

New Year To Arrive One Second Late

December 23 2005



Owing to the gradual slowing down of the Earth's rotation, the International Earth Rotation and Reference Systems Service, based at the Paris Observatory, has announced that 2005 will contain an extra second.

The required leap second will be added at the end of 31st December, thus delaying the arrival of 2006 by one second. Although this will be the 23rd such leap second to be added since its introduction at the end of June 1972, this year's leap second will be the first for seven years.

Our normal civil, or clock time, is based on Greenwich Mean Time (GMT), the world standard since 1884, which is tied to when the Sun arrives due south at the Greenwich Meridian, the zero line of longitude. The resulting 'Universal Time' is based, as has always been the case, on the rotation of the Earth on its axis.

However, the speed of the Earth's rotation is continually changing: partly due to varying weather patterns and geological disturbances, but more importantly due to the friction of tides raised by the Sun and Moon, which cause a systematic lengthening of the day.

In fact, the day is now about 2 milliseconds longer than it was a couple of hundred years ago. As a result, leap seconds will always be needed if we are to keep 'clock time' and 'Sun time' in step.

However, the International Telecommunications Union has recently proposed that the practice of inserting leap seconds should be abolished. This would remove the difficulty of updating communication and navigation systems following a change that ultimately depends on the unpredictable slowing of the Earth's rotation.

But the proposal is subject to the law of unintended consequences. Quite apart from professional scientists, such as astronomers, who might be adversely affected by such a change, over hundreds of years the civil time would no longer coincide, even approximately, with the 'Sun time' traditionally shown on a sundial. Even over a few decades, when the error might grow up to a half a minute or so, one can imagine the arguments that lawyers and insurance companies might have about whether an event had occurred just before or just after midnight; and in today's modern electronic era differences of seconds between different people's interpretation of the correct time might sometimes lead to dispute!

The Royal Astronomical Society has recommended that any decision on such a fundamental change in the way we record time should not be left to a single professional body, but should instead follow a much wider, more informed public debate.

Source: Royal Astronomical Society

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