

DEFENCE AND SPACE
Space Products

IDCU

Inline Deciphering
Cyphering Unit

A v i o n i c s

P l a t f o r m

D a t a

S e c u r i t y



If Julius Caesar is known as one of the first people to use cryptographic systems to encrypt his communications, Airbus Space Electronics is known for its powerful secured space systems solutions.

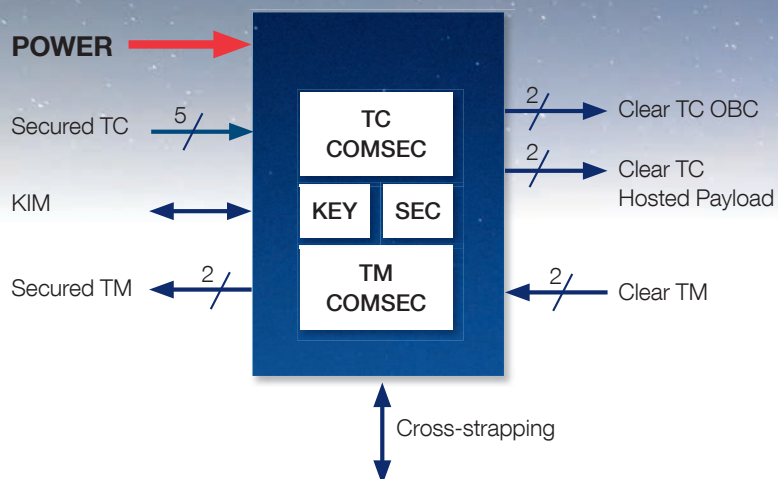
For Earth observation commercial, telecom or dual missions, the Inline Deciphering Cyphering Unit (IDCU) provides inline TM/TC security. In addition, out-of-band security is also available within On-Board Computers (OBCs) or Mass Memories.

The IDCU is located on the Satellite Platform between the OBC and the TM/TC RF transponder system. It is responsible for the encryption/decryption and authentication of the Telecommand (TC) and Telemetry (TM) data handled by the OBC.

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Designed using the latest security crypto standards (SDLS for the security layer, AES256 GCM for symmetric authenticated encryption), Airbus Space Electronics' security solutions can support nominal and redundant OBCs and On-Board Processors (OBPs) at bit rates up to 2.4 Mbps (17 Mbps for the future New Space version) and TM bit rates up to 4 Mbps. Traffic keys can be renewed via a secured OTAR mechanism.

Block diagram



Keys are stored in the IDCU in EEPROM and are inserted using the serial key injection interface. Keys can then be renewed using the OTAR mechanism.

Decryption and authentication are based on the CCSDS security layer standard. A routing mechanism embedding access control sends TC directly to the OBP or to hosted payloads on separate interfaces. All memory is protected by ECC and triplication.

Main features

- Decryption/authentication of secured CCDS TC (CLTU) received from transponders and sent to OBC/OBP
- Encryption/authentication of TM from OBC to transponders
- In-band security command and control (insertion of TM reports in the flow)
- Key size: 256 bits
- Serial protocol for ground configuration (key injection media)
- In-flight update of keys (OTAR) through a second security layer

Interfaces

- Powered by Class 0 R-LCL 34V (22V to 52V)
- Up to 4 TC inputs (connected to transponders)
- 2 TC outputs (connected to OBC)
- 2 TC outputs (connected to Hosted Payload)
- 2 TM inputs (connected to OBC)
- 2 TM outputs (connected to transponders)
- Cross-strapped capabilities for redundancy management

Characteristics	Definition
Voltage Input	22 - 52 V
Power Consumption (Typ.)	5 W
Length	265.9 mm
Width	162 mm
Height	220 mm
Mass of the unit	4,1 kg

Developed by AD Space Electronics France, the IDCU is already being used on three different LEO missions. It has been in flight since April 2021.

A New space version dedicated to LEO/MEO constellations is in preparation. This version, based on the same Core Crypto functions, will benefit from SpE France's know-how and expertise in constellations (more than 1,200 units in flight for a cumulative lifetime of more than 3,000 years).

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