NDSF Technology update

NDSF NATIONAL DEEP SUBMERGENCE FACILITY

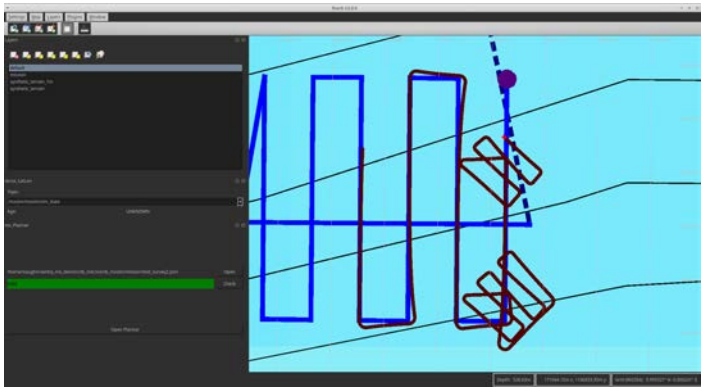
NDSF Technology Update: New Goals

Increase the capability, efficiency, and cross training of NDSF by:

- More aggressively pulling technology from R&D projects
- Ensuring that designs are as modular and re-useable as possible and that significant effort is put into common hardware and software on all vehicles
- Moving all vehicles to a single software platform that is also run on R&D vehicles to improve code re-use streamline maintenance and enable technology pull

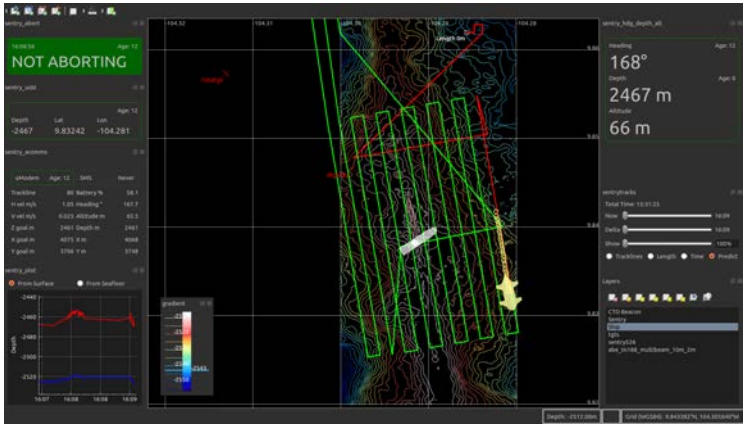
NDSF Technology Update: DS_ROS

- ROS now running on Sentry 60+ dives – highly reliable
- Rolling out mission executive for advanced monitoring and autonomy
- Gives ability to rapidly develop new autonomy modules in a relatively low risk way
- Gives a high end monitoring and cueing system as well as configuration control that will be highly useful even on human-in/on-the-loop systems
- Initial testing on Sentry Engineering Cruise this fall
- Substantial ONR funded development work now ongoing as well (path planning, new nav,
- Started planning work for moving Alvin/Jason to ROS – Jason to start Fall 2020
- Maintainable, common code base
- Interchangeable personnel
- New capabilities for both



NDSF Technology Update: NavG3

- New vehicle user interface
- Looks similar, but different from the ground up
- GIS based – co-locate your data, planning, and monitoring
- Plug in based with savable configurations
- Mainstream on Sentry
- Currently being adapted for Jason – goal is rollout this fall (Oct?)



NDSF Technology Update:

- Move all three vehicles to a common post processing pipeline
- Close, but have all diverged
- Adopt Sentry cruise report format
- Requires a web front end and a database back end to make accessible to all users
- Summer student last summer made viable Sentry/Jason proto – further internal discussion next week
- Will move forward on this as soon as staff free up from Jason NavG3 work
- Reliability Tracking
- Goal is to capture more detailed failure information to allow a data driven approach to reliability
- Being developed now – goal is roll out Fall 2020.