International Satellite Communications System (ISCS)

Providing Aviation-Related Weather Information to Over 90 Countries, and Meteorological Telecommunications Between the United States, Central America, and Caribbean Nations

LEGEND

AOR	Atlantic Ocean Region, ISCS/World Area Forecast System (WAFS)
POR Sat 1	Pacific Ocean Region, ISCS/World Area Forecast System (WAFS)
POR Sat 2	Pacific Ocean Region, ISCS/World Area Forecast System (WAFS)
RMTN	WMO Region IV Meteorological Telecommunications Network
SADIS	Grey landmass is serviced by SADIS

INTELSAT 701 satellite, for ISCS/WAFS Pacific Area Broadcast
INTELSAT 903 satellite, for ISCS/WAFS, and ISCS/RMTN Atlantic Area Broadcast
INTELSAT 906 satellite, for ISCS/WAFS East Asia/Nearby POR Area Broadcast

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ISCS Web Site:	http://www.nws.noaa.gov/iscs		
SADIS Web Site:	http://www.metoffice.gov.uk/sadis		

Description of the International Satellite Communications System (ISCS)

ISCS is a satellite data distribution system operated by the United States National Weather Service (NWS), providing support to (1) the **World Area Forecast System (WAFS)**, and (2) the **Region IV Meteorological Telecommunications Network (RMTN)**. Verizon/MCI, under NWS contract, operates the satellite broadcast communications service for ISCS.

ISCS support for WAFS is on behalf of the International Civil Aviation organization (ICAO) and World Meteorological Organization (WMO). ISCS/WAFS purpose is to provide the worldwide aviation community with operational meteorological forecasts and information about meteorological phenomena required for flight planning and safe, economic, and efficient air navigation. As a real-time, point to multi-point service, it operates on a 24-hour/365-day basis. NWS obtains funding support for ISCS/WAFS from the United States Federal Aviation Administration (FAA).

ISCS support for RMTN is part of a cooperative effort between NWS and WMO to improve the Global Telecommunications System (GTS), in WMO Region IV (North and Central America). RMTN allows for a two-way exchange of meteorological information between the United States and nations in the Caribbean and Central America. It replaced a much slower, less reliable, "daisy chain" of terrestrial circuits.

ISCS broadcasts utilize three commercial geostationary satellites, (1) **INTELSAT 903** (for broadcast to the Atlantic Ocean Region [AOR], including North and South America, Central America, and the Caribbean), (2) **INTELSAT 701** (Satellite 1, for broadcast to the major portion of the Pacific Ocean Region [POR] and Eastern Asia), and (3) **INTELSAT 906** (Satellite 2, for broadcast to the remainder of the Pacific Ocean Region, East Asia and nearby POR areas). The broadcasts provide data to over ninety countries. The ISCS satellite uplinks are located at three International Gateways—Andover, Maine; Yacolt, Washington; and Fuchsstadt, Germany.

Aviation (WAFS) meteorological broadcasts for the rest of the world (Europe, Africa, Middle East, and Western Asia) are provided by the United Kingdom (UK) Meteorological Office, utilizing the INTELSAT 904 satellite located over the Indian Ocean. The UK WAFS program is known as the **Satellite Distribution System** for information relating to air navigation **(SADIS)**.

ISCS and SADIS are the two components of the worldwide WAFS program, providing vital meteorological support for flight planning and air traffic management throughout the world.

Products for the International Satellite Communications System (ISCS)

ISCS/WAFS provides global forecasts for grid point in digital form for all required levels as defined in the International Civil Aviation Organization Annex 3, Meteorological Services for International Air Navigation. The forecasts are for upper winds, upper-air temperatures and humidity, tropopause heights and temperatures, and maximum wind, direction and height. Products available are as follows:

(1) Gridded Binary (GRIB), containing forecasts for the required standard flight levels of upper wind and temperature data, tropopause height and temperature, relative humidity, and maximum wind (height, speed, direction), using WMO Code FM-92-IX Ext - GRIB, and a 1.25 x 1.25 degree global grid for flight planning.

(2) Binary Universal Form for the Representation of Meteorological data (BUFR) encoded charts for Significant Weather (SIGWX) forecasts. Volcanic Ash Graphics are included when available.

(3) Operational Meteorology (OPMET) alphanumeric messages, consisting of (a) Routine aviation METeorological Aerodrome Reports (METARs) and Special METARS (SPECI) (b) Terminal Aerodrome Forecasts (TAFs) (c) en-route hazardous weather warnings of Significant Meteorological information (SIGMETs) (d) Volcanic Ash Advisories and (e) Tropical Cyclone Advisories. Administrative messages are also broadcast as OPMET.

ISCS/RMTN, as part of the Global Telecommunications System (GTS), disseminates a wide variety of meteorological data products, the vast majority originating at the National Weather Service Telecommunications Gateway (NWSTG) in Silver Spring, MD. It also receives meteorological data from individual RMTN network sites for re-broadcast to all network sites through the NWSTG.

Product Collection and Dissemination for the International Satellite Communications System (ISCS)

The three INTELSAT satellites and International Gateways disseminate meteorological products to users as follows: Data in TCP/IP protocol, is sent from the National Weather Service Telecommunications Gateway (NWSTG), in Silver Spring, MD, to the International Gateway in Andover, Maine, via redundant terrestrial links at 128 kilobytes per second. From Andover, data is sent directly to the INTELSAT 903 satellite for broadcast to the AOR. Data is also sent from Andover via terrestrial links to the Yacolt, Washington and Fuchsstadt, Germany International Gateways, for broadcast by the INTELSAT 701 (POR, Satellite 1) and INTELSAT 906 (POR, Satellite 2, East Asia and nearby POR areas) satellites, respectively. The satellite broadcasts are C-band (5-6 Ghz), with data rate of 128 kilobytes per second. A Hughes Communications satellite protocol is used.

Reception of the satellite broadcast is based on the Very Small Aperture Terminal (VSAT) technology, consisting of a 2.4 meter parabolic antenna. Other required hardware at receiving sites includes a satellite receiver modem and a user workstation to receive and process the satellite broadcast. The Hughes software interface application (PD Receiver) is required to be installed on the user workstation. Specialized meteorological workstations are available for purchase from several vendors.

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