

## TROPICO-SIDEREAL WORLD CALENDAR

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*The Clock Face: Logo for Time of the HOURS*

This unique proposal is based on **Brij Bhushan Vij's** original contribution published in Standards India; V6 N4; 1992 July issue through Bureau of Indian Standards, New Delhi.

While this author has been actively engaged in establishing that Le Systeme International d'Unites have lacked to bridge the need to define 'deciMetric units for time'; and link them with 'rotation of Earth and its circumference' via the Earth quadrant — as arcAngle and establishing the HOUR-Angle relation. The uphill task for a non-astronomy IAF engineer undoubtedly provided indifferent attitude from all quarters, since 1970's.

Why it is that man NEVER used the interval of Sidereal 'time count' for civil use in compilation of a calendar? If ever tried, why is there NO history and/or its record available. In the format of **this unique work**, I use: (1) the interval for tropical year,  $y_{2000} = 365.242189669781$  days; and (2) the interval between TWO sunrises (sidereal day) = 86164.0905 SI-atomic seconds.

This makes the average tropical year,  $y_{2000} = 366.24218981$  sidereal days ( $d_s$ ). Using the above 12/24-hour clock having 100x100 'decimal' sidereal seconds ( $s_s$ ): the base time interval is: '1/87898125.55374<sup>th</sup> of the year. Duration of present, 1  $s_s = 916506505$  cycle of C<sub>s</sub>-133 atom.

**DEFINITION: "ONE Decimal Sidereal Second**,  $s_{sd}$ , is the time interval between any two events that take place during the fraction 1/240000<sup>th</sup> of Sidereal Day; and shall be 3300311482 periods of cesium-133 atom, at defined hyperfine levels, when the atom is at rest. This time interval, ( $s_{sd}$ ) shall be:

\*1/87898125.56th of Average Mean Tropical

Year\*. The sidereal day has:  $24h_s \times 100m_{sd} \times 100s_{sd}$ .

Thus, Sidereal Year of (365 d 6 h 9 m 9s)

$365.256363051$  solar days =  $366.256401993896$   $d_{sd}$  —  $366d_s$  6h<sub>s</sub> 9m<sub>s</sub> 13s<sub>sd</sub>.1323.

Ratio, Sidereal year: Tropical Year = 1.0000388054 33; and SI-atomic day or second: SI-sidereal day or second = 1.00273790971.

19-years = 6959.14168 sidereal days ( $d_s$ ); and Tithi or Phase =  $6959.14168/6932.5 = 1.003843011888$   $d_s$ ; also, Ratio \*138 Weeks: 965 Tithi/Phase =  $138W_s/965 = 1.0010362694301d_s^*$ .

128-yrs = 46879.00029568  $d_s$  ( $52 * 128 + 7 * 41$ )  $d_s$ . 41 Leap Weeks can be accommodated, ONCE every 3-years BUT ignoring during 66<sup>th</sup> and 128<sup>th</sup> years. An 896-year span has:  $328153.00206976$   $d_s$  or  $[(896 * 52) + (2 * 128) + 31]$  weeks i.e. ( $52 * 896$ ) + 256 LWks + 31KeplersLWks on **div.7 basis**, when 'TWO Leap Weeks' are added — one at beginning & one at the end of 'these 52-week years during every alternate 7-yrs cycle', & placed to replace Leap & World Days; the remaining 31 Keplers' Leap Weeks are included once every 28-years, except during 896<sup>th</sup> years. This give, Mean Year =  $[7^*$

$(52 + 2/7) + 31/896] = 366.2421875$   $d_s$ ; or  $328153 / 896 = 366.2421875$   $d_s$ .

**Brahaspati Years/Weeks:** An 896-year span has:  $328153.00206976$   $d_s$  or  $[7 * 52 + 287]$  weeks. Adding One Brahaspati Year, FIVE times, once every 150<sup>th</sup> years, during 150<sup>th</sup>, 300<sup>th</sup>, 450<sup>th</sup>, 600<sup>th</sup>, 750<sup>th</sup> years plus 27 LWks i.e.  $[5 * 364 + 189$   $d_s]$  during remaining 146-years. Three additional Brahaspati weeks included during Brahaspati Years 300<sup>th</sup>, 450<sup>th</sup> & 600<sup>th</sup> make these of 53-weeks each. The remaining 24 LWks get accounted, once every 37<sup>th</sup> year, leaving first & last 4 –years every 896-yrs cycle. This is a total of  $[(5 * 52 + 3 + 24) = 287$  Brahaspati LWks].

A similar working is done by this author, using the duration of **Sidereal Year**, since difference between a Sidereal and Mean Tropical Year is:  $366.256401993896 - 366.24218981 = 0.014212184$   $d_s$  i.e. 1  $d_s$  in 70.3621624938152-years. This is in sync with the rate of 'precession of equinoxes' completing one revolution around zodiacs in 25330.3785 years ( $25330$   $y_s$  138  $d_s$  14h<sub>s</sub>.9244815). It is my 'intuition' that precession shall vanish if Sidereal Years are used for calendar construction, when a sidereal day is sacrificed ONCE in 70-years. Related Length Unit, Metre New (m') — can still be defined as:  $1/10^5$ <sup>th</sup> of the arcAngle  $\pi/180$  (1-degree); and Nautical Kilometre \*1/100<sup>th</sup> of arcAngle  $\pi/180$  (1-degree).

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# SOLAR to SIDEREAL TIME CONVERSION

1 Solar Year =  $Y_{2000} = 365.242189669781$  days [366.24218980723853169436054106527 d<sub>s</sub>]  
 1 Sidereal Year = 365.256363051 days [366.25640199389558925362300435327 d<sub>s</sub>]  
 1 solar day = 86400 SI-atomic second; 1 sidereal day = 86164.0905 SI-atomic second  
 Solar Day: Sidereal Day = 1.0027379097096138907193594760917

YEARS	SOLAR DAYS (d)	WEEKS (W)	SIDEREAL DAYS (d <sub>s</sub> )	WEEKS (W <sub>s</sub> )
5-yrs	1826.210948348905	260.8873	1831.21094903619266	261.601564148
9-yrs	3287.179707028029	469.5971	3296.17970826514679	470.882815466
13-yrs	4748.148465707153	678.3069	4761.148467494100912	680.164066785
17-yrs	6209.117224386277	887.0167	6226.117226723055039	889.4453181033
<b>19-yrs</b>	<b>6939.601603725839</b>	<b>991.3717</b>	<b>6958.6016063375321022</b>	<b>994.0859437625</b>
21-yrs	7670.085983065401	1095.727	7691.0859859520091656	1098.726569422
25-yrs	9131.054741744525	1304.436	9156.0547451809632924	<b>1308.00782074</b>
29-yrs	10592.023500423649	1513.146	10621.023504409917419	1517.28907206
<b>33-yrs</b>	<b>12052.992259102773</b>	<b>1721.856</b>	<b>12085.9922636388715459</b>	<b>1726.570323377</b>
37-yrs	13513.961017781897	1930.566	13550.961022867825673	1935.8515746954
<b>41-yrs</b>	<b>14974.929776461021</b>	<b>2139.276</b>	<b>15015.9297820967797995</b>	<b>2145.1328260138</b>
45-yrs	16435.89853514014	2347.986	16480.8985413257339262	2354.41407733225
<b>49-yrs</b>	<b>17896.8672938193</b>	<b>2556.695</b>	<b>17945.867300554688053</b>	<b>2563.69532865067</b>
53-yrs	19357.83605249839	2765.405	19410.8360597836421798	2772.97657996909
58-yrs	21184.0470008473	3026.292	21242.0470088198348383	3034.57814411712
<b>62-yrs</b>	<b>22645.01575952642</b>	<b>3235.002</b>	<b>22707.0157680487889651</b>	<b>3243.85939543554</b>
65-yrs	23740.74232853576	3391.535	23805.7423374705045601	3400.82033392436
69-yrs	25201.71108721489	3600.244	25270.711096699458687	3610.10158524278
73-yrs	26662.67984589401	3808.954	26735.679855928412814	3819.382836561202
77-yrs	28123.64860457314	4017.664	28200.6486151573669405	4028.664087879624
81-yrs	29584.61736325226	4226.374	29665.617374386321067	4237.945339198046
84-yrs	30680.3439322616	4382.9063	30764.343943808036662	4394.906277686862
87-yrs	31776.07050127095	4539.439	31863.070513229752257	4551.867216175679
89-yrs	32506.55488061051	4643.793	32595.554892844229321	4656.50784183489
90-yrs	32871.79707028029	4695.971	32961.797082651467852	4708.828154664495
93-yrs	33967.52363928963	4852.5034	34060.52365207318345	4865.789093153312
97-yrs	35428.49239796876	5061.2132	35525.49241130213757	5075.070344471733
100-years	36524.2189669781	5217.746	36624.21898072385317	5232.03128296055
<b>128-yrs</b>	<b>46751.00027773197</b>	<b>6678.714</b>	<b>46879.000295326532057</b>	<b>6697.000042189504</b>
<b>293-Years</b>	107015.961573246	15287.99451	107308.96161352088979	15329.85165907441
<b>400-yrs</b>	<b>146096.8758679124</b>	<b>20870.982</b>	<b>146496.87592289541268</b>	<b>20928.1251318422</b>
<b>417-yrs</b>	<b>152305.9930922987</b>	<b>21757.999</b>	<b>152722.99314961846772</b>	<b>21817.5704499455</b>
<b>834-yrs</b>	<b>304611.9861845974</b>	<b>43515.998</b>	<b>305445.98629923693543</b>	<b>43635.140899891</b>
<b>896-yrs</b>	<b>327257.00194412378</b>	<b>46751.0003</b>	<b>328153.0020672857244</b>	<b>46879.0002953265</b>
<b>2688-yrs</b>	<b>981771.00583237133</b>	<b>140253.0008</b>	<b>984459.0062018571732</b>	<b>140637.0008859796</b>
<b>8019-yrs</b>	<b>2928877.118961974</b>	<b>418411.017</b>	<b>2936896.120064245786</b>	<b>419556.5885806065</b>

128-years = **46879 d<sub>s</sub> (6697 W<sub>s</sub>)**;  $7 * [(52 * 128) + 41 \text{ LW}_s \text{ weeks}] = [7 * (52 + 2/7) \text{ d}_s + 1 \text{ Leap day ONCE every 4-years, EXCEPT } 128^{\text{th}} \text{ year}]$ . This give: Mean Year =  $(366 + 31/128) \text{ d}_s = 7 * [(52 + 41/128) \text{ W}_s] = 366.2421875 \text{ d}_s$   
 896-years = **328153 d<sub>s</sub> (46879 W<sub>s</sub>)** Mean Year =  $7 * (52 + 2/7 + 31/896) = 366.2421875 \text{ d}_s$   
 2688-years = **2936896 d<sub>s</sub> (418411 W<sub>s</sub>)** Mean Year =  $7 * (52 + 2/7 + 93/2688) = 366.2421875 \text{ d}_s$ .

**Note:** [**W<sub>s</sub>** = sidereal weeks, and **d<sub>s</sub>** = sidereal days] **Mean Year** =  $[7 * 52.3203125 \text{ d}_s = 366.2421875 \text{ d}_s]$   
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