

FORUM8

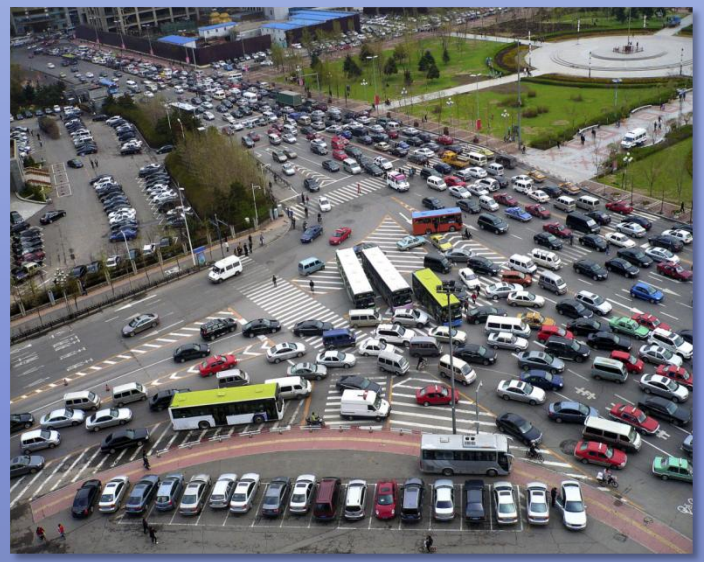
Starway Dispatch

AstroFlow

A Next-Generation LEO Space Traffic Management System

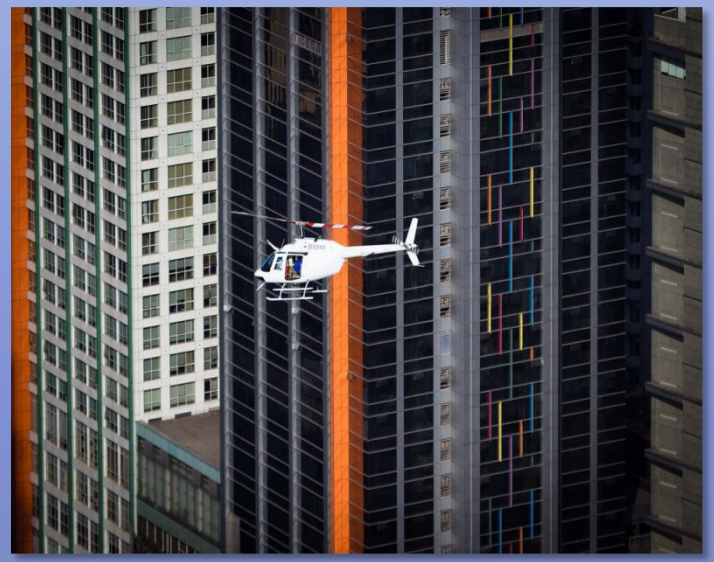
PROJECT BACKGROUND: MOTIVATION FOR PROBLEM SOLVING

Exhaustion of 2D resources



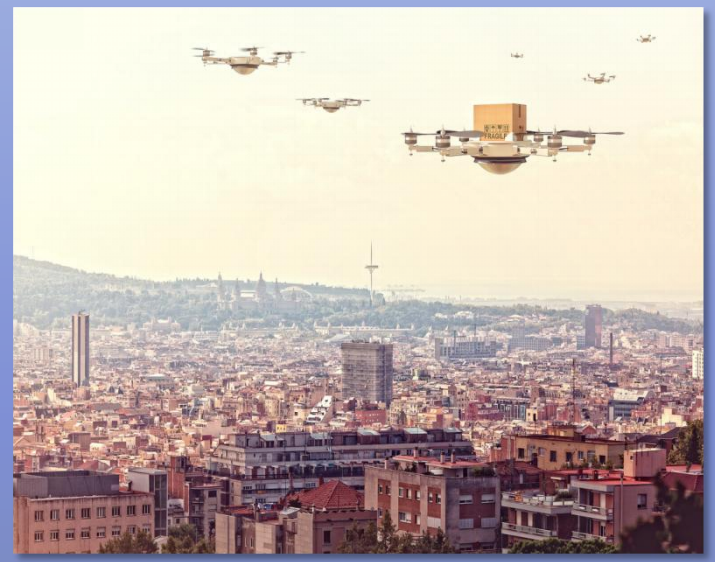
The two-dimensional ground transportation network has reached its **physical limit**, and the marginal cost of expansion is increasing exponentially.

Traditional ATC blind spot



The current air traffic control system is unable to cope with the scheduling of **low-altitude aircraft (eVTOL)** flying among high-density, complex buildings in the future.

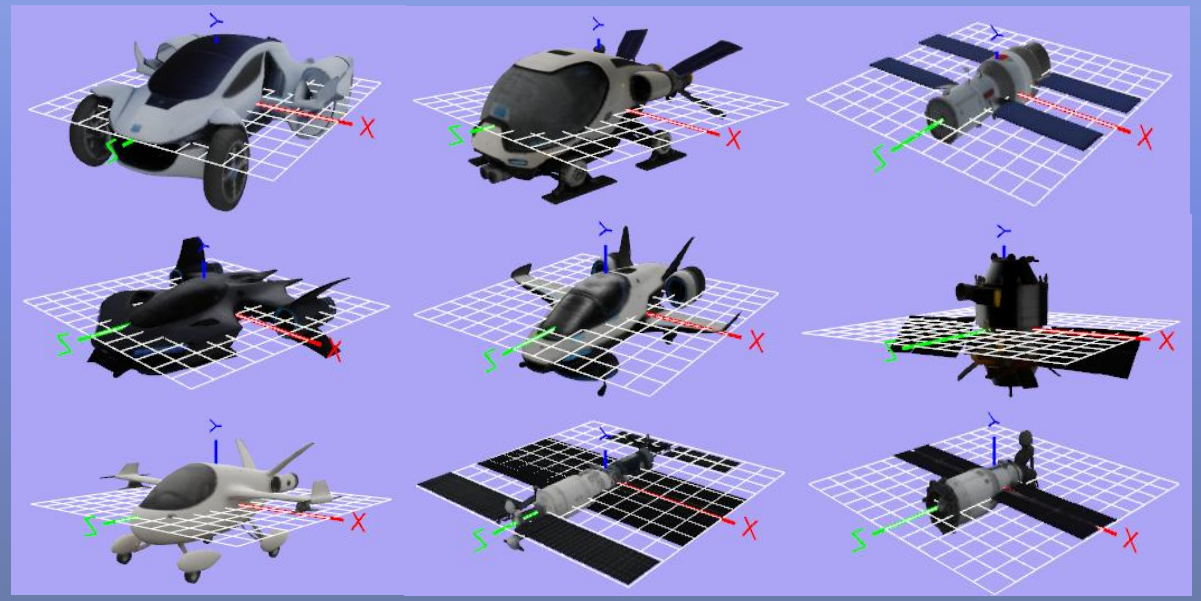
Space collision avoidance technology



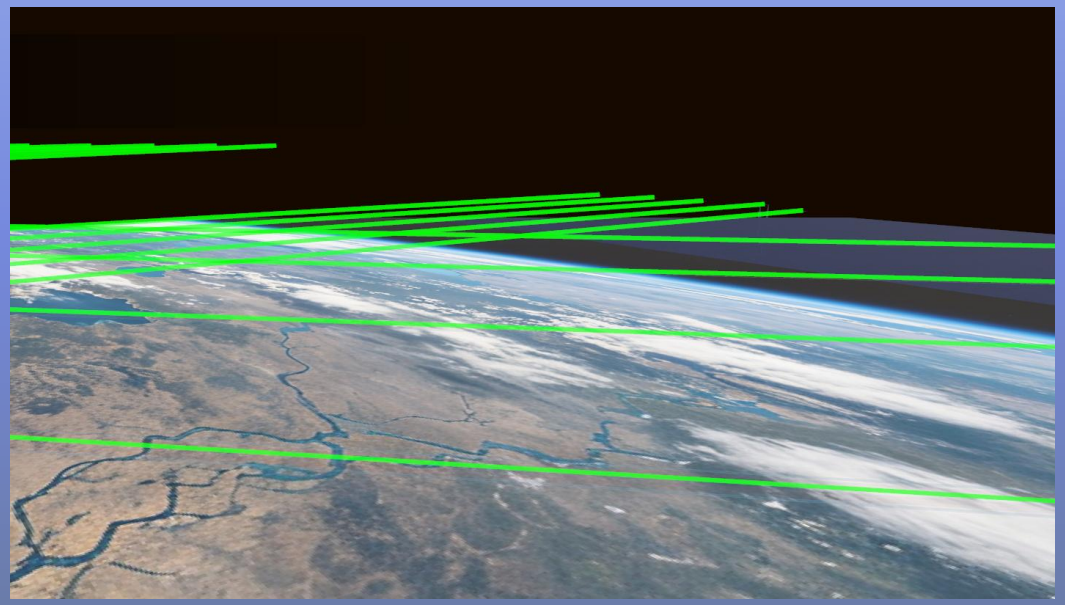
There is a lack of **real-time 3D collision prediction** and millisecond-level response for heterogeneous aircraft Correction mechanism.

- **Infrastructure Design**

  The project closely simulates the **Earth's surface** to recreate the effects of a near-surface orbit and constructs a simulated model of an **aircraft** to represent future near-surface aircraft, simulating the flight of such aircraft in a near-surface orbit.



Simulation using 9 different aircraft



Simulated Earth's Surface

By presenting the infrastructure in a visually striking way the project becomes more visually appealing and easier to understand.

STARWAYDISPATCH: OVERALL ARCHITECTURE

FORUM8

Module Architecture

The StarwayDispatch plugin employs a "**perception-decision-execution**" closed-loop control architecture and is deeply integrated into the UC-win/Road SDK framework.

SDK Interface Layer

Hooks
OnNewTransientObject
OnTransientDeleted

Movement Override
SetCallbackOn-DoMovement

Perception & Monitoring Layer

Density Assessment Engine
Density = Number / Road Length
Calculates the utilization percentage (util%) for each route in real time

Fuzzy Traffic Condition
Traffic density data
Smooth, Slow, Busy, Jammed

Multi-End Synchronization Mechanism
Ensures millisecond-level synchronization for F8main.cpp

Decision-Making Layer

Adaptive Scheduling
Search for the route with the lowest density across the entire field

Virtual Node Fallback
generate virtual lane-change points

Safety Verification Logic
Perform obstacle avoidance and collision detection within a 40-meter radius

Execution Layer

Three-stage controller
Ascend、Lateral、Descend

Interpolation Smoothing Algorithm
SmoothStep / Linear Interpolation

UI & Interaction Layer

Ribbon Integrated Console
Scenarios、Macro
Micro、Rescue

Statistics Dashboard
1,500+ units
performance metrics

Rule Config
Dynamically adjust density thresholds obstacle-avoidance radii

This ensures the operational efficiency of large-scale simulations while delivering highly expressive, intelligent air traffic control demonstrations

STARWAYDISPATCH: HARDWARE ARCHITECTURE

FORUM8

- **ArchitectureHardware Implementation and Environmental Architecture**

The StarwayDispatch plugin is implemented based on a hardware runtime environment and physical architecture, enabling full utilization of high-performance computing resources. **It is compatible with future real-world air traffic control hardware and supports engineering-grade deployment**.



◆ **Core Computing Platform**

CPU： multi-core parallel processing capabilities

GPU： OpenGL hardware-accelerated architecture



◆ **Interaction Hardware Interface**

Human-Computer Interaction：Ribbon UI Console

Real-Time Display System：Main Display /Secondary Monitor



◆ **InterfaceSensor Data Simulation**

Virtual Radar Data Stream：OnNewTransientObject

V2X Communication Simulation：Vehicle-to-Everything

◆ **Hardware Performance Metrics**

Response Delay：Keep physical latency within 200 ms

Data Throughput：Supports processing tens of thousands of location update commands per second

◆ **Emergency Response Link**



Rescue Monitoring System：Simulated Air Traffic Control Operations Center (TOC)

V2X Communication Simulation：Trigger the “viewpoint jump” hardware command for the scene camera

- **ArchitectureHardware Implementation and Environmental Architecture**

The StarwayDispatch plugin offers **high integration**, **rigorous simulation**, and **strong interactivity**, enabling the management of low-altitude air traffic operations.

◆ Monitoring & Visualization

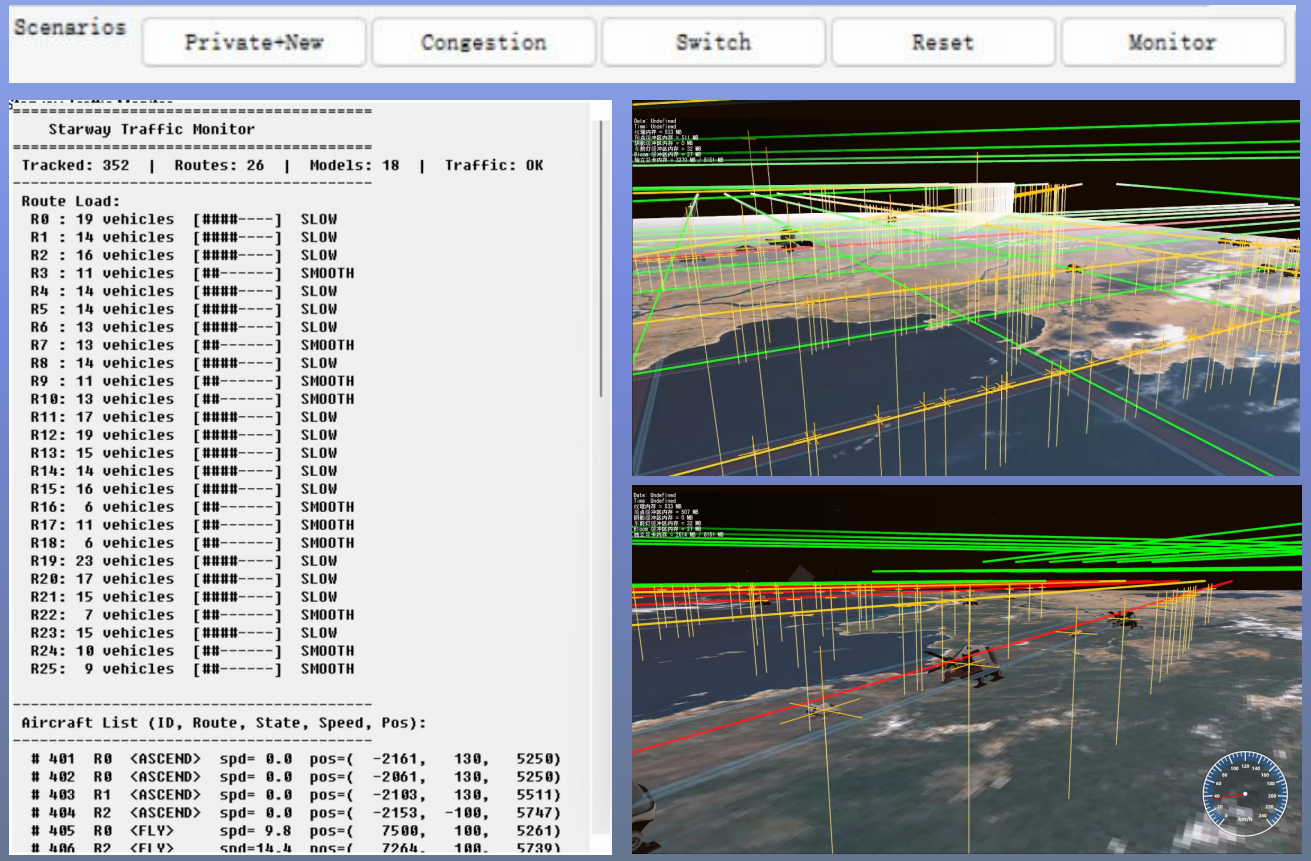
Density = Real-time count / Road length
3D Dynamic Road Condition Rendering

- Smooth: Unimpeded
- Slow: Light congestion
- Busy: Highly saturated
- Jammed: Severe traffic congestion

Cross-Device Data Synchronization

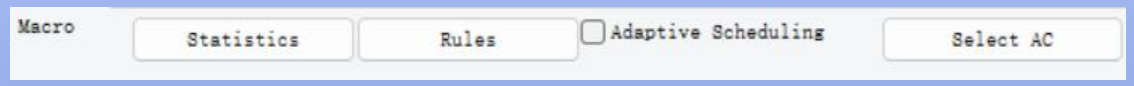
◆ Autonomous Scheduling

Full-Volume Background Flow Takeover
Virtual Intersection Matching Algorithm
Three-Stage Smooth Lane Change Control
Visual Scheduling Feedback

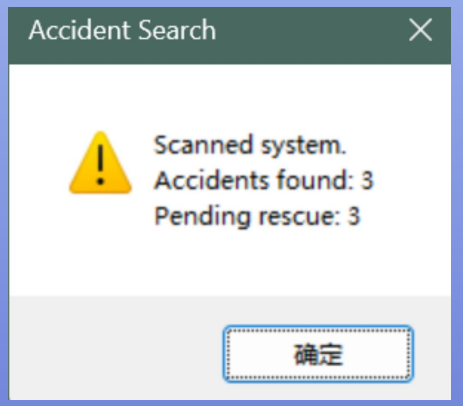


Plugin Scheduling in Real-Time Scenarios

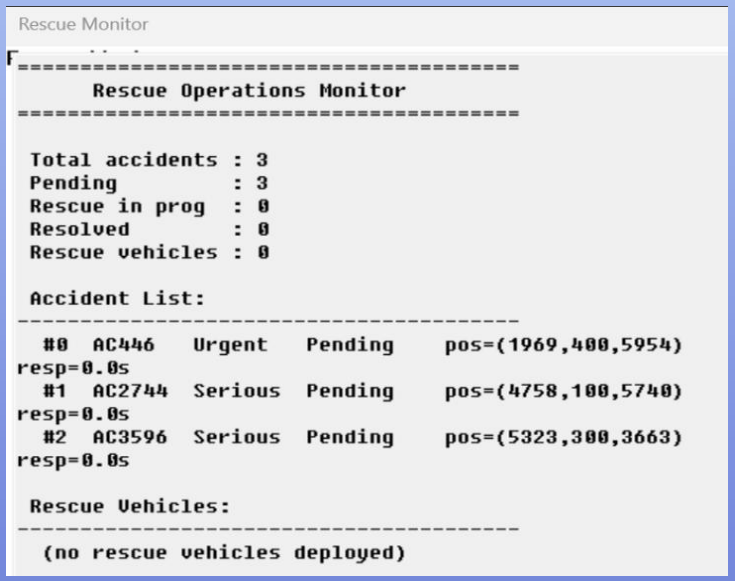
STARWAYDISPATCH: PLUGIN FEATURES



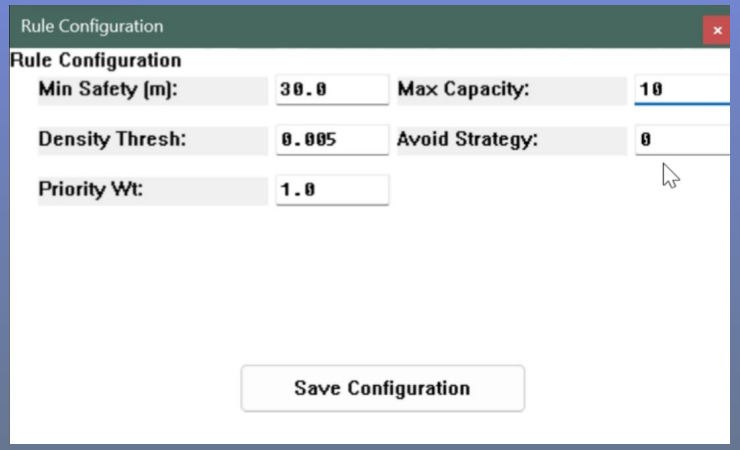
- **Emergency Response & Rescue Module**
  - Quick Search for Accidents
  - Real-Time Monitoring of Rescue Operations
  - Obstacle Avoidance Safety Verification
- **Ribbon Integrated Interaction Console**
  - Scenario Management
  - Macroeconomic Policy
    - Adaptive Scheduling Switch
    - Statistics Dashboard
    - Rule Configuration
  - Micro Guidance
  - Time Board
- **Data Analysis and Dashboard Module**
  - Route Load Distribution
  - Real-Time Flight List



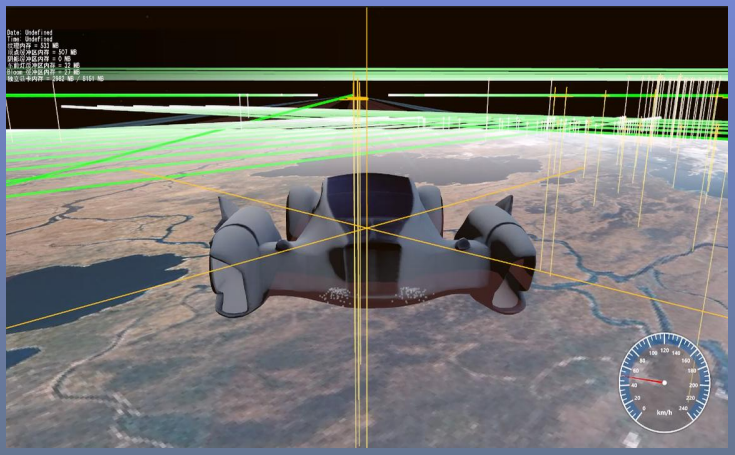
Detect Emergency



Rescue Panel



Coordinating Rule Settings



Aircraft Simulation

Development & Compilation

- **Preparing the Source Code**

  Core File: F8main.cpp

  Operations： Write the core logic in C++

  OnNewTransientObject

  GetRoadStatus

  VirtualNode

- **Project Configuration**

  Core File: StarwayDispatchPlugin.vcxproj

  Operations： Open in Visual Studio

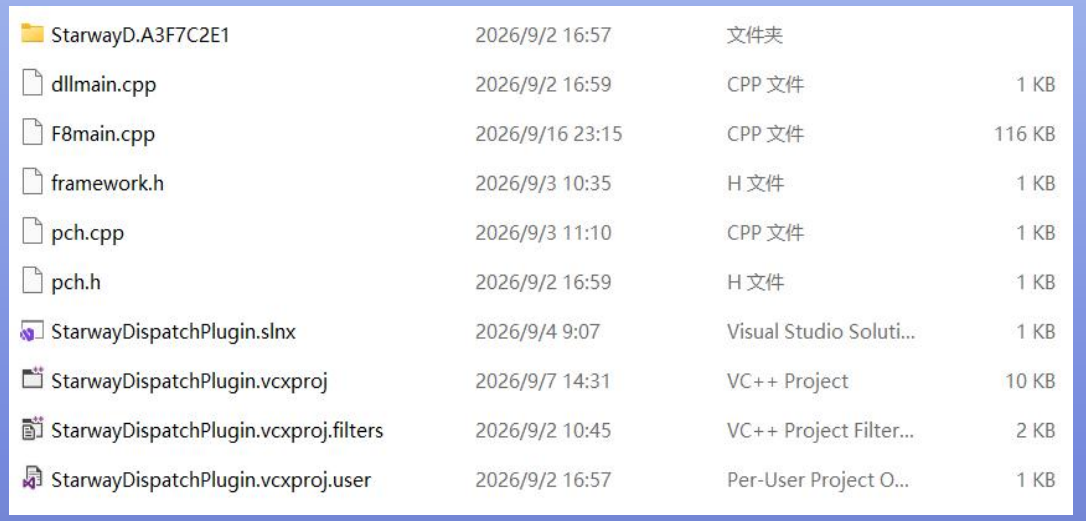
  Table of Contents：Include folder points to the SDK

  Library Directory：Link the .lib files provided by the SDK

  Compilation and Generation：

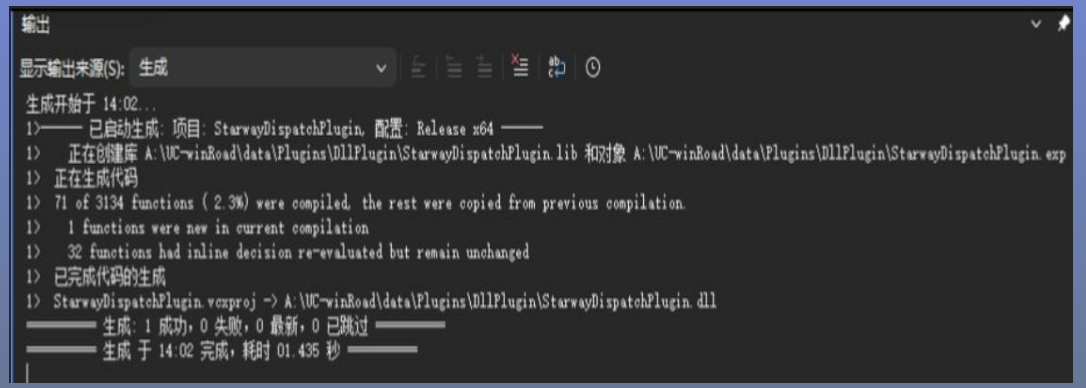
  Select the “Release | x64” configuration

  Generate StarwayDispatchPlugin.dll



StarwayD.A3F7C2E1	2026/9/2 16:57	文件夹	
dllmain.cpp	2026/9/2 16:59	CPP 文件	1 KB
F8main.cpp	2026/9/16 23:15	CPP 文件	116 KB
framework.h	2026/9/3 10:35	H 文件	1 KB
pch.cpp	2026/9/3 11:10	CPP 文件	1 KB
pch.h	2026/9/2 16:59	H 文件	1 KB
StarwayDispatchPlugin.slnx	2026/9/4 9:07	Visual Studio Soluti...	1 KB
StarwayDispatchPlugin.vcxproj	2026/9/7 14:31	VC++ Project	10 KB
StarwayDispatchPlugin.vcxproj.filters	2026/9/2 10:45	VC++ Project Filter...	2 KB
StarwayDispatchPlugin.vcxproj.user	2026/9/2 16:57	Per-User Project O...	1 KB

Engineering Documents



The engineering documentation has been compiled.

Development & Loading

- **Plugin Deployment**

  Target Path: UC-win/Road - Plugins

- **Startup and Activation**

  Operations: Launch the UC-win/Road

  Check the “StarwayDispatch” in menu

  Ribbon menu bar at the main interface

Simulation & Operation

- **Load Demo Scene**

  Create an Archive / open demo.rd

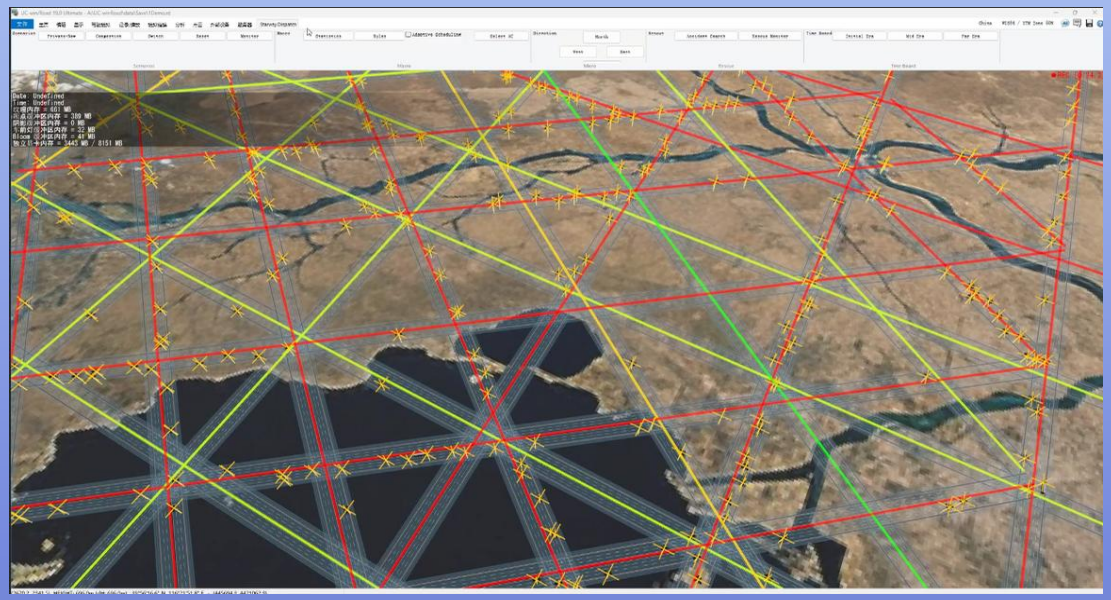
  Operations: plugin automatically triggers

  AfterLoadProject callback

  rescans the current road network

- **Activating the “Digital Brain”**

  Operations: Check the “Adaptive Scheduling”



Traffic Flow Tuning

- **Dynamic Parameter Tuning**

  Operations: Click the “Rules” button

  Modify the Density Threshold to adjust the sensitivity of congestion detection.

- **Emergency and Directional Control**

  Operations: Directional Control

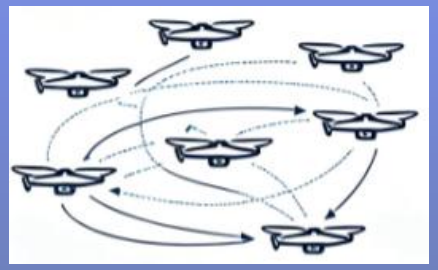
  Accident Search

Air-Ground Collaborative V2X

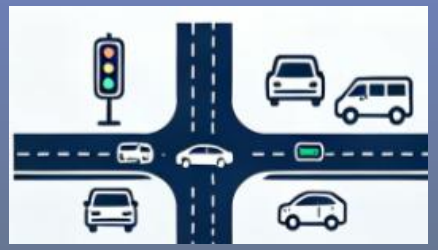
Concept: Break air-ground information silos for holistic optimization of 3D transportation.

Task Objective: Link Starway scheduling engine with UC-win/Road ground signal system.

Technical Approach: When high-density vehicle clusters pass over intersections, the ground green light is automatically extended to reduce impacts of ground emissions on low-altitude flight environment. Meanwhile, real-time ground incident information is fed back to airspace to reroute aircraft.



Aircraft



Ground Transportation

Aircraft Status

Cluster Trajectory

StarwayDispatch

- Flight Mission Scheduling
- Signal Phase Conflict
- Optimization of Conflict Resolution

Green Light Phase

Extension Directive

Low-Altitude Flight Information

UC-win/Road Ground Signaling System

Ground Information

Detour Route Guidance