



SPOTLIGHT

Uncovering potential sanction violations
through maritime monitoring in Venezuela

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imagery and advanced analytics
can be applied to solve the
world's most complex challenges.



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MAXAR TOOLS PROVIDE ACTIONABLE INTELLIGENCE FOR PRESSING CHALLENGES

In 2017, the United States enacted a “maximum pressure” sanction campaign designed to financially isolate Venezuela, Venezuelan President Nicolás Maduro and his authoritarian regime, reports the Center for a New American Security. Prior to the sanctions on state-owned Petróleos de Venezuela SA (PDVSA) and others associated with the oil industry, Venezuela exported 1.3 million barrels of oil per day (bpd) and had a gross domestic product (GDP) of \$98.4 billion. In 2021, Venezuelan exports have fallen to 700,000 bpd, and the country’s GDP has plummeted to \$42.53 billion, according to CEIC data. The New Yorker notes this has left Maduro’s government strapped for cash and Venezuelan citizens facing shortages of food, medicine and other necessities.

Bypassing U.S. sanctions to export oil from Venezuela has been accomplished with international facilitators, including Cuba, Cyprus, Iran, the People’s Republic of China (PRC) and Russia. To avoid detection, vessels engage in “dark” activity, which The Center for International Maritime Security defines as turning off a ship’s Automatic Identification System (AIS) transponder, drifting, changes in Maritime Mobile Service Identity (MMSI) numbers, sailing

more slowly than 3 knots, course deviations and ship-to-ship rendezvous. ii Vessel detection and identification, route analysis and port monitoring have become essential to assess the extent of sanction violations. Maxar provides near real-time monitoring capabilities as well as in-depth analysis to help decision-makers prioritize and direct their resources most efficiently.

SUMMARY OF UNIQUE TOOLS & APPLICATIONS

Maxar’s Crow’s Nest Maritime Monitoring and Security (MMS) leverages AIS vessel data, synthetic aperture radar (SAR) imagery, electro-optical imagery, advanced machine learning, automation and low-latency alerting to deliver critical information quickly, saving lives, resources and time. The service provides broad-area surveillance, detection of vessels not transmitting via AIS and the ability to zoom in on vessels of interest for greater understanding of an individual vessel’s activity and identity. Crow’s Nest was used to identify and track oil tankers off the coast of Venezuela.

Vivid is Maxar’s suite of high-resolution, high-accuracy imagery basemap products, available off the shelf. From metro to global scale, Vivid offers solutions to meet a range of customer needs and budgets, providing a high-quality, visually consistent view of Earth.

Comprehensive analytic reports are in-depth, unclassified reports that contextualize diverse environments and recommend solutions to challenging issues. Each product delivers unique insight by harnessing the collective power of proprietary and open-source information, including high-resolution satellite imagery.



THE JOSÉ ANTONIO ANZOÁTEGUI PETROCHEMICAL COMPLEX AND PORT (SEEN IN THE INSET) ARE IN BARCELONA, ANZOÁTEGUI STATE, IN VENEZUELA.

VENEZUELA SKIRTS SANCTIONS WHILE FACILITATORS PROP UP AUTHORITARIAN REGIME

Crude oil, Venezuela's main export, accounted for approximately 95% of the country's export revenue as of August 2019, according to Reuters. There is strong incentive for Maduro to circumvent U.S. sanctions, and there are many willing facilitators—Russian facilitation is examined on pages 6-7 and Cypriot facilitation on pages 8-9.

Iran has assisted Venezuela in rebuilding its oil industry since 2020. In April 2020, Iran sent vital materials to restart refineries in exchange for gold, reports the United States Institute for Peace. Iran made several oil shipments to Venezuela in 2020, demonstrating an established and strengthening alliance, according to the Center for Strategic and International Studies. In February 2021, Iran and Venezuela exchanged jet fuel for gasoline, and, in June 2021, the United States issued a warning to Venezuela and Cuba against receiving Iranian warships believed to be carrying arms, according to Reuters.

The PRC and Venezuela are linked by shared ideologies as well as oil and loans. The PRC provided an estimated \$68.7 billion to Venezuela between 2000 and 2014, more than 90% of which was in the form of loans—and Venezuela has committed to repaying much of it with oil, according to Transparencia Venezuela. International observers and Venezuelan opposition members have described PRC loans as a “debt trap,” according to Foreign Policy. In 2020, amid U.S. sanctions, Bloomberg reported that the PRC was the main destination for Venezuelan oil: At least 11.3 million barrels of Venezuelan oil were shipped to the PRC in 2020. However, a new Chinese environmental tax on oil imports has called the future of the Venezuela-PRC oil relationship into question, according to CNN.

Cuba has relied on Venezuelan oil through its own decadeslong sanctions, in what U.S. News & World Report described as an oil-for-services trade; Cuba receives billions of dollars of crude, and Venezuela receives doctors, teachers



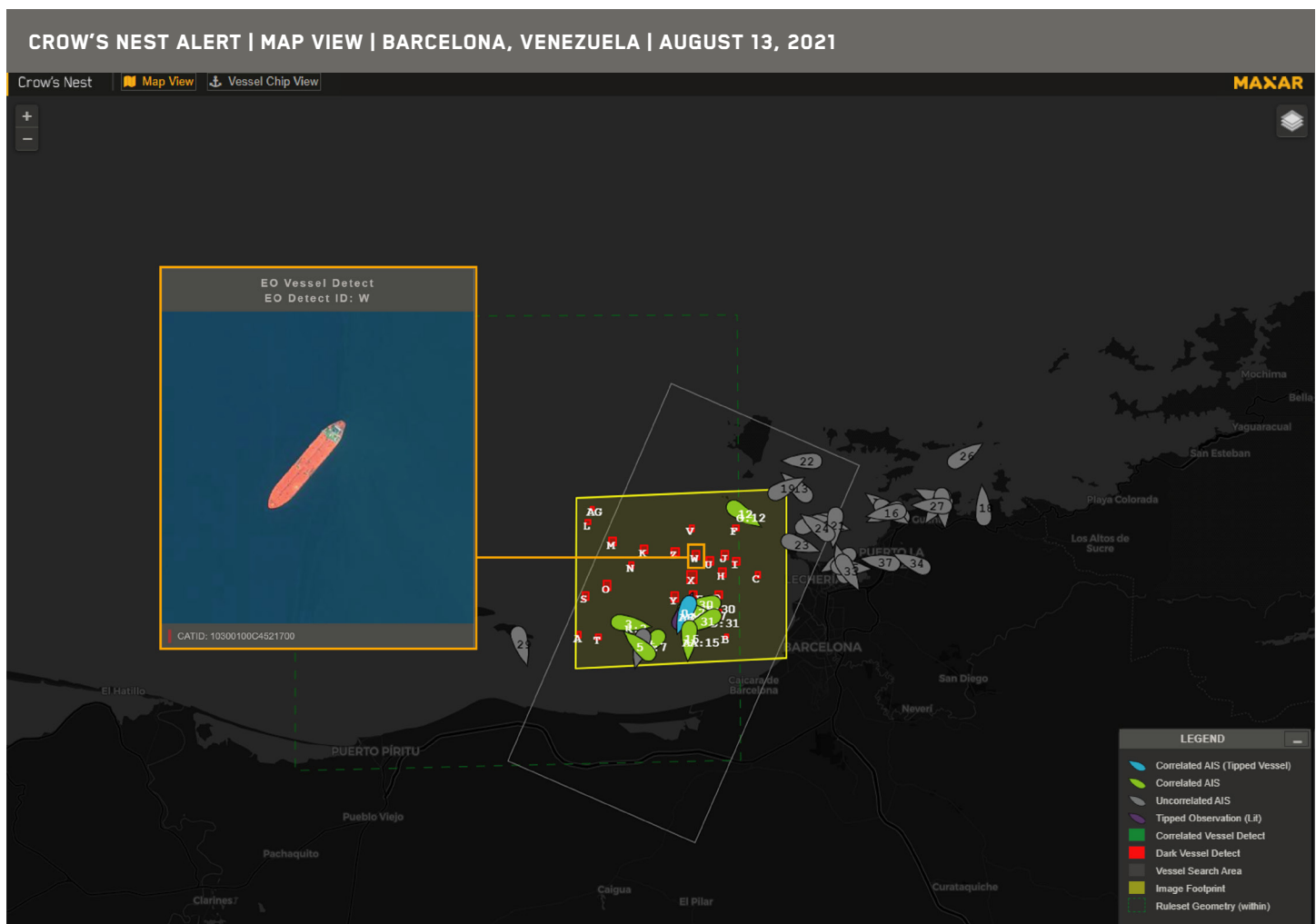
and military and intelligence advisers. In an interview with the Financial Times in 2019, Leopoldo López, former Venezuelan presidential candidate now in exile, described Cuba's military and intelligence advisers as vital to keeping Maduro in power, a sentiment echoed by analysis from the International Crisis Group. In the first half of 2020, Venezuela sent 33 tankers, carrying a total of more than 13 million barrels of Merey crude oil, worth approximately \$348 million, to Cuba, according to the Venezuelan Ambassador to the U.S. Despite facing its own mass food shortage, Venezuela sent Cuba a shipment of food in July 2021, reports the Havana Times.

OPTICAL TIPPING AND CUEING IN NEAR-REAL TIME

Known historically as “the crow’s nest,” a ship’s lookout on the mast was the best place to spot hazards or other ships. Maxar’s Crow’s Nest MMS solution provides modern, comprehensive maritime satellite surveillance in near-real time. Using multisensor SAR vessel detections and maritime tipping and cueing to optical imagery coupled with optical vessel detection, Crow’s Nest supplies intelligence-grade visibility of vessels in any area of interest (AOI) within minutes to hours after collection. Images of vessels with Maxar’s industry-leading optical resolution enable analysts to see salient vessel features and positively identify vessels. Vessel activity such as fishing nets in the water or active

transshipments are clearly visible, allowing maritime security agencies to deploy the appropriate resources in response.

Monitoring foreign naval installations and other points of interest are high-stakes operations for many nations. Reliable, timely intelligence about the location, movement and identity of vessels can prevent surprise encounters and aid successful intervention and de-escalation. With Crow’s Nest, notifications are delivered when new imagery over a designated AOI becomes available, enabling the closest to real-time port and AOI monitoring on the market.



CROW'S NEST MARITIME TIPPING AND CUEING ALERTS PROVIDE AN INTUITIVE USER EXPERIENCE. HERE A DAILY CAPTURE REVEALS VESSELS REPORTING VIA AIS AND THOSE OPERATING DARK, WITH THE OPTICAL COLLECTION TIPPED FROM A USER-DEFINED RULESET TO HOME IN ON SPECIFIC ACTIVITY AND VESSELS OF INTEREST.

DETECT AND VERIFY MARITIME ACTIVITY ANYWHERE IN THE WORLD

MARITIME TIPPING AND CUEING SERVICE

Using high-resolution optical imagery and a proprietary machine learning algorithm, Maxar delivers images of individual vessels within an AOI. Collection automation, comprehensiveness and visual clarity provide end users with insight into vessel activity not previously available through remote techniques.

MULTI-SENSOR SAR VESSEL DETECTION SERVICE

Maxar leverages proprietary algorithms, sourced from SAR imagery derived from Maxar's constellation and third-party constellations, to detect vessels over vast areas, giving maritime agencies a better understanding of vessel activity, including that of vessels operating dark.

CROW'S NEST ALERT | VESSEL CHIP VIEW | BARCELONA, VENEZUELA | AUGUST 13, 2021

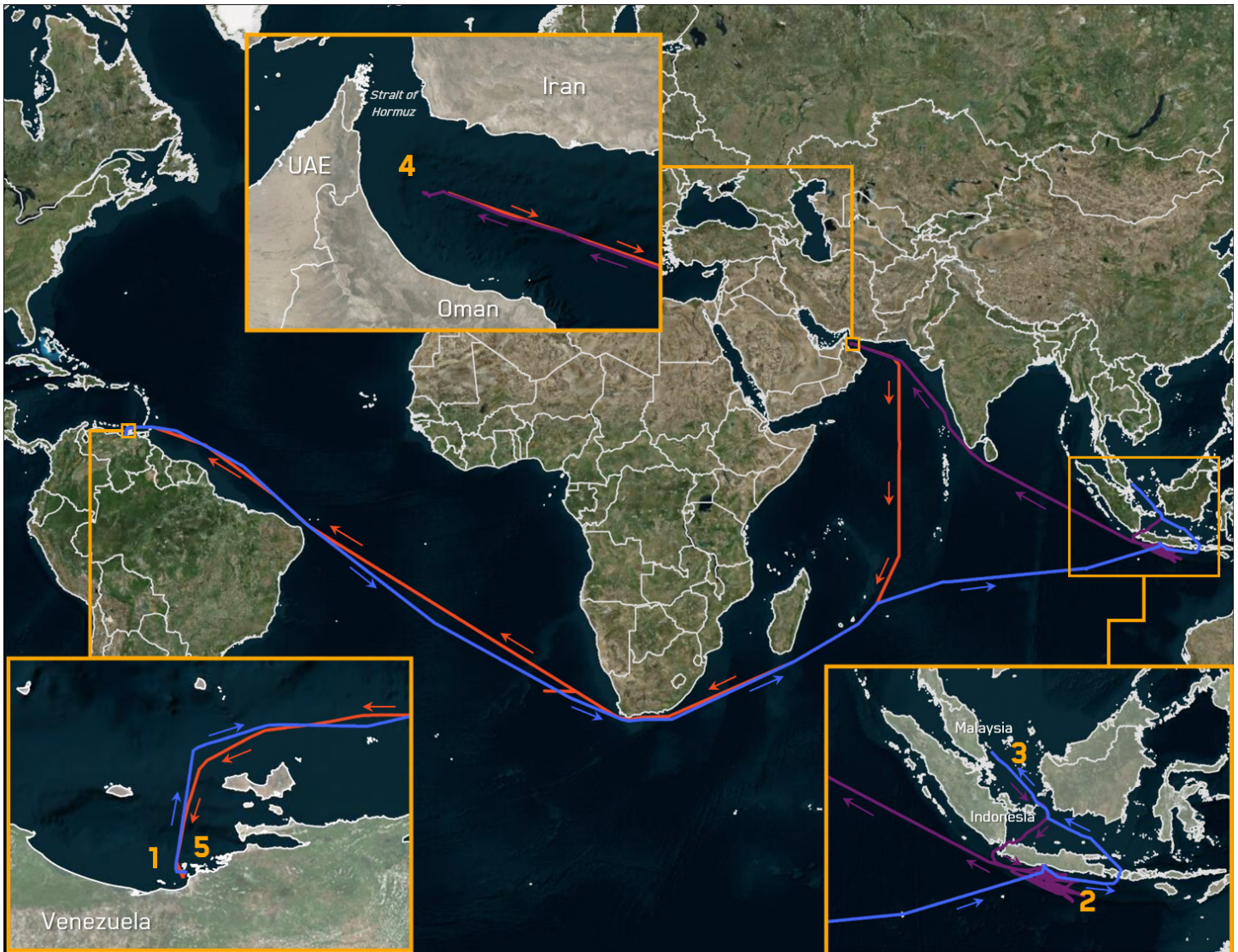
The screenshot displays a grid of 16 vessel chip views, each with associated metadata. The vessel MAKSIM GORKY is highlighted in the bottom row, second column. A detailed view of this vessel is shown on the right side of the interface.

EO Detect AE
MMSI: 273212070

MMSI: 273212070
IMO: 9590008
Vessel Name: MAKSIM GORKY
Call Sign: UBOU8
Flag: Russian Federation
Class: Tankers, All ships of this type
AIS Length (m): 332.0
AIS Width (m): 60.0
Chip Centroid Lat/Lon: 10.1685, -64.7787
Panchromatic GSD (m): 0.505
Inventory ID: 10300100C4521700
Detection Quality: None

VESSELS ENTERING THE AOI DURING THE COLLECTION PERIOD TIP THE CAPTURE OF ELECTRO-OPTICAL IMAGERY FROM MAXAR'S CONSTELLATION. HERE, MULTIPLE VESSELS ARE SEEN ON A SINGLE DAY, INCLUDING DARK VESSELS AND THOSE TRANSMITTING AIS DATA. THE MAKSIM GORKY WAS TIPPED BASED ON AN ESTABLISHED RULESET.

RUSSIAN OIL TANKER MAKSIM GORKY GLOBAL MOVEMENT SEPTEMBER 2020-APRIL 2021



ACTIVITY DETAILS

- | | |
|--|--|
| <p>1 PUERTO LA CRUZ TERMINAL, VENEZUELA
AUGUST 11-SEPTEMBER 3, 2020</p> <p>2 PERTAMINA TERMINAL, CILICAP, INDONESIA
THREE VISITS BETWEEN OCTOBER 2020 AND FEBRUARY 2021</p> <p>3 ANCHORED 40 MILES OFF THE COAST OF MALAYSIA
OCTOBER 20-DECEMBER 18, 2020</p> | <p>4 POSSIBLE TRANSshipment IN THE STRAIT OF HORMUZ
MARCH 4, 2021, DURATION 12 HOURS</p> <p>5 PUERTO LA CRUZ TERMINAL, VENEZUELA
APRIL 10-AUGUST 11, 2021</p> <p>— VOYAGE A: SEPTEMBER 4-OCTOBER 20, 2020
— VOYAGE B: DECEMBER 19, 2020-MARCH 4, 2021
— VOYAGE C: MARCH 4-APRIL 10, 2021</p> |
|--|--|

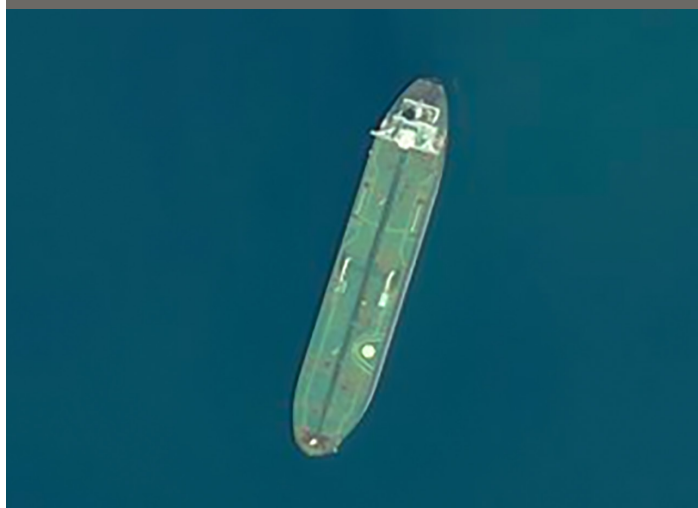
TIPPING AND CUEING LEADS TO HIGH-RESOLUTION ELECTRO-OPTICAL IMAGERY OF VESSELS OF INTEREST

The Maksim Gorky vessel, formerly the Ayacucho, is a crude oil tanker of Very Large Crude Carrier class sailing under the Russian flag since June 2020. The U.S. Office of Foreign Assets Control states that the Maksim Gorky is linked to Venezuela's maritime authority, the Instituto Nacional de los Espacios Acuáticos e Insulares (INEA). The Maksim Gorky is the largest tanker currently in operation for Russia.

Under the name Ayacucho, the vessel formed part of Singapore-based company CV Shipping, which was founded by Venezuela's state-owned oil company PDVSA and the PRC's PetroChina. According to Venezuelan outlet Frontera Viva, the vessel often made ship-to-ship transfers of what was believed to be Merey crude, a method of avoiding penalties for trading in crude and hiding the origins of oil. Following financial losses due to U.S. sanctions on PDVSA in January 2019, CV Shipping was dissolved in January 2020, and Venezuela maintained control of the Ayacucho, reports Spanish outlet Energia 16. The Ayacucho was renamed the Maksim Gorky in May 2020, and, in June 2020, the vessel began sailing under the Russian flag, reports Marine Traffic. According to the U.S. Department of the Treasury, the vessel and the INEA were sanctioned in January 2021 for operating in the oil sector of Venezuela, aiding PDVSA and forming part of a network that attempted to evade U.S. sanctions on Venezuela's oil sector.

In August 2020, commander of U.S. Southern Command Admiral Craig Faller stated on an Atlantic Council panel that Russian influence is a key force keeping Maduro in power and helps Venezuela circumvent oil sanctions. Russia and Venezuela have numerous ties, including a 10-year bilateral agreement made in April 2021 regarding collaboration on health, finance, education, energy, food and security, according to Venezuelanalysis. Reuters reports that Russian state-owned oil companies, of which Rosneft was the largest, handled up to 80% of Venezuela's total oil exports in February 2020. U.S. sanctions resulted in Rosneft's withdrawal from Venezuela in March 2020, further isolating the Maduro regime, according to the Center for Strategic and International Studies.

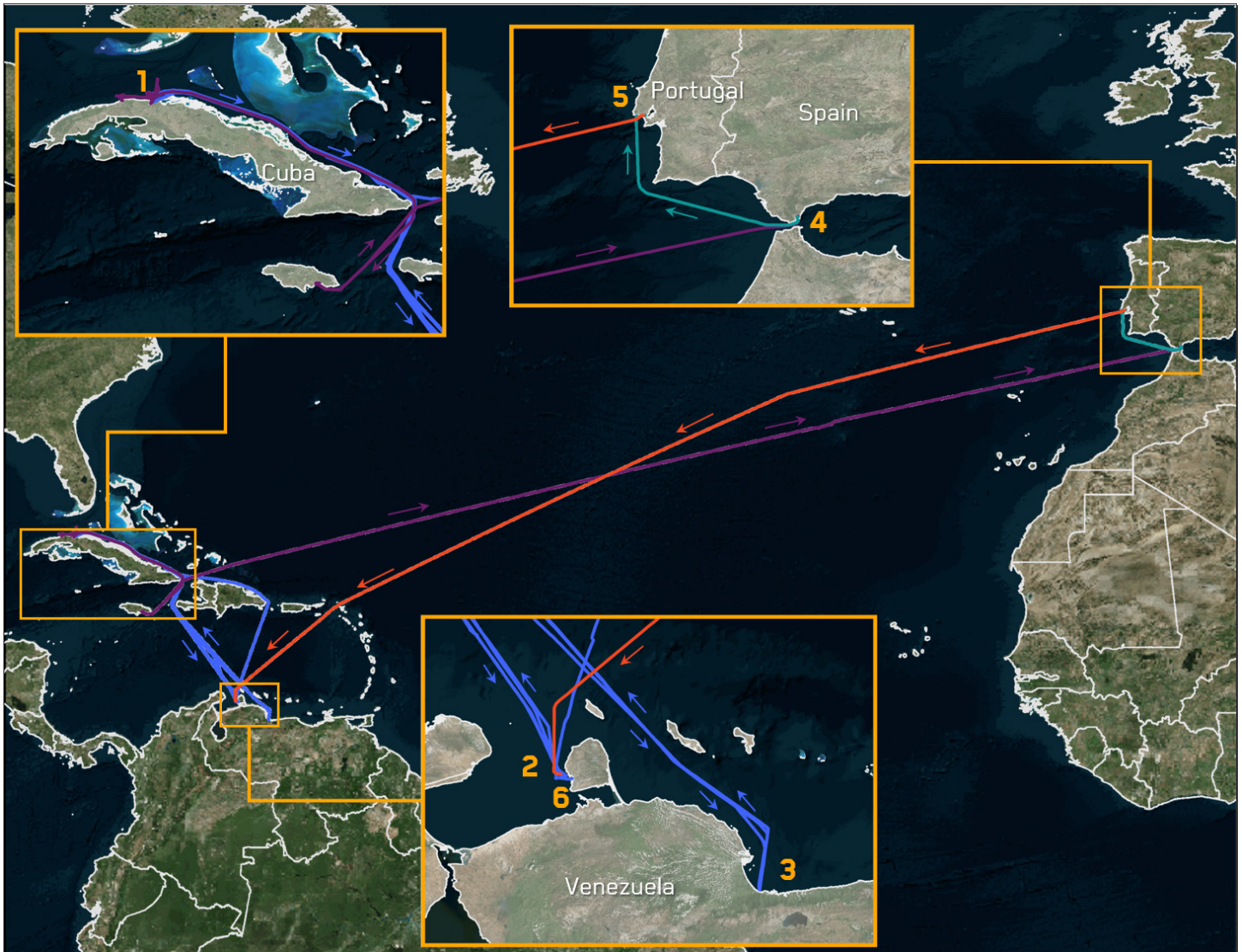
MAKSIM GORKY | CROW'S NEST VESSEL CHIP
AUGUST 13, 2021 | WORLDVIEW-2



CROW'S NEST FEATURES

- Determine vessel class, activity and individual vessel identity with high-resolution optical imagery.
- Multisatellite approach allows for more frequent revisit and coverage options.
- Detect vessels reporting—and not reporting—via AIS.
- Images of vessels are delivered as quickly as 30 minutes from the time of collection.
- Imagery provides the ability to positively ID dark targets.
- Crow's Nest MMS solutions are easily integrated into existing workflows, with a tipping API scheduled for release in late 2021 and delivery formats that can be customized for system ingest.

CUBAN-FLAGGED TANKER LOURDES GLOBAL MOVEMENT OCTOBER 2020-MAY 2021



ACTIVITY DETAILS

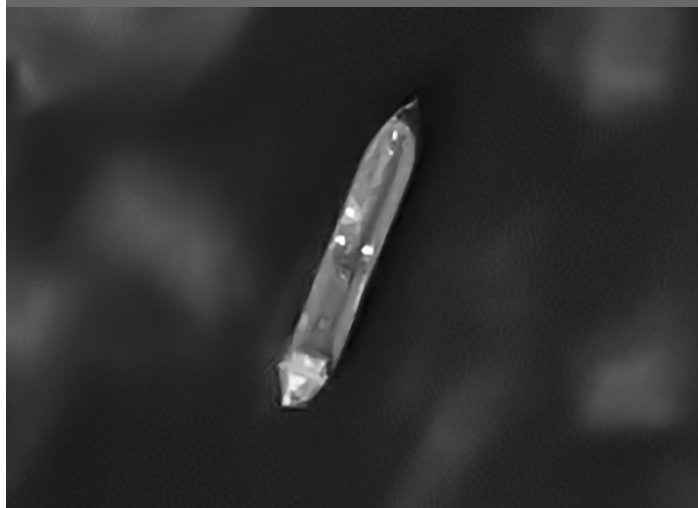
- | | |
|---|--|
| <p>1 MULTIPLE TRIPS FROM AND TO MATANZAS, CUBA—VESSEL LIKELY BASED OUT OF THIS LOCATION
OCTOBER 28, 2020-MARCH 4, 2021</p> <p>2 MULTIPLE TRIPS TO AMUAY REFINERY, PUNTO FIJO, VENEZUELA
OCTOBER 28-DECEMBER 31, 2020</p> <p>3 TWO SEPARATE VISITS TO EL PALITO REFINERY, PUERTO CABELLO, VENEZUELA
JANUARY 7-26 AND FEBRUARY 16-22, 2021</p> | <p>4 CEPSA REFINERY, GIBRALTAR, SPAIN
APRIL 6-29, 2021</p> <p>5 IDLE FOR FOUR HOURS IN THE MIDDLE OF THE TAGUS RIVER, LISBON, PORTUGAL, BEFORE BEGINNING VOYAGE BACK ACROSS THE ATLANTIC
MAY 2, 2021</p> <p>6 AMUAY REFINERY, PUNTO FIJO, VENEZUELA
MAY 14-30, 2021</p> |
| <p>— VOYAGES A, B, C: OCTOBER 28, 2020-MARCH 4, 2021</p> <p>— VOYAGE D: MARCH 4-APRIL 6, 2021</p> | <p>— VOYAGE E: APRIL 29-MAY 2, 2021</p> <p>— VOYAGE F: MAY 2-MAY 14, 2021</p> |

CUSTOM RULESET ENABLES IMAGERY COLLECTION OF SPECIFIC VESSELS OVER A TARGETED AOI

The Lourdes vessel, formerly the Giralt and Impros but labeled as the Sanko Advance, is a crude oil tanker sailing under the Cuban flag. It is currently owned by Cyprus-based Caroil Transport Marine Limited and, until June 2019, was owned by the Panama-based Bluelane Overseas SA, according to the Federal Register. Under its former ownership, the vessel was subject to U.S. sanctions. The transfer of ownership and renaming in June 2019 was seen as an attempt to evade these sanctions, according to former U.S. Treasury Deputy Secretary Justin Muzinich in a December 2019 press release. In September 2019, Caroil Transport Marine Limited was blacklisted by U.S. officials for transporting Venezuelan crude and fuel oil to Cuba, reports Kathimerini English Edition, despite a close cooperation between the U.S. and Cyprus to “advance shared priorities in the Eastern Mediterranean region,” according to the U.S. Department of State.

Cyprus has emerged as key partner for Venezuela in circumventing U.S. sanctions. Lloyd’s List reports that, in the past year, 11 oil tankers have been reflagged as Cypriot and have come under the ownership of newly incorporated Cypriot or Greek single-ship companies. In 2019, 80% of Venezuelan crude oil was transported by Greek shipowners, according to Lloyd’s List. Cypriot vessels have been sighted loading crude in Venezuela and have been recorded using covert tactics to load crude oil from Venezuela to Asia under the guise of transporting Malaysian oil, reports AP News. Cyprus is not under legal obligation to enforce U.S. sanctions and is committed to enforcing only U.N. or EU sanctions, Cyprus’ shipping ministry stated to Lloyd’s List.

LOURDES | CROW'S NEST VESSEL CHIP
JUNE 14, 2021 | WORLDVIEW-1



“The transfer of ownership and renaming (the ship to Lourdes) in June 2019 was seen as an attempt to evade these sanctions,”

- JUSTIN MUZINICH | U.S. TREASURY DEPUTY SECRETARY

CROW'S NEST IN ACTION: METHODOLOGY AND DATA EXTRACTION

The intuitive Crow's Nest MMS platform enables the creation of maritime rulesets, allowing users to receive email alerts when their selected ships tip optical imagery collection. Imagery is easily viewed in Vessel Chip View on the platform and can be sorted by various parameters, saving users time and effort.

For this Spotlight, preliminary research identified the José Antonio Anzoátegui Petrochemical Complex and port in Barcelona, Anzoátegui State, Venezuela, as a hot spot of potential sanction violations. The data-collection period spanned April 19 through June 21, 2021. Research on Venezuelan sanction violators and international facilitators resulted in a list of 19 tankers of interest from 10 countries. Analysts submitted the 19 tankers for a Crow's Nest tipping and cueing ruleset.

A total of 49 oil tankers were identified by AIS during the collection period over the AOI, with an additional 26 unique dark tankers captured. Two tankers on the ruleset tip list were present at least once in the AOI over the collection period, the Russian vessel Maksim Gorky and the Cameroonian-flagged Angel; no suspicious activity by the Angel was observed within the data collected. Open-source AIS analysis verified that none of the remaining 17 vessels on the ruleset tip list were dark in the AOI during the collection period, showing that these tankers were in the Persian Gulf, Bengal Bay, Yellow Sea and Malacca Strait. This allowed analysts to redirect attention to the remaining dark vessels identified by electro-optical tipping, enabling rapid analysis.

CROW'S NEST VESSEL CHIP | MAY 10, 2021 | WORLDVIEW-2



CROW'S NEST TIPPED ON THREE TANKERS DOCKED AT A FUELING STATION DURING THE DATA-COLLECTION PERIOD. THE IMAGERY ABOVE WAS COLLECTED MAY 10, 2021; ON THAT DATE, ALL THREE VESSELS WERE DARK. THE VENEZUELAN TANKER YARE WAS SEEN AT THE LOWER STATION ON MAY 13 AND JUNE 14, AND THE VENEZUELAN TANKER PARAMACONI PINGED AT THE LOWER STATION ON MAY 15. PRC VESSEL THOUSAND SUNNY PINGED AT THE UPPER LEFT STATION ON JUNE 14 AND JUNE 18. NO AIS WAS DETECTED FOR THE VESSEL AT THE UPPER RIGHT STATION AT ANY TIME DURING THE COLLECTION PERIOD OF APRIL 19-JUNE 21, 2021.

IMPROVE MARITIME SITUATIONAL AWARENESS WITHIN TERRITORIAL WATERS

CONCLUSION

Maxar’s Crow’s Nest MMS solution provides broad-area coverage, automated processes, multisensory inputs and actionable timelines, resulting in intelligence-grade optical vessel images. This Spotlight demonstrates the power of the Crow’s Nest platform for analyzing sanction violations in

Venezuela’s oil sector. Through port monitoring and tipping and cueing, combined with expert open-source analysis provided in Maxar’s comprehensive analytic reports, decision-makers can gain insight into the movements and activities of tankers from Cuba, Cyprus, Iran, the PRC and Russia.

OTHER APPLICATIONS INCLUDE:


1 **SOVEREIGNTY PROTECTION**
Foreign naval vessels in or approaching territorial waters



4 **FISHERIES PROTECTION**
Vessels engaged in illegal fishing within exclusive economic zones or controlled areas



2 **COUNTERPIRACY**
Possible pirate vessels and historical piracy events



5 **ENVIRONMENTAL PROTECTION**
Vessels engaged in illegal bilge dumping or accidental oil spills



3 **COUNTERTERRORISM**
Potential threats from inbound vessels



6 **COUNTERTRAFFICKING**
Suspicious inbound vessels or vessels traversing territorial waters





FOR A BETTER WORLD

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