role	o	o	o	simpleProBindReq	
17	DUA support simple protected authentication in the responder role	o	o	o	simpleProDindRes	
18	DUA support simple unprotected authentication in the initiator role	o	o	o	simpleUnProBindReq	
19	DUA support simple unprotected authentication in the responder role	o	o	o	simpleUnProBindRes	
20	DUA support strong authentication in the initiator role	o	o	m	strongBindReq	
21	DUA support strong authentication in the responder role	o	o	m	strongDindRes	
22	DUA support commonly used Algorithms	o	o	m	commonAlgs	
23	Support for the generation of cerfication parth for strong authentication	o	o	m	certPath	
0	Support Certificate Format |-Version 1	c:m	c:m	o	strongDUA	default (1988)
24b	|-Version 2	c:m	c:m	o	strongDUA	v1 (1993)
24c	|-Version 3	o	o	m		Extensions
24d	|-Other	i	i	o		
25a	Support of Certificate Revocation List supported? |-Version 1	c:m	c:m	o	crl	1988
25b	|-Version 2	c:m	c:m	o	strongDUA	1993
25c	|-Version 3	o	o	m		Extension
25d	|-Other	i	i	o		

26	Support of Authority Revocation List			m	ar1	
27	DUA support the Distinguished encoding rules	c:m	c:m	c:m	strongDUA or signedOperations	Note 2

Note 3.— 0.1 - DUAs must support at least one of the protected simple or strong authentication.

Note 4.— Three-way authentication is not supported by the ISO/IEC 9564 standard.

Note 5.— DUAs must conform to the encoding rules as specified in Clause 9 of ISO/IEC xxxx (ITU Recommendation X.509).

7.6.3.3 The only application context supported is Directory Access application context.

7.6.3.4 The DUAs shall comply as a precondition to the operations requirements specified in Section xxx.

7.6.3.6 The ATN Directory DUA shall implement the Bind protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.1.1 as indicated in Table 7.6.3.6-1.

Note.—Table 7.6.3.6-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-5 (ADY41). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-5, and the column "ATN DUA" specifies the static capability of a DUA to convey and handle the specified protocol elements.

Table 7.6.3.6 -1 DUA Bind Protocol Elements as Specified in ISP 15125-5

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
1	DirectoryBindArgument	m	m	m	
2	credentials	c1	c1	c1	
3	simple	c:m	c:m	c:m	
4	name	m	m	m	
5	validity	c:m	c:m	c:m	
6	time1	o	m	m	
7	time2	o	o	o	
8	random1	o	m	m	
9	random2	o	o	o	
10	password	c:m	c:m	c:m	
11	unprotected	c2	c2	c2	
12	protected	c2m	c2m	c2m	
13	algorithmIdentifier	m	m	m	
14	encrypted	m	m	m	
15	strong	c:m	c:m	c:m	
16	certification-path	o	o.2	o.2	

17	bind-token	m	m	m	
18	toBeSigned	m	m	m	
19	algorithm	m	m	m	
20	name	m	m	m	
21	time	m	m	m	
22	random	m	m	m	
23	algorithmIdentifier	m	m	m	
24	encrypted	m	m	m	
25	name	o	o.2	o.2	
26	externalProcedure	i	i	i	
27	versions	m	m	m	

c1 if [simpleDUA, protectedDUA or strongDUA] then support of this feature is m else support is o.

c2 The password, for the DUA, may be unprotected or protected as described in Clause 8 of ISO/IEC 9594-3, and Clause 6 of ISO/IEC 9594-8.

o.2 At least one of the certification-path and name must always be present, and if both, then they must “agree”, i.e., indicate the same name.

7.6.3.7 The ATN Directory DUA shall implement the Bind protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.1.2 as indicated in Table 7.6.3.7-1.

Note.—Table 7.6.3.6-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-5 (ADY41). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-5, and the column "ATN DUA" specifies the static capability of a DUA to convey and handle the specified protocol elements.

Table 7.6.3.7 -1 DUA Bind Result Protocol Elements as Specified in ISP 15125-5

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
1	DirectoryBindArgument	m	m	m	
2	credentials	c1	c1	c1	

3	simple	c:m	c:m	c:m	
4	name	m	m	m	
5	validity	c:m	c:m	c:m	
6	time1	o	m	m	
7	time2	o	o	o	
8	random1	o	m	m	
9	random2	o	o	o	
10	password	c:m	c:m	c:m	
11	unprotected	c2:m	c2:m	c2:m	
12	protected	c2:m	c2:m	c2:m	
13	algorithmIdentifier	m	m	m	
14	encrypted	m	m	m	
15	strong	c:m	c:m	c:m	
16	certification-path	o	o.2	o.2	
17	bind-token	m	m	m	
18	toBeSigned	m	m	m	
19	algorithm	m	m	m	
20	name	m	m	m	
21	time	m	m	m	
22	random	m	m	m	
23	algorithmIdentifier	m	m	m	
24	encrypted	m	m	m	
25	name	o	o.2	o.2	
26	externalProcedure	i	i	i	
27	versions	m	m	m	

c1 if [simpleDUA, protectedDUA or strongDUA] then support of this feature is m else support is o.

c2 The password, for the DUA, may be unprotected or protected as described in Clause 8 of ISO/IEC 9594-3, and Clause 6 of ISO/IEC 9594-8.

o.2 At least one of the certification-path and name must always be present, and if both, then they must “agree”, i.e., indicate the same name.

7.6.3.8 The ATN Directory DUA shall implement the Bind Error protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.1.3 as indicated in Table 7.6.3.7-1.

Note.—Table 7.6.3.8-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-5 (ADY41). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-5, and the column "ATN DUA" specifies the static capability of a DUA to convey and handle the specified protocol elements.

Table 7.6.3.8 -1 DUA Bind Error Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	directoryBindError	m	mo	m	
2	versions	m	m	m	Default (v1)
3	serviceError	m	m	m	unavailable
4	securityError	m	m	m	inappropriateAuthentication or invalid Credentials

7.6.3.9 The ATN Directory DUA shall implement the Read protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.3 as indicated in Table 7.6.3.9-1.

Table 7.6.3.9 -1 DUA Read Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN Directory	
1	read	c:m	c:m	c:m	
2	ReadArgument	m	m	m	
3	unsigned	m	m	m	

4	argument (ReadArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ReadArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	ReadResult	c:m	c:m	c:m	
11	unsigned	m	m	m	
13	signed	c:m	c:m	c:m	
14	toBeSigned	m	m	m	
15	result (ReadResult)	m	m	m	
16	algorithmIdentifier	m	m	m	
17	encrypted	m	m	m	
18	Errors	i	i	i	

7.6.3.10 The ATN Directory DUA shall implement the Compare protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.4 as indicated in Table 7.6.3.10-1.

Table 7.6.3.10 -1 DUA Compare Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN Directory	
1	compare	c:m	c:m	c:m	
2	CompareArgument	m	m	m	
3	unsigned	m	m	m	

4	argument (ReadArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ReadArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	CompareResult	c:m	c:m	c:m	
11	unsigned	m	m	m	
13	signed	c:m	c:m	c:m	
14	toBeSigned	m	m	m	
15	result (CompareResult)	m	m	m	
16	algorithmIdentifier	m	m	m	
17	encrypted	m	m	m	
18	Errors	i	i	i	

7.6.3.11 The ATN Directory DUA shall implement the List protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.3 as indicated in Table 7.6.3.9-1.

Table 7.6.3.11 -1 DUA List Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	list	c:m	c:m	c:m	
2	ListArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (ListArgument)	m	m	m	

5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ListArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	ListResult	c:m	c:m	c:m	
11	unsigned	m	m	m	
13	signed	c:m	c:m	c:m	
14	toBeSigned	m	m	m	
15	result (ListResult)	m	m	m	
16	algorithmIdentifier	m	m	m	
17	encrypted	m	m	m	
18	Errors	i	i	i	

7.6.3.12 The ATN Directory DUA shall implement the Search protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.7 as indicated in Table 7.6.3.12-1.

Table 7.6.3.12 -1 DUA Search Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	search	c:m	c:m	c:m	
2	SearchArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (SearchArgument)	m	m	m	
5	signed	c:m	c:m	c:m	

6	toBeSigned	m	m	m	
7	argument (SearchArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	SearchResult	c:m	c:m	c:m	
11	unsigned	m	m	m	
13	signed	c:m	c:m	c:m	
14	toBeSigned	m	m	m	
15	result (SearchResult)	m	m	m	
16	algorithmIdentifier	m	m	m	
17	encrypted	m	m	m	
18	Errors	i	i	i	

7.6.3.13 The ATN Directory DUA shall implement the Add Entry protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.8 as indicated in Table 7.6.3.13-1.

Table 7.6.3.13 -1 DUA Add Entry Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	addEntry	c:m	c:m	c:m	
2	AddEntryArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (AddEntryArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	

7	argument (ReadArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	Errors	i	i	i	

7.6.3.14 The ATN Directory DUA shall implement the Remove Entry protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.9 as indicated in Table 7.6.3.14-1.

Table 7.6.3.14 -1 DUA Remove Entry Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	addEntry	c:m	c:m	c:m	
2	AddEntryArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (AddEntryArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ReadArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	Errors	i	i	i	

7.6.3.15 The ATN Directory DUA shall implement the Modify Entry protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.10 as indicated in Table 7.6.3.15-1.

Table 7.6.3.15 -1 DUA Modify Entry Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	modifyEntry	c:m	c:m	c:m	
2	ModifyEntryArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (ModifyEntryArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ModifyEntryArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	Errors	i	i	i	

7.6.3.16 The ATN Directory DUA shall implement the Modify DN Entry protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.11 as indicated in Table 7.6.3.16-1.

Table 7.6.3.16 -1 DUA Modify DN Entry Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN DUA	Notes
1	modifyDNEntry	c:m	c:m	c:m	
2	ModifyDNArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (ModifyDNArgument)	m	m	m	
5	signed	c:m	c:m	c:m	

6	toBeSigned	m	m	m	
7	argument (ModifyDNArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	Errors	i	i	i	

7.7.1 DSA Support of Directory Access

Note.— Profile ISO/IEC ISP 15125-3 defines the behavior of a DSA regarding the operation of the Directory Access Protocol (DAP) for communicating with a DUA. It covers the DSA performing the responder role of DAP, receiving the invocation of an operation from a DSA, and responding with a result or error response. This profile defines the capabilities and constraints on support for DAP by DSAs so that DUAs are able to interwork with the Directory Service.

7.7.1.1 DSA implementations shall conform to all requirements of clause 9.2 in [ISO/IEC 9594-5 : 1993 | ITU-T Rec. X.519 (1995)] applicable to a DSA implementing the **directorySystemAC** application context, including the requirements directly and indirectly referenced by that clause.

7.7.1.2 DSA Dynamic Requirements

7.7.1.2.1 APDU size

7.7.1.2.1.2 ***Recommendation*** --When an oversize request APDU is received or an oversize response APDU would be sent, it may be discarded, and the appropriate error (i.e., Service Error "**unwillingToPerform**" or "**administrativeLimitExceeded**") should be returned

Note 1.—A DSA may be operated with administrative limits on APDU size lower than those specified in the static conformance requirements. The possible effects on distributed operations should be considered in establishing such limits.

Note 2.—ISO/IEC ISP 15125-3 does not impose constraints on the actions of the supporting layers upon receiving APDUs in excess of the limits specified.

7.7.1.2.2 Filter Constraints

7.7.1.2.2.1 Each DSA shall support at least 32 FilterItems in a SearchArgument.

7.7.1.2.2.2 Each DSA shall support the nesting of at least eight levels deep for any possible combination of elements of the Filter (i.e., Choice of item, and or, and not).

Note.—An implementation may constrain the deepest of the eight levels to be an item.

7.7.1.2.2.3 When a request exceeding the filter constraints is received, the DSA may refuse to perform the request if the DSA reaches the operation evaluation phase, in which case the **serviceError** response shall be **ServiceProblem**, **unwillingToPerform**.

7.7.1.2.2.4 A DSA shall support search strings ("initial", "any", or "final" elements) of at least 1024 characters. For approximate matching, a DSA is not required to use any matching rule other than the relevant equality matching rule.

7.7.1.2.3 All DSAs shall support either the performer role or both performer and invoker role.

7.7.1.3 DSA Capabilities and Options as Specified in ISO/IEC ISP 15125-3

7.7.1.3.1 Supported application context

7.7.1.3.3.1 The Directory AccessAC application context shall be supported.

7.7.1.3.2 Operations and Extensibility

7.7.1.3.2.1 Operations

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	DirectoryBind	m	m	m		
2	DirectoryUnbind	m	m	m		
3	Read	m	m	m		
4	Compare	m	m	m		
5	Abandon	m	m	m		Note
6	List	m	m	m		
7	Search	m	m	m		
8	AddEntry	m	m	m		
9	RemoveEntry	m	m	m		

10	ModifyEntry	m	m	m		
11	ModifyDN	m	m	m		

Note.— The Abandon operation can only be supported if the asynchronous mode (ROSE class 2) of operation is supported in Items A.3.1/6 for DSA .

7.7.1.3.2.2 Extensibility

Note.— This table defines a number of extensions which are available in the 1993 edition of the Directory. The supplier of the implementation shall indicate in the following table, which extensions for which conformance is claimed.

Item No.	Extension	Base	ISP	ATN DSA	Predicate	Note
1	subentries	o	o	o	subentries	
2	copyShallDo	o	o	o	copyShallDo	
3	attributeSizeLimit	o	o	o	attributeSizeLimit	
4	extraAttributes	o	o	o	extraAttributes	
5	modifyRightsRequest	m	m	m	modifyRightsRequest	
6	pagedResultsRequest	o	o	o	pagedResultsRequest	
7	matchValuesOnly	o	o	o	matchValuesOnly	
8	extendedFilter	o	o	o	extendedFilter	
9	targetSystem	o	o	o	targetSystem	
10	useAliasOnUpdate	o	o	o	useAliasonUpdate	
11	newSuperior	o	o	o	newSuperior	

7.7.1.3.3 Protocol Elements

7.7.1.3.3.1 Directory Bind Elements

7.7.1.3.3.1.1 Directory Bind Arguments

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	DirectoryBindArgument	m	m	m		
2	credentials	c1	c1	c1		
3	simple	c:m	c:m	c:m	Simple-DSA	
4	name	m	m	m		
5	validity	o	o	o		
6	time1	o	o	o		

7	time2	o	o	o		
8	random1	o	o	o		
9	random2	o	o	o		
10	password	o	o	o		
11	unprotected	o.2	o.2	o.2		
12	protected	o.2	o.2	o.2		Note
13	strong	c:m	c:m	c:m	Strong-DSA	Note
14	externalProcedure	i	i	i		
15	versions	m	m	m		Default (v1)

c1 If [Simple-DSA or Strong-DSA] then support of this feature is m else support is o.

o.2 The password, for the DSA, may be unprotected or protected as described in clause 8 of ISO/IEC 9594-3, and clause 6 of ISO/IEC 9594-8.

Note.— Refer to ISO/IEC ISP 15125-6 (ADY42).

7.7.1.3.3.1.2 Directory Bind Result

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	DirectoryBindResult	m	m	m		
2	credentials	c1	c1	c1		
3	simple	c:m	c:m	c:m	Simple-DSA	
4	name	m	m	m		
5	validity	o	o	o		
6	time1	o	o	o		
7	time2	o	o	o		
8	random1	o	o	o		
9	random2	o	o	o		
10	password	o	o	o		
11	unprotected	o.2	o.2	o.2		
12	protected	o.2	o.2	o.2		Note
13	strong	c:m	c:m	c:m	Strong-DSA	Note
14	externalProcedure	o	i	i		
15	versions	m	m	m		Default (v1)

c1 If [Simple-DSA or Strong-DSA] then support of this feature is m else support is o.

o.2 The password, for the DSA, may be unprotected or protected as described in clause 8 of ISO/IEC 9594-3, and clause 6 of ISO/IEC 9594-8.

Note.— Refer to ADY42

7.7.1.3.3.1.3 Directory Bind Error

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	directoryBindError	m	m	m		
2	versions	m	m	m		Default (v1)

3	error	m	m	m		
4	serviceError	m	m	m		unavailable
5	securityError	m	m	m		inappropriateAuthentication invalidCredentials

7.7.1.3.3.2 Directory Unbind Elements

Note.— DirectoryUnbind has no arguments (see Section 8.2 of ISO/IEC 9594-3)

7.7.1.3.3.3 Read Elements

Item No.	Protocol Element	Base	ISP	ATN DSA	ReferencePredicate	Note
1	read	m	m	m		
2	ReadArgument	m	m	m		
3	unsigned	m	m	m		
4	object	m	m	m		
5	selection	m	m	m		d({})
6	modifyRightsRequest	m	m	m		d(false)
7	CommonArguments	m	m	m		See 7.7.1.3.3.13
8	signed	o	o	m		
9	ToBeSigned	m	m	m		
10	object	m	m	m		
11	selection	m	m	m		d({})
12	modifyRightsRequest	m	m	m		d(false)
13	CommonArguments	m	m	m		See 7.7.1.3.3.13
14	algorithmIdentifier	m	m	m		
15	encrypted	m	m	m		
16	ReadResult	m	m	m		
17	unsigned	m	m	m		
18	entry	m	m	m		
19	modifyRights	o	m	m		
20	item	m	m	m		
21	entry	m	m	m		
22	attribute	m	m	m		
23	value	m	m	m		
24	permission	m	m	m		
25	CommonResults	m	m	m		See 7.7.1.3.3.14
26	signed	o	o	m		
27	toBeSigned	m	m	m		
28	entry	m	m	m		

29	modifyRights	o	m	m		
30	item	m	m	m		
31	entry	m	m	m		
32	attribute	m	m	m		
33	value	m	m	m		
34	permission	m	m	m		
35	CommonResults	m	m	m		See 7.7.1.3.3.14
36	algorithmIdentifier	m	m	m		
37	encrypted	m	m	m		
38	Errors	m	m	m		See 7.7.1.3.3.12

7.7.1.3.3.4 Compare Elements

Item No.	Protocol Element	D	P	Predicate	Note
1	compare	m	m		
2	CompareArgument	m	m		
3	unsigned	m	m		
4	object	m	m		
5	purported	m	m		
6	CommonArguments	m	m		
7	signed	o	o		
8	toBeSigned	m	m		
9	object	m	m		
10	purported	m	m		
11	CommonArguments	m	m		
12	algorithmIdentifier	m	m		
13	encrypted	m	m		
14	CompareResult	m	m		
15	unsigned	m	m		
16	name	o	m		
17	matched	m	m		
18	fromEntry	m	m		
19	matchedSubtype	o	m		
20	CommonResults	m	m		
21	signed	o	o		
22	toBeSigned	m	m		
23	name	o	m		
24	matched	m	m		
25	fromEntry	m	m		
26	matchedSubtype	o	m		
27	CommonResults	m	m		

28	algorithmIdentifier	m	m		
29	encrypted	m	m		
30	Errors	m	m		

7.7.1.3.3.5 Abandon Elements

Item No.	Protocol Element	Base	ISP	ATN DSA	Predictate	Notes
1	abandon	m	m	m		
2	AbandonArgument	m	m	m		
3	invokeID	m	m	m		
4	AbandonResult	m	m	m		
5	Errors	m	m	m		AbandonFailederror

7.7.1.3..3.6 List Elements

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	list	m	m	m		
2	ListArgument	m	m	m		
3	unsigned	m	m	m		
4	object	m	m	m		
5	pagedResults	o	m	m		
6	CommonArguments	m	m	m		See 7.7.1.3.3.13
7	signed	o	o	m		
8	toBeSigned	m	m	m		
9	object	m	m	m		
10	pagedResults	o	m	m		
11	CommonArguments	m	m	m		See 7.7.1.3.3.13
12	algorithmIdentifier	m	m	m		
13	encrypted	m	m	m		
14	ListResult	m	m	m		
15	unsigned	m	m	m		
16	listInfo	m	m	m		
17	name	o	m	m		
18	subordinates	m	m	m		
19	rdn	m	m	m		
20	aliasEntry	o	m	m		d(false)
21	fromEntry	o	m	m		d(true)
22	partialOutcomeQualifier	o	o	m		
23	limitProblem	o	o	m		

24	timeLimitExceeded	m	m	m		
25	sizeLimitExceeded	m	m	m		
26	administrativeLimitExceeded	m	m	m		
27	unexplored	o	m	m		
28	unavailableCriticalExtensions	m	m	m		d(false)
29	unknownErrors	o	o	m		
30	queryReference	o	c:m	m	pagedResults Request	
31	CommonResults	m	m	m		See 7.7.1.3.3.14
32	uncorrelatedListInfo	o	o	o		
33	signed	o	o	o		
34	toBeSigned	m	m	m		
35	listInfo	m	m	m		
36	name	o	m	m		
37	subordinates	m	m	m		
38	rdn	m	m	m		
39	aliasEntry	o	m	m		d(false)
40	fromEntry	o	m	m		d(true)
41	partialOutcomeQualifier	o	o	o		
42	limitProblem	o	o	o		
43	timeLimitExceeded	m	m	m		
44	sizeLimitExceeded	m	m	m		
45	administrativeLimitExceeded	m	m	m		
46	unexplored	o	m	m		
47	unavailableCriticalExtensions	m	m	m		d(false)
48	unknownErrors	o	o	o		
49	queryReference	o	c:m	m	pagedResults Request	
50	CommonResults	m	m	m		Ref. A.4.3.14
51	uncorrelatedListInfo	c2	m	m		
52	algorithmIdentifier	m	m	m		
53	encrypted	m	m	m		
54	Errors	m	m	m		Ref. A.4.3.12

c2: If item A.1.2/7 indicates that the DSA is a “Cooperating” DSA then support of this feature is m else support is o.

7.7.1.3.3.7 Search Elements

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	search	m	m	m		
2	SearchArgument	m	m	m		
3	unsigned	m	m	m		
4	baseObject	m	m	m		
5	subset	m	m	m		d(0)
6	filter	m	m	m		d(and{})
7	searchAliases	m	m	m		d(true)
8	selection	m	m	m		d({})
9	pagedResults	o	m	m		
10	matchedValuesOnly	c:m	c:m	c:m	matchedValuesOnly	d(false)
11	extendedFilter	c:m	c:m	c:m	extendedFilter	
12	CommonArguments	m	m	m		See 7.7.1.3.3.13
13	signed	o	o	m		
14	toBeSigned	m	m	m		
15	baseObject	m	m	m		
16	subset	m	m	m		d(0)
17	filter	m	m	m		d(and{})
18	searchAliases	m	m	m		d(true)
19	selection	m	m	m		d({})
20	pagedResults	o	m	m		
21	matchedValuesOnly	c:m	c:m	c:m	matchedValuesOnly	d(false)
22	extendedFilter	c:m	c:m	c:m	extendedFilter	
23	CommonArguments	m	m	m		See 7.7.1.3.3.13
24	algorithmIdentifier	m	m	m		
25	encrypted	m	m	m		
26	SearchResult	m	m	m		
27	unsigned	m	m	m		
28	searchInfo	m	m	m		
29	name	o	m	m		
30	entries	m	m	m		
31	partialOutcomeQualifier	o	m	m		
32	limitProblem	o	m	m		
33	timeLimitExceeded	m	m	m		
34	sizeLimitExceeded	m	m	m		

35	administrativeLimitExceeded	m	m	m		
36	unexplored	o	m	m		
37	unavailableCriticalExtensions	m	m	m		d(false)
38	unknownErrors	o	m	m		
39	queryReference	o	c:m	c:m	pagedResultsRequest	
40	CommonResults	m	m	m		See 7.7.1.3.3.14
41	uncorrelatedSearchInfo	c2	m	m		
42	signed	o	o	o		
43	toBeSigned	m	m	m		
44	searchInfo	m	m	m		
45	name	o	m	m		
46	entries	m	m	m		
47	partialOutcomeQualifier	o	m	m		
48	limitProblem	o	m	m		
49	timeLimitExceeded	m	m	m		
50	sizeLimitExceeded	m	m	m		
51	administrativeLimitExceeded	m	m	m		
52	unexplored	o	m	m		
53	unavailableCriticalExtensions	m	m	m		d(false)
54	unknownErrors	o	m	m		
55	queryReference	o	c:m	c:m	pagedResultsRequest	
56	CommonResults	m	m	m		See 7.7.1.3.3.14
57	uncorrelatedSearchInfo	c2	m	m		
58	algorithmIdentifier	m	m	m		
59	encrypted	m	m	m		
60	Errors	m	m	m		See 7.7.1.3.3.12

c2: If item A.1.2/7 indicates that the DSA is a “Cooperating” DSA then support of this feature is m else support is o.

7.7.1.3.3.8 Add Entry Elements

Item No.	Protocol Element	D	P	ATN DSA	Predicate	Note
1	addEntry	m	m	m		
2	AddEntryArgument	m	m	m		
3	unsigned	m	m	m		
4	object	m	m	m		
5	entry	m	m	m		
6	targetSystem	c:m	c:m	c:m	targetSystem	
7	CommonArguments	m	m	m		See 7.7.1.3.3.13
8	signed	o	o	o		
9	toBeSigned	m	m	m		
10	object	m	m	m		
11	entry	m	m	m		
12	targetSystem	c:m	c:m	c:m	targetSystem	
13	CommonArguments	m	m	m		See 7.7.1.3.3.13
14	algorithmIdentifier	m	m	m		
15	encrypted	m	m	m		
16	AddEntryResult	m	m	m		NULL
17	Errors	m	m	m		See 7.7.1.3.3.12

7.7.1.3.3.9 Remove Entry Elements

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	removeEntry	m	m	m		
2	RemoveEntryArgument	m	m	m		
3	unsigned	m	m	m		
4	object	m	m	m		
5	CommonArguments	m	m	m		See 7.7.1.3.3.13
6	signed	o	o	o		
7	toBeSigned	m	m	m		
8	object	m	m	m		
9	CommonArguments	m	m	m		See 7.7.1.3.3.13
10	algorithmIdentifier	m	m	m		
11	encrypted	m	m	m		
12	RemoveEntryResult	m	m	m		NULL

13	Errors	m	m	m		See 7.7.1.3.3.12

7.7.1.3.3.10 Modify Entry Elements

Item No.	Protocol Element	D	P	ATN DSA	Predicate	Note
1	modifyEntry	m	m	m		
2	ModifyEntryArgument	m	m	m		
3	unsigned	m	m	m		
4	object	m	m	m		
5	changes	m	m	m		
6	addAttribute	m	m	m		
7	removeAttribute	m	m	m		
8	addValues	m	m	m		
9	removeValues	m	m	m		
10	CommonArguments	m	m	m		See 7.7.1.3.3.13
11	signed	o	o	o		
12	toBeSigned	m	m	m		
13	object	m	m	m		
14	changes	m	m	m		
15	addAttribute	m	m	m		
16	removeAttribute	m	m	m		
17	addValues	m	m	m		
18	removeValues	m	m	m		
19	CommonArguments	m	m	m		See 7.7.1.3.3.13
20	algorithmIdentifier	m	m	m		
21	encrypted	m	m	m		
22	ModifyEntryResult	m	m	m		NULL
23	Errors	m	m	m		See 7.7.1.3.3.1.12

7.7.1.3.3.11 ModifyDN Elements

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	modifyDN	m	m	m		
2	ModifyDNArgument	m	m	m		
3	unsigned	m	m	m		

4	object	m	m	m		
5	newRDN	m	m	m		
6	deleteOldRDN	o	m	m		d(false)
7	newSuperior	c:m	c:m	c:m	newSuperior	
8	CommonArguments	m	m	m		See 7.7.1.3.3.13
9	signed	o	o	m		
10	toBeSigned	m	m	m		
11	object	m	m	m		
12	newRDN	m	m	m		
13	deleteOldRDN	o	m	m		d(false)
14	newSuperior	c:m	c:m	c:m	newSuperior	
15	CommonArguments	m	m	m		See 7.7.1.3.3.13
16	algorithmIdentifier	m	m	m		
17	encrypted	m	m	m		
18	ModifyDNResult	m	m	m		NULL
19	Errors	m	m	m		See 7.7.1.3.3.12

7.7.1.3.3.12 Errors and Parameters

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	Abandoned	m	m	m		
2	AbandonFailed	m	m	m		
3	problem	m	m	m		
4	noSuchOperation	m	m	m		
5	tooLate	m	m	m		
6	cannotAbondon	m	m	m		
7	operation	m	m	m		
8	AttributeError	m	m	m		
9	object	m	m	m		
10	problems	m	m	m		
11	problem	m	m	m		
12	noSuchAttributeOrValue	m	m	m		
13	invalidAttributeSyntax	m	m	m		
14	undefinedAttributeType	m	m	m		
15	inappropriateMatching	m	m	m		
16	constraintViolation	m	m	m		
17	attributeOrValueAlreadyExists	m	m	m		

18	type	m	m	m		
19	value	o	m	m		
20	NameError	m	m	m		
21	problem	m	m	m		
22	noSuchObject	m	m	m		
23	aliasProblem	m	m	m		
24	invalidAttributeSyntax	m	m	m		
25	aliasDereferencingProblem	m	m	m		
26	matched	m	m	m		
27	Referral	c2	m	m		
28	candidate	m	m	m		
29	SecurityError	m	m	m		
30	problem	m	m	m		
31	InappropriateAuthentication	m	m	m		
32	invalidCredentials	m	m	m		
33	insufficientAccessRights	m	m	m		
34	invalidSignature	m	m	m		
35	protectionRequired	m	m	m		
36	noInformation	m	m	m		
37	ServiceError	m	m	m		
38	problem	m	m	m		
39	busy	m	m	m		
40	unavailable	m	m	m		
41	unwillingToPerform	m	m	m		
42	chainingRequired	m	m	m		
43	unableToProceed	m	m	m		
44	invalidReference	m	m	m		
45	timeLimitExceeded	m	m	m		
46	administrativeLimitExceeded	m	m	m		
47	loopDetected	m	m	m		
48	unavailableCriticalExtension	m	m	m		
49	outOfScope	m	m	m		
50	ditError	m	m	m		
51	invalidQueryReference	m	m	m		
52	UpdateError	m	m	m		
53	problem	m	m	m		
54	namingViolation	m	m	m		
55	objectClassViolation	m	m	m		
56	notAllowedOnNonLeaf	m	m	m		
57	notAllowed OnRDN	m	m	m		
58	entryAlreadyExists	m	m	m		
59	affectsMultipleDSAs	m	m	m		
60	objectClassModificationProhibited	m	m	m		

c2: If item A.1.2/7 indicates that the DSA is a "Cooperating" DSA then support of this feature is m else support is o.

7.7.1.3.3.13 Common Arguments Elements

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	CommonArguments	m	m	m		
2	serviceControls	m	m	m		d({})
3	securityParameters	o	c:m	m	Strong-DSA	
4	requestor	o	o	o		Note 1
5	operationProgress	m	m	m		d(nameResolution Phase NotStarted)
6	nameResolutionPhase	o	o	o		
7	notStarted	m	m	m		
8	proceeding	m	m	m		
9	completed	m	m	m		
10	nextRDNToBeResolved	o	m	m		
11	aliasedRDNs	o	o	o		Note 2
12	criticalExtensions	o	m	m		
13	referenceType	o	m	m		
14	entryOnly	m	m	m		d(true)
15	exclusions	o	m	m		
16	nameResolveOnMaster	m	m	m		d(false)

Note 1.— This parameter may be ignored unless the request is signed.

Note 2.— This parameter is only present when communicating with 1988 implementations.

7.7.1.3.3.14 Common Results Elements

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	CommonResults	m	m	m		
2	securityParameters	c:m	c:m	m	Strong-DSA	
3	performer	o	o	o		
4	aliasDereferenced	o	m	m		d(false)

7.7.1.3.3.15 Service Controls

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	ServiceControls	m	m	m		
2	options	m	m	m		d({})
3	preferChaining	m	m	m		
4	chainingProhibited	m	m	m		
5	localScope	m	m	m		
6	dontUseCopy	m	m	m		
7	dontDereferenceAliases	m	m	m		
8	subentries	m	m	m		
9	copyShallDo	m	m	m		
10	priority	o	m	m		d(medium)
11	timeLimit	o	m	m		
12	sizeLimit	o	m	m		
13	scopeOfReferral	o	m	m		
14	attributeSizeLimit	c:m	c:m	c:m	attributeSizeLimit	

7.7.1.3.3.16 Entry Information Selection

Item No.	Protocol Element	D	P	ATN DSA	Predicate	Note
	EntryInformationSelection	m	m	m		
2	attributes	m	m	m		d(allUserAttributes)
3	allUserAttributes	m	m	m		
4	select	m	m	m		
5	infoTypes	m	m	m		d(attributeTypesAndValues)
6	attributeTypesOnly	m	m	m		
7	attributeTypesAndValues	m	m	m		
8	extraAttributes	o	m	m		
9	allOperationalAttributes	m	m	m		
10	select	m	m	m		

7.7.1.3.3.17 Entry Information

Item No.	Protocol Element	D	P	ATN DSA	Predicate	Note
1	EntryInformation	m	m	m		
2	name	m	m	m		
3	fromEntry	m	m	m		d(true)
4	information	o	m	m		
5	attributeType	m	m	m		
6	attribute	m	m	m		
7	incompleteEntry	m	m	m		d(false)

7.7.1.3.3.18 Filter Elements

Item No.	Protocol Element	D	P	ATN DSA	Predicate	Note
1	Filter	m	m	m		
2	item	m	m	m		
3	and	m	m	m		
4	or	m	m	m		
5	not	m	m	m		

7.7.1.3.3.19 Filter Item Elements

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	FilterItem	m	m	m		
2	equality	m	m	m		
3	substrings	m	m	m		
4	type	m	m	m		
5	strings	m	m	m		
6	intial	m	m	m		
7	any	m	m	m		
8	final	m	m	m		
9	greaterOrEqual	m	m	m		
10	lessOrEqual	m	m	m		
11	present	m	m	m		
12	approximateMatch	m	m	m		
13	extensibleMatch	m	m	m		
14	matchingRule	m	m	m		

15	type	m	m	m		
16	matchValue	m	m	m		
17	dnAttributes	m	m	m		d(false)

7.7.1.3.3.20 Paged Results

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	PagedResultsRequest	m	m	m	pagedResultsRequest	
2	newRequest	m	m	m		
3	pageSize	m	m	m		
4	sortkeys	o	o	o		
5	type	m	m	m		
6	orderingRule	o	o	o		
7	reverse	m	m	m		d(false)
8	unmerged	m	m	m		d(false)
9	queryReference	m	m	m		

7.7.1.3.3.21 Continuation Reference

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	ContinuationReference	c2	m	m		
2	targetObject	m	m	m		
3	alaisedRDNs	o	m	m		
4	operationProgress	m	m	m		
5	nameResolutionPhase	m	m	m		
6	notStarted	m	m	m		
7	proceeding	m	m	m		
8	completed	m	m	m		
9	nextRDNToBeResolved	o	m	m		
10	rdnsResolved	o	m	m		
11	referenceType	m	m	m		
12	accessPoints	m	m	m		
13	MasterOrShadowAccessPoint	m	m	m		
14	AccessPoint	m	m	m		
15	ae-title	m	m	m		

16	address	m	m	m		
17	pSelector	m	m	m		
18	sSelector	m	m	m		
19	tSelector	m	m	m		
20	nAddresses	m	m	m		
21	protocolInformation	o	o	o		
22	category	m	m	m		d(master)
23	master	m	m	m		
24	shadow	m	m	m		
25	additionalPoints	o	o	o		
26	entryOnly	m	m	m		d(false)
27	exclusions	o	m	m		
28	returnToDUA	m	m	m		d(false)
29	nameResolveOnMaster	m	m	m		d(false)

c2: If Item A.1.2/7 indicates that the DSA is a "Cooperating" DSA then support of this feature is m else support is o.

7.7.1.3.3.22 Security Parameters

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	SecurityParameters	c6	c6	c6		
2	certification-path	c7	c7	c7		See 7.7.3
3	name	o	m	m		
4	time	o	m	m		
5	random	o	m	m		
6	target	o	o	o		

c6: If [Strong-DSA] then m else support is -.

c7: If the argument or result is to be signed then support of this parameter is m else support is o.

7.7.1.3.3.23 CertificationPath

Item No.	Protocol Element	Base	ISP	ATN DSA	Predicate	Note
1	CertificationPath	c8	c8	c8		
2	Certificate	m	m	m		
3	toBeSigned	m	m	m		
4	algorithmIdentifier	m	m	m		
5	encrypted	m	m	m		
6	version	m	m	m		d(v1)
7	serialNumber	m	m	m		
8	signature	m	m	m		
9	algorithm	m	m	m		
10	parameters	m	m	m		
11	issuer	m	m	m		
12	validity	m	m	m		
13	notBefore	m	m	m		
14	notAfter	m	m	m		
15	subject	m	m	m		
16	subjectPublicKeyInfo	m	m	m		
17	algorithm	m	m	m		
18	subjectPublicKey	m	m	m		
19	issuerUniqueIdentifier	o	o	o		Note
20	subjectUniqueIdentifier	o	o	o		Note
21	extensions	c9	c9	c9		
22	extnID	c9	c9	c9		

23	critical	c9	c9	c9		
24	extnValue	c9	c9	c9		
25	CertificatePair	o	o	o		
26	forward	o.3	o.3	o.3		
27	reverse	o.3	o.3	o.3		

c8: If [A.4.3.1.1/10 or A.4.3.1.2/10 or A.4.3.22/1] then support is m else support is o.

c9: If version3 then m else o.

o.3: At least one of the pair shall be present as specified in ITU-T Rec. X.509, Clause 8.

Note.— If present, version must be 2 or 3.

7.7.2 DSA Support of Distributed Operations

Note.— The use of the DAP by a DSA which invokes an operation on a DSA and receives a response or an error is specified in ISO/IEC ISP 10615-4 (for 1988) and ISO/IEC ISP 15125-4 (for 1993). This Section further refines the specification in the ISP by limiting the use of DAP to the requirements of the ATN.

7.7.2.1 DSA Static Requirements

7.7.2.1.1 DSAs shall support either the performer role, or both performer and invoker roles.

7.7.2.1.2 DSAs shall be able to use the referral mode of interaction, even if it only supports the DirectorySystemAC application context.

7.7.2.1.3 DSAs shall be capable of handling APDUs of at least 1Mb.

7.7.2.1.4 Security Level

7.7.2.1.4.1 DSAs shall be able to carry out the peer entity authentication of DSAs by the following ways:

1) None,
2) Simple authentication with unprotected password,
3) Simple authentication without password,
4) Simple protected authentication, and
5) Strong authentication.

Note 1.— Simple authentication, with protected and unprotected passwords, and strong authentication are profiled in paragraph 7.x.x.xx.

7.7.2.1.5 Elements of Operation

7.7.2.1.5.1 Reference Types

7.7.2.1.5.1.1 DSAs shall hold and use reference types as indicated in Table 7.7.2.1.5.1.1-1.

Table 7.7.2.1.5.1.1-1 Reference Types

Reference types	Holding and using capability	Notes
Superior reference	Mandatory	Non-first-level DSAs shall hold precisely one single Superior Reference. All DSAs shall be capable of acting as a non-first-level DSA, and so are required to support a Superior Reference.

Subordinate reference	Mandatory	
Cross-reference	Optional	Support of Cross References may be required for particular configurations of DSA.
Non-specific Subordinate reference	Optional	
Supplier reference	Conditional	This form or reference is applicable to DSAs that support shadowing as shadow consumers; such DSAs must support a Supplier Reference.
Master reference	Conditional	This form or reference is only applicable to DSAs that support shadowing as shadow consumers; such DSAs may optionally support a Supplier Reference.
Immediate superior reference	Conditional	Applicable to DSAs that support Hierarchical Operational Bindings as the subordinate DSA

7.7.2.1.5.1.2 DSAs shall be capable of holding and using a (single) Superior Reference.

Note.— DSAs may optionally be able to hold and use Cross References.

7.7.2.2 Dynamic Requirements

7.7.2.2.1 DSAs shall conform to the dynamic requirements as specified in Clause 5.3 of ISO/IEC ISP 15125-4.

7.7.2.2.2 DSAs shall conform to the error requirements as specified in Clause 5.4 of ISO/IEC ISP 15125-4.

7.7.2.2.3 DSAs shall use A-ABORT to disconnect from other DSAs as specified in Clause 5.6 of ISO/IEC ISP 15125-4.

7.7.2.2.4 DSAs shall conform to the requirements specified in Clause 7.1.2 for knowledge references and root context.

7.7.2.2.5 DSAs shall conform to the requirements specified in ISO/IEC ISP 15125-4 Clause 7.2 for administrative authorities.

7.7.2.2.6 DSAs shall conform to the requirements specified in ISO/IEC ISP 15125-4 Clause 8 for operations requirements.

7.7.2.3 Operations

7.7.2.3.1 DSAs shall conform to ISO/IEC ISP 15125-4 as indicated in Table 7.7.2.3.1-1.

Table 7.7.2.3.1-1 Operations

Item No.	Protocol Element	D Init	D Resp	P Rel	P Act	P Resp	A Rel	A Act	A Resp	Reference/notes
1	DirectoryBind	m	m	c4	c4	m				Note 1
2	DirectoryUnbind	m	m	c4	c4	m				Note 1
3	ChainedRead	m	m	c4	c4	m				Note 1
4	ChainedCompare	m	m	c4	c4	m				Note 1
5	ChainedAbandon	m	m	c4	c4	m				Note 1
6	ChainedList	m	m	c4	c4	m				Note 1
7	ChainedSearch	m	m	c4	c4	m				Note 1
8	ChainedAddEntry	m	m	c4	c4	m				Note 1
9	ChainedRemoveEntry	m	m	c4	c4	m				Note 1
10	ChainedModifyEntry	m	m	c4	c4	m				Note 1
11	ChainedModifyDN	m	m	c4	c4	m				Note 1

Conditionals:

c4: if p_invoker then m else o

Note.— The PICS doesn't distinguish between the relaying and acting role.

7.7.2.4 Protocol Elements

7.7.2.4.1.1 DSA Bind Arguments

7.7.2.4.1.1.1 The ATN Directory shall conform to ISO/IEC ISP 15125-4 as indicated in Table 7.7.2.4.1.1.1-1.

Note 1.— Table 7.7.2.4.1.1.1-1 is structured as a PRL derived from the profile specification included in ISO/IEC ISP 15125-4 (ADY22). The columns "D" and "P" are extracted from the ISO/IEC ISP 15125-4, and the column "A" specifies the capability of the ATN DSA to support and handle the appropriate argument.

Note 2.— The columns marked Init correspond to the bind initiator.

Item No.	Protocol Element	D Init	D Resp	P Init	P Resp	A Init	A Resp	References/Notes
1	DirectoryBindArg	m	m	m	m			A.4.2.1/1
2	credentials	c	c	m	m			
3	simple	c	c	m	m			
4	name	m	m	m	m			
5	validity	o	o	c5	c5			see 1
6	time1	o	o	c5	c5			see 1
7	time2	o	o	o	o			see 1
8	random1	o	o	c5	c5			see 1
9	random1	o	o	o	o			see 1
10	password	o	o	m	m			
11	unprotected	o	o	m	m			
12	protected	o	o	c5	c5			see 1
13	algorithmIdentifier	m	m	m	m			
14	encrypted	m	m	m	m			
15	strong	c	c	c6	c6			

16	certification-path	o	o	o	m			see 2
17	bind-token	m	m	m	m			
18	toBeSigned	m	m	m	m			
19	algorithm	m	m	m	m			
20	name	m	m	m	m			
21	time	m	m	m	m			
22	random	m	m	m	m			
23	algorithmIdentifier	m	m	m	m			
24	encrypted	m	m	m	m			
25	name	o	o	o	m			
26	externalProcedure	i	i	i	i			
27	versions	m	m	m	m			

Predicates:

c5: If p_simple_protected then m else o

c6: If p_strong then m else o

[1] The support of simple protected authentication is profiled by ADY43.

[2] Requirements on certification-path are profiled by ADY43

7.7.2.4.1.2 Bind Result

7.7.3 DSA Authentication as DAP Responder

Note.— The primary DSA conformance requirements are specified in the Directory Standards as profiled in ADY11. The ATN application of this ISP is found in Section 7.7. The profile defined in ISO/IEC 15125-6 covers strong authentication and digital signature. The protocol specifications specify the use of particular elements concerned with the process of simple protected authentication, strong authentication, or digital signatures.

7.7.3.1 DSAs shall comply with the procedures specified in ISO/IEC 15125-6 Clause 5.

7.7.3.2 The ATN Directory DSAs shall conform to ISO/IEC 15125-6 as specified in Clause 6.

7.7.3.3 The ATN Directory DSA shall implement the security system in accordance with ISO/IEC 15125-6, Appendix A.3 as indicated in Table 7.7.3.3-1.

Note.— Table 7.7.3.3-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-6 (ADY42). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-6, and the column "ATN DSA" specifies the static capability of a DSA to convey and handle the specified protocol elements.

Table 7.7.3.3-1 DSA Implementation and/or System as Defined in ISP 15125-6

Ref. No.	Operation	Base	ISP	ATN DSA	Reference/ Predicate	Note
1.1	Supported Security Levels|-None	o.1	i			
1b	|-Simple	o.1	i			
1c	|-Protected Simple	o.1	i			
1d	|-Strong Authentication	o.1	i			
1	|-External	o.1	i			
1.2	Support of Strong Authentication on Bind Request |-One-way	o	o		oneWay	
2b	|-Two-way	o	o		twoWay	
2c	|-Three-way	-	-			Note 1
3	Support Strong Authentication on Bind Result	o	o		strongBindResult	
4	Support Signed Read Request	o	o		signReadReq	
5	Support Signed Read Result	o	o		signReadRes	
6	Support Signed Compare Request	o	o		signCompareReq	
7	Support Signed Compare Result	o	o		signCompareRes	
8	Support Signed List Request	o	o		signListReq	
9	Support Signed List Result	o	o		signListRes	
10	Support Signed Search Request	o	o		signSearchReq	
11	Support Signed Search Result	o	o		signSearchRes	

12	Support Signed Add Entry Request	o	o		signAddReq	
13	Support signed Remove Entry Request	o	o		signRemoveReq	
14	Support Signed Modify Entry Request	o	o		signModifyReq	
15	Support Signed ModifyDN Request	o	o		signModDNReq	
16	DUA support simple protected authenication in the initiator role	o	o		simpleProBindReq	
17	DUA support simple protected authentication in the responder role	o	o		simpleProDindRes	
18	DUA support simple unprotected authentication in the initiator role	o	o		simpleUnProBindReq	
19	DUA support simple unprotected authentication in the responder role	o	o		simpleUnProBindRes	
20	DUA support strong authentication in the initiator role	o	o		strongBindReq	
21	DUA support strong authentication in the responder role	o	o		strongDindRes	
22	DUA support commonly used Algorithms	o	o		commonAlgs	
23	Support for the generation of cerfication parth for strong authentication	o	o		certPath	
0	Support Certificate Format |-Version 1	c:m	c:m		strongDUA	default (1988)
24b	|-Version 2	c:m	c:m		strongDUA	v1 (1993)
24c	|-Version 3	o	o			Extensions
24d	|-Other	i	i			
25a	Support of Certificate Revocation List supported? |-Version 1	c:m	c:m		crl	1988
25b	|-Version 2	c:m	c:m		strongDUA	1993

25c	|-Version 3	o	o			Extension
25d	|-Other	i	i			
26	Support of Authority Revocation List				ar1	
27	DUA support the Distinguished encoding rules	c:m	c:m		strongDUA or signedOperations	Note 2

Note 1.– 0.1 - DUAs must support at least one of the protected simple or strong authentication.

Note 2.– Three-way authentication is not supported by the ISO/IEC 9564 standard.

Note 3.– DUAs must conform to the encoding rules as specified in Clause 9 of ISO/IEC xxxx (ITU Recommendation X.509).

7.7.3.4 The only application context supported is Directory Access application context.

7.7.3.5 The DSAs shall comply as a precondition to the operations requirements specified in Section xxx.

7.7.3.6 The ATN Directory DSA shall implement the Bind protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.1.1 as indicated in Table 7.6.3.6-1.

Note.— Table 7.7.3.6-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-6 (ADY42). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-5, and the column "ATN DSA" specifies the static capability of a DSA to convey and handle the specified protocol elements.

Table 7.7.3.6 -1 DSA Bind Protocol Elements as Specified in ISP 15125-6

Ref. No.	Protocol Element	Base	ISP	ATN DUA	Notes
1	DirectoryBindArgument	m	m	m	
2	credentials	c1	c1	c1	
3	simple	c:m	c:m	c:m	
4	name	m	m	m	
5	validity	c:m	c:m	c:m	
6	time1	o	m	m	
7	time2	o	o	o	
8	random1	o	m	m	
9	random2	o	o	o	
10	password	c:m	c:m	c:m	
11	unprotected	c2:m	c2:m	c2:m	
12	protected	c2:m	c2:m	c2:m	
13	algorithmIdentifier	m	m	m	
14	encrypted	m	m	o	See Sub-Volume 8

15	strong	c:m	c:m	m	See 7.7.3
16	certification-path	o	o.2	o	<<See GACS/Signore Issue >>
17	bind-token	m	m	m	
18	toBeSigned	m	m	m	
19	algorithm	m	m	m	
20	name	m	m	m	
21	time	m	m	m	
22	random	m	m	m	
23	algorithmIdentifier	m	m	m	
24	encrypted	m	m	m	
25	name	o	o.2	o	<<See GACS/Signore Issue>>
26	externalProcedure	i	i	i	
27	versions	m	m	m	

c1 if [simpleDSA, protectedDSA or strongDSA] then support of this feature is m else support is o.

c2 The password, for the DSA, may be unprotected or protected as described in Clause 8 of ISO/IEC 9594-3, and Clause 6 of ISO/IEC 9594-8.

o.2 At least one of the certification-path and name must always be present, and if both, then they must "agree", i.e., indicate the same name.

7.7.3.7 The ATN Directory DSA shall implement the Bind protocol elements for security in accordance with ISO/IEC 15125-6, Appendix A.4.3.1.2 as indicated in Table 7.7.3.7-1.

Note.— Table 7.7.3.7-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-5 (ADY41). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-5, and the column "ATN DSA" specifies the static capability of a DSA to convey and handle the specified protocol elements.

Table 7.7.3.7 -1 DSA Bind Result Protocol Elements as Specified in ISP 15125-6

Ref. No.	Protocol Element	Base	ISP	ATN DSA	Notes
1	DirectoryBindArgument	m	m	m	
2	credentials	c1	c1	c1	
3	simple	c:m	c:m	c:m	
4	name	m	m	m	
5	validity	c:m	c:m	c:m	
6	time1	o	m	m	
7	time2	o	o	o	
8	random1	o	m	m	
9	random2	o	o	o	
10	password	c:m	c:m	c:m	
11	unprotected	c2:m	c2:m	c2:m	
12	protected	c2:m	c2:m	c2:m	
13	algorithmIdentifier	m	m	m	
14	encrypted	m	m	o	
15	strong	c:m	c:m	m	
16	certification-path	o	o.2	o	<<ISSUE>>
17	bind-token	m	m	m	
18	toBeSigned	m	m	m	
19	algorithm	m	m	m	
20	name	m	m	m	
21	time	m	m	m	
22	random	m	m	m	
23	algorithmIdentifier	m	m	m	
24	encrypted	m	m	m	
25	name	o	o.2	o	<<ISSUE>>
26	externalProcedure	i	i	i	

27	versions	m	m	m	

c1 if [simpleDUA, protectedDUA or strongDUA] then support of this feature is m else support is o.

c2 The password, for the DUA, may be unprotected or protected as described in Clause 8 of ISO/IEC 9594-3, and Clause 6 of ISO/IEC 9594-8.

o.2 At least one of the certification-path and name must always be present, and if both, then they must "agree", i.e., indicate the same name.

7.7.3.8 The ATN Directory DSA shall implement the Bind Error protocol elements for security in accordance with ISO/IEC 15125-6, Appendix A.4.3.1.3 as indicated in Table 7.7.3.7-1.

Note.— Table 7.7.3.8-1 is structured as a PRL derived from the ISP PICS Proforma included in ISO/IEC ISP 15125-6 (ADY42). The columns "Base" and "ISP" are extracted from the ISO/IEC ISP 15125-6, and the column "ATN DSA" specifies the static capability of a DSA to convey and handle the specified protocol elements.

Table 7.7.3.8 -1 DSA Bind Error Protocol Elements as Specified in ISP 15125-6

Ref. No.	Object Class	Base	ISP	ATN DSA	
1	directoryBindError	m	mo	m	
2	versions	m	m	m	Default (v1)
3	serviceError	m	m	m	unavailable
4	securityError	m	m	m	inappropriateAuthentication or invalid Credentials

7.7.3.9 The ATN Directory DSA shall implement the Read protocol elements for security in accordance with ISO/IEC 15125-6, Appendix A.4.3.3 as indicated in Table 7.7.3.9-1.

Table 7.7.3.9 -1 DSA Read Protocol Elements as Specified in ISP 15125-6

Ref. No.	Object Class	Base	ISP	ATN DSA	
1	read	c:m	c:m	c:m	
2	ReadArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (ReadArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ReadArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	ReadResult	c:m	c:m	c:m	
11	unsigned	m	m	m	
13	signed	c:m	c:m	c:m	
14	toBeSigned	m	m	m	
15	result (ReadResult)	m	m	m	
16	algorithmIdentifier	m	m	m	
17	encrypted	m	m	m	
18	Errors	i	i	i	

7.7.3.10 The ATN Directory DSA shall implement the Compare protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.4 as indicated in Table 7.6.3.11-1.

Table 7.7.3.10 -1 DSA Compare Protocol Elements as Specified in ISP 15125-56

Ref. No.	Object Class	Base	ISP	ATN Directory	
1	compare	c:m	c:m	c:m	
2	CompareArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (ReadArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ReadArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	CompareResult	c:m	c:m	c:m	
11	unsigned	m	m	m	
13	signed	c:m	c:m	c:m	
14	toBeSigned	m	m	m	
15	result (CompareResult)	m	m	m	
16	algorithmIdentifier	m	m	m	
17	encrypted	m	m	m	
18	Errors	i	i	i	

7.7.3.11 The ATN Directory DSA shall implement the List protocol elements for security in accordance with ISO/IEC 15125-6, Appendix A.4.3.3 as indicated in Table 7.6.3.9-1.

Table 7.7.3.11 -1 DSA List Protocol Elements as Specified in ISP 15125-6

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	list	c:m	c:m	c:m	
2	ListArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (ListArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ListArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	ListResult	c:m	c:m	c:m	
11	unsigned	m	m	m	
13	signed	c:m	c:m	c:m	
14	toBeSigned	m	m	m	
15	result (ListResult)	m	m	m	
16	algorithmIdentifier	m	m	m	
17	encrypted	m	m	m	
18	Errors	i	i	i	

7.7.3.12 The ATN Directory DSA shall implement the Search protocol elements for security in accordance with ISO/IEC 15125-6, Appendix A.4.3.7 as indicated in Table 7.7.3.12-1.

Table 7.7.3.12 -1 DSA Search Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	search	c:m	c:m	c:m	
2	SearchArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (SearchArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (SearchArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	SearchResult	c:m	c:m	c:m	
11	unsigned	m	m	m	
13	signed	c:m	c:m	c:m	
14	toBeSigned	m	m	m	
15	result (SearchResult)	m	m	m	
16	algorithmIdentifier	m	m	m	
17	encrypted	m	m	m	
18	Errors	i	i	i	

7.7.3.13 The ATN Directory DSA shall implement the Add Entry protocol elements for security in accordance with ISO/IEC 15125-6, Appendix A.4.3.8 as indicated in Table 7.7.3.13-1.

Table 7.7.3.13 -1 DSA Add Entry Protocol Elements as Specified in ISP 15125-6

Ref. No.	Object Class	Base	ISP	ATN DSA	
1	addEntry	c:m	c:m	c:m	
2	AddEntryArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (AddEntryArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ReadArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	Errors	i	i	i	

7.7.3.14 The ATN Directory DSA shall implement the Remove Entry protocol elements for security in accordance with ISO/IEC 15125-6, Appendix A.4.3.9 as indicated in Table 7.7.3.14-1.

Table 7.7.3.14 -1 DSA Remove Entry Protocol Elements as Specified in ISP 15125-6

Ref. No.	Object Class	Base	ISP	ATN DSA	
1	addEntry	c:m	c:m	c:m	

2	AddEntryArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (AddEntryArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ReadArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	Errors	i	i	i	

7.7.3.15 The ATN Directory DUA shall implement the Modify Entry protocol elements for security in accordance with ISO/IEC 15125-5, Appendix A.4.3.10 as indicated in Table 7.7.3.15-1.

Table 7.7.3.15 -1 DUA Modify Entry Protocol Elements as Specified in ISP 15125-5

Ref. No.	Object Class	Base	ISP	ATN DUA	
1	modifyEntry	c:m	c:m	c:m	
2	ModifyEntryArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (ModifyEntryArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ModifyEntryArgument)	m	m	m	

8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	Errors	i	i	i	

7.7.3.16 The ATN Directory DSA shall implement the Modify DN Entry protocol elements for security in accordance with ISO/IEC 15125-6, Appendix A.4.3.11 as indicated in Table 7.7.3.16-1.

Table 7.7.3.16 -1 DUA Modify DN Entry Protocol Elements as Specified in ISP 15125-6

Ref. No.	Object Class	Base	ISP	ATN DSA	
1	modifyDNEntry	c:m	c:m	c:m	
2	ModifyDNArgument	m	m	m	
3	unsigned	m	m	m	
4	argument (ModifyDNArgument)	m	m	m	
5	signed	c:m	c:m	c:m	
6	toBeSigned	m	m	m	
7	argument (ModifyDNArgument)	m	m	m	
8	algorithmIdentifier	m	m	m	
9	encrypted	m	m	m	
10	Errors	i	i	i	

7.7.4 DSA to DSA Authentication

7.7.4.1 The ATN Directory DSAs shall support:

- Simple Unprotected Authentication either in the responder role alone, or in both the initiator and responder role;
- Simple Protected Authentication either in the responder role alone, or in both the initiator and responder role;
- Strong Authentication in the DSA, DOP, or DISP Bind either in the responder role alone, or in both the initiator and responder role; and
- Signed DSP or DISP operations either in the responder role alone, or in both the initiator and responder role.

7.7.4.2 DSAs shall also support unsigned DSP or DISP operations as appropriate.

7.7.4.3 Each DSP,DOP, or DISP of a DSA that supports Simple Unprotected Authentication shall conform to the procedures specified in ISO/IEC 15125-7, Section 5.1.1.

7.7.4.4 Each DSP,DOP, or DISP of a DSA that supports Simple Protected Authentication shall conform to the procedures specified in ISO/IEC 15125-7, Section 5.1.2.

7.7.4.5 Each DSP, DOP, or DISP of a DSA that supports Strong Authentication shall conform to the procedures specified in ISO/IEC 15125-7, Section 5.1.3.

7.7.4.6 Each DSP or DISP of a DSA that supports signed operations shall conform to the procedures specified in ISO/IEC 15125-7, Section 5.1.4.

7.7.4.7 DSAs supporting signed DSP operations shall conform to the procedures specified in ISO/IEC 15125-7, Section 5.1.5.

7.7.4.8 DSAs shall conform to the procedures specified in ISO/IEC 15125-7, Section 5.1.6 for Certificates and Revocation Lists.

7.7.4.9 A DSA shall conform to the procedures for Simple Unprotected Authentication as specified in ISO/IEC 15125-7, Section 6.2.

7.7.4.10 A DSA shall conform to the procedures for Simple Protected Authentication as specified in ISO/IEC 15125-7, Section 6.3.

7.7.4.11 A DSA shall conform to the procedures for Strong Authentication in the DSA, DOP, or DISP Bind as specified in ISO/IEC 15125-7, Section 6.4.

7.7.4.12 A DSA shall conform to the procedures for Singed DSP or DISP operations as specified in ISO/IEC 15125-7, Section 6.5.

7.7.4.13 A DSA shall conform to the procedures for Certificate processing as specified in ISO/IEC 15125-7, Section 6.6.

<<< editor's note -- section 6.7 and 6.8 of the ISP may need reference here. >>>

7.7.4.14 The ATN Directory DSA shall support the security levels in accordance with ISO/IEC 15125-7, Appendix A.2.2.2 as indicated in Table 7.7.4.14-1.

Table 7.7.4.14 -1 Supported DSA Security Levels as Specified in ISP 15125-7

Ref. No.	Questions	Base	ISP	ATN DSA	Notes
1	Is the security level "none" for originator authentication supported?	o	-	-	see 1
2	Is the security level "simple without password" for originator authentication supported?	o	-	-	see 1
3	Is the security level "simple with unprotected password" for originator authentication supported?	o	-	-	see 1
4	Is the security level "simple with protected password" for originator authentication supported?	o	-	-	see 1
5	Is the security level "strong" for originator authentication supported?	o	-	-	see 1
6	Is the security level "none" for peer entity authentication supported?	o	o	o	

7	Is the security level "simple with distinguished name" for peer entity authentication supported with unprotected password?	o	c1	c1	
8	Is the security level "simple with distinguished name" for peer entity authentication supported with protected password?	o	c2	c2	
9	Is the security level "strong" for peer entity authentication supported?	o	c3	c3	
10	Are signed DSP operations supported	o	c4	c4	

[1] DAP authentication is out of the scope of this section.

c1: if p_sim_unprot then m else o.

c2: if p_simp_prot then m else o.

c3: if p_strong then m else o.

c4: if p_signed then m else o.

7.7.4.15 The ATN Directory DSA shall implement the DSA operations in accordance with ISO/IEC 15125-7, Appendix A.2.3.1 as indicated in Table 7.7.4.15-1.

Table 7.7.4.15 -1 Supported DSA Security Levels as Specified in ISP 15125-7

Ref. No.	Protocol Element	S Rel	S Act	S Rsp	P Rel	P Act	P Rsp	AS Rel	AS Act	AS Rsp	AP Rel	AP Act	AP Rsp	Reference	Notes
1	DirectoryBind	o	o	m	c5	c5	m	o	o	m	c5	c5	m		
2	DirectoryUnbind	o	o	m	c5	c5	m	o	o	m	c5	c5	m		
3	ChainedRead	o	o	m	c5	c5	m	o	o	m	c5	c5	m		
4	ChainedCompare	o	o	m	c5	c5	m	o	o	m	c5	c5	m		
5	ChainedAbandon	o	o	m	c5	c5	m	o	o	m	c5	c5	m		
6	ChainedList	o	o	m	c5	c5	m	o	o	m	c5	c5	m		
7	ChainedSearch	o	o	m	c5	c5	c5	o	o	m	c5	c5	c5		
8	ChainedAddEntry	o	o	m	c5	c5	c5	o	o	m	c5	c5	c5		
9	ChainedRemoveEntry	o	o	m	c5	c5	c5	o	o	m	c5	c5	c5		
10	ChainedModifyEntry	o	o	m	c5	c5	c5	o	o	m	c5	c5	c5		
11	ChainedModifyDN	o	o	m	c5	c5	c5	o	o	m	c5	c5	c5		

c5: if p_invoker then m else o.

7.7.4.16 The ATN Directory DSA shall implement the DSA Bind protocol elements in accordance with ISO/IEC 15125-7, Appendix A.2.3.2.1.1 as indicated in Table 7.7.4.16-1.

Table 7.7.4.16 -1 Supported DSA Security Levels as Specified in ISP 15125-7

Ref. No.	Protocol Element	S Init	S Rsp	P Init	P Rsp	ATN S Init	ATN S Rsp	ATN P Init	ATN P Rsp	Reference	Notes
1	DirectoryBindArg	m	m	m	m	m	m	m	m	7.7.4.15-1/1	
2	credentials	m	m	m	m	m	m	m	m		
3	simple	c6	m	m	m	m	m	m	m		
4	name	m	m	m	m	m	m	m	m		
5	validity	c7	c7	c7	c7	c7	c7	c7	c7		
6	password	c6	c6	m	m	c6	c6	m	m		
7	unprotected	c8	m	m	m	c8	m	m	m		
8	protected	c7	m	c7	c7	c7	m	c7	c7		
9	strong	c9	m	c9	c9	c9	m	c9	c9		
10	certification-path	o	m	m	m	o	m	m	m	A.5.3	
11	bind-token	m	m	m	m	m	m	m	m		

12	toBeSigned	m	m	m	m	m	m	m	m		
13	algorithm	m	m	m	m	m	m	m	m	A.5.4	
14	name	m	m	m	m	m	m	m	m		
15	time	m	m	m	m	m	m	m	m		
16	random	m	m	m	m	m	m	m	m		
17	algorithmIdentifier	m	m	m	m	m	m	m	m	A.5.4	
18	encrypted	m	m	m	m	m	m	m	m		
19	name	o	m	o	m	o	m	o	m		
20	externalProcedure	i	i	i	i	i	i	i	i		
21	versions	m	m	m	m	m	m	m	m		

c6: if (p_simp_unprot OR p_simp_prot) then m else o.

c7: if p_sim_prot then m else o.

c8: if p_simp_unprot then m else o.

c9: if p_strong then m else o.

7.7.4.17 The ATN Directory DSA shall implement the DSA Chained Operation protocol elements in accordance with ISO/IEC 15125-7, Appendix A.2.3.2.1.3 as indicated in Table 7.7.4.17-1.

Table 7.7.4.17 -1 DSA Chained Operation Protocol Elements as Specified in ISP 15125-7

Item No.	Protocol Element	S Init	S Rsp	P Init	P Rsp	ATN S Init	ATN S Rsp	ATN P Init	ATN P Rsp	Reference	Notes
1	Chained-xxx-operation	m	m	m	m	m	m	m	m		see 1
2	signed-chained-xxx-operation	c10	c10	c10	c10	c10	c10	c10	c10		see 1,2
3	unsigned-chained-xxx-operation	m	m	m	m	m	m	m	m		see 1,2
4	signature	m	m	m	m	m	m	m	m		
5	algorithmIdentifier	m	m	m	m	m	m	m	m	A.5.4	
6	unsigned-chained-xxx-operation	m	m	m	m	m	m	m	m		
7	chainingArguments	m	m	m	m	m	m	m	m		
8	xxx-operation	m	m	m	m	m	m	m	m		
9	Chained-xxx-result	m	m	m	m	m	m	m	m	A.2.3.1/3-11...	see 1
10	signed-chained-xxx-result	c10	c10	c10	c10	c10	c10	c10	c10		see 1
11	unsigned-chained-xxx-result	m	m	m	m	m	m	m	m		see 1,3
12	signature	m	m	m	m	m	m	m	m		
13	algorithmIdentifier	m	m	m	m	m	m	m	m	A.5.4	
14	unsigned-chained-xxx-result	m	m	m	m	m	m	m	m		see 1
15	ChainingResults	m	m	m	m	m	m	m	m		
16	xxx-operation	m	m	m	m	m	m	m	m		

c10: if p_signed then m else o.

[1] xxx is any of:

read, compare, list, search, add-entry, remove-entry, modify-entry, modify-DN.

[2] Breakdown as Item 6.

[3] Breakdown as Item 14.

7.7.4.18 The ATN Directory DSA shall implement the DSA Chaining argument elements in accordance with ISO/IEC 15125-7, Appendix A.2.3.2.6 as indicated in Table 7.7.4.18-1.

Table 7.7.4.18 -1 DSA Chained Arguments Elements as Specified in ISP 15125-7

Item No.	Protocol Element	S Rel	S Act	S Rsp	P Rel	P Act	P Rsp	ATN S Rel	ATN S Act	ATN S Rsp	ATN P Rel	ATN P Act	ATN P RSP	Notes
1	originator	m	m		m		m	m	m		m	m	m	
2	targetObject	m	m	m	m	m	m	m	m	m	m	m	m	
3	operationProgress	m	m		m		m	m	m		m	m		
4	nameResolutionPhase	m	m		m		m	m	m		m	m		
5	nextRNTToBeResoluved	m	m		m		m	m	m		m	m	m	
6	traceInformation	m	m		m		m							
7	aliasDereferenced	m	m		m		m							
8	aliasedRDN	m	m		m		m							
9	returnCrossRefs	o	o	m	o	o	m							
10	referenceType	m	m	m	m	m	m	m	m	m	m	m	m	

11	info	o	o	m	o	o	m							
12	timeLimit	m	m		m		m	m	m					
13	securityParameters	o	o	m	o	c10	c10							
14	entryOnly	m	m		m		m							
15	uniqueIdentifier	o	o	m	c11	c11	m							
16	authenticationLevel	o	o	m	c12	c12	m							
17	exclusions	o	o	m	o	o	m							
18	excludeShadows	o	o	m	o	o	m							
19	nameResolveOnMaster	o	o	m	o	o	m							

c10: if p_signed then m else o.

c11: if p_unique_names then m else o.

c12: if p_auth_level then m else o.

7.7.4.19 The ATN Directory DSA shall implement the DSA Chaining Result elements in accordance with ISO/IEC 15125-7, Appendix A.2.3.2.7 as indicated in Table 7.7.4.19-1.

Table 7.7.4.19 -1 DSA Chaining Result Elements as Specified in ISP 15125-7

Item No.	Protocol Element	S Rel	S Act	S Rsp	P Rel	P Act	P Rsp	ATN S Rel	ATN S Act	ATN S Rsp	ATN P Rel	ATN P Act	ATN P RSP	Note
1	info	m	m	o	m	m	o	m	m	o	m	m	o	
2	crossReferences	o	o	o	o	o	o	o	o	o	o	o	o	
3	securityParameters	m	m	o	m	m	c10	m	m	o	m	m	c10	
4	alreadySearched	m	m	o	m	m	o	m	m	o	m	m	0	

c10: if p_signed then m else o.

7.8 Use of Underlying Services

7.8.1 Use of ROSE services

Note.— The Remote Operations Service Element (ROSE) is defined in ITU-T Rec. X.881 | ISO 9072-2.

7.8.1.1 The ATN Directory Service Protocols shall use ROSE as specified in ISO 9072-2.

Note 1.— The ROSE supports the request/reply paradigm of remote operations.

*Note 2.— The Directory ASEs are users of the **RO-INVOKE**, **RO-RESULT**, **RO-ERROR**, **RO-REJECT-U** and **RO-REJECT-P** services of the ROSE.*

Note 3.— The remote operations of the DAP and the DSP are asynchronous. Note that as the DUA is a consumer of the DAP it may choose to operate in a synchronous manner.

7.8.1.2 The remote operations of the DISP shall be supported as synchronous operations and may optionally be supported as asynchronous operations.

Note.— The remote operations of the DOP are asynchronous.

7.8.2 Use of RTSE services

Note 1.— The Reliable Transfer Service Element (RTSE) is defined in CCITT Rec. X.218 | ISO/IEC 9066-1.

Note 2.— The RTSE provides for the reliable transfer of Application Protocol Data Units (APDUs). The RTSE ensures that each APDU is completely transferred exactly once, or that the sender is warned of an exception. The RTSE recovers from communication and end-system failure and minimizes the amount of retransmission needed for recovery.

Note 3.— Alternative application contexts with and without RTSE are defined to support the DISP.

7.8.2.1 The RTSE shall be used in normal mode.

Note.— The use of the normal mode of the RTSE implies the use of the normal mode of the ACSE and the normal mode of the Presentation Service.

7.8.2.2 If the RTSE is included in an application context, the mapping from ROSE to RTSE shall be according to ISO/IEC 9594-9 (ITU Recommendation X.519).

*Note.— The **RO-BIND** service maps onto the **RT-OPEN** service of the RTSE and the **RO-UNBIND** service maps onto the **RT-CLOSE** service of the RTSE. The basic ROSE services are the sole user of the **RT-TRANSFER**, **RT-TURN-PLEASE**, **RT-TURN-GIVE**, **RT-P-ABORT** and **RT-U-ABORT** services of the RTSE.*

7.8.3 Use of ACSE services

Note 1.— The Association Control Service Element (ACSE) is defined in CCITT Rec. X.217 | ISO 8649.

Note 2.— The ACSE provides for the control (establishment, release, abort) of application-associations between AEs.

7.8.3.1 If the RTSE but not SESE is included in an application context, the RTSE shall be the sole user of the **A-ASSOCIATE**, **A-RELEASE**, **A-ABORT** and **A-P-ABORT** services of the ACSE.

7.8.3.2 If the RTSE and SESE are both not included in an application context, then the users of the ACSE services shall be:

- **RO-BIND** and **RO-UNBIND** services as the sole users of the **A-ASSOCIATE** and **A-RELEASE** services of the ACSE; and

- the application-process the user of the **A-ABORT** and **A-P-ABORT** services of the ACSE.

7.8.3.3 If the SESE but not RTSE is included in an application context then the users of ACSE shall be according to:

a) the **RO-BIND** services use the ACSE **A-ASSOCIATE** kernel functional unit;

b) the **SE-TRANSFER** services carrying the first two security exchange items of the security exchange use the ACSE **A-ASSOCIATE** authentication functional unit;

c) the **RO-UNBIND** services are the sole users of **A-RELEASE** services of the ACSE;

d) the application-process is the user of the **A-ABORT** and **A-P-ABORT** services of the ACSE.

7.8.3.4 If the SESE and RTSE are both included in an application context then the ACSE shall be according to:

a) the **RTSE** services use the ACSE **A-ASSOCIATE** kernel functional unit;

b) the **SE-TRANSFER** services carrying the first two security exchange items of the security exchange use the ACSE **A-ASSOCIATE** authentication functional unit.

c) **RTSE** is the sole users of **A-RELEASE, A-ABORT** and **A-P-ABORT** services of the ACSE.

7.8.3.5 The receipt of an **A-ABORT** or **A-P-ABORT** on an association supporting the DAP shall terminate all request processing.

7.8.3.6 Except for certain conditions described in ITU-T Rec. X.518 | ISO/IEC 9594-4, this shall also be true for the DSP.

Note.—It is a Directory user responsibility to confirm if requested modifications to the DIB occurred.

7.8.3.7 The receipt of an **A-ABORT** or **A-P-ABORT** on an association supporting the DISP shall be processed according to the procedures described in ITU-T Rec X.525 | ISO/IEC 9594-9.

7.8.3.8 The receipt of an **A-ABORT** or **A-P-ABORT** on an association supporting the DOP shall be processed as described in ITU-T Rec. X.518 | ISO/IEC 9594-4.

7.8.4 Use of the Presentation service

Note 1.— The presentation-service is defined in CCITT Rec. X.216 | ISO 8822.

Note 2.— The Presentation Layer coordinates the representation (syntax) of the Application Layer semantics that are to be exchanged.

Note 3.— In normal mode, a different presentation-context is used for each abstract-syntax included in the application-context.

7.8.4.1 The ACSE shall be the sole user of the **P-CONNECT**, **P-RELEASE**, **P-U-ABORT** and **P-P-ABORT** services of the presentation-service.

7.8.4.2 If the RTSE but not SESE is included in an application context, the RTSE shall be the sole user of the **P-ACTIVITY-START**, **P-ACTIVITY-END, P-ACTIVITY-INTERRUPT, P-ACTIVITY-DISCARD, P-ACTIVITY-RESUME, P-DATA, P-MINOR-SYNCHRONIZE, P-U-EXCEPTION-REPORT, P-P-EXCEPTION-REPORT, P-TOKEN-PLEASE** and **P-CONTROL-GIVE** services of the Presentation Service.

7.8.4.3 If the RTSE and SESE are both not included in an application context, the ROSE shall be the sole user of the **P-DATA** service of the Presentation Service.

7.8.4.4 If the SESE but not RTSE is included in an application context, and the security exchange involves more than a two way exchange, then SESE shall be the sole user of the **P-DATA** service of the presentation service until after an **SE-TRANSFER** request or indication with the **End Flag** set or until an **SE-U-ABORT** or an **SE-P-ABORT**.

7.8.4.5 Following this the ROSE shall be the sole user of the **P-DATA** service.

7.8.4.6 If the SESE and RTSE are both included in an application context, and the security exchange involves more than a two way exchange, then SESE shall be the sole user of the **P-TYPE-DATA** service of the presentation service until after an **SE-TRANSFER** request or indication with the **End Flag** set or until an **SE-U-ABORT** or an **SE-P-ABORT**.

7.8.4.7 Following this the RTSE shall be the sole user of the **P-ACTIVITY-START**, **P-ACTIVITY-END, P-ACTIVITY-INTERRUPT, P-ACTIVITY-DISCARD, P-ACTIVITY-RESUME, P-DATA, P-**

MINOR-SYNCHRONIZE, P-U-EXCEPTION-REPORT, P-P-EXCEPTION-REPORT, P-TOKEN-PLEASE and **P-CONTROL-GIVE** services of the Presentation Service.

Note.— Presentation default context, context restoration, and context management are not used.

7.8.5 Use of the Session service

7.8.5.1 The use of the connection-oriented session service as required by the presentation protocol shall be supported.

7.14 Mapping to ATN Internet

7.14.1 The use of the connection-oriented transport service provided by the ATN Internet shall be as specified in Clause 6 of ISO/IEC 8327-1, except as noted in this section.

7.14.2 The TS-user shall indicate in all T-CONNECT requests that the transport expedited flow is not required.

Note 1.— The ATN Directory Service does not set the ATN Security Label and provides a transport layer interface that is compliant with commercial software systems.

Note 2.— This means that DIR traffic travels as General Communications

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END