

# Honeywell

## Guidance, Navigation and Control Center of Excellence (COE)

SAE G&C Committee Meeting  
March 2, 2005

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**Honeywell**

# Spring Update

- **Autonomy**

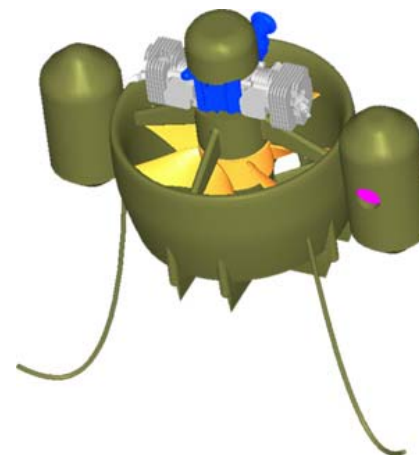
- **Micro Air Vehicle (MAV)**

- ◆ First tethered flights Dec 21, 2004

- **Organic Air Vehicle – 2 program commenced**

- ◆ Focus on collision avoidance algorithms

- **HURT program kicked-off**



- **Advanced Control**

- **NASA CUPR program**

- ◆ Piloted simulations at Langley

- **Boeing 7e7 program**

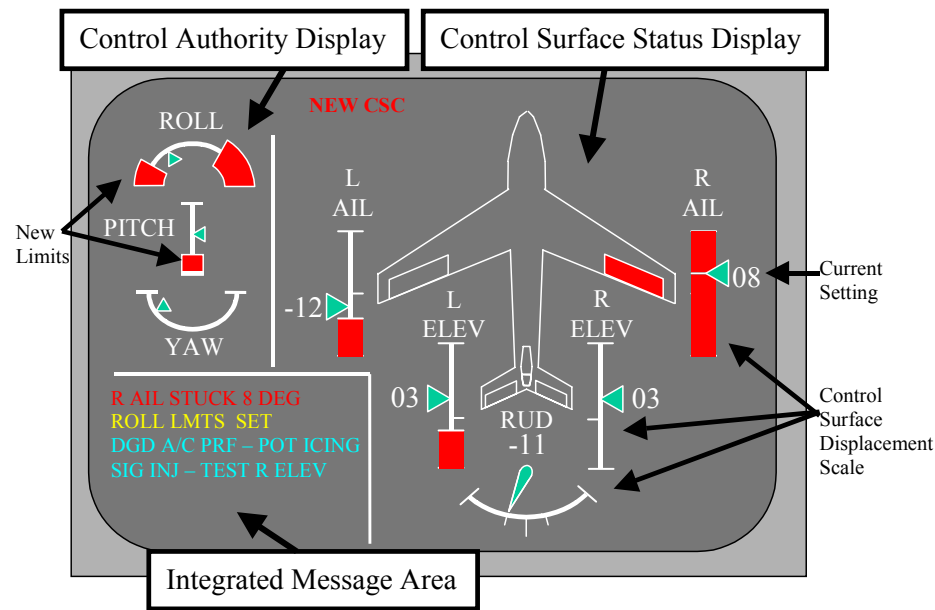
- ◆ Fly-by-wire implementation

- **Boeing CMUS program**

- ◆ Technical progress reviewed

- **Coordinated control**

- **C-17 FFS program update**

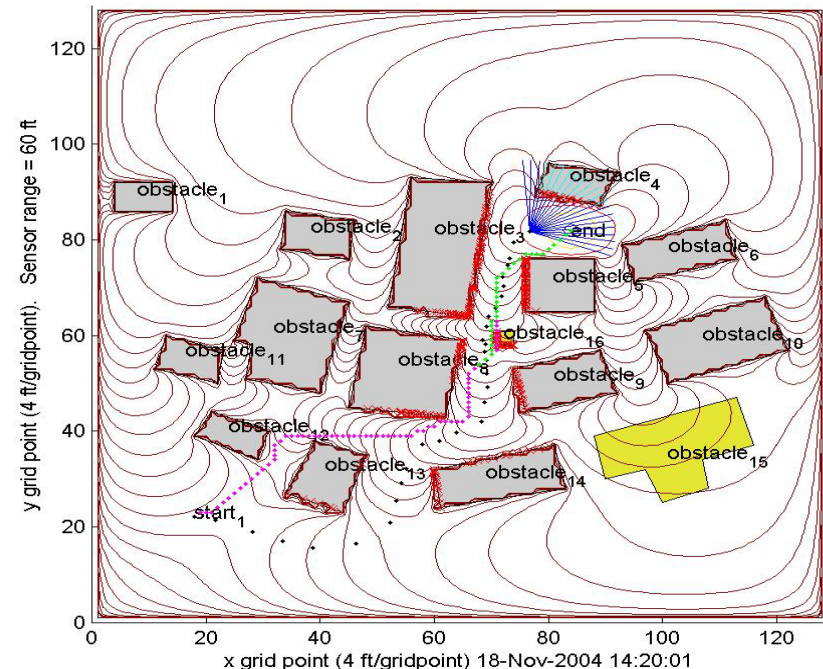


# Intelligent Autonomy

- **Micro-Air Vehicle (MAV)**
  - Tethered flights at Honeywell's Albuquerque site
  - Challenging flight controls and navigation problems
  - SMARTLabs for prototyping, visualization
  
- **Organic Air Vehicle (OAV-2)**
  - Phase 1 effort ongoing
  - Focus on collision avoidance
  - Explore sensor modalities and novel algorithms
  - React to pop-up obstacles



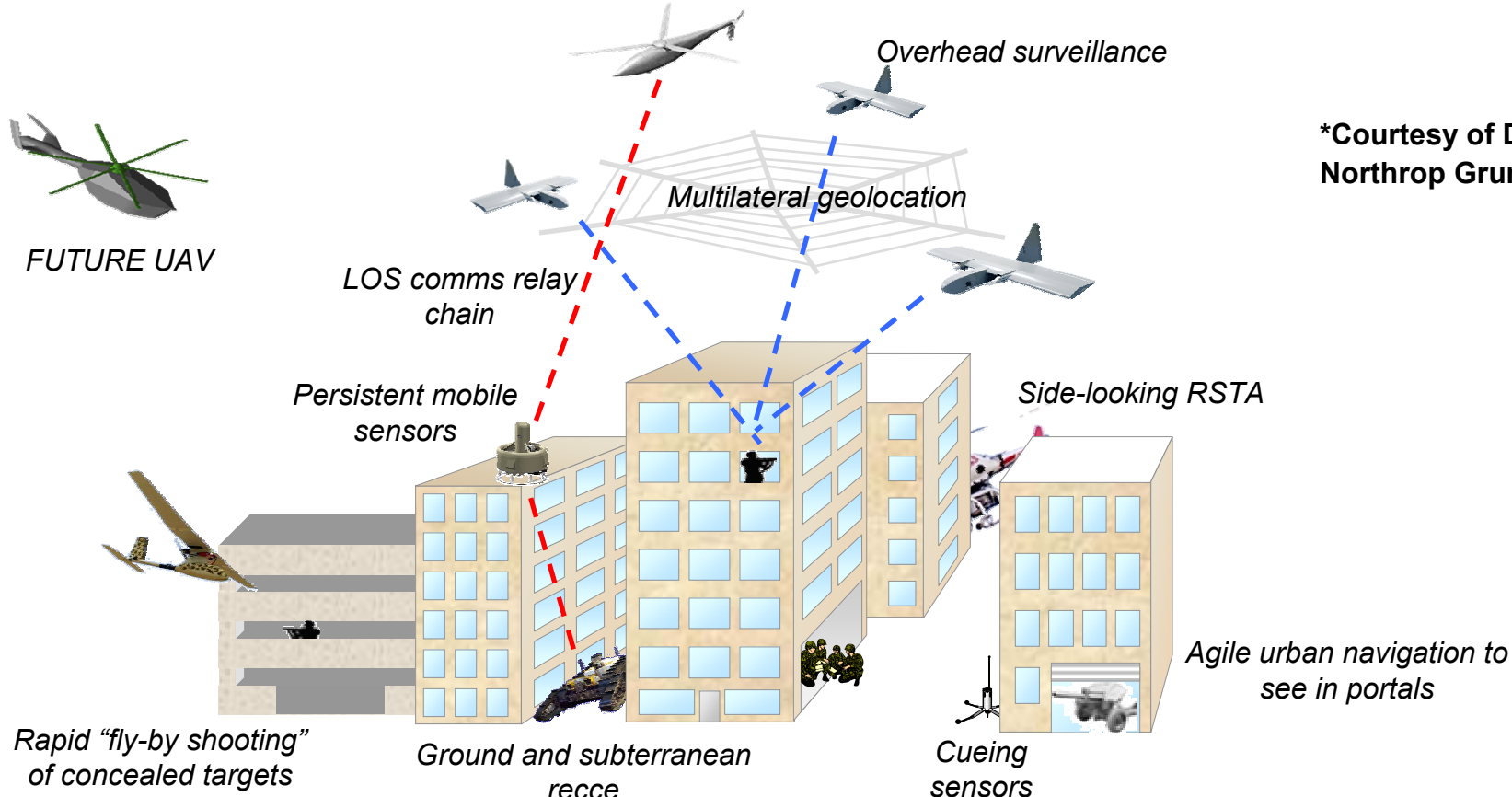
$r=[x,y]$ . Laplacian( $v(r)$ )=0.  $v(r)=v_0$  for  $r$  on given (grey) or seen (red) obstacles.  $v(r)=v_{end}$  for  $r=end$ .



# Intelligent Autonomy (contd.) – HURT program



**Urban RSTA requires horizontal viewpoints and rapid reaction to cues and perceived threats**



\*Courtesy of DARPA and Northrop Grumman

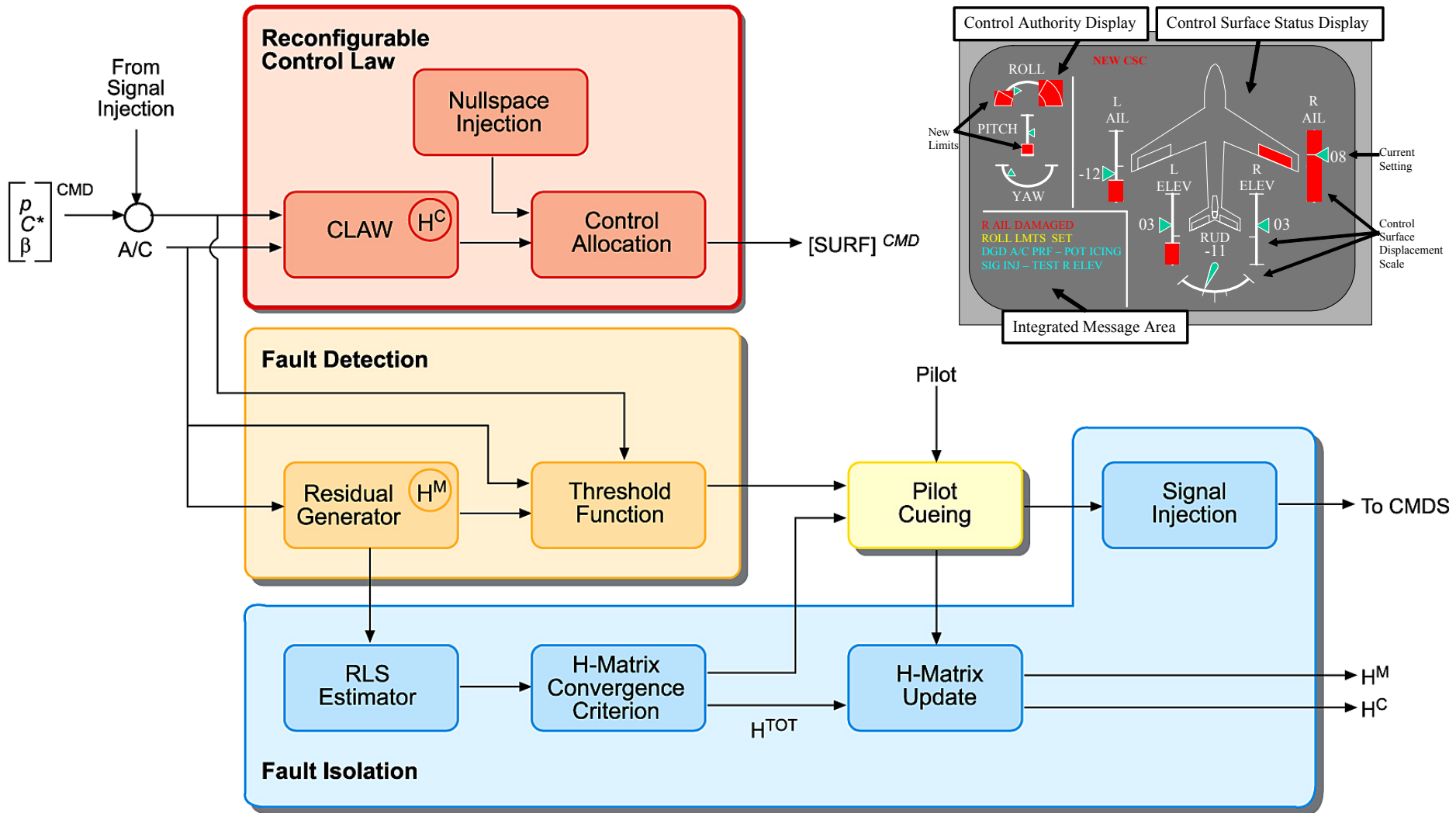
**The HURT control layer can make existing vehicles behave like a distributed robotic sensor**

**HURT Provides On-Demand Collaborative RSTA for Obscured Targets**

- **7E7 Fly-by-wire program**
  - Design reviews ongoing
  - End-to-end system modeling, redundancy analysis
- **Boeing/AFRL CMUS program**
  - Adaptive inner loop algorithms responsive to IVHM signals
- **Second Piloted simulation at NASA Langley**
  - Successful demonstration of CUPRSys for 3 operating points
  - Demonstrated benefits of reconfigurable control
    - ◆ Elevator faults simulated on Boeing 757 model
    - ◆ Nominal, faulty and reconfigured cases evaluated
    - ◆ Results will be presented at SAE-G&C Meeting 96



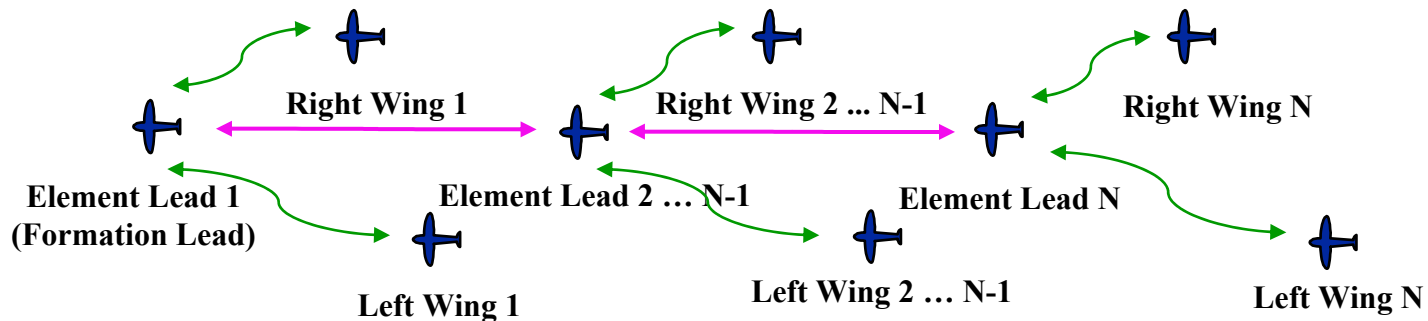
# Honeywell Labs CUPRSys



C05032-02

# Multi-Vehicle Control

- **Formation Flying System (FFS) for C-17**
  - Ensure spacing and coordination
  - System level analysis and algorithm design of TCAS-ADSB hybrid surveillance for C17 formations
  - Delivered MILACAS-FR FFS Processor consignment EDU to Boeing for support test and integration



**Thank you**