



# SENSORVIEW

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A Look at the Advanced Tech Bringing You the  
Clearest Imagery

# OVERVIEW

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Since the launch of the first Very High Resolution commercial satellite, European Space Imaging has been providing the best possible spatial resolution to the European market. From our inception in 2002, we have established and maintained strong relationships with the industries premium satellite imagery leaders and this has allowed us to ensure that we stay at the forefront of the geospatial industry.

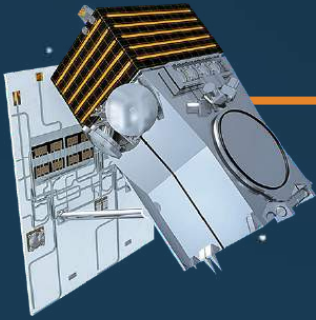
Through our long-standing partnership with Maxar Technologies, we have direct access to the WorldView constellation, the World's best satellites in terms of spatial resolution. From our ground station at the German Aerospace Center (DLR) our expert operations staff directly access the satellites as they pass over Europe and North Africa. Utilising optimised and flexible collection planning, we can confidently guarantee the best possible image in terms of clarity, and always with 15% cloud cover or less. The WorldView constellation collects over 3 million square kilometres of data per day and can cover approximately 60% of the Earth's surface monthly with intraday revisits.



Expanding our satellite portfolio to extend beyond just that of Very High Resolution, we entered into a partnership with Satellogic in 2020 and have access to their entire satellite portfolio, including their Aleph-1 constellation, delivering up to 0.7 m and beyond spatial resolution satellite imagery in both multispectral and hyperspectral. The Aleph-1 constellation can collect more than 4 million square kilometres per day and has a revisit rate of up to 4 times per day.

Through these innovative partnerships, European Space Imaging now has access to 25 orbiting satellites at resolutions of 30 cm – 1 m and with a combined daily revisit of close to 10 times per day. In addition, we have access to an extensive imagery archive incorporating billions of square kilometres of dating from all over the world dating back as far as 2000.

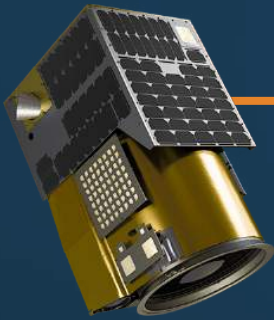
# SATELLITES



## WORLDVIEW LEGION

MAXAR TECHNOLOGIES | 2021 | 6 SATELLITES PLANNED

- 29 cm Resolution\*
- 8 Multispectral Bands
- < 5.0 m CE90



## ALEPH-1

SATELLOGIC | 2020 | 14 SATELLITES ACTIVE | 300 PLANNED

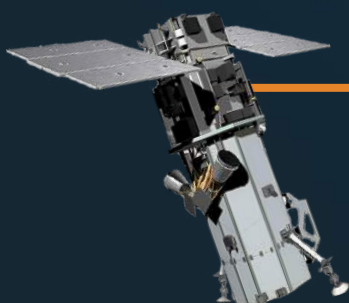
- 70 cm Resolution\*
- 4 Multispectral / 29 Hyperspectral Bands
- < 10.0 m CE90



## WORLDVIEW-3

MAXAR TECHNOLOGIES | 2014

- 31 cm Resolution
- 16 Multispectral Bands (Including 8 SWIR)
- < 3.5 m CE90

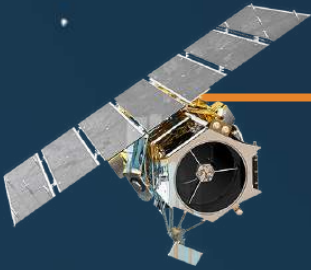


## WORLDVIEW-2

MAXAR TECHNOLOGIES | 2009

- 46 cm Resolution
- 8 Multispectral Bands
- < 3.5 m CE90

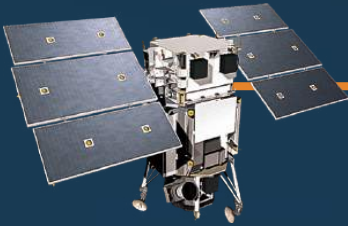
\* Best possible resolution from constellation



## GEOEYE-1

MAXAR TECHNOLOGIES | 2008

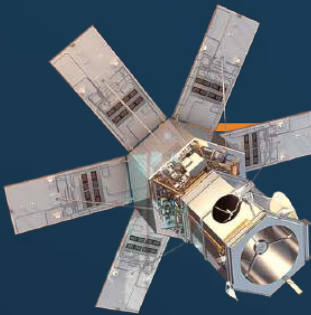
- 41 cm Resolution
- 4 Multispectral Bands
- < 3.0 m CE90



## WORLDVIEW-1

MAXAR TECHNOLOGIES | 2007

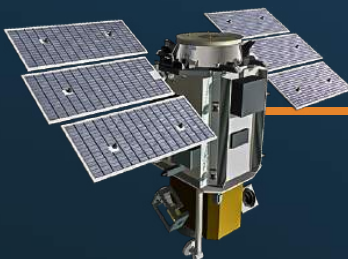
- 50 cm Resolution
- Panchromatic
- < 4.0 m CE90



## WORLDVIEW-4 (DECOMMISSIONED)

MAXAR TECHNOLOGIES | 2016

- 31 cm Resolution
- 4 Multispectral Bands
- < 4.0 m CE90



## QUICKBIRD (DECOMMISSIONED)

MAXAR TECHNOLOGIES | 2001

- 61 cm Resolution
- 4 Multispectral Bands
- < 23.0 m CE90



## IKONOS (DECOMMISSIONED)

MAXAR TECHNOLOGIES | 1999

- 82 cm Resolution
- 4 Multispectral Bands
- < 9 m CE90



# WORLDVIEW LEGION

WorldView Legion is the next generation of VHR optical satellites from European Space Imaging partner, Maxar Technologies. Planned to begin launching in 2021, the WorldView Legion constellation will contain six high-performance satellites that deliver continuity for existing customer missions and dramatically expand revisit over high-interest areas to better inform critical, time-sensitive decisions.



## COLLECTION CAPACITY

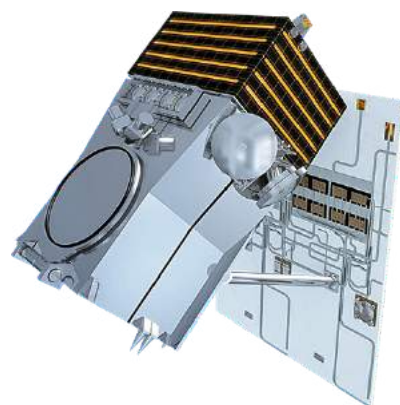
Ability to image 5 million km<sup>2</sup> per day with multiple daily revisits



## ACCURACY

Predicted <5 m CE90 without ground control point

Orbit	<ul style="list-style-type: none"><li>Altitude: 450km</li><li>Type: Mid-inclination and sun-sync</li></ul>																
Life	10 years expected service life																
Swath Width	At Nadir: 9 km																
Sensor Bands	<p><b>Panochromatic</b> 450 - 800 nm</p> <p><b>8 Multispectral</b></p> <table><tr><td>Coastal</td><td>400 - 450 nm</td><td>Red:</td><td>630 - 690 nm</td></tr><tr><td>Blue:</td><td>450 - 510 nm</td><td>Red Ed.-1:</td><td>695 - 715 nm</td></tr><tr><td>Green:</td><td>510 - 580 nm</td><td>Red Ed.-2:</td><td>730 - 750 nm</td></tr><tr><td>Yellow:</td><td>585 - 625 nm</td><td>Near IR:</td><td>770 - 895 nm</td></tr></table>	Coastal	400 - 450 nm	Red:	630 - 690 nm	Blue:	450 - 510 nm	Red Ed.-1:	695 - 715 nm	Green:	510 - 580 nm	Red Ed.-2:	730 - 750 nm	Yellow:	585 - 625 nm	Near IR:	770 - 895 nm
Coastal	400 - 450 nm	Red:	630 - 690 nm														
Blue:	450 - 510 nm	Red Ed.-1:	695 - 715 nm														
Green:	510 - 580 nm	Red Ed.-2:	730 - 750 nm														
Yellow:	585 - 625 nm	Near IR:	770 - 895 nm														
Resolution	<table><tr><td><b>Panochromatic</b></td><td><b>4 Multispectral</b></td></tr><tr><td colspan="2"><u>Off Nadir Angle (ONA)</u></td></tr><tr><td>0° ONA:</td><td>0.29* m</td><td>0° ONA:</td><td>.48 m</td></tr></table> <p>* Best possible resolution from constellation</p>	<b>Panochromatic</b>	<b>4 Multispectral</b>	<u>Off Nadir Angle (ONA)</u>		0° ONA:	0.29* m	0° ONA:	.48 m								
<b>Panochromatic</b>	<b>4 Multispectral</b>																
<u>Off Nadir Angle (ONA)</u>																	
0° ONA:	0.29* m	0° ONA:	.48 m														



# ALEPH-1

The Aleph-1 constellation from Satellogic offers European Space Imaging customers the “sweet spot” of collecting data with enough clarity to extract meaningful insights at a revisit frequency and cost that is competitive within the industry. The total constellation of 300 planned satellites delivers sub-meter multispectral and 25 m hyperspectral imagery with a goal to image the entire Earth on a daily basis.



## COLLECTION CAPACITY

Ability to image 4 million km<sup>2</sup> per day with multiple daily revisits

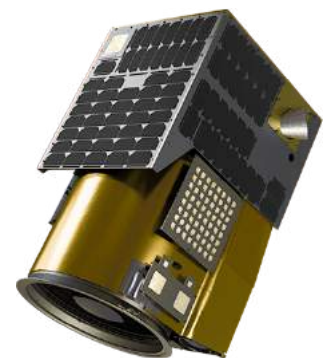


## ACCURACY

Predicted <10 m CE90 Multispectral / 150 m CE90 Hyperspectral

Orbit	<ul style="list-style-type: none"><li>Altitude: 470km</li><li>Type: SunSync</li></ul>	
Life	3 years expected service life	
Swath Width	5 km Multispectral / 125 km Hyperspectral	
Sensor Bands	<b>4 Multispectral</b> Red: 590 - 690 nm Green: 510 - 580 nm Blue: 450 - 510 nm Near IR: 750 - 900 nm	<b>29 Hyperspectral</b> 462-830 nm 14 to 35 nm FWHM depending on the wavelength
Resolution	<b>Multispectral</b> <u>Off Nadir Angle (ONA)</u> 0° ONA: 0.70* m	<b>Hyperspectral</b> 0° ONA: 25 m

\* Best possible resolution from constellation



# WORLDVIEW-3

Launched in 2014, WorldView-3 set a new standard as the industry's first multi-payload, super-spectral, high resolution commercial satellite delivering imagery at 31 cm resolution. With 29 spectral sensors on board, the data from WorldView-3 allows you to differentiate between objects with far greater accuracy than ever before.



## COLLECTION CAPACITY

Ability to image 680,000 km<sup>2</sup> per day with a <1 day revisit rate



## ACCURACY

Predicted <3.5 m CE90 without ground control



## CONTIGUOUS AREA COLLECTED

Mono: 66.5 km x 112 km (5 strips)  
Stereo: 26.6 km x 112km (2 pairs)

Orbit	<ul style="list-style-type: none"><li>Altitude: 617 km</li><li>Type: SunSync, 10:30 am descending node</li><li>Period: 97 minutes</li></ul>	
Dynamic Range	11-bits per pixel PAN and MS; 14-bits per pixel SWIR	
Swath Width	At Nadir: 13.1 km	
Sensor Bands	<b>Panochromatic</b> 450 - 800 nm	
	<b>8 Multispectral</b>	
	Coastal 400 - 450 nm      Red: 630-690 nm	
	Blue: 450 - 510 nm      Red Edge: 705-745 nm	
Resolution	Green: 510 - 580 nm      Near IR1: 770-895nm	
	Yellow: 585 - 625 nm      Near IR2: 860-1040 nm	
	<b>8 SWIR Bands</b>	
	SWIR-1: 1195 - 1225 nm      SWIR-5: 2145 - 2185 nm	
	SWIR-2: 1550 - 1590 nm      SWIR-6: 2185 - 2225 nm	
	SWIR-3: 1640-1680nm      SWIR-7: 2235-2285nm	
	SWIR-4: 1710 - 1750 nm      SWIR-8: 2295-2365nm	
	<b>Panochromatic</b>	<b>Multispectral</b>
0° ONA*: 0.31 m	0° ONA: 1.24 m	
20° ONA: 0.34 m	20° ONA: 1.38 m	
SWIR		
	0° ONA: 3.70 m	
	20° ONA: 4.10 m	
	* Off Nadir Angle (ONA)	



# WORLDVIEW-2

Launched in October 2009, WorldView-2 is the first Very High Resolution 8-band multispectral commercial satellite. Operating at an altitude of 770 km, WorldView-2 incorporates industry-leading geolocation accuracy and is able to geolocate to less than 5 m to create maps in remote areas, thereby maximizing the utility of available resources. Multispectral resolution imagery is acquired by use of bi-directional scanning and rapid retargeting using Control Moment Gyros - more than two times faster than any competitor.



## COLLECTION CAPACITY

Ability to image 1 million km<sup>2</sup> daily with a 1.1 day revisit rate



## ACCURACY

Predicted <3.5 m CE90 without ground control



## CONTIGUOUS AREA COLLECTED

Mono: 138 km x 112 km (8 strips)  
Stereo: 63 km x 112km (4 pairs)

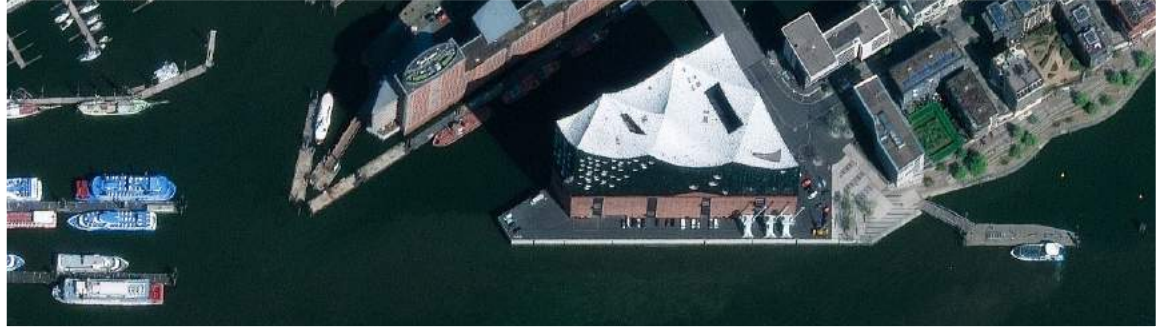
Orbit	<ul style="list-style-type: none"><li>Altitude: 770 km</li><li>Type: SunSync, 10:30 am descending node</li><li>Period: 100 minutes</li></ul>
Dynamic Range	11-bits per pixel
Swath Width	At Nadir: 16.4 km
Sensor Bands	<div><div>Panochromatic</div><div>450 - 800 nm</div></div> <div><div>8 Multispectral</div><div><div>Coastal: 400 - 450 nm</div><div>Blue: 450 - 510 nm</div><div>Green: 510 - 580 nm</div><div>Yellow: 585 - 625 nm</div><div>Red: 630 - 690 nm</div><div>Red Edge: 705 - 745 nm</div><div>NearIR1: 770 - 895 nm</div><div>NearIR2: 860-1040nm</div></div></div>
Resolution	<div><div><div>Panochromatic</div><div>Multispectral</div></div><div><div>Off Nadir Angle (ONA)</div><div><div>0 ° ONA: 0.46 m</div><div>20 ° ONA: 0.52 m</div></div><div><div>0 ° ONA: 1.85 m</div><div>20 ° ONA: 2.07 m</div></div></div></div>





# GEOEYE-1

Launched in 2008, the GeoEye-1 satellite is equipped with some of the most advanced technology ever used in a commercial remote sensing system. Operating at an altitude of 681 km, GeoEye-1 provides 41 cm panchromatic resolution and 1.65 m multispectral resolution. Utilising GeoEye-1, European Space Imaging currently offers customers stereoscopic collection on a single pass (synoptic) collection ensuring continuity and consistency of image quality.



## COLLECTION CAPACITY

Ability to image 350,000 km<sup>2</sup> daily with a 2.6 day revisit rate



## ACCURACY

< 5 m CE90, 3 m CE90 (measured)



## CONTIGUOUS AREA COLLECTED

Mono: 45 km x 112 km (3 strips)  
Stereo: 15 km x 112km (1 pair)

Orbit	<ul style="list-style-type: none"><li>Altitude: 681 km</li><li>Type: SunSync, 10:30 am descending node</li><li>Period: 98 minutes</li></ul>						
Dynamic Range	11-bits per pixel						
Swath Width	At Nadir: 15.3 km						
Sensor Bands	<b>Panochromatic</b> 450 - 800 nm  <b>4 Multispectral</b> Blue: 450 - 510 nm Green: 510 - 580 nm Red: 655 - 690 nm Near IR: 780 - 920 nm						
Resolution	<table><thead><tr><th>Panochromatic</th><th>Multispectral</th></tr></thead><tbody><tr><td>Off Nadir Angle (ONA)</td><td></td></tr><tr><td>0° ONA:</td><td>0.41 m      0° ONA: 1.65 m</td></tr></tbody></table>	Panochromatic	Multispectral	Off Nadir Angle (ONA)		0° ONA:	0.41 m      0° ONA: 1.65 m
Panochromatic	Multispectral						
Off Nadir Angle (ONA)							
0° ONA:	0.41 m      0° ONA: 1.65 m						



# WORLDVIEW-1

WorldView-1, launched in September 2007, is the first of our next-generation satellites - the most agile satellites ever flown commercially. The high-capacity, panchromatic imaging system features half-meter resolution imagery. Operating at an altitude of 496 km, WorldView-1 has an average revisit time of 1.7 days. The satellite is also equipped with state of the art geolocation accuracy capabilities and exhibits stunning agility with rapid targeting and efficient in-track stereo collection.



## COLLECTION CAPACITY

Ability to image 1.3 million km<sup>2</sup> daily with 1.7 day revisit rate



## ACCURACY

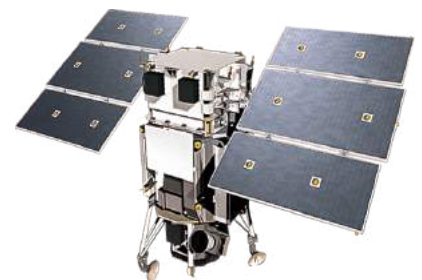
Predicted <4 m CE90 without ground control



## CONTIGUOUS AREA COLLECTED

Mono: 111 km x 112 km (6 strips)  
Stereo: 51 km x 112km (3 pairs)

Orbit	<ul style="list-style-type: none"><li>Altitude: 496 km</li><li>Type: SunSync, 10:30 am descending node</li><li>Period: 95 minutes</li></ul>
Dynamic Range	11-bits per pixel
Swath Width	At Nadir: 17.7 km
Sensor Bands	<b>Panochromatic</b> 400 - 900 nm
Resolution	<b>Panochromatic</b> <u>Off Nadir Angle (ONA)</u> 0° ONA: 0.50 m 20° ONA: 0.55 m



# WORLDVIEW-4

WorldView-4 was launched in 2016 and was decommissioned in 2019. It operated at an altitude of 617 km and provided 31 cm panchromatic resolution and 1.24 m multispectral resolution. Although the satellite spent only a short amount of time in space, it collected millions of square kilometres of data that is accessible through the archive for our customers. Additionally WorldView-4 data can also be found in Maxar's online subscription based platform, SecureWatch.



## Archive Contribution

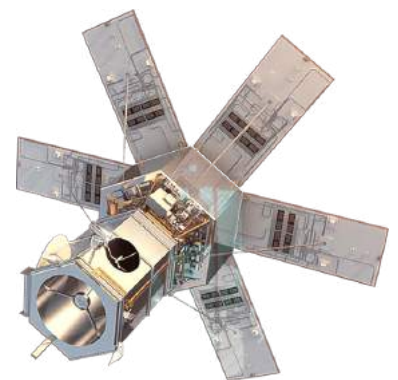
Captured over 165 million km<sup>2</sup>



## ACCURACY

Predicted <4 m CE90 without ground control

Orbit	<ul style="list-style-type: none"><li>Altitude: 617 km</li><li>Type: SunSync, 10:30 am descending node</li><li>Period: 97 minutes</li></ul>																								
Dynamic Range	11-bits per pixel																								
Swath Width	At Nadir: 13.1 km																								
Sensor Bands	<p><b>Panochromatic</b> 450 - 800 nm</p> <p><b>4 Multispectral</b> Red: 655 - 690 nm Green: 510 - 580 nm Blue: 450 - 510 nm Near IR: 780 - 920 nm</p>																								
Resolution	<table><tr><th colspan="2">Panochromatic</th><th colspan="2">4 Multispectral</th></tr><tr><td colspan="4"><u>Off Nadir Angle (ONA)</u></td></tr><tr><td>0° ONA:</td><td>0.31 m</td><td>0° ONA:</td><td>1.24 m</td></tr><tr><td>20° ONA:</td><td>0.34 m</td><td>20° ONA:</td><td>1.38 m</td></tr><tr><td>56° ONA:</td><td>1.00 m</td><td>56° ONA:</td><td>4.00 m</td></tr><tr><td>60° ONA:</td><td>3.51 m</td><td>60° ONA:</td><td>14.00 m</td></tr></table>	Panochromatic		4 Multispectral		<u>Off Nadir Angle (ONA)</u>				0° ONA:	0.31 m	0° ONA:	1.24 m	20° ONA:	0.34 m	20° ONA:	1.38 m	56° ONA:	1.00 m	56° ONA:	4.00 m	60° ONA:	3.51 m	60° ONA:	14.00 m
Panochromatic		4 Multispectral																							
<u>Off Nadir Angle (ONA)</u>																									
0° ONA:	0.31 m	0° ONA:	1.24 m																						
20° ONA:	0.34 m	20° ONA:	1.38 m																						
56° ONA:	1.00 m	56° ONA:	4.00 m																						
60° ONA:	3.51 m	60° ONA:	14.00 m																						



# QUICKBIRD

The QuickBird satellite is no longer collecting imagery but continues to offer sub-meter resolution imagery with high geolocational accuracy through the imagery archive. With global collection of panchromatic and multispectral imagery, QuickBird imagery supports a wide range of geospatial applications.



## Archive Contribution

Captured over 649 million km<sup>2</sup>



## ACCURACY

<23 m CE90 without ground control

Orbit	<ul style="list-style-type: none"><li>Altitude: 482 km</li><li>Type: SunSync, 10:00 am descending node</li><li>Period: 94.2 minutes</li></ul>	
Dynamic Range	11-bits per pixel	
Swath Width	At Nadir: 18.0 km	
Sensor Bands	<b>Panochromatic</b> 405 - 1053 nm	
	<b>4 Multispectral</b> Blue: 430 - 545 nm Green: 466 - 620 nm Red: 590 - 710 nm Near IR: 715 - 918 nm	
Resolution	<b>Panochromatic</b>	<b>Multispectral</b>
	<u>Off Nadir Angle (ONA)</u> 0° ONA: 0.61 m	0° ONA: 2.44 m





# IKONOS

Launched on Sept. 24, 1999, the IKONOS satellite was a pioneering step in the new commercial Earth observation industry. It was the first commercial satellite to collect high-resolution images of the Earth. Over its lifetime, IKONOS took 597,802 public images, covering more than 154 million square miles (400 million square kilometers) — about three times the size of Earth's land surface area.



## Archive Contribution

Captured over 405 million km<sup>2</sup>



## ACCURACY

<9 m CE90 (measured)

Orbit	<ul style="list-style-type: none"><li>Altitude: 681 km</li><li>Type: SunSync, 10:30 am descending node</li></ul>	
Dynamic Range	11-bits per pixel	
Swath Width	At Nadir: 11.3 km	
Sensor Bands	<b>Panochromatic</b> 405 - 1053 nm	
	<b>4 Multispectral</b> Blue: 430 - 545 nm Green: 466 - 620 nm Red: 590 - 710 nm Near IR: 715 - 918 nm	
Resolution	<b>Panochromatic</b>	<b>Multispectral</b>
	<u>Aff Nadir Angle (ONA)</u> 0° ONA: 0.82 m	0° ONA: 3.2 m



# IMAGERY TYPES & PROCESSING METHODS

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## Atmospheric Compensation

Atmospheric compensation (ACOMP) is a fully automated framework that enables the extraction of information using physical quantities to improve the performance of multi-temporal data analysis. It has the ability to cut through haze and thereby improves image quality, clarity and usability.

## 15 cm HD

15 cm HD is achieved through a process that intelligently increases the number of pixels in a native 30 cm resolution image, resulting in an improved visual experience. Analysts and machines can then utilise 15 cm HD imagery to better extract features and meaningful information. Not limited to any certain resolution, HD technology can also be applied to native 40-60 cm imagery, rendering a 30 cm HD image and thus, increasing the availability of 30 cm resolution imagery across the historical archive.

## Standard Imagery

Standard Imagery products are suitable for users requiring modest absolute accuracy and/or large area coverage. These products are radiometrically corrected, sensor corrected, and projected to a plane using the map projection and datum of the users choice. The radiometric corrections applied to this product include: relative radiometric response between detectors, non-responsive detector fill, and a conversion for absolute radiometry. The sensor corrections account for internal detector geometry, optical distortion, scan distortion, any line-rate variations, and registration of the panchromatic and multispectral bands. Geometric corrections remove spacecraft orbit position and attitude uncertainty, Earth rotation and curvature, and panoramic distortion.

Standard Imagery comes in two varieties:

- **View Ready (2A) Imagery:** Standard Imagery has a coarse DEM applied to it, which is used to normalize for topographic relief with respect to the reference ellipsoid. The degree of normalization is relatively small, so while this product has terrain corrections, it is not considered orthorectified.
- **Ortho Ready Standard (OR2A) Imagery:** Ortho Ready Standard Imagery has no topographic relief applied with respect to the reference ellipsoid, making it suitable for orthorectification. Ortho Ready Standard Imagery is projected to a constant base elevation, which is calculated on the average terrain elevation per order polygon or can be supplied by the customer.

# IMAGERY TYPES & PROCESSING METHODS

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## Orthorectified Imagery

Orthorectified imagery is fully processed and ready to be integrated into your GIS workflow. Orthorectified images provide a perfect base for creating and revising mapping and GIS databases or for registering existing feature layers. It can be used for change detection and other analytical applications that require a high degree of absolute accuracy. It comes with all the geolocation information applied, including the refined ephemeris, attitude, rotation, terrain elevation, and alignment to the map projection. Multiple images can be mosaicked to minimize seamlines, and tonal balancing can be applied if desired.

It is available in two different accuracy specifications:

**Mapping:** No ground control points

**Precision:** With ground control points

## Basic Stereo Pair Imagery Products

Basic Stereo Pair Imagery products are suitable for customers with a high level of image expertise and who have software that is capable of ingesting, processing, and/or displaying stereo imagery. Basic Stereo Pair Imagery products are typically used to create Digital Elevation Models (DEMs) or for three-dimensional feature extraction.

Basic Stereo Pair Imagery products are comprised of one or more pairs of Basic Images with 100% overlap over the customer's Area of Interest (AOI). Stereo mates are collected on the same satellite orbit and with specific look angles in order to attain imagery appropriate for stereo viewing. Basic Stereo Imagery is available in Panchromatic, 4-band Multispectral, or Pan + 4-band Multispectral Products.

## Ortho Ready Stereo Imagery Products

Ortho Ready Standard Stereo Imagery products are suitable for customers with a high level of image expertise and software that is capable of ingesting, processing and/or displaying stereo imagery. They are typically used to create Digital Elevation Models (DEMs) or for three dimensional feature extraction. Customers ordering stereo products who require a small area of interest (AOI) should order the Ortho Ready Standard Stereo Product while customers requiring large area coverage should opt for the Basic Stereo Product.

Ortho Ready Stereo Imagery is map projected but has no topographic relief applied with respect to the reference ellipsoid, making it suitable for orthorectification. Ortho Ready Stereo Imagery is projected to a constant base elevation, which is calculated on the average terrain elevation per order polygon or can be supplied by the customer.

## About European Space Imaging

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Since the launch of the first commercial VHR satellite, we at European Space Imaging have committed ourselves to providing much more than the world's highest quality satellite imagery.

**We provide solutions.** Utilising our multi-mission ground station at the German Aerospace Center, the team of geospatial experts at European Space Imaging are able to bring together unique partnerships, innovative techniques and tailored services to achieve results for any project.

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