ANTI capsize system

It was certainly pleasing to see such a contrast in the 2006 Route du Rhum from the carnage that took place back in 2002 in the ORMA multihull fleet. Of course, the very contrasting weather conditions go part of the way to explaining how these flying yachts made it without any problem across the ocean, but we should also take into account the measures taken by the ORMA class. This year, for example, an anti-capsize device was compulsory aboard the trimarans. Roger Ganovelli, the designer of the most popular system in the fleet, explains a few details to us.

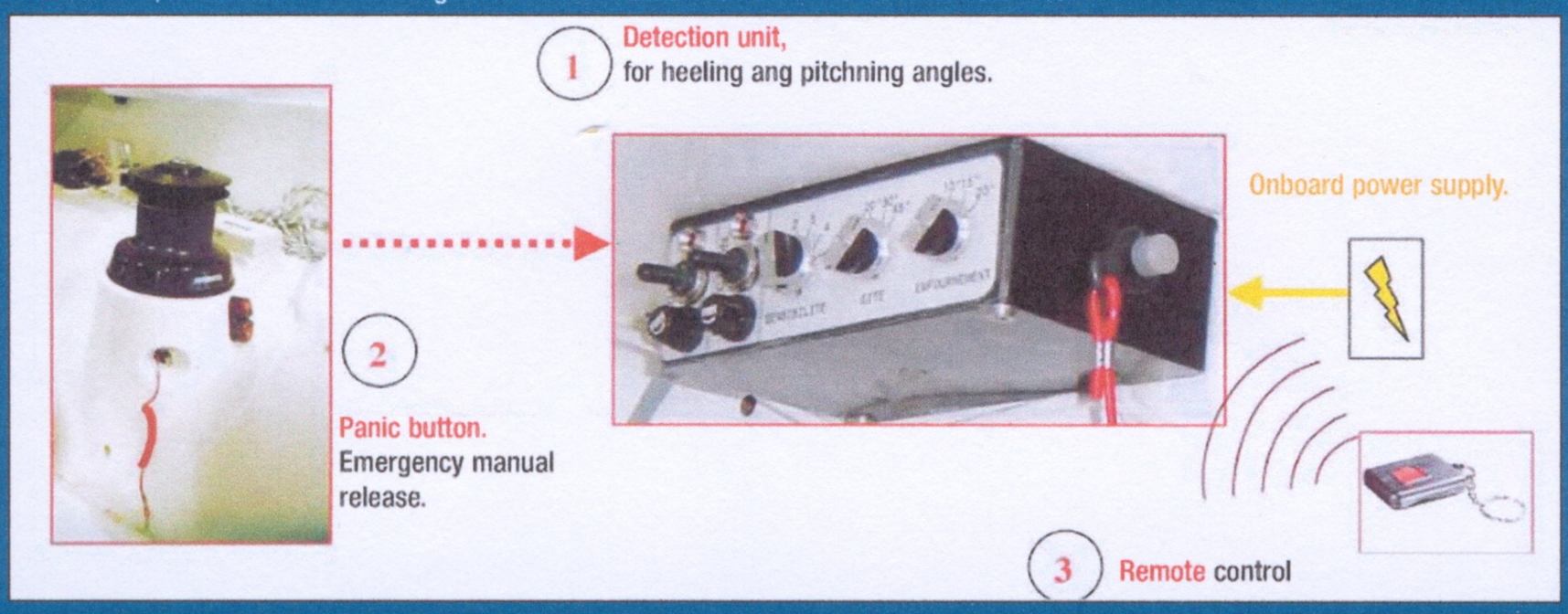
It's really more a passion for us

«THIS PRODUCT IS THE RESULT OF TWO AND A HALF YEARS OF HARD WORK financed by private funding. Groupama was the first team to buy our system, and it is thanks to this, that we were able to continue to develop the device,» explained Roger Ganovelli to begin his presentation. The engineer, who is also a teacher, created the Anti Capsize System (ACS) in association with his father, a dental surgeon, who had carried out two Olympic Tornado preparations in the past. «We have a multihull background, stressed Roger, who pointed out from the outset: «We are not counting on the development and sales of our product to live, and it's really more a passion for us. A few years ago, this type of system was out of the question, and it took the ORMA class decision to make an anti capsize device compulsory for it to develop, as I believe left up to individual choice, the equipment was not very common.» Let us take a close look at this equipment, which Franck Cammas says would have avoided him turning over, if he had had it onboard back in 2002

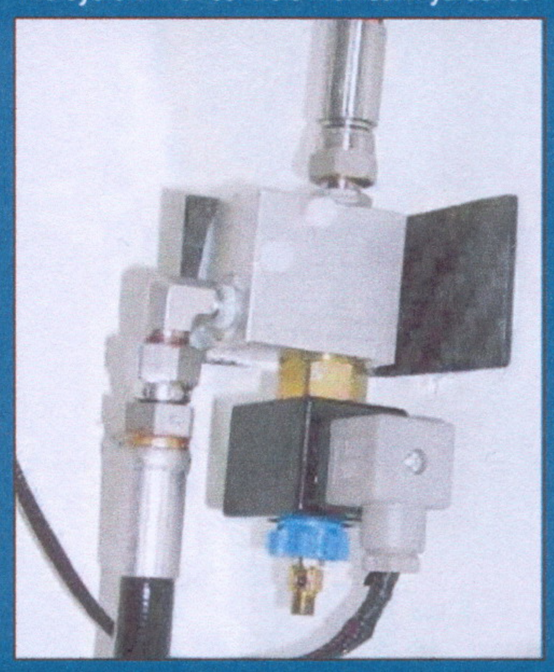
Angle measurements

«The principle of the ACS is to detect any critical heel angle and /or pitching and to ease out the mainsail sheets and/or the foresail, as soon as this angle is reached. As for the heel and pitching angles, there is an off position for both of them, so they can be detected independently of each other. When the wave pattern is fairly long, you can imagine that the boat will go down for 20 to 30 seconds, and that it reaches a pitching angle, which is detected as being critical. However, it may not really be so, as it is riding the wave. At that moment, you can turn off the measurement of the angle in the longitudinal direction and merely detect the heel. Concerning the pitching angle, there is a specific detail to consider, as it is based around a detection on a semi-axis: as these boats tend to sail bow up by 4 to 5°, in particular with the effect of the foils, which are placed in front of the axis of the mast, so the system must not confuse this backwards angle with a pitching angle. Concerning the heel, the setting is the same on either side, so that means you do not require two detectors (editor's note: we can add that beyond a pitching angle of 7 - 8°, the rudders are out of the

In the middle, the detection and settings unit. All the electronics fit within a 20 x 10 x 5 cm box.



The system that controls mainsail hydraulics



water). The system is exclusively based on angle measurements (Roger Ganovelli prefers to avoid going into details in order not to give anything away to potential competitors), and not on acceleration detectors. Pierre Bourcier (see Course Au Large N°13), who worked on Groupama's electronics, carried out measurements showing that when the boat is about to dive in, there is firstly a change of angle and then between one and one and a half seconds later a deceleration. Working on this measurement is therefore not suitable, as the detection of the critical angle and setting off the easing off process occurs too late. Moreover, an acceleration detector is a pendulum, which reacts according to the Earth's gravity and as everyone knows, there are important variations, according to your position in the world, as the magnetic declination is not the same everywhere. We began our work in this direction, as acceleration detectors are simple and easily available devices, but we soon abandoned this idea for the two reasons I just explained. By basing the device solely on angles, the product does not take up much space. The box is 20 cm wide, 10 cm deep and 5 cm high, and absolutely everything is inside – the detectors and the adjustment controls. So the box can be fitted almost anywhere, as long as it is placed perfectly horizontally, which can be determined by a correctly calibrated inclinometer. The skipper is then in control of how he uses the system, as he sets it according to the style of sailing he has planned and it can be adapted to the weather conditions. You cannot limit the device, as sailors wish to keep as much autonomy as possible, which is quite understandable (editor's note: people like Michel Desjoyeaux or Loïck Peyron have more than once shown themselves to be sceptical about assistance systems, which take over from the pilot's decision). Franck Cammas has a chart, rather like speed polars, and knows his exact adjustment according to the speed, the type of wind and sea. Teams, which have worked seriously and who have mastered the system make sensible use of it – that is the case for Cammas and Pascal Bidégorry.

A wide range of actions

Slackening the foresails is achieved via a pivoted turret, which sends the rope out of the jaws of the clutch, as beyond a certain angle, it only pulls in the axis, so it is very simple (and allows you to maintain ordinary manual use). To summarise, downwind, you need to concentrate on the pitching angle and the slackening of the foresail – gennaker – and upwind, you detect the heel and slacken the mainsail. Slackening the mainsail downwind only causes the sail to twist, and increase the tension at the top. On the foresails, it is all or nothing. The device lets the sheet out all the way, while for the mainsail, which is generally connected to a hydraulic jack, it only eases out a metre of the sheet. Downwind, that is insignificant, while upwind, that slackens it a lot, which is why it is interesting to act on the mainsail and on the foresails to react to many situations. The Panic Buttons are made of outboard engine lanyards – traditional shut-offs – and as many as required can be fitted on the boat (at the helm, foot of the mast, nav table etc.). They either control the electro-mechanical valve in the mainsail hydraulics, or the foresail rope clutch or both, according to what was selected on the device. (N.B: the person in charge can also decide not to set it off). The set is also equipped with manual mode, which allows you to ease out using a remote control that for example, Franck Cammas, Pascal Bidégorry and Yvan Bourgnon wear on their wrist. In automatic mode, the easing out is decided by the device, which reacts according to the sensitivity that has been selected. However, the remote controls work all the time, so if the skipper thinks the system is reacting too slowly, he just has to push on a button to get it to act. The transmitter works within a radius of 50 metres around the boat, which was one of the final modifications made before the start of the Route du Rhum. In my opinion, it would be sensible for such safety devices to become commonplace on fifty-footers or on small racing multihulls, as in the end it was in this fleet that most of the incidents occurred in the Rhum. It is really upsetting to see a boat like Charlie Capelle's capsize, when you know how much he has invested personally in her… We are currently working on a system, which is adapted to cruising multihulls, which is much simpler and a lot less expensive than the ACS that is fitted to ORMA trimarans (which cost 13,500 Euros). The boat's architect gives us the maximum angle that he considers reasonable, and we add it to the system, which is then sealed at this value. No more subtle adjustments or settings. It then comes to around the same price as an automatic pilot, or in other words about 2000 Euros…»

Jocelyn Blériot

60' ORMAs fitted with the ACS system for the Route du Rhum :
Banque Populaire, Groupama II, Brossard, Sopra Group, Région Guadeloupe

The foresails sheet-release system.

Fine discrimination

«Sometimes the boat will ride up on a wave, and it must not be interpreted as a signal that you have gone beyond the threshold angle. That is the function of the sensitivity adjustment on the case, which is the equivalent of gain on a pilot. If the sea is smooth, the sensitivity can be set to 0 or 1, as you ware looking for a quick reaction, and on the other hand, in rough seas, it can be turned up to 5 or 6. To understand how that works, you need to imagine a graph with peaks: the sensitivity adjustment is a horizontal bar, which goes down more or less, and which eliminates the peaks to smooth the signal. Anything above the bar will not be detected, and the height of the bar is set by adjusting the sensitivity.»