FY27 NSRP ET Panel Project Solicitation Pitch Meeting

August 19, 2026

Agenda

Title	Speaker
Ultrasound Condition Based Monitoring (CBM) systems	Robert Roche, CTRL Systems Inc.
1 kV, 5 kA (50 kA fault) Hybrid LVDC Breaker	Juliet Collings, Diversified Technologies, Inc.
Integrated Power Node Center	Juliet Collings, Diversified Technologies, Inc.
Medium Voltage Direct Current (MVDC) Disconnect Switches	Juliet Collings, Diversified Technologies, Inc.
Unreal Routing: Automated Cable Routing, Rule Checks & Pull Sheets	Dakota Dyche, HighVoltage Technologies
Fiber Optic Cable Integrity Monitoring System	Giovanni Tomasi, RSL Fiber Systems, LLC
Ships' Solid State Lighting Control System	Giovanni Tomasi, RSL Fiber Systems, LLC

CTRL Systems Inc. Ultrasound Condition Based Monitoring (CBM) systems

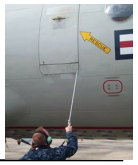
CTRL Systems Inc.
1004 Littlestown Pike, Ste H
Westminster, MD 21157
410-876-5676

CEO: Robert H Roche, Cell 443-847-5103
POC: Robert Roche
Broche@ctrlsys.com
Dave Roche, VP Gen Mgr
daroche@ctrlsys.com

Cage 62373
Veteran owned small business

- **Prior NAVSEA Surface & Subsurface & NAVAIR**
- PMS Activities (Estimated 15:1 ROI For Implementation)
- Over 100 identified potential uses NAVSEA 04 report
- VCHT - Vacuum Leaks of Wastewater Systems
- Compressed Air Leak Detection
- Critical Valves
- Retrofitting & Overhaul (I.e. USS Nimitz & SUPSHIPS)
- Used on F-35, KC46, C130, F-5, P3 & 8, EA-6B & Others



- Handheld sensors kits (**CTRL UL101**) several kits with NSN, best signal to noise ratio on the market
- a 24/7 wireless mounted sensor to be released in 2027 with equal to or better signal to noise
- **InCTRL** a cloud based data capture and analysis software
- **PB300** long distance capture and safety device
- **CloudCTRL** a cloud based AI tech training system. This process is more naturally intuitive to most learners, and helps to increase long-term retention. Ability to access the platform from any browser or the mobile app.
- Vetted and used for assessing conditions of Electrical, Bearing, Gear box, Steam, internal valves, Pressure and vacuum systems, Hydraulic
- Over 30 years of continuing development integrated by industry, NASA ISS, Aviation, Power Gen/Grid, Military (AIr, Land & Sea)

- Ultrasound Condition Based Monitoring (CBM), complete systems for fast field integration
- Electrical vetting by Penn St ARL show a 15:1 ROI to life cycle cost
- Aviation apps cut AOG times to improve readiness and cost of repair
- Compress air energy cost deduced by over 20%
- Apps improves Tech Safety
- Reduced Manpower headcount and time to do current task

1 kV, 5 kA (50 kA fault) Hybrid LVDC Breaker

Project Lead Organization: Diversified Technologies, Inc.

Concept/Idea

Issue: High power density, networkable qualified LVDC circuit breakers are needed for equipment and sailor safety. Faster interruption speed and no DC interruption-arc or arc by-products is highly desirable. The ability to network circuit breakers offers the potential to coordinate opening switches under fault conditions (allowing downstream breakers to operate first and upstream breakers operate only if necessary), provide remote status indication and communications, and minimize fault currents and the time fault currents flow through sensitive equipment.

Proposed Solution(s):
DTI has designed and built a hybrid circuit breaker replacing arc chutes with a solid state switch in a mechanical circuit breaker. The breaker handles 5 kA continuously and 50 kA fault current for 10 ms. The design is scalable and has improved performance compared to a stand-alone mechanical or solid state breaker. It has far less steady state losses than a solid state breaker, and it is arc-less and has a faster opening time than a mechanical breaker.

Benefits/Justification

Benefits of the Project:

The Navy can replace conventional AC breakers, which are typically vacuum or expensive counter-pulse systems with improved performance hybrid LVDC breakers. This project provides compact, ruggedized breakers from United States-based companies for shipboard applications.

- Compact, networkable, ruggedized air-cooled hybrid DC circuit breaker
- Low steady-state losses
- No arc flash or blast by-products
- Low maintenance requirements because contacts do not erode due to high-current interruption
- Solid state devices handle full fault surge current
- The breaker is unrackable within the enclosure to create a safety air gap and for maintenance

Project Approach

High Level Statement of Work:

- The breaker will be tested and demonstrated to the Navy and an environmental qualification plan is being developed for transition onto ships. The next steps are to further ruggedize the breaker for shock and vibration and qualify the breaker. Future development can scale the hybrid breaker to a family of DC low- and medium-voltage and increase current ratings.

Metric(s) of Success:

- Transition from present TRL 6 to TRL 7

Cost/Images/Relevant Information

Project Estimated Cost:

- $2M to qualified unit, can be phased. PoP 12-24 months
- Qualification process included.

Prototype Deliverables:

- Identified system will be delivered.

Integrated Power Node Center

Project Lead Organization: Diversified Technologies, Inc.

Concept/Idea

Issue: Uninterruptable power system for mission-critical systems is essential in combat conditions. Multiple power inputs and outputs with conversion between and amongst with galvanic isolation. Power distribution technologies supplement 60 Hz and 400 Hz AC power systems, convert AC←→DC, incorporate energy storage, and more. Variable voltage power distribution eliminates power factor concerns, frequency conversion, phase balancing, and phase ordering.

Proposed Solution(s):

Air-cooled, galvanically-isolated compact Integrated Power Node Center (IPNC) [images below] are shown with multiple AC and DC Input and Output Modules, polyfilar 300 kW, 20 kHz transformer and rectifiers. Rear-view shows brassboard rack to supply high-quality, uninterruptible ship-board power. The fans exhaust thru the radiators for the air-cooled closed-loop cooling system.

Benefits/Justification

Benefits of the Project:

- Shipboard power can be translated easily with the DTI IPNC at point of use
- Changing voltages, frequencies, and AC-to-DC conversion (or reverse) is performed in modules.
- The various inputs and outputs are galvanically isolated so fault in one input or output does not take down whole system.
- The multiple inputs and outputs can be DC, AC (60 or 400 Hz), or any mix.
- The architecture supports energy storage for uninterruptible power source operation (source-interruption fight-through).
- The present interface choices are dual input voltages of 1000 VDC and 440 VAC, output voltages of 650 VDC, 1000 VDC, 440 VAC at 60 Hz and 400 Hz 3-phase, and a bi-directional energy storage of 300 kW. Other choices possible.
- The modularity of the system provides flexible integration in a wide range of shipborne applications.
- The high power density of 3 MW/m^3 is achieved by using high frequency switched mode power supplies (SMPS).

Project Approach

High Level Statement of Work:

- Several modules and system have been demonstrated in relevant environment.
- Some input / output modules have been breadboarded (TRL 5), but need to demonstrate greater TRL.
- Additional modules are needed and existing modules need refinement and qualification.
- Proposed approach is desired module identified, design refinement, fabricate and test, ruggedize, and qualify system
- Air cooled system due to high efficiency components
- Packaging for shipboard installation.

Metric(s) of Success:

- Transition IPNC from TRL 5 to TRL 7.

Cost/Images/Relevant Information

Project Estimated Cost:

- $3M to qualified unit, can be phased. PoP 24-36 months
- Qualification process included.

Prototype Deliverables:

- Identified modules and system will be delivered.

Medium Voltage Direct Current (MVDC) Disconnect Switches

Project Lead Organization: Diversified Technologies, Inc.

Concept/Idea

Issue: Due to the desire to increase shipboard efficiency and performance, ships are becoming 'more electric' and an increased presence of power semiconductor switches requires disconnect switches to provide galvanic isolation air-gaps for safety and maintenance. Transition pathways are sought to ensure Navy qualification and full transition of this program.

Proposed Solution(s):

The fundamental technologies include voltage standoff capability for Medium Voltage systems, low-loss low resistance contacts for high currents, and a symmetric cam-follower mechanical system providing high CLOSED contact force for low contact resistance which is insensitive to high shock or vibration environments. An electric motor provides remote OPEN-CLOSE operations as well as a mechanical ratchet for manual local control and lock out/tag out. Specifications for a family of MVAC or MVDC two-pole mechanical disconnect switches of varying rated current. Bi-directional disconnect switches are rated for voltages up to 12 kV and currents of 100 A, 500 A, 1000 A, 2000 A, and 4000 A.

Benefits/Justification

Benefits of the Project:

- 'More electric' MVAC or MVDC power distribution systems require advanced disconnect switches for protection (air-gap) and efficiency.
- Medium Voltage systems are more efficient since, for the same transmitted power, the current is reduced hence dissipation is reduced.
- Switchgear enables MVDC power distribution - the warfighter benefits from platforms with greater efficiency, power density, and reliability and lower cost due to design synergies (elimination of multiple transformations, etc.).
- Scalable family of advanced switchgear leverages available reductions in volume , weight, cost, and maintenance of high-speed DC shipboard power distribution and protection systems.
- Disconnect switch is 99.99% efficient.

Project Approach

High Level Statement of Work:

The disconnect switch designed as part of this program will be available for use for MVDC and MVAC bus distribution applications. Transition pathways, such as switchgear for solid state circuit breakers or automatic bus transfer switches are sought to ensure full commercial transition of this program and Navy qualification.

Metric(s) of Success:

- Transition from present TRL 6 to TRL 7

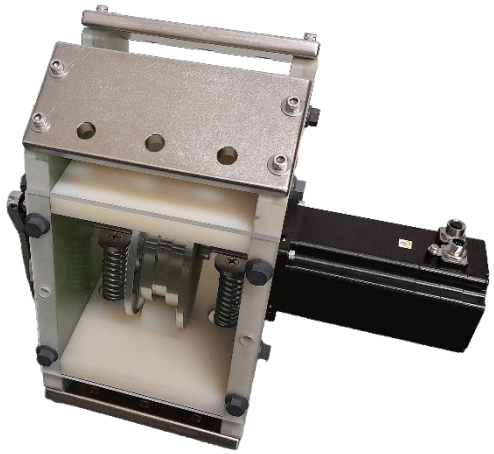
Cost/Images/Relevant Information

Project Estimated Cost:

- $2M to qualified unit, can be phased. PoP 12-18 months.
- Qualification process included.

Prototype Deliverables:

- Identified system will be delivered.



Unreal Routing: Automated Cable Routing, Rule Checks & Pull Sheets

Project Lead Organization: HighVoltage Technologies
Project Team Members: Dakota Dyche (Lead), Tim Norton, Chris Castile; U.S. shipyard partner (TBD)

Concept/Idea

Issue:

- Cable routing is the most labor-intensive, error-prone task in shipboard electrical design. Routes are picked by hand; every structural change forces manual reroute of thousands of cables and new pull sheets.
- Rules are checked after the fact, by hand. Follow hulls inherit lead-hull routes wholesale; hull-specific upgrades mean re-routing by hand again.

Proposed Solution(s):

- Unreal Routing — existing browser-based platform (TRL 5): imports cable schedule and wireway/MCT network, auto-routes by segregation and cable type, checks rules as it routes, packs transits, issues pull sheets; class baseline with per-hull applicability. NSRP funds solver hardening, CAD plugins and a shipyard pilot.

Benefits/Justification

Benefits of the Project:

- 60–80% less routing/rerouting labor; full-zone reroute after a design change in minutes, not weeks.
- Rules enforced at design time (46 CFR Subch. J / IEEE 45, segregation, fill, VD, ampacity, transit class) — higher first-time yield.
- Hull applicability: one class baseline, per-hull deltas — a Hull 2 upgrade re-routes Hull 2 only, with a hull-to-hull diff report.
- Runs in the browser — no workstation install — and can be hosted on-premises inside the yard's network with no cloud dependency. Optional Navisworks/AutoCAD/Revit plugins push routes back into the model.
- TIP FY26: §7.2.2.2(3) cableways, segregation, first-time yield; §7.2.2.6(1d) penetrations.

Project Approach

High Level Statement of Work:

- Shipyard partner requirements — rules, cable library, data formats (Task 1).
- Harden auto-router for large-ship networks; batch reroute; hull applicability & diff (Task 2).
- Navisworks / AutoCAD / Revit plugins — routes back into the model (Task 3).
- Pilot on shipyard vessel dataset; benchmark vs. manual baseline (Task 4).
- Tech transfer: panel briefings, user guide, final report & roadmap (Task 5).

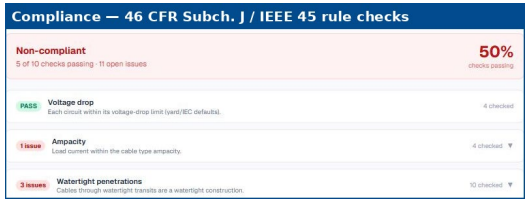
Metric(s) of Success:

- ≥50% cut in routing labor vs. manual; ≥95% auto-routes accepted as-is; full-zone reroute <1 hr; zero rule violations in issued pull sheets.

Cost/Images/Relevant Information

Project Estimated Cost:

- NSRP funds requested: $195,000 · 12 months · TRL 5 → TRL 7
- Labor ~$160K · shipyard pilot & travel ~$20K · software/ODCs ~$15K
- Cost share (in-kind): shipyard partner labor & pilot vessel dataset



Fiber Optic Cable Integrity Monitoring System (2027 PP)

Project Lead Organization: RSL Fiber Systems, LLC
Project Team Members: [NSWCDD, NAVSEA, PSU EOC, TBD Shipyards]

Concept/Idea

Issue: Fiber breakage during cable installation is detected only after fibers are terminated, creating high labor and material costs for replacement.

Visual fault locators require termination of individual fibers.

Proposed Solution(s): Secure a fiber visual fault locator to one end of the cable being pulled to continuously monitor all the fibers at once from the pull end.

Benefits/Justification

Benefits of the Project:

- Reduce labor cost of replacing cable with broken fibers by identifying breaks as soon as they occur during cable pull.
- Eliminate the labor cost to terminate and check each fiber individually to detect breakage.
- May provide a visual indication of fibers undergoing stress at installation by detecting the dimming light output.

Project Approach

High Level Statement of Work:

- Develop a rapid basic termination for an input bundle combining 4F or 8F to couple visible light into all fibers at once.
- Develop a rapid termination method for 4F and 8F at pull end to separate fibers and see light emitted from each.
- Modify a commercial visual fault locator to couple to input fiber bundle and attach to cable during pulling operation.

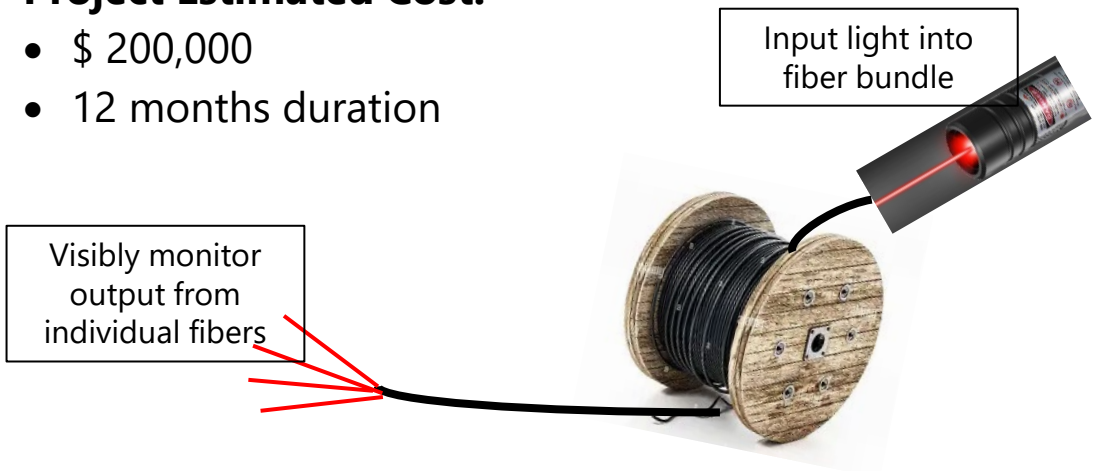
Metric(s) of Success:

- Termination is quick and can be performed with basic tools.
- Light from both SM and MM fibers is clearly seen from pull end of cable.

Cost/Images/Relevant Information

Project Estimated Cost:

- $ 200,000
- 12 months duration



Ships' Solid State Lighting Control System (2027 PP)

Project Lead Organization: RSL Fiber Systems, LLC
Project Team Members: [TBD NAVY, TBD Shipyards]

Concept/Idea

Issue: Ships' navigation lighting control panels are designed for legacy incandescent sources where the source goes from full intensity to off (burnt filament). In Solid State Lighting (SSL) devices the intensity decreases over time. The panel will not detect if the navigation light intensity falls below COLREGS.

Proposed Solution(s): Develop control panels that detect the light output intensity and notify if it falls below COLREGS.

Benefits/Justification

Benefits of the Project:

- Ensure COLREGS compliance of navigation and signaling lights with SSL light sources.
- Facilitate the transition from legacy lighting devices to SSL by providing direct replacement to legacy panels.
- Reduce ships' Total Ownership Cost (TOC) by increasing light sources life from 1,000 hrs. to >30,000 hrs. and by reducing maintenance.

Project Approach

High Level Statement of Work:

- Evaluate the different methods to monitor the output intensity of SSL sources (current, voltage, light sensor, timer…)
- Evaluate commercial SSL navigation lights' control panels.
- Determine most effective SSL control panel design for legacy retrofit and for new constructions.

Metric(s) of Success:

- Panel can be a direct replacement for legacy panels when legacy navigation lights are upgraded to SSL.
- Panel can be used for new constructions.

Cost/Images/Relevant Information

Project Estimated Cost:

- $ 200,000 12 months duration

USS Ford Nav Lights Panel

Yacht Nav Lights Panel
(PMC Controls)

Next Steps

- Panel Project solicitation requires a whitepaper proposal submitted by August 26
- Make sure you have attached support emails from Shipyard Delegates
- Follow all requirements in the NSRP.org solicitation guidelines to ensure your proposal is accepted