1. (normative)  
   Communication system requirements document (CSRD) - DRD
   1. DRD identification
      1. Requirement identification and source document

This DRD is called from ECSS-E-ST-50, requirement 5.2.1.3a.

* + 1. Purpose and objective

The communication system requirements document (CSRD) contains the top level assumptions, constraints and communication system requirements for a given mission to enable the supplier of the communication system to elaborate a design for the communication system.

The CSRD is written by the space project customer and is the highest level requirements document defining the requirements on the space communication system. The supplier of the space communication system formally responds to the CSRD with the communication system baseline definition (CSBD, see ECSS-

E-ST-50 Annex B) where all the requirements in the CSRD can be traced to a proposed implementation.

* 1. Expected response
     1. Scope and content

Introduction

The CSRD shall contain a description of the purpose, objective, content and the reason prompting its preparation.

Applicable and reference documents

The CSRD shall list the applicable and reference documents in support to the generation of the document.

Mission overview

The CSRD shall briefly describe:

the main objectives and characteristics of the space mission;

the spacecraft;

the instruments on­board the spacecraft;

the ground segment for the control and operations of the spacecraft, the instruments, and the ground segment itself;

the operations to achieve the goal of the space project.

Project responsibilities

The CSRD shall briefly describe the distribution of responsibilities within the space project, including the responsibilities of the space project customer and those of the communication system supplier.

Major project milestones

The CSRD shall summarize the major project milestones relating to the space segment.

The CSRD shall summarize the major project milestones relating to the ground segment.

The CSRD shall summarize major project milestones relating to the communication system.

Mission constraints

The CSRD shall include the following launch information

The launch vehicle, the launch site location and the ascent trajectory.

For orbital vehicles, the orbit injection characteristics.

The CSRD shall describe the trajectory by summarizing the following:

The trajectory of the spacecraft.

Any significant constraints or parameters associated with each part of the trajectory.

Any notable periods arising from the trajectory during which communications with the spacecraft are difficult or impossible.

For orbital vehicles, the intended orbital period and visibility periods and characteristics during which communication can be performed.

The CSRD shall describe the operational phases by summarizing the following:

Each distinct operational phase of the space mission.

Any constraints on, and expected characteristics of the communication system for each phase.

1. Mission phases usually include LEOP, commissioning, routine operations, and disposal. Other phases that can be included are contingency operations, critical manoeuvres, and hibernation.

The CSRD shall describe any constraints imposed on the communication system by the spacecraft.

1. For example power limitations, antenna pointing constraints, and prohibited frequencies.

The CSRD shall describe any other constraints not covered in the preceding categories, and other essential mission information that impacts on the design of the communication system.

Communication system requirements

General

The CSRD shall list the high level requirements on the space communication system, at a level appropriate to enable all significant aspects of the communication system technical baseline to be elaborated.

1. his in turn enables:
   * + informed decision making concerning the development and procurement of the communication system components, and
     + the communication system design drivers to be established.

The list specified in <7.1>a shall include the communication system requirements that address the following major system elements:

functional;

performance;

reliability;

availability;

interface;

design (implementation);

maintainability;

security.

Where the requirements for a particular system element differ for different operational or mission phases, the requirements shall first be listed for the normal operational phases and then those that are different for other mission phases.

Organization of the communication system requirements

The CSRD shall list the overall system requirements on the communication system including requirements related to:

overall system availability and reliability,

end­to­end performance,

communication system lifetime,

design and implementation,

interfaces to existing external entities, and

compatibility with specific communications protocols.

The CSRD shall list the security requirements for the communication system.

1. As specified in ECSS-E-ST-50, this is based on a threat analysis of the mission.

The CSRD shall list the communication system requirements for the space network, which comprises all of the nodes of the flight segment of the mission.

For missions that involve multiple space segment elements, such as cluster missions, orbiter­lander combinations, lander­rover combinations, and missions with deployable probes, the CSRD shall list the requirements on the communications between those elements.

The CSRD shall list the requirements for the link between the ground station and the spacecraft including requirements regarding:

uplink and downlink performance,

RF frequencies,

contact periods and outages,

link acquisition, and

link failure modes.

The CSRD shall list the communication system requirements for the ground network, which comprises all of the ground communication facilities used in the mission, including requirements for redundancy, availability, and accessibility.

* + 1. Special remarks

None.