SmartCoast - An Innovative Digital Coastal Zone Management Tool for the Torres Strait

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SUMMARY

SmartCoast is a pioneering collaborative initiative lead by Fugro in partnership with James Cook University (JCU) and EOMAP. Addressing the need for better coastal zone management tools, the project focuses on improving access and use of GeoData in the Torres Straits. This region is increasingly vulnerable to climate change, experiencing more frequent extreme weather events and amongst the highest rates of sea level rise for any island communities in the Pacific. Mangroves, which naturally line the shorelines of these islands, provide a crucial nature-based solution to mitigate coastal erosion. However, there is a significant lack of baseline data on the extent and health of these mangroves, with monitoring to determine the need for intervention and rehabilitation difficult due to their remote or difficult to access locations.□□To address these challenges, SmartCoast employs a fusion of Earth Observation, LiDAR, and high-resolution imagery to create an uninterrupted, high-resolution, sea-to-land survey path with a specific focus on mangrove vegetation. This comprehensive data collection is essential for developing the robust SmartCoast application, which will serve as a foundational tool for ecosystem and mangrove management.□□SmartCoast is designed as a tailored platform to deliver precise and actionable geo-data insights for coastal management. By creating a virtual representation of the islands, the platform enablse users to make informed decisions by visualizing complex natural processes. It features environmental hindcasting and forecasting for various climate scenarios and storm events. The digital twin will undergo iterative prototyping with various UI/UX designs to ensure user-friendliness and adherence to FAIR (Findable, Accessible, Interoperable, and Replicable) data principles. Codesign with the local community is key to this.□□The verification of mangrove ecosystem data is led by James Cook University (JCU) in collaboration with local island habitat rangers. This collaboration will support the development of advanced capabilities, including inventory classification (e.g., healthy, threatened, transition zones, catchment areas) to enhance mangrove management and assess asset exposure risk to coastal inundation.□□Beyond mangrove

management, SmartCoast has a wide range of potential applications. It can be used for coastal erosion monitoring and mitigation, habitat mapping and biodiversity conservation, disaster preparedness and response, water quality monitoring, fisheries management, tourism and recreation planning, infrastructure development, and climate change research. By providing detailed maps and advanced Geodata, SmartCoast supports biodiversity conservation efforts, helps prepare for and respond to natural disasters, monitors water quality, manages fisheries sustainably, plans sustainable tourism, informs coastal infrastructure development, and contributes to climate change research. SmartCoast represents a significant advancement in digital coastal zone management, providing a scalable and replicable model that can be adapted to other regions facing similar challenges. By integrating cutting-edge technology with local expertise, SmartCoast aims to ensure the resilience and sustainability of coastal ecosystems in the Torres Strait and beyond. Leveraging robust scientific knowledge and innovative technology is vital for developing inventive and comprehensive management practices. Contributions on any aspect of the protection and restoration of coastal and ocean ecosystems are encouraged to promote sustainable and fair management practices.