



Helios Challenge

GulfStream Team

May 3, 2023

IA & Oceans

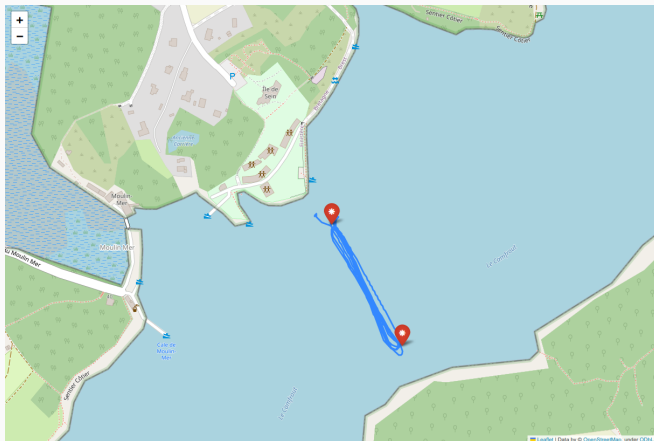
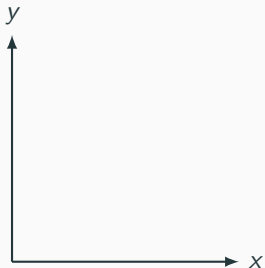
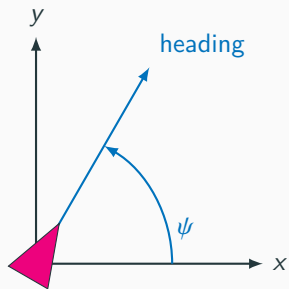
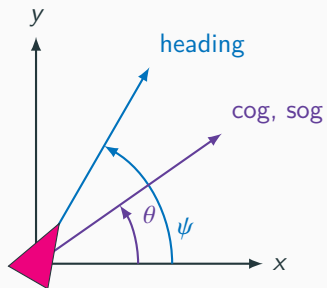
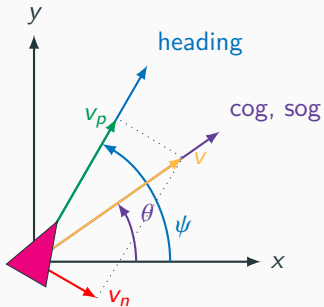


Figure 1: Mission









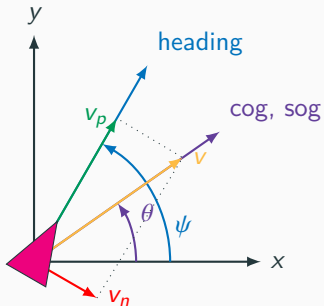
Sway Surge

- Velocity v
- Surge v_p (Heading parallel velocity)
- Sway v_n (Heading normal velocity)

$$v = v_p + v_n \quad (1)$$

$$v_p = v \cdot \cos(\theta - \psi) \quad (2)$$

$$v_n = v \cdot \sin(\theta - \psi) \quad (3)$$



Sway Surge

- Velocity v
- Surge v_p (Heading parallel velocity)
- Sway v_n (Heading normal velocity)

$$v = v_p + v_n \quad (1)$$

$$v_p = v \cdot \cos(\theta - \psi) \quad (2)$$

$$v_n = v \cdot \sin(\theta - \psi) \quad (3)$$

Current estimation

- Normal current $v_n = c_n$
- Parallel current $v_p = v_{helios} + c_p$

Velocities

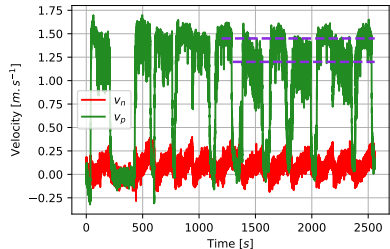
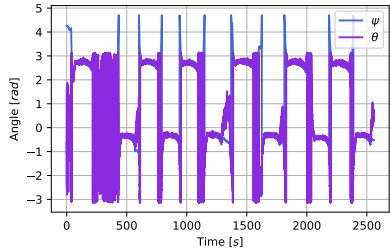
$$\mathbf{v} = \mathbf{v}_p + \mathbf{v}_n \quad (4)$$

$$v_p = v \cdot \cos(\theta - \psi) \quad (5)$$

$$v_n = v \cdot \sin(\theta - \psi) \quad (6)$$

COG heading

$$\theta = \arctan2(\dot{y}, \dot{x}) \quad (7)$$



Current

- $c_n = 0.15 \pm 0.5 \text{ m.s}^{-1}$
- $c_p = 0.10 \pm 0.5 \text{ m.s}^{-1}$

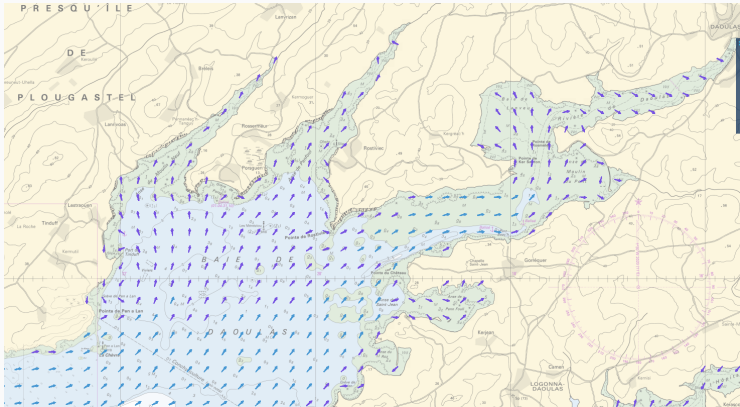


Figure 2: Final map of currents at Moulin-Mer

Questions?