December 21, 2025, Moscow

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1). THE DYNAMIC REFERENCE STANDARD OF THE CHRISTIAN FIXED SPACE CALENDAR FOR EARTH, MOON, AND BUSINESS
2). CAN RUSSIA FLY TO MARS WITHOUT THE UNITED STATES? RESPONSE FROM THE HEAD OF RSC ENERGIA NAMED AFTER S.P. KOROLEV

Re: About the need to create ***the Center for calendar support of space activities***. No one has yet created an instrument-based physical scale of lunar time. The mathematical fixed time scale associated with the Earth calendar is described in this article. This option is currently the only one in the world that actually works. *This is the navigation task.*

BRIEF INTRODUCTION

Peaceful use of outer space. Humanity is entering a new era of lunar exploration, in which a record number of states and organizations are participating, and this may forever change our relations with our nearest celestial neighbor.

Member States are working with the United Nations to preserve the Moon as an area of global cooperation, guided by the fundamental principle of the Outer Space Treaty: "the exploration and use of outer space, including the Moon, should be carried out in the interests and for the benefit of all countries." Established by the UN General Assembly in 1959, the UN Committee on the Peaceful Uses of Outer Space plays a key role in shaping international space law, addressing new challenges and promoting international cooperation.

The United Nations Office for Outer Space Affairs, which serves as the Committee's Secretariat, supports this work by helping countries create the necessary legal, institutional, scientific and technical conditions for the development of space ecosystems and the benefits of space.

The 68th session of the Committee was held in Vienna in June. One of these mechanisms is the new Advisory Group on Activities on the Moon, established to facilitate dialogue and make recommendations on international coordination.

The Group will develop a work plan for the coming years and identify priority topics, such as *the coordination of lunar time*, to ensure the coordinated and orderly development of activities on the Moon.

The issue of colonizing the Moon raises a legitimate question: what time is it on the Moon? The international community at the United Nations is trying to agree on a common time frame on the moon.

One "lunar day" [one complete revolution of the Moon around its axis] lasts approximately 27.32166 Earth days relative to the "fixed stars"; or 29.53 Earth days, if we count the full phase revolution.

The equatorial regions of the Moon can be under continuous sunlight for up to 14 consecutive days [if observed from the Sun]. On some peaks of the highest lunar mountains, which are called the "peaks of eternal light," the Sun does not set at all.

In addition, as physicists and science fiction fans know, time on the moon flows differently than on Earth [according to Einstein's theory of relativity].

If you synchronize two completely identical chronometers – leave one on Earth and place the other on the Moon – then within a day, according to Earth time, the "lunar" clock will rush by about 58.1 microseconds [one full second of error will run up in 50 earth years]. [32]

This may seem like a minor delay, but even such an error is sometimes quite critical for spacecraft navigation.

Obviously, in order for the lunar time zone to function satisfactorily, the participants in the discussions will have to agree on a common time reference system that will be reliable, correlated with Earth time and accessible to all.

The United Nations Office for Outer Space Affairs is actively contributing to this work. And maintains its own website [31].

The ESA is counting. that before a fully autonomous reference time scale is implemented on the Moon, systems will need to translate time and frequency to the Earth reference time scale for realistic clock control and management.

To this end, ESA already has a plan to launch an atomic clock that will be installed on the Moon, but this event is scheduled no earlier than 2031. They're counting. that in order to realize lunar time, an ensemble of atomic clocks should be placed on the lunar station.

NASA today does not know exactly how the lunar time scale will function and be measured in comparison with the Earth clock. How can the UTC [Coordinated Universal Time] laboratory be involved? How can we define a step-by-step approach to the implementation and implementation of this issue, ensuring transparency and based on cooperation with UTC laboratories?

India, for example, currently does not operate or plan any system for location [positioning], navigation and timekeeping on the Moon.

India currently has no plans to implement a lunar timeline using ground stations, orbiters, or satellite groupings. All flight time calculations, where applicable, are based only on the UTC Earth Calendar Scale (NPLI).

Currently, there is not a single national program on Earth aimed at defining or using a special lunar time scale.

However, it is obvious. For most day-to-day operations, it would be very difficult to use a different timeline on Earth and on the Moon.

But given that there will not yet be the means for accurate metrology on the Moon for a long period of time, we must focus on what is already acceptable to us in the near future: *the reference standard of "Keplerian" time for the Earth and the Moon at the same time.*

Abstract. The division of the globe between Spain and Portugal; the Papal meridian; the Age of Great Geographical Discoveries; navigation on the high seas; determining longitude; replacing the inaccurate Julian calendar with a more accurate Gregorian; the invention of the pendulum clock; the age of Great Space Discoveries; colonization of the Moon; creation of the 25 lunar time zone; creation of an absolutely accurate dynamic reference standard the Christian fixed space calendar for Earth, Moon and Business; creation of the Calendar Support Center for Space Activities; creation of universal navigation based on the reference standard of linear lunar time.

Keywords. Pope Alexander VI Borgia; Pope Julius II; Magellan; Spice Islands; Tycho Brahe; Johannes Kepler; Gauss; Galileo Galilei; Huygens; Newcomb; Mendeleev; the standard is static; the standard is dynamic; dynamic reference standard the Christian fixed space calendar for Earth, Moon and Business; Calendar Support Center for Space Activities; universal navigation based on the reference standard of linear lunar time.

First, Pope Alexander VI Borgia, a native of Aragonese Valencia, announced on May 3, 1493, that all lands that Castile had discovered or would discover west of the meridian passing 100 leagues west of the Cape Verde Islands should belong to her, and new lands that would be discovered in areas east of this line should belong to Portugal.

This rule did not apply to territories that were already under the rule of other Christian countries. The meridian was named the Papal Meridian. The Papal Meridian runs along a line that is located 370 nautical leagues (1,770 kilometers or 1,100 miles) west of the Cape Verde Islands — this corresponds to the coordinates of the meridian 49°32'56" west longitude. *The treaty was signed in June 1494 in the city of Tordesillas in Castile.*

The signing of the Treaty of Tordesillas in June 1494

A coin of 200 Portuguese escudos in 1994.
Inscription: The Tordesillas Treatise

A coin of 200 Portuguese escudos in 1994. The obverse (on the left) depicts Ferdinand of Aragon, Isabella of Castile and King Juan II of Portugal. On the reverse (on the right), pay attention to the demarcation line in South America and the Portuguese "piece", which later turned out to be a huge Brazil.

Coin 200-escudo 1994. Inscription: "Division of the world 1494"

In 1494, the Vatican [Pope Alexander VI Borgia], by his bull, divided the globe into zones of colonial influence along the line of the "papal meridian" in the Atlantic Ocean: the eastern hemisphere was transferred to the protectorate of Portugal; the Western hemisphere to Spain.

The "Papal Meridian" in the Atlantic Ocean is an imaginary line drawn in accordance with the Treaty of Tordesillas in 1494. According to this treaty, the seas and lands east of the meridian were considered the property of Portugal, and to the west — of Spain.

The treaty became known as the "papal meridian" after it was officially ratified by Pope Julius II in 1506. The meridian was located 100 leagues (about 400 km) west of the Cape Verde Islands, located off the western coast of Central Africa.

From that moment, the era of Great Geographical Discoveries officially began. First, Portuguese national Vasco da Gama sailed to India, sailing East around the African Cape of Good Hope, and Spanish national Columbus sailed to America, sailing West from the Papal meridian.

Then Magellan, having passed to the West, left the Atlantic Ocean through the Strait of his name (Strait of Magellan), rounded Cape Horn, into the Pacific Ocean and completed the world's first circumnavigation.

Both campaigns were aimed at the discovery of Spice Island, from which Arab merchants imported spices to Europe. Goods from Asia were actively supplied to Europe before.

However, the conquest of the Balkans and Asia Minor (now Turkey) by the Ottomans in the middle of the 15th century made it much more difficult for Europeans to use the former eastern (land and sea) trade routes.

But trade with the East brought fabulous profits (700-800% of income), and therefore there was an increasing desire to find an alternative sea route (east or west) to India and China.

If you look at the world map, it may seem strange that Spain, which is not very large compared to the rest of the world, and Portugal, which is 5 times smaller than Spain, had the opportunity to take everything and divide it according to this Spanish-Portuguese treaty of the 15th century, which implied the eternal and monopoly domination of Portugal and Spain. over the whole world outside of Europe.

This dominance was made possible by the fact that both of these countries were leaders in Great Geographical Discoveries — they possessed the most advanced knowledge of navigation and shipbuilding for that time. However, these Papal bulls, which blessed the Spanish-Portuguese partition of the world, did not make much impression on other European colonialists. King Francis I of France expressed this idea very precisely. "I do not remember such a place in Adam's will that would deprive me of a share in the ownership of the New World.

"***This moment was the beginning and cause of the outbreak of world wars and confrontations.***

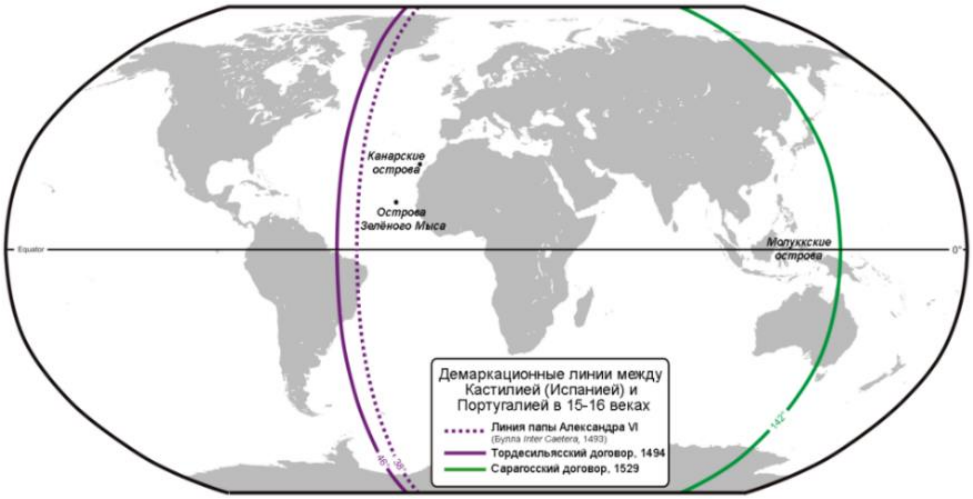
It was a struggle for new markets, for sources of raw materials for capitalist industry, for new colonies.

This was the beginning of the extensive development of capitalism as a socio-economic formation, which was preceded by feudalism, slavery and the primitive communal system.

Holland, which had its own colonies in the region, ignored the treaty. Portugal violated the terms of the Treaty of Tordesillas during the colonization of the American continent, gradually moving from Brazil to the west and south of the continent. *This led to the signing of the Treaty of Madrid in 1750, which abolished the Tordesillas line. Officially, the treaty was abolished in 1777 by the treaty of San Ildefonso.*

The World map of 1502.

The World map of 1502. Outside of Europe, only Africa is relatively accurately delineated.



Demarcation lines between Portuguese and Spanish colonies

The problem of navigation in the open ocean was the *inaccurate* Julian calendar of the Vatican. As well as *inaccurate* solar and water clocks. Sailing caravels often lost their course and crashed.

They could not accurately determine their coordinates in the open sea. Astronomical tables of planetary motion of 1627 is the only lifetime edition, the last and main work of the German astronomer and mathematician Johannes Kepler.

The book includes 40 tables of the location of the Moon, six planets of the Solar system known at the beginning of the 17th century (Mercury, Venus, Earth, Mars, Jupiter, Saturn), as well as a catalog of fixed and variable positions of 1,500 stars.

Using a newly discovered system of logarithms, the scientist created the most accurate tables of planetary motion at that time.

They made it possible to predict the position of celestial bodies even in the distant future, and ***30-50 times more*** accurately than using previously existing tables.

For a long time, this work of Kepler was the reference book of all navigators, travelers, and also astrologers.

The Jesuits in China used the tables to complete the reform of the Chinese calendar in 1645.

The Rudolphin tables included a world map that was unique in accuracy for the Middle Ages.

On a scroll in the lower left corner of the map were written instructions on how to use the map to measure the «lunar distance», that is, ***to calculate longitude relative to the meridian at Greenwich.***

In particular, they said that by observing the edge of the lunar disk relative to a known star or during a lunar eclipse, you can calculate ***the longitude at the observation point*** by calculating the local time and comparing it with the time indicated in the tables.

For this purpose, Kepler needed his map to be as up-to-date as possible, and it is notable for being one of the first to show the Dutch discoveries of the west coast of Australia, the *Land of Endracht* and the *Land of Doels*; this information was apparently taken from *the Geographical Table Nova Totius Terrarum Orbis Geographica ac Hydrographica Tabula by Jodocus Hondius II, published in Amsterdam in 1625.*

Hondius drew his geographical knowledge of Australia from an unpublished 1622 map of the Indian Ocean compiled by *Hessel Herritz*. Almanac star tables have been compiled for many centuries and were used to determine the position of planets relative to fixed stars (in particular, the thirteen/twelve constellations traditionally used in astrology) on a specific date for horoscopes, which were very common in the Middle Ages.

Until the end of the 16th century, ***the Alphonse tables*** were most widely used, first compiled in the 13th century and subsequently regularly updated. They were based on the *Ptolemaic*, *geocentric model* of the Solar system. Although ***Alfonsin's tables*** were not very accurate, there were simply no other options for the civilization of that time, so they continued to be actively used.

In 1551, after the publication of Nicolaus Copernicus' De revolutionibus orbium coelestium, Erasmus Reinhold compiled ***Prutenic tables*** based on the heliocentric model of the Solar System, but they were no more highly imperfect and no more accurate than the previous tables. The situation in pre-telescopic astronomy was radically changed by the astronomer and mathematician Tycho Brahe.

The observations underlying the Rudolfin tables were carried out by Tycho Brahe and his team. ***Brahe's measurements were much more accurate than those previously available.*** [8-14] He worked with very sophisticated instruments to determine the exact position of planets and stars in the sky, but ***he did not have a telescope***.

The measurements of Tycho Brahe (1546-1601) were much more accurate than those previously available. Brahe was the first in Europe to conduct systematic and highly accurate astronomical observations. Brahe not only increased the size of the instruments, but also developed new observation methods that minimize errors. Some improvements: [vk.com, vk.com].

The orientation of the armillary sphere is not to the ecliptic, as has been customary since the time of Ptolemy, *but to the celestial equator*. [vk.com]

The use of Venus as an intermediate reference star instead of the Moon, which practically did not move during the pause in observations. [ru.wikipedia.org *vk.com Careful verification of the results — Brahe personally checked and rechecked numerous observational results, striving to bring them to perfection. [archi-fact.livejournal.com.] ***The results turned out to be unique***. The accuracy of observations of stars and planets is an error of less than an arc minute.

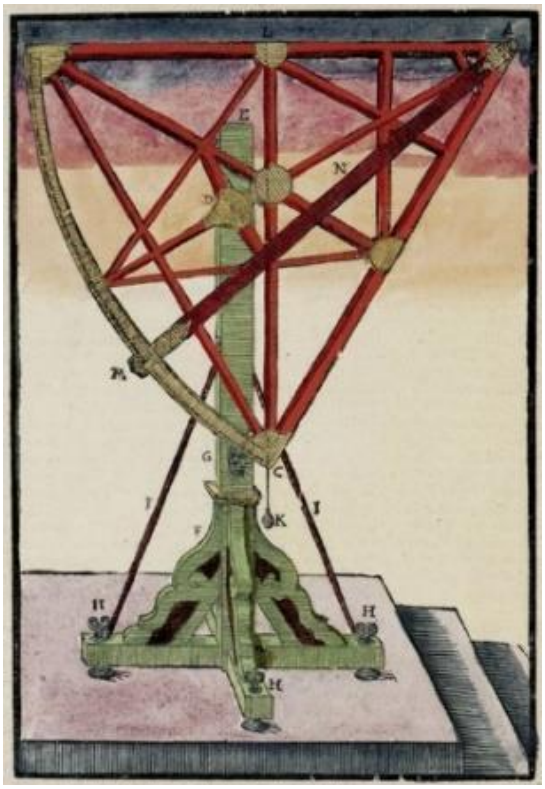
The position of the Sun according to the Brahe tables was accurate *to one minute,* whereas the previous tables gave an error of *15-20 minutes*.

In 1592, Brahe first published a catalog of 777 stars, and by 1598 he had brought the number of stars to 1004, replacing the previously outdated catalogues of Ptolemy in Europe.

Brahe discovered two new irregularities in the movement of the Moon in longitude: the third (variation) and the fourth (annual).

He also discovered periodic changes in the inclination of the lunar orbit to the ecliptic, as well as changes in the position of the lunar nodes (latitude evection). [ru.wikipedia.org; u. ruwiki.ru].

Brahe's observations formed the basis for *the Rudolphin tables*, a star catalog and planetary tables published by ***Johannes Kepler in 1627***. Therefore, these tables were much more accurate than all the earlier similar tables.



Measuring instrument from the collection of astronomical instruments by Tycho Brahe

The observations of Tycho Brahe helped his successor, the German scientist I. Kepler, discover the three basic laws of planetary motion, which formed the basis of all modern celestial mechanics.

Brahe enjoyed the support of the Danish King Frederick II and in 1576-1596 built an observatory on the island of Hven. After the death of the king, Brahe moved to Prague and became the official court astronomer of Emperor Rudolf II.

The Christian calendar, adopted by the Vatican in 325 in Nicaea [at the First Ecumenical Christian Council], showed Christian Easter in 1582 on *March 11 instead of the astronomical date of March 21, that is, it lagged behind astronomical reality by 10 days.*

The calendar component of errors in determining longitude during sea voyages in the open ocean became obvious.

Every 128 years, the calendar lag error increased by another full day. Over 1257 years, it was 9.8 days [1582-325=1257/128=9.82 days≈10 days].

Therefore, in 1582, the Vatican replaced the Nicene [or Constantinian] version of the Julian calendar with the Gregorian one.

A new correction factor formula was introduced: instead of [$^{32}/_{128}=^{100}/_{400}$=0.25 days], [$^{97}/_{400}$=0.2425 days] was adopted.

The error decreased from 675 seconds per year to 27 seconds per year and began to increase in the amount of one full day over 3,200 years.

This was almost an ideal solution for Columbus' sailing caravels. Their speed did not exceed 12-14 nautical knots per hour [***1.8*14≈25 km/h***].

The second solution in marine navigation to accurately determine longitude was for navigation tables, the accuracy of which increased dramatically if the newly discovered Nepean logarithms were used.

The Vatican commissioned astronomer Tycho Brahe to compile such navigation tables.

In 1600, mathematician Kepler joined Tycho Brahe, and Emperor Rudolf II commissioned them both to publish new marine tables.

Kepler was the first to apply Nepean logarithmic calculations in astronomy, and he was able to complete the Rudolph Tables only thanks to this unique new mathematical tool.

In 1601, a year and a half after the start of cooperation between scientists, Tycho Brahe fell ill and died suddenly a few days later.

Kepler got a job as a mathematician at the imperial court and began studying the theory of planetary motion.

He took all of Tycho Brahe's notes, which he had been making based on his observations for thirty years, and released the Rudolphin Tables based on them [8-14].

When Tycho Brahe was already unwell, he asked Kepler to finish his tables. But Kepler's final result did not quite confirm Brahe's theories. Johannes Kepler completed work on the tables in 1623, but actually published them only in 1627.

The results published in the tables confirm Kepler's laws and the theory of heliocentrism.

The Rudolphin tables received their name in honor of Emperor Rudolf II, whom Johannes Kepler treated with deep respect.

The Rudolphin tables are the best ***pre-telescopic*** catalog, which contains indications of the positions of 1005 stars (compared to 777 at Tycho Brahe), with an accuracy of several arc minutes, as well as tables and directions for determining the location of planets.

This is the first catalog to include atmospheric refraction correction factors and ***logarithmic tables.***

Kepler used a newly discovered system of *logarithms* and created the most accurate tables of planetary motion at that time, which made it possible to predict the position of celestial bodies even in the distant future, and ***30-50 times more*** accurately than using previously existing tables.

The time scale located along the equator on the Kepler map shows how many hours need to be added or subtracted to determine the longitude value (one hour is equal to 15 degrees longitude).

In astrogation, the "*lunar distance*" is defined as the angular distance between the Moon and some other fixed celestial body [some star or Sun].

The lunar distance method uses this angle and the nautical almanac to calculate Greenwich Mean Time, if necessary, or, more broadly, any other time.

The calculated time can be used to solve a spherical triangle. The theory was first published by Johannes Werner in 1524, even before the necessary almanacs were published.

A more complete method was published in 1763 and was used until about 1850, when it *was superseded by the marine chronometer*, ***starting in 1657***, the date of *Huygens*' invention of the pendulum clock based on the materials of the disgraced Galileo Galilei, who secretly sold them to Huygens because of the extreme need he found himself in after the Inquisition trial in 1633.

In stellar navigation, knowing the time at Greenwich (or another known location) and the measured coordinates of one or more celestial objects allows the navigator to calculate longitude.

Reliable marine chronometers were initially very expensive to produce and therefore not affordable in mass use until the end of the 18th century.

Therefore, after the calculation method was first published in 1763 by the Royal British astronomer *Neville Maskelyne*, based on the pioneering work of *Tobias Mayer*, for about the hundred years (until about 1850), sailors who did not have a chronometer used the lunar distance method *to determine Greenwich Mean Time as a key step in determining longitude.*

Conversely, a sailor who had a chronometer could verify its accuracy by determining the GMT time using the lunar method.

This method was used until the early 20th century on small ships that could not afford a chronometer or had to rely on this method to adjust the chronometer readings.

In 1627, Kepler correctly calculated the length of the average tropical solar year for the first time: 365 days, 5 hours, 48 minutes, 45 seconds =365, 2421875 days = 365 (31/128) days [8,9,10,12,13,14]

However, neither Kepler, nor Gauss, nor Struve, nor Medler, nor Newcomb, nor Mendeleev, nor their other followers were able to create ***the Dynamic Unified reference standard Christian calendar of the space age civilization***.

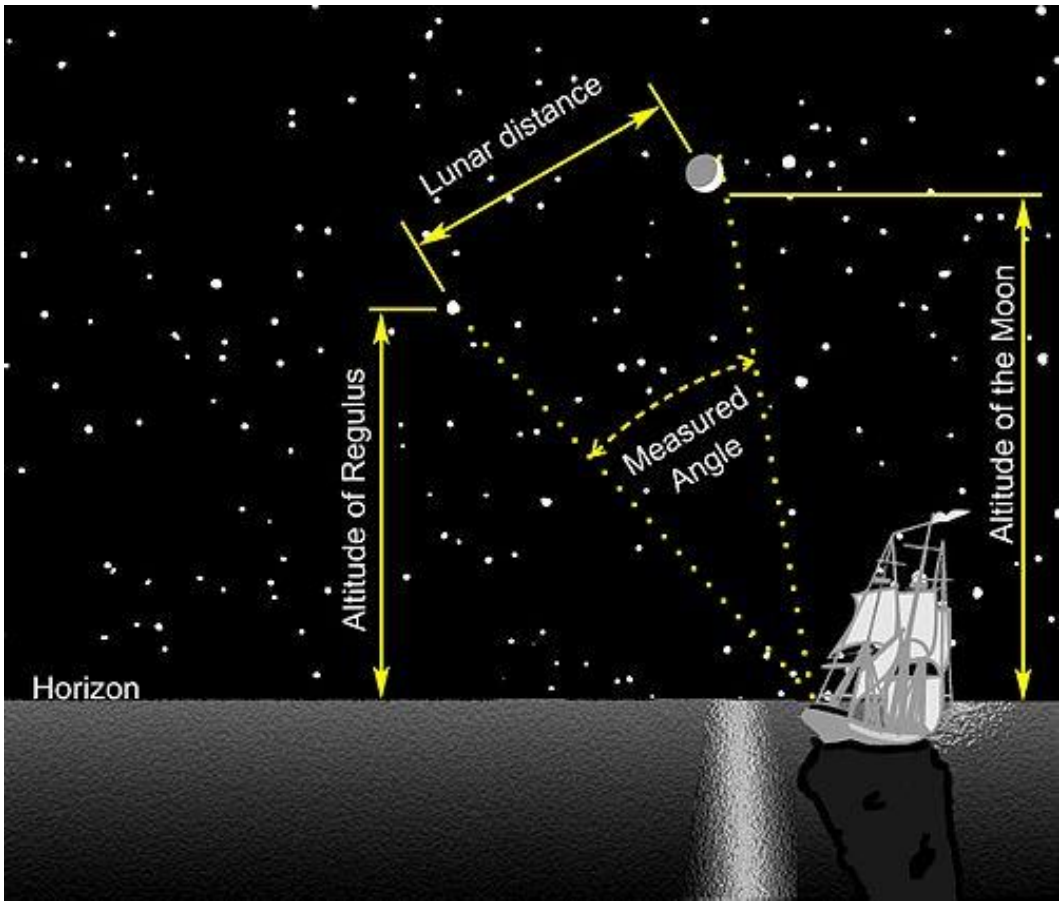
This issue was resolved only after applying two principles.:

1) *Morozov's principle of calendar equivalence*;

2) *the principle of the Morozov`s calendar constant* – in 2015 [3]

The method of *determining longitude* from tables was based on the fact that the Moon moved relatively quickly across the background sky, rotating 360 degrees in 27.321 days (sidereal month), or 13.2 degrees per day.

In one hour, it will move about ***half the degree***, [8-15] *approximately by its angular diameter relative to the background stars and the Sun.*



Determination of GMT time at sea using the lunar distance. The lunar distance is the angle between the Moon and a star (for example, the Sun). The star Regulus is used in the illustration above. The heights of the two bodies are used to make corrections and determine the time.

https://en.wikipedia.org/wiki/Lunar_distance_(navigation)

Longitude (relative to Greenwich Mean Time) is easily calculated from the difference between local and Greenwich mean time with a difference of 15 degrees per hour [360° of the Earth's total rotation/24 hours=15° degrees per hour].

In practice, by measuring the distance to the Moon and the height of two celestial bodies, the navigator can determine the GMT time in three stages.

The almanac tables predict the distance between the center of the Moon and another celestial body (they were published in Great Britain between 1767 and 1906).[10][11]

However, the observer cannot accurately determine the center of the Moon (or the Sun, which was most often used as the second object). Instead, the distance to the Moon is always measured from the sharply illuminated outer edge (the limb, not the terminator) of the Moon (or the Sun).

The first correction for the distance to the Moon is the distance between the edge of the Moon and its center.

Since the apparent size of the Moon varies depending on its distance from Earth, almanacs indicate the half-diameter of the Moon and the Sun for each day.[12]

In addition, the observed heights are cleared by half a meter. Clearing: the distance to the Moon is adjusted taking into account the influence of parallax and atmospheric refraction on the observation.

The stellar almanac shows the lunar distances as they would look if the observer were in the center of the transparent Earth.

Because the Moon is so much closer to the Earth than the stars that the observer's position on the Earth's surface changes the relative position of the Moon by almost a whole degree.[13][14]

The correction for parallax and refraction is the trigonometric function of the observed distance to the Moon and the heights of two celestial bodies.

The navigators used sets of mathematical tables to perform these calculations using dozens of different methods.

For practical use today, *Bruce Stark tables* can be used to determine the distance to the Moon.

They are designed in such a way that instead of trigonometric calculations, you only need to add and subtract numbers from the table.

Determination of time: the navigator, having calculated the distance to the Moon, checks the prepared table of distances to the Moon and the GMT time at which they will be traveled in order to determine the GMT time for observation.

To predict the position of the Moon for several years ahead, it is necessary to solve ***the three-body problem***, since it involves the Earth, Moon and Sun.

Euler developed the numerical method they used, the Euler method, and received a grant from the Longitude Council to carry out the calculations.

Having determined the (absolute) Greenwich Mean time, the navigator either compares it with the observed local time (the separate observation) to determine his longitude, or compares it with the Greenwich Mean time on the chronometer (if available) if he wants to check the chronometer.[13]

Correction of common errors. The distance to the Moon varies with time by about ***half a degree***, or 30 arc minutes, per hour. [8-14]

The total error due to these two factors is usually about half an arc minute in the distance to the moon, which is equivalent to one minute GMT, that is, an error of a quarter of ***the degree of longitude***, or about *15 nautical miles (28 km)* at the equator.

Forster noted that the method of determining longitude by the distance to the moon is the best and most accurate compared to watches that can fail due to mechanical problems.

Huygens invented the pendulum clock and the marine spring chronometer in 1657 and 1675, respectively. In 1657, Huygens patented a description of the device of a pendulum clock he had invented.

300 years later, in 1957, on October 4, the first artificial satellite of the Earth was launched, and 200 years later, in 1857, K.E. Tsiolkovsky was born.

The central element was an anchor invented by Huygens, which periodically pushed the pendulum and maintained uniform, undamped oscillations. Huygens developed two types of pendulums — a conical one and a cycloid one.

Specially designed for navigation, he designed a pendulum clock with three separate dials for hours, minutes and seconds. The accuracy of the Huygens clock was uniquely high for that time — *the daily error did not exceed 10 seconds*.

In 1674, Huygens began work on an improved model of a clock in which the pendulum would be replaced by a spiral spring and a balance beam.

However, the mechanism did not work out — the mechanism was initially very sensitive to changes in ambient temperature, which was a common, normal phenomenon during sea voyages.

The warmer it was, the more the spring lengthened, and the clock's running frequency increased.

It was only after Huygens' death that the spring mechanism for the marine chronometer was successfully applied.

A reliable and accurate marine chronometer appeared only in 1735 (in Great Britain). [15]

This invention predetermined the triumph of the American astronomer S. Newcomb and the 26th President of the United States *Woodrow Wilson*, who created the "***Standard Time Law" [Colbert's Law] on March 19, 1918***.

This law defined navigation throughout the 19th and 20th centuries, based on the Gregorian calendar with its "zero" reference to the meridian at Greenwich.

The error of the Gregorian calendar was *1 day in 3200 years*. [8-17] In the pre-space era, such precision was quite sufficient. But the very first real attempt to reach the surface of the Moon in 1959 led to disappointment, which has been going on for 66 years [2025-1959=66].

Obviously, it was necessary to create a more accurate standard calendar reference. Mendeleev was the first to understand this back in 1899.

He convinced Emperor Nicholas II to create a special calendar commission at the Academy of Sciences, to which Mendeleev invited his friend, academician, mathematician and astronomer from the USA S.

Newcomb, who was responsible for navigation tables for the US Navy and had the status of *rear admiral of the US Navy*.

The Commission worked until 1911. But in 1907 Mendeleev died suddenly, and in 1909 Newcomb died. In 1914, the First World War began.

After the end of the First World War. In 1918, Soviet Russia joined the US time standard, developed by Newcomb and introduced by 26th US President *Woodrow Wilson*, as the "*Standard Time Act", or as the "Calder Act", on March 19, 1918.*

All reference standards are divided into two categories:

1*) static* [measures of weight, length] and

2) *dynamic* [time measures, electric current strength measures; radio frequency ranges].

The space Age needs the new ***Unified Dynamic Reference Christian Fixed calendar for Earth, Moon and Business,*** which is registered as ***the standard at the Institute of Standards of the Space State of Asgardia on September 29, 2024***.[18]

Asgardian Standard

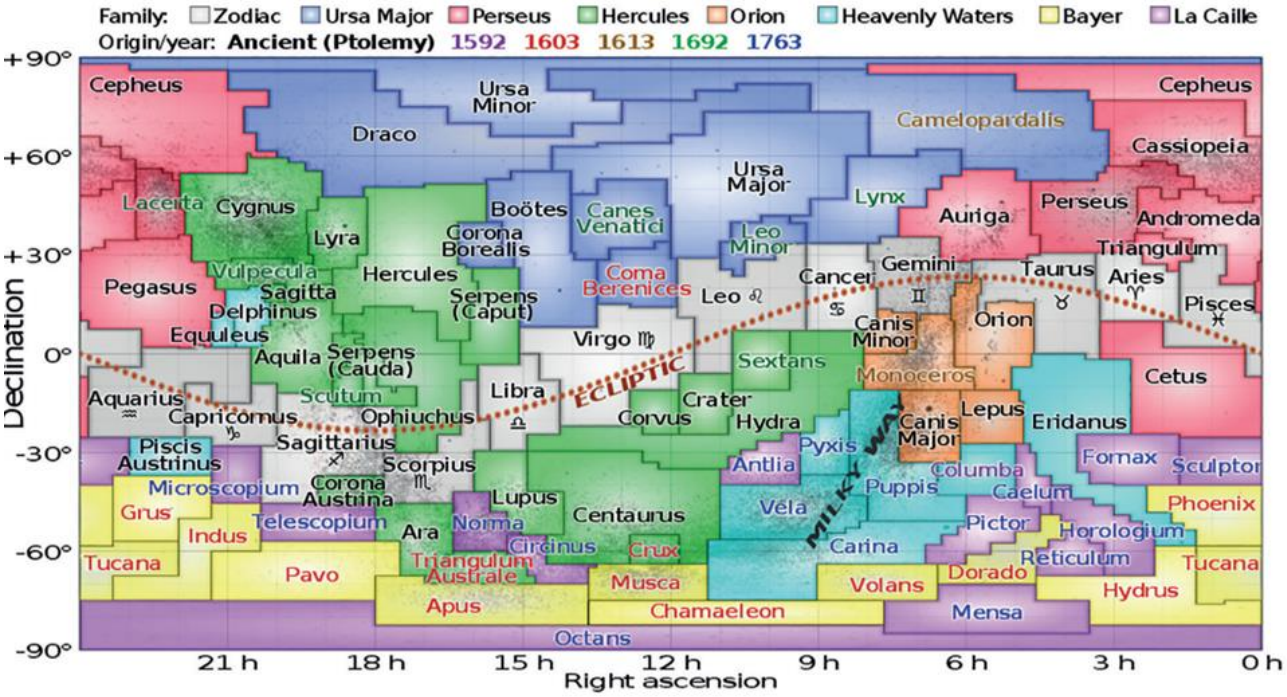
Asgardian Calendar

Asgardia Institute of Standards

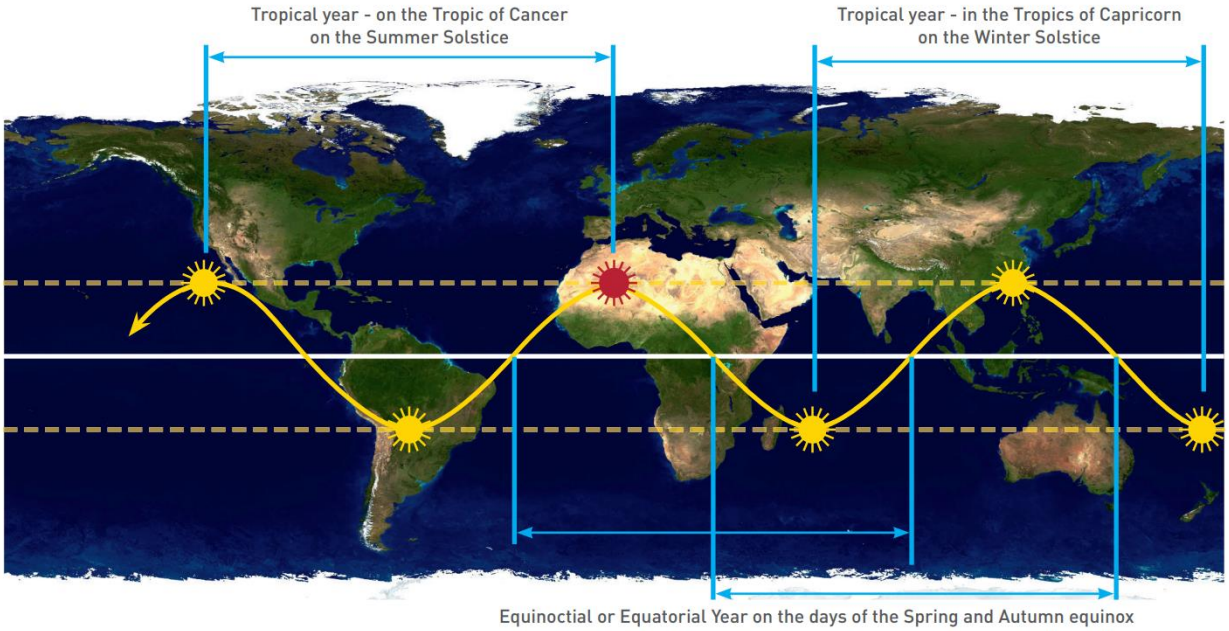
Full name:	Asgardian Calendar
Version:	2.1, Definitive, Sco 21, 0008 // Sep 29, 2024
Approval:	Approved by the Minister of Manufacturing
ID:	AS-A2006

This document is an Asgardian Standard, created by the AIS, the Asgardia Institute of Standards, AsgardiaInstituteOfStandards.Space.
Contact: Jacob Mulder, Minister of Manufacturing, Jacob.Mulder@Asgardia.Space.

The calendar is described in detail in the article: Morozov S.L. Asgardia Calendar and its Role in Space Industrialization Strategy. ROOM Journal No. 3 (21), 2019, pp. 66-72 (English).



The trajectory of the annual ecliptic against the background of 88 constellations of the universe [8]



Determination of the duration of the tropical Kepler solar year [8]

Days of the week	I -XIII month				Extra days
1st	1	8	15	22	ED 29, EDD 30
2nd	2	9	16	23	
3rd	3	10	17	24	
4th	4	11	18	25	
5th	5	12	19	26	
6th	6	13	20	27	
7th	7	14	21	28	

Table 6 - Compact display of the fixed standard 13-month reference Asgardia calendar in the form of the single mathematical table-matrix.

Table 5. Comparative table of the Julian, Gregorian, and cosmic Morozov calendar based on Kepler calculations [8]

Table 5 - Per-second ratio of calendar calculations of the duration of the year in different calendars in comparison with the duration of the tropical solar year.

Calendar year	Number of days	Seconds per year	Mistake
Julian (Heliacal year of the star Sirius)	$365.25 = 365^{1/4} = 365^{100/400} = 365\ ^{32/128}$	31 557 600	+675 sec +11 min 15 sec
Gregorian average [Figure 3]	$365.2425 = 365\ ^{97/400}$	31 556 952	+27 sec
Non-Leap Gregorian	365	31 536 000	-20 925 sec -5,8125 hr
Leap Gregorian	366	31 622 400	+65 475 sec +18,1875 hr
Astronomical (Equinodent) average solar year according to Simon Newcomb by the points of the spring and autumn equinox at the equator (1900)	$365.2422 \approx 365\ ^{132/545} \approx 365.2422018$	31 556 926.08 ≈ 31 556 926.23	+1,08 sec +1,23 sec
Experimental determination of the duration of the average equinoctial solar year (1900) [Figure 2]	365.24219878	31 556 925.974592	+0.974592 sec
Asgardia calendar has avereage duration equal to exp. determination of the duration of an average tropical[1] solar year. 365 days 5 hr 48 min 45 sec[2]	$365.2421875 = 365\ ^{31/128}$	31 556 925.0	±0

1. Tropical year. Astronomical Almanac Online Glossary (2015) https://en.wikipedia.org/wiki/Tropical_year (Retrieval date: 20.12.2018).https://en.wikipedia.org/wiki/Tropical_year
2. Meeus J., Savoie D. (1992). The History of the Tropical Year. Journal of the British Astronomical Association 102(1), 40–42; Secular Terms of the Classical Planetary Theories Using the Results of General Theory. Astronomy and Astrophysics 157, 59–70.

The mathematical form of the Morozov space calendar, calculated from the Kepler materials [8]. Morozov's calendar constant
[Morozov`s calendar invariable - MCI] $\mu = {}^{31}/_{128}$ суток

Box 1: Tropical year of the Sun calculation

The unified universal mathematical formula for calculating the duration of the space tropical year (L) for all existing calendar types is as follows:

L = (integer part) + (fractional part) = CONST + const;
L = K + (α + |±β|) = K +μ = 365 + μ = 365 + 31/128 days (Earth-specific),

where L is the total duration of the space tropical year in integers and fractions of a day; K = CONST, the basic duration of year in integer day (for Earth, K is 365 days); α — the accuracy of the calendar; |±β| — the value of the system error.

μ = α + |±β| = MCI = const. The universal Space standard [Morozov's calendar invariable - MCI, (the universal MCI for any rotating subject in space, such as a planet, satellite, star, galaxy, rotating near a certain center of mass)] is always a constant, which is calculated as a simple algebraic sum of the accuracy coefficient α and the system error |±β|. Hence, two important calendar relations are obtained: |±β| = μ (1 — α/μ); α = μ (1 — |±β|/μ).

[Morozov S.L. (Moscow) Universal mathematical model of calendar year duration for all types of the exchange calendars. Calendar constant. Economics and mathematical methods, 2015, 51 (1), 109-129.]

Accuracy of the Earth calendar: α = μ = 31/128 days, when |±β|=0 (the condition of fixing the calendar, its stabilisation and guarantee against deviations in any direction from the actual values of the tropical astronomical year).

The heliacal year of the star Sirius is 365¼ days (295¼ days + 70 days = 365¼ days = 365 [$^{32}/_{128}$] days = 365.25 days = 365 days 6 hours). The duration of the heliacal year of Sirius for many millennia is fixed and stable with an accuracy of ± 1.0-1.5 minutes.

Box 2: Solar calendar accuracy

To determine the accuracy of any solar calendar, one can use the following formula:

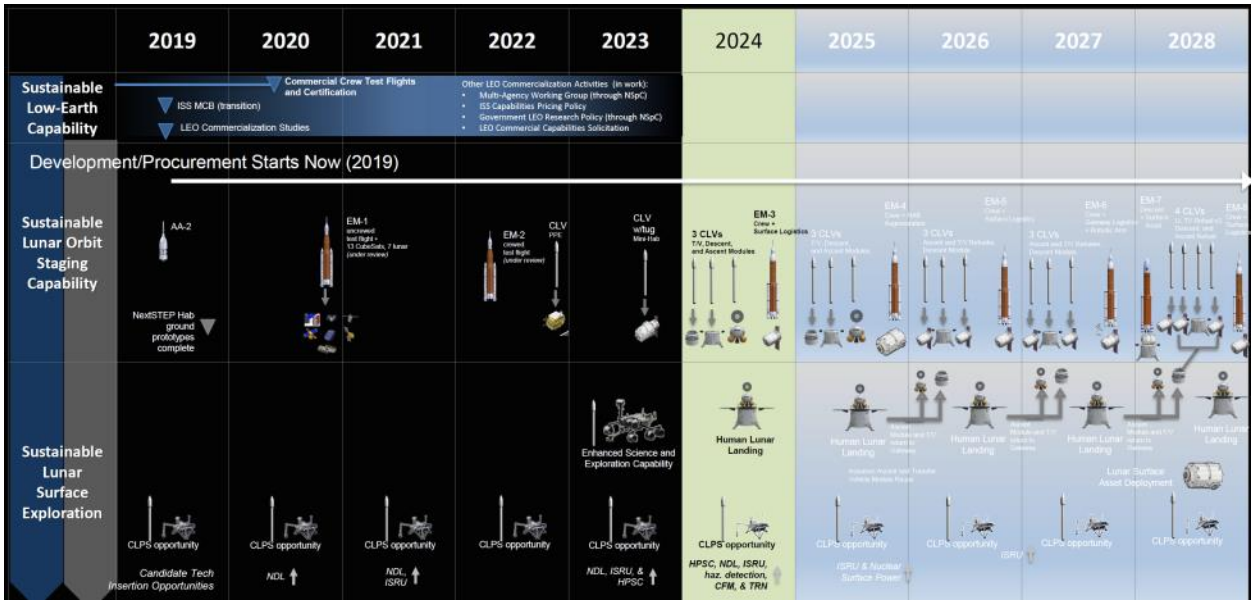
$$A = [365m + 366\,n] / [m + n] - T,$$

where: A is the absolute value of the annual error in the average day, T [365.2421875 days] is the duration of the tropical year in the same day, m [97 days] is number of simple years in the calendar cycle, and n [31 days] is number of leap years in the same cycle.

The denominator of the fraction [m + n] = [97+31=128 days] in the formula is taken as a calendar cycle: $A= (365x97) + (366x31)/128 - 365.2421875 = (35,405 + 11,346)/128 - 365.2421875 = 46,751/128 - 365.2421875 = 365.2421875 - 365.2421875 = |\pm 0|$.

Calculation of the accuracy of the Morozov space calendar, calculated based on Kepler materials. [8]

An ambitious lunar project designed for 10 years, according to which 37 launches from Earth, 5 crewed landings on the surface, and the creation of the first lunar base will be completed. ***The Moon is in the global trend and in priority, and there, in its orbit, it will soon be very, very crowded***. [19]



CONCLUSION I

1). Starting in 2026, it is necessary to produce clocks with displays of world lunar time everywhere on a global scale [***the 25-hour lunar zone with an automatic relativistic Einstein correction of 1 second of deduction every 50 years***].

Starting in 2026, it is necessary to install unified displays in all space flight control centers around the world to avoid accidents. As it was already [in 1918, on March 19] during the time of the massive introduction of steam locomotive global movement around the globe.

In 1918, the situation was saved by the American Rear Admiral, astronomer and mathematician S. Newcomb and the 26th President of the United States Woodrow Wilson. 24 time zones of the Earth [the Law on Standard Time or Calder's Law] and the "ephemeris" standard coordinates of Newcomb, adopted for world navigation at the Paris conference, calculated on the basis of the Gregorian calendar, were introduced.

Russia has joined the American [Standard Time Act or Calder's Law]. Russia switched to the Gregorian calendar on February 14, 1918. The decree was adopted on January 24 (February 6), 1918, after the separation of the ecclesiastical Julian calendar from the secular Gregorian state calendar [formally, in the political sense, it was the separation of church and state].

The difference between the old Julian style and the new Gregorian was 13 days. Therefore, after January 31, 1918, it was followed not by February 1, but immediately by February 14, 1918. [24].

2). Everyone knows that Werner von Braun and his German team of rocket engineers prepared for NASA the entire Apollo program of the flight to the Moon - [from President Kennedy's speech on September 12, 1962 on the development of the manned space plan of the government of President Eisenhower in 1960] – in particular, for the first series of flights Americans to the Moon starting with Apollo 7 in 1968 [October 11] and ending with Apollo 17 in 1972 [December 19].

The entire American Apollo program was the realization of the development of the Soviet rocket engineer ***Kondratyuk [Shargey],*** the student of Tsiolkovsky and a distant relative of Werner von Braun through the Swedish General Schlippenbach, who served in the forces of King Charles XII and was captured by Tsar Peter I during the Battle of Poltava in 1709.

In the USSR, Kondratyuk Yuri Vasilyevich was personally invited by Sergei Pavlovich Korolev to work at the Russian Research Institute [at the military rocket research Institute created by Marshal Tukhachevsky].

Kondratyuk [actually ***Shargey Alexander Ignatievich***] was a participant in the Civil War. He fought on the side of the White Guard. He was a White Guard officer and hid from the NKVD after the Civil War under a false name.

Fearing exposure and execution, he did not go to work for Korolev at the military Research Institute. He volunteered for the front and probably crossed the front line in 1942.

He managed to unite with his relative on the Swedish side of his mother, who was Werner von Braun.

They may have worked together on a top-secret missile program at the Third Reich base in Peenemünde.

Perhaps they built the V-2 rocket together? There is the bust of Kondratyuk (Shargey) in the Hall of Fame of the New Mexico Museum of Astronautics in the USA.

Since 1960, von Braun has been a member of the US National Aeronautics and Space Administration (NASA) and director of the NASA Space Flight Center.

Head of development of Saturn series launch vehicles and Apollo series spacecraft. Werner von Braun became the head of the US lunar program.

On July 16, 1969, the Saturn 5 launch vehicle with the Apollo 11 spacecraft launched from the Cape Canaveral space Center.

On July 20, 1969, Neil Armstrong, commander of Apollo 11, became the first man on Earth to set foot on the lunar surface.

For this flight, von Braun was awarded the NASA Distinguished Service Medal.

But already in January 1970, Werner von Braun and his entire German team of rocket engineers were unexpectedly de facto removed from NASA's Apollo program and replaced by a new, purely American management team.

This was immediately followed by the ***unsuccessful Apollo 13 flight***, which took place between April 11 and 17, 1970. It was a tub of cold water. Out of fright, NASA refused to dismiss Wernher von Braun. The full dismissal of Werner von Braun from NASA was suspended, transferring him to the honorary position of "***NASA space planning strategist***." Since January 1970, he has been listed in the formal, meaningless position of *NASA's Deputy Assistant Administrator for Planning*. After that, four more Apollons flew successfully. These were: the Apollo 14 flight [January 31 – February 9, 1971]; Apollo 15 [July 26-August 7, 1971 – with the lunar rover]; Apollo 16 [April 16-27, 1972] and Apollo 17 [December 7-19, 1972].

The U.S. government terminated the Apollo lunar program ahead of schedule, without completing it. The Apollons 18, 19 and 20 simply did not fly. They made a Skylab out of them, like a prototype of the ISS, the wreckage of which fell on Australia, because they couldn't lift it into orbit – did they forget to attach the engine?

On May 26, 1972, Wernher von Braun [March 23, 1912 – June 16, 1977] was discharged from NASA.

Wernher von Braun's Apollo Lunar Program

The first US lunar program of the 1960s and 70s, during which 12 American astronauts visited the Moon as part of six expeditions, and over 380 kg of lunar soil samples were delivered to Earth.

Werner Von Braun and President John F. Kennedy. May 19th, 1963

Werner Von Braun and President John F. Kennedy. May 19th, 1963

3). Isn't that why the Americans lost all their "lunar" competencies after Werner von Braun's death in 1972 and only can to partially restore them in the Artemis program by 2026?

The situation is the same in Russia. After the deaths of Korolev, Keldysh and Chelomey, did the Russian cosmonautics gradually lose its exceptional lunar competencies?

Even from a private space company: Igor Ashurbeyli's "Asgardia Space State" Roscosmos *is 10 years behind* in creating a dynamic reference standard fixed space calendar for Earth, Moon and Business. In Asgardia, this daily is officially published in 2026 ***for the tenth edition***.

4). Asgardia is creating its new navigation competencies and their Blue Ghost module successfully landed on the Moon on March 2, 2025 with the help of the American company Firefly Aerospace. Whereas the Luna-25, produced by Roscosmos, failed on August 19, 2023, and this after a series of absolute brilliant successes by its numerous Soviet predecessors?

5). The Reference Standard in stationary design differs from the Reference Standard in dynamic design in that the latter must be artificially maintained in the form of an operating model; therefore, this costly measure must be centralized for all countries of the world.

Therefore, in order to maintain the DYNAMIC REFERENCE STANDARD OF THE CHRISTIAN FIXED SPACE CALENDAR FOR THE EARTH, MOON AND BUSINESS, it is necessary to create ***the Calendar Support Center for Space Activities*** - both in Roscosmos and NASA – simultaneously in two replicas for uniform management of the ISS. In near space, the same Center should be placed later on the lunar base itself.

The lunar manned base will also not be able to operate successfully permanently without the implementation of this project of the reference standard ***linear*** lunar time.

Earth time behaves stepwise: when moving from the Eastern Hemisphere to the Western [Earth switch date line], the calendar "loses" one day, and when moving back from the Western Hemisphere to the Eastern, the calendar "returns" the lost day.

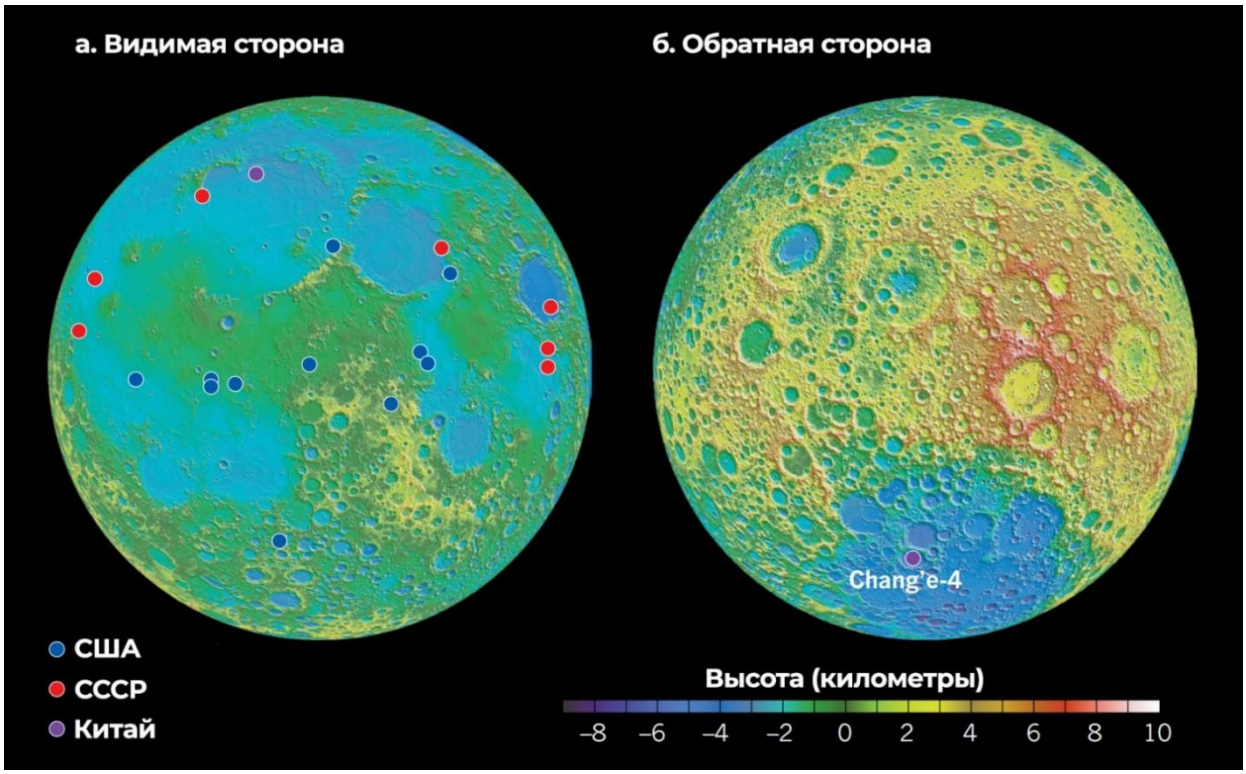
This is the "***Magellan effect***." There is no date switch line on the Moon. Therefore, time on the Moon ***is exceptionally linear***, both in the past, in the present, and in the future.

But it can easily transform into 24 Earth time zones and vice versa. There is a "***Bartini time***" on the Moon [25,26]? Is the "present tense" the line of transition from the "Past" to the "Future"?

This ***Unified Global Center for calendar support of space Activities,*** figuratively speaking, will become the conditional "**Brain**" and "Heart" of the Civilization of the Universe.

Starting in 2026, it is necessary to produce watches with displays of world lunar time all over the world.

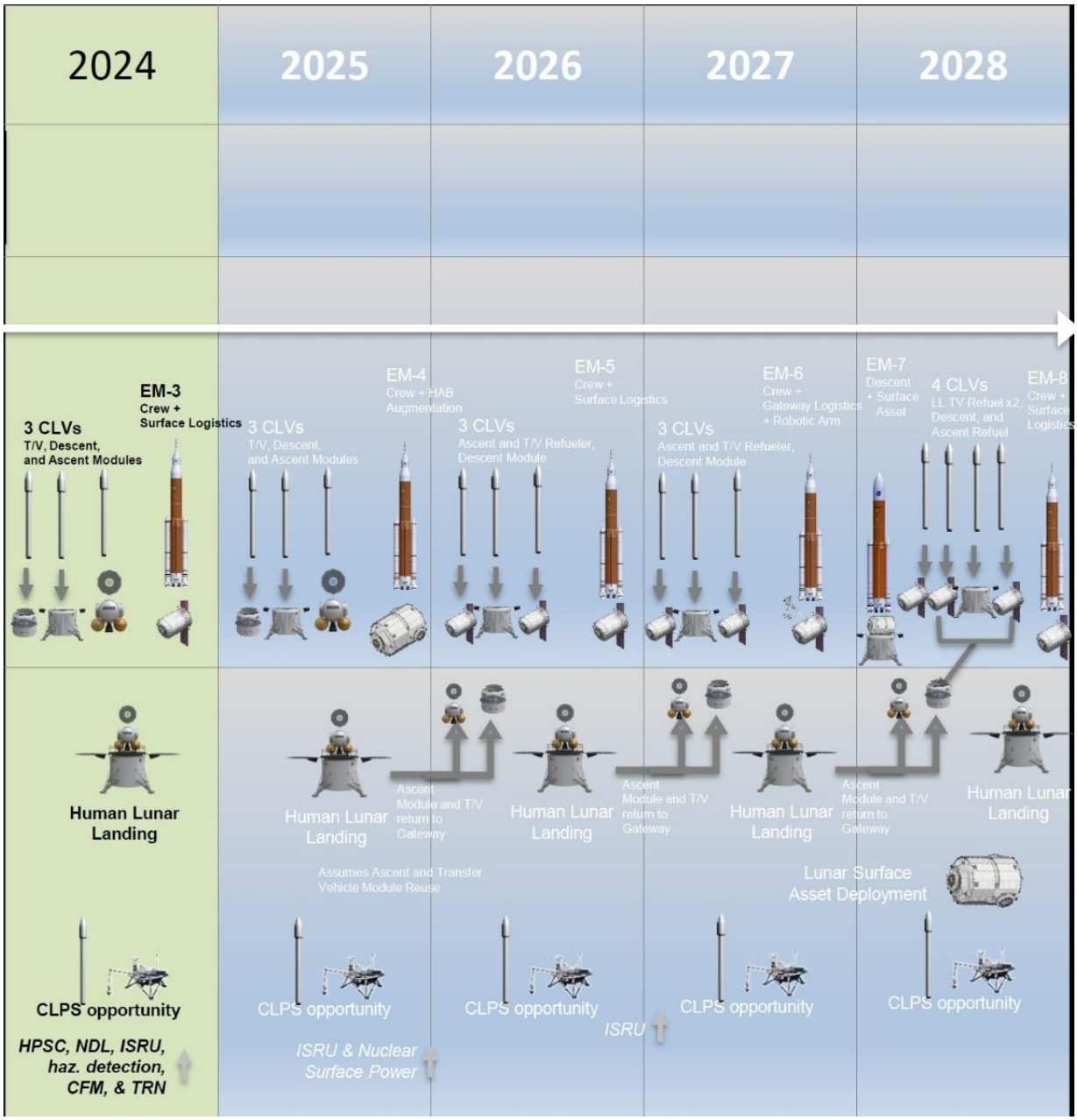
Starting in 2026, it is necessary to install unified displays in all space flight control centers around the world to avoid accidents.



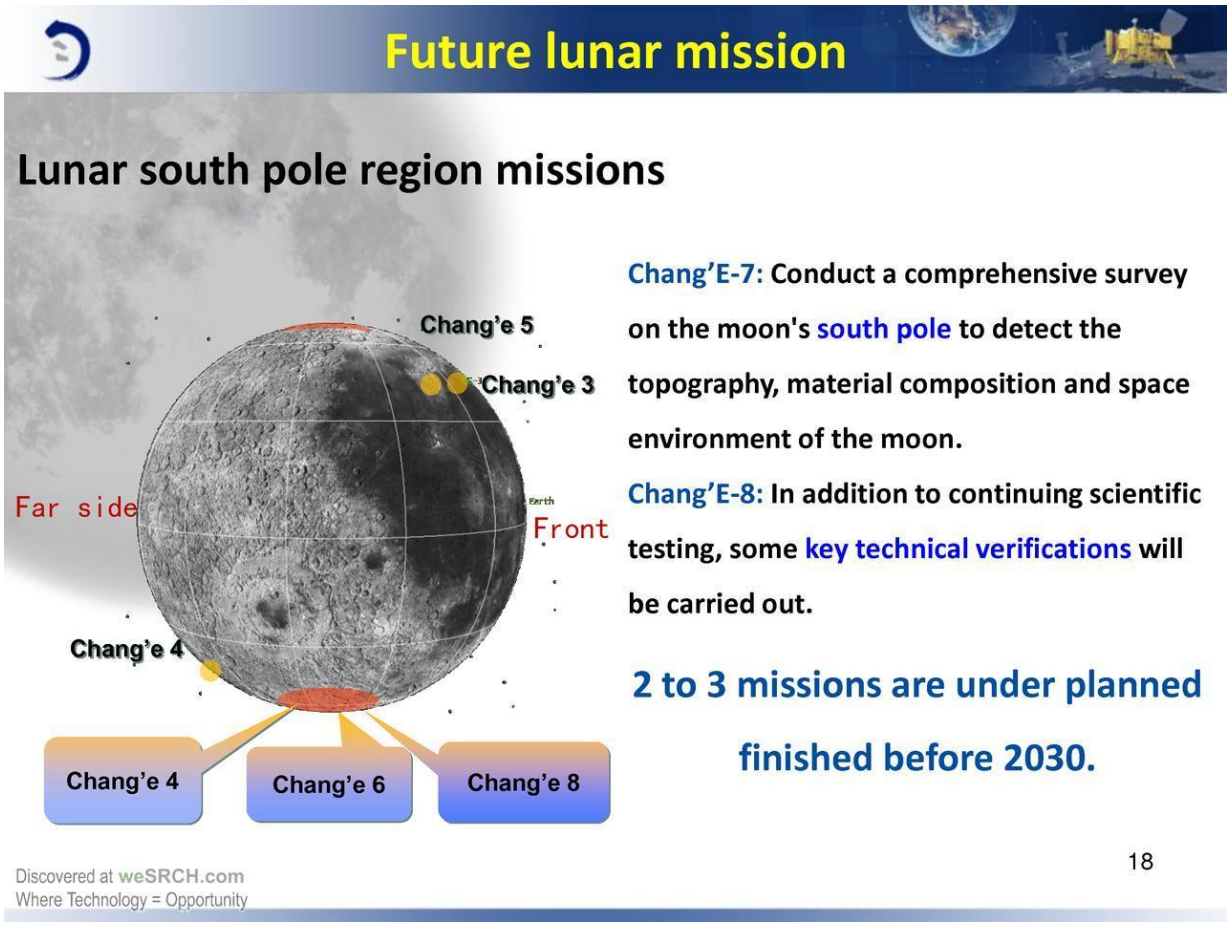
Thus, the exploration of the Moon will continue and there will be many more circles on the map below.

We need the universal lunar wristwatch for every astronaut and just the person, and a car, an airplane and a ship in all four habitats.

This proposed **Unified World Center for Calendar Support of Space Activities**, in its replica located on the Moon, will cover all cycles of production activities, and all circadian biorhythms of astronauts, as well as the biorhythms of all plants, animals and birds that astronauts will bring with them to this "Lunar Noah's Ark."



NASA's ten—year plan for colonizing the Moon [2019-2028] provides for the use of both private launch vehicles, spacecraft and modules, as well as NASA developments (Space Launch - SLS Block 1B heavy rocket, Orion spacecraft and the creation of a Lunar base through Gateway) to gradually launch a large number of payloads and several crews into lunar orbit.



The poles of the Moon will be a new area of research – these are the Chang'e-6 (7-8) missions, some of which are planned to be implemented by 2030.

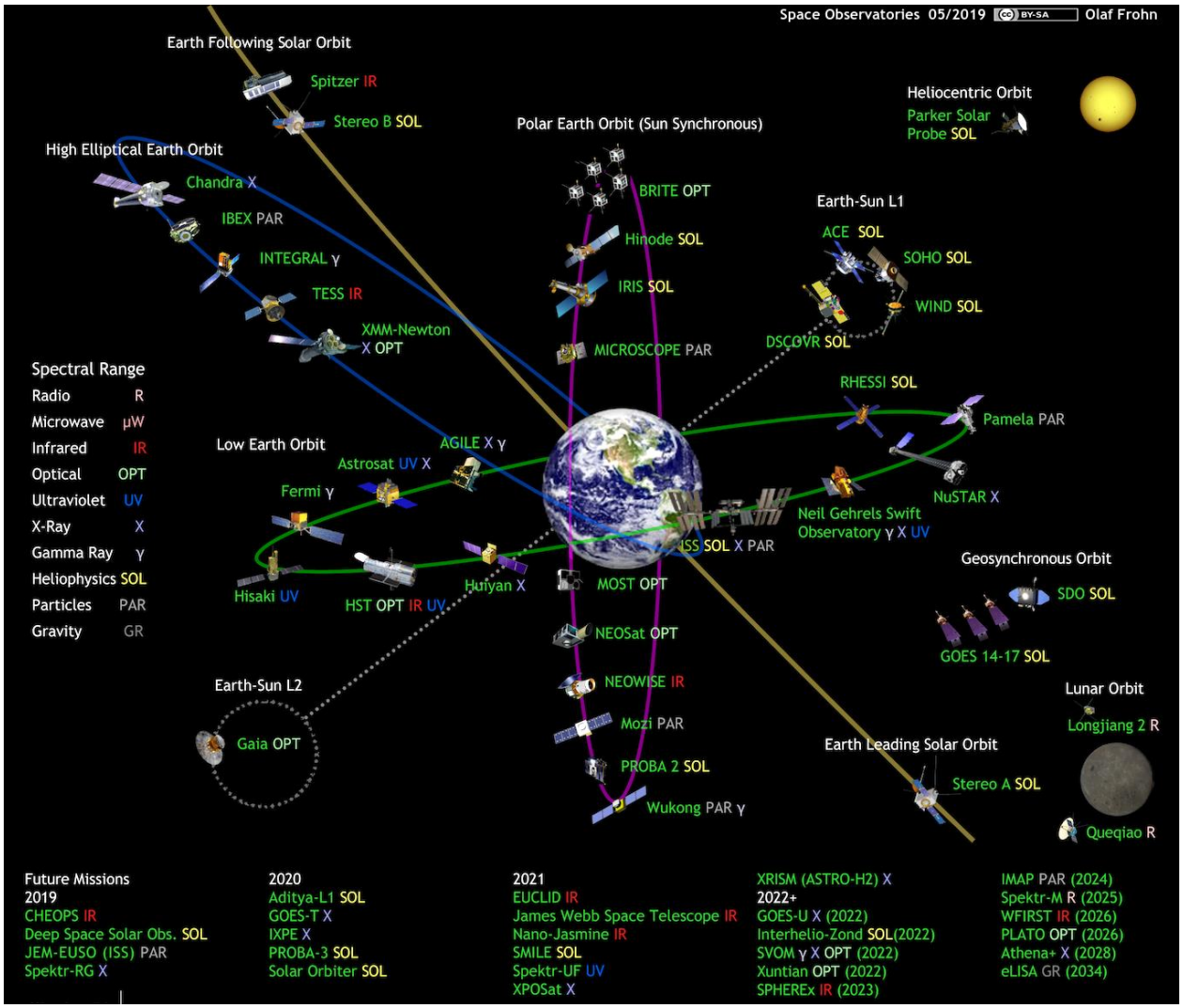
The need to introduce a single Lunar time for all global space navigation will be carried out according to the type of a single [Beijing] time zone in navigation, which already exists in China.

All airports, spaceports, race tracks and bus stations, water stations and seaports should be calculated in a single worldwide "linear lunar time" with automatic recalculation to any time zone on Earth, and in the future – on any planet, satellite and spacecraft with all necessary relativistic corrections.

The unified fixed reference standard world "***Keplerian***" time should be applied in four environments at once [World Transport Timetable – "WTT"] [1-10]:

1) in space;
2) in the atmosphere;
3) on the surface of the Earth and underground; and
4) on the surface of water and under water.

This will be, figuratively speaking, the "***Keplerization***" of human and machine activity.



This is what a scientific satellite constellation looks like in the outer space of the Solar System. The Moon will soon be crowded there, too, in its orbit for sure.

NASA has selected 11 companies to participate in the Artemis program to conduct research and create a prototype of the lander. List of companies:

— Aerojet Rocketdyne – Canoga Park, California
— Blue Origin – Kent, Washington
— Boeing – Houston
— Dynetics – Huntsville, Alabama
— Lockheed Martin – Littleton, Colorado
— Masten Space Systems – Mojave, California
— Northrop Grumman Innovation Systems – Dulles, Virginia
— OrbitBeyond – Edison, New Jersey
— Sierra Nevada Corporation, Louisville, Colorado, and Madison, Wisconsin
— SpaceX – Hawthorne, California
— SSL – Palo Alto, California

CONCLUSION II

REFERENCE STANDARD LINEAR LUNAR TIME AN IDEAL TOOL FOR BUILDING UNIVERSAL NAVIGATION ON EARTH AND IN SPACE

The UK-based magazine ROOM of the Asgardia space state has published *my* article on the phenomenon of linear lunar time.[6]

The Reference Standard Linear Lunar Time [LLT], the dynamic reference standard of which is publicly available on the free Internet, is rigidly linked to the Greenwich time zone.

For this reason, it is ***an ideal tool for building universal navigation***, both on Earth and in space, since ***it has nothing to do with the switch date line not only on Earth, but also with switch date lines on other planets and satellites of the Universe.*** [1,2]

CONCLUSION III

1). THE CURRENT TASKS OF CIVILIZATION TO EXPLORE THE "SUBLUNAR" SPACE BETWEEN THE "CARMAN LINE" OF THE EARTH'S ATMOSPHERE AND THE ORBIT OF THE MOON, AND THE MOON ITSELF, FROM THE POINT OF VIEW OF US PRESIDENT DONALD TRUMP

2). CAN RUSSIA FLY TO MARS ALONE WITHOUT THE UNITED STATES? RESPONSE FROM THE HEAD OF RSC «ENERGIA» NAMED AFTER S. P. KOROLEV

The "Martian" challenge by U.S. President D. Trump, who announced on January 20, 2025, in his inauguration speech, "his intention to send American astronauts ... who will install the star-spangled flag on the planet Mars" [23].

Sevastyanov Nikolay Nikolaevich [Candidate of Technical Sciences, Head of S. P. Korolev RSC Energia (2005-2007, 2019-2020) Korolev, Moscow Region; nikcosmo2030@gmail.com] [21]

"By 2020, 48 expeditions had been made to Mars, of which only 30% were successful."[20].

"The Moon should be the first step towards organizing manned flights to Mars. My suggestion is to consider the manned Mars program ***as the next stage after the Lunar program."***

"The logic is to gradually refine the technologies needed for long-distance flights. I outlined the concept of the development of manned space exploration at the plenary session of ***the International Astronautical Congress [IAC] in 2006***."

"The cost of creating the ISS was $150 billion. According to the latest estimate, the price of one manned expedition to Mars with human landing will exceed ***$400 billion***.

The annual budget of all space agencies in the world does not exceed $105 billion per year. NASA's budget is about **$24 billion per year**.

As of 2024, there are **77 space agencies** in the world, of which **16** have launch capabilities. Thus, it will take **at least ≈20 years** for humanity to organize such an expedition at the current rate of funding."[21].

There are only **5 countries** with critical capabilities to create the new space socio-economic formation, predicted by K.E. Tsiolkovsky.

Tsiolkovsky calculated the **16 stages** of the development of civilization that it must go through before humanity will be able to make an Exodus into space, into the Universe. Today, humanity has reached **10&11** (steps or stages) out of the indicated 16.

According to the Visual Capitalist portal for 2026, the ***top 10 countries*** in terms of GDP will be as follows:

USA - $ 31,821.29 billion.

China - $20,650.75 billion

Germany - $5328.18 billion

India is 4505.63 billion.
Japan - $4463.63 billion
Great Britain -Italy 4225.64 billion
France - $3558.56 billion
Italy - $2701.54 billion
Russia - $2509.42 billion
Canada - $2,420.84 billion
Total: **$82185.48 billion**

Further progress in space colonization is possible, according to US President *Donald Trump* [22], in particular, only after combining the critical economic opportunities and scientific potentials of ***5 countries leading*** in space research [C-5]:

1). China [$20,650.75 billion];
2). USA [$31,821.29 billion];
3). Russia [$2509.42 billion];
4). India [$4505.63 billion] and
5). Japan [$4463.63 billion].
Total: **$63.94 trillion.**

The estimated combined GDP of these 5 countries in 2026 will be ***$63.94 trillion.*** This amount will probably be quite enough to colonize the Moon and the entire sublunar space under the Artemis program by 2028.

Thus, these five leading countries of the world [C-5] have a total GDP of approximately ***77.80%*** of the total GDP of the top ten leading countries in the world. [$63.94/$82,18 = 0.7780≈77.80%].

Russia has [$63.94 trillion] among these five.] only **3.9%** [2.5/63.94=0.0390=3.9%]

The real financial and economic situation of Russia today casts doubt on its ability to participate independently (alone) in the expensive manned colonization of the Moon and, moreover, Mars.

Even Russia buys army uniforms abroad today. Has Russia planned to independently sew army uniforms only for 2026?

According to the forecast for 2026, the expected total global GDP is ≈**$124 trillion.**

Thus, these five leading countries of the world [C-5] have a total GDP of approximately **51.56%** of the total global GDP. [$63.94/$124 = 0.5156≈51.56%], this ensures its dominant position in the world.

If Trump's plan, under the symbol "C-5", is implemented, it will probably mean the formation of a de facto new composition of the ***UN Security Council***.

Will this probably mean the end of ***the Bretton Woods*** financial system and the ***Potsdam-Yalta Peace Treaty***?

Are the United States, Great Britain, Turkey, and Russia likely to divide their spheres of influence in Europe, the World, and ***the Universe*** in a new way?

According to Trump, will the C-5 group probably be the dominant group of the new political core, around which the new space socio-economic formation of K.E. Tsiolkovsky will take shape?

The main space agencies in the world, in particular, are:
1. NASA (National Aeronautics and Space Administration, USA);
2. ESA (European Space Agency);
3. CNSA (Chinese National Space Administration);
4. Roscosmos (Federal Space Agency of Russia);
5. JAXA (Japan Space Exploration Agency);
6. ISRO (Indian Space Research Organization);
7. CSA (Canadian Space Agency);
8. UKSA (British Space Agency);
9. KARI (Korea Aerospace Research Institute);
10. ASA (Algerian Space Agency);
11`. SSAU (State Space Agency of Ukraine);
12. ISA и **ISRC** (The Iranian Space Agency and the Iranian Space Research Center);
13. INTA (National Technical Agency for Aerospace Engineering of Spain);
14. NSO (Office of Space Research of the Netherlands);
15. SNSB (Swedish National Space Administration);
16. AEB (Brazilian Space Agency);
17. SUPARCO (Commission on Space and Upper Atmosphere Research);
18. SANSA (National Space Agency of South Africa);
19. SSO (Swiss Space Administration);
20. AEM (Mexican Space Agency);
21. BSA (Belarusian Space Agency);
22. APRSAF (Forum of Regional Space Agencies of the Asia-Pacific Region);
23. UNOOSA (United Nations Office for Outer Space Affairs). winspiremagazine.com

CONCLUSION IV

1). Topic: the need to create the ***Center for calendar support of space activities in the general system for ensuring the safety of space flights and space activities of civilization***.

No one has yet created an instrument-based physical scale of lunar time. [31,32]

The mathematical Keplerian fixed time scale associated with the Earth's calendar has actually been created and is working.

It is described in the proposed work using the *Keplerian time scale*, rigidly linked to the meridian at Greenwich Mean Time [and to atomic time fixation in the UTC (Coordinated Universal Time) international system].

The proposed option is currently the only one in the world that actually works in automatic mode simultaneously on Earth, on the Moon, and in outer space, and can be used to solve any navigation tasks, both on Earth and in near and far outer space.

2). The rocket often individually has a countdown in seconds from the moment of launch. However, the seconds of the cyclogram count are always eventually converted to standard calendar time units, and this is usually either the Julian or Gregorian time scale.

Both of these ancient medieval calendar scales have a significant measurement error for cosmic velocities. Unfortunately, these errors lead to accidents, both individual and systemic.

It was the same when railways were introduced and steam locomotives with a speed of about **50 km/h** appeared. Then 26th US President *Woodrow Wilson* had to introduce the Law on Standard Time [Calder's Law], in March 1918, based on the Gregorian calendar scale.

This law is still valid in three environments: terrestrial, aquatic and aerial. But it no longer meets the requirements of navigation at four space travel speeds. It does not cover the fourth habitat of modern man – space.

This material was officially presented in 2024 at 59 scientific readings dedicated to the development of scientific heritage and the development of ideas by K.E. Tsiolkovsky. Kaluga. September 17-19, 2024. September 18. 2024. Section No. 6 of Professor S.V. Krichevsky, Test Cosmonaut, Item 5.

S.L. Morozov. "The transition from standard Earth time (1918) to the unified space reference standard time (2024); impact on the development and prospects of mankind.

K.E. Tsiolkovsky: Key ideas and modern achievements of cosmonautics. Materials of 59 Scientific readings. Part 2, pp. 37-39. Kaluga, 2024.

Now we need an amendment to the original Calder Law. It is necessary to introduce a Law on LLT (reference standard linear lunar time).

In 2025, I made an official report on this issue at the annual royal readings in the section of Alexandrov Alexander Pavlovich, cosmonaut pilot, Twice Hero of the Soviet Union [RSC Energia].

This speech of mine took place on January 28-31, 2025. Section 1. Item 22. "*Linear lunar time of civilization is the basis of astronavigation in the Universe*." S.L. Morozov (S.I. Vavilov Institute of Physics and Technology of the Russian Academy of Sciences).

The materials are officially published in the Collection of the Bauman Moscow State Technical University, in the materials "*XLIX Academic Readings on*

Cosmonautics, dedicated to the memory of Academician S. P. Korolev and other outstanding Russian scientists, pioneers of space exploration. January 28-31, 2025 Section 1. Item 22." "*Linear lunar time of civilization is the basis of astronavigation in the Universe*." S.L. Morozov (S.I. Vavilov Institute of Physics and Technology of the Russian Academy of Sciences).

World statistics show (according to official data from L.M. Zeleny, [27] Academician of the Russian Academy of Sciences from the IKI RAS) that by 2020, in particular, on average *no more than 30% of all flights to Mars are successful.*

According to other sources, from 40% to 70% are failures. And not only during flights to Mars, but also to the Moon [Luna-25]. Why? In this regard, we proposed converting seconds of time counting in flight duration cyclograms to the Kepler calendar system, which has an average error of zero, in contrast to the scales of the Julian and Gregorian calendar systems.

3). The Keplerian calendar time scale has been perfected: It is represented by a dynamic reference standard calendar model that has been operating continuously on the global Internet for 10 years and operates in a fully automatic mode without any problems.

4). The system automatically eliminates errors during mass simultaneous space flights, both in manned and non-piloted modes. It automatically insures against accidents with overlays in the "start window" selection.

The proposed Keplerian system is de facto part of the overall space flight safety system, and it is fully operational.

It can be implemented immediately and simultaneously on Earth, on the Moon, during flights in outer space, and on the ISS right now. I repeat: it can be used simultaneously on Earth, on the ISS, on the Moon, and in outer space right here and now.

It is ready without special preparation for experimental testing, in particular, as in the MCC (in parallel and simultaneously in Russia and the USA in different and any time zones without any restrictions and any additional conditions), for example, in experiments on the ISS, ***and does not require any additional financial costs.*** It is also easily applicable in other precision technical applications of the space industry, in *mass serial production* of rockets and satellites; technical calculations and modeling of cyclograms; solving issues of *multi-year network planning* of all systems and subsystems of multi-level production cycles.

It is also used to solve navigation problems continuously and around the clock, especially in the areas of the "Magellanic" date transition lines from the Western Hemisphere to the Eastern Hemisphere and vice versa.

The health of astronauts directly depends on the correct alternation of circadian rhythms, which themselves, in turn, depend entirely on the Keplerian time scale – on the tropical calendar ["seasonal"] of the Kepler cycle.

And this moment is of direct strategic importance for the functioning of Russia's cosmodromes located in the Far East and especially in the future on the islands of the Kuril Ridge, located geographically directly on the ***Magellanic transition date line***.

In February 2026, NASA plans to fly around the Moon in manned mode with the participation of 4 astronauts at once. It is possible to suggest to colleagues the use of the developed Keplerian lunar time scale for the parallel test calculation of all flight cyclograms of the Orion spacecraft under the Artemis II program.

The entire space flight can be planned according to linear space lunar time [LLT]. There will be no ***"Magellan phenomenon" with the date transition line***. And this will be an additional guarantee of the success of the flight with 4 astronauts on board and, most importantly, their successful return landing to Earth.

There is no Magellanic date transition line on the Moon. It is possible to carry out important work right now to assess the circadian biorhythms of astronauts on the ISS during long-term flights and to assess some aspects of women's health (the 28-day Keplerian scale of the month allows this to be done).

The introduction of an industry-specific space calendar requires systematic planned work on its implementation and effective use within the framework of the *proposed Center for Calendar Support of Space Activities in the general system for ensuring industry safety during the colonization of outer space, as well as the production and simulation of flights by Roscosmos, etc.*

We need a program to test the use of the very idea of the Keplerian time scale in astronautics. You need to work out the simplest calendar models first. It is necessary to work out the release of the production ***yearbook for the upcoming 2026***, as Igor Ashurbeyli has done for the **10th time**, who adopted this error-free Keplerian calendar scale as the state calendar of his space state Asgardia based on my calculations in 2016.

And this moment is of direct strategic importance for the functioning of Russia's cosmodromes located in the Far East and especially in the future on the islands of the Kuril Ridge, located geographically directly on the Magellanic date line. In February 2026, NASA plans to fly around the Moon in manned mode with the participation of 4 astronauts at once.

It is possible to suggest to colleagues the use of the developed Keplerian lunar time scale for the parallel test calculation of all flight cyclograms of the Orion spacecraft under the Artemis II program.

The entire space flight can be planned according to linear space lunar time [LLT]. There will be no "Magellan phenomenon" with a change of dates. And this will be an additional guarantee of the success of the flight with 4 astronauts on board and, most importantly, their successful return landing to Earth. *There is no Magellanic switch date line on the Moon.*

It is possible to carry out important work right now to assess the circadian biorhythms of astronauts on the ISS during long-term flights and to assess some aspects of women's health (the 28-day Keplerian scale of the month allows this to be done).

The introduction of an industry-specific space calendar requires systematic planning work on its implementation and effective use within *the framework of the proposed Center for Calendar Support of Space Activities in the general system for ensuring industry safety during the colonization of outer space, as well as the production and simulation of flights by Roscosmos, etc.*

In 2015, *S.K. Krikalev*, a cosmonaut pilot, twice Hero of the USSR and Russia, was my consultant. My opponent in the pre-defense of his doctoral thesis at the Central Research Institute of the Russian Academy of Sciences was *Baturin Yu. M.*, cosmonaut pilot, Hero of Russia, Corresponding member of the Russian Academy of Sciences.

My supervisor was *V.L. Makarov*, Director of the Central Research Institute of the Russian Academy of Sciences, Academician of the Russian Academy of Sciences.

The discovery of the phenomenon of linear Lunar time [Linear Lunar Time - LLT] based on the Keplerian calendar scale makes it possible to make it a universal world navigation system both on Earth and on the Moon, as well as on any other planet and satellite of the Solar System, any spacecraft and space in general.

This phenomenon, in particular, is directly related to the launch of global positioning system satellites such as Glonass, Galileo, GPS and Starlink celestial Internet satellites, in particular, during the colonization of the Moon proper.

On the Moon, people and equipment will be subject to the reference standard of linear lunar time [LLT], rather than the stepped Earth time with its ***"Magellanic" date change line***.

All circadian rhythms of humans, animals, birds, insects, microorganisms, viruses, plants on the Moon [in the lunar "Noah's Ark"], which directly determine their health, will depend directly on the reference linear standard LLT, and not on the stepped Earth time with its "innate" effect of the switch Magellanic date line.

The linear reference standard of Lunar time [LLT] should gradually become, figuratively speaking, the "**Heart**" and "central nervous system" ["**Brain**"] of the entire cosmic civilization of mankind. Its importance in this sense cannot be overestimated. He will be the main "**metronome of the Universe**."

Nikolai Nikolaevich Sevastyanov, Head of the S.P. Korolev RSC “Energia”, considers the Moon to be the primary and key object in the process of space colonization by the Earth's civilization. [21, 30]

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ID: AS-A2006
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