EARTH EXPLORATION SATELLITE SYSTEMS AND METEOROLOGICAL SYSTEMS

RECOMMENDATION ITU-R SA.1020

HYPOTHETICAL REFERENCE SYSTEM FOR THE EARTH EXPLORATION-SATELLITE AND METEOROLOGICAL-SATELLITE SERVICES

(Question ITU-R 138/7)

(1994)

The ITU Radiocommunication Assembly,

considering

a) that systems in the Earth exploration-satellite and meteorological-satellite services may utilize transmission systems having various Earth-to-space, space-to-space, and space-to-Earth links;

b) that a hypothetical reference system defines radio links, transmitting and receiving stations, and the potential interconnections between stations;

c) that descriptions of transmission systems in the form of a hypothetical reference system facilitates the organization and conduct of system performance analyses, the establishment of performance objectives and the derivation of criteria for permissible levels of interference, frequency sharing and coordination of frequency assignments,

recommends

1. that the hypothetical reference system depicted in Fig. 1 defines the radio signal paths, spacecraft and earth stations that may be used in various systems operating in the Earth exploration-satellite and meteorological-satellite services (see Note 1);

2. that systems operating in the earth exploration-satellite and meteorological-satellite services may utilize any or all of the components in the hypothetical reference system;

3. that performance objectives for the Earth exploration-satellite and meteorological-satellite services be specified in relation to the functions listed below (see Note 2);

3.1 data collection: the process of retrieving data from a data collection platform;

3.2 data dissemination: the transmission of data from a central data processing facility to earth stations at remote sites;

3.3 data collection platform interrogation: the transmission of commands evoking a data collection platform to transmit data (may also include commands to change platform operating mode);

3.4 passive sensing: measurement of natural emissions from the Earth or its atmosphere;

3.5 active sensing: reception of signals that have been transmitted and reflected, refracted or scattered by media under observation;

3.6 direct data readout: reception of data that is generated by instruments on the spacecraft and transmitted as it is collected (real-time transmission);

3.7 recorded data acquisition: reception of data that has been collected and stored on the spacecraft and transmitted upon command.

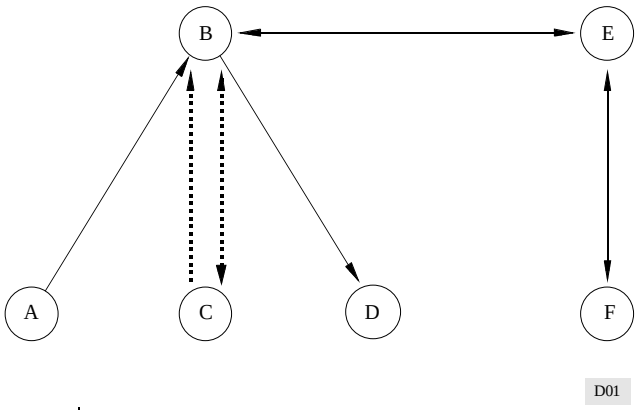
Note 1 – The hypothetical reference system of Fig. 1 includes all major systems needed to establish performance objectives and interference and sharing criteria. The earth stations A and D are specifically designated for uplink and downlink functions respectively because some earth stations are used for only transmission or reception. Processing sub-systems that provide baseband signals to transmitting earth stations are not included, but the characteristics of the

baseband signals present at this interface are of concern to the establishment of performance objectives. Likewise, data processing and display sub-systems that utilize the baseband signals from receiving earth stations are not included, but consideration of the baseband signal quality requirements and associated operational needs is necessary. The media being observed by active or passive sensors are included when the sensor operates at radio-frequency wavelengths; the sensor baseband output signals are included in all cases.

Note 2 – The functions listed in § 3 generally have different performance objectives and generally utilize separate frequencies.

FIGURE 1

Hypothetical reference system



A: transmitting earth station (data collection, data dissemination, data collection platform interrogation, tracking or command)

B: satellite, including any active and passive sensors, transponders and data handling or processing sub-systems

C: media being remotely observed

D: receiving earth station (interrogation received by a data collection platform, data collection, data dissemination, direct data readout, recorded data acquisition or tracking)

E: data relay satellite

F: earth station serving data relay satellite