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HM Nautical Almanac Office

The Future of Almanac Services

An HMNAO perspective ...

Journées Systèmes de Référence Spatio-Temporels

“Recent developments and prospects in ground-based and space astrometry”

Pulkovo Observatory, St. Petersburg: 22-24 September 2014

***Steve Bell, Susan Nelmes,
Paresh Prema & James Whittaker***



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This talk ...

- **History**
- **Examples of HMNAO Services**
- **Current practice**
 - Paper
 - Web based
- **Next generation data services**
 - Web based
 - Mobile Apps
- **Future services**
 - What might they be ...



History (I)

- Earliest texts considered to be almanacs go back to second millennium BCE – hemerologies and paraepgmata
- Babylonian, Greek and Islamic almanacs – zijs and tables
- Medieval almanacs – Regio-Montanus (1472)

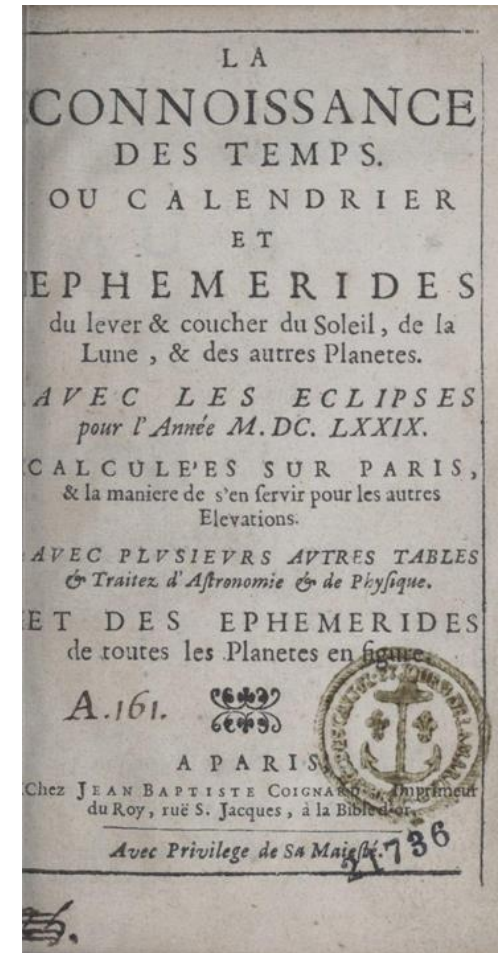




History (II)

■ Early Astronomical Ephemerides

- La Connaissance des Temps ou calendrier et éphémérides du lever & coucher du Soleil, de la lune & des autres planètes, Picard (1679)
- Astronomische Ephemeriden, Hell (1757)
- The Nautical Almanac and Astronomical Ephemeris, Maskelyne (1767)
- Berliner Astronomisches Jahrbuch, Bode (1776)
- Almanaque Nautico (1792)





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HMNAO Services (I)

One of the
location entry
methods for
Websurf –
HMNAO's
dynamical
data
resource

Her Majesty's Nautical Almanac Office
UK Hydrographic Office

Astronomical data...for everyone!

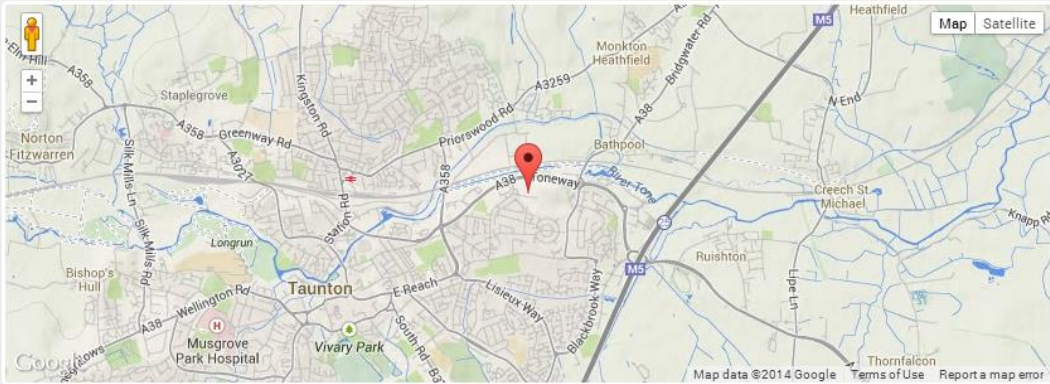
[HMNAO Home](#) [Back to Declaration](#) [Return to options](#) [Feedback/Report bugs](#)

[Rise, Set and Twilight Times](#) ▶ [Location](#) ▶ [Parameters](#) ▶ [Results](#)

Rise, Set and Twilight Times - *Select a Location*

[Frequently-used locations](#) [Named location](#) [UK postcode](#) [Latitude, longitude and timezone](#) [Map](#)

Use the map below to choose a location (click marker to set location) ⓘ



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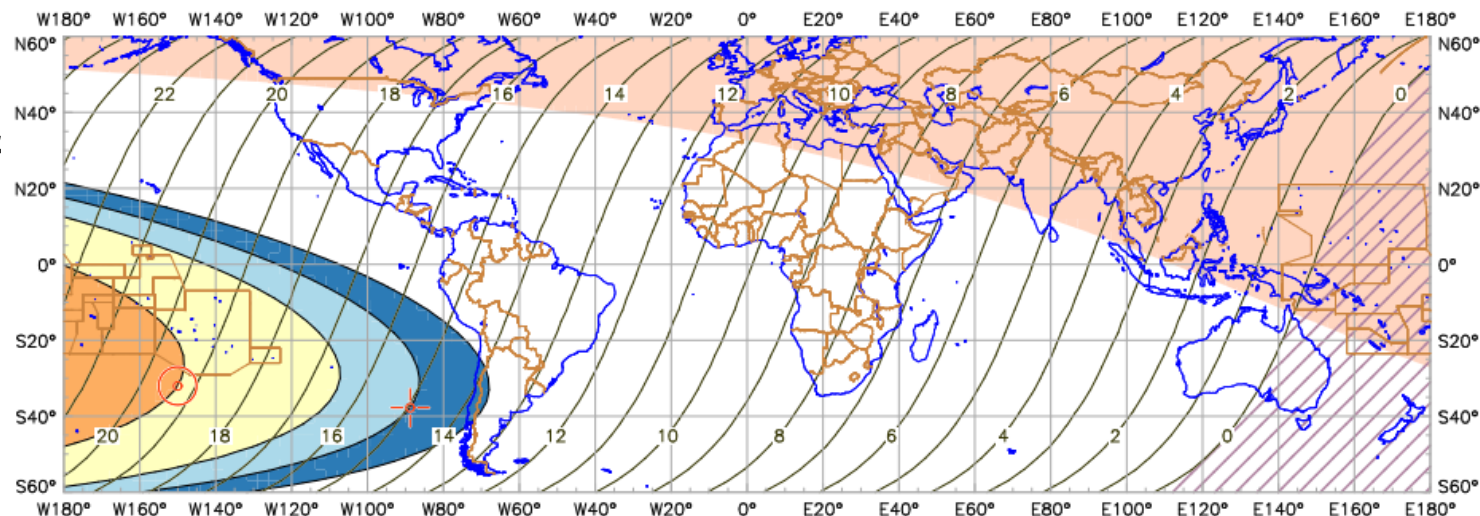


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HMNAO Services (II)

Visibility of the New Crescent Moon for 2014 June 27 (Ramadan 1435 AH)

Visibility of
the new
crescent
moon for
Ramadan
2014



New Moon occurred at 2014 June 27 at 08:08 UT

Age of the Moon at first visibility with the naked eye = 19.32 hours

Age of the Moon in hours at the "Best time" — 20 —

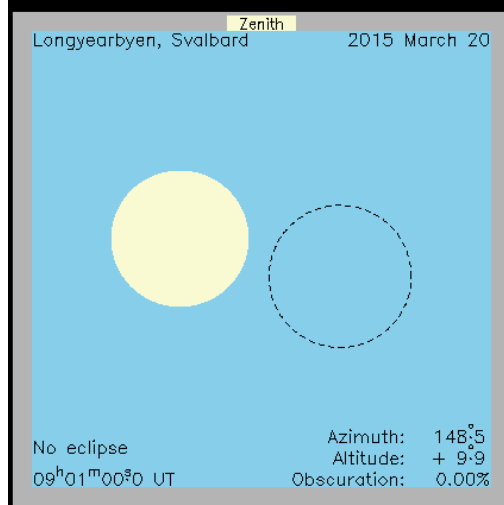
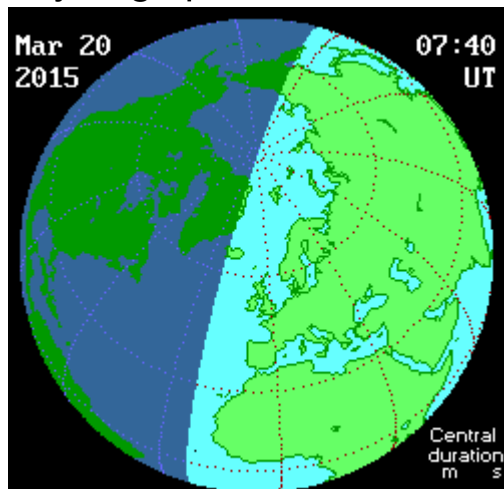
Age of the Moon at first visibility with a telescope = 14.94 hours

New Crescent Moon Visibility Key – Colour Coding of Areas

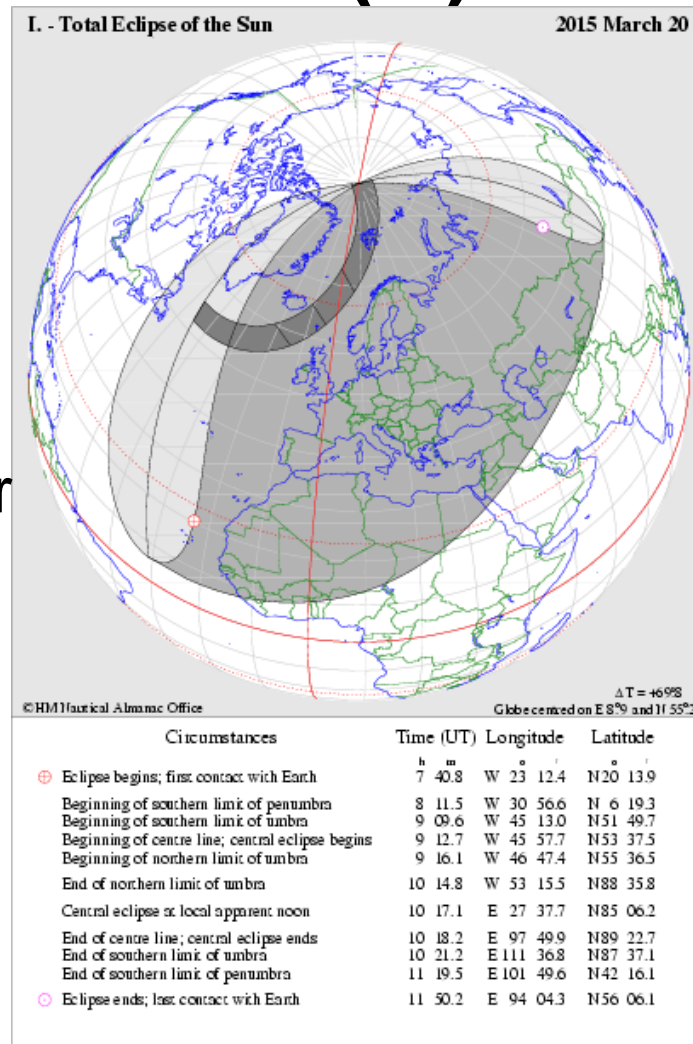
- | | |
|--|---|
| A – Easily visible to the naked eye | D – Will need optical aid to find the crescent moon |
| B – Visible to the naked eye under perfect conditions | E – Not visible with a telescope |
| C – May need optical aid to find the crescent moon initially | F – Not visible – below the Danjon limit |
| Moon sets before the Sun | Moon prior to conjunction (new moon) |
| Predicted location of first visibility with the naked eye | Predicted location of first visibility with a telescope |



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Global and local circumstances for March 20th 2015 Total Eclipse of the Sun

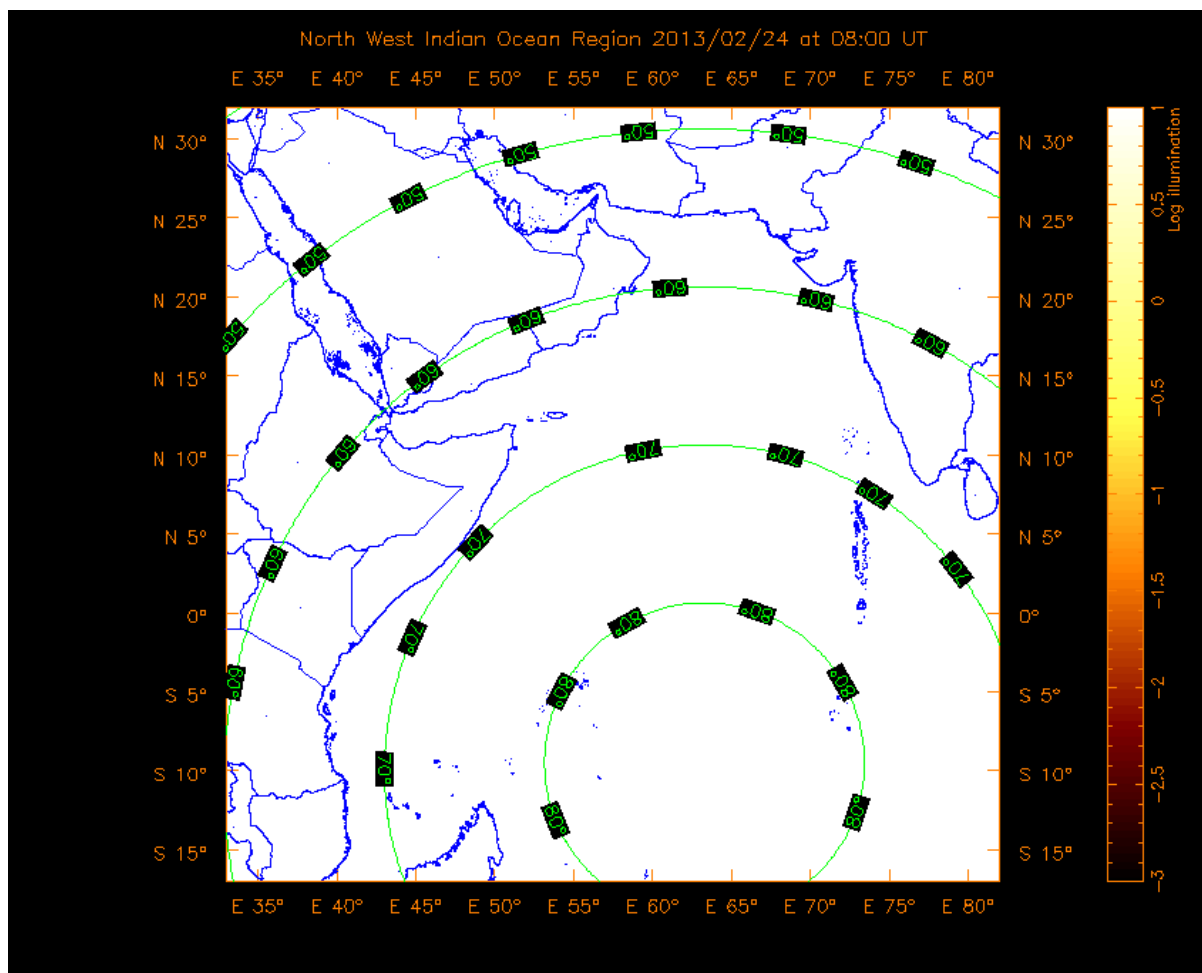




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HMNAO Services (II)

Ground
Illumination
data for
maritime
activities





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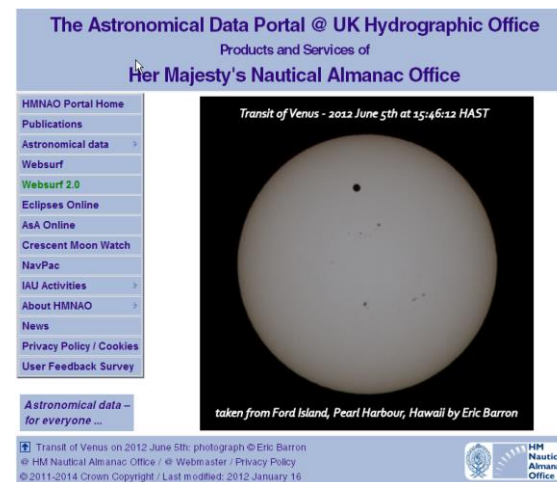
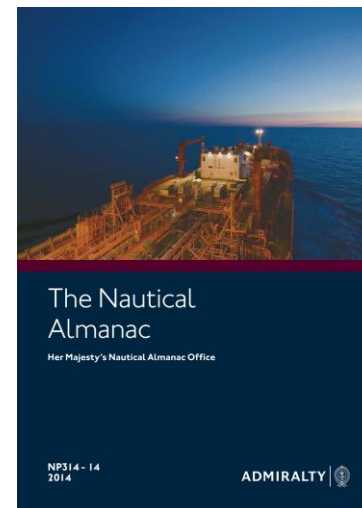
Current Services (I)

■ Paper

- User friendly
- Archival
- Expensive / Distributor chains

■ Web

- Need internet access
- Lack of flexibility
- Access to large amounts of data
- Ephemeral





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Current Services (II)

■ Hybrid Publications

- e-publications e.g. e-NA
- pdf only publications e.g. UKAA

■ Software

- NavPac

■ Paper + Web

- AsA Online



Contents Errata Constants Glossary Utilities Additional Info

Welcome

The Astronomical Almanac is a joint publication of the U.S. Nautical Almanac Office, United States Naval Observatory (USNO), in the United States and Her Majesty's Nautical Almanac Office (HMNAO), United Kingdom Hydrographic Office (UKHO), in the United Kingdom. The printed version contains precise ephemerides of the Sun, Moon, planets, and satellites, data for eclipses and other astronomical phenomena for a given year, and serves as a world-wide standard for such information. The online version extends the printed version by providing data best presented in machine-readable form.

These pages are available at USNO and HMNAO.

- Introduction
- Errata in printed editions
- Section A: Phenomena (incl. eclipses)
- Section B: Time-Scales and Coordinate Systems
- Section C: Sun
- Section D: Moon
- Section E: Planets
- Section F: Natural Satellites
- Section G: Dwarf Planets and Small Solar System Bodies
- Section H: Stars and Stellar Systems
- Section J: Observatory Search
- Section K: Tables and Data
- Section L: Notes and References
- Section M: Glossary
- Section N: Index
- Additional Information

Recent and Upcoming Phenomena (UT)			
Tue	Sep 16, 02h	LAST QUARTER	
Sat	Sep 20, 11h	Jupiter 5° N. of Moon	
Sat	Sep 20, 14h	Moon at apogee	
Sun	Sep 21, 02h	Mercury 0° S. of Spica	
Sun	Sep 21, 22h	Mercury greatest elong. E. (26°)	
Mon	Sep 22, 13h	Pluto stationary	
Tue	Sep 23, 02h	Equinox	
Wed	Sep 24, 08h	NEW MOON	
Fri	Sep 26, 10h	Mercury 4° S. of Moon	
Sat	Sep 27, 21h	Mars 3° N. of Antares	
Sun	Sep 28, 01h	Ceres 0° 11 N. of Moon, Occn.	
Sun	Sep 28, 04h	Saturn 0° 1 S. of Moon, Occn.	
Sun	Sep 28, 15h	Vesta 0° 5 S. of Moon, Occn.	
Mon	Sep 28, 17h	Mars 6° S. of Moon	

Diary of Phenomena in iCalendar format



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Next Generation Services

■ **Web**

- SOAP / REST services
- Access by flexible geographical tools / location sensitive software
- Customisation of web pages on a per user basis

■ **Mobile apps**

- Services that do not require large amounts of data
- Creative presentation of data
- Location / Orientation sensitive
- Augmented reality



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Future Services ...

■ **Delivery of data by different means & methods**

- Youtube
- Repackaging with other data e.g. e-Navigator
- Make more use of data visualisation
- More flexible licensing of data to make creation of new products simpler

■ **Standards**

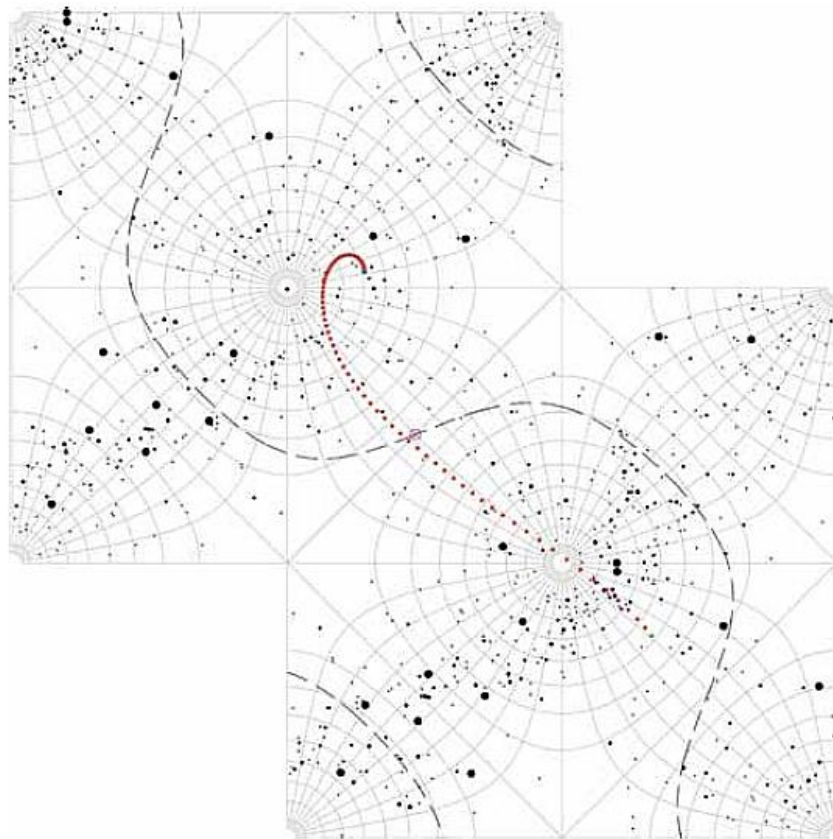
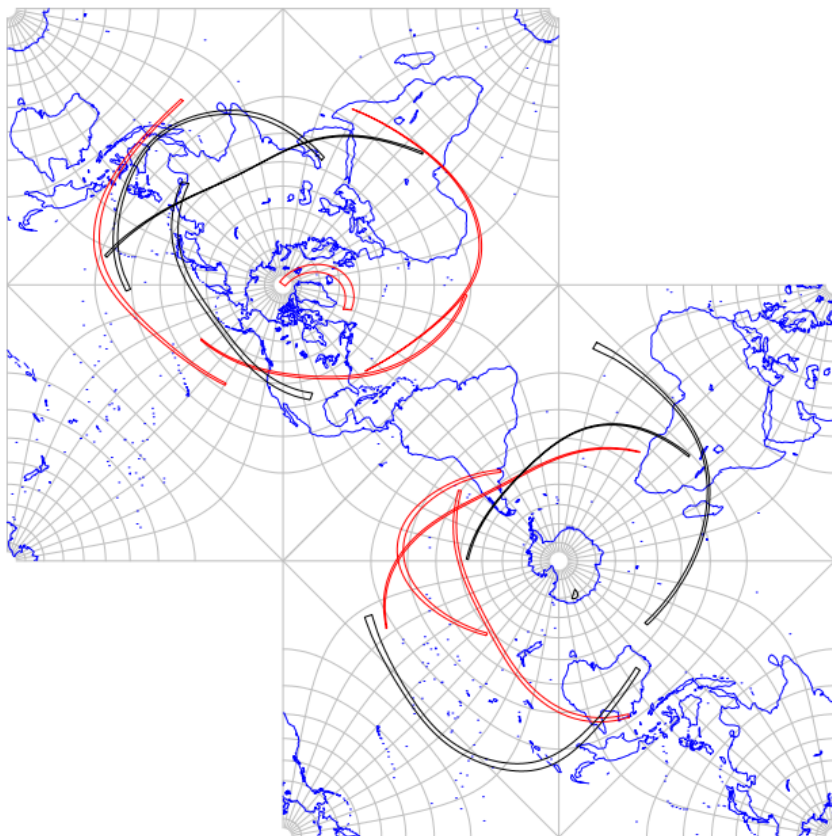
- UT1/UTC – Leap Seconds





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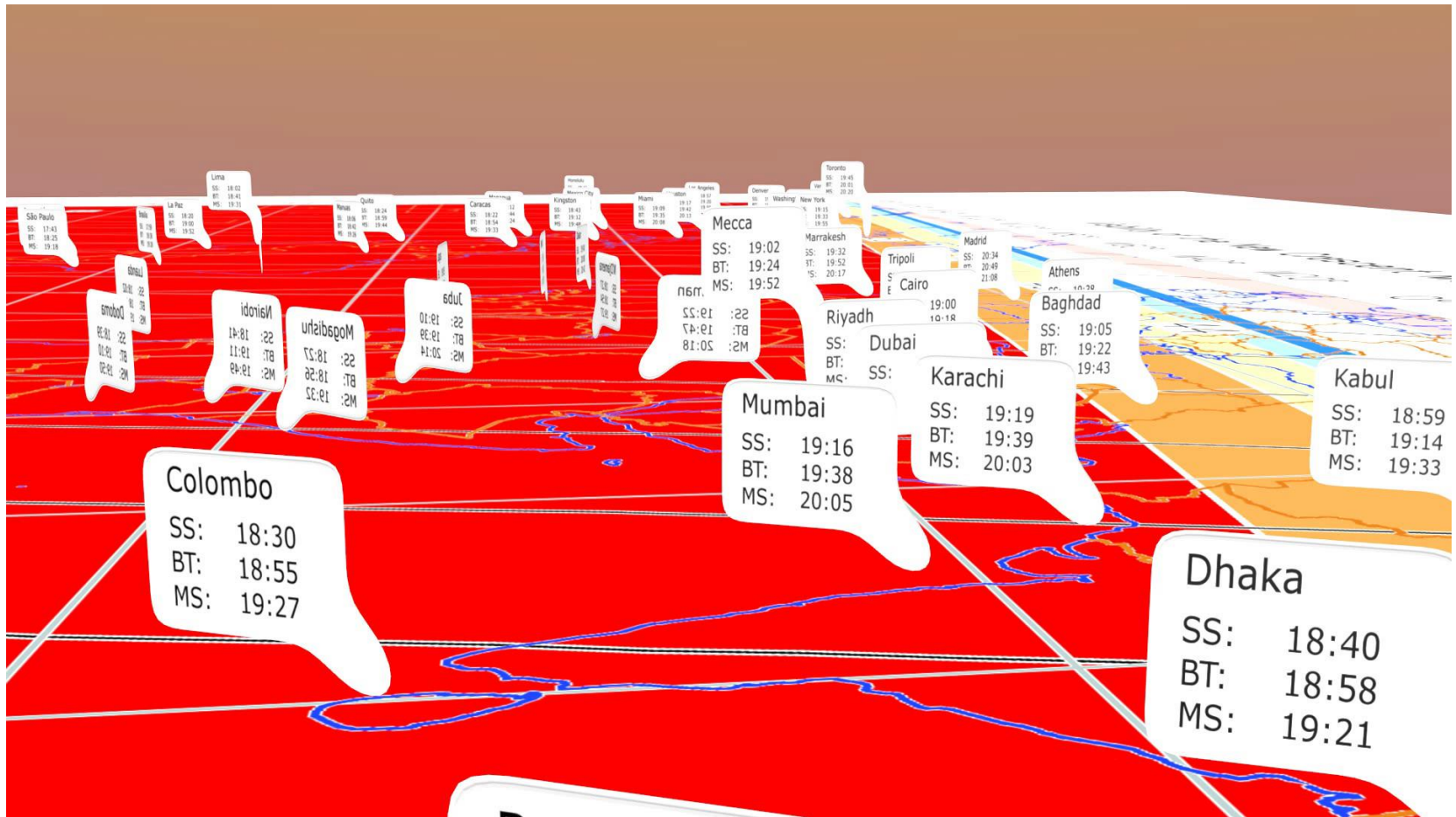
Visualisation of data (I)



See <http://astro.ukho.gov.uk/data/tn/naotn75.pdf>



Visualisation of data (II)





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Thank you / спасибо

■ **Any questions ...**