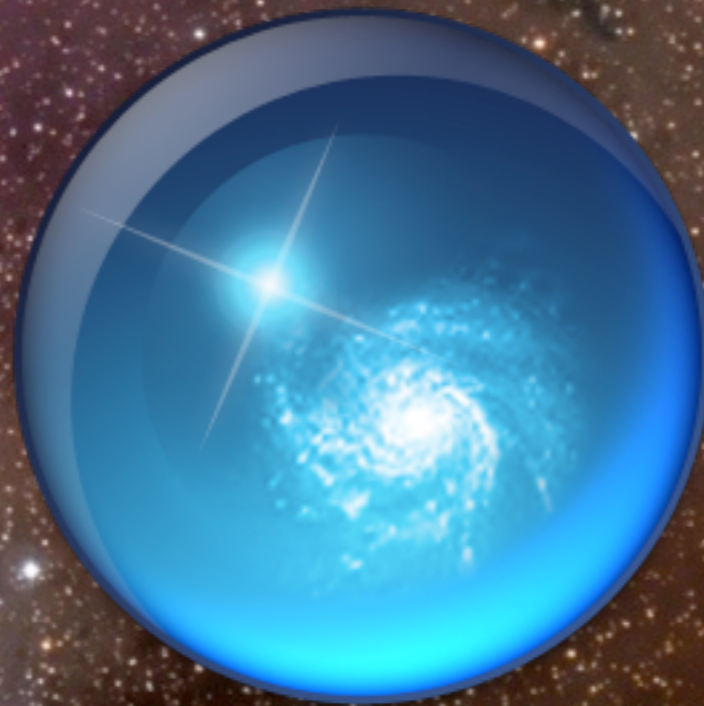


WorldWide Telescope

Microsoft
Research



(Secrets of the)
WorldWide Telescope

Alyssa A. Goodman

*Professor of Astronomy
Harvard University*



WWT software created by Curtis Wong & Jonathan Fay at Microsoft **Research**

3500 years of Observing

Stonehenge, 1500 BC



Ptolemy in Alexandria, 100 AD



Observatory Tower, Lincolnshire, UK, c. 1300



Galileo, 1600



The "Scientific Revolution"

Reber's Radio Telescope, 1937



NASA/Explorer 7
(Space-based
Observing)
1959

"The Internet"

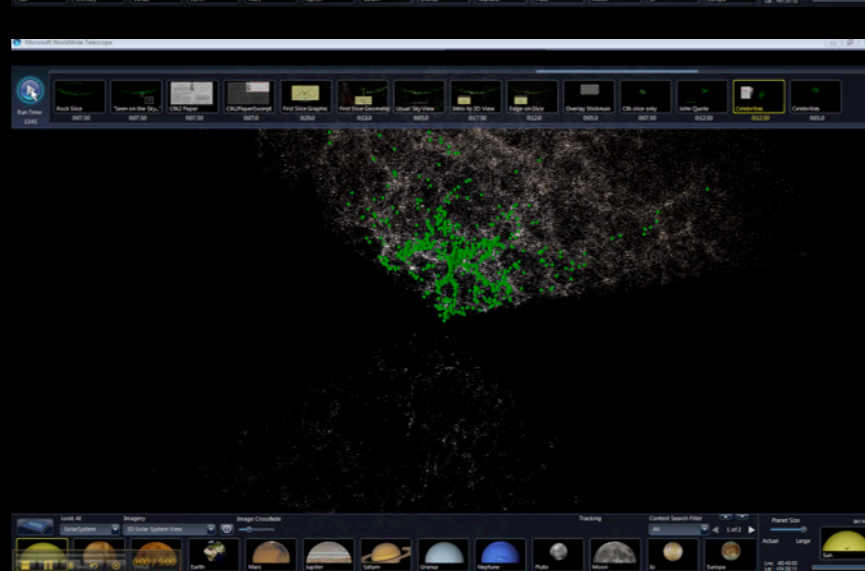
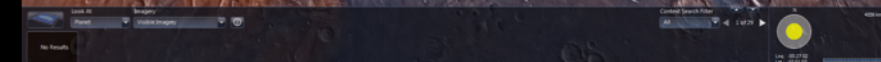
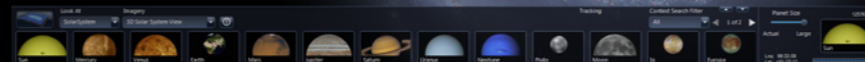
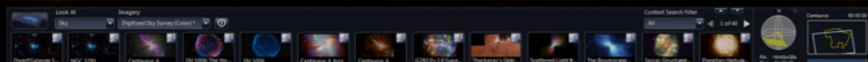
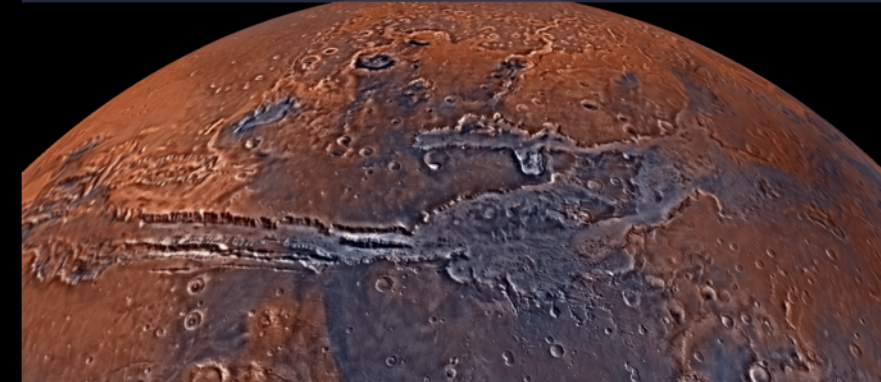
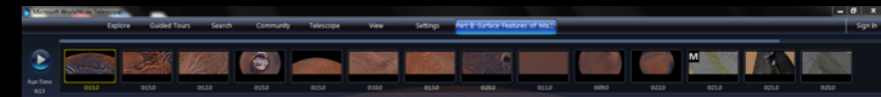
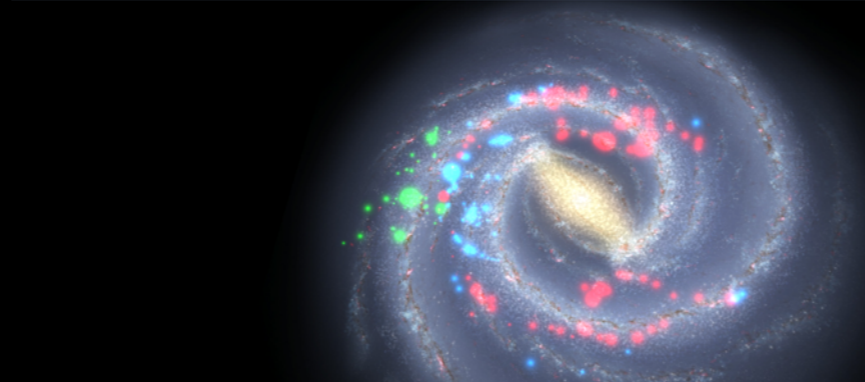
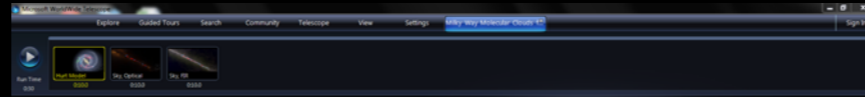
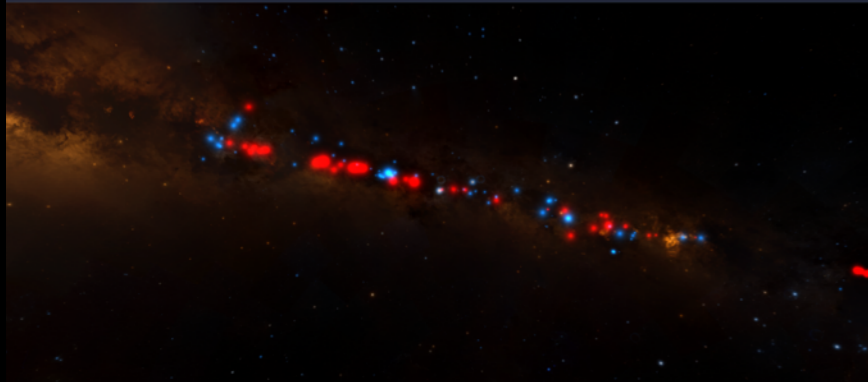
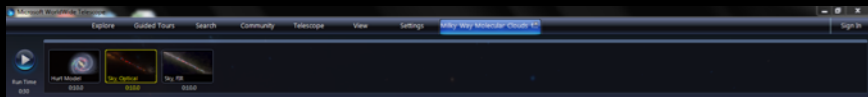
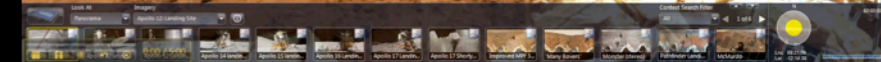
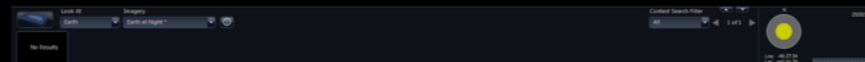
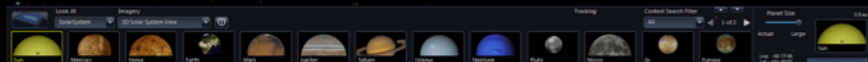
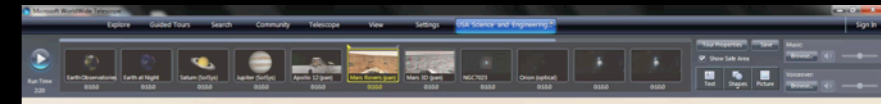
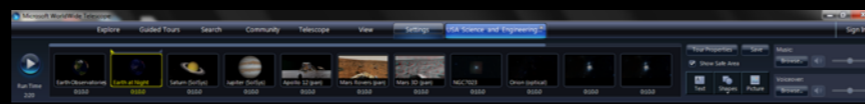
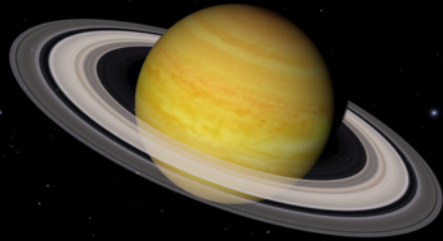
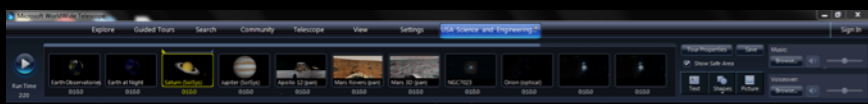


Long-distance
remote-control/
"robotic"
telescopes
1990s



"Virtual
Observatories"
21st century

2013



Experience WWT at worldwidetelescope.org



Microsoft® Research WorldWide Telescope

Experience WWT at worldwidetelescope.org

The screenshot shows the WorldWide Telescope interface with a dark blue background. At the top, there are navigation tabs: 'Explore' (highlighted), 'Guided Tours', 'Search', 'View', and 'Settings'. Below these are several thumbnail images representing different astronomical data sets: 'Digitized Sky Survey', 'VLSS: VLA Low-frequency Sky Survey', 'WMAP ILC 5-Year CMB Temperature Anisotropy', 'SFD Dust Map (Infrared)', 'IRIS: Improved Resolution', '2MASS: Two Micron All Sky Survey', and 'Hydrogen Alpha Filter'. A central circular field of view shows a detailed view of a spiral galaxy. A 'Finder Scope' window is open, displaying a smaller image of the galaxy and its classification: 'Spiral Galaxy in Andromeda' (NGC224). Below the Finder Scope, there is a 'Look At' dropdown menu set to 'Sky', and a 'Context bar' showing 'Andromeda' and '01:58:26'. At the bottom, there are buttons for 'Research', 'Show Object', and 'Close'. A 'Context globe' is visible on the right side, showing the current field of view on a celestial sphere.

Seamlessly explore imagery from the best ground and space-based telescopes in the world

Expert led tours of the Universe

Control time to study how the night sky changes

View and compare images from across the electromagnetic spectrum

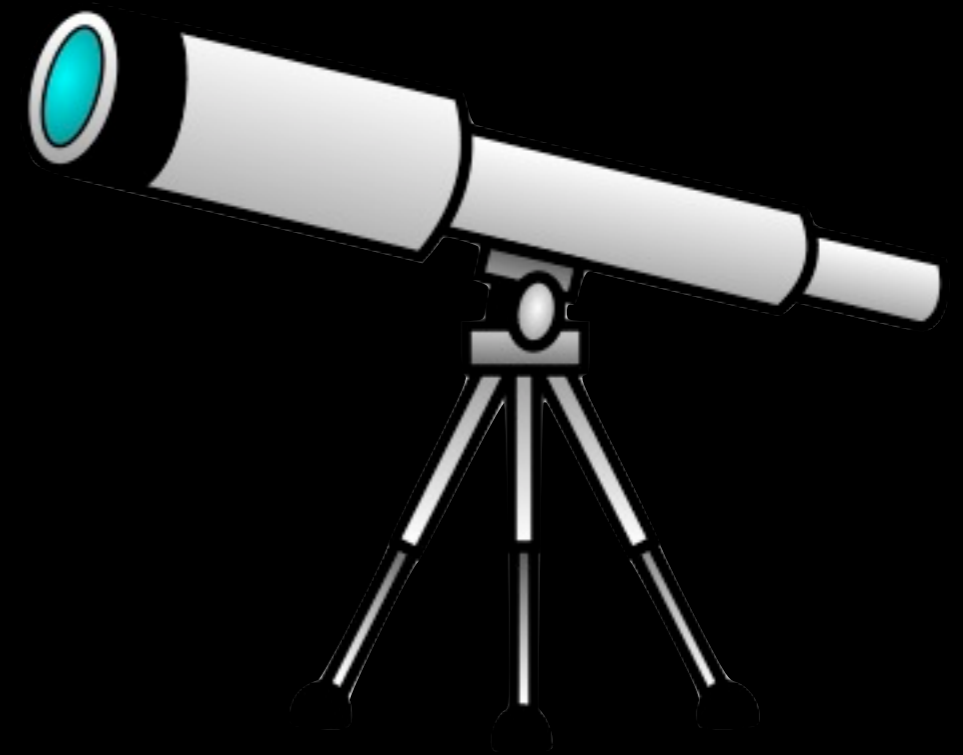
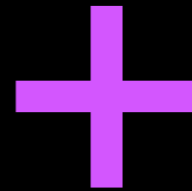
Much more than “just” the sky at night! 3D features can take you to other planets, stars & galaxies.

Finder Scope links to Wikipedia, publications, and data, so you can learn more

Context bar shows items of interest in current field of view

Context globe shows where you’re looking.

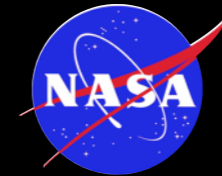
(Secrets of the)
WorldWide Telescope



Secrets of WorldWide Telescope

Collaboration

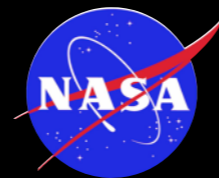
Microsoft
Research



“Standards”

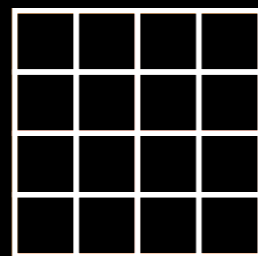


Data



theastrodata.org

“Tricks”



“Interoperability”



Collaboration



Curtis Wong
Microsoft Research



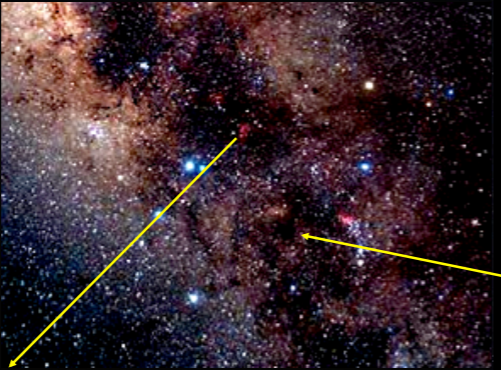
Alyssa Goodman
Harvard University

Story mode

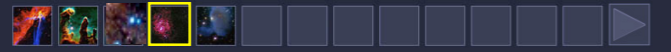
Stellar Evolution
SKY SERVER

Story mentions gravitational condensation of proto-stars from hydrogen and galactic dust
And links to related content appears below

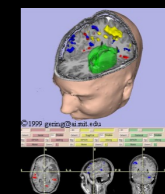
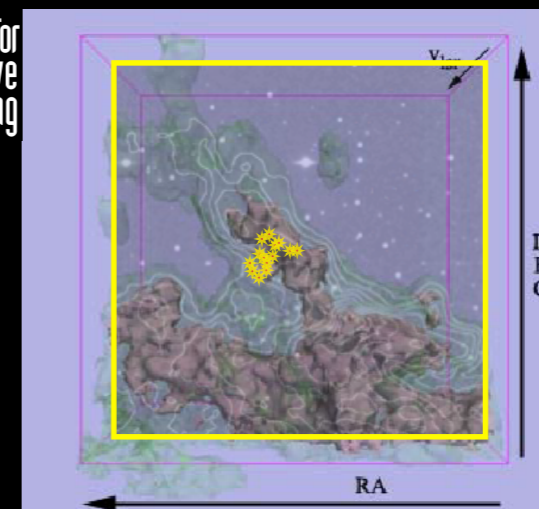
Clicking on the related link below takes you to the object in context of the sky



Nebula

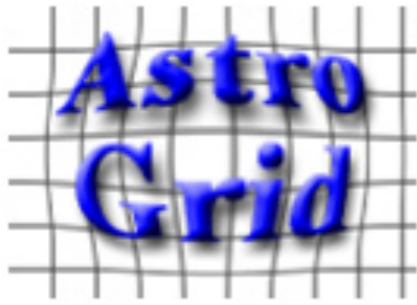


"Astronomical Medicine"



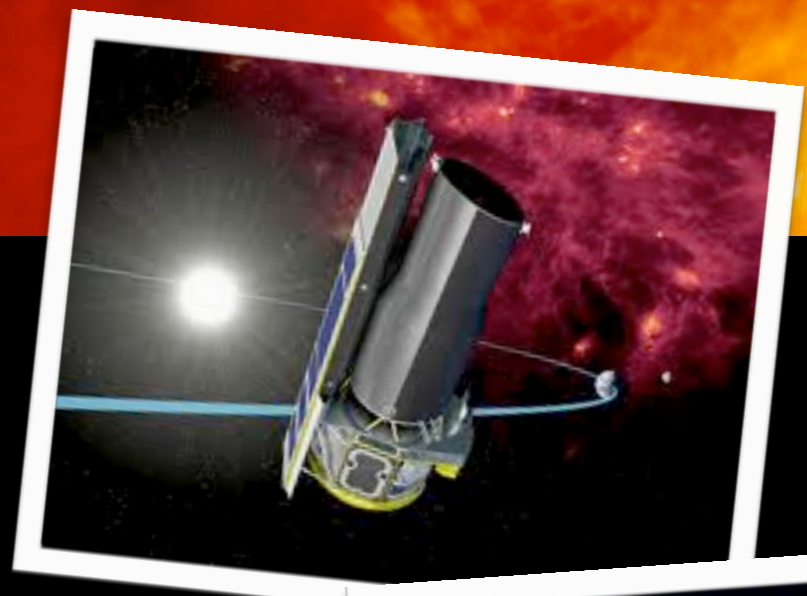
A joint venture of FAS-Astronomy & HMS/BWH-Surgical Planning Lab.
Work shown here is from the 2005 Junior Thesis of Michelle Borkin, Harvard College.

“Standards”



Collections >

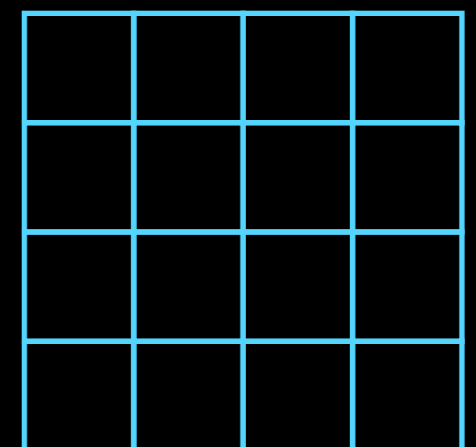
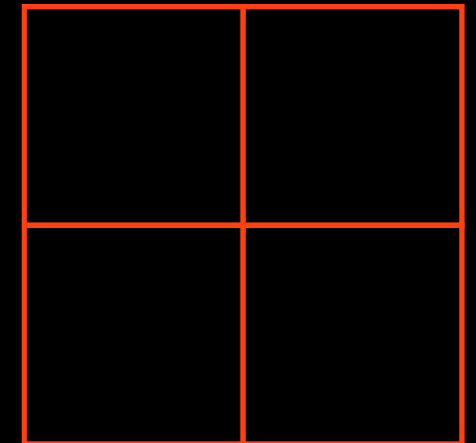
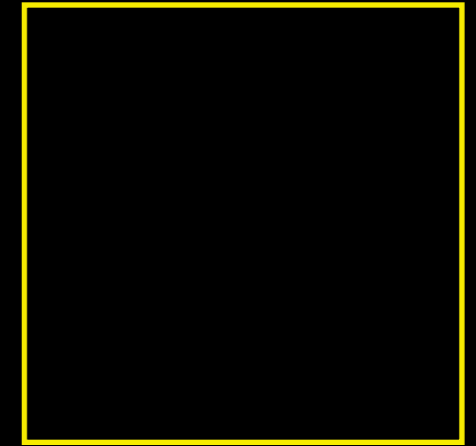
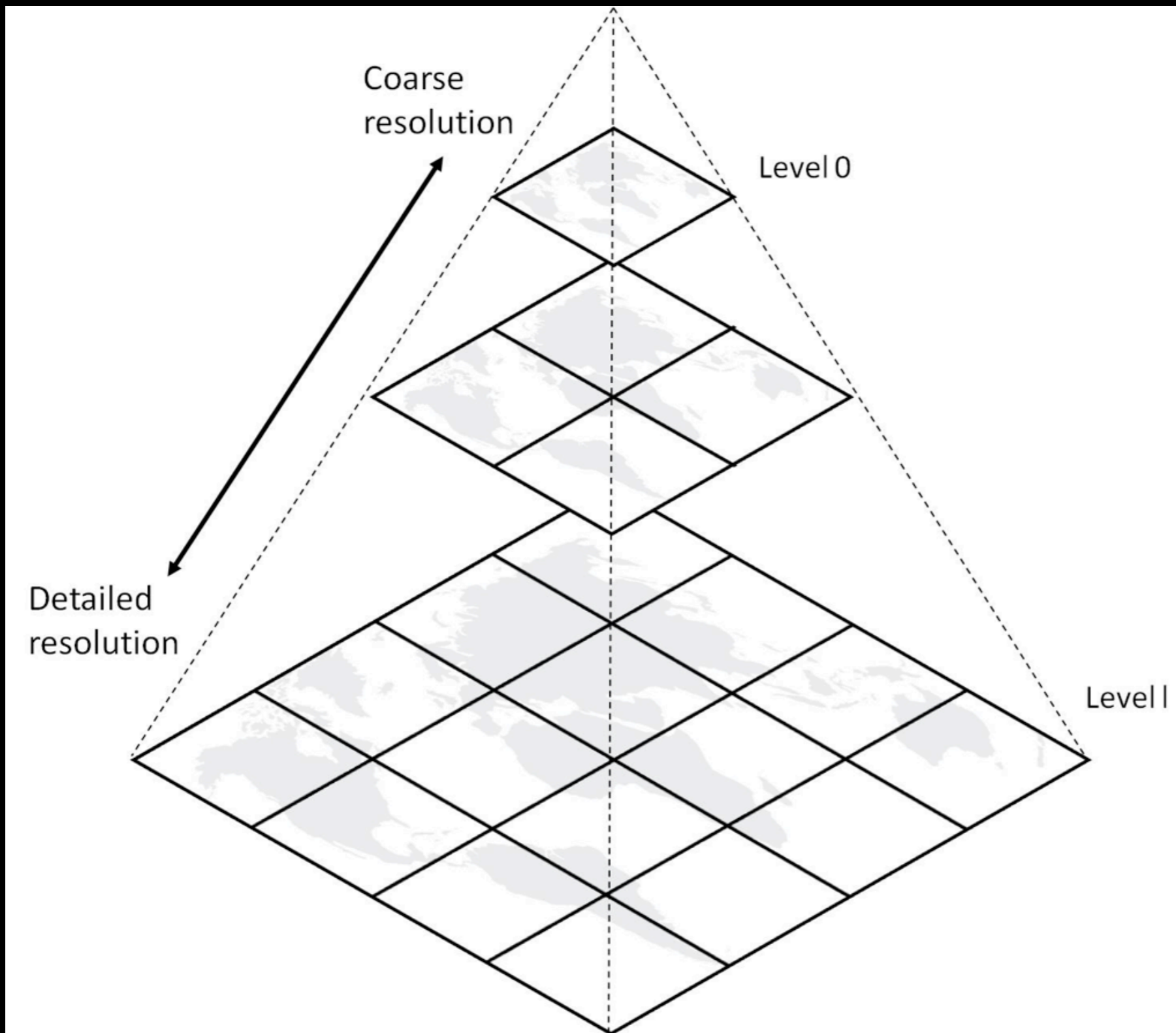
- MyCollections
- Constellations
- Solar System (Sky)
- All-Sky Surveys
- Spitzer Studies
- Chandra Studies
- Hubble Studies
- Astrophotography
- Radio Studies
- NOAO Studies
- Gemini



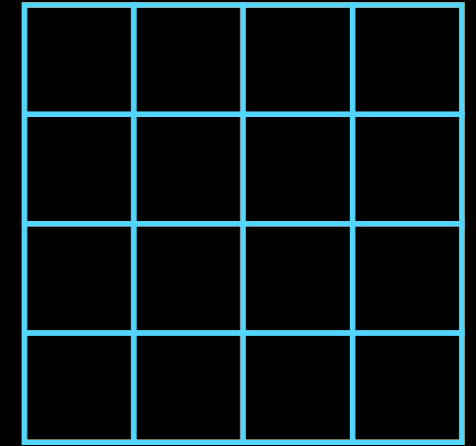
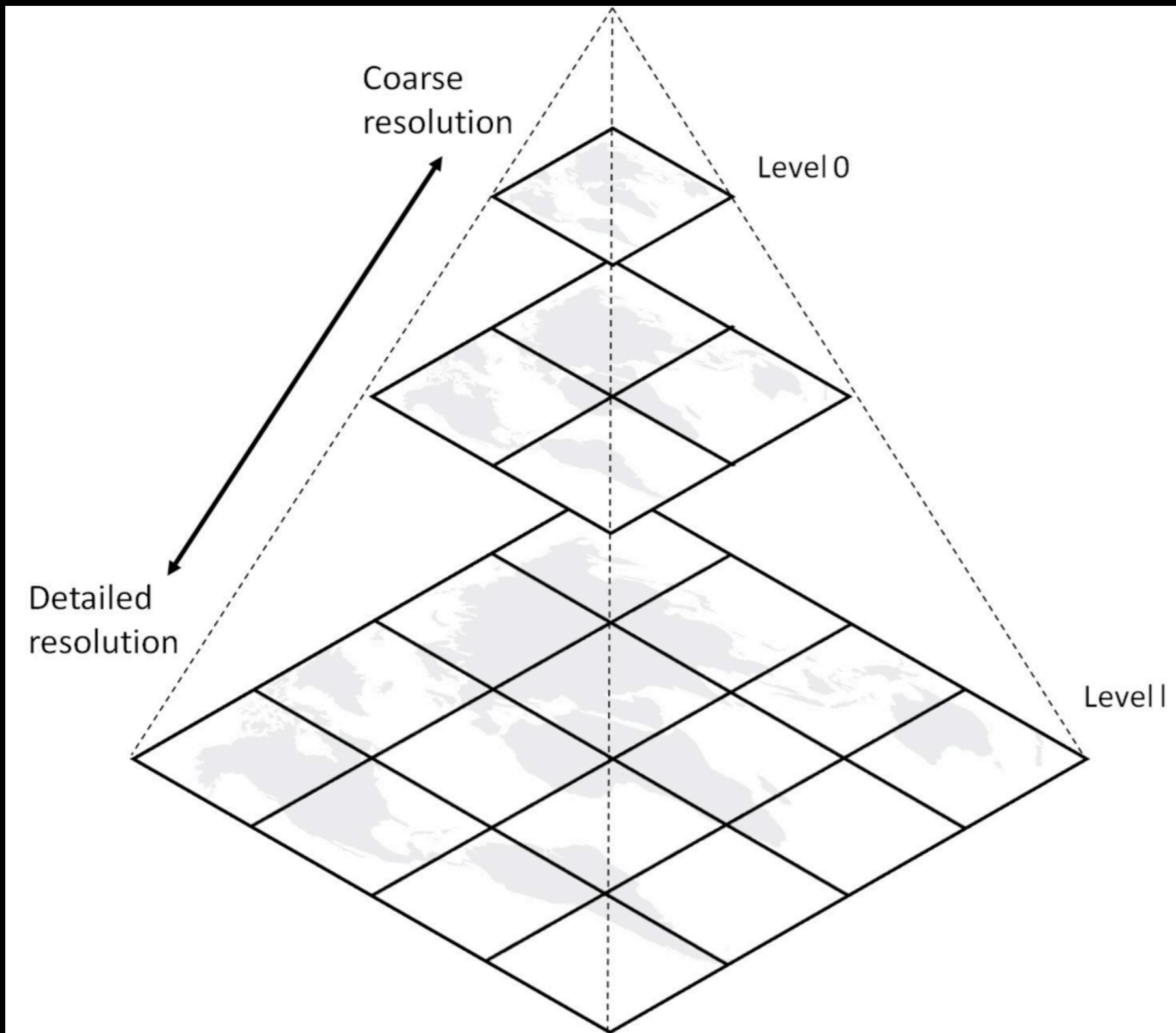
Data



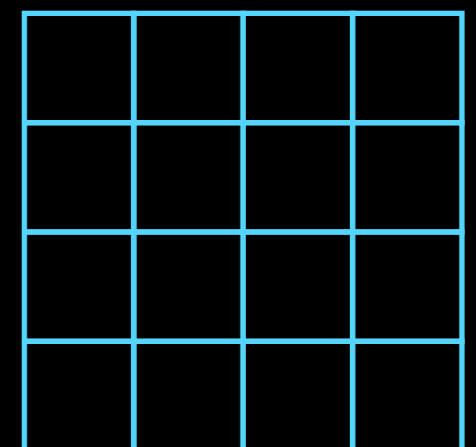
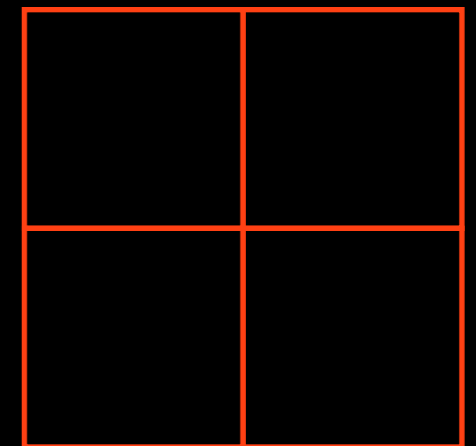
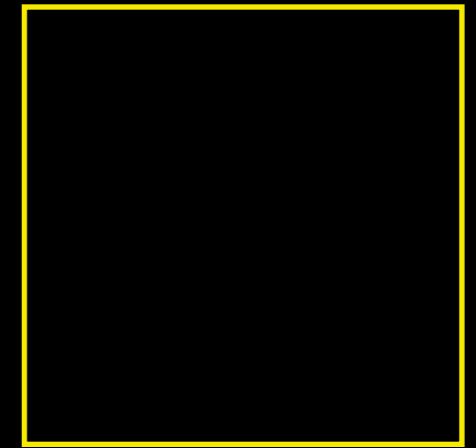
“Tricks”...for example...



“Tricks”...for example...

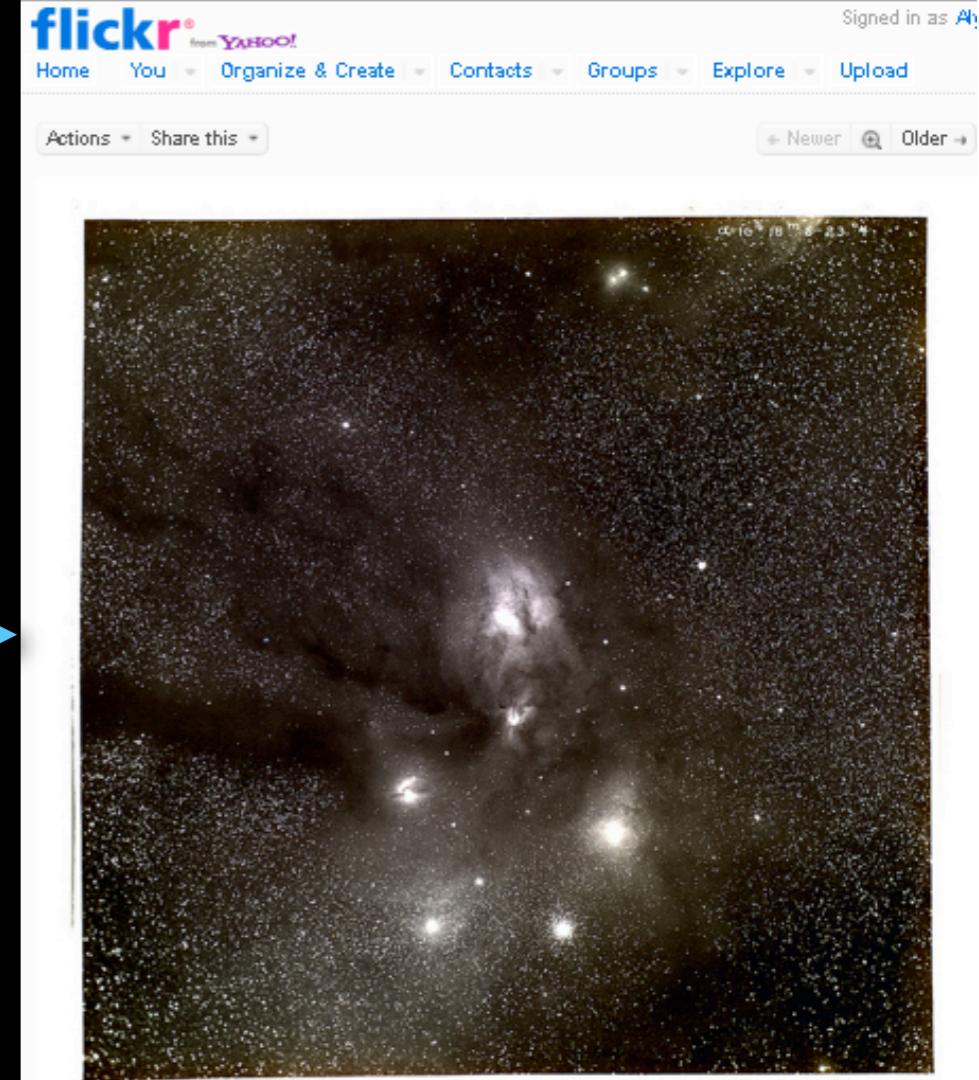
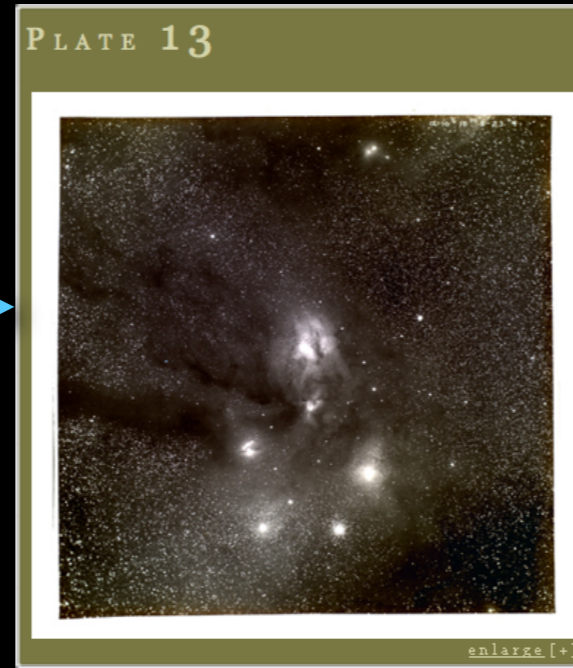
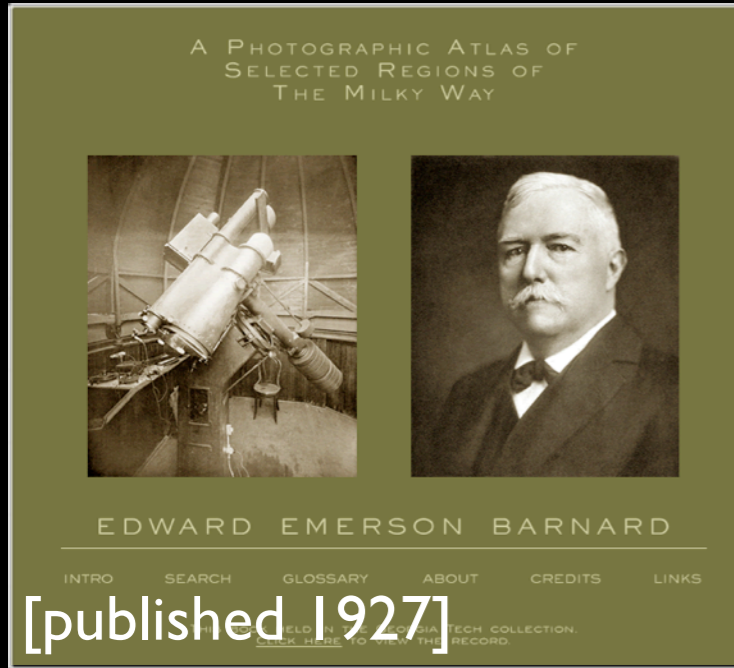


“Tricks”...for example...



“Interoperability” ...for example...


astrometry.net + flickr + WWT



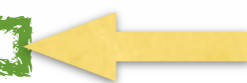
barnardoph

E.E. Bamard's image of Ophiuchus
www.library.gatech.edu/bpdi/bpdi.php

Comments and faves **astrometry.net**

 **astrometry.net** (6 days ago | reply | delete)
Hello, this is the blind astrometry solver. Your results are:
(RA, Dec) center:(246.421365149, -23.6749819397) degrees
(RA, Dec) center (H:M:S, D:M:S):(16:25:41.128, -23:40:29.935)
Orientation:178.34 deg E of N
Pixel scale:52.94 arcsec/pixel
Parity:Reverse ("Left-handed")
Field size :9.41 x 9.41 degrees
Your field contains:
The star Antares (α Sco)
The star Graffias (β 1Sco)
The star Al Niyat (σ Sco)
The star τ Sco
The star ω 1Sco
The star ν Sco
The star ω 2Sco
The star ω Oph
The star λ 3Sco
The star ρ Sco
IC 4592
IC 4601
NGC 6121 / M 4
IC 4603
IC 4604 / rho Oph nebula
IC 4605

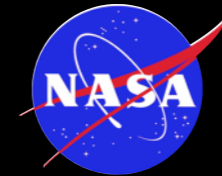
[View in World Wide Telescope](#)



Secrets of WorldWide Telescope

Collaboration

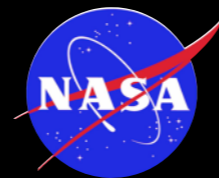
Microsoft
Research



“Standards”

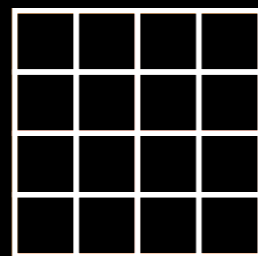


Data



theastrodata.org

“Tricks”



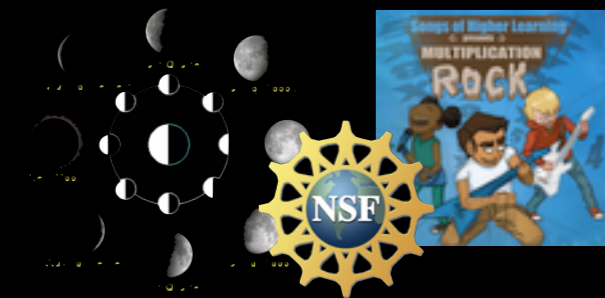
“Interoperability”



WWT Ambassadors



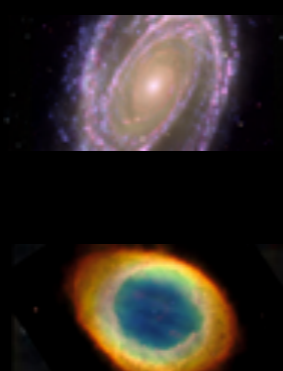
WWT VizLabs



WWT in Research



“Tours”



+Coming Attraction... WWT in edX

Galileo Galilei

(1564-1642)

Sc. Principale.

Galileo Galilei, Familiare Seruo della Ser. V. inuigilante
 et assiduo, et lo ogni spirito se bene no solo satisfar
 aluano che non della attua di Mathematico nelle Scuole
 di Padova,

Inuere diuere determinate di presentare al Sc. Principale
 l'occhio et il pensiero di giuamenti inestimabile di ogni
 negozio et in circa marittima o terrestre stua di tenere que
 sto nuovo artificio nel maggior segreto et solap a disposizione
 di V. Ser. L. Galileo conato dalle piu uide speculazioni di
 prospectua in l'uantaggio di scoprire Legni et Vele dell' inimico
 di mare et pu di tempo prima di esse sopra noi et distinguend
 il numero et la qualita de i Vascelli giudicare le sue forze
 ballottarsi alla caccia et combattimento o alla fuga, o pure esser
 nella campagna aperta uedere et particolarmente distinguere ogni suo
 posto et provvedimento.

Adi 7. di gennaio
 Giove si uede a 7. * uici: 10. 11.
 Adi 8. uici: 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30.
 4. * * * * * ora diu. diretto et no retrogrado
 Adi 12. si uede in tale uisione * * * * *
 N. 13. si uede in uisione a Giove 4 stelle * * * * *
 Adi 14. è angelo
 N. 15. * * * * * la pressi a 4. ora in uici la 4. ora di =
 stante dalla 3. a coppia terra
 Lo spazio delle 3. uide non om
 maggiose del diametro di 7. et c.
 in una linea retta.

7	* * ○ *	17	* ○
8	○ * * *	18	* ○
10	* * ○	19	* ○ * *
11	* * ○	19	* ○ * *
12	* ○ *	20	○ * ○ ○
13	* ○ * *	21	... ○ *
15	○ * * * *	22	* ○ * *
15	○ * * *	22	* ○ * *
16	* ○ *	23	* ○ *
17	* ○ *	24	* ○ *

SIDERIUS NUNCIUS

On the third, at the seventh hour, the stars were arranged in this
 quence. The eastern one was 1 minute, 30 seconds from Jupiter
 the closest western one 2 minutes; and the other western one wa
 East * ○ * * West

0 minutes removed from this one. They were absolutely on the
 same straight line and of equal magnitude.

On the fourth, at the second hour, there were four stars around
 Jupiter, two to the east and two to the west, and arranged precisely
 East * * ○ * * West

on a straight line, as in the adjoining figure. The easternmost wa
 distant 3 minutes from the next one, while this one was 40 second
 from Jupiter; Jupiter was 4 minutes from the nearest western one
 and this one 6 minutes from the westernmost one. Their magnitude
 were nearly equal; the one closest to Jupiter appeared a little smaller
 than the rest. But at the seventh hour the eastern stars were only
 30 seconds apart. Jupiter was 2 minutes from the nearer eastern
 East ** ○ * * West

one, while he was 4 minutes from the next western one, and this
 one was 3 minutes from the westernmost one. They were all equal
 and extended on the same straight line along the ecliptic.

On the fifth, the sky was cloudy.

On the sixth, only two stars appeared flanking Jupiter, as is seen
 East * ○ * West


in the adjoining figure. The eastern one was 2 minutes and the
 western one 3 minutes from Jupiter. They were on the same straight
 line with Jupiter and equal in magnitude.


On the seventh, two stars stood near Jupiter, both to the east


Notes for & re-productions of Siderius Nunciuss



THE MILKY WAY PROJECT

FOLLOW US ON TWITTER 

VISIT THE BLOG 

MILKY WAY TALK 

HOME TAKE PART ABOUT TUTORIAL LOG IN GALACTOMETER™




WELCOME

The Milky Way Project aims to sort and measure our galaxy, the Milky Way. Initially we're asking you to help us find and draw bubbles in beautiful infrared data from the Spitzer Space Telescope.

Understanding the cold, dusty material that we see in these images, helps scientists to learn how stars form and how our galaxy changes and evolves with time.

[Click here](#) to see the full tutorial or browse the site to find out more about the science behind the Milky Way Project.

YOU CAN NOW SEE HOW CLOSE WE ARE TO 1,000,000 DRAWINGS AT [HTTP://WWW.MILKYWAYPROJECT.ORG/G...](http://www.milkywayproject.org/g...)  12 DAYS AGO
194,943 IMAGES SERVED · 252,562 BUBBLES DRAWN · 24,234 POSSIBLE STAR CLUSTERS · 8,978 CANDIATE GALAXIES · 597,054 OTHER OBJECTS

© COPYRIGHT 2010 ZOO NIVERSE