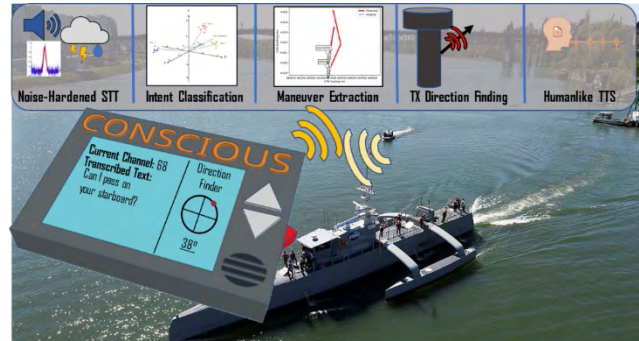


Contextual Observations for Natural Speech Characterization On Unmanned Ships (CONSCIOUS)



TDI Novus, Inc.
Philadelphia, PA
www.tdinovus.com



Contact:

Nicholas DiLeo
 Vice President, Research and Development
 TDI Novus, Inc.
ndileo@tdinovus.com

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THE CHALLENGE

While Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) provide clear guidance for encounters at sea, there are scenarios, such as multi-vessel maneuvering, that are not fully prescribed by these rules. In these instances, mariners typically use Bridge-to-Bridge radio to resolve ambiguities, improve Situational Awareness (SA), and reduce the likelihood of collision. Additionally, mariners use VHF radio to fulfill their watchstanding duties. For Unmanned Surface Vehicles (USVs) to be operationally relevant and safely operate alongside human-piloted vessels, it is necessary for USVs to have a way to intelligently interact over Bridge-to-Bridge radio.

THE INNOVATION

CONSCIOUS gives a USV the ability to transcribe text despite noisy radio communication, extract information from transmissions, convey mission-relevant details to the USV, and generate intelligent responses over VHF radio. CONSCIOUS improves SA for USVs by better understanding other vessels' intents and for nearby ships by clarifying the USV's intentions. Both of these improvements resolve ambiguities on the water and reduce the likelihood of collision.

THE NAVY BENEFIT

Unmanned vehicles and autonomy serve to multiply the impact of the Fleet by reducing manpower and costs associated with typical manned vessels. CONSCIOUS is one critical component that moves USVs from experimental platforms to platforms that have operational impact. Key to this is allowing USVs to operate safely alongside human-piloted vessels and ensuring that USVs comply with watchstanding requirements. To date, TDI Novus has proven its technology iteratively on more complex datasets and demonstrations. In May 2023, TDI successfully performed water demonstrations that show CONSCIOUS' ability to carry a conversation with other vessels (e.g., hailing requests, VHF channel changes) and negotiate maneuvering conversations (i.e., port to port passage, request to alter course).

THE FUTURE

TDI Novus intends to continue maturing CONSCIOUS technology through integration with a USV and performing more complex test cases, including heavily accented speech and non-standard phrasing. TDI Novus is interested in supporting the DoD for other types of human-robot interaction applications, in partnering with large primes for unmanned integrations and demonstrations, and in working with VHF radio manufacturers to license or integrate CONSCIOUS technology into their products.