

# **Ground Segment**

## **Engineering and Design Capabilities**

### **for Systems and Products**

## **Elital History**

Elital (the name is Elettronica Italiana) was founded in 1986 and has rapidly expanded its capabilities in the design and manufacturing of complex and multidisciplinary systems, subsystems and complete products. The fields where our technology is applied are mainly Space and Defence (Homeland Security included) and also Industrial application.

## **Elital Main Products**

Satcom  
Aeronautics  
ATC  
Defence  
Space

# Satcom Products

## Ground Systems

Satellite Earth Stations System Engineering

Satellite Earth Station Implementation

## Systems

Flyaway Terminal - CommuniPack 2300

Satcom Transportable Terminal – Mobsat 2 & 3

Dual Band Avionic Terminal Ka/EHF

Hexapode Antenna

UGV & UAV Station

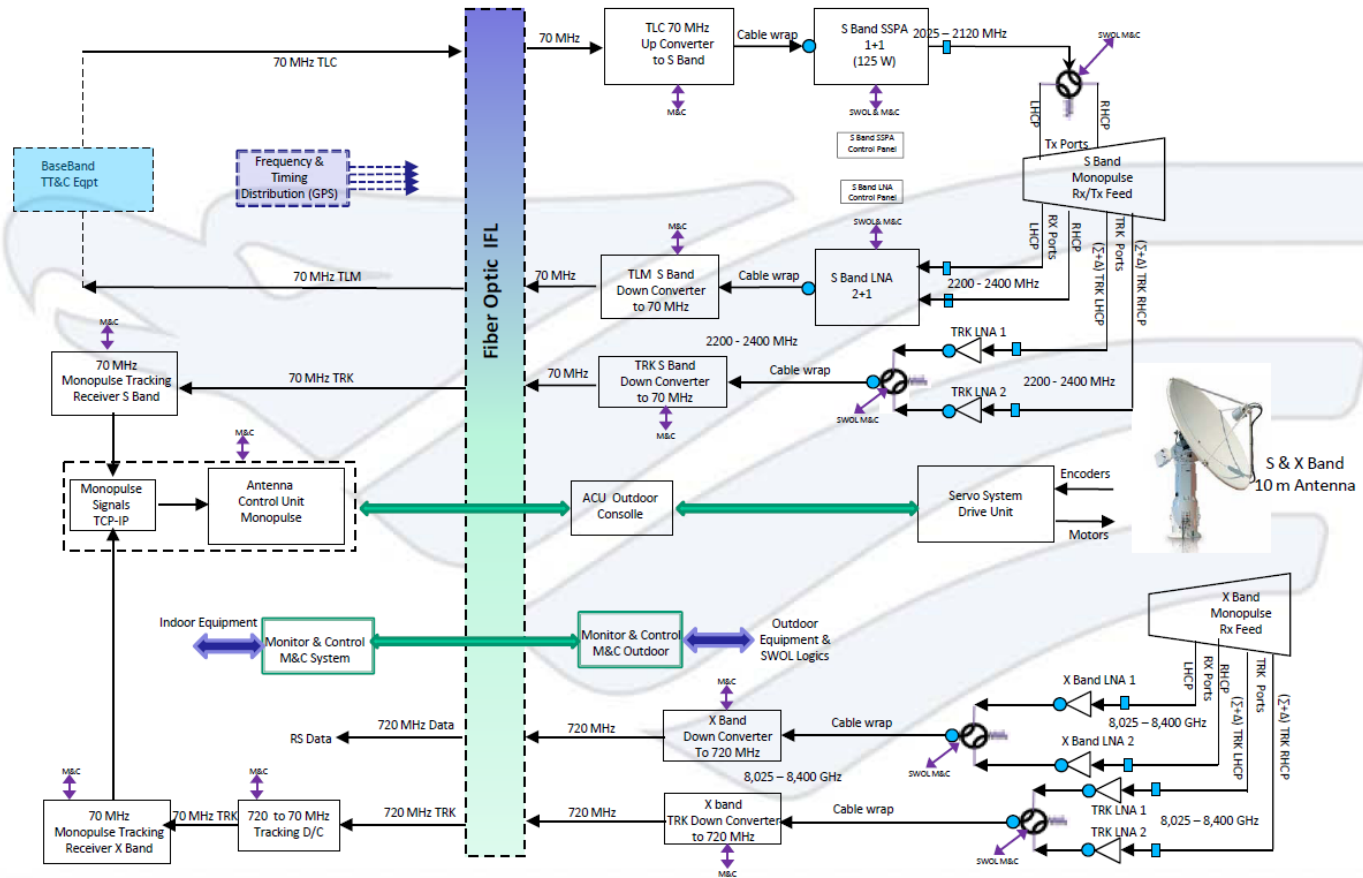
## Products

SNG Antenna – SNG10

Antenna Control Unit - ACU Pro

L Band Down Converter

# Satellite Earth Stations Engineering



Example of an entire Station Block Diagram (S/X Band Monopulse Antenna)

# Satellite Earth Stations Implementation

Elital has got a large skill in the Implementation of Fixed Ground Stations for professional use providing Installation and Maintenance Services. The antenna paraboloid and the pointing system represents the front end of the system.

Main Skills:

Command and Control systems (TT&C)

Tracking Systems

Television broadcast Stations

Propagation Experiments

Radio Trasmissions



## Flyaway - CommuniPack 2300

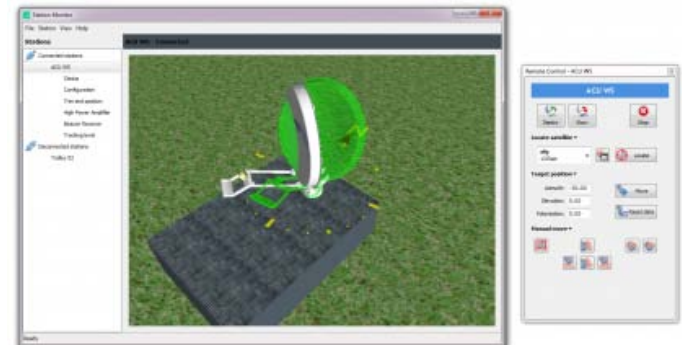
The CommuniPack is made of light materials in order to be particularly robust and at the same time transportable by one person. The time required to put the system in operation from the transport position is between 15 minutes and 30 minutes. The terminal operates in the Ku and Ka bands.

For hand-transport condition the antenna system is integrated in one trolley. By removing the protective top cover of the case it is easy to have access to the mechanical antenna and control/communication electronics. The strong integration allows the operator to minimize the time of commissioning.

Compliant to IP67, MILSPEC4150J, STANAG4280, ATA300, IATA.



CommuniPack 2300 Layout



ACU Graphic User Interface

# Transportable Satcom Terminal - MobSat

The Mobsat Terminal is particularly suited for Broadcast and Disaster Recovery applications.

The use of Mobsat makes possible to access easily the satellite with a transportable vehicle, fast deployable, for communications recovery in case of disaster or for TV contribution in case of television events.

Main Functionality:

ACU Pro - advanced system for antenna movement and pointing control

Power Management Settings built-in

Automatic Calculation of the magnetic declination

Certification for Aviation Portability



Mobsat Layout of control



## Dual Band Avionic Satcom Antenna – Ka & EHF

The development and implementation by Elital srl of an Airborne Antenna operating in the Ka and EHF bands is part of a research program funded by the Italian Ministry of Defence Aeronautics Department (Armaereo).

The designed antenna is shaped Cassegrain (elliptical main reflector) and its optics includes a dichroic mirror that maximizes the performances in Ka and EHF bands. In order to obtain a low aerodynamic profile the antenna has been conceived with an elliptical main reflector having an aperture of 38 x 28 cm.

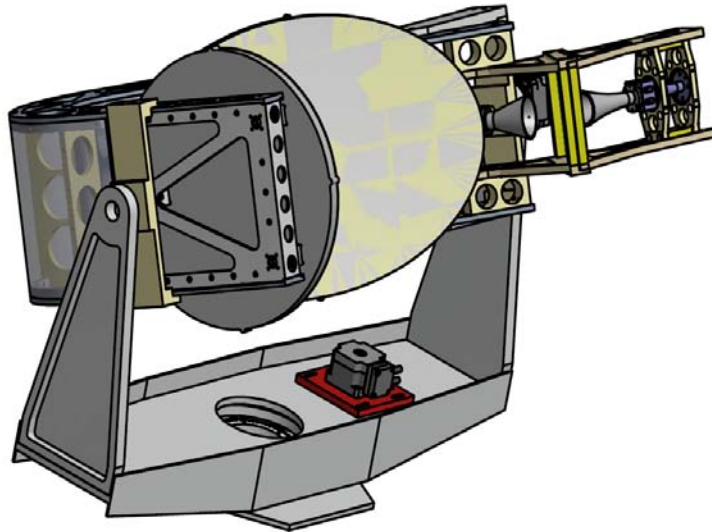
The antenna bandwidth ranges from 19,2 to 44,5 GHz (about 25 GHz bandwidth) and can operate with dual-use satellites like Athena Fidus. This antenna is equipped with two Feeds: one for the receiving bandwidth of 2.0 GHz (from 19.2 to 21.2 GHz) and the other one for the transmission bandwidths (1 GHz centered at 29.5 GHz and 1 GHz centered at 44.0 GHz).

The two Feeds are separated by a dichroic mirror that reflects the received band and lets the two-transmitting bands passing through. In this way the radio characteristics of both Ka and EHF bands are optimized and the antenna is equivalent to a centered optics reflector (30 cm) with an efficiency of 75%.

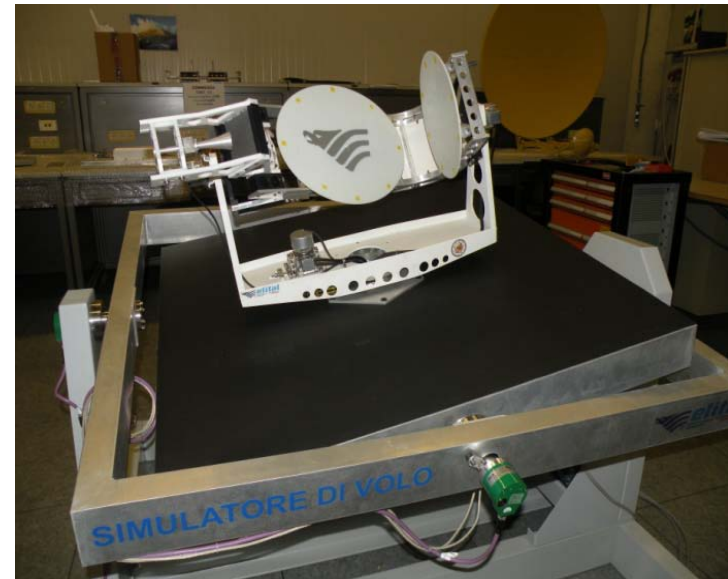
The two Feeds operate in circular and linear polarization for both EHF and Ka band. The Antenna performances have been fully tested and validated.



## Satcom Antenna – Layouts



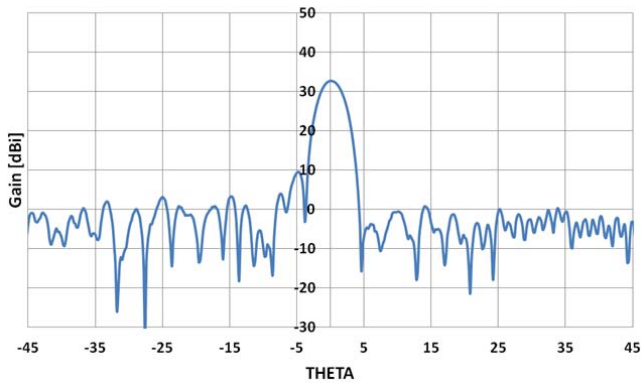
Antenna Layout



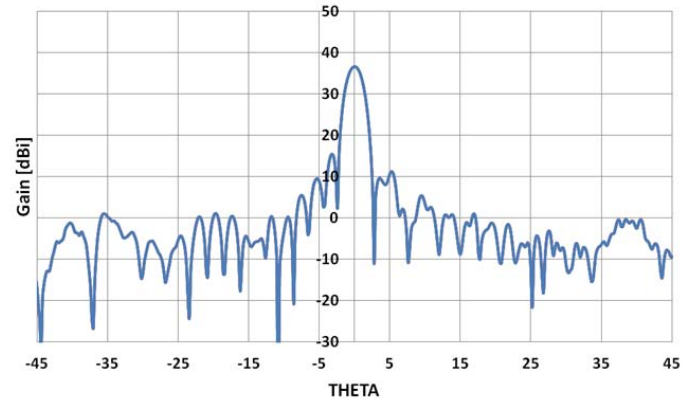
Antenna on Flight Simulator

# Satcom Antenna Performances

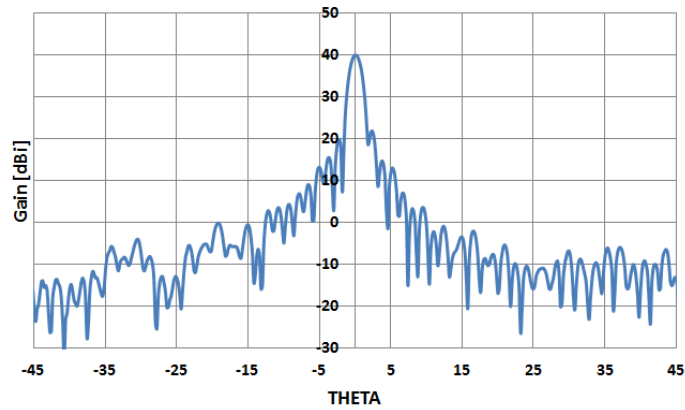
Radiation Pattern 20.2GHz



Radiation Pattern 29.5GHz



Radiation Pattern 44GHz



## Hexapode Antenna

Elital has designed and built an antenna for LEO satellite Tracking and typically usable for telecommunications, remote sensing and military communications. The hexapod pointing system offers the following advantages compared to traditional structures :

- Lightweight
- No singular point
- No Slip Ring
- Continuous Azimuth Motion
- Greater Pointing Accuracy
- Very High Speed Tracking and rapid repositioning
- Easy Accessibility to the structure
- Easy Installation



## UGV & UAV Station

Elital has designed and realized for Selex the UGV & UAV Aircraft Driving Stations for commercial or specifically modified vehicles. These Stations have been constructed ad hoc or utilizing Shelter or strategic vehicles.

Main Compliances:

CEI EN61326-1 (electromagnetic compatibility)

UNI EN 40-3-3 / UNI EN 40-3-1

ETS 300 019 Environmental Conditions and Tests

R&TTE 1999/5/EC Radio and Telecommunication

CEI EN 60950 (R&TTE)

ETSI EN 301 489-12 Electromagnetic compatibility

MIL

ASTM



## SNG Antenna – SNG10

The SNG10 Antenna has the following main features:

- The Antenna is equipped with ACU Pro
- ACUpro - advanced system for antenna motion control
- Remote Interface via IP (using ACU client)
- Power Control of the SSPA
- Brushless motors
- Absolute encoders
- Attitude sensors of the vehicle
- Integrated GPS



## SNG10 Technical Performances

Feed rotante	
Azimuth range	380°
Elevazione range	-5 ÷ +185
Offset Reflector,	
Offset angle	22°,
Horizontal Dimension	1,2m,
Vertical Dimension	1.3m,
OMT – 2 Port (3 port available),	
Ku-Band	11-14 GHz
Antenna Gain	42dB
Noise Temperature	53°K @ 30° El
Cross Polarization	>35dB
K-Band	18-22GHz
Antenna Gain	47dB (@21GHz)
Noise Temperature	53°K @ 30° El
Cross Polarization	>35dB

# Antenna Control Unit - ACU Pro

The ACUpro® system adds new features compared to previous ACU version (ACUmax). The integrated monitor displays more information and the connection capacity allows the operator to capture and view the status of most on-board equipment and to send commands.

The operating modes are dell'ACUpro:

- Step Tracking
- Program Tracking



ACU Max Layout



ACU Pro Layout

## Digital Beacon Receiver DBR

The Elital Digital Beacon Receiver is the new generation receiver designed for optimize pointing and tracking of GEO satellites from earth stations.

The DBR operate in L-band and accept a 950- 2150 MHz signal with an high dynamic range from  $-110$  to  $-10$  dBm.

The DBR use a signal processing totally digital for obtain a fast response combined with an high accuracy.

Due to its high sensitivity, the DBR can be used on systems that do not have high antenna gain such as mobile stations.

The DBR can be used as stand alone module, supplementing with accessories such as LCD display and keypad, or coupled to the ACU able to control via RS232/RS422 or Ethernet interfaces





## L-Band Down Converter

