Defensive Laser Systems for Air Mobility Platforms

3rd Annual Directed Energy Systems Summit
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Defensive High Energy Laser Systems

- Air Mobility Command supports the development of airborne high energy laser weapon systems to defend mobility aircraft from incoming missile threats

ABL – circa 2002

Headquarters
Air Mobility Command

Airlift

Air Refueling

Air Mobility Support

Aeromedical Evacuation

Development and Transition Path

- **AMC is relying on government and industry partners to mature laser systems for mobility aircraft**
  - **Science and Technology Development: Air Force Research Laboratory (AFRL)**
    - Self-protect High Energy Laser Demonstrator (SHiELD) program
  - **Experimentation: Strategic Development Planning and Experimentation (SPDE)**
    - Dr. Michael Jirjis presentation
  - **Prototyping: AF Life Cycle Management Center (AFLCMC)**
    - High Energy Laser (HEL) Flexible Prototype
  - **Industry laser development (IRAD)**
  - **Other DoD Programs**

AFRL SHiELD

- **Technical Challenge**
  - **Design, develop, and demonstrate laser weapon systems that are:**
    - **Sufficiently compact and robust to fit on aircraft**
    - **Operate within relevant stressing flight environments**
    - **Deliver sufficient power to defeat incoming threats**
- **Program Approach**
  - **Phase I: Low power in-flight demonstration**
    - **Demonstrate the ability of the beam control subsystem to acquire, track, point, and focus a low energy laser onto a dynamic, non-cooperative target**
    - **Demonstrate the aero-effect mitigation capability (compensate for the aerodynamic flow induced vibration and beam spread).**
  - **Phase II: High energy laser subsystem**
  - **Full demonstration of the self-protect capability by lethal engagement of incoming threats**

AFRL SHiELD, continued

- **Timeline**
  - **Currently in the design phase for the laser, beam control, system control, power, and thermal subsystems, as well as the pod structure**
  - **Test strategy is being finalized**
  - **Ground and flight tests for Phase I testing in 2019**
- **SHiELD Contractor Awards**
  - **Turret Research in Aero-Effects (STRAFE) – Northrop Grumman**
    - Develop the beam control subsystem, including the turret, which will mitigate aero-effects
  - **Laser Pod Research and Development (LPRD) – Boeing Company**
    - Develop the aero-dynamic structure which houses the laser system and the ancillary subsystems including power and thermal management and control subsystems
  - **Laser Advancement of Next-Generation Compact Environments (LANCE) – Lockheed Martin-Aculight**
    - Develop the high energy laser source that will operate in the flight environment in phase II

Directed Energy Systems
- Beyond S&T -

- Progress is being made on the technical aspects of directed energy systems
- As we move toward prototypes, other questions are starting to arise:
- Acquisition/sustainment:
  - Ease of repair/ maintainability
  - Affordable upgrade path as laser technology continues to mature
- Operational issues
  - Reliability
  - Pilot interactions
- Early prototyping will serve to identify and prompt answers to these questions

Air Force High Energy Laser Rapid Prototyping - AFLCMC

- **Air Force Materiel Command, Life Cycle Management Center released RFI on 6 June**
  - **High Energy Laser (HEL) Flexible Prototype**
  - **Program manager: Doug Rogers**
  - **Interested in rapid demonstration and verification of a laser weapon system (LWS) in a realistic operating environment for potential future integration with an airborne vehicle**

Conclusion

- AMC is on the path towards employing directed energy defensive weapons to protect against incoming threats
- Laser systems have been integrated into several ground and sea military platforms, such as the Army's HEL-MD demonstrator and the Navy's LAWS laser demonstration system, as well as large airborne platforms, such as the Airborne Laser
- AMC is working with AFRL, SDPE, and AFLCMC to develop and prototype high energy lasers on mobility aircraft
- SHiELD and HEL Flexible Prototype will take these advances one step further in reducing size and weight and ruggedizing the system

4TH ANNUAL DIRECTED ENERGY SUMMIT

IDGA
Institute for Defense and Government Advancement

INTERESTED IN ATTENDING?

Future weapons, including directed energy weapons have been in the Research & Development phase for the past several years. As the US armed forces, continue to develop and innovate in order to achieve battlefield overmatch and superiority, the Directed Energy weapon systems are making their way form the R&D phase to DoD and Military programs as the next step before acquisition and force integration.

Over the three-day summit we will examine the latest DE advancements, initiatives and plans regarding technology, acquisition and service roadmaps. This event will bring together thought leaders, acquisition executives, industry solution providers, and academia in order to tackle some of the challenges that face this community in the near, mid, and far term fight. We will look to gain insight and lessons learned from warfighter perspectives on the operational challenges and requirements of DES that will influence the capabilities of this game-changing technology.

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