

# SafeRoute™ ADS-B Program Briefing

Presented at the

FAA ADS-B Industry Day

# ACSS™

The logo for ACSS (Airborne Collision Avoidance System) features the letters 'ACSS' in a large, bold, black sans-serif font. A red arrow with a black outline points to the right, starting from the bottom of the 'S' and extending past the end of the text. A thin blue horizontal line is positioned below the 'ACSS' text, ending at the start of the arrow.

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Presented by

Cyro A. Stone

***Now Introducing...***



***ACSS and UPS Join to Develop SafeRoute***



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# SafeRoute – Introduction



## ● SafeRoute ADS-B Solutions

- SafeRoute is a Set of “ADS-B In” Software Solutions That Utilize “ADS-B Out” Messages for In-Cockpit Operational Functions
- SafeRoute is Developed to Improve Safety and Efficiency in the Airport Vicinity
  - Safety Improvements Are Through **SAMM** Functionality
    - ▶ SAMM = Surface Area Movement Management
    - ▶ Addresses Runway Incursions
  - SAMM Provides Enhanced Surface Situational Awareness of Own Ship Relative to Other On-Ground Aircraft
  - Efficiency Improvements Are Gained From **Merging & Spacing** Functionality
    - ▶ Eliminates Need for Radar Vectors in Terminal Area
  - Efficiency Improvements Are Gained From **CAVS** Functionality
    - ▶ Provides VFR Landing Rates During IFR Conditions
- Capable of Being Hosted on ACSS Surveillance Platforms
  - TCAS 2000 and Surveillance Processor



# SafeRoute – Functions



## ● **SAMM (Surface Area Movement Management)**

### ■ Operational Goals:

- Provide the Needed On Ground Situational Awareness to Reduce Terminal Area Aircraft to Aircraft Collisions

### ■ Provides Enhanced Surface Situational Awareness of Own Ship Relative to Other On-Ground Aircraft

- Provides DISPLAY of Own Ship Relative to Other On-Ground Aircraft
- Provides VISUAL & AURAL ALERTS of Potentially Hazardous Situations Relative to Own Ship and Other On-Ground Aircraft

## ● **Merging & Spacing**

### ■ Operational Goals:

- Save Fuel, Reduce Emissions, & Reduce Noise
- Eliminate ATC Radar Vectors and Speed Changes
- Decrease Air Traffic Controller Work Load

### ■ Provides Speed Guidance to Merge Behind Lead A/C & Maintain Specified Interval

## ● **CAVS (CDTI Assisted Visual Separation)**

### ■ Allows Continued Use of Visual Separation as Visibility Deteriorates

### ■ Save Fuel, Reduce Emissions, & Reduce Noise



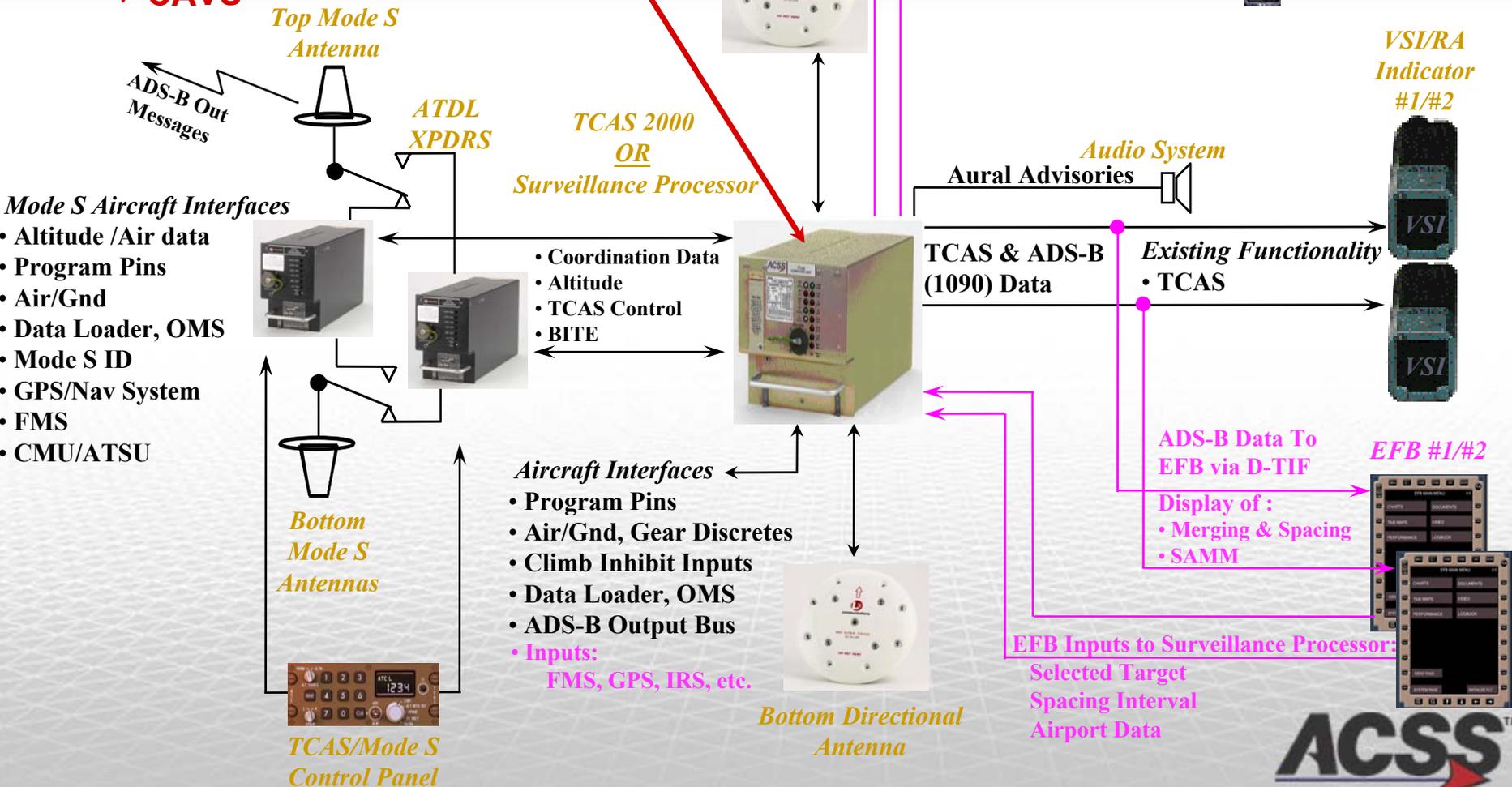
# SafeRoute – Aircraft Architecture

## Example SafeRoute Aircraft Architecture

Additional Features With SafeRoute (ADS-B Upgrade)

### SafeRoute (ADS-B) Functions

- ✓ SAMM
- ✓ Merging & Spacing
- ✓ CAVS



# SafeRoute – Certification



## ● Included in SafeRoute First Release:

- **Traffic Collision and Avoidance System (TCAS/ACAS)**
- **Enhanced Traffic Situational Awareness on the Airport Surface (ATSA-SURF)**
  - **Surface Area Movement Management (SAMM)**
    - ▶ Enhanced Visual Acquisition
    - ▶ Airport Surface Situational Awareness
    - ▶ Final Approach and Runway Occupancy Awareness
- **Enhanced Sequencing and Merging Operations (ATSA-S&M)**
  - **Merging & Spacing (M&S)**
    - ▶ Enhanced Visual Acquisition
- **Enhanced Visual Separation in Approach (ATSA-VSA)**
  - **CDTI Assisted Visual Spacing (CAVS)**
    - ▶ Enhanced Visual Acquisition
    - ▶ Enhanced Visual Approaches



# SafeRoute – Program Overview



## ● Program Goals

- **Provide Implementation Guidance**
  - Guidance for Other Operators and NAS
  - Pave Way for Certification Guidelines & Industry Standards
- **Support FAA, Eurocontrol, and JPDO Plans for Modernization of Aviation**
- **Harmonize Approach with US, Australian and European ADS-B Programs**
- **Implement SafeRoute with Key European Operator**
- **Obtain Support from US, European, and Asian (Australian) Regulatory Agencies**
- **Provide Affordable Retro-Fit**
  - Ability to Standardize Across All Fleet Types
- **Provide Bundled Applications Within in One System**
  - Create Layered, Cumulative Benefits With Good ROI
  - Prove Safety Benefit and Cost Savings To Operators



# SafeRoute – Program Overview



## ● Program Milestones

- Certification Plan Submittal – Feb 06
- Expected Certification Flight Test – June 07
- Expected TSO Submittal – July 07
- Expected STC Approval – Aug 07
- Expected Ops Approval – Sept 07



# SafeRoute – Program Overview



## ● Industry Support / Activity

### ■ FAA Tiger Team

- FAA Has Formed a Team of FAA Personnel Dedicated to UPS SafeRoute Program
- Tiger Team Working to Support Product Certification, Aircraft Certification, and Operational Approval of SafeRoute System.

### ■ Air Services Australia – ITP Flight Trials

### ■ Working Groups

- Airbus & Boeing Technical Coordination Meetings Have Occurred
- ACSS & UPS Have Gained Support of Various RTCA Working Groups for SafeRoute Functionality
- Merging & Spacing Working Group
  - ▶ FAA, NASA, MITRE, MIT/LL, Eurocontrol, UPS, ACSS



**SafeRoute™**

***Merging & Spacing Function***

**ACSS™**

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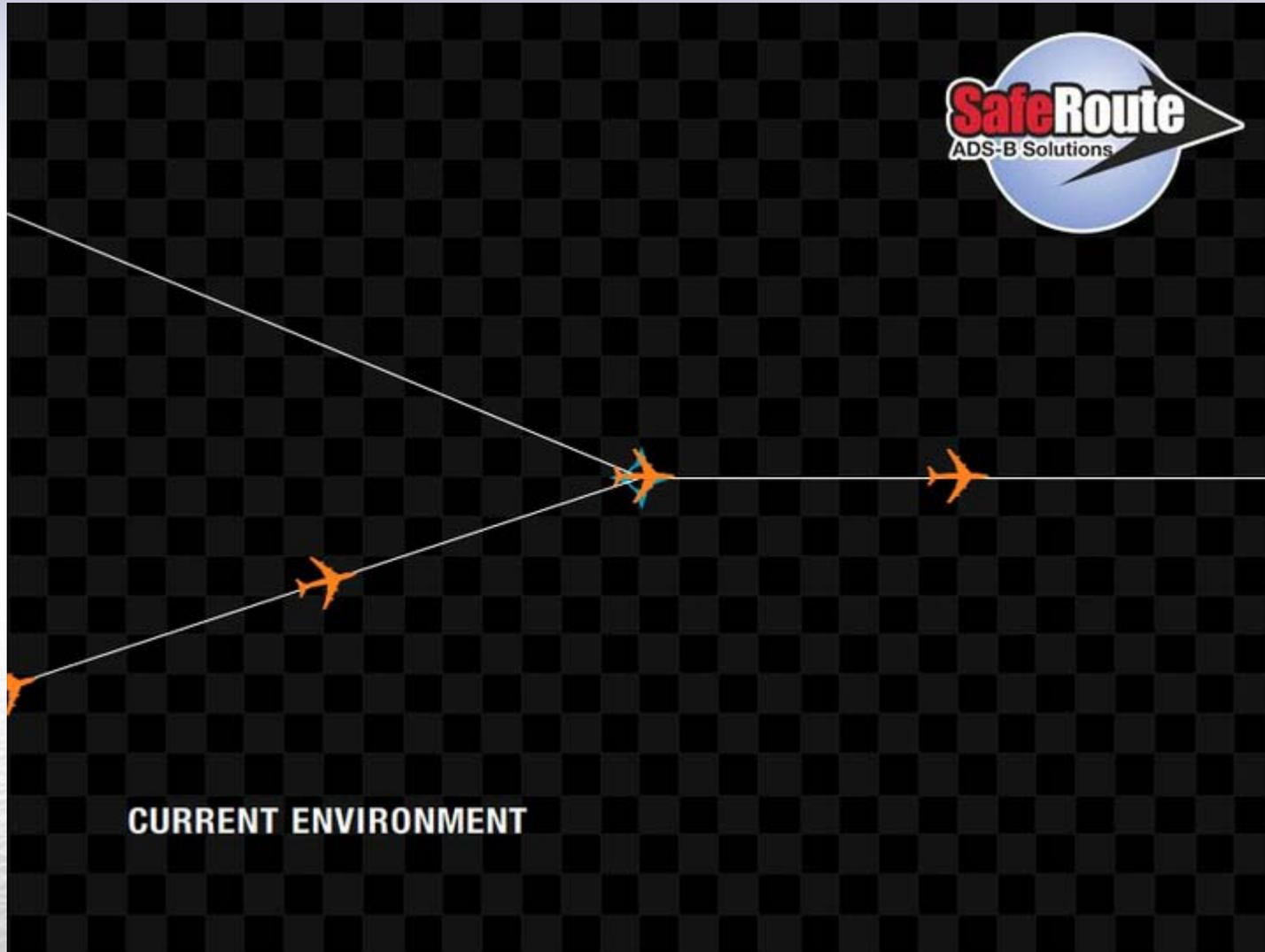
**ACSS™**

A faint, gray, semi-transparent reflection of the ACSS logo is visible below the main logo, mirroring its shape and position.

# SafeRoute – Merging & Spacing



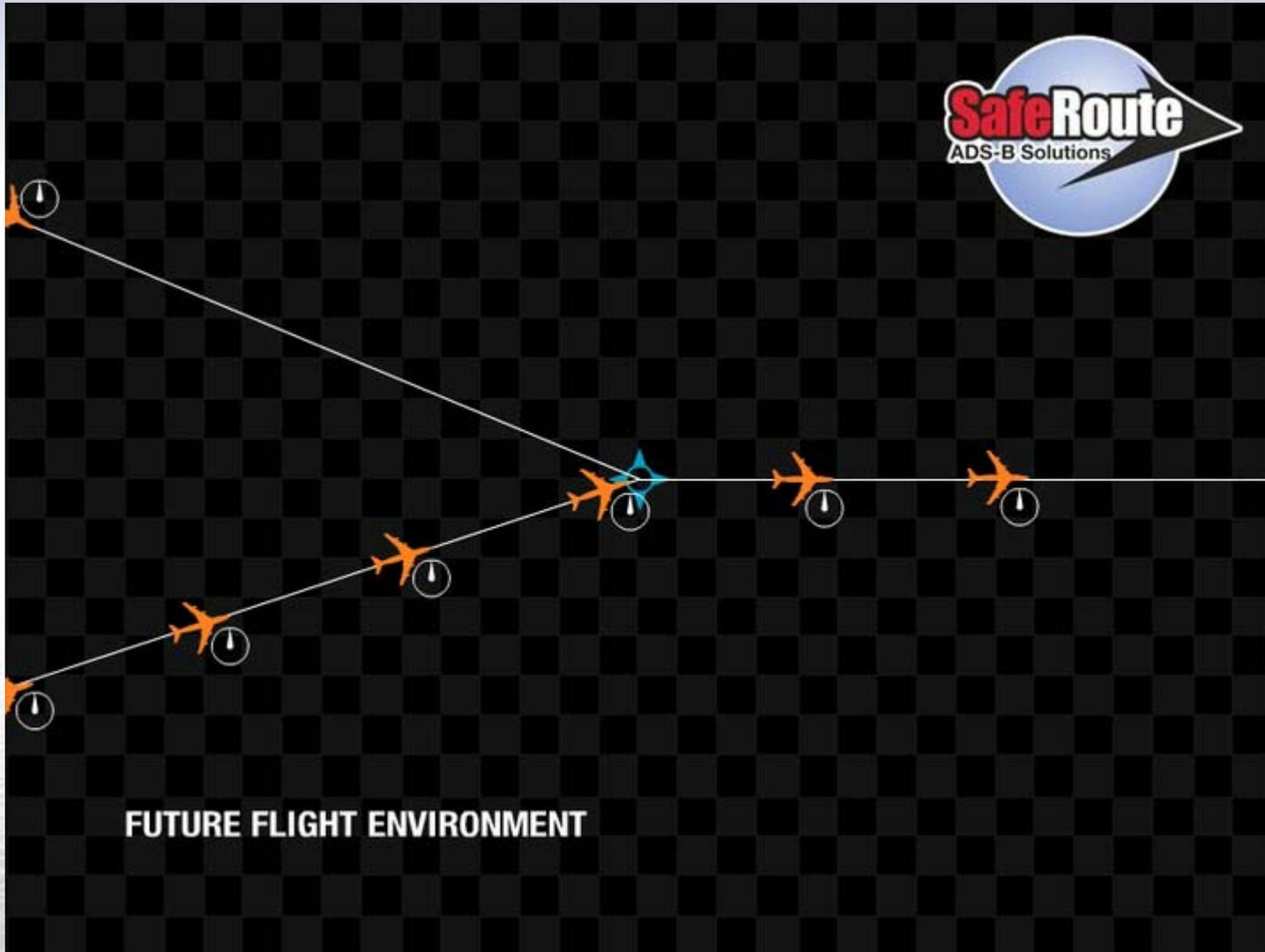
- M&S Operation – Current Environment



# SafeRoute – Merging & Spacing



- M&S Operation – Future Environment



FUTURE FLIGHT ENVIRONMENT



# SafeRoute - Merging and Spacing



- **Operational Example of SafeRoute M&S and CAVS Function**

- **Phases Of Operation**

  - **Instruction**

    - **ATC or AOC Instructs Pilot With Flight ID Of Traffic To Follow, Merge Point, and Spacing Interval**
    - **The Pilot Enters The ID Of Traffic To Follow, Merge Point, And Spacing Interval Via The CDTI Menu. No Merge Point Is Entered For A Remain Behind**
    - **If The Traffic To Follow Is Not Currently Within ADS-B Range Then The Selected Function Will Arm Only**



# SafeRoute - Merging and Spacing



## ● Phases Of Operation

### ■ Conduction

- Once The Traffic To Follow Is Within ADS-B Range The System Will Activate
- The Merging And Spacing Function Generates Speed Targets To Achieve The Desired Spacing Interval At The Merge Point And Then Continue To Generate Speed Targets To Maintain The Spacing Interval

### ■ Termination

- Under Normal Operation, The Function Is Terminated At 2000 Feet Radio Altitude
- ATC Can Intervene With A Speed Change At Which Point The Pilot Will Cancel The Function
- It Is The Pilots Responsibility To Ensure Any Speed Targets Generated By The System Will Result In Safe Aircraft Operation Within The Aircraft Operating Envelope



# SafeRoute – Merging & Spacing



## M&S Function

■ As Seen Through CDTI Hosted on Astronautics EFB



**SafeRoute™**

***End of Presentation***

**ACSS™**

The logo for ACSS features the letters 'ACSS' in a bold, black, sans-serif font. A horizontal line is positioned below the letters. A red arrow with a black outline points to the right, starting from the end of the horizontal line and pointing towards the right side of the 'S'. The letters 'ACSS' are positioned above the horizontal line.

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