

# Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2018-0575

Topic # N04-160

Synthetic External Hydraulic (HEX) Fluid (2075-S) for Submarine Applications  
METSS Corporation

## WHO

**SYSCOM:** NAVSEA

**Sponsoring Program:** PMS 450 and SEA 07

**Transition Target:** All classes of submarines: Los Angeles SSN-688, Seawolf SSN-21, Ohio SSBN/GN 726, Virginia SSN 774, and Columbia SSBN 826.

**TPOC:**  
(202)781-3086

**Other transition opportunities:**

Possibility exists to provide 2075-S to the surface fleet as well. Synthetic fluid technology can be adapted to other motion control and fluid power system applications across the Navy surface combatant, undersea vehicle, and auxiliary ship fleet to improve operational readiness and mission reliability.

Move the US Navy to 2075-S.  
One Navy, One Oil

**Notes:** In the picture to the right, the submarine's thin-line towed array and its associated handling system (capstan shown) is one of several systems controlled by external hydraulic (HEX) fluids.



Image provided by METSS, Copyright 2011

## WHAT

**Operational Need and Improvement:**

The US Navy seeks to develop an improved generation of synthetic hydraulic fluid capable of meeting or exceeding the revised MIL-PRF-17672E specifications for 2075 fluids for use aboard Navy submarines in their lubricating, hydraulic, steam turbine and gear applications, both in the propulsion plant and in selected shipboard auxiliary systems

**Specifications Required:**

Critical for program success is meeting or exceeding MIL-PRF-17672E Qualification Test Requirements:

- Pour Point, °C (°F) max = -29 (-20);
- Flash Point, °C (°F) min = 157 (315);
- Viscosity, centistokes (cSt) @ 40 °C = 28.8 - 35.2;
- Viscosity Index, min = 94;
- Acid Number, mg KOH/g, max = 0.20;
- Corrosion, copper strip @ 100 °C (212 °F), max = 1;

**Technology Developed:**

METSS is developing a new synthetic hydraulic fluid with the goal of meeting and exceeding the revised performance specification for 2075 under MIL-PRF-17672E.

**Warfighter Value:**

METSS service synthetic lubricating & hydraulic fluid:

- lowers shipboard maintenance costs,
- improves the operational readiness of various critical ship systems, and
- extends the performance service life of high precision propulsion and motion control devices shipboard

## WHEN

**Contract Number:** N00178-17-C-2008 **Ending on:** July 25, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Develop Chemical Formula	Low	Chemical additives that enhance the performance of the base stock fluid are identified, and their concentrations in the formulated product are optimized.	5	July 2018
Test and Evaluate Formula	Low	The final 2075-S product formulations will be subjected to the full battery of MIL-PRF-17672E qualification test requirements using a qualified third-party testing facility.	5	September 2018
Develop Detailed Specifications	Low	NAVSEA approval	5	May 2019
Product Scaling	Low	DLA approved facility	6	May 2019
Complete Technology Transition Test Plan	Low	Navy requirements	8	July 2019

## HOW

**Projected Business Model:**

METSS will manufacture and sell 2075-S to the US Navy submarine fleet.

For the surface fleet, METSS also will pursue the development of the other viscosity grades of fluids managed under MIL-PRF-17672E, to create synthetic analogs for 2110-TH and 2135-TH.

**Company Objectives:**

The primary objective is to fully develop and qualify a cost effective synthetic replacement fluid for the MIL-PRF-17672E petroleum-based hydraulic fluid.

**Potential Commercial Applications:**

- Any undersea commercial drilling operation (protect drill bit)
- Wind turbines

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