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## Photo Finish Technology Evaluation

### Introduction

The evaluation summarized in the paragraphs below was performed in response to a situation that occurred after the 3<sup>rd</sup> race at Del Mar on November 11<sup>th</sup> 2017.

The Stewards were criticized for a long delay (about ten minutes after the finish of the race) to declare a dead heat. It has been common practice, for very tight finishes, to produce a paper print of the photo finish monitor picture to provide the stewards a hand-held copy. Sometimes the image is enlarged (zoom in) to allow the stewards to discern fine differences at the finish. For the race in question, the printer did not initially operate correctly. The relatively long delay drew criticism from the media and from the public.

In this day of digitized photography and high resolution monitors, it is surprising that the stewards would need to have the photograph printed to improve their ability to accurately view the result.

### Fact Finding

The undersigned was assigned to investigate the circumstances behind the incident and to determine if, in California, we are employing state-of-the-art photo finish technology. Bill O'Brien of Plusmic (Photo Finish Vendor) and Jim Porep of Pegasus Communications (Video Replay Vendor) were interviewed several times by telephone. Subsequently, an East Coast supplier, Jim Pelrine of International Sound (IS), was interviewed. IS competes with our California vendors outside our state and it was thought to be prudent to consider a potentially opposing point of view. Their clients include Belmont Park, Churchill Downs, Saratoga and Pimlico.

### Findings

- 1) The photo finish cameras used in California are state-of-the-art. They are manufactured by Yamaguichi of Japan and produce single-pixel 1-D frames at a rate of up to 5,000 fps. This equates to a frame about every 0.015 inches a horse travels crossing the finish line. This is more than adequate resolution to ensure a continuous, accurate view of the horse's nose. There are new cameras that advertise frame rates up to 20,000 fps but they are extremely expensive. The industry standard is about 3,000 fps.
- 2) Jim Pelrine of IS was referred to us by Chris Dobbins of The Jockey Club/InCompass Solutions. IS has the photo finish contract with several major Midwestern and Eastern racetracks. Mr. Pelrine confirmed that their technology is similar. Their primary

camera supplier is Lynx System Developers that make the FinishLynx line of cameras. They operate similarly to the Yamaguichi cameras.

- 3) Photo finish pictures were compared between California and New York and Kentucky by viewing pictures posted on the web. The California images were noticeably clearer and more-well defined. It is concluded that our camera technology is adequate.
- 4) The output from the camera is transmitted to a custom built computer that processes the camera signal to produce a continuous view of the finish line. The computer output is transmitted to monitors that are viewed by the photo finish official, the placing judges and the stewards. The signal is then sent (in series) to the video production truck for display on racetrack, simulcast and TV broadcast monitors.

The video replay vendor has upgraded their monitor technology to full HD with pixel density of 1920 x 1080. Unfortunately, the monitors that have been used in the judge's stands are older 1280 x 1024 pixel technology with 22 inch screen size. This results in requiring the video vendor to modify the signal to view it on the full HD screens. But, the more significant issue is that the judges are viewing a less well-defined image than the fans in the stands and at the simulcast facilities.

- 5) Plusmic and Pegasus committed to replacing the existing judge's stand monitors at Santa Anita before the start of the winter meeting on December 26<sup>th</sup>. They conducted a rehearsal on Wednesday, December 20<sup>th</sup>. The new monitors are full HD, 32 inch with 1920 x 1080 pixels. Plusmic had to build a new computer to interface with the Yamaguichi cameras and the new monitors. They also are installing a parallel backup system with a new computer. The judge's stand photos and the video truck will now display photos of the identical resolution (everybody sees the same photo in the same screen format).

Kim Sawyer represented the CHRB at the rehearsal on December 20<sup>th</sup>. She viewed photo images on the new monitors. She reported that the new monitor images were significantly improved compared to the old monitors. She also stated that Plusmic planned to mount the monitors at eye-level so judges can get as close as deemed necessary to review the photo.

- 6) Jim Porep and the undersigned discussed the new Santa Anita system on December 27<sup>th</sup>. He stated that the new computer and monitors were functioning correctly, the signal to the video replay truck was in place and that the back-up system was being installed.

He said that the two companies would operate for a few months at Santa Anita to ensure that there are no issues. They would then proceed to upgrade the monitors at

Del Mar, Los Alamitos and Golden Gate fields. He feels that they should use identical monitors at these four major tracks. He stated that he favored having permanently mounted monitors at each racetrack to eliminate the risk of moving these fragile systems. The photo finish cameras and the computers are moved from Santa Anita to Del Mar and back after each meeting.

### Conclusion

The photo finish camera technology employed in California is state-of-the-art. The 1-d frame rates are adequate for our application. A comparison of our photo finish images to other major tracks showed our photos to be equal or better.

The monitor technology upgrade at Santa Anita is necessary and timely. Jim Porep of Pegagus has assured us that they will pursue monitor upgrades at Del Mar and Los Alamitos after a few months of experience at Santa Anita.

In light of the changes being implemented in Southern California, the systems in Northern California should be reviewed. These would include GGF and all of the fair tracks.

Jeff Salmon