

# Traveling to Australia to certify L&E



Only to find out I'm the 2<sup>nd</sup> yank to do so ☹️

# First Things First



- Australia is about the same size and shape as the continental US
  - Yet it has about 1/10 the population and most of that is in a few cities
- It's what the US would be like if it weren't spoiled by Lawyers
- International shipping isn't that difficult once you figure it out, nor is it that expensive
- Rocketry in Oz is much less advanced than it is here, especially regarding regulations! (working with CASA to improve)
- Utes and Wombats are cool
- Vegemite is good, if eaten properly! If you think otherwise, your wrong!

# The hardest part...



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- Convincing the spouse that you need to interrupt “their” vacation with a rocket launch...
  - Ruth??

# Getting There Is Half the Fun

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- It was cheaper to fly east via Abu Dhabi
- The day after we left, there was 20 cm (~8 inches) of snow here
  - We enjoyed 29C+ (85F) temperatures!
- Going the long way actually took not much longer, and only one layover!
  - Incidentally total travel time was only 2:22 longer than coming home via KLAX
  - The rocket flew through Dubai... came home through KLAX as well... how many L3 certification rockets have completed one orbit!

# Getting the rocket there, not so much

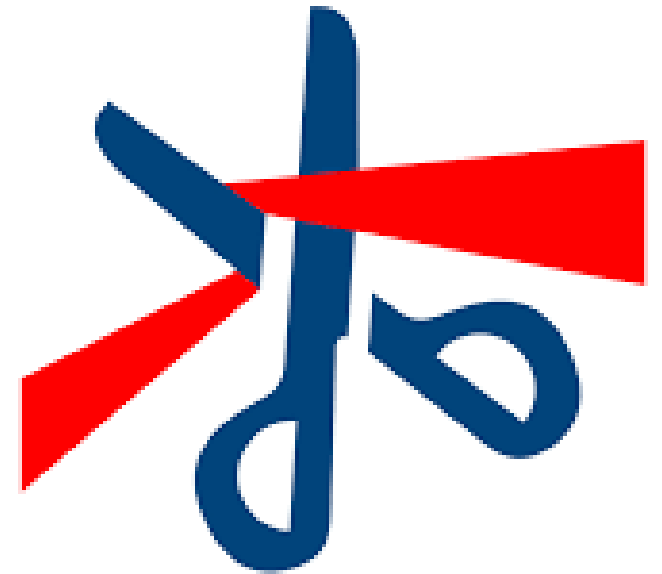


- Most major “people” cargo airlines don’t like to carry larger rockets
  - Tom and Maria Ha solved this by limiting to “suitcase” sized rockets
  - Steve Lubliner used removable fins.
  - I had bigger plans
  - Bryce Chaines found out the hard way that large boxes aren’t accepted
  - I called ahead
- Cargo airlines are much more amenable, but require a bit more advanced planning
  - Talk to a freight forwarder, usually found around larger airports
  - This can be FAR cheaper than excess baggage fees!

# Ah... the red tape



- Armature radio licensing is “similar” to that in the US, and there is license reciprocity
- HP regulations are similar
  - A waiver is still needed
  - Getting a waiver is a more difficult process
  - AMRS safety code is the same as the NAR’s safety code
  - NAR and AMRS have a reciprocity agreement
    - \$10 souvie!!
- Other things are not regulated the same
  - Black powder is very thoroughly regulated
  - E-matches are not!



# About the Rocket



- Custom design (as a L3 project should be in my opinion)
- PML tubing, schnozcone, other components
- Personal design of fins, cut from a sheet of G-10
- It's built to take a larger motor, but let's certify first.
- Suffered a few OH \$#!%s along the way



Taken 12 February 2015  
Got on a plane 2 March 2015

# More about the rocket



- Size
  - 6" diameter, 10'+ in length
  - 98mm motor mount X 50"
- 2X layers of 9oz / yd<sup>2</sup> e-glass and 2X tip to tip glass of the fins
  - Was difficult, but fun!, done as a cost saving measure
- Fins are 3/16" G-10
- 35' of Kevlar<sup>®</sup> shock-cord, piston on the main 'chute, same on drogue
- 2 independent altimeters (Ozark ARTS & MissileWorks RRC3)
- Aeropak motor retainer
- 30ish lbs dry!, ~38 on the pad
- Source of parts: PML, Ken Allen, Fiberglass.com, Crossnail Laminates, McMaster Carr, Home Deopt, & Amazon



# Before We Went to the Launch



- Spent 3 days in Sydney
- A day in Brizzie
- Went to Australia Zoo
- Got the ~~rocket~~ Model Aircraft out of customs
- Saw cool stuff!



# Unpacking in Brizzie!



And this is where Ruth started to yell at me for making a mess, I don't see it  
The Concierge kindly asked that we don't blow up the building

# Getting to the Launch Site



- It's about a 5.5 hour drive from Brisbane
- The nearest gas petrol station is about a 60km trip!
  - Speed limits in Australia are IMMORAL!
  - Fuel prices are relatively high (with the exchange rate, ~\$4 / gallon)
- The road is a bit on the bumpy side, similar to VA 245
- Have a GPS (you will get lost otherwise)
- Once you turn onto the station, its about another 20 minutes

# About the Station



- Over 20,000 Hectares (50,000 Acres!)
- Holds the world record for most wheat planted in a 24 hour period
- The station owners are INCREDIBLE!
  - Even offered to give Tom Ha gas petrol
  - Huge thanks to John and Lyn Coggan!!
- Creature comforts are limited (Ruth says “nonexistent”)
  - They did have beer though!
- There were rocket loving trees however (not many)
  - Chainsaw recovery was permitted



# But it is Rocket Heaven



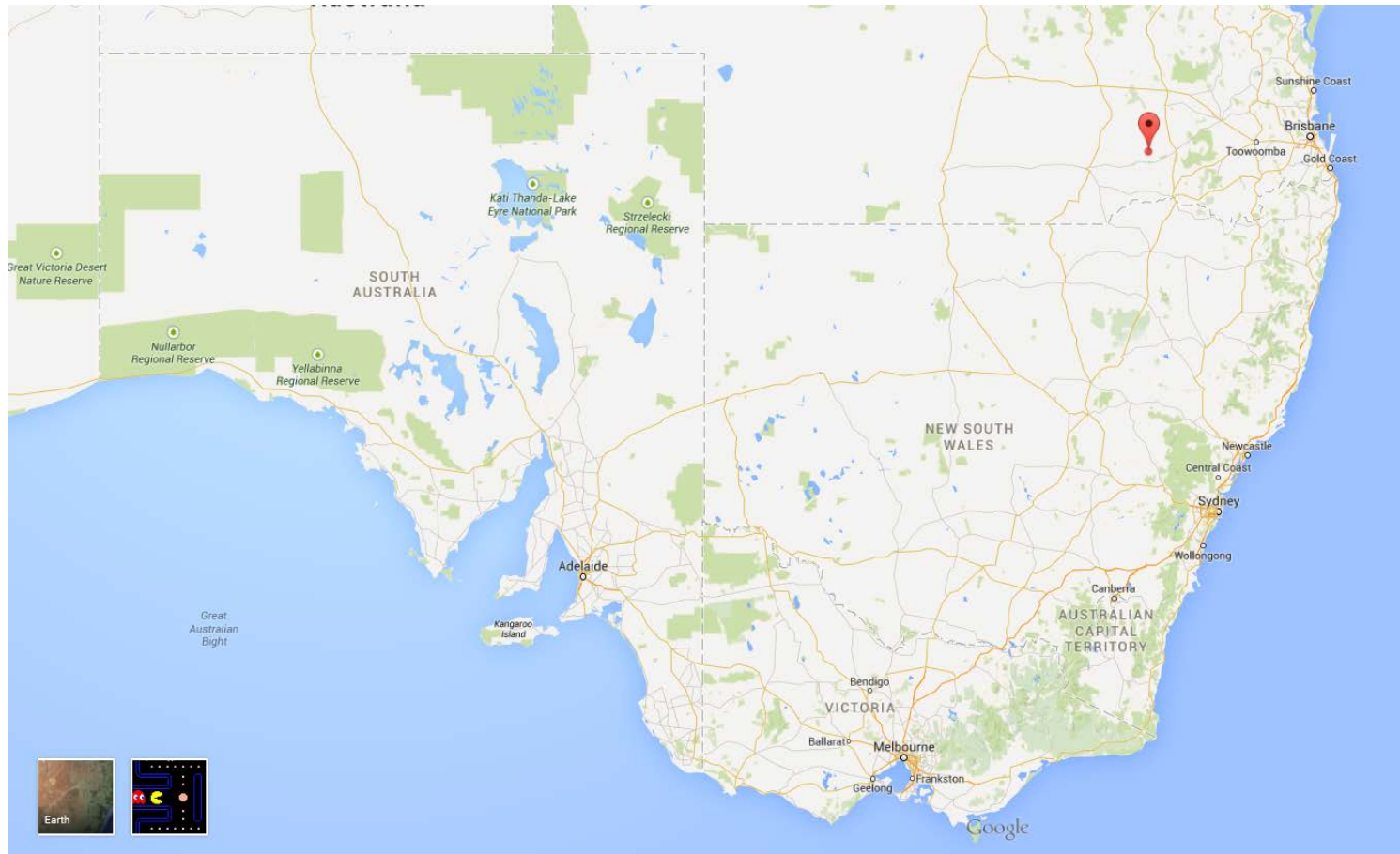
- 120K foot waiver (more may be possible in the future)
- Minimal rocket eating trees
- 9km radius around the launch site!
- Minimal signage



# So Really, where are we?



- Woop woop! (Aussie slang for east bumblef^{%})



- 5 hours west of Brizzie
- Similar location to Greensboro, NC
- Still not the outback!



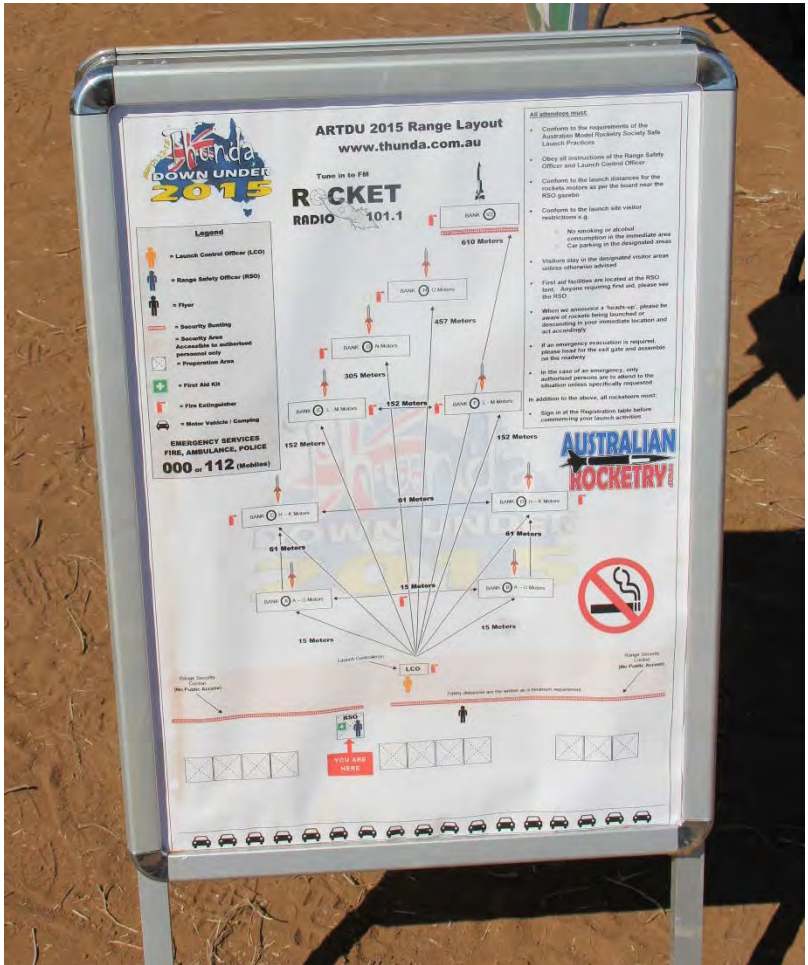
# Creature Comforts



- Food:
  - Had the option to buy lunch and dinner at the range
  - Banquet under the stars
  - Ice was difficult to come by
  - After hours “bar”
- Toilets
  - 2 portajohns
  - Other option...
- Camp sights
  - The ground was hard!
- Baby wipes were a good idea



# The Range

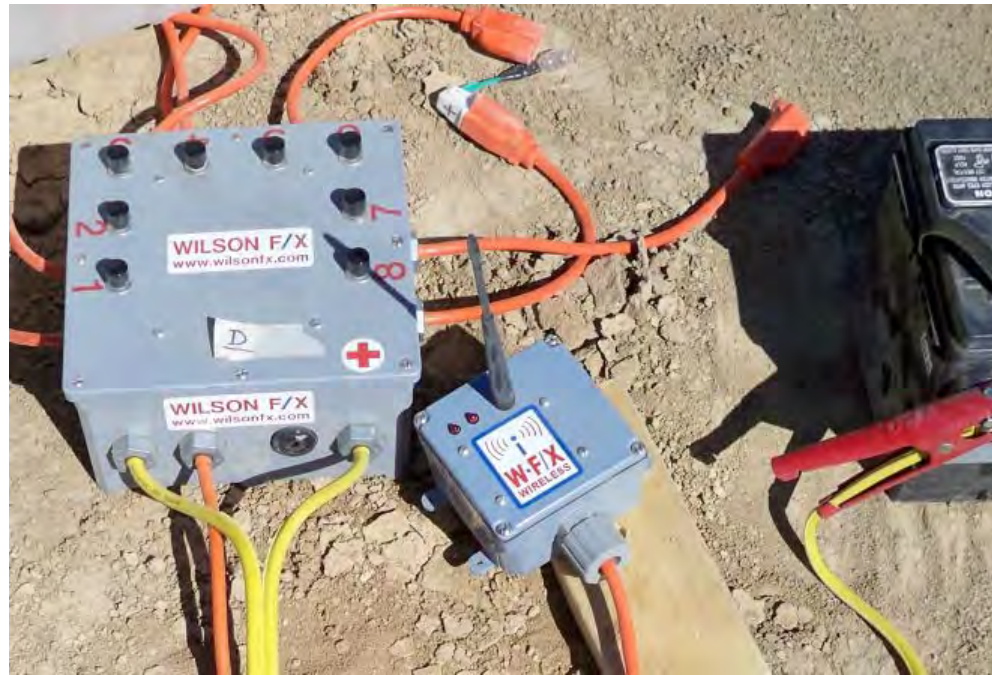




# Range Equipment



- The launch control system was complex, but worked well, it's wireless!
- The major issues with the pads is that they couldn't be angled



# Prep Work



- I did most of it away from the flight line, took my time
- Really not much more to it than on a smaller rocket, just bigger
- Was debating postponing a day, but the weather cleared up around 4pm
- Needed help with an igniter, used an e-match, bit of propellant, and a bit of black powder
- Regulations are different



← Wilber!

# The launch



- Had a great break in the clouds
- I had a rack to myself
- I was **a lot** nervous leading up to it



# Flight



Got the name  
“Aussie Thunda”  
from the crowd!

# Me? Excited? Never!!!!



“That is probably one of the most dramatic celebrations I’ve seen in a long time. He is ok though and he is level 3!”

-Bryce Chanes on seeing me certify (while laughing)

# Recovery



- Maybe ~0.75km between the flight line and the landing
- Looked great!
- Shortest distance was across a barbed wire fence
- Altitude:
  - RRC3 - 84??
  - ARTS - 89??
- Lightest 35 lbs rocket!



# Aftermath



- Not the best blast deflector!!
- This hole wasn't there when I set-up!

# Other cool flights... Water Rockets



- Estimated G 1000 equivalent
- Flew last day on XXXX
- Had a few other water rockets
  - Multi-stage in parallel
  - Cool effects on some!





# Other cool flights... Buckey Ball



- Flew on a K multiple times
- Very light weight
- Awesome construction
- Owner had a thing for sparkeys



# Other cool flights... Matching Accessory



- I checked this rocket in
- Pool on poodle vs. parachute
- Again, crowd named!



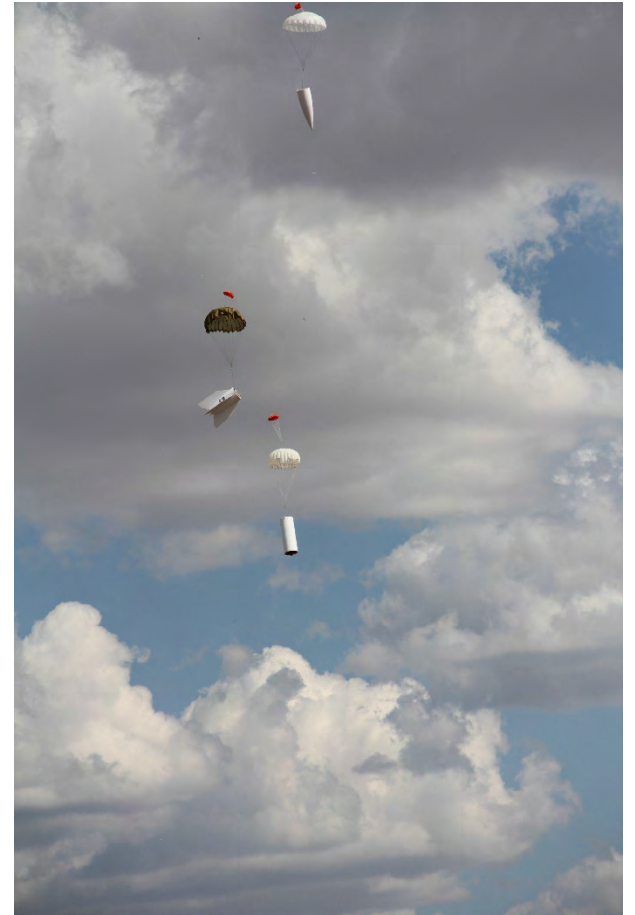
# Other cool flights... Airborne Macropod



- No connection with any airline



# Other cool flights... Full Scale V2?



The Saturn V was more impressive

# Evening activities



- Rocket fuel “bar”
- Star viewing from Australia’s top amateur astronomers
  - Almost no light pollution
  - A number of large telescopes, also used to track rockets and view sun-spots
- Lecture on the “better half of the sky”
- Banquet under the stars
- Some retired NASA guy was there
  - Movie night



# Video



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- Go to the video now!

# Issues from the Launch



- Launch rods could not be angled, most flights blew over crowd
- Range layout was not conducive to loading one bank and launching another
- Number of people exceeded demand for “camp sites”
- Better coordination for shipping rockets!
  - Could have shipped another L3 rocket for no additional cost
  - Lots of other smaller rockets could easily fit in
  - FYI... Most airlines won't take a “rocket” sized “suitcase”
- Some form of a camper is mandatory (Ruthie says so!)



# After the launch...

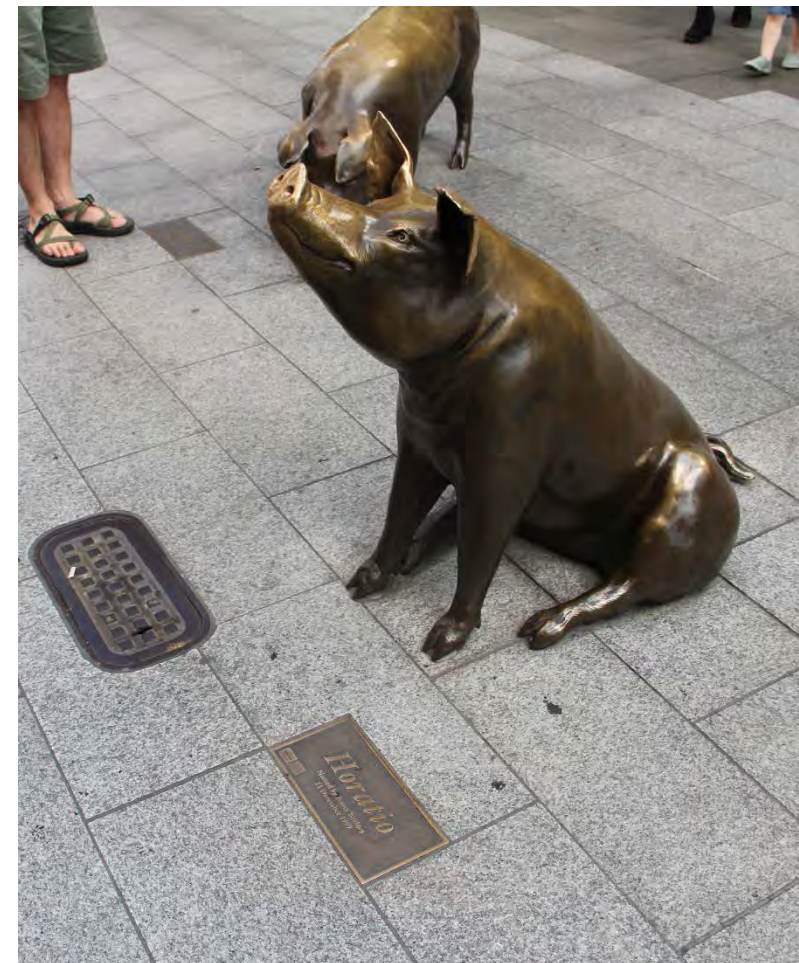
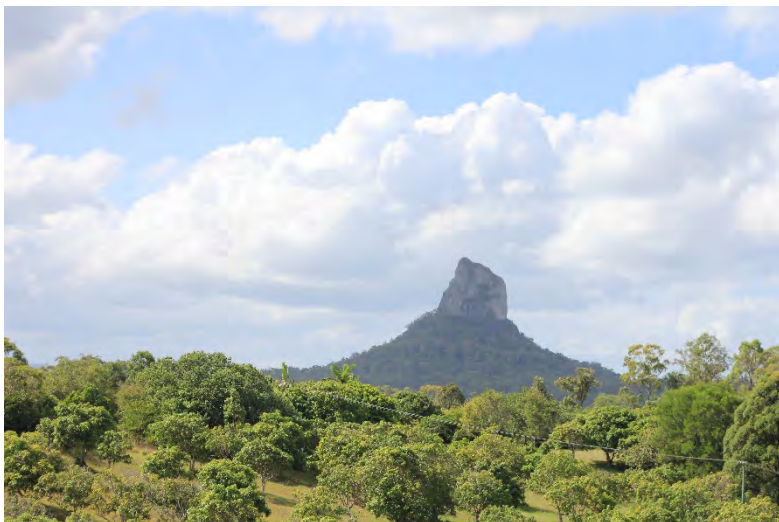


- Back to Brizzie
  - SHOWER!!! And laundry!!!!
  - Glass House Mountains
- Adelaide / Kangaroo Island
- Clare Valley
- Warrnambool (Ruth went to Uni there!)
- Great Ocean Road
- Melbourne





# Pictures of travels!



# Sadly, all good things...



- We had to return home
  - I was beginning to understand Cricket
  - My liver couldn't take it any more!
- Return shipment:
  - We dropped the rocket "Personnel Effects" off in Brizzie
  - They held it for the remainder of our trip
  - Got back to KIAD the same day we did
  - Customs in the US was easier, took 20 minutes from arriving to leaving Dulles!
  - Tom & Maria got their table back at TARC!



# Special Thanks to:



- Trip for letting me know about the launch, and lending me his casing, parachute, and constant encouragement
- Ben and Mitch for the review of the rocket 2 days before shipping
- Blake Nikolik for setting up the launch and signing off on my flight
- The rest of the QRS for working the launch
- Steve Lubliner, Tom & Maria Ha for observing motor assembly, table use, etc.
- Ruthie! (most importantly!)

I have seen further because I have been  
hoisted up upon the shoulders of giants!

What's next?



1<sup>st</sup> weekend in October 2018!!!!!!!!!!

<http://thunda2.com.au/>

# Improvements???



- More toilets!
- 24 showers with 15000 of water
- Fireworks show
- Potential double feature! (Rocket Boys and Hidden Figures)
- Special guests
- 120k ft waiver!
- Bigger promotion around Australia
  - Moving from ~1500 people to hoping for 5,000