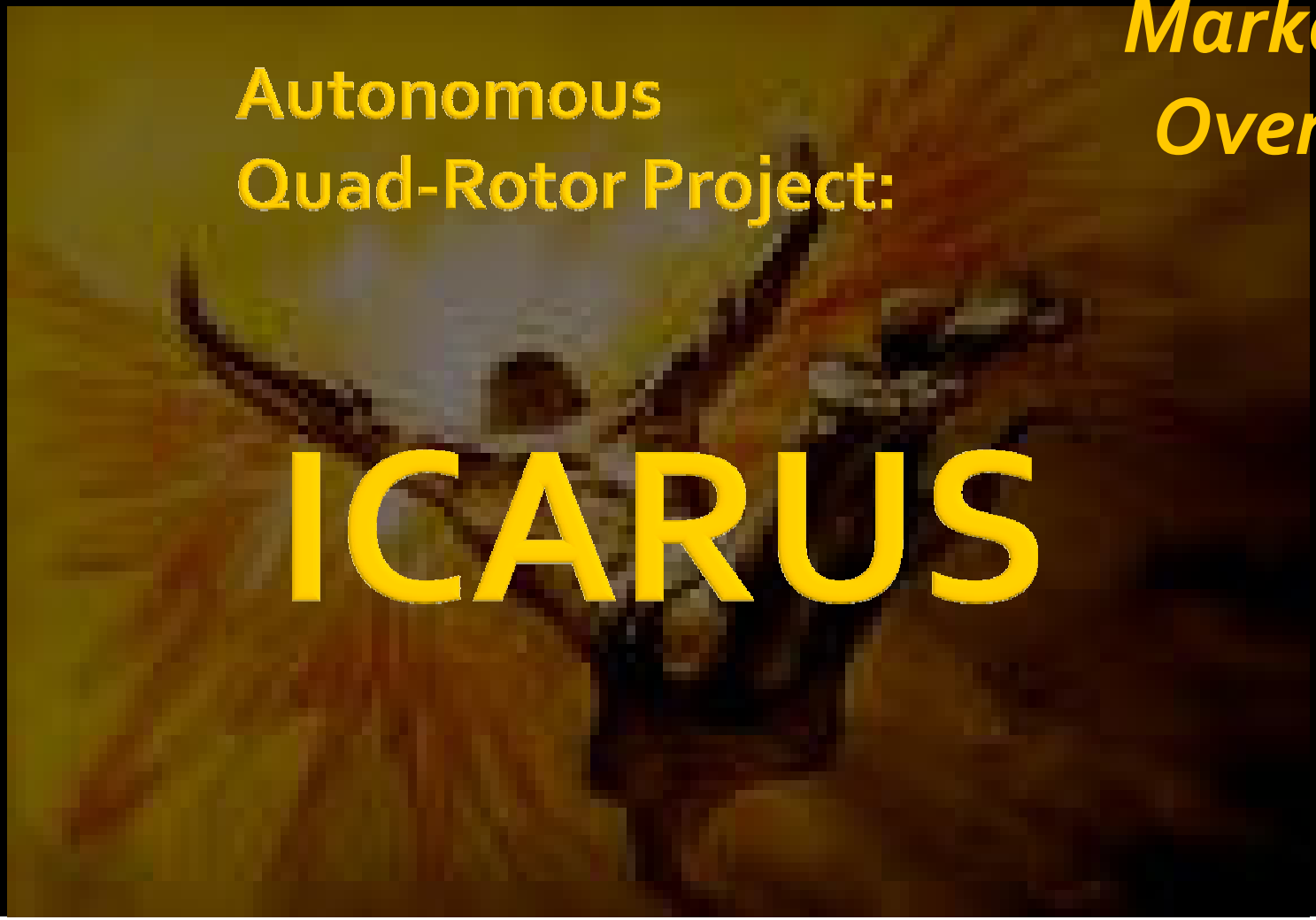


Marketing Overview

Autonomous Quad-Rotor Project:

ICARUS

Integrated Complex Advanced Robotic Unmanned System

David Gitz, EE, ICARUS Lead Engineer

Mission

"To develop innovative and interoperable unmanned systems"

Sometimes, flying feels too godlike to be attained by man. Sometimes, the world from above seems too beautiful, too wonderful, too distant for human eyes to see . . .
— *Charles A. Lindbergh, 'The Spirit of St. Louis,' 1953.'*

There is an art, it says, or rather, a knack to flying. The knack lies in learning how to throw yourself at the ground and miss. [...] Clearly, it is this second part, the missing, which presents the difficulties.
— *Douglas Adams,* 'The Hitchhiker's Guide to the Galaxy'

Core Team

- Ben Wasson
  - Masters Student
  - ICARUS Business Manager
- David Gitz
  - Electrical Engineer
  - ICARUS Lead Engineer
- Michael Welling
  - PhD Candidate
  - ICARUS Systems Engineer
- James Chaklos
  - Masters Student
  - ICARUS Test-Stand Engineer
- Steve Warren
  - Computer Engineer
  - ICARUS Communications Engineer

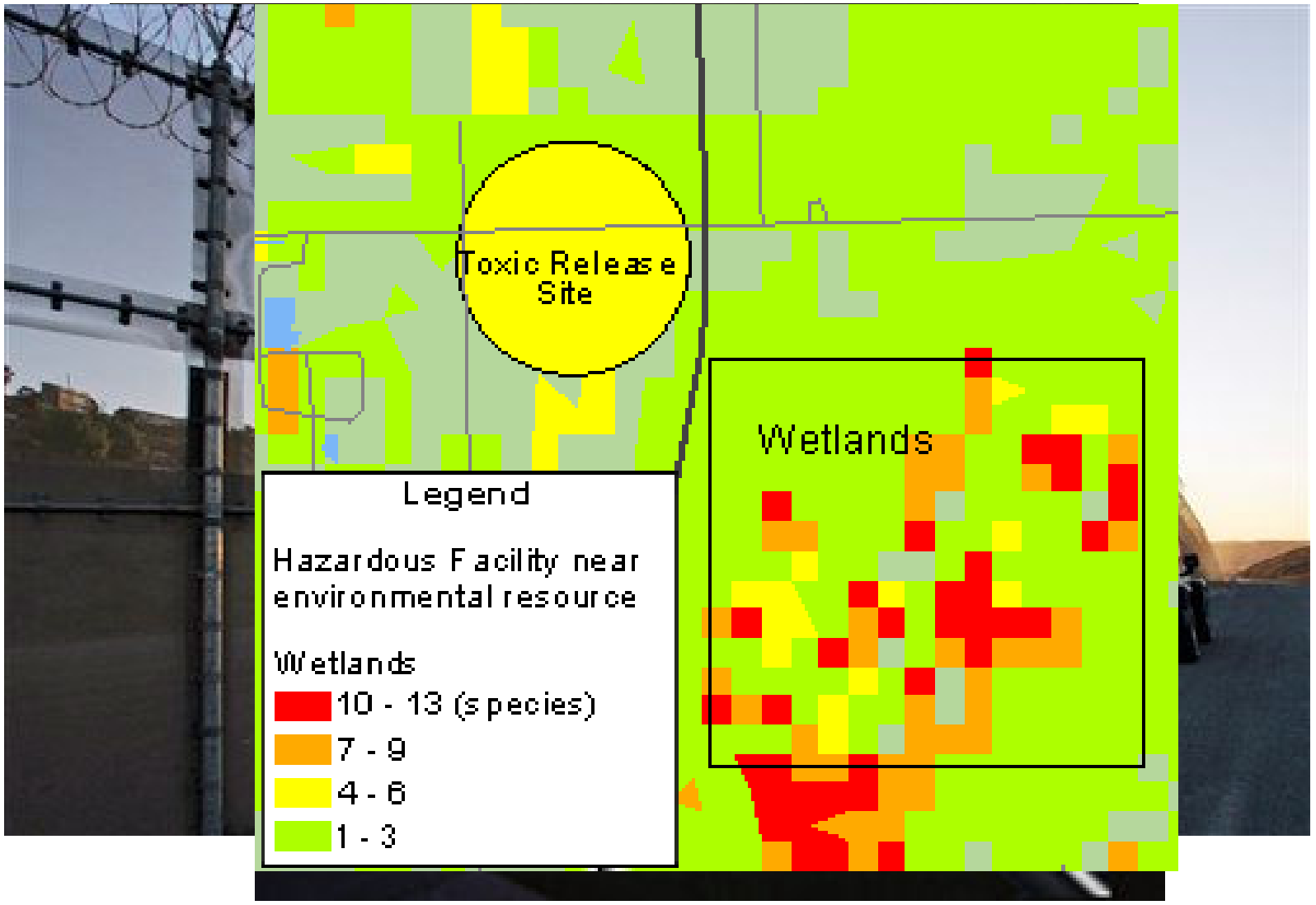
Satellite Teams

- Washington University UAV Team
- SIU-Carbondale ECE Lab Team
- SIU-Carbondale Senior Design (pending)
- Boeing ONE Group (pending)

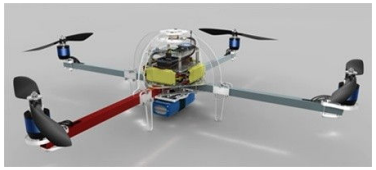
Topics:

- Applications
- The Future
- System Description
- Capabilities
- Competitor Analysis

Applications

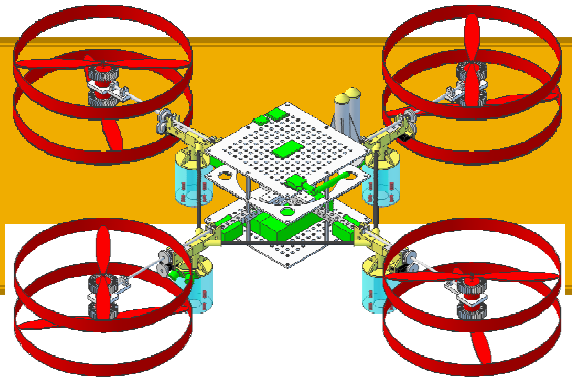


Future of Quad-Rotor's



ArduCopter

V-44
Bell/Boeing
Pending



V-22 Osprey
Bell Helicopter
Boeing Rotorcraft Systems
2007

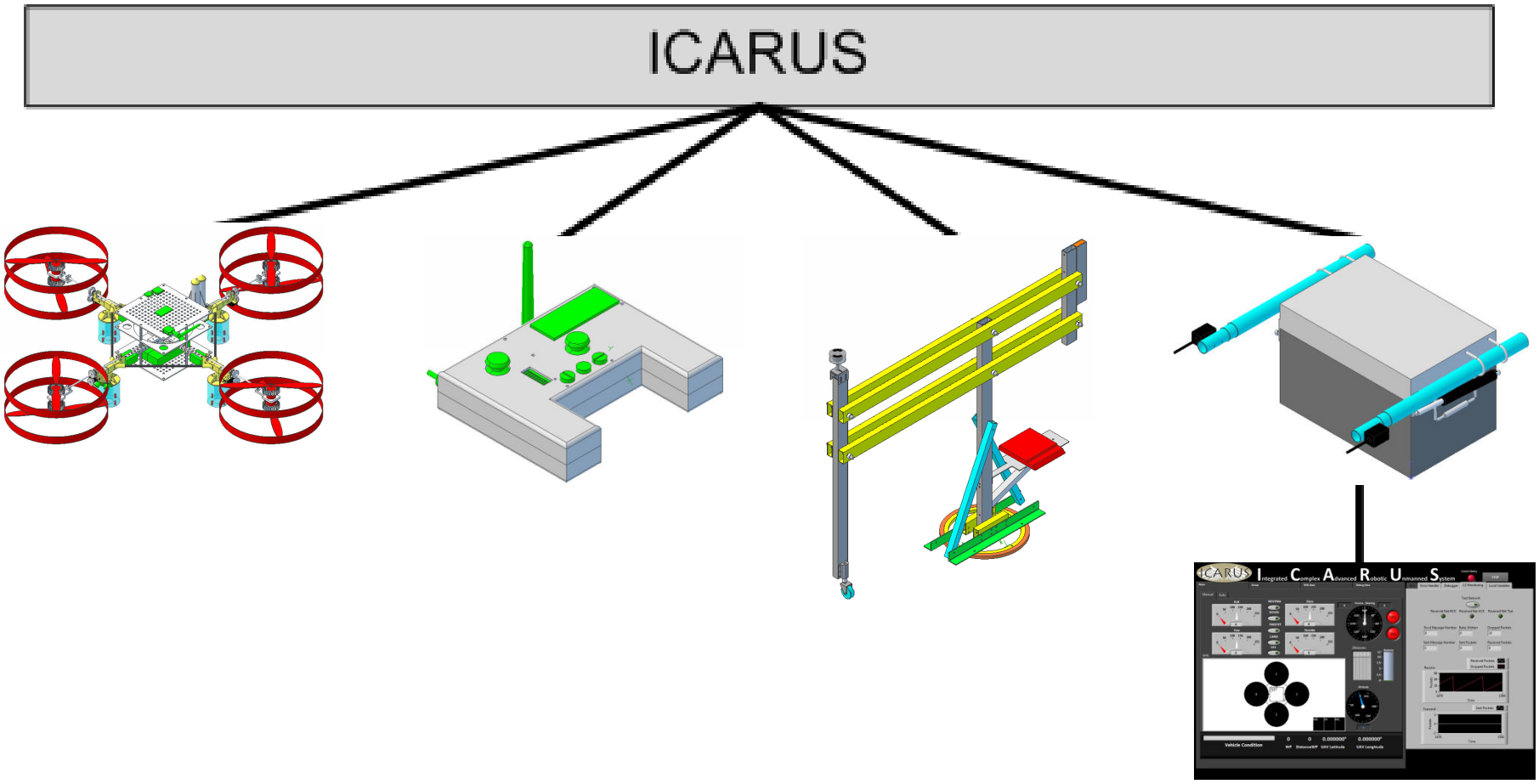
ICARUS

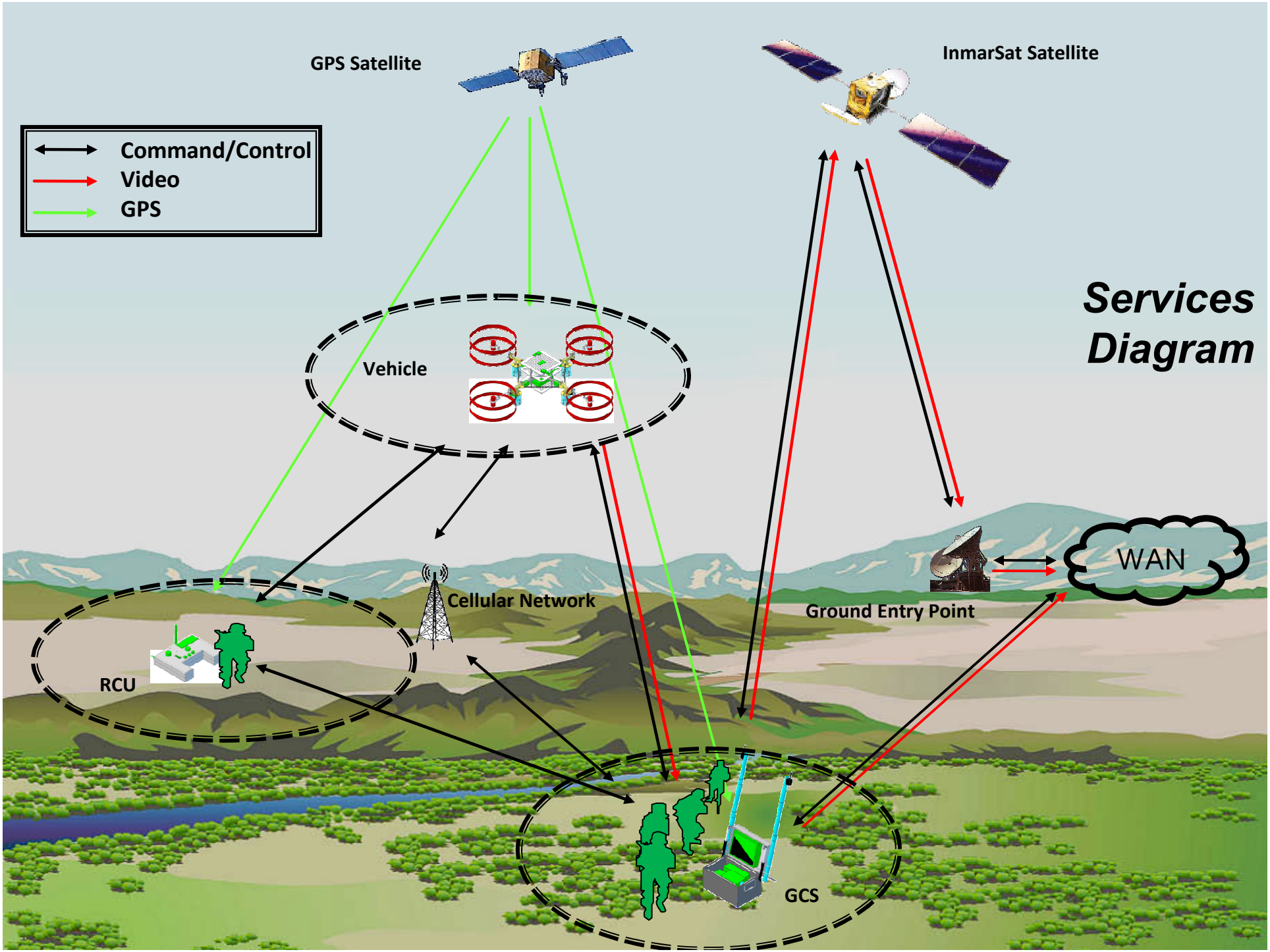
PAST

DraganFlyer v6

FUTURE

System Description




GPS Satellite
InmarSat Satellite
Command/Control
Video
GPS
Services Diagram
Vehicle
Cellular Network
Ground Entry Point
WAN
RCU
GCS

Capabilities

Capabilities - Planned	
Manual Control via RCU or GCS	Simple Calibration and Testing via Test-Stand
Limited Autonomous Navigation via RCU	Error Display on RCU and GCS
Extended Autonomous Navigation via GCS	Force-Feedback on RCU
Automatic Takeoff, Hover and Landing	Vehicle Health Reporting

Capabilities - Future	
Real-Time Video Transmission to GCS	Image Capture
Wireless airborne programming	Advanced Hover modes
Vehicle Status Audio via RCU	Extended Range
Configurable Payloads	Terrain Following
Extended Flight Duration	Obstacle Avoidance
Swarm Autonomy	Vehicle Status - Audio

Competitor Analysis

Capability	Advanced Hover	Automatic Takeoff/Hover/Landing	Autonomous Navigation	Manual Control	Calibration via Test-Stand	Vehicle Health System	Collapsible Frame	Configurable Payloads	Extended Range	Extended Flight Duration	Image Capture	Obstacle Avoidance	Swarm Autonomy	Terrain Following	Audible Vehicle Status	Video Transmission	WiFi Repeater	Wireless Airborne Programming	Wireless Charging other Systems
System																			
ICARUS ver 2	X	X	X	X	X	X	-	F	F	F	F	F	F	F	F	F	F	F	F
ICARUS ver 1	-	X	X	X	X	X	-	-	F	F	F	F	F	F	F	F	F	F	-
ArduCopter	-	X	X	X	-	-	-	-	-	-	-	X	-	X	-	-	-	-	-
AR Parrot Drone	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-
Dragan Flyer VI	-	X	-	X	-	X	X	X	X	-	X	-	-	-	-	X	-	-	-

Questions?

- Contact:
  - David Gitz: david.gitz@icarusuav.com
  - Ben Wasson: ben.wasson@icarusuav.com