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A Comprehensive Roadmap to 50 Years of (Satellite) Earth Observation Resources for the Island of Ireland (1972 – 2023)

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Abstract: A comprehensive review of optical (panchromatic, multispectral and hyperspectral) and synthetic aperture radar satellite imagery coverage for terrestrial and near-shore areas of interest on the island of Ireland. The review spans 50 years and includes approximately 170+ retired and operational Earth Observation (EO) satellite sensors, and a further 60+ EO satellite sensors which are planned to be launched over the next five years.

Satellite characteristics and sensor capabilities are listed in tabular form and the extents of the spatial and temporal coverage of the island of Ireland are estimated for each sensor (as available). Guidance on how to access this data is provided, with an emphasis on gaining free or reduced cost access for research and scientific purposes.

Information on free open source software tools for viewing, processing and analysing EO imagery is provided, along with a selection of online resource and reference materials.

Keywords: *Earth Observation, synthetic aperture radar (SAR), multispectral, panchromatic, hyperspectral, satellite*

1.0 Introduction

From the launch of Landsat-1 in 1972 to the somewhat recent trend in multi-satellite constellations, there has been an exponential growth in the volume of Earth Observation (EO) data available. Over this timeframe, the best spatial resolution available has improved from 80m to sub-meter levels, and revisit times have decreased from weeks to days. However, navigating through the ever-increasing plethora of online portals and catalogues to search and gain access to this data can be an overwhelming and laborious endeavour.

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The objective of this article is to provide a means of streamlining the search for satellite EO resources for terrestrial and near-shore areas of interest (AOIs) on the island of Ireland. The article is aimed at all levels of EO users, however, it was written with an emphasis on providing information on an accessible level for both early-stage EO users and non-EO users who may be considering incorporating EO data into their research. This approach was taken with the view to encouraging and promoting increased usage of EO data and expanding the EO community throughout the island. The article is also expected to be of interest to existing EO users in terms of providing a much-needed compendium of EO resources for the island.

The article provides a comprehensive review of optical (panchromatic, multispectral and hyperspectral) and synthetic aperture radar (SAR) satellite imagery coverage of Ireland. The review spans 50-years (1972 to 2023) and includes approximately 170+ retired and operational EO satellite sensors and a further 60+ EO satellite sensors which are planned to be launched over the next five years. Details on how to access this data are provided, with an emphasis on gaining free or reduced cost access for research and scientific purposes.

The article concludes by providing practical guidance on how to determine the spatial resolution required, tips on searching for EO data and advice on applying for access to this data.

2.0 Satellite and Sensor Review Tables

Review tables are organised by sensor type (panchromatic and multispectral, hyperspectral, and synthetic aperture radar) and are included as supplementary tables to this article (available from the Irish Geography website as a supplementary set of tables, 3a to 9). The tables are listed in chronological order by satellite mission, with legacy/follow-on missions grouped together for clarity. Future missions, planned to be launched over the next five years, are listed in separate follow-on tables. References and links to all resources used to compile this article are provided between Section 2.1 and Table 7.

Table 3a	Panchromatic and Multispectral Missions (Retired & Operational)
Table 3b	Panchromatic and Multispectral Missions (Planned)
Table 4a	Hyperspectral Missions (Retired and Operational)
Table 4b	Hyperspectral Missions (Planned)
Table 5a	Synthetic Aperture Radar Missions (Retired and Operational)
Table 5b	Synthetic Aperture Radar Missions (Planned)
Table 6	Micro- and Nano-Satellites (Optical)
Table 7	List of Access Browsers/Portals for EO Datasets
Table 8	Pricelists for EO Datasets
Table 9	Reference Materials and Online Tutorials

It was originally intended to include a comprehensive review of micro- (10-100kg) and nano- (1-10kg) satellite constellations. However, a separate independent review, beyond the scope of this article, would be required for this rapidly emerging sector. For completeness, examples of both micro- and nano-satellites are provided in Table 6. Several of the databases listed in Section 2.1 include micro- and nano-satellite listings. However, the *Nanosatellite Database* is the most comprehensive source of information on these classes of satellite (Nanosats, 2018).

For the most part, definitions of the terms used in the tables are not included in this article as they are widely available from online resources and EO handbooks. A list of suggested online resources is provided in Supplementary Table 9.

2.1 Satellite and Sensor Specifications

Sensor specifications and satellite orbit characteristics were obtained from a combination of the following databases and resources:

- *Committee on Earth Observation Satellites Database* (CEOS, 2018-a) http://database.eohandbook.com/
- *Earth Observation Portal Satellite Missions Database* (EOP, 2018) https://directory.eoportal.org/web/eoportal/satellite-missions
- *Nanosatellite Database* (Nanosats, 2018) https://www.nanosats.eu
- *OSCAR (Observing Systems Capability Analysis and Review Tool)* (WMO, 2018) https://www.wmo-sat.info/oscar/satellites
- *University of Twente ITC Satellite and Sensor Database* (UT, 2018) https://www.itc.nl/research/research-facilities/labs-resources/satellite-sensor-database/
- *Belgian Earth Observation Platform* (BEOP, 2018) https://eo.belspo.be/en
- *Union of Concerned Scientists Satellite Database* (UCS, 2018) https://www.ucsusa.org/resources/satellite-database
- *N2YO Satellite Database* (N2YO, 2018) https://www.n2yo.com/database/
- *Survey of Hyperspectral Earth Observation Applications from Space in the Sentinel-2 Context* (Transon et al., 2018) https://www.mdpi.com/2072-4292/10/2/157/htm
- Satellite/sensor operator entities (Airbus Defence and Space, 2018; CSA, 2018; CRESDA, 2018; DLR, 2018-a; ESA, 2018-a; ISRO, 2018; MDA Corporation, 2018; Satellite Imaging Corp., 2018; NASA, 2018-a; USGS, 2018)
- Satellite/sensor designers and manufacturers (Airbus Defence and Space, 2018; MDA Corporation, 2018; SSTL, 2018)

2.2 Estimates of Spatial and Temporal Coverage

Estimates of the historical spatial and temporal coverage of the island of Ireland were developed by reviewing imagery archives (as available) for each individual sensor. This review catalogued the temporal span of coverage (e.g., 1993-2003), the frequency of acquisitions, and the spatial extent of the coverage over the island.

Spatial coverage is categorised as: *Very Limited* (<25%), *Limited* (25% to 75%) or *Extensive* (75% to 100%).

Temporal coverage is categorised as: *Infrequent* (rare/one-off acquisitions), *Intermittent* (multiple acquisitions at irregular frequencies), or *Frequent* (approximately per satellite *repeat cycle*).

Estimates of spatial and temporal coverage are provided in Tables 3a, 4a, 5a and 6.

2.3 Spatial Resolution Classes

The spatial resolution classes published by the ESA *Copernicus Programme* were used to categorise the capabilities of the individual sensors (Table 1). The resolution classes are very useful for comparative purposes and are good indicators of the relative cost and accessibility of the imagery (e.g., VHR1 imagery is most expensive and typically has *constrained access*).

VHR1	Very High Resolution 1	Resolution ≤ 1m
VHR2	Very High Resolution 2	1m < Resolution ≤ 4m
HR1	High Resolution 1	4m < Resolution ≤ 10m
HR2	High Resolution 2	10m < Resolution ≤ 30m
MR1	Medium Resolution 1	30m < Resolution ≤ 100m
MR2	Medium Resolution 2	100m < Resolution ≤ 300m
LR	Low Resolution	300m ≤ Resolution

Table 1: Spatial Resolution Classes (Copernicus, 2018-a)

3.0 Accessing EO Datasets

3.1 Access Categories

The CEOS database specifies the following access categories for EO datasets: *Open Access*, *Constrained Access*, *Very Constrained Access*, and *No Access* (CEOS, 2018-a). Definitions of the categories are not provided; however, the terminology used is self-explanatory.

ESA use the term *Open Access* for free datasets where access is gained by *Fast Registration* (explained below), and the term *Restrained Access* for datasets that typically require a *Project Proposal* to be submitted to gain access (also explained further below) (ESA, 2018-b). For the purposes of this article, *Constrained Access* and *Restrained Access* are considered synonymous.

Unfortunately, CEOS does not list the access category for all the sensors in the database, as a result there are several access types labelled as *Unknown*. In some cases, the access categories were inferred by considering the access categories assigned to sensors that are both within the same resolution class and operated by the same entity.

3.2 Access Browsers/Portals

A list of the EO browsers/portals used for this review are hyperlinked in Tables 3a, 3b, 4a, 4b, 5a, 5b and 6. Additional EO browsers/portals are provided in Table 7 for reference. Also included in Table 7 is a list of the individual EO datasets available from each of the individual browsers/portals.

The majority of EO browsers/portals are now typically configured with an Earth browser type interface for navigating to, and defining, the users' Area of Interest (AOI). AOIs can be defined using rectangular windows, polygons, or uploading shapefiles. Several of the browsers/portals allow the uploaded shapefiles to be saved online to facilitate future searches (registered users only).

After a search is performed, the footprint of the acquisitions and detailed metadata of the EO data is provided (and in some cases may be exported/downloaded).

Most EO browsers/portals now incorporate a cloud filter into the search query for optical datasets (which is particularly useful screening through suitable imagery for AOIs in Ireland).

3.3 Access for Scientific and Research Purposes

There are a number of options available for gaining free or reduced cost access to EO datasets for scientific and research purposes. The *Copernicus Contributing Missions* and the *ESA Third Party Missions* offer the largest collections of EO datasets made available for scientific and research purposes (Copernicus, 2018-b; ESA, 2018-c). A number of individual satellite operator entities also facilitates free access to their datasets through *Open Calls* and *Research Announcements*.

3.3.1 Copernicus Contributing Missions

The *Copernicus Programme* is an Earth Observation programme managed and coordinated by the European Commission (Copernicus, 2018-c). *Copernicus Contributing Missions* (CCM) are a collection of approximately 30 existing or planned missions by ESA, European Member States, and European and international third-party operators that provide data to the programme (Copernicus, 2018-b). CCMs include missions with SAR and optical sensors, as well as other missions with instrumentation for measuring land and ocean temperature, sea-level and air quality (Copernicus, 2018-b). An overview of the various CCM groups is provided in Table 2.

Mission Group	Sensor Type and Resolution Class
1	SAR VHR1 – MR1
2	Optical HR1 – HR2
2b	Optical VHR1 – VHR2
3	Optical MR1 – MR2
4/5	Atmospheric Missions

Table 2: Copernicus Contributing Mission Groups (Copernicus, 2018-d)

Varying levels of access to CCM data is provided to: (i) *Institutions and bodies of the EU*; (ii) *Participants to a research project under the Union research programmes (space and non-space)*; (iii) *Public authorities* of participating member states (which includes: *any research and academic organisation*); (iv) *international organisations and NGOs;* and (v) *public users* (Copernicus, 2018-e).

Access rights depend on the user category and include: *Download*, *Discovery* and *View*. Further details on *CCM User Categories* and *CCM Access Rights* are provided in the *Copernicus Space Component Data Access Portfolio: Data Warehouse 2014-2020* (Copernicus, 2018-a). The majority of the data delivered by the CCMs is provided on a *full, free and open access basis* per the appropriate *User Category/Access Rights* (Copernicus, 2018-a; Copernicus, 2018-f).

Copernicus Space Component Data Access is currently provided via the *CSCDA Portal* (Copernicus, 2018-g). However, a cloud-based platform system known as *Data and Information Access Services,* or *DIAS,* was recently developed and is now available online (Copernicus, 2018-h; Copernicus, 2019).

3.3.2 ESA Third Party Missions Scheme

Third Party Missions (TPM) are satellite missions operated by non-ESA entities, for which *ESA has been granted a right of distribution to selected users* (ESA, 2017). EO missions designated as an ESA TPM are indicated in the right-hand column of Tables 3a, 4a, 5a and 6. There are approximately 30 ESA TPMs in the scheme at the time of writing this article. Access to ESA TPM data is granted to registered users by either *Fast Registration* or by submitting a *Project Proposal* (ESA, 2018-d).

Fast Registration is typically used to provide access to free datasets and limited ESA archives (of the TPM dataset). *Fast Registration* is completed using an *Earth Online* (*My Earthnet*) account (ESA, 2018-e). Access to requested TPM datasets is typically provided within 24-hours (if not instantaneously).

Access to constrained (or 'restrained') TPM datasets require the submission of a *Project Proposal* (also termed as *Full Proposal*). ESA's *Guidelines for the Submission of Project Proposals* provides a very helpful and concise overview of the required content of the proposal and the evaluation criteria (ESA, 2015). Proposals are submitted online via an *Earth Online* account and evaluation results are typically provided within four to six weeks (ESA, 2018-b). It is important to note that only limited quotas of TPM data are provided to successful applicants (ESA, 2018-d). In return for gaining access to constrained TPM datasets, users are expected to submit an annual progress report (depending on duration) and a final report at the end of the project period (ESA, 2018-f). The reports are submitted via *My Earthnet* and are published on Earth Online (ESA, 2018-g).

3.3.3 Other Access Opportunities

Besides CCMs and ESA TPMs, several individual EO mission operators provide data access for research and scientific purposes, for example, the German Aerospace Center (DLR) for TerraSAR-X data, and Planet Labs for PlanetScope/Dove data (DLR, 2018-b; Planet, 2018).

DLR requires submission of a project proposal (which conveniently is almost identical in format and content to the ESA TPM project proposal) for access to TerraSAR-X and TanDEM-X data. Access to archived data (over 18-months old) is provided free of charge, whereas more recent acquisitions and tasking requests cost €200 (DLR, 2014; DLR, 2018-c). This is a flat rate cost with the size of the scene dependent on the spatial resolution of the product requested (Airbus Defence and Space, 2017). Similar to the ESA TPM Scheme, DLR assigns a limited quota of imagery per project. Progress reports are required to be submitted every six months and a final report submitted upon completion.

Access to Planet Labs data is gained by completing the very minimal online application form (Planet, 2018). Up to 10,000km^2 of data per month per user is offered free of charge through their *Education and Research Program* (Planet, 2018).

The *Japan Aerospace Exploration Agency* (JAXA) periodically issues *Research Announcements* for access to *ALOS-2* data for research and scientific applications (JAXA, 2018-a). The last Research Announcement was issued in late 2018; the next announcement is not expected to be issued until 2020 (based on the schedule of previous announcements) (JAXA, 2018-a; JAXA, 2018-b, JAXA, 2019).

4.0 Cost of Purchasing EO Data

Although the focus of this article is to provide information on gaining free or reduced cost access to EO datasets, hyperlinks to price lists for purchasing imagery at full cost are provided in Table 8 for reference and comparison purposes.

The cost of satellite imagery is typically quoted per km^2 with a minimum size AOI specified per order (e.g., 100km^2 minimum order for Worldview-1/2, Pléiades-1A/1B and GeoEye) (LANDinfo, 2018). Alternatively, some imagery datasets can be priced per *scene* (i.e., specified acquisition area related to sensor resolution). It is also important to note that stereo and tri-stereo imagery (e.g., Pléiades) are priced per sensor acquisition (i.e., twice the cost for stereo and triple the cost for tri-stereo imagery).

The cost per km^2 (or scene) of pre-existing imagery varies depending on the spatial resolution and how recent the image was acquired. Costs also vary depending on whether they are sourced directly from the satellite operator entity or from authorised resellers. Higher costs per km^2 are charged for satellite *tasking* (i.e., requesting future acquisition of a specific AOI) and additional surcharges may apply depending on lead time of the requested acquisition.

5.0 Software Tools

5.1 Free Open Source Software

The *Sentinel Application Platform* (SNAP) and associated *Sentinel Toolboxes* (S1TBX, S2TBX and S3TBX) provided by ESA are very versatile tools for viewing, processing and analysing EO imagery. Despite *Sentinel* being included in the naming, the platform and toolboxes are capable of importing and processing a multitude of sensor data types, both optical and SAR, and from ESA and non-ESA missions. The software is provided by ESA on a free open-source software (FOSS) basis (ESA, 2018-h). The *Sentinel-1 Toolbox* (S1TBX) is used for viewing and processing SAR imagery and the *Sentinel-2 Toolbox* (S2TBX) is used for multispectral imagery. The *Sentinel-3 Toolbox* (S3TBX) is primarily used for ocean applications, however, it does also provide tools for processing medium to low resolution multispectral imagery for coastal and land applications. SNAP is configured with graphical user interface (GUI) and a command-line interface (CLI) for *Python* scripting.

QGIS (formerly *Quantum GIS*) is a very powerful FOSS GIS platform with a growing number of downloadable free plug-ins developed for viewing and analysing EO imagery (QGIS, 2018-a). The *Semi-Automatic Classification Plugin (SCP)* provides a collection of very useful tools for importing, processing and analysing multispectral and panchromatic imagery (Congedo, 2016). *SCP* is available from the *QGIS Python Plugins Repository* which can be accessed directly through the QGIS platform or online (QGIS, 2018-b). QGIS is configured with a very robust GUI, and CLI for *Python* scripting.

Other FOSS GIS platforms include *Geographic Resources Analysis Support System (GRASS)* and *System for Automated Geoscientific Analyses (SAGA)*. *GRASS GIS* which was originally developed by the US Army Corps of Engineers between 1982 and 1995, has evolved into a powerful and versatile FOSS platform (GRASS, 2018). *GRASS GIS* contains over 350 modules, including many image processing and classification tools which support optical, thermal and SAR satellite EO datasets. In addition to the GUI, *GRASS* is configured with a CLI for *Python* scripting. *SAGA GIS* was originally developed with an emphasis on terrain analysis applications and was initially released in 2004. Since then, *SAGA GIS* has become a well-rounded FOSS GIS platform with a library of over 600 tools, advanced 3D viewing capabilities and a growing array of remote sensing and image processing algorithms (Conrad *et al.,* 2015; GISGeography, 2018). The *SAGA GIS* CLI supports scripting in *Python*, *Java* and *R* (SourceForge, 2018).

The *Orfeo ToolBox (OTB)* comprises a collection of applications and algorithms for processing and analysing high-resolution panchromatic, multispectral, hyperspectral and SAR imagery (Grizonnet *et al.,* 2017). The toolbox provides functions and algorithms for pre-processing data, image classification, features extraction, change detection and a variety of other image processing tools (OSGeo, 2018-a). *OTB* is equipped with more than 90 applications, and the toolbox can be directly interfaced with FOSS platforms such as SNAP and QGIS (Grizonnet *et al.,* 2017).

Specialised SAR specific FOSS options (in addition to *S1TBX* in *SNAP*) include *MapReady*, *DORIS*, *SNAPHU* and *PolSARPro*. The *MapReady Remote Sensing Toolkit* was

developed by the Alaska Satellite Facility for the purpose of processing native-format SAR imagery into ortho-rectified *GeoTIFF* images that can be viewed on GIS platforms (Atwood *et al.,* 2008). *Delft Object-orientated Radar Interferometric Software (DORIS)* was developed by TU-Delft for performing interferometric SAR processing to generate unwrapped georeferenced products from Single Look Complex (SLC) data (TU Delft, 2018). *SNAPHU* is an extensively used algorithm for performing the phase-unwrapping step of SAR interferometry (Chen and Zebker, 2002). The *Polarimetric SAR Processing and Educational Tool (PolSARpro)* was specifically developed for analysing and exploiting multi-polarised SAR datasets including ALOS PALSAR, TerraSAR-X, COSMO-SkyMed and RADARSAT-2 (ESA, 2018-i).

SARbian OS is a Linux-based operating system developed for processing SAR imagery and includes many of the FOSS platforms and tools mentioned above (e.g., *SNAP*, *S1TBX*, *QGIS*, *GRASS GIS*, *MapReady*, *DORIS* and *PolSARPro*) (EO College, 2018).

Additional libraries of FOSS geospatial tools and resources under development are available from the *Open Source Geospatial Foundation* (OSGeo, 2018-b).

5.2 Commercial Software

Although the focus of this article is to provide information about FOSS, it was considered prudent to include a brief list of some of the most popular commercial packages.

Commercial software options include: ArcGIS (ERSI), eCognition (Trimble), ENVI Opticalscape (Harris Geospatial), ENVI SARscape (Harris Geospatial), ERDAS IMAGINE (ERDAS), GAMMA (GAMMA Remote Sensing), Geomatica (PCI Geomatica), and Matlab (MathWorks).

Details of the capabilities and licensing costs of these commercial packages can be found online.

5.3 Cloud Platforms

Cloud platforms provide EO users with significantly increased computational power and the ability to process and analyse EO datasets without the necessity of having to download large files onto a local drive.

5.3.1 ESA Thematic Exploitation Platforms

ESA launched their *EO Exploitation Platform* initiative in 2014, which has since evolved into a number of interconnected *Thematic Exploitation Platforms* (TEPs) (ESA, 2018-k). ESA defines their TEPs as *a collaborative, virtual work environment providing access to EO data and the tools, processor and information and communication technology resources required to work with them, through one coherent interface* (ESA, 2018-k). There are currently seven TEPs in development, addressing *coastal*, *forestry*, *hydrology*, *geohazards*, *polar*, *urban*, and *food security* themes.

The TEPs provide access to large volumes of EO data, cloud-based data storage, processing tools (e.g., S1TBX, S2TBX, QGIS and Orfeo ToolBox), computing resources

and a collaborative algorithm development space (ESA, 2018-l, ESA, 2018-m). The TEPs are currently available for use without charge. However, a pay-per-use model will be implemented after the development phase is over (ESA, 2018-n).

5.3.2 Copernicus Research and User Support

The *Research and User Support (RUS*) platform was developed *to promote the uptake of Copernicus data and support the scaling up of R&D activities* (Copernicus RUS, 2018-a). The platform operates in a Linux environment and includes a suite of software and tools, including both *SNAP* and *QGIS* (Copernicus RUS, 2018-b). The platform also allows users to install their own software including (Linux compatible) FOSS and commercial software (Copernicus RUS, 2018-c).

The platform is free of charge and was first made available to the public in September 2017; it is planned to remain online until at least September 2020, with possible extensions beyond. Work is currently underway to integrate RUS with the Copernicus *Data and Information Access Services* (refer to Section 3.3.1) which will significantly improve the speed of accessing EO data (Copernicus RUS, 2018-d).

5.3.3 Commercial Platforms

Google's *Earth Engine* and Amazon's *Earth on Amazon Web Services (AWS)* cloud platforms offer very powerful work environments for EO users (Google, 2018-a; AWS, 2018-a). *Google Earth Engine* operates under a commercial license programme, but is offered free for research, education and non-profit use (Google, 2018-b). The platform is configured in a split screen format with a GUI (based on the familiar *Google Earth* platform) and a CLI (called the *Earth Engine Code Editor*) which uses *JavaScript* (Gorelick *et al.,* 2017). The code editor includes a growing library of scripts for a multitude of geospatial analysis operations. These scripts can also be modified as required, or new scripts can be developed for performing customised or more complex analysis.

Earth on AWS is also a subscription-based platform but offers a number of free services for the first twelve months as well as *cloud credits* for students, educators and researchers involved in Earth Observation research (AWS, 2018-a). *Earth on AWS* facilitates access to (partial catalogues of) Sentinel-1, Sentinel-2 and Landsat-8 imagery (among others) via *Amazon S3* (their cloud storage service), and the CLI supports *Python*, *Java*, *JavaScript* and *Ruby* (among others) (AWS, 2018-b).

SENTINEL Hub is a cloud platform for browsing and performing basic analysis on a limited catalogue of EO datasets. The *Sentinel Hub Playground* provides access to the Sentinel-2 archive and allows on-the-fly generation of spectral band combinations and spectral indices. The *Sentinel Hub EO Browser* provides similar functionality but also provides access to Landsat-5/7 (ESA archive only), Landsat-8 (full USGS archive), MODIS and Proba-V products. Access to many of the features are free, however, a subscription is required for more advance features (Sentinel Hub, 2018-a).

5.4 Satellite Coverage and Acquisition Forecasting Tools

The *CEOS Visualisation Environment* (COVE) portal provides users with forecasts of the timing that satellites may acquire imagery of a specific AOI, as well as the ability to analyse the historical coverage of the AOI (CEOS, 2018-b). The portal also offers a data browser for a limited number of EO datasets.

The *Copernicus Sentinel App* (available for both Android and Apple) provides real-time tracking of the Sentinel satellites and allows the user to query when a specific satellite last passed over, and will next pass over, a specific AOI (Copernicus, 2018-i). The app can also provide notifications of when specific Sentinel satellites are passing overhead.

5.5 Time-lapse Viewers for EO Imagery

Google Earth Engine provides a global zoomable *Timelapse* video viewer for the period 1984 to 2018. Over five million images were used to generate a global cloud-free mosaic for each of the 35 years (Google, 2018-c). The images were acquired from a combination of five different satellites (Google, 2018-c): Landsat-4 (1984-1993), Landsat-5 TM (1984-2012), Landsat-7 ETM+ (1999-2013), Landsat-8 OLI (2013-2018), and Sentinel-2A (2015-2018).

The *Timelapse* video viewer can be zoomed from global scale down to a scene size of approximately 11.5km x 5.3km. This powerful tool enables the user to very quickly identify how an AOI has changed over the past three decades (e.g., development, coastal erosion, deforestation).

The *Sentinel Hub EO Browser* offers the ability to quickly generate time-lapse video clips of an AOI from their catalogue of Sentinel-2 and Landsat-8 imagery (Sentinel Hub, 2018-b). As well as true colour, these video clips can also be generated from user assigned spectral band combinations or spectral indices (which is a very useful feature, but unfortunately hindered by persistent cloud cover over AOIs in Ireland). Time-lapse video clips can also be generated from Sentinel-1 (SAR) imagery using a single polarisation channel, a combination of the two polarisation channels, or a user assigned polarisation index.

6.0 Guidance Notes

6.1 Review Tables

- It was not always possible to find complete specifications for a number of the satellites/sensors reviewed. In these cases, the field has been designated as *Unknown*.
- Occasionally, it was found that there was conflicting information between the databases on some of the various satellite/sensor specifications. In these cases, the correct information was typically found by referring to the specifications published by the satellite operator entity.
- Unfortunately, it was not possible to find online portals for some of the EO datasets identified. Some of these datasets are categorised with *Constrained Access* or *Very*

Constrained Access which may explain why access could not be gained immediately. These cases occurred for some (but not all) datasets from Russia, China and India data, as well as datasets from Thailand, Algeria and Kazakhstan. As such, it may also be that access could not be gained due to language barriers related to search terms.

- The information provided in this article is a snapshot of what was available as of September 2018. Collections and catalogues are continuously expanding, both with future acquisitions, as well as third party portals receiving increased access to archived EO data.
- The terms *repeat cycle* and *revisit time* are often used interchangeably in texts and specifications; however, they are not the same. The (orbit) *repeat cycle* of a satellite refers to the time interval between repeating orbit passes over the same point on Earth and is a function of the orbit characteristics (e.g., altitude, velocity) of the satellite (ESA, 2018-j). Whereas *revisit time* is used to define the time interval between successive acquisitions of the same point on Earth (ESA, 2018-j). The *revisit time* is a function of the sensor characteristics (swath width, ability to tilt/steer the sensor), the satellite *repeat cycle*, the latitude of the AOI (*revisit time* decreases with increasing latitude due to converging orbit paths) and the number of satellites in a constellation (if applicable). Satellite operators typically quote the *revisit time* (based on equatorial locations), but sometimes refer to it as the *repeat cycle*.
- There are varying definitions for the wavelength ranges of visible (VIS), near-infrared (NIR), short-wave infrared (SWIR), medium-wave infrared (MWIR) and thermal infrared (TIR) regions of the electromagnetic spectrum. However, the following defined ranges are most commonly found in EO databases (CEOS, 2018-a, BEOP, 2018; NASA, 2018-b):

VIS	~0.40µm to ~0.75µm
NIR	~0.75µm to ~1.30µm
SWIR	~1.30µm to ~3.00µm
TIR	~6.00µm to ~15.0µm

Spatial Resolution

- Prior to searching for EO data, the user should first determine what spatial resolution is required for the specific application. The typical default response to this is *the best resolution available*. However, high-resolution imagery is expensive to purchase or will require writing a science proposal. It may be the case that free, open-access, lower resolution imagery will suffice for the application.
- Another consideration, depending on the application, is the trade-off between the spectral resolution and the spatial resolution of satellite optical imagery (Key *et al.,* 2001; Carleer *et al.,* 2005). The poor spectral resolution associated with very high-resolution optical imagery may be insufficient for the intended purpose (e.g. land

cover classification) or may require more complex image processing techniques to achieve the desired result.

- The spatial resolution required can be determined by considering the following:
  - What are the dimensions of the smallest feature(s) to be identified?
  - For change detection analysis: *(a) What are the expected minimum, mean and maximum rates of change of the parameter(s) of interest (based on historical data)? (b) What is the monitoring frequency (e.g., 1-month, 1-year, 5-years) for the parameter(s) of interest?*

When the above questions are considered, it may be concluded that free, open-access data (e.g., Sentinel-2A/B, Landsat 1-8) would suffice.

6.3 Searching for EO Data

- When searching for data from a specific satellite, it is recommended to start with the satellite operator entity as third party EO portals do not always contain complete catalogues.
- Cloud filters provide a very efficient means of searching through optical imagery to find cloud-free acquisitions of an AOI. Cloud filters are set by limiting the *Cloud Cover Area* (0-100%) in the search query. To expedite searches, it is recommended to start with a low *Cloud Cover Area* (e.g. 0-10%) and then progressively increase the limit (if required) until the desired imagery is found.
- Consider using a password manager application for comprehensive searches involving the use of multiple EO browsers/portals.

6.4 Applying for EO Data

- Registering as a CCM User and *Fast-Registration* for ESA TPMs provide very quick access to multiple EO datasets without the need for a detailed proposal.
- Submitting a *Project Proposal* to ESA for access to ESA TPM *Constrained Access* datasets is the most efficient means of gaining access to bulk quantities of higher resolution imagery from multiple satellite sensors.
- Prior to writing a proposal for access to optical data, it is recommended that a detailed search and inventory is carried out to ensure that there are sufficient suitable images available to justify writing the proposal.

Note: Tables 3a to 9 are separately available from the Irish Geography website.

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Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
Landsat-1 (MSS)	USA (USGS/NASA)	Retired (1972 - 1978)	SSO (917km) [99.2°]	185km	- 4x VIS/NIR -	- 80m -	MR1 (6-bit) [18-days]	Extensive / Frequent (1973 - 2012) (Open Access) [USGS EarthExplorer]	FREE CCM: **NO** ESA TPM: **NO**
Landsat-2 (MSS)		Retired (1975 - 1982)							
Landsat-3 (MSS)		Retired (1978 - 1983)	SSO (917km) [99.1°]						
Landsat-4 (MSS & TM)		Retired (1982 - 1993)	SSO (705km) [98.2°]		4x VIS/NIR 6x VIS/NIR/SWIR 1x TIR	80m 30m 120m	MR1 - MR2 (8-bit) [16-days]		FREE CCM: **NO** ESA TPM: **YES** ESA Archive: **FR**
Landsat-5 (MSS & TM)		Retired (1984 - 2012)							FREE CCM: **YES** ESA TPM: **YES**
Landsat-6 (ETM)		Failed to Reach Orbit (1993)	N/A (N/A) [N/A]		Pan 6x VIS/NIR/SWIR 1x TIR	15m 30m 120m	HR2 - MR2 (8-bit) [16-days]	N/A (N/A) [N/A]	N/A
Landsat-7 (ETM+)		Operational (1999 - ≥2019)	SSO (705km) [98.2°]		Pan 6x VIS/NIR/SWIR 1x TIR	15m 30m 120m	HR2 - MR2 (8-bit) [16-days]	Extensive / Frequent (1999 - 2019) (Open Access) [USGS EarthExplorer]	FREE CCM: **YES** ESA TPM: **YES**
Landsat-8 (OLI/TIRS)		Operational (2013 - ≥2019)			Pan 8x VIS/NIR/SWIR 2x TIR	15m 30m 100m	HR2 - MR2 (12-bit) [16-days]		
Resurs-O1-1 [Resurs-O1 N1] (MSU-E)	Russia (ROSKOSMOS)	Retired (1985 - 1986)	SSO (620km) [98°]	80km	- 3x VIS/NIR -	- 40m -	MR1 (8-bit) [21-days]	Unknown / Unknown+ (Unknown) [Unknown] + Unable to Find Data Access Portal	Unknown CCM: **YES** ESA TPM: **YES**
Resurs-O1-2 [Resurs-O1 N2] (MSU-E)		Retired (1988 - 1999)	SSO (650km) [98°]						
Resurs-O1-3 [Resurs-O1 N3] (MSU-E)		Retired (1994 - 2001)	SSO (678km) [97.88°]						
Resurs-O1-4 [Resurs-O1 N4] (MSU-E)		Retired (1998 - 2002)	SSO (835km) [98.75°]						

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
SPOT-1 (HRV)	France (CNES)	Retired (1986 - 2003)	SSO (822km) [98.7°]	60km	Pan 3x VIS/NIR -	10m 20m -	HR2 (8-bit) [26-days]	Extensive / Intermittent (1986 - 2003) (Open Access) [Airbus GeoStore]	PURCHASE CCM: SPOT-4 **YES** CCM: SPOT-5/6/7 **YES** ESA TPM: **YES** SPOT 1-7 ESA Archive: **FR** SPOT 1-5 Full Archive: **PP** SPOT 6-7 Full Archive & Tasking: **PP**
SPOT-2 (HRV)		Retired (1990 - 2009)							
SPOT-3 (HVR)		Retired (1993 - 1996)							
SPOT-4 (HRVIR)		Retired (1998 - 2013)	SSO (822km) [97.8°]	60km	Pan 4x VIS/NIR -	10m 20m -	HR2 (8-bit) [26-days]		
SPOT-5 (HRG / HRS)		Retired (2002 - 2015)	SSO (822km) [97.8°]	60km	Pan 4x VIS/NIR/SWIR -	2.5m / 5m 10m/20m -	VHR2 - HR2 (8-bit) [26-days]	Extensive / Intermittent (2002 - 2015) (HRG:Open / HRS:Constrained) [Airbus GeoStore]	
SPOT-6 (NAOMI)		Operational (2012 - ≥2022)	SSO (694km) [98.79°]	60km	Pan 4x VIS/NIR/SWIR -	2m 8m -	VHR2 - HR1 (12-bit) [26-days]	Extensive / Frequent (2012 - 2019) (Constrained Access) [Airbus GeoStore & ESA TPM]	
SPOT-7 (NAOMI)		Operational (2014 - ≥2024)							
IRS-1A (LISS-1)	India (ISRO)	Retired (1988 - 1992)	SSO (904km) [99°]	148km	- 4x VIS/NIR -	- 72m -	MR1 (7-bit) [22-days]	No Acquisitions Found (Constrained Access) [IRSO NRSC]	Unknown CCM: **NO** ESA TPM: **NO**
IRS-1B (LISS-1)		Retired (1991 - 2001)							
IRS-1C (LISS-3)		Retired (1995 - 2005)	SSO (817km) [98.7°]	70km/142km	Pan 3x VIS/NIR 1x SWIR	5.8m 23.5m 70.5m	HR1 - MR1 (7-bit) [24-days]	Extensive / Intermittent (1996-2005) (Constrained Access) [EOWEB GeoPortal & ESA OSA]	PURCHASE CCM: **NO** ESA TPM: **YES** ESA Archive: **FR**
IRS-1D (LISS-3)		Retired (1997 - 2010)							
IRS-1E / IRS-P1 (MEOSS / LISS-1)		Failed at Launch (1993)	N/A (N/A) [N/A]	510km/148km	Pan 4x VIS/NIR -	50m / 158m 72m -	MR1 - MR2 (7-bit / 8-bit) [22-days]	N/A (Failed launch) (N/A) [N/A]	N/A
IRS-P2 (LISS-2M)		Retired (1994 - 1997)	SSO (817km) [98.7°]	131km	- 4x VIS/NIR -	- 32.7m -	MR1 (7-bit) [24-days]	Unknown / Unknown+ (Unknown) [Unknown] + Unable to Find Data Access Portal	Unknown CCM: **NO** ESA TPM: **NO**
IRS-P3 (WiFS)		Retired (1996 - 2004)	SSO (817km) [98.7°]	770km	- 3x NIR/SWIR -	- 190m -	MR2 (7-bit) [24-days]		

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
JERS-1 (OPS)	Japan (JAXA)	Retired (1992-1998)	SSO (568km) [98°]	75km	- 8x VIS/NIR/SWIR -	- 18m -	HR2 (6-bit) [44-days]	Extensive / Intermittent (1992 – 1998) (Open Access) [ESA TPM Portal]	FREE CCM: **NO** ESA TPM: **YES** ESA Archive: **FR**
Terra (MODIS/ASTER)	USA (NASA)	Operational (1999 - ≥2019)	SSO (705km) [98.3°]	2230km	- 36x VIS/NIR -	- 250m - 1km -	MR2 - LR (8-bit & 12-bit) [16-days]	Extensive / Intermittent (2000-2019) (Open Access) [USGS GloVis]	FREE CCM: **NO** ESA TPM: **NO**
				60km	- 3x VIS/NIR 6x SWIR 5x TIR	- 15m, 30m 90m	HR2 - MR1 (8-bit & 12-bit) [16-days]		
KOMPSAT-1 (EOC)	Rep. of Korea (KARI)	Retired (1999 - 2008)	SSO (685km) [98.13°]	17km	Pan - -	6.6m - -	HR1 (8-bit) [28-days]	V. Limited / Infrequent (2001 & 2005) (V. Constrained Access) [Arirang Portal]	PURCHASE CCM: NO ESA TPM: NO
KOMPSAT-2 (MSC)		Operational (2006 - ≥2019)		15km	Pan 4x VIS/NIR -	1m 4m -	VHR1 - VHR2 (10-bit) [28-days]	Extensive / Infrequent (2007 - 2019) (V. Constrained Access) [Arirang / ImageHunter]	PURCHASE CCM: **YES** ESA TPM: **NO**
KOMPSAT-3 (AEISS)		Operational (2012 - ≥2019)		15km	Pan 4x VIS/NIR -	0.7m 2.8m -	VHR1 - VHR2 (14-bit) [28-days]	Limited / Intermittent (2013 - 2019) (V. Constrained Access) [Arirang / ImageHunter]	
KOMPSAT-3A (AEISS-A/IIP)		Operational (2015 - ≥2019)	SSO (528km) [97.5°]	13km	Pan 4x VIS/NIR 1x TIR	0.5m 2m 5.5m	VHR1 - HR1 (14-bit) [28-days]	Limited / Intermittent (2015 - 2019) (V. Constrained Access) [Arirang]	PURCHASE CCM: **NO** ESA TPM: **NO**
CBERS-1 (HRCC/IRMSS)	China / Brazil (CAST/INPE)	Retired (1999 - 2003)	SSO (778km) [98.5°]	113km/120km	2x Pan 4x VIS/NIR 3x SWIR/TIR	20m/80m 20m 80km/160km	HR2 - MR2 (8-bit) [26-days]	No Acquisitions Found (Open Access) [INPE Portal]	Unknown CCM: **NO** ESA TPM: **NO**
CBERS-2 (HRCC/IRMSS)		Retired (2003 - 2007)							
CBERS-2B (HRCC/HRPC)		Retired (2007 - 2010)		27km/113km	2x Pan 4x VIS/NIR -	2.7m/20m 20m -	VHR2 - HR2 (8-bit) [26-days]		
CBERS-3 (PANMUX/ MUXCAM)		Failed Launch (2013)	N/A (N/A) [N/A]	60km/120km	Pan 3x + 4x VIS/NIR -	5m/20m 10m -	HR1 - HR2 (8-bit & 10-bit) [N/A]	N/A (Failed launch) (N/A) [N/A]	
CBERS-4 (PANMUX/ MUXCAM/ IRMSS-2)		Operational (2014 - ≥2019)	SSO (778km) [98.5°]	60km	Pan 4x+3x+3x VIS/NIR/SWIR 1x TIR	5m 10m/20m/40m 80m	HR1 - MR1 (8-bit & 10-bit) [26-days]	No Acquisitions Found (Open Access) [INPE Portal]	

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
IKONOS-1 (OSA)	USA (GeoEye)	Failed Launch (1999)	N/A (N/A) [N/A]	11.3km	Pan 4x VIS/NIR -	0.82m 3.3m -	VHR1 - VHR2 (11-bit) [N/A]	N/A (Failed launch) (N/A) [N/A]	N/A
IKONOS-2 (OSA)		Retired (1999 - 2015)	SSO (681km) [98.1°]				VHR1 - VHR2 (11-bit) [14-days]	V. Limited / Infrequent (Open Access) [ESA TPM Portal]	PURCHASE CCM: **YES** ESA TPM: **YES** ESA Archive: **FR**
EO-1 (ALI)	USA (NASA/USGS)	Retired (2000 - 2017)	SSO (691km) [98.7°]	37m	Pan 9x VIS/NIR -	10m 30m -	HR1 - MR1 (12-bit) [16-days]	V. Limited / Frequent (2015 Only) (Open Access) [USGS EarthExplorer]	FREE CCM: **NO** ESA TPM: **NO**
EarlyBird-1 (Unknown)	USA (DigitalGlobe)	Lost after Launch (1997)	N/A (N/A) [N/A]	Unknown	Pan VIS/NIR -	3m 15m -	VHR2 - HR2 (Unknown) [N/A]	N/A (Lost after launch) (N/A) [N/A]	N/A
QuickBird-1 (BGIS-2000)		Failed Launch (2000)	N/A (N/A) [N/A]	11.2km/16.5km	Pan 4x VIS/NIR -	0.60m 2.4m -	VHR1 - VHR2 (11-bit) [N/A]	N/A (Failed launch) (N/A) [N/A]	
QuickBird-2 *[Quickbird]* (BGIS-2000)		Retired (2001 - 2015)	SSO (450/482km) [93.4°]	11.2km/16.5km	Pan 4x VIS/NIR -	0.60m 2.4m -	VHR1 - VHR2 (11-bit) [20-days]	Extensive / Frequent (2002 - 2014) (Constrained Access) [DigitalGlobe Geoportal]	PURCHASE CCM: **YES** ESA TPM: **YES** Full Archive: **PP**
OrbView-4 (OHRIS)	USA (GeoEye)	Failed at Launch (2001)	N/A (N/A) [N/A]	8km	Pan 4x VIS/NIR -	1m 4m -	VHR1 - VHR2 (11-bit) [N/A]	N/A (Failed at launch) (N/A) [N/A]	PURCHASE CCM: **NO** ESA TPM: **NO**
OrbView-3 (OHRIS)		Retired (2003 - 2007)	SSO (470km) [97.25°]				VHR1 - VHR2 (11-bit) [3-days*] * Revisit Time	V. Limited / Intermittent (Open Access) [USGS EarthExplorer & USGS GloVis]	
GeoEye-1 *[Orbview 5]* (GIS)		Operational (2008 - ≥2019)	SSO (684km) [98°]	15.2km	Pan 4x VIS/NIR -	0.41m 1.64m -	VHR1 - VHR2 (11-bit) [14-days]	Limited / Frequent (2009 - 2019) (Constrained Access) [DigitalGlobe Geoportal]	PURCHASE CCM: **NO** ESA TPM: **YES** Full Archive & Tasking: **PP**
PROBA-1 (HRC)	Europe (ESA)	Retired (2001 - 2017)	SSO (615km) [96.97°]	4km	Pan - -	8m - -	VHR1 - VHR2 (12-bit) [7-days*] * Revisit Time	V. Limited / Infrequent (2003 - 2013) (Open Access) [ESA TPM Portal]	Unknown CCM: **YES** ESA TPM: **NO**
PROBA-V (Végétation-P)		Operational (2013 - ≥2019)	SSO (820km) [98.7°]	2285km	- 4x VIS/VNIR/SWIR -	- 100m/200m -	MR2 (12-bit) [2-days*] * Revisit Time	Extensive / Frequent (2014 - 2019) (Open Access) [VITO Portal]	Unknown CCM: **YES** ESA TPM: **NO**

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
ALSAT-1 (SLIM6)	Algeria (ASAL)	Retired (2002 - 2010)	SSO (700km) [98.2°]	600km	- 3x VIS/NIR -	- 32m -	MR1 (8-bit) [14-days]	Constellation Mission Extensive / Intermittent (2005 - 2009) (Constrained Access) [DMCii Online Catalogue]	PURCHASE CCM: **YES** UK-DMC-2 only ESA TPM: **YES** 2007 European Coverage: **PP** Note: UK-DMC, Beijing-1 & NigeriaSat-1 only
UK-DMC-1 (SLIM6)	UK (UKSA)	Retired (2003 - 2011)	SSO (686km) [98.2°]						
NigeriaSat-1 (SLIM6)	Nigeria (NASRDA)	Retired (2003 - 2011)	SSO (686km) [98°]						
BILSAT-1 (PanCam/MSIS)	Turkey (TUBITAK-UZAY)	Retired (2003 - 2006)	SSO (686km) [98°]	55km	Pan 4x VIS/NIR -	12m 26m -	HR2 (8-bit) [14-days]		
Beijing-1 *[DMC-4]* (CMT/SLIM6)	China (NRSCC)	Unclear (2005 - ≥2019)	SSO (699km) [98.2°]	24km/600km	Pan 3x VIS/NIR -	4m 32m -	VHR2 - MR1 (8-bit) [14-days]		
UK-DMC-2 (SLIM6-22)	UK (UKSA)	Operational (2009 - ≥2019)	SSO (686km) [98.14°]	600km	- 3x VIS/NIR -	- 22m -	HR2 (8-bit or 10-bit) [14-days]		
Nigeriasat-2 (MRI/VHRI)	Nigeria (NASRDA)	Operational (2011 - ≥2019)	SSO (718km) [98°]	20km, 300km	Pan 4x & 4x VIS/NIR -	2.5m 5m, 32m -	VHR2 - MR1 (8-bit) [14-days]		
NigeriaSat-X (SLIM6)		Unclear (2011 - ≥2019)	SSO (681km) [98°]	600km	- 3x VIS/NIR -	- 22m -	HR2 (8-bit) [14-days]		
Resourcesat-1 *[IRS-P6]* (AWiFS/LISS)	India (ISRO)	Operational (2003 - ≥2019)	SSO (821km) [98.76°]	70km/740km	- 4x/4x/3x VIS/NIR -	- 5.8m/23.5m/56m -	HR1 - MR1 (10-bit) [24-days]	Extensive / Frequent (2004-2013) (Open: AWiFS/LISS-III Constained: LISS-IV) [EOWEB / ISRO NRSC]	PURCHASE CCM: **YES** ESA TPM: **YES**
Resourcesat-2 *[IRS-R2]* (AWiFS/LISS)		Operational (2011 - ≥2019)	SSO (817km) [98.72°]					Extensive / Frequent (2014-2016) (Open: AWiFS/LISS-III) (Constained: LISS-IV) [EOWEB / ISRO NRSC]	
Resourcesat-2A (AWiFS/LISS)		Operational (2016 - ≥2021)						Extensive / Frequent (2017) (Open: AWiFS/LISS-III Constained: LISS-IV) [EOWEB / ISRO NRSC]	PURCHASE CCM: **NO** ESA TPM: **NO**

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
FORMOSAT-2 (RSI)	China (NPSO/UCAR)	Retired (2004 - 2016)	SSO (891km) [97.7°]	24km	Pan 4x VIS/NIR -	2m 8m -	VHR2 - HR1 (12-bit) [14-days]	Extensive / Frequent (2006 - 2016) (Constrained Access) [ImageHunter Portal]	PURCHASE CCM: **NO** ESA TPM: **YES**
FORMOSAT-5 (RSI)		Operational (2017 - ≥2022)	SSO (720km) [98.28°]		Pan 4x VIS/NIR -	2m 4m -	VHR2 (12-bit) [2-days*] * Revisit Time	Unknown / Unknown (Unknown) [CRESDA LOSDS Platform]	PURCHASE CCM: **NO** ESA TPM: **NO**
CartoSat-1 *[IRS-P5]* (Pan)	India (ISRO)	Operational (2005 - ≥2019)	SSO (618km) [97.87°]	30km	Pan - -	2.5m - -	VHR2 (10-bit) [5days*] * Revisit Time	Extensive / Frequent (2008 - 2015) (Constrained Access) [EOWEB GeoPortal]	PURCHASE CCM: **YES** ESA TPM: **YES**
CartoSat-2 (Pan)		Operational (2007 - ≥2019)	SSO (635km) [97.87°]	9.6km	Pan - -	0.8m - -	VHR1 (10-bit) [4-days*] * Revisit Time	Limited / Intermittent (2009 - 2018) (V. Constrained Access) [IRSO NRSC]	PURCHASE CCM: **NO** ESA TPM: **NO**
CartoSat-2A (Pan)		Operational (2008 - ≥2019)	SSO (635km) [97.64°]					No Acquisitions Found (V. Constrained Access) [IRSO NRSC]	
CartoSat-2B (Pan)		Operational (2010 - ≥2019)	SSO (640km) [97.87°]					V. Limited / Infrequent (2010 - 2016) (V. Constrained Access) [IRSO NRSC]	
CartoSat-2C (Pan/HRMX)		Operational (2016 - ≥2021)	SSO (505km) [97.48°]	10km	Pan 4x VIS/NIR -	0.65m 2m -	VHR1 - VHR2 (11-bit) [5-days*] * Revisit Time	Unknown / Unknown[+] (V. Constrained Access) [Unknown] [+] Unable to Find Data Access Portal	PURCHASE CCM: **NO** ESA TPM: **NO**
CartoSat-2D (Pan/HRMX)		Operational (2017 - ≥2022)							
CartoSat-2E (Pan/HRMX)		Operational (2017 - ≥2022)							
CartoSat-2F (Pan/HRMX)		Operational (2018 - ≥2023)							

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
Resurs-DK (Geoton-1)	Russia (ROSKOSMOS)	Retired (2006 - 2016)	Inclined (570km) [69.9°]	30km	Pan 3x VIS/NIR -	1m 3m -	VHR1 - VHR2 (10-bit) [6-days*] * Revisit Time	V. Limited / Infrequent (2006 - 2019) (Constrained Access) [Roscosmos Geoportal]	PURCHASE CCM: **NO** ESA TPM: **NO**
Resurs-P 1 (Geoton-L1/ShMSA)		Operational (2013 - ≥2019)	SSO (475km) [97.3°]	38km - 441km	1x/1x/1x Pan 5x/5x/5x VIS/NIR -	1m/12m/60m 4m/12m/120m -	VHR1 - MR2 (10-bit) [3-days*] * Revisit Time		
Resurs-P 2 (Geoton-L1/ShMSA)		Operational (2014 - ≥2019)							
Resurs-P 3 (Geoton-L1/ShMSA)		Operational (2016 - ≥2021)							
ALOS *[DAICHI]* (AVNIR-2 / PRISM)	Japan (JAXA)	Retired (2006 - 2011)	SSO (692km) [98.16°]	70km	Pan 4x VIS/NIR -	2.5m 10m -	VHR2 - HR1 (8-bit) [46-days]	Extensive / Frequent (2006 - 2010) (Open Access) [ALOS PLATFORM]	PURCHASE CCM: **YES** ESA TPM: **YES** TPM however no imagery available for Ireland
EROS-A (PIC)	Israel (ImageSat Intl)	Retired (2000 - 2012)	SSO (500km) [97.4°]	15km	Pan - -	2m - -	VHR2 (11-bit) [4.5-days*] * Revisit Time	Unknown / Unknown (Constrained Access) [Unknown]	PURCHASE CCM: **NO** ESA TPM: **NO**
EROS-B (PIC-2)		Operational (2006 - ≥2022)	SSO (510km) [97.4°]	7.5km	Pan - -	0.7m - -	VHR1 (10-bit) [3-days*] * Revisit Time	V. Limited / Infrequent (2010 - 2016) (Constrained Access) [ImageSat Catalogue]	
Worldview-1 [WV-1] (WV60)	USA (DigitalGlobe)	Operational (2007 - ≥2020)	SSO (496km) [97.2°]	17.7km	Pan - -	0.50m - -	VHR1 (11-bit) [1.7-days*] * Revisit Time	Extensive / Frequent (2008 - 2019) (Constrained Access) [Digital Globe Geoportal]	PURCHASE CCM: **YES** ESA TPM: **YES** European Cities (WV-2): **FR** Full Archive & Tasking (WV 1-3): **PP**
Worldview-2 [WV-2] (WV110)		Operational (2009 - ≥2022)	SSO (770km) [97.8°]	16.4km	Pan 8x VIS/NIR -	0.46m 1.84m -	VHR1 - VHR2 (11-bit) [1.1-days*] * Revisit Time		
Worldview-3 [WV-3] (WV110)		Operational (2014 - ≥2021)	SSO (617km) [98°]						
Worldview-4 *[WV-4 / GeoEye-2]* (SV-110)		Operational (2016 - ≥2023)	SSO (617km) [98°]	13.1km	Pan 4x VIS/NIR -	0.31m 1.24m -	VHR1 - VHR2 (11-bit) [3-days*] * Revisit Time		PURCHASE CCM: **YES** ESA TPM: **NO**

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
RapidEye-1 RapidEye-2 RapidEye-3 RapidEye-4 RapidEye-5 (REIS)	Germany (RapidEye)	Operational (2008 - ≥2019)	SSO (630km) [97.9°]	78km	- 5x VIS/NIR -	- 6.5m -	HR1 (12-bit) [5.5-days]	Constellation Mission Limited / Infrequent (Open Access) [ESA TPM]	PURCHASE CCM: **YES** ESA TPM: **YES** ESA Archive: **FR** Full Archive & Tasking: **PP**
Huan Jing 1A *[HJ-1A]* (WVC)	China (CAST)	Unclear (2008 - ≥2019)	SSO (650km) [97.95°]	360km	- 4x VIS/NIR -	- 30m -	HR2 (8-bit) [31-days]	Unknown / Unknown (Open Access) [CRESDA LOSDS Platform]	Unknown CCM: **NO** ESA TPM: **NO**
Huan Jing 1B *[HJ-1B]* (WVC/IRMSS)					- 4x + 4x VIS/NIR -	- 30m/150m -	HR2 - MR2 (8-bit) [31-days]		
IMS-1 (Mx-T)	India (ISRO)	Retired (2008 - 2012)	SSO (635km) [97.94°]	150km	- 4x VIS/NIR -	- 36m -	MR1 (10-bit) [22-days]	Unknown / Unknown+ (Unknown) [Unknown] + Unable to Find Data Access Portal	Unknown CCM: **NO** ESA TPM: **NO**
DEIMOS-1 (SLIM6)	Spain (Elecnor-Deimos)	Operational (2008 - ≥2019)	SSO (660km) [98.1°]	600km	- 3x VIS/NIR -	- 22m -	HR2 (8-bit & 10-bit) [14-days]	Extensive / Frequent (Open Access) [Deimos Imaging Catalogue]	PURCHASE CCM: **YES** ESA TPM: **YES** Full Archive & Tasking: **PP**
DEIMOS-2 (HiRAIS)		Operational (2014 - ≥2024)	SSO (620km) [98°]	12km	Pan 4x VIS/NIR -	1m 4m -	VHR1 - VHR2 (10-bit) [4-days*] * Revisit Time	Limited / Infrequent (Open Access) [Deimos Imaging Catalogue]	
THEOS *[Thaichote]* (MS / Pan)	Thailand (GISTDA)	Unclear (2008 - ≥2019)	SSO (822km) [98.7°]	22km/90km	Pan 4x VIS/NIR -	2m 15m -	VHR2 - HR1 (8-bit) [26-days]	Unknown / Unknown+ (Constrained Access) [Unknown] + Unable to Find Data Access Portal	PURCHASE CCM: **NO** ESA TPM: **NO**
DubaiSat-1 (DMAC)	UAE (EIAST)	Retired (2009 - 2016)	SSO (686km) [98.1°]	20km	Pan 4x VNIR -	2.5m 5m -	VHR2 - HR1 (10-bit) [4-days*] * Revisit Time	Unknown / Unknown+ (Unknown) [Unknown] + Unable to Find Data Access Portal	PURCHASE CCM: **NO** ESA TPM: **NO**
DubaiSat-2 (HiRAIS)		Operational (2013 - ≥2019)	SSO (600km) [97.8°]	12km	Pan 4x VIS/NIR -	1m 4m -	VHR1 - VHR2 (10-bit) [4-days*] * Revisit Time		PURCHASE CCM: **YES** ESA TPM: **NO**

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
TIANHUI 1-01 *[TH-1A]* (Pan/MS)	China (PLA/CAST)	Unclear (2010 - ≥2019)	SSO (503km) [97.7°]	60km	Pan 4x VIS/NIR -	5m 10m -	HR1 (Unknown) [Unknown]	Unknown / Unknown (Unknown) [CRESDA LOSDS Platform]	Unknown CCM: **YES** ESA TPM: **NO**
TIANHUI 1-02 *[TH-1B]* (Pan/MS)		Unclear (2012 - ≥2019)	SSO (498km) [97.3°]						
TIANHUI 1-03 *[TH-1C]* (Pan/MS)		Operational (2015 - ≥2019)	SSO (498km) [97.5°]						
ALSAT-2 (NAOMI)	Algeria (ASAL)	Unclear (2010 - ≥2019)	SSO (686km) [98.23°]	17.5km	Pan 4x VIS/NIR -	2.5m 10m -	VHR2 - HR1 (12-bit) [Unknown]	Unknown / Unknown+ (Unknown) [Unknown] + Unable to Find Data Access Portal	Unknown CCM: **NO** ESA TPM: **NO**
ALSAT-1B (SLIM6)		Operational (2016 - ≥2021)	SSO (690km) [98.1°]	600km	- 3x VIS/NIR -	- 32m -	MR1 (8-bit) [7-days*] * Revisit Time		
ALSAT-2B (NAOMI)		Operational (2016 - ≥2021)	SSO (670km) [98.1°]	17.5km	Pan 4x VIS/NIR -	2.5m 10m -	VHR2 - HR1 (12-bit) [Unknown]		
Zi Yuan 1-2 *[ZY-1-2C]* (HRPC-2/HRCC-2)	China (CRESDA)	Retired (2011 - 2017)	SSO (778km) [98.5°]	54km	Pan 4x VIS/NIR -	2.4m / 5m 10m -	VHR2 - HR1 (Unknown) [26-days]	No Acquisitions Found (Constrained Access) [ImageHunter Portal]	PURCHASE CCM: **NO** ESA TPM: **NO**
Zi Yuan 3-01 *[ZY-3-01]* (TAC / MSC)		Unclear (2010 - ≥2019)	SSO (505km) [98.5°]	51km	Pan 4x VIS/NIR -	2.1m / 3.5m 5.8m -	VHR2 - HR1 (Unknown) [59-days]	Unknown / Unknown+ (Unknown) [Unknown] + Unable to Find Data Access Portal	
Zi Yuan 3-02 *[ZY-3-01]* (TAC / MSC)		Operational (2016 - ≥2021)	SSO (505km) [97.4°]						
Shijian 9A [SJ-9A] (Pan / MUX]	China (CRESDA)	Unclear (2012 - ≥2019)	SSO (645km) [98°]	30km	Pan 4x VIS/NIR -	2.5m 10m -	VHR2 – HR1 (Unknown) [69-days]	Unknown / Unknown+ (Unknown) [Unknown] + Unable to Find Data Access Portal	PURCHASE CCM: **NO** ESA TPM: **NO**
Shijian 9B [SJ-9A] (IRS]		Unclear (2012 - ≥2019)		18km	- - 1x TIR	- - 73m	VHR2 – HR1 (Unknown) [69-days]		

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
Pléiades-1A (HiRI)	France (CNES)	Operational (2011 - ≥2019)	SSO (694km) [98.2°]	20km	Pan 4x VIS/NIR -	0.7m 2.8m -	VHR1 - VHR2 (12-bit) [4-days*] * Revisit Time	Constellation Mission Limited / Frequent (2012 - 2019) (Open & Constrained Access) [Airbus GeoStore]	PURCHASE CCM: **YES** ESA TPM: **YES** ESA Archive: **FR** Full Archive & Tasking: **PP**
Pléiades-1B (HiRI)		Operational (2012 - ≥2019)							
KANOPUS-V1 *[Canopus-V N1]* (PSS/MSU/MSS)	Russia (ROSKOSMOS)	Unclear (2012 - ≥2019)	SSO (510km) [97.4°]	20km/250km	2x Pan 4x VIS/NIR -	2.5m / 25m 12m -	VHR2 - HR2 (12-bit) [17-days]	V. Limited / Infrequent (2014) (Constrained Access) [Roscosmos Geoportal]	PURCHASE CCM: **NO** ESA TPM: **NO**
KANOPUS-V-IK1 (PSS/MSU/MSS)		Operational (2017 - ≥2022)	SSO (510km) [97.4°]	20km/2000km	2x Pan 4x VIS/NIR 2x TIR	2.5m / 25m 12m 200m	VHR2 - MR2 (12-bit) [Unknown]	Extensive / Intermittent (2017 – 2019) (Constrained Access) [Roscosmos Geoportal]	
KANOPUS-V3 *[Canopus-V N3]* (PSS/MSU/MSS)		Operational (2018 - ≥2023)	SSO (510km) [97.46°]	20km/250km	2x Pan 4x VIS/NIR -	2.5m / 25m 12m -	VHR2 - HR2 (12-bit) [5-days*] * Revisit Time	No Acquisition Found (Constrained Access) [Roscosmos Geoportal]	
KANOPUS-V4 *[Canopus-V N4]* (PSS/MSU/MSS)		Operational (2018 - ≥2023)							
Gao Fen-1 *[GF-1]* (PMS / WFI)	China (CNSA)	Operational (2013 - ≥2019)	SSO (644km) [97.46°]	60km/800km	Pan 4x+4x VIS/NIR -	2m 8m / 16m -	VHR2 - HR2 (10-bit) [41-days]	Extensive / Intermittent (2014 - 2019) (Open Access: VIS/NIR) (Very Constrained Access: PAN) [ImageHunter Portal]	PURCHASE CCM: **NO** ESA TPM: **NO**
Gao Fen-2 *[GF-2]* (PAN / MUX)		Operational (2014 - ≥2020)	SSO (631km) [97.2°]	45.3km	Pan 4x VIS/NIR -	0.8m 3.2m -	VHR1 - VHR2 (14-bit) [69-days]		
Gao Fen-4 *[GF-4]* (VNIR / MWIR)		Operational (2015 - ≥2023)	GSO (35,780km) [N/A]	400km/ 7,000km	Pan 1x MWIR -	50m 400m -	MR1 - LR (Unknown) [N/A]	No Coverage of Ireland (due to GSO) (Open Access: MWIR) (Very Constained Access: VNIR) [CRESDA LOSDS Platform]	
Gao Fen-5 *[GF-5]* (VIMS)		Operational (2018 - ≥2026)	SSO (708km) [98.2°]	Unknown	- - 4x TIR	- - 40m	MR1 (Unknown) [Unknown]	No Acquisition Found (Unknown) [CRESDA LOSDS Platform]	

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
Gao Fen-6 *[GF-6]* (PMS/WFV)	China (CNSA)	Operational (2018 - ≥2026)	SSO (640km) [98.1°]	90km/800km	Pan 4x + 4x VIS/NIR -	2m 8m / 16m -	VHR2 - HR2 (Unknown) [30-days]	Unknown / Unknown (Open Access: VIS/NIR) (Very Constained Access: PAN) [CRESDA LOSDS Platform]	PURCHASE CCM: **NO** ESA TPM: **NO**
Gao Fen-8 *[GF-8]* (PMS-2)		Operational (2015 - ≥2023)	SSO (475km) [97.4°]	48km	Pan 4x VIS/NIR -	0.8m 3.2m -	VHR1 - VHR2 (Unknown) [60-days]		
Gao Fen-9 *[GF-9]* (PMS-2)		Operational (2015 - ≥2023)	SSO (650km) [97.9°]						
KazEOSat-1 (NAOMI)	Kazakhstan (Kazcosmos)	Operational (2014 - ≥2021)	SSO (759km) [98.54°]	10km	Pan 4x VIS/NIR -	1m 4m -	VHR1 - VHR2 (12-bit) [Unknown]	Unknown* / Unknown* (Unknown) [KazEOSat Earth Observation] * Access requested but not provided	Unknown CCM: **NO** ESA TPM: **NO**
KazEOSat-2 (KEIS)		Operational (2014 - ≥2021)	SSO (630km) [98°]	78km	- 5x VIS/NIR -	- 6.5m -	HR1 (12-bit) [Unknown]		
DMC-3A DMC-3B DMC-3C *[Triplesat]* (VHRI-100)	UK (UKSA)	Operational (2015 - ≥2022)	SSO (647km) [97.8°]	23km	Pan 4x VIS/NIR -	1m 4m -	VHR1 - VHR2 (10-bit) [1-day*] * Revisit Time	Extensive / Intermittent (Constrained Access) [Earth-i Portal]	PURCHASE CCM: **NO** ESA TPM: **NO**
Sentinel-2A (MSI)	Europe (ESA)	Operational (2015 - ≥2022)	SSO (786km) [98.5°]	290km	- 13x VIS/NIR/SWIR -	- 10m/20m/60m -	HR1 - MR1 (12-bit) [10-days]	Constellation Mission Extensive / Frequent (2015 - 2019) (Open Access) [Copernicus OAH]	FREE CCM: **N/A** ESA TPM: **N/A**
Sentinel-2B (MSI)		Operational (2017 - ≥2024)							
TeLEOS-1 (TeLEOS-1)	Singapore (Agilspace)	Operational (2015 - ≥2020)	NEqO (550km) [15°]	12km	Pan - -	1m - -	VHR1 (10-bit) [1-day*] * Revisit Time	No Coverage of Ireland (due to Near Equatorial Orbit)	PURCHASE CCM: **NO** ESA TPM: **NO**
Sentinel-3A (OLCI / SLSTR)	Europe (ESA)	Operational (2016 - ≥2023)	SSO (807km) [98.65°]	740km/1270km	- VIS/NIR/SWIR MWIR/TIR	- 300m / 500m 1000m	MR2 - LR (10-bit) [27-days]	Extensive / Frequent (2016 - 2019) (Open Access) [Copernicus OAH]	FREE CCM: **N/A** ESA TPM: **N/A**
Sentinel-3B (OLCI / SLSTR)		Operational (2018 - ≥2025)							

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
Superview-1 01 Superview-1 02 *[GaoJing-1-01/02]* (Imager)	China (CNSA)	Operational (2016 - ≥2025)	SSO (530km) [98°]	12km	Pan 4x VIS/NIR -	0.5m 2m -	VHR1 - VHR2 (11-bit) [4-days*] * Revisit Time	Constellation Mission Extensive / Frequent (2017 - 2019) (Constrained Access) [ImageHunter Portal]	PURCHASE CCM: **NO** ESA TPM: **NO**
Superview-1 03 Superview-1 04 *[GaoJing-1-03/04]* (Imager)		Operational (2018 - ≥2026)	SSO (530km) [98°]						
KANOPUS-V5 (PSS/MSU/MSS)	Russia (ROSKOSMOS)	Operational (2018 - ≥2023)	SSO (510km) [97.46°]	20km/250km/25km	2x Pan 4x VIS/NIR -	2.5m/25m 12m -	VHR2 - HR2 (12-bit) [5-days*] * Revisit Time	No Acquisition Found (Constrained Access) [Roscosmos Geoportal]	PURCHASE CCM: **NO** ESA TPM: **NO**
KANOPUS-V6 (PSS/MSU/MSS)									
PRISMA (PAN)	Italy (ISA)	Commissioning (2019 - ≥2023)	SSO (614km) [98.19°]	30km	Pan - -	5m - -	HR1 (12-bit) [29-days]	Unknown / Unknown (Constrained) [PRISMA Portal]	TBD CCM: **TBD** ESA TPM: **TBD**

Notes:
(1) Mission Status: from Observing Systems Capability Analysis Review Tool (OSCAR). *Status Unclear = Lack of information whether the satellite is still operational*
(2) Orbit Type: SSO = Sun-Synchronous Orbit, LEO = Low Earth Orbit, GSO = Geostationary Orbit, NEqO = Near Equatorial Orbit
(3) Spectral Bands: VIS = Visible, NIR = Near-Infrared, SWIR = Short-wave Infrared, TIR = Thermal Infrared (see Guidance Notes in Section 6.1)
(4) Radiometric quantization (Bit Number)
(5) Repeat Cycle / Revisit Time: See Guidance Notes in Section 6.1
(6) Estimates of Spatial/Temporal Coverage of Ireland: Refer to Section 2.2
(7) Access Category: Refer to Section 3.1
(8) CCM: Copernicus Contributing Mission - refer to Section 3.3.1
(9) ESA TPM: ESA Third Party Mission (FR = Fast Registration / PP = Project Proposal) - refer to Section 3.3.2

Maguire, D. (2019) 'A Comprehensive Roadmap to 50 Years of (Satellite) Earth Observation Resources for the Island of Ireland (1972 – 2023)' Irish Geography, 52(1), 1-16, DOI XXXXXXXXXXXXX

Satellite Platform *[Also Named]* **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Launch)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**
CartoSat-3 (Pan/MX)	India (ISRO)	Planned (Launch ≥2019)	SSO (450km) [97.9°]	15km	Pan 4x VIS/NIR -	0.25m 1m -	VHR1 (11-bit) [TBD]	TBD / TBD (Very Constrained Access) [TBD]
CartoSat-3a (Pan/MX)		Planned (Launch ≥2019)						
CartoSat-3b (Pan/MX)		Planned (Launch ≥2020)						
Gao Fen-7 *[GF-7]* (PMS-7)	China (CNSA)	Planned (Launch ≥2019)	SSO (650km) [98°]	48km	Pan - -	0.8m 3.2m -	VHR1 – VHR2 (TBD) [TBD]	TBD / TBD (TBD) [CRESDA LOSDS Platform]
Resourcesat-3 (ALISS3)	India (ISRO)	Planned (Launch ≥2019)	SSO (795km) [98.72°]	280km / 925km	Pan 4x VIS/NIR/SWIR -	10m 20m -	HR2 (TBD) [11-days]	TBD / TBD (Constrained Access) [TBD]
Resourcesat-3A (APAN/MX)		Planned (Launch ≥2020)						
Resourcesat-3S (ALISS-3)		Planned (Launch ≥2019)	SSO (633km) [97.89°]	60km	Pan 4x VIS/NIR -	1.25m 2.5m -	VHR2 (TBD) [48-days]	TBD / TBD (Constrained Access) [TBD]
Resourcesat-3SA (AWiFS/LISS)		Planned (Launch ≥2020)						
EROS-C (PAN / MS)	Israel (ImageSat Intl)	Planned (Launch ≥2019)	SSO (520km) [97.4°]	12.5km	Pan 4x VIS/NIR -	0.4m 0.8m -	VHR1 (12-bit) [TBD]	TBD (Constrained Access) [TBD]
HRSAT-1A (PAN / MX)	India (IRSO)	Planned (Launch ≥2019)	SSO (660km) [TBD]	15km / 6km	Pan 4x VIS/NIR 1x LWIR	1m 4m 20m	VHR1 (TBD) [TBD]	TBD (Constrained Access) [TBD]
HRSAT-1B (PAN / MX)								
HRSAT-1C (PAN / MX)								

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Launch)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**
SEOSat *[Ingenio]* (Pan / MS)	Spain (CDTI / ESA)	Planned (Launch ≥2019)	SSO (668km) [98°]	60km	Pan 4x VIS/NIR -	2.5m 10m -	VHR2 - HR1 (TBD) [38-days]	TBD (Constrained Access) [TBD]
Landsat-9 (OLI-2/TIRS-2)	USA (USGS / NASA)	Planned (Launch ≥2020)	SSO (705km) [98.2°]	185km	TBD	TBD	TBD (TBD) [TBD]	Extensive / Frequent* (Open Access) [USGS EarthExplorer] * Based on Landsat Missions
ALOS3 (PRISM-2)	Japan (JAXA)	Planned (Launch ≥2020)	SSO (618km) [97.9°]	50km	Pan - -	0.8m - -	VHR1 (11-bit) [TBD]	TBD (TBD) [TBD]
ALOS-4 (CIRC)		Planned (Launch ≥2020)	SSO (640km) [TBD]	128km	- - 1x TIR	- - 200m	MR2 (TBD) [TBD]	
Resurs-PM N1 (OEKVR/SHMASR)	Russia (ROSKOSMOS)	Planned (Launch ≥2020)	SSO (TBD) [TBD]	19km / 120km	1x Pan 8x + 10x VIS/NIR/SWIR -	0.4m 1.6m/5-20m -	VHR1 - HR2 (TBD) [3-days*] * Revisit Time	TBD (Open Access: SHMASR) (Constrained Access: OEKVR) [Roscosmos Geoportal]
Resurs-PM N2 (OEKVR/SHMASR)		Planned (Launch ≥2021)						
Resurs-PM N3 (OEKVR/SHMASR)		Planned (Launch ≥2023)						
Resurs-PM N4 (OEKVR/SHMASR)		Planned (Launch ≥2024)						
SHALOM	Italy / Israel (ASI / ISA)	Planned (Launch ≥2021)	SSO (640km) [97.96]	10km	Pan - -	2.5m/5m - -	VHR2 - HR1 (TBD) [2-days*] * Revisit Time	TBD (TBD) [TBD]
Sentinel-2C	Europe (ESA)	Planned (Launch ≥2022)	SSO (786km) [98.5°]	TBD	TBD	TBD	TBD (TBD) [TBD]	Extensive / Frequent* (Open Access) [Copernicus OAH] * Based on Sentinel-2A/B & Sentinel-3A/B Missions
Sentinel-2D		Planned (Launch ≥2023)						
Sentinel-3C (OLCI / SLSTR)		Planned (Launch ≥2023)	SSO (807km) [98.65°]	740km / 1270km	- VIS/NIR/SWIR MWIR/TIR	- 300m / 500m 1000m	MR2 - LR (10-bit) [27-days]	

Notes:
(1) Mission Status: from Observing Systems Capability Analysis Review Tool (OSCAR). *Status Unclear = Lack of information whether the satellite is still operational*
(2) Orbit Type: SSO = Sun-Synchronous Orbit, LEO = Low Earth Orbit, GSO = Geostationary Orbit, NEqO = Near Equatorial Orbit
(3) Spectral Bands: VIS = Visible, NIR = Near-Infrared, SWIR = Short-wave Infrared, TIR = Thermal Infrared (see Guidance Notes in Section 6.1)
(4) Radiometric quantization (Bit Number)
(5) Repeat Cycle / Revisit Time: See Guidance Notes in Section 6.1
(6) Estimates of Spatial/Temporal Coverage of Ireland: Refer to Section 2.2
(7) Access Category: Refer to Section 3.1

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Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Spectral Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
EO-1 (Hyperion)	USA (NASA/USGS)	Retired (2000 - 2017)	SSO (691km) [98.7°]	7.5km	- 220x VIS/NIR/SWIR -	- 30m -	- 10nm -	HR2 (12-bit) [16-days]	V. Limited / Frequent (2012 - 2017) (Open Access) [USGS EarthExplorer & USGS GloVis]	FREE CCM: **NO** ESA TPM: **NO**
Proba-1 (CHRIS)	Europe (ESA)	Operational (2001 - ≥2019)	SSO (615km) [97.9°]	14km	18x VIS/NIR/SWIR **or** 63x VIS/NIR/SWIR	18m **or** 36m	5.6 - 32.9nm	HR2 - MR1 (12-bit) [7-days*] * Revisit Time	V. Limited / Intermittent (2007 - 2010) (Open Access) [ESA TPM Portal]	FREE CCM: **YES** ESA TPM: **YES** Full Archive: **FR**
OrbView-4 (OHIS)	USA (GeoEye)	Failed at Launch (2001)	N/A (N/A) [N/A]	5km	40x VIS/NIR 80x NIR 80x SWIR	8m 8m 8m	11.4nm 11.4nm 11.4nm	HR2 (12-bit) [N/A]	N/A (N/A) [N/A]	N/A
SS Shenzhou-3 *[SZ-3]* (CMODIS)	China (CNSA)	Retired (2002 - 2003)	Unknown (374km) [42.4°]	650km	30x VIS/NIR 1x SWIR 3x TIR	500m 500m 500m	20nm 10nm 10-100nm	LR (12-bit) [N/A]	Unknown / Unknown (Unknown) [CRESDA LOSDS]	Unknown CCM: **NO** ESA TPM: **NO**
Huan Jing-1A *[HJ-1A]* (HSI)	China (CAST)	Unclear (2008 - ≥2019)	SSO (650km) [97.95°]	50km	- 115x VIS/NIR/SWIR -	- 100m -	- 5nm -	MR1 (12-bit) [31 days]	Unknown / Unknown (Constrained Access) [CRESDA LOSDS]	Unknown CCM: **NO** ESA TPM: **NO**
IMS-1 (HySI)	India (ISRO)	Retired (2008 - 2012)	SSO (632km) [97.9°]	130km	- 64x VIS/NIR/SWIR -	- 500m -	- 10nm -	LR (10-bit) [22-days]	No Acquisitions Found (Open Access) [NASA EarthData / IRSO NRSC]	FREE CCM: **NO** ESA TPM: **NO**
International Space Station (HICO)	USA (NASA)	Retired (2009 - 2014)	Near Circular (400km) [51.6°]	42km	- 128x VIS/NIR -	- 90m -	- 5.7nm -	MR1 (14-bit) [3-days*] * Revisit Time	No Acquisitions Found [Constrained Access] [NASA OCW]	FREE CCM: **NO** ESA TPM: **NO**
SS TianGong-1 *[TG-1]* (HSI)	China (CNSA)	Retired (2009 - 2015)	Unknown (Unknown) [Unknown]	10km	64x VNIR 64x SWIR -	10m 20m -	10nm 23nm -	HR1 - HR2 (Unknown) [Unknown]	Unknown / Unknown (Unknown) [CRESDA LOSDS]	Unknown CCM: **NO** ESA TPM: **NO**
Resurs-P N1 *[Resurs-P1]* (GSA)	Russia (ROSKOSMOS)	Operational (2013 - ≥2019)	SSO (475km) [97.3°]	25km	- 255x VIS/NIR -	- 30m -	- 5-10nm -	HR2 (Unknown) [3-days*] * Revisit Time	Unknown / Unknown (Constrained Access) [ROSCOSMOS Geoportal]	PURCHASE CCM: **NO** ESA TPM: **NO**
Resurs-P N2 *[Resurs-P2]* (GSA)		Operational (2014 - ≥2019)								
Resurs-P N3 *[Resurs-P3]* (GSA)		Operational (2016 - ≥2021)								

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Spectral Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
International Space Station (DESIS)	Germany (DLR)	Operational (2018 - ≥2023)	Inclined (407km) [51.6°]	44km/57km	- 235x VIS/NIR -	- 30m -	- 2.5nm -	HR2 (12-bit) [Unknown]	Not Currently Available (Unknown) [TBD]	TBD CCM: **NO** ESA TPM: **NO**
Gao Fen-5 *[GF-5]* (AHSI)	China CNSA)	Operational (2018 - ≥2026)	SSO (708km) [98.2°]	No Information Available					Not Currently Available (V. Constrained Access) [CRESDA LOSDS]	TBD CCM: **NO** ESA TPM: **NO**
PRISMA (HYC)	Italy (ASI)	Commissioning (2019 - ≥2023)	SSO (614km) [98.19°]	30km	66x VIS/NIR 171x NIR/SWIR -	30m 30m -	10nm 10nm -	HR2 (12-bit) [29-days]	Not Currently Available (Constrained) [PRISMA Portal]	TBD CCM: **TBD** ESA TPM: **TBD**

Notes:
(1) Mission Status: from Observing Systems Capability Analysis Review Tool (OSCAR). *Status Unclear = Lack of information whether the satellite is still operational*
(2) Orbit Type: SSO = Sun-Synchronous Orbit, LEO = Low Earth Orbit, GSO = Geostationary Orbit, NEqO = Near Equatorial Orbit
(3) Spectral Bands: VIS = Visible, NIR = Near-Infrared, SWIR = Short-wave Infrared, TIR = Thermal Infrared (see Guidance Notes in Section 6.1)
(4) Radiometric quantization (Bit Number)
(5) Repeat Cycle / Revisit Time: See Guidance Notes in Section 6.1
(6) Estimates of Spatial/Temporal Coverage of Ireland: Refer to Section 2.2
(7) Access Category: Refer to Section 3.1
(8) CCM: Copernicus Contributing Mission - refer to Section 3.3.1
(9) ESA TPM: ESA Third Party Mission (FR = Fast Registration / PP = Project Proposal) - refer to Section 3.3.2

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Satellite Platform *[Also Named]* **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Spectral Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**
CartoSat-3 (HySI)	India (ISRO)	Planned (Launch ≥2019)	SSO (450km) [97.9°]	5km	- 200x VIS/NIR/SWIR -	- 12m -	- TBD -	HR2 (12-bit) [29-days]	TBD / TBD (Very Constrained Access) [TBD]
Resurs-P N4 (GSA)	Russia (ROSKOSMOS)	Planned (Launch ≥2020)	SSO (475km) [97.3°]	25km	- 255x VIS/NIR -	- 30m -	- 5-10nm -	HR2 (Unknown) [3-days*] * Revisit Time	TBD / TBD (Constrained Access) [Roscosmos Geoportal]
Resurs-P N5 (GSA)		Planned (Launch ≥2021)							
Resurs-PM N1 (GSA2)		Planned (Launch ≥2020)	SSO (TBD) [97.3°]	25 - 30km	- 290x VIS/NIR -	- 25m-100m -	- TBD -	HR2 - MR1 (Unknown) [3-days*] * Revisit Time	TBD / TBD (Constrained Access) [Roscosmos Geoportal]
Resurs-PM N2 (GSA2)		Planned (Launch ≥2021)							
Resurs-PM N3 (GSA2)		Planned (Launch ≥2023)							
Resurs-PM N4 (GSA2)		Planned (Launch ≥2024)							
EnMAP (HSI)	Germany (DLR)	Planned (Launch ≥2019)	SSO (653km) [97.96°]	30km	88x VIS/NIR 154x SWIR -	30m 30m -	6.5nm 10nm -	HR2 (14-bit) [27-days]	TBD / TBD (Open Access) [TBD]
International Space Station (HISUI)	International (Multiple)	Planned (Launch ≥2019)	Near Circular (400km) [51.6°]	20km	57x VIS/NIR 128x NIR/SWIR -	30m 30m -	10nm 12.5nm -	HR2 (12-bit) [TBD]	TBD / TBD (TBD) [TBD]
ALOS-3 (HISUI)	Japan (JAXA)	Planned (Launch ≥2020)	SSO (620km) [97.9°]	30km	57x VIS/NIR 128x NIR/SWIR -	30m 30m -	10nm 12.5nm -	HR2 (12-bit) [60-days]	TBD / TBD (Open Access) [TBD]
SHALOM (SHALOM)	Italy / Israel (ASI / ISA)	Planned (Launch ≥2021)	SSO (640km) [97.96°]	10km	241x VIS/NIR/SWIR - -	10m - -	10nm - -	HR1 12-bit [TBD]	TBD / TBD (TBD) [TBD]
HyspIRI (HyspIRI)	USA (JPL / NASA)	Planned (Launch ≥2021)	SSO (626km) [98°]	150km / 600km	85x VIS/NIR 135x SWIR 8x TIR	30m 30m 60m	10nm 10nm 3-12nm	HR2 - MR1 (14-bit) [19-days]	TBD / TBD (Open Access) [TBD]

Satellite Platform *[Also Named]* **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Spectral Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**
FLEX (FLORIS)	Europe (ESA)	Planned (Launch ≥2022)	SSO (815km) [TBD]	150km	TBD TBD -	- 300m -	0.1-0.5nm 1-2nm	MR2 (TBD) [20-days]	TBD / TBD (Open Access) [TBD]
HypXIM (HypXIM)	France (CNES)	Planned (Launch ≥2023)	SSO (650km) [TBD]	15km	- 210x VIS/NIR/SWIR -	- 8m-20m -	- 10nm -	HR1 - HR2 (TBD) [TBD]	TBD / TBD (TBD) [TBD]

Notes:

(1) Mission Status: from Observing Systems Capability Analysis Review Tool (OSCAR). *Status Unclear = Lack of information whether the satellite is still operational*

(2) Orbit Type: SSO = Sun-Synchronous Orbit, LEO = Low Earth Orbit, GSO = Geostationary Orbit, NEqO = Near Equatorial Orbit

(3) Spectral Bands: VIS = Visible, NIR = Near-Infrared, SWIR = Short-wave Infrared, TIR = Thermal Infrared (see Guidance Notes in Section 6.1)

(4) Radiometric quantization (Bit Number)

(5) Repeat Cycle / Revisit Time: See Guidance Notes in Section 6.1

(6) Estimates of Spatial/Temporal Coverage of Ireland: Refer to Section 2.2

(7) Access Category: Refer to Section 3.1

Maguire, D. (2019) 'A Comprehensive Roadmap to 50 Years of (Satellite) Earth Observation Resources for the Island of Ireland (1972 – 2023)' Irish Geography, 52(1), 1-16, DOI XXXXXXXXXXXXX

Satellite Platform *[Also Named]* **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Band (Center Freq.) [Wavelength]**	**Look Direction (Swath Width) [Incidence Angle]**	**Polarisation (Repeat Cycle / Revisit Time)[5] [Radiometric Resolution]**	**Spatial Resolution Class Highest Resolution⁺ (Azimuth, Range) [⁺Sensor Mode]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
SEASAT (SAR)	USA (NASA)	Retired (1978 - 1978)	Drifting (785km) [108°]	L-Band (1.275GHz) [23.5cm]	Right (100 km) [22°]	Single (HH only) (17-days) [5-bit]	HR2 (6m, 25m) [Image Mode]	Limited / Infrequent (1978) (Open Access) [ESA Earth Online]	FREE CCM: **NO** ESA TPM: **YES** ESA Archive: **FR**
Resurs-O1-N1 (SAR-Travers)	Russia (ROSKOSMOS)	Retired (1985 - 1988)	SSO (620km) [98°]	L-Band (1.227GHz) [23.4cm] S-Band 3.28GHz [9.1cm]	Unknown (80km) [35°]	Single (21-days) [4-bit]	HR2 (20m, 100m) [SAR]	Unknown / Unknown (Unknown) [Unknown]	Unknown CCM: **NO** ESA TPM: **NO**
ERS-1 (AMI-SAR)	Europe (ESA)	Retired (1991 - 2000)	SSO (785km) [98.52°]	C-Band (5.3GHz) [5.6cm]	Right (100km) [20.1° - 25.9°]	Single (VV only) (35-days) [8-bit (4I+4Q)]	HR2 (5m, 25m) [Image Mode]	Extensive / Frequent (1991 - 1999) (Constrained Access) [ESA ODC]	FREE CCM: **YES** ESA TPM: **N/A**
ERS-2 (AMI-SAR)		Retired (1995 - 2011)						Extensive / Frequent (1995 - 2011) (Constrained Access) [ESA ODC]	
JERS-1 *[FUYO-1]* (SAR)	Japan (JAXA)	Retired (1992 - 1998)	SSO (568km) [98°]	L-Band (1.275GHz) [23.5cm]	Right (75km) [32° - 38°]	Single (HH only) (44-days) [3-bit]	HR2 (6m, 18m) [Strip Mode]	Extensive / Frequent (1992 - 1998) (Open Access) [ESA TPM]	FREE CCM: **NO** ESA TPM: **YES** ESA Archive: **FR**
Space Shuttle Endeavour *[SIR-C]* (C-RADAR / X-RADAR)	International (NASA/DLR/ASI)	Retired (1994)	LEO (224km) [57°]	C-Band (5.3GHz) [5.6cm]	N/A (15 - 90km) [20° - 55°]	Dual (N/A) [8-bit]	MR1 (30m) [ScanSAR]	V. Limited / Infrequent (1994) (Open Access) [USGS EarthExplorer]	FREE CCM: **NO** ESA TPM: **NO**
				L-Band (1.275GHz) [23.5cm]	N/A (15 - 90km) [20° - 55°]	Dual (N/A) [8-bit]			
				X-Band 9.6GHz [3.1cm]	N/A (15 - 60km) [15° - 55°]	Single (N/A) [8-bit]	HR2 (25m) [ScanSAR]	Very Limited / Infrequent (1994) (Open Access) [EOWEB Geoportal]	FREE CCM: **NO** ESA TPM: **NO**

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Band (Center Freq.) [Wavelength]**	**Look Direction (Swath Width) [Incidence Angle]**	**Polarisation (Repeat Cycle / Revisit Time)[5] [Radiometric Resolution]**	**Spatial Resolution Class Highest Resolution+ (Azimuth, Range) [+Sensor Mode]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
RADARSAT-1 (SAR)	Canada (CSA)	Retired (1995 - 2013)	SSO (798km) [98.59°]	C-Band (5.3GHz) [5.65cm]	Right (40 - 500km) [20° - 52°]	Single (HH only) (24-days) [8-bit (4I+4Q)]	HR1 - MR1 (8m, 8m) [StripMap]	Extensive / Intermittent (1997 - 2007) (Constrained Access) [ASF Vertex & NASA EarthData]	PURCHASE CCM: **NO** ESA TPM: **YES** Full Archive: **PP**
RADARSAT-2 (SAR)		Operational (2007 - ≥2019)	SSO (798km) [98.59°]	C-Band (5.405GHz) [5.55cm]	Right or Left (18 - 500km) [20° - 49°]	Single/Dual/Quad (24-days) [8-bit (4I+4Q)]	VHR1 - MR1 (1m, 3m) [Spotlight]	Extensive / Frequent (2009 - 2019) (Constrained Access) [MDA RADARSAT-2 Portal]	PURCHASE CCM: **YES** ESA TPM: **YES** Full Archived & Tasking: **PP**
PRIRODA-MIR (SAR-Travers)	Russia (ROSKOSMOS)	Retired (1996 - 2001)	SSO (400km) [51.6°]	L-Band (1.227GHz) [23.4cm] S-Band 3.28GHz [9.1cm]	Unknown (50km) [35°]	Single (6-days*) [4-bit] * Revisit Time	HR2 (20m, 100m) [SAR]	Unknown / Unknown+ (Unknown) [Unknown] + Unable to Find Data Access Portal	Unknown CCM: **NO** ESA TPM: **NO**
Space Shuttle Endeavour *[Shuttle Radar Topography Mission]* (C-RADAR / X-RADAR)	USA (NASA)	Retired (Feb. 2000)	LEO (233km) [57°]	C-Band (5.3GHz) [5.6cm] X-Band 9.6GHz [3.1cm]	N/A (50 - 225km) [15° - 55°] N/A (50 - 225km) [17° - 60°]	Dual (N/A) [8-bit] Single (N/A) [12-bit]	MR1 (30m) [ScanSAR] HR2 (25m) [ScanSAR]	Extensive / Infrequent (2000) (Open Access) [USGS EarthExplorer]	FREE CCM: **NO** ESA TPM: **NO**
ENVISAT (ASAR)	Europe (ESA)	Retired (2002 - 2012)	SSO (774km) [98.5°]	C-Band (5.331GHz) [5.6cm]	Right (100 - 400km) [15° - 45°]	Single/Dual (35-days) [8-bit (4I+4Q)]	HR2 - LR (10m, 30m) [Image Mode]	Extensive / Frequent (2002-2012) (Constrained Access) [ESA ODC]	FREE CCM: **YES** ESA TPM: **N/A**
ALOS (PALSAR)	Japan (JAXA)	Retired (2006 - 2011)	SSO (692km) [98.16°]	L-Band (1.27GHz) [23.6cm]	Right (40 - 350km) [10° - 51°]	Single/Dual (46-days) [5-bit]	HR1 - MR1 (5m, 10m) [Fine]	Extensive / Intermittent (2006-2010) (Open Access) [ESA TPM]	FREE CCM: **YES** ESA TPM: **YES** ESA Archive: **FR**
ALOS2 (PLASAR2)		Operational (2014 - ≥2020)	SSO (640km) [97.9°]	L-Band (1.27GHz) [23.6cm]	Right or Left (25 - 350km) [7.3° - 58.8°]	Single/Dual/Quad (14-days) [32-bit (16I+16Q)]	VHR1 - MR1 (1m, 3m) [Spotlight]	Extensive / Frequent (2014 - 2019) (Open Access) [ALOS PLATFORM]	PURCHASE CCM: **NO** ESA TPM: **NO**

Satellite Platform *[Also Named]* (Sensor)	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Band (Center Freq.) [Wavelength]**	**Look Direction (Swath Width) [Incidence Angle]**	**Polarisation (Repeat Cycle / Revisit Time)[5] [Radiometric Resolution]**	**Spatial Resolution Class Highest Resolution[+] (Azimuth, Range) [[+]Sensor Mode]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
TerraSAR-X *[TSX]* (SAR-X)	Germany (DLR)	Operational (2007 - ≥2019)	SSO (515km) [97.4°]	X-Band (9.65GHz) [3.1cm]	Right (4 - 270km) [20° - 45°]	Single/Dual/Quad (11-days) [32-bit (16I+16Q)]	VHR1 - MR1 (0.24m x 0.6m) [Staring Spotlight]	Extensive / Infrequent (2007-2017) (Open Access) [EOWEB Geoportal]	PURCHASE CCM: **YES** ESA TPM: **YES** Full Archive & Tasking: **PP**
TanDEM-X *[TDX]* (SAR-X)		Operational (2010 - ≥2019)						No Acquisitions Found (Open Access) [EOWEB Geoportal]	
COSMO-SkyMed-1 *[CSK-1]* (SAR 2000)	Italy (ASI)	Operational (2007 - ≥2019)	SSO (620km) [97.86°]	X-Band (9.60GHz) [3.1cm]	Right or Left (10 - 200km) [20° - 50°]	Single/Dual/Quad (16-days) [16bit (8I+8Q)]	VHR1 - MR1 (≤1m x ≤1m) [Spotlight]	Limited / Frequent (2008 - 2017) (Constrained Access) [ASI e-geos Catalog]	PURCHASE CCM: **YES** ESA TPM: **YES** Full Archive & Tasking: **PP**
COSMO-SkyMed-2 *[CSK-2]* (SAR 2000)								Extensive / Frequent (2008 - 2019) (Constrained Access) [ASI e-geos Catalog]	
COSMO-SkyMed-3 *[CSK-3]* (SAR 2000)		Operational (2008 - ≥2019)						V. Limited / Intermittent (2009 - 2016) (Constrained Access) [ASI e-geos Catalog]	
COSMO-SkyMed-4 *[CSK-4]* (SAR 2000)		Operational (2010 - ≥2019)						Limited / Frequent (2011 - 2019) (Constrained Access) [ASI e-geos Catalog]	
RISAT-2 (SAR-C)	India (ISRO)	Operational (2009 - ≥2019)	Drifting (550km) [41°]	X-Band (9.59GHz) [3.1cm]	Right or Left (10 - 50km) [20° - 45°]	Single/Dual (14-days) [Unknown]	VHR1 - HR1 (≤1m, ≤1m) [Spotlight]	Unknown[+] / Unknown[+] (V. Constrained Access) [Unknown[+]] [+] Unable to Find Data Access Portal	PURCHASE CCM: **NO** ESA TPM: **NO**
RISAT-1 (SAR-C)		Inactive (2012 - ≥2017)	SSO (536km) [97.55°]	C-Band (5.35GHz) [5.6cm]	Right or Left (10 - 220km) [20° - 49°]	Single/Dual/Quad (12-days) [16bit (8I+8Q)]	HR1 - MR1 (3.3m, 2.2m) [Fine Res. Strip]	Extensive / Infrequent (2014) (Constrained Access) [ESA ODC & IRSO NRSC]	PURCHASE CCM: **YES** ESA TPM: **NO**
Huan Jing-1C *[HJ-1C]* (SAR-S)	China (CRESDA)	Unclear (2012 - ≥2019)	SSO (502km) [97.3°]	S-Band (2.7GHz) [11.1cm]	Unknown (40 - 100km) [25° - 47°]	Single (31-days) [4 bit]	HR1 - HR2 (5m, 20m) [Strip Mode]	Unknown / Unknown (No Access) [N/A]	NO ACCESS CCM: **NO** ESA TPM: **NO**

Satellite Platform *[Also Named]* (Sensor)	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Band (Center Freq.) [Wavelength]**	**Look Direction (Swath Width) [Incidence Angle]**	**Polarisation (Repeat Cycle / Revisit Time)[5] [Radiometric Resolution]**	**Spatial Resolution Class Highest Resolution+ (Azimuth, Range) [+Sensor Mode]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
KOMPSAT-5 (COSI)	Rep. of Korea (KARI)	Operational (2013 - ≥2019)	SSO (550km) [97.6°]	X-Band (9.66GHz) [3.1cm]	Right or Left (5 - 100km) [20° - 45°]	Single/Dual (28-days) [16bit (8I+8Q)]	VHR1 - HR2 (≤1m, ≤1m) [Spot SAR]	V. Limited / Infrequent (2014 - 2016) (V. Constrained Access) [ESA ODC]	PURCHASE CCM: **YES** ESA TPM: **NO**
Sentinel-1A *[S1-A]* (SAR-C)	Europe (ESA)	Operational (2014 - ≥2021)	SSO (693km) [98.2°]	C-Band (5.405GHz) [5.55cm]	Right (80 - 400km) [15° - 45°]	Single/Dual (12-days) [32-bit (16I+16Q)]	HR1 - MR1 (5m, 5m) [StripMap]	Extensive / Frequent (2014 - 2019) (Open Access) [Copernicus OAH]	FREE CCM: **NO** ESA TPM: **N/A**
Sentinel-1B *[S1-B]* (SAR-C)		Operational (2016 - ≥2023)						Extensive / Frequent (2016 - 2019) (Open Access) [Copernicus OAH]	
Gaofen-3 *[GF-3]* (C-SAR)	China (CNSA)	Operational (2016 - ≥2024)	SSO (755km) [98.4°]	C-Band (5.4GHz) [5.55cm]	Right or Left (10 - 650km) [20° - 50°]	Single/Dual/Quad (29-days) [8-bit]	VHR1 - LR (1m, 1m) [Spotlight]	Unknown / Unknown (No Access) [CRESDA LOSDS Platform]	NO ACCESS CCM: **NO** ESA TPM: **NO**
PAZ *[SEOSAR]* (Paz SAR-X)	Spain (MDE/CDTI)	Operational (2018 - ≥2023)	SSO (514km) [97.4°]	X-Band (9.65GHz) [3.1cm]	Right (5 - 100km) [15° - 60°]	Single/Dual/Quad (11-days) [16bit (8I+8Q)]	VHR1 - MR1 (<1m, <1m) [Spotlight]	Not Currently Available (Constrained Access) [TBD]	PURCHASE CCM: **YES** ESA TPM: **NO**
SAOCOM-1A (SAR-L)	Argentina (CONAE)	Operational (2018 - ≥2023)	SSO (620km) [97.89°]	L-Band (1.275GHz) [23.5cm]	Right or Left (30 - 320km) [15° - 50°]	Single/Dual/Quad 16-days [TBD]	HR1 - MR1 (≤10m, ≤10m) [StripMap]	Not Currently Available (Unknown) [TBD]	PURCHASE CCM: **NO** ESA TPM: **NO**
RCM-1 RCM-2 RCM-3 *[RADARSAT Constellation Mission]* (SAR-RCM)	Canada (CSA)	Operational (2019 - ≥2026)	SSO (592km) [97.7°]	C-Band (5.405GHz) [5.55cm]	Right (20 - 350km) [20° - 49°]	Single/Dual/Quad 12-days [TBD]	VHR1 - MR1 (1m, 3m) [Spotlight]	Not Currently Available (Constrained Access) [TBD]	PURCHASE CCM: **NO** ESA TPM: **NO**

Notes:

(1) Mission Status: from Observing Systems Capability Analysis Review Tool (OSCAR). *Status Unclear = Lack of information whether the satellite is still operational*

(2) Orbit Type: SSO = Sun-Synchronous Orbit, LEO = Low Earth Orbit, GSO = Geostationary Orbit, NEqO = Near Equatorial Orbit

(5) Repeat Cycle / Revisit Time: See Guidance Notes in Section 6.1

(6) Estimates of Spatial/Temporal Coverage of Ireland: Refer to Section 2.2

(7) Access Category: Refer to Section 3.1

(8) CCM: Copernicus Contributing Mission - refer to Section 3.3.1

(9) ESA TPM: ESA Third Party Mission (FR = Fast Registration / PP = Project Proposal) - refer to Section 3.3.2

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency / Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Band (Center Freq.) [Wavelength]**	**Look Direction (Swath Width) [Incidence Angle]**	**Polarisation (Repeat Cycle / Revisit Time)[5] [Radiometric Resolution]**	**Spatial Resolution Class Highest Resolution[+] (Azimuth, Range) [[+]Sensor Mode]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**
RISAT-1A (SAR-C)	India (ISRO)	Planned (Launch ≥2019)	SSO (536km) [97.8°]	C-Band (5.6GHz) [5.3cm]	Right or Left (10 - 220km) [20° - 49°]	Single/Dual/Quad/ Circular (12-days) [TBD]	HR1 - MR1 (3.3m x 2.2m) [Fine Res. Strip]	TBD / TBD (Constrained Access) [CRESDA LOSDS Platform]
RISAT-1B (SAR-C)	India (ISRO)	Planned (Launch ≥2021)						
CSG-1 CSG-2 *[COSMO-SkyMed Second Generation]* (SAR-2000SG)	Italy (ASI)	Operatio (Launch ≥2019)	SSO (620km) [97.8°]	X-Band (9.60GHz) [3.1cm]	Right or Left (10 - 320km) [20° - 50°]	Single/Dual/Quad 16-days [TBD]	VHR1 - HR2 (0.35m, 0.55m) [Spotlight 2A]	TBD / TBD (Constrained Access) [ASI e-geos Catalogue]
SAOCOM-1B (SAR-L)	Argentina (CONAE)	Planned (Launch ≥2020)	SSO (620km) [97.89°]	L-Band (1.275GHz) [23.5cm]	Right or Left (30 - 320km) [15° - 50°]	Single/Dual/Quad 16-days [TBD]	HR1 - MR1 (≤10m, ≤10m) [StripMap]	TBD / TBD (TBD) [TBD]
SAOCOM-2A (SAR-L)		Planned (Launch ≥2020)						
SAOCOM-2B (SAR-L)		Planned (Launch ≥2020)						
ALOS-4 (PALSAR-2)	Japan (JAXA)	Planned (Launch ≥2020)	SSO (640km) [TBD]	L-Band (1.275GHz) [23.5cm]	Right or Left (25 - 350km) [8° - 70°]	Single/Dual/Quad (14-days) [TBD]	TBD (TBD, TBD) [TBD]	TBD / TBD (TBD) [ALOS PLATFORM]
TSX-NG *[TerraSAR-X Next Generation]* (HRWS-SAR)	Germany (DLR)	Planned (Launch ≥2020)	SSO (515km) [97.44°]	X-Band (9.65GHz) [3.1cm]	TBD (15km - 500km) [20° - 55°]	Single/Dual/Quad (11-days) [16bit (8I+8Q)]	VHR1 - HR2 (0.25m, 0.25m) [VHS 0.25]	TerraSAR-X Next Generation TBD / TBD (Open Access) [EOWEB Geoportal]
Sentinel-1C (SAR-C)	Europe (ESA)	Planned (Launch ≥2022)	SSO (693km) [98.19°]	C-Band (5.405GHz) [5.55cm]	TBD (TBD) [TBD]	TBD 12-days [TBD]	TBD (TBD, TBD) [TBD]	Extensive / Recurrent* (Open Access) [Copernicus OAH] * Based on Sentinel-1A/B Missions
Sentinel-1D (SAR-C)		Planned (Launch ≥2023)						

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency / Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Band (Center Freq.) [Wavelength]**	**Look Direction (Swath Width) [Incidence Angle]**	**Polarisation (Repeat Cycle / Revisit Time)[5] [Radiometric Resolution]**	**Spatial Resolution Class Highest Resolution[+] (Azimuth, Range) [[+]Sensor Mode]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**
TanDEM-L (L-SAR)	Germany (DLR)	Planned (Launch ≥2023)	SSO (745km) [97°]	L-Band (1.258GHz) [23.8cm]	Right and Left (350km) [26.3° - 47°]	Single/Dual/Quad 16-days [TBD]	VHR1 - MR1 (1m, 1m) [High Res. Mode]	TBD / TBD (TBD) [EOWEB Geoportal]
NI-SAR (L-SAR/S-SAR)	USA/India (NASA/ISRO)	Planned (Launch ≥2022)	SSO (747km) [98°]	L-Band (1.275GHz) [23.5cm]	Left & Right (242km) [32.9° - 47.9°]	Single/Dual/Quad/ Circular 12-days [TBD]	HR1 - MR1 (7m, 1.8m) [TBD]	TBD / TBD (Open Access) [TBD]
				S-Band (3.2 GHz) [9.4cm]			HR1 - MR1 (6.4m, 2m) [TBD]	
BIOMASS (SAR-P)	Europe (ESA)	Planned (Launch ≥2022)	SSO (660km) [97.97°]	P-Band (0.435GHz) [68.9cm]	TBD (50 - 60km) [25°]	Single/Dual/Quad 17-days [TBD]	MR2 (50m, 50m) [TBD]	TBD / TBD (TBD) [ESA Earth Online]

Notes:

(1) Mission Status: from Observing Systems Capability Analysis Review Tool (OSCAR). *Status Unclear = Lack of information whether the satellite is still operational*

(2) Orbit Type: SSO = Sun-Synchronous Orbit, LEO = Low Earth Orbit, GSO = Geostationary Orbit, NEqO = Near Equatorial Orbit

(5) Repeat Cycle / Revisit Time: See Guidance Notes in Section 6.1

(6) Estimates of Spatial/Temporal Coverage of Ireland: Refer to Section 2.2

(7) Access Category: Refer to Section 3.1

(8) CCM: Copernicus Contributing Mission - refer to Section 3.3.1

(9) ESA TPM: ESA Third Party Mission (FR = Fast Registration / PP = Project Proposal) - refer to Section 3.3.2

Maguire, D. (2019) 'A Comprehensive Roadmap to 50 Years of (Satellite) Earth Observation Resources for the Island of Ireland (1972 – 2023)' Irish Geography, 52(1), 1-16, DOI XXXXXXXXXXXX

Satellite Platform ***[Also Named]*** **(Sensor)**	**Nation/Region (Agency/Operator)**	**Mission Status[1] (Start - End)**	**Orbit Type[2] (Altitude) [Inclination]**	**Swath Width**	**Spectral Bands[3] (Pan, VIS, NIR, SWIR, TIR)**	**Spatial Resolution**	**Resolution Class (Bit Number)[4] [Repeat Cycle / Revisit Time][5]**	**Spatial/Temporal Coverage of Ireland[6] (Access Category)[7] [EO Portal(s)]**	**FREE / PURCHASE CCM[8] ESA TPM[9]**
Plantscope 1-175+ *Dove* (MS)	USA (Planet Lab)	Operational (2013 - ≥Varies)	Varies (Varies) [Varies]	16.4km	- 4x VIS/NIR -	- 3-5m -	VHR2 - HR1 (12-bit) [<1-day*] * Revisit Time	Extensive / Recurrent (2016 - Present) (Open Access) [Planet Explorer Portal]	PURCHASE CCM: **NO** ESA TPM: **NO**
SkySat 1-13 (Pan / / MS)		Operational (2014 - ≥Varies)		2km/8km	Pan 4x VIS/NIR -	0.8m/1.1m 1m -	VHR1 - VHR2 (12-bit) [<1-day*] * Revisit Time		

Notes:
(1) Mission Status: from Observing Systems Capability Analysis Review Tool (OSCAR). *Status Unclear = Lack of information whether the satellite is still operational*
(2) Orbit Type: SSO = Sun-Synchronous Orbit, LEO = Low Earth Orbit, GSO = Geostationary Orbit, NEqO = Near Equatorial Orbit
(3) Spectral Bands: VIS = Visible, NIR = Near-Infrared, SWIR = Short-wave Infrared, TIR = Thermal Infrared (see Guidance Notes in Section 6.1)
(4) Radiometric quantization (Bit Number)
(5) Repeat Cycle / Revisit Time: See Guidance Notes in Section 6.1
(6) Estimates of Spatial/Temporal Coverage of Ireland: Refer to Section 2.2
(7) Access Category: Refer to Section 3.1
(8) CCM: Copernicus Contributing Mission - refer to Section 3.3.1
(9) ESA TPM: ESA Third Party Mission (FR = Fast Registration / PP = Project Proposal) - refer to Section 3.3.2

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Abbreviated Title of EO Browser/Portal [Full Title of EO Browser/Portal]	**EO Browser/Portal Weblink**	**EO Datasets Available:**
Airbus Geostore [Airbus Defence & Space Geostore]	www.intelligence-airbusds.com/geostore/	Pléiades-1A, Pléiades-1B, SPOT 1-7, TerraSAR-X, UK-DMC, UK-DMC2
ALOS PLATFORM [PASCO Earth Observation Data Utilization Promotion Platform]	http://en.alos-pasco.com/	ALOS PRISM, ALOS-2 PALSAR-2, Landsat-7/8, Terra ASTER
Arirang Portal [Arirang Satellite Image Search & Order System]	https://ksatdb.kari.re.kr/arirang/	KOMPSAT-1, KOMPSAT-2, KOMPSAT-3, KOMPSAT-3A, KOMPSAT-5
ASF Vertex [Alaska Satellite Facility's Data Portal for Remotely Sensed Imagery]	https://vertex.daac.asf.alaska.edu	ALOS PALSAR, ERS-1, ERS-2, JERS-1, RADARSAT-1, Sentinel-1A, Sentinel-1B
ASI e-geos Catalogue [Agenzia Spaziale Italiana / Telespazio e-geos Catalogue]	http://catalog.e-geos.it	COSMO-SkyMed-1/2/3/4, GeoEye-1, IKONOS-2, Quickbird-2, Worldview-1/2/3
CBERS Portal [China-Brazil Earth Resources Program Image Catalogue]	www.dgi.inpe.br/CDSR/	CBERS-2/2B/4, DEIMOS, Landsat-1/2/3/4/5, Landsat-7/8, Resourcesat-1/2, Terra, UK-DMC-2
Copernicus OAH [European Space Agency Copernicus Open Access Hub]	https://scihub.copernicus.eu/dhus/	Sentinel-1A, Sentinel-1B, Sentinel-2A, Sentinel-2B, Sentinel-3A
CRESDA LOSDS Platform [China Centre for Resources Satellite Data and Application (CRESDA) Land Observation Satellite Data Service Platform]	http://218.247.138.119:7777/DSSPlatform/	CBERS-01/02/2B, GaoFen-1/2/3, HJ-1A/1B/1C, SJ9A, SJ9B, ZY02C, ZY3, ZY302,
Deimos Imaging Catalogue [UretheCast Deimos Imaging Catalogue]	www.deimos-imaging.com/catalogue	Deimos-1, Deimos-2
DigitalGlobe Geoportal [DigitalGlobe Geoportal]	https://discover.digitalglobe.com/	GeoEye-1, Quickbird-2, Worldview-1/2/3/4
DMCii Online Catalogue [Disaster Monitoring Constellation 2 Online Catalogue]	http://catalogue.dmcii.com/	Deimos-1, UK-DMC-2, NigeriaSat-2, NigeriaSat-NX, UK-DMC-2, NigeriaSat-1, Bilsat-1, Alsat-1, Beijing-1
Earth-i DMC3 Portal [Earth-i Disaster Monitoring Constellation 3 Portal]	www.earthi.world/portal	DMC-3A/3B/3C (Triplesat)
EarthImages [Geocento Global Earth Imaging]	https://earthimages.geocento.com	SLOS-2, Beijing-1, CosmoSkyMed-1/2/3/4, Deimos-1/2, DubaiSat-1/2, Envisat, Eros-A/B, ERS-1/2, Formosat-2, GaoFen-1/2, GeoEye-1, Ikonos-2, KompSat-2/3/3A/5, Landsat-4/5, Landsat-7/8, PAZ, Pléiades-1A/1B, QuickBird-2, RADARSAT-1/2, RapidEye-1/2/3/4/5, Sentinel-1A/1B, Sentinel-2A/2B, SPOT-1/2/3/4/5/6/7, Superview-1-01/02/03/04, TanDEM-X, TeLEOS-1, TerraSAR-X, TripleSat-1/2/3, UK-DMC, UK-DMC-2, Worldview-1/2/3/4
EOWEB Geoportal [German Aerospace Center (DLR) Earth Observation Portal]	https://geoservice.dlr.de/egp/	Cartosat-1 (IRS-P5), IRS-1C/1D, MODIS, Rapideye Science Archive, Resourcesat-1 (IRS-P6), Resourcesat-2, TanDEM-X, TerraSAR-X, SRTM
ESA Earth Online [European Space Agency Earth Online]	https://earth.esa.int	ALOS, COSMO-SkyMed-1/2/3/4, CartoSat-1, DMC, Deimos-1/2, ENVISAT, ERS, GeoEye-1, IKONOS-2, IRS-1C/1D, JERS-1, KOMPSAT-1/2, Landsat-5/7/8, PROBA-1, Pléiades-1A/1B, PROBA-V, QuickBird, RADARSAT-1/2, RapidEye-1/2/3/4/5, Resourcesat-1 (IRS-P6), Resourcesat-2, SPOT-1/2/3/4/5/6/7, TerraSAR-X, Worldview-1/2/3

Abbreviated Title of EO Browser/Portal [Full Title of EO Browser/Portal]	**EO Browser/Portal Weblink**	**EO Datasets Available:**
ESA ODC* [European Space Agency Online Dissemination Catalogue] * Formerly EOLi-sa [ESA Earth Observation Link]	https://esar-ds.eo.esa.int/oads/access/	COSMO-SkyMed-1/2/3/4. Deimos-1, GeoEye-1, CartoSat-1 (IRS-P5), IRS-1C/1D, KOMPSAT-2, KOMPSAT-3, KOMPSAT-5, PROBA-V, Resourcesat-1 (IRS-P6), RADARSAT-2, RapidEye-1/2/3/4/5, Resourcesat-2, RISAT-1A, SPOT-1/2/3/4/5, TerraSAR-X, Worldview-1/2/3
ESA TPM Portal [European Space Agency Third Party Mission Geoportal]	https://tpm-ds.eo.esa.int/oads/access/	Extensive catalogue - too many to list
ERS Open Data Portal [Russian Federal Space Agency]	https://pod.gptl.ru/	Meteor-M2, Resurs-P1/P2/P3
EUspaceimaging [European Space Imaging]	http://iohs.euspaceimaging.com/smartsearch#user	GeoEye-1, Quickbird-2, IKONOS, Worldview-1/2/3/4
ImageHunter Portal [Apollo Mapping]	https://imagehunter.apollomapping.com/	GeoEye-1, IKONOS, QuickBird-2, Worldview-1/2/3/4, GaoFen-1/2, Superview-1, ZiYuan-3, Deimos-1/2, Formosat-2, Pléiades-1A/1B, SPOT-1/2/3/4/5/6/7, TripleSat, ALOS, EROS-B, PlanetScope, RapidEye-1/2/3/4/5, SkySat, KOMPSAT-2/3/3A, TeLEOS-1, Landsat-1/2/3/4/5, Landsat-7/8
ImageSat Catalogue [iSi ImageSat Catalogue]	https://www.imagesatintl.com/catalogue/	EROS-B
INPE Image Catalogue [Instituto Nacional de Pesquisas Espaciais]	http://www.dgi.inpe.br/CDSR/	CBERS-2/2B/4, Resourcessat-1/2, AQUA, TERRA, S-NPP, UK-DMC-2, Landsat-1/2/3/4/5, Landsat-6/7
IRSO NRSC [Indian Space Research Organisation National Remote-Sensing Center]	https://www.nrsc.gov.in/	Cartosat-1/2/2A/2B, IRS-1A/1B/1C/1D, Landsat-5/7/8, MODIS, Resourcesat-1/2/2A, RISAT-1
JAXA G-Portal [Japanese Aerospace Exploration Agency Globe Portal System]	https://gportal.jaxa.jp/gpr/	ALOS, ALOS-2 (coming soon), JERS-1
KazEOSat Portal [Kazakhstan Earth Observation Portal]	http://cof.gharysh.kz/COFWelcome/	KazEOSat-1/2
LANDinfo [Satellite Imagery Search Portal]	http://search.landinfo.com/	GeoEye-1, IKONOS, KOMPSAT-2, KOMPSAT-3, KOMPSAT-3A, Pléiades-1A/1B, QuickBird-2, SkySat, TripleSat, Worldview-1/2/3/4
MDA RADARSAT-2 Portal [Maxar Technologies (formerly MDA Corp.) RADARSAT-2 Catalogue]	https://gsiportal.mdacorporation.com/	RADARSAT-2
NASA EarthData [National Aeronautics and Space Administration Earth Science Data]	https://search.earthdata.nasa.gov/	Extensive catalogue - too many to list
NASA OCW [National Aeronautics and Space Administration Ocean Color Web]	https://oceancolor.gsfc.nasa.gov	HICO
Planet Explorer [Planet Labs Imagery and Archive]	https://www.planet.com/products/planet-imagery/	PlanetScope, RapidEye-1/2/3/4/5, SkySat

Abbreviated Title of EO Browser/Portal [Full Title of EO Browser/Portal]	**EO Browser/Portal Weblink**	**EO Datasets Available:**
PRISMA Portal [Agenzia Spaziale Italiana PRISMA Portal]	http://www.prisma-i.it	PRISMA
Roscosmos Geoportal [Roscosmos Geoportal Satellite Images Service]	https://gptl.ru	Meteor-M2, Kanopus-V1, Kanopus-V-IK1, Resurs-DK, Resurs-P1/P2/P3
RSS EO Portal [Russian Space Systems - Scientific Center for Operational Earth Monitoring]	http://bbp.ntsomz.ru/catalog/	Resurs-P1/P2/P3, Landsat-5, Kanopus-V1/V3/V4, Kanopus-V-IK, Meteor-M1/M2
TerraSAR-X Archive [Airbus Defence & Space]	https://terrasar-x-archive.terrasar.com/	TerraSAR-X
USGS EarthExplorer (United States Geological Survey Earth Explorer Platform)	https://earthexplorer.usgs.gov/	Extensive catalogue - too many to list
USGS GloVis (United States Geological Survey Global Visualization Viewer)	https://glovis.usgs.gov/	Extensive catalogue - too many to list
VITO Portal [belspo/ESA Vision on Technology Portal]	https://www.vito-eodata.be	PROBA-V, Sentinel-1A/1B, Sentinel-2A/2B, ENVISAT

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Source:	Weblink:	EO Datasets:
ALOS PLATFORM	http://en.alos-pasco.com/new/2017/02.html	ALOS, ALOS-2
Apollo Mapping	https://apollomapping.com/image_downloads/Apollo_Mapping_Imagery_Price_List.pdf	ALOS, Eros-A/B, QuickBird, Ikonos, Pléiades-1A/1B, Worldview-1/2/3/4, SPOT-1/2/3/4/5/6/7, Formosat-2, RaipidEye-1/2/3/4/5, Deimos-1, GaoFen-1, ZiYuan-3, PlanetScope
DMC International Imaging	http://www.dmcii.com/?page_id=8609	Deimos-1, UK-DMC-2, NigeriaSat-2, NigeriaSat-NX, UK-DMC-2, NigeriaSat-1, Bilsat-1, Alsat-1, Beijing-1
ASI e-geos	https://www.e-geos.it/#/satellite-hub/general/satellite-detail/csk	ALOS, ALOS-2, Cosmo-SkyMed, Deimos-1/2, GeoEye-1, Ikonos, QuickBird, IRS-P5, IRS-P6, IRS-1C/1D, KompSAT-2/3/3A/5, RapidEye-1/2/3/4/5, RADARSAT-1/2, Worldview-1/2/3/4
Harris Geospatial Solutions	https://www.harrisgeospatial.com/Data-Imagery	GeoEye, QuickBird, Ikonos, KompSat-2/3, Pléiades-1A/1B, SPOT-6/7, RapidEye-1/2/3/4/5, TerraSAR-X
LANDinfo	https://www.landinfo.com/LAND_INFO_Satellite_Imagery_Pricing.pdf	Ikonos, GeoEye-1, QuickBird, Pléiades-1A/1B, Worldview-1/2/3/4,
MDA Geospatial Services	https://mdacorporation.com/docs/default-source/product-spec-sheets/geospatial-services/radarsat-1-pricing-information.pdf?sfvrsn=12	RADARSAT-1
SCS Global Information	http://www.scsgi.com/images/satellites/	Deimos-1/2, KazEOSAT-1/2, TripleSat, IRIS (Onboard ISS), THEIA (Onboard ISS), RADARSAT-2, KOMPSAT-2/3/3A/5, TeLEOS-1, Resurs P1/P2/P3

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Title:	Published By:	Weblink:
Newcomers Earth Observation Guide	European Space Agency	https://business.esa.int/newcomers-earth-observation-guide
Fundamentals of Remote Sensing	Natural Resources Canada	https://www.nrcan.gc.ca/node/9309
EO Training Courses (PDFs of Course Materials)	European Space Agency	https://earth.esa.int/web/guest/pi-community/training
Sentinel-1 SAR User Guide	European Space Agency	https://sentinel.esa.int/web/sentinel/user-guides/sentinel-1-sar
Sentinel-1 Toolbox - SAR Basics Tutorial	European Space Agency	http://step.esa.int/docs/tutorials/S1TBX%20SAR%20Basics%20Tutorial.pdf
Sentinel-2 MSI User Guide	European Space Agency	https://sentinel.esa.int/web/sentinel/user-guides/sentinel-2-msi
Sentinel-2 User Handbook	European Space Agency	https://sentinels.copernicus.eu/documents/247904/685211/Sentinel-2_User_Handbook
Sentinel-2 Toolbox Tutorials	European Space Agency	https://step.esa.int/main/doc/tutorials/sentinel-2-toolbox-tutorials/
Sentinel Application Platform Video Tutorials	European Space Agency	http://step.esa.int/main/doc/tutorials/
Synthetic Aperture Radar User Guide	European Space Agency	https://earth.esa.int/handbooks/asar/toc.html
RADAR and SAR Glossary	European Space Agency	https://earth.esa.int/handbooks/asar/CNTR5-2.html
Getting Started (SAR)	Alaska Satellite Facility	https://www.asf.alaska.edu/get-data/get-started/
SAR Tutorials	Alaska Satellite Facility	https://www.asf.alaska.edu/asf-tutorials/tutorial-overview/#

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