

# Bellarmine 2017 Eclipse Plans and Notes

Stephen Brown and Ahktar Mahmood

July 13, 2017

## 1 Notes given to us

- Provide expert perspective about the upcoming solar eclipse
- “How to watch the eclipse”
- A description of what’s happening in the sky
- What has everyone so excited about this particular opportunity,etc.

## 2 Additional questions given us

1. When the moon blocks direct sunlight, how is that dangerous to the naked eye? What potential dangers should people be aware of when the event occurs?
  - Short naked eye viewing (contrary to everything you will hear leading up to the eclipse) is “mostly” safe. It is highly unlikely that a creature would evolve on a surface of a planet that could be so easily blinded by an item in its normal environment. In our age of litigious safety concerns, since a lot can harm we are told to never look for any short period. That being sad, “Don’t stare at the Sun.”
2. What is the best (or safest) method for viewing a total solar eclipse? Can you offer some general safety tips children and adults can follow?
  - You can look directly at the Sun for brief moments of time. It is very rare for naked eye viewers to permanently damage their eye-sight in this manner. The real danger is when using additional larger than our eye optics like binoculars and telescopes. These gather more light and are correspondingly brighter and are dangerous to look through at the Sun, eclipse or not for any period of time. Some telescopes have optics that can even be damaged by direct sunlight, and many modern telescopes that are computer controlled have software that doesn’t allow the user to even point at the Sun.

3. Are there any dangers in taking photographs or videos? With so many of us carrying smart phones, it will be tempting to video or photograph the occurrence.
  - I would feel safe with a smart phone, but with an unfiltered SLR no. I personally will be taking filtered eclipse pictures with a DSLR camera attached to a computer so I can see the images without having to look through the finder. I plan to help the other physics faculty to set up something like this at Bellarmine. But mistakes can and will happen (and I have destroyed optics this way) and if you are not comfortable with your equipment, don't do it. Unless you start to travel to view eclipses, this is most likely a once or twice in a lifetime event, I have never taken or seen a photograph that can transmit the experience, so relish the experience technology free. I will abandon my attempts at photography if there is any chance it will interfere with the experience.
4. Can Louisville expect total or near-total darkness?
  - Surprisingly, there isn't a clear consensus that I could find on this issue. At Bellarmine, there will be a maximum eclipse of about 95%, so at maximum you will be able to tell there is definitely something going on, but I have heard stories that people were oblivious during higher eclipses. But along the center line of the totality, it can be like mid-night and near impossible to ignore.
5. Do you know when the next total solar eclipse will occur?
  - Eclipses are visible on a single point of the earth approximately once every 350 years. For Louisville, the next one in April of 2024 path will be even closer than this one, but I couldn't find another close one (or even totatlity) for another hundred plus years.

### **3 Stephen's notes**

#### **3.1 Understand!**

MUST BE IN SHADED REGION TO SEE TOTALITY!

#### **3.2 Next Eclipse**

Next one in the area will be April 2024, but there will not be another total near by till after 2100....so do what you can to see this one.

#### **3.3 Safety**

- welding glasses...

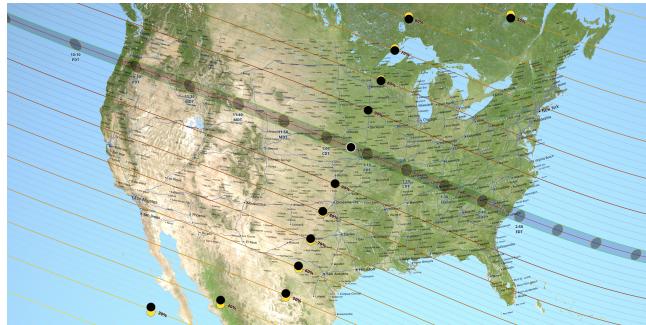


Figure 1: Total Eclipse Map of United States

- Don't Look at Sun
- etc

### 3.4 What's going on in the Sky?

- Saros cycle = 18 yrs, 11 days, 8 hrs. ( $120^\circ$ ...in which direction I don't know...) The type of alignment follows the Saros Cycle—although this has no bearing on a local observer. The spot at which he/she views an eclipse will not have another one in about 350 years.
- syzygy "astronomical alignment"
  - 'all eclipses are syzygy events, but not all syzygy events are eclipses.'
  - The Sun, Moon, and the Earth can line up to 7 times a year
    - \* lunar eclipses are viewable from half the Earth
    - \* solar eclipses the viewer must be in the shadow
      - partial solar eclipse = viewer is in umbra
      - total solar eclipse = viewer is in penumbra (annular eclipse is a total eclipse and the Moon is farther away than a normal total eclipse so it doesn't cover all the Sun.)
- The Moon is 400 times smaller than the Sun, but is 400 times closer to the Earth. ( $1/2^\circ$  in angular diameter)

### 3.5 Things to look for before totality

- Shadow Bands. Bands of shadows that cross the surface. I've always been in flat locations without height when I've seen eclipses and I never had a chance to see them. Hopefully, this time I plan to be higher than the local terrain...

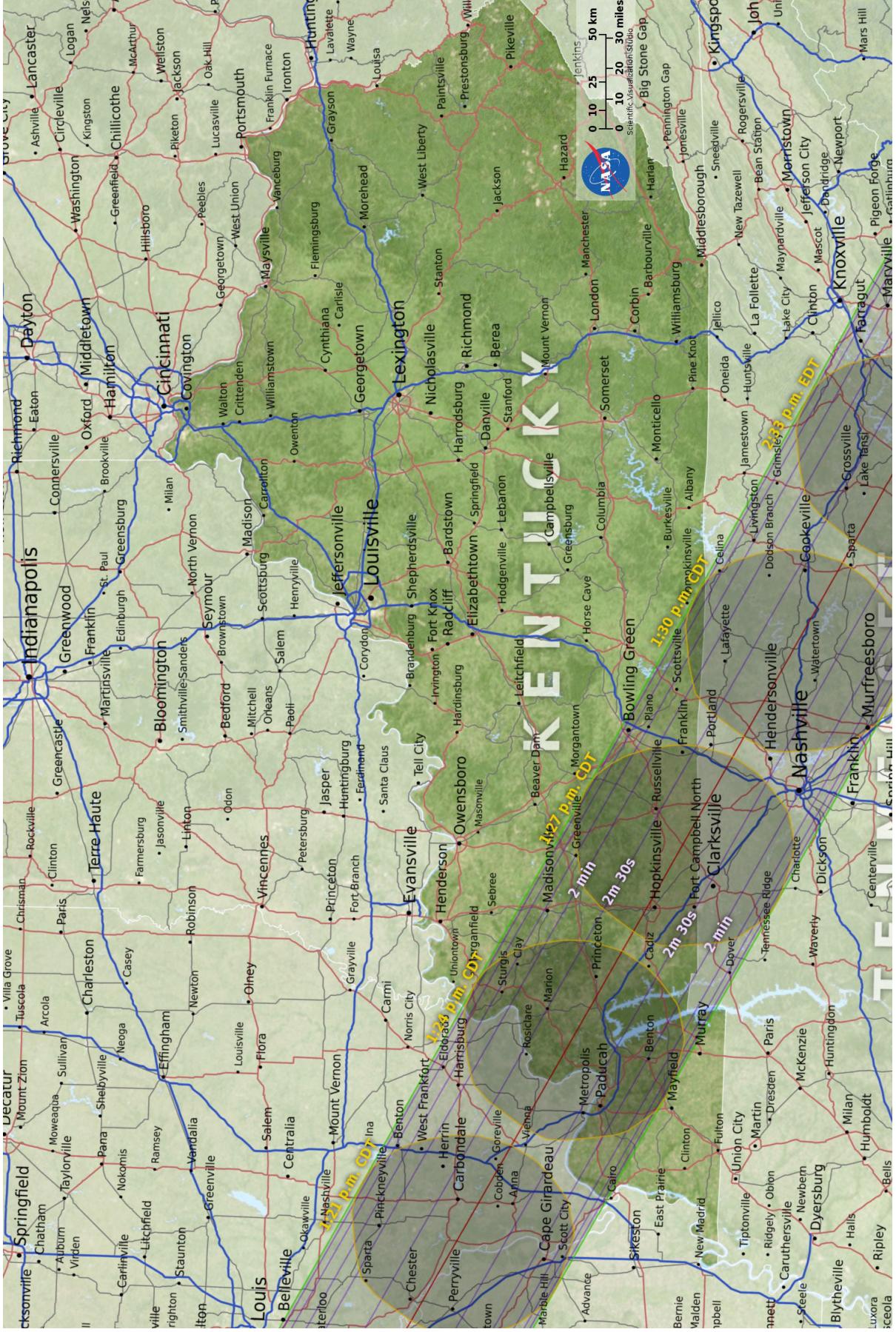


Figure 2: Kentucky's Path of Totality

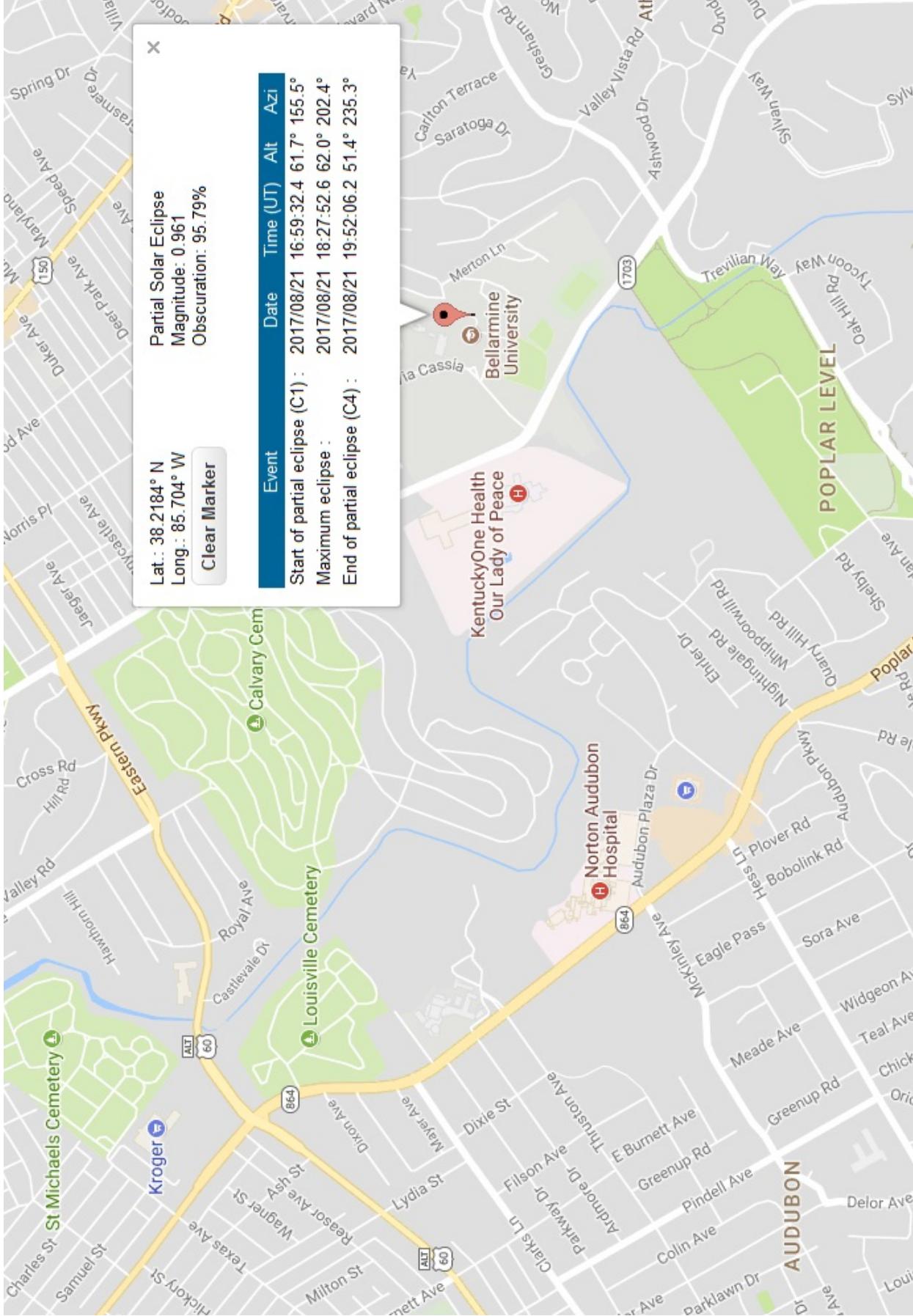
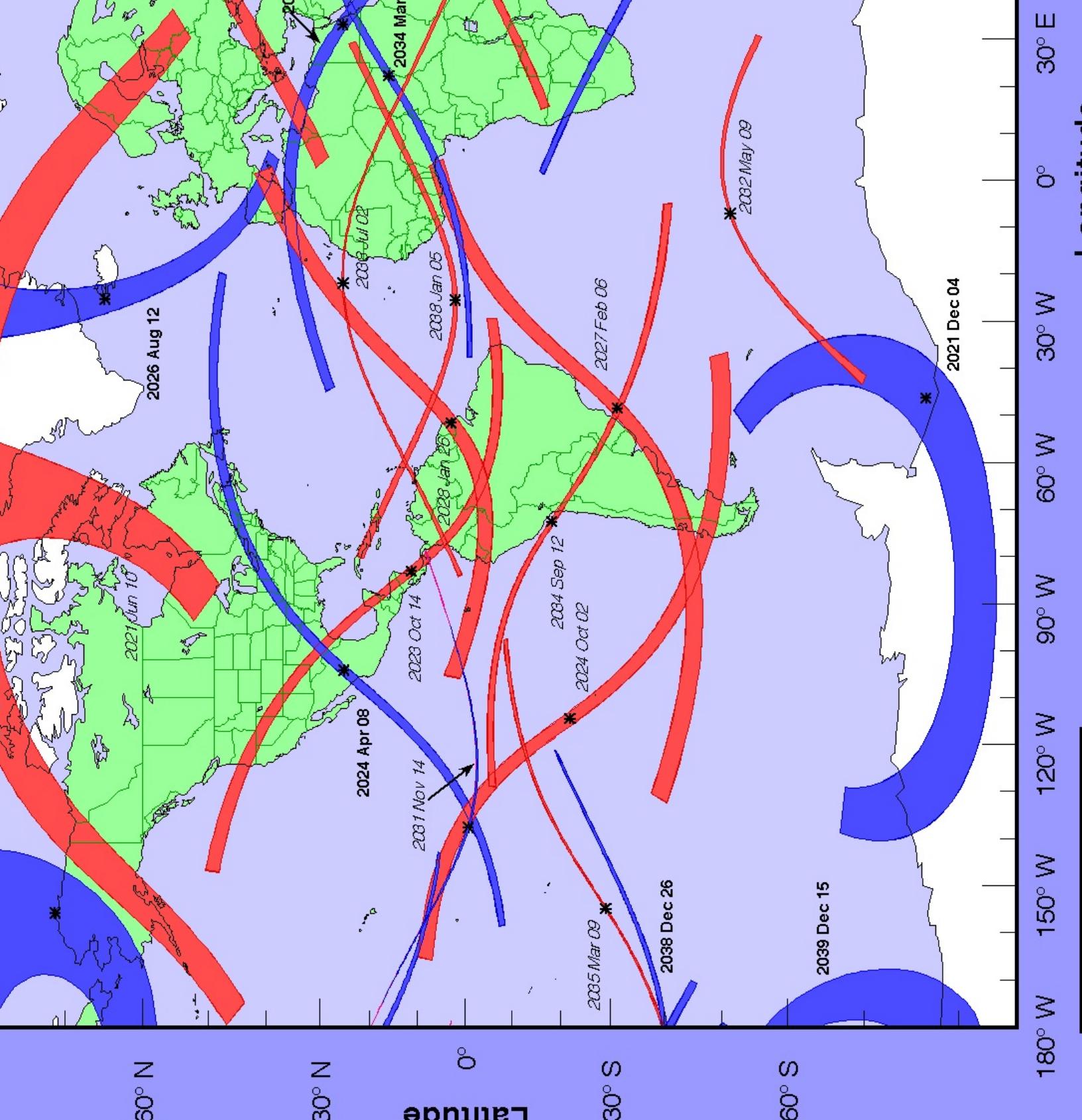


Figure 3: Bellarmine's Eclipse Experience Information



- Baily's Beads. Sunlight shooting through the valleys and canyons of the Moon right before totality as the higher terrain blocks off sunlight first. The final one can be a spectacular...
- Diamond Ring! The last Baily's Beads can be very brilliant looking like a large diamond shining next to the Sun.

### 3.6 Bellarmine's Actual Plan for Eclipse

- Stephen Brown is NOT going to be doing any outreach! He will be hopefully encamped in a desolate local free of clouds and with a good view of the surrounding horizon.
- The solar telescope will be set up in the quad if it is clear. If the Bellarmine Eclipse Team can get it working, we will have a live camera of the event broadcasting either to the Hiperwall or to a nearby television.
- The camera will have a solar lens on it and possibly be piggy backed to another telescope with the objective completely blocked off for safety reasons. This then will be connected to a wifi connected laptop from which it can go to the hiperwall or a hdmi-connected TV.