HELIOS, which stands for Helicopter Overset Simulations, is a next generation high-fidelity, multi-physics simulation for rotary-wing air vehicles.

It is a new computational platform targeted toward high-fidelity rotorcraft aeromechanics simulations.

It is a product of the High Performance Computing Institute for Advanced Rotorcraft Modeling and Simulation (HARMS) and the CREATE-AV (Air Vehicles) programs sponsored by the DoD HPCMP.

HELIOS is based on an overset framework that employs unstructured mixed-element meshes in the near-body domain, combined with high-order Cartesian meshes in the off-body domain.
CREATE HELIOS – High fidelity, full vehicle, multi-physics analysis tool for rotary wing aircraft

V-22 Aircraft
CREATE HELIOS – High fidelity, full vehicle, multi-physics analysis tool for rotary wing aircraft
V-22 Aircraft
Kestrel is a high-fidelity, full vehicle, multi-physics analysis tool for fixed-wing aircraft.

It is a new integrated product that allows cross-over between simulation of aerodynamics, dynamic stability and control, structures, propulsion, and stores separation.

Kestrel is also targeted toward simulating multi-disciplinary physics such as fluid-structure interactions, inclusion of propulsion effects, moving control surfaces, and coupled flight control systems.

The Kestrel software product addresses these needs for fixed-wing aircraft in flight regimes ranging from subsonic through supersonic flight, including maneuvers, multi-aircraft configurations, and operational conditions.
CREATE KESTREL – High fidelity, full vehicle, multi-physics analysis tool for fixed wing aircraft

F-18 Aircraft
CREATE KESTREL – High fidelity, full vehicle, multi-physics analysis tool for fixed wing aircraft

F-16 Aircraft
CREATE SHADOW OPS

- Shadow-Ops teams provide computational tools to solve acquisition engineering problems and provide the acquisition engineers with hands on involvement in how to use these tools.

- It is a new integrated product that allows cross-over between simulation of aerodynamics, dynamic stability and control, structures, propulsion, and stores separation.

- Shadow Ops works with the acquisition engineers in selected DOD program offices to address current problems using existing computational engineering tools and to identify and understand acquisition programs requirements for software tool development.

- It provides CREATE with needed information as to which legacy functions are valuable and provides the acquisition engineering community immediate support and experience to enable better and faster responses.
CREATE SHADOW OPS – Computational tools to support acquisition programs that provide experience and establish connections and value

Harrier A-8
CREATE FIREBOLT

- Firebolt is a software engineering module for propulsion systems in fixed and rotary-wing air vehicles.

- Module includes models of propulsion systems suitable for conceptual studies and also high-fidelity, multi-physics simulation.

- The goal is to produce maintainable, extensible, portable and reliable software products developed with the right balance of agility and flexibility and short and long term planning based.

- Software product must be configured for multiple processors beyond the current parallelization techniques to be able to compute solutions in hours or days (current turbomachinery CFD calculation take weeks to months).
CREATE FIREBOLT – Module for propulsion systems in fixed and rotary-wing air vehicles

F-35 Aircraft
CREATE RADIO FREQUENCY

• Product: SENTRI – Scalable Engineering Tools for RF Integration

• SENTRI is computational tools that enhance antenna performance and integration with platforms on ships, aircraft, etc.

• It provides computer aided engineering software for DoD electromagnetic applications.

• SENTRI is designed for high accuracy – full wave (non-optical) numerical methods.

• The computational tools are used on antennas (air, sea, ground, and space platforms), and in areas such as communication, navigation, surveillance, target recognition, electronic attack, countermeasures, etc.
CREATE RADIO FREQUENCY –
Computational tools that enhance antenna performance and integration with platforms on ships, aircraft, etc.