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THE PAST AND THE FUTURE OF SMALLSAT CONSTELLATIONS - A SUCCESS STORY

Abstract

Planet is the leader in global Earth Observation with SmallSats today. Its constellation of SuperDove satellites provide a daily multi-spectral image of nearly the entire landmass of the Earth every day with 3-4m resolution, supported by the SkySat constellation, which can image selected areas of interest with multispectral sub-meter imagery for detailed analysis.

What started in a garage in California in 2010 is now the by far most advanced company in designing, building and operating large fleets of SmallSats for Earth Observation. In just 7 years the start-up's mission of "imaging the whole world every day, making change visible, accessible and actionable" became reality and is the core of Planet's commercial business today. Acquiring, downloading, translating to a cloud computing center in California, cataloging, processing and providing imagery of more than 200 satellites is a daily challenge. Nevertheless, Planet demonstrates the ability to provide application-ready satellite imagery in very short timeframes after acquisition. By using fast API and web-based tools the data can be made available to hundred thousand users worldwide, so that they are able to consider the information contained for their assessment and decision making.

However, the SmallSat technology has not reached their full potential. It is impressive to see that a 3U SmallSat like Planet DuperDove can produce spatially, temporally, and spectrally high-resolution imagery with 8 spectral bands, 6 of them being close to the Sentinel-2 band set. But it is even more impressive to see what the new generation of Planet satellites can offer. The next generation of SkySat satellites, Pelican, will perform better in terms of spatial resolution, time for tasking the satellite and receiving the imagery, the ability for sub-daily image acquisitions and other aspects.

The new constellation of SmallSats Tanager will expand Planets EO capabilities with a hyperspectral offering. Imagery with more than 400 very narrow spectral bands will help to see fine differences between object conditions on Earth, to identify and measure greenhouse gas emissions and to understand better, what has changed on the Earth surface in short timeframes.

We give a detailed overview about the success of the missions in the past and a detailed outlook into Planet's next SmallSat missions to become real in near future. Beside that we come with real projects that showed success how satellite data helps to mitigate the risk of natural disasters such as and even monitor water bodies all over the world and forestry.