

# F-5E/F Weapon Delivery and Navigation System (WDNS)

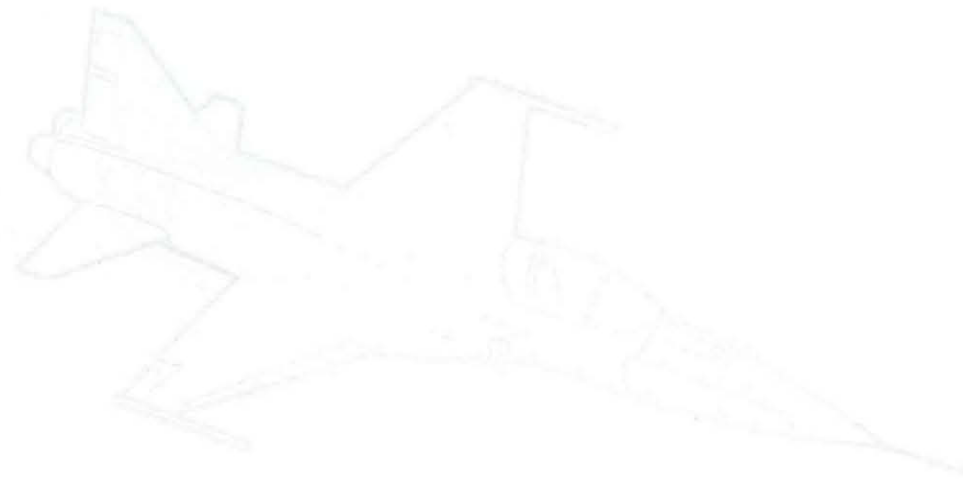


**Display Systems Group (Rochester)**  
**DISPLAYS DIVISION**

## System Advantages

GEC-Marconi Avionics offers this upgrade system giving the following advantages :

- Operational
  - Force multiplier, makes F-5 three times more effective in weapon delivery
  - Provides Tactical Flexibility, attack profiles are not constrained to set parameters and aiming 'settling' time
- Training
  - F-5 pilots need very little conversion training. System follows pilot F-5 mode selection automatically
  - Ease pilot transition from training to front line fighter combat readiness
  - 'Desk-top' trainer available with complete mode selection, joystick and throttle box
- Safety
  - Improves flight safety, all basic flight information presented to the pilot 'Head Up'
- Installation
  - Very simple 'drop fit' installation, no metal cutting required
  - Very simple 'A' kit adaptor harness integrates existing/new sensors into a sophisticated electronic system at low cost and high integrity
- Maintainability
  - No scheduled maintenance required
  - All line replaceable units (LRU's) easily installed/removed
  - All LRU's easily harmonised



## System Composition

The Weapon Aiming and Navigation System comprises :

- GEC-Marconi Avionics Head Up Display and Weapon Aiming Computer (HUDWAC)
- GEC-Marconi Avionics Miniature Standard Central Air Data Computer (MSCADC)
- Litton/Honeywell
  - Inertial Navigation System (LN-39, LN-93, H-423 or even the existing AHRS or LN-33)
  - Litton (Canada) Control and Display Unit (could be provided in HUD as alternative)
- GEC-Marconi Avionics Cockpit Television System
  - Camera
  - Video Cassette Recorder
  - Remote Control
- Installation Kit ('A' Kit)
  - Cableharness & Connectors
  - Recorder Mounting Tray
  - EU Mounting Tray
  - Recorder Receptacle (for cockpit location)
  - INS Mounting Tray
  - Cooling Fan and Housing
  - Rear Seat Raster Monitor by ESCO - installation of mode select switch (Radar/HUD)
- Radar
  - Will interface with all ESCO existing radars, APQ-153, 157 and 159
  - Will also interface with all multimode radars



Pilots Display Unit



Electronics Unit



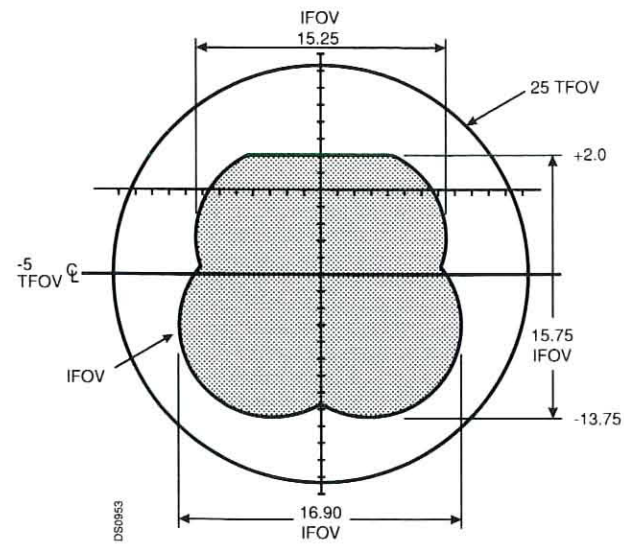
Weapon Data Input Panel



MSCADC

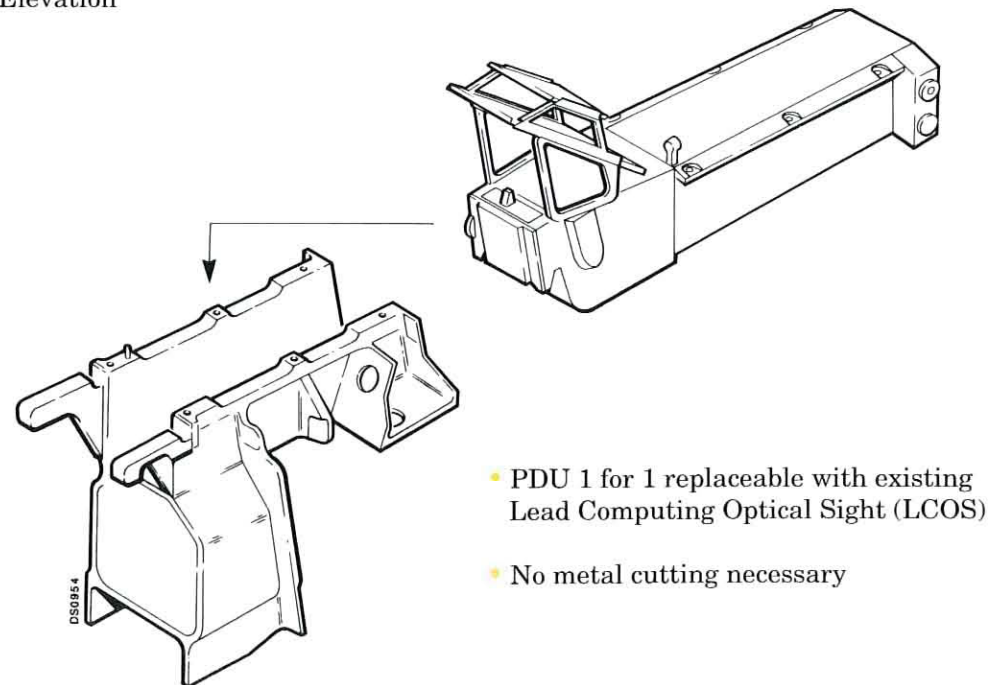
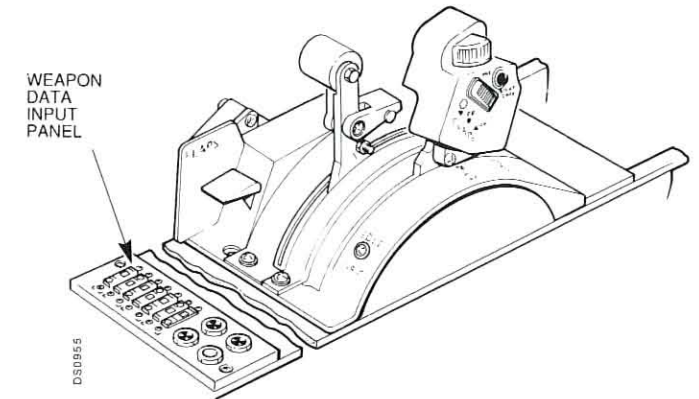
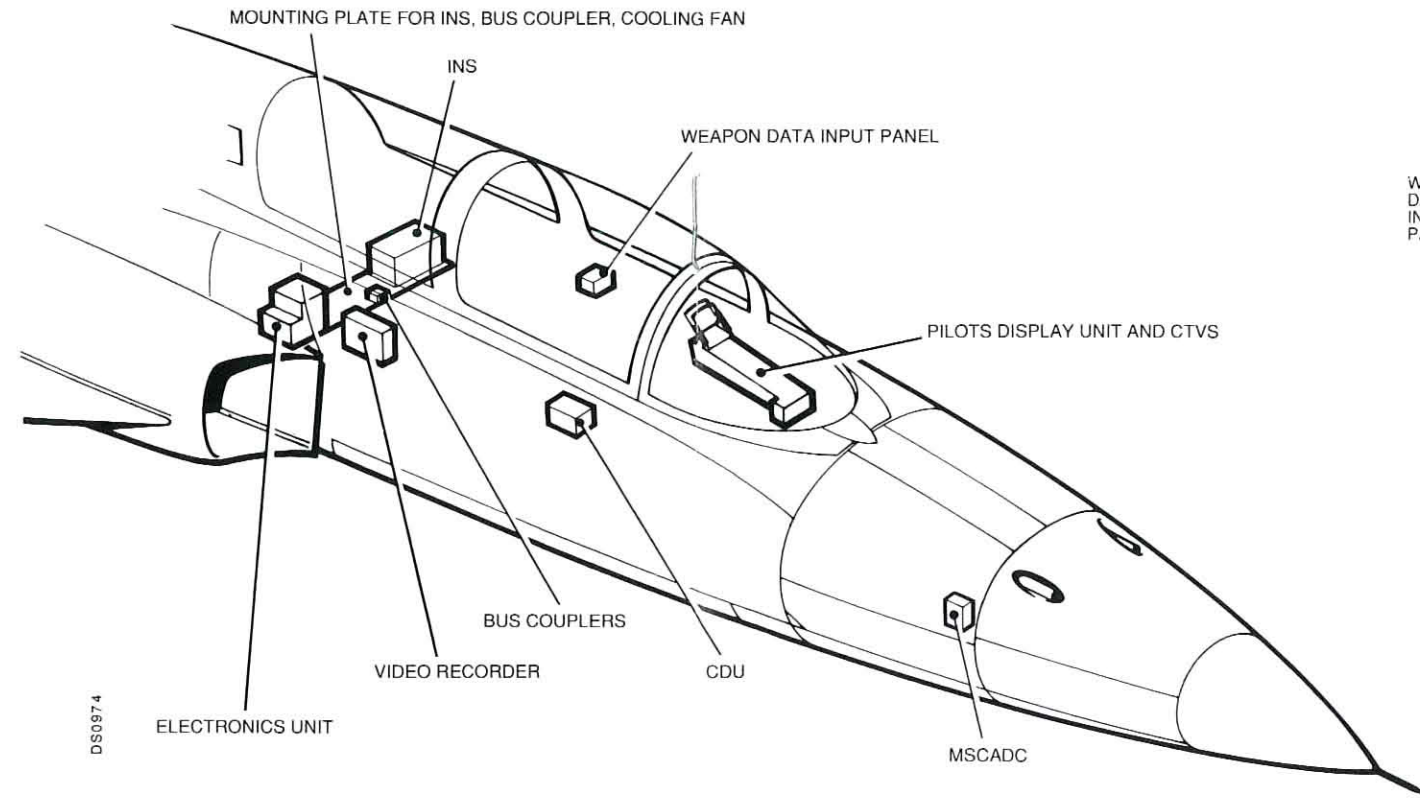
# Installation of WDNS Units on F-5 Aircraft

## PDU Fields of View



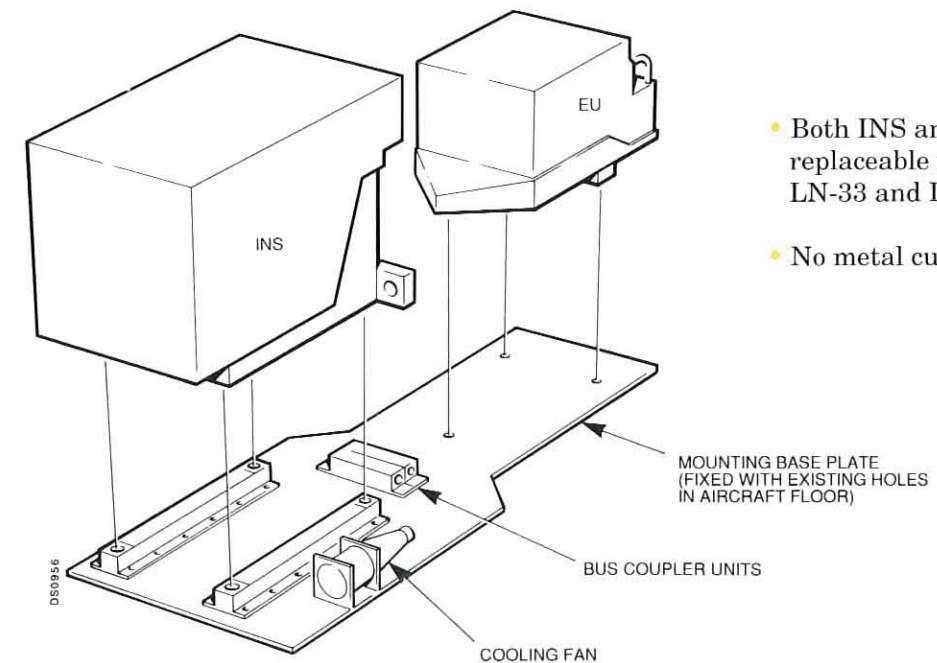
- Large Total Field of View (TFOV) 25° circular
- Instantaneous Field of View 16.9° Azimuth 15.75° Elevation

## WDIP Installation



- PDU 1 for 1 replaceable with existing Lead Computing Optical Sight (LCOS)
- No metal cutting necessary

PDU Installation using existing LCOS mount



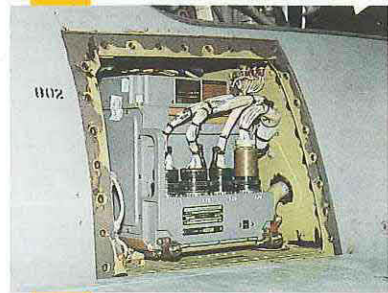
- Both INS and EU are 'drop fit' replaceable for existing AHRS, LN-33 and LCOS EU
- No metal cutting necessary

INS and EU mounting arrangement in aft avionics bay

## LCOSS and HUDWAC Comparison



PDU Installation



EU Installation



PDU Test Station



EU/ System Test Station

### Display Generation Computer Optics

- Size
- Field of View

### Rate Sensing

- Pitch
- G
- Roll
- Yaw
- AOA

### Data Display

- Radar Range
- Range Rate
- Missile Envelope
- Attitude
- Airspeed, Mach
- Heading
- Fragment Avoidance
- Warning, Caution
- Simultaneous Gun & Missile Aiming

### Operation

- Mode Selection
- Brightness

**LCOSS**  
Electro-Mech.  
Analog

4 inch  
13.5°V x 12°H

Yes  
Yes  
No  
No  
No

Analog  
No  
Discrete  
No  
No  
No  
No  
No  
No

Manual  
Manual

**HUDWAC**  
CRT  
Digital

4.6 inch  
25° total  
15.75°V x 16.9°H  
instantaneous

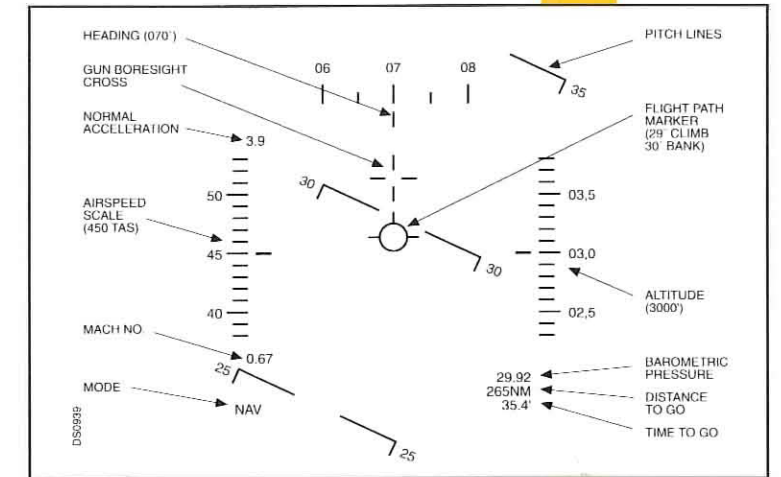
Yes  
Yes  
Yes  
Yes  
No (but distance  
between FPM &  
gun cross gives  
indication)

Analog, Digital  
Yes  
Discrete, Analog  
Yes  
Yes  
Yes  
Yes  
Yes  
Yes

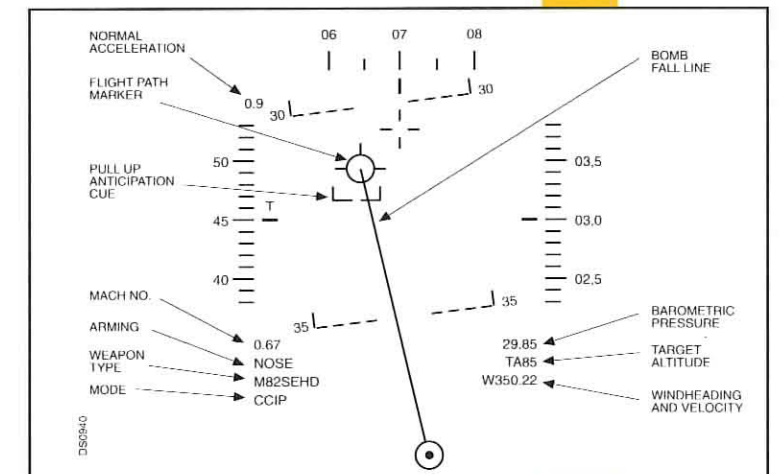
Automatic  
Automatic,  
Manual

## Typical Symbolologies

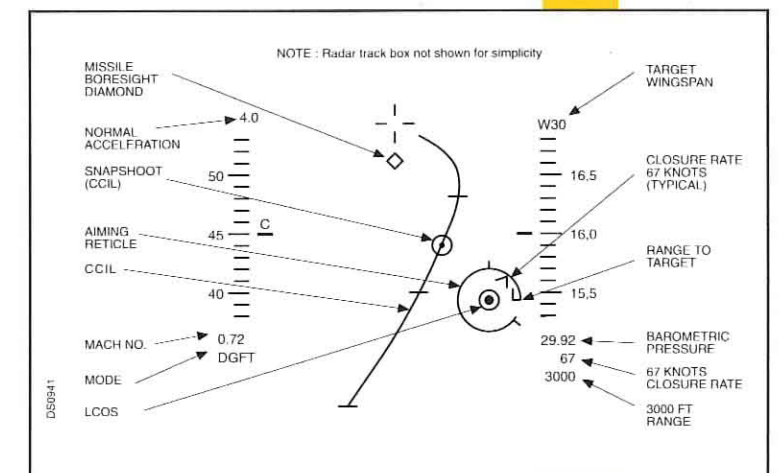
### Navigation Mode



### CCIP Mode (Bombs) Display



### Dogfight Display



**GEC-Marconi Avionics Limited**  
**Display Systems Group (Rochester)**  
**Displays Division**  
Airport Works, Rochester,  
Kent, ME12XX. England

Telephone Brian Gotting on 44-(634) 816042 Facsimile 44-(634) 816748

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