Twin Galaxies says Billy Mitchell “flirts with perjury” in high-score case



Enlarge / Billy Mitchell (left) and Jace Hall (center) attend an event at the Arcade Expo 2015 in Banning, California.

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In May, Ars Technica was the first to report on a Los Angeles County defamation lawsuit brought against Twin Galaxies over the video game scoreboard’s 2018 removal of Billy Mitchell’s historical scores.

As that case barrels toward a July 6 anti-SLAPP motion

hearing, both sides have recently filed hundreds of pages of new evidence and arguments laying out their contrasting views of the case and the facts behind it. Those documents contain some of the strongest language yet between the two parties, with Mitchell accusing Twin Galaxies of lying and ignoring eyewitness accounts during its investigation, while Twin Galaxies says some of Mitchell's statements "flirt with perjury."

Pineiro's dueling statements

Some of the strongest disagreement in the opposing filings center on the role of one Carlos Pineiro. Both sides agree that, during Twin Galaxies' investigation, Pineiro spent significant time experimenting with arcade *Donkey Kong* hardware and recording equipment. That time was expended in an effort to recreate the infamous "girder finger" that appears during level loads in certain Twin Galaxies tapes of Mitchell's purported gameplay performances.

Jeremy Young, who originally brought the dispute to Twin Galaxies, argued that this "girder finger" was a telltale sign that the tapes were recorded using emulation software like MAME and not original arcade hardware. Thus, if Pineiro or others could recreate that unique level-loading behavior with actual arcade hardware, a significant hole would be punched in Young's case.

In its 2018 finding, Twin Galaxies cites Pineiro as the technician that "Billy Mitchell engaged to help examine the dispute case claims on his behalf, utilizing whatever original equipment Billy could provide, whose final finding was consistent with Twin Galaxies investigation and others."

But in a signed statement—dated September 10, 2019, and presented to court by Mitchell's lawyers—Pineiro writes that he "did not represent Billy Mitchell in the dispute, and my research was not done on his behalf." In addition, he writes,

“I cannot conclude that Billy Mitchell did play, or did not play on an original unmodified *Donkey Kong* PCB [printed circuit board]. I cannot confirm what platform the game was played on. To me, this is inconclusive.”

[embedded content]
Carlos Pineiro addresses a document disavowing his investigation into Mitchell’s scores, which he now says was signed under duress.
To confuse matters further, the September statement conflicts with *another* signed statement from Pineiro, this one filed by the Twin Galaxies lawyers on June 26. In it, Pineiro says he “was certainly under duress when I signed the September 2019 declaration.”

Pineiro’s June statement continues:

> *Billy Mitchell asked me to sign the [September 2019] declaration. I told Mr. Mitchell that I did not agree with what was written in the declaration, particularly the portion of the declaration relating to the retraction of my findings. I told Mr. Mitchell that I would not sign the declaration for this reason as I did not intend to retract my findings.*
>
> *After three hours of pleading, and after he threatened that he would sue me if I did not sign the declaration right there, I capitulated and signed it partly because I did not want to be sued and also because Billy Mitchell promised that the document would not be used for any purpose other than to keep me out of any legal proceedings.*

Pineiro’s more recent statement matches closely with his explanation of events as presented in a September 12, 2019 video. “I knew internally I shouldn’t have [signed Mitchell’s statement],” he said at the time. “I regret that. I regret it heavily.

“Although I started my investigation with the explicit intent

to exonerate Billy Mitchell and to disprove Jeremy Young's dispute I claim, it did not pan out that way," Pineiro writes in his June filing. "I meticulously reviewed that gameplay to see if I could find the Girder Finger anywhere, and I just could not do so."

Who's working for whom?

Apart from disagreements over Pineiro's actual findings, Twin Galaxies and Mitchell can't even agree in court documents over whether Pineiro was part of a "Team Billy" recruited by Mitchell to investigate on his behalf.

Mitchell writes that Pineiro was simply a "random individual who entered Arcade Game Sales on his own volition, promising to debunk the allegations, and I explicitly told Pineiro that he did not act on my behalf." Twin Galaxies' claim that Mitchell "engaged [Carlos Pineiro] to help examine the dispute case claims" is "simply a ***lie***," Mitchell writes (emphasis in original).

For its part, Twin Galaxies argues that Mitchell's "attempts to distance himself from [Pineiro's findings] by incredulously declaring that Pineiro was not working on his behalf" is a "declaration [that] flirts with perjury."



Enlarge / Billy Mitchell competes at a (presumably authentic) *Donkey Kong* cabinet.

As evidence, Twin Galaxies presents a text message, sent by Mitchell to Pineiro and Twin Galaxies owner Jace Hall, stating that "Joel [West] has the authority to speak for me and request things as he is the coordinator of my effort. The technical end is headed up by Carlos."

Twin Galaxies also presents testimony from Steven Kleisath, who says he aided Pineiro's investigation and presented Pineiro's findings with permission on the Twin Galaxies score-dispute thread. Kleisath testifies that Mitchell and an associate "provided what they claimed was the original *Donkey Kong* arcade cabinet PCB, 2 bit converter, and capture card that was used to record Billy Mitchell's… score performances for Mr. Pineiro to record and analyze."

"There is no question that Carlos Pineiro and I volunteered our time to exonerate Billy Mitchell," Kleisath writes. "We worked tirelessly and hand-in-hand with Billy Mitchell to provide evidence to the Mitchell Score Dispute Thread on his

behalf. But, our investigation results did not exonerate him, and instead validated Mr. Young's dispute claim."

What about the witnesses?

Central to Mitchell's argument in these new court documents is the fact that Twin Galaxies did not seek testimony from dozens of eyewitnesses whom he says saw the *Donkey Kong* score performances at the heart of the case performed live.

Mitchell's evidence package includes sworn statements from a number of these eyewitnesses, who say they can verify the authenticity of Mitchell's live performances. They include:

- Former Twin Galaxies referee Todd Rogers (who is also banned from Twin Galaxies for alleged malfeasance), who said a score obtained at a 2007 Florida Mortgage Brokers Association Convention was on "an original Nintendo *Donkey Kong* Arcade machine as I have known since 1981."
- Valerie Saunders of the Florida Association of Mortgage Brokers, who said, "before and after the convention, we underwent processes to secure the integrity of Billy's *Donkey Kong* machine. We locked the machine and secured it in a safe room supervised by hotel security."
- Sheila Kiniry, who oversaw the installation of the board used in the Mortgage Brokers performance and allegedly made sure it was sent to Nintendo for authentication afterwards.
- Former Twin Galaxies referee Kimberly Mahoney, who said that a score obtained at Boomers Arcade was on a machine that "did not possess a backdoor, and therefore everyone within the arcade could view the machine's inner hardware."
- Enzo Celani, who says he loaned out the machine used for the Boomers Arcade performance and can "confirm the authenticity of the hardware provided for the event."
- Joe Tortorella, Boomers Arcade manager, who affirmed

> that “it was easy to identify this as an authentic *Donkey Kong* machine based on the physical hardware inside the cabinet. During the performance, the backdoor of the machine was off, and all the internal hardware was viewable for anyone to check.”

To disregard this testimony, Mitchell argues, means that “Twin Galaxies’ case essentially rests on a conspiracy nearly as broad (and untenable) as the Kennedy assassination: scores of people around the country with seemingly no connection to each other have agreed to lie and fabricate evidence that Mitchell achieved his records on arcade software. The cheating claim is ludicrous.”

Focus on the tapes

In its filings, Twin Galaxies says that testimony from Mitchell’s eyewitnesses is “irrelevant and immaterial to the dispute.” That’s because the dispute as presented on the site was focused exclusively on the videotaped footage that Twin Galaxies had used to support Mitchell’s record claims in the past, and not on any live verification of said records.

To prove that Twin Galaxies’ statements against Mitchell were false (and therefore not subject to a “truth defense” against libel), the scoreboard says that “Mitchell must show that the videotape recordings of the performances were from an original unmodified Donkey Kong PCB. He provides no evidence in this respect.”

[embedded content]
Mitchell presents video of his purported high score performances in *Donkey Kong* and *Donkey Kong Jr.* in 2010.
Instead, Twin Galaxies says Mitchell offers “a handful of vague declarations from people swearing that they saw him playing *Donkey Kong* at a convention of mortgage brokers in 2007. None of these eyewitnesses testify to whether the performance recorded on the videotape in question is the

performance they witnessed at the convention. In fact, none of the eyewitnesses even testify that they have seen what is on the tape. Without that evidence, Mitchell cannot prove falsity."

Twin Galaxies also notes that Mitchell did not provide any of this eyewitness testimony during the site's initial investigation into his scores, which concluded on April 28, 2018. "Billy Mitchell never identified any witnesses by name, and to be sure, he never asked me to interview anyone specifically," Hall writes. "I did tell [Mitchell] that if he wanted any eyewitness testimony to be considered for any reason, that he was free, but not required, to post that testimony in the dispute thread for everyone to review and consider."



Enlarge / Former Twin Galaxies referee Robert Mruczek sits next to taped footage of a Mitchell performance showing the telltale "girder finger" in a 2006 MTV News interview.

In court documents, Mitchell does argue about the provenance of some of Twin Galaxies' tapes, the originals of which have been lost over the course of time and with changes in Twin Galaxies ownership. He argues that copies of those score performances provided by community member Dwayne Richard (who says he received them from former Twin Galaxies founder Walter Day) are suspect in large part because of the "personal animosity" that Richard harbors for Mitchell.

Mitchell also argues that a recording of Mitchell's first million-point *Donkey Kong* game—as featured in *The King of Kong*

documentary and not performed in front of a live audience—also can't be authenticated. That's because former referee Robert Mruczek—who originally validated that tape in 2006 and reaffirmed its authenticity in court documents—"expressed direct hatred for me, compared me to convicted sexual assaulter Bill Cosby, and falsified testimony to imply that I used money to corrupt my way to success," as Mitchell put it.

But Hall counters that performance tapes provided by Richard and community member Greg Erway were identical. And the *King of Kong* footage matches footage provided by Mruczek as background for a 2006 MTV News interview.

All these issues and more are set to be hashed out in front of a Los Angeles County judge at a July 6 hearing, which could well serve as the climax to one of the longest-running and most fascinating debates in classic-gaming history.

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How holographic tech is shrinking VR displays to the size of sunglasses



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- A model shows off a prototype form factor for a holographic VR display.
- An overhead shot highlights the 9mm thickness of the prototype display.
- The clear film of the prototype display, embedded in the glasses housing.
- An animated GIF from Facebook showing off the difference between holographic film VR displays and traditional displays using bulkier lenses (click through if the animation doesn’t load).
- A view of the “holographic directional backlight,” which projects an image on a 1mm film that appears as a “virtual light source” an apparent 13mm away.
- The display module for the sunglasses-style prototype.
- The current “sunglasses” prototype uses green lasers to create an image like the one on the left. A larger “benchtop” prototype using a color LCD can create images

like the one on the right.
- Close-up highlighting the resolution of the prototype displays.
- A close-up on a test image shows how the laser-based display allows tiny details to still be distinguishable.

For all the advancements in virtual reality technology in recent years, one major factor still holding the space back is the size and relative discomfort of current headset design. Even the most compact and comfortable VR headsets today still resemble something like a cross between ski goggles and a motorcycle helmet, requiring massive headstraps to secure a heavy display that protrudes multiple inches away from the face. Reference designs for "eyeglasses" style VR displays help a bit, but they still look like coke-bottle spectacles from a steampunk cosplay event (and provide a limited field of view, to boot).

Now, researchers at Facebook Reality Labs are using holographic film to create a prototype VR display that looks less like ski goggles and more like lightweight sunglasses. With a total thickness less than 9mm—and without significant compromises on field of view or resolution—these displays could one day make today's bulky VR headset designs completely obsolete.

In the newly published ACM Siggraph paper Holographic Optics for Thin and Lightweight Virtual Reality, researchers Andrew Maimone and Junren Wang detail the optics behind their lightweight prototype. The key to the thinness is a series of flat, polarized films that use a "pancake optics" light-folding technique to reflect the displayed image multiple times in a small space.

That design effectively extends the apparent focal length of the image (which is key to user eye comfort) without the need for a large physical space for the light to travel through. Holographic films used to focus the image onto the eye also

eliminate the need for the kinds of bulky refractive lensing systems found in current headsets.

How does it look?

Despite the thinness, the prototype display is able to provide a roughly 90-degree horizontal field of view in testing. That's a big improvement over thin-film AR displays like Microsoft's Hololens or Magic Leap, and it's comparable to VR headsets like the Oculus Rift and Quest (but less than higher-end headsets like the HTC Vive and Valve Index).

Since Facebook's prototype display uses lasers instead of LCDs to create an image, it's hard to make a traditional pixel-based resolution measurement. The resolution of the display varies as you get farther from the center as well, with what the researchers describe as "significant ghosting" once you get outside a central 60-degree field of view.

That said, the researchers say the images at the center of their prototype display can clearly define details only slightly larger than one arcminute in apparent size. That's approaching the limits of 20/20 human vision, a level of detail that would require ridiculous pixel densities on a traditional LCD headset.

A coming revolution?

While there's a lot of potential here, there are plenty of limitations to the current holographic display prototypes as well. For one, the current model only displays content in multiple shades of green, creating an effect somewhat similar to the red-tinted 3D images of Nintendo's failed Virtual Boy (you can see a video of this green-tinted display in action in this Facebook Research blog post).

Getting full-color images in that form factor will require

integrating and overlaying red and blue lasers as well, which will require some careful design and engineering work. On the plus side, though, those lasers should theoretically be able to provide a wider color gamut than the usual sRGB LCD displays in current VR headsets.

The current holographic prototypes also offload everything except a single monocular display away from the "sunglasses" frame to prevent additional bulk. As the researchers note, "A truly portable and practical display would integrate a pair of display modules, a computing platform, batteries, positional trackers, and all external components into a sunglasses-like frame."

All that said, the prototype discussed here sounds like a revolutionary and altogether feasible new direction for future VR displays—one that could break virtual reality out of the significant limits of its current uncomfortable form factor. While we're a long way off from this kind of technology ever making its way to any consumer-level products, it's nice to see Oculus-owner Facebook pushing the state of the art for VR display.

Listing image by Facebook Research

https://arstechnica.com/?p=1688309

NatGeo expedition hunts for 1924 climber's body in Lost

on Everest documentary



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- Base camp of the National Geographic crew, illuminated below Everest.
  Renan Ozturk/National Geographic
- Jim Hurst, Thom Pollard, and Mark Synnott sit in Jilong shortly after crossing the border from Nepal.
  Renan Ozturk/National Geographic
- Thom Pollard in Tingri, catching a first glimpse of Mt. Everest at sunset.
  Renan Ozturk/National Geographic
- Mark Synnott, Jamie McGuinness, and Thom Pollard map out a plan to climb the north side of Mt. Everest in search of Irvine’s remains.
  Renan Ozturk/National Geographic
- Thom Pollard.
  Renan Ozturk/National Geographic

- Mark Synnott and Jamie McGuinness.
  Renan Ozturk/National Geographic
- Mark Synnott during the expedition.
  Renan Ozturk/National Geographic
- Mapping out a plan to climb the north side of Mt. Everest.
  Renan Ozturk/National Geographic
- Mark Synnott and Renan Ozturk look at a GPS path for the drone during the expedition.
  Matt Irving/National Geographic
- Members of the expedition with gear and supplies.
  Renan Ozturk/National Geeographic
- Team members pose for a group photo with Sherpa team.
  Renan Ozturk/National Geographic
- Sunlight touches the top of Mt. Everest.
  Renan Ozturk/National Geographic
- Mark Synnott at “interim camp,” halfway between Base Camp and Advanced Basecamp.
  Renan Ozturk/National Geographic

Edmund Hillary and Sherpa mountaineer Tenzing Norgay made climbing history when they became the first men to successfully summit Mount Everest on May 29, 1953. But there’s a chance that someone may have beaten them to the summit back in 1924: a British mountaineer named George Leigh Mallory and a young engineering student named Andrew “Sandy” Irvine. The two men set off for the summit in June of that year and disappeared—two more casualties of a peak that has claimed over 300 lives to date.

Lost on Everest is a new documentary from National Geographic that seeks to put to rest the question of who was first to the summit once and for all. The gripping account follows an expedition’s attempt to locate Irvine’s body (lost for over 95 years) and hopefully retrieve the man’s camera—and photographic proof that the two men reached the summit.

NatGeo is also premiering a second companion documentary,

Expedition Everest, narrated by actor Tate Donovan (*MacGyver, Man in the High Castle*), following an international team that included multiple scientists as they trek up the mountain. Along the way, team geologists collected sediment samples from the bottom of a Himalayan lake; biologists surveyed the biodiversity at various elevations to track how plants, animals, and insects are adapting to a warming climate; and climate scientists collected ice cores from the highest elevation to date to better understand glacier evolution. Finally, the team installed the world's highest weather station in Everest's infamous "death zone," above 26,000 feet, to gather real-time data on weather conditions at that altitude.

Mallory is the man credited with uttering the famous line "because it's there" in response to a question about why he would risk his life repeatedly to summit Everest. An avid mountaineer, Mallory had already been to the mountain twice before the 1924 expedition: once in 1921 as part of a reconnaissance expedition to produce the first accurate maps of the region and again in 1922—his first serious attempt to summit, although he was forced to turn back on all three attempts. A sudden avalanche killed seven Sherpas on his third try, sparking accusations of poor judgement on Mallory's part.

Undeterred, Mallory was back in 1924 for the fated Everest expedition that would claim his life at age 37. He aborted his first summit attempt, but on June 4, he and Irvine left Advanced Base Camp (21,330 feet/6,500 meters). They reached Camp 5 on June 6, and Camp 6 the following day, before heading out for the summit on June 8. Team member Noel Odell reported seeing the two men climbing either the First or Second Step around 1pm before they were "enveloped in a cloud once more." Nobody ever saw Mallory and Irvine again, although their spent oxygen tanks were found just below the First Step. Climbers also found Irvine's ice axe in 1933.

There were several expeditions that tried to find the

climbers’ remains. A climber named Frank Smythe thought he spotted a body in 1936, just below the spot where Irvine’s ice axe was found, “at precisely the point where Mallory and Irvine would have fallen had they rolled on over the scree slopes,” he wrote in a letter that was not discovered until 2013. A Chinese climber reported stumbling across “an English dead” at 26,570 feet (8,100 meters) in 1975, but the man was killed in an avalanche the following day before the report could be verified.

Mallory’s mummified remains

Mallory’s body wasn’t found until 1999, when an expedition partially sponsored by Nova and the BBC found the remains on the mountain’s north face, at 26,760 feet (8,157 meters)—just below where Irvine’s axe had been found. The team thought it was Irvine’s body and hoped to recover the camera, since there was a chance any photographs could be retrieved to determine once and for all whether Mallory and Irvine reached the summit—thereby changing mountaineering history. But the name tags on the clothing read “G. Leigh Mallory.” Personal artifacts confirmed the identity: an altimeter, a pocket knife, snow goggles, a letter, and a bill for climbing equipment from a London supplier.

As the NatGeo documentary shows in quite vivid detail, Mallory’s body was exceptionally well-preserved, bleached by the intense sun and essentially mummified from exposure to the elements. There were clear fractures to his right leg—the tibia and fibula, just above the boot (by one account, his right foot was nearly broken off)—and a puncture wound on his forehead the size of a golf ball, which is believed to have caused his death. It’s been speculated that the wound was from an errant ice axe bounding off a rock to hit him in the head. There were remnants of a climbing rope around his waist and evidence of trauma from a rope-jerk injury, meaning it’s likely he and Irvine were roped together when Mallory slipped

and fell. Either the rope snapped or Irvine was forced to cut Mallory loose, since rescue was impossible.

After that exciting discovery, the search was on to find Irvine's body (and the camera) based on the unverified 1975 sighting. A 2001 followup expedition did locate the men's last camp. Noted Everest historian Tom Holzel—whose latest research features prominently in *Lost on Everest*—relied on a 2001 Chinese climber's sighting of a body lying on its back in a narrow crevasse, as well as aerial photography, to pinpoint the most likely spot to search: in the region known as the Yellow Band, at an altitude of 27,641 feet (8,425 meters).

And that brings us to 2019, when the NatGeo crew joined up with a world-renowned team of professional climbers to document their own search for Irvine's body, based on Holzel's latest research. NatGeo photographer Renan Ozturk—also an experienced climber and mountaineer—led the documentary crew, joined by two other seasoned climbers: journalist and adventurer Mark Synnott, (who also penned a feature article for National Geographic about the expedition) and filmmaker Thom Pollard, who was a member of the 1999 expedition that found Mallory's remains.

(Did they find Irvine's body? Spoilers below the gallery.)

- Team members climb Mt. Everest.
  Renan Ozturk/National Geographic
- Sound engineer Jim Hurst at sunrise on the North Col. Hurst opted not to continue for the final push because of altitude sickness.
- Just before a storm, tents from several expeditions huddle against a snowy slope. North Col camp, 23,000 feet. Hurricane force winds blasted down every tent, carrying one hundreds of feet into the air.
- Renan Ozturk uses a drone to capture footage during the Everest expedition.

Thom Pollard/National Geographic

- Sunlight touches the top of Mt. Everest.
- Renan Ozturk (right) pilots a drone at Advanced Base Camp while Matt Irving (left, in red) operates the camera on a separate controller.
  Thom Pollard/National Geographic
- Team member plowing forward.
  Matt Irving/National Geographic
- Renan Ozturk.
  Matt Irving/National Geographic
- A view of tents on the mountainside.
  Renan Ozturk/National Geographic
- A view from the push to the summit.
  Renan Ozturk/National Geographic
- Team member battling the elements.
  Matt Irving/National Geographic
- Navigating a treacherous path.
  Matt Irving/National Geographic
- A helping hand.
  Matt Irving/National Geographic
- A lone team member against a vast expanse of white.
  Renan Ozturk/National Geographic
- Renan Ozturk remains on the mountain after the rest of the team descends.
  Renan Ozturk/National Geographic
- Expedition team members (clockwise from top left): Jim Hurst, Renan Ozturk, Mark Synnott, Jamie McGuinness, Thom Pollard, and Matt Irving.
  Renan Ozturk/National Geographic

In addition to their usual camera equipment, Ozturk and his crew relied on drones—a Mavic Pro and an Inspire2—to capture footage, aided by an app called Litchi to help with flight paths. They tested the drones in a hyperbaric chamber at a NASA subfacility prior to the expedition to simulate the extremes of temperature and altitude in which the drones would be operating. They also made several modifications to the

drones' climb speed, descent speed, and flight ceiling so they could climb higher and descend faster.

"These lithium ion batteries perform strangely in the cold," Ozturk told Ars. "Sometimes they say they have a certain percentage left, but then they all of a sudden drop to zero, and the drones would fall out of the sky. The last thing we wanted to do was leave a drone on the mountain along with all the other trash." Cameramen had special pockets in the underarms of their clothing to keep batteries warm and constantly battled ice crystals forming over their lenses.

It was also challenging to understand the wind currents and assess the light and temperature to figure out the best time to fly the drones, which Ozturk admits involved a significant element of luck. "Piloting an aircraft is a game of precision and steady fingers," said Ozturk. "You're just trying to keep your cool and watch what the drone is doing and making judgement calls second by second. We definitely had a few close calls."

NatGeo documentary crews are well-accustomed to overcoming harsh, challenging conditions to get that glorious footage we all know and love. But Everest exerted a tremendous physical and mental toll on even these experienced hardy souls. The NatGeo expedition spent more time than other teams at those punishing higher altitudes, in part because they waited to make their summit push to avoid overcrowding on the route. Everest is always dangerous, but 2019 was among the deadliest climbing seasons in recent memory, with 11 fatalities. That's comparable to the 1996 climbing disaster, immortalized in Jon Krakauer's best-selling book *Into Thin Air* (12 climbers died on Everest that season), and the 16 Sherpa lives lost to an avalanche on the treacherous Khumbu Icefall during the 2014 climbing season. Nepal now plans to institute new rules for climbers to qualify for an Everest permit.

Listing image by Renan Ozturk/National Geographic

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Human Interface: What (almost) every button in an F-15C fighter's cockpit does



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[embedded content]
Video directed by Morgan Crossley, edited by Ron Douglas and Brady Jackson. Motion graphics by Brady Jackson and Dylan Blau. Click here for transcript.
Welcome to the pilot episode of "Human Interface," a new series we're kicking off wherein we take you up close and personal with complex systems and have an expert explain what

all the buttons and switches do. “Pilot episode” is particularly appropriate here, because we’re kicking off the series with a look at a McDonnell Douglas F-15C Eagle, one of the world’s most famous air superiority fighters. The F-15C and its variants are in service with multiple air forces around the world, including the United States, Japan, and Israel, and the aircraft has an outstanding combat record—across all its deployments and operators, air-superiority F-15s like the F-15C have racked up more than 100 air-to-air kills and zero losses.

Before the coronavirus made everything crazy, we were able to score some time with an F-15C on the flight line at Fresno Air National Guard Base in California. Our tour guide was Air Force pilot Colonel Andrea Themely, who retired in 2018 after serving for 23 years. Col. Themely has about 3,400 hours piloting high-performance jet fighters and about 1,100 hours specifically in F-15Cs, and her last post was commanding the Air Force’s 80th Flying Training Wing.

Buttons, buttons everywhere…

As I found out firsthand a few years ago in the Navy’s F/A-18 simulator at NAS Oceana, a fourth-generation jet fighter like the F-15C is typically equipped with a mish-mash of ’70s- and ’80s-era screens and buttons, with other more current-looking ’00s-era controls shoehorned into the corners. This reflects the fact that fighters like the F-15C and its contemporaries are mostly products of the 1970s, with more modern improvements bolted on over time.

Our California ANG F-15C is no exception, and Col. Themely spends a lot of the video explaining the physical controls in the cockpit—switches and levers that actuate functions that on a more modern fifth-generation fighter might instead be primarily accessed via touchscreen.

The amount of controls to address might appear overwhelming,

but there’s a secret to aircraft cockpits—you tend to only care about a few things at any given moment, so once you’re familiar with the instruments, you focus on what you need and ignore the rest. It’s the exact same thing people do when driving a car or operating any complex piece of machinery.

For our next trick

We’re really excited about the possibilities of “Human Interface” as a series, and we have *many* more cool machines we’d like to see explained like this. Airliners, submarines, huge earth moving machines, power plants, giant car-eating dinosaur monster trucks—we’ve got a long list of stuff we’re trying to get in to see, and if you have any suggestions, please feel free to leave them in the comments.

My personal bucket list item for the series would be to have some Apollo-era flight controllers walk us through NASA’s restored Mission Operations Control Room 2 in Houston, but since its multi-million dollar restoration, NASA has been reticent to allow any filming on the floor of MOCR2. We’ll definitely keep asking!

https://arstechnica.com/?p=1688248

Harmonix’s Fuser wants to make you a DJ… but only up to a point



Enlarge / You can’t have Coachella this summer, but you can fake like a Coachella main-stage DJ “this fall” with Harmonix’s *Fuser*.

reader comments

11 with 11 posters participating

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Late last decade, plastic guitars and motion sensors vanished from the console gaming landscape—and, coincidentally, the same goes for Harmonix. For years, the pioneering music-gaming developer has struggled to break out with a mainstream hit anywhere near the scale of *Guitar Hero*, *Rock Band*, or *Dance Central*.

The company’s last new-series stab, 2018’s *DropMix*, was a complicated gamble, as it required players to buy a bulky peripheral and a series of physical playing cards. *DropMix* had its aficionados, but for whatever reason—a smartphone requirement, or a “buy more cards to get more songs” gimmick—the collaboration with toymaker Hasbro didn’t pan out.

Harmonix is clearly still bullish on *DropMix*‘s music-

engineering trickery, which revolves around letting players splice and combine existing songs' separate elements (vocals, guitars, drums) and become "mash-up" DJs. This year, the developer is trying again with *Fuser*, a version made specifically for consoles and PC. Thanks to Harmonix, we were able to go hands-on with the game's latest preview build ahead of its launch "this fall," and our existing controllers sufficed—no additional hardware or cards are required. That's good news, but does that mean *Fuser* is poised to succeed where *DropMix* failed?

The Carly Rae Pitbull creation of your… dreams?

- The *Fuser* interface includes four "turntables" on which you'll drop elements taken from songs in your crate (seen in the top-most wrap of album covers). This screen shows what happens when you drop a new melody element (typically green) onto your mix.
- Unlike *DropMix*, which struggled to gamify this mechanic, *Fuser* throws requests at players. Some appear as shouts from fans. Others appear as sidebar requests.
- Campaign missions have some songs as "requirements" (noted with check marks). You'll get additional slots to add personal favorites.
- Three turntables explode simultaneously because they've had a "riser" triggered. This lets you swap the entire soundscape for a new one as you see fit, which is a nice tweak that *DropMix* couldn't support.
- Call Carly's song sample, maybe.

As a base experience, *Fuser* works similarly to *DropMix*. Players manage a DJ platform and juggle a "crate" full of songs, each split into four elements (drums, lead melody, bass, vocals). As you splice and mix each element, you can create a variety of pop-music monstrosities. Make DMX rap over

a Lady Gaga melody, then nudge a Fatboy Slim drumbeat into the mix. You have control of four sonic elements at a time this time, cut down from *DropMix*‘s quintet of simultaneous sounds, but you’re also freed to use any sound types on any “turntable.” Want to drill a moment down with two drum beats and two bass lines? How about four vocal tracks competing with each other? Go ahead.

Fuser adds one useful trick you might expect from a digital DJ platform: a “cue” system. Use this to assemble a quartet of musical elements “on deck,” then tap a button to transition the current mix into the new one. You can either have them all switch over instantly, or you can ask *Fuser* to turn on a “smart riser,” which switches the key and tempo to emphasize an element in the new mix. (You can also manually fudge with the key and tempo at any time.)

Should you seek more than a mash-up sound toy, *Fuser* has your back in the form of a campaign mode. On paper, this sounds like a no-brainer way to add challenge to the formula. Various “requests” will pop up during the span of your stage performance, with demands like “play a country drum beat” or “play only vocals and drums” for a certain number of measures. In the course of fulfilling these requests, you’ll also be expected to remove and add sonic elements according to a “downbeat” meter, which ticks along like a metronome.

A “crowd” meter changes how many points you score for either fulfilling requests or freestyling, and that crowd meter will grow so long as you maintain a steady level of sonic variety. Swap records too quickly or madly, and the crowd meter will shrink (which Harmonix says it’s doing to stop players from madly swapping records to the beat, which would arguably get a real-life DJ booed off the stage).

Chained to the master loop timeline

At first blush, all of this works well enough, mostly because each sampled chunk is time- and pitch-shifted to fit with the others. You can't manually turn an individual element into a screeching mismatch with the others.

The thing is, my hands-on time with the pre-release game went beyond the usual 20-minute E3-styled demo thanks to an unlimited timer. And that left me pretty quickly grasping for creative straws.



Enlarge / The kind of song and genre variety you can expect from *Fuser*. Is that enough for you? Will roughly 70 more songs make up for anything missing here? That remains to be seen.

One glaring example comes from a new "make-your-own-element" panel, which lets you tap on a 16-button panel to create a new, synthesized element for your mix, like keyboards, saxophone, or drums. The trouble is, *Fuser* only includes pre-made loops in this section, which you can *slightly* tweak in terms of tone and texture with that 16-button panel. When I saw the panel, I thought I was getting something like a pure sample trigger, the kind that established DJs use to make

their own on-the-fly beats. *Fuser* taps those creative brakes.

Worse, the popular songs in this game are, for the most part, firmly constructed as 128-beat loops. The campaign's focus is on adding or removing sonic elements with button-tapping precision for high scores, so it expects you to swap tunes on a regular basis and enjoy the surprises that come from mixing and matching these fixed loops. But you can't guarantee in a given moment that you're inserting, say, the catchy "Hair down, check my nails" vocal line from Lizzo's "Feelin' Good" or the snare-tapping, build-up moment from Macklemore and Ryan Lewis' "Thrift Shop." You're chained to the master-loop timeline.

And then there's the song selection, whose 34-song demo selection doesn't appear to benefit from the tighter genre focus we got from *Rock Band* or *Dance Central*. If the soundtrack revolved entirely around one musical archetype, we might have gotten a more interesting mix variety to work with—like a deeper breakbeat crate, full of classic jazz and funk samples, or a wider, zanier variety of rock subgenres (grunge, new wave, metal). The dissonance of attaching Nelly's voice to a Billie Eilish melody runs out of steam a little faster.

A DJ's unique creative process

[embedded content]
Fuser trailer, June 2020 edition.
The rub, of course, is that Harmonix is trying to make a game where you feel like a DJ superstar without requiring real-world DJ abilities, much like *Guitar Hero* let people fake like a rock star with only a few buttons. Slapping an entire "make-your-own-music" system around *Fuser* might defeat that purpose, right?

But unlike other classic Harmonix games, which ask you to pantomime your favorite bands, *Fuser* opens players up to a

DJ’s unique creation process. The game’s latest pre-release demo, made available exclusively to press, fakes that sensation up to a point; when you follow the campaign’s opening instructions, the resulting songs are catchy and full of compatible elements, and this is aided by the game’s sneaky, automatic tweaks to tempo and key when new elements land in the mix. From a “baby’s first DJ” gameplay perspective, this beats the pants off of the tap-to-the-beat weirdness of 2009’s *DJ Hero*.

But even when playing *Fuser*‘s campaign, as opposed to the “freestyle” creative mode, the game constantly reminds you that variety matters, as opposed to blindly following a pattern of notes (these reminders come in the form of the aforementioned “crowd meter”). And in its current implementation, *Fuser* already needs more variety once the first-blush bluster wears off. Players can’t trigger customized samples. They can’t experiment with unusual time signatures. And they can’t access elements from included songs outside the 128-beat meter.

Harmonix tells Ars Technica it won’t add music-creation tools for users unless they ask for it: “If the cry from the community is to get tools for bands and DJs to put their stuff in, then, you know, I’d be thrilled,” one of the game’s developers tells Ars. (When I suggest that *Beat Saber* is beloved in part because of its built-in custom-music options, the *Fuser* team replies bluntly: “We are advocates of licensing music at Harmonix.”) The devs also aren’t ready to confirm plans for future paid DLC, beyond saying the game is “architected” to support add-ons but that its “100-plus” song package is meant to offer “value out of the box.”

We’ll keep an eye on *Fuser* to see how it evolves before launching on Xbox One, PlayStation 4, Nintendo Switch, and Windows PCs “this fall.”

https://arstechnica.com/?p=1688173

New hack runs homebrew code from DVD-R on unmodified PlayStation 2



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[embedded content]
A demo from CTurt shows an SNES emulator running on a PS2 from a burned DVD-R.
Nearly 20 years after its initial release, a hacker has found a way to run homebrew software on an unmodified PlayStation 2 using nothing but a carefully burned DVD-ROM.

Previous efforts to hack the PS2 relied on internal modifications, external hardware (like pre-hacked memory cards

and hard drives), or errors found only on very specific models of the system. The newly discovered FreeDVDBoot differs from this previous work by exploiting an error in the console's DVD video player to create a fully software-based method for running arbitrary code on the system.

Security researcher CTurt laid out the FreeDVDBoot discovery and method in detail in a blog post this weekend. By decrypting and analyzing the code used for the PS2's DVD player, CTurt found a function that expects a 16-bit string from a properly formatted DVD but will actually easily accept over 1.5 megabytes from a malicious source.

Sending carefully formatted data to that function causes a buffer overflow that in turn triggers another badly written function to tell the system to jump to an area of memory with arbitrary, attacker-written code. That code can then tell the system to load an ELF file written to a burned DVD-R in the system. Building on previous PS2 homebrew efforts like uLaunchELF, it's relatively simple to use that DVD-R to load homebrew software or even full copies of otherwise copy-protected PS2 games.

The exploit is currently limited to very specific versions of the PS2's DVD player firmware (as of press time, firmwares 3.10 and 3.11, when set to "English") found in later editions of the console and won't work in earlier systems. But CTurt writes that he's "confident that all other versions also contain these same trivial IFO parsing buffer overflows" and can be exploited with broadly similar methods. The possibility of similar hacks through the Blu-ray player on the PS3 and PS4 (or the CD player on the PS1) are also being examined by the community.

Better late than early?

In the year 2020, a new software-only hacking method for the PS2 seems unlikely to have much effect on Sony's bottom line.

But we can’t help but marvel at how lucky Sony was that an exploit like this wasn’t found and disseminated during the PS2’s heyday in the early ’00s.

[embedded content]
A DVD-R copy of *Shadow of the Colossus* running on an unmodified PlayStation 2, courtesy of Cturt’s hack.
Remember, the PS2 existed in a day and age before regular system firmware updates were distributed via download or packaged on game discs. Thus, a PS2 exploit that allowed for simple, widespread piracy with nothing but a DVD burner could have had a huge impact on the market for PS2 software, much as similar exploits did for the Dreamcast and its legacy.

More than that, though, this new PS2 hack once again proves that even the best copy-protection schemes will eventually fall if the community puts in enough attention and effort. At best, console makers are just buying time before someone finds a way to trick the system into acting like an arbitrary computer. For Sony, it seems, their efforts bought them over 20 years of effective protection from simple, DVD-R-based hacks.

Listing image by CTurt / YouTube

https://arstechnica.com/?p=1688063

How to move your role-playing game nights online



Aurich Lawson

reader comments

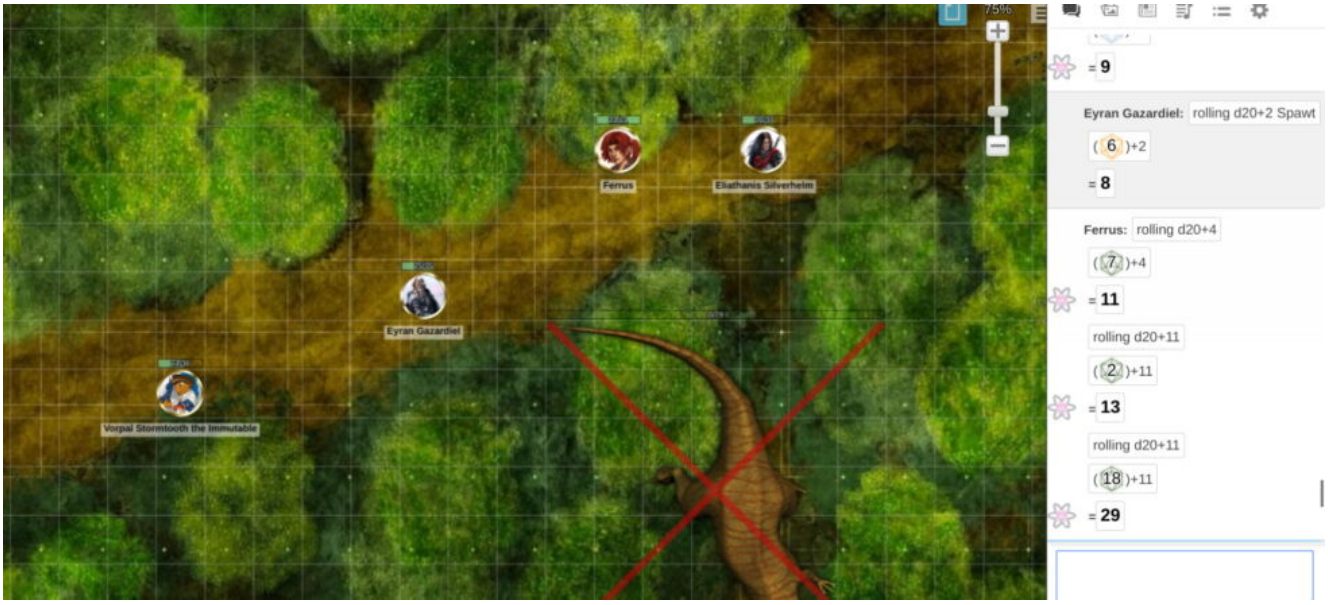
17 with 13 posters participating

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When the dust cleared, the golem lay in pieces across the dungeon floor. Erik sighed deeply, and though his vision blurred, he could still see the rest of the party coming to his aid. Emmelina, the knight that had first welcomed him into the group, cradled him in her arms as he took his last breath. Our team had come this far only to lose its youngest member. Across five different states, there wasn't a dry eye among our team, but we recomposed ourselves and continued to play our tabletop adventure through the service we've used for half a decade now: Roll20.

Perhaps, like me, you had fun adventures with friends locally when you were younger or, perhaps you're interested in role-playing now but unable to actually, you know, meet up with anyone thanks to the pandemic. If so, Roll20 solves the biggest hurdle between you and delving dungeons with your

buddies. And it does so without overly complicating things. If you have access to the internet, you can run virtual tabletop games of *Dungeons & Dragons*—or anything else—thanks to Roll20.



Enlarge / Your standard map with tokens on it after a hard-fought battle with dice rolls to the side.

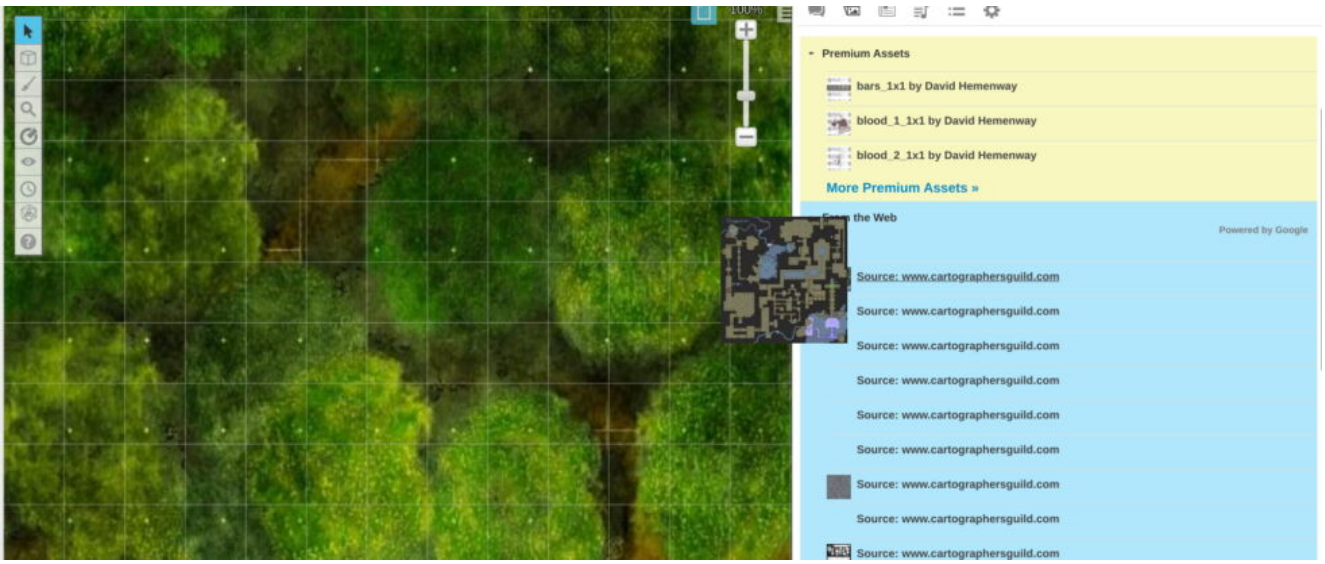
What is Roll20?

Roll20 is a digital platform from relatively small company The Orr Group. It launched in 2012 and allows people to create, share, and play tabletop campaigns. Various upgrades are available to purchase, but the basic service will let anyone do all of the above without too much muss or fuss. And of all the reasons to give Roll20 a shot, possibly the biggest is the simplest: it’s free.

From the start, Roll20 lets you create campaigns, use a variety of different maps which can be toggled as active or not, place digital miniatures in the form of tokens that can then be moved about said maps, and more. Want to do video and voice while you play? That’s built right in. Basic text chat also allows for rolling dice, sending messages as specific characters, and just, well, shooting the breeze. There’s even a jukebox function baked into the free version that lets you set the mood with a little music.

There are also certain premium options in Roll20, and they range from useful to extremely useful: things like dynamic lighting and premium tokens. But all of the core functionality is there from the start, and there's no reason to upgrade if you don't need the extras. It's a nice setup, really, because you can run full campaigns without having to pay anything, but all of the extras are helpful. The different subscription tiers (Plus at $49.99 a year and Pro at $99.99 a year) add more storage, the aforementioned dynamic lighting, custom character sheets, and more. I've subscribed in the past and likely will again in the future, but for someone just starting out, a sub will likely only add more stuff to fiddle with. No need to up the learning curve from the start, after all.

In addition to subscription tiers, Roll20 also straight-up sells digital modules and handbooks to play a number of different RPG systems. If you're the kind of person that really wants to "wow" folks but doesn't have the time to build everything from scratch, you can just pick up some preconstructed adventures and run them without too much tweaking. In my opinion, nothing quite replaces having the physical books on hand, but there's also something to be said for being able to access anything and everything within said books using just a few clicks, and you can't exactly dump a physical book into a virtual tabletop system in the same way.



Enlarge / While the premium options will almost always be a

better fit, Roll20 makes finding free maps and tokens easy enough.

Who needs it?

Even before the COVID-19 response shut everything down, virtual tabletop was a way to connect with folks across disparate spaces—and it remains so. There just now happens to be even more people with the time and the distance to make such services all the more appealing. My own journey to Roll20 seems to be pretty common: in the wake of my high school *Dungeons & Dragons* group moving away for college, and then across the country for work, Roll20 let us play in the same space again, even if it was a digital one.

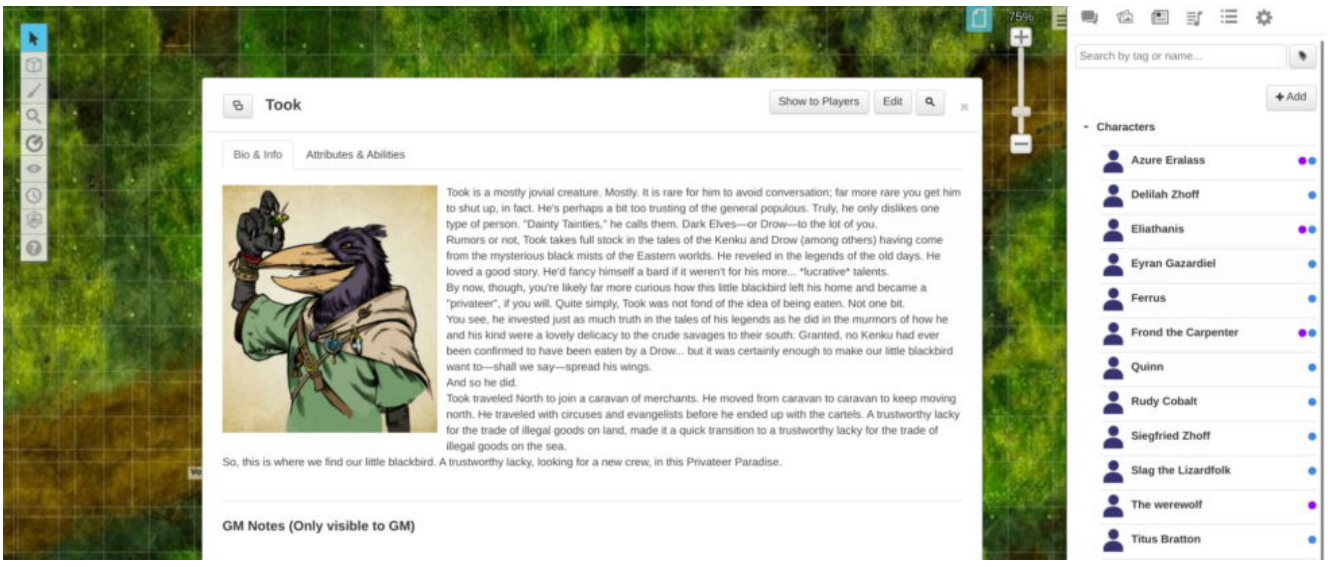
Since joining Roll20 in late 2012, I've logged nearly 500 hours on the platform—with the vast majority of that bringing together friends and former acquaintances rather than random strangers. Not that there's any problem with random groups, and Roll20 even facilitates this with the ability to add yourself to a directory of players by indicating what sort of games, by system, you're looking to join. Or, if you're feeling adventurous, you can browse the forums where players look for games to join and where those running games look for players.

Over the years, I've tried out other virtual tabletop platforms, but I always seem to drift back to Roll20 thanks to its relative ease of use and broad access. Other popular options include Fantasy Grounds or D20PRO, but both are far more fiddly than Roll20, in my experience. The path in Roll20 from signing up to joining a game to playing in a game is fairly straightforward, and for players, it largely comes across as seamless. Folks that are actually running games have a number of different choices to make, including just how detailed of a game they want to run, but players in large part simply need to click a couple links and show up at the

designated time.

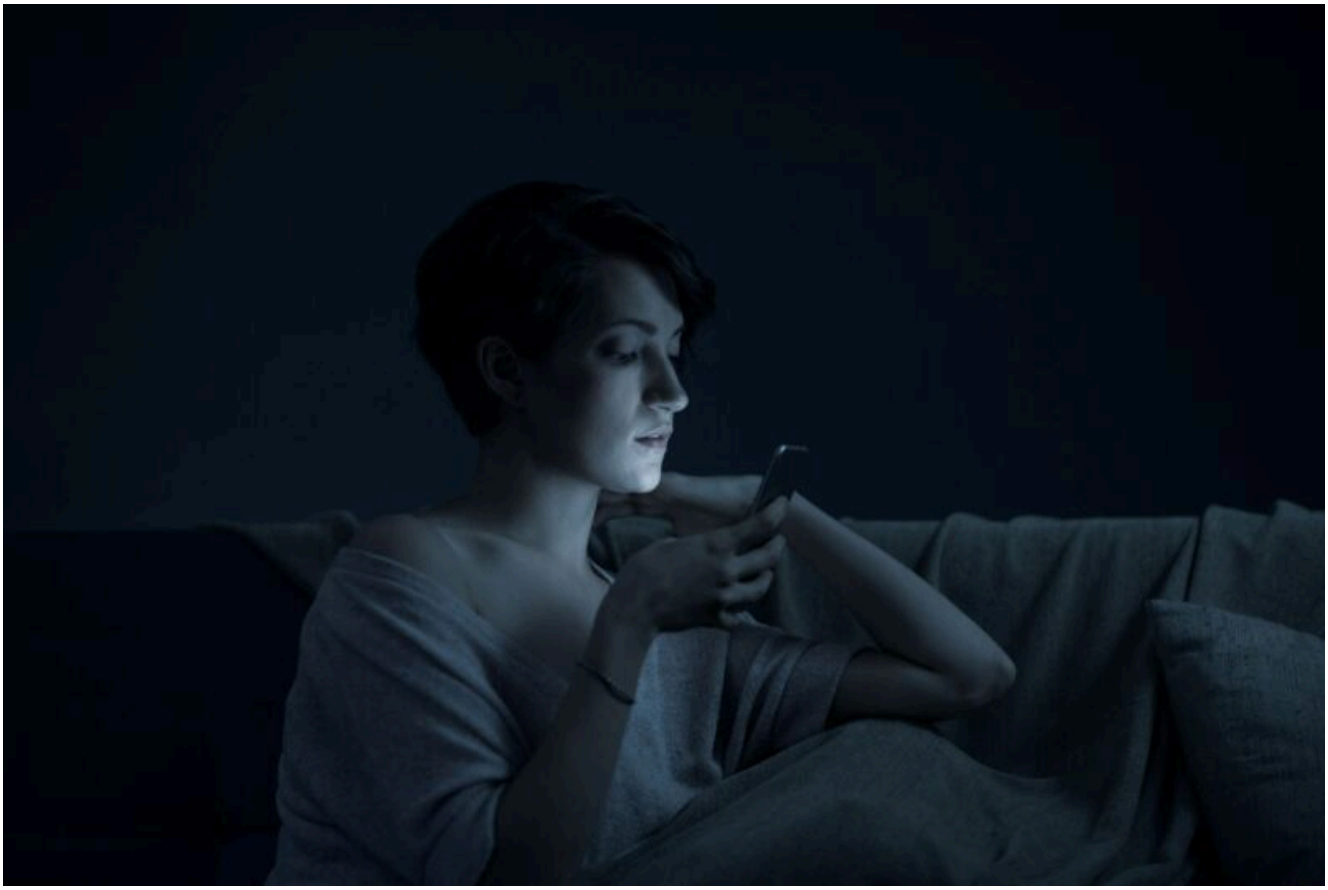
And that, for the last five years or so, has worked perfectly for a game that I run for a bunch of what were once acquaintances online. The vast majority of these are people I've never physically met, and the one I have? The last time we met outside of the internet was something like 2013. Every two weeks, or three, we log into Roll20 in order to play out a campaign using Green Ronin's Dragon Age tabletop setting. My players theorize in Discord about our game while we're not playing, and they share terrible memes, and every session is a new reminder of just how much fun playing tabletop can be despite the fact that this is entirely virtual.

Here's an overview of the party: there's the jock knight that was kicked out of school, the archer that likes to play music and maybe has more religion in her than she cares to admit, the quiet elven mage that isn't always sure what to make of the rest of the group, and the dwarven gladiator trying to hold it all together. The archer keeps a canonical story-style log of our campaign, which at this point is hundreds of pages long. There's fan art. And custom miniatures. And, at least partly, it's all thanks to Roll20.



Enlarge / You can get as detailed as you like with character descriptions and even upload portraits to flesh them out.
https://arstechnica.com/?p=1687621

Doomscrolling is slowly eroding your mental health



Joel Sorrell | Getty Images

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It’s 11:37pm and the pattern shows no signs of shifting. At 1:12am, it’s more of the same. Thumb down, thumb up. Twitter, Instagram, and—if you’re feeling particularly wrought/masochistic—Facebook. Ever since the COVID-19 pandemic left a great many people locked down in their homes in early March, the evening ritual has been codifying: Each night ends

the way the day began, with an endless scroll through social media in a desperate search for clarity.

To those who have become purveyors of the perverse exercise, like The New York Times' Kevin Roose, this habit has become known as *doomsurfing*, or "falling into deep, morbid rabbit holes filled with coronavirus content, agitating myself to the point of physical discomfort, erasing any hope of a good night's sleep." For those who prefer their despair be portable, the term is *doomscrolling,* and as protests over racial injustice and police brutality following the death of George Floyd have joined the COVID-19 crisis in the news cycle, it's only gotten more intense. The constant stream of news and social media never ends.

Of course, a late-night scroll is nothing new—it's the kind of thing therapists often hear about when couples say one or the other isn't providing enough attention. But it used to be that Sunday nights in bed were spent digging through Twitter for *Game of Thrones* hot takes, or armchair quarterbacking the day's game. Now, the only thing to binge-watch is the world's collapse into crisis. Coronavirus deaths (473,000 worldwide and counting), unemployment rates (around 13 percent in the US), protesters in the street on any given day marching for racial justice (countless thousands)—the faucet of data runs nonstop. There are unlimited seasons, and the promise of some answer, or perhaps even some good news, always feels one click away.



But it's not. Right now, people are living at a time with no easy solutions, a moment with a lot of conflicting "facts" in a rapidly changing landscape. According to Nicole Ellison, who studies communication and social media at the University of Michigan's School of Information, that means there's a "lot of demand on cognitive processing to make sense of this. There's

no overarching narrative that helps us." That, she adds, only compounds the stress and anxiety they're already feeling.

For years, people have questioned the net benefits of platforms like Twitter and Facebook, and while some studies have found social media, when used responsibly, can have positive effects on mental health, it can also lead to anxiety and depression. Or, at the bare minimum, FOMO. And that's just the result of looking at too many brunch photos or links to celebrity gossip. Add in a global pandemic and civil unrest—and the possibility that social media networks are incentivized to push trending topics into your feeds—and the problem intensifies. "In a situation like that, we engage in these more narrow, immediate survival-oriented behaviors. We're in fight-or-flight mode," Ellison says. "Combine that with the fact that, socially, many of us are not going into work and standing around the coffee maker engaging in collective sense-making, and the result is we don't have a lot of those social resources available to us in the same way."

> *hey, are you doomscrolling?*
>
> *It's almost Monday. Lots of big things happened this weekend, good and bad. Don't forget to take care of yourself and your mental health. Rest is still important. Sleep well.*
>
> *— Karen K. Ho (@karenkho)* ***June 15, 2020***

> *Every marriage has one person who doom scrolls and reads headlines out loud pre-coffee, and another person who is begging them to stop*
>
> *— Anna Kissed Alice (@Almost_Anna)* ***June 16, 2020***

The doom and gloom isn't all the media's fault, though. Mesfin Bekalu, a research scientist at the Lee Kum Sheung Center for Health and Happiness at Harvard's T.H. Chan School of Public Health, notes that while a lot of the news is bad, "as humans

we have a ‘natural’ tendency to pay more attention to negative news.” This, along with social media algorithms, makes doomscrolling—and its impacts—almost inevitable. “Since the 1970s, we know of the ‘mean world syndrome’—the belief that the world is a more dangerous place to live in than it actually is—as a result of long-term exposure to violence-related content on television,” Bekalu says. “So, doomscrolling can lead to the same long-term effects on mental health unless we mount interventions that address users’ behaviors and guide the design of social media platforms in ways that improve mental health and well-being.”

The effects of doomscrolling also vary depending on who’s doing it. Allissa Richardson, a professor at USC’s Annenberg School of Communication and Journalism, notes that when she was researching her new book *Bearing Witness While Black: African Americans, Smartphones, and the New Protest #Journalism*, she spoke to many activists who didn’t participate in doomscrolling simply because, they said, “I can’t see myself being killed over and over again in this tiny square on my phone.” Being able to participate in, and then opt out of, excessive social media use is, she notes, a privilege, which is why, when it comes to social media, many Black users turn to *Verzuz* battles on Instagram Live and other forms of Black joy as an act of resistance. “Doomscrolling for Black people works in the inverse, we’re actually trying to look for something separate and apart from bad things,” Richardson says. “For many nonblack Americans, this has been an incredibly enriching time, and doomscrolling for them is a deep dive into the things maybe they weren’t educated well about in the first place or maybe did have an inkling about but were ignoring.”

To that end, there have been some upsides to the constant clicking. Social media is helping people stay connected during lockdown, and as the conversation shifted away from COVID-19 and toward racial justice and the Black Lives Matter movement,

it’s become a tool for active engagement—spreading news about protests, bail funds, community resources—rather than just a forum for the passive consumption of pandemic updates. Yet the late-night digging, the endless reading of bad news, is draining. (It can also, Richardson notes, endanger protesters whose identities get spread around in other people’s feeds.) It’s a compulsion that’s only gotten worse in recent months, and one that points to humanity’s quest to find coping mechanisms when many of them have been stripped away.

So, the doomscrolling continues. The actual origins of the term are a bit murky, though many point to this tweet from October 2018 as a possible forebear. More recently, doomscrolling was designated one of Merriam-Webster’s Words We’re Watching, and Dictionary.com named it one of its “New Words We Created Because of Coronavirus.”

There’s something else in the etymology, though. Particularly in the word *doom*. Originally, the word had connotations that related it to judgement day and the end of the world, but now it’s just as likely to be associated with destruction or ruin. The act of doomscrolling, then, is to roll toward annihilation. Or, to borrow a phrase from Joan Didion (writing during America’s last traumatic, generation-defining year, 1968), it is an act of slouching toward quietus. Taken biblically, it has a Revelation tone. Each swipe through the timeline marks the end of a day of reckoning—for the state of the world at large and for the person attached to each appendage doing the scrolling. Simultaneously, each person watches the demise of so much, while also slowly destroying themselves. (This rush to judgement could also explain why so many public figures are now facing cancellation.) Didion lifted “slouching towards Bethlehem” from W.B. Yeats’ poem “The Second Coming,” itself a reflection on the destruction caused by World War I written amidst the 1918 flu pandemic. It’s only natural that the world’s scrolling reflects those writers’ apocryphal Apocalypse visions.

At the same time, it doesn’t have to. Doomscrolling will never actually stop the doom itself. Feeling informed can be a salve, but being overwhelmed by tragedy serves no purpose. The current year is nothing if not a marathon; trying to sprint to the end of one’s feed will only cause burnout and a decline in mental health among the people whose level-headedness is needed most. That means you, dear reader. Amidst all of the pain, isolation, and destruction of the past six months, it’s not worth it to add on to the strain with two hours of excess Twitter every night. Perhaps now just needs to be the End Times for your timeline.

This story originally appeared on wired.com.

https://arstechnica.com/?p=1687764

Mulan release date bumped to August 21 as coronavirus pandemic rages on



Enlarge / We'll have to wait a little bit longer for Disney's hotly anticipated live action remake of *Mulan*
YouTube/Disney

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The murmurs this past week were true: Deadline Hollywood reports that Disney has decided to bump the release date of its live action remake, *Mulan*, from July 25 to August 21, as the coronavirus pandemic continues to flare up around the world. It is not unexpected: theaters still haven't re-opened in China, with no concrete dates for re-openings in New York and Los Angeles, either. Without those major markets, the financials just don't work.

"While the pandemic has changed our release plans for *Mulan* and we will continue to be flexible as conditions require, it has not changed our belief in the power of this film and its

message of hope and perseverance," Alan Horn, co-chairman and chief creative officer, and Alan Bergman, co-chairman, The Walt Disney Studios, said in a statement. "Director Niki Caro and our cast and crew have created a beautiful, epic, and moving film that is everything the cinematic experience should be, and that's where we believe it belongs – on the world stage and the big screen for audiences around the globe to enjoy together."

As Deadline notes, "The good news here for exhibition is that Disney has a plan to open *Mulan* in the near future, close to *Tenet* and not during the holidays or 2021 (or even on Disney+, for that matter)."

As for other films, the Coronavirus Hollywood Shuffle continues. Just two weeks ago, Warner Bros. decided to shift *Tenet*'s release date to July 31; yesterday the studio bumped it again, this time to August 14. Nolan's planned 10th anniversary reissue of *Inception* now will open on July 31 instead of July 17.

That, in turn, prompted United Artists to move the release date of *Bill and Ted Face the Music* to August 28, to avoid competing with *Tenet*'s new release date. That's when *The New Mutants* was scheduled to drop, so we can probably expect that date to change, too. Basically, until we get this pandemic under control, we should all just assume these are flexible rolling release dates and plan accordingly. And as Deadline points out, major cinema chains are likely to delay their planned re-openings as well.

I think *Mulan* will be worth the wait. When the first teaser dropped last July, I noted that, while I'm not a huge fan of Disney's live-action remakes, "this is an effective, sumptuously eye-catching teaser." The first full trailer dropped in December, and cemented that assessment. "It looks gorgeous, very much in the style of a period war drama, and its rumored $300 million production budget shows in every

breathtaking shot," I wrote.

The final trailer, from the halcyon pre-pandemic days of February, is embedded below. Let's all suck it up and continue to wear our masks, keep social distancing, and hopefully implement even more testing and contact tracing, so we can all finally go back to the movies before the summer ends, mmmkay?

[embedded content]
Final trailer for Disney's live action *Mulan*.
https://arstechnica.com/?p=1687845

Back to kick some demon derrière: Wynonna Earp S4 trailer is finally here



reader comments

11 with 11 posters participating

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[embedded content]
Melanie Scrofano returns as the titular gunslinging, demon-hunting heroine in S4 of SyFy's *Wynonna Earp*.
The SyFy series *Wynonna Earp* has trod a rocky road on the way to its fourth season, much to the frustration of its loyal fanbase ("Earpers"). First, the start of S4 production was delayed until late 2019, due to financial troubles at IDW Entertainment. Shooting finally commenced this past January in Alberta, Canada, and was nearly complete when the coronavirus pandemic led to the shutdown of all film and TV productions. Showrunner Emily Andres and her determined team have nonetheless managed to complete the season, and we now have the first trailer (uncensored, with colorful language fully intact), and an air date: July 26, 2020.

(Some spoilers for first three seasons below.)

The original comic book series created by Beau Smith in 1996 had Wynonna roaming the world hunting down revenants and other demons; the TV series mostly keeps her in her hometown of Purgatory (primarily for budgetary reasons). As I wrote when S3 wrapped way back in October 2018, Wynonna is the the Anti-Buffy: "She's a hard-drinking, foul-mouthed, promiscuous, bar-brawling free spirit with a chip on her shoulder. She never even had a shot at being Homecoming Queen in high school."

Instead of battling vampires, Wynonna (Melanie Scrofano) takes on "revenants," the repeatedly reincarnated outlaws that Wyatt Earp killed. They won't stay dead until the Earp heir—Wynonna—offs them with Wyatt's famous 16-inch barrel revolver, dubbed Peacemaker. She's also battled witches, vampires, vengeful spirits, nutty sister-wife cults, possessed neighbors, and killer trees, among other threats. She is not without allies, however, including the immortal being, Doc Holliday (Tim Rozon), with whom Wynonna becomes romantically

entangled. Then there is her baby sister, Waverly (Dominique Provost-Chalkley), who falls for local deputy Nicole Haught (Katherine Barrell)—a popular pairing dubbed "Way-Haught" by shippers.

In the first season, Wynonna sought out the band of revenants responsible for the deaths of her father and sister, only to find her sister's fate was something quite different. In S2, she wrestled with her mother's mysterious abandonment of the family while contemplating her own impending motherhood, courtesy of Doc. At the same time, she discovers that Waverly might not be an Earp after all. In S3, we got some answers, as Wynonna discovers her mother, Michelle (Megan Follows) is a patient in a high-security psychiatric hospital, and Waverly—well, Waverly turns out to be half angel, thanks to Mama Earp's affair with an angel named Julian (Sebastian Pigott). Wynonna also finally had the chance to confront the demon Bulshar (Jean Marchand), the one who cursed the Earp family (and by extension the revenants) in the first place.

- Wynonna Earp (Melanie Scrofano) is having a bit of an identity crisis with the loss of Peacemaker.
  YouTube/SyFy
- Her baby sister Waverly (Dominique Provost-Chalkley) seems to have been freed from the Garden of Eden.
  YouTube/SyFy
- Waverly's girlfriend, Nicole Haught (Katherine Barrell) is now sheriff of Purgatory.
  YouTube/SyFy
- Doc Holliday (Tim Rozon) keeps beating death.
  YouTube/SyFy
- He's also Wynonna's baby daddy.
  YouTube/SyFy
- Looks like we'll get to see retired sheriff Randy Nedley (Greg Lawson) in S4 too.
  YouTube/SyFy
- Wynonna has her own Q in Jeremy (Varun Saranga), a Black

Badge scientist who might not be entirely human.
YouTube/SyFy

- Careful with that high-tech weapon, girl.
  YouTube/SyFy
- Doc spent some time in a very bad place, it seems.
  YouTube/SyFy
- Women on the warpath.
  YouTube/SyFy
- Doc and Wynonna, back together and rarin' for a bar fight.
- A good day for a hanging?
  YouTube/SyFy
- Wynonna's just chuffed to be back in Purgatory, y'all.
  YouTube/SyFy
- We're definitely gonna get some creepy supernatural monsters in S4.
  YouTube/SyFy
- Wynonna and Nicole weigh their options.
  YouTube/SyFy
- Ready to kick some demon derrière.
  YouTube/SyFy

Wynonna Earp has a small but very loyal audience, and hence there's never any guarantee of additional seasons, despite the critical raves. Perhaps that's why Andras decided to really raise the stakes in the S3 finale, which pretty much blew up the show's original premise. The Earp curse appears to be lifted, the revenants have vanished, and Peacemaker is no longer a gun but a flaming sword that serves as the key to a portal leading to a lost Garden of Eden.

Alas, the victory is Pyrrhic at best. Everything comes with a price, and the personal sacrifice required was particularly high this time. Waverly was forced to remain in the Garden of Eden as its prisoner to keep the portal closed, and Doc—now a vampire, and frankly needing to make amends for some very bad S3 behavior—volunteered to remain there as well, to keep her

safe. Asked where, exactly, Doc and Waverly are, Andras told the Hollywood Reporter, “If I get the budget I want, they’re in Hawaii, and we all have to go get them. Spoiler alert: They’re probably not in Hawaii. But we will have an adventure getting to them regardless.”

Judging by the S4 trailer, Doc and Waverly are definitely not in Hawaii, and it’s clear that Wynonna and her remaining allies pulled off a successful rescue operation, because both characters feature prominently in the footage. It opens with Wynonna having a crisis of confidence, having lost everything that made her such a formidable force in the prior seasons: Peacemaker, Waverly, Doc, even Nicole, who is understandably angry with Wynonna for how S3 events played out.

“Demons running amok, mystical portals to an otherworldly realm—it’s just so good to be home,” Wynonna says. She’s trying to get the gang back together, but they’ve got some issues to work through in the process: Nicole responds to Wynonna’s proffered hug with a punch to the face. But Sheriff Randy Nedley (Greg Lawson), supposedly retired, pitches in, and we soon see Doc, Waverly, and Nicole on board and ready to kick some demon butt and take back Purgatory. Just repeat Wynonna’s battle mantra: “Clear eyes, full bra, can’t lose.”

The fourth season of *Wynona Earp* premieres on Sunday, July 26, 2020, 10 PM/9 PM Central on SyFy.

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