CHANGE NOTICE

Affected Document: IS-GPS-705 Rev G	IRN/SCN Number XXX-XXX-XXXX-XXX	Date: XX-XXX-XXXX
Authority: RFC-00467	Proposed Change Notice PCN-IS-705G_RFC467	Date: 26-APR-2021

CLASSIFIED BY: N/A
DECLASSIFY ON: N/A

Document Title: NAVSTAR GPS Space Segment/User Segment L5 Interfaces

RFC Title: 2021 Proposed Changes to the Public Documents

Reason For Change (Driver):
1. Reserved/spare bits in the CNAV/CNAV-2 in IS-GPS-200 are assumed to be a static bit pattern. With the current proposed implementation to fill those bits with a pseudorandom bit pattern, users are at risk of incorrectly using those bits for integrity checks.
2. The GPS IIIF SV Configuration Code '101' confirms that the "alert" in HOW is still applicable. As such, one of the public stakeholder was requesting clarification to confirm if the "alert" in the HOW will also be applicable in the future undefined configuration codes. This is not sufficient for safety-of-life equipment that would need to have the confirmation because the alert is part of the "marginal" conditions leading to the selection/deselection of a satellite in a RAIM or ARAIM integrity context.
3. Current Issue of Data and Clock (IODC) requirement in IS-GPS-200 states that the IODC will be different from any value transmitted by the SV during the preceding 7-days. In certain occasions, current operations have shown not to follow that requirement.
4. The descriptions of how the navigation message changes with time (for example, transitions between data sets, or behavior under extended navigation) do not capture all the implementation differences between earlier SVs and GPS III/IIIF.
5. Documents need clarification and clean-up, as identified in past Public ICWGs and as newly-identified changes of administrative nature.

Description of Change:
1. Clarify language in IS-GPS-200, IS-GPS-705, ICD-GPS-240, ICD-GPS-870, and IS-GPS-800 to tell users to not utilize the spare/reserved bits.
2. Add clarification to the SV Configuration Code section for the undefined SV codes.
3. Modify or delete the IODC requirement.
4. Update the timing-related information to reflect the current implementation, including aspects specific to GPS III/IIIF.
5. Provide clarity and clean up identified administrative changes in all affected documents.

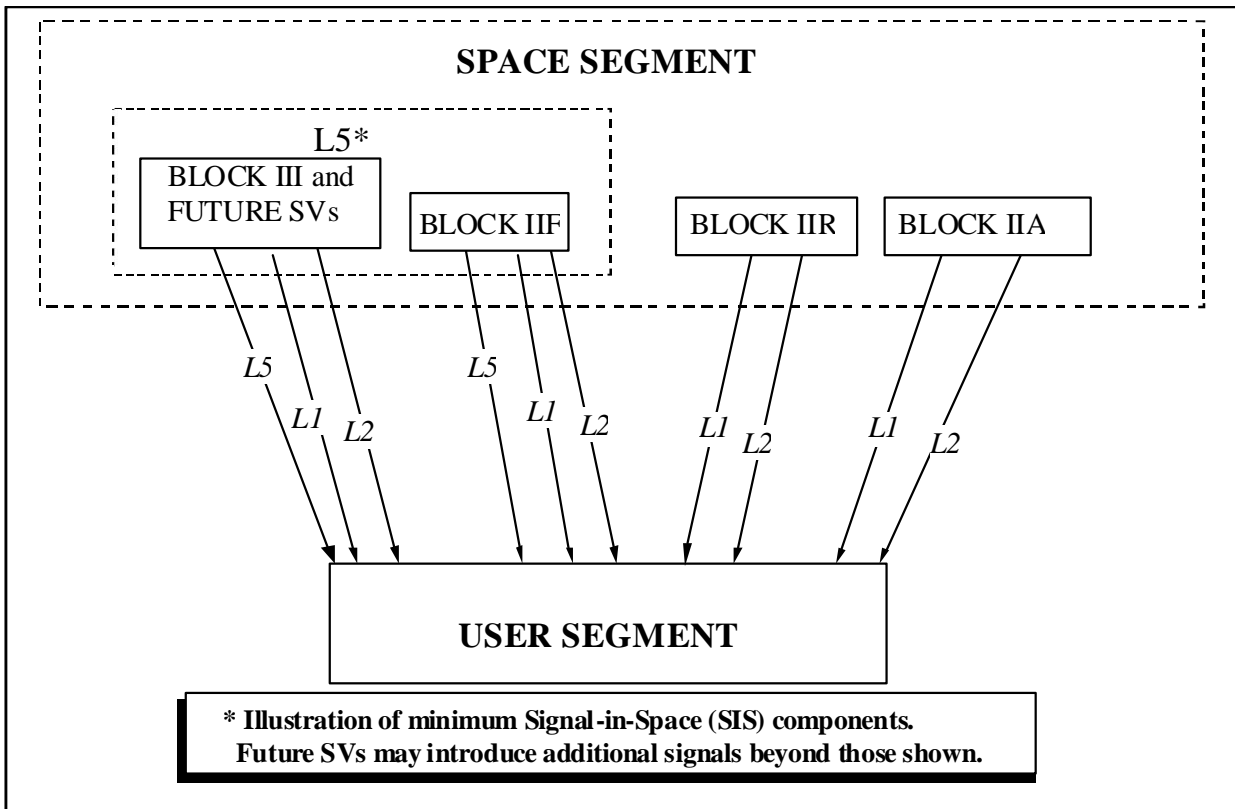| Authored By: RE: Chirag Patel		Checked By: RE: Ralph Anthony	
AUTHORIZED SIGNATURES	**REPRESENTING**		**DATE**
	PNT Capability Area Integration, Portfolio Architect Space and Missile Systems Center – LAAFB		

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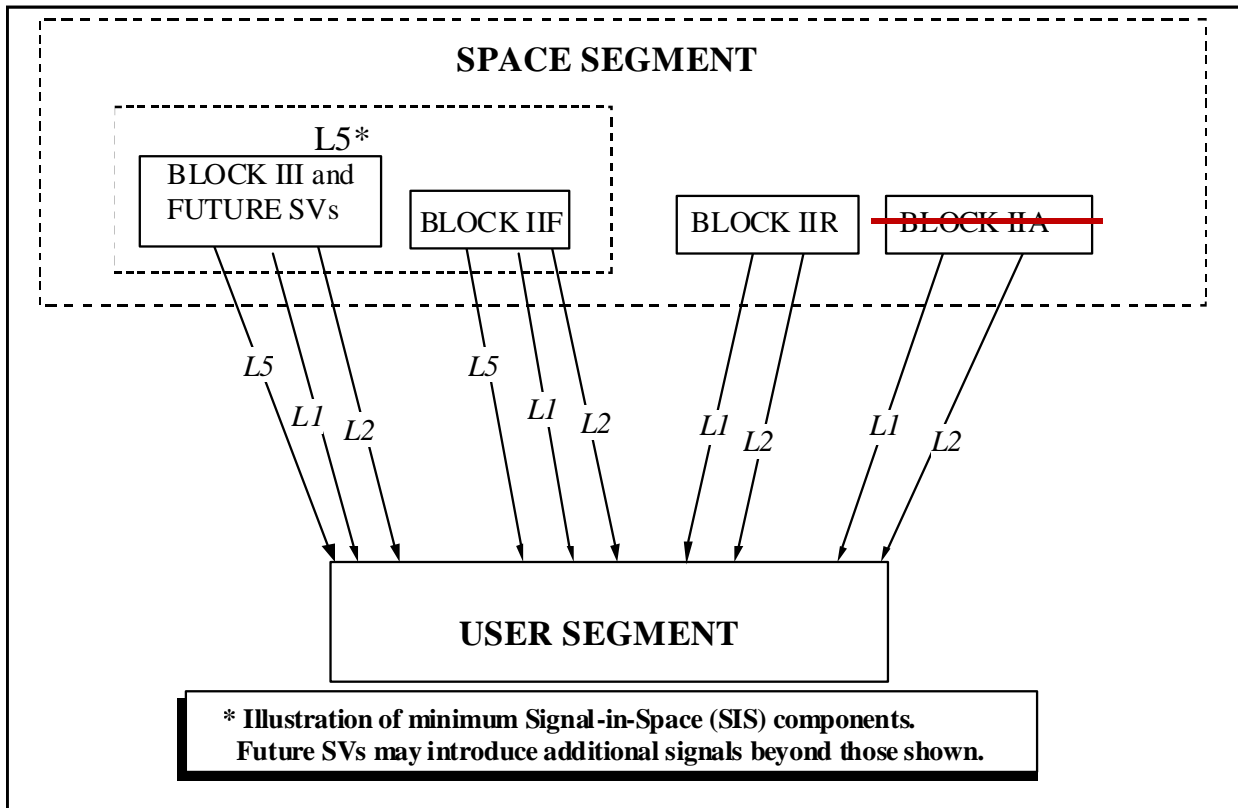
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	CODE IDENT 66RP1

IS705-1534:

Section Number:
3.1.0-3
WAS:

SPACE SEGMENT

L5*

BLOCK III and FUTURE SVs

BLOCK IIF

BLOCK IIR

BLOCK IIA

L5   L1   L2   L5   L1   L2   L1   L2   L1   L2

USER SEGMENT

* Illustration of minimum Signal-in-Space (SIS) components.
Future SVs may introduce additional signals beyond those shown.

Redlines:

SPACE SEGMENT

L5*

| BLOCK III and FUTURE SVs | BLOCK IIF | | BLOCK IIR | ~~BLOCK IIA~~ |

L5   L1   L2   L5   L1   L2   L1   L2   L1   L2

USER SEGMENT

*** Illustration of minimum Signal-in-Space (SIS) components.
Future SVs may introduce additional signals beyond those shown.**

IS:

SPACE SEGMENT

L5*

| BLOCK III and FUTURE SVs | BLOCK IIF | BLOCK IIR |

L5   L1   L2   L5   L1   L2   L1   L2

USER SEGMENT

*** Illustration of minimum Signal-in-Space (SIS) components.
Future SVs may introduce additional signals beyond those shown.**
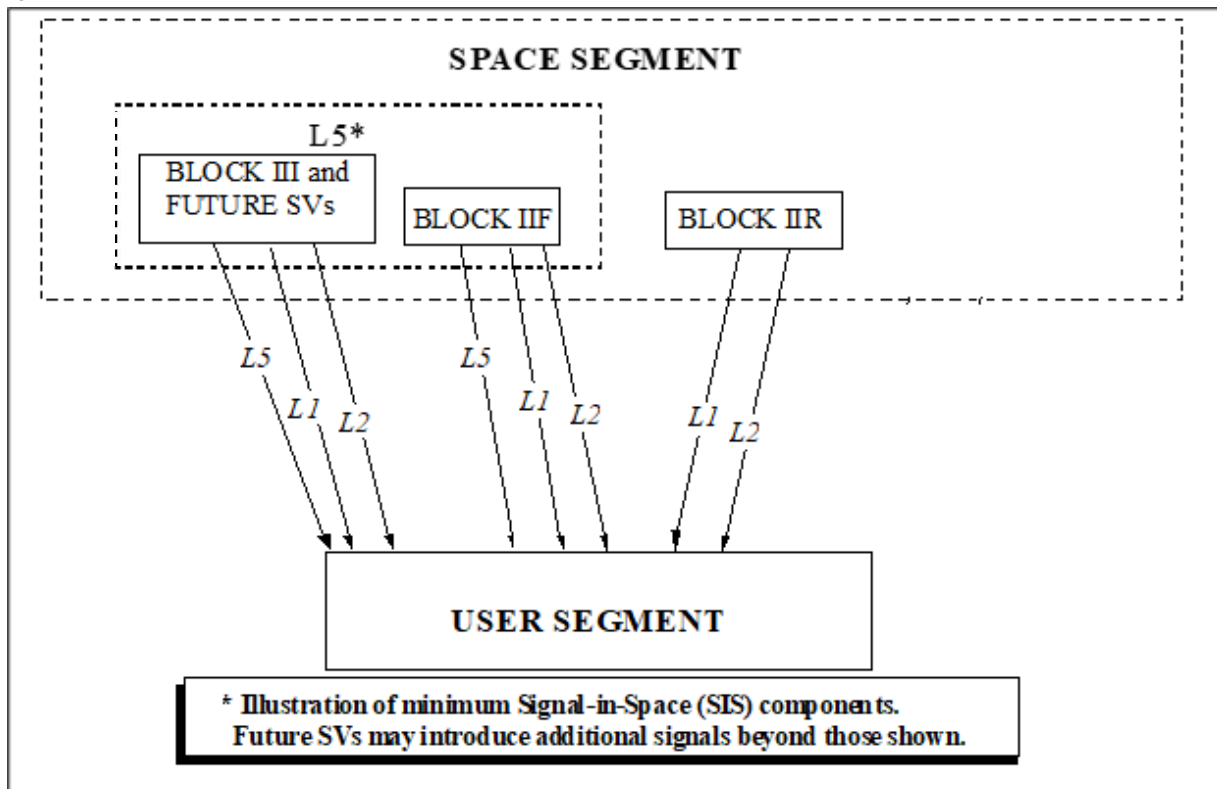
Rationale:
During the RFC discussions, it was determined that certain terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms if it does not impact other parts of the document.

IS705-119:

Section Number:
6.2.2.2.0-1
WAS:
The operational satellites are designated Block IIA, Block IIR, Block IIRM, Block IIF, GPS III, and GPS IIIF SVs. Characteristics of these SVs are provided below. These SVs transmit configuration codes as specified in paragraph 20.3.3.5.1.4 of IS-GPS-200. The navigation signal provides no direct indication of the type of the transmitting SV.
Redlines:
The operational satellites are designated Block ~~IIA, Block~~ IIR, Block IIRM, Block IIF, GPS III, and GPS IIIF SVs. Characteristics of these SVs are provided below. These SVs transmit configuration codes as specified in paragraph 20.3.3.5.1.4 of IS-GPS-200. The navigation signal provides no direct indication of the type of the transmitting SV.
IS:
The operational satellites are designated Block IIR, Block IIRM, Block IIF, GPS III, and GPS IIIF SVs. Characteristics of these SVs are provided below. These SVs transmit configuration codes as specified in paragraph 20.3.3.5.1.4 of IS-GPS-200. The navigation signal provides no direct indication of the type of the transmitting SV.
Rationale:
During the RFC discussions, it was determined that certain terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms if it does not impact other parts of the document.

IS705-1494:

Section Number:
6.2.2.2.1
WAS:
Object Heading : Block II SVs
Redlines:
Object Heading : ~~Block II SVs~~RESERVED
IS:
Object Heading : RESERVED
Rationale:
During the RFC discussions, it was determined that certain terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms if it does not impact other parts of the document.

IS705-1495:

Section Number:
6.2.2.2.1.0-1
WAS:
See paragraph 6.2.2.2.1 of IS-GPS-200. These satellites do not broadcast the L5 signal.
Redlines:
~~See paragraph 6.2.2.2.1 of IS-GPS-200. These satellites do not broadcast the L5 signal.~~
IS:
<DELETED OBJECT>
Rationale:
During the RFC discussions, it was determined that certain appropriate terms are outdated, such as Block IIA. As a result, this RFC plans to remove those outdated terms if it does not impact other parts of the document.

IS705-128:

Section Number:
6.2.2.2.6
WAS:
Object Heading : GPS III SVs
Redlines:
Object Heading : GPS III and GPS IIIF SVs
IS:
Object Heading : GPS III and GPS IIIF SVs

Rationale:
The section title needs updating to match the new title of IS-GPS-200 section 6.2.2.2.6.

IS705-131:

Section Number:
6.2.3.0-1
WAS:
See paragraph 6.2.3 of IS-GPS-200. There is no requirement for extended operations on L5.
Redlines:
See paragraph 6.2.3 of IS-GPS-200. There is no requirement for extended operations on L5.
IS:
See paragraph 6.2.3 of IS-GPS-200.
Rationale:
The statement that there is "no requirement for extended operations on L5" is potentially misleading; some SVs (GPS III/IIIF) have the capability to broadcast L5 for 60 days if contact with the CS is lost. It would be more relevant to state that on L5 only "normal operations" is applicable: this is already addressed by the change to the referenced IS-GPS-200 section 6.2.3, so the information does not need to be repeated here.

IS705-299:

Section Number:
20.3.3.4.4.0-1
WAS:
The three, one-bit, health indication in bits 155, 156 and 157 of message type 37 and bits 29, 30 and 31 of each packet of reduced almanac refers to the L1, L2, and L5 carrier of the SV whose PRN number is specified in the message or in the packet. These health indication bits only apply to codes and data as defined in IS-GPS-200, IS-GPS-705, and IS-GPS-800. The health of each carrier is indicated by:

     0 = Some or all codes and data on this carrier are OK,
     1 = All codes and data on this carrier are bad or unavailable.

The health bit indication shall be given relative to the capabilities of each SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4 of IS-GPS-200). Accordingly, the health bit for any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured into a mode which is normal from a user standpoint and does not require that capability; however, the Operating Command may choose to set the health bit "unhealthy" for an SV without a certain capability. Single-frequency L5 users or users who have not received or choose not to use configuration code should assume that every signal is available on every SV. The predicted health data will be updated at the time of upload when a new midi almanac or reduced almanac has been built by the CS. Therefore, the transmitted health data may not correspond to the

actual health of the transmitting SV. For more information about user protocol for interpreting health indications see paragraph 6.4.5.

Redlines:

The three, one-bit, health indication in bits 155, 156 and 157 of message type 37 and bits 29, 30 and 31 of each packet of reduced almanac refers to the L1, L2, and L5 carrier of the SV whose PRN number is specified in the message or in the packet. These health indication bits only apply to codes and data as defined in IS-GPS-200, IS-GPS-705, and IS-GPS-800. The health of each carrier is indicated by:

> 0 = Some or all codes and data on this carrier are OK,
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The health bit indication shall be given relative to the capabilities of each SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4 of IS-GPS-200). Accordingly, the health bit for any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured into a mode which is normal from a user standpoint and does not require that capability; however, the Operating Command may choose to set the health bit "unhealthy" for an SV without a certain capability. Single-frequency L5 users or users who have not received or choose not to use configuration code should assume that every signal is available on every SV. The predicted health data will be updated at the time of upload when a new midi almanac or reduced almanac has been built by the CS. Therefore, the transmitted health data may not correspond to the actual health of the transmitting SV or other SVs in the constellation. For more information about user protocol for interpreting health indications see paragraph 6.4.5.

IS:

The three, one-bit, health indication in bits 155, 156 and 157 of message type 37 and bits 29, 30 and 31 of each packet of reduced almanac refers to the L1, L2, and L5 carrier of the SV whose PRN number is specified in the message or in the packet. These health indication bits only apply to codes and data as defined in IS-GPS-200, IS-GPS-705, and IS-GPS-800. The health of each carrier is indicated by:

> 0 = Some or all codes and data on this carrier are OK,
> 1 = All codes and data on this carrier are bad or unavailable.

The health bit indication shall be given relative to the capabilities of each SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4 of IS-GPS-200). Accordingly, the health bit for any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured into a mode which is normal from a user standpoint and does not require that capability; however, the Operating Command may choose to set the health bit "unhealthy" for an SV without a certain capability. Single-frequency L5 users or users who have not received or choose not to use configuration code should assume that every signal is available on every SV. The predicted health data will be updated at the time of upload when a new midi almanac or reduced almanac has been built by the CS. Therefore, the transmitted health data may not correspond to the actual health of the transmitting SV or other SVs in the constellation. For more information about user protocol for interpreting health indications see paragraph 6.4.5.

Rationale:

Latest public Up Rev revision left out text that was not caught in the Revision previous to it.

IS705-1737:

Insertion after object IS705-301

Section Number:

20.3.3.4.5.0-2

WAS:

<INSERTED OBJECT>

Redlines:

The Midi almanac parameters shall be updated by the CS at least once every 3 days while the CS is able to upload the SVs. If the CS is unable to upload the SVs, the accuracy of the Midi almanac parameters transmitted by the SVs will degrade over time.

IS:

The Midi almanac parameters shall be updated by the CS at least once every 3 days while the CS is able to upload the

SVs. If the CS is unable to upload the SVs, the accuracy of the Midi almanac parameters transmitted by the SVs will degrade over time.
Rationale:
The Midi almanac description is missing the CS update requirement, which is 3 days for modernized almanac formats, same as for the Reduced almanac in IS-GPS-705 20.3.3.4.6.1.

IS705-1476:

Section Number:
20.3.4.4
WAS:
Object Heading : CEI Data Sets
Redlines:
Object Heading : ~~CEI~~ Data Sets
IS:
Object Heading : Data Sets
Rationale:
Change the section title to "Data Sets" for consistency with IS-GPS-200 section 20.3.4.4 .

IS705-1672:

Section Number:
20.3.4.4.0-2
WAS:
t_{op} does not have to match t_{oe}/ t_{oc}. As a redundant check, t_{op} in message type 10 will match with the t_{op} term in message type 30-37 for a valid CEI data set.
Redlines:
top does not have to match -toe/-toc. ~~As a redundant~~,but ~~check,~~the top in ~~message~~Message ~~type~~Type 10 will match ~~with~~ the top ~~term~~ in ~~message~~Message ~~type~~Type 30-37 ~~for~~from ~~a~~the ~~valid~~same CEI data set.
IS:
t_{op} does not have to match t_{oe}/t_{oc}, but the t_{op} in Message Type 10 will match the t_{op} in Message Type 30-37 from the same CEI data set.
Rationale:
This section of the IS should be describing the behavior of the navigation data rather than implying specific checks to be performed by the UE.

IS705-1674:

Section Number:
20.3.4.4.0-4
WAS:
Cutovers to new CEI data sets will occur only on hour boundaries except for the first CEI data set of a new CEI data sequence propagation. The first CEI data set may be cut-in (reference paragraph 20.3.4.1) at any time during the hour and therefore may be transmitted by the SV for less than one hour.
Redlines:
Cutovers to new CEI data sets will occur only on two-hour boundaries except for the first CEI data set of a new CEI data sequence propagation. The first CEI data set may be cut-in (reference paragraph 20.3.4.1) at any time during the ~~hour~~two hours and therefore may be transmitted by the SV for less than ~~one~~two ~~hour~~hours.
IS:
Cutovers to new CEI data sets will occur only on two-hour boundaries except for the first CEI data set of a new CEI data

sequence propagation. The first CEI data set may be cut-in (reference paragraph 20.3.4.1) at any time during the two hours and therefore may be transmitted by the SV for less than two hours.

Rationale:
All modernized CEI data set cutovers nominally occur on "even" hour boundaries.

IS705-1675:

Section Number:
20.3.4.4.0-5
WAS:
The start of the transmission interval for each CEI data set corresponds to the beginning of the curve fit interval for the CEI data set. Each CEI data set remains valid for the duration of its transmission interval, and nominally also remains valid for the duration of its curve fit interval. A CEI data set is rendered obsolete before the end of its curve fit interval when it is superseded by the SV cutting over to the first CEI data set of a new CEI data sequence propagation.
Redlines:
The start ~~of the transmission interval for each CEI data set corresponds to the beginning~~time of the curve fit interval ~~for~~of the ~~CEI data set. Each~~first CEI data set ~~remains valid for the duration~~ of ~~its~~a ~~transmission~~new ~~interval,~~CEI ~~and~~data ~~nominally~~sequence ~~also~~propagation ~~remains~~may ~~valid~~be ~~for~~later than the ~~duration~~start time of ~~its~~the curve fit interval~~.~~ ~~of A~~the preceding CEI data set ~~is~~that ~~rendered~~was ~~obsolete~~transmitted ~~before~~prior to the ~~end~~cutover. The beginning of ~~its~~the curve fit interval ~~when it is superseded by the SV cutting over to~~of the first CEI data set of a new CEI data sequence propagation will be a multiple of 300 seconds (5 minutes) relative to the start of week.
IS:
The start time of the curve fit interval of the first CEI data set of a new CEI data sequence propagation may be later than the start time of the curve fit interval of the preceding CEI data set that was transmitted prior to the cutover. The beginning of the curve fit interval of the first CEI data set of a new CEI data sequence propagation will be a multiple of 300 seconds (5 minutes) relative to the start of week.
Rationale:
Clarification of curve fit interval start time

IS705-1736:
Insertion after object IS705-1675
Section Number:
20.3.4.4.0-6
WAS:
<INSERTED OBJECT>
Redlines:
The curve fit interval of the first CEI data set of a new CEI data sequence propagation may have a later start time than the curve fit interval of the preceding CEI data set that was transmitted prior to the cutover. The beginning of the curve fit interval of the first CEI data set of a new CEI data sequence propagation will be a multiple of 300 seconds (5 minutes) relative to the start of week.
IS:
The curve fit interval of the first CEI data set of a new CEI data sequence propagation may have a later start time than the curve fit interval of the preceding CEI data set that was transmitted prior to the cutover. The beginning of the curve fit interval of the first CEI data set of a new CEI data sequence propagation will be a multiple of 300 seconds (5 minutes) relative to the start of week.
Rationale:
New information (using wording that accommodates the differences in CEI data set implementation for IIR/IIR-M/IIF and GPS III/IIF) to explain the constraints on selection of the new curve fit interval, for the first CEI data set of a new CEI data sequence propagation.