Port of Kolobrzeg. Air and Water quality monitoring

SCOPE

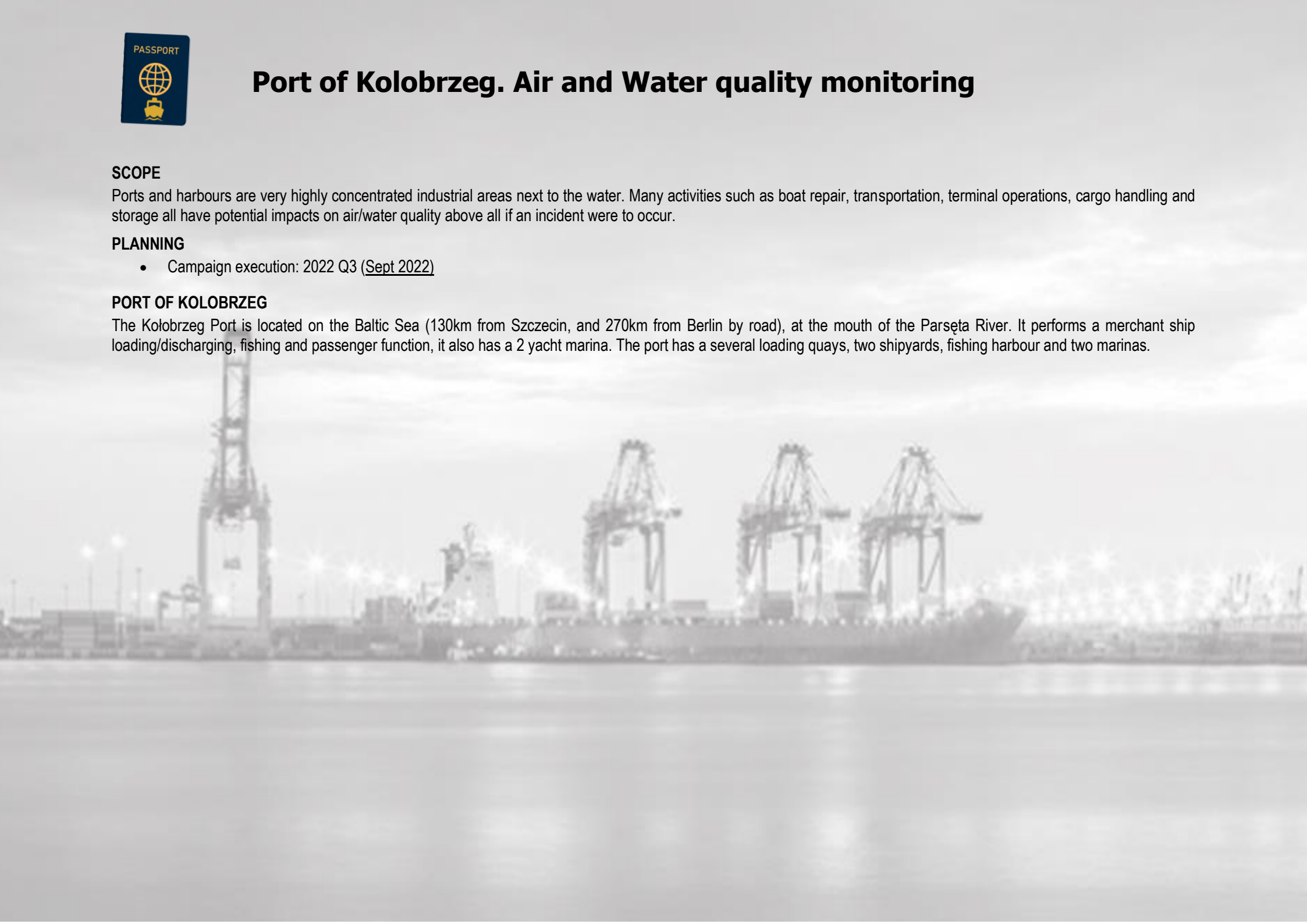
Ports and harbours are very highly concentrated industrial areas next to the water. Many activities such as boat repair, transportation, terminal operations, cargo handling and storage all have potential impacts on air/water quality above all if an incident were to occur.

PLANNING

- Campaign execution: 2022 Q3 (Sept 2022)

PORT OF KOLOBRZEG

The Kołobrzeg Port is located on the Baltic Sea (130km from Szczecin, and 270km from Berlin by road), at the mouth of the Parsęta River. It performs a merchant ship loading/discharging, fishing and passenger function, it also has a 2 yacht marina. The port has a several loading quays, two shipyards, fishing harbour and two marinas.



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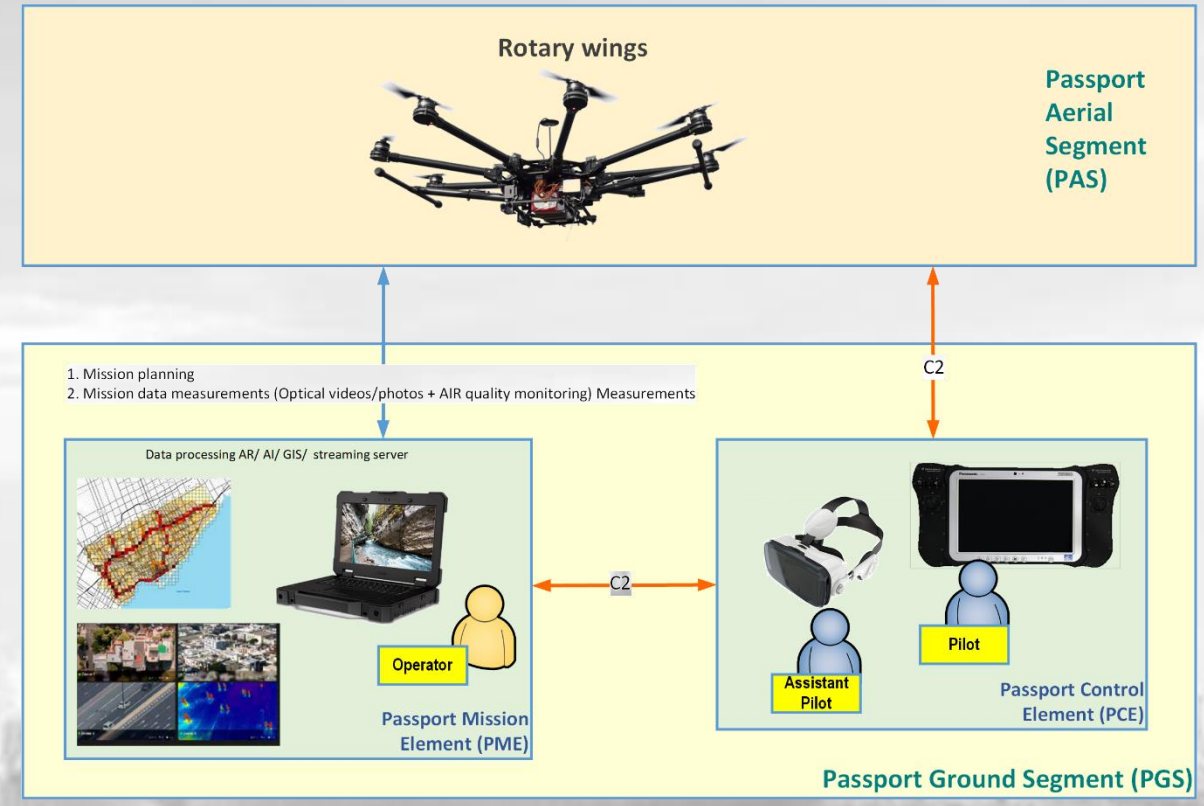
PASSPORT ARCHITECTURE CONFIGURATION

PASSport configuration for this campaign is composed by:

- One (1) rotary wing drone equipped by pollution sensors and optical camera for distant video monitoring
- One (1) pilot ground segment composed by a remote command and mixed reality goggles
- One (1) mission center (PME) where both real time (video for situational awareness) and data for post-processing are collected, processed together with Copernicus, validated and published. PME also manages all mission phases, i. e. planning, acquisition, processing, validation, reporting.



EGNOS/ Galileo usage

Drones operations are supported by Galileo enabled GNSS receivers operating in RTK configuration

Copernicus usage

The **Sentinel-5P** satellite mission enables air quality monitoring on a global scale. Sentinel-5 Precursor, or Sentinel-5P is the first mission dedicated to monitoring our atmosphere.

Mixed Reality

a custom Mixed reality (MR) system is being developed to improve comfort, usability, situational awareness, readability for the pilot in command.

THE PILOT IN PORT AREA

During air quality surveillance mission, a 3d point map will be generated with each data point describing air quality as measured with all installed sensors. Colour coding and simple alert system should be implemented. The mission assumes the surveillance flight around the cargo and administration area with few height levels. Details of the flight will be established with the pilot. Flight will be realised in square patterns with increasing heights of 20m (above the port buildings), 40m and 60m.

During water pollution surveillance mission drone will be equipped with a camera, thermal camera and UV camera system and will perform flight around the shipyard and fishing port area analysing visible, UV and IR spectra. With cooperation with local SAR service, it may be possible to perform such mission during SAR oil spill training. The oil spill will be simulated by natural materials (popcorn) floating down the river Parsęta. Cooeration wit the SAR service and port cleaning vessel is planned to perform oil – combat action.

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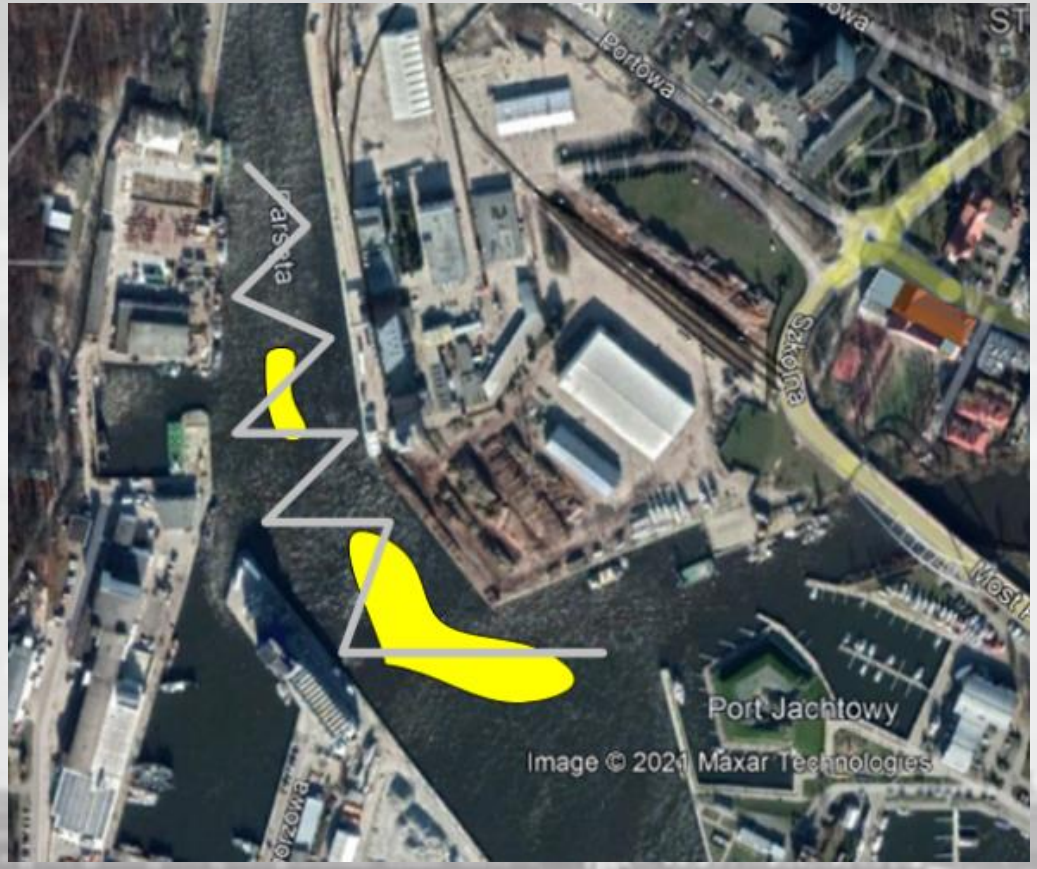

Preliminary mission plan for air quality monitoring

Simulated oil pollution and drone patterns for monitoring and detection