

## EQUIPMENT LIST 5-4-17

- Backup – 4-channel DVR can be used to monitor slalom (gate/EC/boat, jump, tricks): Caution on type of video output (most new DVR HDMI/VGA output) and playback.
  - Model ECOR 264 4F1 4D1 or 4F2: (older models)  
(4=4 input channels, F means without DVD, D=DVD;  
1 series older and 2 Hi-Resolution: both have VGA out and BNC out (main): With BNC video out, you can go straight to capture card, with playback.
  - ECOR960 or 970-4F/1T2 (\$312 B&H Photo): Hi-Resolution, but the VGA/HDMI is main output, BNC is the Call output: Therefore, works for slalom – VGA/HDMI out to TV. If using this model 960/970 for jump requires a VGA/HDMI to RCA converter.
  - ECOR DVRs playback goes back 60 sec, but works well for slalom/jump.
  - Model IDT-DVR8/D1 – This model has a knob to view backward/forward, which makes it easier. Costs more.
  - DVR Requirement
    - 30fps per channel for slalom, 15fps jump acceptable.
    - Hi-Resolution 704x480
    - All recorded video should have a minimum resolution of (NTSC:704x480 - PAL:704x576)
  - **Caution: When purchasing a DVR ensure that the playback is acceptable, several DVRs do not have a quick way to “rewind”. And that it has BNC (analogy) MAIN Output (required for jump). CALL Output cannot be used. If MAIN output is HDMI/VGA, requires HDMI/VGA to RCA converter for jump/analogy capture card.**
- Jump and Trick Computer – Bob Corson – Programs are free and can be downloaded from AWSA Webpage, under TC Resources. Requires XP operating system/computer. Programs will not work on WIN 7/8/Vista operating system. (New version should be out this year).
- SplashEye – Slalom/Jump and Trick – Donal system uses Win7/8 Operating System. The slalom does have an option to track boat path.
- Felix Loreto – Jump/Trick program.
- Boetcher – Jump program.

Grid and setup for Loreto and Boetcher are similar to meters setup. Corson and SplashEye are similar using pixels in a grid to measure distance.

### EC Camera:

- Security camera (1/3 CCTV box camera, CS mount non fix lens) is most common. Recommend getting 12/24V- these cameras can take either voltage. If running cable a long way, use 24 v power supply)
- Security camera with fix variable lens (need to ensure lens will cover area (ex Samsung model SCZ-2370N)

- An adapter can be purchase to mount an older camera zoom lens to a C or CS mount on a security camera. Example B&H (NY) has an adapter part# VA301 for \$35 that mounts an older Canon Lens FD to CS Mount. The lens needs to be “fixed aperture” and not auto or electronic.
- Lens: any where from 150 to 300mm will work for most sites.
- Dave Clark has some modified cameras that will fit in regular size security box.
- Pelco Model EH4718 is large enough security box for any lens/camera to fit. A plastic Breadbox can also be used to protect camera/lens.
- If using CAT5, use baluns: Muxlab # 500024 (2 wires video, 4 wires power). Recommend using 24V (This is acceptable up to 1500ft, if longer, may need to add a booster for video).
- If running Cat 5 between 1600 and 4000 ft, Use AVB1 Active Balun, Power Transmitter / Receiver (requires 12 V each end).
- Coax for Video and 2 pair (16 gauge) for power/local power at EC Camera.
  - Caution: Some coax (underground) will float.

### **Gate Camera**

- Camera, same as EC camera (12/24 v)
- Security camera with 10-100mm lens (depending on site)  
CS mount lens up to 100mm are standard
- Pelco security box for camera housing
- Cat 5 use baluns: Muxlab # 500024 (2 wires video, 4 wires power), IF using 12V, can use one 15V power supply (power loss).
- Coax for Video and 2 pair (16 gauge) for power.
  - Caution: Some coax (underground) will float.

### **Gate/EC Transmit signal:**

Several methods of transmitting signal back to judges.

Hardwire is the best method.

- 1) CAT 5 cable with Balun on each end; this provides power and transmits signal over one cable (small/compact) (Recommend baluns: Muxlab # 500024).
- 2) Siamese Coax (coax w 2 16g wire) also provides power & transmit signal over one cable (Recommend for permanent installation).
- 3) Standard Coax and run 2 conductor #16 wire along beside for power
- 4) Standard Coax with battery at camera for power supply.
- 5) Wireless may work well at some sites and others will not work at all due to high power transmission line or other frequency interferences. One type is Omni Direction 2.4 GHz transmitters/receivers. Another is Wi-Fi. See Transmitting from boat below.
- 6) Everfocus Palun- (Powered Video Balun) which can transmit both power and Digital IP video signal over COAXIAL cable (500m)- For upgrading camera to IP (720 resolution) using your existing coax cable.

### **Boat Camera (slalom/tricks)**

- Some of the new hand held camera do not have RCA out, only HD out, therefore, need HD converter to RCA.

- If using a pylon setup, a security camera can be used if transmitting out. A 4mm lens is not zoom in for longer lines; 6mm is zoom in too much for short lines (41off). Need a 5 or 5.5mm. Current using 4mm IP camera.
- Wi-Fi can use IP camera- Example HIKVISION Model DS-2CD2023-1 4MM
- I-Phones have an APP that can be used to turn/off camera based on speed/gps coord. Used for specific application (slalom).
- Hand Held: *JVC Everio MS120/Kodak PlaySport Zx3*

### **Transmitting from Boat:**

- Omni 2.4 GHz Transmitter/receivers – Pending on area how well this works. Could have interference.
- Note: 2.4GHz -longer range than 5Ghz, 5GHz is faster.
- Digital Transmitter/receivers work the best for T/R example <https://www.protectiondepot.net/High-Power-Digital-Transmitter.html>
- Wi-Fi—air MAX-CPE- Bullet M / Pico Station M2HP (UBQuiTi)(www.UBNT.com) Setup as Bridge/Client. Use Hi Gain Antenna on the boat. Use computer (Ethernet to receive the video on shore. IF required convert and send to DVR or capture in the computer for review/playback, see converts section)
- Antenna- End of Lake use 2.4Gh Direct Antenna 12dbi example TP-LINK model TL-ANT2414A end of cable is SMA that will go directly to M2HP but will need a SMA to N if going to Bullet M.:  
Middle of lake (judges tower) use TP-LINK model TL-ANT2412D This antenna has N connector that goes directly on the M2 Bullet Wi-Fi.
- Antenna cable: from antenna to Pico Station would require N male end connector to RP-SMA Male (approx. 2 meter long).
- Boat Camera is IP camera to connect to Pico Station
- Place the Receiver close to water (approx. 2 feet off water) and in middle of course. For the best signal, use a Hi Gain antenna at the end of lake (EC).
- Antenna Mount- Use RAM mount (1" ball) to mount antenna to boat windshield. (RAM-B-108BU, RAM-B-201U, RAM-B-121BAU)



## **JUMP Camera:**

- Same as above (Gate/EC) (Resolution should be 720 + if getting new cameras).
- Recommend if using BC or Splasheyeye System:
- Lens 5mm to 60mm covers most sites.
- Cameras- PTZ Example: "Swann PRO-752 Dome/, RS242 PTZ" (remote or thru DVR)
- PTZ Camera- IntelliSecu 7" 27x Optical 1000 TVL (CS-AHAA710) (approx. \$330)
- Balun Muxlab "500022" (2 wires for video, 2 wires for power, 2 wires PTZ) thru Cat 5 cables. Recommend using 24/12V converter at camera to allow 24V power supply to be used for all cameras.
- PTZ can be controlled via computer software, DVR or remote. (Remote can be done at the pole or at the computer.)
- Balun: Muxlab # "500024" (4 wire power, 2 wires video) for non PTZ cameras.
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## **CAPTURE device (XP computers/ analogy input):**

- Desktop – "ATI All in Wonder Pro PCI TV Tuner/Capture" (requires adapter cable)
- Desktop – "ATI TV Wonder VE TV Tuner/Capture Card (PCI)"- does not require adapter cable. (this may or may not work for tricks (30fps- pending on your computer, works very well for jump at 15fps)
- Laptop – "ATI TV Wonder USB2.0" (external power 6V)
- Laptop – "Pinnacle HW-SET DVC100" (color white –for WinXP).

## **Tricks**

- Capture computer with Trick Timing Program.
- Computer (Win 7/10) with HDMI output/USB SD Card Reader (save from SD card to computer, rename and play) (A batch file that auto copy files, open and delete the files from SD card is available)
- Handheld Camera SD Card Reader. (if mini SD card, need adapter).  
*JVC Everio MS120/Kodak PlaySport Zx3/Sonny*
- HDMI splitter and converter listed below. Use HDMI to S-Video output for best quality to timer computer. Or use VGA splitter/converter listed below.
- If using camera to play video, output RCA -one to timer computer and one to TV for judges (Note for Records, the video from the SD card is required along with the file from the timer computer).
- Splasheyeye computer capture card/program.
- Splasheyeye has free software can be used for timing tricks capture on SD card. Also QuickTime can be used also, but QuickTime for Record tourn is in frame counts, Class C can use seconds.

## **CONVERTERS/SPLITTERS**

- Digital:
  - HDMI splitter: Monoprice, PN# 8154 1x2 HDMI® Amplifier Splitter, (Tricks Splitter- Sending HD video out of computer used to play the SD

card; INPUT (from computer to HDMI Spitter, OUTPUT 1 to TV for judges, OUTPUT 2 to analogy converter to trick timer computer. (\$30)

- HDMI to Analogy Converter (RCA): “1080P HD 3RCA AV CVBS Composite & S-Video R/L Audio to HDMI Converter Adapter” (\$30)  
(used to converter HDMI output to analogy for Trick Timer Capture Card( BC or Splasheye) or from computer to DVR when using WiFi from boat.
- Analogy:
  - “VX-8204F” (4 VGA out) or “VX-8208F” (8 VGA out) (from Monoprice):  
Tricks Splitter- Sending VGA out from the computer used to capture or play the SD Card to several monitors.
  - “LKV-2000” (from Monoprice): Tricks –for converting VGA output to RCA/S-Video to go into trick timing computer capture card (BC or Splasheye).

## LIST and LINKS:

(2) Ubiquiti PicoStation M2HP 2.4GHz 802.11g/n High Power Access Point (configure one as a client and one as a bridge. Assign a static IP on the same network i.e. 192.168.254.28 and 192.168.254.29).

[http://www.amazon.com/Ubiquiti-PicoStation-2-4GHz-802-11g-Access/dp/B0055PKSG6/ref=sr\\_1\\_1?ie=UTF8&qid=1436805756&sr=8-1&keywords=ubiquity+pico](http://www.amazon.com/Ubiquiti-PicoStation-2-4GHz-802-11g-Access/dp/B0055PKSG6/ref=sr_1_1?ie=UTF8&qid=1436805756&sr=8-1&keywords=ubiquity+pico)

(2) Grandstream GS-GXV3500 IP Video Encoder/Decoder (configure one to encode in boat / one to decode at shore. Assign each a static IP on same network as Ubiquiti Radios i.e. 192.168.84 and 192.168.254.85) (IF converting analog)

[http://www.amazon.com/Grandstream-GS-GXV3500-Video-Encoder-Decoder/dp/B006307P6S/ref=sr\\_1\\_1?ie=UTF8&qid=1436805883&sr=8-1&keywords=grandstream+GS-gxv3500](http://www.amazon.com/Grandstream-GS-GXV3500-Video-Encoder-Decoder/dp/B006307P6S/ref=sr_1_1?ie=UTF8&qid=1436805883&sr=8-1&keywords=grandstream+GS-gxv3500)

(1) DC-DC Converter Step Up Step Down Module 3.5-28V to 1.25V-26V (For boat regulated 12v for Grandstream rated for 1 A nominal - 3A max, check specs before also powering a 12v camera)

<http://www.icstation.com/converter-step-step-down-module-125v-p-2486.html>

(1) LTC1871 DC-DC Step up Boost Module Power Supply 3.5V to 30V 100W (For boat configure to 24v for Ubiquiti Radio)

<http://www.icstation.com/ltc1871-step-boost-module-power-supply-100w-p-3712.html>

(1) iCreatin Passive PoE Injector and PoE Splitter Kit with 5.5x2.1 mm DC Connector (For boat only use injector)

[http://www.amazon.com/iCreatin-Passive-Injector-Splitter-Connector/dp/B00NRHNP UA/ref=sr\\_1\\_4?ie=UTF8&qid=1436807279&sr=8-4&keywords=poe+injector](http://www.amazon.com/iCreatin-Passive-Injector-Splitter-Connector/dp/B00NRHNP UA/ref=sr_1_4?ie=UTF8&qid=1436807279&sr=8-4&keywords=poe+injector)

(1) MW-RPSMA-2-ANT-6 - Maxxwave Antenna 2.4GHz 6dBi Mini Omni Magnetic w/RP-SMA Connector (can be used as an external antenna in-lieu of Ubiquity antenna ), Or use 9 dBi antenna in boat

<http://www.balticnetworks.com/maxxwave-mini-2-4ghz-6dbi-omni-magnetic-wifi-antenna-mmcx-connector-934.html>

(1) NETGEAR-ProSAFE-FS105NA-5-Port-Ethernetswitch (For shore if setting up more than one camera)

[http://www.amazon.com/NETGEAR-ProSAFE-FS105NA-5-Port-Ethernet/dp/B00002EQCW/ref=sr\\_1\\_6?s=electronics&ie=UTF8&qid=1437065367&sr=1-6&keywords=ethernet+switch](http://www.amazon.com/NETGEAR-ProSAFE-FS105NA-5-Port-Ethernet/dp/B00002EQCW/ref=sr_1_6?s=electronics&ie=UTF8&qid=1437065367&sr=1-6&keywords=ethernet+switch)