

RESINEX *news*

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Oceans

Resinex versatility for the oceanology needs



Once again Resinex confirms its key success factor in the Oceanology business. The company is able to follow all customers needs in terms of multi-functional use of its wide range of marine products. Elastic Beacons, Cable Floats, Ultra Deep Water Floats, Marker Buoys coming from their natural markets of offshore oil and navigational aids sectors find a perfect function in the Oceanology market. China, Korea, Thailand, Germany, Italy, Portugal, Cyprus, Norway, Brasil, Dubai, Romania, India, USA and Antarctic are only the last destinations of Resinex products for the Oceanology activity in the world seas.



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Wind Monitoring with elastic beacon

RSE SpA - Research on Energy System - is a corporation of the GSE Group SpA (controlled by the Italian Ministry of Economic Development).

The company develops its research activities in the field of electro-energy, with particular reference to national strategic projects of general public interest.

RSE, in mid-2012, has installed a large elastic beacon off the coast of Mazara del Vallo (Sicily Channel) to constantly monitor the marine weather data with particular attention to the wind.

This beacon, deployed at 50 meters depth, continuously provides data that will be used to provide guidelines for the installation of wind farms for the production of electricity.

Resinex has also supplied small buoys installed at the seabed of 50 meters.

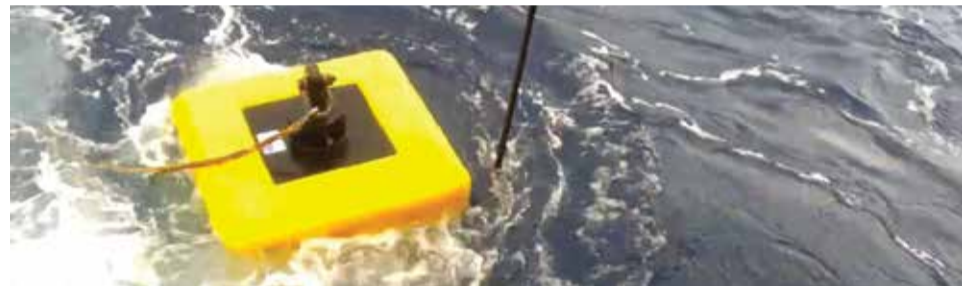


Compact buoys for Seismic activity in Brazilian waters

In early 2013 Resinex supplied 31 Deep Water buoyancy elements to GeoRxt-Brasil (now part of Georadar Group) for their seismic activity in Brazilian waters.

The buoys were especially designed to match the needs of the Brazilian competitor: they had to be reliable, compact, squared and able to go till 400 meters underwater.

Nett Buoyancy 1000kg.



In partnership with Polarcus for the study of the seabed



The field of oil exploration is still one of the most important for Resinex. During 2012, we signed a major partnership with Polarcus, a company listed on the Oslo Stock Exchange but with operational headquarters in Dubai, which creates seismic analysis in the sea with its own fleet of vessels. The two companies have studied and developed a buoy innovative, designed specifically for the study and the data transmission. Resinex has developed new moulds and created the prototype, following step by step, all the technical specifications of the customer.

The buoys will be used in the course of study of the seabed, to detect the presence of oil fields. At regular intervals the sound waves generated by underwater air compressed explosions will be gathered by the instruments positioned on the floats and then transmitted to the main vessel. Were made about twenty prototypes that are placed along the west coast of Norway for a series of tests.



3000 meters under Indian waters

In the second half of 2011 Resinex supplied 150 pieces of Umbilical Cable Floats to NIOT (National Institute of Ocean Technology) of India. The floats have been designed to maximize hydrodynamics and resistance under pressure at 3000 meters operational depth. The floats are used to generate a Lazy S curve during deployment operations of an Autonomous Coring System (ACS) using steel aramid umbilical. Nett buoyancy is 20Kg at 3000 mts operative depth. Autonomous Coring System (ACS) is deployed by NIOT in joint collaboration with M/s Williamson & Associates, Seattle, USA. System is capable to take 100 m long cores from ocean basins up-to the maximum depth of 3000 m. System is integrated with pressure core sampler for the recovery of gas hydrates at in-situ pressure condition.





Tsunami Alarm in Korea

With 10 very special Resinex PEM 43 buoys

From 2010 to 2012 Resinex supplied 10 giant buoys earmarked to be used in an integrated water monitoring system and anti-tsunami alert were ordered by the specialized Oceantech company to be dislocated off the South Korean coast.

These were 10 Pem 43 buoys, 4,3 metres of diameter and 2 metres in height, which were delivered by our company about halfway through 2010 to the Port of Busan.

They are able to produce a net buoyancy of 23 tons and were positioned at a sounding depth of 150 metres in a stretch of water where the current reaches 1 metre a second with waves of up to eight metres. On the marine component, meteorological CO₂ monitoring and wave measuring sensors were installed.

As well as these, an acoustic transducer was positioned in order to receive signals from the submerged monitoring system. This supply goes together with other many ordered in the last years from Asia of tsunami alarm systems.



German Oceanology till 6000 meter depth



The Leibniz Institute at University of Kiel in Germany is one of the most prestigious European research institutes. It has 750 technical and scientific employees all involved in marine science, geology and meteorological researches. For new experiments in ultra deepwater also the Leibniz Institute uses Resinex syntactic foam blocks. During 2010 various blocks were supplied by Resinex to be used at a depth of 4,000 meters and at 6,000 meters.

The syntactic foam products are produced by Resinex in its specialized plant of Torbiato. Then, they are tested in the other specialized plant of Adro where the pressure and buoyancy tests are performed. The pressure tanks at Adro plant can test till 880 bars (8.800 meter).

The Leibniz Institute makes research in all the oceans' world. The 4 division studies: Ocean circulation and climate dynamics, Marine Biogeochemistry, Marine Ecology and dynamics of the Ocean floor.

During 2013 Resinex supplied another important actor of German oceanology. 140 squared floats with a net buoyancy from 17 to 21 Kgs were supplied to Geomar.

The operative water depth is 6000 meters.



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From the depths to the stars

A telescope in the Mediterranean to look at the sky

Descending until and beyond 3 thousand metres under the level of the sea even though it was projected to sustain pressures until 400 bars can be found the experimental Nemo project (Neutrino Mediterranean Observatory) which the Institute of Nuclear Physics (INFN) has in course to create a telescope of a new conception, baptised "Kilometro cubo" (Cubic kilometer).

The syntactic foam floats which support this installation are Resinex products, just as those used in 2005 during the first phase of the experiment. In the light of experience the new buoys have been made thin-

ner, obtaining greater modularity. Purposely studied for deep water, they were positioned at the base of the mini towers which give support to the structure and are currently in the test phase. The Nemo project foresees the construction of a big submerged antenna in order to reveal high energy neutrins coming from astrophysic sources. Revealing the presence of neutrins could extend the knowledge of the actual astronomy which is based on the revealing of photons, that is light and electromagnetic radiation.

It also represents the biggest monitoring station (oceanographic, geophysical, chemical and acoustic)

in the marine environment as well as a pole of technology development for the exploration of the abyss. The definite location will probably be off Cape Passero (Sicily), which will permit the telescope to be positioned at a depth of about 3.500 metres and some 100 kilometres off the coast of Sicily. Under this stretch of water, the telescope will be in optimum position of darkness in respect to low energy cosmic radiation that at a more shallow level would counter it and not allow the observation of the neutrins. It will extend for two square kilometres and is made up of 81 750-metre high towers with about 5.000 light sensors.

Buoy modules for RXT in Brazil



Reservoir Exploration Technology (RXT), the Norwegian company specializing in geophysic relief of the seabed exploration on behalf of the oil industry and seismic control has been furnished with Resinex support floats assembled on surface buoys destined for the new operational field in Brazil.

These are floating modules which support an installation for registering signals from the seabed. After the delivery of 40 medium depth buoys (300 metres) the Scandinavian company confirms the choice of Resinex buoys for its seabed mapping operation.



The Nemo module with by Resinex orange buoys 4000 meters water depth rated.

Vulcanology at 6.000 Metres



The national institute of geophysic and vulcanology of Rome (INGV), which carries out a precious work regarding seismic research and vulcanology is also involved in the study of underwater telluric phenomena. It manages among others a large band Mediterranean MedNet seismic net which continuously monitors in deep water, arriving to depths of 6 thousand metres. Also INGV turns to Resinex technology to have reliable and sure deep water syntactic foam modules which is by now able to produce floats which can support pressures of up to 1.100 bars.

CNR uses Resinex deep water



The image refers to an oceanic moorage with a Resinex buoy by Cnr-Issia of Genoa and Enea-Cram of La Spezia near the Odas Italia 1 buoy-laboratory anchored in the middle of the Liguria sea at a depth of 1.200 metres.

The positioning was carried out by technicians from the National Research Centre (CNR) and the Italian Navy ship Tavolaro. The Resinex buoy was studied to operate at a depth of 300 metres and will be utilized in the sphere of the CNR experiments.

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Tsunami sentinels

Warning system in the Southern Chinese sea

The two early warning anti tsunami system consigned to the state oceanographic administration of the People's Republic of China that are to be positioned in the South China Sea will be utilizing Resinex buoys. This is the marine component of the system and is made up of two Poseidon class Envirotech tsunamimètres positioned at a depth of about 4.000 metres and supported by two oceanic Resinex buoys built to resist force 12 seas and of two mooring lines formed by Resinex Synt floats studied for 4 thousand metre depths. The system will have to remaining the sea for two consecutive years without maintenance in a zone

continually bombarded by tropical typhoons. The buoys, extremely stable, will have to withstand 120 plus kilometre winds and 12 metre plus waves, conditions which are, by now, very frequent in the South China Sea. The system is composed of two monitoring stations dislocated at a depth potentially covering between 500 and 7.000 metres which transmits pressure parameters taken from the seabed and relays them to the surface buoy which in turn transmits the information via satellite to a control centre situated in Beijing therefore giving the alarm for a tsunami generated off the southern Chinese coast.

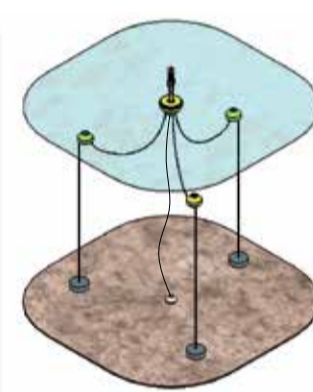


Deployment of the buoys in China Sea.



Above, the monitoring system diagram.

A non-rotation anchorage



Corr-Tek is a company which is involved in the production of scientific measuring instruments for water monitoring as well as planning and installation of plants for measuring drainage and in controlling physical and chemical water parameters. It had to project a marine survey station, particularly stable, positioned off the port of Goro (North Adriatic). Our technical office, as a result, created a floating laboratory formed by a central buoy with three anchorage points supported by jumpers which guaranteed both stability and resilience.

Otranto: canal monitoring



The National Institute of Oceanography and Experimental Geophysics (OGS) of Trieste has installed an instrument monitoring buoy in the Otranto canal as part of a European project. This is a floating system connected to a depth of 1.200 metres and fitted instruments and sensors in order to carry out profiles of the wind and water. For this project a Resinex model Pem18 buoy was used with a float of 1.8 metre diameter with a signalling lantern. The power is guaranteed by solar panels.

Among the Antarctic ice



It was tested twice. The first time in February 2009 in the Black Sea by the Nato alliance research ship. The second time in the central Ligurian sea by the Italian naval ship Tavorara. We are speaking about the Resinex model RS6 buoy which is destined to carry out scientific experiments in the gelid waters of the Antarctic. It will be part of the national research programme in Antarctica, an Italian project which is studying planetary phenomena.

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A sonar in the Alaskan fiord

Resinex buoys for measuring acoustic health of U.S. Submarines

Its name is SEAFAC, which stands for Southeast Alaska Acoustic Measurement Facility, and it is an important and continuing U.S. Navy project developed by Naval Surface Warfare Center (NSWC) for the purpose of measuring the acoustic signatures of naval vessels. Science Applications International Corporation recently upgraded the measurement capabilities at the facility on behalf of NSWC. As part of these facility upgrades, SAIC opted to use Resinex support buoys.

The SEAFAC site, in operation since 1991, is located in the Behm Canal, a fiord in an isolated area of Alaska, near Ketchikan. The location and depth of this fiord provide low environmental noise levels, without acoustic interference. In this remote, quiet environment, advanced measurements are carried out

to assess the noise levels generated by American submarines while navigating at full speed in deep water. The aim was to reduce noise levels to a minimum for the latest Seawolf and Virginia classes of submarines. SAIC will mount these highly sensitive hydrophone arrays on two cables supported by two large Resinex support buoys suspended 45 metres below the sea surface. When the submarine passes between the two arrays, the system will acquire all of the necessary acoustic measurements. This process involves the use of costly, sophisticated, and advanced electronic equipment, and Resinex is pleased that SAIC has chosen to use its Resinex type PEM 21 floats (2.1 metres width by 3.1 metres height, tested to operate at a depth of 60 metres and produce 6 tons of net buoyancy).



Reliability: Resinex buoys keep the sensor lines under tension at a 45-meter depth.

Sound in Depth with sonardyne

The British company Sonardyne, the world market leader in underwater positioning continues to cooperate with Resinex for the supply of high performance floatation collars for its range of subsea acoustic transponders. The smaller floatation collar is able to support transponders to depths of 500 metres while the larger float is designed for transponders operating at depths of 3000, 5000 and 7000 meters.



University deepens its study in the abyss



The buoys on the deck before deployment.

Tested to operate in total safety to a level of 500 metres below sea level, two deep water buoys were delivered this Autumn to the University of Azores.

The two buoys were ordered by the Oceanographic and Fish department of the said University and are positioned off Ponta Delgada in the island of San Miguel as a support for its study of ocean currents and fish movements in the area.

They are two floats formed by an external shell in polyethylene rotationally moulded filled with syntactic foam capable of resisting at great depths.

Both buoys are vertically crossed by a steel bar.

The bigger one measures 1.2 metres in diameter by 1.24 metres in height and has a swivel type hook for every extremity that can become 1.75 high (produces 745 kilos if net buoyancy).

The other, 1.15 metres in diameter by 1.15 metres in height, which in its upper part can accommodate a sensor, generates a net buoyancy of 710 kilos.

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Telecom test at 2090 meter depth

The first tsunami warning system in the Mediterranean sea

The first step, towards the end of 2006, consisted of the positioning of the system in the South Tyrrhenian, a few kilometers off Palermo at a water depth of 2090 meters. This was the test system for the Me Tas Mediterranean Tsunami Alarm System, a project for the monitoring of the water and sea bed instituted by Telecom Italia using Resinex buoys.

The prototype consists of two principle components, always linked together by a bi-directional acoustic modem: a platform is situated in deep water and float for satellite transmission. The platform collects the data

provided by the sismometres and also records pressure variations, directly correlated to the indications of an expected tsunami or to the passage of one. The buoy, through the modem which remains connected to the platform on the bottom, transmits the data via satellite to Les Immarsat of Fucino which in turn passes it onto the Envirtech laboratories for preliminary tests.

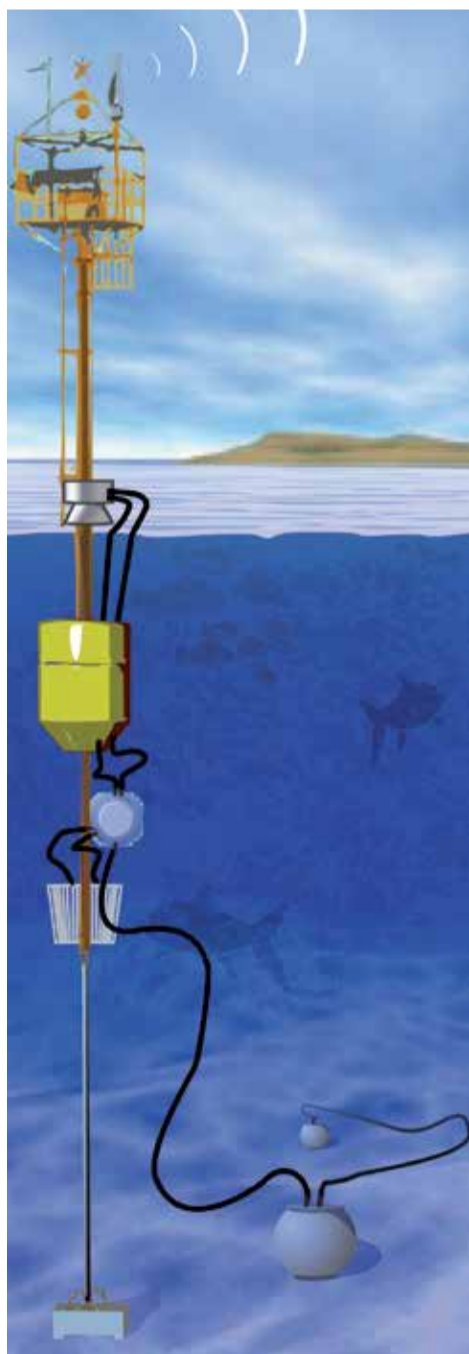
Finally everything is elaborated by the Environmental Agency and Technical Services (Apat) which gives scientific support and approval of the results.

This experiment, which makes use of giant Res-

inex floats (a buoy of 1.3 metres in diameter and 13 meters long assigned to the receiving and transmission of data plus another 11 deep water buoys for the buoyancy of the mooring system), has the scope to calibrate the measuring procedure and alarm. The data and any danger warnings flow directly to a control centre which in turn passes such information to the competent authority. The system can be transferred to every port of the world and positioned at any sea depth and has therefore a vast range of potential applications.



Above, the long Resinex buoy on the deck. Right, positioning of the deep water platform.



Alenia controls the bradyseism

The bradyseism of the Gulf of Pozzuoli is that old phenomenon which produces the upward slide of the coast and the slow but inexorable deterioration of the inhabited area. This zone is scrutinied by every type of monitoring and it is exactly here that Resinex, in Autumn 2006, gave its own contribution with a big beacon which made up the floating competent of the project developed by Alenia (www.alenia-aeronautica.it) through Meg Sud. It is a system of control and analysis positioned at a depth of about 100

metres and linked to a central exchange situated on a square metal tower which transmits all collected data to a land base. The equipment is powered by solar panels able to generate a power of 200 watts with a tension of 12 volts.

The choice of Alenia to use an elastic beacon anchored in 100 meter-deep water is the most recent testimony of the reliability and versatility of Resinex elastic beacons "invented" by our company in the 70's and used in hundreds of installations throughout the world.



Rogue waves, the Thai organisation

Resinex has supplied two Spar buoys for the Thailand tsunami warning system designed and developed by Envirtech. The buoys are installed in the Andaman sea at about 200 nautical miles from the Thai coasts at 2300 and 2700 meters of water depth. Each buoy is equipped with redundant acoustic link and satellite link for the communication with underwater module for the detection of tsunami waves and with a data centre located in Bangkok for the reception of tide data and alarm messages. Each buoy is equipped with solar

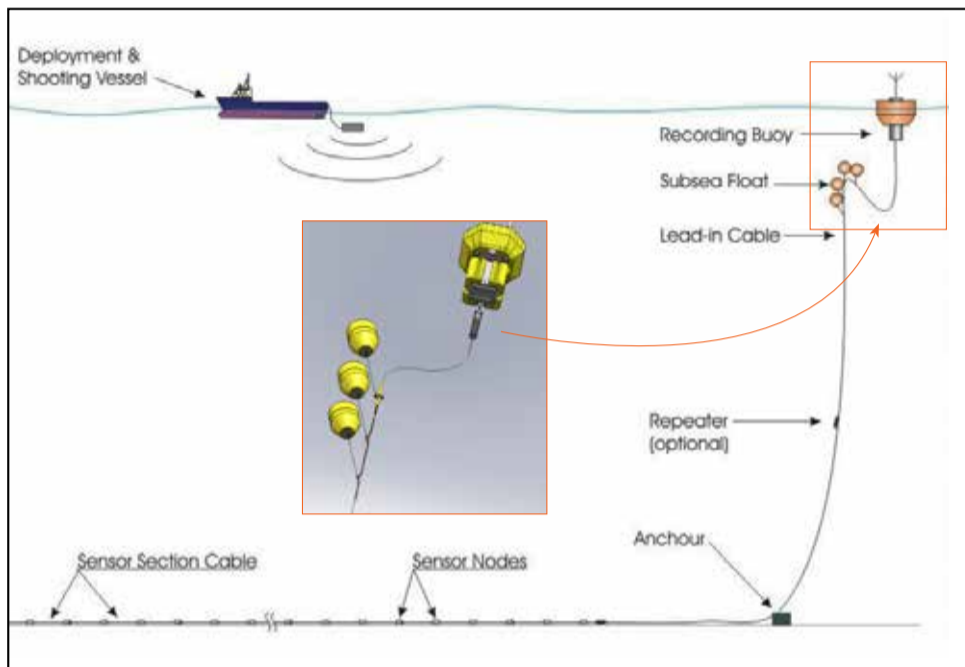


panels autonomous power supply system, with wireless link for data communication, Gps receiver, signaling light and radar reflector Iala compliant. The stability of the Spar configuration allows to get reliable acoustic communication also in case of high sea states. The implemented system allows to increase the safety of the Thai coasts providing an alarm one hour in advance in case of detection of anomalous waves over the normal tide.

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Seismic activity in the seven seas

40 buoys for sea mapping



Above: working scheme of the RXT sensor system for the sea bed detections.
Right: the installation of the Resinex buoys.

Reservoir Exploration Technology (RXT) was a Norwegian company extremely specialized, with branches all over the world.

They dealt with geo-physical relief and with the acquisition of data about the sea bed for the various usages, from the checking of the sounding depths, to the positioning of cables and hoses, to the detections for the oil industry.

RXT, puts on the sea bed the sensors, arranging a series of special cables which communicate with the signals emitted by the support vessel and send the data to a surface buoy which records them. The sensors grant a precise and detailed analysis of the ground.

Since 2007 also RXT has discovered the reliability of Resinex deep water floats. They ordered 40 pieces to use them for different Seismic detections which they have to make up to 1000 metres water depth for the oil reconnaissance. Resinex floats are used at about 300 metres under sea level to support the weight of the cables, full of sensors positioned at the bottom.

In the last years of activity the marine operations took place in Nigeria, in the Gulf of Mexico, in Brazil and in the Caspian Sea.



Stromboli, under the volcano

The University of Florence Department of Science on behalf of the Italian Civil Protection has positioned off the coast of the island of Stromboli (southern Tyrrhenian sea) a Resinex elastic beacon equipped with a wave metre and hydro-acoustic system. The aim is to monitor the stability of the submerged flank of the Stromboli volcano, the famous "Sciara" of fire. In December 2002 a volcanic eruption did in effect produce an instability of the said "Sciara" of fire which, sliding into the sea (about

10 million cubic metres), created a tsunami wave which invested the southern Tyrrhenian sea causing substantial damage to all the Eolie islands as well as along the Calabrian and Sicilian coastlines.

Thanks to a sinker of about 15 tons, connected by means of an anti-torsion cable, the beacon is anchored some 200 metres off the coast to a depth of 43-metres.

The set of instruments mounted on the Resinex beacon is made up of a large band hydrostatic pressure sensor, a water temperature sensor, a hydro-acoustic sensor (positioned at 14 meter depth), two tiltmetres and a Gps (on the tower).

The beacon is therefore able to provide immediately variables of hydrostatic pressure and consent the complete monitoring of marine fluctuations. The hydrophone, positioned at a 14-metre depth, is used to register any possible hydro-acoustic waves resulting from the underwater sliding of the volcano and which propagates in the water at speeds of 1,500 metres per second. The Gps receiver ensures the correct temporal synchronization of all data on board and monitors the geographical position.



The beacon is equipped with many monitoring systems powered by solar panels.

All the equipment on board is monitored by an electronic control system totally developed by the National Institute of Applied Optics of Florence in collaboration with Bioage S.r.l.

The signals transmitted by the beacon also contain a series of diagnostic parameters which enable the immediate and continuous monitoring of the on board instrumentation and timely maintenance procedures. The entire monitoring system is powered by three solar panels but has the capacity to operate autonomously for long periods (about 6 months) without the aid of the panels.