



## IDENTIFICATION AND GEOLOCATION OF SUBMARINE SHIPYARD FOR PCTF

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Give Me Four Words, Vasily.

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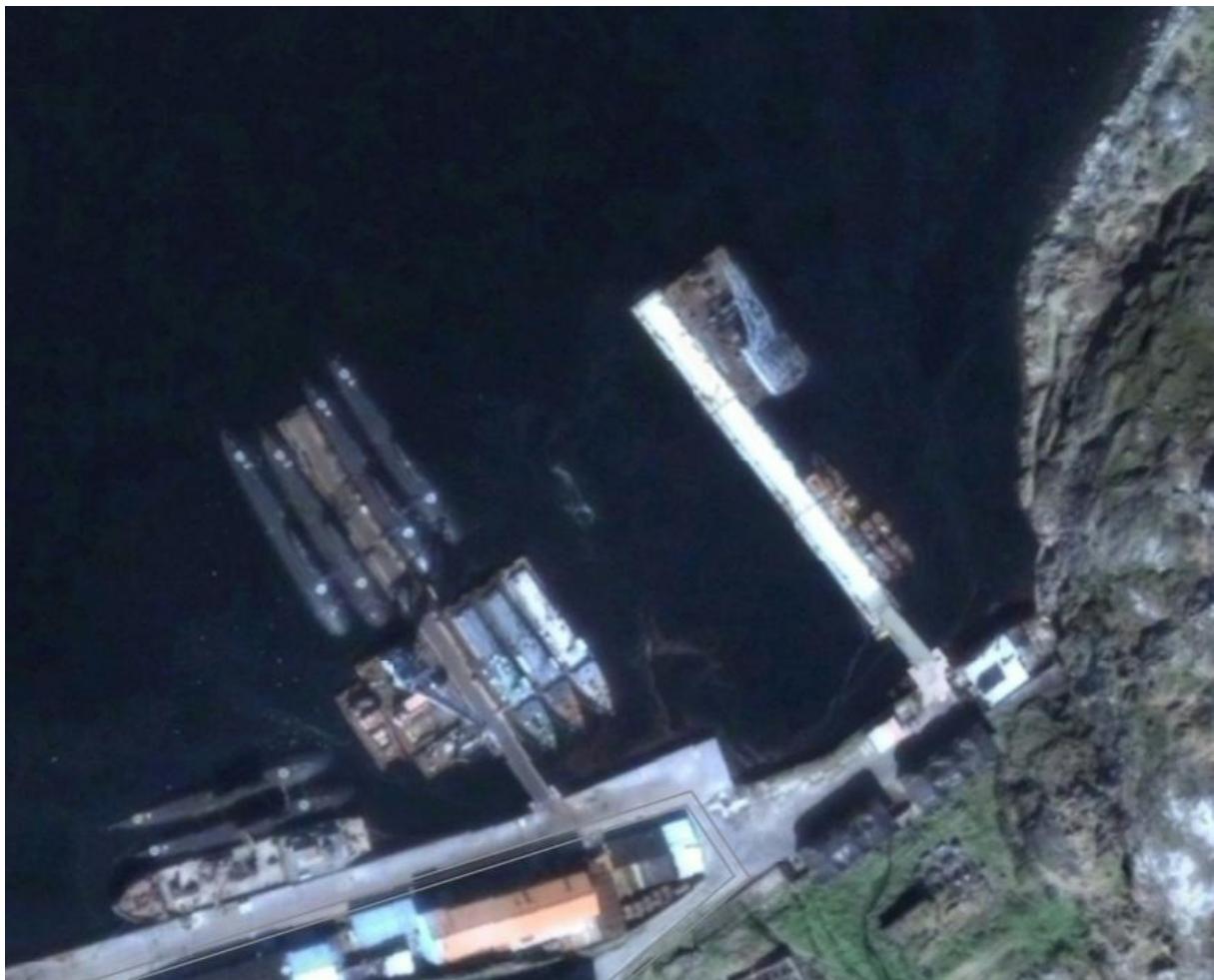
## 1 Provided Information

From the given prompt, the task has been clearly identified as giving the geolocation of the aft end of the northernmost submarine attached to the pier. This location is to be provided in exactly three English words followed by the NATO reporting name of the submarine: four words in total.

The first part of the task will be accomplished using the site what3words (<https://what3words.com>) which maps 1mx1m sections of the earth captured by Google Maps to exactly 3 words. This first requires identifying at what location the image was taken.

An image is attached showing the location along with the hint that the NATO reporting name of the submarine is a spelled out letter from the NATO phonetic alphabet.

### 1.1 Attached Image





## 2 Using Context To Narrow The Search

The prompt has several critical clues that can save hours of searching if properly read. The use of the phrase "NATO reporting name" in particular hints that this is not a NATO submarine which means that large chunks of land like North America, France, Sweden, etc. can be safely ignored. Additionally, the use of the NATO phonetic alphabet to designate submarine classes is something historically associated with Soviet and Russian Federation vessels.

Looking at the image itself, there are some clues about the potential location revealed in the hue of the water and the terrain. The water is clearly very dark despite being close to a large terrain formation. This hints at the location being cold and relatively deeper which is usually associated with the Northern Hemisphere. While the People's Republic of China could still be in consideration, the Russian Federation is a better initial guess given this information.

Knowing that submarines must be kept relatively close to open waters and that their storage in shallower waters is impractical, this also limits the search significantly to the shore of large inlets in the coastline.

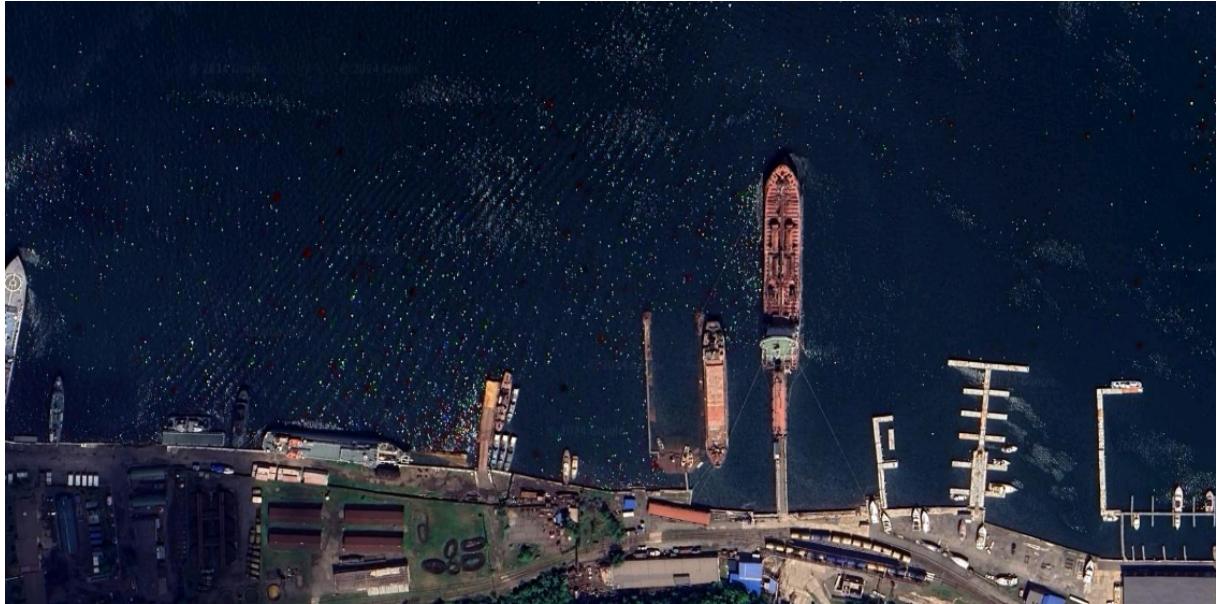
### 2.1 Ruling Out The Black Sea Fleet

The Black Sea Fleet currently operates in its namesake body of water in the south of Russia. The main two ports that could potentially house submarines being either occupied Sevastopol or Novorossiysk. As seen in the image below, the waters in this region are much lighter, especially as they approach inland terrain, and the terrain features do not match with the provided image at all.



## 2.2 Ruling Out Vladivostok

Vladivostok looks more promising, but has some features that make it unlikely to be a good contender. For one, the waters are clearly more turbulent, whereas in the provided image they are almost completely still. Secondly, the terrain does not match the rocky/cliff face appearance of the provided image.



## 2.3 Honing In On Murmansk

Murmansk on the other hand has much calmer waters and the terrain is a much closer match. Being rocky, but with some greenery.





## 3 Identifying The Submarine Class

Looking at the Wikipedia page for various NATO reporting names for submarines, there is one in particular that stands out. Thumbing through the entries shows that the Kilo class is the most relevant of the Hunter/killer submarines due to its recency and widespread adoption and is a good initial working theory.

### List of NATO reporting names for submarines

Article Talk

Read Edit

From Wikipedia, the free encyclopedia

**NATO has a system of reporting names for non-Western submarines.** During the Cold War, NATO introduced code names for classes of Soviet and Chinese submarines. This served to provide standard names where the original Soviet/Chinese designations of vessels were unknown. The system was influenced by a pre-existing, separate system for non-Western aircraft.

Until the 1980s, reporting names for submarines were taken from the NATO spelling alphabet. Modifications of the given descriptive terms, such as "Whiskey Long Bin". From the 1980s onwards, new designs were given names of words, such as "Akula" ("Shark"). These names did not correspond to the Soviet names. Coincidentally, "Akula", which refers to an attack submarine by NATO, was the actual Soviet name for another, ballistic missile submarine class, which was named "Typhoon".

The names for Chinese submarines are taken from Chinese dynasties.

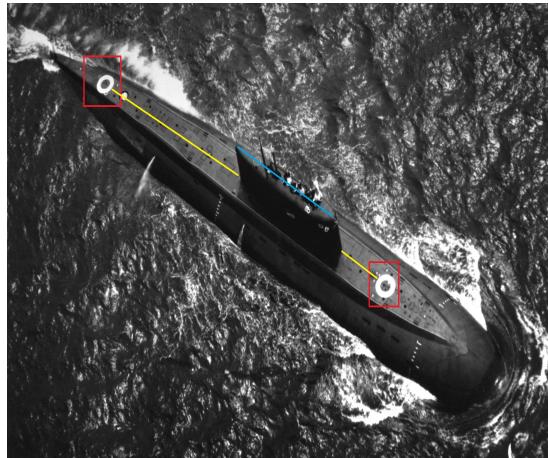
### List of reporting names for Soviet/Russian vessels [ edit ]

The code names are followed by official Soviet Navy/Russian Navy designations.

#### Hunter/killer submarines [ edit ]

- Hunter/Killer Submarines - Diesel/Electric Propelled (*Podvodnaya Lodka - PL*)<sup>[1]</sup>
  - "Zulu" (Project 611) 26 boats
  - "Whiskey" (Project 613)
  - "Quebec" (Project A615)
  - "Romeo" (Project 633)
  - "Foxtrot" (Project 641)
  - "Tango" (Project 641B - Som class)
  - "Kilo" (Project 877)
  - "Export Kilo"
  - "Improved Kilo" (Project 636)
  - "Petersburg" (Project 677, Lada)

This theory can be further supported by comparing open-source images of Kilo-class submarines to the submarines in the provided image.



(a) Kilo-Class Submarine



(b) Provided Image

Figure 1: A side-by-side comparison of the two images shows the distinct markings and proportions of the Kilo-class submarine present in the image

## 4 Tracking Down The Base

Putting all this together, the base is likely to be housing Kilo-class submarines somewhere in Murmansk. Looking at the Wikipedia page for Kilo-class submarines, there is a base in Polyarny that is explicitly mentioned:

### Gallery [ edit ]



The Polish Kilo-class submarine [ORP Orzeł](#), 26 June 2011

Russian Kilo-class submarines in [Polyarny](#), Murmansk Oblast

An Algerian Kilo-class submarine

A Chinese Kilo-class submarine being delivered from Russia as deck cargo in 1995.



ORP *Orzeł*, the control room of an 877E-class submarine

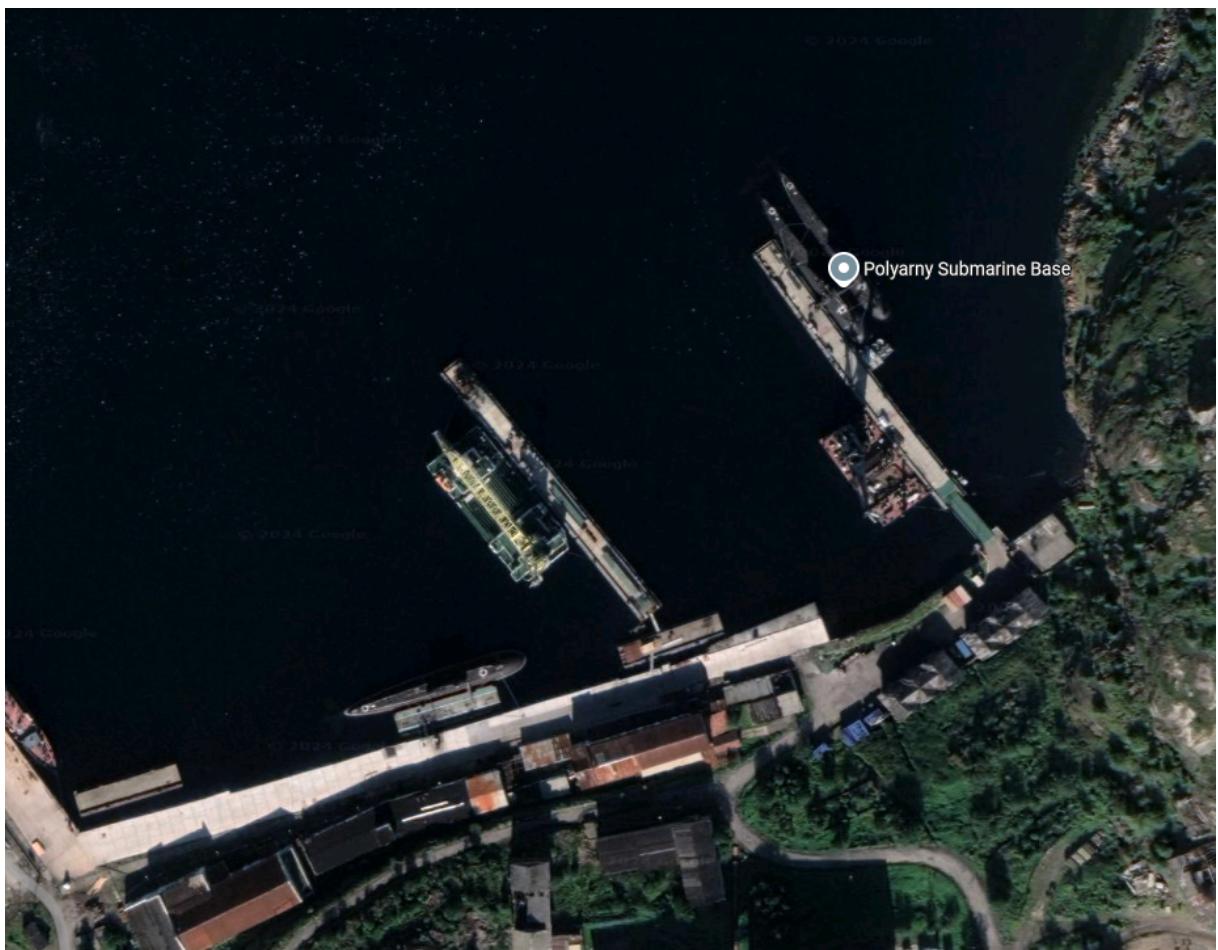
The Iranian Kilo-class submarine *Yunes*, during delivery in 1995.

Indian Kilo-class submarine, INS *Sindhughosh*

Diesel submarine Kilo-class *Kaluga* returns from a long voyage

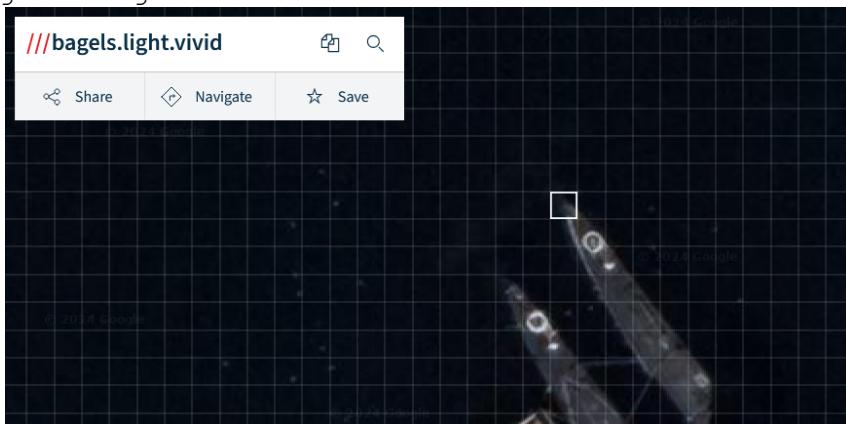
Russian Improved Kilo-class submarine *Ufa* during the Russian Navy Day parade in 2023.

Going to this location in Google Maps shows the current layout of the base as this:



This bears more than just a passing resemblance and is strikingly similar to the provided images. There are two long piers connected to a piece of terrain with the same silhouette as in the image and a complex of identical (though much more worn-out) buildings on the shore.

Using the demanded format, this location has the unique code of bagels.light.vivid:



And the flag becomes: PCTF{bagels.light.vivid.kilo}