

COMPACT INDUSTRIAL APPLICATION

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Compact Industrial Solution

Compact Industrial 솔루션 제품은 설치 공간이 협소한 설비 내부나 휴대성이 필요한 분야에서 사용할 수 있도록 가볍고 매우 작은 크기로 설계되어 있으며 높은 송신 출력과 수신 감도를 제공합니다.



AirLink

Compact Wi-Fi Access Point, Ethernet Bridge, 표준 Mesh Point
2.4/5GHz operation, +23.5dBm transmit power, 2T2R MIMO
10/100/1000 Mbps Ethernet 1포트
9~48V DC power input, -20 ~ +70°C 동작
사이즈: 103(L) x 67(W) x 24(H) mm, 무게: 225 g



AirXroad

Rugged Wi-Fi Access Point, Ethernet Bridge, 표준 Mesh Point
2.4/5GHz operation, +23.5dBm transmit power, 2T2R MIMO
10/100/1000 Mbps Ethernet 1포트
9~48V DC power input, -40 ~ +70°C 동작
사이즈: 115(L) x 64(W) x 34(H) mm, 무게: 332 g



EmbedAir1000

Dual Access Point, Ethernet Bridge module, 표준 Mesh Point
2.4/5GHz operation, 최고 +23.8dBm transmit power, 3T3R MIMO
10/100/1000 Mbps Ethernet 1포트 (TTL or RJ45)
5V DC power input, -40 ~ +75°C 동작
사이즈: 89(L) x 51(W) x 28(H) mm, 무게: 45 g



EmbedAir100

Access Point, Ethernet Bridge module, 표준 Mesh Point
2.4/5GHz operation, 최고 +23.5dBm transmit power, 2T2R MIMO
10/100 Mbps Ethernet 1포트 (TTL or RJ45)
5V DC power input, -40 ~ +75°C 동작
사이즈: 89(L) x 51(W) x 20(H) mm, 무게: 35 g



WLg-4LAN

Compact Wi-Fi Access Point, Ethernet Bridge
2.4/5GHz operation, +20dBm transmit power
10/100 Mbps Ethernet 4포트 (4포트 Ethernet Switch)
9~48V DC power input, -20 ~ +70°C 동작
사이즈: 91(L) x 122(W) x 24(H) mm, 무게: 264 g



WLg-DONGLE

Compact Serial to Wi-Fi Device Server
Wireless Modbus/TCP Gateway
2.4/5GHz operation, +20dBm transmit power
RS232 Serial 1포트, Modbus ASCII/RTU 프로토콜 지원
5V DC power input, -20 ~ +70°C 동작
사이즈: 103(L) x 67(W) x 24(H) mm, 무게: 184 g

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Ethernet to Wifi Bridge

일반적인 이더넷 장치 및 Modbus/TCP, PROFINET 장치를 Wi-Fi 무선 네트워크로 연결합니다. 소형 크기로 제작되어 설비 내부에 손쉽게 장착할 수 있으며, Fast Roaming 기능을 사용하여 여러 개의 Access Point 사이를 이동할 때도 끊김 없이 데이터를 송수신할 수 있습니다.

Remote Monitoring System #1

Remote Monitoring System #2



FA Backbone Network

Vehicle Private Network

Vehicle Control & Monitoring Server

TCP/IP Server or Client



EISK8-GT
Ethernet Switch



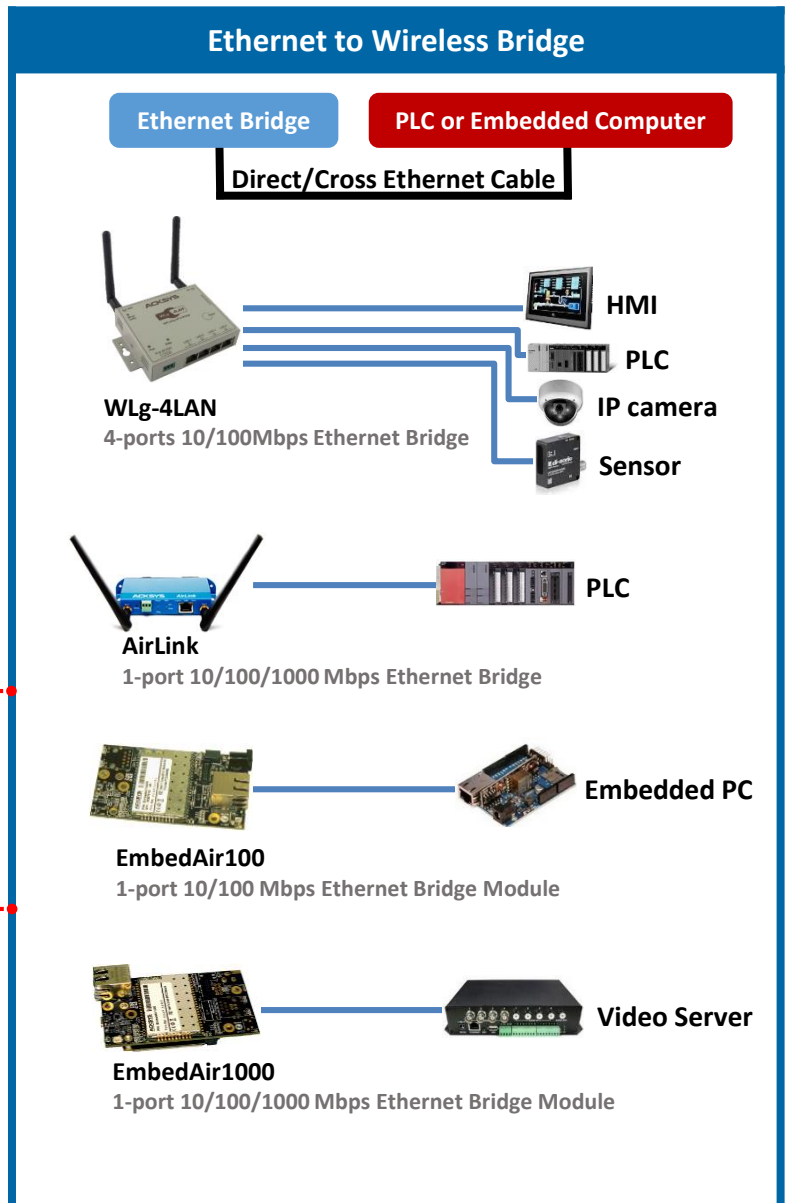
AP #1



Fast Roaming
Less than 30ms



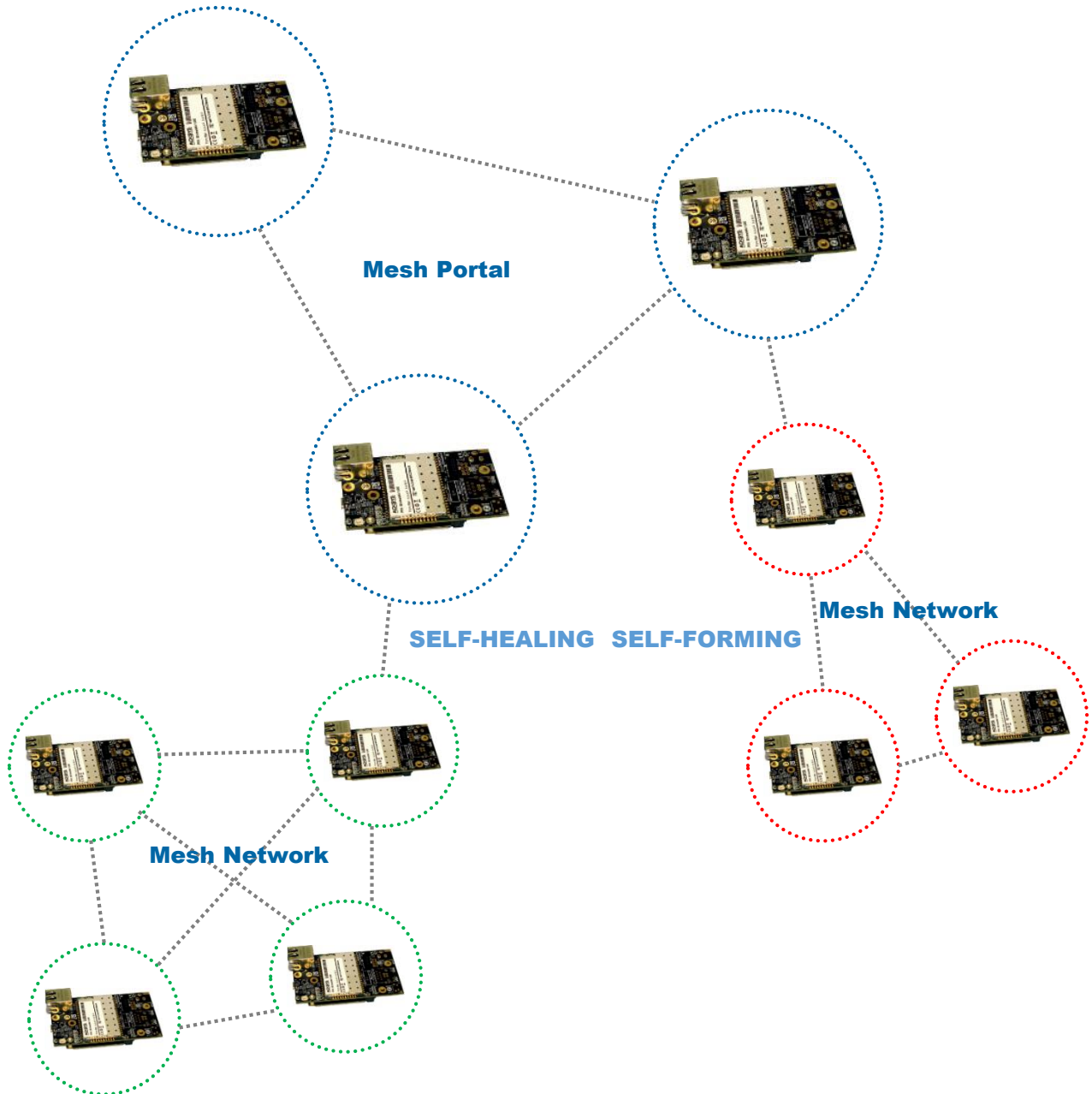
AP #2



Compact Industrial Solution

802.11s MESH Network

일반적인 이더넷 장치를 802.11s 메쉬 무선 네트워크로 손쉽게 연결합니다. 소형 크기로 제작되어 설비 내부에 손쉽게 장착할 수 있으며, 무선 네트워크 연결을 자동으로 구성하고 복구합니다.



Compact Industrial Solution

Serial to Wi-Fi

RS232/422/485 및 TTL 레벨의 시리얼 데이터를 Wi-Fi 무선랜을 사용하여 전송합니다. 기본적인 TCP/IP 소켓 통신과 가상 COM 포트 모드를 지원합니다.



Remote Control & Monitoring System

TCP/UDP socket communication

Server or Client Mode

Virtual COM Mode

Ethernet Network

Ethernet Switch



AP #1



Roaming



AP #2



Wireless Serial Device Server

Serial Device Server
TCP/UDP Socket
Server or Client

PLC or Embedded Computer
RS232/422/485 or TTL Interface

Serial Cross Cable



WLg-xROAD/S

802.11a/b/g Wi-Fi, Single Antenna
RS232/422/485 Serial, Surge Protection
9~50 VDC Power Input
IP65 방수/방진 규격



WLg-DONGLE

802.11a/b/g Wi-Fi, Single Antenna
RS232 Serial Only
5 VDC Power Input Only
IP30, 소형 크기

Compact Industrial Solution

Industrial Protocol

Modbus ASCII/RTU 및 Modbus/TCP, PROFINET, Ethernet/IP 장치를 Wi-Fi 무선랜에 연결합니다.



Remote Control & Monitoring System
Modbus/TCP, Ethernet/IP, PROFINET

Ethernet Network

Ethernet Switch



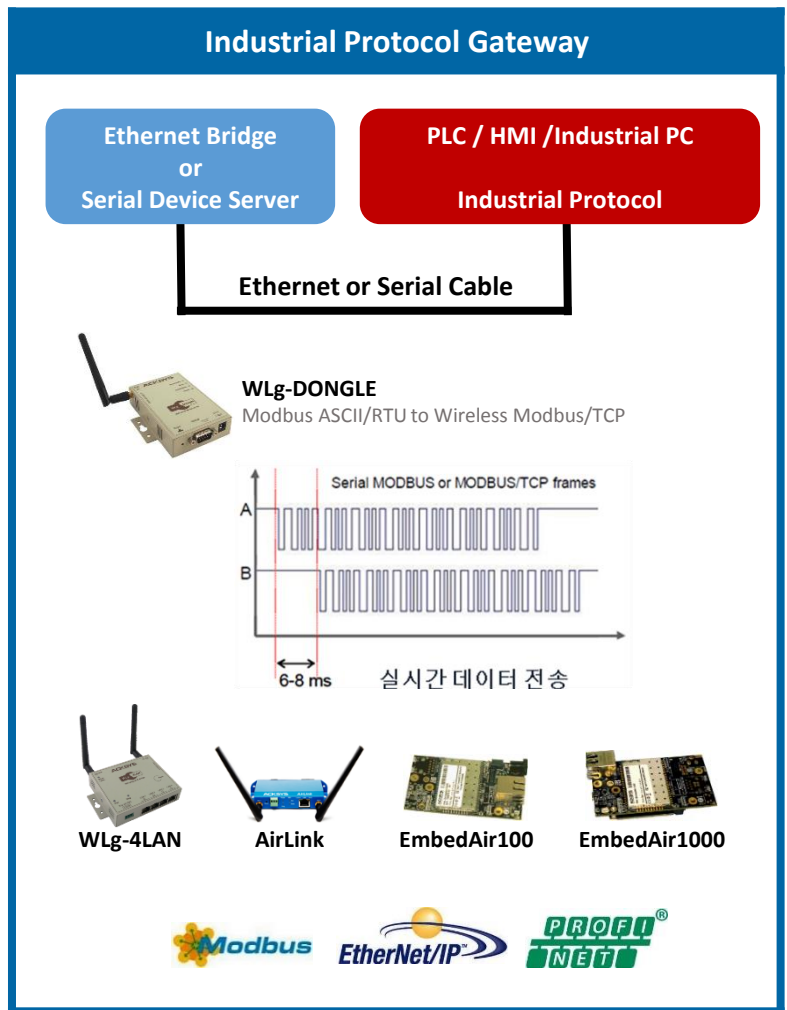
AP #1



Roaming



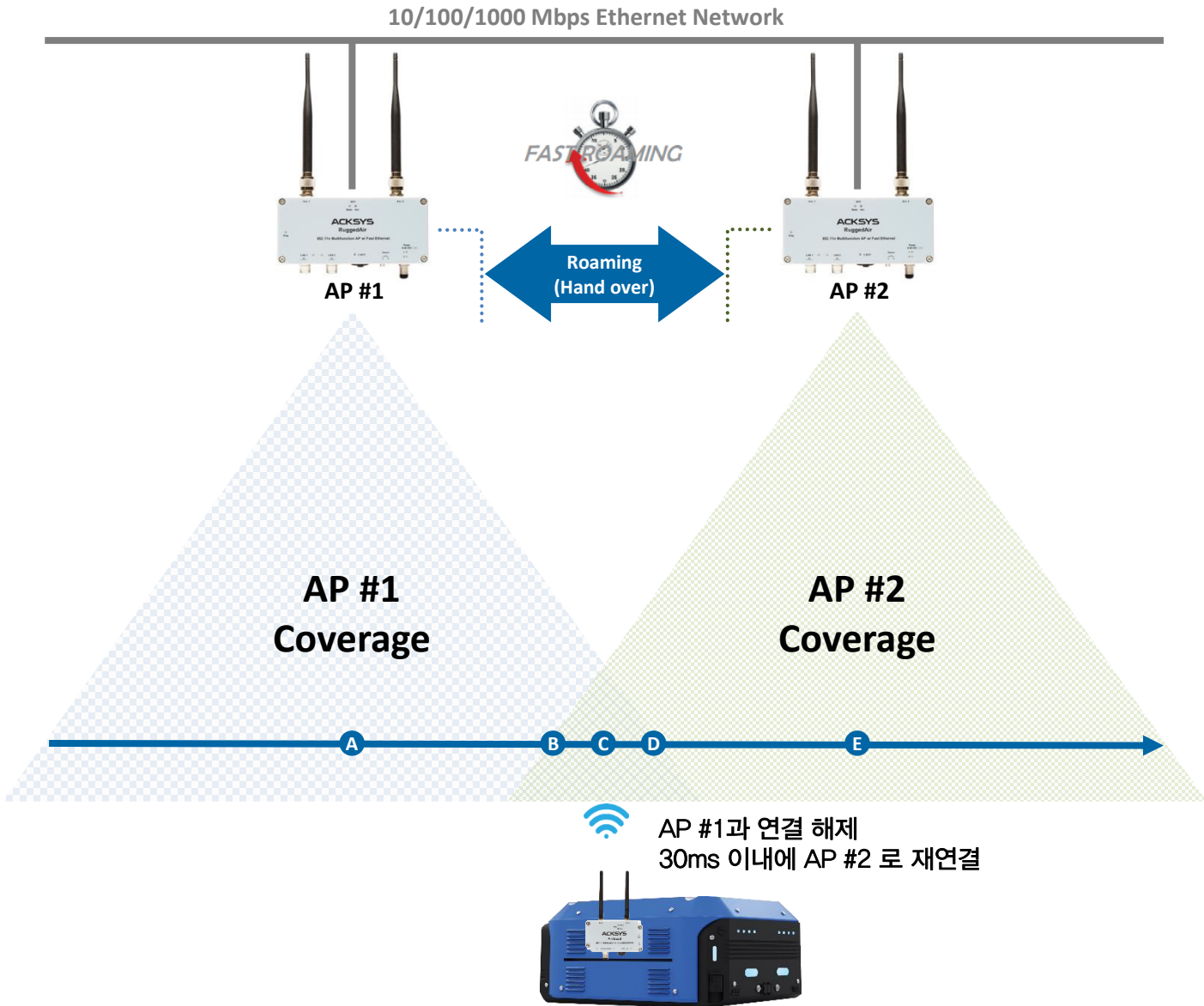
AP #2



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Fast Roaming

이동하는 설비에 탑재된 무선 장치가 여러 개의 Access Point 사이를 이동할 때 모델에 따라 30ms 이내의 짧은 시간 내에 주변에 위치한 다른 Access Point 와 무선을 재연결합니다. 따라서 데이터를 분실할 가능성이 매우 낮고, 기존 연결된 Access Point 에 장애가 발생하여도 주변에 설치된 다른 Access Point 로 신속하게 재연결 하여 안정적인 무선 네트워크를 구축할 수 있습니다. Fast Roaming 기능을 제공하여 AGV 와 같은 무인 물류 시스템 및 항공기, 선박, 차량, 크레인 등 다양한 산업분야에서 활용되고 있습니다.

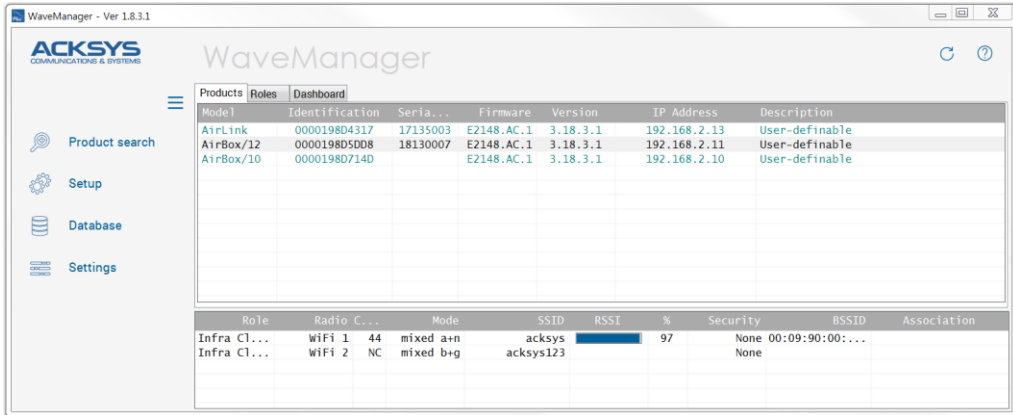


- A : AP #1의 RSSI 값이 매우 좋음, 주변의 다른 AP를 검색하지 않음
- B : AP #1의 RSSI 값이 낮음, 주변의 다른 AP를 검색함
- C : AP #1의 RSSI 값이 낮음, AP #2의 RSSI 값을 체크함
- D : AP #1의 RSSI 값이 AP #2의 RSSI 보다 낮음, AP #2로 연결
- E : AP #2의 RSSI 값이 매우 좋음, 주변의 다른 AP를 검색하지 않음

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Network Monitoring

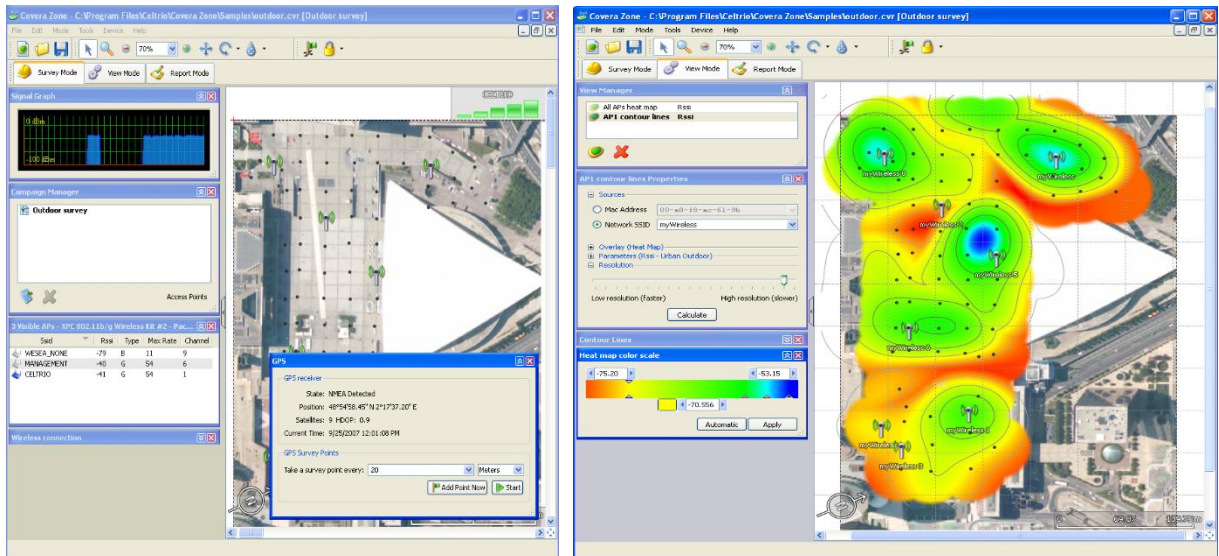
웹 설정 및 소프트웨어를 사용하여 유무선 네트워크에 연결된 모든 장치들의 동작 상태를 모니터링 하거나 제품 설정을 변경할 수 있습니다.



NAME	CHANNEL	MODE	BSSID	ENCRYPTION	QUALITY	SIGNAL
MDY	1	Access Point	00:1C:F0:08:CF:10	WEP	74%	-58 dBm
az12@bjKm	64	Access Point	00:80:48:64:22:5A	WPA2 PSK (CCMP)	50%	-75 dBm
acksysjc3	100	Access Point	92:A4:DE:AA:3F:B1	None	100%	-37 dBm
acksysjc1	100	Access Point	90:A4:DE:AA:3F:AF	None	100%	-36 dBm
acksysjc2	100	Access Point	92:A4:DE:AA:3F:B0	None	100%	-36 dBm
acksysjc4	100	Access Point	92:A4:DE:AA:3F:B2	None	100%	-36 dBm

무선 진단 및 설계

전문 소프트웨어를 사용하여 무선 환경 진단, 무선 네트워크 설계



Compact Industrial Solution

Compact Size

- MIMO 안테나기술을 사용하여 장애물에 의한 멀티패스 현상 해결
- MAC Address Filtering 을 통해 시스템 제어 관리
- 무선 암호를 주기적으로 변경하여 보안 강화
- 대용량 영상 데이터를 무선랜을 통해 전송



Remote Control Unit



Access Point

IEEE 802.11 a/b/g/n/ac WiFi

Control Data
Video Data

Ethernet Bridge



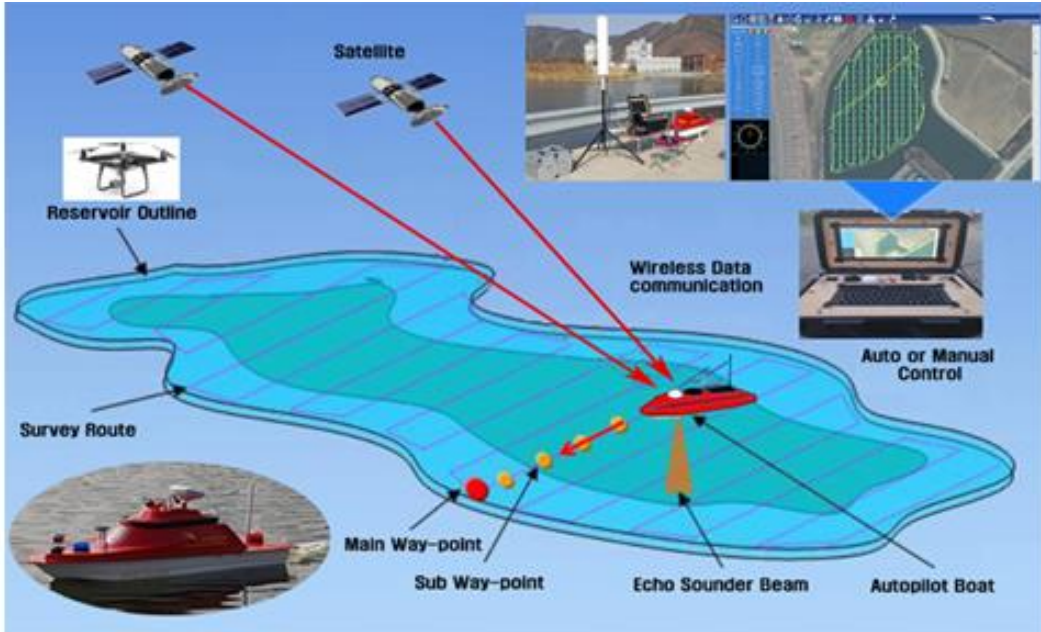
Ethernet Bridge



Compact Industrial Solution

Autonomous Underwater Vehicle

댐, 저수지 및 해양의 지형을 측정하여 3D로 재구성하는 솔루션에 EmbedAir 제품과 고성능 안테나가 적용되었습니다. 지상에는 관제시스템 (GCS), EmbedAir1000 과 같은 지향성 / 무지향성 안테나로 구축하고 무인수상정에는 EmbedAir100과 무지향성 안테나로 구성하여 보트가 수면 위 어디를 가서 탐색하더라도 무선으로 데이터를 주고 받을 수 있도록 설계하였습니다. 이 솔루션은 수면 아래 지형을 측량하여 준설 필요성을 파악하고, 빠른 시간고 저비용의 역사자 수색 용도로 활용되고 있습니다.



Compact Industrial Solution

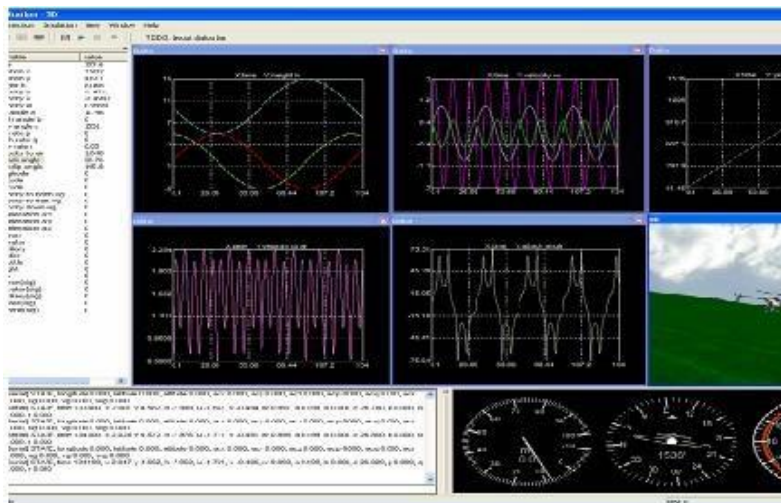
Autonomous Unmanned Rotorcraft

HeLion is a first generation rotorcraft built as part of the Unmanned Aerial Vehicle (UAV) helicopter family in The National University of Singapore (NUS). HeLion was constructed with a few objectives in mind. It has Achieve long ranged, high endurance autonomous light; transfer of flight data from onboard sensors and images to the ground station; execution of flight control for a myriad of flying formations, e.g. slalom and pirouette flight; peer to peer and point to multi-point communication between multiple UAVs in formation flight.



Figure 1: HeLion in autonomous hovering flight

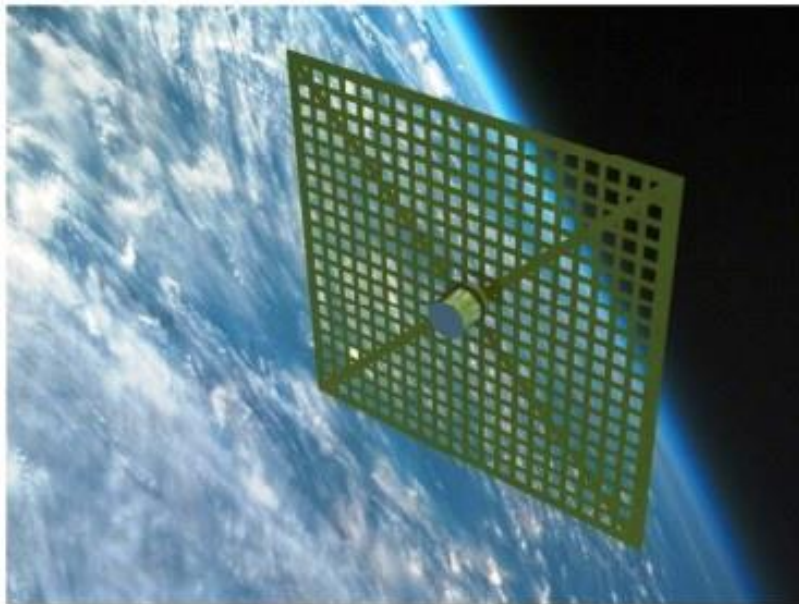
HeLion is an ideal platform for advanced control law implementation and evaluation. It can perform reliable automatic flight in the full flight envelope including automatic taking-off and landing. As HeLion is a key member of the multiple UAV formation control project, there is a need to upgrade the wireless modem previously used with the Acksys (EmbedAir100) WiFi Module. The Acksys WiFi module boasts a large line-of-sight range with high data throughput of 25 Mbps. It is compact, reliable and can provide high-powered wireless data transmission. On top of these, the module is also able to run on the QNX operating system. This is a perfect fit for the HeLion as the next objective of the HeLion was to achieve remote



Compact Industrial Solution

Suaineadh Satellite Project

The Suaineadh experiment is a collaboration between the University of Strathclyde, the University of Glasgow and the Royal Institute of Technology, Stockholm. The aim of the experiment is to deploy and stabilize a space web by means of the centrifugal forces acting on the spinning assembly which is ejected from the nosecone of the REXUS-12 sounding rocket. Controlled web deployment and stabilization will be achieved by an active control method. Operational data will be accumulated visually, via cameras, and by on-board sensors in the form of inertial measurement units. This data is transmitted via an integrated communications architecture back to data storage module on-board REXUS and recorded. A portion of the operational data is relayed to Esrange ground station during flight whilst the remainder is recovered once the rocket has returned back to Earth. It is also planned to recover the experimental module by using a GPS beacon



Wireless communication using the EmbedAir100-TTL

Part of the system is separated from the rocket to be able to deploy the web. Since that part, called CHAD (Central Hub And Daughters), will fall down to ground without any parachutes it might not survive the impact on earth. Thus there was a need to send sensor and image data wirelessly from CHAD back to the REXUS rocket. By using two EmbedAir100-TTL, each connected to a FPGA, the wireless link could be realized.

Because of the nature of this project the requirements on the chosen components and modules were very high. The most important aspects and requirements when choosing the wireless link was that the size should be as small as possible as well as the temperature range. The size limitation is due to the fact that the experiment itself has a very limited space inside of the rocket. The launch site is in northern Sweden where the outside temperatures may be as low as -40°C . However since the module will be placed inside two layers of metal for a few minutes before launch the inside temperature is not likely to drop to those ranges. The EmbedAir100-TTL has a lowest temperature of operation of -20°C and it was deemed to be enough.

Another important aspect is the use of the frequencies between 5.470-5.725 GHz. Most of the frequencies at and below 2.4 GHz is occupied by the REXUS rocket and its communication systems. Therefore it was decided to use the higher frequencies and EmbedAir100-TTL suited the needs of this project perfectly.