ADVANCED MATERIALS FOR RESILIENT SENSORS

PROBLEM

- Address liabilities impacting safe and rapid advanced materials manufacturing modernization
- Environment as a threat to nano-enabled technologies (life cycle)
- Uncertainty threatens technology deployment

SOLUTION

- Real-time harmful gas detection prioritizing soldier and environmental health
- Life cycle assessment of nano-enabled sensors
- Environmental durability of sensor performance & toxicity of common nano-enabled base materials
- Prototyping a multi-functional nano-enabled gas sensor; embedding sensors into sensing platforms (UAVs, stored munitions, CO_2 filtration composites)

IMPACT

- Define liabilities and reduce uncertainty delaying nano-enabled technology deployment
- Improve efficiency of safe and rapid advanced materials development; public/workforce education (STEM); user friendly apps
- Reduce environment as a threat for nano-enabled technologies and thus the mission

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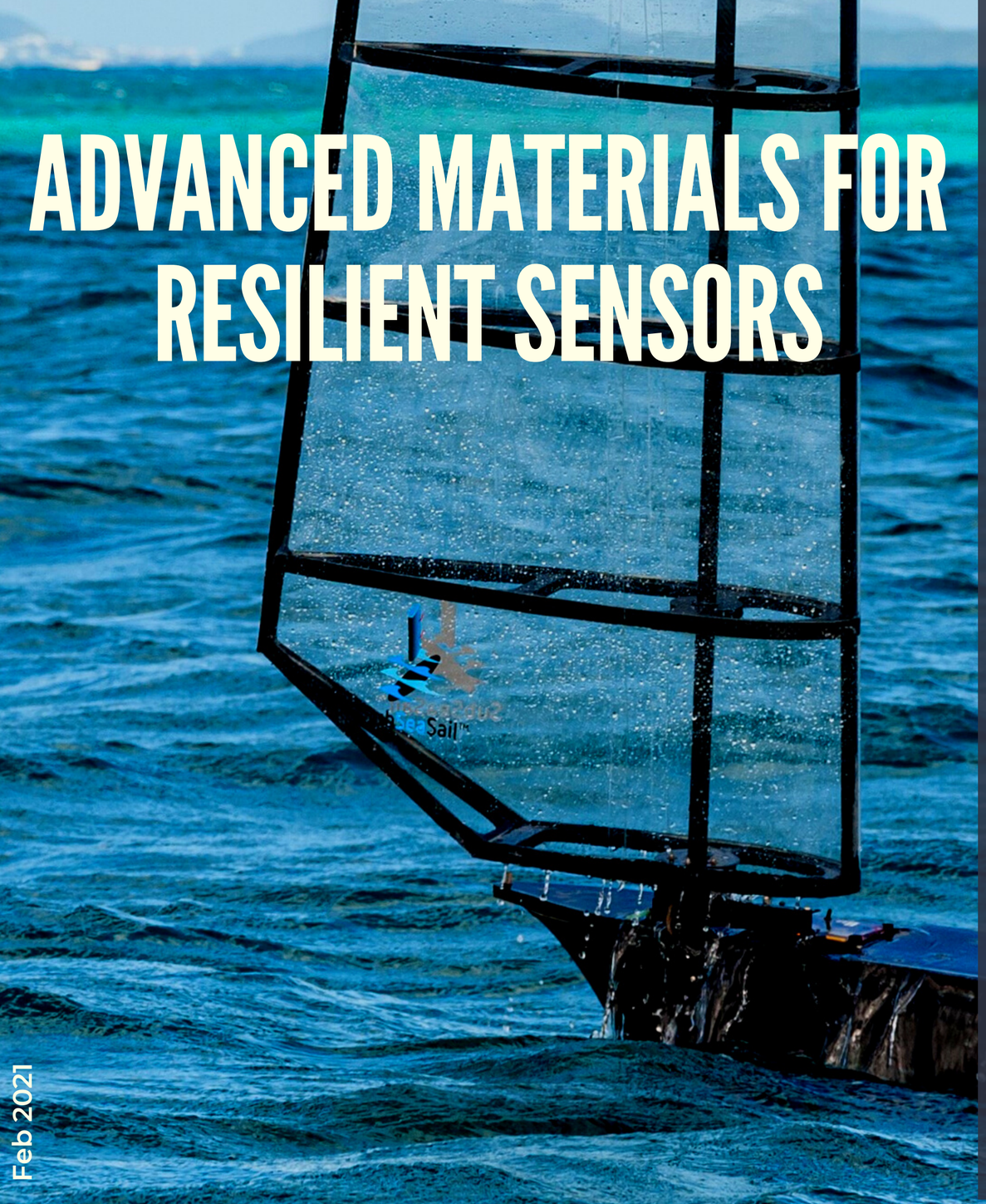

APPLICATIONS

- Inexpensive deployable network of miniaturized environmental sensors enabled by nanomaterials
- Deployable multifunctional devices used in monitoring and prototyping for threat reduction of Army chemicals
- Additively manufactured site-specific chemical monitoring and threat reduction
- Software decision tools to reduce uncertainties and potential liabilities
- Multifunctional sensors embedded into UAS replacement parts to monitor environmental challenges

STATUS

- Multifunctional gas sensor prototyping research in progress for confined or poorly ventilated spaces
- FY20 – FY21: 15 journal articles, 4 technical reports and 5 conference presentations
- Two software decision tools for rapid acquisition of nano-enabled materials

BENEFITS

- Inexpensive, deployable sensor network
- Life cycle assessment framework for rapid acquisition
- Green engineering, manufacturing and disposal procedures based on targeted hazard assessment
- Reduced ESOH uncertainty to decrease environmental liabilities

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