METEKSAN SAVUNMA

ELECTRONIC WARFARE PROTECTED DATA LINKS FOR UNMANNED SYSTEMS

AKSON

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BİLKENT HOLDİNG

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1. Introduction

Modern warfare has evolved to a new level with frequent use of Unmanned Systems. However, operational capabilities of these systems are strictly bounded to the abilities of the subsystems used on the platform. Data links are crucial subsystems for Unmanned Systems which are used for the control of the Unmanned System and for the platform/payload data transfer. Communication range of the data link directly determines the effective range of the UAV. A skillful data link is the key for extended operations. Features such as; bandwidth, encryption, weight, robust link, automatic handover are also crucial for end users. AKSON LOS data link system, which is designed and developed by Turkish company Meteksan Defence, is engineered to deliver performance, flexibility and seamless integration.

AKSON C-Band Data Link is a Line-of-Sight, air-to-ground, real time bi-directional communication system. From ground to air UAV's command and control data is transmitted. From air to ground telemetry data and high rate, real-time video data is delivered to ground control station.

AKSON offers;

- **Extended Operational Range**
  Maintain a strong, stable link across long distances.
- **High Bandwidth Performance**
  Transmit HD video, sensor data, telemetry, and control data with low latency.
- **Robust, Encrypted Communication**
  AES-256 encryption and secure protocols for mission-critical confidentiality.
- **Electronic Warfare (EW) Protection**
  Advanced anti-jamming, frequency hopping, and signal integrity mechanisms to ensure reliable operation in contested environments.
- **Lightweight & UAV-Optimized**
  Compact form factor with minimal SWaP (Size, Weight, and Power) footprint for flexible UAV integration.
- **Automatic Link Handover**
  Intelligent switching between ground terminals — no manual intervention required.
- **Designed for Harsh Conditions**
  Resilient against extreme temperatures, vibration, and EMI-heavy environments.
- **Remote Video Terminal Support**
  Access live HD video streams on the go with rugged remote video terminals, empowering field operators with instant situational awareness.

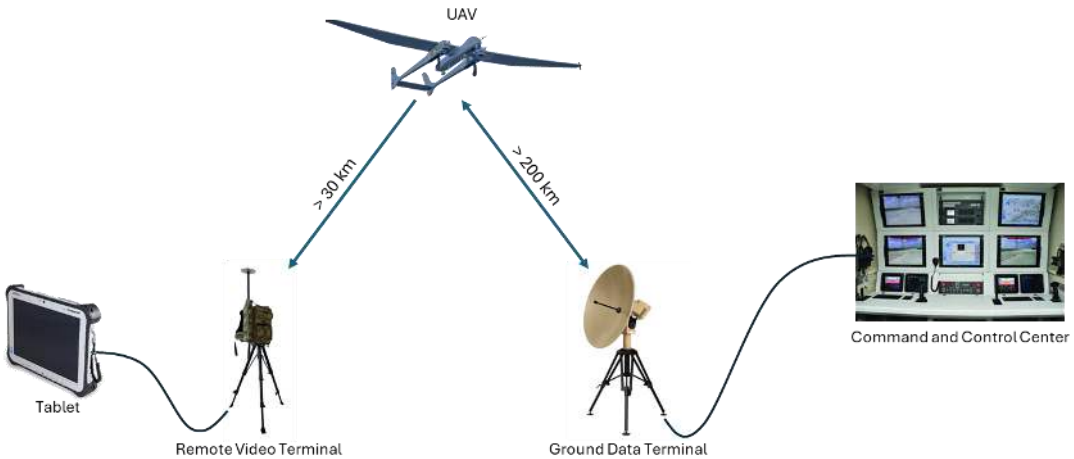

Figure 1. AKSON Operational Concept

2. Components

AKSON C-Band Data Link has the components shown in Figure 2. There are three subsystems in the system, namely Airborne Data Terminal (ADT) shown in Figure 3, Ground Data Terminal (GDT) shown in Figure 4 and Remote Video Terminal (RVT) whose Manpack option is shown in Figure 5 and Ground Based or Maritime Extended Range option is shown in Figure 6. There is a two-way point to point communication between the ADT and GDT; one-way communication between ADT and RVT. The communication link from ADT to GDT or RVT and from GDT to ADT are named DownLink (DL) and UpLink (UL) respectively. AKSON is a transparent data link except for video interfaces.

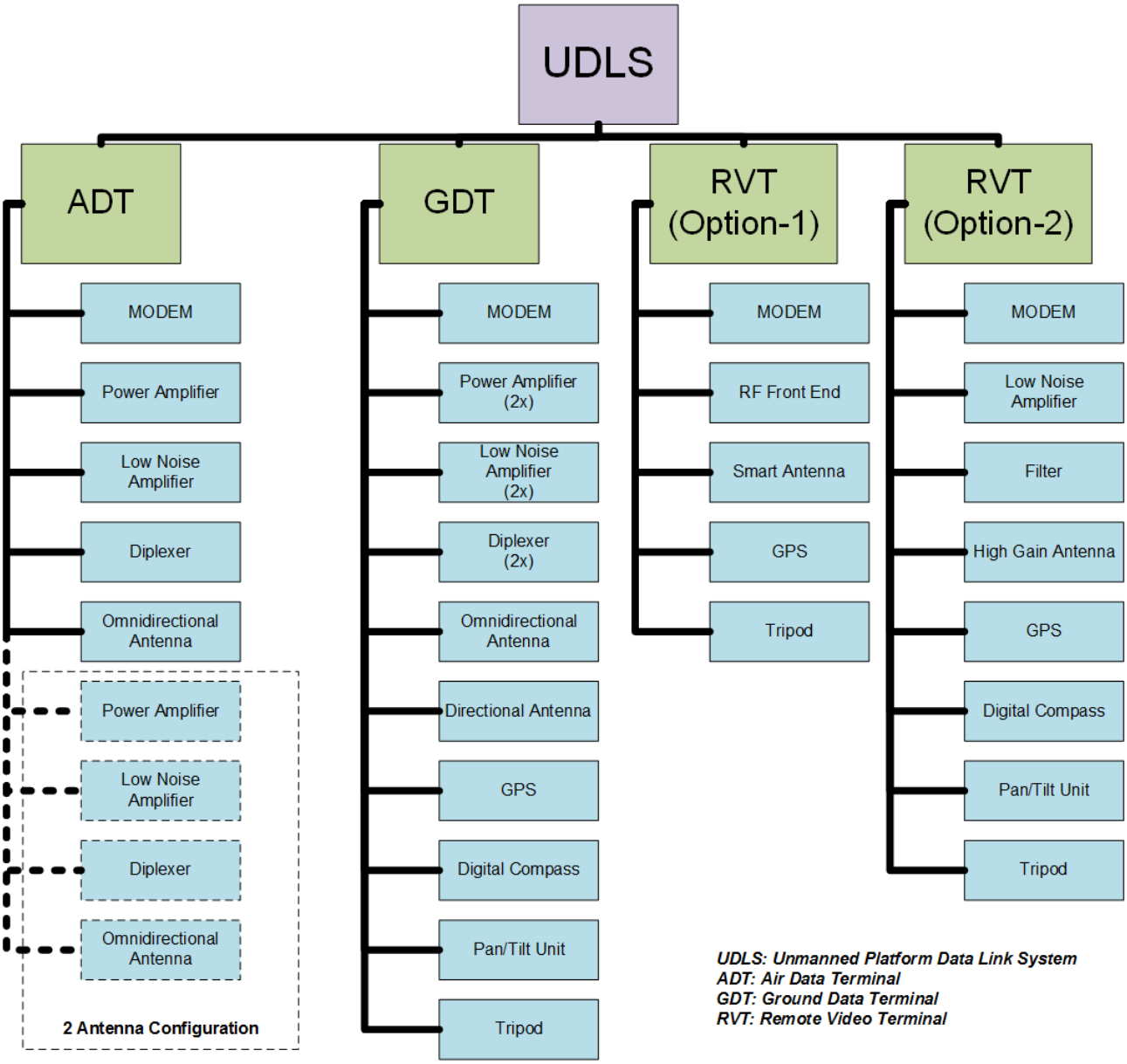

Figure 2. AKSON Components

AKSON C-Band Data Link is designed to be competitive compared to similar systems in the market targeting easy integration to various platforms and cost effectiveness in procurement and maintenance. All sub-units (modem, RF front-end, carbon fiber composite antennas, radome and control units) are developed and produced by Meteksan Defence.

Antennas are designed according to the suitable gain parameters achieved by link budget analysis. The reflector antenna surface is manufactured with carbon fiber composite or aluminum, significantly decreasing the antenna weight. The aluminum reflector is designed as a modular structure composed of four quadrants, and each has grids to reduce wind load (shown in Figure 4). Air vehicle antenna radome is developed to be resistant to the airborne environmental conditions.

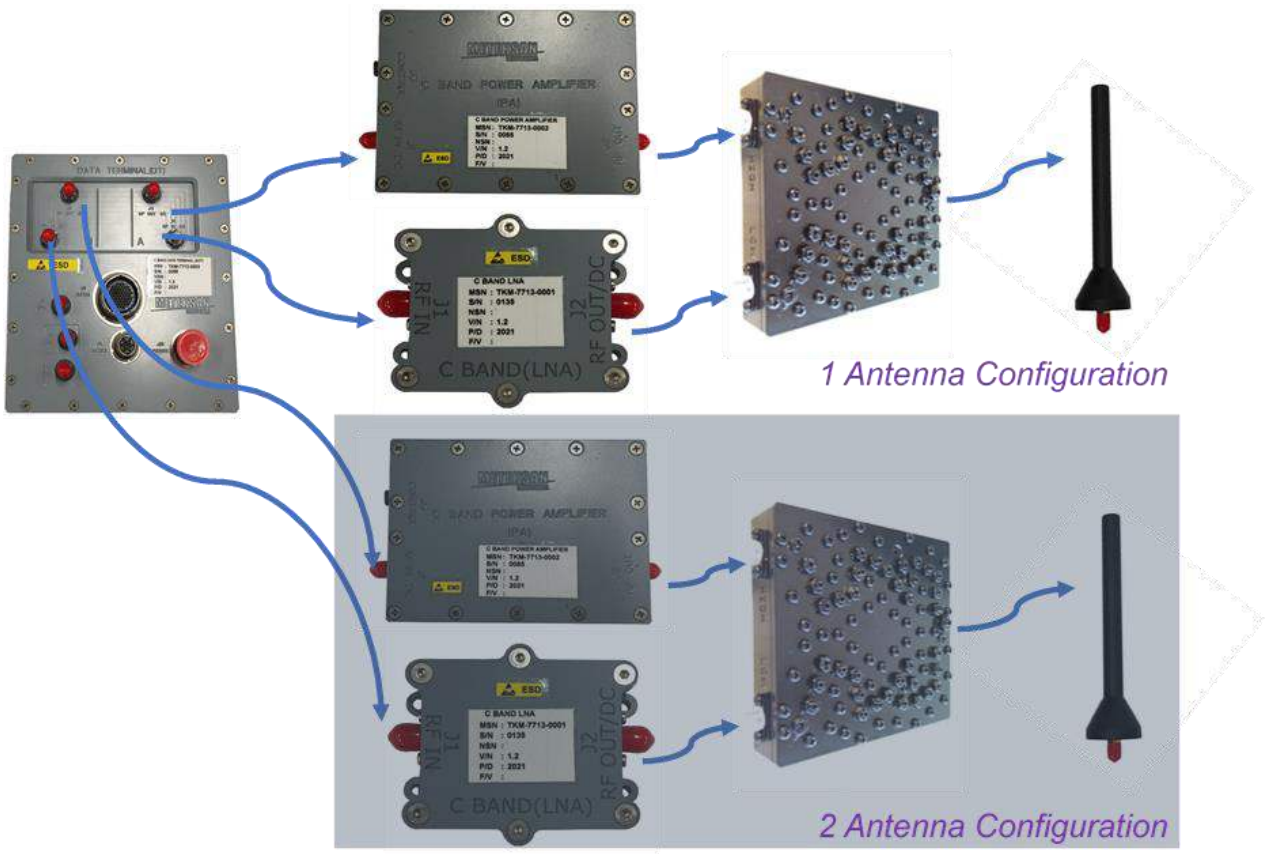

Figure 3. Air Data Terminal Assembly (Distributed Architecture)

Figure 4. Ground Data Terminal Assembly

Figure 5. RVT (Manpack Option)

Figure 6. RVT (Extended Range Option)

3. Key Features

- Data Rate: 10 Mbps (user data)
- Data Range: 200 km (ADT&GDT), 30 km (ADT&RVT Option 1), 80 km (ADT&RVT Option 2)
- SWAP, modular and highly reliable design
- Compliant to MALE/HALE airborne environmental conditions
- Full Duplex Communication
- Remote Video Transfer to Mobile Terminals (RVT)
- Multi Antenna Support
- Point-To-Point, Ethernet IP Based Communication
- Embedded GPS Support
- Video Compression/Decompression: H.264
- Automatic Tracking Antenna System
- AES-256 Encryption
- Electronic Warfare Protection (Frequency Hopping and Direct Sequenced Spread Spectrum)
- Toughbook, software and related cables for maintenance (Optional for “Support Equipment”)
- Standards: MIL-STD-810, MIL-STD-461

4. Integrated Platforms

AKSON C-Band UAV Data Link is currently used by Turkish Armed Forces as it is integrated to UAV platforms such as ANKA/ANKA-S (Medium Altitude Long Endurance (MALE) UAV shown in Figure 7), AKSUNGUR (High Altitude Long Endurance (HALE) UAV shown in Figure 8) and ANKA III (shown in Figure 9).

Figure 7. ANKA-S MALE UAV

Figure 8. AKSUNGUR HALE UAV

Figure 9. ANKA III UAV