


I just came off one of those wikipedia-rabbit hole like searches. I've been looking for a way in python to get human-eye visible star positions with the stars listed by name, as close to down to the pixel as possible given a set of camera parameters and a range of star magnitudes. I found astropy. Is there any function in there or in the sub projects that might be interesting for that goal?


🔗 Sources


Custom template: 1-Coordinates-Intro - Learn Astropy

Astronomy & Python With Astropy - Conjunction Introduction

Astronomical Coordinate Sy

 learn.astropy

 youtube

 docs.astropy

✂ Answer

Astropy is indeed an excellent choice for your goal of obtaining star positions for visualization. The `astropy.coordinates` package, particularly the `SkyCoord` class, can be very useful for this purpose ^{1 3}. Here's how you might approach this task:

1. Use `astropy.coordinates.SkyCoord` to represent star positions ^{1 3}.
2. Utilize the `astroquery` package (an Astropy affiliated package) to query star catalogs for visible stars within a given magnitude range ¹.
3. Convert celestial coordinates to pixel coordinates using `astropy.wcs` (World Coordinate System) ¹.

Here's a basic outline of how you might implement this:

python

```
from astropy.coordinates import SkyCoord
from astroquery.vizier import Vizier
from astropy.wcs import WCS
import astropy.units as u

# Set up your camera parameters
wcs = WCS(naxis=2)
wcs.wcs.crpix = [1024, 1024] # Center pixel
wcs.wcs.cdelt = [-0.1, 0.1] # Pixel scale in degrees
wcs.wcs.crval = [0, 0] # RA and Dec of center pixel
wcs.wcs.ctype = ["RA---TAN", "DEC--TAN"] # Projection type

# Query Vizier for stars
v = Vizier(column_filters={"Vmag": "<6"}) # Stars brighter than magnitude 6
v.ROW_LIMIT = -1 # No row limit
catalog = v.get_catalogs("I/239/hip_main")[0] # Hipparcos catalog

# Create SkyCoord object from catalog
stars = SkyCoord(ra=catalog['RAJ2000'], dec=catalog['DEJ2000'], frame='icrs')

# Convert to pixel coordinates
pixels = wcs.world_to_pixel(stars)

# Now 'pixels' contains the x and y pixel coordinates for each star
```



This script queries the Hipparcos catalog for stars brighter than magnitude 6 and converts their celestial coordinates to pixel coordinates based on the specified camera parameters ^{1 3}.

To get star names, you can include the 'HIP' column in your Vizier query, which provides the Hipparcos identifier for each star ¹.

Remember to adjust the WCS parameters and magnitude limit to match your specific camera setup and observing conditions. You may also want to consider factors like field rotation and distortion for more precise positioning ¹.

For more advanced functionality, you might explore Astropy's visualization capabilities or consider using libraries like Matplotlib or Plotly to create star charts based on this data ²👍.



+ New

5h

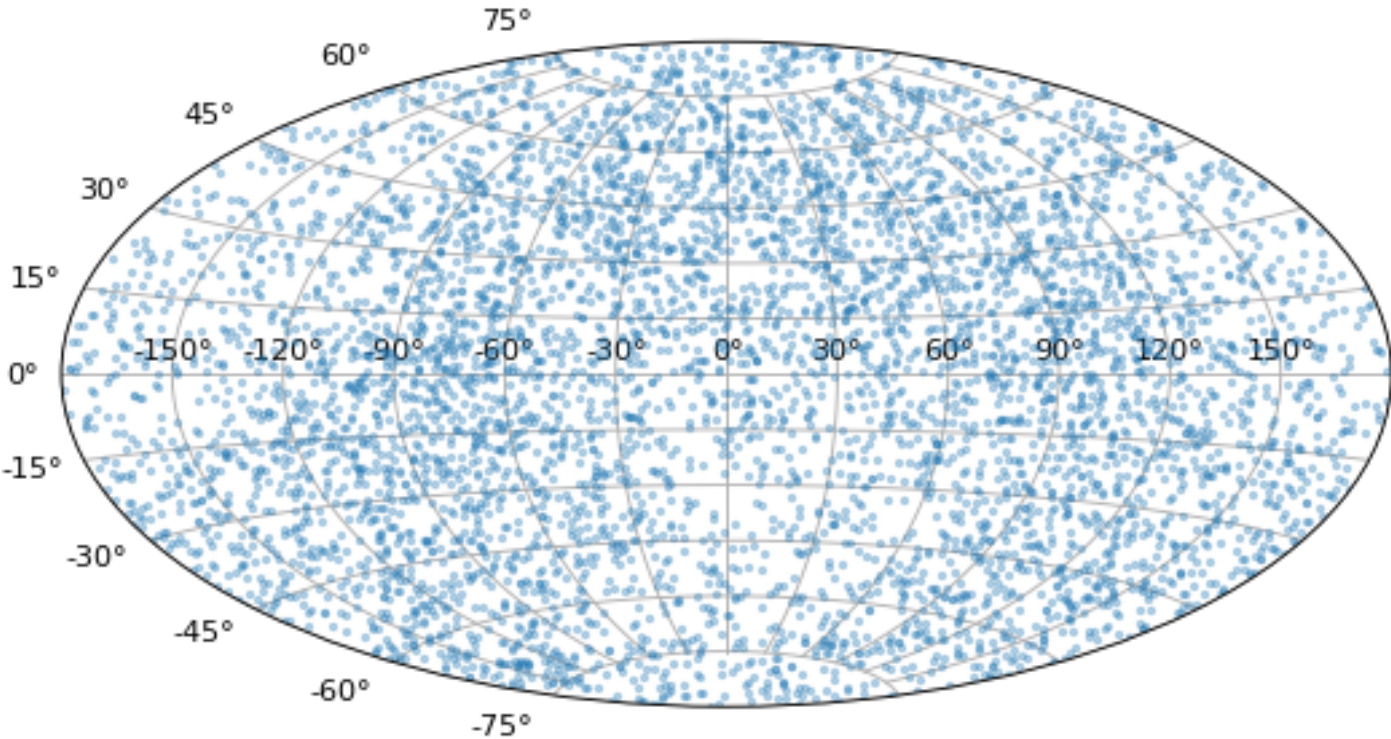
...

🔖

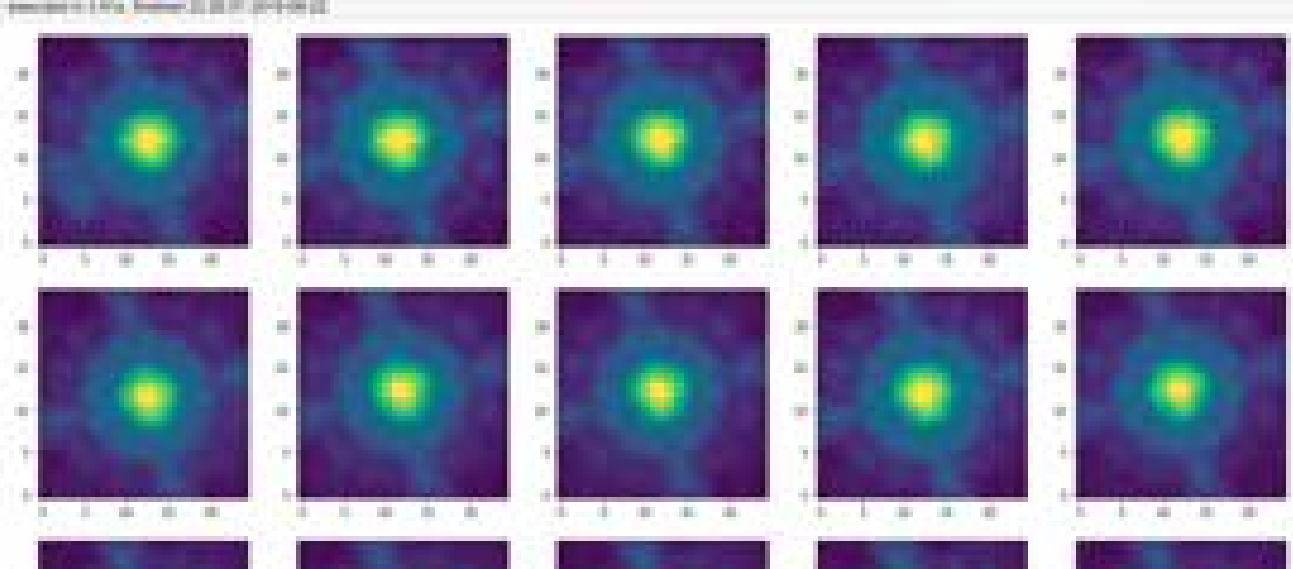
Share

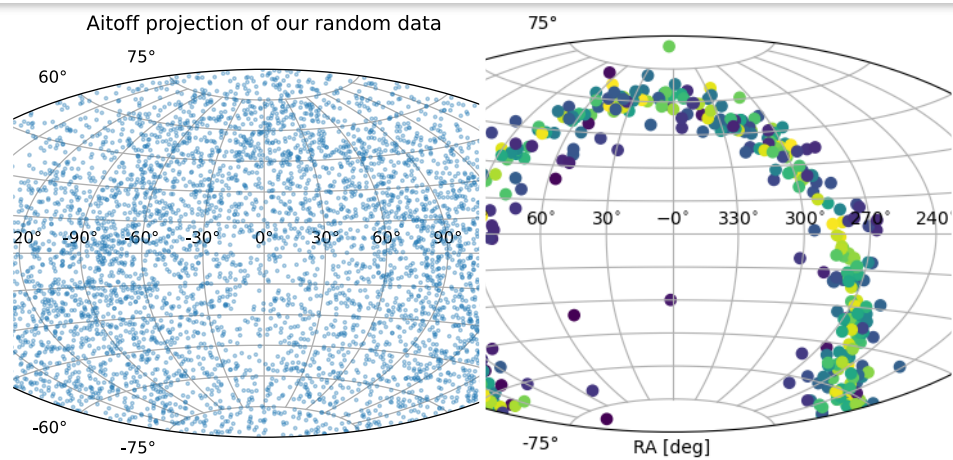
Watch

Aitoff projection of our random data



```
from matplotlib.figure import Figure
fig, ax = plt.subplots(2, 2, figsize=(10, 10),
                      subplot_kw={'projection': 'aitoff'})
ax = ax.ravel()
for i in range(8):
    name = f'example_{i+1}.png'
    plt.imshow(ax[i].imshow(ax[i].normdata, origin='lower', cmap='magma'))
```





 View More



photutils

An **Astropy** Package for Photometry

DRAW



CIRCULAR



APERTURE

STARS

GALAXIES



Watch

How about using the http API for Stellarium, is there a way to have it also output a list of starnames by x,y in a generated image?

🔗 Sources

Display only names of navigational stars - Launchpad Answers

SkyCoord#

Astronomical Coordinates 1: `astropy.coordinates`[¶]

 answers.launchpad

 docs.astropy

 learn.astropy

✳ Answer

Stellarium does offer an HTTP API, but it doesn't directly provide a feature to output a list of star names with their x,y coordinates in a generated image. However, you can use a combination of Stellarium's scripting API and some additional processing to achieve this goal. Here's an approach you could take:

1. Use Stellarium's scripting API to select and get information about visible stars:

javascript

```
// Select stars brighter than a certain magnitude
core.setMagnitudeLimit(6);
```



 Home

Discover

Spaces

Library

```
// Iterate through stars and get their names and screen positions
var starList = [];
for (var i = 0; i < stars.length; i++) {
    var star = stars[i];
    var name = star.name;
    var screenPos = core.j2000ToScreenPosition(star.ra, star.dec);
    starList.push({name: name, x: screenPos.x, y: screenPos.y});
}
```

2. Use Stellarium's `saveScreenShot` function to generate an image:

```
javascript

core.saveScreenShot("star_chart.png", true, "png");
```

3. Output the star list as JSON or another format:

```
javascript

core.output(JSON.stringify(starList));
```

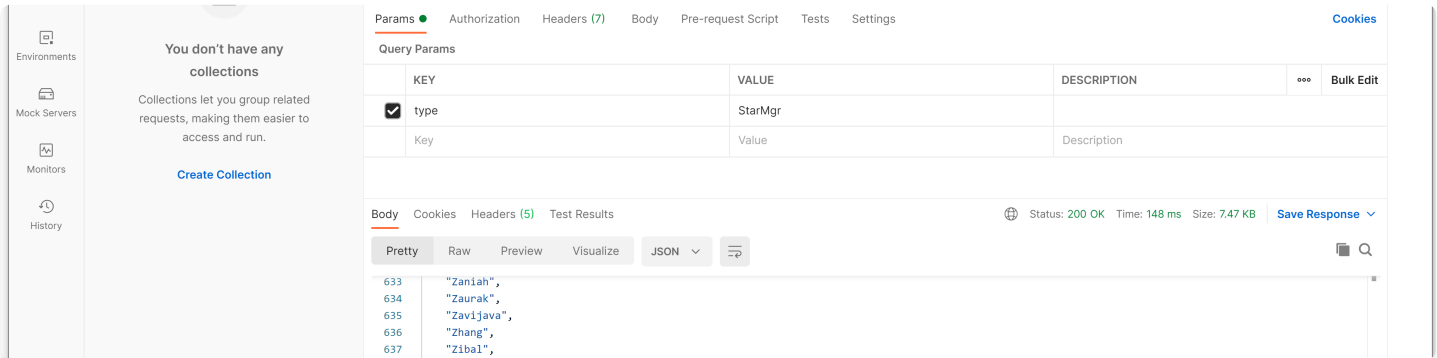
This approach will give you a list of star names with their corresponding x,y coordinates in the generated image. However, you'll need to set up a way to execute these scripts and retrieve the output, possibly through a custom server that interacts with Stellarium's HTTP API ⁴ ⁵.

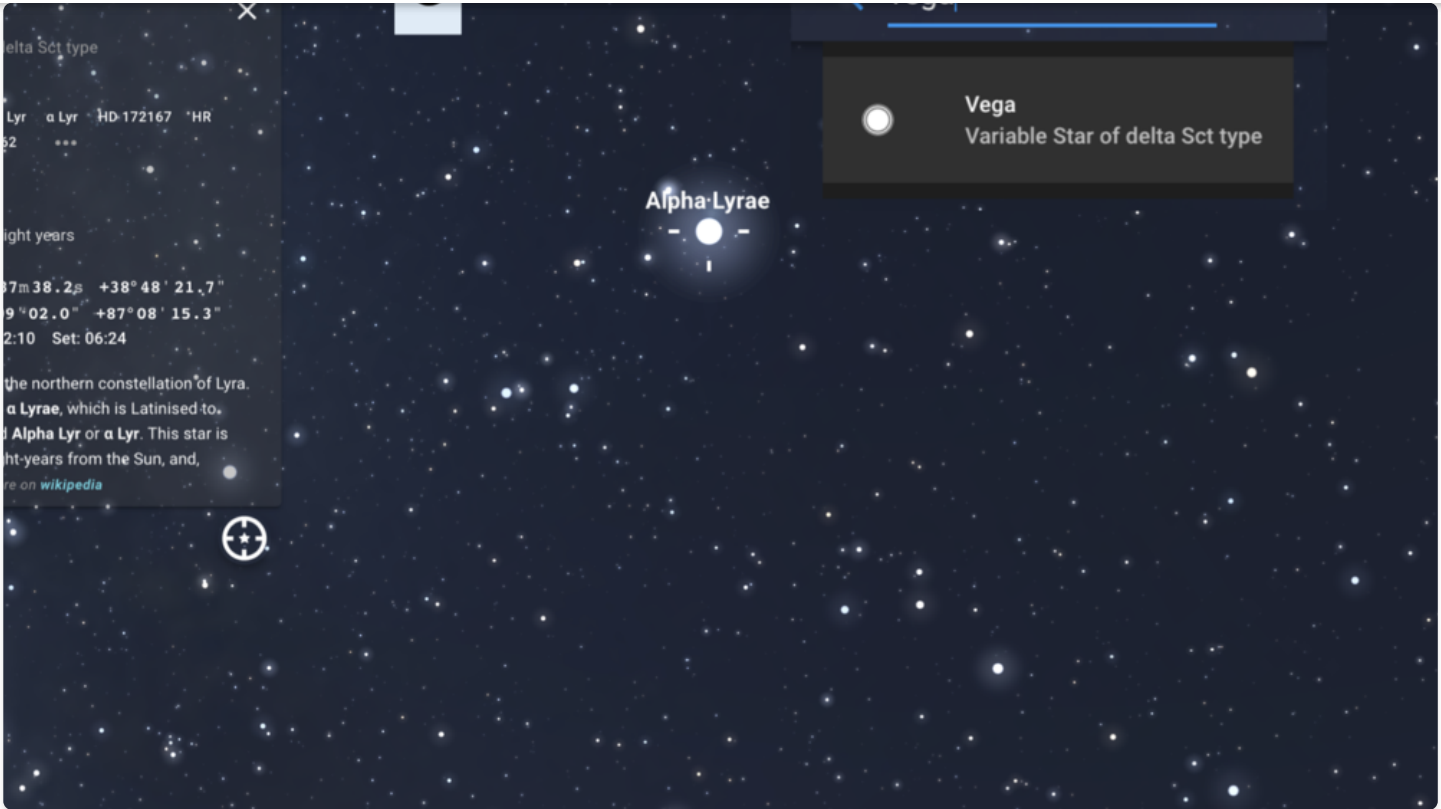
Keep in mind that the exact pixel positions may vary depending on the viewport size and other display settings. You might need to adjust the coordinates based on the actual image dimensions.

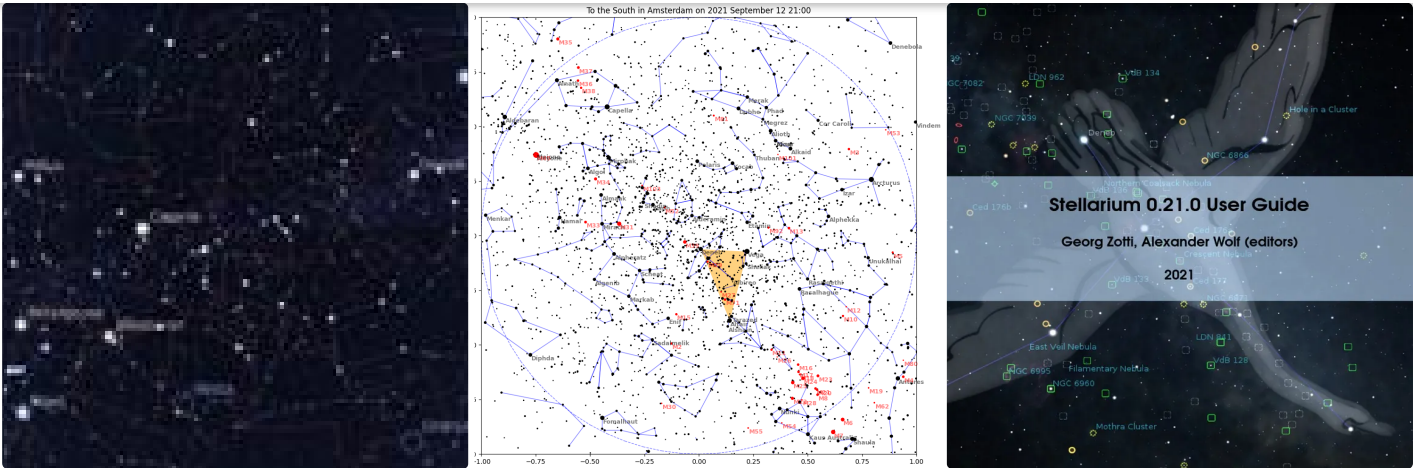
For more precise control over star selection and positioning, you could consider using Astropy as mentioned in your previous query, and then use a plotting library like Matplotlib to generate the image and get precise pixel coordinates ³.

↗ Share ↻ Rewrite

👍 🗨 📋 ✎ ...










 View More

Does the above star list contain planets and/or the moon as well?

🔗 Sources

jasonincanada/stellarium-scripts - GitHub	Stellarium Scripts	Stellarium Scripts
 github	 stellarium	 stellarium


🌟 Answer

Based on the search results, the scripts mentioned are primarily focused on solar system objects, but they don't provide a comprehensive star list with x,y coordinates. Several scripts specifically highlight planetary and lunar observations:

- Solar System Exploration Scripts:
 - A tour of the solar system up to Saturn
 - Moon hopping script
 - Galilean moons cycle script
 - Fly to Mars script
 - Moon from Mars view
 - Neptune from Naiad moon view
- Planetary Event Scripts:
 - Scripts for tracking planetary events like:
 - Retrograde motion
 - Opposition
 - Closest approach
 - Rise and set times
 - Planetary ephemeris

While these scripts demonstrate extensive solar system object tracking, they do not explicitly provide a star list with x,y coordinates. The search results suggest that to get such a detailed star and planetary coordinate list, you might need to combine Stellarium's scripting capabilities with custom scripting or additional astronomical libraries like Astropy.

For a precise star and planetary coordinate list, you would likely need to write a custom script using Stellarium's `StelMainScriptAPI` and its `getObjectInfo()` method to extract the required information.

 Share  Rewrite     

☰ Related

Which scripts in Stellarium focus on the moons of planets



 Home

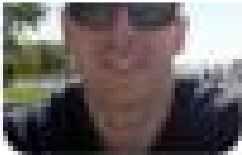
Discover

Spaces

Library

- How can I view the orbits of planets and their moons in real-time using Stellarium
- What scripts are available for studying the Galilean moons in Stellarium
- Can I see a tour of Saturn and its moons using Stellarium scripts

stellarium-scripts



My scripts for Stellarium, the planetarium program.
Good for studying the orbits of the planets and
moons in real-time

