

Hi this is Steve Nerlich from Cheap Astronomy www.cheapastro.com and this is *Cheap Astronomy - Live in Hawaii*.

Now, if you're going to fly from Australia to Hawaii, that is the state, you pretty much have to land in Honolulu, which is on the island of Oahu. So, a little jet lagged we landed drank a Book 'em Dano cocktail, watched the sunset, failed to see the green flash, then shopped and slept. Next day we flew to Hawai'i, that is the island – or as it's better known the Big Island.

It was a good flight, with Mai Tai cocktails – and off to the left we could see Mt Haleakula, on the island of Maui, which has its own its own astronomy outpost on the summit. Anyway, the flight took us to Kona on the Big Island, where we once again failed to see the green flash at sunset, over Pina Coladas, we slept and we awoke to the 6th of June 2012. We looked nervously at the weather, since this was the day for the 2012 Transit of Venus. It all looked good, apart from the usual early morning vog – which is what the Hawaiians call a light haze resulting from volcanic out-gassing – not fog, but vog.

So, all being well we went off to admire the Galaxy Garden – a curious entity designed by Planetary Society member and artist John Lomberg. The Galaxy Garden is essentially a shrubbery about 15 metres in diameter – which forms a scaled model of the Milky Way. It has hedges representing the spiral arms with lots of different shaped shrubs to represent nebulae and globular clusters and lots of the plants have speckled leaves to represent stars and you have to hunt around to find one particular leaf on one particular hedge representing the Orion Spur, where you find a little sign that indicates the rough position of the Solar System.

But while educationally passed the time until first ingress of the Venus transit due at 12.09 – oh bollocks, the clouds had come in. In fact, we totally missed first and second contact. And as for the much vaunted live feed from Mauna Kea, we were already piling into the van as our host was still pleading with their tech support that their wireless router had five bars showing.

Anyhow, we went and saw some sights around the island as a hidden Venus began its slow six-hour track across the face of the Sun. And after a couple of stops, I did start getting glimpses through the clouds of that tiny dot – and then as we came out of some historical church, Holy Haleakula – the Sun was clear. Our group grabbed eclipse glasses and grade 14 welders' glass and yours truly even projected an image through my cheap but trusty binoculars onto a wall. There it was folks, the bleeping Transit of bleeping Venus, 2012. So, we all hopped back into the van, went back to the galaxy garden and geeked out with solar filtered binoculars and a 10 inch Dobsonian (nothing too expensive you understand) until it was all over. Woo hoo.

After all that, we calmed our nerves over a Blue Lagoon or two, then it was straight to bed and then onto the next big day... Mauna Kea.

The Mauna Kea observatories are promoted as world's best optical astronomy site – and this is probably true, with the Atacama desert observatories being a very close and very competitive second place holder. From Mauna Kea's summit you really experience the feeling of being above the clouds and indeed the atmosphere there is perceptively thinner.

And we were lucky enough to get a guided tour of the optical/infrared Japanese Subaru telescope. The Subaru telescope is an 8.2 metre Cassegrain – but with a substantial options package. For example, you can position a camera at its primary focus, that is the focal point of the main mirror, or you can keep the secondary mirror there and place a tertiary mirror to deflect the light beam off to the side (which is apparently called a Nasmyth focus).

The inside of the building enclosing the Subaru telescope was a darn sight colder than the outside – even though the outside was the summit of a 4200m extinct volcano. This is because they have to keep the telescope environment near zero degrees Celsius, otherwise the infrared detector will pick up too much background noise from both the telescope infrastructure and the surrounding building. Indeed, the detector itself is kept at a chilly 37 Kelvin using a vacuum pump/heat exchange thingy that goes like this... Cool, huh?

After that we had a look at the twin 10.2 metre Keck telescopes, although these were closed to visitors. In fact, all the Mauna Kea telescopes generally have minimal personnel on site, with most of the operational work being done remotely from surrounding towns like Waimea and Hilo. The Keck telescope people did also give us a nice presentation but inside a cosy lecture theatre in Waimea, much closer to sea level.

People are still saying the twin Keck's have the biggest mirrors of any optical telescope – although the Great Telescope in the Canary Islands has a 10.4 metre mirror, there's just some debate about whether it's fully operational. As you may know the Kecks have segmented mirrors composed of 28 interlocking hexagonal segments – since a single 10 m mirror would warp under its own weight using current technologies.

Anyway, after our big geek out on Mauna Kea we began the drive back to sea level. But first we stopped at the Visitors Centre which is at about 3,000 metres where you have to stop to on your way up to acclimatise. And when you come back down, you can just hang around here until it gets dark and then do some awesome dark sky viewing.

So, I did the usual thing of finding the Big Dipper and then following the pointer stars along to Polaris. Then the helpful volunteers at the Visitors Centre ran me through the following mnemonic. If you start from Polaris and trace a line back to the Big Dipper, then you can follow the curve of the dipper's handle and 'arc over to Arcturus'. And from there you can 'spike down to Spica' (where down is a roughly southerly direction) and you can just keep following that line all the way down towards the southern horizon where you find the Southern Cross just peeking over the top.

Of course this configuration only works in the Spring. But it is kind of nifty that being less than 20 degrees north of the Equator, you can see both Polaris (the Northern Celestial Pole) and the Southern Cross – which is at least pointing the way to the Southern Celestial Pole.

In fact, the 'arc over to Arcturus' story gives you an insight into Polynesian astronomy – which these people used to navigate their way between the eight islands of Hawaii and indeed across the wider Pacific. The line created by arcing around to Arcturus, down to Spica and then to the Southern Cross offers quite a reliable direction finder and the residents of the Big Island would know they were near home when Arcturus, known locally as Hokule'a, was directly overhead at the zenith of the sky.

And after all that, we reflected on this great day over some Saddle Road Sunsets then we slept and got up and went and saw the active volcano Kilauea – which if it's not about astronomy, is at least about planetology. And now I can tick that little box that says *have seen the red glow of inner Earth*.

Mahalo for listening. This is Steve Nerlich from Cheap Astronomy, www.cheapastro.com. Cheap Astronomy offers an educational website in the spirit of Aloha where I just give you something and you are not obliged to give me anything in return. No ads, no profit, just good science. Bye.