

TECNICA IL MONOCILINDRICO RECORD THE BIKE FIELD 24 SPECIAL FATTE IN CASA

# MOTOCICLISMO

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Su strada e in laboratorio

## PROVA INTERFONI

- ▶ Qualità audio
- ▶ Autonomia batterie
- ▶ Distanza di ricezione

## TURISMO

### VENETO

Ville palladiane  
e classici del cinema

### MOLLO TUTTO!

Vivere di solo viaggio

## 11 GRANDI TEST

**APRILIA** Tuono V4 1100 Factory

**BENELLI** TRK 502

**BMW** R nineT Pure - R nineT

**DUCATI** Scrambler Café Racer

**HONDA** CB650F - CBR650F

**HONDA** CB1100 RS

**HONDA** CMX500 Rebel

**MORINI** CORSARO 1200 ZZ

**YAMAHA** X-Max 300

**YAMAHA** SCR950

**YAMAHA** R6



COMPARATIVA CROSSOVER

# Effervescenti naturali

**KTM** 1090 Adventure vs **DUCATI** Multistrada 950

# SPEAKING INTO THE WIND

**We compared four of the most popular group communication intercoms on the market: Cardo Pack Talk, Cellularline Interphone Tour, Midland BT Next Pro, Sena 20S. We tested the autonomy, signal distance, ease of use and, above all, the audio quality, measured in wind tunnel tests.**

**In the next instalment, we will be taking a look at helmets with built-in intercoms.**

**We** have been observing the evolution of intercom systems with interest over the years. From the first generation of wireless models where communication between the driver and passenger was barely possible, there has been a giant step forward. If we are honest, however, we are still not fully satisfied with the performance offered by the products on the market, if you consider the purchase price as well. The concerns were due to good audio quality only up to limited speeds and batteries that lasted less than a day's travel (6-8 hours) and the difficulty of communication between two people. This is also why we have not done any comparison tests in recent years (the last one was in the 09/2013 issue of *Motociclismo*: since then we have had the opportunity to test various advancements and new models on the market, but only in individual tests. Now, we have succeeded in organising a sophisticated comparison which compares the best universal intercoms and those built-in to helmets (in the next issue). We can already say that progress has been made.

**APPS MAKE LIFE EASIER**

Why would a motorcyclist want to communicate while driving? To be honest, we are all well aware that this is a subject of contention: there are those who view a bike ride as an opportunity to "talk" to one another or, at least, with the passenger. Among leisure riders and those who like riding in groups, however, it is much more popular. Even though the biggest obstacle is that it is viewed as a technological device that is complicated to use. But this is where the

latest technology comes in and revolutionises everything and makes it all simpler. Firstly, the smartphone apps for managing intercoms now detect what we are doing "in real time" (choosing a song, a radio station, the person to talk to, etc.) via settings menus that are simple and intuitive. Obviously, to have everything under control while you are driving means you need a smartphone holder on the handlebars and "touch" gloves. However, it is more convenient to do some operations at a standstill (such as saving your favourite radio stations or setting separate volumes for each function, connecting new devices) and, once you head off, manage the few functions that are important directly via the control unit keys (or with voice commands).

**GROUP CHAT: A NEW ERA**

We recently launched a survey on the website *Motociclismo.it* precisely on intercoms, which has proved to be on trend and very popular (2,150 readers answered our questions). We know that most of you consider an intercom to be a device for the driver and passenger where excellent audio quality is required, plus a long battery life. However, there are increasing numbers who want to be participate in group chats. These people are part of a "new frontier" of communication. All the products, however, have attained excellent levels in two-way conversations.

When you read the results of this test, remember that we started from a fairly high standard. After all, we chose the top of reach manufacturer's range.

**AUDIO QUALITY: SO MANY VARIABLES!**

Audio quality also depends on how the speakers are positioned and on the helmet itself, if it is preconfigured or not to house an intercom. Don't think that the closer they are to your ears, the better the sound. In theory, we should go into a complicated explanation about in phase and out of phase sound waves, the sound box and the materials used for the shell of the helmet (a carbon helmet improves sound quality, etc.), but we don't want to put too many irons in the fire. Try putting the speaker of your phone flat on the table, in speaker mode, then try putting your hands around both it and the speaker. In the second instance, the voice will seem warmer, deeper and less metallic because you have amplified the low frequencies. Replicating this simple example on your helmet is not easy, but we know that you can play around with the thickness of the velcro or of the inner EPS shell. Every manufacturer, of course, makes a choice in the type of speakers to use. Given the limited amount of space to play with, the decision must be made about which frequencies to focus on: voice or music, basically. Even when making phone calls at 90 km/h (56 m/h) as a practical test, the person on the other end was always amazed to find out that we were talking while driving on the motorway.

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**"SOUND" SIMULATION**

In the photo, the author of the article is in the wind tunnel testing the intercom audio quality. The goal was to simulate the "noise" conditions encountered during road use. Luca Nagini is holding a list of words (used in Amplifon tests) to read "downwind" (110 km/h) to test if they can be heard at a distance or if they overlap.



# OUR TEST

For the most important comparison test on audio quality, we went to the Newton laboratory in Mazzo di Rho (Milan), one of the most sophisticated labs specialised in the certified testing and development of helmets, where Formula 1 helmets are tested as well. Our score card, however, also gives a grade for autonomy, overall size, weight and signal strength.

## AUDIO QUALITY



**THE "MOUTH" OF TRUTH**  
In Newton's closed circuit wind tunnel (with wind speeds up to 300 km/h), we used a binaural head, size 60, as per the EN960 standard, where the two microphones are fitted in each ear.  
The Newton lab has experience in performing similar tests for combat helmets where soldiers must be able to communicate with one another and distinguish the words perfectly without confusing the syllables. There are problems linked to reverberation where the syllables of a word tend to overlap, making them difficult to understand.  
So, the binaural head is given seventeen simple phonemes to "listen" to, chosen from a table, which gives three options per line of similar phonemes which are easily distinguishable, e.g. one word from LUMBER-DINNER - HAMMER We customised the test by placing two helmets (always the same ones) in the wind tunnel in which two intercoms had been installed for each brand. An actual person read the series of seventeen phonemes, first in static conditions and then, with a 110 km/h (about 70 m/h) wind speed. This is a tough test because at 110 km/h without aerodynamic protection, it was like being a Naked bike; the sound of the wind was really strong. In this way, we simulated real driving conditions with a combination of microphone and speakers, plus a background noise reduction software, incorporated into all the intercoms we tested.



## LISTENING TEST



**THE JURY'S VERDICT...**  
After the binaural head test, we obtained an audio file which we played to a sample audience. They had to guess the words spoken from the ones chosen and give an overall grade to each file they listened to. For our sample panel, we chose members of the editorial team, Motociclismo readers and staff working at the Newton laboratory. None of those interviewed, obviously, knew which brand of intercoms the audio recording came from.

## MEASURES



## AUTONOMY TEST



**RADIO BLASTING!**  
To test the autonomy, we connected the intercoms together and turned up the volume to the maximum. Each one "spoke" to the other devices, spread around the room, listening to the voice and the music coming from a radio that was on all the time. These are the best usage conditions for battery life because all modern intercoms have a software that can find out how far other users are away and adjust the signal strength as a result. The greater the distance, the higher the strength required.

**TAPE MEASURE AND SCALES**  
We weighed the entire system installed on the helmet: control unit, base clamp (adhesive), speakers and boom microphone. The overall size refers to the control unit fitted on the base clamp, with the antenna closed.



## TEST ON SIGNAL DISTANCE

**THE PILOTS BECOME "BRIDGES"**  
We chose a secluded road with no traffic, houses and electricity lines to minimise the variables, but with fixed obstacles, such as trees or gentle bends en route. The data far from the values declared should not come as a surprise because there is no standard in this sense. Each manufacturer can perform the tests as he prefers, even in the middle of a desert, without fitting the control units on a real person wearing a helmet. In four-way communication the two riders in the middle act as a radio bridge between the first and last. Even if the signal distance every two users is inferior to that obtained with two-communication, the final distance of the chain, between the first and last rider, will, however, be greater. The first rider stays still while the other three move away until the communication starts to break up, but is still good. At this point, the second motorcyclist stops and acts as a bridge, while the other two continue and repeat the procedure. When the communication starts to break up, the third rider stops and the fourth carries on alone. Each time a pawn is "lost", a coordinate is signalled with the GPS which gives us the distance at the end.



# CARDO PACK TALK

Single 329.95 Euros  
Double 549.95 Euros

### DATA DECLARED

- ▶ **SIGNAL DISTANCE** up to 1.6 km
- ▶ **AUTONOMY** up to 13 hours talk-time - 1 week in stand-by
- ▶ **FUNCTIONS** DMC intercom mode up to 15 users, Bluetooth 4-way intercom conferencing or 1+8 toggling, voice command (VOX), Bluetooth connectivity with two devices, Music Sharing, A2DP-AVRCP, call and navigator instruction sharing via intercom, universal intercom (Gateway), App (Cardo Smart Set) for remote control, parallel audio-streaming, customisable hot-dial number, FM radio with RDS: 6 preset station memory with auto-select of strongest signal, self-adjusting volume (AGC), Cardo Community platform

### DATA DETECTED

- ▶ **WEIGHT** 127 g
- ▶ **OVERALL SIZE (L/W/H mm)** 35 x 90 x 47
- ▶ **SIGNAL DISTANCE** 610 m
- ▶ **AUTONOMY** 10 h 20'

### OUR SCORE CARD

- ▶ **AUDIO QUALITY** ●●●○○
- ▶ **AUTONOMY** ●●●○○
- ▶ **GROUP COMMUNICATION** ●●●●●
- ▶ **EASE OF USE** ●●●●●



**PLUS**  
Latest DMC technology

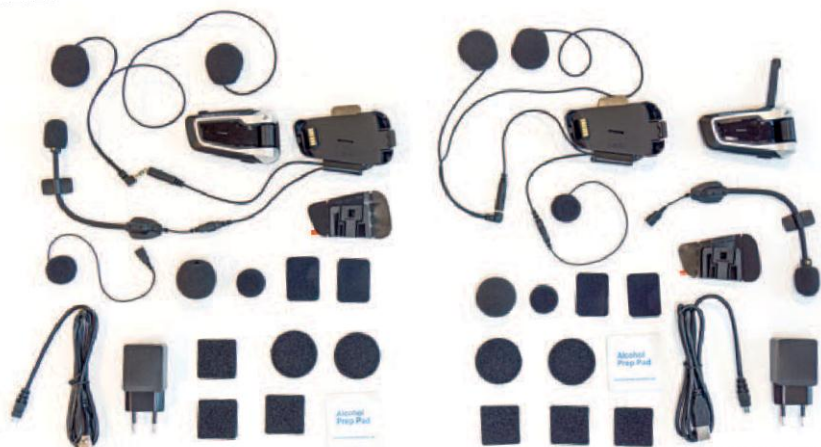
**MINUS**  
Autonomy

### COMPACT AND INTUITIVE

It is less bulky and the most compact. The base does not protrude outside the control unit which has a closable antenna (43 mm in length, 1.7"). The roller wheel selector is the easiest and most intuitive system for adjusting the volume and moving around the menus (intercom, phone, music) which are easy to find with. The box contains velcro fasteners, a double helmet clamp, a boom microphone and a microphone adhesive with replacement sponges, plus two micro USB cables and a mains charger. It gives you the impression of quality, from the care taken over the cables to the control unit-base attachment. Cardo has speakers that have a smaller diameter than the other three.

### A NEW WAY FOR GROUP COMMUNICATION

Cardo has developed a technology, called DMC (Dynamic Meshwork Communication), where each user is part of a virtual network that connects everyone separately. This means that each motorcyclist can enter and exit a group without compromising or interrupting the other riders' conversation. And, when put to the test, it works really well. As soon as the intercom is switched on, you are automatically connected to the group, without having to press a button or wait while the control units perform a search. And the group signal distance is significantly better compared to rival brands because each user acts as a bridge for the others. In addition to DMC mode, it can communicate via a classic Bluetooth "chain" connection and with different brands of intercom, share background music with other users (only within 10 m-33 feet), as well as navigator instructions. The audio quality is good, the voice commands work well, but it isn't easy to remember the names of the commands themselves. The Cardo battery has a slightly shorter life. Complete app which works well with remote controls and manages who to talk to.



# CELLULARLINE INTERPHONE

Single 269.00 Euros  
Double 489.00 Euros

### DATA DECLARED

- ▶ **SIGNAL DISTANCE** up to 1.5 km
- ▶ **AUTONOMY** up to 20 hours' talk-time - 1,000 hours in stand-by
- ▶ **FUNCTIONS** Bluetooth 4.2 intercom up to 4 users, voice commands (VOX), Music Sharing, A2DP-AVRCP, universal intercom (Anycom), App (Interphone) for remote control, auto reconnect, hot-dial to any phone number, multi-party intercom calls, Bluetooth connection, FM radio with RDS: 8 preset station memory with auto select of 8 with strongest signal, background radio during intercom functions (FM mix), self-adjusting volume, automatic connection with other intercoms (Genius Pairing)

### DATA DETECTED

- ▶ **WEIGHT** 125 g
- ▶ **OVERALL SIZE (L/W/H mm)** 27 x 88 x 55
- ▶ **SIGNAL DISTANCE** 180 m
- ▶ **AUTONOMY** 23 h

### OUR SCORE CARD

- ▶ **AUDIO QUALITY** ●●●●○
- ▶ **AUTONOMY** ●●●●●
- ▶ **GROUP COMMUNICATION** ●●●○○
- ▶ **EASE OF USE** ●●●●●



**PLUS**  
Ease of use

**MINUS**  
"Parallel"

### NO EXTERNAL ANTENNA

It is slightly bigger than average, but does not have an external antenna. You need to take care when installing it to avoid pushing the connector under the lower side of the helmet (otherwise, it may get damaged when you put the helmet down on a flat surface). Classic standard equipment (various velcro fasteners, double helmet clamp, boom microphone and microphone adhesive with replacement sponges, micro USB cable). However, there is no mains charger (the same one for mobile phones), which is replaced by two external, rechargeable batteries which are handier during a bike trip (and you can also recharge your smartphone since the battery life is so long). Ultra slim speakers.

### RECORD BREAKING AUTONOMY

The battery life undoubtedly stands out. We reached 22 hours of talk-time which was double the time compared to the other brands. Excellent audio quality and very convenient auto reconnect function when a user exits and then, re-enters the communication range. The latter is the most limited. It may be that the lack of an external antenna limits the signal distance. Very easy to use, although you need to remember the functions of all the eight large buttons, which are easy to find, even with gloves on. The ease of connection to Bluetooth devices, such as other intercoms, phones and navigators, is a definite advantage: just hold the power button down. A further three Tour Interphones can be connected in a chain by putting the four control units together. Group chat is limited to four users. It is easy to rapidly choose who to talk to via the app (A, B or A+B). There are some limits in parallel audio mode: when the navigator speaks, the intercom communication is interrupted, or you can only have background music or share a call between two users.



## MIDLAND BT NEXT PRO

Single 269.00 Euros  
Double 469.00 Euros

### DATA DECLARED

- ▶ **SIGNAL DISTANCE** up to 1.6 km
- ▶ **AUTONOMY** up to 10 hours' chat time
- ▶ **FUNCTIONS** Bluetooth 4.2 intercom up to 8 users, voice commands (VOX), Music Sharing, A2DP-AVRCP, Universal Intercom, App (BT set App) to adjust settings and Apps, (BTTalk) to communicate in intercom via phone, call and navigator instructions sharing in intercom, Bluetooth connectivity with 2 devices, FM radio with RDS: 6 preset station memory, AUX external audio input, self-adjusting volume (AGC), emergency led when braking

### DATA DETECTED

- ▶ **WEIGHT** 122 g
- ▶ **OVERALL SIZE (L/W/H mm)** 30 x 90 x 52
- ▶ **SIGNAL DISTANCE** 390 m
- ▶ **AUTONOMY** 10 h 30'

### OUR SCORE CARD

- ▶ **AUDIO QUALITY** ●●●○○○
- ▶ **AUTONOMY** ●●●○○○
- ▶ **GROUP COMMUNICATION** ●●●●○○
- ▶ **EASE OF USE** ●●●●○○



**PLUS**  
BT Talk System

**MINUS**  
Low audio volume

### IF YOU BRAKE, YOU "LIGHT UP"

Aerodynamic shape and external, fixed antenna which is small and semi-rigid (it only increases the overall height by 24 mm) The base clamp increases the overall height of the intercom mounted on the helmet to 84 mm (3/4") because it encloses the powerful red light that comes on during emergency braking, thanks to an internal accelerometer. The standard equipment (velcro fasteners, double helmet clamp, boom microphone and a microphone adhesive with replacement sponges, micro USB cable), you also get a mains charger for

### COMMUNICATION VIA INTERNET

Complete, ground-breaking product which does not excel in one point on the score card, but the big advantage of the communications feature, BT Talk via smartphone. The specific app creates an intercom conversation which uses the internet phone connection to communicate with other devices which use the same app, as if it were a VOIP (Voice Over IP) call on applications, such as Skype or WhatsApp. Clearly, this means there is no limit to the communication distance: all you need is a phone network. Remember that you can only talk one at a time, by making a request on your smartphone or on the optional handlebar control. Apart from that, the intercom is managed via a menu that changes the function by pressing a button (the name of the function is announced: radio, phone, intercom, music). Unlike other intercoms, there is no specific physical button for each function. The one-touch option for connecting to all devices in "conference" mode is handy. The audio quality suffers from the limited maximum volume level.



## SENA 20S

Single 349.00 Euros  
Double 649.00 Euros

### DATA DECLARED

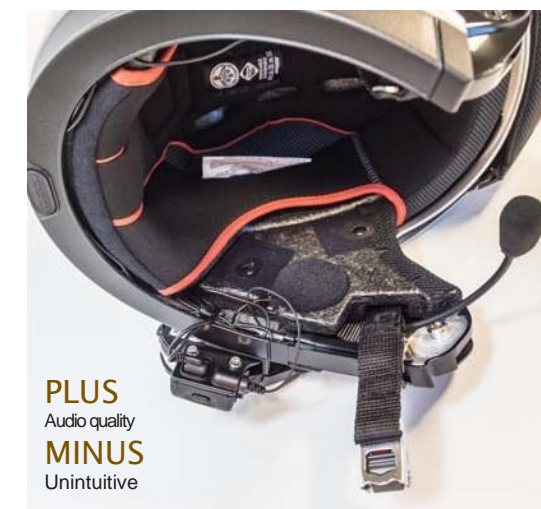
- ▶ **SIGNAL DISTANCE** up to 2 km
- ▶ **AUTONOMY** up to 13 hours' talk-time - 10 days in stand-by
- ▶ **FUNCTIONS** Bluetooth 4.1 intercom up to 8 users, voice commands (VOX), FM radio-GPS instructions-music sharing (Audio Multitasking), A2DP-AVRCP, auto reconnect, Universal Intercom, App (SENA) for settings adjustment and remote control, connectivity with two Bluetooth devices, FM radio with RDS: 10 preset station memory, AUX cable, Intelligent Volume, Advanced Noise Control

### DATA DETECTED

- ▶ **WEIGHT** 155 g
- ▶ **OVERALL SIZE (L/W/H mm)** 30 x 93 x 46
- ▶ **SIGNAL DISTANCE** 420 m
- ▶ **AUTONOMY** 11 h

### OUR SCORE CARD

- ▶ **AUDIO QUALITY** ●●●●○○
- ▶ **AUTONOMY** ●●●●○○
- ▶ **GROUP COMMUNICATION** ●●●●○○
- ▶ **EASE OF USE** ●●●○○○



**PLUS**  
Audio quality

**MINUS**  
Unintuitive

### COMPREHENSIVE STANDARD KIT

Ample range of standard equipment (which in part justifies the high price). For every intercom, you get three microphones: strip adhesive, boom with velcro and a second, longer microphone boom which is fixed to the control unit base clamp. In Jet helmets, you don't have to dismantle the inner padding because the boom can pass on the outside. An AUX cable is also supplied to connect an audio device and a cigarette charger (but not a mains charger, just a micro USB cable). The design features large roller-buttons for all adjustments. The closable antenna measures 58 mm; the base is very bulky, so the total height is 138 mm and it weighs 155 g.

### BULKIER SPEAKERS

The focus is on audio quality which is excellent. It has bigger, thicker speakers than its competitors and a proprietary software which cuts down background noise. HD audio (for use in wind tunnels) can only be enabled for two-way conversations which cuts down the signal distance, but the quality was excellent even in the practical 4-way communications test. It should also be pointed out that the volume can be set very high, higher than any other. The adjustment knob is practical, but very sensitive. It was the hardest to understand how to use. To change function and control different settings, you are required to combine or hold down a series of keys that are difficult to remember. Fortunately, the app is extremely comprehensive and allows you to manage everything more simply (it even includes a 75-page manual!). The 20S intercom, however, is relatively easy to connect for 4-way communication. The signal distance is good.



# CLASSIFICATION

## Cellularline

points  
23

Extremely easy to use, excellent audio quality and "limitless" battery life (twice as long as the other brands). Unbeatable in two-way communications, with some limitations in group chats due to the signal distance.



## Cardo

points  
21.5

A revolution in group communication: just switch it on and forget about it. You are "on the net" immediately: enter and exit the signal field (the best) without interrupting the other riders. Easy to use, small and compact. Slightly shorter-than-average battery life.



## Sena

points  
21.5

Superior audio and equipment (the price as well). It works very well in group chats, but it is not easy to learn how to get maximum use out of the customisation options (very high number).



## Midland

points  
18

Similar to its competitors in "classic" mode, but with the possibility of communicating via a smartphone app. Almost unlimited distance and number of participants, with the sole limit of having to talk one at a time, but only in this case.



### OUR CALCULATIONS

The final score for each intercom tested is the sum of the grades obtained in each entry on the score card. A grade that was the equivalent of the other three together, however, was given to the audio quality. So, if a product were to obtain a 3 in group chats, a 3 in ease of use, a 3 in autonomy and a 3 in audio quality, the calculation would be: 3+3+3+(3x3).

*Continues from page 70*

This is because of the superior ability to filter out the wind noise (some more, some less).

### WHAT ABOUT AUTONOMY? IT DEPENDS ON THE CHIPSET

When it comes to the battery, rather than increase its capacity and size, the focus was on cutting down consumption by the control unit by using new low consumption chipsets and working on management software. Intercoms can detect the distance from the other devices they are connected to and consequently, adjust the signal strength they produce. The autonomy between driver and passenger will be greater than the same pair of intercoms used by two riders on two different motorbikes (bigger distance, therefore).

For group chats, the best performing chipsets allow multiple functions at the same time or perform an auto scan to detect who is outside the range and a single key to connect everyone. Only Cardo has truly evolved in this sense. The others still work with the "chain" logic by communicating with Bluetooth signals which is a standard that was developed to only connect two

devices at a time (of any type). To obtain multiple connections, you need multiple Bluetooth channels. Our intercoms have two, so they communicate along the lines of A talks to B, B talks to A and to C at the same time. So, B acts as a bridge to allow A to also communicate with C. If a fourth person D is added, he must connect with C who at this point communicates with D, but also with B at the same time. B and C have dual communication and act as a bridge so A and D can also talk. Obviously, B and C consume more power than A and D. In this chain, if B or C exits, the communication is lost between A and D because they have no direct connection. Consequently, they must stop and recreate the connections between the three remaining devices. Lastly, as far as range is concerned, there has not been much improvement with respect to the past. We know that the maximum signal distance stated by the manufacturer is the equivalent of the fuel consumption declared for a motorbike. The ideal conditions in which tests are carried out do not equate to real life. We did the tests on a mixed route with natural obstacles. It goes without saying that the signal strength emitted by intercoms can only be increased so much because they are devices that are positioned close to the brain, so precautions must be taken. **M**