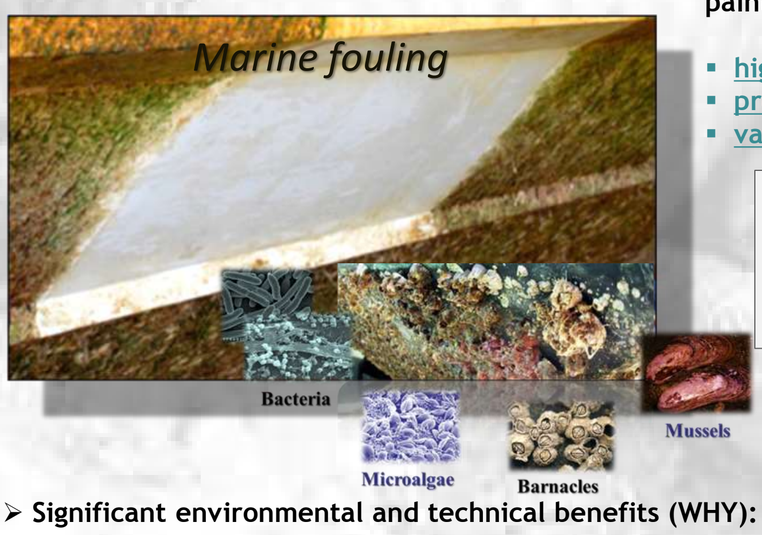
PAINT-IT Project - Overview

[LIFE 15 ENV/IT 00417]

Objectives&Scope



➢ Demonstration of a novel anti-fouling paint for naval application (WHAT):

- high-quality safe anti-fouling paints
- pre-industrial scale production
- validation on real-to-close conditions

Amphiphilic surfaces physically disorientate the growth of marine species (HOW): *functionalization of organic-inorganic hybrid resins*

➢ Significant environmental and technical benefits (WHY):

- 100% reduction of biocides in marine ecosystems
- huge decrease of waste due to the reduction of hull maintenance activities
- consistent reduction in CO_2 emissions due to reduced friction of clean vessels

Summary of project's actions

ACTION A: Preparatory actions
Set of activities to finalize the antifouling formulation to be scaled-up

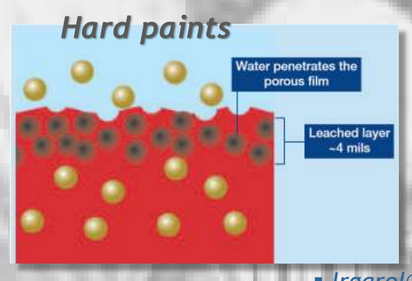
ACTION B: Implementation actions
Demonstration of the capability of the pilot plant

ACTION C: Monitoring of the impacts of the project actions
Life Cycle Assessment (LCA) analysis (ISO 14040:2006, 14044:2006)

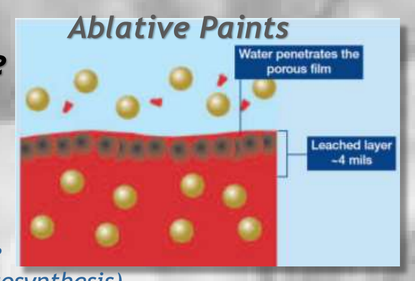
ACTION D: Communication and dissemination
Impact of project results at national/EU scales

ACTION E: Management and monitoring of the project progress

State of the art



Anti-vegetative paints



Based on biocides:
- *Cuprous Oxide*
- *Cuprous Thiocyanate*
- *Irgarol® 1051 (inhibitor of photosynthesis)*
- *Zinc Pyrithione*
- *Econea™ (organic metal-free antifouling agent)*

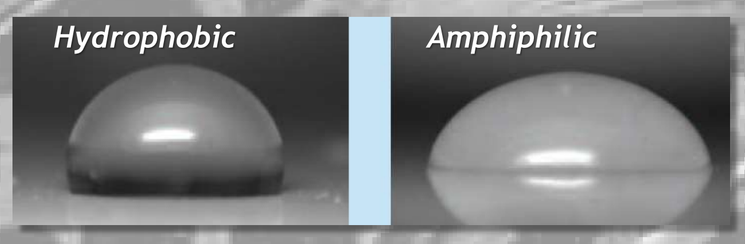
Leaching of the biocides from an intact hard paint layer:
- decreasing release of biocides with time
- do not work out of the water
- need repainting by over-coating

Release of biocides by the progressive ablation of paints:
- release of biocide slowed down until the leaching layer is worn off

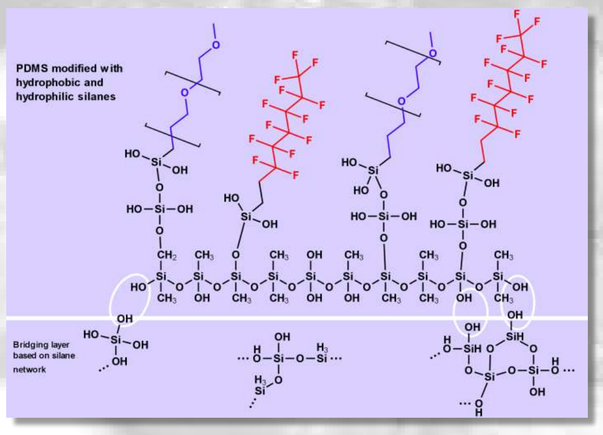
Non-biocidal coatings

Foul Release Coatings
- ❑ Silicone based technologies work by providing very smooth, slippery, low friction surface onto which fouling organisms have difficulty attaching or are easily removed.
- ❑ The introduction of the fluoro-polymer chemistry leads to significant improvement of the performance of silicone based systems.

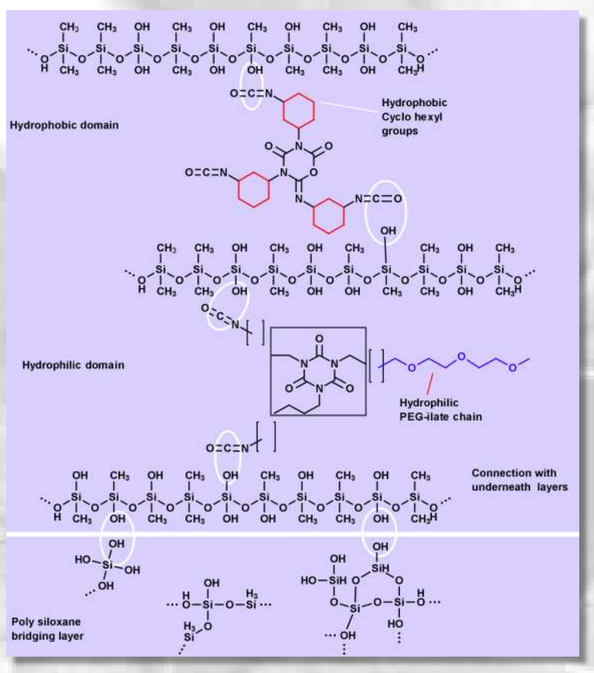
Amphiphillic coatings
- ❑ With their mutual (hydrophobic to hydrophilic) behaviour, disorientate the growth of marine species and suppress significantly the adsorption of proteins.



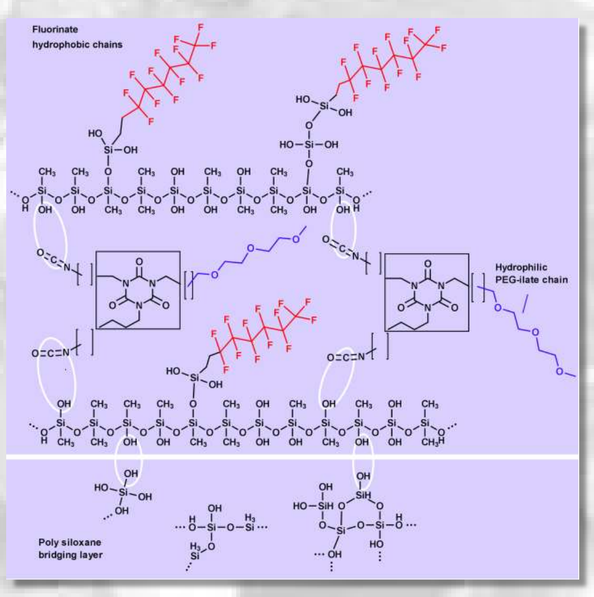
Focus on the strategies



Strategy 1



Strategy 2



Hybrid strategy

Easy-to-process chemical routes and operations:

- ✓ no nitrogen atmosphere
- ✓ no dialysis or super-filtration steps
- ✓ no pressurized reactor
- ✓ shorter reaction times (few seconds to max 2 h)
- ✓ reactions carried out at standard conditions

Critical issues:

- need to control heat released during the process
- need to manage the release of gases