Future AC-130 Gunship
Integrated Weapons Systems Concept
March 06

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SECDEF Challenge

Per your Memo:

"We need more weapon systems like the AC-130, where the ordnance can be directed in a more precise way"

OSD/AT&L
Nov 29, 2001

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The Warfighter's Problem

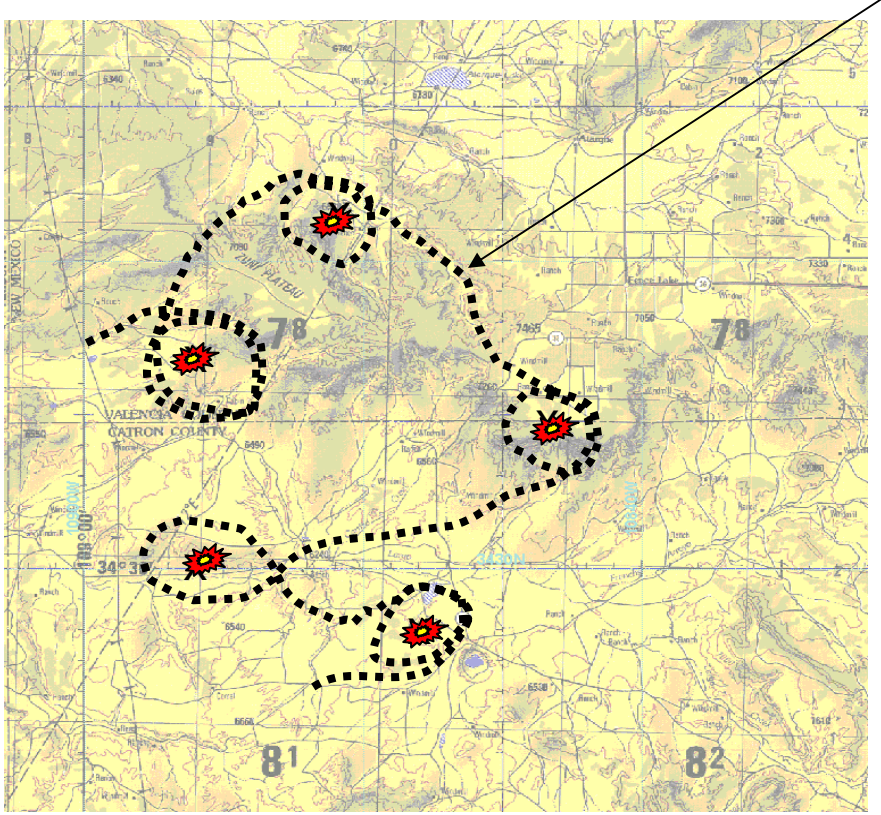
- **AC-130 survivability/employability in medium to high-threat areas and ability to respond to time sensitive targeting is limited**
  - **Currently operate in low to selected medium threat environments at night unless mission dictates otherwise**
  - **Increased threat forces gunship into higher altitudes and greater standoff ranges**

- **Result: Reduced precision/decreased munitions effectiveness**
  - **Spend more time-over-target to achieve desired effect**
  - **Expend more munitions per given target**
  - **Higher probability of collateral damage/fratricide in urban areas**
  - **Missed opportunities against high value fleeing targets**

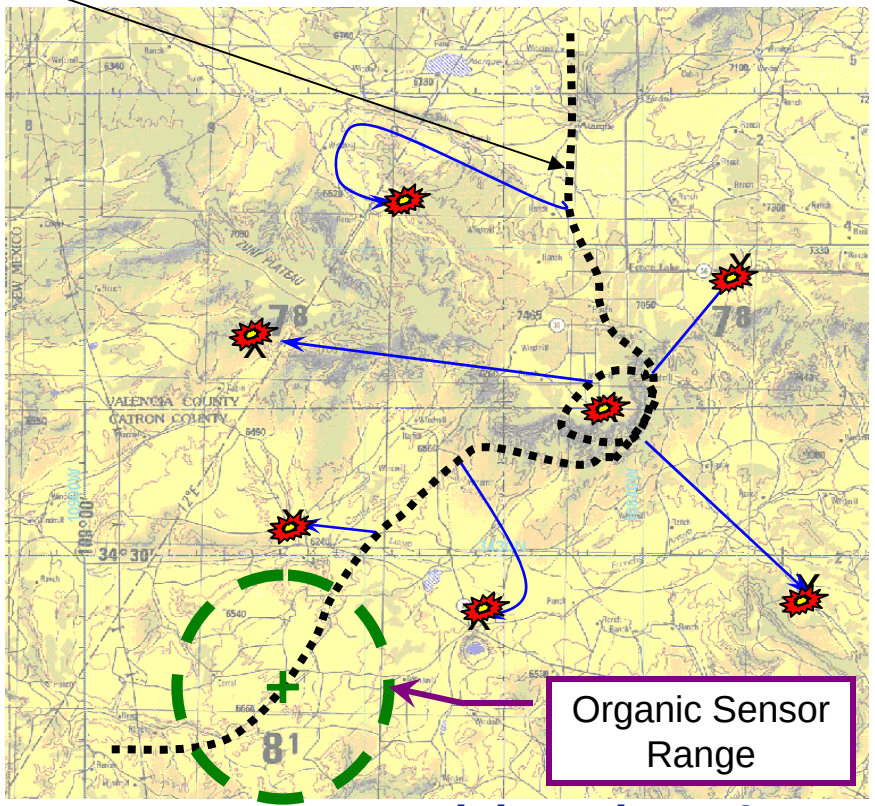
- **Lethality Enhancement ORD (1997)**
- **Combat Need: Urgent theater request for low yield, precision firepower**

Evolution of Gunship Ops

Gunship Flight Path



Today's Operations—Direct Attack (3-4 NM)



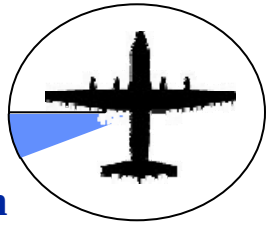
Tomorrow's Vision Direct & Indirect Attack (15+ NM)

Threat exists both inside and outside aircraft orbits

Need Increased Responsiveness, Interoperability, Lethality

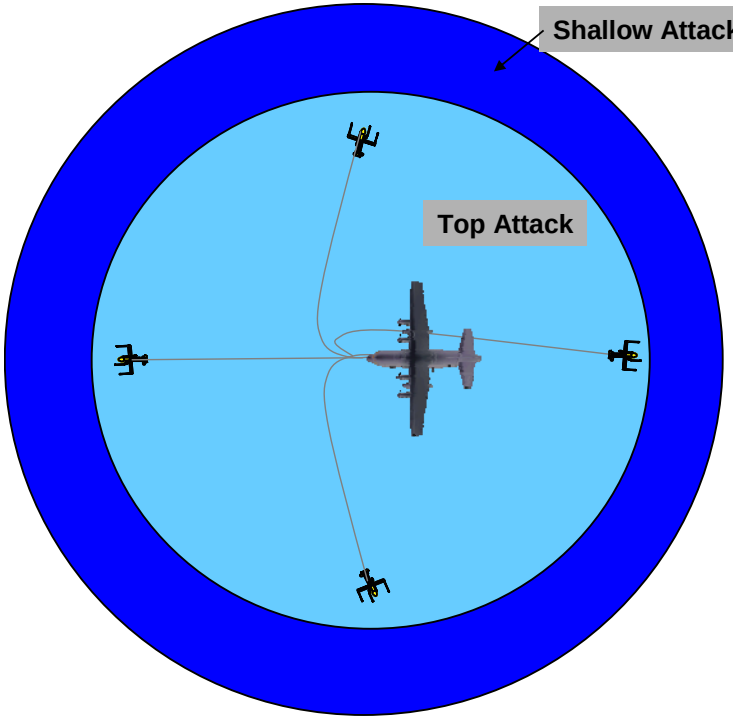
Increased Target Engagement Envelope

Today's Operations:
SA < $^1/_3$ sq nm



5 nm

Tomorrow's Vision:
SA > 1300 sq nm



Sphere of Influence Requires Automated Mission Planning

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Gunship Tenet Requirements/Issues

- Unique: Gunship encompasses entire kill chain
  - Situational Awareness
    - Onboard sensor improvements; offboard sensors—air launched UAVs
  - Lethality
    - Precision munitions necessary in today's environment
    - Must leverage off other munition programs
  - Persistence
    - Deeper magazine
    - Increase time on station
  - Survivability
    - Increase altitude
    - Decrease time over target

Gunship Road Ahead

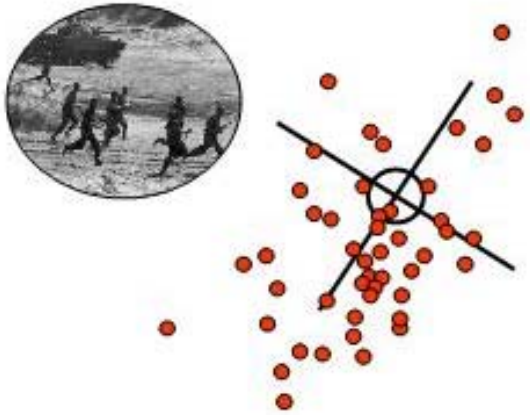
- **Investigating Various Technologies and Concepts**

- **Direct Attack Concepts**
  - **Convert Current 105mm to 120 mm Smooth Bore Barrel**
    - **Introduces 120mm Breech Loaded Family of Munitions**
      - Includes a Precision Strike Munition
      - Maintains Suppression Capability with Various Munition Options
    - **Provides a Multipurpose Launching Tube**
      - **UAV as Off-Board Sensors for Increased SA**

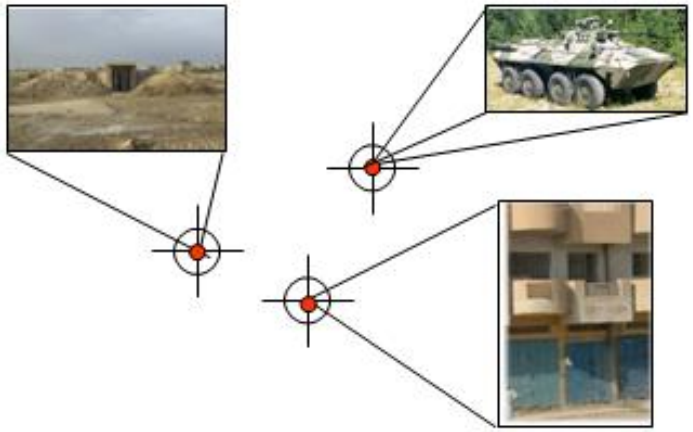
- **Indirect Attack Concepts**
  - **Initial Assessment via the USSOCOM SOPGM ACTD**
  - **Introduces Digital Call for Fires Battle Management System**
  - **Uses a Precision Guided Munition**
    - **Viper Strike (GPS/INS with a SAL Seeker)**

120mm Precision Guided Munitions

Suppression → Destruction



- High Explosive
  - Area Effects
  - High Volume of Fire
  - Defeat Targets in the Open
  - Suppress Personnel Under Cover



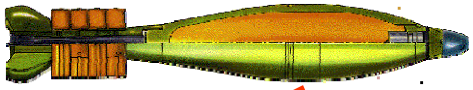
- Precision Guided
  - Precision Effects
  - 1 – 2 Rounds per Target
  - Incapacitate Personnel Under Cover
  - Low Collateral Damage

Provide Organic, Precision Strike Destructive Capability

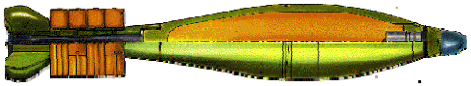
120mm Family of Munitions Multi-purpose Launcher

120mm UAV

M934A1 High Explosive Multi-Option Fuze (Combat Round)



M933 High Explosive Point Detonation Fuze (Training)



120mm Multipurpose Launcher

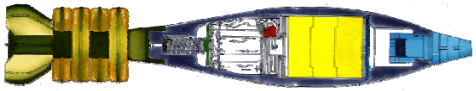
PGMM

XM931 Full Range Training Round

M929 Smoke

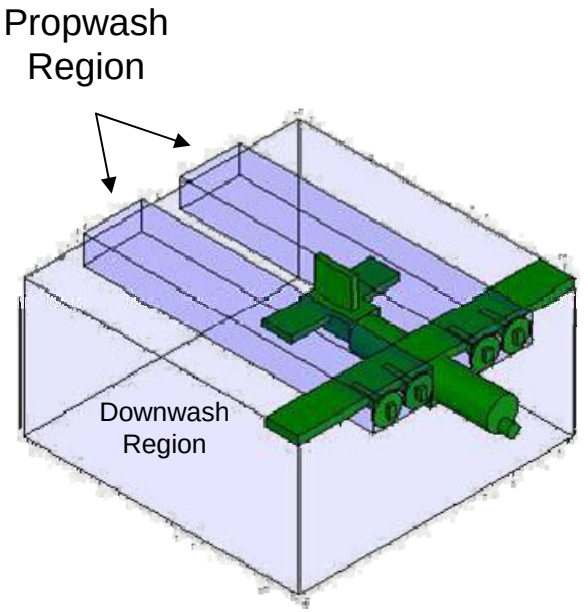
M983 Infrared Illumination

M930 Visible Light Illumination



120mm Safe Separation Study

- **Can we Launch 120mm Smoothbore / Fin Stabilized Munitions into a High Slip Stream Environment?**
- **Completed an initial assessment**
  - **Approach**
    - **Utilize AEROPREDICTION (AP05) and NSWC 6DOF Model to Analyze Aerodynamics and Flight Characteristics**
  - **Assessed Munitions and UAV**
    - **M934A1 HE Round**
    - **ATK PGMM XM395**
    - **ARL SOAR EP (Modified M930 Dispense Vehicle)**
  - **AC-130 Gunship Conditions**
    - **Altitude 18,000 and 25,000 Feet**
    - **Aircraft Speed 180 and 250 Knots**
    - **Level Flight**

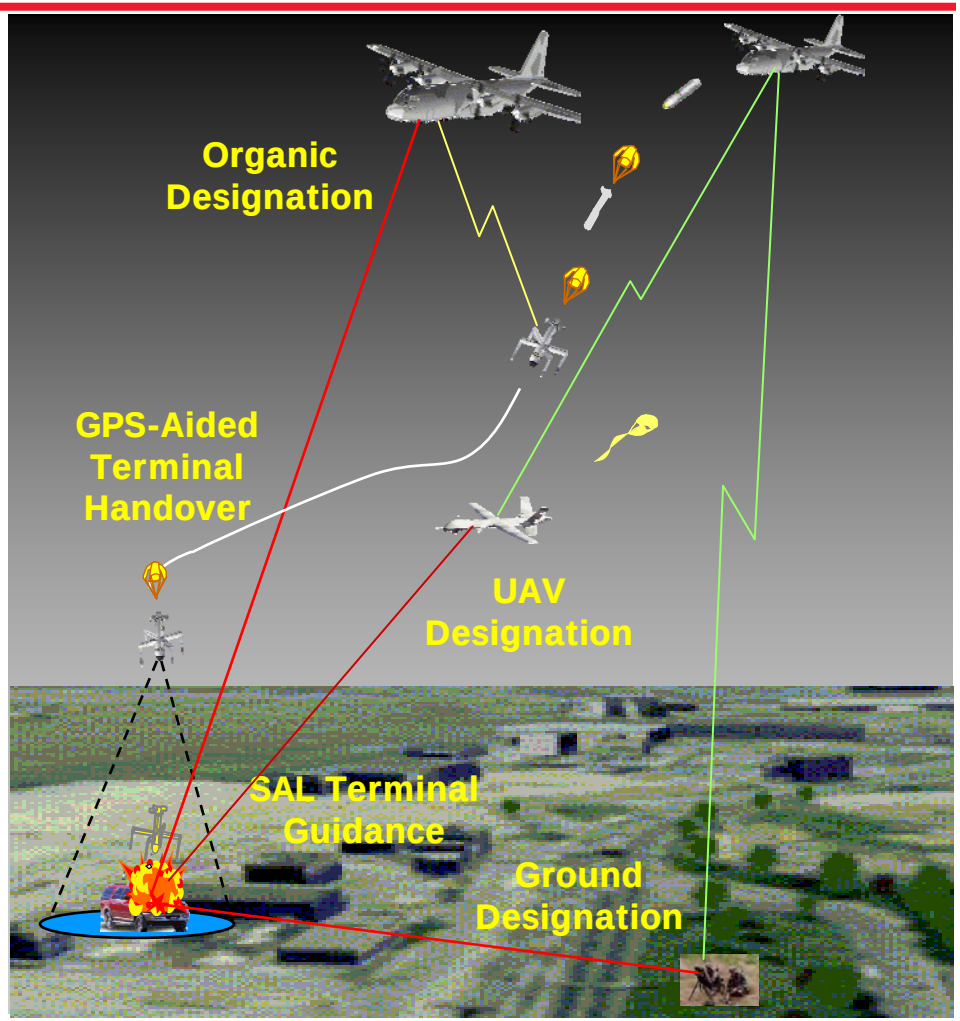


Results indicated Satisfactory Performance

Indirect Attack
AC-130 SOPGM ACTD Goals

- **Develop SOPGM Weapon System**
  - Modified Viper Strike Munition
  - Battle Management System
  - Launcher
- **Demonstrate the Military Utility of SOPGM Weapon System**
  - Initial Proof-of-Concept Demo: One (1) Ground and Six (6) Flight Tests
  - Tactical Proof-of-Concept Demo: Six (6) Flight Tests and Optional Residual Demo
  - Residual Assets for EUE:

    (20 Munitions, 2 BMS, 2 MIUs, 2 Launchers)



Evolve Gunship Tactics to Exploit Benefits of Stand-Off Precision Guided Munitions

Digital Calls for Fire

- **With the Advent of Non-Line of Sight (NLOS) Weapons, Need Automation to:**
  - Automate Rules of Engagement
  - NLOS Tactical (Digital) Communications
  - Reduce Planning Cycle Time
  - De-conflict Operating Area
    - Blue Force Tracking
    - Fire Support Coordination Measures
    - Restricted Target Lists
  - Manage Fire Support Resources
  - Support Interoperability in Joint and Coalition Operations
    - Connect to the Network Centric Fabric
    - Machine to machine comms -- reduce time and data errors

Will Introduce Digital Call for Fires Capability

SOPGM Weapon System Architecture

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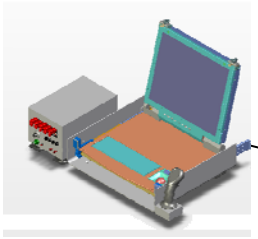
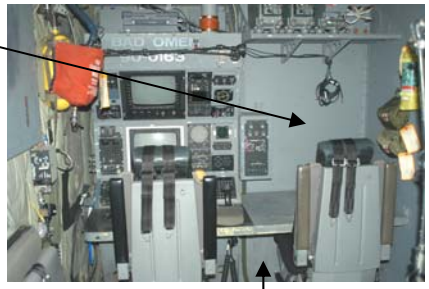
NORTHROP GRUMMAN

Battle Management System

Located in AC-130 Battle Management Center (BMC)

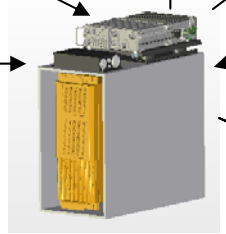


Operator Console



BMS PRC-117F

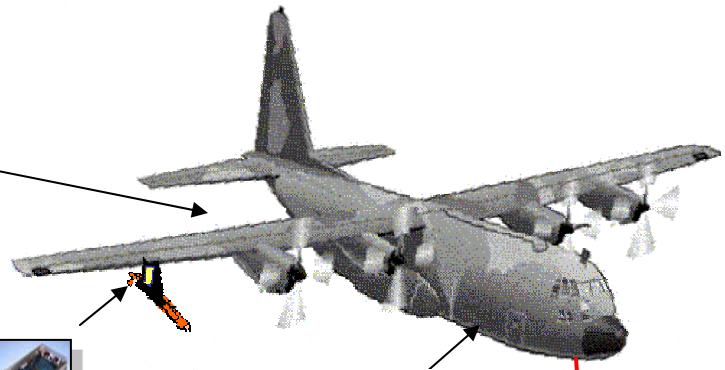
BMS GPS



Computer

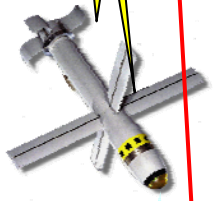
Missile Interface Unit (MIU)

Located in A/C Pylon



RF Antenna Location on A/C TBD

RF Data Link



Battlefield Air Operations Kit PRC-117F

Laser Designation

Viper Strike Munition Overview

Key Characteristics

- **Length** **<36 in.**
- **Diameter** **5.5 in.**
- **Wing Span** **36 in.**
- **Weight** **46 lbs.**
- **Glide Ratio** **9:1**
- **GPS Aided, inertial navigation for fly-out**
- **Semi-Active Laser Sensor for terminal navigation**

- **TPOC Enhancements**
  - Two Way RF Data Link
  - Extended Range Thermal Battery
  - Shallow Attack Mode

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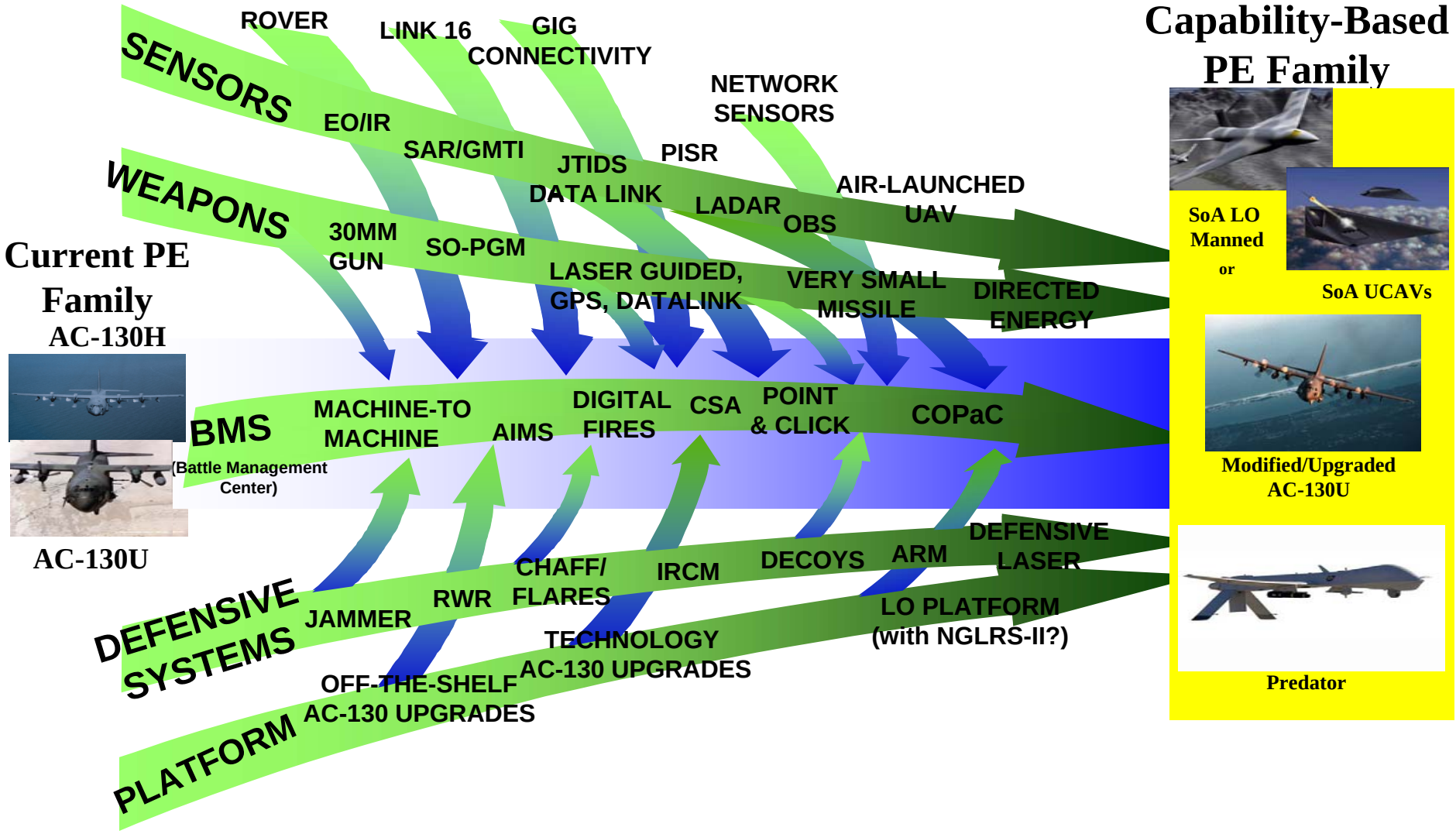
Path to Realize "Gunship" Tenets

Situational Awareness, Lethality, Persistence, Survivability



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PSAS OV-1