

SPACE COOPERATION

Land Remote Sensing Satellite Data

**Memorandum of Understanding
Between the UNITED STATES OF
AMERICA and the EUROPEAN SPACE AGENCY**

Signed at Reston and Paris
June 18 and July 17, 2012

with

Annexes



NOTE BY THE DEPARTMENT OF STATE

Pursuant to Public Law 89—497, approved July 8, 1966
(80 Stat. 271; 1 U.S.C. 113)—

“ . . .the Treaties and Other International Acts Series issued under the authority of the Secretary of State shall be competent evidence . . . of the treaties, international agreements other than treaties, and proclamations by the President of such treaties and international agreements other than treaties, as the case may be, therein contained, in all the courts of law and equity and of maritime jurisdiction, and in all the tribunals and public offices of the United States, and of the several States, without any further proof or authentication thereof.”

EUROPEAN SPACE AGENCY

**Space Cooperation: Land Remote Sensing
Satellite Data**

*Memorandum of understanding signed at
Reston and Paris June 18 and July 17, 2012;
Entered into force July 17, 2012.
With annexes.*

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
UNITED STATES GEOLOGICAL SURVEY
OF THE DEPARTMENT OF THE INTERIOR
AND THE
EUROPEAN SPACE AGENCY
FOR COOPERATION IN THE USE OF
U.S. LANDSAT DATA

PREAMBLE

The United States Geological Survey of the United States Department of the Interior (hereinafter referred to as "USGS") and the **European Space Agency** (hereinafter referred to as "ESA") established by the Convention which was opened for signature in Paris on 30 May 1975 and entered into force on 30 October 1980, having its headquarters at 8-10 rue Mario-Nikis, 75015 Paris, France (hereinafter referred to as "the Parties"),

RECOGNIZING their mutual interest in the use of space technology for peaceful purposes;

NOTING the value of the United States Landsat satellite missions to cooperation among governments in space-based remote sensing of the Earth's surface;

DESIRING to establish an overall legal framework for cooperation in future land remote sensing satellite missions;

HAVE AGREED as follows:

ARTICLE 1 – PURPOSE AND SCOPE OF COOPERATION

This Memorandum of Understanding (hereinafter referred to as "MOU") establishes the terms and conditions under which USGS will provide United States-owned land remote sensing satellite data from Landsat 8 and subsequent spacecraft (hereinafter referred to as "Landsat data") and ESA will receive, process, archive, distribute, and exchange such data in cooperation with the USGS. This MOU consists of a main text, an annex containing the definition of terms used in the main body of the MOU (Annex I), and an annex on the annual access fee agreement for the Landsat missions that shall be concluded at the outset of each new Landsat mission (Annex II, III, IV, etc.). The annexes form an integral part of this MOU, but the Parties may update and amend them in a separate and independent process without requiring the revision of the main text of the MOU.

ARTICLE 2 – RESPONSIBILITIES OF THE PARTIES

A. The USGS shall:

1. Program Landsat satellites to collect and provide Landsat data of areas within the acquisition radius of ESA's ground station(s) to the extent that such requests can be accommodated by the spacecraft. The USGS shall endeavor to schedule satellite downlink resources to meet requests from all of its international cooperators (hereinafter referred to as "IC"s) in an

equitable and balanced manner, subject to conflict-resolution guidelines to be provided to all stations. Programming details to meet such requests will be arranged by mutual decision of the Parties' technical representatives.

2. Provide ESA with orbital elements for calculating the antenna pointing angles necessary to acquire the satellite-transmitted signals and with the necessary ancillary and calibration information for processing the data acquired.
3. Reserve the right to curtail or terminate transmission of satellite data to ESA for reasons of (1) spacecraft or USGS ground equipment limitations, or (2) non-payment of annual access fee as agreed for the Landsat missions in the annexes to this MOU. In these cases, the USGS shall notify ESA and discuss the planned action in the most expeditious manner possible.
4. Provide to ESA, upon request by ESA, reasonable quantities of raw USGS Landsat data extracted from the USGS archive in an agreed-upon format and delivered electronically or on media at a price to be negotiated. At the point of the request made by ESA, USGS and ESA shall agree on the basis of consensus on the reasonableness of the quantities of the data request.
5. Provide spacecraft anomaly resolution for USGS Landsat satellite missions.
6. Endeavour to ensure that any radio frequency problem occurring in relation to data reception by ESA's ground station(s) is resolved to the satisfaction of the Parties.

B. ESA shall:

1. Operate (a) ground station(s) for the reception, processing, archiving, distribution, and exchange of USGS Landsat data at its own expense, including the cost of establishing and operating the necessary communication links with the USGS's Mission Operations Center (hereinafter referred to as "MOC") and the USGS's data center located at the Earth Resources Observation and Science Center (hereinafter referred to as "EROS").
2. Produce Landsat data products in accordance with agreed-upon USGS-sponsored distribution formats. ESA shall be also entitled to use its own processor and distribute the data in its own format(s).
3. Ensure that all USGS Landsat data acquired by ESA are available for distribution on a public, nondiscriminatory basis.

4. Make available to the USGS, upon request, English-language copies of any arrangements signed by ESA concerning the distribution of USGS Landsat data from ESA. Such arrangements shall be consistent with this MOU.
5. Maintain a current inventory of its USGS Landsat data holdings and provide at least monthly updates of its metadata to the USGS as set out and agreed upon between USGS and ESA as required in the USGS Ground System-to IC Specification Document in an agreed-upon format, electronically or on agreed-upon media, once the ground station(s) is (are) operational. These metadata may be made available publicly through USGS data facilities.
6. Establish and maintain a computer-accessible electronic system, with external public access, of browse imagery for its USGS Landsat data holdings, or provide browse data at least monthly to the USGS in an agreed-upon format and on agreed-upon media, once the ground station(s) is (are) operational. ESA browse imagery may be made available publicly through USGS data facilities.
7. Store and preserve USGS Landsat data that will meet ESA quality standards in ESA's archive for at least 10 years following data acquisition, using industry established archive management practices. If ESA plans to discard data, it will issue a purge alert to the USGS, which will be given first right of refusal or acceptance to acquire the data at a price to be negotiated.
8. Endeavor to ensure that any radio frequency problem occurring in relation to data reception by ESA's ground station(s) is resolved to the satisfaction of the Parties. Questions concerning radio frequency interference by the USGS Landsat spacecraft raised by entities in third countries will be referred to the USGS.
9. When requested by the USGS in support of key U. S. Government programs, provide reasonable quantities of ESA-held USGS Landsat satellite data gathered since the entry into force of this MOU, in an agreed-upon format, electronically or on media, and at a price to be negotiated. At the point of the request made by USGS, ESA and USGS shall agree on the basis of consensus on the reasonableness of the quantities of the data request.
10. Repatriate to the USGS, within 30 days of downlink, any Landsat data received which is unique to ESA's archive. For all other Landsat satellite data stored in Landsat-1, -2, -3, -4, 5 and Landsat-7 ESA archives created prior to the entry into force of this MOU, a dedicated repatriation plan shall be put in place according to which the Landsat data of these missions

shall be repatriated to USGS.

11. For purposes of validating data quality, exchange limited amounts of ESA-held USGS Landsat data, in an agreed-upon format, electronically or on media, when requested by the USGS. Data for this purpose shall be exchanged annually, at no cost to the USGS. ESA and USGS shall concur and agree which amounts constitute limited amounts of ESA-held USGS Landsat data.
12. When requested by the USGS in response to a significant loss of spacecraft capability to record data for the USGS archive, and as long as this is possible subject to budgetary and network resources, provide sufficient quantities of newly acquired USGS Landsat data to meet U.S. Government mission requirements, in an agreed-upon format, electronically or on media, at a cost to be negotiated. For any support necessary to ESA beyond providing USGS Landsat data to the USGS as described above, the Parties will negotiate specific financial terms.
13. Communicate with the MOC on spacecraft information, in order to maximize data collection and efficiency of spacecraft operations.
14. Endeavour to provide support for spacecraft anomaly resolution of the USGS Landsat missions.

ARTICLE 3 – INTERNATIONAL MISSION COORDINATION

1. Each Party shall designate program representatives to be responsible for the implementation of this MOU, who will meet on a yearly basis. Supplemental meetings between the Parties will be held by mutual agreement.
2. Program management representatives from the Parties will participate in annual meetings of the Landsat Ground Station Operators Working Group (LGSOWG). This group, chaired by the USGS, will serve as a forum for the exchange of policy, programmatic and management information among station operators and the USGS.
3. Technical representatives from the Parties will participate in annual meetings of the Landsat Technical Working Group (LTWG). This group, also chaired by the USGS, will review and coordinate technical and operational aspects of USGS international mission support.

ARTICLE 4 – SCIENCE AND APPLICATIONS DEVELOPMENT

The Parties may consider partnering with a view to:

1. Identify opportunities for cooperation in improved land remote sensing satellite data collection, user accessibility, and data distribution.
2. Identify opportunities to support new research in the use of land remote sensing satellite data, and the development of related applications to enhance land use practices, ecosystems management, climate change research, and other areas of Earth systems science.
3. Cooperate in the support of global observation and science programs involving the use of land remote sensing satellite data.
4. Consult with one another on best practices and improved means of cooperation in the long-term archiving and preservation of land remote sensing satellite data.
5. Share information and consider opportunities for training and capacity building in the use of land remote sensing satellite data.
6. Share information on their respective development and potential for cooperation in their respective land remote sensing satellite missions in accordance with the provisions of Article 10.

ARTICLE 5 – USER SERVICE ARRANGEMENTS

The USGS reserves the right to service the requests for Landsat data made by all users affiliated with U.S. Government programs.

ARTICLE 6 – FINANCIAL ARRANGEMENTS AND LEGAL AUTHORIZATION

1. The Parties shall be responsible for funding their respective activities under this MOU. Additionally, ESA, or its designated agent, shall pay to the USGS in a timely manner, any access fees described in the annexes to this MOU. These fees are required to enable the USGS to administer all operations in support of a global network of cooperating ground receiving stations.
2. Obligations under this MOU and any implementing annexes shall be subject to the availability of funding obtained through each Party's funding procedures.
3. Should either Party encounter budgetary problems that may affect the activities carried out under this MOU that Party shall notify and consult with the other Party in a timely manner in order to minimize the negative impact of such problems on the Parties' cooperation.

ARTICLE 7 – DUTIES, FEES, AND TAXES

In accordance with its applicable laws, rules, and regulations, each Party shall seek to ensure free customs clearance and waiver of all applicable duties, fees, and taxes for the import or export of goods necessary for the implementation of this MOU. In the event that any duties, fees, or taxes of any kind are nonetheless levied on such goods, such duties, fees, or taxes shall be borne by the Party of the country levying them.

ARTICLE 8 – ENTRY AND EXIT OF PERSONNEL

On a reciprocal basis, each Party shall use reasonable efforts to facilitate, in accordance with its applicable laws, rules, and regulations, the entry to and exit from the territory concerned or premises as applicable of personnel engaged in the performance of activities pursuant to this MOU.

ARTICLE 9 – LAWS, WARRANTIES, RIGHTS, AND LIABILITY

1. The activities under this MOU shall be conducted in accordance with the laws, rules, and regulations applicable to the Parties, respectively, and shall be subject to the availability of appropriated funds.
2. The USGS does not warrant the suitability of its Landsat data for any purpose and shall not be liable for any damage or injury brought about by use of USGS Landsat satellite systems and their data.
3. The USGS retains the ownership right to all raw Landsat data acquired by its satellites. Beyond the provisions of Article 2.B.3, the USGS places no restrictions on ESA to disclose, use, manipulate, generate products from, distribute, or sell USGS Landsat data.

ARTICLE 10 – EXCHANGE OF TECHNICAL INFORMATION

1. USGS and ESA shall exchange appropriate technical information for processing data and documentation for the purposes of downlinking, processing, and archiving USGS Landsat data as well as for generating and distributing products from that data.
2. Technical information exchanged between the Parties will be subject to the applicable laws, rules, regulations, and policies of the Parties, respectively. In the event it is necessary to exchange technical information and the furnishing Party considers that such technical information is to be protected for proprietary or export control purposes, such information must be clearly marked with a legend indicating the country of origin, the conditions of release, that the information relates to this MOU, and that it is furnished in confidence.

3. USGS and ESA will take all lawful steps available to prevent disclosure of such protected or proprietary technical information without the consent of the other Party and to ensure that it is used only for the purposes of this MOU.
4. USGS and ESA may release to the public other general, non-technical information regarding each other's programs or operations after ensuring, through consultation with each other when necessary, that this information is fairly and accurately represented.

ARTICLE 11 – CONSULTATIONS AND SETTLEMENT OF DISPUTES

1. The Parties shall consult with each other promptly when events occur or matters arise that may call into question the interpretation or implementation of the terms of this MOU.
2. Any issue in the interpretation or implementation of this MOU that cannot be resolved by the Parties' respective Program Managers will be referred for settlement to the ESA Director of Earth Observation and the USGS Land Remote Sensing Program Coordinator. If they are unable to come to an agreement, then the issue will be referred to the ESA Director General and the USGS Director or their designated representatives for joint resolution.
3. If an issue not resolved through consultation still needs to be resolved, the Parties may agree to submit the dispute to an agreed form of dispute resolution.

ARTICLE 12 – ENTRY INTO FORCE, DURATION, AND TERMINATION

1. This MOU shall enter into force upon signature by both Parties and remain in force through the operational lifetime of the USGS Landsat 8 and subsequent spacecraft from which ESA receives USGS Landsat data. This MOU may be amended at any time by written agreement of the Parties in accordance with the rules and procedures of each Party. Amendments shall take effect on the date of their signature by the Parties.
2. In the event that either of the Parties is unable to comply with any provision of this MOU, either Party, after consultation with the other, shall have the option of terminating this MOU, providing at least 30 days' notice of such action, forwarded in writing by one Party to the other.
3. Notwithstanding termination or expiration of this MOU, the obligations of the Parties set forth in Articles 2.B.3, 2.B.7, 9.2, 9.3, and 10 of this MOU shall continue to apply.

4. This MOU shall neither replace nor supersede the previously concluded agreements between the Parties on Landsat -1, -2, -3, -4, -5 and -7 data which shall continue to be in force in accordance with their respective provisions.

ARTICLE 13 – SIGNATURE

IN WITNESS THEREOF, respective representatives of the Parties have signed this Memorandum of Understanding.

Done at..... on.....

Done at..... on.....

**For the United States Geological Survey
of the Department of the Interior:**

For the European Space Agency:

Marcia McNutt

Marcia McNutt
Director
U.S. Geological Survey
Reston, Virginia

Mordj

Mr. Jean-Jacques Dordain
Director General
European Space Agency
Paris, France

June 18, 2012

Date

July 17, 2012

Date

Reston, Virginia

Place

Paris

Place

ANNEX I
TO THE
MEMORANDUM OF UNDERSTANDING
BETWEEN THE
UNITED STATES GEOLOGICAL SURVEY
OF THE DEPARTMENT OF THE INTERIOR
AND THE
EUROPEAN SPACE AGENCY
FOR COOPERATION IN THE USE OF
U.S. LANDSAT DATA
DEFINITION OF TERMS

Acquisition Radius:

An ESA acquisition radius is that portion of the Earth over which the satellite can communicate with ESA's ground station or stations.

Browse:

Browse is a full resolution or sub-sampled Level 0R or Level 1 digital image of the Earth that can be viewed on a scene basis to quickly assess general ground area coverage, data quality, and the spatial relationships between ground area coverage and cloud coverage. A browse is an image with a reduced data volume to facilitate screening of archived Land Remote Sensing Satellite Data. Specifications regarding browse images are documented in the appropriate mission Data Format Control Book (DFCB) and made available by the USGS.

Data Format:

The Landsat Technical Working Group (LTWG) recommends the archive data format for exchanging data between an International Cooperator and USGS archives. The archive data exchange format for purposes of quality assessment and key government programs is typically the lowest level of processed data available (i.e. Mission or Raw Computer Compatible [RCC] Data) and is transferred electronically or on media. The archive data exchange format is documented in the appropriate mission Data Validation and Exchange Plan and associated Data Format Control Book (DFCB) and made available by the USGS.

Data Products Distribution Format:

The USGS Land Remote Sensing Satellite Data products are Level-0Rp (Level Zero Reformatted Product) in HDF format and Level-1T (terrain corrected) in Geo-TIFF format. International Cooperators may produce data products of their choice. ESA is encouraged, but not required to produce Level 0Rp data products in HDF format, but is required to distribute Level-1T data products in Geo-TIFF format. Specifications regarding Level-0Rp and Level-1T data products are documented in the appropriate mission Data Format Control Book (DFCB) and made available by the USGS.

International Cooperator (IC):

An International Cooperator (IC) is any non-U.S. Government agency or commercial organization acting on behalf of or in cooperation with a foreign government or international organization, which enters into an agreement with the USGS for purposes of receiving or exchanging Land Remote Sensing Satellite Data.

Key U.S. Government Programs:

Key U.S. Government Programs are any U.S. Government agencies and U.S. Government contractors, other U.S. and foreign researchers and entities involved in the

United States Global Change Research Program, and U.S. and foreign researchers and foreign and international entities having signed a cooperative agreement with the United States Government involving the use of USGS Land Remote Sensing Satellite Data for non-commercial purposes.

The United States Global Change Research Program is the Executive Branch program responding to Public Law 101-606, the Global Change Research Act of 1990, and most recently described in the annual report accompanying the President's budget entitled "Our Changing Planet: The U.S. Climate Change Science Program for Fiscal Year 2012."

International counterpart programs of the U.S. Global Change Research Program are discussed in Section V of "Our Changing Planet." These include the Intergovernmental Panel on Climate Change, the World Climate Research Program, the International Council on Science, and the Group on Earth Observations.

Mission Operations Center (MOC):

The Mission Operations Center (MOC) consists of the people, procedures, and hardware/software systems used for the successful execution of real-time spacecraft operations and off-line scheduling and analysis activities. All command and control functions of the spacecraft performed by the Flight Operations Team (FOT) will take place from the MOC.

Metadata:

Metadata is descriptive information pertaining to the USGS Land Remote Sensing Satellite Data, including such information as location and acquisition date, compiled for Level 0R and Level-1 data, and made available through the USGS user interface. Specifications regarding the metadata are documented in the Landsat Metadata Description Document (LMDD) and made available by the USGS.

Raw Data:

Raw Data is the USGS Land Remote Sensing Satellite Data in the form of wideband telemetry transmitted by the satellite.

U.S. Government and Affiliated Users:

U.S. Government and Affiliated Users are any federal, state or local government agency personnel and personnel from any organization performing cooperative work with or for these government agencies.

USGS Land Remote Sensing Satellites:

USGS Land Remote Sensing Satellites are the Landsat satellites owned and operated by the USGS for the purposes of this agreement.

ANNEX II
TO THE
MEMORANDUM OF UNDERSTANDING
BETWEEN THE
UNITED STATES GEOLOGICAL SURVEY
OF THE DEPARTMENT OF THE INTERIOR
AND THE
EUROPEAN SPACE AGENCY
FOR COOPERATION IN THE USE OF
U.S. LANDSAT DATA
LANDSAT 8
ANNUAL ACCESS FEE AGREEMENT

INTRODUCTION

Pursuant to Article 6 of the Memorandum of Understanding (MOU) between the United States Geological Survey of the Department of the Interior and the European Space Agency (ESA) for Cooperation in the use of US Landsat Data, the U.S. Presidential Decision Directive/National Science and Technology Council-3, as amended on October 16, 2000 and the Land Remote Sensing Policy Act of 1992, the USGS has established a fee structure to enable it to administer all operations in support of a global network of cooperating ground receiving stations for direct reception of data from the Landsat 8 mission. This Annex sets forth the related financial and administrative terms and conditions for Landsat 8 cooperation between the USGS and ESA.

ARTICLE 2 – FEE STRUCTURE

The fee structure comprises a one-time initialization fee and an annual access fee. If ESA moves a receiving antenna to a new location greater than 50 kilometers from its original location, an antenna move fee will be assessed. The annual access fee will be payable for the United States Government (USG) Fiscal Year, which begins on October 1 and ends on September 30, and may be prorated to the remaining portion of the USG Fiscal Year, from the start date for direct transmission of Landsat 8 data to September 30.

The initialization fee for a new ESA station is U.S. \$35,000 for each receiving site. The total initialization fee for ESA will be U.S. \$0 for any of the existing receiving sites located at Kiruna, Sweden; Neustrelitz, Germany; Maspalomas, Spain; Matera, Italy; or Malindi, Kenya.

The antenna move fee is U.S. \$15,000 and will be billed each time a station is moved a distance greater than 50 kilometers.

The annual access fee is U.S. \$100,000 for a single station operation. Each additional ground station in operation at any one time has an annual access fee of U.S. \$50,000, as shown in the following table.

	Year 1 (FY2013)	Year 2 (+3%) (FY2014)	Year 3 (+3%) (FY2015)	Year 4 (+3%) (FY2016)
One Site	U.S. \$100,000	U.S. \$103,000	U.S. \$106,090	U.S. \$109,273
Two Sites ¹	U.S. \$150,000	U.S. \$154,500	U.S. \$159,135	U.S. \$163,909
Three Sites	U.S. \$200,000	U.S. \$206,000	U.S. \$212,180	U.S. \$218,545
Four Sites	U.S. \$250,000	U.S. \$257,500	U.S. \$265,225	U.S. \$273,182
Five Sites	U.S. \$300,000	U.S. \$309,000	U.S. \$318,270	U.S. \$327,818

¹ The locations can be varied seasonally among the ESA stations.

ARTICLE 3 – PAYMENT SCHEDULE

The one-time initialization fee and antenna move fee, if applicable, are due and payable 30 days prior to ESA reception of Landsat 8 data.

The annual access fee will be paid annually. ESA will receive an annual bill 30 days prior to the start of the USG Fiscal Year (billing date of September 1).

The USGS reserves the right to terminate transmission of Landsat 8 data to ESA at any time that ESA is in arrears in its payments to the USGS or is delinquent in regularly scheduled delivery of raw telemetry data to the USGS in accordance with MOU Article 2.A.3. The USGS will notify ESA 30 days in advance of its intention to terminate transmission for these reasons. Payments may be by check or electronic bank transfer in U.S. dollars. Payments by check shall be in U.S. dollars and shall be payable to:

Department of the Interior/USGS

Payments by check shall be mailed to:

USGS Office of Financial Management
271 National Center
12201 Sunrise Valley Drive
Reston, Virginia, 20192 USA

Payments by electronic bank transfer shall be in U.S. dollars and transferred to the USGS's bank account. The USGS will provide exact electronic bank transfer information with each billing.

All payments must be received within 30 days from the date of invoice. Charges for late payment will be at the U. S. Treasury Department prevailing rate on the overdue balance for each 30-day period or portion thereof that payment is delayed.

ARTICLE 4 – FEE CHANGES

While USGS reserves the right to make modifications to the annual access fee used in this fee structure, it is the USGS's intent to minimize the changes to the fee structure during the life of the Landsat 8 mission. For the Landsat 8 mission, a 3% annual increase is planned to account for average annual rates of inflation. Reasonable notification of any proposed change to these fees (initialization, antenna move, and annual access fees), taking into account the budget cycles of the parties, shall be provided in writing by the USGS to ESA 60 days prior to the implementation of the proposed change. Any proposed fee change would not exceed 10% of the current annual access fee.

ARTICLE 5 – CONTINGENCIES

The USGS, in consultation with ESA, may curtail or terminate the transmission of data and adjust the annual access fees if the USGS is unable to satisfy data requests due to spacecraft system capability limitations or ground receiving stations conflicts. The determination of a non-operable spacecraft for an extended period of time shall result in pro-rated compensation through either a credit toward future payments or a refund of the amount as agreed through mutual consent of the Parties.

ARTICLE 6 – DURATION AND AMENDMENT

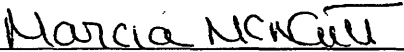
This Annex will remain in effect as long as the MOU remains in force, and it may be amended by mutual consent of USGS and ESA through an exchange of letters.

At the beginning of each new USG Fiscal Year, the USGS and ESA will review this Annex and revise it if necessary.

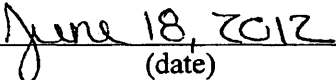
ARTICLE 7 – AUTHORIZING SIGNATURES

The signatures of the authorized officials below signify the agreement by the Parties to the terms of the annex.

**For the United States Geological Survey
of the Department of the Interior:**




Marcia McNutt
Director
U.S. Geological Survey
Reston, Virginia




(date)

For European Space Agency:



Gunther Kohlhammer
Head of the Ground Segment and
Mission Operations Department
European Space Agency (ESA)
ESRIN, Rome



(date)