75

75

February 10, 2025

NCRC Meeting 13 January 2025

The meeting was called to order by Vice President Jim Sendrak at 19:10. This late start was caused by difficulty with the AV set up. Video projection and the Zoom session were not operational.

The minutes from the short business session held during the December Christmas party were not read nor approved.

New members Rene Martel, Greg Lavoy, and Joe DeMarco were voted into membership.

About this time John Vecoli was able to restore video projection with a backup projector.

Treasurer John Jackman reported that our account balances had decreased slightly due to expected on-going expenses.

Repeater lead Dave Neal reported that the W1SYE repeater was operational with a standby unit at slightly more than standard power, that the main unit had been repaired, and would be reinstalled as weather permits.

Winter Field Day was described and operators solicited by leads Jay Nuzum, and Jim Sendrak. Willy Maclean added details to the operating environment.

Mike Cullen described the GMRS/FRS drill involving all three island towns plus North Kingstown. Mike Rousseau and John Jackman were also involved.

President Jim Sammons, Mike Cullen, and Youth Coordinator for RI Rowan Egbert described the upcoming School Club Roundup to be run by NCRC volunteers at All Saints Steam Academy beginning February 10th.

President Jim Sammons presented a photo review of NCRC Island and other activations and described future activations that club members will be welcome to participate in.

The meeting closed with an appeal to members to voice their desires for programs and activities that they would like to see in the future, including scheduling of future licensing classes.

Adjournment at 20:23

New Members

Report from Vice President
Jim Sendrak, KC1LYG

Membership

Report from treasurer
John Jackman N1SMX

Year	2025	2024	2023	Members	
Paid	85	132	141	Technician	36
Life	12	11	12	General	44
Unpaid	47	0	4	Extra	57
Total	**144**	**143**	**157**	Advanced	3
				Unlicensed	4

Treasurer's Report, January 2025

Newport County Radio Club
Statements of Assets, Liabilities and Capital
At January 31, 2025

Assets	
Cash	11,794.12
PayPal	5,678.76
Total Assets	17,472.88
Liabilities & Capital	
Liabilities	-
Club Equity	(17,472.88)
Total Liabilities & Capital	(17,472.88)

Newport County Radio Club
Change in Capital
1 Month Period Ending January 31, 2025

Beginning Capital	16,677.20
Prior period adjustment	-
Net Income (Loss)	795.68
Ending Capital	17,472.88

Newport County Radio Club
Statement of Income
1 Month Period Ending January 31, 2025

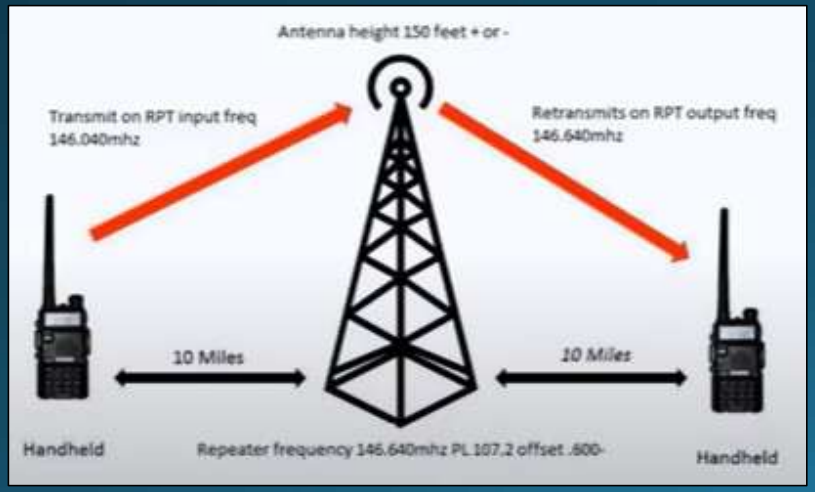
Income		
Grants	105.00	
Dues	1,450.00	
Donations	-	
Education	84.00	
Misc	-	
Total Income		1,639.00
Expenses		
Grants	(65.00)	
Paypal	-	
Supplies	(317.97)	
Education	(120.00)	
Utilities	(266.50)	
Insurance	-	
Banking	(73.85)	
Total Expenses		(843.32)
Net Income (Loss)		795.68

Newport County Radio Club
Statement of Cash Flow
1 Month Period Ending January 31, 2025

Cash at January 1, 2025		16,479.46
Cash Inflows		
Grants	105.00	
Dues	1,450.00	
Donations	-	
Education	84.00	
Misc	-	
Total Cash inflows		1,639.00
Cash Outflows		
Grants	(65.00)	
Paypal	-	
Supplies	(317.97)	
Education	(120.00)	
Utilities	(266.50)	
Insurance	-	
Banking	(73.85)	
Total Cash Outflows		(843.32)
Cash at January 31, 2025		17,275.14

Notes:		
	Unrestricted cash	$12,518.78
	Restricted ARRL Grant	$2,962.31
	Restricted Pete Lawson Fund	$1,403.90
	Restricted IBM Grant	$390.15

NCRC Repeaters W1SYE and W1AAD



Dave Neal
W2DAN

Education & youth activities

Old Business

New Business

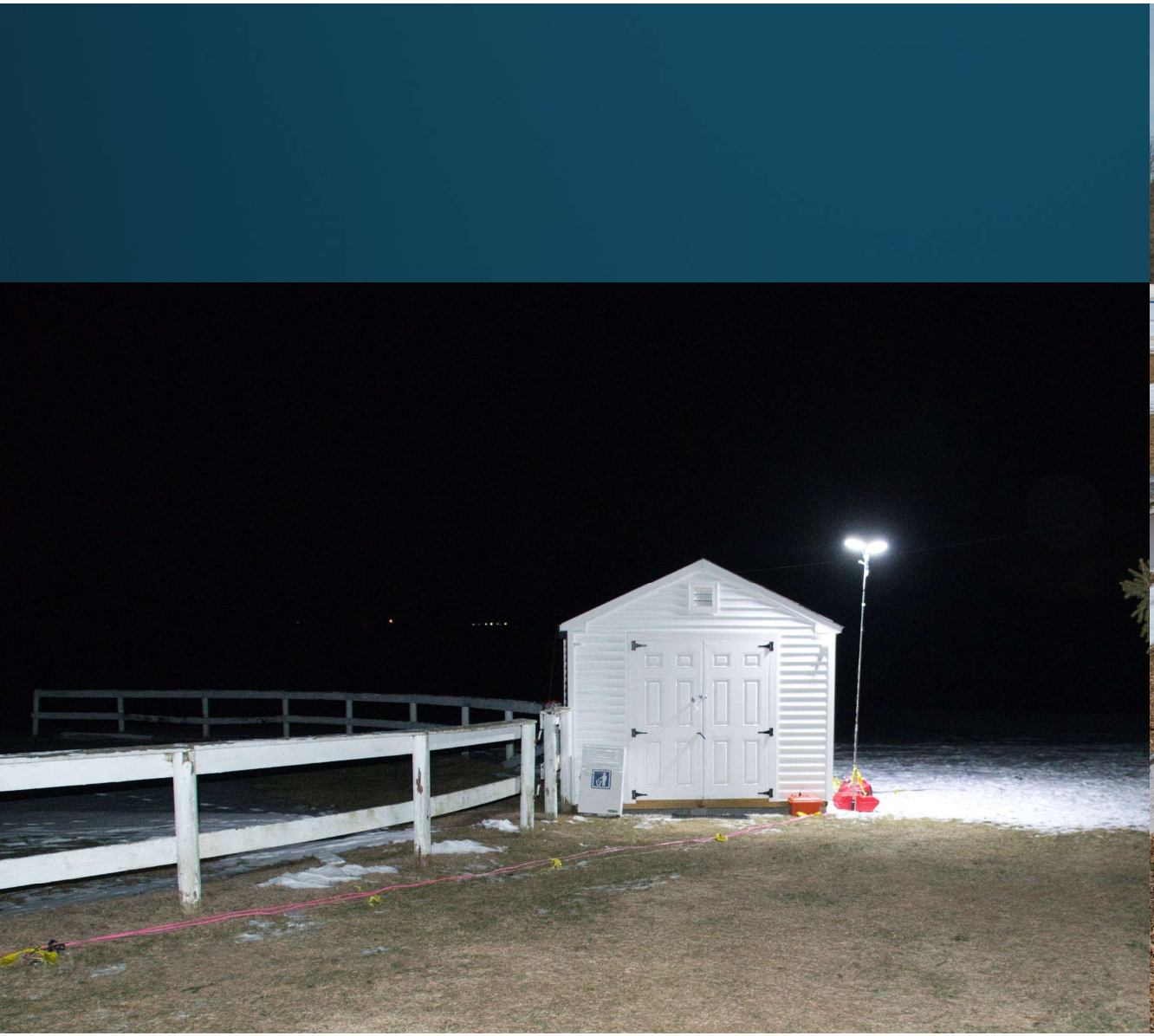
- Contracting of a Cube Smart 5x5 storage space in North Kingstown
- Approval of three-month contract cost of storage space, $54.00
- Approval of expenses associated with Winter Field Day.
- From the floor?

Winter Field Day

January 25th and 26th

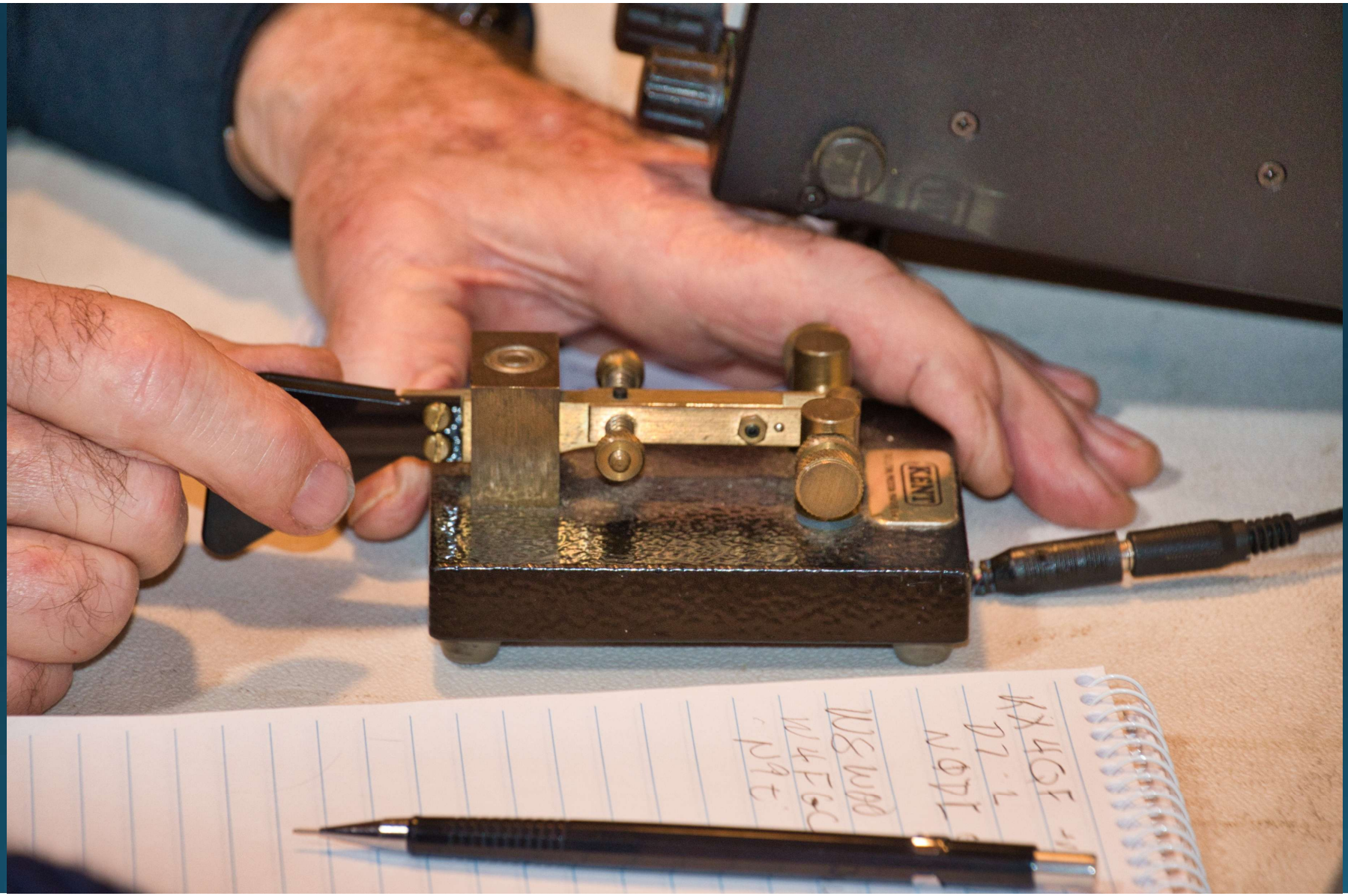
2025


NASA
NASA




HONDA


nautica


KENT


HONDA

Mike Cullen and Mike Rousseau

GMRS and FRS radio network drill

GMRS/FRS 3 LIFELINE

Newport County

Frequency: 462.6125 MHz

GMRS/FRS Channel 3

THESE ARE UNCERTAIN TIMES. OUR DIGITAL INFRASTRUCTURE IS FRAGILE.

HAVE A BACKUP. LEARN MORE ABOUT THIS ISLAND-WIDE RADIO RESILIENCE EFFORT.

WWW.GEN4AI.ORG


School Club Roundup
at All Saints Steam
Academy
February 10-14

End February Business Meeting

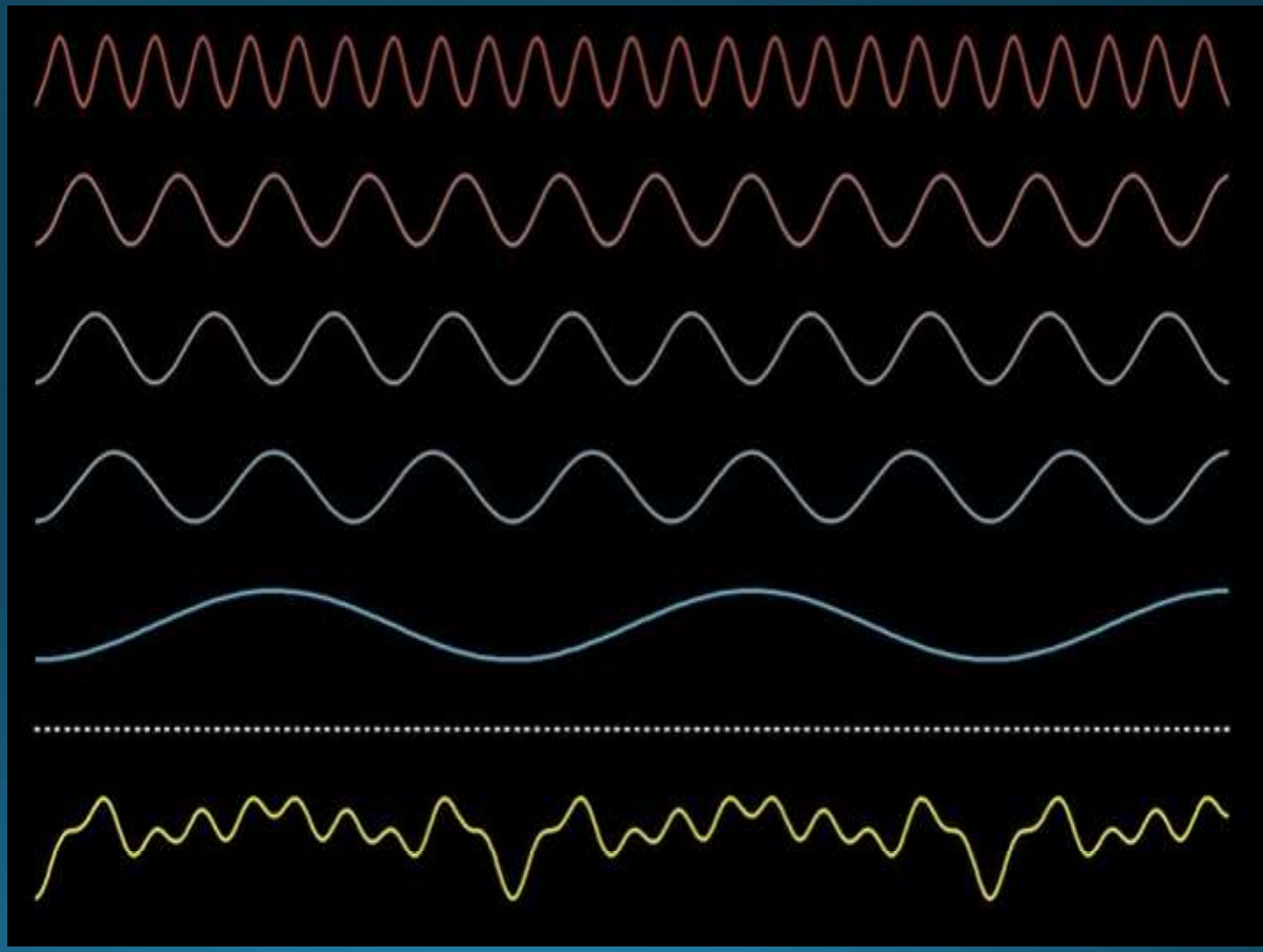
And now for something completely different

Tides, shifting seasons, Melankovitch Cycles, and Ham Radio as Complex Wave Forms

Complex waves

Simple sine waves of decreasing frequency

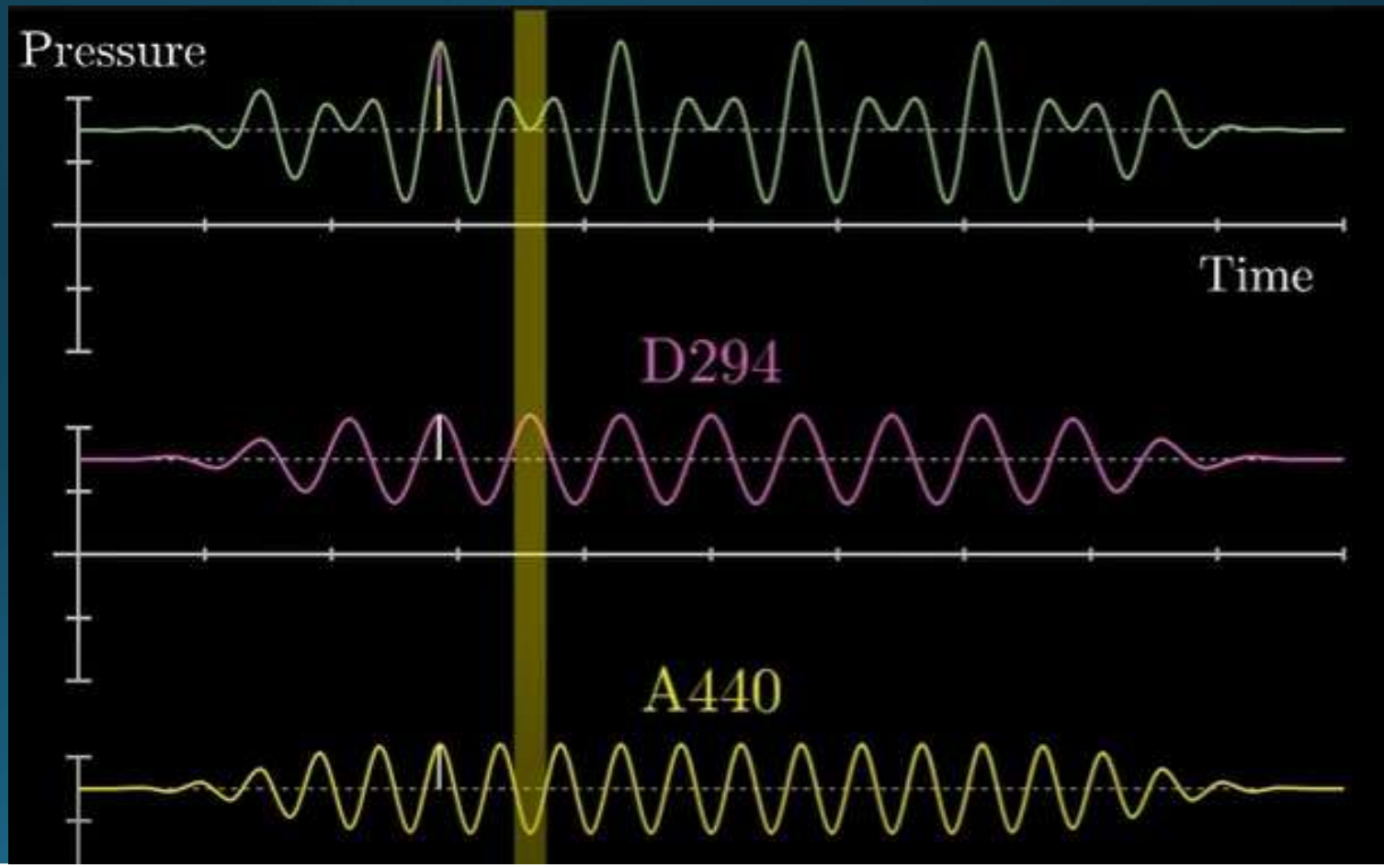
Sum of simple sine waves

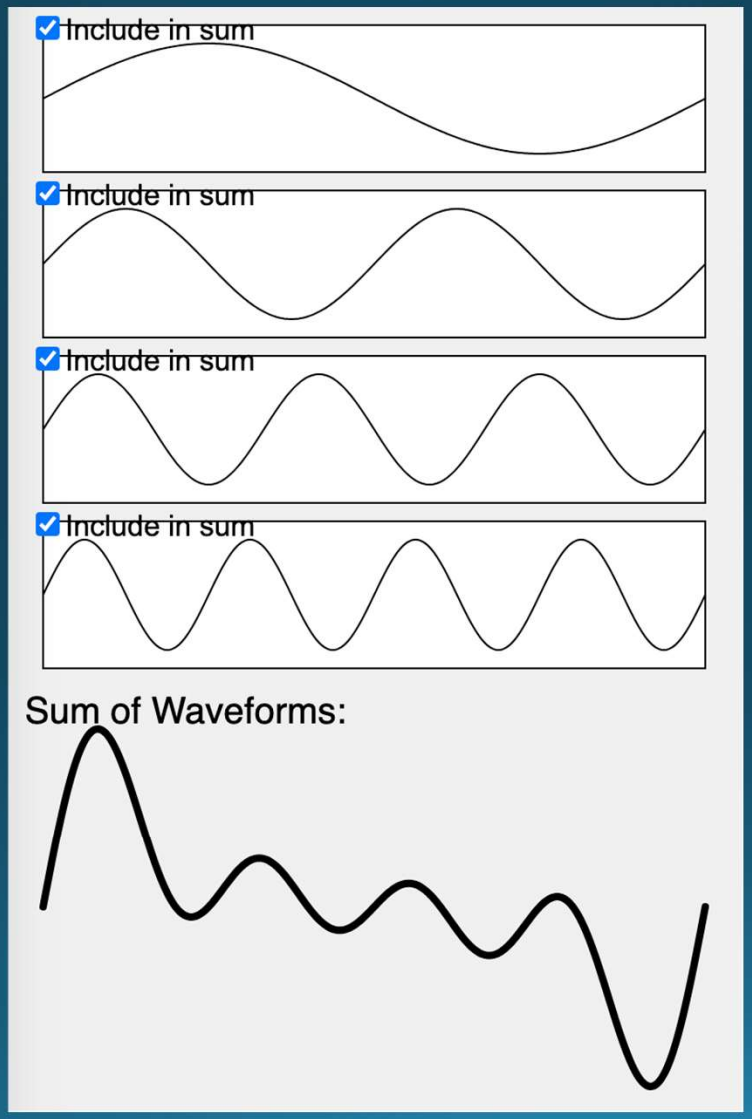


Forming a complex wave

Here a concert D tone is added to a second tone of concert A.

The result is the sound pressure wave that reaches your ear.

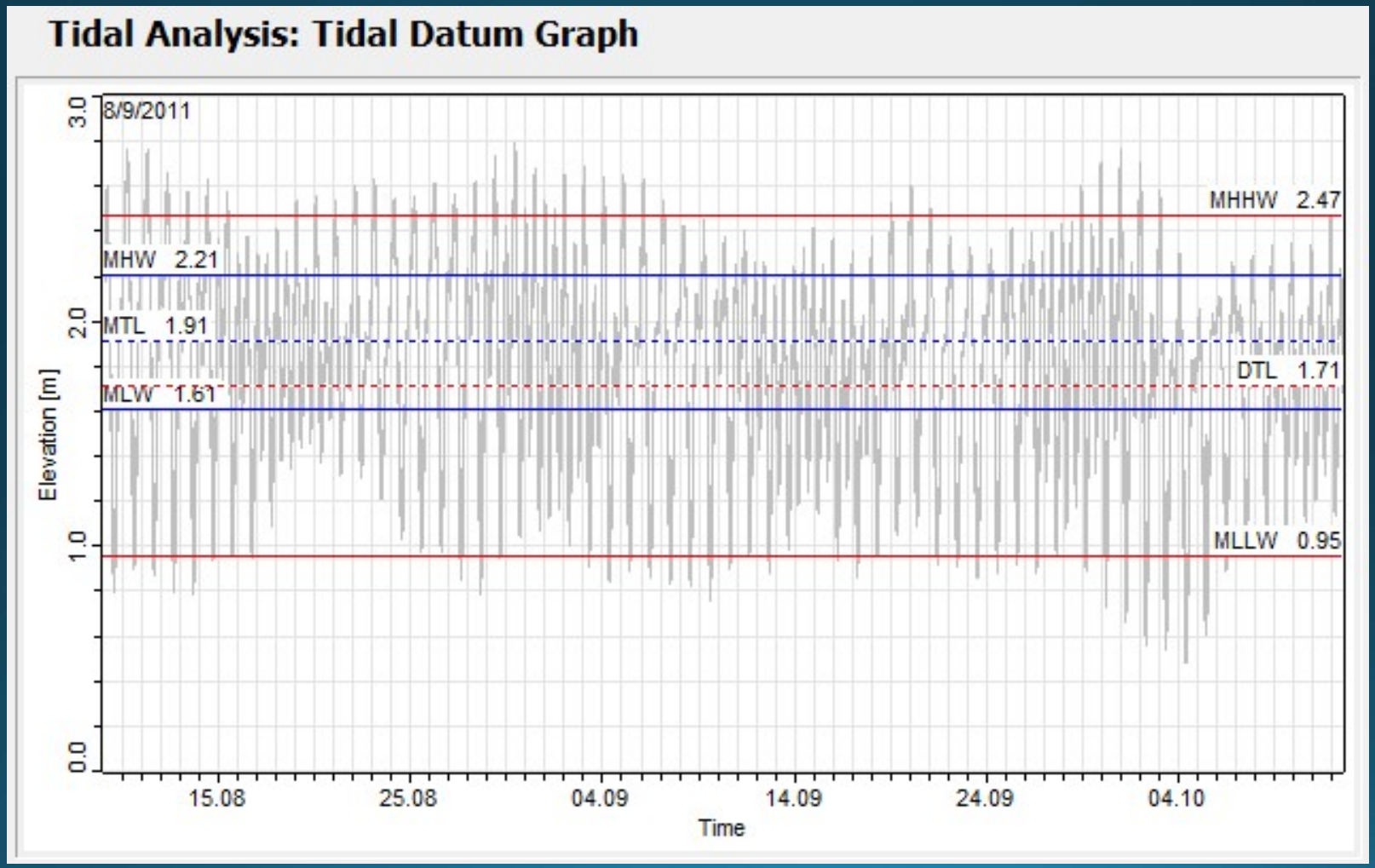



Include in sum
Include in sum
Include in sum
Include in sum
Sum of Waveforms:

Tidal data are an excellent example of a complex wave.

The cone is an ultra sonic projector that measures the distance to the sea surface every few minutes.

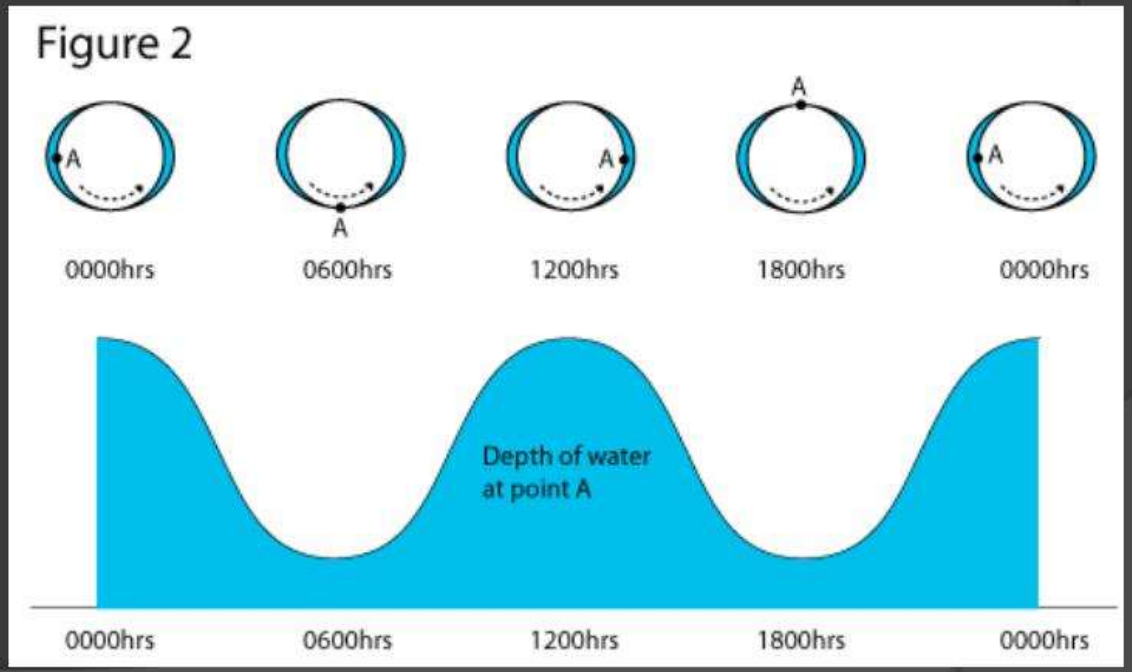
Somewhat smoothed raw sea surface height readings



To make a Tide Table, the complex wave first must be converted to its component sine waves. This is the job of the Fast Fourier Transform – FFT. The raw time domain data are "transformed" into frequency domain data.

Idealized tide prediction

- Two high tides/two low tides per lunar day
- Six lunar hours between high and low tides



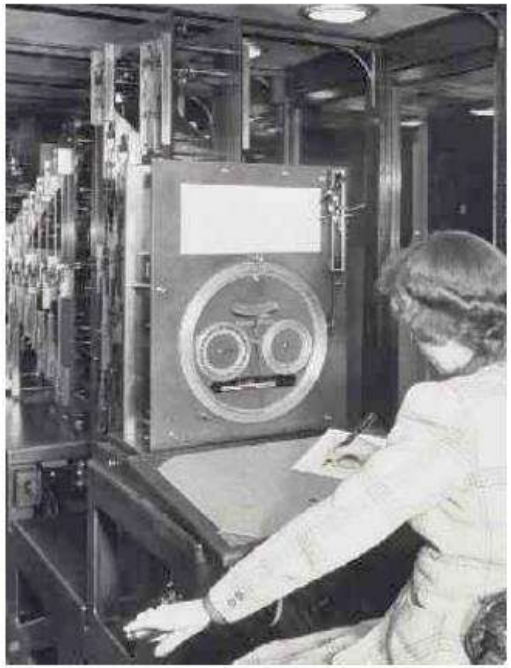
http://www.aztecsailing.co.uk/theory/Ch2-Fig-2-tidal-cycle.gif

The fabulous Fourier Transform

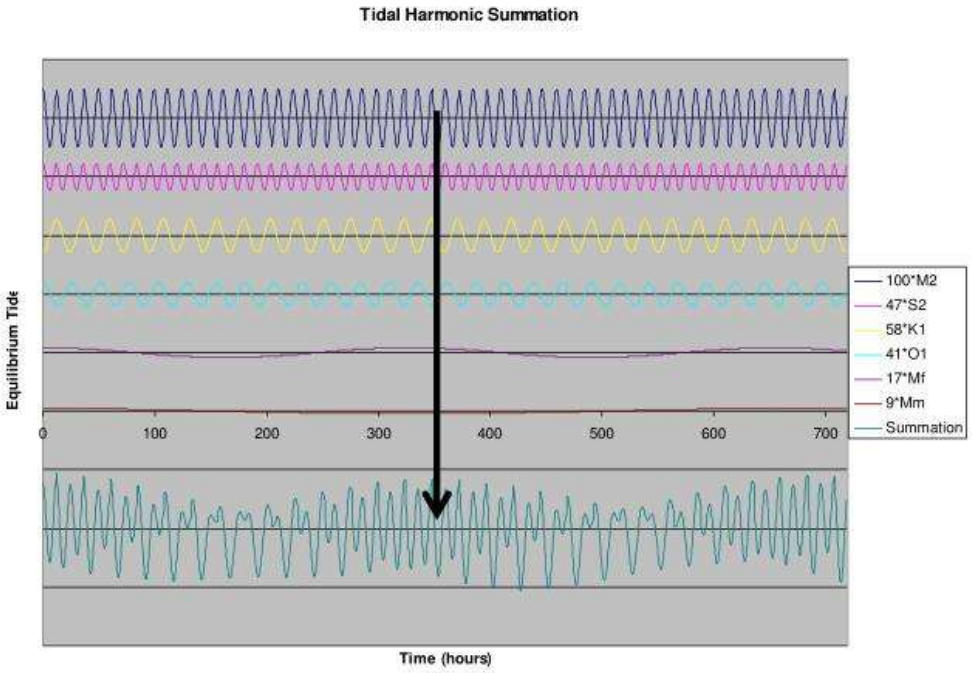
The FFT changes a time domain graph into a frequency domain bar graph.
The result is an array of the sine wave components that formed the original complex wave.

https://www.youtube.com/watch?v=spUNpyF58BY

Tide Predictions

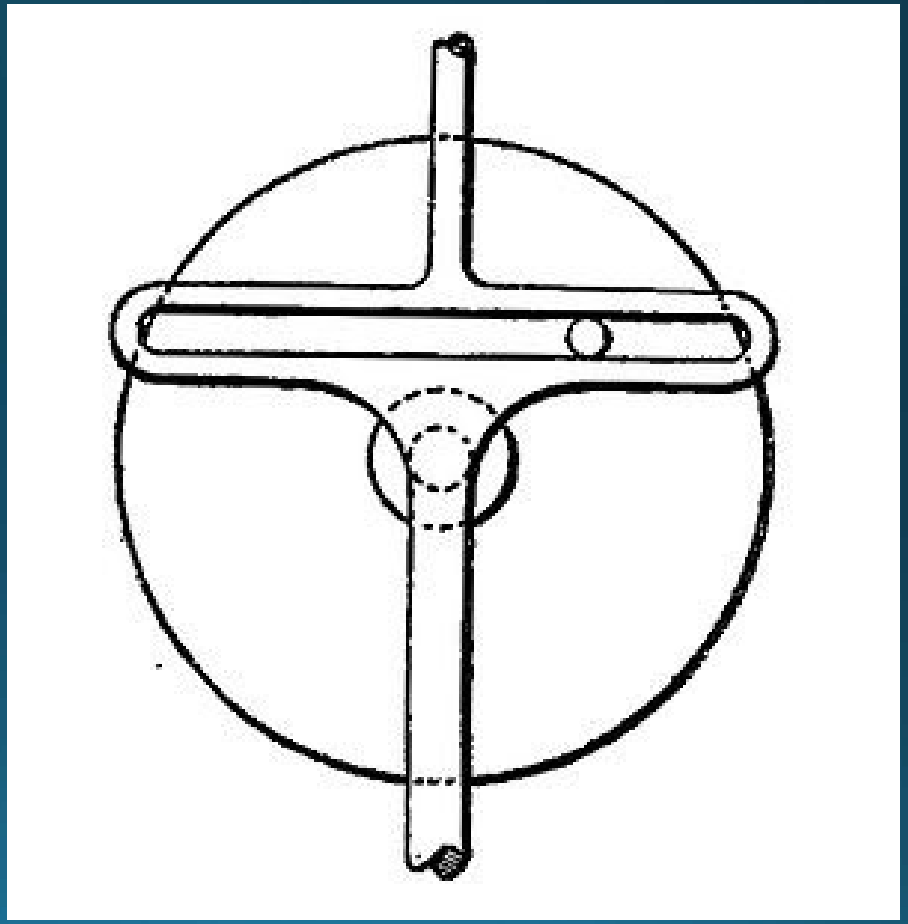


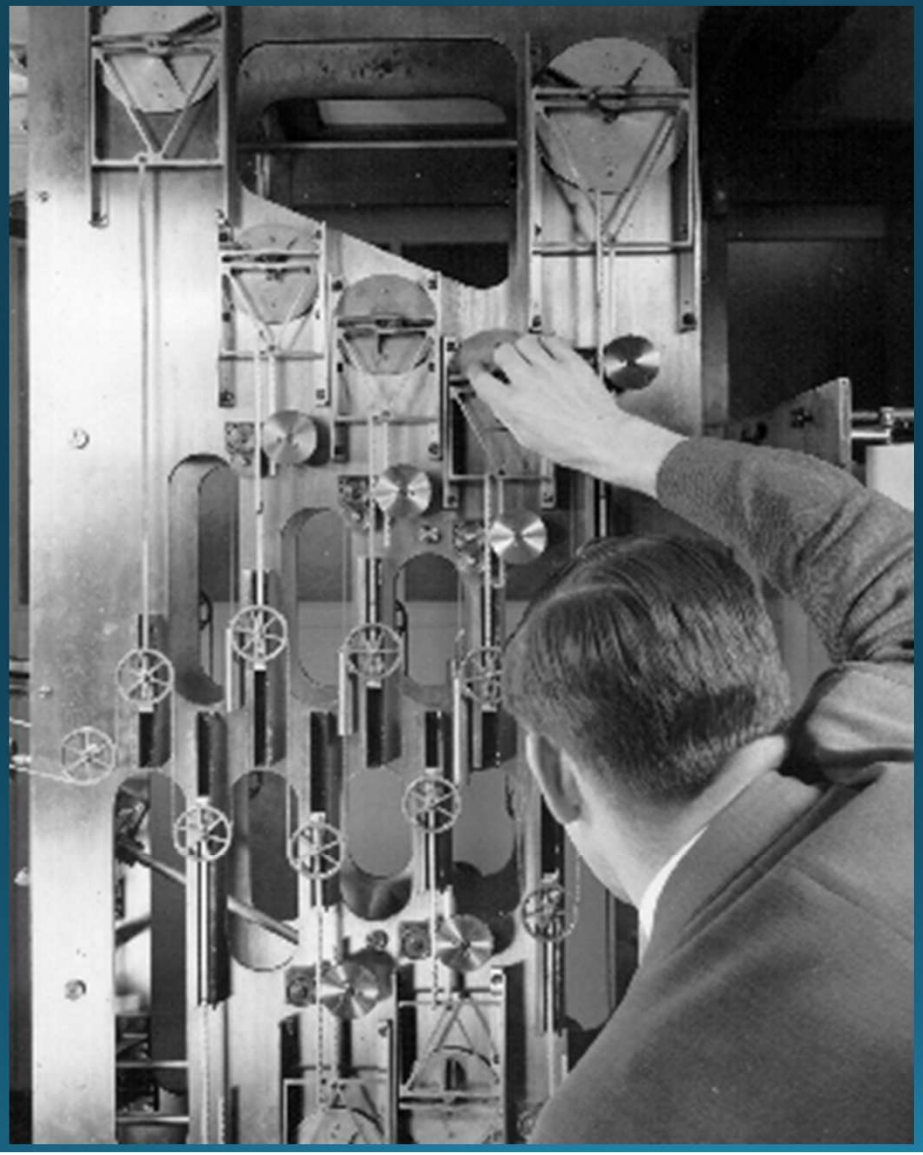
USC&GS Tide Predicting Machine

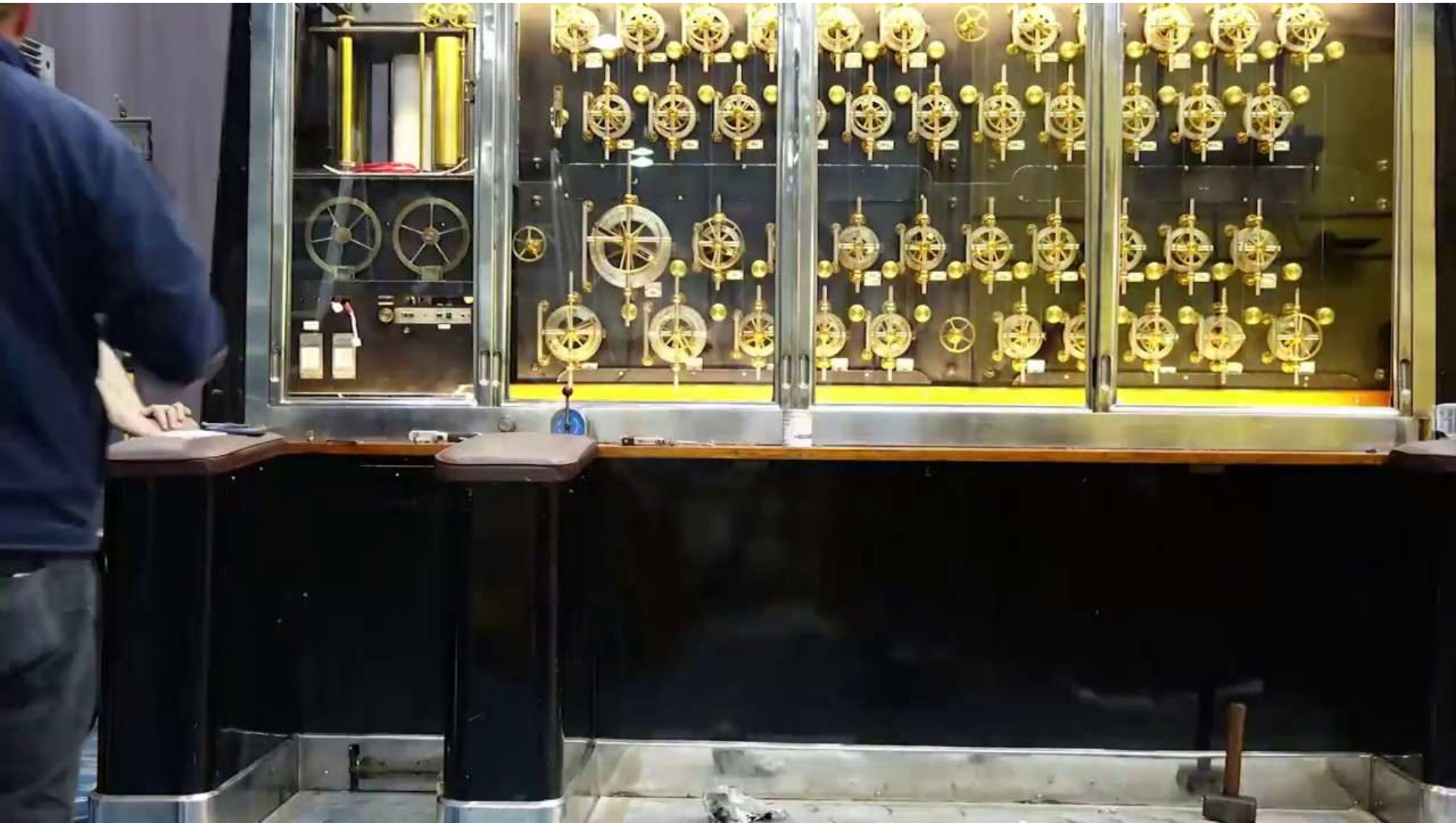



StockFreeImages.com
ID: 87380255

Here is an adjustable cam that will allow one engine to make predictions for multiple harbors.







But why so many cams?

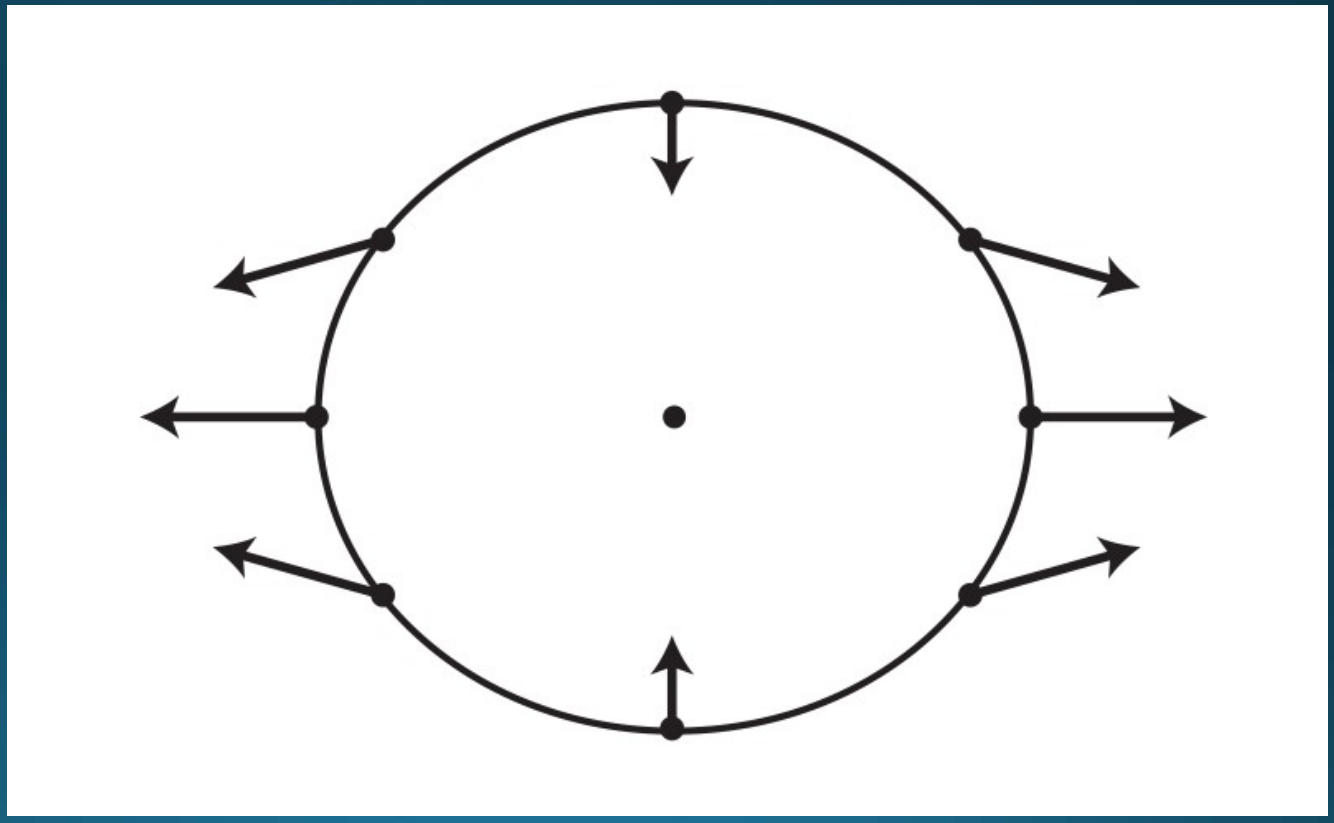
Are there really that many sine wave components in a tide cycle?

Now for a little Astronomy

As you know, the Moon is the main cause of the tides.

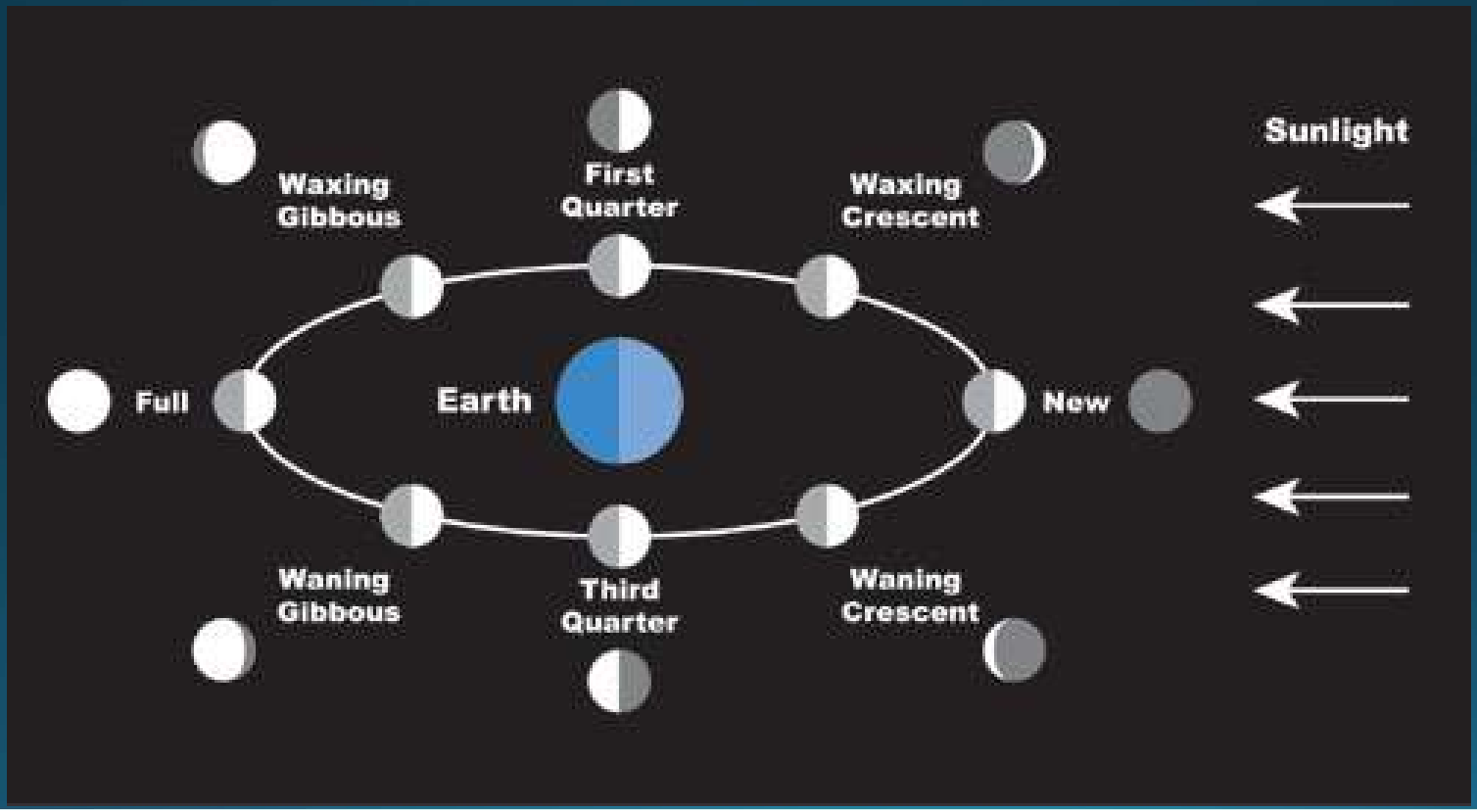
The Sun also causes tides, but although much bigger, it's further away and has less effect.

The difference in Earth-Moon gravity at each location generates two tidal bulges.



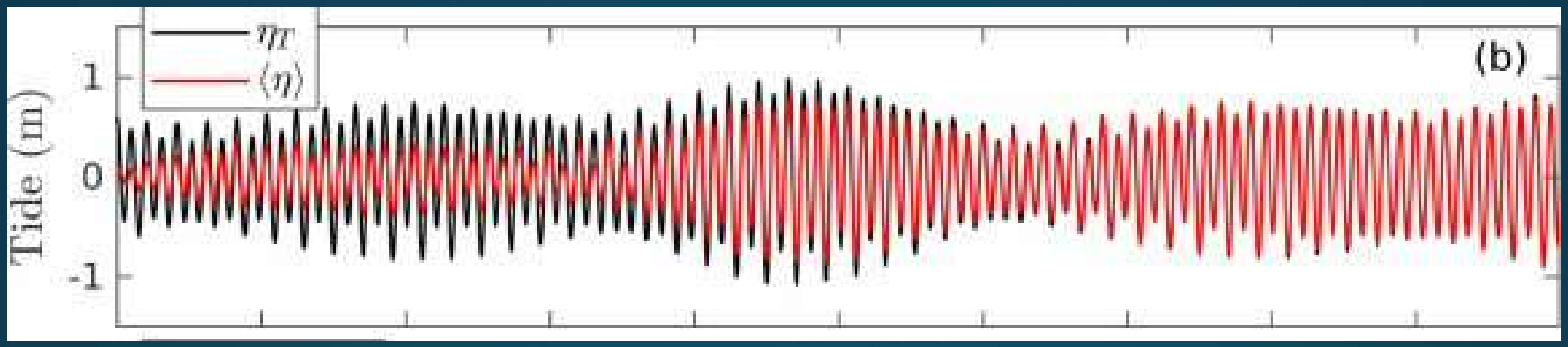

Sun
It takes about 28 days from one New Moon to the next
New
Waxing Crescent
First Quarter
Waxing Gibbous
Full
Waning Gibbous
Last Quarter
Waning Crescent
New
The Moon as seen from Earth

Because a Lunar Month is about 28 days long, each lunar quarter is about a week apart.



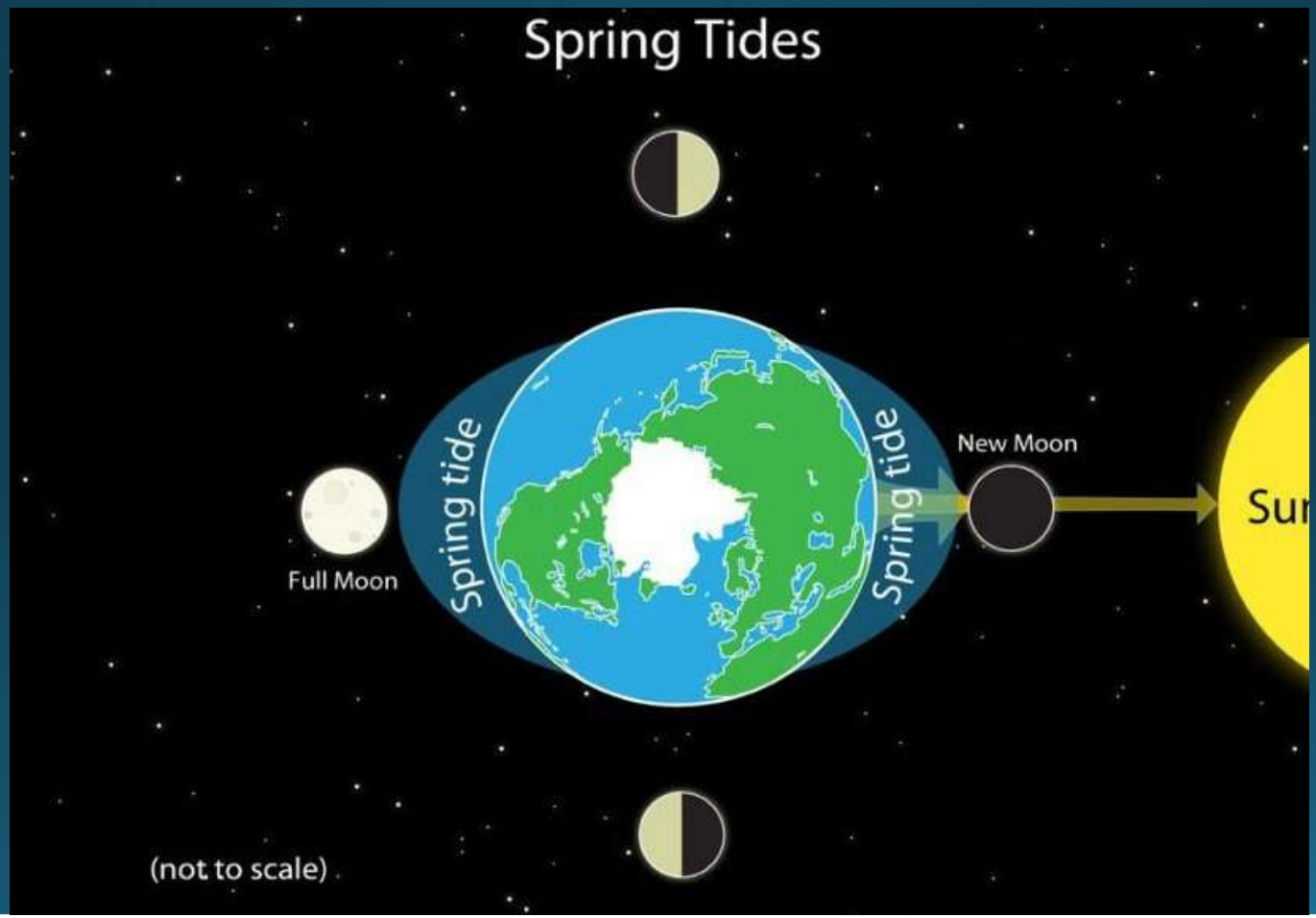
The Lunar Cycle accounts for the first cam, but that's just the first sine wave.

Sampled and further smoothed sea surface heights

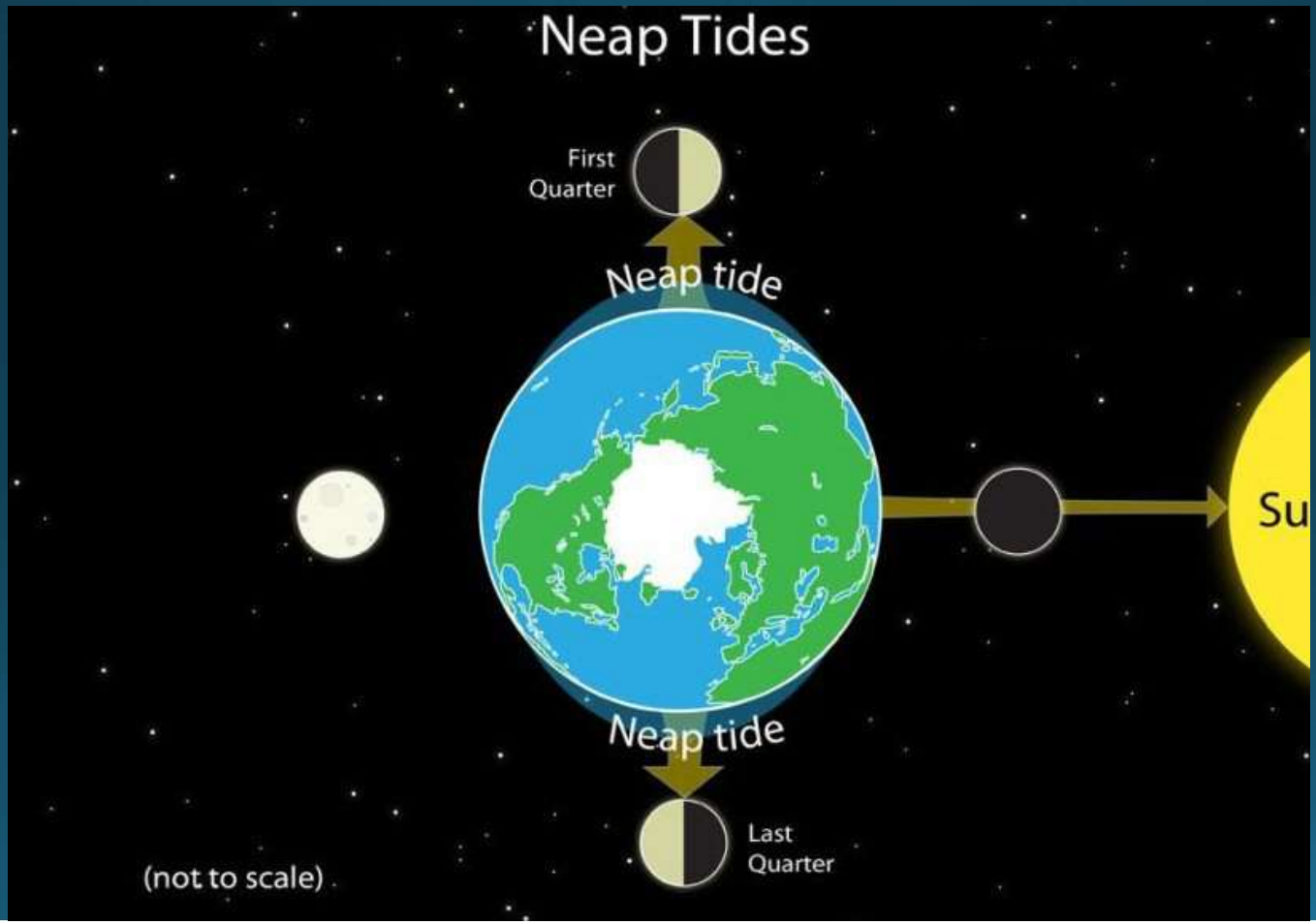


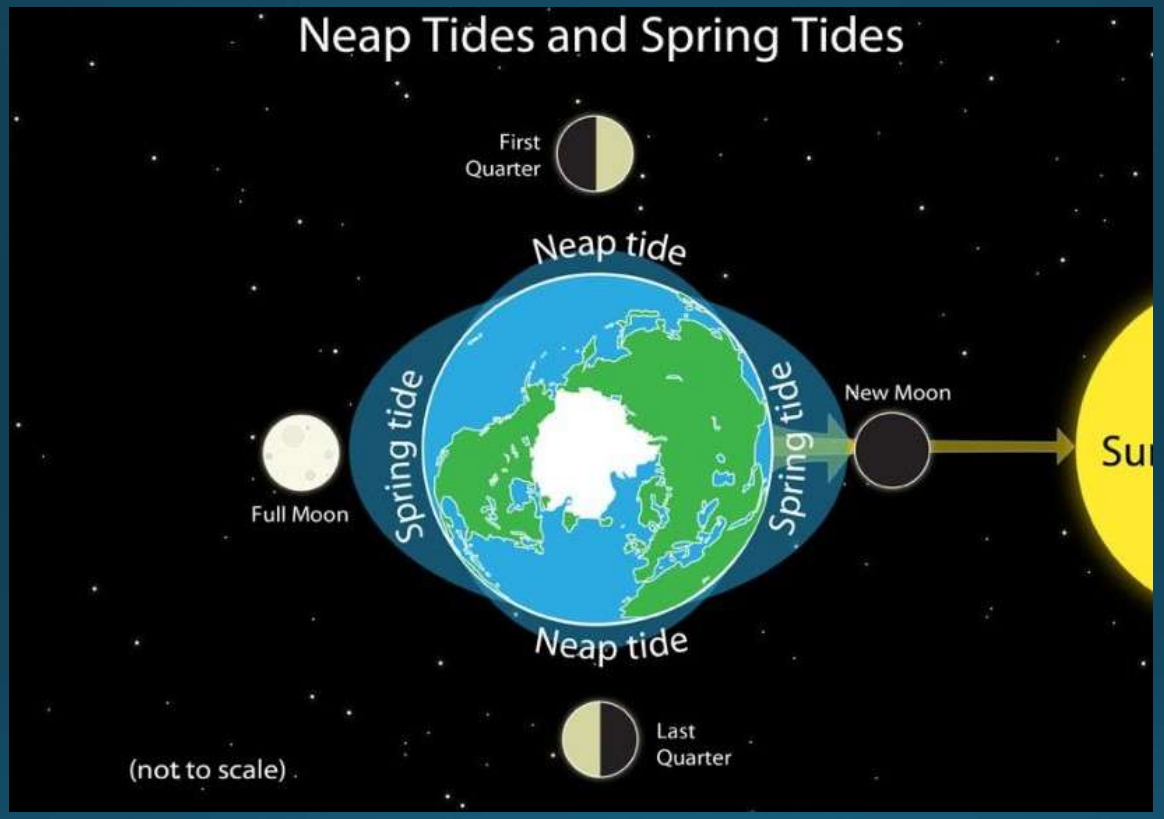
Fourier Transform reveals that the centers of the first two swells are fourteen days apart. That's half a Lunar Cycle.

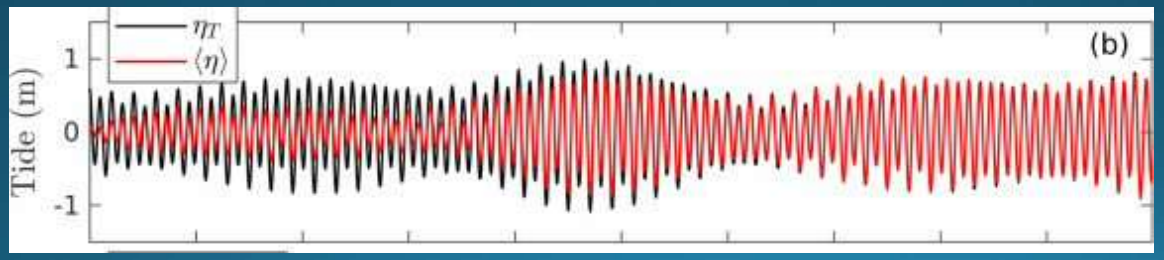
Sun and Moon in alignment



Sun and Moon in misalignment




Neap Tides and Spring Tides
First Quarter
Neap tide
Spring tide
Spring tide
New Moon
Full Moon
Neap tide
Last Quarter
(not to scale)


η_T
$\langle\eta\rangle$
(b)
Tide (m)
1
0
-1

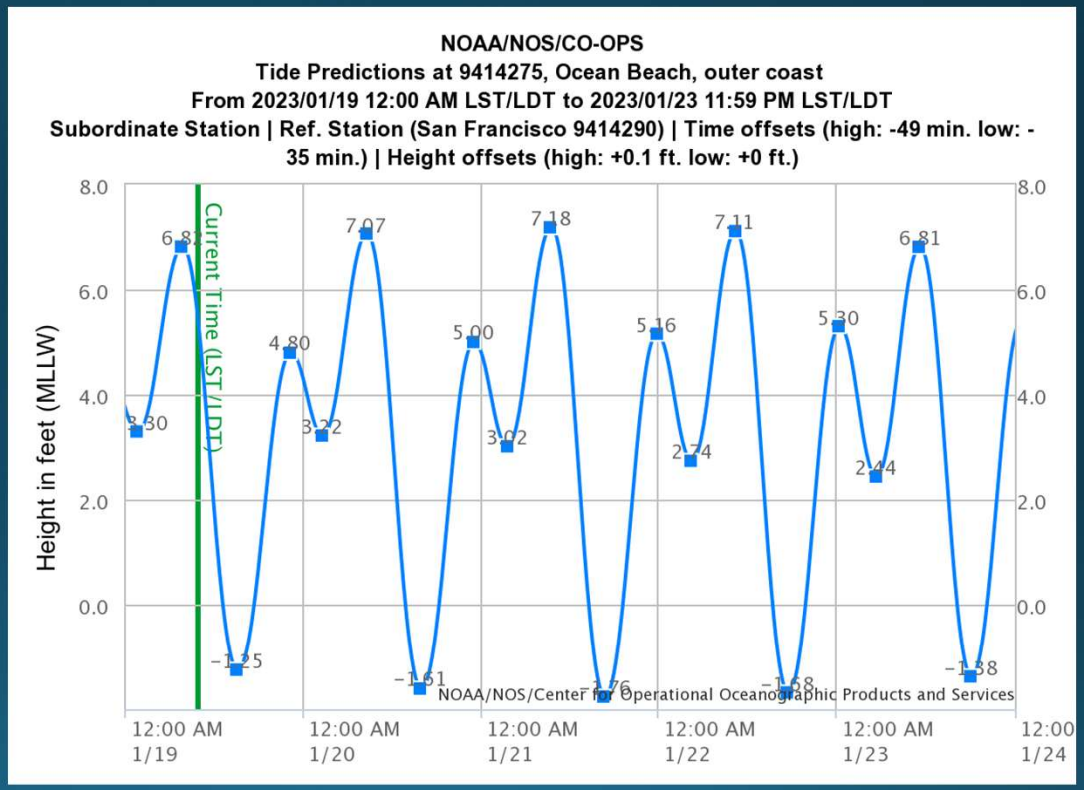
Here is another example of FFT revealing the astronomy behind an observed phenomenon.
The period of spring-neap tides corresponds to the time between Sun-Moon alignment-misalignment.

Add a second cam

Semi-diurnal Inequality

This tidal element often goes unnoticed:

Alternating high tides are of different heights. Their following low tides are of different depths.

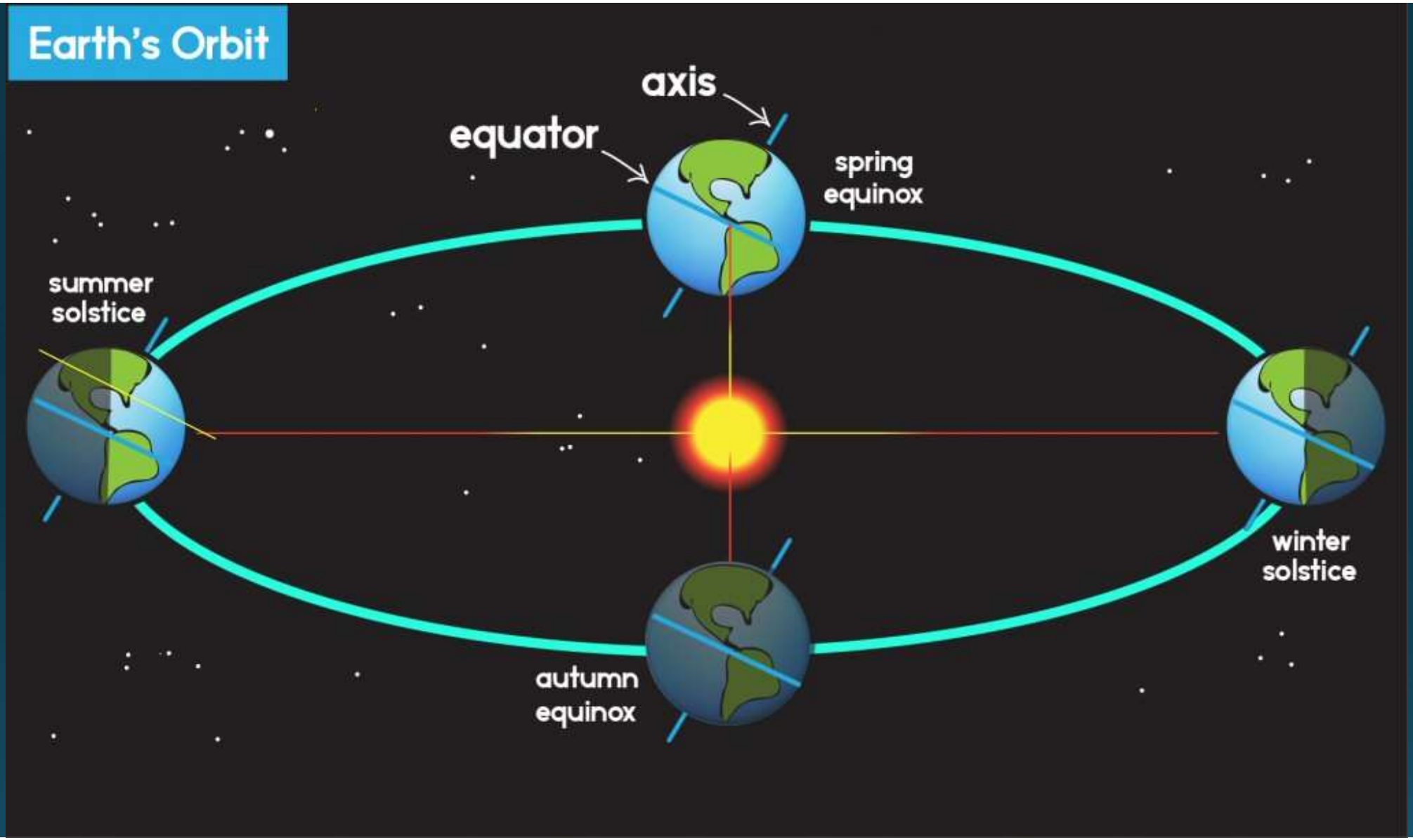


You've seen the result of this inequality, but probably didn't recognize it.

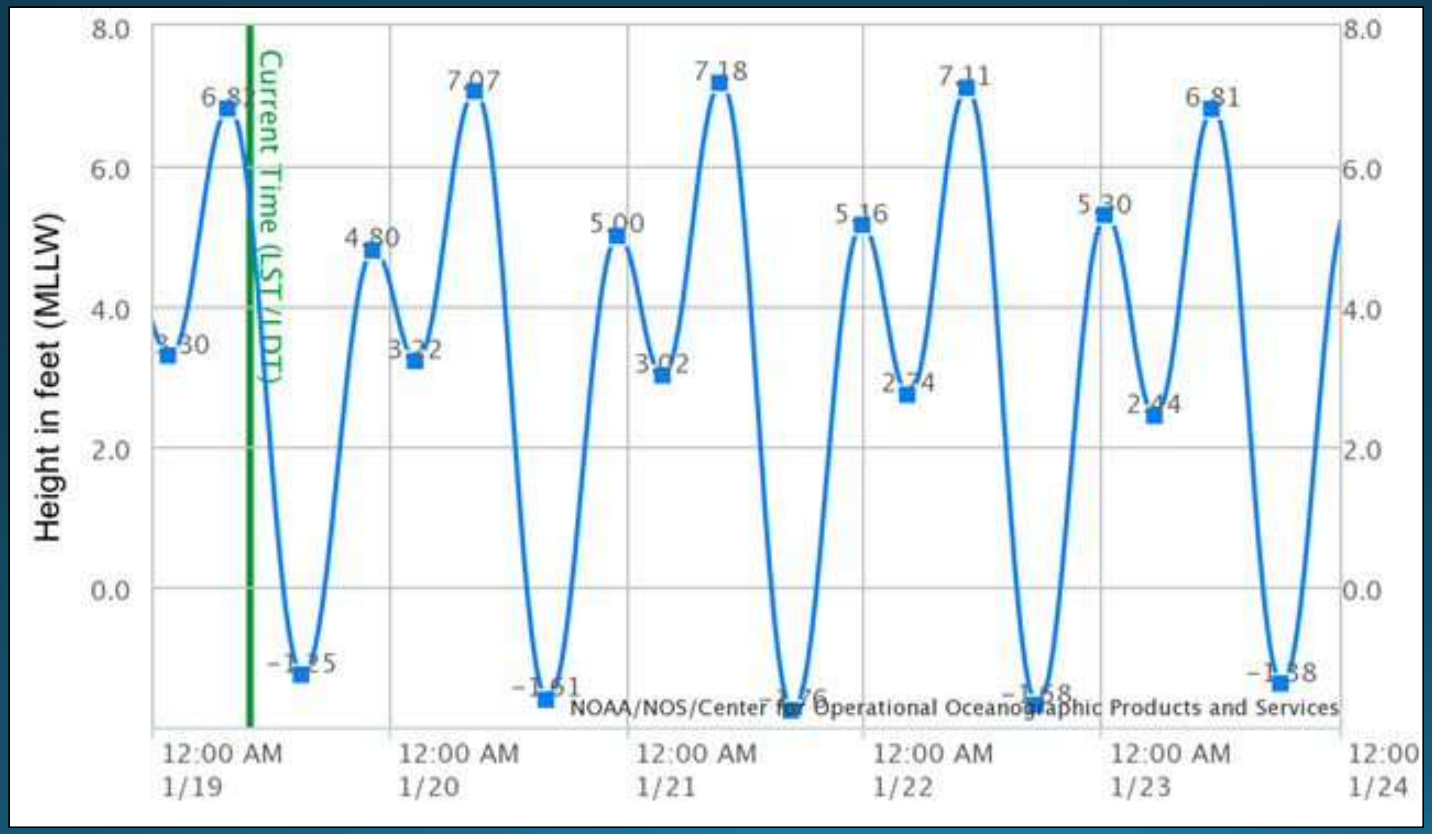
Paired wrack lines

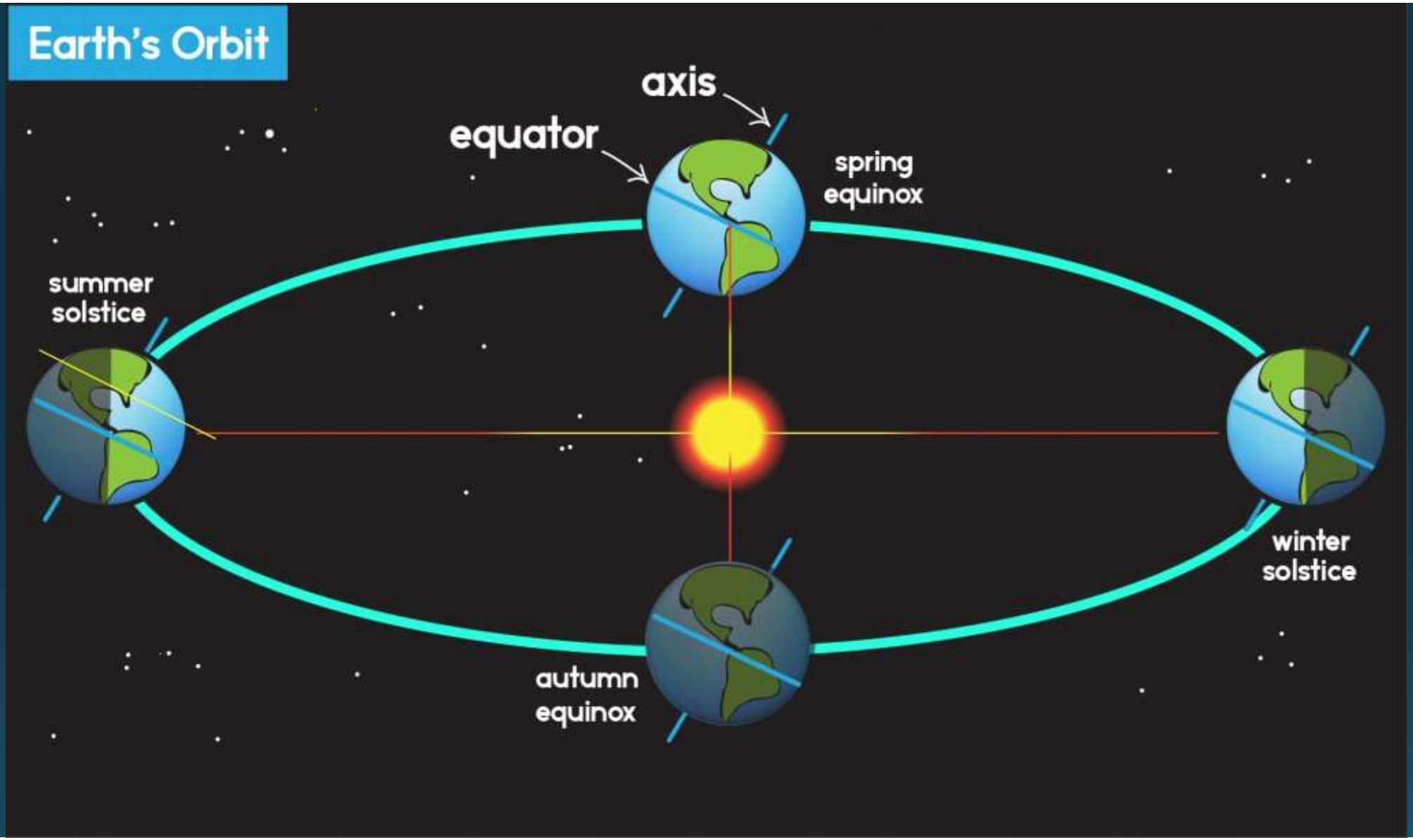
What causes alternating high tides to swing between higher high then lower high levels?

The Fourier Transform shows us that the period of this alternation is twice the tidal cycle. In other words, about 25 hours or a lunar day.


Earth's Orbit
axis
equator
spring equinox
summer solstice
winter solstice
autumn equinox

Try your hand – winter or summer in the Northern Hemisphere?




Earth's Orbit
axis
equator
spring equinox
summer solstice
winter solstice
autumn equinox

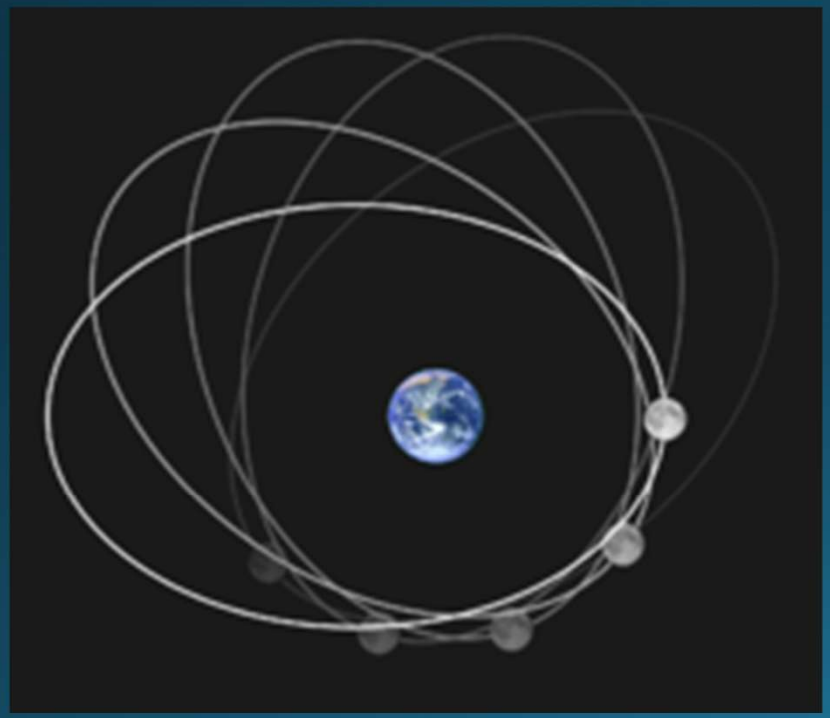
Semi-Diurnal Inequality builds and fades as the Moon moves between spring and neap tides. This strong-weak rhythem also moves as Earth moves between seasons.

Add a third and fourth cam.

Those are the biggies of tidal predicting, but there are many more.

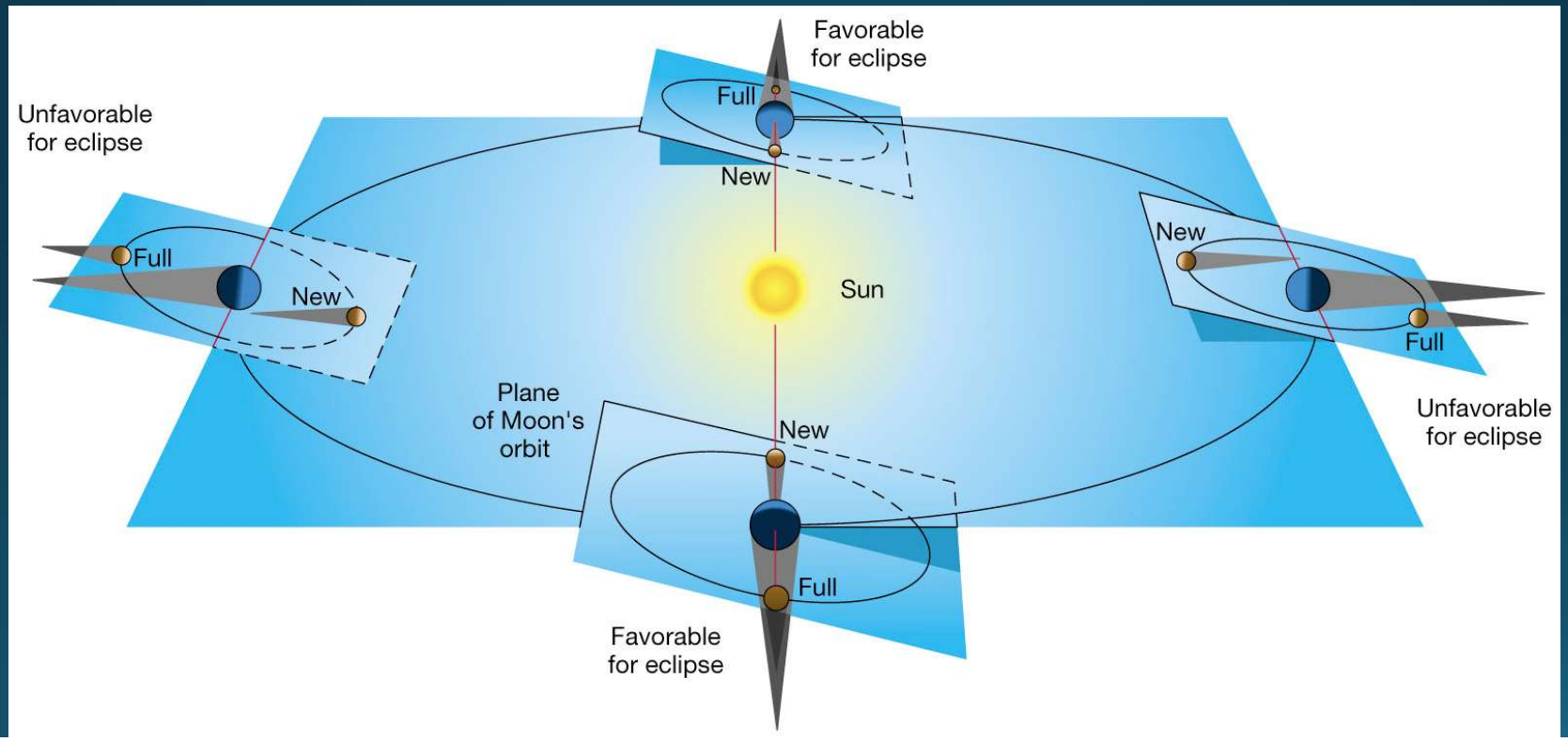
It's important to note that for casual use, those three components will do, but to make a tide table that goes out several years, the other sine waves must be resolved and included.

The Moon's orbit is slightly oblate and the long axis migrates with a period of 8.85 years.



Further, the amount that it varies from circular also cycles from nearly round to more oblate.

The plane of the Moon's orbit is slightly different than the plane of Earth's orbit. This effects the tides and the occurrence of solar and lunar eclipses.

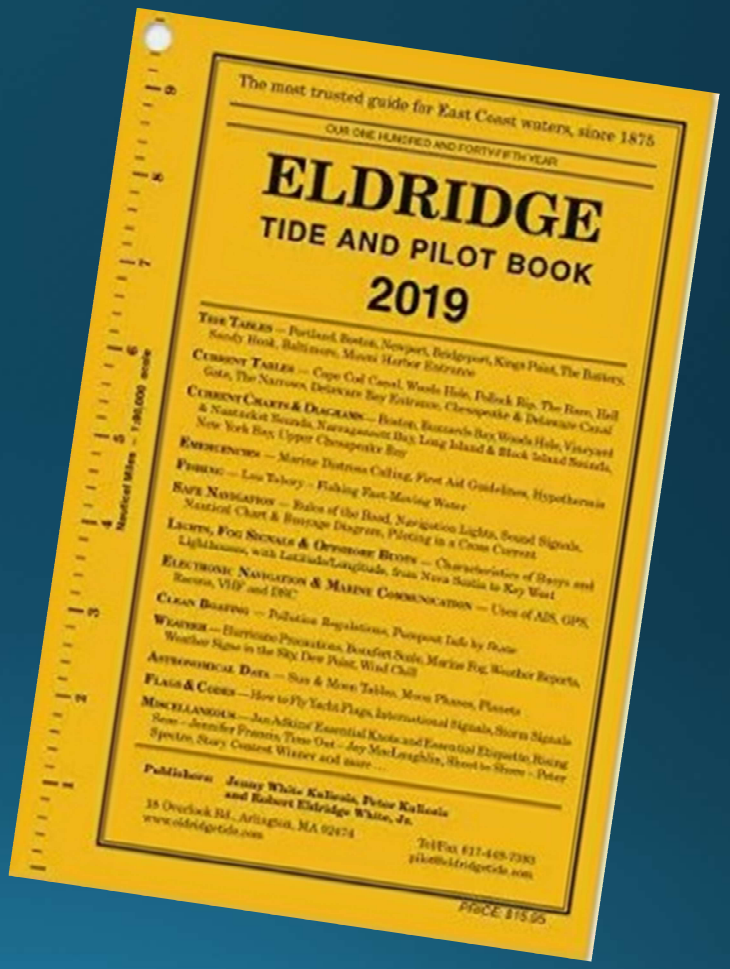


In summary, there are eleven important cycles that determine the tides. But as you saw from the cams of the tide predicting engines, there can be as many as thirty-seven!

Before we leave tides, here is something that you can impress your grandkids with.

Eldridge was found in every commercial vessel's wheel house.

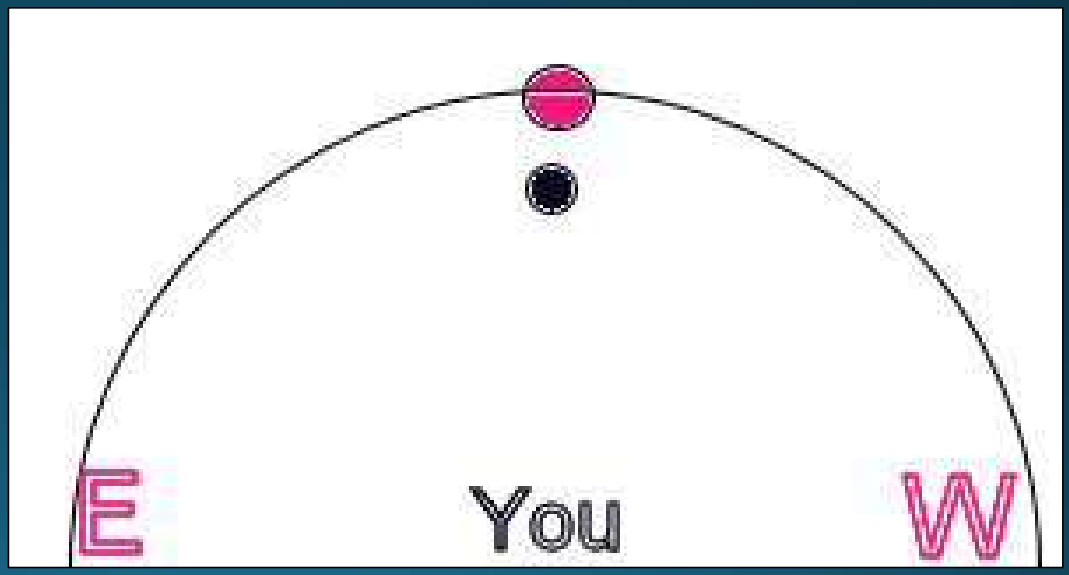
But before tide tables, every captain needed a way to approximate the time of high water.



Tidal bulges, time of day, and Moon phases.

In a frictionless all-water world, the centers of both tidal bulges would lie in line with the Moon.

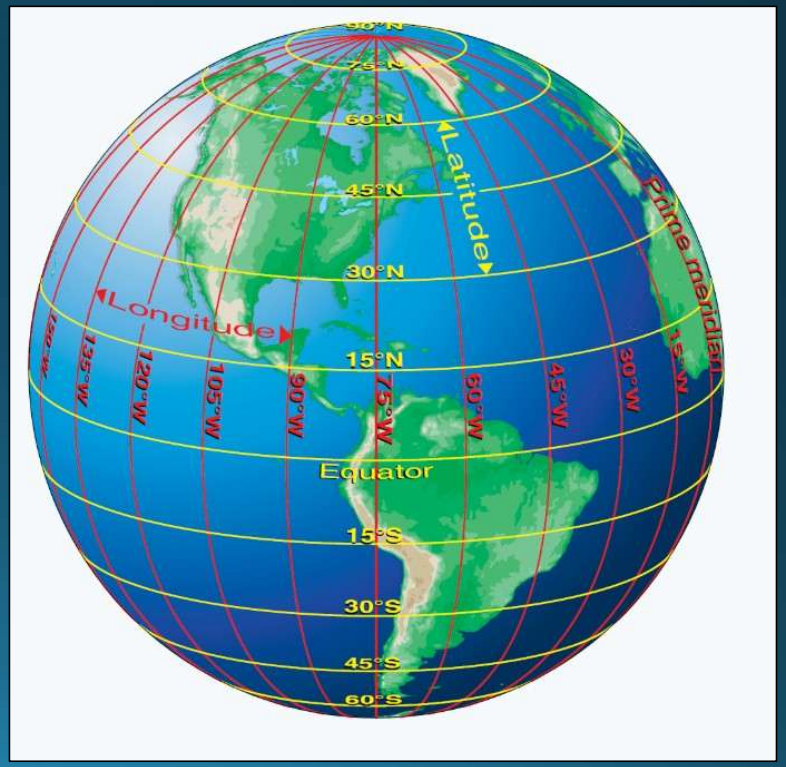
New Moon at Noon and high tide.



Tidal bulges and the effect of geography

But in our world, the tidal bulges are slowed. The amount of delay for each harbor is called the *Establishment of the Port.*

The Establishment of the Port for **Newport is 6 hours**.

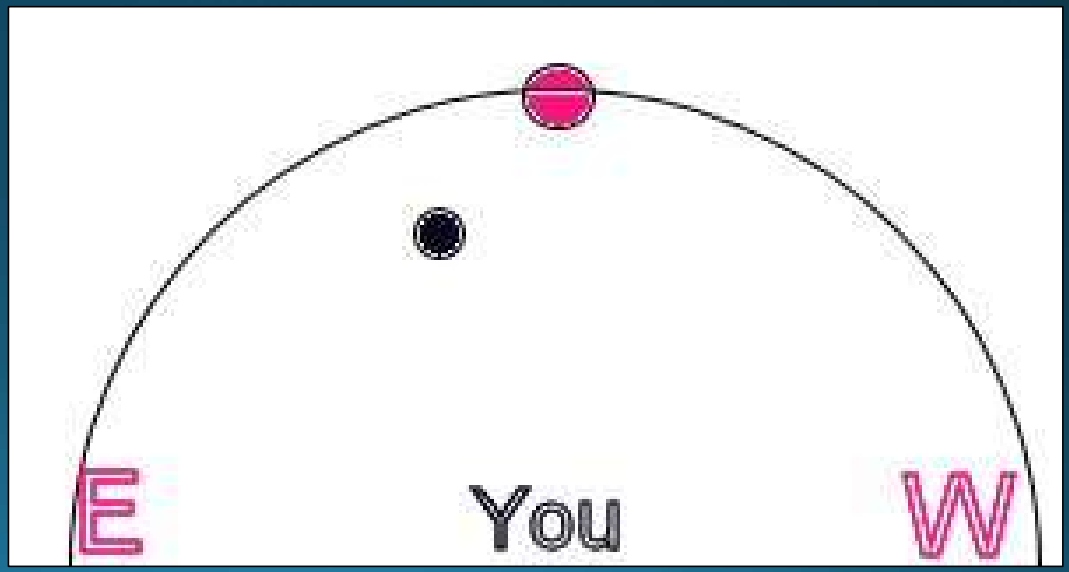


Moon movement and time of high tide.

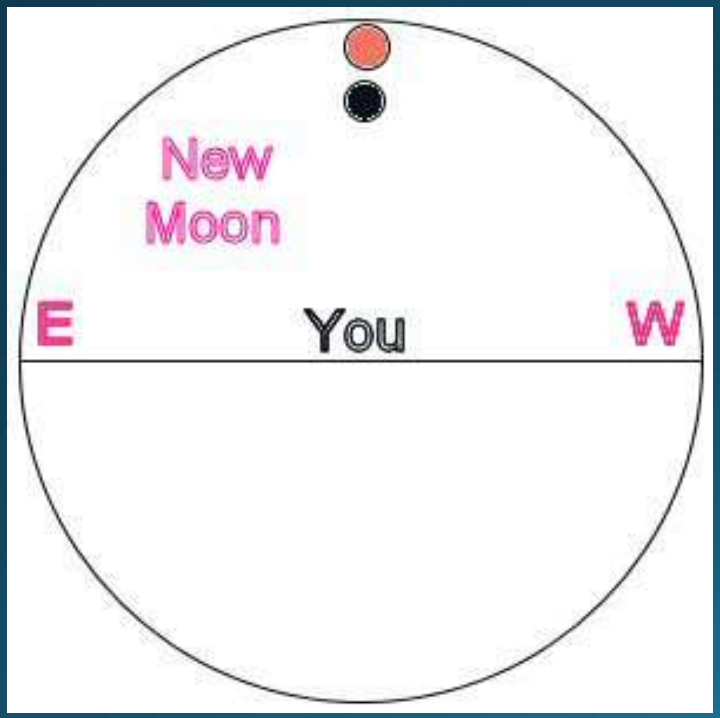
A day later, the Moon has moved counterclockwise.

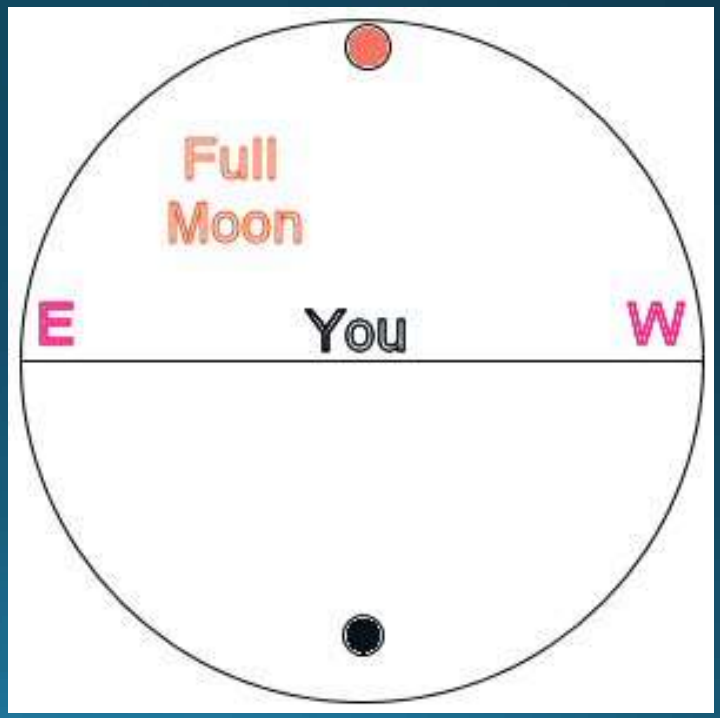
High tide will occur about an hour later, or at 13:00

Still assuming a frictionless world

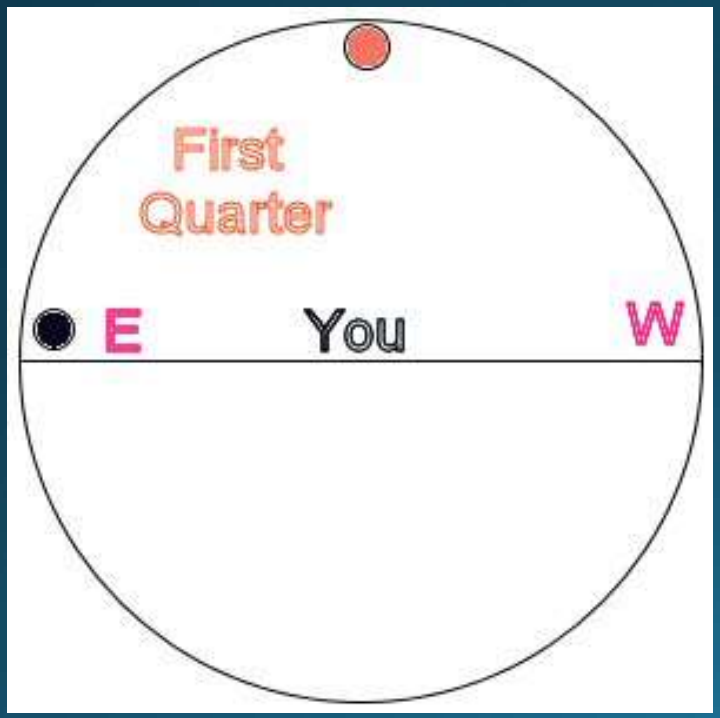


Looking South at Noon. The New and Full Moons are under and opposite the Sun.





Looking South at Noon. The First and Third Quarter Moons are on the horizon.



Quick rule of thumb for Newport Harbor:

- New and Full Moon – High Tide at 6:00 AM and PM.
- First and Third Quarter -High Tide at Noon and Midnight.

Where is the Moon today?

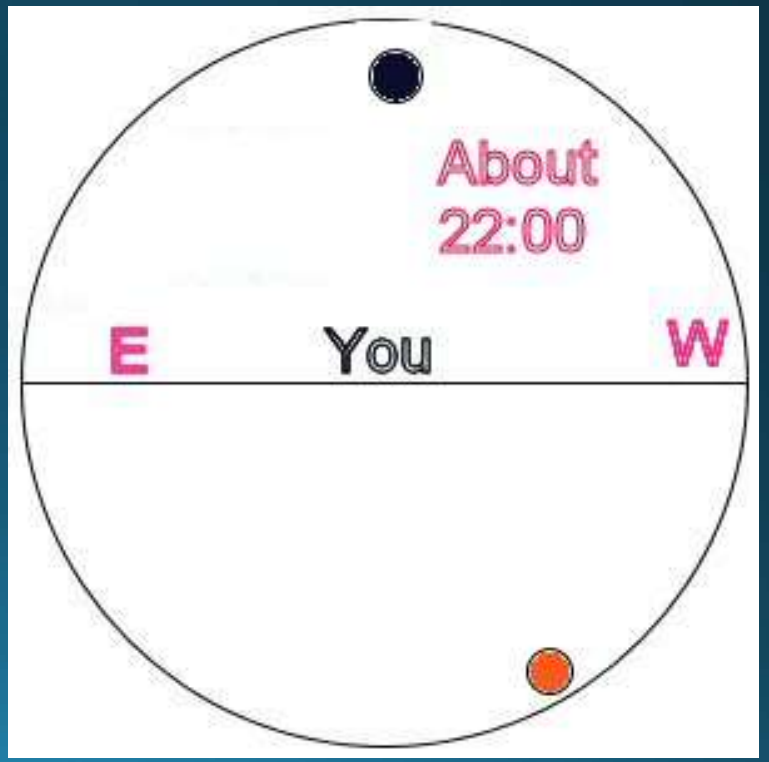
Waxing Gibbous on the 9th.

Full Moon on the 12th.

Part way between today.

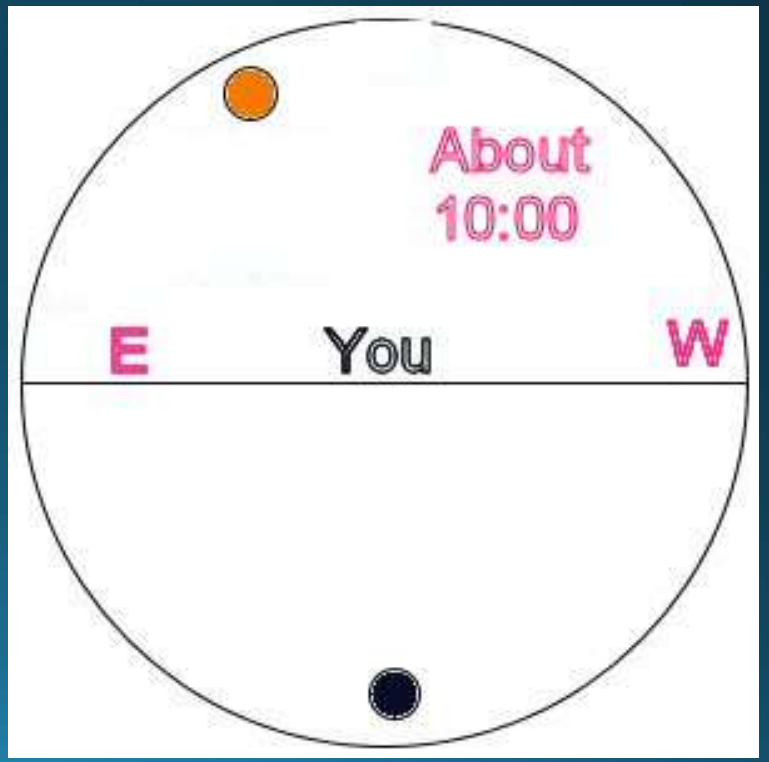
The Moon will be directly above us two hours before Midnight – 22:00.

Add the Establishment of the Port, six hours, and high water will occur around 04:00 in the morning.



The Moon will be directly under us two hours before Noon tomorrow – 10:00

Add the Establishment of the Port, six hours, and high water will occur around 16:00 that afternoon.



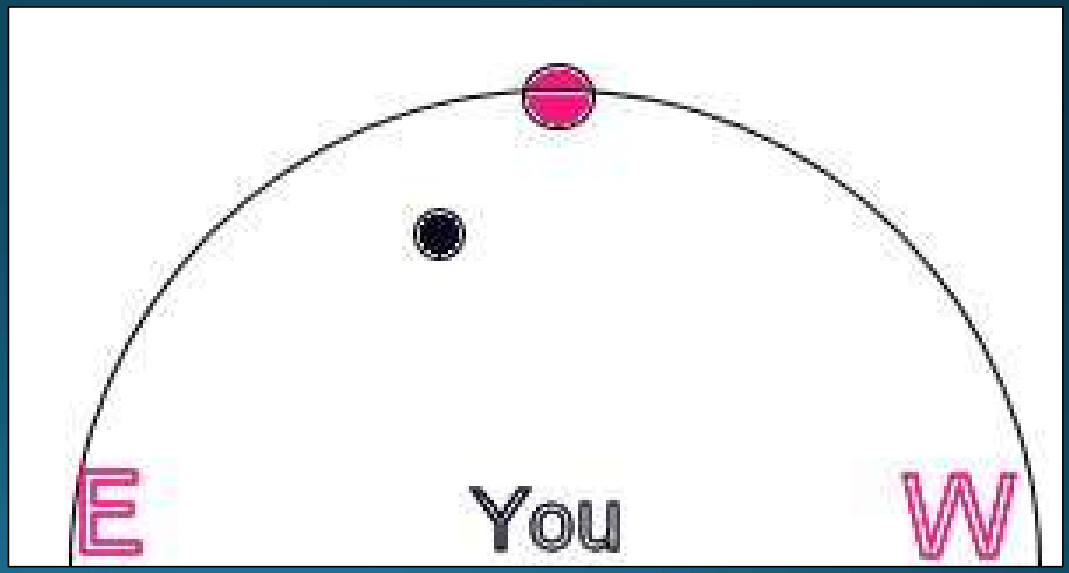
Your turn: At what time will high tide occur?

A day later, the Moon has moved counterclockwise.

1. Guestimate the time when the Moon will be overhead.

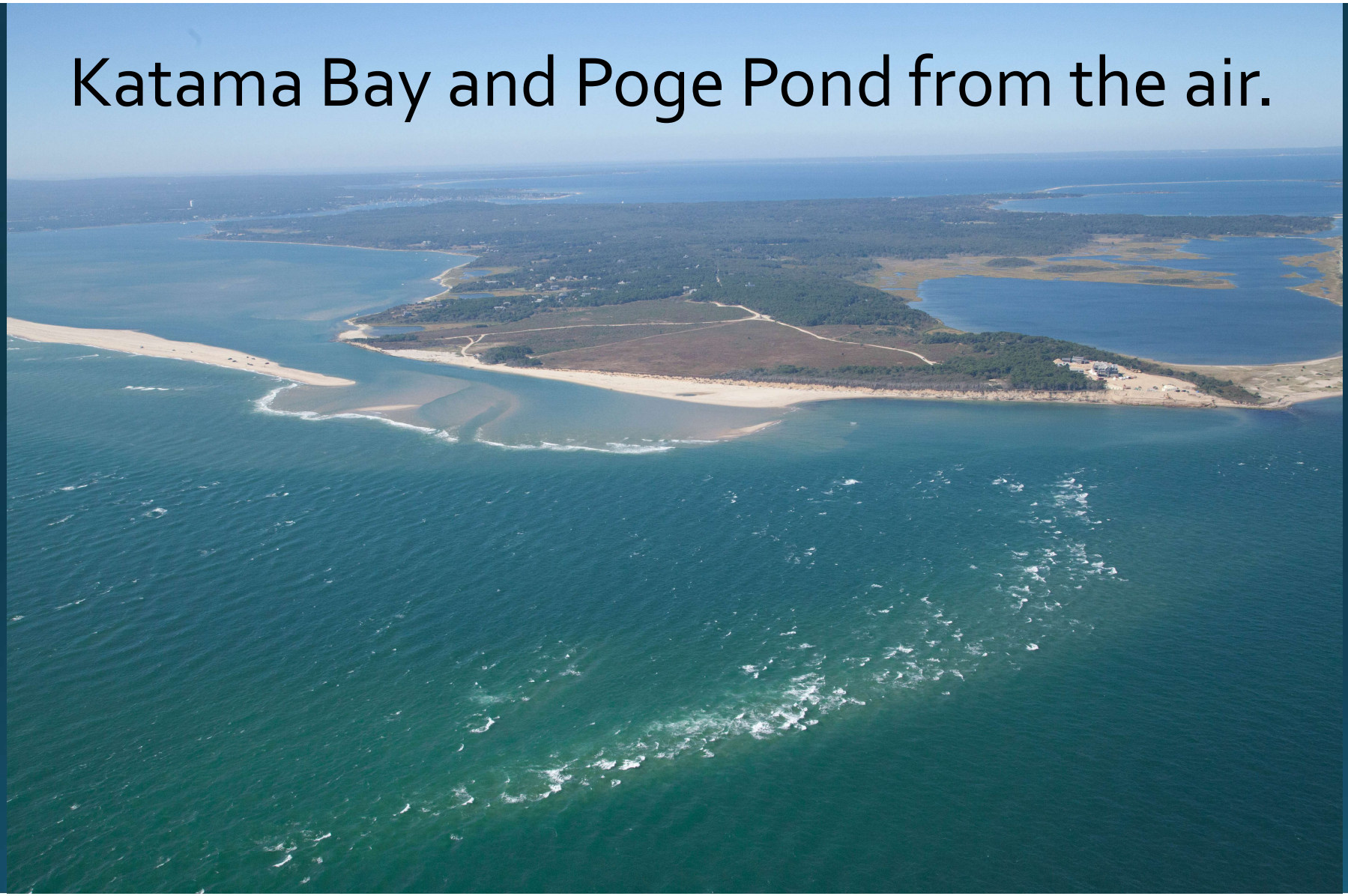
2. Now add the Establishment of the Port – 6 hours.

Real world with friction



Predicting the tides is hard enough. Predicting currents is just plain squirrelly

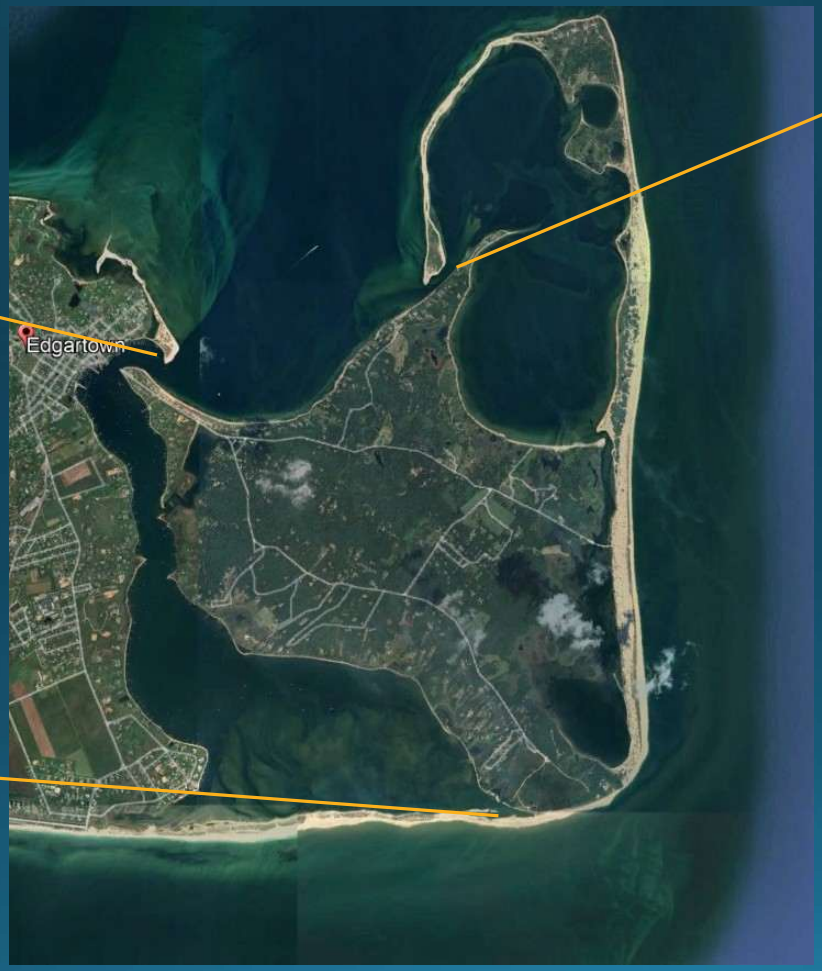
Katama Bay and Poge Pond from the air.



Martha's Vineyard

Edgartown Harbor entrance

Norton Point



The Gut – entrance to Poge Pond.

Poge Pond tide is 90 degrees out of phase.

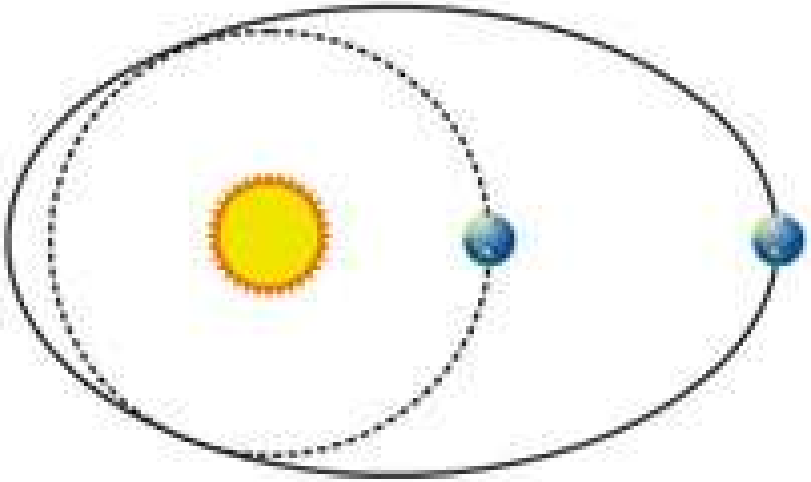
In our look at tides, we've been concerned with the direction and strength of the Sun and Moon's gravity.

In our next complex wave example, we will be concerned only with the strength of the Sun's radiation.

Milankovitch Cycles

- Changes in Earth's orbit from nearly circular to more elliptical. The distance to the sun varies more during a more elongated orbit period
- Changes in the direction of the long axis of Earth's elliptical orbit.
- Changes in the degree of obliquity (tilt) of Earth. A more oblique Earth has more extreme seasons.
- Changes in direction of Earth's tilt (axial precession). Changes in the direction of Earth's tilt change the time of year of our seasons.

Milankovitch Cycles



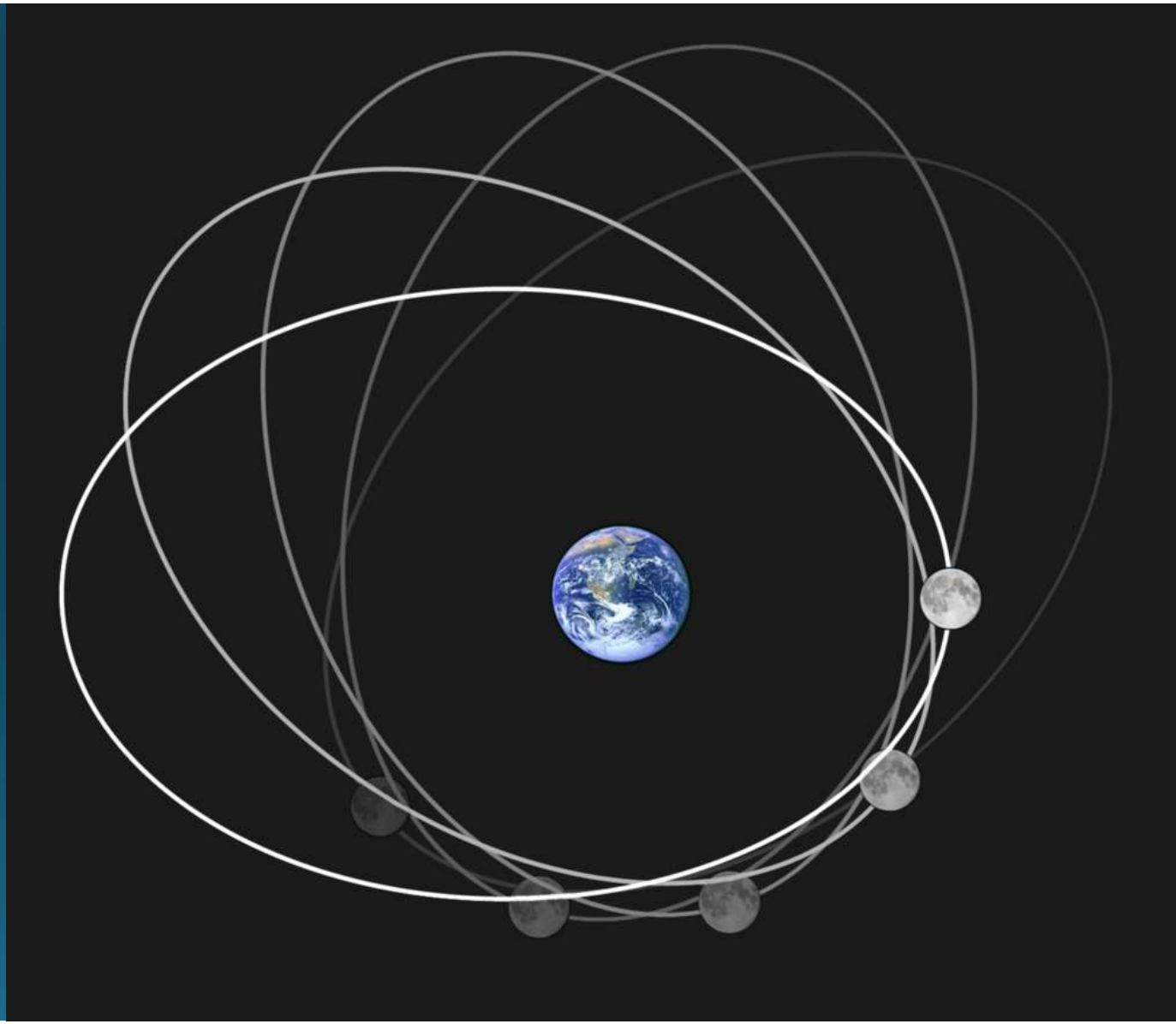
Eccentricity

Obliquity

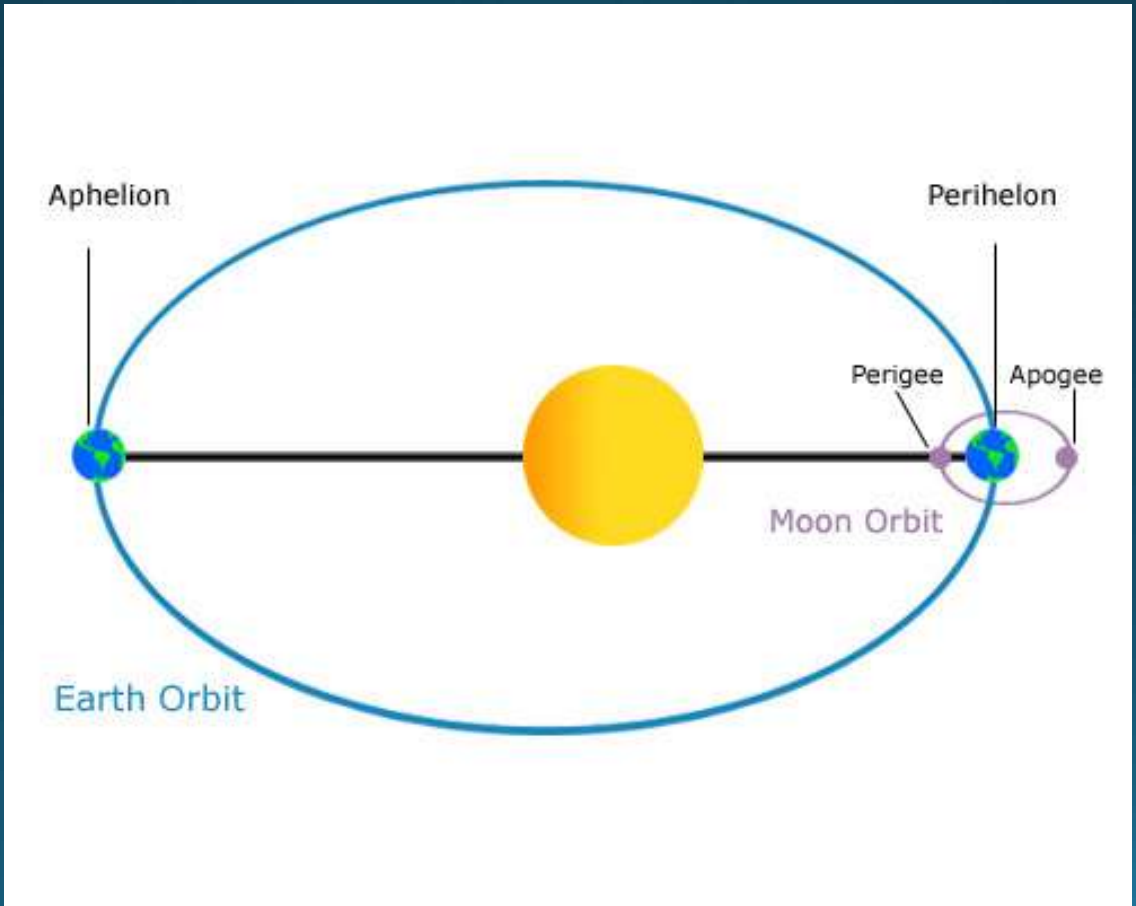
Precession

Precession of Earth's orbit.

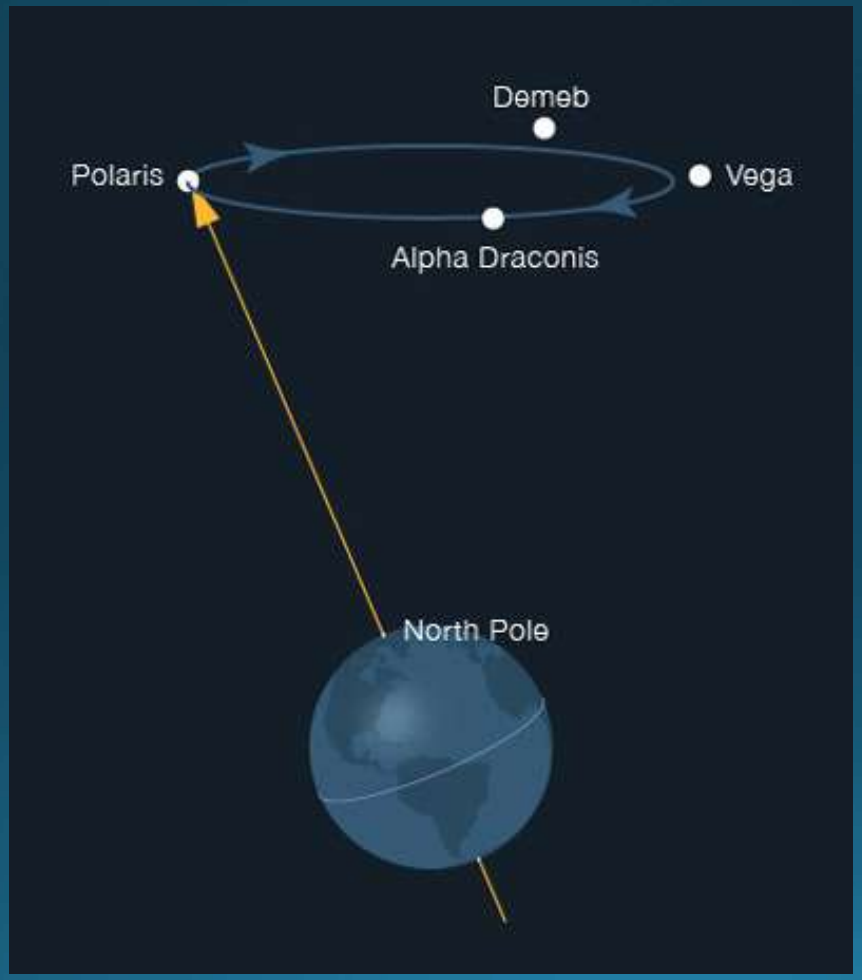
We saw this earlier with the Moon, but Earth does the same thing.

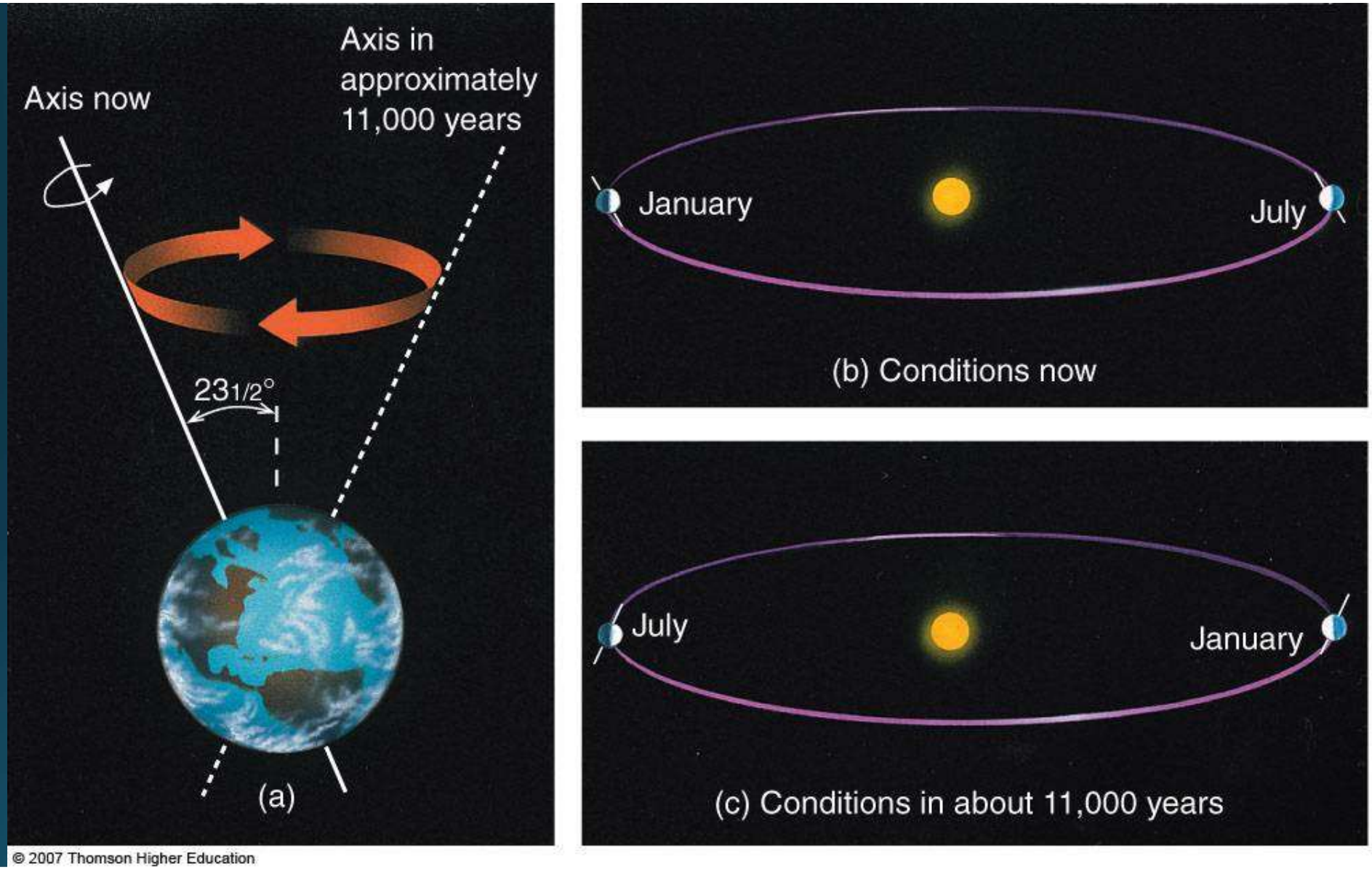


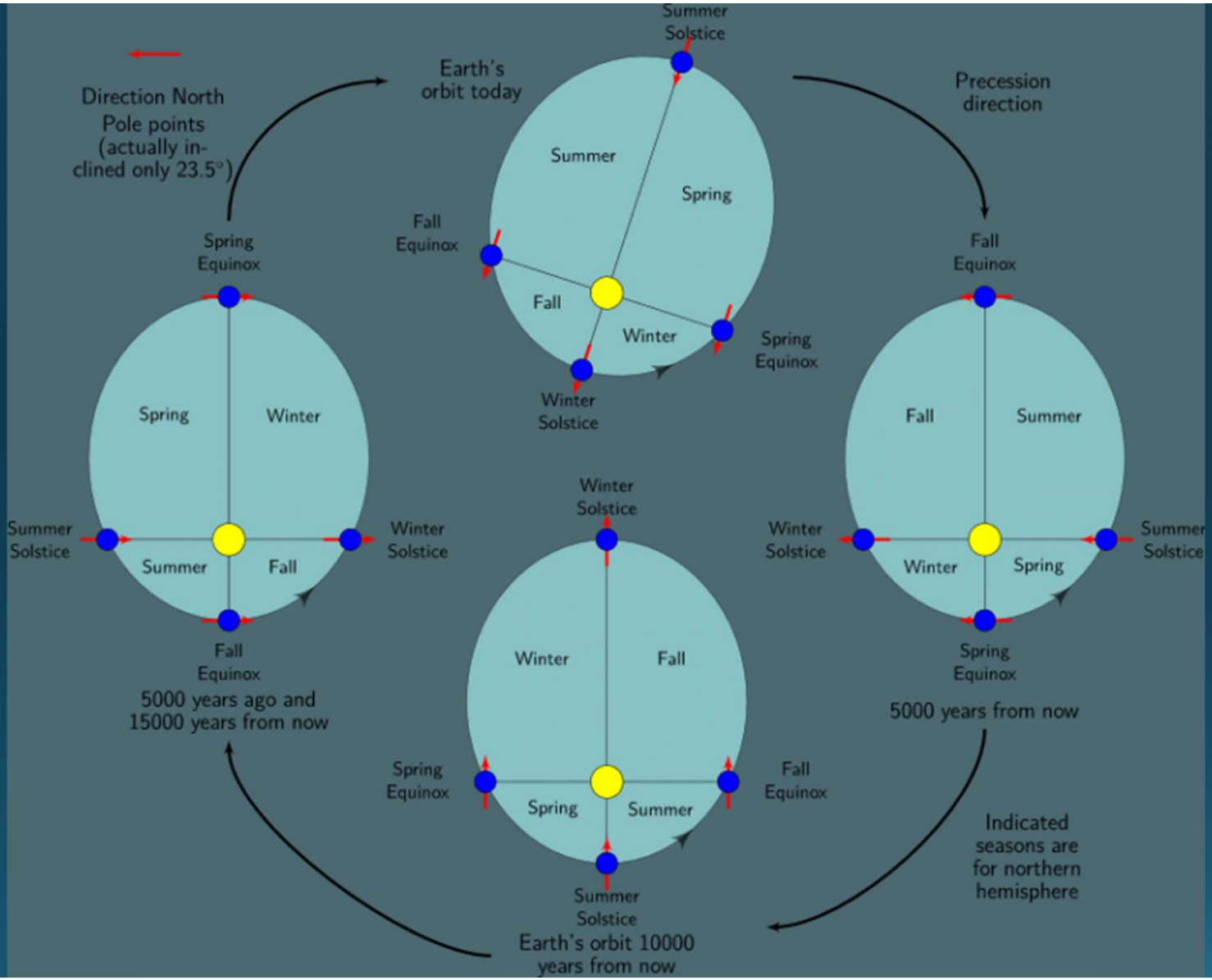
The shape of Earth's orbit changes systematically



Like a spinning top, Earth's axis rotates in space






Direction North Pole points (actually inclined only 23.5°)
Earth's orbit today
Summer Solstice
Summer
Spring
Fall Equinox
Fall
Winter
Spring Equinox
Winter Solstice
Precession direction
Spring Equinox
Spring
Winter
Summer Solstice
Summer
Fall
Winter Solstice
Fall Equinox
5000 years ago and 15000 years from now
Fall Equinox
Fall
Summer
Winter Solstice
Winter
Spring
Summer Solstice
Spring Equinox
5000 years from now
Winter Solstice
Winter
Fall
Spring Equinox
Spring
Summer
Fall Equinox
Summer Solstice
Earth's orbit 10000 years from now
Indicated seasons are for northern hemisphere

Fourier analysis has been around for a long time. Joseph Fourier started the idea in the early 1800s, but others have refined it since.

Some of the central concepts go back as far as the Babylonians.

Temperature and CO_2 Over Time