

CHALLENGER OF RECORD & DEFENDER

AMERICA'S CUP 36

Interpretation 069

of

AC75 Class Rule Version 1.16 issued 30th September 2020

Rule References:

- 23.1 Electric or electronic components or circuits are permitted only as:
- (a) part of an **ECC, ILS, or CIS**;
 - (b) standalone **crew indication devices**, such as wristwatches, that are incapable of measuring or receiving any part of the **yacht state**;
 - (c) standalone **hardwired** cameras and screens mounted on the **yacht** to aid visibility of different parts of the **yacht**, providing no information other than raw audio and video from the **yacht** is transmitted, played or displayed;
- 23.5 A **crew indication device**:
- (b) must be incapable of measuring any part of the **yacht state**
- 26.2 The **CIS**:
- (a) shall be incapable of measuring any part of the **yacht state**;
- 26.3 As an exception to Rule 23.5 (b), **crew indication devices** in the **CIS** containing sensors such as accelerometers or solid-state gyroscopes may be considered incapable of measuring any part of the **yacht state** by
[...]
- 35.10 **CIS**
Crew information system: an electronic system connected to the **Media System** to display the raw or processed **Competitor** data output from the **Media System** to the crew, and to provide voice communication between the crew.
- 35.20 **Crew indication device**
Any device that:
- (a) contains an electronic system, or is connected directly or indirectly to an electronic system;
 - (b) displays or plays audibly information that it has received or generated internally;
 - (c) is worn or installed on the **yacht**;
 - (d) can be seen or heard by the crew, directly or indirectly; and
 - (e) may process data internally,
such as a display, LED or speaker.
- 35.109 **Yacht state**
The specific condition of the **yacht**, comprising all of the following:
- (a) the position and orientation of the **yacht** in space;
 - (b) the position and orientation of any **control surface**;
 - (c) the position and orientation of a **foil**;
 - (i) the water or wave height or velocity relative to the yacht;
 - (l) all quantities from which the above can be derived or approximated.
- 35.40 **Force input device**

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A device that is moved by one or more crew members to provide control and/or power input, and whose movement, resistance to movement or response can, where expressly permitted within the **AC75 Class Rule**, be affected by certain parts of the **yacht state**. Examples are a sheet or winch connected to a sail, a grinding pedestal connected to a mechanical drive train or hydraulic pump, and a helm wheel connected through cables to a **rudder**.

35.87 Passive input device

A device that is moved by a crew member to produce an electrical control signal, where that control signal relates only to the crew member's manual input and is not significantly affected by the **yacht state** (except for unintended manual input caused, for example, by a crew member falling on to a button). Examples are buttons, joysticks, sliders or touch screens.

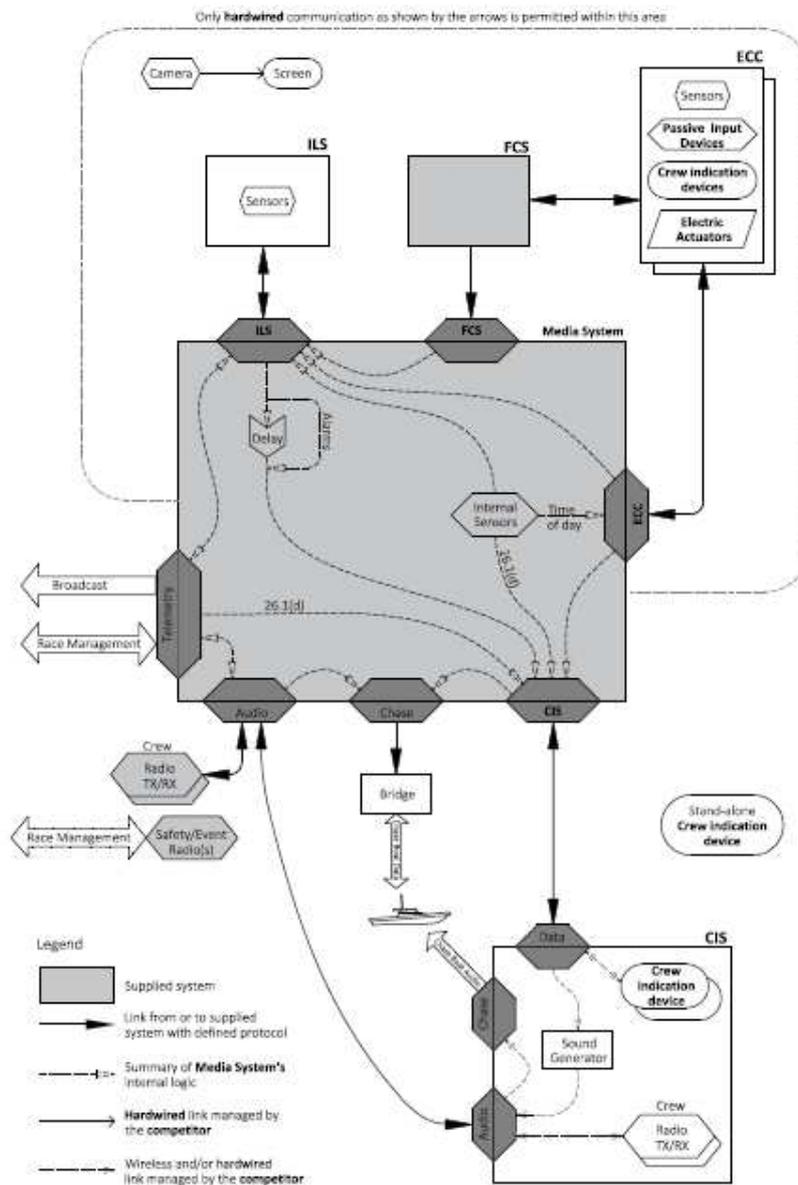


Figure 23.1: Permitted communication between electronic systems

Questions:

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1. A camera and screen are connected together, in isolation from other electronic systems, as described by Rule 23.1(c). The camera is attached to the **yacht** and is filming the horizon or the sea surface such that the position and/or orientation of the yacht relative to the horizon or the sea surface is estimable from the screen that is wired to the camera.

If the primary purpose of the camera/screen arrangement is to estimate or measure the position and/or orientation of the yacht relative to the horizon or the sea surface, does it satisfy the condition in 23.1 (c) of being “to aid visibility of different parts of the yacht”?

2. The screen described in question 1 is mechanically connected to, or overlaid with a **passive input device** (or to a component which is mechanically connected to such a device). By moving the screen or the device to somehow align or position the image of the horizon on the screen with the device or some reference mark or line, the crew can effectively measure and pass the position or orientation of the horizon, relative to the **yacht**, to the ECC.

Does the camera/screen arrangement satisfy the condition in 23.1 (c):

- a. of being “to aid visibility of different parts of the yacht”?
 - b. that the camera/screen arrangement is “standalone”?
3. The screen described in question 1 is mechanically connected to, or overlaid with a **force input device** (or to a component which is mechanically connected to such a device). By moving the screen or the device to somehow align or position the image of the horizon on the screen with the device or some reference mark or line, the crew can effectively measure and pass the position or orientation of the horizon, relative to the **yacht**, to a **control system** connected to the **force input device**.

Does the camera/screen arrangement satisfy the condition in 23.1 (c):

- a. of being “to aid visibility of different parts of the yacht”?
 - b. that the camera/screen arrangement is “standalone”?
4. The screen described in question 1 is overlaid with reference marks or lines, for example, printed lines on the screen. The camera is connected to a **passive input device** or a **force input device**, such that the crew is able to provide input to a **control system** by rotating the camera. By orienting the camera to align or position the image of the horizon on the screen with the reference marks or line, the crew can effectively measure and pass the position or orientation of the horizon, relative to the **yacht**, to a **control system**.

Does the camera/screen arrangement satisfy the condition in 23.1 (c):

- a. of being “to aid visibility of different parts of the yacht”?
 - b. that the camera/screen arrangement is “standalone”?
5. A camera and screen are connected together, in isolation from other electronic systems, as described by Rule 23.1(c). The camera is attached to the gunwhale of the yacht and directed outwards, capturing within its view a foil and foil arm, and the race course beyond the yacht. The purpose of the camera is to provide visibility of the foil and the race course to crew on the other side of the yacht whose view is blocked by the mainsail. In a boat-on-boat crossing situation, it helps to remove a ‘blind spot’ by allowing a helmsman on the windward side to see an approaching yacht. Is such an arrangement permitted by 23.1 (c)?

Interpretation:

In the absence of an appropriate definition from the OED, the RC concludes that “standalone hardwired cameras and screens...” means that apart from the provision of electrical power and mounting on the **yacht**, the camera and the screen have no connections other than to one-another. This prohibits any kind of system (electronic, magnetic, mechanical, ...) to be used in conjunction with the camera or screen, including to measure the position or orientation of the camera, of the screen, or of images appearing on the screen. Rule 21.9 further limits the use

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of the camera/screen. The camera/screen are not part of the **ILS** and so may not be used to measure the height of the **yacht** above water.

Answers:

1. No.
2.
 - a. No.
 - b. No.
3.
 - a. No.
 - b. No.
4.
 - a. No.
 - b. No.
5. Yes, the system described is to “aid visibility” of a part of the **yacht** which is obscured to the helmsman, and the environment beyond it. This is different from the scenarios described in 1-4, where the system was not to “aid visibility” but to provide specific, quantifiable position and orientation information.

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