



NAUTISAT

CONNECTING FLEET OVER THE SEAS

Corporate Overview

Nautisat is an Italian leading designer, manufacturer and installer of TVRO and VSAT satellite communications antenna for commercial vessels, oil platforms, and yachts of all sizes.

Nautisat designs and manufactures antennas for radar (ATC) in the S and L band.

Since 20 years his expert designers and engineers work to offer high-grade ranging products from large 360cm to smaller 60cm ones dish antennas .

Every **Nautisat** Antenna System, both in its mechanical and electrical parts, is entirely designed in our laboratories to develop a well-engineered and cost balanced product.



Corporate Overview

NAUTISAT was one of the first of Italian companies to try and provide GSM telecommunications systems, GPRS, etc., on ships for connection and integration with the terrestrial network.

NAUTISAT is one of the few manufacturers in the world that produces systems with dishes stabilized, with search, automatic pointing and tracking for TLC and TV satellite reception, suitable for operate on ships, boats and / or platforms.

NAUTISAT produces a complete line of radome for terrestrial and marine, standard models and on request.

NAUTISAT produces also servo-mechanisms, logical systems for automation, electrical systems, production systems and control energy and other high-tech products. Its products are exported and operating worldwide.

NAUTISAT is able to assist its clients with specialized personnel for the management of installations for the ordinary and extraordinary maintenance, ensuring the highest performance over time with periodic checks and tune-ups.



Major Clients

Aersat

Alenia Spazio

Alos Communications

AZIMUT

E.N.E.A.

Elman

Gitiesse

Marina Militare Italiana

Marconi Communications

PSI

Selex Communications

SITIE

Superfast Ferries

Trenitalia S.p.a.



Product Features

- Applied Standards
 - **MIL-STD-461** RFI/EMI
 - **MIL-STD-167-1** Mechanical vibration of shipboard equipment
 - **MIL-STD-901D** Shock testing for shipboard equipment
 - Communication Comunicazione: FCC, Eutelsat, EuropeStar, INTELSAT, AsiaSat, IPSTAR, Hispasat

Nautisat technology supporting the return of the Costa Concordia to its final port

The antenna Nautisat VSAT-120 mounted on the ship Goletta Verde ensured the satellite broadcast live the journey of the Costa Concordia from the island of Giglio to the port of Genoa



Supply of the Nautifly to the Italian Civil Protection

In March 2015, the first NautiFly75 have been delivered to the Raggruppamento Nazionale Radioamatori Emergenziali during the presentation of the Satellite Network of R.N.R.E attended by over 50 volunteers involved in the project.



Attending the 40th edition of the International Amateur Radio Exhibition - HAM RADIO Friedrichshafen



Technical Overview

Nautisat antennas, **TVRO** and **VSAT**, have dish sizes from 0.60, to 3.60 meters, using an exclusive **Nautisat's** stabilization system, based on solid state gyros accelerometers for position control that grant superior performance and great simplification of the system architecture, all supported by a CNC Milled Aluminum mechanics that ensure the maximum pointing precision.

The line includes three sizes of supports:

- Small antennas with 0.6 m or 0.9 m dish
- Average antennas with 1.2-1.5 -1.8 m dish
- Large antenna from 2.4 to 3.6 m dish

In the naval communications network satellite, L-band no longer responds to the growing needs and has now been replaced by networks C-band and Ku-band, while overlooking the Ka-band scene.



Most Significant Characteristics

- CNC Machined Aluminium and Stainless Steel modular structure

Almost every mechanical component in Nautisat marine satellite system is made of aluminium alloy or stainless steel CNC machined from solid, it ensures the maximum mechanical precision and grants to the system the maximum pointing and tracking reliability other than a rugged construction and an excellent resistance to the marine environment.



Most Significant Characteristics

- **Maximum transceiver efficiency**

Thanks to the proprietary RNFeed technology Nautisat antenna systems ensure great efficiency with high gain and extremely low sidelobes, it allows high transmission power with bucs up to 40W.

The antenna type is *prime focus*.

The RF feed and the parts are interchangeable designed and produced by **Nautisat**.

The feed is fed directly through the waveguides.



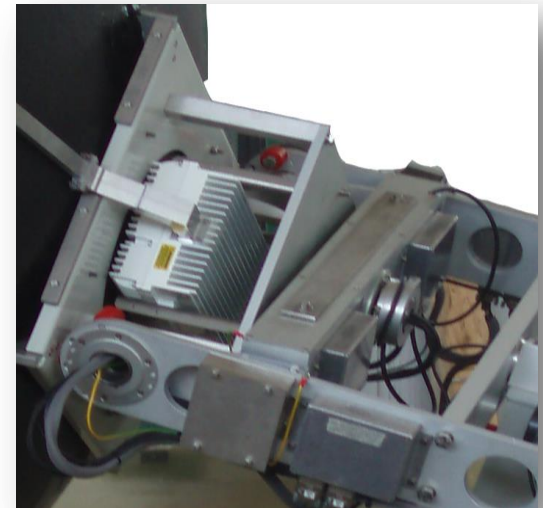
Most Significant Characteristics

The disc, carbon fiber high precision, is supported by a basket in which fit from 4W to 50W BUC, LNB, filters and other parts of RF.

The whole complex of the disc Feed, waveguides and RF parts move together around the blade shaft to position and stay in the correct polarization.

This whole movement eliminates RF rotary joints between feed and BUC or flexible cables, reducing losses and allows to easily implement RF functions.

This is undoubtedly one of the key points of the architecture of the antenna of **Nautisat**.



Most Significant Characteristics

- 3 axis stabilization system with independent skew

On Nautisat systems stabilization is performed with reference to the dish frame, and in conjunction with the use of coaxial absolute optical encoders, it ensures precise and direct movements for any antenna position. Steptrack cycle is performed regardless of ship's geographical position and satellite elevation outsmarting any rough parametric step system. The independent Skew Axis with a range of $\pm 175^\circ$ acts in TVRO models rotating the LNB whereas in VSAT models the whole ANTENNA-FEED-WAVEGUIDE PLUMBING-BUC group is rotated. This solution grants to transmit/receive antennas a stable radiation pattern while the waveguide transmission lines eliminate signal losses caused, in other systems, by cables and rotary joints.

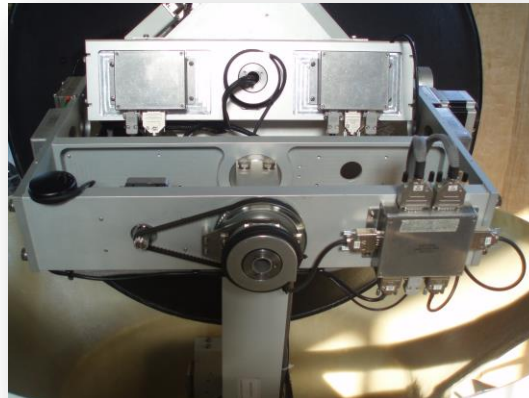
Most Significant Characteristics

The parabolic antenna is sustained by a support with three axes so arranged:

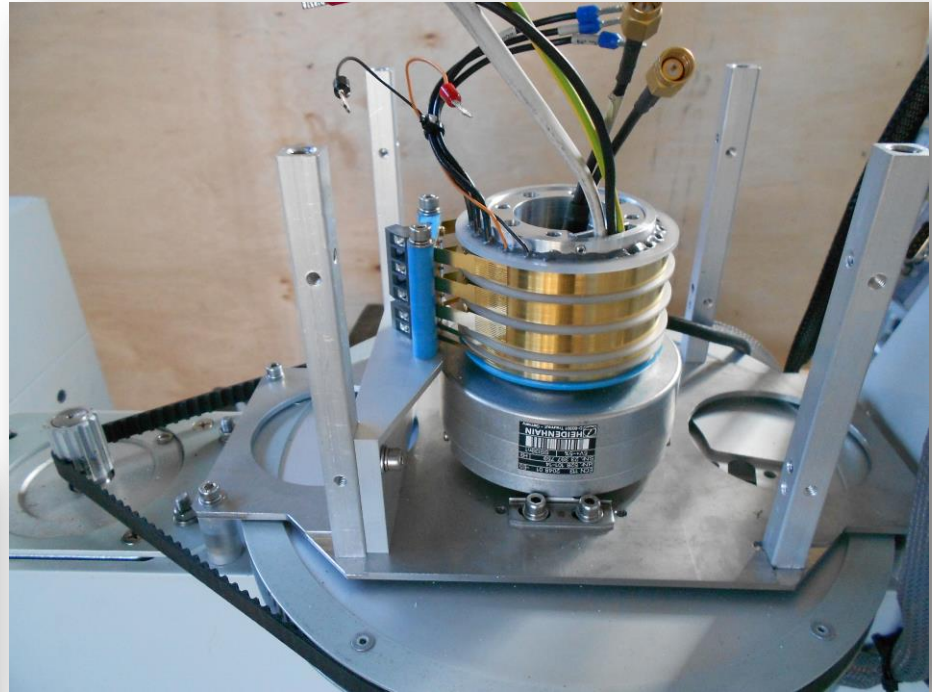
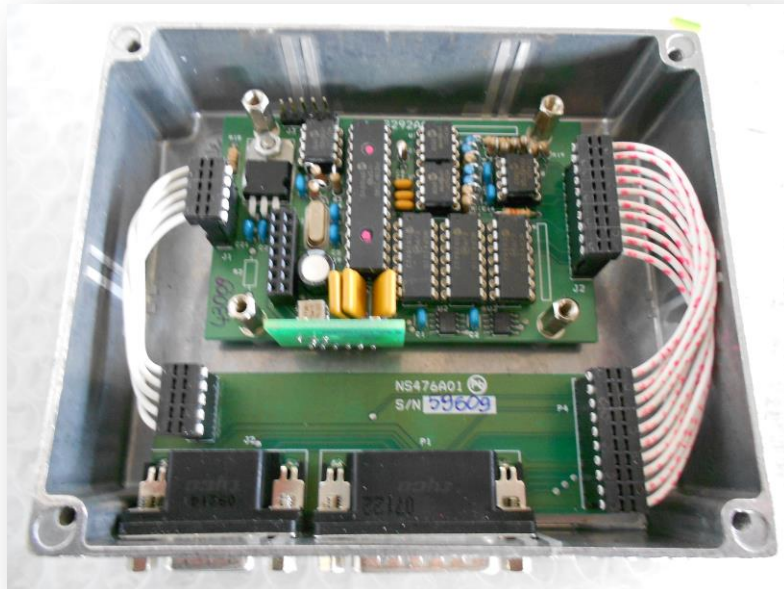
- Azimuth
- Tilting on azimuth
- Elevation on tilting

This configuration allows that there is no overlap in the movement of the axes, a problem which may occur if the tilting is in elevation

The structure of the column is made with aluminum alloy, with the main parts realized by machine from a single piece, seamless, for greater accuracy and robustness of the assembly.



Most Significant Characteristics



Most Significant Characteristics

- Extra wide pointing range with elevation spacing from -30 to +120 degrees and tilt from -30 to +30 degrees

thanks to its mechanical architecture Nautisat antenna systems allow a perfect pointing from the poles to the equator with wide compensation margins over ship's roll and pitch movements.

Antenna Control Unit - ACU

The ACU is a computer with Linux operating system and is easily controlled through a touch type screen 4.3 "color to select the different operations and different satellites.

- Maximum system integrability

Every ACU implements a communication port through socket server and can be easily integrated with any existent hardware or software, on board or remotely, that might interact or take control over the antenna system. Nautisat products are ready to operate standalone or as part of large and complex systems.

- Remote control interface through LAN or over internet

Every ACU embeds a web server that makes possible, with any java enabled browser, to control antennas easily through LAN or over Internet. This particular characteristic makes real scenarios like: remote control, assistance and fleet monitoring.



Most Significant Characteristics

Every **Nautisat** System has been designed to reduce the number of components to minimum, creating functional blocks and assemblies to minimize the number of spare parts.

The electronic components are functionally divided into seven boxes of aluminum connected by cables with professionals.

All cables are external and easy to replace.

The antenna structure and electronics functionally distributed allow simple maintenance.

It can be performed by qualified personnel simply following the instructions in the provided manual .



Most Significant Characteristics

- Rugged, accessible and transparent to radio frequency radomes

Nautisat antenna radomes are built with a "sandwich" structure of fiberglass and airex®, they are characterized by a really low attenuation level (0.2 dB), an excellent focal precision and great toughness. Every radome is also equipped with an inspection hatch that allows direct access to the inner equipment and makes easy every operation of maintenance and control.



Full Range of Products

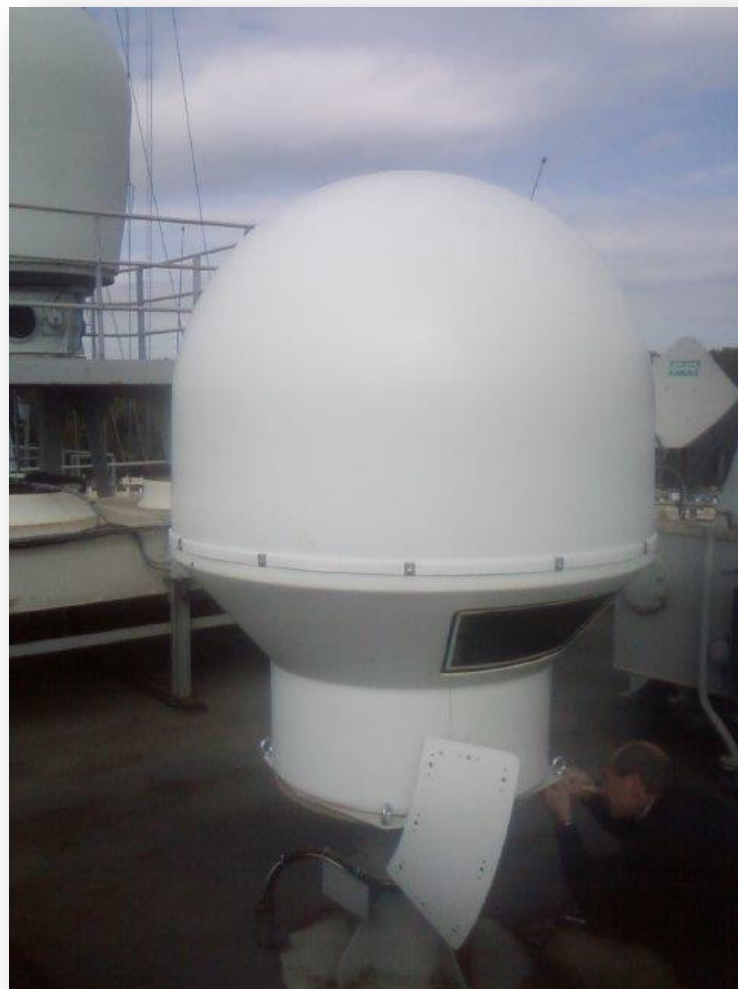
Model	Band	Availability
Vsat 60	Ku Band	Testing and developing
Vsat 90	Ku Band	Testing and developing
Vsat 120	Ku Band	Immediatly
Vsat 150	Ku Band	Testing and developing
Vsat 150	C Band	Testing and developing
Vsat 180	Ku Band	Testing and developing
Vsat180	C Band	on request
Vsat180	C + Ku Band	on request
Vsat 240	C Band	on request
Vsat 240	C + Ku Band	on request
Vsat 360	C Band	on request

Model	Band	Availability
TVRO 60	Ku Band	Testing and developing
TVRO 90	Ku Band	Testing and developing
TVRO 120-2	Ku Band	Immediatly
TVRO 120M	Ku Band	Immediatly
TVRO 150	Ku Band	Testing and developing
TVRO 180	Ku Band	Testing and developing
TVRO 180	C Band	Testing and developing
TVRO 180	C + Ku Band	on request
TVRO 200	C + Ku Band	on request
TVRO 240	KuBand	on request
TVRO 240	C Band	on request
TVRO 240	C + Ku Band	on request
TVRO 300	C + Ku Band	on request
TVRO 360	C Band	on request

Installed Antennas



Easy Installation and Maintenance



Terrestrial Project : Nautiland

Nautiland 120 is a system that integrates antenna's performance VSAT120 and the power and versatility of the Nissan Navara pick-Up.

Nautiland 120 unlike any other uplink that requires work in static and leveled conditions, allows static links without leveling and stable and long lasting links with the vehicle in motion even at high speed or unfavorable road conditions or running off the road as taking advantage of the great features of the Nissan Navara.

Nautiland 120 is transportable by CH-47 Chinook helicopter



Terrestrial Project : Nautiland

Nautiland 120 has been designed for various application both civilian and military:

Civil Protection: for the restoration of communications during disasters or natural disasters by exploiting the capabilities of off-road vehicle

Area radio & television: possibility to make broadcasts of events or events in motion that require long distance travel.

Internet and voice: provides coverage In situation of inconvenience or disaster recovery.

Military: to ensure links the troops during operations and report to the General Staff the situation on the ground.



NAUTI FLY 75 AUTOMATIC 0,75m Ka band Trolley

NAUTIFLY 75 is an automatic pointing flyaway antenna for satellite communications in Ka-band transportable by one person only as contained in a trolley.

NAUTIFLY 75 is up and running in a time of 5 to 10 minutes by one person.

NAUTIFLY 75 can be embarked upon a plane flight passing through the normal check-in passengers performing with IATA standards (the sum of the three dimensions is less than 158 cm and weighing less than 32 kg). Upon arrival, the trolley will be withdrawn on the conveyor belt



NAUTI FLY 75 AUTOMATIC 0,75m Ka band Trolley

ELECTRICAL CHARACTERISTICS

Antenna:	Ka-band
Reflector:	0,75 m prime focus
Polarization:	Circular
Feed and Transceivers:	Integrated Technology ViaSat
TX Power:	3W
Maximum power:	4W (optional)
Frequency TX:	29.50 ÷ 30.00 GHz
Frequency RX:	19.70 ÷ 20.20 GHz
TX Gain:	44.2 dB (typical at 29.75 GHz)
RX Gain:	40.1 dB (typical at 19.95 GHz)
Handling Az and El:	Motorized
Automatic tracking through	GPS, Fluxgate electronic and angular sensors
Azimuth range:	-90 ° to + 90 °
Elevation range:	0° to 90°
Power supply	220V BC; 30V A.D.
Auxiliary batteries	24V A.D.

MECHANICAL PROPERTIES

Trolley Dimensions	930 x 440 x 220 mm
Weight	less than 32 kg
Tightness class	IP67



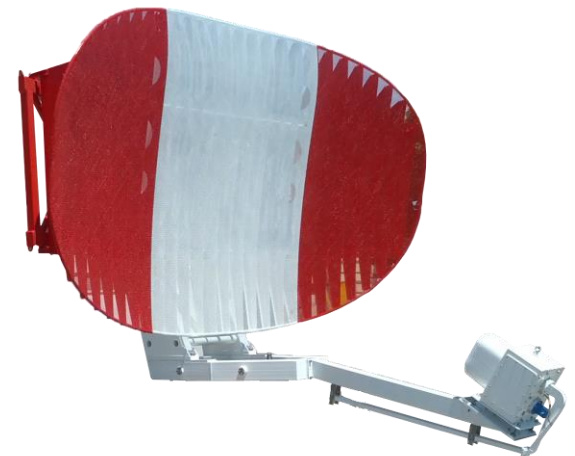
NAUTISAT S-BAND AIR TRAFFIC CONTROL (A.T.C.) RADAR ANTENNA SYSTEM

Nautisat S-Band A.T.C. radar antenna system is a modern off-set antenna that benefits of the most advanced techniques and software in the design.

The profile reflector and the feed/polarizer system are designed with a Nautisat proprietary software. The reflector off-set profile is most innovative and it can generate side lobes of very low level. The reflector is equipped with tilting mechanism with graduated scale. The pedestal with two drive motors is designed to support the primary antenna and a large open array antenna for the secondary radar. An encoder box codify the azimuth position.

The antenna structure and surface are made in aluminum alloy. The pedestal is made in welded and galvanized steel with polyurethane paint.

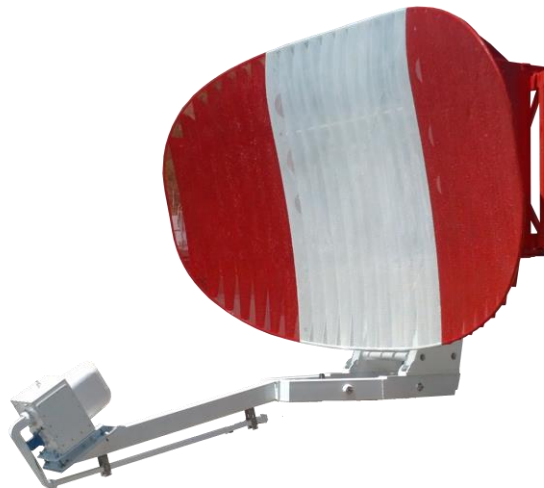
Nautisat ensure high repeatability in production and high performance and reliability.



NAUTISAT S-BAND AIR TRAFFIC CONTROL (A.T.C.) RADAR ANTENNA SYSTEM

CHARACTERISTICS

- High gain
- Main and auxiliary radiating beams
- Instantaneous polarization switching
- Weather channel (optional)
- Elevation coverage to 45°
- Meets ICAO (International Civil Aviation Organization) environmental specifications
- Tilt mechanism for adjust the beam elevation angle
- Dual drive motor gear box with electromechanical clutch
- Dual encoder box
- Six channel RF rotary joint
- Multi-channel sleep ring for signals and power
- Interlock stow pins
- Great dimensions ball-bearing with oil lubrication
- Operational without need of a radome
- Antenna dimensions: W:5390 x D:4534 x H:3150 mm
- Antenna weight: 1100 kg
- Pedestal dimensions: W1105 x D1105 x H1840 mm
- Pedestal weight : 1030 kg



NAUTISAT S-BAND AIR TRAFFIC CONTROL (A.T.C.) RADAR ANTENNA SYSTEM

MAIN BEAM

PARAMETER	VALUE
Operating band frequencies	2.7 – 2.9 GHz
Coverage	
Azimuth	360°
Elevation	Up to 45° in the elevation plan
Operation speed	Up to 15RPM
Polarization	Horizontally linear, circular (L/R)
Antenna reflector loss	0,10 dB
Feed and polarizer loss	0,05 dB
VSWR over the entire band	1,35 : 1
Presence of the radome	yes
Antenna gain	35 ± 1 dB
Horizontal beam width at -3 dB	$1,39^\circ \pm 10\%$
Vertical beam width at -3 dB	$5^\circ \pm 10\%$
Side lobes level	≤ 25 dB ± 1 dB
Slope on the horizon, at -3dB from the main peak beam	4 to dB / deg
Tilt angle	-2° to +5° manually controlled
ICR	20 dB





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