Aeronautical Telecommunication Network (ATN) Chapter 3

Part 1

Version 0.1

>NOTE - SUPERSEDED WP5-10b (version 0.3)

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1. DEFINITIONS

A-FU	Authentication Functional Unit
A/G	Air-ground
AAC	Aeronautical Administrative Communications
AARE	ACSE Associate Response APDU
AARQ	ACSE Associate Request APDU
ABRT	ACSE Abort APDU
AC	Accept
ACA	Address compression algorithm
ACAS	Airborne Collision Avoidance System
Accounting Management	Accounting management enables charges to be established for the use of resources, and for costs to be identified for the use of those resources. Accounting management includes functions to inform users of costs incurred or resources consumed, enable accounting limits to be set and tariff schedules to be associated with the use of resources, and enable cos to be combined where multiple resources are invoked to achieve a given communications objective.
ACSE	Association control service element
ACSE	Association Control Service Element
ACSE.	The Association Control Service Element is the common mechanism in t ALS for establishing and releasing ASO-associations
ACT	Activity Management
Active User	A user that is currently in an applications dialogue, such as for CM or CPDLC.
Actual TSAP	The actual TSAP is composed of the IDP and the long TSAP.
AD	Administrative domain

AD	Addendum (of an ISO/IEC standard)
Address Domain	An Address Domain is a set of address formats and values administered l a single address authority. Under the ISO plan, any address authority ma define subdomains within its own domain, and delegate authority within those subdomains.
Addressing (logical)	Logical addressing means that the address defined in the addressing plan and used to locate the addressed object is a virtual address which is a substitute of the actual (physical) address of an object. Address mapping functions have to fulfil this substitution, carefully maintaining unambigu of identification of objects.
Addressing (physical)	Physical addressing means that the address defined in the addressing pla and used to locate the addressed object is the physical, i.e. hardwired, ha coded, or configured address of the object. An example of a physical address is the ICAO 24-bit Aircraft Address used for the SSR Mode S Transponder.
Addressing Authority	An Addressing Authority defines formats and/or values of NSAP address within its jurisdiction.
ADJBISMO	Adjacent BIS MO
ADJRIBMO	Adjacent RIB MO
ADM	Administrative identifier
ADMD	Administration management domain
ADMF	ADM Flag
Administrative Domain	A collection of end systems, intermediate systems, and subnetworks operated by a single organisation or administrative authority. An administrative domain may be internally divided into one or more routin domains.
ADS	Automatic Dependent Surveillance
ADS	Automatic Dependent Surveillance
ADS-AE Abstract Service Interface	The abstract interface between the ADS-users and the ADS-service-provider.
ADS-CF	That abstract part of the AE that performs the mapping between the ADS-ASE service primitives and other elements within the ADS application
ADS abstract service interface	The abstract interface between the ADS-air-ASE and the ADS-air-user o between the ADS-ground-ASE and the ADS-ground-user

ADS emergency report	An ADS report provided as part of an emergency contract
ADS report	A report provided by the ADS-air-user and sent to the ADS-ground-user concerning conditions on the aircraft, notably its location and FOM
ADS service primitive	See *Service Primitive*.
ADS service provider	See *Service Provider*.
ADS-air-ASE	That abstract part of the aircraft system that performs the communicatior related functions of ADS
ADS-air-user	That abstract part of the aircraft system that performs the non communications related functions of ADS
ADS-ASE Abstract Service Interface	The abstract interface through which the ADS-ASE services are accessec *Note 1.— In version 1 of the ADS application, this interface coincides w the ADS-AE abstract service interface.*
ADS-ATC	ADS-based Air Traffic Control system
ADS-ground-ASE	That abstract part of the ground system that performs the communicatior related functions of ADS
ADS-ground-user	That abstract part of the ground system that performs the non communications related functions of ADS
AE	Application Entity
AE	Application Entity
AE Qualifier	That part of the AE title that unambiguously identifies the particular application entity.
AE Title	An unambiguous name for an application entityTh
Aeronautical Administrative Communications (AAC)	Communications used by aeronautical operating agencies related to the business aspects of operating their flights and transport services. These communications are used for a variety of purposes, such as flight and ground transportation bookings, deployment of crew and aircraft,, or any other logistic purposes that maintains or enhances the efficiency of overa flight operation.
Aeronautical Administrative Messages	Messages regarding the operation or maintenance of facilities provided f the safety or regularity of aircraft operation, messages concerning the functioning of the aeronautical telecommunication services, and message exchanged between government civil aviation authorities relating to aeronautical services.
Aeronautical Industry Service	AINSC comprises aeronautical industry communications between airline aeronautical industry service providers, general aviation operators, and a

Communication (AINSC)	other industry stakeholders. This term is used for purposes of address administration.
Aeronautical Information Service Messages.	Messages concerning NOTAMS and messages concerning SNOWTAMS
Aeronautical Mobile Satellite Service (AMSS)	AMSS provides packet-mode data and circuit-mode data and voice servic to aircraft and ground users provided by a satellite subnetwork which comprises satellites, Aircraft Earth Stations (AESs), Ground Earth Static (GESs), and associated ground facilities such as a network coordination center.
Aeronautical Operational Control (AOC)	Communications required for the exercise of authority over the initiation continuation, diversion, or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of flight.
Aeronautical Passenger Communications (APC)	Communications relating to the non-safety voice and data services to passengers and crew members for personal communications.
Aeronautical stakeholder	Definition tbd
Aeronautical Telecommunication Network (ATN)	The Aeronautical Telecommunication Network is an internetwork architecture which allows ground, air-to-ground, and avionics data subnetworks to interoperate by adopting common interface services and protocols based on the International Organization for Standardization (ISO) Open Systems Interconnection (OSI) reference model.
AES	Aircraft earth station
AF-Address	AFTN-form address
AFI	Authority and format identifier
AFS	Aeronautical fixed service
AFTN	Aeronautical fixed telecommunication network
AINSC	Aeronautical Industry Service Communication
AINSC Administrative Domain	An AINSC Administrative Domain is an ATN Administrative Domain owned and/or administered by an aeronautical industry service organisation.
AINSC RDC	The ATN AINSC RDC consists of all AINSC RDs in the ATN.
AINSC Routing Areas	An AINSC Routing Area is a routing subdomain comprising one or mor ISs, and optionally, one or more ESs owned and/or administered by an aeronautical industry service organisation. For example, an AINSC Routing Area may correspond to a physical location such as an airline's systems located at an airport.
AINSC Routing Domains	An AINSC Routing Domain comprises ESs and ISs that are part of an

	AINSC Administrative Domain.
Air Traffic Control(ATC)	ATC is a service operated by an appropriate authority to promote the safe orderly, and expeditious flow of air traffic.
Air Traffic Management (ATM)	ATM consists of a ground and air part, both needed to ensure the safe an efficient movement of aircraft during all phases of operation.
Air Traffic Services (ATS)	Services provided by governmental civil aviation authorities.
Air Traffic Services Communications (ATSC)	Communications related to air traffic services including air traffic contro aeronautical and meteorological information, position reporting, and services related to safety and regularity of flight. This communication must involve one or more air traffic service administrations. This term i used for purposes of address administration.
AK	Data acknowledgement
ALS	The Application Layer Structure (ALS) refers to the internal architecture the OSI Application Layer as described in ISO/IEC 9545, Edition 2.
ALS	Application Layer Structure
AMHS	ATS message handling system
AMSS	Aeronautical mobile satellite service
ANC	Air Navigation Commission
AOC	Aeronautical Operational Communications
AOC	Aeronautical Operational Control
AOM	Systems Management Upper Layer profile
AP	Application process
APC	Aeronautical Passenger Communications
APDU	An Application Protocol Data Unit (APDU) is an (N)-PDU where N refe to the Application Layer. An APDU is the basic unit of information exchanged between the airborne application and the ground application.
APDU	Application Protocol Data Unit
API	Application Program Interface
App	Application
Application	Software providing services to its users, in the guise of a consistent set of functionality; example given, the ATC related functions implemented in the server(s) and/or controller work position host computers.(from

EATCHIP Glossary of Terms / COPS/CWP Report)

Application Control Service Element (ACSE)	The association control service element (ACSE) establishes, maintains a releases associations between application entities.
Application Entity (AE)	Part of an application process that is concerned with communications within the OSI environment. The aspects of an application process that need to be taken into account for the purposes of OSI are represented by one or more AEs. .
Application identifier	An abstract identifier which distinguishes one application from another.
Application Layer	The layer of the OSI reference model that controls application user acces to the communication system.
Application process (AP)	A set of resources, including processing resources, within a real open system which may be used to perform a particular information processin activity.
Application service	The abstract interface between the (N)-service and the (N)-service user, where N refers to the Application layer; thus it is the boundary between t ATN-App-AE and the Application-user.
Application Service Element (ASE)	A set of functions which provide OSI communications capabilities for th interworking of AEs for a specific purpose. An AE may be composed of one ASE or several ASEs of different types.
Application Service Element (ASE)	A set of application functions which provide a capability for the interworking of application-entity-invocations for a specific purpose; AS are a component of application service objects. An ASE can be consider to be a protocol module that is combined with others to form a complete protocol.
Application Service Object (ASO)	An active element within (or equivalent to the whole of) the application-entity embodying a set of capabilities defined for the Application Layer t corresponds to a specific ASO-type (without any extra capabilities being used). An ASO is a combination of ASEs and ASOs that perform a specific function. An ASO that provides the functions of the establishme and data transfer phases is considered a complete protocol.
Application-user	That abstract part of the aircraft or ground system that performs the non-communications related functions of the Application

APRL	ATN profile requirements list
ARS	Administrative Region Selector
ARSD	ARS Default [Flag]
ASE	Application Service Element

ASI	Abstract Service Interface
ASN.1	Abstract Syntax Notation One
ASO	Application Service Object
ATC	Air Traffic Control
ATFM	Air traffic flow management
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATM/ATS Applications	These are applications supporting ATM or other ATS functions and do n necessarily correspond to ATN applications. The term is usually used to distinguish between ATM functions and other non-ATM functions using the same communication service.
ATN	Aeronautical Telecommunication Network
ATN App	A generic name for an ATN application.
ATN Applications	Refers to applications that support ATM or aeronautical industry functio and that are designed to operate across an OSI communications system. ATN applications are always distributed applications, i.e. peer processes are hosted by different end systems which are interconnected.
ATN Environment	The term ATN environment relates to functional and operational aspects around the ATN as a complete end-to-end communication system.
ATN host computer	An ATN host computer is a civil aeronautical computer system which contains one or more end user applications and that communicates using the ATN internet. In OSI terms, it denotes an End System. An ATN Hc Computer may also implement the upper layers necessary to support the Systems Management Agent and Systems Management Manager and up layer protocols as specified for the supported end-user applications.
ATN Internet (ATNI)	An implementation of the ISO OSI network layer services and protocols support of interprocess data communication between aeronautical host computers. It is defined to be the collection of the connected internetwor routers and subnetworks that conform to ATN internetwork requirement
ATN Island Backbone RDC	An ATN backbone is an RDC comprising a subset of Transit Routing Domains within an ATN Island which provide general connectivity.
ATN Island Bridge	A bridge between two ATN Islands is a communications link between backbones over a suitable subnetwork.
ATN Island RDC	An ATN Island is an RDC comprising CAA-operated ATN RDs within a geographical region, and may include associated ATN service providers, an RDC comprising Aeronautical Industry members which are users of

	communications services of a single Aeronautical Industry Service Provider, or more than one such provider providing services in combination with each other.
ATN Network Operating Concept	An ATN Network Operating Concept will address the administrative, operational, institutional, and policy issues and additional (non-SARPs relevant) technical aspects to enable the efficient and correct operation of the ATN.
ATN Presentation Address	In the ATN, presentation addresses must, as a minimum, include an NSA Address and a TSAP Selector and may include a PSAP Selector and SSA Selector based on the addressing structure adopted within the ES and whether the application requires the OSI session or presentation protocol
ATN Profile Requirement List (APRL)	APRLs contained in the Draft ATN SARPs identify, in a tabular form, requirements together with the options and parameters for protocols used in the ATN. The supplier of an ATN protocol implementation claiming conform to the ATN SARPs must indicate conformance to those requirements by preparing a Protocol Implementation Conformance Statement (PICS) based on the set of APRLs presented in the SARPs.
ATN Router	The communication element that manages the relaying and routing of da while in transit from an originating ATN host computer to a destination ATN host computer. In ISO terms, an ATN router comprises an OSI intermediate system and an end system supporting a systems managemer agent.
ATN Routing Domain Confederation	The ATN RDC is the set of interconnected RDs that together form the ATN.
ATN Services	The ATN services are provided to ATN users that require ground-ground or air-ground data communication. The ATN internet service is provide at the transport layer (service access point). The ATN accommodates different grades of services which can be expressed by Quality of Service parameters.
ATN System Applications	System Applications support the operation of the ATN communication services and are either not directly or not at all used by ATN users but rather by the service providers or operators. Typical examples of ATN system applications are the ATN directory service, ATN context management or ATN systems management.
ATN Systems Management	The ATN Systems Management provides mechanisms for monitoring, control and co-ordination of resources necessary to provide ATN services ATN Systems Management is based on OSI System Management principles and may be distributed, centralised, or local.
ATN-App ASE	That abstract part of the ATN end system that performs the communications related functions of the ATN application. Examples of the ATN-App ASE include: the ADS-Air ASE and the CM-Air ASE.
ATNI	ATN internet

ATNPA	ATN protocol architecture
ATNSM	ATN systems management
ATS	Air Traffic Services
ATS Message	A unit of user-data, coded in binary form, which is conveyed from an originator of the data to one or more recipients of the data. It is possible associate a unique message identifier and a priority with each ATS message.
ATS Message Handling Service	Procedures used to exchange ATS Messages over the ATN such that the conveyance of an ATS Message is in general not correlated with the conveyance of another ATS Message by the service provider. Two ATS Message Handling Services are defined in Sub-Volume III. They are the ATS Message Service and the ATN Pass-Through Service.
ATSC	Air Traffic Services Communications
ATSC Administrative Domain	An ATSC Administrative Domain is an ATN Administrative Domain owned and/or administered by an air traffic services organisation.
ATSC RDC	The ATN ATSC RDC consists of all ATSC RDs in the ATN.
ATSC Routing Areas	An AINSC Routing Area is a routing subdomain comprising one or mor ISs, and optionally, one or more ESs owned and/or administered by an ATS organisation. For example, an ATSC Routing Area may correspon to a physical location such as an airport.
ATSC Routing Domain	An ATSC Routing Domain comprises ESs and ISs that are part of an ATSC Administrative Domain.
ATSU	Air Traffic Services Unit
AU	Access unit
Authentication information	Information used to authenticate the identity of an application or user.
Automatic Dependent Surveillance (ADS)	A technique in which aircraft automatically provide, via a data link, data derived from on-board navigation and position-fixing systems, including aircraft identification, four-dimensional position, and additional data as appropriate. ADS is a data link application.
BCD	Binary Coded Decimal
BER	Basic Encoding Rules (of ASN.1)
BIS	Boundary intermediate system
BISPDU	BIS PDU

Boundary Intermediate System (BIS)	An intermediate system that is able to relay data between two separate routing or administrative domains.
BPS	Bits per second
Broadcast Subnetwork	Broadcast subnetworks (e.g. LANs) are often used to connect ISs and ES within a small geographical area with media offering relatively high data throughput with relatively low delays.
C	Counter
CAA	Civil aviation administration
CAN	Cancellation
CC	Connection confirm
CCITT	International Telegraph and Telephone Consultative Committee
CDSE	Confirmed Data Service Element
CDT	Credit
CE	Congestion experienced flag
CF	That abstract part of the AE that performs the mapping between the ATN App ASE service primitives, the ACSE service primitives, and other elements within the Application Entity.
CF	Control Function
CIDIN	Common ICAO data interchange network
CL	Connectionless mode
CLNP	CL network protocol
CLNPMMO	CL network protocol machine MO
CLNS	CL network service
CLTP	CL transport protocol
CLTPMMO	CL transport protocol machine MO
CM	Context Management
CM-CF	That abstract part of the application entity that performs the mapping between the CM-ASE service primitives and other elements within the C application.

CM AE abstract service interface	The abstract interface between the CM-users and the CM-service provide
CM service primitive	See *Service Primitive*.
CM service provider	See *Service Provider*.
CM-air-ASE	An abstract part of the aircraft system that performs the communication related functions of CM.
CM-air-user	The abstract part of the aircraft system that performs the non communication related functions of CM.
CM-ASE abstract service interface	The abstract interface through which the CM-ASE service are accessed..
CM-ground-ASE	An abstract part of the ground system that performs the communication related functions of CM.
CM-ground-user	The abstract part of the ground system that performs the non communication related functions of CM.
CMIP	Common management information protocol
CMIS	Common management information service
CMISE	CMIS element
CN	Connect
CNS	Communications, Navigation, and Surveillance
CNS/ATM	Communications Navigation Surveillance / Air Traffic Managemer
CO	Connection mode
COMSEC	Communications security
Configuration Management	Configuration management identifies, exercises control over, collects dat from and provides data to open systems for the purpose of preparing for, initialising, starting, providing for the continuous operation of, and terminating interconnection services.
Congestion	In the ATN Internet sense, congestion describes the state where the network is overloaded. Typical effects of congestion are extended transit delays, drastically reduced throughput, and the loss of data packets.
Congestion Avoidance	Techniques which continuously control the data flow into the network in order to prevent the network from getting overloaded. These encompass both open-loop techniques which ensure that a traffic contract specified b the source is respected, and closed-loop techniques which monitor signal generated by the network and adapt the traffic generated by the sources accordingly.

Congestion Management	A set of rules and techniques that prevent congestion , e.g. by monitoring actual network load. Co-operative interaction of all end systems is requi in order to prevent individual end-systems taking up the throughput save by well-behaving systems.
Congestion Recovery / Congestion Control	A mechanism that reacts to congestion after it has occurred in order to remove the overload condition. Congestion Recovery can be initiated on after congestion has been experienced, and is not able to safely prevent congestion in the network.
Connection mode Service (CO)	The communication service technique that transfers data between peer layers using a prior connection to logically associate the sequence of protocol data units (PDUs).
Connectionless mode Service (CL)	The communication service technique transfers data between peer layers without prior coordination. All protocol data units (PDUs) are transferre with no explicit association between them.
Context Management	Refers to an ATN application. This application implements an ATN log service allowing initial aircraft introduction into the ATN. The logon service also allows indication of all other data link applications on the aircraft. CM also includes functionality to forward addresses between A centres. Thus, CM is a logon and simple directory service. Note: "Conte Management" is a recognised OSI presentation layer term. The OSI use and the ATN use have nothing in common.
contract	An agreement between the ADS-ground-user and the ADS-air-user that latter will provide reports to the former under the conditions specified in the contract.
COTP	CO transport protocol
COTP	Connection-oriented transport protocol
COTPMMO	COTP protocol machine MO
COTS	CO transport service
CP	Connect PPDU
CPA	Connect Accept PPDU
CPC	Controller-Pilot Communications
CPDLC	Controller-Pilot Data Link Communications
CPDLC AE abstract service interface	The abstract interface between the CPDLC-users and the CPDLC-service provider.
CPDLC ASE abstract service interface	The abstract interface through which the CM-ASE service are accessed..

CPDLC service primitive	See *Service Provider*.
CPDLC service provider	See *Service Provider.*
CPDLC-air-ASE	An abstract part of the aircraft system that performs the communication related functions of CPDLC.
CPDLC-air-user	The abstract part of the aircraft system that performs the non-communication related functions of CPDLC.
CPDLC-CF	That abstract part of the application entity that performs the mapping between the CPDLC-ASE service primitives and other elements within t CPDLC application.
CPDLC-ground-ASE	An abstract part of the ground system that performs the communication related functions of CPDLC.
CPDLC-ground-user	The abstract part of the ground system that performs the non-communication related functions of CPDLC.
CPR	Connect Reject PPDU
CR	Connection request
CR	Context Restoration
Current Data Authority	The ground system that is permitted to conduct a CPDLC dialogue with aircraft.
CVER	Compressed VER
Data Communications Equipment (DCE)	An interface between data terminal equipment and the transmission mechanism.
Data Link Applications	Applications using either a specific data link (air/ground subnetwork) or air-ground communications in general. (should be replaced by the term ATN Air/Ground Applications.)
Data Link Layer	The layer of the OSI reference model that manages the operations of the physical layer and may utilise special error detection or retransmission techniques to achieve acceptable error rates.
Data Terminal Equipment (DTE)	A digital data transmitter/receiver device that includes terminals and computers.
Datagram service	A service providing the transmission and reception of packets of data as discrete messages.
DC	Demand Contract
DC	Disconnect confirm

DCC	Data country code
DCE	Data circuit terminating equipment
DCPC	Direct Controller-Pilot Communications
Demand Contract	A “contract” between a requestor and a provider of information service, such as ADS or FIS, to provide a single report to the requestor (vs. Continual reports to one request).
DFDAU	Digital flight data acquisition unit
Dialogue	A co-operative relationship between elements which enables communication and joint operation.
Dialogue service	The lower service boundary of an ATN-App ASE; the service allows two ATN-App ASEs to communicate, such as a CM-ground-ASE to communicate with a CM-air-ASE.
Directory	A facility that supports on request the retrieval of ATN address informati or the resolution of application names.
Directory Service	Provides the ATN user with the addressing information that is associated with the application process title or application entity title used as input t the directory. The addressing information provided by the directory serv includes the network address as well as further technical addresses on th layers above, as required or applicable. Furthermore, the ATN Directory Service resolves generic application process titles or application entity titles, i.e. names which may be incomplete or contain “don’t care” elements, into the corresponding (list of) non-generic application process titles or application entity titles.
Distinguishing Path Attribute (DPA)	Used to discriminate among multiple routes to a destination, based on differences in the quality of service between the routes (for example, expense, transit delay or residual error probability.)
DL	Distribution List
DN	Disconnect
Domain	A set of end systems and intermediate systems that operate according to t same routing procedures and that is wholly contained within a single Administrative domain.
Domain Specific Part (DSP)	An Addressing Authority is responsible for its own Addressing Subdoma and NSAP Addresses within that addressing domain are distinguished, where necessary, by the value of the DSP.
Downstream Data Authority	The ground system that is permitted to conduct a DSC dialogue with an aircraft.

DPA	Distinguishing path attribute
DR	Disconnect request
DS	Dialogue Service
DSP	Data link service provider
DSP	Domain specific part
DST-REF	Destination reference
DT	Data
DT	Data Transfer SPDU
DTE	Data terminal equipment
E/C	Error probability over cost flag
E/R	Error report requested
E/T	Error probability over transit delay flag
EA	ED acknowledge
ED	Expedited data
EGP	Exterior gateway protocol
emergency contract	A contract to provide ADS reports at regular intervals during an emergency situation
emergency contract	A contract to provide ADS reports at regular intervals during an emergency situation
emergency mode	A mode of operation of the aircraft when a *Active User:* a user that is currently involved in a CM dialogue.
End Routing Domain (ERD)	A RD that only routes PDUs from/to its own RD.
End System (ES)	A system that contains the seven OSI layers and contains one or more en user application processes.
end user	The human who is using the user interface to the system
Engineering Trials	Trials based on pre-operational, prototype, or experimental equipment. Aim is to demonstrate the technical feasibility and correctness of applied techniques, concepts, and specifications.
Entity	An active element in any layer which can either be a software entity (suc

as a process) or a hardware entity (such as an intelligent I/O chip).

EoS	Element of Service
EOT	End of TSDU
ER	Error [TPDU]
ER	Error report [NPDU]
ER	Error report requested flag
ERD	End routing domain
ERP	Echo Response [NPDU]
ERQ	Echo Request [NPDU]
ES	End System
ESCT	ES configuration timer
ESH	ES hello
Ethernet	Based on the local area network standard, ISO 8802-3 Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method, a Physical Layer Specifications using broadcast technology which may connect as an ATN subnetwork.
event contract	A contract to provide ADS reports when certain events occur.
EX	Expedited Data SPDU
EXCEP	Exceptions
EXP	LOCREF extension flag
Expected Quality of Service (QoS)	A combination of a priori knowledge and analysis of performance information received from the operation of routing protocols.
Expected Transit Delay	The time elapsed between the invocation of CLNS by the source ATN NS user and the arrival of an NSDU at the destination ATN NS user, based o an NPDU size of 512 octets. Transit Delay values are typically expressed in increments of 500 milliseconds.
Expense	The cost to perform some task. In the context of internetworking, expens is defined in terms of the incremental expense incurred for transfer of a single NSDU of 512 octets in size.
extended projected profile	A projected profile extended up to a number of way points.
F/M	Fixed/Mobile

FANS	Future Air Navigation Systems
Fast Byte	definition tbd.
Fault Management	Encompasses fault detection, isolation, and the correction of abnormal operation, and includes functions to maintain and examine error logs, accept and act upon error detection notifications, trace and identify faults carry out sequences of diagnostic tests, and correct faults.
FD	Functional Description
FD	Full Duplex
FDPS	Flight Data Processing System
FG	Functional Group
FIB	Forwarding information base
FIBMO	FIB MO
FIFO	First in first out
FIS	Flight Information Services
FIS-AE Abstract Service Interface	The abstract interface between the FIS-users and the FIS-service-provide
FIS Abstract Service Interface	The abstract interface between the FIS-air-AE and the FIS-air-user or between the FIS-ground-AE and the FIS-ground-user. In CNS/ATM-1 Package, this interface identifies both the FIS AE abstract service interfa and the FIS-ASE abstract service interface.
FIS service-primitive	A function of an FIS AE that is not broken down further into subfunctior and is presented as part of the abstract service interface (i.e. request, indication, response, or confirmation).
FIS service-provider	Composed of the ground and airborne FIS AEs, all underlying data communication protocol entities and the physical media. As a consequence, it encompasses everything between the FIS-AE service interfaces of the end-users of the FIS application.
FIS-air-ASE	The abstract part of the aircraft system that performs the communication related functions of FIS.
FIS-air-user	The abstract part of the aircraft system that performs the non communication related functions of FIS.
FIS-ASE	The FIS-air-ASE and the FIS-ground-ASE.
FIS-ASE Abstract Service Interface	The abstract interface through which the FIS-ASE services are accessed.

FIS-CF	The abstract part of the AE that performs the mapping between the FIS-ASE service primitives and others elements within the FIS Application.
FIS-ground-ASE	The abstract part of the ground system that performs the communications related functions of FIS.
FIS-ground-user	The abstract part of the ground system that performs the non communication related functions of FIS.
FIS-user	The FIS-air-user or the FIS-ground-user.
Fixed ATN RDC	The Fixed ATN RDC consists of all ground-based RDs that form the AT
flight id	An identifier, to an ICAO approved format, for a particular flight.
Flight plan	Specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft. *NOTE: Specifications for flight plans are contained in Annex 2.*
Flow control	A function that controls the flow of data to perform buffer management within a layer or between adjacent layers.
FMS	Flight management system
FN	Finish SPDU
FOM	An indication of the level of accuracy of positional information given in ADS report.
FOM	Figure Of Merit
forward contract	A contract to provide a ground ADS system with ADS reports.
Forwarding Information Base (FIB)	The information base that is maintained by each ATN router and contain the set of forwarding paths reflecting the various policy and QoS ranking available to reach each known destination.
Four-D profile	TBD
FP	Full/Prefix
FSM	Finite state machine
FTAM	File transfer, access and management
FU	Functional Unit
Function	a coherent set of activities which fulfils, by itself or together with other functionality, a concept. Examples of functions: conflict free planning;

	electronic representation of the flight.
Functional Requirements	Operational requirements that determine what function a system should perform. They can usually be expressed by a verb applying to a type of data, e.g. display aircraft position.
G	Gauge
GA	General Aviation
Gateway	A system used to interconnect dissimilar networks. A gateway may cont all seven layers of the OSI reference model.
GDMO	Guideline for definition of MOs
General Communications	A category of communications which includes APC, public correspondence, and other non-operational and non-administrative communications.
General Topology Subnetwork	Used to connect geographically dispersed ISs and ESs.
GES	Ground earth station
Global Network Addressing	An internetwork addressing plan covering worldwide aeronautical operations which enables all participating subnetworks to function in a single integrated global network.
Global Network Addressing Domain	An addressing domain consisting of all the NSAP addresses in the OSI environment.
GT	Give Tokens SPDU
HD	Half Duplex
HF	High Frequency
HI	High Interface
IA5	International Alphabet Number 5
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICC	Inter-Centre Coordination
ICC	Inter-Centre Communications
ICD	International code designator
ICS	Implementation conformance statement

ID	Identification
ID	Identifier
IDI	Initial domain identifier
IDP	Initial Domain Part
IDRP	Interdomain routing protocol
IDRPCFGMO	IDRP configuration MO
IIH	IS-IS hello
Indicated QoS	Determined by the QoS parameters passed in protocol control informatio and may reflect varying accuracy with respect to actual characteristics.
Initial Domain Part (IDP)	The Addressing Authority responsible for an Addressing Subdomain tha assigned the NSAP Address, and that specified the abstract syntax and structure of the remainder of the NSAP Address.
Institutional Issues	Issues related to ownership, control, and responsibility for correct implementation and operation of systems that involve more than one stat or organisation.
Integrated Services Digital Network (ISDN)	A public telecommunications network that supports the transmission of digitised voice and data traffic on the same transmission links.
Intermediate System (IS)	A system comprising the lower three layers of the OSI reference model a performing relaying and routing functions.
Internetwork	A set of interconnected, logically independent heterogeneous subnetwork The constituent subnetworks are usually administrated separately and ma employ different transmission media.
Internetwork Protocol	A protocol that performs the basic end-to-end mechanism for the transfe of data packets between network entities. In the ATN Internet, the ISO 8473 internetwork protocol is used.
Interoperable	Describes the ability of the ATN to provide, as a minimum, a transparen data transfer service between end systems even though the ATN compris various ground, air-to-ground, and avionics subnetworks. The ability to interoperate between end systems can be extended to include commonalit of upper layer protocols.
Intra-domain routing information exchange protocol	In the ATN, the ISO 10589 IS-IS intra-domain routing information exchange protocol may be used to exchange connectivity and topology information between ATN routers within a routing domain.
IOC	Internet operations centre

IP	Internetwork protocol
IPI	Initial protocol identifier
IPM	Interpersonal message
IPMS	Interpersonal Messaging System
IPN	Interpersonal notification
IPRL	ISP Protocol RL
IS	International Standard
IS	Intermediate system
IS-SME	IS SME
ISDN	Integrated Services Digital Network
ISH	IS hello
ISN	Initial sequence number
ISO	International Organization for Standardization
ISOPA	ISO protocol architecture
ISORM	ISO reference model
ISP	International standardized profile
ISPICS	ISP Implementation Conformance Statement
ITA-2	International Telegraph Alphabet No. 2
ITU	International Telecommunication Union
ITU-T	ITU Telecommunication Standardization Sector
IUT	Implementation under test
IVMO	Initial value MO
K	Kilo
L1R	Level 1 Router
L2R	Level 2 Router
LAN	Local area network

Level 1 subdomain	A routing subdomain of end systems and intermediate systems that maintains detailed routing information about its own internal compositio and routing information which allows it to reach other routing areas. A level 1 subdomain area is also denoted a routing area.
Level 2 subdomain	The subset of all level 2 intermediate systems within a routing domain.
LI	Low Interface
LI	Length indicator
LINKMO	Linkage MO
LOC	Location Identifier
Local Area Network (LAN)	A network connecting various data communication devices in a localised geographical area such as a single aircraft, office building, or a group of buildings.
LOCD	LOC Default [Flag]
LOCREF	Local reference
LOCRIBMO	Local RIB MO
Long TSAP	Composed of the RDP and the short TSAP.
Lower layers	The physical, data link, network and transport layers of the OSI referenc model.
LSP	Link state PDU
M	More [bit] (X.25)
MA	Major Synchronisation
MAC	Medium Access Control
MAD	Management administrative domain
Managed Object	Data processing and data communication resources that may be managec through the use of the OSI Management protocol.
Management Administrative Domain	A management domain where the managed objects in the domain are all under the responsibility of one, and only one, administrative authority.
Management Agent	Performs management operations on managed objects within its local environment as a consequence of management operations communicated from a manager. An Agent may also forward notifications emitted by managed objects to a manager.

Management Domain	Resources that for systems management purposes are represented by managed objects. A management domain possesses at least the following quantities: a name that uniquely identifies that management domain, identification of a collection of managed objects that are members of the domain, and identification of any inter-domain relationships between thi domain and other domains.
Management Information Base (MIB)	A conceptual composite of management information within an open system.
Management Information System (MIS)-User	A management application. For the purposes of network management, a MIS-User is allowed to take on one of two possible roles — either an age role or a manager role.
Manager	The term given to a system that requests or otherwise receives informatic about managed objects.
MD	Management Domain
MD4	Message Digest Algorithm
Mean Transit Delay	The average time it takes to transfer a standard packet size from source t destination.
Message	Basic unit of user information exchanged between an airborne applicatio and its ground counterpart, or between two ground applications. Messag are passed in one or more data blocks from one end user to another throu different subnetworks.
Message Element	A component of a message used to define the context of the information exchanged.
Message Element Identifier	The ASN.1 tag of the ATCUplinkMsgElementID or the ATCDownlinkMsgElementId.
Message Header (air/ground)	The control information used to maintain synchronisation between the aircraft and the ground ATC system.
Message Header (ground/ground)	Control information used to maintain synchronisation between the two ground ATC systems.
Message Identification Number	A unique number assigned to each air/ground message. This number is used to differentiate messages and is conveyed in an air/ground message header.
Message Reference Number	Used to uniquely associate a response with a previously received message The Message Identification Number of a previously received message becomes the Message reference number of the response message. The Message Reference number is conveyed in the message header.
MET	Meteorological

MF-Address	MHS-form address
MHS	Message Handling Services
MHS	Message handling system
MIB	Management information base
MIDS	Management information definition statement
MIS	Management information service
MO	Managed object
MOA	MO attribute
Mobile Routing Domains	Formed from ATSC and AINSC systems onboard an aircraft (or any othe mobile platform), within the aircraft operator's Administrative Domain. mobile RD is characterised as an End Routing Domain (ERD).
Mobile Subnetwork	A subnetwork connecting a mobile system with another system not reside in the same mobile platform. These subnetworks tend to use free-radiati media (e.g. VHF/UHF radio, D-band satellite or D-band secondary surveillance radar) rather than "contained" media (e.g. wire or coaxial cable); thus they exhibit broadcast capabilities in the truest sense.
MOCS	MO conformance statement
MOD	Modulus
Mode S	Mode Select
Mode Select (Mode S)	An enhanced mode of secondary surveillance radar (SSR) which permits the selective interrogation of Mode S transponders, the two-way exchang of digital data between Mode S interrogators and transponders, and also interrogation of Mode A or Mode C transponders.
MORTS	MO requirement template specification
MOTIS	Message-oriented text interchange system
MS	More segments flag
MS	Message store
MTA	Message transfer agent
MTS	Message Transfer System
MTSE	Message transfer service element

Multi-homed End Routing Domain	An ERD that is in communication with more than one RD.
N/A	Not applicable
navigational intent	The intended path of the aircraft for a period of time in the future.
NE	Network entity
NEMO	NE MO
NET	NE title
Network Addressing Domain	A subset of the global addressing domain consisting of all the NSAP addresses allocated by one or more addressing authorities.
Network Entity	A functional portion of an internetwork router or host computer that is responsible for the operation of internetwork data transfer, routing information exchange, and network layer management protocols.
Network Entity Title (NET)	The global address of a network entity.
Network Layer	Provides a uniform service interface for the transfer of data among end systems and intermediate systems (ISs) utilising the ISO protocol architecture.
Network Management	The set of functions related to the management of various OSI resources and their status across the Network Layer of the OSI architecture.
Network Service Access Point (NSAP)	Point within the ISO protocol architecture at which global end users may be uniquely addressed on an end-to-end basis.
Network Service Access Point (NSAP) Address	A hierarchically organised global address, supporting international, geographical, and telephony-oriented formats by way of an address forma identifier located within the protocol header. Although the top level of tl NSAP address hierarchy is internationally administered by ISO, subordinate address domains are administered by appropriate local organisations.
Network Topology Map	Provides an overall view of the global network connectivity, and is used path computations by the operative routing algorithm.
Next Data Authority	The ground system so designated by the Current Data Authority.
NL	Network layer
NLE	NL entity
NLM	NL management
NLPI	NL protocol information

NLRI	NL reachability information
NLSP	NL security protocol
NM	Network management
NOR	No orderly release
NOTAM	Notice to Airmen
NPAI	Network protocol address information
NPDU	Network protocol data unit
NR	Negotiated Release
NRN	Non-Receipt Notification
NS	Network service
NSAP	Network Service Access Point
NSAP address prefix	Used to identify groups of systems that reside in a given routing domain confederation. An NSAP prefix may have a length that is either smaller than, or the same size as, the base NSAP address.
NSAPMO	NSAP MO
NSDU	NS data unit
NSMO	Network subsystem MO
O/R	Originator/recipient
OA	Overflow Accept
OCA	Object class attributes
OCN	Object class notifications
OCNB	Object class name bindings
OHI	Optional Heading Information
OID	Object Identifier
OOC	Operations on object classes
Open Systems Interconnection (OSI) Protocol Architecture	A set of protocols used to implement the OSI reference model.

Open Systems Interconnection (OSI) reference model	A model providing a standard approach to network design introducing modularity by dividing the complex set of functions into seven more manageable, self-contained, functional layers. By convention these are usually depicted as a vertical stack.
Operating Concept	The technical functionality of a system and its inherent capabilities regarded from the system operator's point of view. This includes the interaction between user and system, the services provided by the system well as the internal operation of the system.
Operational Concept (1)	Describes, from the user's point of view, the operational requirements, constraints, and prerequisites within which a technical system is suppose to work as well as the inherent capabilities of the system. It describes the interaction between the user and the system as well as the services the us may expect from the system.
Operational Concept (2)	Broad outline of an operational structure able to meet a given set of high level user requirements. It comprises a consistent airspace organisation, general operational procedures, and associated operational requirements system support.
Operational Requirements	Refers to a set of requirements that define the operational needs and constraints within which a technical system has to operate in order to ful its anticipated role. The ATN operational requirements relate to ATN communications as seen from the user point of view. Operational requirements are composed of functional and non-functional requiremen
Operational Trials	Trials based on an operational environment. This includes operational systems and operational equipment, e.g. routinely scheduled flights in an operational ATS environment. Aim is to demonstrate the operational acceptance and correctness of applied mechanisms, applications, and concepts.
OR	Operational Requirement
OSI	Open Systems Interconnection
OSIE	OSI environment
OSIM	OSI management
OSISME	OSI SM environment
P	Priority
Packet	The basic unit of data transfer among communications devices within the network layer.
PC	Personal Computer
PCI	Protocol control information

PDAI	Predetermined address indicator
PDAM	Proposed Draft Addendum
PDN	Public data network
PDU	Protocol Data Unit
PDU, Protocol Data Unit	A unit of data specified in an (N)-protocol and consisting of (N)-protocol control-information and possibly (N)-user-data, where N indicates the layer.
PDV	Presentation Data Value
PDV, Presentation Data Value	the unit of information specified in an abstract syntax, which is transferr by the OSI presentation-service (ISO/IEC 8822).
PER	Packed Encoding Rules (of ASN.1)
Performance Management:	Enables the behaviour of resources and the effectiveness of communicati activities to be evaluated. Includes functions to gather statistical information, maintain and examine logs of system state histories, determine system performance under natural and artificial conditions, an alter system modes of operation.
Performance Requirements	Requirements with respect to the performance of a system (e.g. reliability availability, response time, processing delay, etc.) and are derived from Operational Requirements. In general, they describe the minimum performance figures that a system must provide in order to fulfil the operationally required functions.
periodic contract	A contract to provide ADS reports at regular intervals.
Physical Layer	The layer of the OSI reference model that controls access to the transmission medium which forms the basis for the communication syste
PIB	Policy information base
PIBMO	PIB MO
PICS	Protocol implementation conformance statement
PIREP	Pilot Report
Policy Information Base (PIB)	Contained with a BIS, and consists of a set of policy statements specified by the Systems Manager which together describe the applicable Routing Policy.
PPDU	Presentation PDU
PR	Prepare

Presentation Layer	The layer of the OSI reference model that controls the coding, format, an appearance of the data transferred to and from the application layer.
Presentation Service Selector (PSAP Selector)	The element of the presentation address that identifies the user of the presentation protocol entity.
Priority	The relative importance of a particular PDU relative to other PDUs in transit, and used to allocate resources which become scarce during the transfer process.
PRL	Profile Requirements List
PRMD	Private management domain
Profile	Defines implementation conformance constraints on a set of reference specifications.
projected profile	An indication of where and when the aircraft anticipates it will be at the following two way-points.
Protocol	A set of rules and formats (semantic and syntactic) which determines the communication behaviour between peer entities in the performance of functions at that layer.
Protocol Control Information (PCI)	Information included in a layer header which contains service primitives specific to that layer.
Protocol Data Unit(PDU)	A unit of data transferred between peer entities within a protocol layer consisting of protocol control information and higher layer user data (i.e. service data units).
PSAP	Presentation service access point
PSDN	Packet switched data network
PT	Please Tokens
PTT	Post, telephone, and telegraph
Q	QOS Maintenance
QoS	Quality of Service
Quality of Service (QoS)	Information relating to data transfer characteristics (for example, request throughput and priority) used by a router to perform relaying and routing operations across the subnetworks which make up a network.
R&R	Requirements and Recommendations
R/W	Read/write

RA	Routing area
RCP	Required Communication Performance
RD	Routing domain
RD PDU	Redirect PDU
RDC	Routing domain confederation
RDF	Routing domain format
RDFD	RDF Domain [Flag]
RDI	Routing domain identifier
RDP	Router Domain Part
REL	Release
Relaying	The process of transferring packets across subnetworks including any necessary packet conversion.
Requested QoS	The service characteristics desired by the service user.
RER	Residual Error Rate
Reserved Value	Legal values for the respective fields (have not yet been assigned specific meanings by ICAO). These values should be processed normally in orde to allow future assignment. Meanings may be assigned in the future and are not available for local use. The allocation of these values requires no change in the version identifier.
Residual Error Probability	Indicates the likelihood that an PDU will be lost, duplicated, or corrupted This probability is defined as the ratio of lost, duplicated, or corrupted NSDUs to the total number of NSDUs transmitted by an ATN NS provid normalised for an NSDU size of 512 octets.
residual error rate (RER)	The ratio of messages misdelivered, non-delivered, or delivered with an error undetected by the system, to the total number of messages delivered the system during a measurement period (adapted from ISO/IEC 8072). *NOTE: for ATN, ICAO is considering not counting non-delivered messages in the total.*
RESYNC	Resynchronisation
RF	Radio frequency
RF	Refuse

RFC	Request for comments
RIB	Routing information base
RJ	Reject
RL	Requirements list
RLRE	ACSE Release Response APDU
RLRQ	ACSE Release Request APDU
RLS	Release
RN	Receipt Notification
ROA	Request of Acknowledgement
ROSE	Remote operation service element

Route	The set of addresses that identifies the destinations reachable over the router, and information about the route's path including the QoS and security available over the route.
Router	The communication element that manages the relaying and routing of da while in transit from an originating end system to a destination end syste An ATN router comprises an OSI intermediate system and end system supporting a systems management agent.
Routing	A function within a layer that uses the address to which an entity is attached in order to define a path by which that entity can be reached.
Routing Area (RA)	A routing subdomain comprising one or more ISs, and optionally one or more ESs.
Routing Domain	A set of end systems and intermediate systems that operate the same routing protocols and procedures and that are wholly contained within a single administrative domain. A routing domain may be divided into multiple routing subdomains.
Routing Domain Confederation (RDC)	A set of Routing Domains and/or RDCs that have agreed to join together The formation of a RDC is done by private arrangement between its members without any need for global coordination.
Routing Domain Identifier (RDI)	A generic NET as described in ISO 7498, and is assigned statically in accordance with ISO 8348. An RDI is not an address, and cannot be use as a valid destination of an ISO 8473 PDU. However, RDIs are, like ordinary NETs, assigned from the same Addressing Domain as NSAP Addresses.
Routing Information Base(RIB)	A data base that is maintained by each router and comprises the information regarding the connectivity and topology of the ESs and ISs

	within a particular Routing Domain and path information pertinent to paths interconnecting Routing Domains. It is maintained by way of the information received by a routing information exchange protocol. Each Routing Information Exchange Protocol has its own RIB specification.
Routing information exchange protocol	The protocol used to exchange subnetwork connectivity information between end systems and intermediate systems and between intermediate systems and intermediate systems.
Routing Policy	A set of rules that control the selection of routes and the distribution of routing information by ATN Boundary Intermediate Systems (BISs). These rules are based on policy criteria rather than on performance metri such as hop count, capacity, transit delay, cost, etc. which are usually applied for routing. There are two groups of routing policy in the ATN: general routing policy specified in the ATN Internet SARPs in order to ensure necessary connectivity in the ATN at a reasonable routing information update rate and (2) user specified routing policy, i.e. individ policy rules which may be additionally implemented in ATN BISs by administrations and organisations to meet their specific operational and policy needs.
Routing Policy	The set of rules in a BIS that determines the advertisement and use of routes is known as a Routing Policy. Each organisational user of the AT must determine and apply their own Routing Policy.
RPF	Reference publication format
RPOA	Recognised private operating agency
RTE	Receiving TE
RTSE	Reliable transfer service element
S/T	Segmentation over transit delay flag
SAC	Short Accept
Safety Case	An analysis presenting an overall justification for the declaration that a particular systems satisfies its safety requirements.
SARPs	Standards and Recommended Practices
SCN	Short Connect
SDU	Service data unit
Security Label	May indicate requirements for protection of a PDU and provide information used by network layer access control functions.
Security Management	To support the application of security policies by means of functions whi include the creation, deletion and control of security services and mechanisms, the distribution of security-relevant information, and the

	reporting of security-related events.
SEL	(Transport) Selector
Service Data Unit	A unit of data transferred between adjacent layer entities, which is encapsulated within a PDU for transfer to a peer layer.
Service primitive	A function of an ASE that is not broken down further into subfunctions, and is presented as part of the abstract service interface (i.e. request, indication, response, or confirmation).
Service Provider	The ground and airborne AEs for the application, all underlying data communication protocol entities and the physical media. As a consequence, it encompasses everything between the Application-AE service interfaces of the peer end-users of the application.
Session layer	The layer of the OSI reference model that establishes the rules of dialogu between two end-user entities.
Session Service Selector (SSAP Selector)	The element of the session address that identifies the user of the session protocol entity.
Short TSAP	Composed of the ARS, the LOC, the SYS, and the SEL.
SHORT-CP	Short Connect PPDU
SHORT-CPA	Short Connect Accept PPDU
SHORT-CPR	Short Connect Reject PPDU
SICASP	SSR Improvements and Collision Avoidance Systems Panel
Single Homed ERD	An ERD that is in communication with one other RD only.
SM	Systems management
SMA	SM application
SMAE	SM AE
SME	SM entity
SMF	SM function
SMFA	SM functional area
SN	Subnetwork
SN-SME	SN SME
SNAcF	SN access function

SNAcP	SN access protocol
SNCR	SN connection reference
SNDCF	SN dependent convergence function
SNDCP	SN dependent convergence protocol
SNICF	SN independent convergence function
SNICP	SN independent convergence protocol
SNL	SN layer
SNOWTAM	Snow NOTAM
SNP	Sequence number PDU
SNPA	SN point of attachment
SNQOS	SN QoS
SNS	SN service
SNSDU	SN SDU
SP	SN Processor
SP	Segmentation permitted flag
Spare Value	A value for which no meaning is currently defined. These values are available by the administering authority for local use, and may be assigne in the future.
SPDU	Session PDU
SPI	Subsequent protocol identifier
SPM	Session Protocol Machine
SRC-REF	Source reference
SRF	Short Refuse
SS	Symmetric Synchronise
SS	Session Service
SSR	Secondary surveillance radar
ST/SYS	Storage and transfer system

Stack (or protocol stack)	A set of co-operating OSI protocols selected from different layers of the basic reference model. Hence, "upper layer stack" refers to session, presentation, and application protocols, while "lower layer stack" refers t physical, data link, network, and transport protocols.
STE	Sending TE
Subnetwork	An actual implementation of a data network that employs a homogeneou protocol and addressing plan, and is under control of a single authority.
Subnetwork Access Facility (SNAcF)	The subset of the OSI network layer that provides the interface with the data link layer and is specific to a particular subnetwork.
Subnetwork Access Protocol (SNAcP)	The actual protocol used to receive services form a particular subnetwork For example, the subnetwork access protocol to many public data networ is X.25.
Subnetwork Dependent Convergence Function (SNDCF)	The set of rules and procedures needed to convert the data transfer needs the subnetwork independent convergence protocol to the actual services provided by a subnetwork.
Subnetwork Domain	The set of end systems and intermediate systems connected to the same physical network.
Subnetwork Independent Convergence Function (SNICF)	The common protocol for all ATN host computers and routers that is use for the transfer of data. In the ATN internet, the SNICF is the connectionless network protocol defined by ISO 8473.
Subnetwork Point of Attachment (SNPA)	The point at which a real end system, interworking unit, or real subnetw is attached to a real subnetwork, and is a conceptual point within an end intermediate system at which the subnetwork service is offered.
Subnetwork Point of Attachment (SNPA) Address.	Provides information used in the context of a particular real subnetwork identify a SNPA. An SNPA address is a subnetwork address such as X.2 DTE Addresses, Ethernet MAC Addresses, etc.
Subnetwork sublayer	A component of the OSI reference model that provides the protocol mechanism for data transfer between peer entities within the same subnetwork. This sublayer is an implementation of the OSI subnetwork access facility (SNAcF).
SY	Minor Synchronise
SYS	System Identifier
SYS4	SYS 4th Octet [Flag]
SYS5	SYS 5th Octet [Flag]
SYS6	SYS 6th Octet [Flag]

Systems Management	The set of functions related to the management of various OSI resources and their status across all layers of the OSI architecture.
Systems Management Application Entity (SMAE)	An application entity for the purpose of systems management communications.
Systems Management Function	The monitoring, controlling, operating, supervising, co-ordination, and administration of a communications network.
T	Tidemark
T/C	Transit delay over cost flag
T/SYS	Transfer system
TC	Transport connection
TCIVMO	TC IVMO
TCMO	TC MO
TCP	Transmission control protocol
TCQIVMO	TC QoS IVMO
TD	Typed Data
TE	Transport entity
TEMO	TE MO
TI	Transmission identification
TLE	Transport layer entity
TP4	Transport protocol class 4
TPDU	Transport protocol data unit
TPDU-NR	TPDU send sequence number
TR	Technical report
Traffic Type	The data conveyed by the ATN is divided into four traffic types: ATN Operational Communications representing safety and regularity of flight communications, ATN Administrative Communications representing no safety and regularity of flight communications sent by aircraft operating agencies and ATS administrations, General Communications representir APC, public correspondence, and other non-operational and non administrative communications, and ATN Systems Management Communications representing systems management information that is critical for support of network operations. The differentiation of traffic

	types is required because different data traffic may have different access subnetworks. The traffic type is conveyed in the ATN Security Label of ISO 8473 (CLNP) and ISO 10747 (IDRP) PDUs. It is used to qualify (CLNP) data packets and (inter-domain) routes according to the class of traffic that they carry. Based on this qualification, access of subnetworks controlled at the ATN Internet level.
Transit Routing Domain (TRD)	A domain whose policies permit its BISs to provide relaying for PDUS whose source is located in either the local routing domain or in a differer routing domain.
Transport layer	The layer of the OSI reference model that assures reliable end-to-end transfer between transport service users.
Transport service (TS) user	The entity that uses transport layer services.
Transport Service Access Point (TSAP)	The logical access point to the transport layer.
Transport Service Access Point (TSAP) address	The complete communications address which unambiguously defines a transport service user. The TSAP address comprises the NSAP address and a TSAP-selector.
Transport Service Access Point Selector (TSAP Selector).	The element of the transport address that identifies the user of the transp protocol entity.

TRD	Transit routing domain
TS	Transport service
TSAP	Transport Service Access Point
TSAPMO	TSAP MO
TSDU	TS data unit
TSMO	Transport subsystem MO
TSN	Tag set name
TWDL	Two-Way Data Link
TWS	Terminal Weather Service
U	User option
UA	User agent
UC	Update Contract
UD	Unit data

UHF	Ultra high frequency
Update Contract	A contract to provide a piece of FIS information and any update of this information.
Upper layers	A term pertaining to the session, presentation, and application layers of t OSI reference model.
User Requirements	A discription of what users expect to obtain from the system (not how the system should do it). They are usually expressed on a high level and do n include technical details. The direct user of the ATN is an application within an end system supporting Air Traffic Management or Aeronautica Industry functions. The Air Traffic Controller, other ground staff, or the Pilot are the human beings using directly, or indirectly, the ATN. The u may also be seen more on the abstract level as an organisation, e.g. airlin or air navigation service provider.
UTC	Co-ordinated Universal Time
Validation	In the ICAO context, a process that ensures that systems meet user requirements to an agreed level of confidence and can be produced from written SARPs and Guidance material. One has to distinguish between performance based and functional validation. Single subsystems of the ATN, like routers, may be validated on a functional basis; validation of t ATN's suitability with respect to network performance etc. requires definition of performance requirements.
VC	Virtual circuit
VDL	VHF data link
VER	Version
Very High Frequency (VHF)	A frequency band from 30 to 300 megahertz.
VHF	Very high frequency
VHF Data Link (VDL)	Packet data communications to aircraft and ground users comprised of airborne VHF data radios (VDRs), VHF ground stations, and connectivit to routers on the aircraft and the ground.
Virtual circuit priority	The priority associated with a connection (virtual circuit) which is established between two systems prior to the transmission of data.
WAN	Wide area network
Wide Area Network (WAN)	Networks used to interconnect geographically dispersed routers and host computers. These subnetworks may be internally complex packet switching entities of their own, or they may be as simple as point-to-poin dedicated lines.

WR	Receive window value
WS	Send window value
WX	Weather
X	Hexadecimal
X.25 Packet Switched Data Network (PSDN)	A communications network that provides a network access service in compliance with CCITT Recommendation X.25.
YR-EDTU-NR	Expected ED TPDU sequence number in EA (‘your ED TPDU
YR-TU-NR	Expected TPDU sequence number (‘your TPDU number')

2. GENERAL

Advanced CNS/ATM concepts include the use of distributed data applications and supporting data communication services to:

a) Deliver air traffic services (ATS) to aircraft;

b) Exchange air traffic management (ATM) information between fixed-based ATS facilities on the ground; and;

c) Control the movements of aircraft and vehicles operating on airport surfaces.

The Aeronautical Telecommunication Network (ATN) provides communication services and applications to support implementation of the CNS/ATM concepts.

2.1.1 These SARP's define:

a) ATN Systems Level Requirements

b) ATN Applications Requirements

1) Air Ground Applications Requirements

i) Controller Pilot Data Link Communications (CPDLC) {includes (Pre)Departure Clearance}

ii) Automatic Dependent Surveillance (ADS)

iii) Flight Information Services (FIS)

2) Ground Ground Applications Requirements

i) Air Traffic Services (ATS) Intercentre Communications (ICC)

ii) ATS Message Handling Services (AMHS)

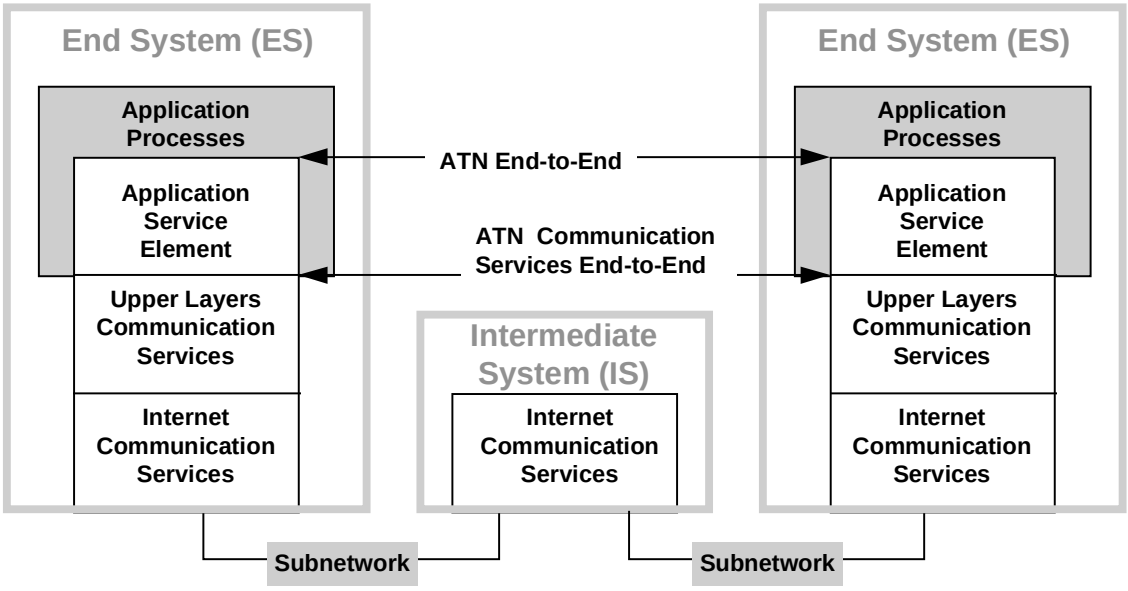
c) Communication Service Requirements

1) Upper Layers Communication Services

2) Internet Communication Services

3) Context Management (CM) {Data link initiation capability}

2.1.2 The Aeronautical Telecommunication Network is the internetwork architecture and associated applications that support Air Traffic Management or aeronautical industry. This network allows ground, air-to-ground, and and avionics data subnetworks to interoperate by adopting common interface services and protocols based on the International Organization for Standardization (ISO) Open Systems Interconnection (OSI) reference model. Figure 2.1-1 shows an overview of the ATN.

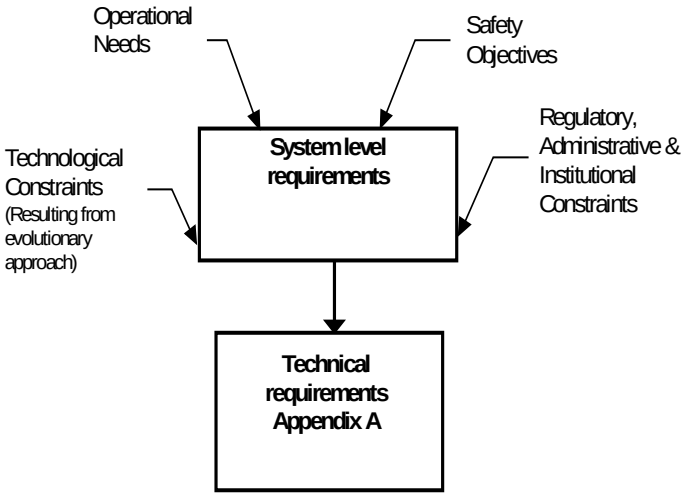


Note: Shading indicates elements outside the scope of the ATN SARPs.

Figure 2.1-1: Overview of ATN.

3. SYSTEM LEVEL REQUIREMENTS

Note.— The system level requirements are high-level technical requirements that have been derived from operational needs, technological constraints, safety objectives and regulatory constraints (administrative and institutional). These system-level requirements are the basis for the lower level technical and derived requirements. A conceptual overview of the relationship between high-level requirements, low-level requirements and external constraints is shown below



3.1 ATN System Level Requirements

3.1.1 The ATN shall use the International Organization for Standardization (ISO) Open Systems Interconnection (OSI) standards.

3.1.2 ATN shall provide a means to facilitate migration from initial implementaations to future versions.

3.1.3. ATN shall reference time based on Co-ordinated Universal Time (UTC).

3.1.4. ATN shall enable only the authorized ATC authority to provide ATC instructions to aircraft operating in its airspace.

3.1.5 ATN shall enable data communications to be carried only over authorized paths for the type of traffic specified by the user.

3.1.6 ATN shall notify the appropriate application processes when no authorized path exists.

3.1.7 ATN shall provide a means to unambiguously address all ATN End and Intermediate systems.

3.1.8 ATN shall enable the recipient of a message to positively identify the originator of that message within a dialogue.

3.1.9 ATN addressing plan shall permit States and organisations to assign addresses within their own administrative domains.

3.1.10 ATN shall enable exchange of application address information.

3.1.11 ATN shall employ policy based routing.

3.1.12 ATN shall employ ATSC traffic classes in accordance with the criteria in Table 3.1-1.

Table 3.1-1: ATSC Traffic Classes

One way End-to-End Transit Delay at 95% probability (seconds)	ATSC Traffic Class
Reserved	A
Reserved	B
7.2	C
13.5	D
18	E
27	F
50	G
100	H
No value specified	No preference

3.1.13 ATN shall enable communication priorities in accordance with Table 3.1-2

Table 3.1-2. Relationship of ATN applications to communication priorities

Message Categories	ATN Application	CORRESPONDING PROTOCOL PRIORITY		
		Transport Layer Priority		Internet Layer Priority
		Transport Connection Priority	TSDU Priority	CLNP Priority
Network/Systems Management		0	0	14
Distress Communications		1	1	13
Urgent Communications		2	2	12
High Priority Flight Safety Messages		3	3	11
Normal Priority Flight Safety Messages	CPDLC ADS AIDC	4	4	10
Meteorological Communications		5	5	9
Flight Regularity Communications	CM	6	6	8
Aeronautical Information Service Messages	FIS	7	7	7
Network/Systems Administration		8	8	6
Aeronautical Administrative Messages		9	9	5
<unassigned>		10	10	4
Urgent Priority Administrative and U.N. Charter Communications		11	11	3
High Priority Administrative and State/Government Communications		12	12	2
Normal Priority Administrative		13	13	1
Low Priority Administrative		14	14	0

Note: Priorities above double line are for communications related to safety and regularity of flight.

3.1.14 ATN shall support fixed and mobile systems.

3.1.15 ATN shall enable an aircraft Intermediate System to be connected to a ground Intermediate System via concurrent mobile subnetworks.

3.1.16 ATN shall accommodate ICAO standardized mobile subnetworks.

3.1.17 ATN shall enable an aircraft Intermediate System to be connected to multiple ground Intermediate Systems.

3.1.18 ATN shall enable peer to peer application exchange of information when an authorized path exists.

3.1.19 ATN shall be capable of establishing, maintaining, releasing, forwarding and aborting peer to peer application associations for Automatic Dependent Surveillance (ADS).

3.1.20 ATN shall be capable of establishing, maintaining, releasing, forwarding and aborting peer to peer application associations for Controller Pilot Data Link Communications (CPDLC).

3.1.21 ATN shall be capable of establishing, maintaining, releasing, forwarding and aborting peer to peer application associations for Context Management (CM).

3.1.22 ATN shall be capable of establishing, maintaining, releasing and aborting peer to peer application associations for Flight Information.

3.1.23 ATN shall be capable of establishing, maintaining, releasing and aborting peer to peer application associations for Inter-Centre Co-ordination communications

3.1.24 ATN shall enable the transition of existing AFTN users and systems into the ATN architecture.

4. ATN APPLICATIONS REQUIREMENTS

4.1. System Applications

Note. — System applications provide services that are necessary for operation of the other ATN applications (air-ground and ground-ground) and/or ATN communication services

4.1.1 Context management (CM) application

Note. — The CM application provides the capability for an aircraft to logon with an ATS ground system. Once an appropriate connection is established, CM provides for the exchange of information on each supported ATN application including the network address of each. CM also provides the capability to update log-on information and the capability for a ATS ground system to forward log-on information to another ATS ground system.

4.1.1.1 The CM application shall support a log-on function in accordance with the requirements of Appendix A (2.1).

4.1.1.2 The CM application shall support a contact function in accordance with the requirements of Appendix A (2.1).

4.1.1.3 The CM application shall support an update function in accordance with the requirements of Appendix A (2.1).

4.1.1.4 The CM application shall optionally support a ground forwarding function in accordance with the requirements of Appendix A (2.1).

4.1.1.4 The CM application shall support a registration function in accordance with the requirements of Appendix A (2.1) .

4.2 Air-ground applications

Note. — Air-ground applications includes those applications that are in support of aircraft-to-ground system data communications via the ATN. Certain of these applications involve ground system-to-ground system data communications as well as aircraft-to-ground system data communications.

4.2.1 Automatic dependent surveillance (ADS) application

Note. — ADS is a surveillance application in which the aircraft automatically provides, via the ATN, data derived from on-board navigation and position-fixing systems, including aircraft identification, four-dimensional position, and additional data as appropriate. ADS provides service based on contracts established between the aircraft and ground ADS applications (i.e. demand contact, periodic contract, event contract and emergency contract) and between two ADS ground applications (i.e. forward contract).

4.2.1.1 The ADS application shall support demand contracts, in accordance with the requirements of Appendix A (2.2.1).

4.2.1.2 The ADS application shall support periodic contracts, in accordance with the requirements of Appendix A (2.2.1).

4.2.1.3 The ADS application shall support event contracts, in accordance with the requirements of Appendix A (2.2.1).

4.2.1.4 The ADS application shall support emergency contracts, in accordance with the requirements of Appendix A (2.2.1).

4.2.1.5 The ADS ground application shall optionally support forward contracts, in accordance with the requirements of Appendix A (2.2.2).

4.2.2 Controller pilot data link communications (CPDLC) application

Note. — The CPDLC application provides the capability for data link communications between air traffic controllers and pilots. The CPDLC application has the capability to establish, manage, and terminate CPDLC dialogues for controller/pilot message exchange.

4.2.2.1 The CPDLC application shall support controller-pilot message exchange functions in accordance with the requirements of Appendix A (2.3).

4.2.2.2 The CPDLC application shall support the transfer of data authority functions in accordance with the requirements of Appendix A (2.3).

4.2.2.3 The CPDLC application shall optionally support the down stream clearance functions in accordance with the requirements of Appendix A (2.3),.

4.2.2.4 The CPDLC application shall optionally support ground forward function, in accordance with the requirements of Appendix A (2.3),.

4.2.3 Flight information service (FIS) application

Note. — The FIS application allows a pilot to request and receive flight information services from ground FIS systems.

4.2.3.1 Automatic terminal information service (ATIS) application

4.2.3.1.1 The ATIS application shall support aircraft initiated FIS demand contracts, in accordance with the requirements of Appendix A (2.4).

4.2.3.1.2 The ATIS application shall support aircraft initiated FIS update contracts, in accordance with the requirements of Appendix A (2.4).

4.2.3.1.3 The ATIS application shall support both an aircraft and ground initiated FIS cancellation of contracts function, in accordance with the requirements of Appendix A (2.4).

4.3 Ground Ground Application Requirements

Note: Ground Ground Applications are those ATN applications resident in ground based systems that exchange information with peer applications also resident in ground based systems.

4.3.1 The ATS Message Handling Services application shall support a ATN Message Service function in accordance with the requirements of Appendix A Sub-Volume 3 Part I

Note: . The ATS Message Handling Services allow ATS Messages to be exchanged between service users, using the (ATN) by providing generic message services over the ATN. The ATN Pass-Through Service is the ATS Message Handling Service offered over the ATN by the use of the Dialogue Service and of the associated upper layer architecture to exchange AFTN Messages formatted in IA-5 in compliance with the provisions of Annex 10, Volume II. The Inter-Centre Communications functions allow for the exchange of information between Air Traffic Service providers AIDC is an ATN application which should be employed by two Air Traffic Service (ATS) units when exchanging Air Traffic Control (ATC) information for an active flight related to flight notification, flight coordination, transfer of control, surveillance data and free (i.e. unstructured) text data.

4.3.2 The ATS Message Handling Services application shall support a ATN Pass-Through Service function in accordance with the requirements of Appendix A Sub-Volume 3 Part I

4.3.3 The ADSP derived operational services that shall be supported by the AIDC SARPs are:

a) Approval for a Flight to Enter ADS-ATC Airspace.

b) Automatic Transfer of Control and Communications Between Airspaces Using Digital Data Interchange.

c) Flight Notification

4.3.4 The AIDC application shall support a Flight Notification function in accordance with the requirements of Appendix A Sub-Volume 3 Part II

4.3.5 The AIDC application shall support a Flight Coordination function in accordance with the requirements of Appendix A Sub-Volume 3 Part II

4.3.6 The AIDC application shall support a Transfer of Control function in accordance with the requirements of Appendix A Sub-Volume 3 Part II

4.3.7 The AIDC application shall support a Transfer of Communications function in accordance with the requirements of Appendix A Sub-Volume 3 Part II

4.3.8 The AIDC application shall support a Transfer of Surveillance Data function in accordance with the requirements of Appendix A Sub-Volume 3 Part II

4.3.9 The AIDC application shall support a Transfer of General Data function in accordance with the requirements of Appendix A Sub-Volume 3 Part II

5. ATN COMMUNICATION SERVICES REQUIREMENTS

Note: The ATN Communication Services Requirements define the requirements for layers 1 through 6, as well as part of layer 7. It takes information produced by one of the individual ATN Application and perform the end-to-end Communication Service in standardized formats. These communication services requirements are divided into two parts. The Upper Layer and Applications Communications Service defines the standards for the layers 5 through 7. The Internet Communications Service defines standards for layers 1 through 4.

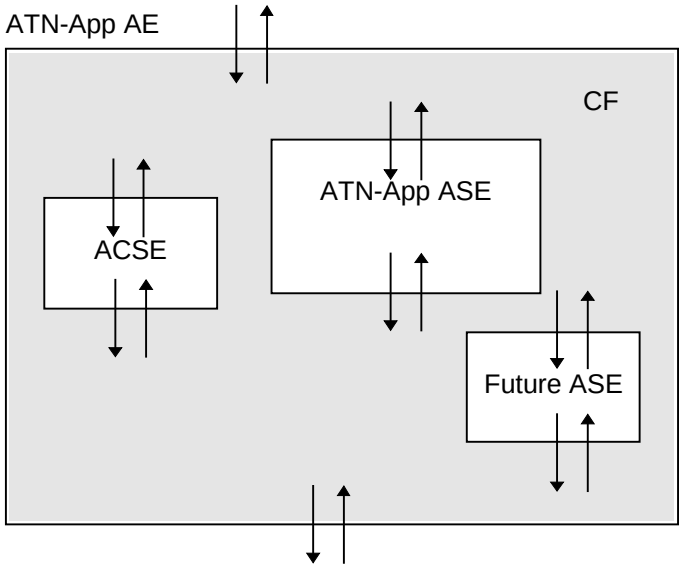
5.1 Upper Layer Communications Service Requirements

5.1.1 Upper Layer and Applications Communications Service shall be implemented in accordance with Appendix A, (4), in support of ATN applications except the ATS Message Application defined in Appendix A, (3).

5.1.2 The Session portion of the profile shall be implemented in accordance with Appendix A, (4).

5.1.3 The Presentation portion of the profile shall be implemented in accordance with Appendix A, (4)..

5.1.4 The Application Entity shall be structurized as specified in Appendix A, (2). The figure below illustrates the ATN Application Entity structure.



5.1.5 The ACSE portion of the profile specified shall be as specified in Appendix A (4).

5.1.6 The Application Service Element (ASE) and Application Service Object (ASO) shall be implemented as specified in Appendix A (2,3,4).

5.1.7 The Control Function shall be defined as specified in Appendix A (4).

5.2 ATN Internet Communication Service Requirements

5.2.1 An ATN End System (ES) shall contain the seven OSI layers and one or more ATN end user application processes, as defined in Appendix A (5).

5.2.2 An ATN ES shall implement the ES-IS protocol defined in Appendix A (5).

5.2.3 An ATN ES shall supporttransport layer functions as defined in Appendix A (5).

5.2.4 An ATN ES shall support the network layer functions as defined in Appendix A (5).

Note: *The ATN infrastructure, referred to as an internet, comprises the interconnection of computers with gateways and routers via real subnetworks.*

5.2.5 An ATN Router shall implement CLNP, a Subnetwork Access Protocol (SNAcP) suitable for each underlying subnetwork, a Subnetwork Dependent Convergence Facility (SNDCF), and the Route Initiation procedures appropriate to the Router Class, as specified in Appendix A (5)

5.2.6 Where an ATN Router is directly connected to one or more mobile subnetworks, it shall implement an End-System to Intermediate System Routing Exchange Protocol as specified in Appendix A (5).

5.2.7 The ATN IS shall support the the Subnetwork Independent Convergence Function (SNICF) as specified in Appendix A (5).

5.2.8 The ATN IS shall support the intermediate system to intermediate system intra-domain routing routine information exchange protocol, as defined in Appendix A (5).

5.2.9 The ATN IS shall implement a Subnetwork Dependent Convergence Facility (SNDCF) as specified in Appendix A (5).

5.2.10 The ATN IS shall implement the ES-IS protocol defined in Appendix A (5).

Note.—When an ATN IS is directly connected to one or more mobile subnetworks it shall implement a sub-set of the ES-IS Routing Exchange Protocol.

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