2015 Iridium System Time Change

The Iridium L-Band frame count, also referred to as Iridium network time or Iridium time, is a 32-bit unsigned number used throughout the Iridium system. It is incremented by one on every 90-millisecond L-band frame, and universally broadcast from the satellite constellation to earth terminals (i.e. ISUs) once every six L-band frames (i.e. once every 540 milliseconds). The Universal Time Coordinated (UTC) time corresponding to the Iridium time value of zero is referred to as the Iridium time epoch. In order to convert from Iridium time to UTC, the Iridium time value multiplied by the 90-millisecond frame period is added to the current Iridium time epoch.

The epoch itself is not broadcast over the Iridium L-band air interface, and so it must be fixed into ISUs. The epoch is currently March 8, 2007, 03:50:21.00 GMT, known as "Era1". Iridium plans, on **March 3rd, 2015 at 18:00:00 UTC to change the L-Band downlink broadcast from ERA1 to ERA2.**
The UTC date and time epoch of the new Iridium Time era (era2) will be May 11, 2014, at 14:23*:55.* This will be seen as a sudden, one-time, large decrease in Iridium time corresponding to the difference between the old and new epochs, followed by the normal steady incrementing on each 90-millisecond frame. This will render invalid all mechanisms used for converting Iridium time to UTC or local time based on the old epoch.

For Iridium Satellite Phone users, **the planned epoch time change on March 3, 2015 will have no impact to service availability and the ability to successfully complete phone calls, SMS messages, or data services.** However, the displayed time and date will revert to December 29, 2007, 7:26:29 UTC and will progress on this baseline until phone settings are adjusted to the new Iridium epoch time. To address this, Iridium satellite phone time settings should be modified after March 3, 2015 in order to display the correct date and time.

Iridium GO! devices will handle the time change automatically and do not require reprogramming.

Satellite Phone Programming

Iridium 9555 and Iridium Extreme® customers can restore the correct time settings by following these steps:

1. Dial *#99#2014051114235500#
2. Press the green key
3. Turn off/on their phone

Iridium 9500, 9505 and 9505A customers will need to set the updated time and date from their phone menu. The extended phone set-up menu must be set to "On" (see page 137 of Iridium 9505A user guide, page 149 of the Iridium 9500 user guide, or page 139 of the Iridium 9505 user guide), then follow these instructions to set time and date:

1. **Follow the steps in** "Getting to Phone Setup..." to get to Set Time and Date, and then **press** OK to select.
2. **Press** MENU to choose Set Home Time + Date or Set Away Time + Date, and then **press** OK. You will see Enter Home Time or Enter Away Time and the time currently set.
3. **Press** OK to accept the displayed time.

   or

   Enter the time in 24-hour format, and then **press** OK. You will see Enter Home Date or Enter Away Time and the date currently set.
4. **Press** OK to accept the displayed date. You will see Completed.

   or

   Enter the date in day(dd)-month(mm)-year(yy) form and then **press** OK. You will see Completed.
5. **Press and hold** C to exit the menu.

These instructions will be posted to Iridium.com for end users to adjust their time/date settings. These steps can also be used to update existing inventory prior to shipment.

New satellite phone inventory shipped from Iridium after February 23rd will have the new epoch settings pre-programmed to prepare for this change.

Effect on AT Commands

AT-MSGEO, AT-MSGEOS, AT-MSSTM, AT+CRISX

These commands provide the Iridium time value in hexadecimal format. After the epoch change, this value will match the valid Iridium time with the new, later epoch. The ISU AT Command Reference section for command AT-MSSTM warns about possible future epoch change and warns not to rely on this value for the current time. Any algorithm in the field application that converts this value using the old Iridium time epoch will generate an invalid result after the epoch change. Any algorithm in the field application that compares the value of subsequent calls to this AT command in order to determine time difference will generate a one-time invalid result immediately after the epoch change.

AT+CCLK

This command provides the current UTC time derived from the ISU's local time and hard-coded Iridium time epoch corresponding to GPS time 03:50:35 8th March 2007. After the epoch change, this command will provide an invalid response and should not be used.

AT+SBD… and Exponential Back-Off (i.e. Traffic Management)

Iridium had originally intended to reset ERA 2 to a time in 2010. Based on this, we determined that 9602 units running firmware release TA11002 and 9602-SB and 9603 units running firmware release TA12003 that are in valid SBD exponential back-off (also referred to as "traffic management") mode at the moment of the epoch change would be placed in the error condition of being stuck in lockout for an excessive period. We included this as a warning in the partner notification on the epoch change.

Since then, the planned new epoch date has been changed to May 2014. With this later new epoch, we no longer believe that ISUs in valid SBD exponential backoff mode at the moment of the epoch change would be placed in the error condition and no longer believer that there is risk of those ISUs being stuck in lockout for an excessive period. For affected units, there will be a grace period of four years after the epoch change date during which any SBD communication attempt will bring the unit out of lockout.

Reliance on AT-MSSTM and Iridium L-Band Broadcast Downlink

Iridium performed this epoch change from Era1 to Era2 in July 2014. This caused the decimal representation of the Iridium time reported in response to AT command AT-MSSTM (and other commands noted above) to drop below eight digits. The new date for the epoch change from Era1 to Era2 is such that the Iridium time reported in response to AT-MSSTM will remain eight digits. Iridium strongly recommends that partner applications and solutions not rely on the Iridium L-Band Broadcast Downlink as the number is can change without notice and the number of characters in the response to ATMSSTM is not predictable.

In the event that you are using any of the AT commands mentioned in this document or if you feel that you may have issues with the upcoming Iridium Epoch change, you may direct any immediate questions you have regarding this event to marsat@marsat.ru.