STELLAR JOCKEYS NOVEMBER NEWSLETTER

Welcome to the Stellar Jockeys newsletter for November. The winter holidays are approaching, so we've got a few gif(t)s waiting for you...

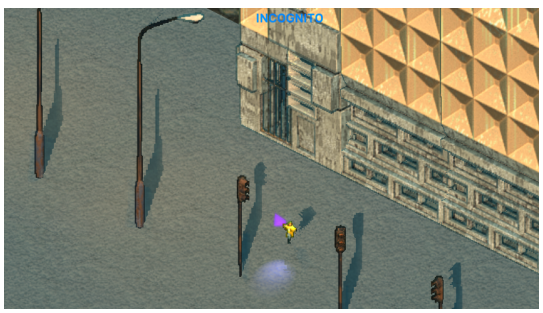
Benjamin, Stellar Jockeys

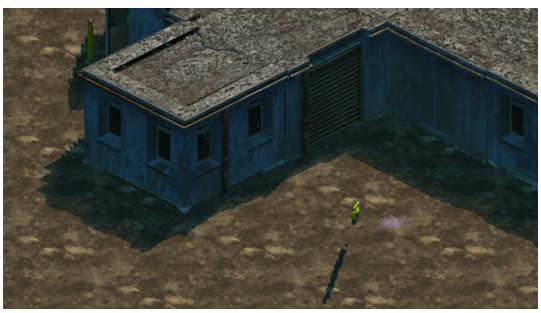
Explaining Brigador Killer's Engine: Shadows

In September's newsletter we talked about the art content pipeline and how we're doubling the resolution of sprites for Brigador Killers. One of the issues with making fundamental changes to the engine for our next game is it inevitably reveals new hurdles that need to be overcome.

[To use a metaphor, imagine that a game engine is a fully-packed suitcase almost ready to burst and that making an engine change is like attempting to put another item inside that suitcase and trying to close it again - chances are you'll need to get a bigger suitcase, or get better at packing.]

So we're going to illustrate some of those issues with a few images and GIFs. First up: shadows, and please note that the following is a work in progress and not indicative of the final product. Below you'll see two images from a so-called "zoo" level. Zoo levels are typically hidden from the player and they are the places we as developers populate with all of one type of thing for testing purposes - in this case *this* zoo level is filled with environmental props (click to enlarge).





In a Brigador level, shadows are cast from a simulated sun. We can adjust the sun's azimuth and elevation using the "weather" .json data file, and the shadows will update their angle and direction appropriately. That's

unusual for a sprite-based game. Many 2.5D games make do with a generalized blob shadow underneath each sprite, since sprites only represent information about the side that's facing you.

In the first game, we solved this by making educated guesses. During the sprite rendering process, we save out the "z-depth" information: for each pixel in the sprite, we remember its distance from the camera. The shadowing shader looks at that pixel, offsets it by the angle of the sun, and draws a slice of the z-depth to fake a cast shadow. It works better when the sun is directly overhead. At low angles, you start to see a "staircase" effect, and the gaps in our educated-guess shadow start to appear.

Here are a couple of gifs of the sun's position being changed in-engine for the above two images (left, right) to more obviously illustrate it. As you can see, wide and chunky props like buildings can cope okay but thin elements like lamposts are immediately noticeable.

[Regarding the disembodied shadow of the player-controlled civilian: the BK engine treats the civilian as if it's floating about 12 feet in the air and produces a shadow separate from the ground, though from our isometric perspective we are tricked into thinking it's still standing on the ground as normal. This is because we have not yet finished updating the way the game handles sprites in the new resolution.]

Brigador also had this problem, but it's much more noticeable with the BK engine because of the higher sprite resolution (and probably sheds some... light as to why so many campaign levels were set at night).

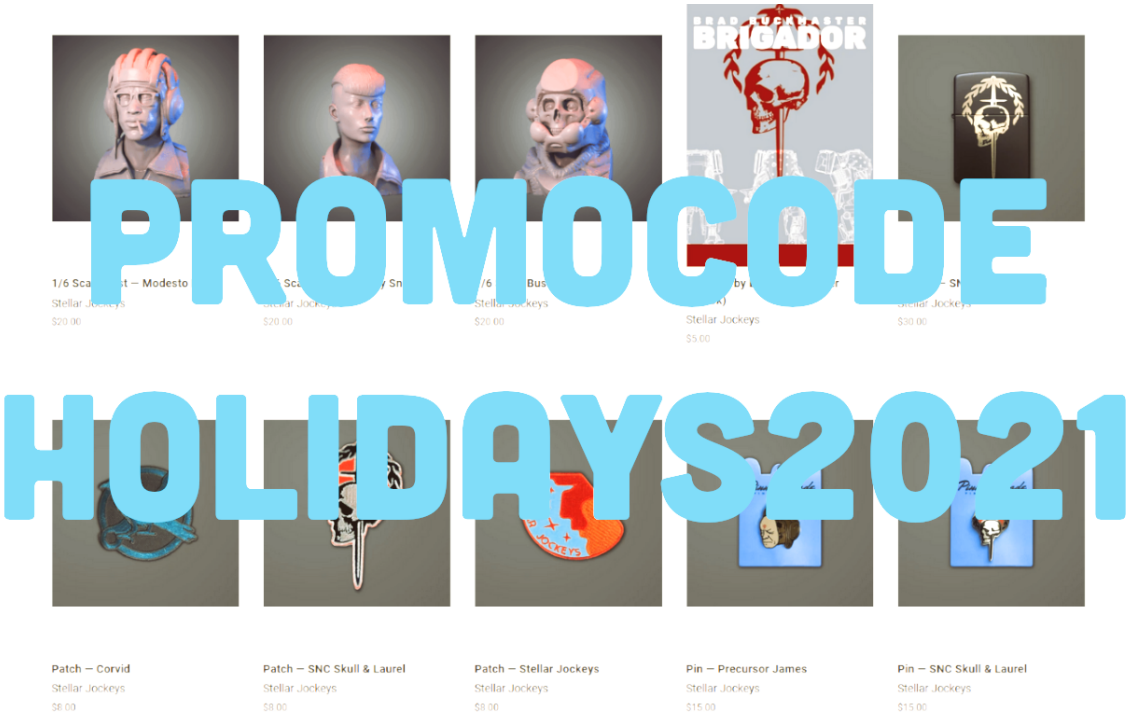
Fortunately, it is no longer 2014 and there have been many developments in render techniques in the past seven years, so there are techniques to address this shadow staircasing effect. One such way might be to use a "reverse depth image" of these models to give the engine an idea of what the sun can "see" so that we can calculate the shadows properly. Put another way: we already get one depth texture for our point of view as a player - we're making another one from the sun's point of view.

However! Remember the suitcase analogy - we can only fit so much, unless we make the suitcase bigger. Rendering an additional texture for every sprite means we need that much more memory to store the textures. It's likely that whatever we end up doing, the engine for Brigador Killers is still going to require more from a computer's hardware than its

predecessor. We can only speculate at this time, but one route might be to use more of the GPU memory. Another is that we could store those shadows into a different kind of buffer in memory, which may affect how long it takes to load a level.

Regardless of what happens, and recalling what we said in August's newsletter, this is all just part of the excitement (and problem) of using your own engine.

Get Your 20% Holiday Discount On Merch



Enter promocode HOLIDAYS2021 at our store checkout (or click the button below) to get 20% off your next merch purchase. We're freshly stocked up on SNC lighters, and there are still plenty of patches, pins and busts.

Get 20% Off

Please note: minimum order value of 8 USD required. Promotional code is active from the moment you receive this email until 23:59 CST, December 31st, 2021. Happy Holidays!

Community Spotlight

A brief but faction-themed community spotlight this month. Seems a bout of inspiration struck Flyingdebris, who has treated us to an excellent Corvid tac rig...

...ORNG 3D-printed a Touro to add to their Battletech Lance but not before painting it in Spacer colors (view more angles of it in this imgur gallery)...

...and we're not exactly sure why but Modusoperandi decided to mash up Leonz' famous Among Us remix with Makeup And Vanity Set's Strange Bedfellows from the Brigador Killers OST via Rave.DJ □♂

As always, you can browse a gallery of community contributions past and present in the #becks_best channel on our Discord server.

Join Our Discord Server

Next Month

December will be a short month for us (and hopefully you!), so the next newsletter will come early.

Stellar Jockeys
112 N Neil St Apt D, Champaign, IL
United States