

# ISO 21076:2016-07 (E)

## Space data and information transfer systems - Space communications cross support - Architecture requirements document

---

### CONTENTS

<u>Section</u>	<u>Page</u>
<b>1 INTRODUCTION.....</b>	<b>1-1</b>
1.1 PURPOSE.....	1-1
1.2 SCOPE.....	1-1
1.3 APPLICABILITY.....	1-3
1.4 RATIONALE.....	1-4
1.5 DOCUMENT STRUCTURE .....	1-4
1.6 DEFINITIONS AND CONVENTIONS.....	1-5
1.7 REFERENCES .....	1-12
<b>2 OVERVIEW.....</b>	<b>2-1</b>
2.1 BACKGROUND .....	2-1
2.2 ROLE OF THIS ARCHITECTURE REQUIREMENTS DOCUMENT .....	2-1
2.3 STRUCTURE OF THE ARD: FOUR VIEWS OF SYSTEM ARCHITECTURE .....	2-3
2.4 RELATIONSHIPS BETWEEN SCCS AND OTHER CCSDS DOCUMENTS ...	2-5
2.5 CROSS SUPPORT SERVICE SYSTEM ELEMENTS.....	2-6
2.6 BASIC SYSTEM-ELEMENT CONFIGURATIONS.....	2-9
2.7 NETWORK TERMINOLOGY .....	2-11
2.8 PRACTICAL LIMITS ON PROTOCOL CHOICES.....	2-14
2.9 HOW TO USE THIS DOCUMENT.....	2-15
<b>3 CROSS SUPPORT OVERVIEW OF ABA AND SSI TECHNICAL ARCHITECTURE—CROSS SUPPORT BUILDING BLOCKS.....</b>	<b>3-1</b>
3.1 OVERVIEW .....	3-1
3.2 BUILDING-BLOCK FUNCTIONS.....	3-2
<b>4 SERVICE VIEW.....</b>	<b>4-1</b>
4.1 OVERVIEW .....	4-1
4.2 ABA SERVICES .....	4-2
4.3 SSI SERVICES.....	4-7
4.4 SECURITY REQUIREMENTS FOR SERVICES .....	4-12
<b>5 PHYSICAL VIEW.....</b>	<b>5-1</b>
5.1 OVERVIEW .....	5-1
5.2 ABA-SPECIFIC ELEMENTS.....	5-2
5.3 SSI PHYSICAL ELEMENTS .....	5-13
5.4 SECURITY REQUIREMENTS FOR PHYSICAL ELEMENTS.....	5-25

## CONTENTS (continued)

<u>Section</u>	<u>Page</u>
<b>6 COMMUNICATIONS VIEW .....</b>	<b>6-1</b>
6.1 OVERVIEW .....	6-1
6.2 PROTOCOL BUILDING BLOCKS .....	6-6
<b>7 END-TO-END DEPLOYMENT VIEW .....</b>	<b>7-1</b>
7.1 OVERVIEW .....	7-1
7.2 ABA END-TO-END PROTOCOL VIEWS—REQUIREMENTS .....	7-1
7.3 SSI END-TO-END PROTOCOL VIEWS: REQUIREMENTS.....	7-3
7.4 DISCUSSION—SECURITY REQUIREMENTS FOR END-TO-END DEPLOYMENTS .....	7-5
<b>ANNEX A SECURITY AND SANA CONSIDERATIONS (INFORMATIVE) .....</b>	<b>A-1</b>
<b>ANNEX B GLOSSARY (INFORMATIVE) .....</b>	<b>B-1</b>
<b>ANNEX C ABBREVIATIONS (INFORMATIVE) .....</b>	<b>C-1</b>
<b>ANNEX D INFORMATIVE REFERENCES (INFORMATIVE) .....</b>	<b>D-1</b>

### Figure

1-1 Graphical Conventions .....	1-10
2-1 Roles of the SCCS Architecture Documents .....	2-2
2-2 Basic ABA Configuration.....	2-10
2-3 SSI Core Configuration .....	2-11
2-4 The SSI .....	2-13
3-1 Generic ABA End-to-End Deployment.....	3-1
3-2 Generic SSI End-to-End Deployment .....	3-2
4-1 ABA Service Interfaces .....	4-2
4-2 SSI End-to-End Run-Time Service Interfaces.....	4-7
4-3 SSI ESLT Service Interfaces for Earth Routing Node .....	4-8
5-1 ABA Node—Generic Building Block .....	5-2
5-2 SSI Node—Generic Building Block.....	5-13
6-1 ABA ESLT Protocol Building Blocks.....	6-8
6-2 ABA ESLT Radiometric Processing Protocol Building Blocks.....	6-10
6-3 ABA ESLT Service Management Protocol Building Blocks.....	6-11
6-4 ABA ESLT Service Management Configuration and Execution Building Blocks....	6-12
6-5 ABA ESLT Monitor Data Protocol Building Blocks .....	6-13
6-6 ESLT Service Control Service-Provider Protocol Stack Building Blocks.....	6-14
6-7 ESLT Delta-DOR Service-Provider Protocol Stack Building Blocks.....	6-15
6-8 ABA ESLT Forward-File Protocol Building Blocks.....	6-16
6-9 ABA ESLT Return File Protocol Building Blocks.....	6-17

## CONTENTS (continued)

<u>Figure</u>	<u>Page</u>
6-10 ABA Earth User Forward Protocol Building Blocks .....	6-19
6-11 ABA Earth User Node Return Protocol Building Blocks .....	6-20
6-12 ABA Earth User Radiometric, Monitor and Control Protocol Building Blocks .....	6-22
6-13 ABA Space User Forward Protocol Building Blocks.....	6-25
6-14 ABA Space User Return Protocol Building Blocks .....	6-26
6-15 ABA Space User Ranging Protocol Building Blocks.....	6-27
6-16 ABA Space User Delta-DOR Protocol Building Blocks.....	6-28
6-17 Secure ABA Earth User F-Frame and Forward-File Protocol Building Blocks .....	6-28
6-18 Secure ABA Space User F-Frame and Forward-File Protocol Building Blocks.....	6-29
6-19 SSI ESLT and User DTN Protocol Building Blocks.....	6-32
6-20 SSI ESLT and User DTN Forward-File Building Blocks .....	6-33
6-21 SSI ESLT and User Service Management Building Blocks.....	6-35
6-22 SSI Space User and Routing Node DTN Protocol Building Blocks .....	6-36
6-23 SSI ESLT and Space Routing DTN Network Management Building Blocks.....	6-37
6-24 SSI Earth Routing Node Forward Building Blocks.....	6-38
6-25 SSI Earth Routing Node Return Building Block.....	6-39
6-26 SSI Earth User Node DTN Forward Building Blocks.....	6-40
6-27 SSI Space User DTN Forward-File Building Blocks .....	6-42
6-28 SSI Space User and Routing Node Local LAN Building Blocks.....	6-42
6-29 SSI Secure Forward-File Building Blocks .....	6-43
6-30 SSI Secure Space User and Space Routing Node Building Blocks.....	6-45
6-31 SSI Last-Hop/First-Hop Delivery Agent Building Blocks.....	6-47
6-32 SSI User Last-Hop/First-Hop Transfer File Building Block.....	6-50
7-1 ABA End-to-End Forward: ABA Agency Supporting ABA Agency .....	7-2
7-2 SSI End-to-End Forward: SSI Agency Supporting SSI Agency .....	7-3
7-3 ABA Secure End-to-End Forward: ABA Agency Supporting ABA Agency .....	7-6
7-4 SSI Secure End-to-End Forward: SSI Agency Supporting SSI Agency .....	7-6

### Table

2-1 Cross Support Service Elements and Nominal Locations .....	2-7
2-2 User Elements and Nominal Locations .....	2-8
2-3 Examples of Provider Cross Support Service Systems and Related Elements .....	2-9
2-4 Examples of User Cross Support Service Systems and Related User Elements .....	2-9
2-5 Example BDPs for Different Earth and Space Applications .....	2-15
2-6 Examples of Mission Application-Specific Views.....	2-17
5-1 ABA CSSE Node Type, Interfaces, and Functions .....	5-3
5-2 ABA UE Node Types, Interfaces, and Functions.....	5-7
5-3 SSI CSSE Node Types, Interfaces, and Functions .....	5-14
5-4 SSI UE Node Types, Interfaces, and Functions .....	5-21

## **CONTENTS (continued)**

<u>Table</u>	<u>Page</u>
6-1 Referenced Communications Protocols.....	6-2
6-2 Referenced Cross Support Protocols .....	6-4
6-3 Referenced Security Protocols.....	6-5
6-4 Required and Optional ABA ESLT Terrestrial Side Protocols .....	6-6
6-5 Required and Optional ABA ESLT Space Side Protocols .....	6-7
6-6 Required and Optional ABA Earth User Node Protocols .....	6-18
6-7 Required and Optional ABA Space User Node Protocols.....	6-24