

2.2.7.2 Time Registration and Latency

This subparagraph contains requirements imposed on the ADS-B Transmitting Subsystem relative to two parameters. The first relates to the obligation of the transmitter to ensure position data in each ADS-B Message relates to a standard *time of applicability*. The second relates to the obligation of the transmitter to reflect new ADS-B Message data available at the transmitter input into the transmitted ADS-B Message itself. This requirement is expressed as a *cutoff time* by which any updated data presented to the UAT transmitter should be reflected in the message output. Rules for time of applicability and cutoff time vary depending on the quality of SV data being transmitted and whether the transmitter is in the UTC Coupled state. The *Precision* or *Non-Precision* condition for reporting SV data is determined according to the criteria below:

- a. Precision condition is in effect when:
 1. The “NAC_p” value is “10” or “11,” or
 2. The “NIC” value is “9,” “10” or “11”
- b. Otherwise, the Non-Precision condition is in effect.

2.2.7.2.1 Requirements When in Non-Precision Condition and UTC Coupled

When the UAT Transmitting Subsystem is in the Non-Precision Condition, and is UTC Coupled:

- a. At the time of the ADS-B Message transmission, position information encoded in the “LATITUDE,” and “LONGITUDE,” fields, and the “ALTITUDE” fields-field when it conveys a Geometric Altitude, **shall** be applicable as of the start of the current 1 second UTC Epoch.
- b. ~~Any—All other~~ updated ADS-B Message fields, ~~other than~~ “LATITUDE,” “LONGITUDE,” or “ALTITUDE,” that are provided at the ADS-B equipment input interface at least 200 milliseconds prior to the time of a scheduled ADS-B Message transmission that involves those fields, **shall** be reflected in the transmitted message.

Notes:

1. *Specifically, any extrapolation of position performed should be to the start of the 1-second UTC Epoch and not the time of transmission.*
2. *Velocity information cannot be extrapolated and may therefore have additional ADS-B imposed latency (generally no more than one extra second).*

2.2.7.2.2 Requirements When in Precision Condition and UTC Coupled

When the UAT Transmitting Subsystem is in the Precision Condition, and is UTC Coupled:

- a. At the time of the ADS-B Message transmission, the position information encoded in the “LATITUDE,” and “LONGITUDE,” fields, and the “ALTITUDE” fields-field, when it conveys a Geometric Altitude, **shall** be applicable as of the start of the current 0.2 second UTC Epoch.

- b. ~~Any~~ ~~All other~~ updated ADS-B Message fields, ~~other than “LATITUDE,” “LONGITUDE” or “ALTITUDE,”~~ that are provided at the ADS-B equipment input interface at least 200 milliseconds prior to the time of a scheduled ADS-B Message transmission that involves those fields, **shall** be reflected in the transmitted message.

Notes:

1. *Specifically, any extrapolation of position performed should be to the start of the 0.2 second UTC Epoch and not the time of transmission.*
2. *Operation in this condition assumes a GPS/GNSS sensor output rate of 5 Hz or greater is available to the ADS-B Transmitting Subsystem.*

2.2.7.2.3 Requirements When Non-UTC Coupled

When the UAT Transmitting Subsystem is in the Non-UTC Coupled Condition:

~~Any~~ ~~any~~ change in an ADS-B Message field provided to the transmitter **shall** be reflected in any transmitted message containing that message field that is transmitted more than 1.0 second after the new value is received by the transmitter.

~~b.a. No extrapolation of position shall be performed in this condition.~~

Note: ~~Even though no extrapolation of position is performed when non-UTC Coupled, the~~ UAT Transmitting Subsystem ~~that is capable of meeting the requirements of §2.2.7.2.2 makes no adjustment to the NIC or NAC that it receives as inputs. Also, it~~ is not expected that a single transmitted message would ever indicate both the Non-UTC Coupled condition and a NIC or NAC_P consistent with the Precision condition.

2.2.7.2.4 Data Timeout

At the Time of Applicability for the ADS-B Message transmission, any ADS-B Message fields without an update provided to the transmitter within the Data Lifetime parameter (in seconds) of [Table 2-64](#) **shall** be encoded as “data unavailable” in the subsequent transmitted message containing that message field.

2.2.8 Receiver Characteristics

2.2.8.1 Receiving Diversity

“Receiving diversity” refers to an ADS-B Receiving Subsystem’s use of signals received from either the top antenna, or the bottom antenna, or both antennas. For the purpose of these requirements, several alternate ADS-B Receiving Subsystem architectures that employ receiving antenna “diversity” are illustrated in [Figure 2-8](#).

- a. Full receiver and message processing function diversity:

(see [Figure 2-8](#), part a.)

There are two receiver input channels, each with its own receiver front end, message synchronization, bit demodulation, and FEC decoding. All Successful Message