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**Optical data product format and requirement of land
observation satellites**

陆地观测卫星光学数据产品格式及要求

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Foreword

Issued on 18 October 2019 by the State Administration for Market Regulation and the Standardization Administration of the PRC, and implemented from 1 May 2020. ICS 33.200; Chinese classification CCS V 80. The cover carries no replacement note, so this is the first edition of the standard.

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by, and is under the jurisdiction of, the National Technical Committee on Space Technology and its Applications of Standardization Administration of China (SAC/TC 425).

Drafting organisations of this standard: China Centre for Resources Satellite Data and Application; State Grid Corporation of China; Hubei Provincial Academy of Land and Resources; China Aerospace Standardization Institute.

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Introduction

In recent years, with the continuous development of China's land observation satellite technology, the land observation satellites operating in orbit have reached several dozen, and satellite remote sensing data have already found wide application. The purpose of this

standard is to establish a unified format and set of requirements for the optical data products of land observation satellites, to regulate the format and the content of the data of different satellites and different sensors, to promote the standardisation of the optical data product format of China's land observation satellites, to raise the efficiency with which users employ and exchange data, and to provide guidance for the development of standards and specifications for the optical data products of land observation satellites.

1 Scope

China now has several dozen land observation satellites in orbit, and each of them was built by a different team, with its own sensors, its own ground segment and, historically, its own way of packaging what comes down from space. That is where the trouble starts. A user who wants to combine a multispectral scene with a wide-field one, or to compare this year's imagery with an archive acquired by an earlier satellite, has to unpick a different directory layout, a different file naming convention and a different set of auxiliary files each time, and the metadata that makes an image usable - acquisition date, receiving station, product level, rational polynomial coefficients for geometric correction - may be present, absent or hidden in a private format. Automated processing chains break, archives cannot be searched consistently, and data exchange between agencies degenerates into manual work. This standard imposes one common structure: which files a level 0, level 1 or level 2 optical product must contain, in which formats, arranged in which directories, and under which naming rules, so that products from any Chinese land observation satellite can be read by the same software.

This standard specifies the basic structure and the file format of the level 0, level 1 and level 2 optical data products of land observation satellites.

This standard applies to the optical remote sensors of land observation satellites; the data product formats of other types of earth observation satellite may be handled by reference to this standard.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document, including all amendments, applies.

GB/T 32453-2015 Rules for classification and grading of satellite earth observation data products.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB/T 32453-2015 and the following apply.

3.1 parameter file

A file that provides data and information support for the further processing of the image data.

3.2 descriptive file of product

A supplementary description of the product, setting out detailed attribute information about it.

4 Abbreviations

The following abbreviations apply to this document.

GeoTIFF: Geography Tagged Image File Format, an image file format carrying geographic information. HDF5: Hierarchical Data Format (Version 5). JPEG: Joint Photographic Experts Group. RPC: Rational Polynomial Coefficient. XML: Extensible Markup Language.

5.1 File composition and file types

The file composition and the file types of products of the different levels are given in Table 1.

Table 1 sets out, for each product level, one file per sensor of each kind. A level 0 product comprises an image data file in GeoTIFF or HDF5, a browse image file in JPEG, a thumbnail file in JPEG and a product description file in XML. A level 1 product comprises the same four files and, in addition, a parameter file of type RPB. A level 2 product likewise comprises the image data file in GeoTIFF or HDF5, the browse image file and the thumbnail file in JPEG, the product description file in XML and the parameter file in RPB. Note 1 to the table states that for hyperspectral products of levels 0 to 2 the image data file type is always HDF5. Note 2 states that the composition above is the basic composition, and that files of other types may be supplemented or added according to actual requirements.

5.2.1 Directory structure

The format of the directory structure is: satellite identifier / data type / product level / sensor identifier / receiving station identifier / acquisition date. The individual elements are as follows. a) Satellite identifier: the abbreviation of the full designation of the satellite, for example CB02, HJ1A, GF1. b) Data type: the identifier used to distinguish data of different types, for example PRODUCT. c) Product level: the level of the data product, for example LEVEL0, LEVEL1, LEVEL2. d) Sensor identifier: the abbreviation of the full English name of the payload, for example PMS, MUX, WFI. e) Receiving station identifier: the abbreviation of the full English name of the ground receiving station, for example MYN, GUA, SAY. f) Acquisition date: the date of satellite imaging in Beijing time, for example 2008-09-07 in the

order year-month-day.

5.2.2 Naming rules

The naming rules for product files are as follows. a) Naming of the compressed package: satellite identifier, underscore, sensor identifier, underscore, E or W followed by the longitude of the scene centre in degrees to one decimal place, underscore, N or S followed by the latitude of the scene centre in degrees to one decimal place, underscore, acquisition date, underscore, L followed by the product number, in which the digit after L denotes the product level and may be 0, 1 or 2 and the product number is the serial number of the product produced, and the extension .tar.gz. Example:

GF1_PMS1_E121.7_N32.6_20171222_L100002870720.tar.gz. b) Naming of the level 0, level 1 and level 2 product files follows on the next page of the standard.