Operational Need

Increased Wildfire Activity Impacts

- Population Growth into what were once uninhabited wildland areas
- Past Forestry Management Policies have allowed an increased build-up of Fuels
- Large wildfires affect citizens and infrastructure annually worldwide with high cost

Impact in the United States

- Each year, an average of approximately 73,000 wildfires burn about 7 million acres of land.
- Agriculture, Cattle & Structures – over $5 billion in economic loss
- Over 2,000 homes and Structures lost
- Wildfire fighting/suppression costs approximately $1 million per day

Wildfires are a Global issue that Impact All Nations Directly or Indirectly
Definition of Terms

**Direct Attack**
- Dropping Water or Fire Retardant directly on the Flames to extinguish the Fire.
- Typically only effective on smaller fires – larger fires too intense for this technique to be effective
- Used frequently to protect structures and infrastructure that are in danger

**Indirect Attack**
- Technique of laying down a line of Fire Retardant in front of the direction of Fire Movement
- Retardant coats fuels on ground to stop the ability of the fire to progress
- Assists Ground Crews in ultimately Containing and Extinguishing Wildfires

Coverage Level (CL) – Number of US Gallons of fluid evenly applied across 100 square foot area
Definition of Terms

**Pressurized Drop Systems**
- Uses Air Pressure to ‘push’ the Retardant out of the aircraft via a Control Nozzle
- Requires additional support Air Compressor Support Equipment (either on the ground or onboard the aircraft)
- Typically more narrow Ground Coverage Lines
- Limited Coverage Levels
- Typically Indirect Attack Only

**Gravity Drop Systems**
- Less Complex with Drop Doors and Gravity pulling the Retardant out of the aircraft downward
- Minimal Ground Support Required
- Lighter Empty Weight enables higher capacity
- Best and more consistent Ground Coverage Lines
- More effective and provides higher Coverage Levels
- Able to perform Direct and Indirect Attack effectively

Choice of System is Dependent on Operator Needs
Requirements for Effective Aerial Firefighting

- Safe Operations are paramount!
- Controlled maneuverability in degraded conditions
  - Low altitude/low airspeeds
  - At near maximum operating weight
  - Typically hot environment with shifting winds
- High lift and ruggedized wing structure
- Immediate rapid power response
  - Turboprop ideal – turbofans lag
- Large payload capacity per sortie (3000 US gallons)
- Controllable/consistent drop capability
  - To deliver best suppression for conditions
  - Certified to recognized standards
- Endurance to reduce ground time for refueling

The Hercules Checks All The Boxes

The most effective drops are conducted at:

- 200-150 feet above terrain
- 120 knots IAS
- Enables retardant or water to fall vertically and without disbursing from wind shear
Why Herc Is Superior

• C-130 Aerial firefighting capacity:
  • Up to 4,000 US gallon capacity per sortie
    • Larger capacity than most other widely used airtanker options
      • AT-802 (800 gallons), Dash 8-400MRE (2450 gallons), CL-515 (1621 gallons)
      • More capacity equals longer drop lengths or more effective split load ability
  • Flexible support - Direct Attack or Indirect Attack Capable
  • Non-Swept High Lift Wing for outstanding low airspeed/low altitude controlled maneuverability

• Most versatile option for aircraft utilization
  • The C-130 retains basic airlifter capabilities when not configured for aerial firefighting
  • Full mission capable after drop system removal

The C-130 as an Aerial Firefighter offers the most overall flexibility
C-130 Aerial Firefighting System Options

MAFFS II – United Aeronautical

- Roll On/Roll Off System
- Minimal Aircraft Mod – Electrical Panel/Software
- 3000 gallon capacity – Pressurized Discharge
- Operated on US Air Force C-130J-30/C-130H
  - Eight systems in the United States
- Also has been delivered to two International C-130H/J operators

RADS-XXL – Coulson

- Semi-Roll On/Roll Off System
- Major Aircraft Mod to Cargo Underfloor
- 4000+ gallon capacity – Gravity Drop
- Installed on Commercially-operated C-130H/Q/382Gs
- Five systems installed with seven more pending
- Simplest & Best Performance

Note: Neither system are currently LM Aero certified
Current Ops

MAFFS II

Best Choice for current Systems Depends on Individual Operator’s Requirements

RADS-XL
C-130J FireHerc - Baseline

- Enhanced Service Life Wing
- 4000+ Gallon Gravity Drop Retardant Delivery System
- Fully Integrated Flight Deck Designed for Low Altitude Missions
- Advanced Turboprop Performance with Auto-Throttle and FADEC
- HUD for superb Situational Awareness (Primary Flight Display)
- NVIS Compatible Flight Deck
- Advanced Centralized Advisory, Caution, Advisory & Warning System
- Modern Safety Features: Stall Warning, Energy Cue, Windshear Detection, GCAS

C-130J Technology = Most Capable Aerial Firefighter
Current Airtanker Operations Tempo

Safety in a Challenging Environment Drives Daytime Firefighting
C-130J FireHerc – Enhanced (expand into night)

- Addition of Distributed Aperture System (DAS) Sensors (IR & Smoke detection)

- Creates ‘Day Like’ VFR imagery presentation to Pilots

- Introduce Head-worn Display for increased Horizontal 180° field of view beyond a HUD

- Addition of advanced Mission Planning Tools and Situational Awareness Updates

Advanced Technology Could Enable Night Ops – Faster Containment, Resources Saved
Lockheed Martin Night Ops Enabling Technologies

LM Aero provided:
- Baseline C-130J Super Hercules w/advanced avionics systems, NVIS lighting and proven RADS-XL installed
- Development of Distributed Aperture System (DAS) and Synthetic Vision (SVS) techniques leveraged from F-35 experience
- Open System Architecture for Integrated SA
- Head-mounted Display systems to provide 180° FOV to Flight Crews
- Advanced Mission Planning System

LM Rotary & Mission Systems (RMS) & LM Space
- Refined Wildfire Behavior Predictive Tools
- Firefighting Intelligence as a Service (FIaaS)
- Cognitive Mission Manager (CMM) System

Hercules Training Center
- Develop Advance Crew Training Systems tailored for Night Airtanker Operations

FireHerc Solution Leverages Proven Product From Multiple LM Businesses
**Summary**

- The C-130 aircraft is recognized as one of the very best Aerial Firefighting platforms in the world
  - Highest Payload Capability = Large Fire Retardant Capacity per sortie 4,000+ gallons
  - Hot ambient temperature and short field capability does not restrict retardant loads
  - Outstanding maneuverability in challenging low altitude/low airspeed environments provide greater safe flight operations during critical mission phases
  - Cargo Compartment Flexibility enables true multi-mission capability
    - Aircraft can be pre-modified to accept Aerial Firefighting Mission Systems to enable rapid conversion between normal airlift operations to Aerial Firefighting missions
    - Basic airlift mission retained unlike other dedicated fixed-wing aerial firefighter options

**Addition of C-130 Aerial Firefighting Capability enables superior support for containment of wildfires to greatly diminish impact to citizens**