

APPENDIX I — MEDIA AND RACE COMM EQUIPMENT

1. GENERAL

- 1.1 The media and Race Committee equipment for the **AC Class Yacht** will be supplied by ACTV (the department of **ACEA** that manages the broadcast of America's Cup racing). This equipment consists of four main systems; TV and audio; tracking; Race Officer Communications; along with biometric and data capture.
- 1.2 The weight and centre of gravity of the equipment will be equalized between the yachts in a race as directed by the **Measurement Committee**.
- 1.3 **Competitors** shall provide all reasonable access to their **AC Class Yacht** for ACTV to install, remove, inspect, or service equipment, including but not limited to adjusting haul out or launch schedules if required.
- 1.4 **Competitors** are not permitted to have additional visual media recording devices on board when racing.
- 1.5 **Competitors** are responsible for the supplied equipment whilst installed on their **AC Class Yacht**. Replacements for damaged, lost or additional equipment must be purchased from ACTV or from a vendor approved by ACTV.
- 1.6 The detailed CAD files of the components and their locations on the **AC Class Yacht**, referenced in this appendix shall be available to each **Competitor** on the shared Google drive.
- 1.7 ACTV will specify and supply a set of components to be installed on each **AC Class Yacht**, including but not limited to:
 - (a) Forward Media Sprit;
 - (b) Port and Starboard Media Bays;
 - (c) Aft Media Post;
 - (d) Wing Tip Antennas;
 - (e) Brackets for Cameras and Battery Peli-cases; and
 - (f) Media Cables and Harnesses.
- 1.8 The ACTV supplied equipment may be freely modified by ACTV as required but may only be modified by the **Competitor** with the prior written approval of ACTV and the **Measurement Committee**. Examples of modifications requiring this permission include but are not limited to the following:
 - (a) Drilling of holes, other than specified on the drawing/CAD file for mounting the components;
 - (b) Removal of material;
 - (c) Lamination or bonding onto the ACTV supplied equipment;
 - (d) Attachment of fairings;
 - (e) Attaching **Competitor** owned equipment to the ACTV supplied equipment; and
 - (f) Equipment positional changes.
- 1.9 **AC Class Yachts** may access the streaming data that is sourced from the ACTV supplied equipment located in the starboard media bay. Details of the data protocol will be posted on the Official Noticeboard.
- 1.10 **AC Class Yachts** shall provide data as specified in Protocol Article 42.3 via a cable(s) to the starboard media bay. Details of data and data protocols for this purpose will be posted on the Official Noticeboard.
- 1.11 Any ACTV equipment that is prescribed to be carried on the crew shall not be included in the weight limit described in Rule 17.3.

2. CABLING

- 2.1 **AC Class Yachts** shall have one full set of media cables and harnesses that is supplied to each **Competitor** by ACTV. Cables are supplied in the form of pre-made harness /looms.
- 2.2 ACTV shall install the supplied cabling as per the cabling routes detailed in in CAD file ACC-11500. This includes attaching mounting hardware used to secure the cable runs. **Competitors** shall ensure equipment or systems do not interfere with these cabling routes.
- 2.3 Cable runs, access holes and conduits/socks associated with the media cables are for the sole use of the ACTV supplied equipment and shall not contain **Competitor** equipment unless specifically authorized by ACTV and approved by the **Measurement Committee**.
- 2.4 Cable runs, raceways, interconnects must be readily accessible for installation and service by ACTV technicians.
- 2.5 Where a cable sock is detailed, it is the **Competitor's** responsibility to supply and install in advance, and ensure that the minimum pass diameter (as detailed in the applicable CAD file) is observed for:
 - (a) Wing;
 - (b) Forward Media Sprit;
 - (c) Media Pods;
 - (d) Aft **Cross Structure** beam; and
 - (e) Forward **Cross Structure** beam.

3. FORWARD MEDIA SPRIT

- 3.1 An **AC Class Yacht** will be fitted with a two-part forward Media Sprit, that attaches to the bowsprit outboard end as detailed in CAD file ACC-11300. The extension is designed to support an outboard end point load of 85 kg.
- 3.2 The Forward Media Sprit shall remain in place for all daily and routine operations, including but not limited to wing in/out and yacht launching / recovery. The Forward Media sprit shall only be removed from its position on the yacht with the permission of either ACTV or the Measurement Committee.
- 3.3 Provision has been made to accept an approved **Competitor** supplied forward facing wind instrument, this is in the form of a 25mm x 25mm ID socket, details supplied on CAD file ACC-11300. Cables for the wind instrument may be routed inside the media sprit, alongside the media cables.

4. MEDIA BAYS

- 4.1 **AC Class Yachts** shall have two Media Bays positioned behind the forward **cross structure** beam and either side of the central pod as detailed in CAD file ACC-11100.
- 4.2 **Competitors** will be responsible for mounting and supply of additional mounting hardware as specified in the CAD file.

5. AFT MEDIA POST

- 5.1 **AC Class Yachts** shall have an Aft Media Post attached directly behind the aft **cross structure** beam on the **yacht centerplane** as detailed in CAD file ACC-11200.
- 5.2 **Competitors** will be responsible for mounting the Aft Media Post (including any additional mounting hardware) as specified in the CAD file.
- 5.3 ACTV may add temporary antennas onto the Aft Media Post. The temporary antennas can be used when there are problems with the ACTV antennas mounted on the wing tip. If temporary antennas are used in a Match Race, the **Measurement Committee** will ensure that the antennas are installed on both yachts. If the temporary antennas are required by ACTV, they shall not be included for **measurement condition**.

6. CAMERAS

- 6.1 **AC Class Yachts** shall have up to: 4 HD agile cameras; 3 POV/Effects cameras and a 360deg camera (as determined by ACTV). Furthermore, crew may be required by ACTV to wear a camera with associated transmitter and power pack.

- 6.2 ACTV may mount agile cameras at the following locations:
- (a) One mounted on the Forward Media Sprit;
 - (b) Two attached to the aft face of the forward **cross structure** beam, either side of the **yacht centerplane**. These shall be positioned to allow for filming of the crew, with each location being 1.2m-2.2m from the **yacht centerplane**; and/or
 - (c) One mounted on the Aft Media Post.
- 6.3 Each agile camera:
- (a) Has an adapter base plate that the camera is locked into for operation. The adapter base plate will be required to be secured to the yacht's structure or to an additional bracket in a position approved by ACTV;
 - (b) Will be connected via a coaxial cable with a molded connector to the media module. The minimum pass diameter for cable access to each camera is 22mm; and
 - (c) May have camera wash bottles added to cameras as required. If they are installed, details will be made available.
- 6.4 Point of View Cameras may be positioned:
- (a) Underslung to the Forward Media Sprit; and/or
 - (b) In an outboard location on each **hull**, in line with the **wing rotation point** (+/- 500mm) approximately 50mm above local deck level.
- 6.5 A 360-degree camera may be positioned on the Aft Media Post.
- 6.6 A body worn camera and associated electronics/antennas to control, power and transmit the signal, may be positioned on crew with additional hardware associated with this camera located in either the port Media Bay or the central pod alternative battery position.
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7. MICROPHONES

- 7.1 **AC Class Yachts** shall carry a combination of individual crew microphones and mounted effect microphones.
- (a) Wireless microphones shall be worn by up to four ACTV designated crew. The transmitter shall be located in dedicated pocket (refer RRSAC 40.1(e)). ACTV will require the microphone to be external to the pocket, attached to the outermost layer of clothing and positioned to provide a clear voice signal from the individual crewmember.
 - (b) One custom effects microphone module, located beneath the agile camera mounted on the Aft Media Post.
 - (c) An additional 2 effect mics can be positioned on/in the platform.
- 7.2 **AC Class Yachts** shall have a cable to provide a Line Out (ideally -10dBv) from the Competitor onboard crew communications system to the port Media Bay.
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8. PLATFORM MOUNTED BATTERY CASES

- 8.1 The media Battery Peli-case's primary location is in the starboard Media Bay.
- 8.2 An additional Battery Peli-case may be also mounted in either:
- (a) The port Media Bay; and/or
 - (b) The central pod as detailed in CAD file ACC-11145.
- 8.3 Each yacht shall be designed to allow the ACTV technician to install and remove the Battery Peli-case (weight between 17-22kg) in an efficient and safe manner.
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9. WING TIP INSTRUMENTS AND RF EMISSIONS FROM TEAM EQUIPMENT

- 9.1 **AC Class Yachts** shall have two Wing Tip Antennas, located at the top of the wing, as agreed by ACTV and the **Measurement Committee**. The minimum distance between antennas is detailed in CAD file ACC-11400.

- 9.2 The Wing Tip Antennas and filter/ubiquity (as detailed in CAD file ACC-11412) shall remain in place for all daily and routine operations. The Wing Tip Antennas and filter/ubiquity shall only be removed from their position on the yacht with the prior permission of either ACTV or the **Measurement Committee**.
- 9.3 Unless specifically permitted or required by ACTV, no other devices producing radio emissions of any type are permitted atop the **wing** or in any other location on the **wing** that might interfere with the operation of the ACTV supplied equipment.
- 9.4 Wind instrumentation at or near the top of the **wing** is permitted, but the specific installation must be submitted to ACTV for approval. If a MHU is used this must be RF Transparent, e.g. made of Kevlar or fiberglass for the first meter above the top of the wing
- 9.5 Wind instrumentation at or near the top of the **wing** shall not utilize wireless telemetry.
- 9.6 **Competitor** electronics that emits RF energy shall require prior consultation with ACTV. Teams shall provide ACTV with details on the frequency, bandwidth, power level, antenna gain, antenna pattern, and antenna locations, and make the proposed equipment available to ACTV for test to confirm that there will be no interference with ACTV supplied equipment. No emissions in the 2.4 GHz Wi-Fi band in channels 1-4 will be permitted.
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10. BIOMETRIC DATA, AND YACHT DATA

- 10.1 It is the intention of ACTV to collect individual crew biometric data during racing, for use within all form of output/broadcast such as live, highlights, news, streaming, ACAApp etc.
- 10.2 **AC Class Yachts** shall carry a combination of individual crew biometric devices and mounted devices that are supplied by ACTV, including:
- (a) An Ant+ chest strap or a Zephyr BioHarness shall be worn by ACTV designated crew. ACTV intends to collect heart rate, heart rate variability, breathing, body temperature, G Forces, calorie burn, and exertion information. If required by ACTV, Competitors shall provide additional information such a age/height/weight to enhance the data collected;
 - (b) A receiver shall be located on the Aft Media Post;
 - (c) Winch handle speed/cadence sensors and winch shaft speed/cadence sensors may be attached on or near the winch pedestals and winch shafts. Such sensors shall be attached temporarily and without any change to the local structure; and
 - (d) Other equipment to be determined and notified by ACTV.
- 10.3 The ACTV biometric system will be a priority over **Competitor** systems (such as ANT+ multi receivers, BT point to point). **Competitors** may access the biometric data feed via a CAN based line out from the receiver.
- 10.4 Final details of this biometric data system will be posted on the Official Noticeboard three months prior to the first race of the America's Cup Qualifiers.
- 10.5 The additional data as requested by ACTV to enhance all forms of the output/broadcast, such as live, highlights, news, streaming, ACAApp etc can be supplied via:
- (a) Instrument data via the TCIP onboard streaming data interface;
 - (b) Ant+ to the Biometric receiver;
 - (c) Serial RS232 interface(s) for 15.2 or 15.3 data fields; and/or
 - (d) Other as approved by ACTV.

The detailed requirements will be posted on the Official Noticeboard.

11. RACE OFFICER COMMUNICATION EQUIPMENT (RO-COMMS)

- 11.1 **AC Class Yachts** shall have the RO-Comms package consisting of:
- (a) Two display modules consisting of a display and 3 push buttons with accompanying small LED indicators. These display modules shall be positioned near the helm position (one each side of the yacht). The final location to be determined by each

Competitor provided it meets ACTV approval. Enclosure supplied by **Competitor** as details provided in ACC-11700;

- (b) Aft Media Post Indicators of flashing LED's modules (blue, red and green);
 - (c) An amber course limits indicator and blue penalty indicator mounted on the Port and Starboard Media Bays;
 - (d) A green light located under the forward camera position; and
 - (e) Other equipment to be determined and notified by ACTV.
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