SKYLIGHT
for Conservation

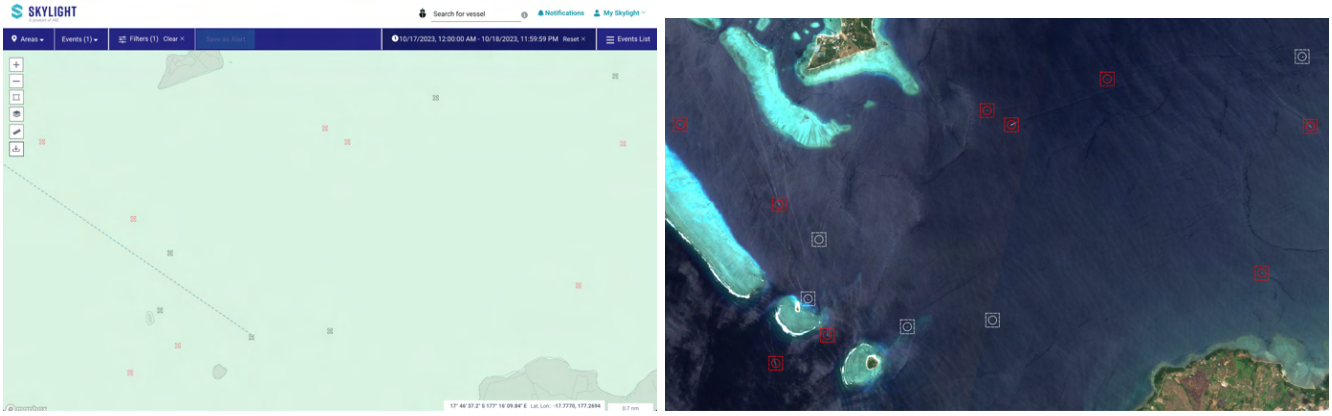
Skylight for Conservation Release Notes November 2023

Next generation insights for marine protection.

Summary

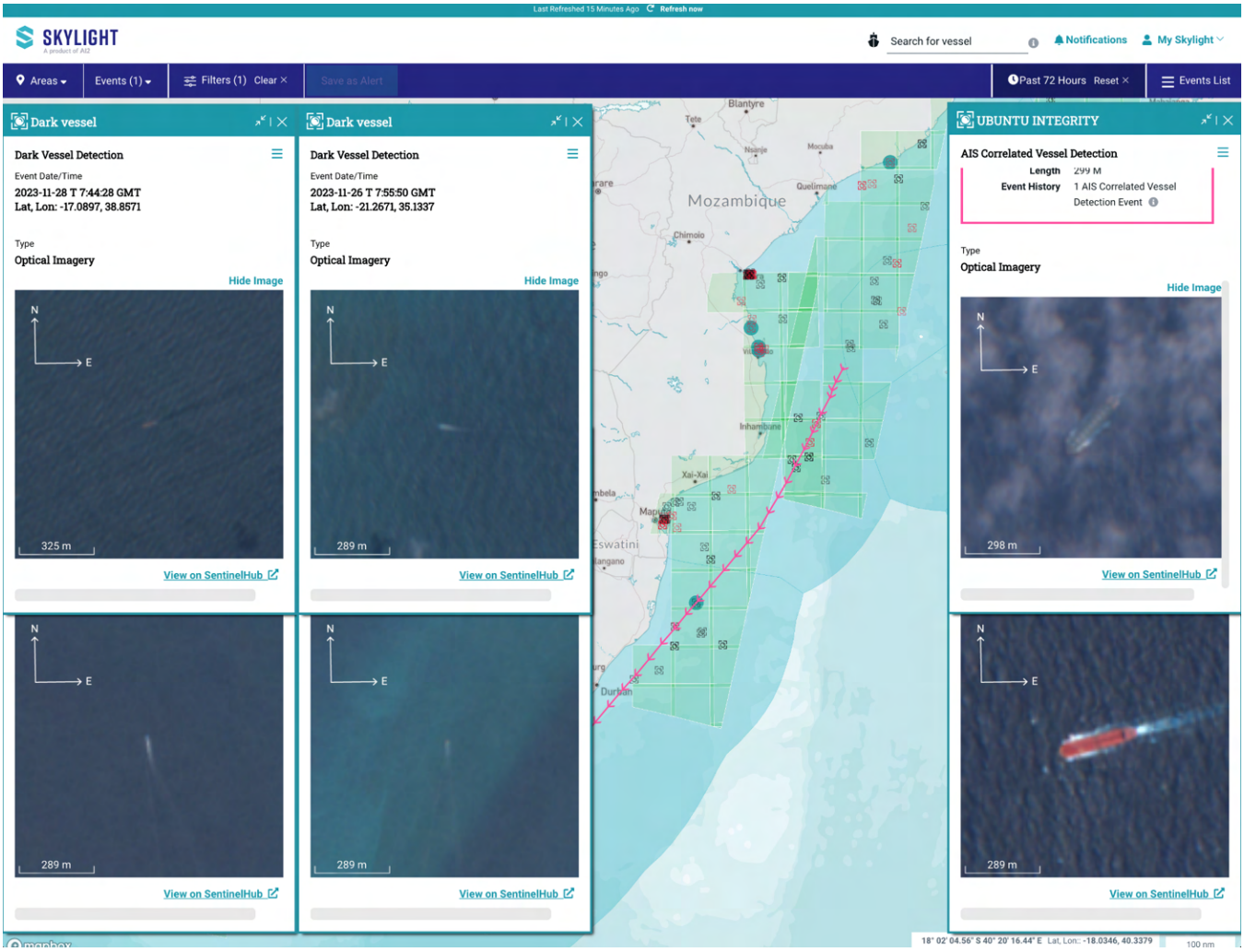
Sentinel-2 Vessel Detections

Skylight now provides vessel detections using imagery from the European Space Agency's Sentinel-2A and 2B electro-optical (EO) satellites. This provides immense value by detecting small vessels more frequently, with more detail, and across wider areas, including many not currently served by synthetic aperture radar (SAR) imagery from the Sentinel-1 satellite.



AIS-correlated and dark vessels located by computer vision in Sentinel-2 imagery.

Sentinel-2 takes images of many of the world's EEZ's every 5 days, before noon local time. These images are 10 meters per pixel. Optical imagery is limited by cloud cover and Skylight processes any image where the overall cloud cover is less than 30% to increase the chances of detecting vessels. Skylight's Sentinel-2 models can detect vessels that are quite small, particularly when a wake or bottom disturbance is visible.



Small, dark vessels are visible in Sentinel-2 imagery, along with details of larger vessels, even detected through light cloud cover.

The color, deck configuration, and certain activities like vessel-to-vessel encounters may be visible in Sentinel-2 imagery, particularly for larger vessels.

Vessel rendezvous observed in Sentinel-2 vessel detections.

While Skylight is committed to constant improvement of our machine learning models, we believe the current outputs are extremely valuable despite the occurrence of false positives. We are aware of, and actively working to omit, the occasional surfacing of wispy clouds, whitecaps, icebergs, and sun glint off the ocean surface. Examples of these occurrences are available in our knowledge base article on Sentinel-2.

Sentinel-2 vessel detections are shown by default, and can be specifically selected in the filters menu by browsing to “Vessel Detections” and selecting “Optical Imagery.” Sentinel-2 imagery appears as a patchwork grid pattern with minor overlaps due to the way the imagery is released by ESA.

We are thrilled to offer this unprecedented data source for maritime domain awareness to contribute to our collective effort to counter IUU fishing. For more information about Optical Imagery from Sentinel-2, please visit our knowledge base.

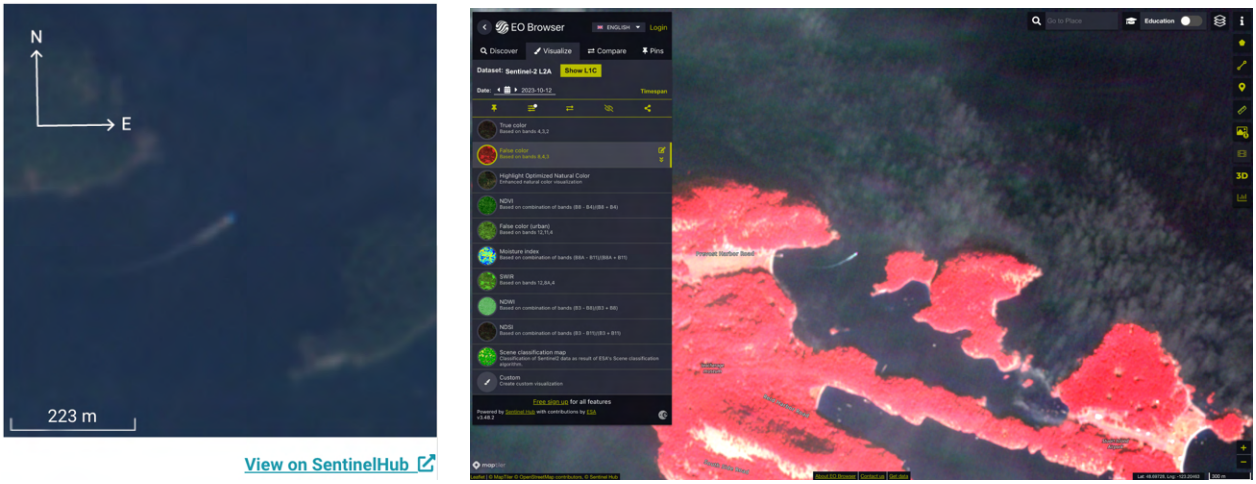
Global Coverage of Satellite Radar from Sentinel-1

Sentinel-1 IW-mode GRD images are now processed globally between 60 N latitude and 60 S latitude, meaning increased availability of vessel detections in places like North America and Europe.

SentinelHub Linking

To support users leveraging our Sentinel-1 satellite radar and Sentinel-2 optical imagery products, we have included hyperlinks to the SentinelHub platform from our vessel detection cards. When viewing a detection in Skylight, the event details card includes a link to SentinelHub to see the expanded image for additional context. SentinelHub provides options to adjust image visualization

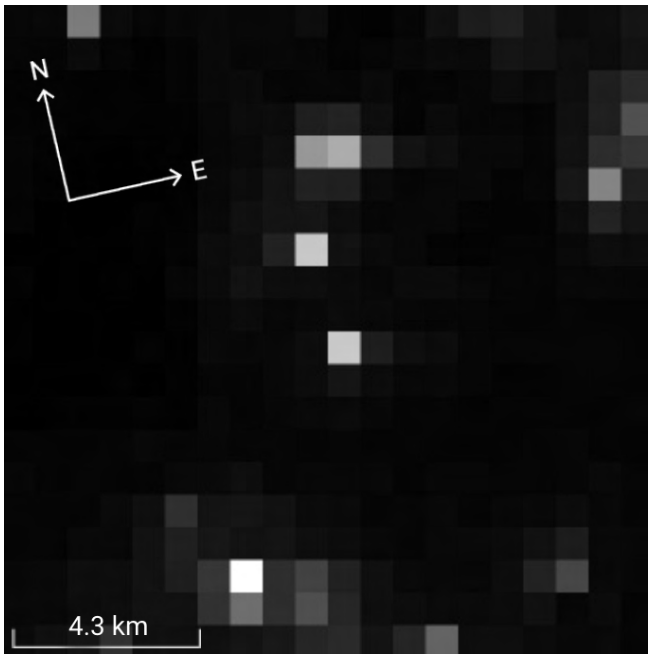
including infrared bands, pan and zoom, and geographic context, to assist our users in interpreting images. SentinelHub is an external product not built or maintained by AI2.



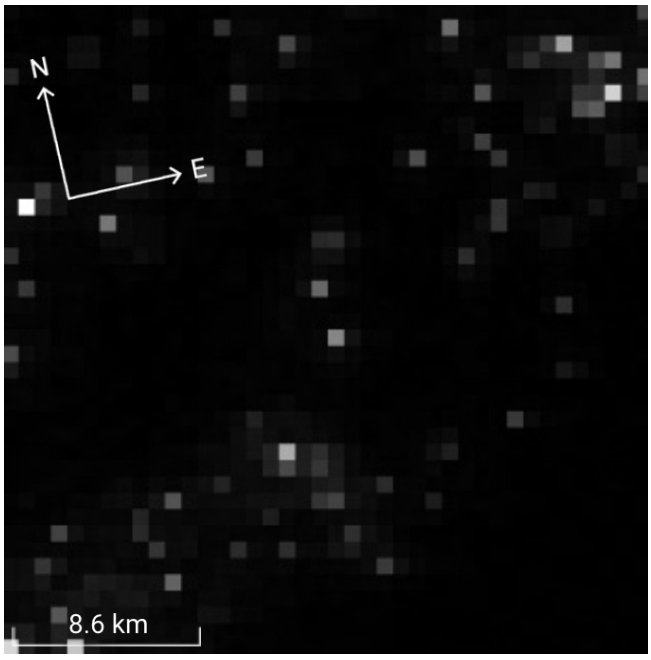
Clicking the SentinelHub link opens a more robust viewer in a new tab. The detected vessel will be centered in the new page, but not marked.

Night Lights Chip Update

Skylight has updated the extents of night lights image chips to provide additional context. While the detected light/object remains at the center of the frame, the additional context should make it easier for users to locate other nearby lights, including some objects we may have missed, and better identify false positives.



Old Night Lights image chip.



New Night Lights image chip of the same area and time. Smaller pixels, bigger insight.

Satlas Infrastructure Model

Skylight has incorporated new marine infrastructure detections to improve the accuracy of our computer vision models across SAR, optical imagery, and VIIRS. These by Satlas, a platform for from the geospatial AI team within PRIOR, AI2's computer vision team. PRIOR's highly accurate map of global marine infrastructure enable us to "geofence" or suppress potential false positives that would otherwise be associated with known infrastructure. The inclusion of these data will reduce false positives, and increase precision across all of our computer vision models including, SAR, optical imagery, and VIIRS (night lights), where fixed infrastructure, small islands, and low-tide exposures are occasionally detected as vessels in satellite imagery. For more information about Satlas, you can visit https://satlas.allen.ai/ and view the marine infrastructure detections here.