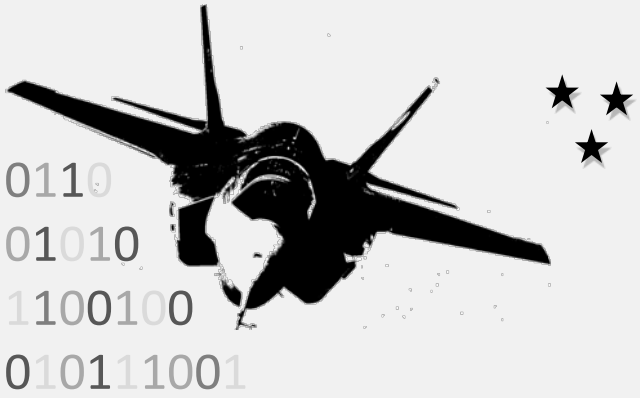
Multi-Disciplinary, Physics-Based Simulation Software Products of the CREATE-AV Project



DOD HPC MODERNIZATION PROGRAM

Dr. Robert L. Meakin

CREATE-AV Project Manager

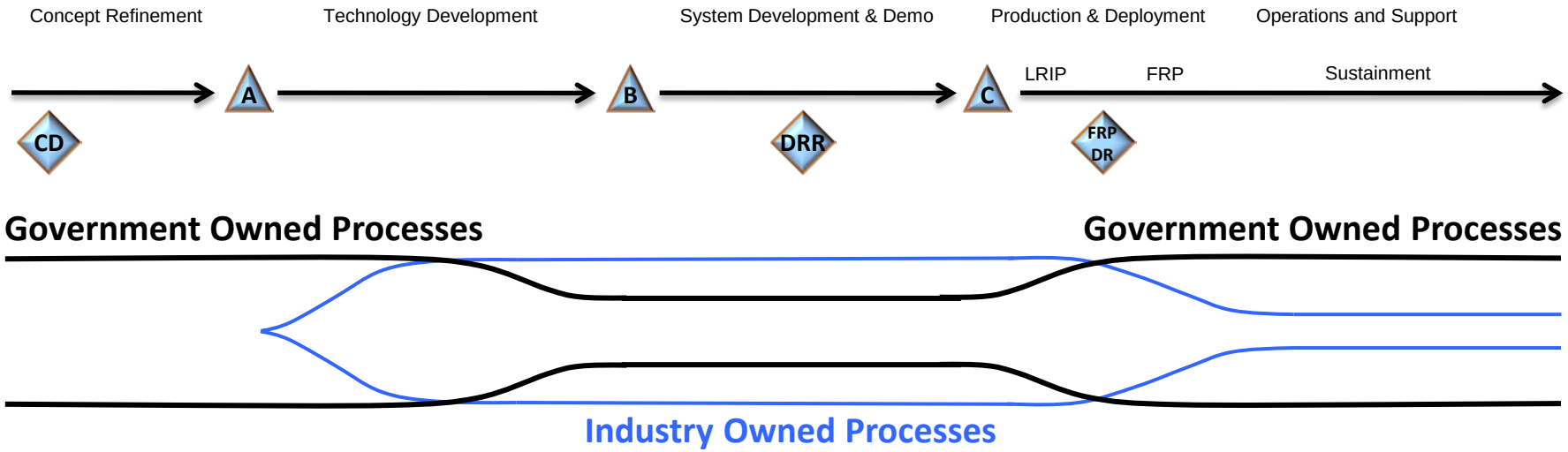
PROJECT MISSION

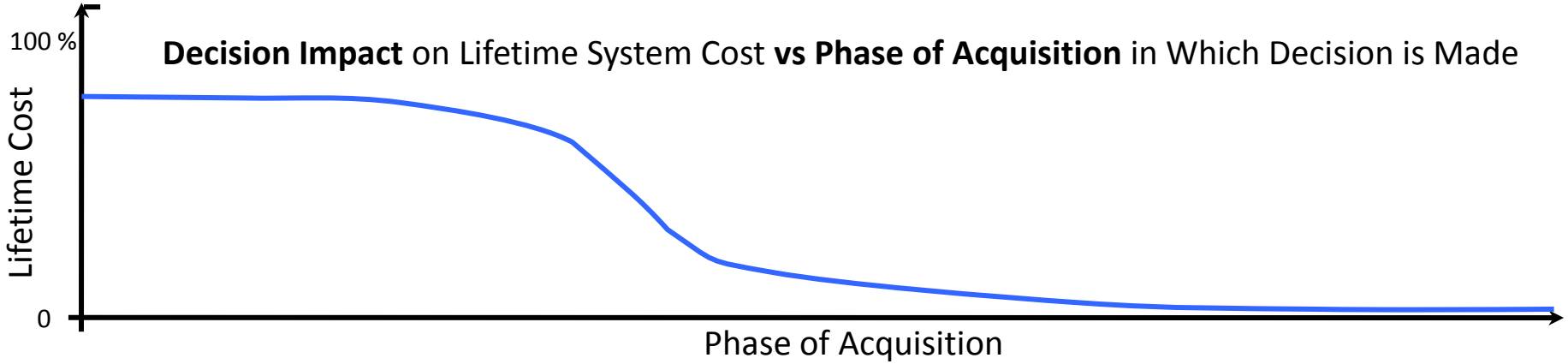
Develop and deploy a set of Computationally Based Engineering (CBE) Software Products that enable…

- **Increased capacity** of the acquisition engineering workforce of the services,
- Reduced workload through **streamlined** and more efficient acquisition **workflows**, and
- **Minimized need for rework** due to early detection of design faults or performance anomalies,

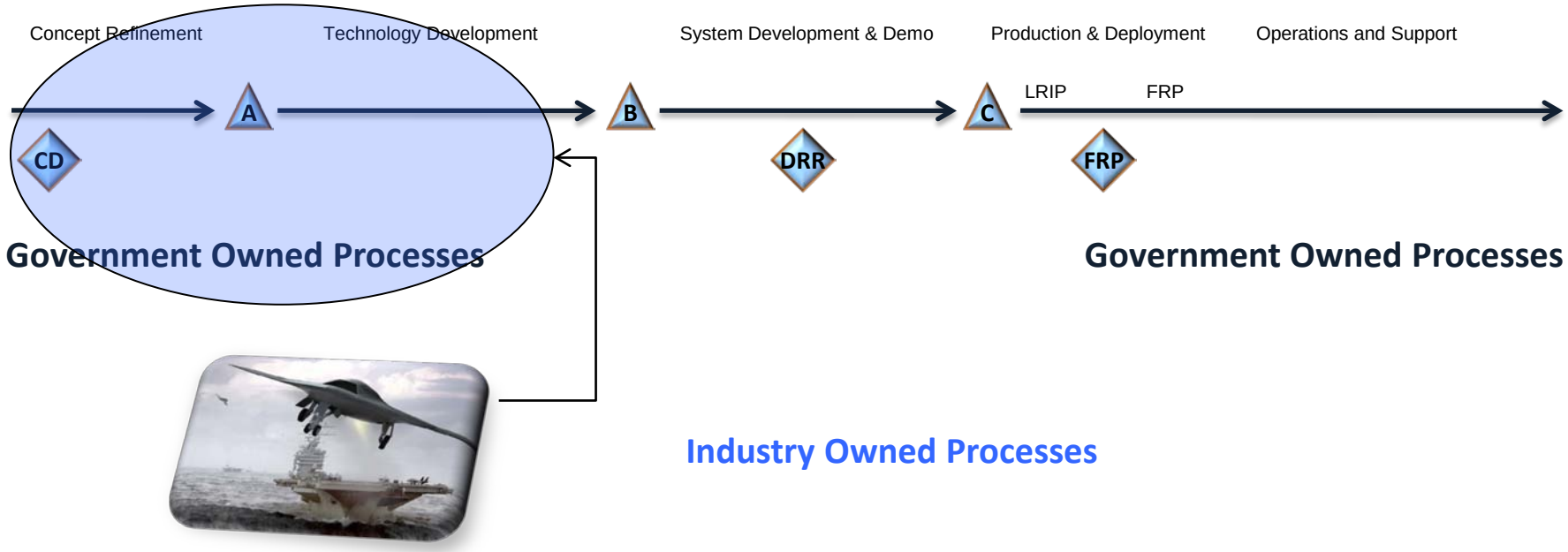
through exploitation of the capacity of next generation computer resources.

Ownership of Processes & Potential for Decision Impacts



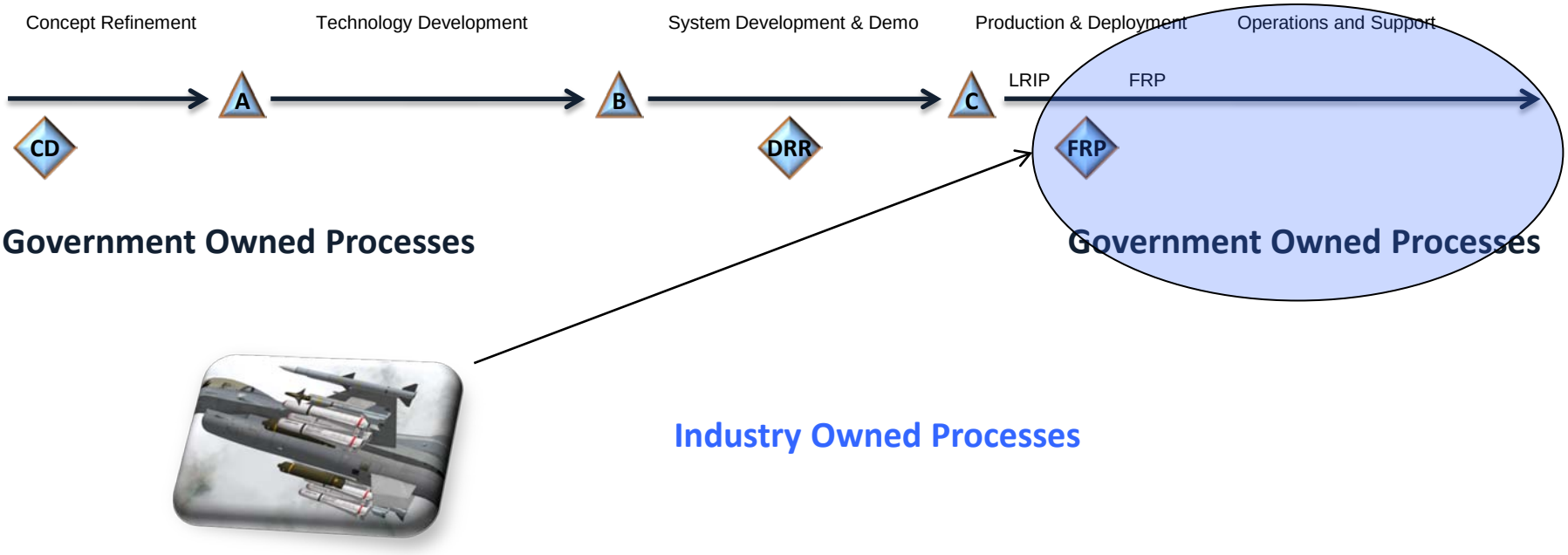


1 of Targeted Set of Government Owned Engineering Processes



ID	Process Name	Use Case
AV-026	**Navy Conceptual Design** Process	Rapidly produce physics-based, optimized conceptual designs in days to weeks. Quantification of design concept performance and sensitivity to new technology. (Benefits: Better decision data at the earliest phases of acquisition have potential to positively impact all subsequent acquisition costs.)

1 of Targeted Set of Government Owned Engineering Processes

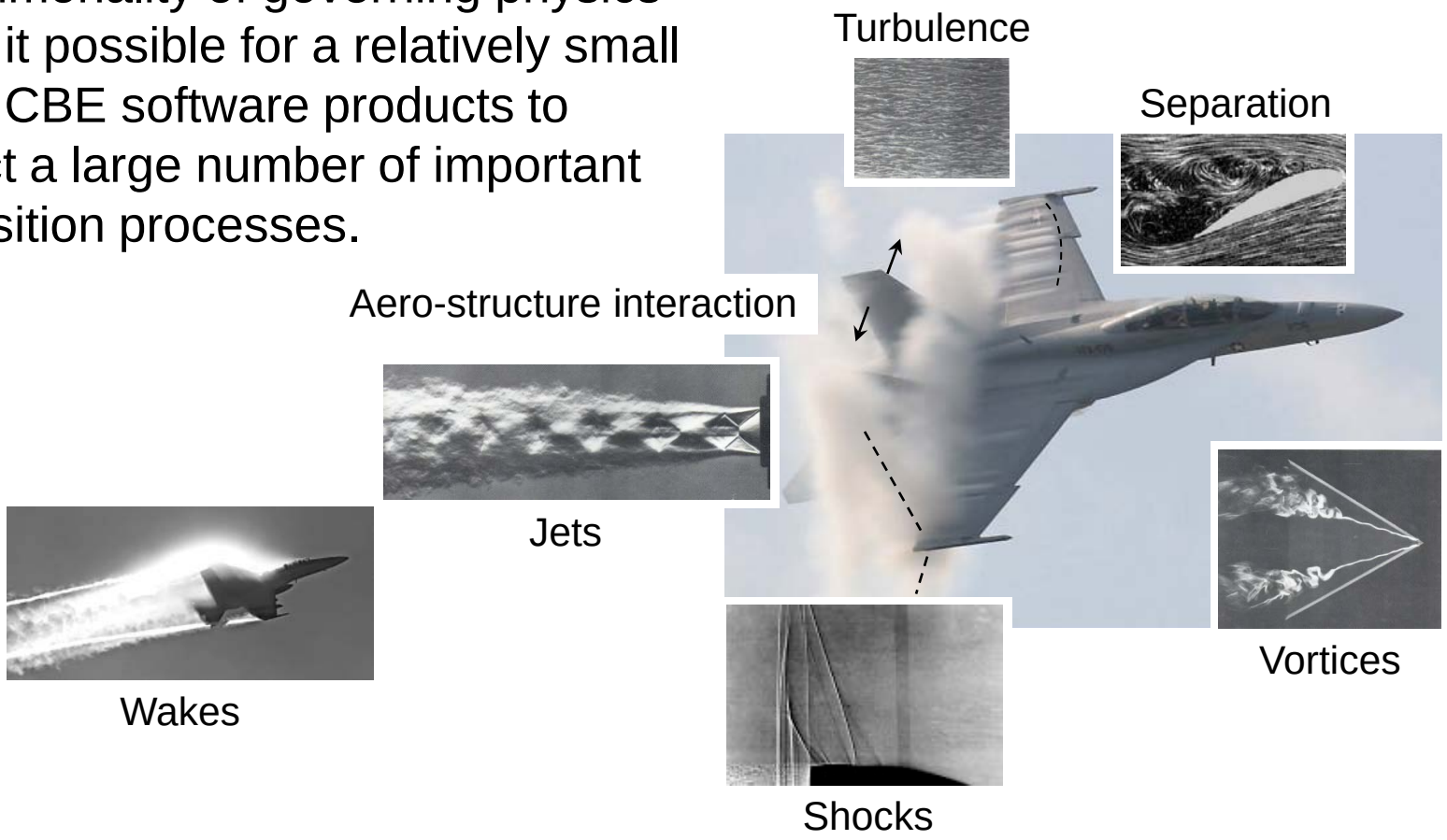


Industry Owned Processes

ID	Process Name	Use Case
AV-006	Store Compatibility Cert Recommend for **Store Separation** Air Force	Evaluate separation characteristics of all store combinations for a given aircraft. The number of configurations necessary to analyze is growing exponentially. (Benefits: Expansion of flight envelope / improve effectiveness & reduce cost of test programs)

AN OBSERVATION…

A commonality of governing physics make it possible for a relatively small set of CBE software products to impact a large number of important acquisition processes.



Capabilities Deployed via ANNUAL Releases of CREATE-AV Software

Conceptual Design tool

High-Fidelity design verification tool for FIXED-WING aircraft

High-Fidelity design verification tool for ROTARY-WING aircraft

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NOTE: "Firebolt" is a MODULE for propulsion to deliver…

- Gas Turbine Engine effects capability via Kestrel, Helios, & DaVinci
- High-Fidelity GTE simulation capability via Kestrel & Helios

CREATE-AV Software Briefs on WEDNESDAY

Software	Presenter	Time	Location
DaVinci	Mr. Greg Roth	1:30	GRAND MESA F
Kestrel	Dr. Scott Morton	2:25	GRAND MESA F
Firebolt	Dr. Robert Nichols	3:30	GRAND MESA F
Helios	Dr. Roger Strawn	4:25	GRAND MESA F
Software Demos	Dr. Nathan Hariharan	TUE + Wed (during breaks and lunch)	CREATE Booth

SUMMARY

- **Identified capabilities that can be delivered by CBE and next generation computer resources to positively impact the acquisition engineering processes and workflows**
  - Based on review of DoD acquisition engineering workforce processes and workflows
- **Have developed and are implementing plans to deliver highest impact capabilities through ANNUAL product releases**
- **Early-phase workflows have the greatest potential for long-term positive impact on defense acquisition**
  - Ability to generate physics-based decision data in a timely way during conceptual design is paradigm changing
- **Sustainment-phase workflows have greatest potential for immediate impact on Warfighters (i.e., during aircraft service-life)**
  - Flight clearance, modified/new configuration/loading certification, launch and recovery envelope generation, envelope expansion, mishap investigation, …