# Topic: N142-097

# San Diego Composites, Inc.

## Composite Pallet Rapid Restraint System for TBFDS

Formed in 2002, San Diego Composites, a highly qualified aerospace company focusing on developing next generation materials, systems, structures, and manufacturing technologies, is steeped in strong engineering principals and offers solid R&D and product development processes. Currently, SDC is developing a Composite Pallet Rapid Restraint (CPR2) system that will exceed the NAVAIR CH-53K g-load crash requirements (20/20/10), successfully restraining the 2,400 gallon Tactical Bulk Fuel Delivery System, and can be transported and installed by a single person in approximately 15 minutes/tank. Our Phase II goal is to further develop the CPR2 system and by December 2018 in simulated operational environment using a representative military aircraft cargo compartment successfully demonstrate our CPR2 system (TRL 6). Other potential airplatforms for the CPR2 include V-22, C-130, and CH-53E.

# **Technology Category Alignment:**

Fixed Wing Vehicles (includes UAS) Rotary Wing Vehicles Mobility Protection, Sustainment, and Warfighter Performance Materials & Manufacturing Processes

### Contact:

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## Department of the Navy SBIR/STTR Transition Program

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Topic # N142-097 Composite Pallet Rapid Restraint System for TBFDS San Diego Composites, Inc.

# WHO

SYSCOM: NAVAIR Sponsoring Program: PMA-261 Transition Target: CH-53K, TBFDS TPOC:

(301)342-5872

Other transition opportunities: C-130, V-22, CH-53E. commercial cargo aircraft, commercial shipping

Notes: TBFDS - Tactical Bulk Fuel Distribution System

Additional Benefits/Goals: - TRL/MRL 5 @ 4 Qtr FY2017 - TRL/MRL 6 @ 4 Qtr FY2018 Composite Pallet Rapid Restraint (CPR<sup>2</sup>) System for CH-53K Helicopter



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## WHAT

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

CH-53K Program Office seeks innovative restraint system for TBFDS that:

- meets all Navy crash survivability standards (20/20/10)
- is lighter and easier to install
- optimizes full capacity of 2,400 gallons of fuel tanks

### Specifications Required:

- Survive Forward-Aft Crash Acceleration: 20 g
- Survive Vertical Crash Acceleration: 20 g down, 10 g up
- Survive Lateral Crash Acceleration: 10 g
- Install all 3 tanks in < 1 hr
- Reduce number of personnel needed to install: < 4 personnel
- Reduce weight of Restraint System: 400-500 lbs

#### Technology Developed:

- Composite pallet able to absorb/dampen crash energy and transfer load to tie-down rings
- CPR2-TBFDS system is pre-assembled for rapid installation
- Load path leverages direct line-of action mechanisms to robust aircraft tie-down rings
- Universal design concept for application to additional platforms

### Warfighter Value:

- SDC's Composite Pallet Rapid Restraint (CPR2) system:
  - Allows crew to fly mission w/o jeopardizing equipment or crew
  - Allows TBFDS to operate at maximum capacity
  - Allows TBFDS to be transported / moved by one person
  - Allows each tank of TBFDS to be installed in approximately 15 minutes
  - Exceeds all Navy loading and restraint safety requirements

#### WHEN Contract Number: N68335-16-C-0111 Ending on: December 24, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Critical/High Risk Mitigated	High	Low risk designs implemented	3	December 2016
Overall Operational/ Structural Design	Med	Design review with PMA-261 buy off	3	April 2017
Component Level Manufacturing and Testing	Med	Validation of predicted safety margins	4	August 2017
Prototype Manufacture and Operational Demonstration	Med	Fully integrated system constructed and assembled with CH-53K cargo handling system	5	December 2017
Prototype Full Scale Structural Test	Med	Fully integrated system tested under critical crash loads	6	December 2018

### HOW

### Projected Business Model:

SDC will manufacture CPR2 in our state-of-the-art 70,000 sqft. composite manufacturing facility SDC will assemble CPR2 in our production facility

SDC will procure restraint mechanisms and flexible cage from Davis Aircraft Products

### **Company Objectives:**

Sell CPR2 product directly to the Navy or to Robertson Fuel Tanks, manufacturer of TBFDS Market CPR2 to various Program Offices such as C-130, V-22, commercial aircraft, etc. Promote CPR2 to other prime contactors:

- Sikorsky

- Boeing - Northrop Grumman - Lockheed Martin
- General Dynamics - Huntington Ingalls

#### **Potential Commercial Applications:**

- Sikorsky Heavy Lift Helicopter Cargo
- Boeing Aircraft Cargo
- Lockheed Martin Aircraft - Commercial cargo carries (aircraft & shipping)

- Bell Helicopter Cargo

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