



Antarctica is a realm where natural phenomena take place in unknown conditions to our daily experience and on surprising dimensions, with atmosphere temperatures down to -80°C , with winds blowing up to beyond 200 Km/h, arising and falling down to zero in few minutes, where the sunlight intensity can achieve to levels elsewhere unreachabe due to the almost complete light backscattering.

In these most extreme conditions (still hard now for human survival despite of the technological progresses) some chemical, physical, geophysical and biological processes take place that are not yet well understood and cannot easily investigated. For these reasons the Italian Program of Researches in Antarctica choosed to realise a big and very robust robotic platform, able to carry on research activities under the human control also in the most extreme situations, allowing autonomous operations, remote control with enhanced environmental perception. A platform endowed with great power availability.

This robot has been called RAS



RAS - a Robot for Antarctica Scouting

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RAS, a robot based on a mechanic platform PB260 and realised by an Italian Consortium of Universities and Industries leded by ENEA, is equipped with a redundant, state-of-the-art sensing system. It will be able to recostruct the environment and allow the autonomous control the vehicle management also in such conditions where the human drivers are usually oriented to stop the travel.

The sensing system includes Artificial Vision, Laser scene reconstruction, millimetric Radar, GPS-RTK, Inertial platform, sophisticated Odometry. High precision non-contact velocimetry and infrared vision are under development and will be integrated in short time.

The robot is endowed with an effective remote tele-operation system. Tests carried out remotely by highly skilled snow-cat drivers (in the picture a test performed in area close to the Terra Nova Bay italian base) has shown a driving capability close to the one of the in-vehicle human driver.

Some aspects of the autonomous operation of RAS are tested in the picture sequence reported here in the bottom: a predefined path to be follow by RAS has been designed and then tracked by the vehicle with good precision.



On the left preliminary tests carried out on the Alps.

Some prototypes of the non-contact velocimeter have been tested on the Presena Glacier. Downside a photo of the 77 Ghz Radar realised by ENEA is shown

