Supplementary material

InterSeA: An Unmanned Surface Vehicle (USV) for Monitoring the Marine Surface Microlayer (SML) in Coastal Areas

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(a)



(b)

Figure S1. Containers for SML (a) and SSW (b) samples

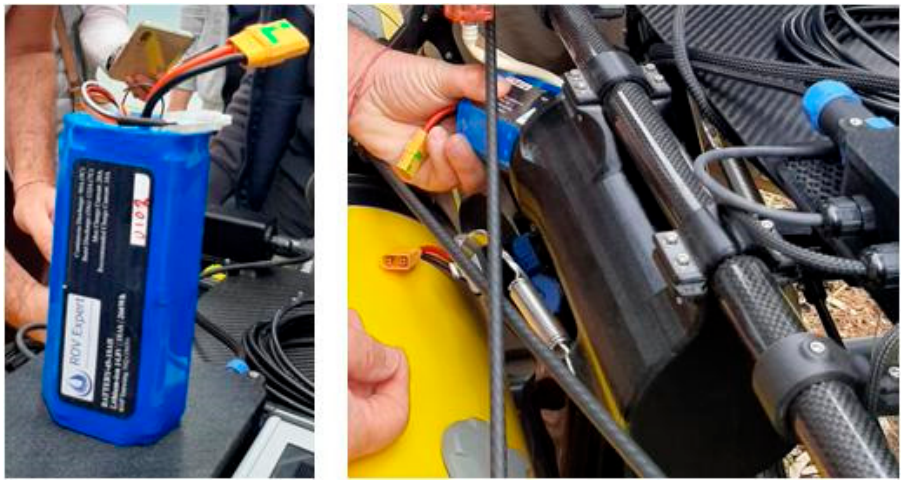


Figure S2. Rechargeable batteries of the USV system



Figure S3. Anemometer, irradiance detector and antenna for the remote navigation of the USV

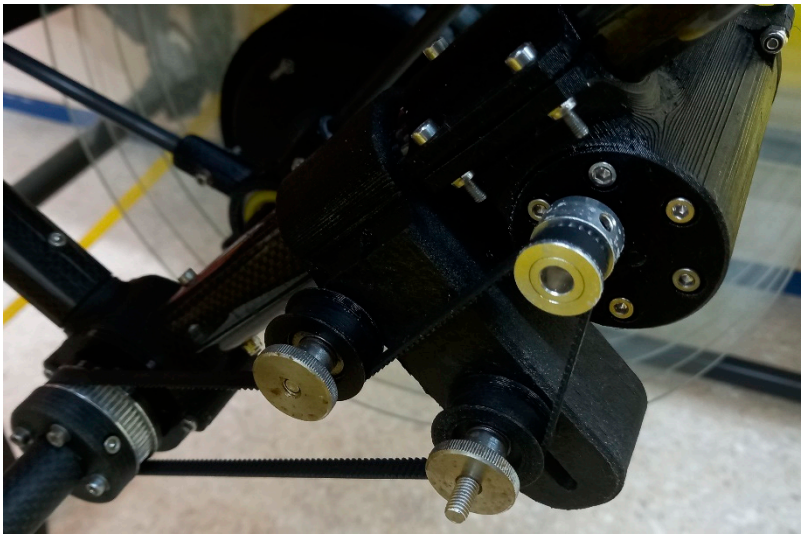


Figure S4. Rotation mechanism of glass discs

Table S1. Limits of detection (LODs) for n-alkanes (C_7-C_{40})

n-alkanes	**LOD (μg L^{-1})**	**n-alkanes**	**LOD (μg L^{-1})**
C_7	0.12	C_{24}	0.10
C_8	0.06	C_{25}	0.06
C_9	0.05	C_{26}	0.06
C_{10}	0.05	C_{27}	0.06
C_{11}	0.06	C_{28}	0.04
C_{12}	0.06	C_{29}	0.04
C_{13}	0.07	C_{30}	0.02
C_{14}	0.07	C_{31}	0.01
C_{15}	0.10	C_{32}	0.02
C_{16}	0.08	C_{33}	0.03
C_{17}	0.11	C_{34}	0.04
C_{18}	0.10	C_{35}	0.06
C_{19}	0.10	C_{36}	0.08
C_{20}	0.12	C_{37}	0.10
C_{21}	0.11	C_{38}	0.14
C_{22}	0.07	C_{39}	0.20
C_{23}	0.11	C_{40}	0.31

Table S2. Limits of detection (LODs) for polycyclic aromatic hydrocarbons (PAHs)

Polycyclic Aromatic Hydrocarbons (PAHs)	Abbreviation	LOD (ng L^{-1})
naphthalene	NP	0.109
acenaphthylene	ACY	0.067
acenaphthene	ACE	0.030
fluorene	FL	0.013
phenanthrene	PHE	0.039
anthracene	ANT	0.016
fluoranthene	FLA	0.054
pyrene	PYR	0.022
chrysene	CHR	0.015
benzo[a]anthracene	BaA	0.024
benzo[b,k]fluoranthene	BbkF	0.021
benzo[a]pyrene	BaP	0.006
dibenzo[a,h]anthracene	DahA	0.004
indeno[1,2,3-cd]pyrene	IcdP	0.008
benzo[g,h,i]perylene	BghiP	0.005

Table S3. Concentrations of dissolved organic carbon (DOC), suspended particulate matter (SPM), chlorophyll-*a* (chl-*a*) and their enrichment factors (EF) in SML

Sampling campaign	Sampling Method	SPM (mg L^{-1})	EF_{SPM}	DOC (mg L^{-1})	EF_{DOC}	chl-*a* (µg L^{-1})	$EF_{chl\text{-}a}$
25.6.2024	SML glass discs	17.6	1.2	1.5	1.2	0.30	1.6
	SSW USV	14.6		1.3		0.19	
	SML mesh screen	21.5	1.1	1.7	0.9	0.66	3.9
	SML glass plate	26.2	1.4	1.7	0.9	0.41	2.4
	SSW manual	19.2		1.8		0.17	
26.6.2024 - I	SML glass discs	22.6	1.0	2.4	1.7	0.69	1.2

Sampling campaign	Sampling Method	SPM (mg L^{-1})	EF_{SPM}	DOC (mg L^{-1})	EF_{DOC}	chl-*a* (µg L^{-1})	$EF_{chl\text{-}a}$
26.6.2024 - II	SSW USV	21.6		1.4		0.58	
	SML mesh screen	30.5	1.3	2.7	1.7	0.52	0.7
	SML glass plate	31.5	1.4	2.6	1.6	0.74	0.9
	SSW manual	22.6		1.6		0.78	
	SML glass discs	23.6	1.0	2.8	1.9	0.50	1.1
	SSW USV	23.2		1.5		0.44	
	SML mesh screen	23.8	1.4	2.1	1.2	0.43	0.9
	SML glass plate	25.0	1.5	2.3	1.4	0.81	1.7
	SSW manual	16.9		1.7		0.49	

Table S4. Concentrations of total PAHs (ΣPAHs), total n-alkanes (Σn-alkanes) and their enrichment factors (EF) in SML

Sampling campaign	Sampling Method	ΣPAHs (ng L^{-1})	$EF_{\Sigma PAHs}$	Σn-alkanes (µg L^{-1})	$EF_{\Sigma n\text{-}alkanes}$
25.6.2024	SML glass discs	54.8	2.8	17.7	0.8
	SSW USV	19.6		21.9	
	SML mesh screen	59.5	3.9	22.7	1.4
	SML glass plate	46.8	3.0	23.9	1.5
	SSW manual	15.4		15.9	
26.6.2024 - I	SML glass discs	56.6	2.0	25.1	1.4
	SSW USV	28.6		18.2	

Sampling campaign	Sampling Method	ΣPAHs (ng L^{-1})	$EF_{\Sigma PAHs}$	Σn-alkanes (µg L^{-1})	$EF_{\Sigma n\text{-}alkanes}$
26.6.2024 - II	SML mesh screen	54.4	2.7	16.7	0.8
	SML glass plate	51.9	2.5	24.0	1.2
	SSW manual	20.4		20.2	
	SML glass discs	36.3	1.9	26.1	1.3
	SSW USV	18.7		19.4	
	SML mesh screen	44.1	2.5	17.5	1.2
	SML glass plate	36.3	2.1	20.2	1.4
	SSW manual	17.6		14.6	