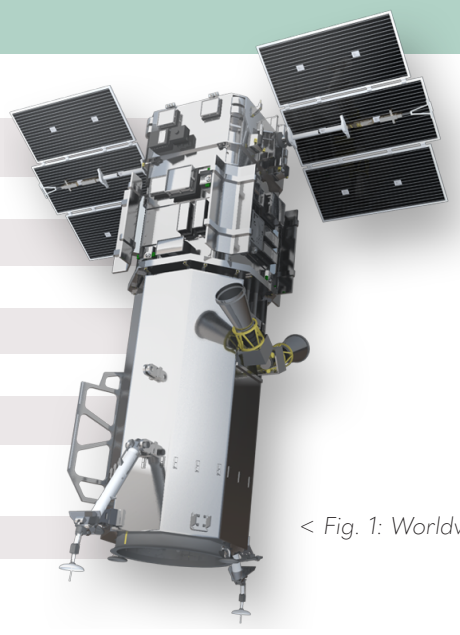
Worldview-3 / Worldview-4

Earth Observation for Urban Planning processes

Factsheet

	Worldview 3	Worldview 4
Resolution	0,31 m (panchromatic); 1,24 m (VNIR); 3,7 m (SWIR)	0,31 m (panchromatic); 1,23 m (multispectral)
Bands	1 panchromatic; 8 multispectral (VNIR) + 8 SWIR	1 panchromatic; 4 multispectral (VNIR)
Revisit	<1,0 days	<1,0 days
Orbit Altitude	617 km	617 km
Orbit Period	97 min	97 min
Swath	13,1 km	13,1 km
Launch	Aug 2014	Nov 2016 retired Dec 2019 after failure
Specials	additional CAVIS data with 30m resolution	



< *Fig. 1: Worldview-3*

Area covered per day: 680.000 km²
Available **20° off-nadir or less imagery** with less frequent revisit and resolution (<5 days)

Both sattelites launched by MAXAR (US). Imagery available as part of **Maxar Standard Satellite Imagery** products. Distribuition via **European Space Imaging (EUSI)** accessible over ESA archive.
[1], [2]

How is it used?

One of the applications of the WorldView-3 imagery is the **determination of the urban infrastructure and its change over time**, which is highly relevant in planning context.

For example, being able to **extract building footprints** is useful in the context of urban planning, environmental management as well as in disaster management [3].
Within the field of environmental monitoring, one can mention uses of WV-3 in forestry to determine tree health for example.

This wide range of applications also includes typical topics in spatial remote sensing such as **detection of changes in land use and land cover** [4]. In fact, the WV satellites are suitable for any application that needs a high resolution of panchromatic or multispectral images.

Why is it fit for the task?

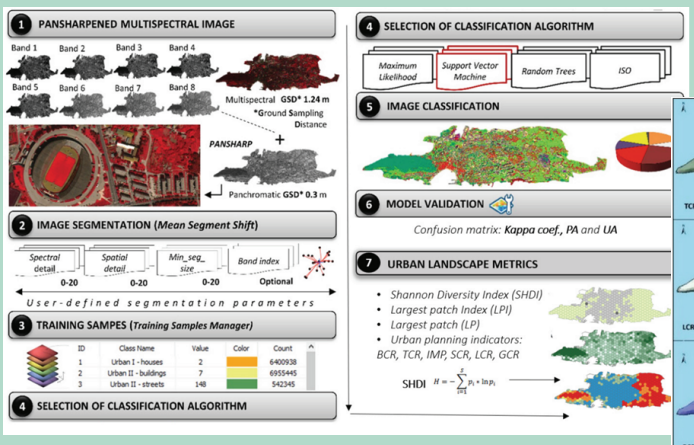
The **good resolution** (up to 0,31m) of the SpaceView-110 camera (WV110), which is present in both WorldView-3 and WorldView-4, allows a fine-scale monitoring of areas of interest. For instance, even small buildings and structures are detectable, which leads to important informations about land usage. Additionally, the **1-day revisit time** of WorldView-3 enables a good temporal resolution, to observe variations in imagery and thereby urban development within short periods of time.

The **multispectral wavebands** allow for a better recognition of materials based on their reflective properties which is considered an aid in land-coverage detection whilst analyzing the current state as part of urban planning [5]. In contrast to hyperspectral images, WV-3's multispectral imagery only provides a limited analysis, which can be a challenge, but at a lower price [6].

Which examples of usage are there?

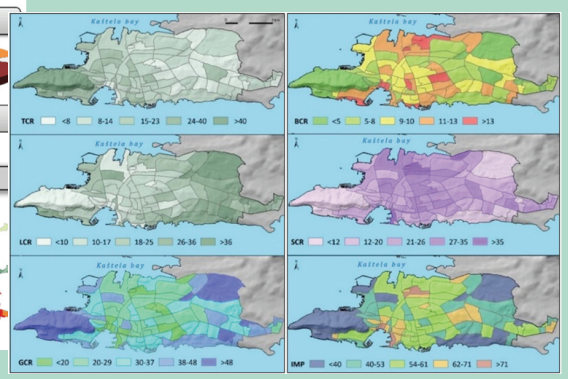
Derivation of Urban Planning Indicators (UPIs) using Worldview-3 Imagery and GEOBIA Method for Split Settlement, Croatia

Urban Planning Indicators are useful metrics for characterizing an urban environment, they provide information about the presence of vegetation and different man-made structures in a certain area. These metrics assist in the process of decision making when planning an urban landscape.
Imagery from WorldView-3 was used for creating a land cover model from which the UPI metrics were derived for the city of Split in Croatia, the accuracy of the derivated metrics depended on the high resolution and multispectral nature of the provided imagery [7].



^ *Fig. 2: Scheme of image processing using GEOBIA*

v Fig. 3: Derived UPIs for Split Settlement



^ *Fig. 4: Study area & detail*

Instance Segmentation for Governmental Inspection of Small Touristic Infrastructure in Beach Zones (e.g. Fortaleza, Brasil) Using Multispectral High-Resolution WorldView-3 Imagery

The monitoring of large public beach zones in Brazil for misuse poses a challenge for the authorities. Private establishments misappropriate public coastal areas for private profit from touristic and leisure activities such as beach clubs. The study made use of the multi spectral band, high resolution and periodic imagery of WorldView-3 for quick and periodic identification of straw beach umbrellas that are installed on beaches in a specified study area in order to determine the usage of public coastal areas by private operators. This reduces the need for manual inspection of unauthorized touristic infrastructure and allows for a more efficient and rapid sanctioning of illegal coastal land usage by tourism-related businesses [8].

References

[1] European Space Agency (2025): Worldview 3 [https://earth.esa.int/eogateway/missions/worldview-3; accessed on 17.09.2025]
[2] European Space Agency (2025): Worldview 4 [https://earth.esa.int/eogateway/missions/worldview-4; accessed on 17.09.2025]
[3] Li, Wija et. al. (2019): Semantic Segmentation-Based Building Footprint Extraction Using Very High-Resolution Satellite Images and Multi-Source GIS Data. Remote Sensing, 11(4), 403. https://doi.org/10.3390/rs11040403
[4] Ouchra, Hafsa et. al. (2022): A comprehensive study of using remote sensing and geographical information systems for urban planning. Internetworking Indonesia Journal 14(1), 15
[5] Lynch, Philip et. al. (2020). Classification of Urban Area Using Multispectral Indices for Urban Planning. Remote Sensing, 12(15), 2503. https://doi.org/10.3390/rs12152503
[6] eoPortal (2025): Satellite Missions Catalogue. Worldview-3 [https://www.eoportal.org/satellite-missions/worldview-3#eop-quick-facts-section; accessed on 17.09.2025]
[7] Milosevic, Rina et. al (2021): Derivation of Urban Planning Indicators (UPIs) using Worldview-3 Imagery and GEOBIA Method for Split Settlement, Croatia. Proceedings of the 7th International Conference on Geographical Information Systems Theory, Applications and Management GISTAM Vol. 1, p. 267-273
[8] de Carvalho, Osmar (2021): Instance Segmentation for Governmental Inspection of Small Touristic Infrastructure in Beach Zones Using Multispectral High-Resolution WorldView-3 Imagery. ISPRS International Journal of Geo-Information. 10(12), 813. https://doi.org/10.3390/ijgi10120813

Fig. 1: Worldview-3 (https://docs.mcube.terradue.com/missions/opt/worldview-3)
Fig. 2: Scheme of image processing using GEOBIA (https://www.scitepress.org/Link.aspx?doi=10.5220/0010465102670273)
Fig. 3: Derived UPIs for Split Settlement (https://www.scitepress.org/Link.aspx?doi=10.5220/0010465102670273)
Fig. 4: Study area & detail of Instance Segmentation in Brazil (https://www.mdpi.com/2220-9964/10/12/813)

VNIR = Visible and Near-Infrared
SWIR = Short-wave infrared
CAVIS = Clouds, Aerosols, Vapors, Ice, & Snow; monitoring of atmosphere & image correction data

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