Cristian Puerto

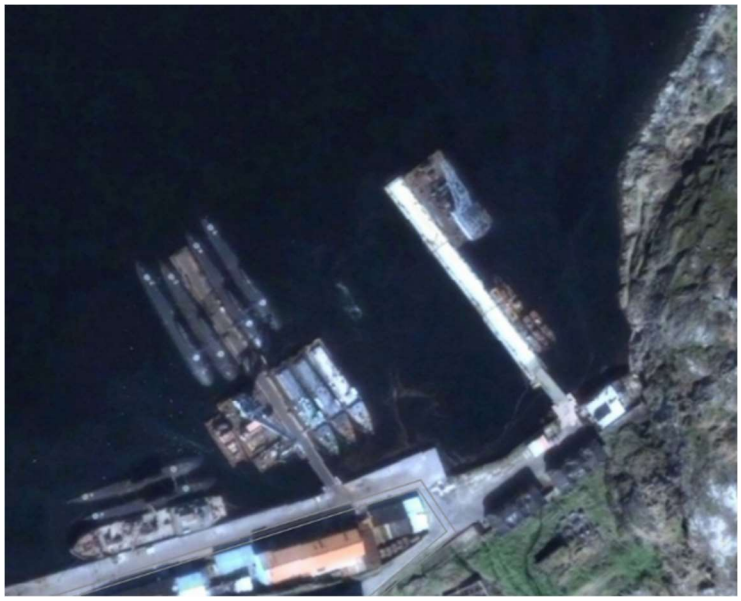
Patriot CTF 2024, Challenge: "**Give me four words, Vasily**", Category: **OSINT**

CTF Date: 09/20/24 – 09/22/2024

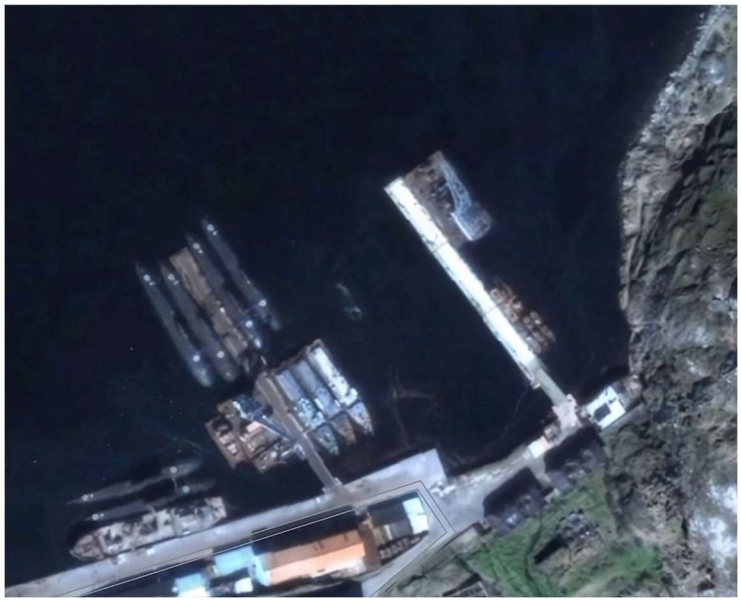
In this challenge, we were tasked with tracking enemy submarines suspected of harboring "skiddies". The image in which we were given (image below) was outdated.

Since it was outdated, we needed to create an enhanced version of the given image. To do this we utilize a website called **Pixelcut** that has an image upscaler and enhancer which enhances the image. We can see the results below:

Before Enhancement

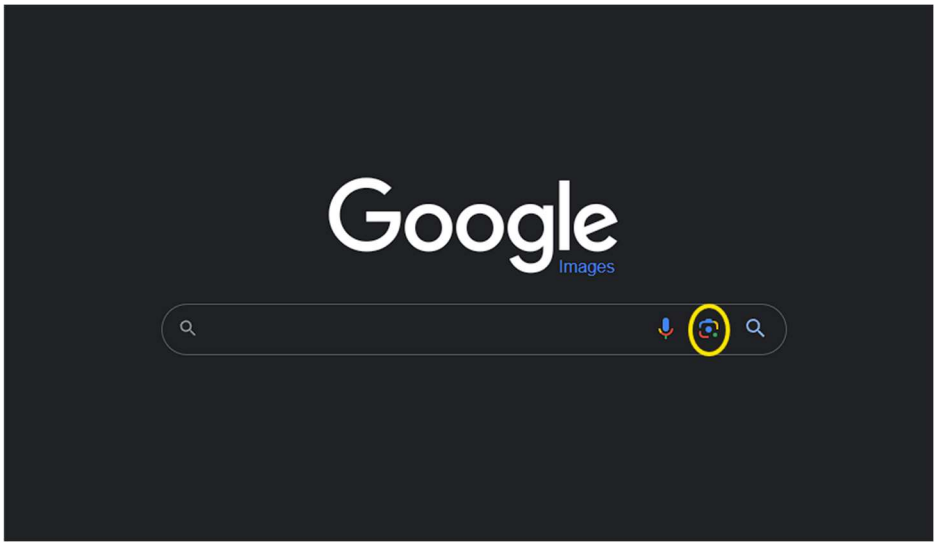


After Enhancement

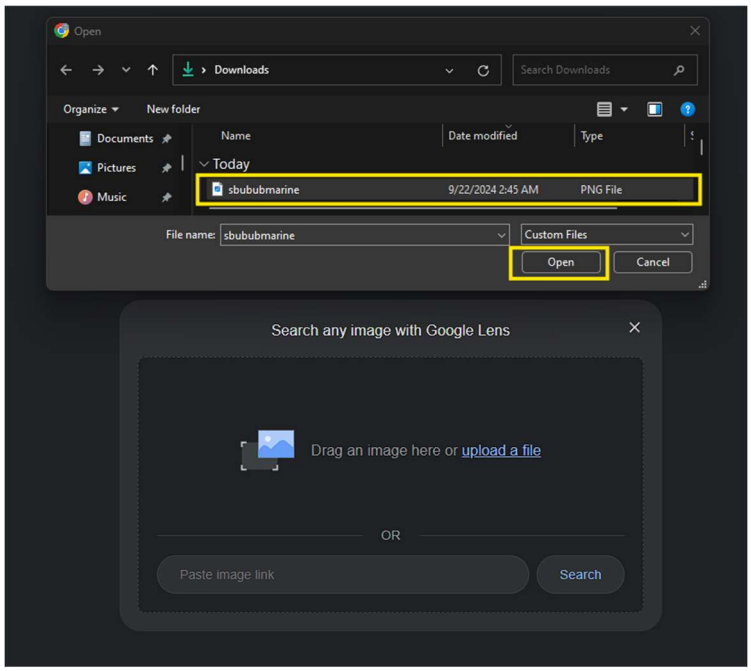


Even though it may not appear “clearer” or “enhanced” to the naked eye per say, the computer states otherwise.

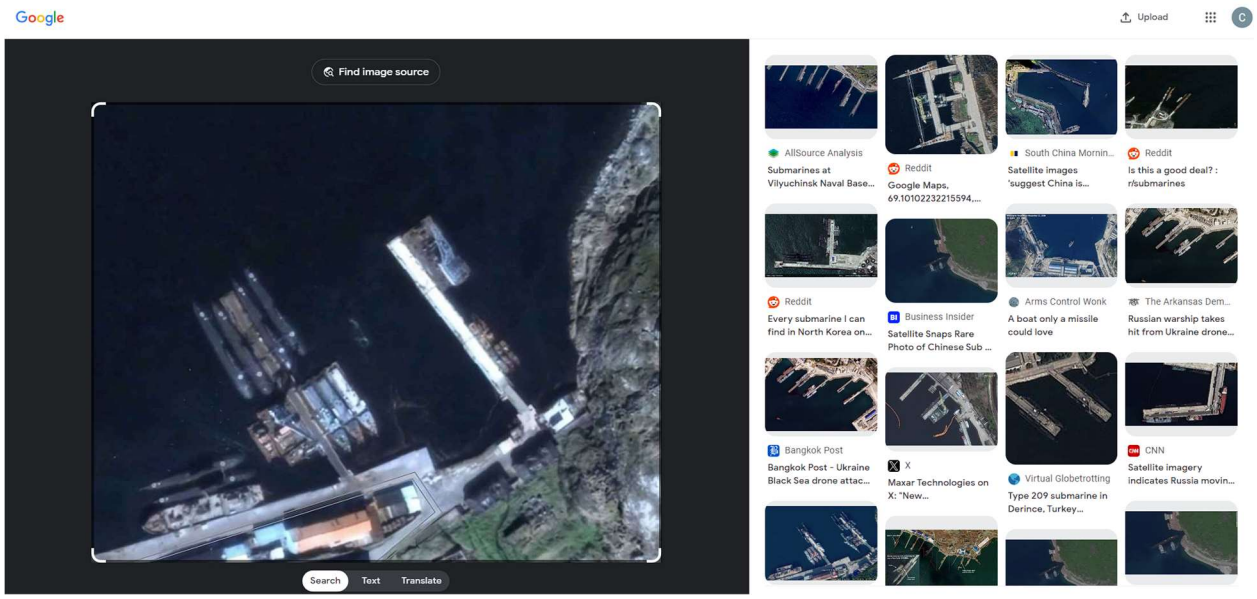
Next, we had to search for other pictures that were similar to the image of the dock with submarines and ships. How I did this was I accessed **Google Images** and clicked the **Search by Image** button which is indicted below by the yellow circle:



After clicking the priorly mentioned button, you are prompted to select an image. Below shows what to choose and the steps to search by the image of choice:

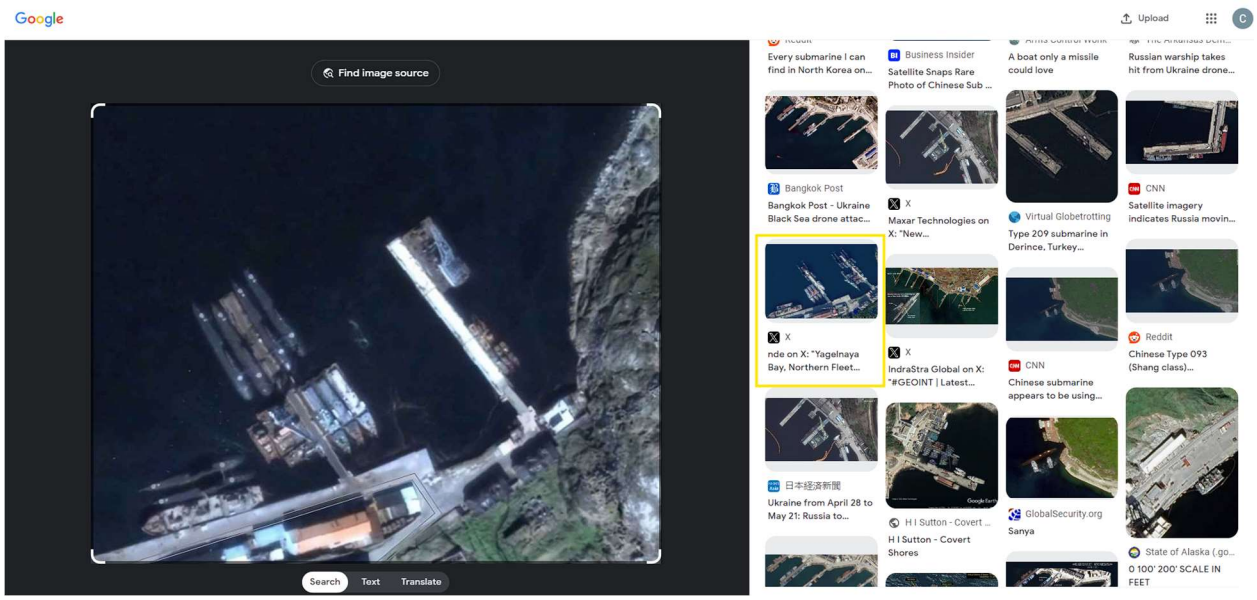


After pressing the **Open** button, we have now searched the web by image. Here is what you will see:

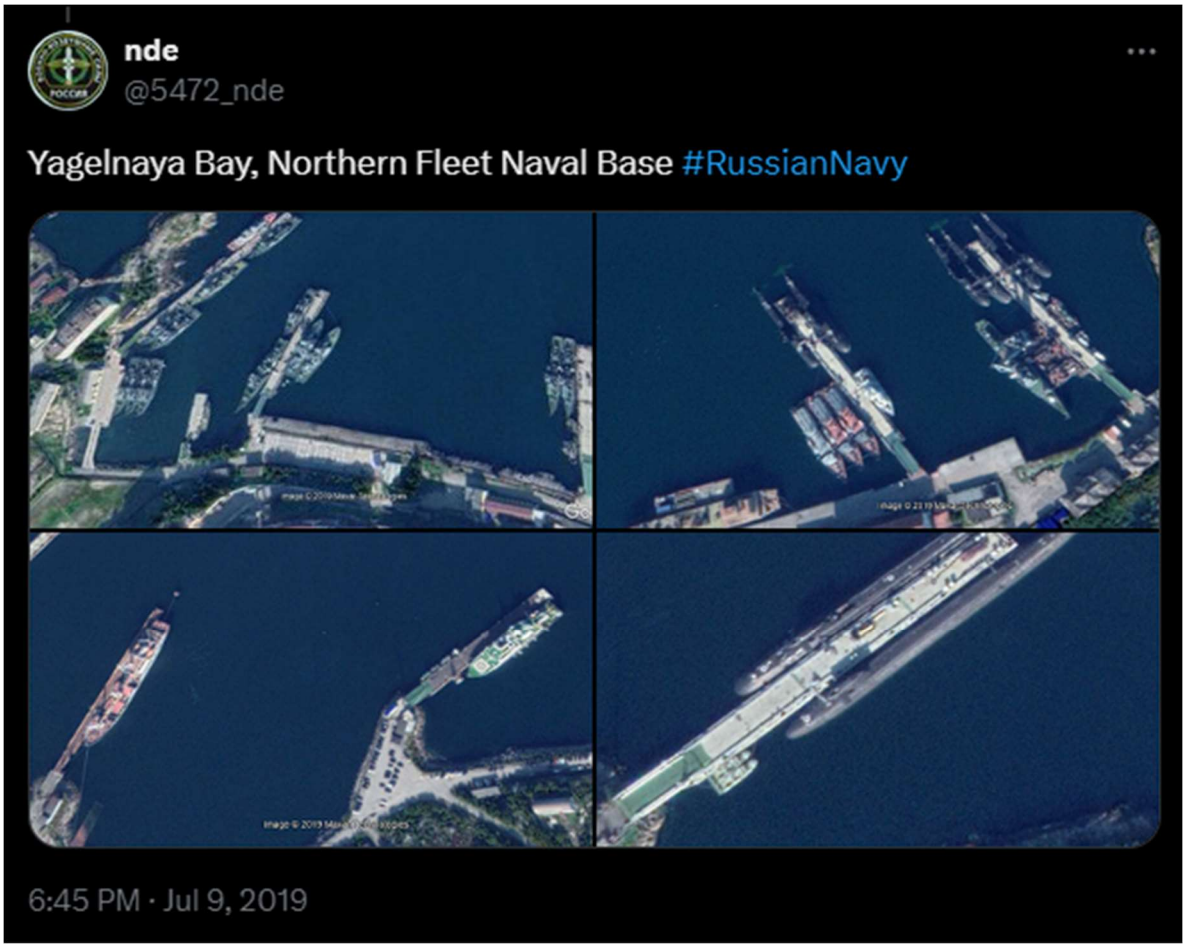


The websites/links on the right were all deemed “similar” by the search, so now we find, with our own perspective, the most similar image.

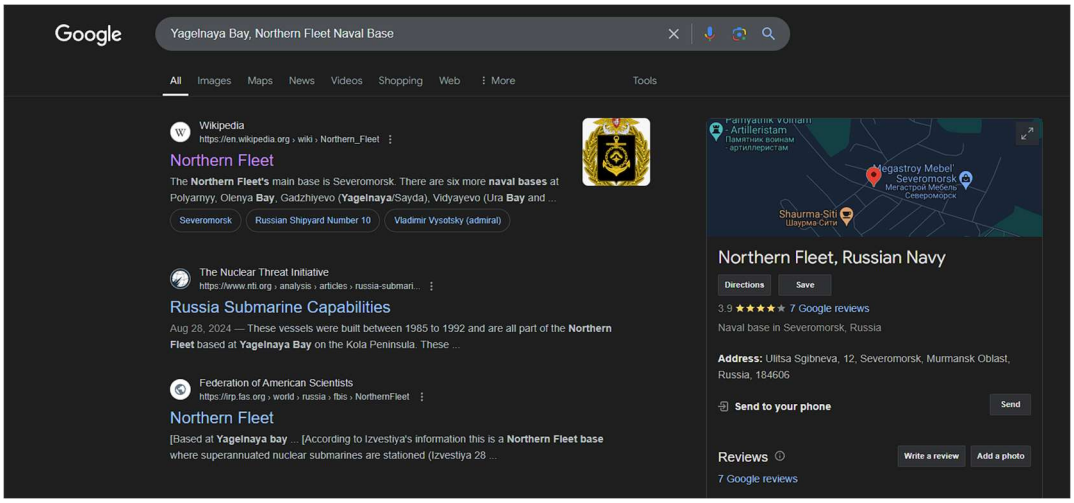
After scrolling with the scroll wheel on the right-hand side about half a scroll, you should see the **X** post which is indicated by the yellow box:



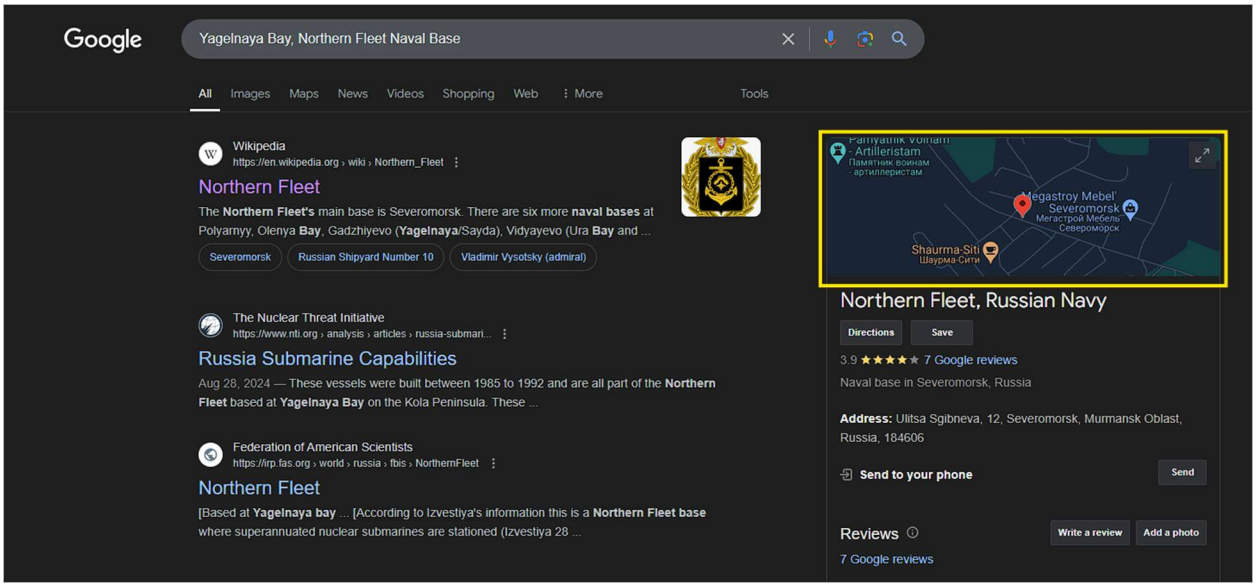
After accessing the website associated with the post, you should see the post itself with the images associated:



If we compare each image to the given image, which has been enhanced, we can determine that they are very similar to each other. Since we have a similar image, we can now proceed. Look above at the text saying “Yagelnaya Bay, Northern Fleet Naval Base”. This is telling us where these satellite images were taken. After copying and pasting the text in the search bar of the web browser, we find this:

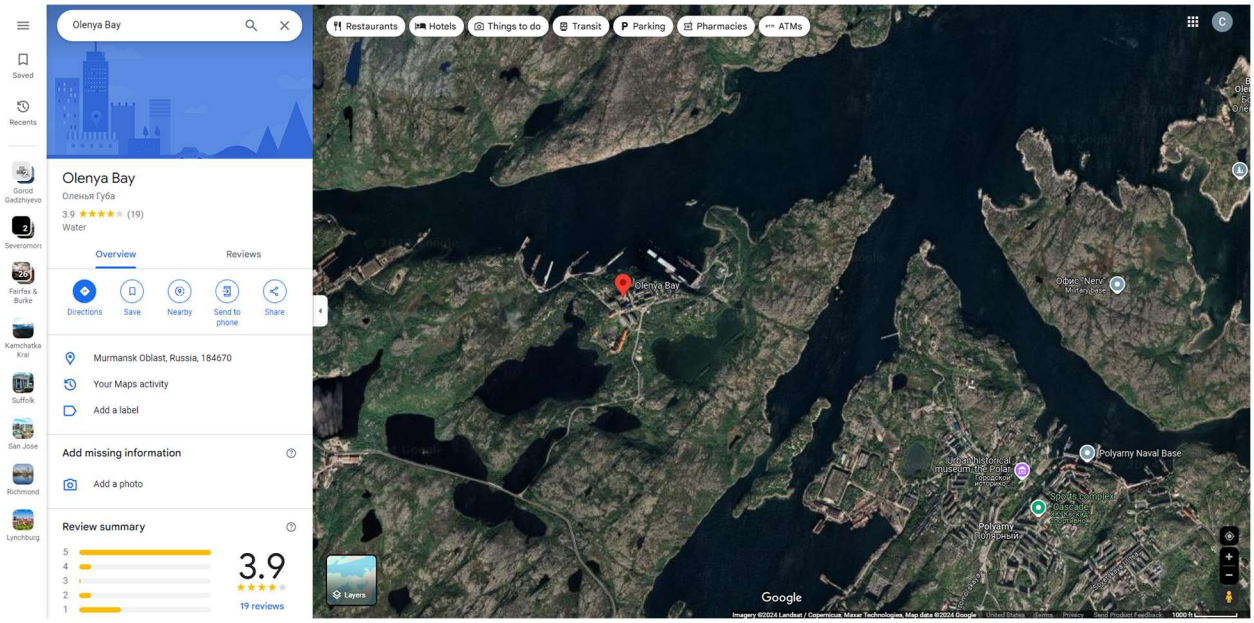


If we look to the right-hand side where it shows the pinpoint on the map indicated by the yellow box, we can access the location through the use of **Google Maps**.



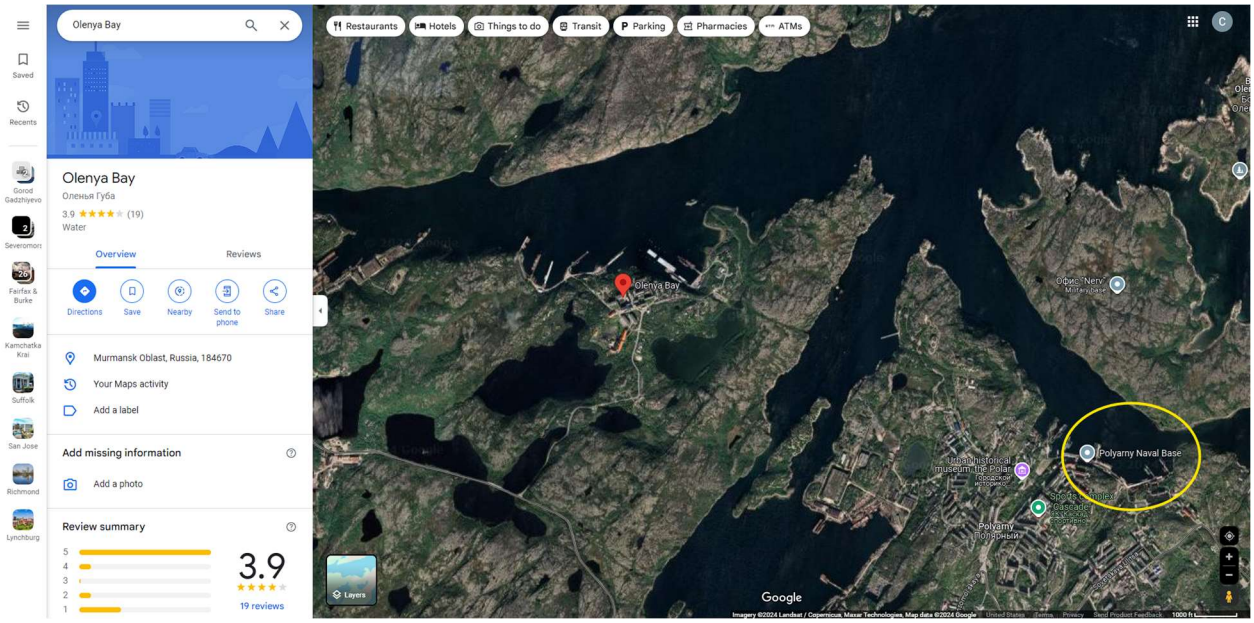
After clicking the Google Maps location link, we should see this:

The Northern Fleet of the Russian Navy has an address of "Ulitsa Sgibneva, 12, Severomorsk, Murmansk Oblast, Russia, 184606". This being said, "Yagelnaya Bay" is stated in the post, so we can search this. This is what it shows after searching this in the Google Maps search bar:



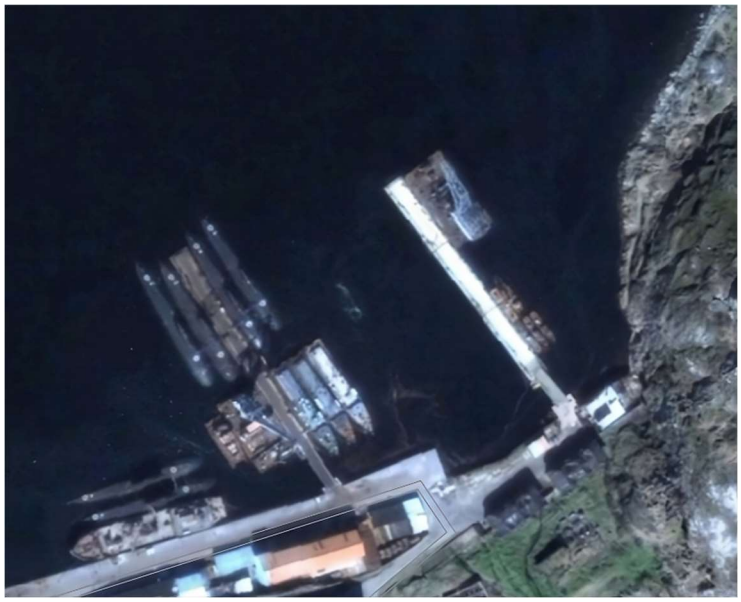
We can now zoom out and start looking for similar ports to our image.

After analyzing the surrounding area, we can see a similar looking port to our given image. Here is where it is:



Now we zoom in on that location and compare our images. Here is the comparison:

Given Image

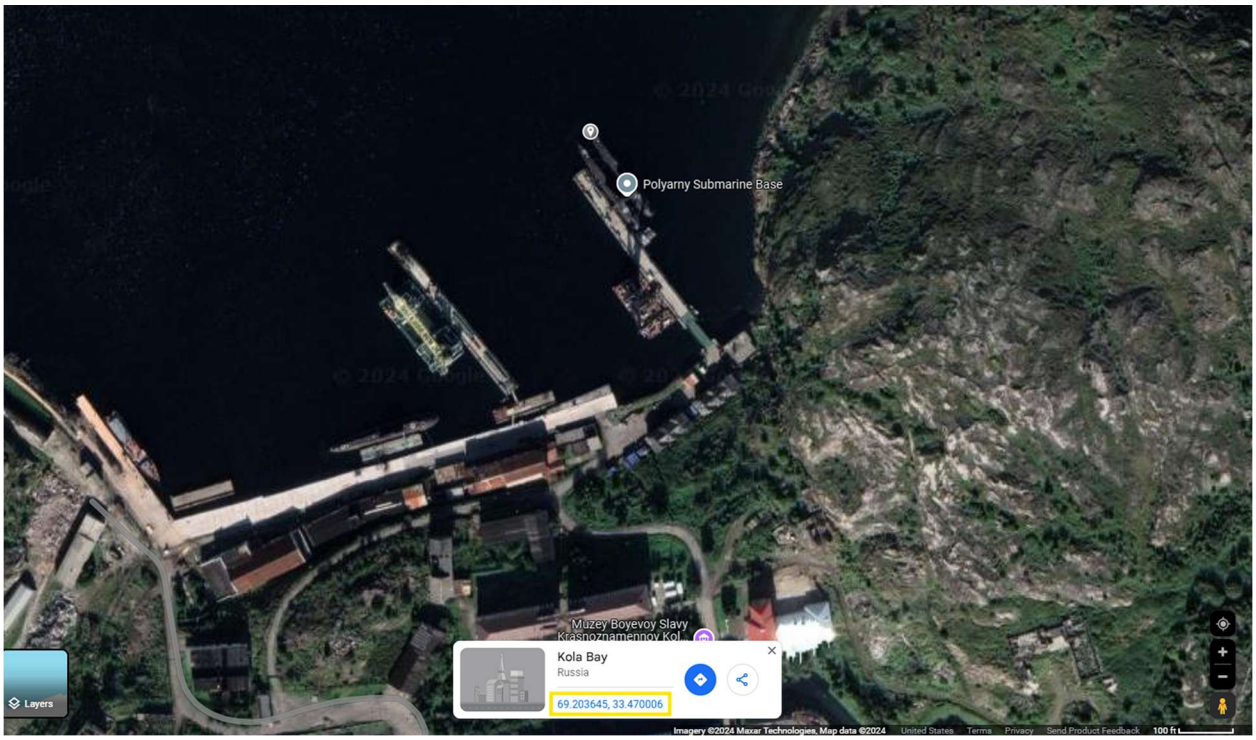


Google Maps Image

After analyzing the two images, we can determine they are the same ports by comparing landscape and buildings which all appear to be extremely similar. The only difference is that in the given image the submarines are on the left-hand dock, whereas in the new image, they are on the right-hand dock.

The prompt says, “We want to know precisely where the aft end of northernmost submarine attached to the pier is”. The aft end of the northern most submarine attached to the pier is indicated below with a yellow arrow:

After indicating the aft end of the submarine we are looking for, we now can get the coordinates for this specific location (aft end is key). Below is the image showing the coordinates with a yellow box:

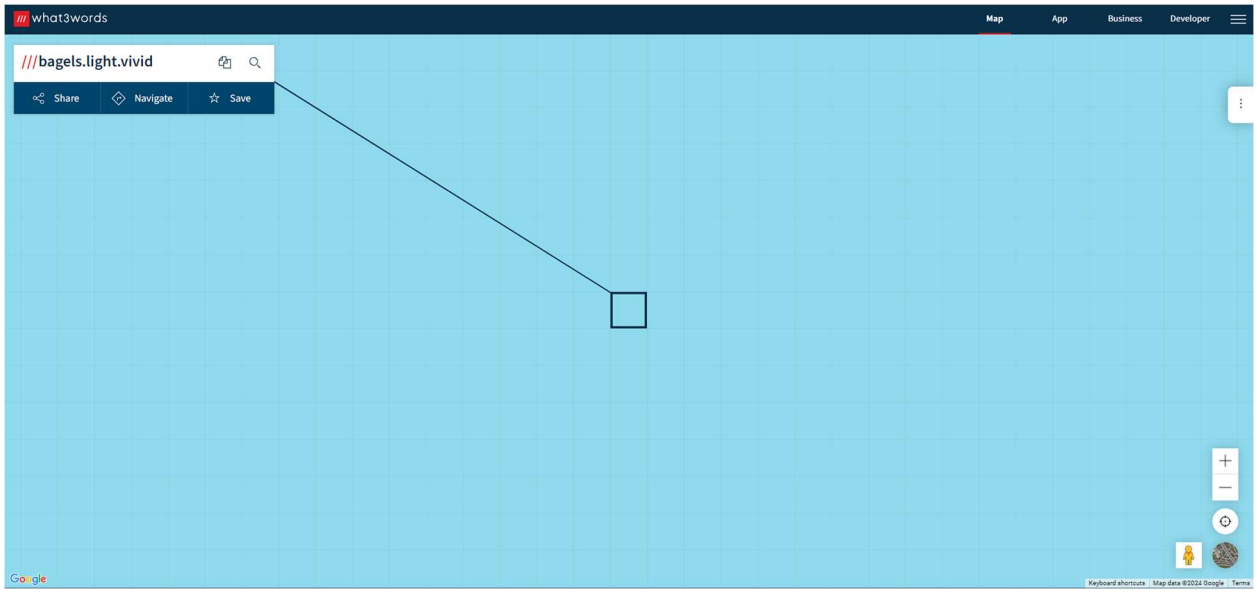


Having the coordinates we needed, we can now focus on the three position words indicated by the prompt. We can access the website **what3words** to generate the three

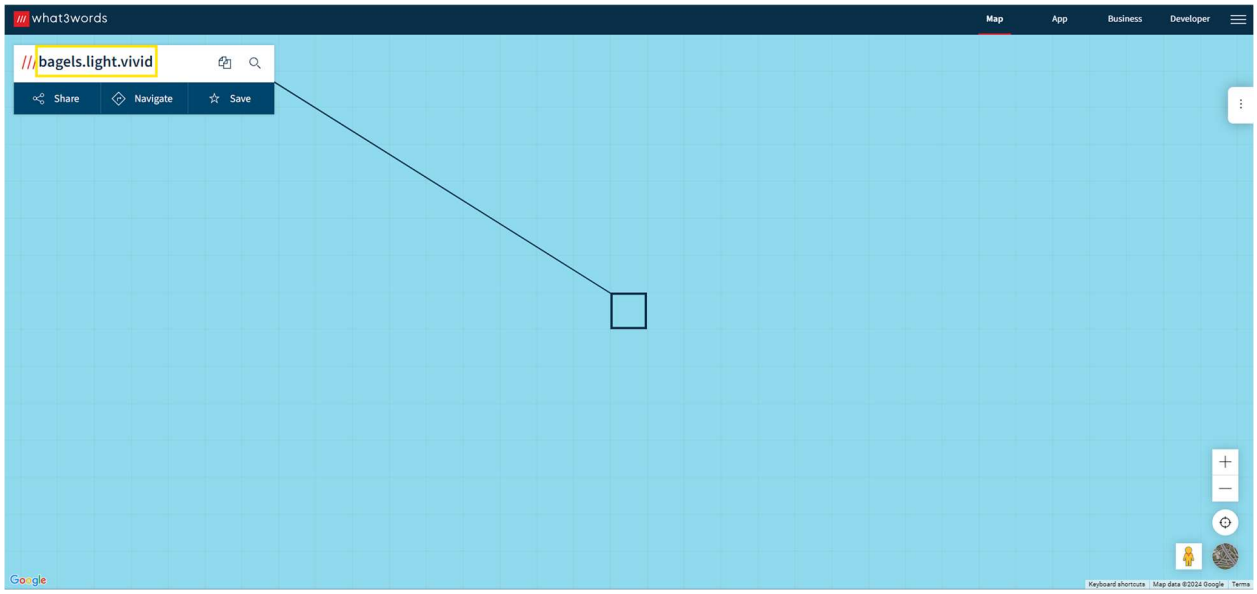
position words based on the coordinates. We can use the three position words when formatting the flag.

After accessing the what3words website, you should see this:

What you want to do is copy the coordinates indicated before and paste them into the and search box shown with a yellow box below and press enter:

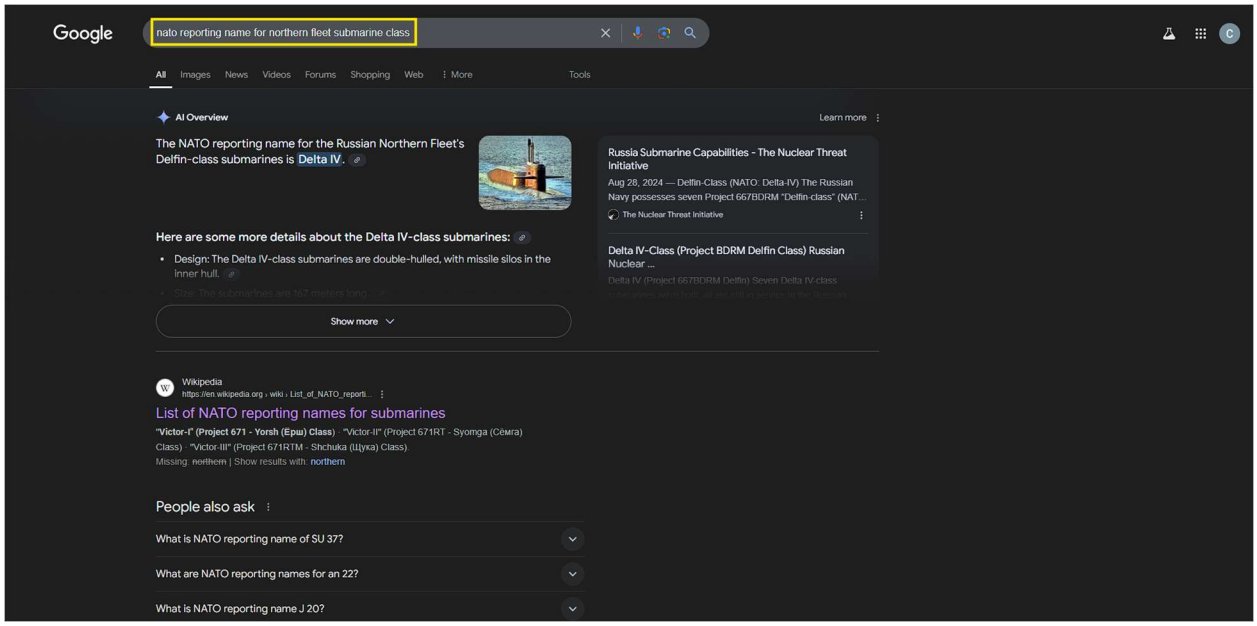


The three-word position is indicated by a yellow box:

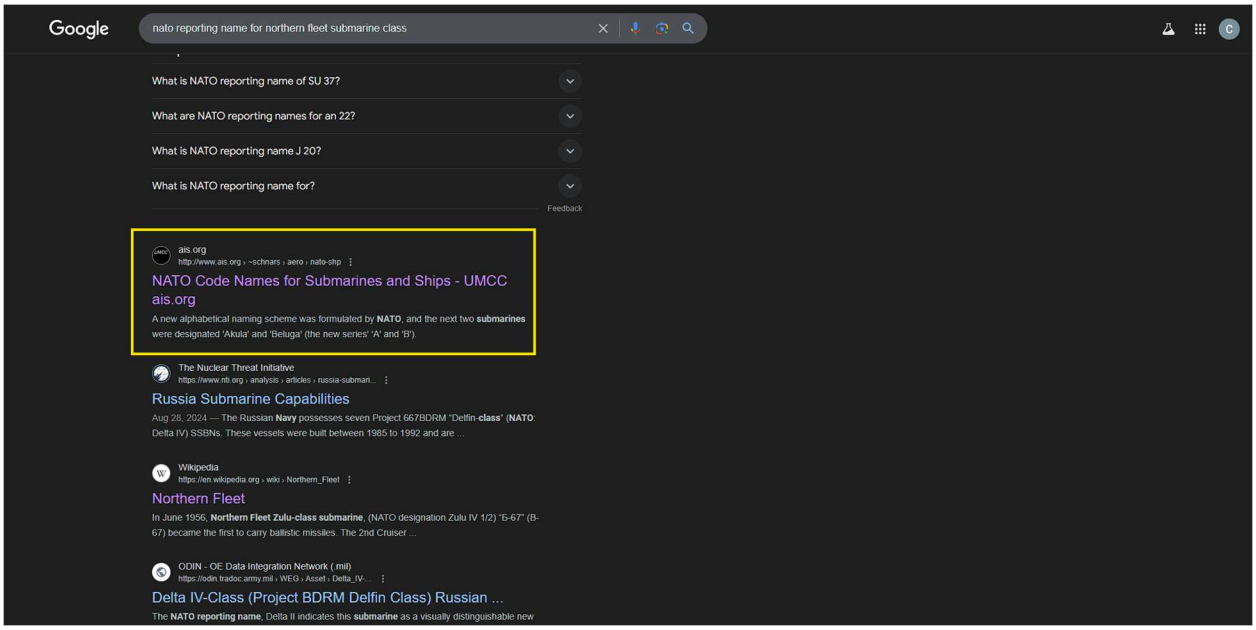


“bagels.light.vivid” is the first part of the flag.

Now we need to find out what the NATO reporting name for the specific class of our submarine is. Firstly, we have to find the class of submarine is it. Below is how to search for this indicated by yellow box:



After scrolling down just a tad bit, you will see the website with a yellow box:



We skipped over Wikipedia since it is not always reliable and can be changed by anyone. Also “.org” websites are reliable. After clicking the link, we will see the list of submarine classes and their reporting names:

ALFA Class
Nuclear powered attack submarines (SSN); service designation "Project 705"; 7 built; in service 1971; 6 torpedo/launch tubes for SS-N-15 or Type 53 tor
1 (prototype) scrapped in 1974;
1 scrapped in 1988;
1 recommissioned for trials in 1989;
all retired;
BRAVO Class
Diesel-electric powered auxiliary/target submarines; 4 built; in service 1968; 4 (or 6) torpedo tubes for Type 53 torpedoes (unconfirmed);
CHARLIE Class
Nuclear powered cruise missile submarines (SSGN); service designation "Project 670";
Charlie I - 12 built; in service 1968; 8 SS-N-7; 6 torpedo/launch tubes for SS-N-15 or Type 53 torpedoes; up to 14 tube-launched weapons;
1 sank off Petropavlovsk 06/1983; salvaged but scrapped in 1987;
1 leased to India 05/01/1988; returned and scrapped in 1991;
Charlie II - 6 built; in service 1973; 8 SS-N-9; 6 torpedo/launch tubes for SS-N-15 or Type 53 torpedoes; up to 14 tube-launched weapons;
DELTA Class
Nuclear powered ballistic missile submarines (SSBN);
Delta I - service designation "Project 667B"; service name "Murena"; 18 built; in service 1972; 12 SS-N-8; 6 torpedo tubes for 18 Type 53 torpedoes;
Delta II - service designation "Project 667BR"; 4 built; in service 1974; 16 SS-N-8; 6 torpedo tubes for 18 Type 53 torpedoes;
Delta III - service designation "Project 667BDR"; service name "Kal'mar"; 14 built; in service 1975; 16 SS-N-18; 6 torpedo tubes for 18 Type 53 torpedo
Delta IV - service designation "Project 667BDRM"; service name "Del'fin"; 8 (+ up to 4 more) built; in service 1984; 16 SS-N-23; 6 torpedo tubes for 18
ECHO Class
Nuclear powered submarines;
Echo I - cruise missile submarines (SSGN); service designation "Project 659"; 5 built; in service 1960; 6 SS-N-3c; 6 torpedo tubes for Type 53 torpedoes
all 1970/74 converted to attack submarines (SSN); 6 torpedo tubes for Type 53 torpedoes + 4 torpedo tubes for Type 40 torpedoes; up to 20 torpedoes;
all retired ?;
Echo II - cruise missile submarines (SSGN); service designation "Project 675"; 29 built; in service 1962; 8 SS-N-3c; 6 torpedo tubes for Type 53 torpedo
15(+) modified for 8 SS-N-12; 6 torpedo tubes for Type 53 torpedoes + 4 torpedo tubes for Type 40 torpedoes; up to 20 torpedoes;
1 modified for special operations in 1980;
1 numbered "334";
FOXTROT Class
Diesel-electric powered patrol/attack submarines (SS); service designation "Project 641"; 62 (out of 160 planned) built plus 17 for export; in service 1958
2 scrapped after accidents;
3 scrapped due to age;
2 transfered to Poland (1 in 1987, 1 in 1988);
generally named after "Komsomol" (Communist Youth League) groups;
1 numbered "941";
exports built for:
Cuba (3): (1 in 02/1979, 1 in 03/1980, 1 in 02/1984);

(There are more if you scroll down)

From here, since we can’t know exactly what type of submarine we have taken the coordinates from, we can try every one of the submarine class’s NATO reporting names by inserting it at the end of the three.position.words to get the flag.

After trying all of the NATO reporting names of all of the classes. The only reporting name that should work is “Kilo”, in which you insert at the end of the three.position.words like:

PCTF{bagels.light.vivid.kilo}

Now you have your flag. Congrats!