Future AC-130 Gunship
Integrated Weapons Systems Concept
March 06
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
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

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 < $\frac{1}{3}$ sq nm

Tomorrow’s Vision:
SA > 1300 sq nm

Sphere of Influence Requires Automated Mission Planning
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

M934A1 High Explosive Multi-Option Fuze (Combat Round)

M933 High Explosive Point Detonation Fuze (Training)

M929 Smoke

M930 Visible Light Illumination

XM931 Full Range Training Round

120mm Multipurpose Launcher

M983 Infrared Illumination

PGMM

120mm UAV

M929 Smoke
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
Battle Management System
Located in AC-130 Battle Management Center (BMC)

- Operator Console
- BMS PRC-117F
- BMS GPS
- Computer
- RF Data Link
- Missile Interface Unit (MIU) Located in A/C Pylon
- RF Antenna Location on A/C TBD
- 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
Path to Realize “Gunship” Tenets
Situational Awareness, Lethality, Persistence, Survivability

Current PE Family
AC-130H
AC-130U

Platform
BMS
DEFENSIVE SYSTEMS
SENORS
WEAPONS
DEFENSIVE LASER
IRCM
CHAFF/FLARES
ROVER
GIG CONNECTIVITY
LINK 16
EO/IR
30MM GUN
SAR/GMTI
SO-PGM
LASER GUIDED, GPS, DATALINK
JTIDS
DATA LINK
LADAR
AIR-LAUNCHED UAV
OBS
VERY SMALL MISSILE
DIGITAL FIRES
POINT & CLICK COPaC
MACHINE-TO-MACHINE
CSA
PISR
DEFENSIVE SYSTEMS
JAMMER
OFF-THE-SHELF
AC-130 UPGRADES
AC-130 H
AIR-LAUNCHED UAV
LON PLATFORM (with NGLRS-II?)
OFF-THE-SHELF
AC-130 UPGRADES
LON PLATFORM

Capability-Based PE Family
SoA LO Manned or SoA UCAVs
Modified/Upgraded AC-130U
Predator
PSAS OV-1

Integrity - Service - Excellence