

Presented at the FIG e-Working Week 2021,
21-25 June 2021 in Virtually in the Netherlands



WORKING WEEK 2021 20-25 JUNE

SMART SURVEYORS FOR LAND
AND WATER MANAGEMENT

CHALLENGES IN A NEW REALITY

Oceans and Seas = SDG14 and a Smart Future

Remote Operations

Surveyor Impact and Opportunities

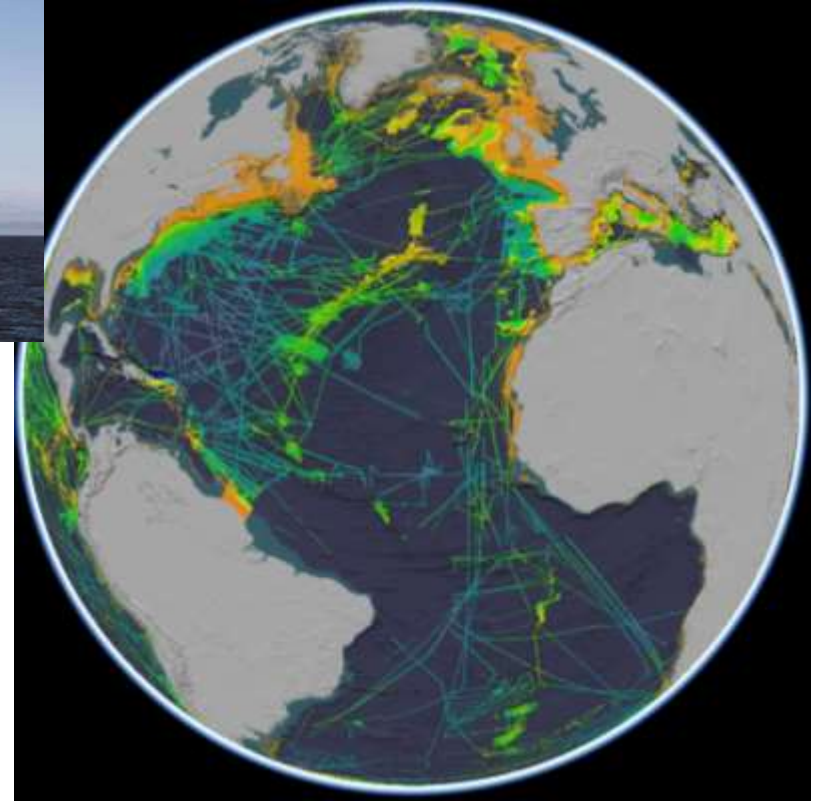
Captain Brian Connon, US Navy, Retired

VP Ocean Mapping

Saildrone, Inc.

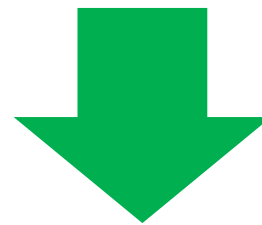
Remote Operations are on the Rise

- Market Drivers
 - Hydrography & Bathymetry
 - Renewable Energy
 - Oil & Gas
- COVID accelerated growth
 - Ships pier side
 - Small boat operations curtailed
 - Extensive quarantine periods
- Necessity breeds innovation
 - Remote Operations
 - Surveyors find a way!



Remote Operations Advantages

- Safety & Comfort
 - Reduced crew size and deck operations
 - Work from home or office
- Work/Life Balance
 - Shore based operations allow flexibility
 - Personal obligations easier to meet
 - Cost of living
- Improved health
 - Reduced impact of ship living
 - Greater access to healthcare/gyms
- Increased productivity?
 - USVs can work longer hours
 - Many feel they are more productive at home
 - COVID likely skews this affect
- Corporate Savings?
 - Salary incentives
 - Reduced physical infrastructure costs



Life



Work



Oceans and Seas = SDG14 and a Smart Future

(NOAA Images Credit: Ensign Jessie Spruill, NOAA)

Remote Operations Disadvantages

- Limited Social & Professional Interaction
 - Face to face contact lost
- Loss of ownership
 - Being physically present for data acquisition
- Health
 - Sedentary workplace
 - Loss of fresh air and physical activity
 - Mental health
- Loss of sea time/pay
 - Surveyors go to sea
- Loss of productivity?
 - Difficult to track employees
 - Distractions and multi-tasking
- Corporate Infrastructure
 - Data security
 - Added equipment expense

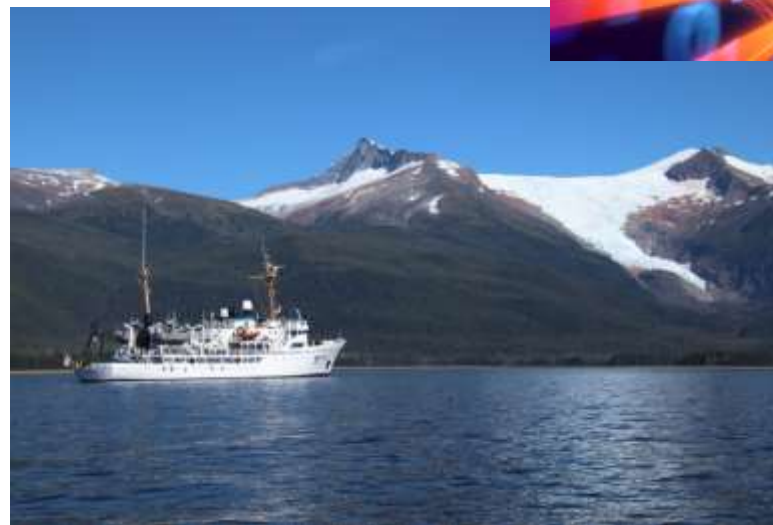
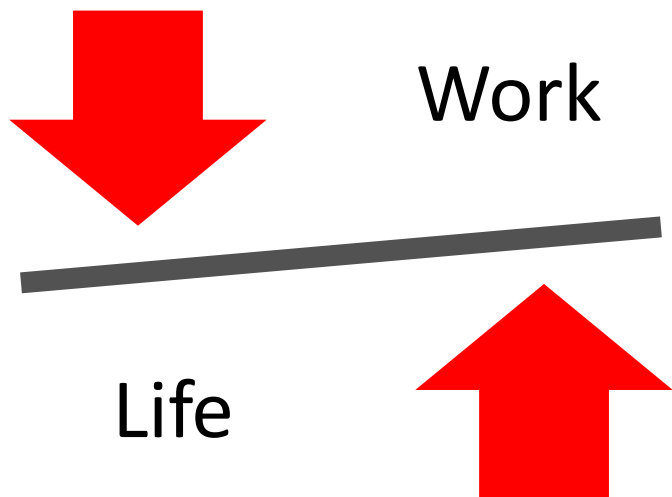
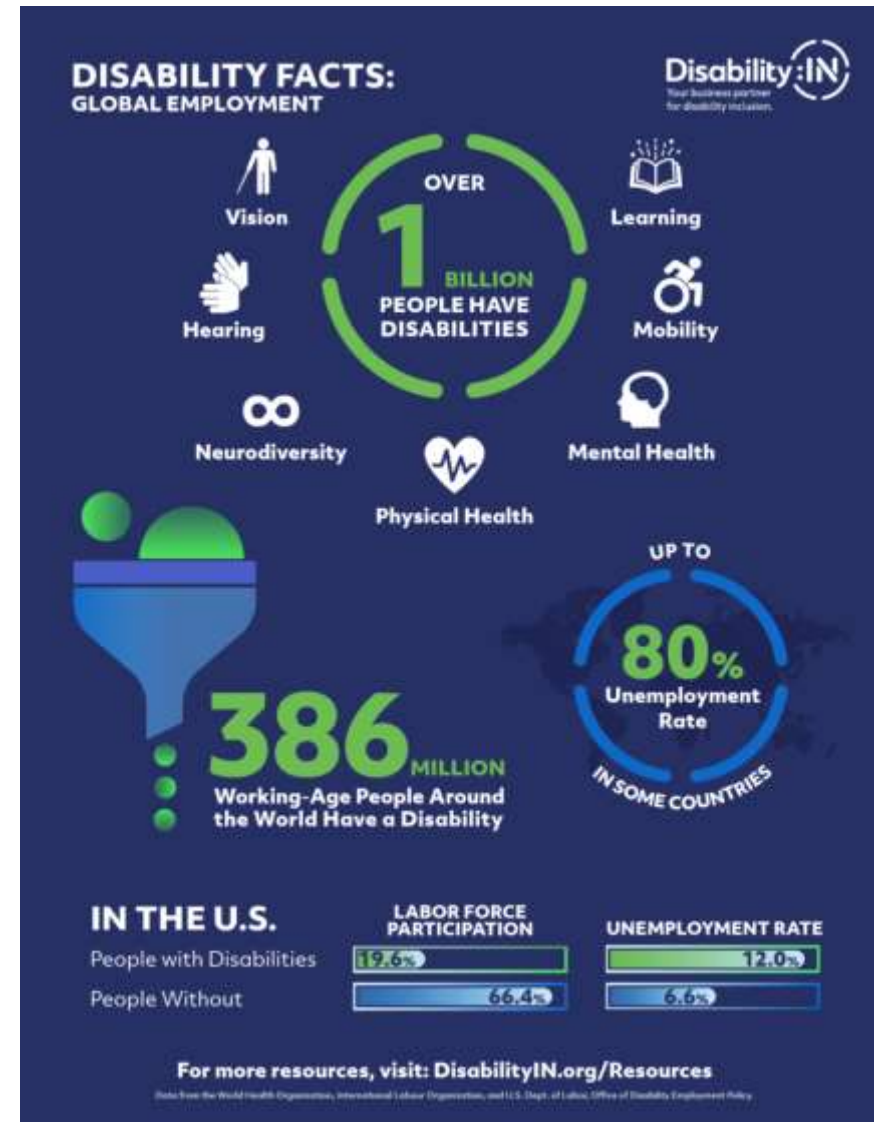


Photo: Audrey Jerauld, NOAA

Oceans and Seas = SDG14 and a Smart Future

Opportunities for Person with Disabilities

- Untapped workforce
 - Training likely required, but worth the effort
- Opportunity for those not qualified/disqualified for shipboard duty
 - Hard of hearing, sight impaired, limited mobility, etc
- Pandemic opened the door
 - Remote work became the norm
- Remote Opportunities
 - Data processing
 - USV Pilot
 - Online Surveyor
 - Production



New Technology Requires New Skills

- Traditional training is ship-centric
 - Remote operations not considered
 - Information and Communication Technology sections of S-5 and S-8 need constant review
- Remote operations need advanced networking
 - Satellite communications
 - Virtual machines
 - Cloud processing
 - Virtual Private Networks
- Data volume is an issue
 - Moving data is costly and time consuming
 - Cloud native acquisition in the future?
- Communications are limiting factor
 - LTE, WiFi, SatCom
 - Bandwidth is small
- Cybersecurity must be considered



Final Thoughts

Industry

- Build ROBUST systems for remote operations
 - Assume uncrewed systems will operate for extended duration over the horizon
 - Resetting cards or cables not an option
 - Streamline data flow
- Data volume is an issue
 - Moving data is costly and time consuming
 - Cloud native acquisition in the future?
- Communications are limiting factor
 - LTE, WiFi, SatCom
 - Bandwidth is small
- Automated onboard processing
- Cybersecurity must be considered

Academia

- Enhance training and education programs
 - Advanced networking
 - Data science
 - Cybersecurity
- Consider continuing education and certificate programs to augment

IHO

- Keep S-5 and S-8 up to date
 - Allow for quick program expansion
- Consider a new Standard
 - Marine Data Scientist