Robodata Daffodil: Converting Actual and Simulated Robot Telemetry and Metadata for Archival DTIC Publication

- Robodata information flow provides a repeatable pattern

• Schema data design: value types and metadata
  - Operator defines mission plan, records summary
  - Robot collects, records sensor data
  - Relay, transfer data to intermediate storage
  - Archive all data: telemetry, imagery, video, 3D
  - Convert telemetry to Rich Semantic Track via Data Format Description Language (DFDL)
  - Operators verify mission logs, narrative, links
  - Publish catalog entries to Calhoun for search
  - Query, compose, analytics mashups, re-use, etc.

- Many years of cumulative prior work all remains sound, see robodata.nps.edu
- Curt Blais dissertation on Rich Semantic Track (RST) shows theoretical basis and practical exemplars for common-denominator track representations among diverse vocabularies for robot/ship/aircraft/simulation missions.
- NPS Calhoun staff has expertise to verify correct application of reusable metadata suitable for archival storage and DTIC publication.
- Multiple projects with students in classes and theses have demonstrated viability of these approaches, steadily improving with each iteration.
- Data Format Description Language (DFDL) enables decorating a structured data model (such as RST) to formally annotate structured text/binary formats.
- Coherent data/metadata publication supports NPS, Navy, USMC missions.

• Artificial Intelligence is diverse, blossoming with common thread:
  - *AI turns data into information usable by humans*
  - Data will enable warfighters to win wars – but only if readable!
  - CNO Maritime Design 2.0 unequivocally confirms that use of unmanned systems is Naval force multiplier, we must engage fully
  - We know how this ends: 24x7x365 robot operations worldwide
  - NPS students need reliable direct access to operational robots and data as part of daily activities, not just occasionally or intermittently
  - Unleash inventive power of junior officers, clearly and repeatably
  - Successful NPS patterns for learning from realistic UNCLAS robotics scenarios can be directly adapted to best practices for fleet forces

• Continuing set of theses exploring crucial Navy challenges driven by defining measurements, tests, feedback loops, spiral development
• Develop data-collection procedures and support, put online
• Establish initial Calhoun storage capacities, equipment, access
• Collect, annotate, publish all ongoing FX experimental data
• Recover, annotate, publish all ongoing FX experimental data
• Tactical Data Strategy Imperatives: structured data as unifying path for system inputs/outputs, coherent interoperability, repeatability
• Training, exemplars by Graduate Writing Center (GWC), Robodojo
• This work supports multiple pillars in NPS Strategic Plan
• Piecemeal approaches waste time to reach same end state

FY20 Call for Proposals

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