Tracking the International Space Station

(celebrating slow)

The ISS, International Space Station, takes ninety minutes to orbit the earth. Against the rush of modern life it obediently follows its invisible path over mountains, oceans and islands around the world. Watching its slow, looping steps from above (almost twenty times higher above but a long way short of the moon) is an exercise in patience, punctuated by highlights of completing or crossing orbits, or flying over a personally significant country.

A HTML/JavaScript page was created using a globe with only coastlines represented because the more well-known WebGL globe reported console errors. The colours were changed to add warmth and visibility, and the globe spins underneath the ISS, centring on its current position (provided by an API server) and updating every eight seconds to shift coastlines smoothly by one or two pixels. Every tenth co-ordinate pair displays an ISS icon formed of three overlapping rectangles, forming a trail spaced out across the centre and bunching up near the horizons.

A separate canvas displays the ISS icon and is wiped every frame to avoid smearing. Icons have transparency included to fade cyclically with age. They also twist, but this is artistic licence.

It was difficult displaying historic ISS positions across a trailing dateline. For example, if the ISS was over Hawaii, anything beyond -180o towards China was not displayed. Archiving ISS positions after running the program for hours helped because test co-ordinates in the archived array could be used to see instantly if the tracks displayed correctly. The problem was only resolved by removing a lower longitude limit in JavaScript: *if( ISSlongitude < -90)*worked but *if( -180 < ISSlongitude < -90)* did not. Another problem was that the ISS icons extended far into space at high latitudes, solved easily by artificially shortening the horizon and including latitude in a Pythagorean calculation.

The whole visualisation requires only two inputs and works well because we are strongly attached to our home planet “into which our identity and awareness are pulled.” (McCloud, 1993). The short and plain introduction before the animation is less successful. It proved difficult to use innerHTML at a late stage and early attempts at using P5 unfortunately placed the visual effects below the main body.

Website references

<https://www.nasa.gov/feature/facts-and-figures>

<https://www.nasa.gov/mission_pages/station/expeditions/expedition26/iss_altitude.html>

<https://www.multicians.org/thvv/gcw.html>

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Book references

McCloud, S. (1993) *Understanding Comics: The Invisible Art* New York: Harper Collins

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