# Department of the Navy SBIR/STTR Transition Program

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# Topic # N202-105 Digital Twin Technologies to Improve Mission Readiness and Sustainment BluEyeQ LLC

# WHO

SYSCOM: NAVAIR

# Sponsoring Program:

**Transition Target:** V-22 Osprey, H-1 Huey, H-60 Seahawk, other proprotor aircraft

TPOC: (301) 757-7597

#### Other Transition Opportunities:

 Surface ship, submarine condition-based maintenance
Industrial rotating equipment applied to bearings, gearboxes, pumps, motors
Army, Air Force, Marines, DHS, Coast Guard

#### Notes:

 Commercially fielded systems in Steel, Amusement Parks, Aluminum, Plastics, Automotive
Life-Cycle loop closed through interactive Bill of Material

and course of action recommendations



https://www.navy.mil/Resources/Photo-Gallery/igphoto/2003050922/; BluEyeQ Internal 3D CAD model

# WHAT

#### **Operational Need and Improvement:**

- Reliability, safety, and total cost of ownership drive life-cycle cost of Naval assets
- Sustaining maintenance cost 60-80% of total cost of asset ownership
- Warfighter Safety unpredictable asset failure
- Sustainable fleet readiness

#### Specifications Required:

- Virtual model-based representation of a physical system

- Physics-based model responds to real-time or simulated operating data to predict / foresee potential outcomes

# Technology Developed:

- Artificial Intelligence algorithms form a virtual "Digital Twin" of machine operation

Prognostic intelligence of machine component loading, lubrication, and operational telemetry data
Predictive technologies monitor machine current state for advanced notification of potential failure conditions

- 3D modeled components and equivalent load calculations feed targeted diagnostic analysis
- Simulated "what-if" scenario development enables algorithm training for robust conclusions

# Warfighter Value:

- Operational foresight
- Planned and predictable maintenance
- Reduced sustainment cost
- Safety

WHEN Contract Number: N68335-22-C-0847 E			nding on: Dec 04, 2023	
Milestone	Risk Level	Measure of Success	Ending TRL	Date
Yr 1 Progress Demonstration	Low	Function Digital Twin framework	3	1st QTR FY23
Yr 2 Demonstration	Low	Standalone Digital Twin software release	4	1st QTR FY24
Digital Twin Release 1.0	Medium	Initial demonstratable release	4	1st QTR FY24
Digital Twin Release 2.0	Medium	Multiple assets, interative improvements	5	1st QTR FY25

# HOW

# Projected Business Model:

- Demonstrate value on existing fleet aviation assets, e.g. V-22, H-1, H-60, platforms

- Additional Navy assets surface ship, submarine condition based maintenance
- Identify Program of Record and Prime Contractor adoption

# **Company Objectives:**

- Substantial value in Life-Cycle sustainment management

Dual-use technology for both Navy/Government and Commercial deployment
Expand model database and algorithm robustness

# **Potential Commercial Applications:**

- Technology elements currently fielded in multiple Industrial vertical markets

- Digital Twin technology evolves and improves as more data is introduced to the model