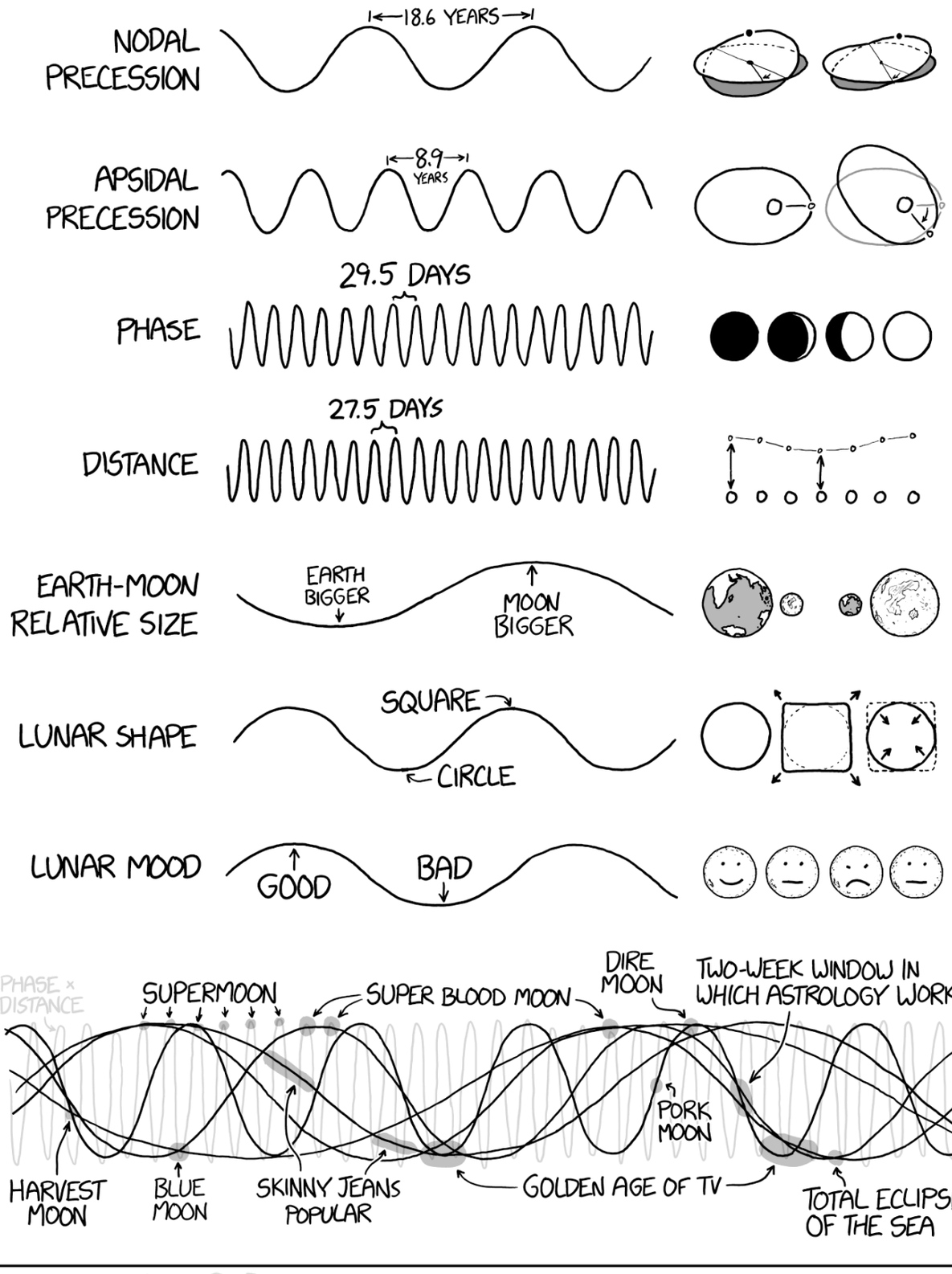
UNDERSTANDING LUNAR CYCLES



xkcd imgs.xkcd.com/comics/lunar_cycles.png

Hi.

I'm Alyssa Goodman.

Robert Wheeler Willson Professor of Applied Astronomy at Harvard
co-Director for Science at the Radcliffe Insitute for Advanced Study
PI of the WWT Ambassadors Program

Visualization Devotee

and to "see" where you're coming from...

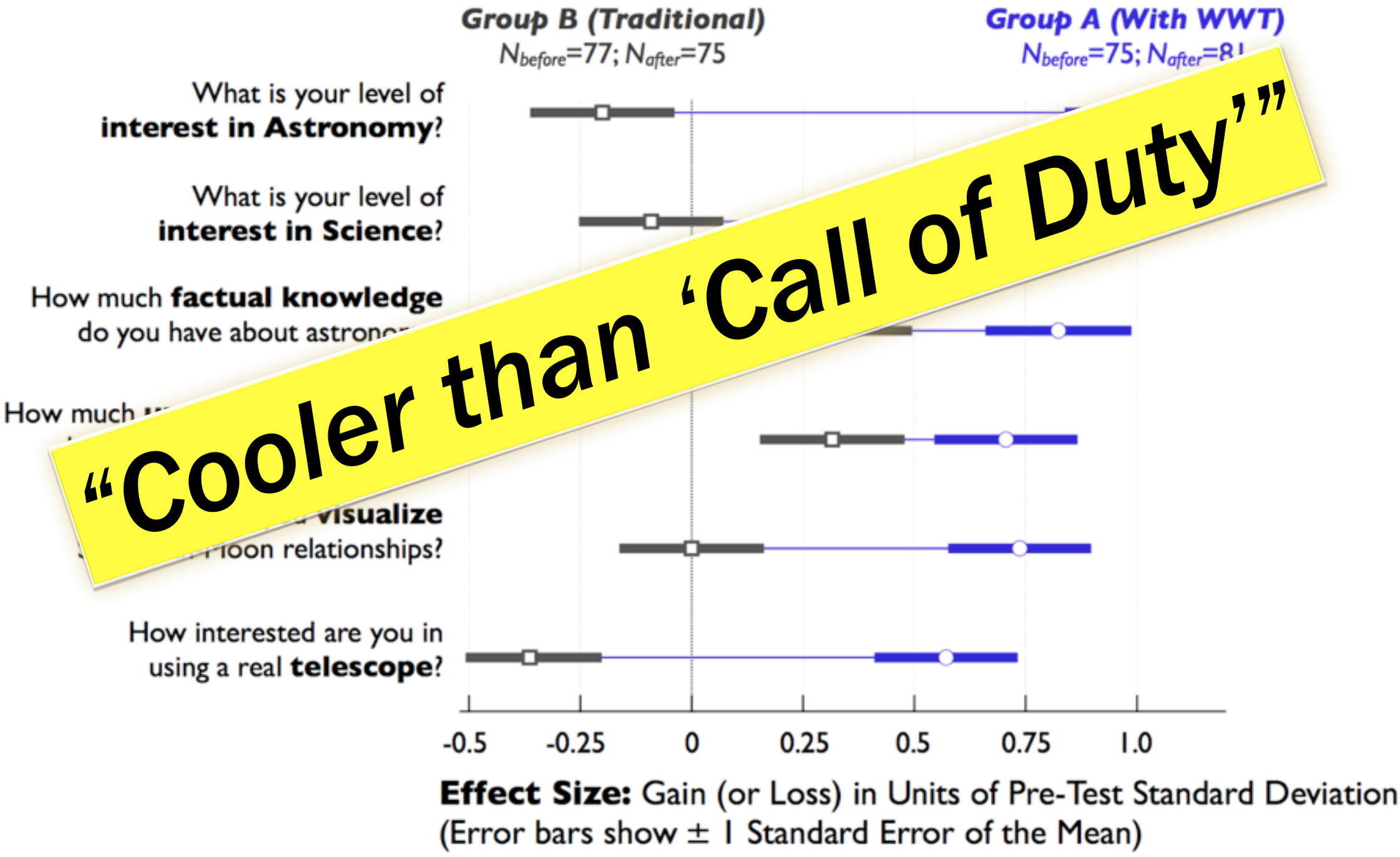
pollev.com/alyssagoodma791

or

SMS ALYSSAGOODMA791 to 37607, then ABC

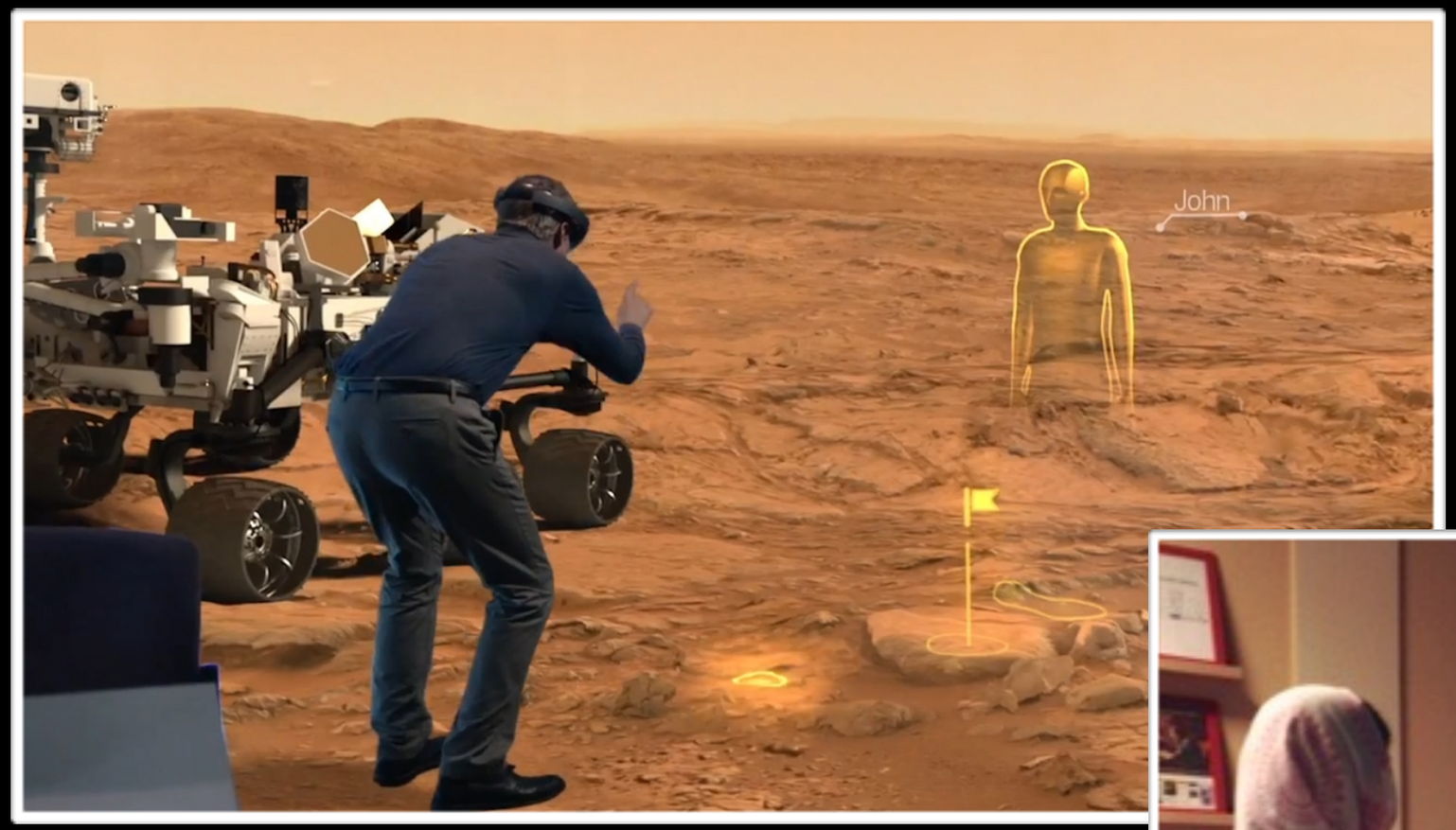
Why am I so devoted to (good) visualization?

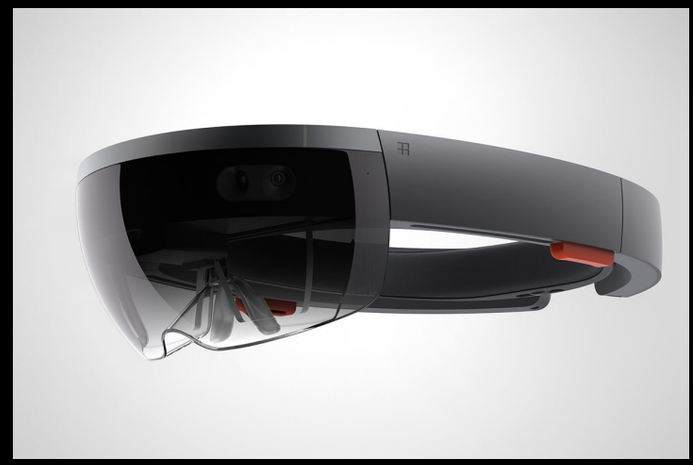
"Visualization-Poor" vs "WWT/Visualization-Rich"

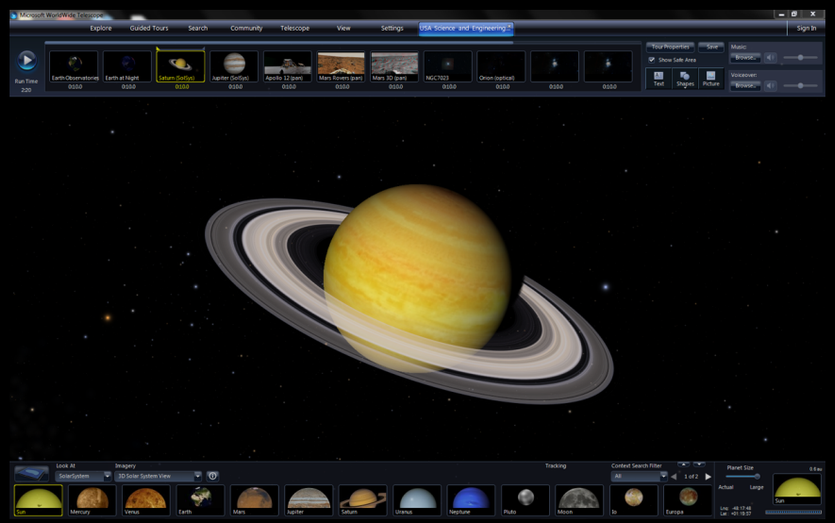


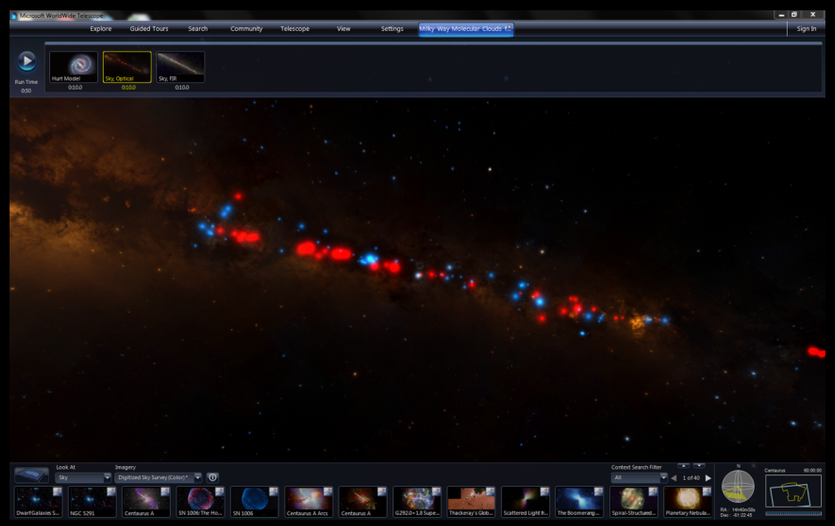
"Cooler than 'Call of Duty'"

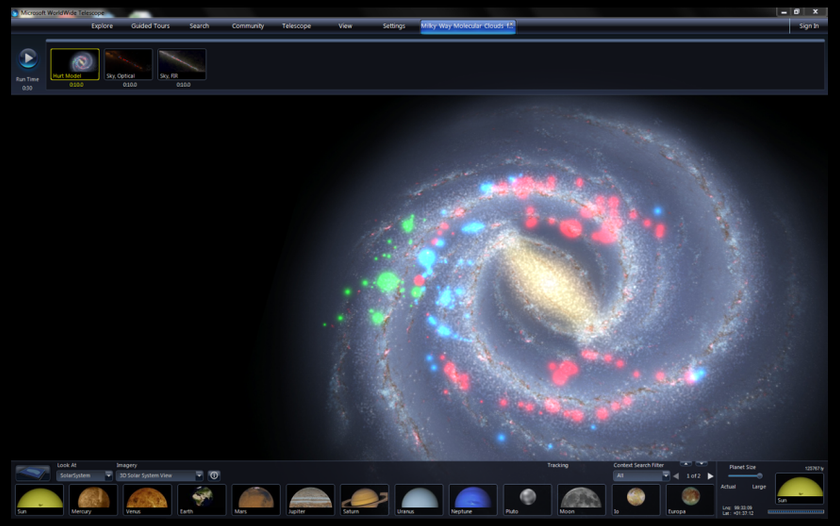
+*Better* than Call of Duty for Exploring and Explaining Data

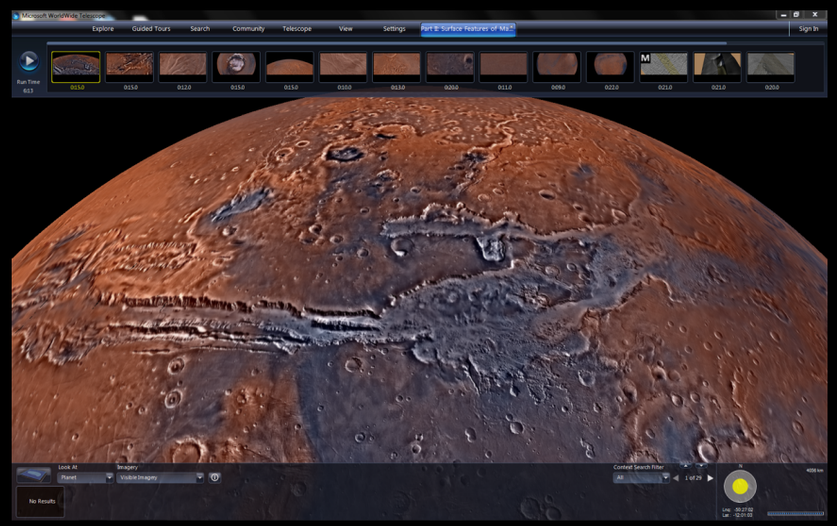


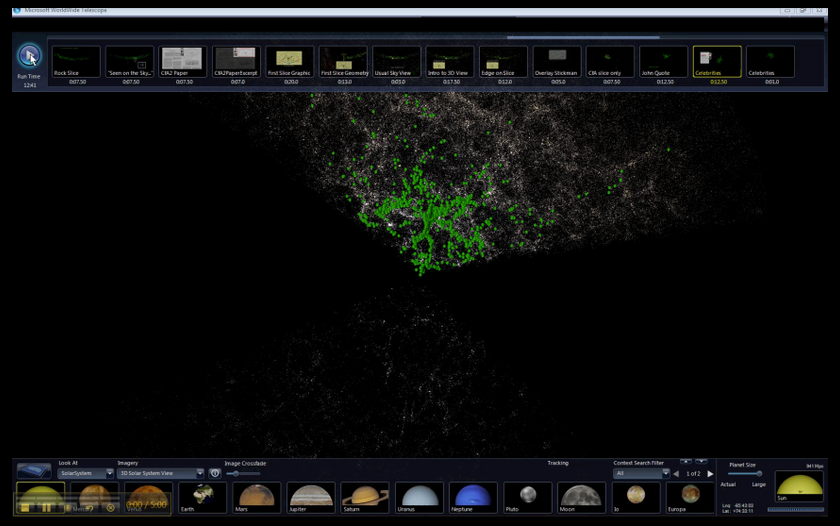


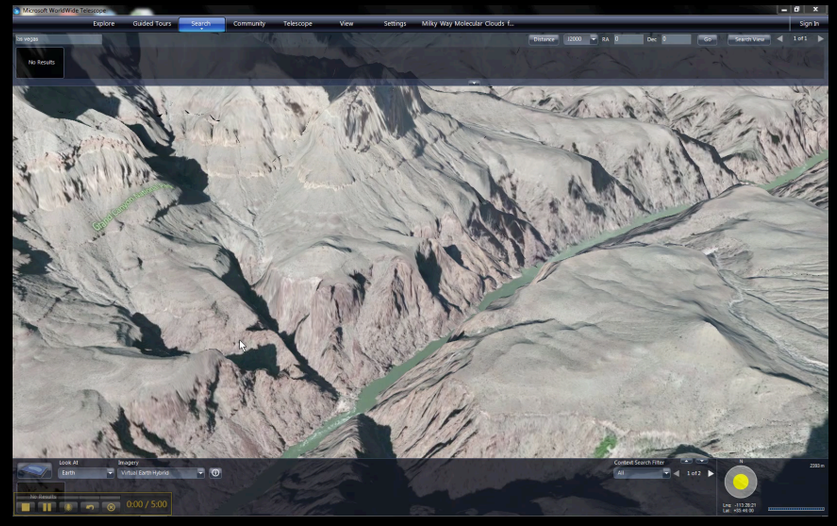






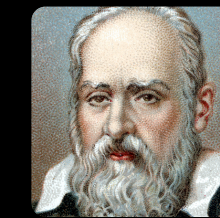


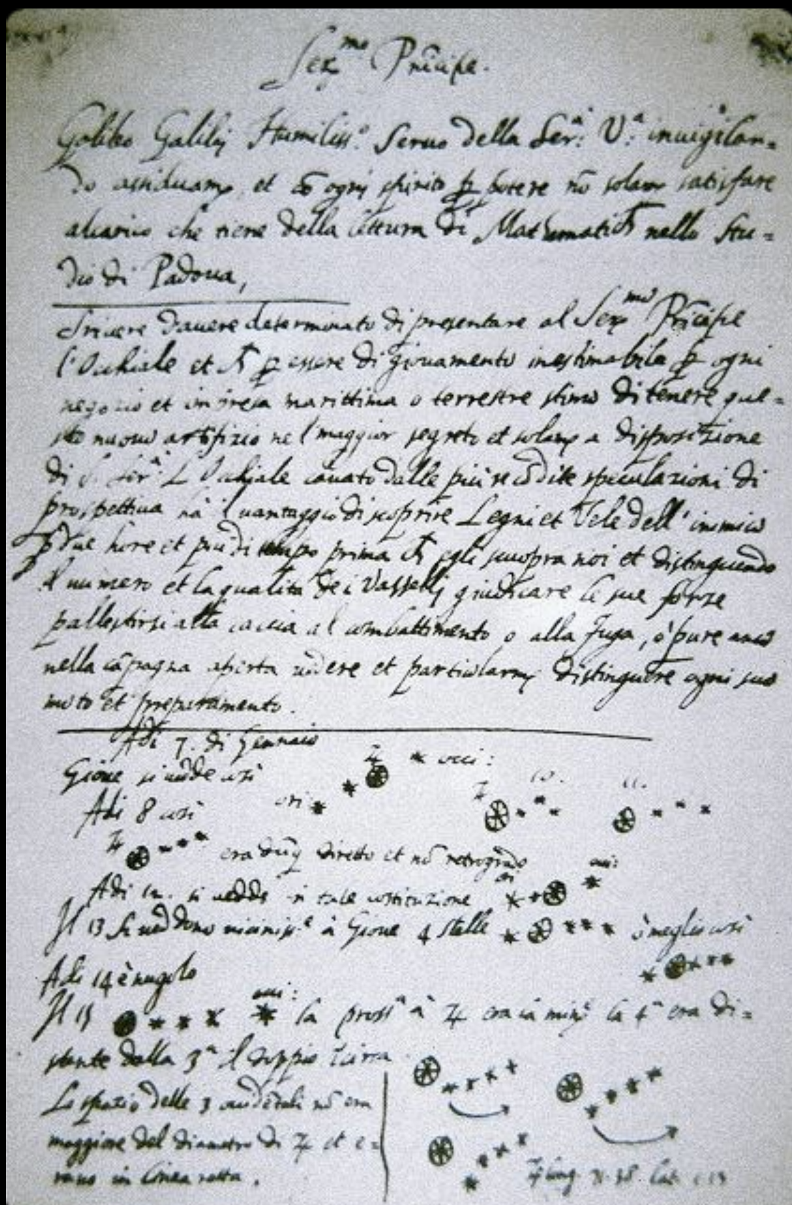




Data in Context & Storytelling with Data worldwidetelescope.org

Galileo's 3D thinking, in WorldWide Telescope



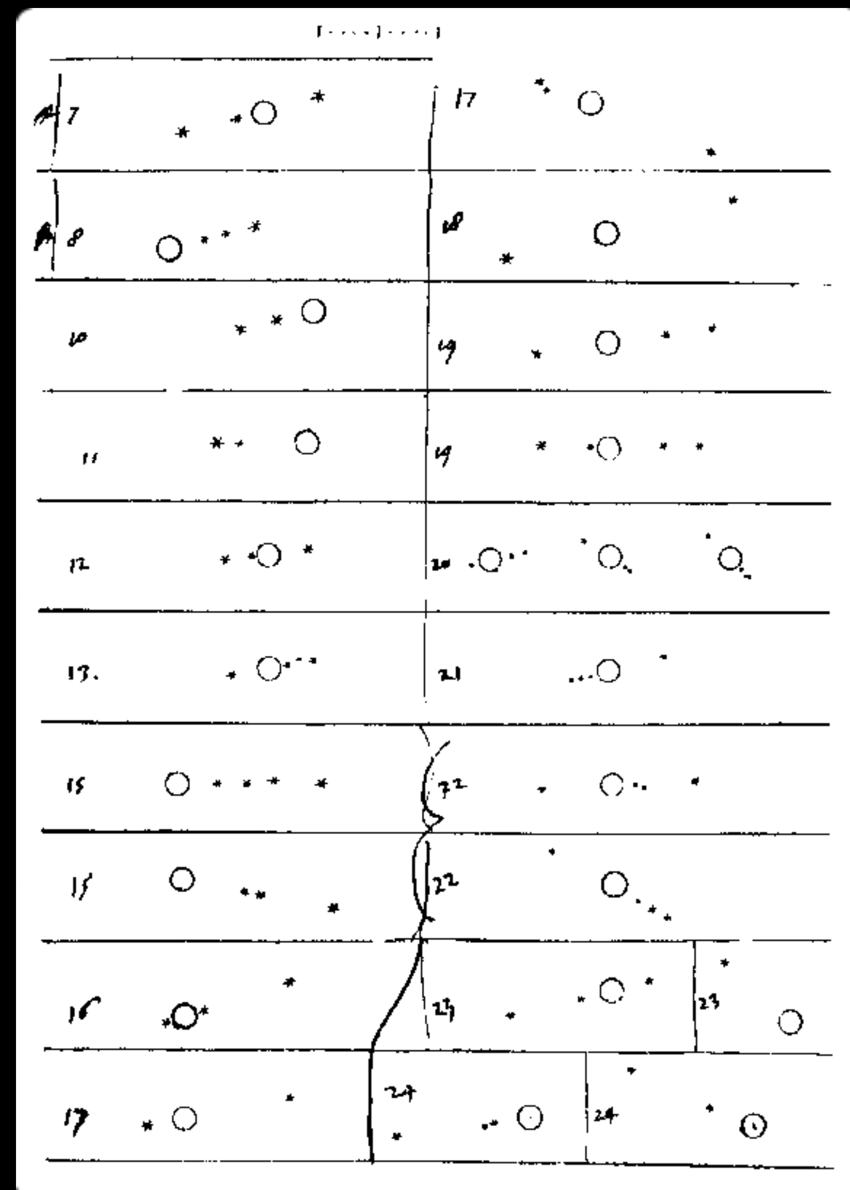


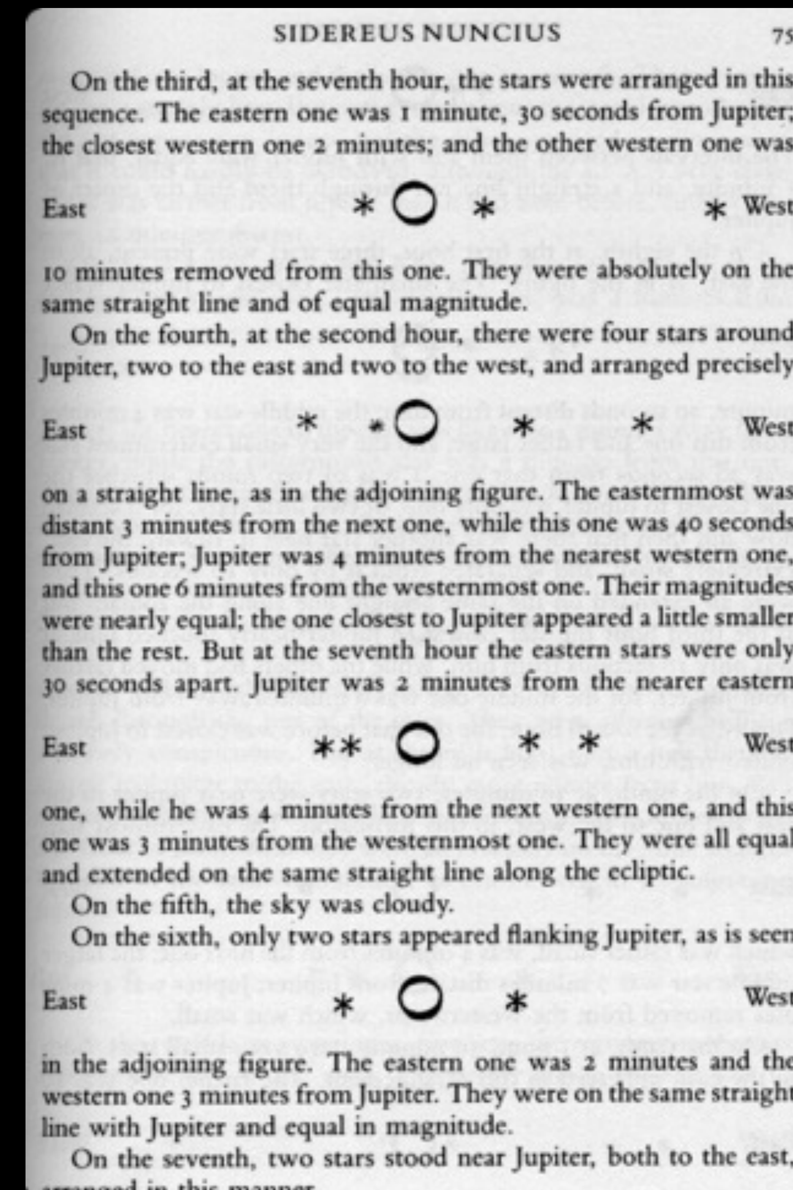
Ser.mo Principe.

Galileo Galilei Humiliss.o Servo della Ser.tà V.ra invigilando assiduamente, et con ogni spirito per potere non solamente satisfare al carico che tiene della lettura di Matematica nello Studio di Padova,

Et havere determinato di presentare al Ser.mo Principe l'Occhiale et per essere di giovamento inestimabile per ogni negozio et impresa marittima o terrestre stimo di tenere questo nuovo artifizio nel maggior segreto et solamente a disposizione di V. Ser.tà L'Occhiale cavato dalle più recondite speculazioni di prospettiva ha il vantaggio di scoprire Legni et Vele dell'inimico due hore et più di tempo prima che egli scuopra noi et distinguendo il numero et la qualità de i Vasselli giudicare le sue forze allestirsi alla caccia al combattimento o alla fuga, o pure ancora nella campagna aperta vedere et particolarmente distinguere ogni suo moto et preparamento.

Adì 7. di Gennaio
Giove si vedeva così
Adì 8 così
era dunque diretto et non retrogrado
Adì 12 si vedde in tale costituzione
Il 13 si veddono vicinissime à Giove 4 stelle in questa guisa
Adì 14 è nugolo
Il 15 ... la prossima à Giove era la minore la 4.ta era distante dalla 3.a il doppio in circa
Lo spazio delle 3 occidentali non era maggiore del diametro di Giove et erano in linea retta.





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

East * ○ * * West

10 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 was distant 3 minutes from the next one, while this one was 40 seconds from Jupiter; Jupiter was 4 minutes from the nearest western one, and this one 6 minutes from the westernmost one. Their magnitudes 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

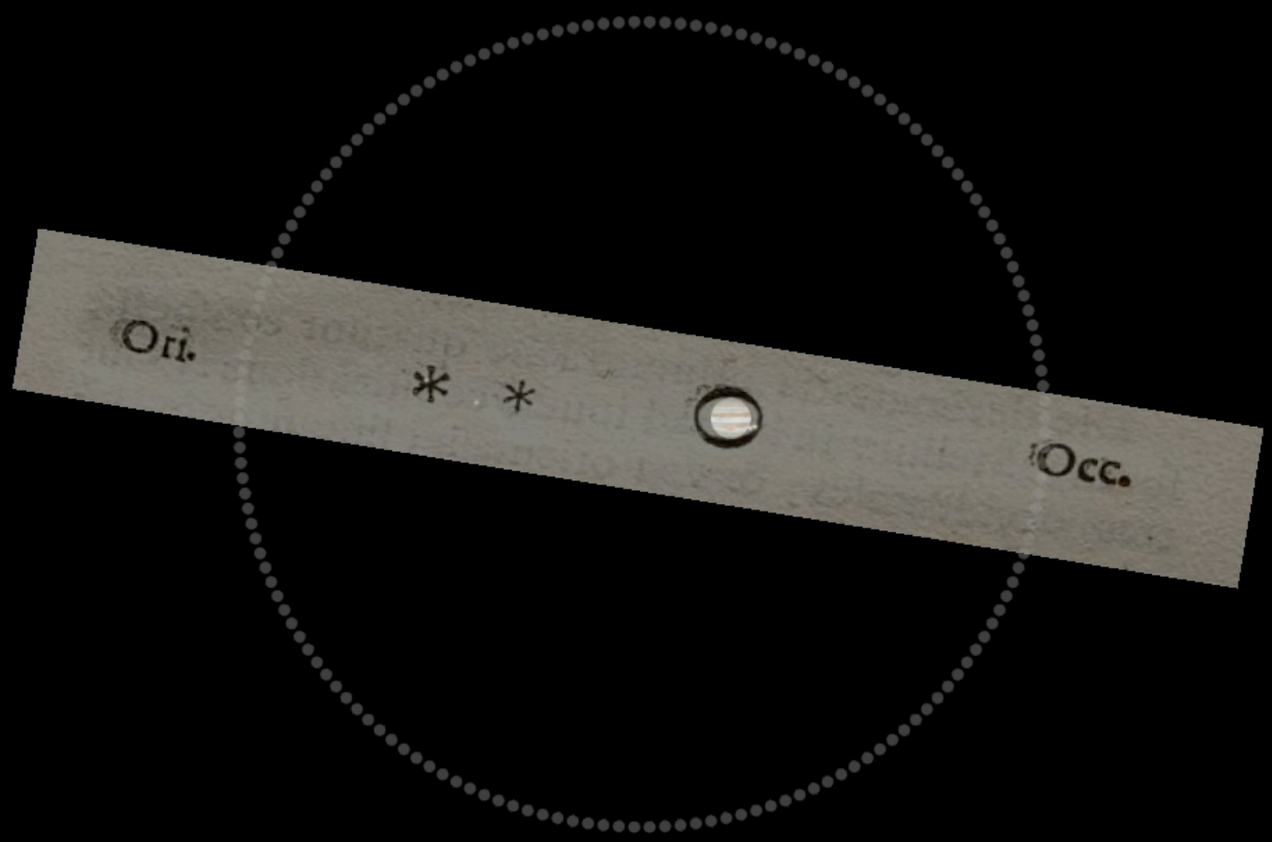
in the adjoining figure. The eastern one was 2 minutes and the western one 3 minutes from Jupiter. They were on the same straight line with Jupiter and equal in magnitude.

On the seventh, two stars stood near Jupiter, both to the east, arranged in this manner.

Notes for & re-productions of Siderius Nuncius

Galileo's 3D thinking, in WorldWide Telescope

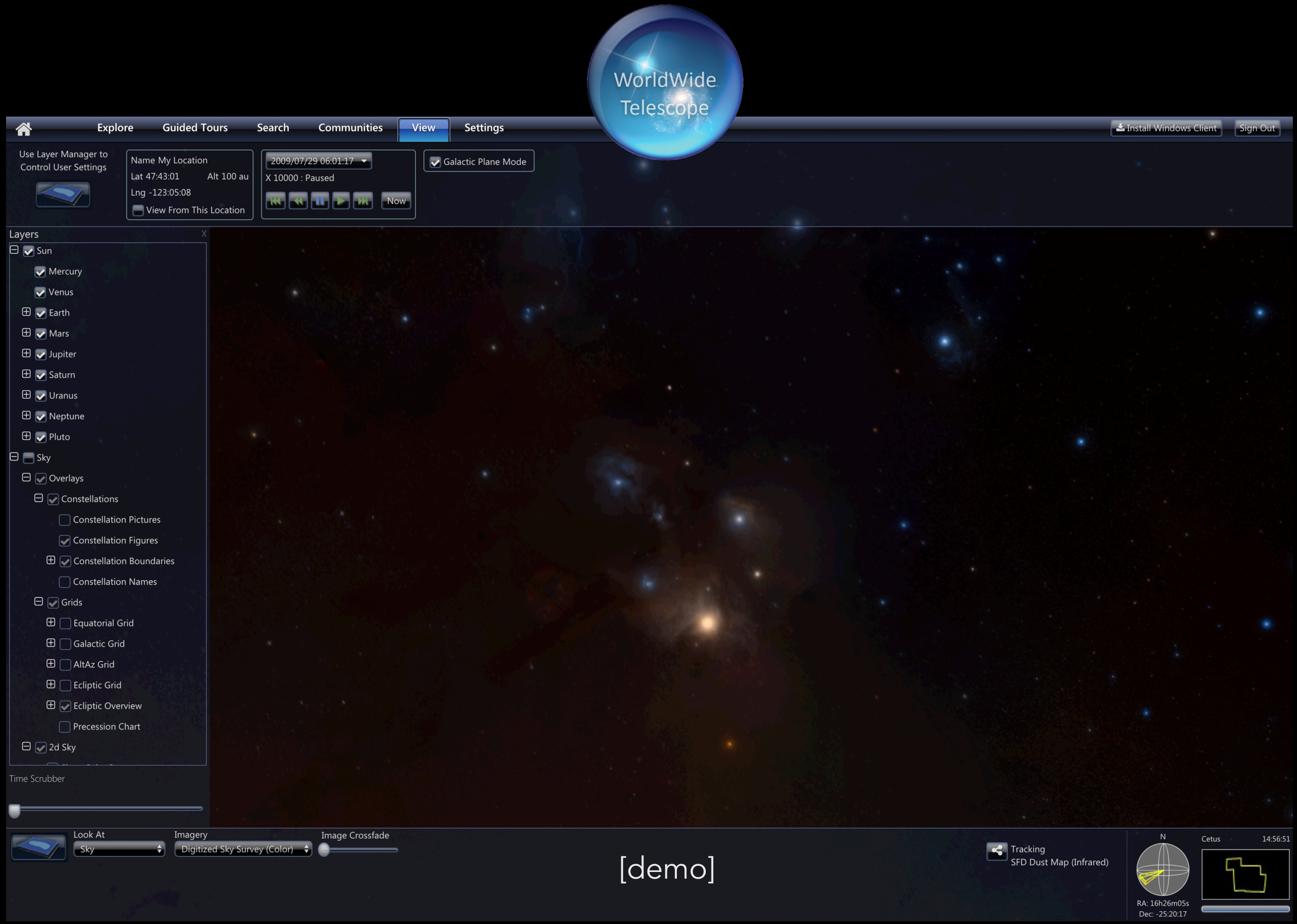
January 11, 1610



Galileo's New Order, A WorldWide Telescope Tour by Goodman, Wong & Udomprasert 2010
WWT Software Wong (inventor, MS Research), Fay (architect, MS Research), et al., now open source, hosted by AAS
see wwtambassadors.org for more on WWT Outreach

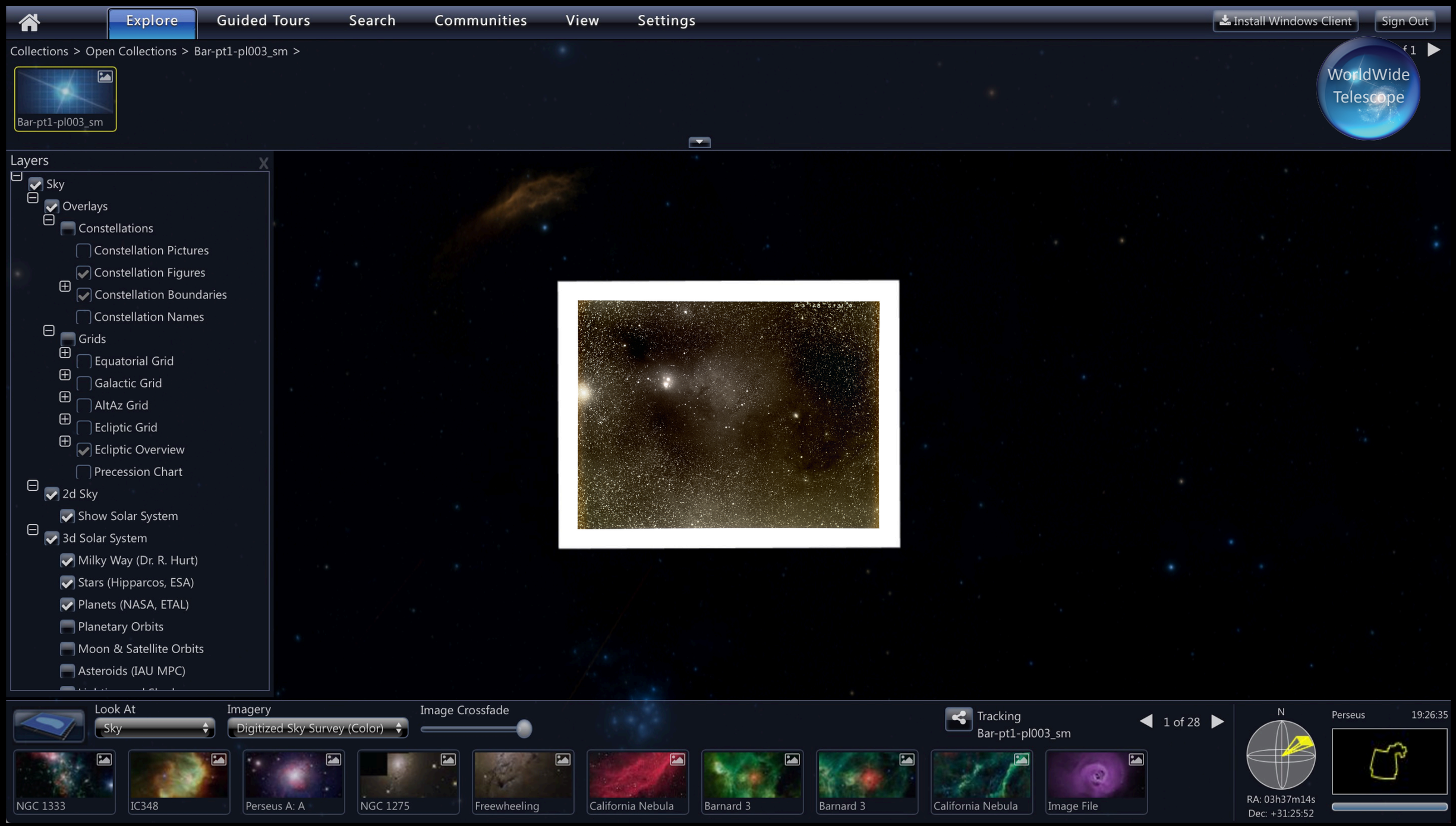
Data in Context & Storytelling with Data

WorldWide Telescope



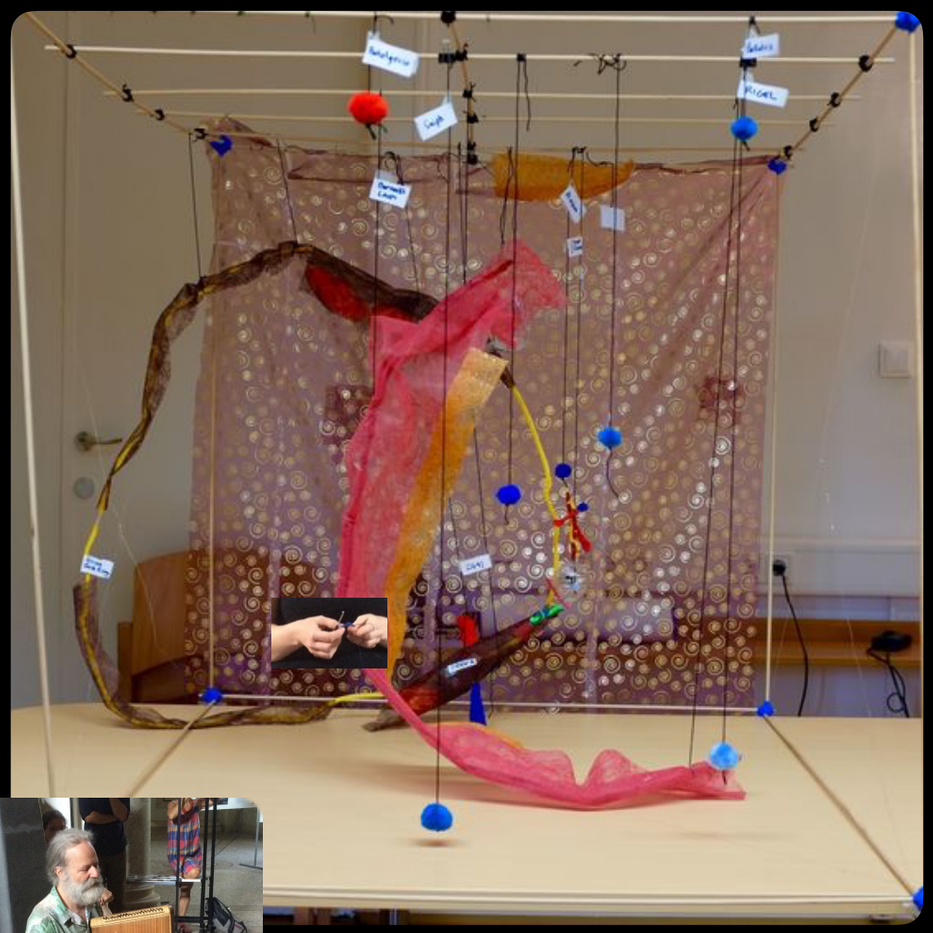
Data in Context & Storytelling with Data

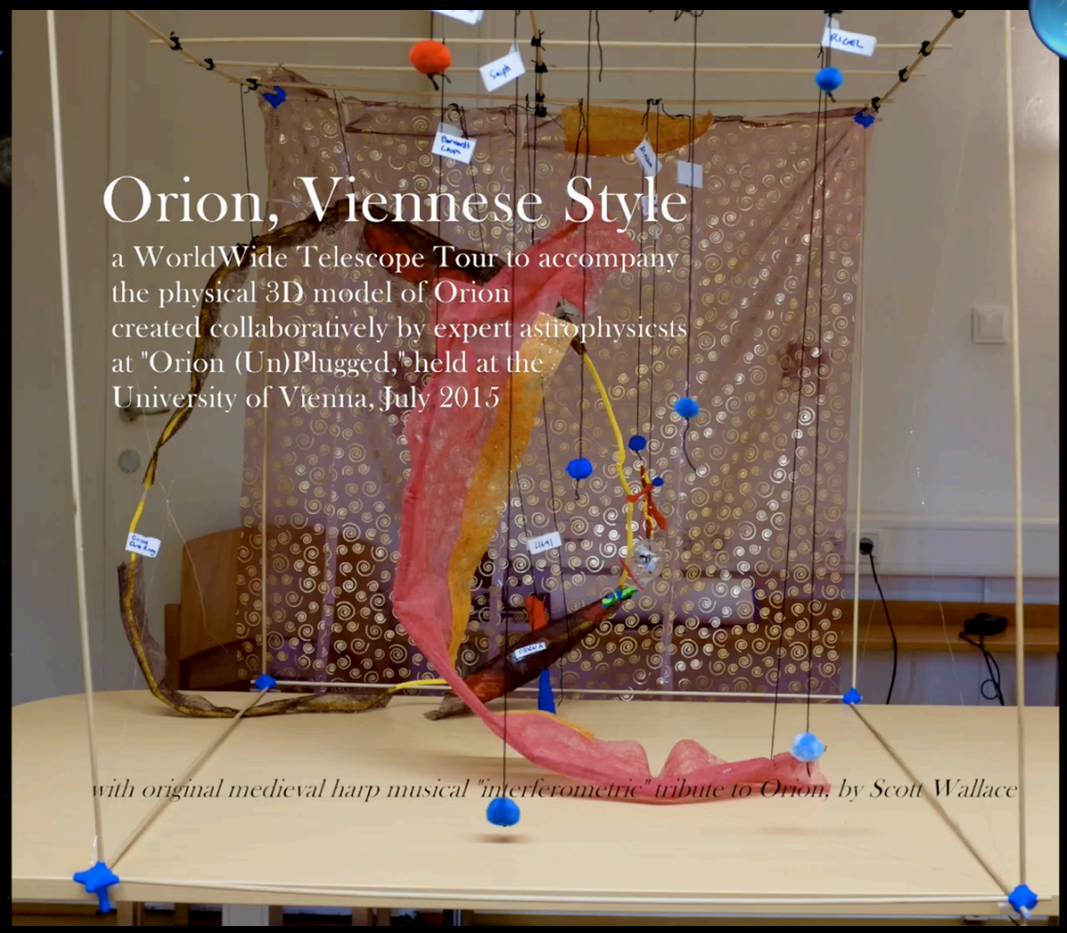
Historical Images on the Sky (see also adsass.org)



Data in Context & Storytelling with Data

VIENNA

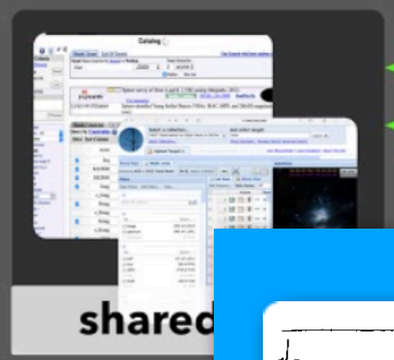


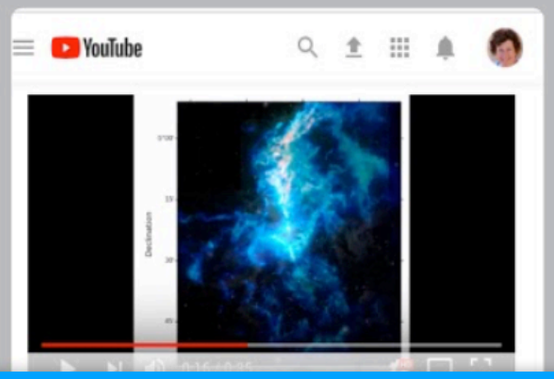


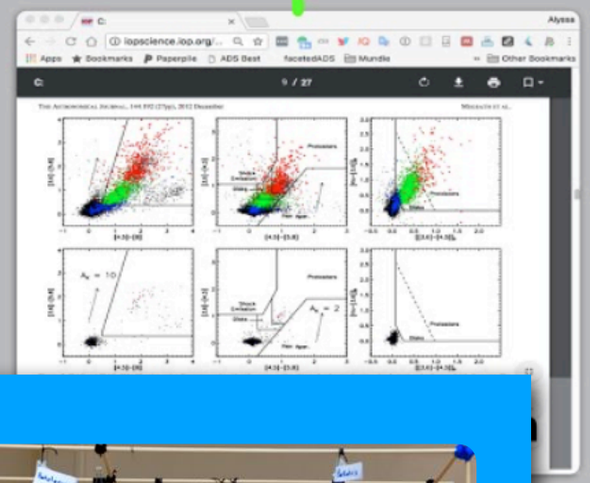
Data in Context & Storytelling with Data

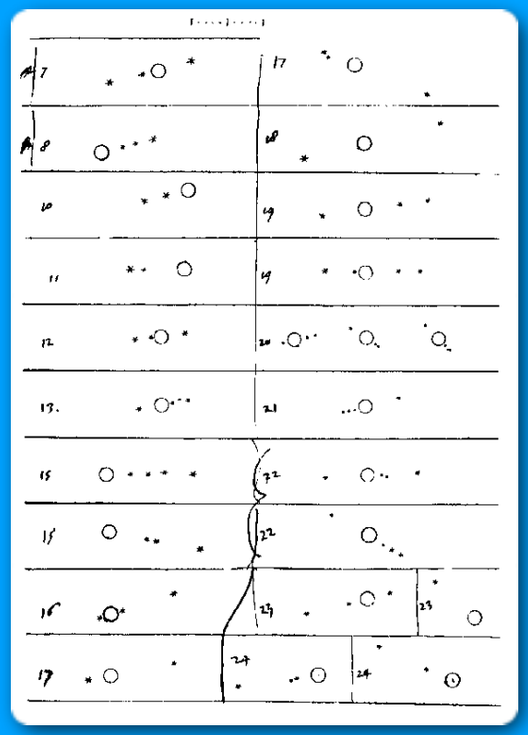
DATA,
CODE,
COLLABORATION

DATA-DRIVEN STORYTELLING

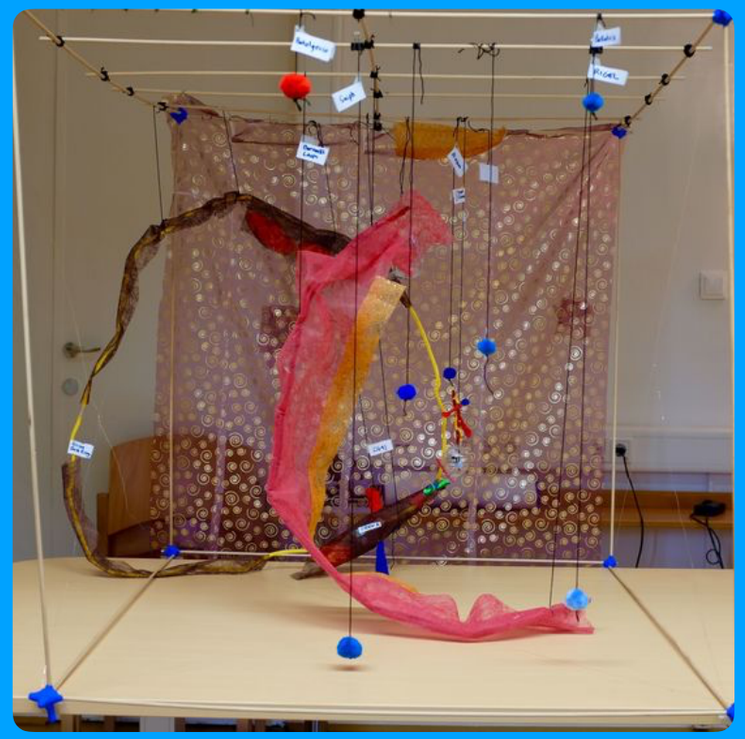








Technology is only ONE tool (which is often best when it complements analog approaches).



open s
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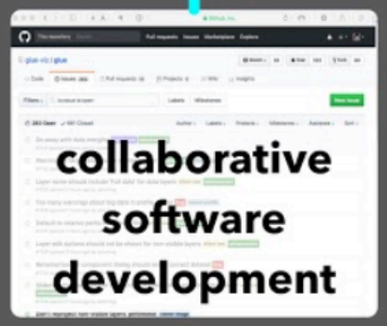
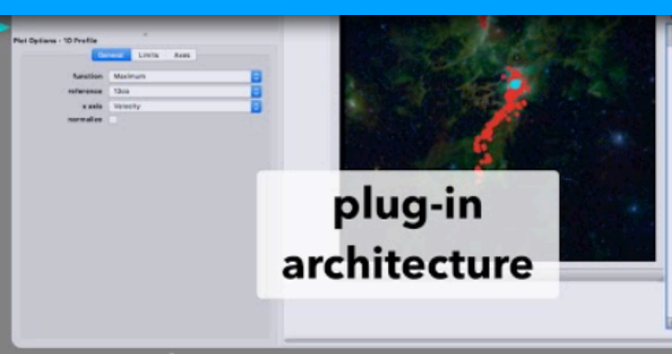
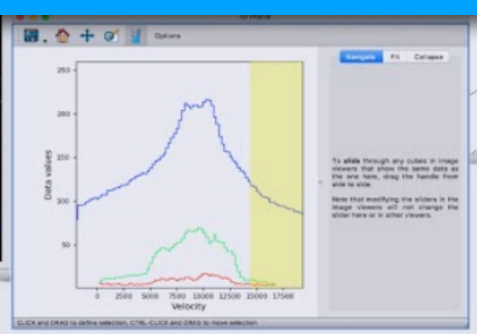
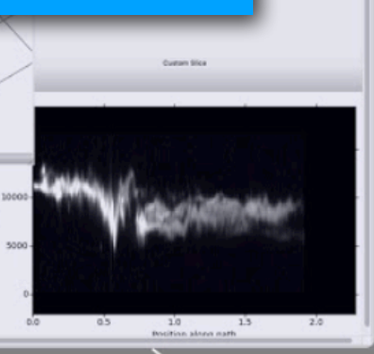




plug-in
architecture





ta

EXPLORATORATION ⇄ EXPLANATION

Visualization “Types”

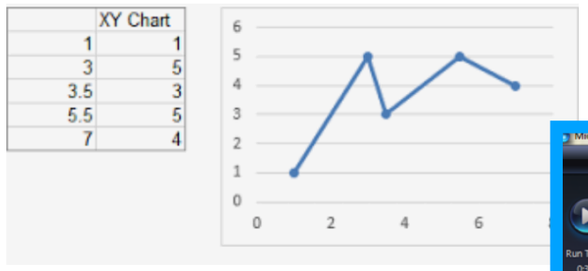
DATAGRAPHICS

INFOGRAPHICS

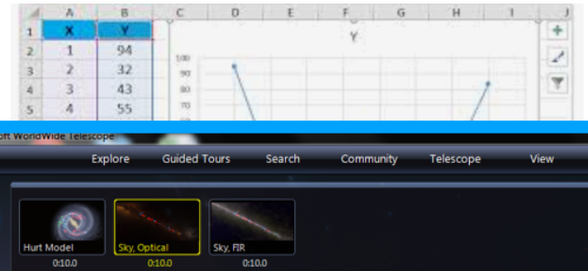
DASHBOARDS

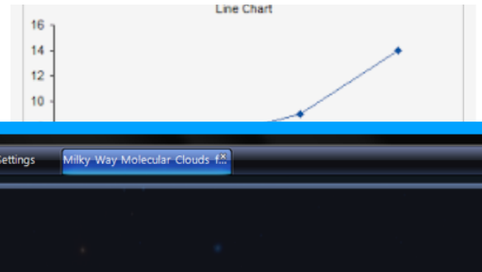
Q. *How much interactivity is optimal in what setting?*

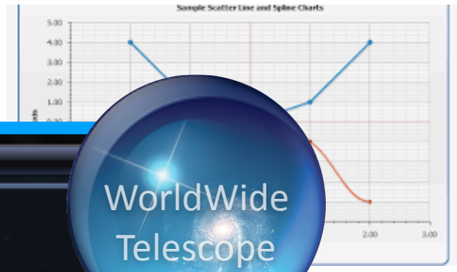
DATAGRAPHICS



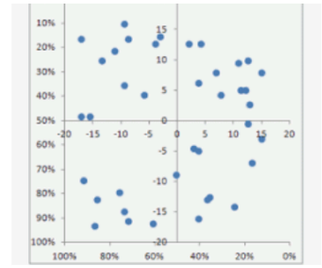
Between Series in an Excel XY Chart
mrexcel.com



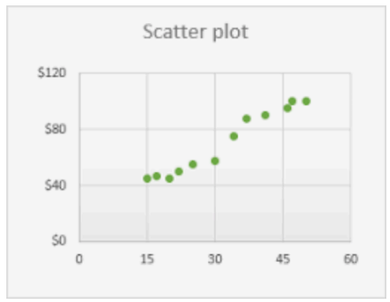




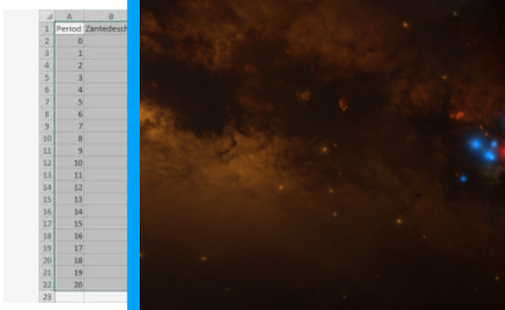
Spline ...



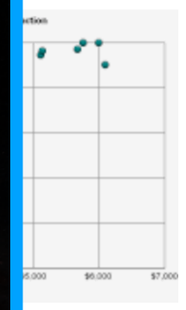
XY Scatter chart with quadra...
teylyn.com

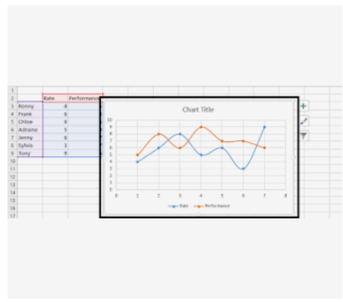


How to make a scatter plot in Excel
ablebits.com

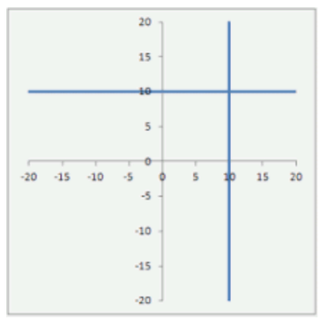


Scatter Char
excel-easy.co

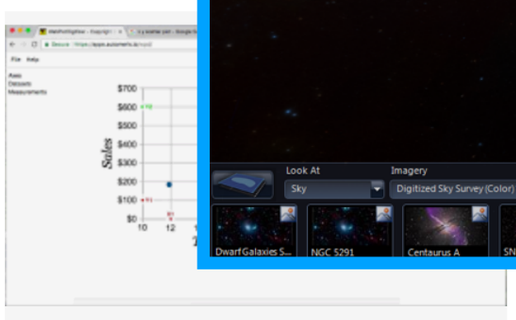




Best Excel Tutorial - XY Chart
best-excel-tutorial.com

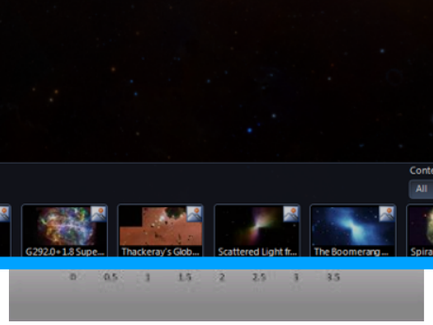


XY Scatter chart with quadran...
teylyn.com

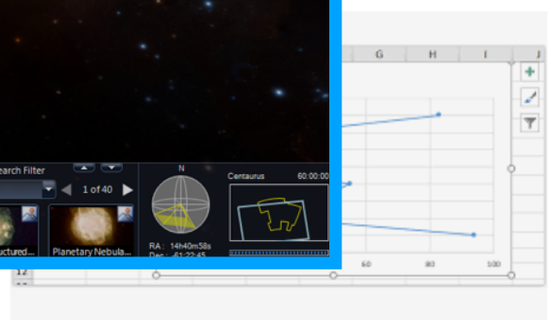


Extracting points from a Graph (X-Y ...
youtube.com

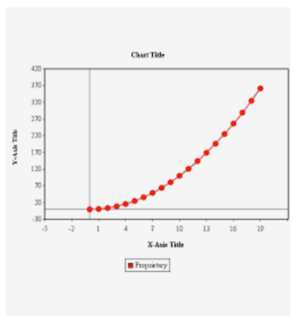
x y chart axis



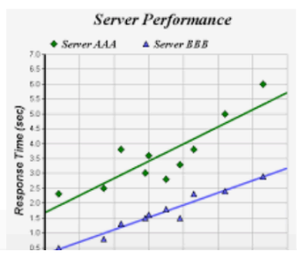
simple XY Scatter Chart in PowerPoint
free-power-point-templates.com

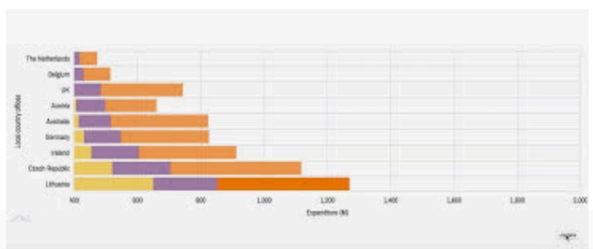


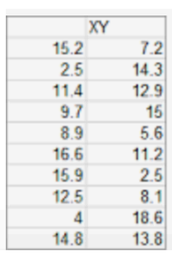
X and Y axis in scatter chart ...
extendoffice.com

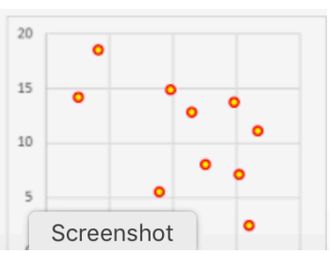


XY Chart
jcharts.sourceforge.net

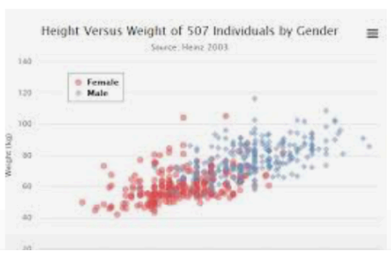


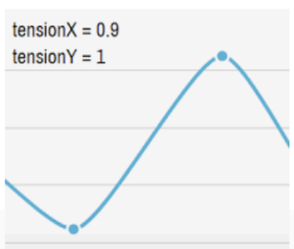


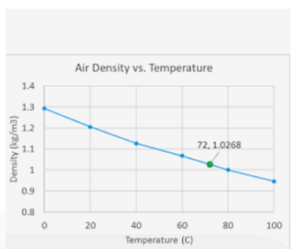




Screenshot







DATAGRAPHICS

Updated 1m 53s ago

LHR — BOS

London Heathrow · Mon, 8 July

Departed	Terminal	Gate
17:13	5	B35

Scheduled departure 16:55

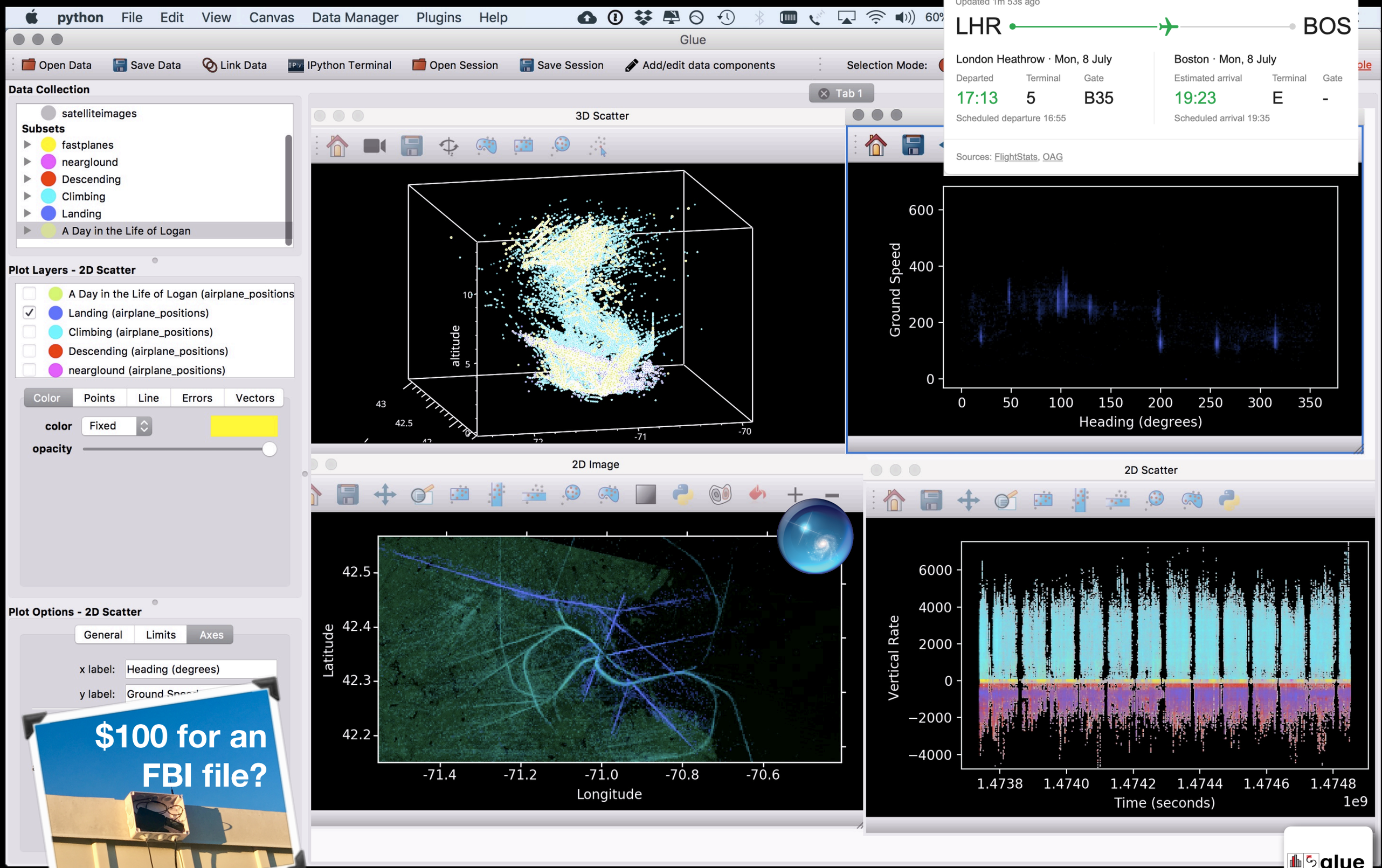
Boston · Mon, 8 July

Estimated arrival	Terminal	Gate
19:23	E	-

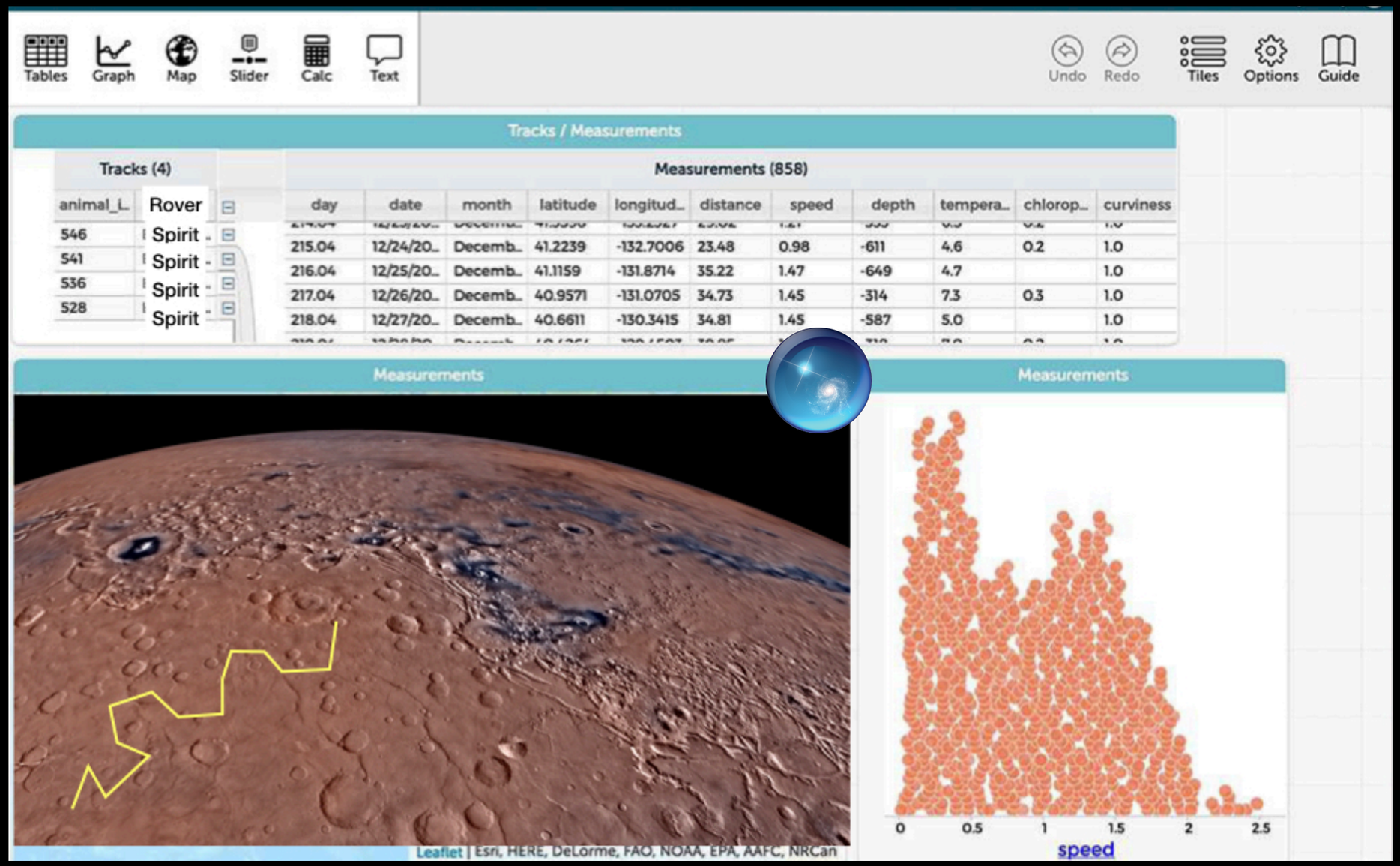
Scheduled arrival 19:35

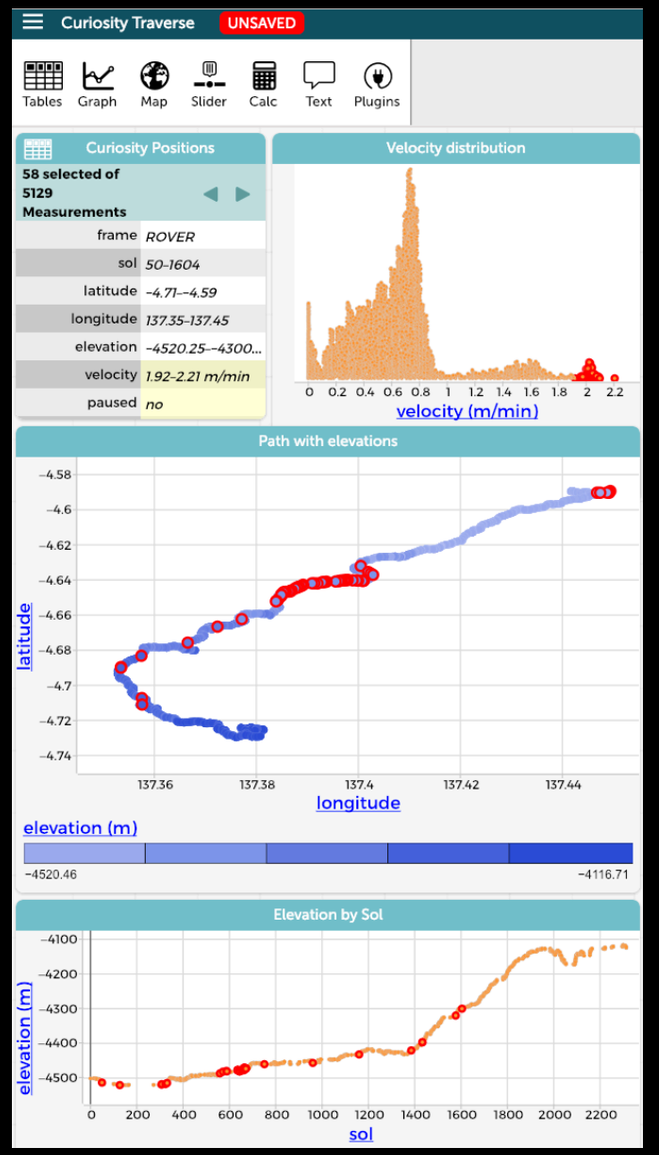
Sources: FlightStats, OAG

(INTERACTIVE, EXPLORATORY) DATAGRAPHICS



(INTERACTIVE, EXPLORATORY) DATAGRAPHICS





Mars Rover data in (glue-like, linked-view) "CODAP"
from Concord Consortium, intended for K12

Visualization “Types”

DATAGRAPHICS

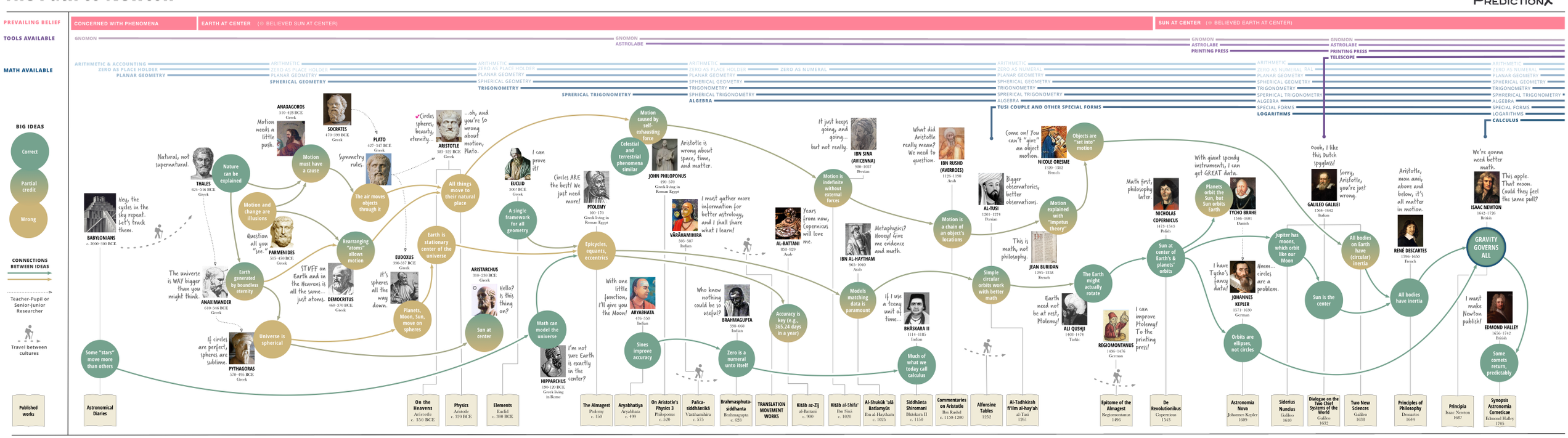
INFOGRAPHICS

DASHBOARDS

Q. *How much interactivity is optimal in what setting?*

INFOGRAPHICS

The Path to Newton



The Path to Newton

PREVAILING BELIEF

CONCERNED WITH PHENOMENA

EARTH AT CENTER (⊙ BELIEVED SUN AT CENTER)

TOOLS AVAILABLE

GNOMON

GNOMON

ASTRO

MATH AVAILABLE

ARITHMETIC & ACCOUNTING
ZERO AS PLACE HOLDER
PLANAR GEOMETRY

ARITHMETIC
ZERO AS PLACE HOLDER
PLANAR GEOMETRY
SPHERICAL GEOMETRY

ARITHMETIC
ZERO AS PLACE HOLDER
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY

SPRERICAL TRIGONOMETRY

BIG IDEAS

Correct

Partial credit

Wrong

CONNECTIONS BETWEEN IDEAS

Teacher-Pupil or Senior-Junior Researcher

Travel between cultures

Published works

Hey, the cycles in the sky repeat. Let's track them.

BABYLONIANS
c. 2000–300 BCE

Astronomical Diaries

Some "stars" move more than others

Natural, not supernatural.

THALES
624–546 BCE
Greek

Nature can be explained

Motion needs a little push.

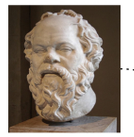
ANAXAGOROS
510–428 BCE
Greek

Motion must have a cause

Motion and change are illusions

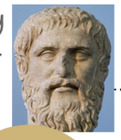
Question all you "see."

PARMENIDES
515–450 BCE
Greek



SOCRATES
470–399 BCE
Greek

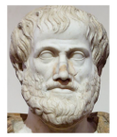
PLATO
427–347 BCE
Greek



Symmetry rules.

The air moves objects through it

Rearranging "atoms" allows motion



Circles spheres, beauty, eternity...

ARISTOTLE
383–322 BCE
Greek

...oh, and you're so wrong about motion, Plato.

All things move to their natural place

Earth is stationary center of the universe

Planets, Moon, Sun, move on spheres

It's spheres all the way down.

EUDOXUS
390-337 BCE
Greek

STUFF on Earth and in the Heavens is all the same... just atoms.

DEMOCRITUS
460–370 BCE
Greek

The universe is WAY bigger than you might think.

ANAXIMANDER
610–546 BCE
Greek

Earth generated by boundless eternity

Universe is spherical

If circles are perfect, spheres are sublime.

PYTHAGORAS
570–495 BCE
Greek

I can prove it!

EUCLID
300? BCE
Greek

A single framework for all geometry

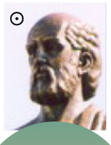
Elements
Euclid
c. 300 BCE

Circles ARE the best! We just need more!

PTOLEMY
100–170
Greek living in Roman Egypt

Epicycles, equants, eccentrics

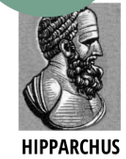
The Almagest
Ptolemy
c. 150



Hello? Is this thing on?

ARISTARCHUS
310–230 BCE
Greek

Sun at center



I'm not sure Earth is exactly in the center?

HIPPARCHUS
190-120 BCE
Greek living in Rome

Math can model the universe

With one little function, I'll give you the Moon!

On the Heavens
Aristotle
c. 350 BCE

Physics
Aristotle
c. 320 BCE

SUN AT CENT

GNOMON
ASTROLABE

ARITHMETIC
ZERO AS PLACE HOLDER
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPRERICAL TRIGONOMETRY
SPHERICAL TRIGONOMETRY
ALGEBRA

ZERO AS NUMERAL

ARITHMETIC
ZERO AS NUMERAL
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPRERICAL TRIGONOMETRY
ALGEBRA
TUSI COUPLE AND OTHER SPECIAL FORMS

Motion caused by self-exhausting force

Celestial and terrestrial phenomena similar

Aristotle is wrong about space, time, and matter.

JOHN PHILOPONUS
490–570
Greek living in Roman Egypt

Circles ARE the best! We just need more!

PTOLEMY
100–170
Greek living in Roman Egypt

I must gather more information for better astrology, and I shall share what I learn!

VĀRĀHAMIHIRA
505–587
Indian

Epicycles, equants, eccentrics

With one little function, I'll give you the Moon!

ARYABHATA
476–550
Indian

Sines improve accuracy

I'm not sure Earth is exactly in the center?

PARCHUS
-120 BCE
ek living
Rome

Who knew nothing could be so useful?

BRAHMAGUPTA
598–668
Indian

Zero is a numeral unto itself

Accuracy is key (e.g., 365.24 days in a year)

Years from now, Copernicus will love me.

AL-BATTANI
858–929
Arab

It just keeps going, and going... but not really.

IBN SINA (AVICENNA)
980–1037
Persian

Motion is indefinite without external forces

Metaphysics? Hooey! Give me evidence and math.

IBN AL-HAYTHAM
965–1040
Arab

Models matching data is paramount

If I use a teeny unit of time...

BHĀSKARA II
1114–1185
Indian

Much of what we today call calculus

What did Aristotle really mean? We need to question.

IBN RUSHD (AVERROES)
1126–1198
Arab

Motion is a chain of an object's locations

Bigger observatories, better observations.

AL-TUSI
1201–1274
Persian

Motion explained with "impetus theory"

Simple circular orbits work with better math

This is math, not philosophy.

JEAN BURIDAN
1295–1358
French

The Earth might actually rotate

Earth need not be at rest, Ptolemy!

ALI QUSHJI
1403–1474
Turkic

Come on! You can't "give" an object motion.

NICOLE ORESME
1320–1382
French

Objects are "set into" motion

Math first, philosophy later.

NICHOLAS COPERNICUS
1473–1543
Polish

Sun at center of Earth's & planets' orbits

I can improve Ptolemy! To the printing press!

REGIOMONTANUS
1436–1476
German

The Almagest
Ptolemy
c. 150

Aryabhatiya
Aryabhata
c. 499

On Aristotle's Physics 3
Philoponus
c. 520

Pañca-siddhāntikā
Vārāhamihira
c. 575

Brahmasphuta-siddhanta
Brahmagupta
c. 628

TRANSLATION MOVEMENT WORKS

Kitāb az-Zīj
al-Battani
c. 900

Kitāb al-Shifa'
Ibn Sīnā
c. 1020

Al-Shukūk 'alā Batlamyūs
Ibn al-Haytham
c. 1025

Siddhānta Shiromani
Bhāskara II
c. 1150

Commentaries on Aristotle
Ibn Rushd
c. 1150-1200

Alfonsine Tables
1252

Al-Tadhkirah fi'ilm al-hay'ah
al-Tusi
1261

Epitome of the Almagest
Regiomontanus
1496

De Revolutionibus
Copernicus
1543

PREDICTIONX

SUN AT CENTER (⊕ BELIEVED EARTH AT CENTER)

GNOMON
ASTROLABE
PRINTING PRESS

ARITHMETIC
ZERO AS NUMERAL
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPRERICAL TRIGONOMETRY
ALGEBRA
TUSI COUPLE AND OTHER SPECIAL FORMS

GNOMON
ASTROLABE
PRINTING PRESS
TELESCOPE

ARITHMETIC
ZERO AS NUMERAL RAL
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPERHICAL TRIGONOMETRY
ALGEBRA
SPECIAL FORMS
LOGARITHMS

ARITHMETIC
ZERO AS NUMERAL
PLANAR GEOMETRY
SPHERICAL GEOMETRY
TRIGONOMETRY
SPHRERICAL TRIGONOMETRY
ALGEBRA
SPECIAL FORMS
LOGARITHMS
CALCULUS

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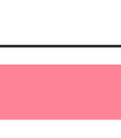

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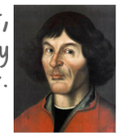

NICHOLAS COPERNICUS
1473–1543
Polish

Math first, philosophy later.

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Come on! You can't "give" an object motion.

NICOLE ORESME
1320–1382
French

Planets orbit the Sun, but Sun orbits Earth

TYCHO BRAHE
1546–1601
Danish

With giant spendy instruments, I can get GREAT data.

Jupiter has moons, which orbit like our Moon

JOHANNES KEPLER
1571–1630
German

I have Tycho's fancy data!

Hmm... circles are a problem.

Orbits are ellipses, not circles

Sun is the center

All bodies on Earth have (circular) inertia

All bodies have inertia

GALILEO GALILEI
1564–1642
Italian

Oooh, I like this Dutch spyglass!

Sorry, Aristotle, you're just wrong.

RENÉ DESCARTES
1596–1650
French

Aristotle, mon ami, above and below, it's all matter in motion.

GRAVITY GOVERNS ALL

ISAAC NEWTON
1642–1726
British

We're gonna need better math.

This apple. That moon. Could they feel the same pull?

EDMOND HALLEY
1656–1742
British

I must make Newton publish!

Some comets return, predictably

Commentaries on Aristotle
Ibn Rushd
c. 1150-1200

Alfonsine Tables
1252

Al-Tadhkirah fi'ilm al-hay'ah
al-Tusi
1261

Epitome of the Almagest
Regiomontanus
1496

De Revolutionibus
Copernicus
1543

Astronomia Nova
Johannes Kepler
1609

Siderius Nuncius
Galileo
1610

Dialogue on the Two Chief Systems of the World
Galileo
1632

Two New Sciences
Galileo
1638

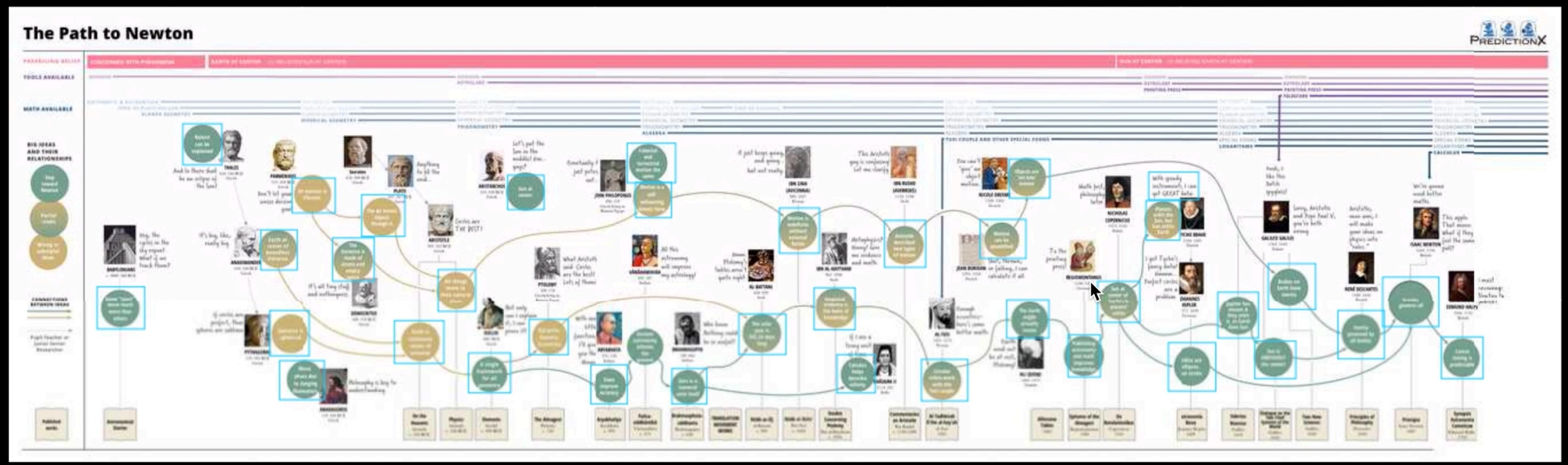
Principles of Philosophy
Descartes
1644

Principia
Isaac Newton
1687

Synopsis Astronomia Cometicae
Edmond Halley
1705

(INTERACTIVE, HYPERLINKED) INFOGRAPHICS

The Path to Newton



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Search by:

Users | Annotation Text | Tag

Search

DrewLich last updated about 14 hours ago

In 1687, Isaac Newton published his *Principia Mathematica* and inaugurated a revolution in physics that would reign supreme until the introduction of Einstein's relativity in the early 20th century. Even though relativity shakes some of the foundations of Newtonian gravity, its modifications are negligible in nearly all Earth-bounded situations. To this day, in classrooms all around the world, Newton's principles and physics continue to be taught and undergird fundamental assumptions about how the universe works.

At the heart of Newton's work was a rigorous definition and mathematical description of *force*. Up until this point, force was theorized qualitatively and used as a noun to describe something being acted upon by something else; however, with Newton, force became an entity unto itself. Since the days of

Visualization “Types”

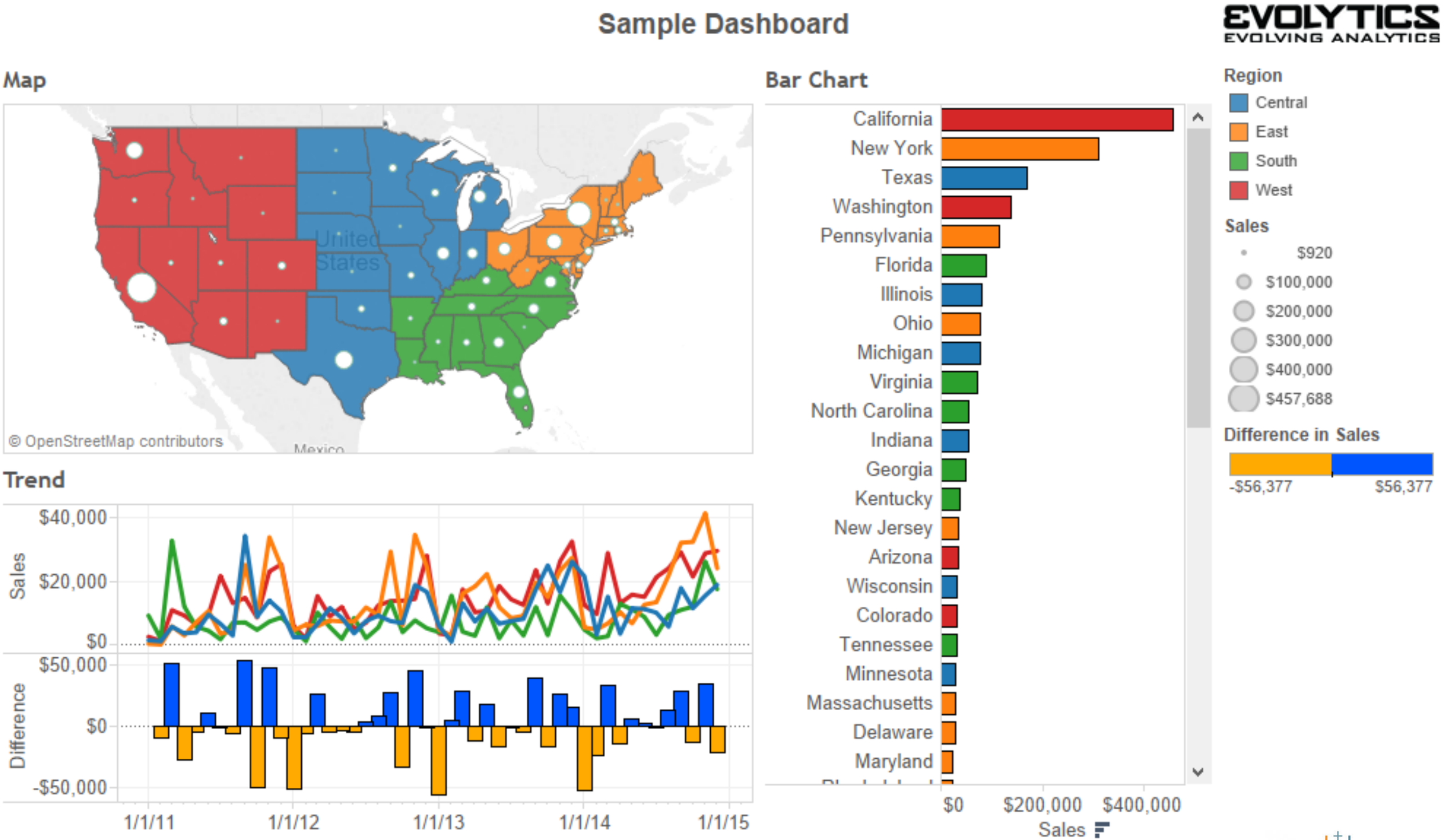
DATAGRAPHICS

INFOGRAPHICS

DASHBOARDS

Q. *How much interactivity is optimal in what setting?*

DASHBOARDS



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Visualization “Types”

DATAGRAPHICS

INFOGRAPHICS

DASHBOARDS

Q. *How much interactivity is optimal in what setting?*

Q. *How much interactivity is optimal in what setting?*

MENU

TEN QUESTIONS TO ASK WHEN CREATING A VISUALIZATION

The 10 Questions

1. **Who** | Who is your audience? How expert will they be about the subject and/or display conventions?
2. **Explore-Explain** | Is your goal to explore, document, or explain your data or ideas, or a combination of these?
3. **Categories** |Do you want to show or explore pre-existing, known, human-interpretable, categories?
4. **Patterns** |Do you want to identify new, previously unknown or undefined patterns?
5. **Predictions & Uncertainty** | Are you making a comparison between data and/or predictions? Is representing uncertainty a concern?
6. **Dimensions** | What is the intrinsic number of dimensions (not necessarily spatial) in your data, and how many do you want to show at once?
7. **Abstraction & Accuracy** | Do you need to show all the data, or is summary or abstraction OK?
8. **Context & Scale** | Can you, and do you want to, put the data into a standard frame of reference, coordinate system, or show scale(s)?
9. **Metadata** | Do you need to display or link to non-quantitative metadata? (including captions, labels, etc.)
10. **Display Modes** | What display modes might be used in experiencing your display?

Now, visit the 10QViz conversation! There's so much more to talk about.

Curious about the **origins** of 10QViz? Try the About page.
Want to learn **how best to use** and **participate** in 10QViz? Try the How to page.
Want to read about the **scholarship** behind 10QViz.org's questions? Try Coltekin & Goodman 2018.

10QVIZ.ORG

For students who like to program, there are many open-source options to enable javascript interactivity, e.g. Google Charts (or d3, Vega, DASH ...)

Google Charts

Search LANGUAGE ALL PRODUCTS

HOME GUIDES REFERENCE SUPPORT SEND FEEDBACK

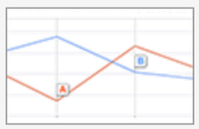
Chart Types
- Chart Gallery
- Annotation Charts
- Area Charts
- Bar Charts
- Bubble Charts
- Calendar Charts
- Candlestick Charts
- Column Charts
- Combo Charts
- Diff Charts
- Donut Charts
- Gantt Charts
- Gauge Charts
- GeoCharts
- Histograms
- Intervals
- Line Charts
- Maps
- Org Charts
- Pie Charts
- Sankey Diagrams
- Scatter Charts
- Stepped Area Charts
- Table Charts
- Timelines
- Tree Map Charts
- Trendlines
- Waterfall Charts
- Word Trees

Additional Charts Gallery

Our gallery provides a variety of charts which are optimized to address your data visualization needs. These charts are based on pure HTML5/SVG technology (adopting VML for old IE versions) so no plugins are required. Adding these charts to your page can be done in a few simple steps.

The main Gallery page can be found here.

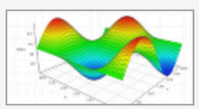
Links below point to demonstrations of each chart. These charts are not necessarily HTML5 compliant. Note that links to third-party visualizations will take you off the Google site.



Annotated Time Line

An animated time series chart.

By: Google



CHAP Links Library

The CHAP Links Library is a web based visualization library for displaying graphs, networks, and timelines. The tools are developed as Google Charts for Javascript and GWT.

By: Almende

Drastic Treemap

A dynamic treemap in Flash.

By: DrasticData

https://developers.google.com/chart/interactive/docs/more_charts

A PERIODIC TABLE OF VISUALIZATION METHODS

Data Visualization
Visual representations of quantitative data in schematic form (either with or without axes)

Information Visualization
The use of interactive visual representations of data to amplify cognition. This means that the data is transformed into an image, it is mapped to screen space. The image can be changed by users as they proceed working with it

Concept Visualization
Methods to elaborate (mostly) qualitative concepts, ideas, plans, and analyses.

Strategy Visualization
The systematic use of complementary visual representations in the analysis, development, formulation, communication, and implementation of strategies in organizations.

Metaphor Visualization
Visual Metaphors position information graphically to organize and structure information. They also convey an insight about the represented information through the key characteristics of the metaphor that is employed

Compound Visualization
The complementary use of different graphic representation formats in one single schema or frame

C continuum																	G graphic facilitation
Tb table	Ca cartesian coordinates											Me meeting trace	Mm metro map	Tm temple	St story template	Tr tree	Ct cartoon
Pi pie chart	L line chart											Co communication diagram	Fp flight plan	Cs concept sceleton	Br bridge	Fu funnel	Ri rich picture
B bar chart	Ac area chart	R radar chart cobweb	Pa parallel coordinates	Hy hyperbolic tree	Cy cycle diagram	T timeline	Ve venn diagram	Mi mindmap	Sq square of oppositions	Cc concentric circles	Ar argument slide	Sw swim lane diagram	Gc gantt chart	Pm perspectives diagram	D dilemma diagram	Pr parameter ruler	Kn knowledge map
Hi histogram	Sc scatterplot	Sa sankey diagram	In information lense	E entity relationship diagram	Pt petri net	Fl flow chart	Cl clustering	Lc layer chart	Py minto pyramid technique	Ce cause-effect chains	Tl toulmin map	Dt decision tree	Cp cpm critical path method	Cf concept fan	Co concept map	Ic iceberg	Lm learning map
Tk tukey box plot	Sp spectogram	Da data map	Tp treemap	Cn cone tree	Sy system dyn./ simulation	Df data flow diagram	Se semantic network	So soft system modeling	Sn synergy map	Fo force field diagram	Ib ibis argumentation map	Pr process event chains	Pe pert chart	Ev evocative knowledge map	V Vee diagram	Hh heaven 'n' hell chart	I infomural

Cy **Process Visualization**

Hy **Structure Visualization**

☼ **Overview**

▫ **Detail**

⚙ **Detail AND Overview**

< > **Divergent thinking**

> < **Convergent thinking**

Note: Depending on your location and connection speed it can take some time to load a pop-up picture.

version 1.5

Su supply demand curve	Pe performance charting	St strategy map	Oc organisation chart	Ho house of quality	Fd feedback diagram	Ft failure tree	Mq magic quadrant	Ld life-cycle diagram	Po porter's five forces	S s-cycle	Sm stakeholder map	Is ishikawa diagram	Tc technology roadmap
Ed edgeworth box	Pf portfolio diagram	Sg strategic game board	Mz mintzberg's organigraph	Z zwicky's morphological box	Ad affinity diagram	De decision discovery diagram	Bm bcg matrix	Stc strategy canvas	Vc value chain	Hy hype-cycle	Sr stakeholder rating map	Ta taps	Sd spray diagram

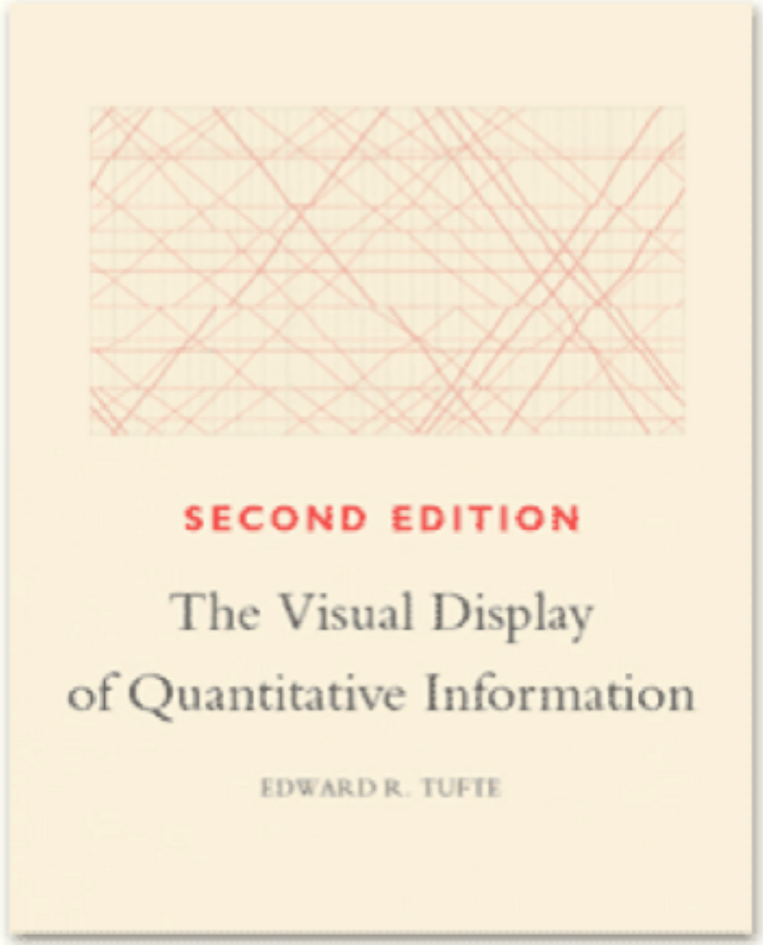
www.visual-literacy.org/periodic_table/periodic_table.html#

CANON LAW

THE VISUAL DISPLAY OF QUANTITATIVE INFORMATION

The classic book on statistical graphics, charts, tables. Theory and practice in the design of data graphics, 250 illustrations of the best (and a few of the worst) statistical graphics, with detailed analysis of how to display data for precise, effective, quick analysis. Design of the high-resolution displays, small multiples. Editing and improving graphics. The data-ink ratio. Time-series, relational graphics, data maps, multivariate designs. Detection of graphical deception: design variation vs. data variation. Sources of deception. Aesthetics and data graphical displays.

This is the second edition of *The Visual Display of Quantitative Information.* Recently published, this new edition provides excellent color reproductions of the many graphics of William Playfair, adds color to other images, and includes all the changes and corrections accumulated during 17 printings of the first edition.



The Path to Newton

Alyssa Goodman,
Jais Brohinsky,
Drew Lichtenstein
& Katie Peek

on behalf of Harvard University

tinyurl.com/aas-path-to-newton

The Path to Newton