



# APN-075: STEADYLINE®

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## STEADYLINE

### Supported Firmware Versions:

STEADYLINE 1.0 – 6.600, 6.620, 6.700

STEADYLINE 2.0 – 6.710, 6.720 or later for OEM6  
– 7.200 or later for OEM7

### Supported Hardware:

STEADYLINE 1.0 – OEM615, OEM628, SMART6, SMART6-B, SMART6-T, SMART6-TB, SMART6-L

STEADYLINE 2.0 – OEM628, SMART6-L  
– All OEM7 Products

## What does STEADYLINE do?

NovAtel's STEADYLINE technology reduces position jumps that can occur when a GNSS receiver changes positioning modes.

A receiver will change its positioning mode depending upon the solution it is able to compute. The type of positioning solution the receiver can compute depends upon:

1. Number of satellites tracked by the receiver
2. Quality of the signals from those satellites
3. Availability of correction signals
4. Positioning types supported by the software model activated on the receiver

This effect is especially evident when a receiver transitions from a high accuracy RTK position solution to a lower accuracy solution such as PPP, DGPS, GLIDE+SBAS or even autonomous GLIDE™ as shown in Figure 1 below:

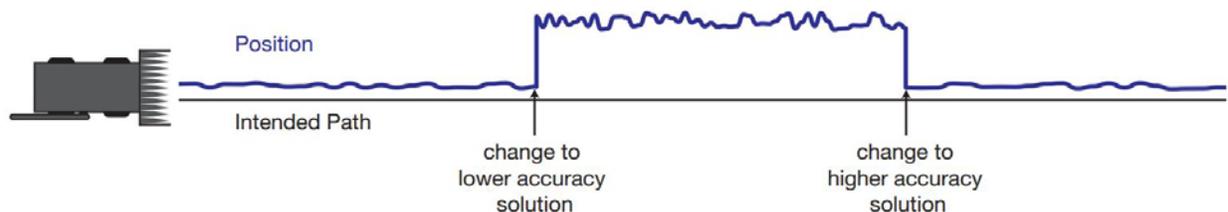


Figure 1 - Positioning Change without STEADYLINE

Smooth transitions are extremely important for precision steering applications where sudden jumps are disruptive.

STEADYLINE provides 4 different modes for smoothing the positioning jumps which are:

- MAINTAIN
- TRANSITION
- PREFER ACCURACY
- UAL

Each of these modes is described in more detail below:

## MAINTAIN

When the receiver transitions to a different positioning mode and MAINTAIN mode is selected, it maintains the position offset calculated to limit a potential real position jump. The receiver continues to apply the position offset to all positions calculated in the new positioning mode as shown in Figure 2 below.

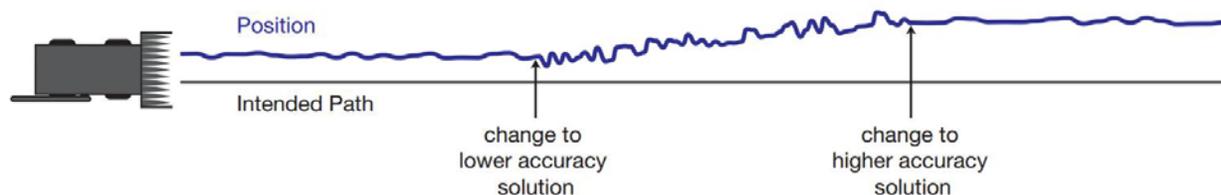


Figure 2 – STEADYLINE MAINTAIN Mode Operation

MAINTAIN is useful for relative positioning throughout the field because it maintains the last position at the time the position mode has changed. It will not return back to the absolute accuracy of the original position mode. This means that when the RTK position is once again available, the offset created by the last used position type will remain in the reported position.

In Figure 3 below, two positioning engines are running on the GNSS receiver: RTK and GLIDE. The BESTPOS log output by the NovAtel receiver will provide the highest accuracy position available by the receiver. At the beginning of the graph, the highest accuracy position available comes from the RTK engine and that position is output in the BESTPOS log. When RTK corrections are lost, the RTK engine will drop out of its fixed integer solution based upon the current RTK Timeout. STEADYLINE MAINTAIN mode switches over to the GLIDE position engine but eliminates the jump in position. The BESTPOS log provides a GLIDE position output without the discontinuity and jump. As the RTK outage progresses, STEADYLINE ramps up towards the position provided by the GLIDE engine. When the corrections are again received and the RTK position engine provides a fixed integer solution, STEADYLINE switches over to the RTK position solution and BESTPOS log provides the RTK position but with a position offset based upon the last position output by the GLIDE engine. The jump is removed but a position offset remains.

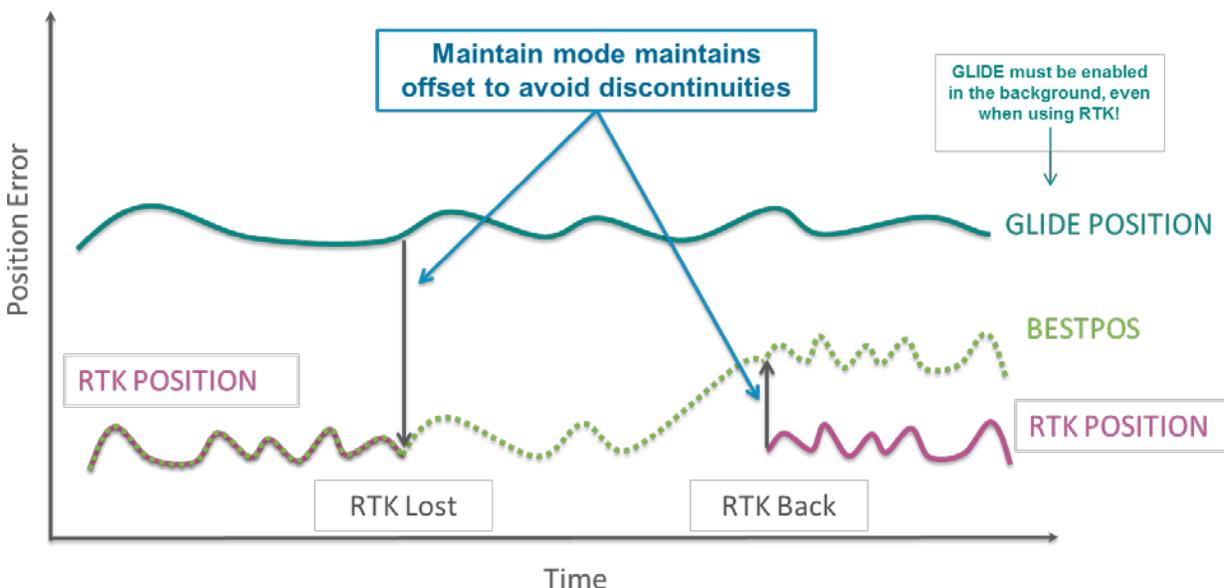


Figure 3 – STEADYLINE MAINTAIN Mode Expanded View

## TRANSITION

When the receiver transitions to a different positioning mode using TRANSITION mode, the position offset is applied to the calculated position to limit a potential real position jump. The position then slowly transitions to the new position type over a user specified period of time as shown in Figure 4 below.

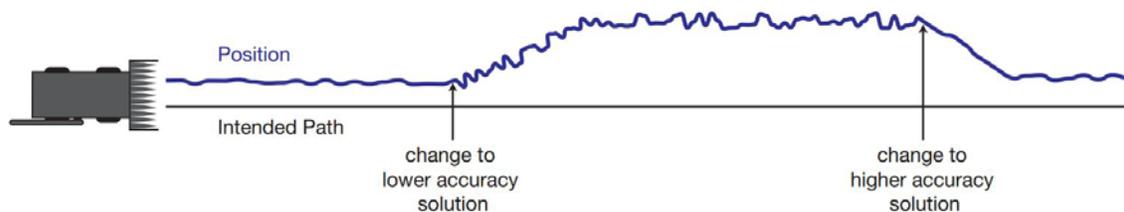


Figure 4 – STEADYLINE Transition Mode Operation

In Figure 5 below, two positioning engines are running on the GNSS receiver: RTK and GLIDE. The BESTPOS log output by the NovAtel receiver will provide the highest accuracy position available by the receiver. At the beginning of the graph, the highest accuracy position available comes from the RTK engine and that position is output in the BESTPOS log. When RTK corrections are lost, the RTK engine drops out of its fixed integer solution. BESTPOS will continue to report the position type as the RTK position type until RTKTIMEOUT expires after which it will report a PDP position type. STEADYLINE TRANSITION mode ramps up towards the position provided by the GLIDE engine based upon the user-specified transition time and this position is reported in the BESTPOS log. When the corrections are again received and the RTK position engine provides a fixed integer solution, STEADYLINE ramps back to

the RTK position solution based upon the user-specified time and the BESTPOS log reports an RTK position type.

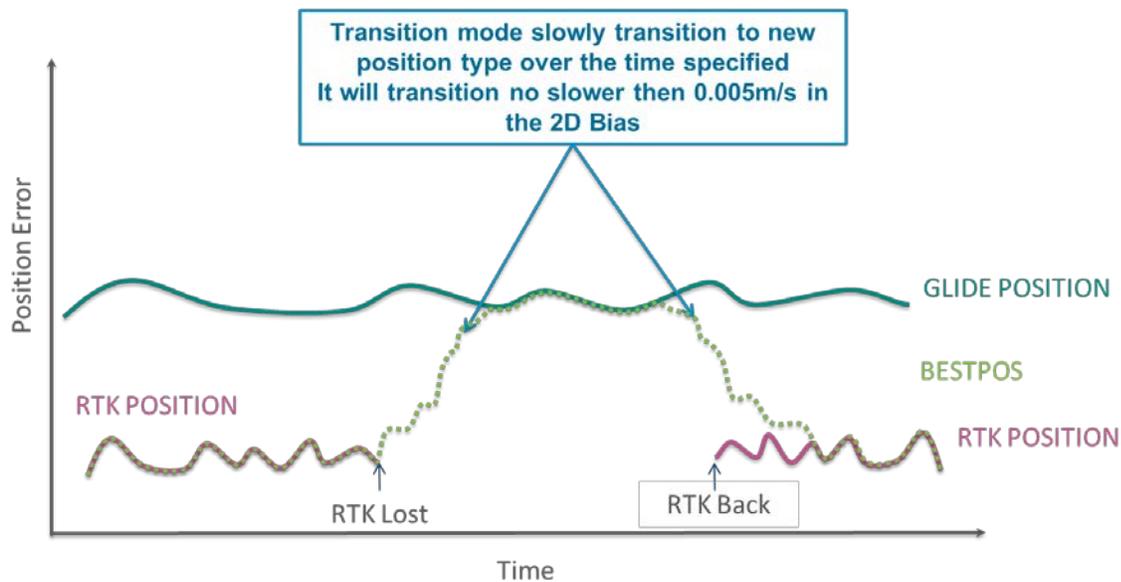


Figure 5 – STEADYLINE TRANSITION Mode Expanded View

## PREFER ACCURACY

In PREFER ACCURACY mode, the positioning mode change depends on the accuracy level of the positioning modes. When the position mode changes from a more accurate to a less accurate mode the receiver uses the MAINTAIN mode. When the position mode changes from a less accurate to a more accurate mode the receiver uses the TRANSITION mode as shown in Figure 6 below.

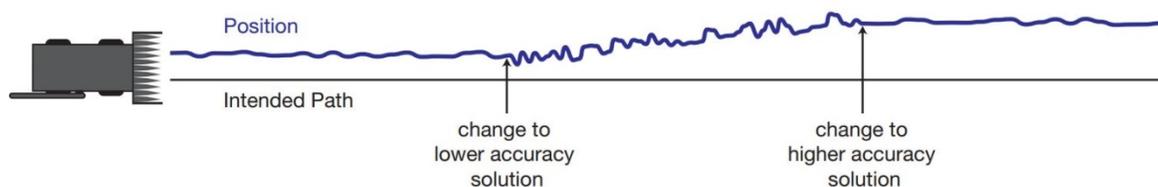


Figure 6 – STEADYLINE PREFER ACCURACY Mode Operation

In Figure 7 below, two positioning engines are running on the GNSS receiver: RTK and GLIDE. The BESTPOS log output by the NovAtel receiver will provide the highest accuracy position available by the receiver. At the beginning of the graph, the highest accuracy position available comes from the RTK engine and that position is output in the BESTPOS log. When RTK corrections are lost, the RTK engine will drop out of its fixed integer solution after the RTK timeout. STEADYLINE MAINTAIN mode switches over to the GLIDE position engine but reduces the jump. The BESTPOS log provides a GLIDE position output but reports an RTK position type without the discontinuity and jump. As the RTK outage progresses, STEADYLINE ramps up towards the position provided by the GLIDE engine. When the RTKTIMEOUT expires, the position type reported changes from RTK to PDP. When the corrections are

again received and the RTK position engine provides a fixed integer solution, STEADYLINE uses TRANSITION mode to ramp back to the RTK position solution based upon the user-specified time and the BESTPOS log reports an RTK position type.

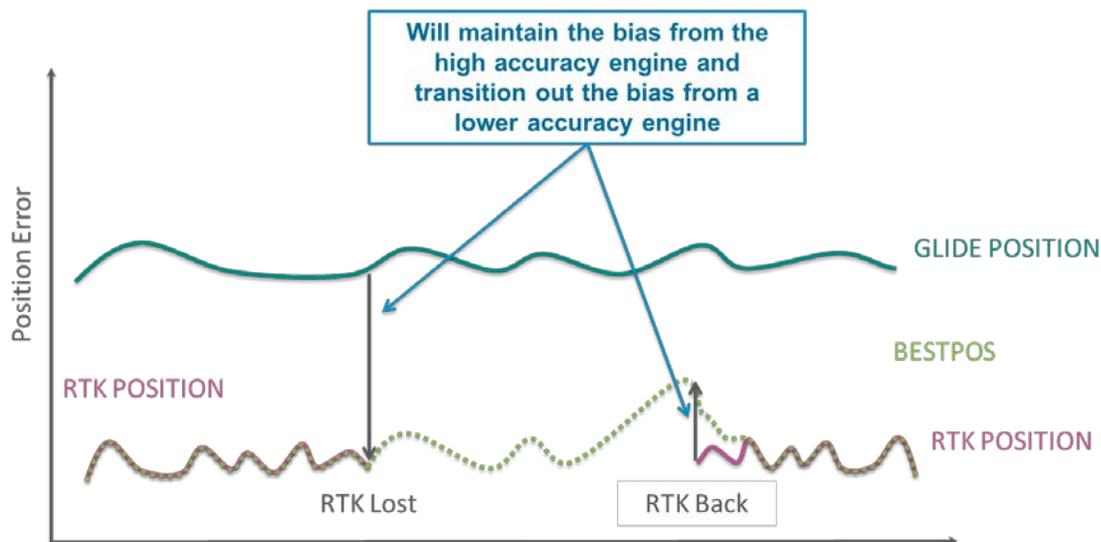


Figure 7 – STEADYLINE PREFER ACCURACY Mode Expanded View

## UAL (USER ACCURACY LEVELS)

User accuracy levels can be set, using the UALCONTROL command, to change the solution type in the GPGLGGA and BESTPOS messages. When UALCONTROL is used along with STEADYLINE, the accuracy mode is adjusted based on the current estimated accuracy (standard deviation).

Using the UALCONTROL command, the user can set the standard deviation limits for operational and warning limits. Using STEADYLINE in UAL mode uses these operational and warning limits to control the STEADYLINE behavior and requires UALCONTROL to be set.

The operational limit is the standard deviation range in meters when STEADYLINE will use the MAINTAIN mode to minimize jumps when changing from higher accuracy to lower accuracy position solution. The warning limit is the standard deviation range specified in meters when STEADYLINE will reset. These limits also control the reported position type in the BESTPOS log output. When the position accuracy is within the operational limit, the BESTPOS message outputs the position type as OPERATIONAL. When the position accuracy is between the operational and warning limits, the position type is reported as WARNING. When the position accuracy is outside of the warning limit, the position type is reported as OUT\_OF\_BOUNDS and STEADYLINE resets. When going from OUT\_OF\_BOUNDS to WARNING or OPERATIONAL, a jump in position will occur.

UALCONTROL can also be used independently from STEADYLINE. This means that the user can generate OPERATIONAL, WARNING and OUT\_OF\_BOUNDS position types in the BESTPOS and GGA logs based upon the limits set by the UALCONTROL command.

In Figure 8 below, the user has set operational and warning limits using the UALCONTROL command. At point A, higher accuracy corrections are lost and the receiver changes to a lower accuracy solution. When the position reported by the receiver is within the operational limits, the solution type reported in the BESTPOS message is OPERATIONAL and the receiver will always use the MAINTAIN accuracy mode. When the position reported is between the operational and warning limits (B), the receiver uses the PREFER\_ACCURACY mode and reports the position type as WARNING in the BESTPOS message. When the position reported by the receiver returns to below the operational limit (C), the solution type reported is OPERATIONAL but the receiver continues to use the PREFER\_ACCURACY mode until the position offset is removed. After the offset is removed (D), the receiver transitions to the MAINTAIN accuracy mode.

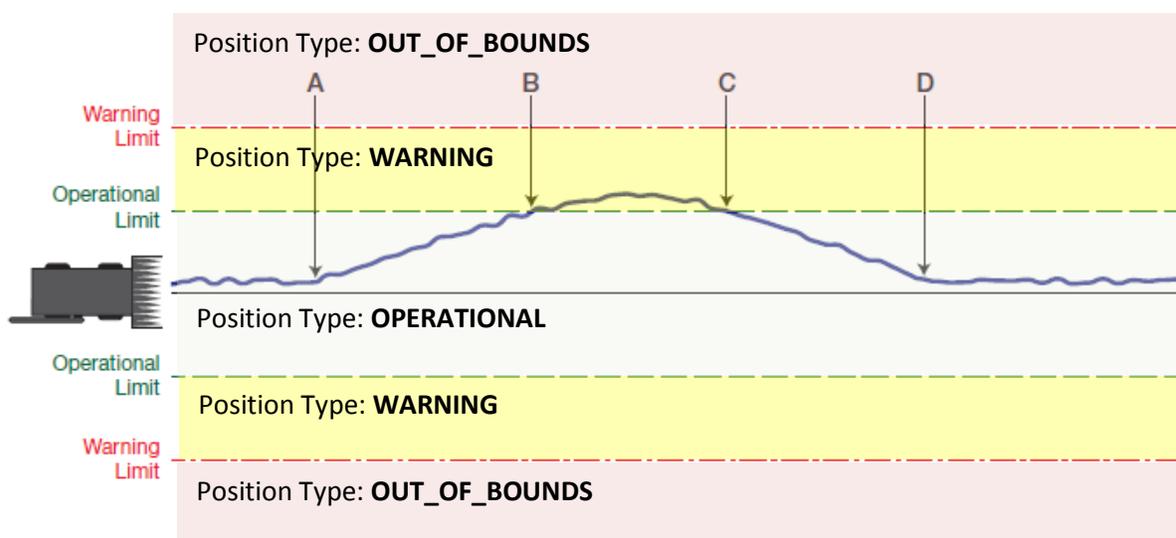


Figure 8 – STEADYLINE User Accuracy Level (UAL) Mode Operation

In the Figure 9 below, the position reported exceeds the operational limit (B) and STEADYLINE changes to TRANSITION mode and the position type changes to WARNING. If the position reported continues to drift off beyond the Warning Limit (C), the position type will be reported as OUT\_OF\_BOUNDS and STEADYLINE will be automatically reset.

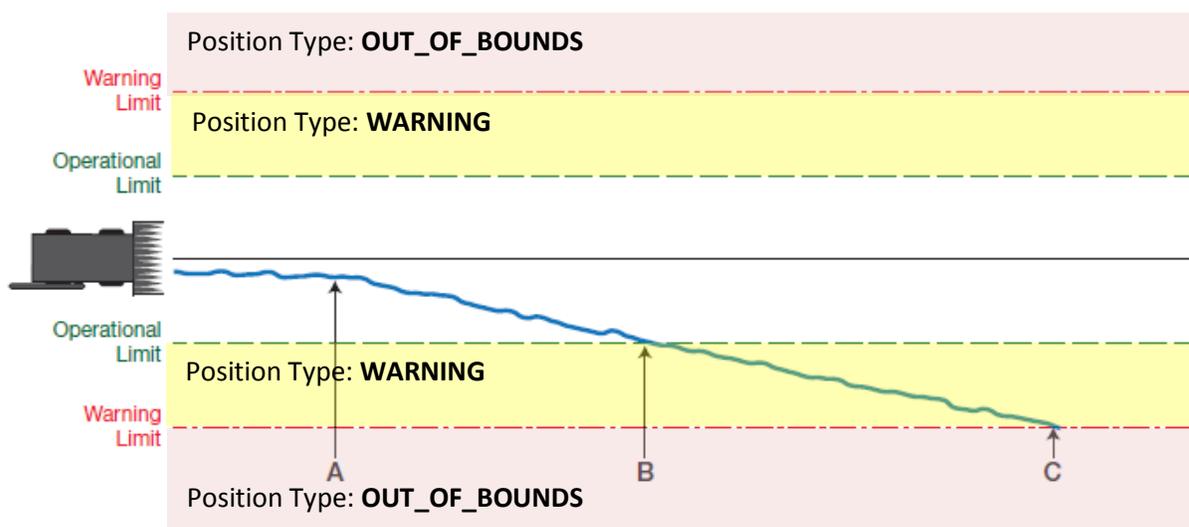


Figure 9 – STEADYLINE USER ACCURACY LEVEL (UAL) Mode Operation – Out of Bounds

## What does STEADYLINE not do?

STEADYLINE is NOT a bridging technology in the true sense in that it will not continue to provide you positions when you lose all GNSS signals. It will bridge short RTK correction outages, but the accuracy of the position solution will be that of the next best positioning mode available.

In an example where RTK corrections are lost and the position switches from an RTK position type (NARROW\_INT) to standalone (SINGLE\_POINT), the receiver accuracy level also changes from RTK (centimeter) to standalone (meter or sub-meter accuracy). Although STEADYLINE smoothed the jump between the centimeters to sub-meter solution, the transition to the sub-meter solution still means sub-meter accuracy. Using GLIDE with STEADYLINE will further smooth the position, but the longer the receiver is providing a sub-meter solution, the more the error will grow.

## In what applications should STEADYLINE not be used?

STEADYLINE should not be used as a long duration high accuracy bridging solution if GLIDE is the only other positioning type supported on the receiver.

STEADYLINE should not be used if GLIDE is the only positioning type supported on the receiver.

## Under what conditions can STEADYLINE be used?

STEADYLINE needs to be used with a high-accuracy GNSS position type such as RTK or TerraStar-C.

STEADYLINE works best when used in open sky conditions where there is a clear view of the sky and no trees or obstacles at the headlands.

## **When is the use of STEADYLINE not recommended?**

STEADYLINE is not recommended for use near tree lines or at treed headlands unless a secondary high accuracy position solution is also available such as TerraStar-C. This would mean that RTK and TerraStar-C should be active on the receiver.

When using STEADYLINE near obstacles and during loss of RTK corrections, STEADYLINE will fall back to the next most accurate positioning mode. If that positioning mode is GLIDE, then the user may experience positioning jumps while running on the GLIDE engine as the vehicle moves in and out of the tree lines.

## STEADYLINE 1.0

### Supported Firmware Versions:

**STEADYLINE 1.0 – 6.600, 6.620, 6.700**

### Supported Hardware:

**STEADYLINE 1.0 – OEM615, OEM628, SMART6, SMART6-B, SMART6-T, SMART6-TB, SMART6-L**

## **Configuring a Receiver**

The format of the STEADYLINE command is:

```
STEADYLINE mode [transition_time]
```

Example:

```
STEADYLINE PREFER_ACCURACY 100
```

The transition\_time parameter is the time over which the position solution will transition in seconds. The minimum rate of change is 0.005 m/s regardless of this parameter. The transition\_time parameter is only valid with TRANSITION, PREFER\_ACCURACY and UAL modes.

## TRANSITION Example

Receiver Commands:

```

STEADYLINE TRANSITION 100
RTKTIMEOUT 60
PDPFILTER ENABLE
PDPMODE GLIDE AUTO
  
```

This will enable STEADYLINE in TRANSITION mode with a transition time of 100 seconds. This means that when STEADYLINE will take 100 seconds to transition between a high and low accuracy solution.

In Figure 10 below, let's assume that our receiver supports RTK as the high accuracy position solution and GLIDE is the next available best accuracy solution.

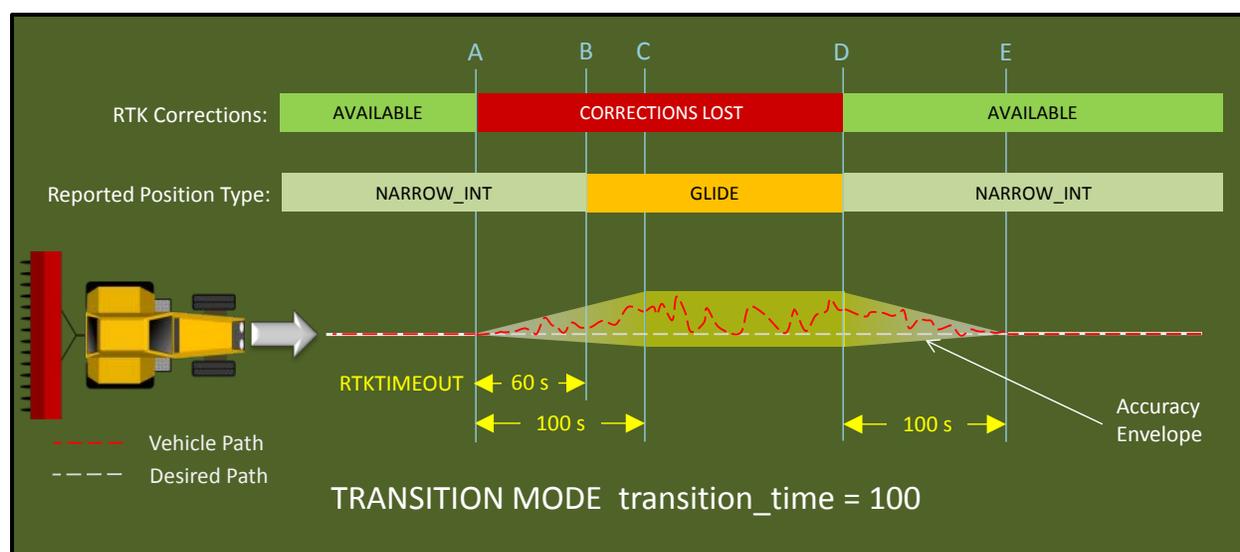


Figure 10 – STEADYLINE Transition Mode Example

When RTK is lost at point A, STEADYLINE will make a 100 second transition to the GLIDE accuracy solution (from point A to C) assuming that RTK is lost for more than 100 seconds. During that time the position will ramp towards the position reported by GLIDE (shown in red). The position accuracy at the end of the transition period from high accuracy to low accuracy will be that of the GLIDE solution as shown in the accuracy envelope, however STEADYLINE will continue to report a position type of NARROW\_INT until the RTKTIMEOUT expires at 60 seconds (point B). After RTKTIMEOUT expires, the position type reported will change to PDP. When RTK returns at point D, STEADYLINE will transition back to the high accuracy solution over 100 seconds until RTK accuracy is restored at point E.

If RTK returns before the transition between the high and low accuracy is complete (e.g. Transition set to 100 seconds but RTK comes back after 55 seconds and before RTKTIMEOUT), the receiver will immediately transition back to the high accuracy position using the programmed transition time as

shown in Figure 11 below. The reported position type will continue to be NARROW\_INT because RTK corrections returned before the expiry of RTKTIMEOUT.

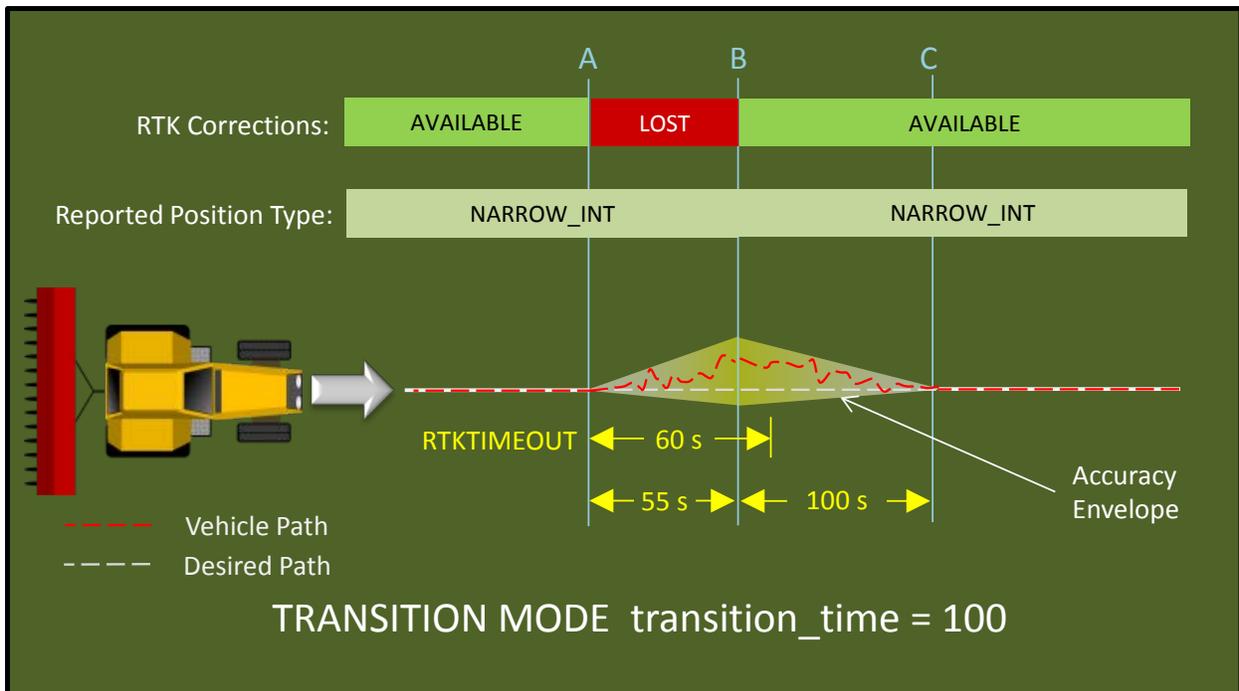


Figure 11 – RTK returns before RTKTIMEOUT Expires

## MAINTAIN Example

Receiver Commands:

```

STEADYLINE MAINTAIN
RTKTIMEOUT 60
PDPFILTER ENABLE
PDPMODE GLIDE AUTO
  
```

This will enable STEADYLINE in MAINTAIN mode which will try to maintain accuracy based upon the last position at each accuracy transition.

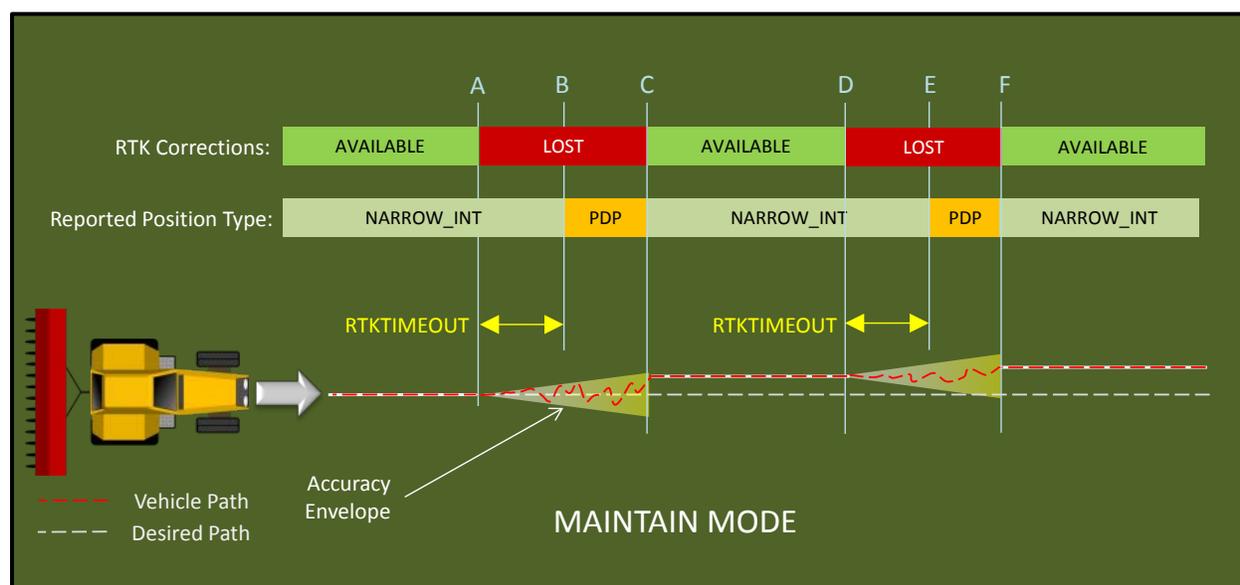


Figure 12 – STEADYLINE Maintain Mode Example

Referring to Figure 12 above, let us assume that our receiver supports RTK as the high accuracy position solution and GLIDE is the next available best accuracy solution. When RTK is lost at point A, STEADYLINE will apply the RTK position bias when it transitions to the GLIDE accuracy solution. STEADYLINE will continue to report the NARROW\_INT position type until the RTKTIMEOUT expires (from point A to B). The rate of transition is determined by the standard deviation of the GLIDE position. After the switchover to the GLIDE position, the GLIDE position may drift within the accuracy envelope (as shown in red) but will maintain the RTK bias so that it never ramps up to the GLIDE position. If the difference between RTK and GLIDE standard deviations is great, the ramp up rate between reported standard deviations will be fast. The position reported by GLIDE may be anywhere within the accuracy envelope which will be centered around the last RTK position.

When RTK is back at point C, MAINTAIN mode maintains the position reported by GLIDE and applies this offset to the RTK position. In MAINTAIN mode, there is no guarantee that the reported RTK position will be accurate. It will always have an offset based upon the last position at the time of the transition. This offset may accumulate on successive transitions as shown at point D and F. MAINTAIN is useful to

maintain trajectory if pass-to-pass accuracy is not important (i.e. when using a “nudge” feature commonly available on agricultural steering controllers).

### PREFER ACCURACY Example

Receiver Commands:

```
STEADYLINE PREFER_ACCURACY 100
RTKTIMEOUT 60
PDPFILTER ENABLE
PDPMODE GLIDE AUTO
```

This will enable STEADYLINE in PREFER ACCURACY mode with a low to high accuracy transition time of 100 seconds. The ramp time of the low to high accuracy mode will be dependent upon the difference in standard deviation between the high and low accuracy solution.

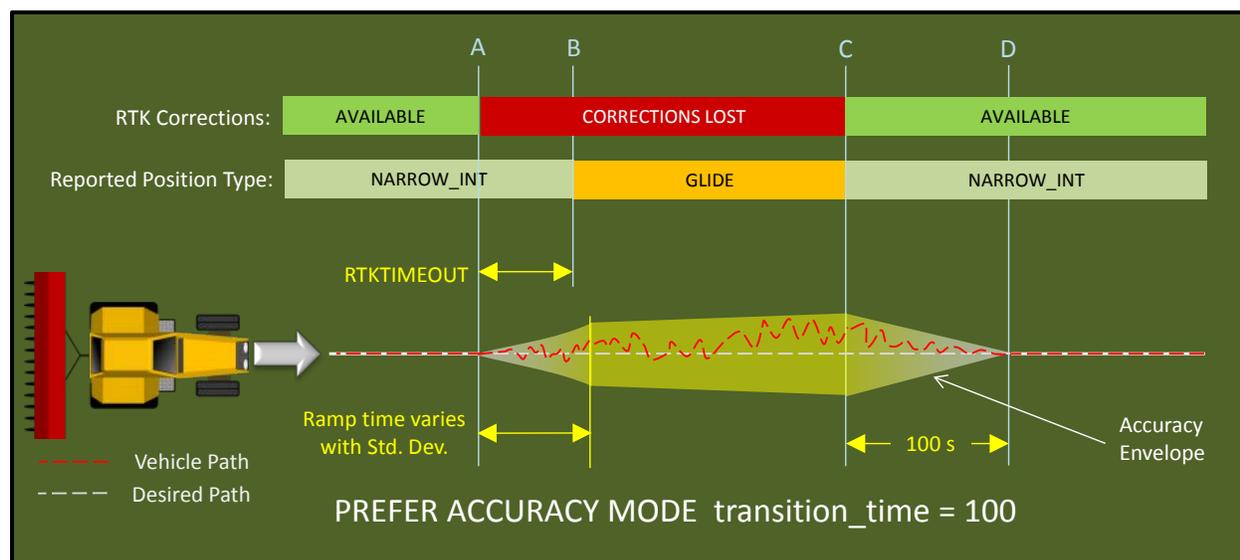


Figure 13 – STEADYLINE PREFER ACCURACY Mode Example

Referring to Figure 13 above, let’s assume that our receiver supports RTK as the high accuracy position solution and GLIDE is the next available best accuracy solution. When RTK is lost at point A, STEADYLINE will apply the RTK position bias when it transitions to the GLIDE accuracy solution. The reported position type will be NARROW\_INT until the RTKTIMEOUT expires (from point A to B). The rate of transition is determined by the standard deviation of the GLIDE position. If the standard deviation is high, the ramp time will be short. After switching over to GLIDE, the position can ramp further towards the position reported by GLIDE (as shown in red) the longer we remain on the GLIDE position. The position accuracy at the end of the transition period from high accuracy to low accuracy will be that of the GLIDE solution as shown in the accuracy envelope. When RTK returns at point C, STEADYLINE will transition back to the high accuracy solution over 100 seconds until back to full RTK accuracy at point D.

## UAL Example

Using STEADYLINE with UAL requires the user to set the STEADYLINE mode to UAL and also set the operational and warning limits using the UALCONTROL command. The following commands will set STEADYLINE to UAL mode with a transition time of 100 seconds and the operational range of +/- 8 cm and warning range of +/- 15 cm:

Receiver Commands:

```
STEADYLINE UAL 100
UALCONTROL ENABLE UAL 0.08 0.15
PDPFILTER ENABLE
PDPMODE GLIDE AUTO
```

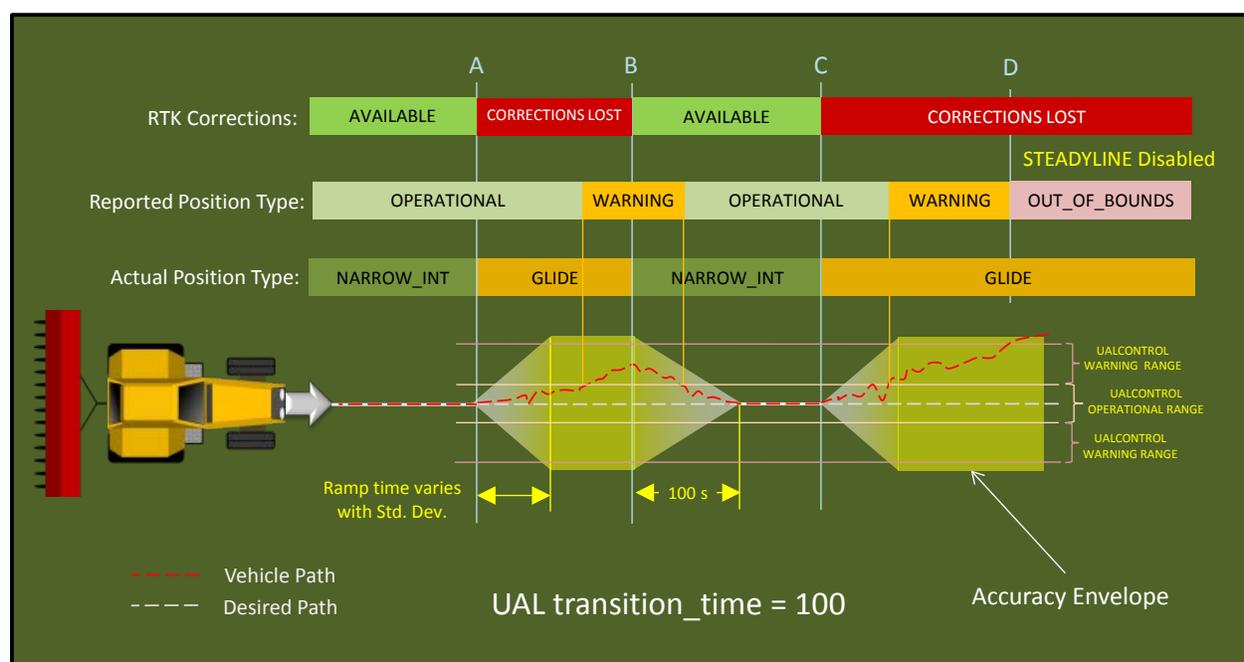


Figure 14 – STEADYLINE USER ACCURACY LEVEL (UAL) Mode Example

Referring to Figure 14 above, let's assume that our receiver supports RTK as the high accuracy position solution and GLIDE is the next available best accuracy solution. The position is within the operational range of +/- 8 cm standard deviation specified in the UALCONTROL command and the BESTPOS and GPGGA logs indicate the position type as OPERATIONAL.

When RTK corrections are lost at point A, STEADYLINE in UAL mode will use the MAINTAIN mode and apply the RTK position bias when it changes to the GLIDE accuracy solution. The rate of transition is determined by the standard deviation of the GLIDE position. If the standard deviation is high, the ramp time will be short. After switching over to GLIDE, the position can ramp further towards the position reported by GLIDE (as shown in red) the longer we remain on the GLIDE position. The position accuracy



at the end of the transition period from high accuracy to low accuracy will be that of the GLIDE solution as shown in the accuracy envelope. As long as the receiver accuracy is within the Operational Range Limit, the STEADYLINE will use the MAINTAIN mode.

When the position exceeds the standard deviation set by Operational Limit of +/-8 cm, the position type output by the BESTPOS and GGA logs changes to WARNING. When the position is within the UALCONTROL Warning Range, STEADYLINE will use the PREFER\_ACCURACY mode which means that it will continue to use the MAINTAIN accuracy mode until a higher accuracy solution is available, after which it uses the TRANSITION mode to return to higher accuracy.

At point B, RTK returns, and STEADYLINE will transition back to the high accuracy solution over 100 seconds. Once the position is less than the specified +/-8 cm Operational Range, the BESTPOS and GPGGA logs indicate the position type again as OPERATIONAL.

At point C, RTK is lost again and STEADYLINE again applies the RTK position bias and transitions to the GLIDE position solution. Unfortunately, RTK corrections never return and the reported position exceeds the +/-8 cm Operational Limit and the position type changes to WARNING. In this example the position may continue to drift until the +/-15 cm Warning Range is exceeded after which the reported position type changes to OUT\_OF\_BOUNDS and STEADYLINE is disabled.

## **DISABLE STEADYLINE**

To disable STEADYLINE use the command:

Receiver Command:

**STEADYLINE DISABLE**

## STEADYLINE 2.0 & New Position Type Reporting

### Supported Firmware Versions:

- 6.710, 6.720 or later for OEM6
- 7.200 or later for OEM7

### Supported Hardware:

- OEM628, SMART6-L
- All OEM7 Products

### What is new in STEADYLINE 2.0?

NovAtel's STEADYLINE 2.0 incorporates three new features:

1. New Position Type Reporting Features
  - STEADYLINE can extend the reporting of RTK position types after transition to GLIDE mode using the new STEADYLINEDIFFERENTIALTIMEOUT function.
2. Ability to propagate position during brief satellite outages
3. Improved smoothing to remove position spikes within position engines

When using STEADYLINE 1.0, the RTKTIMEOUT value would be used to change the position type reported when using STEADYLINE. In FW versions 6.710 and later, the new STEADYLINEDIFFERENTIALTIMEOUT has been added that is also used to control the reporting of position types. **This means that current STEADYLINE users will have to change their configurations when using STEADYLINE 2.0 if they want it to operate similarly to STEADYLINE 1.0 (See Example 3 – Emulating STEADYLINE 1.0 Operation Using STEADYLINE 2.0).**

The STEADYLINEDIFFERENTIALTIMEOUT specifies how long STEADYLINE will report RTK or PPP solutions after a loss of corrections. However, this new timeout is also logically OR'd with the RTKTIMEOUT & PPPTIMEOUT. This means that STEADYLINE will report an RTK or PPP position type based upon the longest timeout: either STEADYLINEDIFFERENTIALTIMEOUT or PPPTIMEOUT or RTKTIMEOUT.

With STEADYLINE 2.0, as soon as STEADYLINE is enabled, the STEADYLINEDIFFERENTIALTIMEOUT is (by default) enabled and set to 300 seconds on firmware version 6.710, and 7.200. Firmware versions 6.720 and later have a default of 60 seconds. For example, when using RTK and corrections are lost, STEADYLINE will transition to the GLIDE engine but will continue to report an RTK fixed position type (NARROW\_INT) for up to 300 seconds as long as it is the most available position type available.

If the RTKTIMEOUT is set to longer than the STEADYLINEDIFFERENTIALTIMEOUT, the solution type will be reported as NARROW\_INT after the transition to the GLIDE solution until the RTKTIMEOUT expires.

This new STEADYLINEDIFFERENTIALTIMEOUT was incorporated to allow STEADYLINE to extend the time an RTK position type is reported. This benefits those integrators who want to continue to report an RTK solution to their customers while STEADYLINE is being used as a fall back solution. This new functionality reduces the back and forth switching in position types and offers more flexibility when using STEADYLINE.

The following examples describe how the new STEADYLINEDIFFERENTIALTIMEOUT command works in STEADYLINE 2.0 using the PREFER\_ACCURACY mode.

### **Example 1 – STEADYLINEDIFFERENTIALTIMEOUT > RTKTIMEOUT**

In this example, STEADYLINE is enabled to use the PREFER\_ACCURACY mode and STEADYLINEDIFFERENTIALTIMEOUT is set to a value higher than the RTKTIMEOUT.

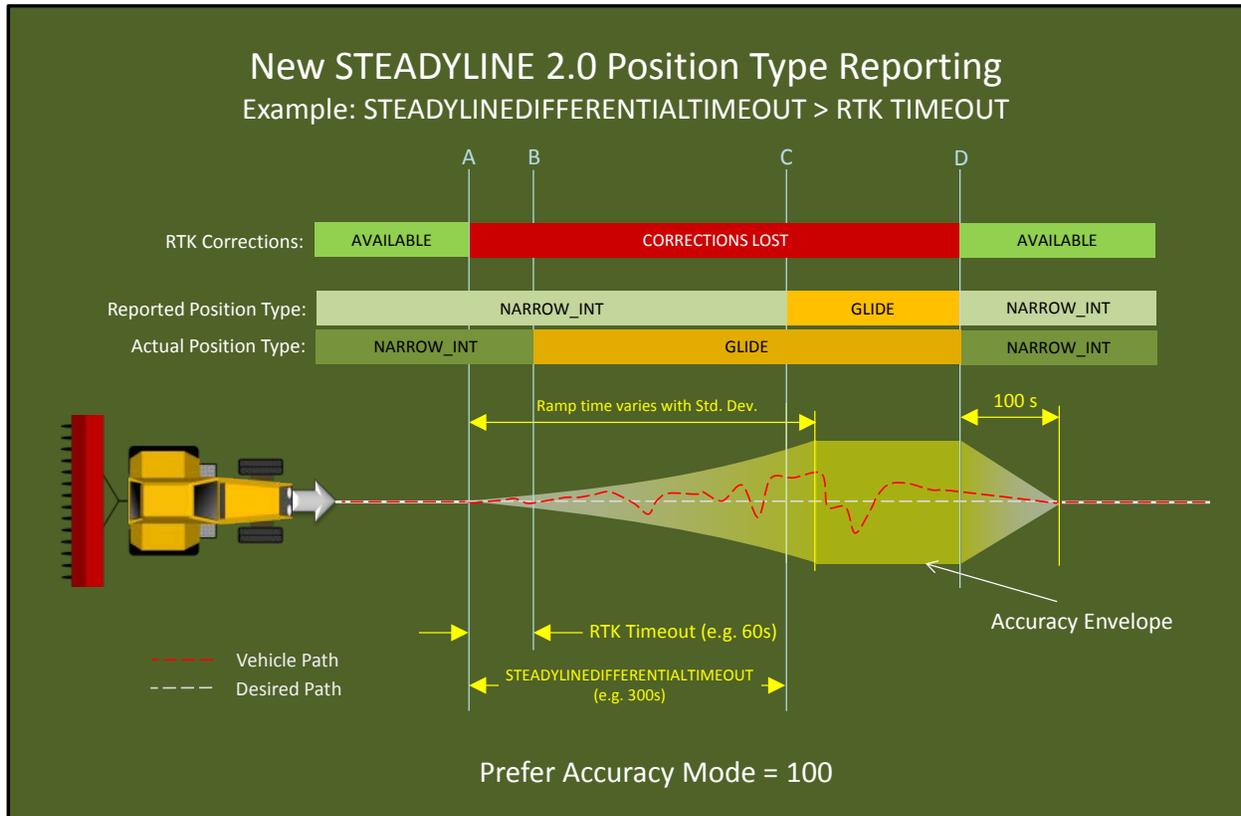
Receiver settings:

```
STEADYLINE PREFER_ACCURACY 100  
STEADYLINEDIFFERENTIALTIMEOUT 300  
RTKTIMEOUT 60  
PDPFILTER ENABLE  
PDPMODE GLIDE AUTO
```

At point A in Figure 15 below, RTK corrections are lost and the differential age increases. STEADYLINE switches over to use the GLIDE solution at point B when RTKTIMEOUT expires, but the receiver will continue to report a position type of NARROW\_INT for the duration of the STEADYLINEDIFFERENTIALTIMEOUT (e.g. 300 seconds) as long as it is the most accurate position type available. When the STEADYLINEDIFFERENTIALTIMEOUT expires at point C, the reported position type will change to GLIDE. Note that even though the RTKTIMEOUT will expire at point B this timeout is shorter than STEADYLINEDIFFERENTIALTIMEOUT, and the position type reported will continue to be NARROW\_INT as long as it is the most accurate position type available.

When RTK corrections return at point D and the receiver fixes to an RTK position, the NARROW\_INT position type will be reported again and STEADYLINE will smoothly transition back over 100s (in this example) from the GLIDE position to the RTK position.

It should be noted that the standard deviations will increase up to those reported by the GLIDE engine even though the reported position type is NARROW\_INT.



**Figure 15 – STEADYLINE 2.0 PREFER ACCURACY Example (STEADYLINEDIFFERENTIALTIMEOUT > RTKTIMEOUT)**

If RTK corrections return before the STEADYLINEDIFFERENTIALTIMEOUT expires, the NARROW\_INT position type will continue to be reported as long it is the most accurate position type available as shown in Figure 16 below. When corrections return at point B, STEADYLINE will smoothly transition back to the RTK accuracy solution over 100 seconds.

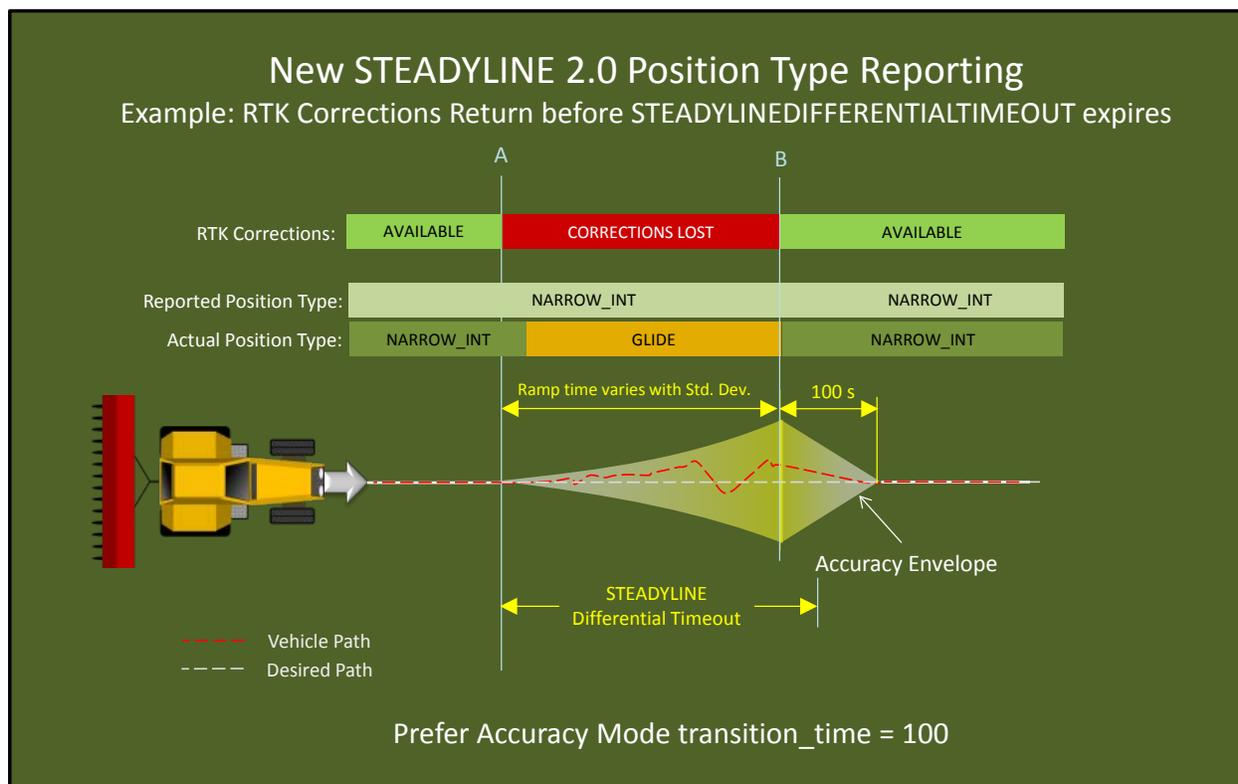


Figure 16 – STEADYLINE 2.0 PREFER ACCURACY Example (RTK Corrections Returns Before Timeout)

### Example 2 – RTKTIMEOUT > STEADYLINEDIFFERENTIALTIMEOUT

In this example, STEADYLINE is setup to use the PREFER\_ACCURACY mode and RTKTIMEOUT is set to a value higher than the STEADYLINEDIFFERENTIALTIMEOUT.

Receiver settings:

```

STEADYLINE PREFER_ACCURACY 100
STEADYLINEDIFFERENTIALTIMEOUT 30
RTKTIMEOUT 120
PDPFILTER ENABLE
PDPMODE GLIDE AUTO

```

At point A, as shown in Figure 17 below, RTK corrections are lost and the differential age begins to increase. STEADYLINE switches over to use the GLIDE solution after RTKTIMEOUT expires, but the receiver will continue to report a position type of NARROW\_INT for the duration of the RTKTIMEOUT (e.g. 30 seconds) as long as it is the most accurate position type available. At point C, the RTKTIMEOUT expires and the reported position type changes to PDP. Note that even though the STEADYLINEDIFFERENTIALTIMEOUT expired at point B, this timeout is shorter than RTKTIMEOUT, and

the position type reported will still be NARROW\_INT as long as it is the most accurate position type available.

When RTK corrections return at point D and the receiver fixes to an RTK position, the NARROW\_INT position type will be reported again and STEADYLINE will smoothly transition back over 100s (in this example) from the last reported PDP position to the RTK position.

It should be noted that the standard deviations will increase up to those reported by the GLIDE engine even though the reported position type is NARROW\_INT.

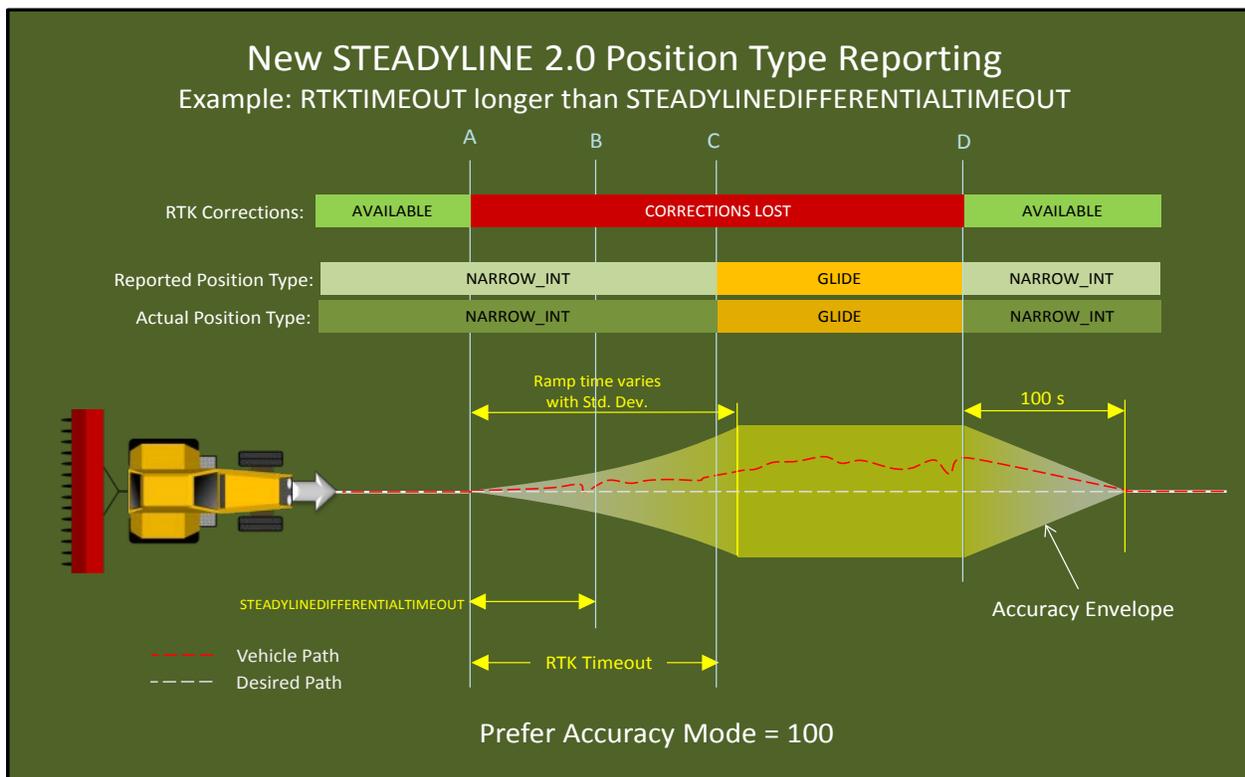


Figure 17 - STEADYLINE 2.0 PREFER ACCURACY Example (RTKTIMEOUT>STEADYLINE DIFFERENTIAL TIMEOUT)

### Example 3 – Emulating STEADYLINE 1.0 Operation Using STEADYLINE 2.0

To make STEADYLINE 2.0 behave similarly to STEADYLINE 1.0 requires that the user set the STEADYLINE DIFFERENTIAL TIMEOUT to the minimum value of 5 seconds. By doing so, the RTKTIMEOUT value will be used to switch the reported position type to PDP as soon as the RTKTIMEOUT expires.

Receiver settings:

```

STEADYLINE PREFER_ACCURACY 100
STEADYLINE DIFFERENTIAL TIMEOUT 5
RTK TIMEOUT 60
PDP FILTER ENABLE
PDP MODE GLIDE AUTO

```

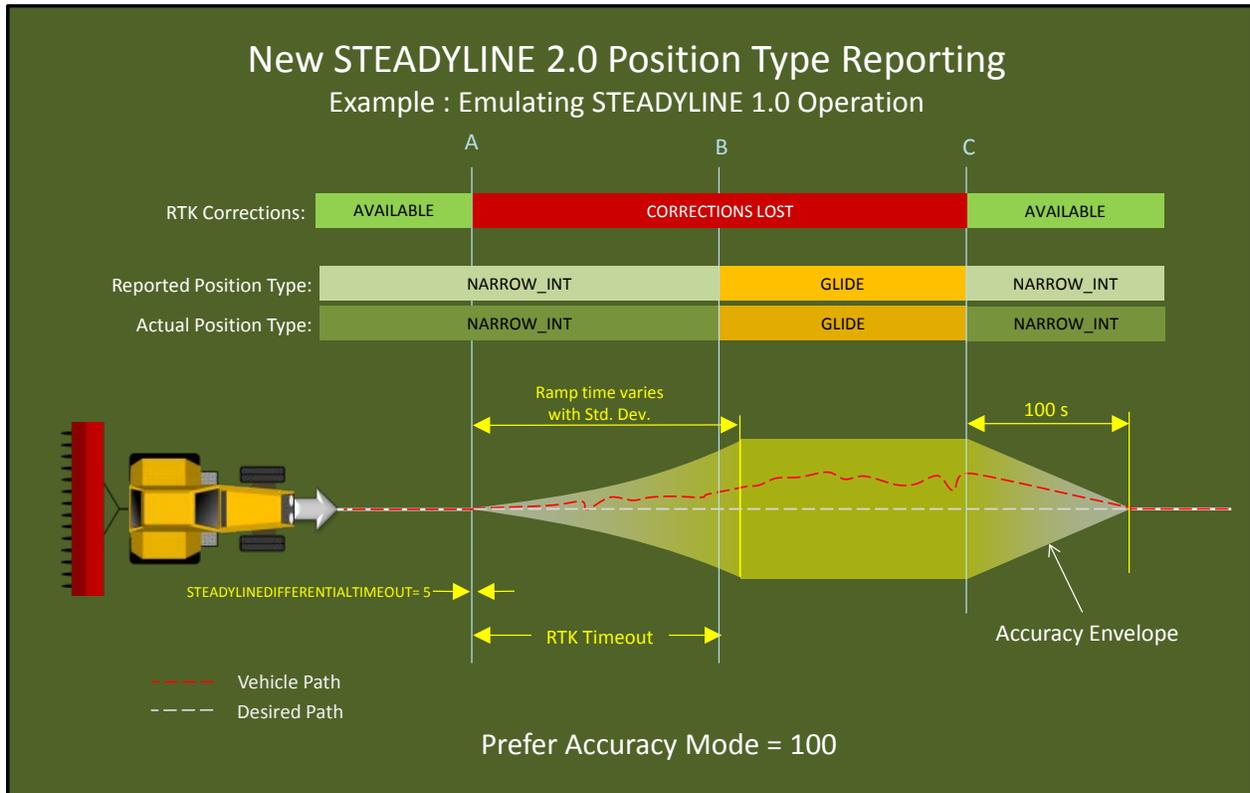


Figure 18 – STEADYLINE 2.0 – Emulating STEADYLINE 1.0 Operation

### Using STEADYLINE 2.0 in Maintain and Transition Modes

STEADYLINE 2.0 works similarly in Maintain and Transition modes in that the STEADYLINEDIFFERENTIALTIMEOUT command will also extend the reporting of RTK or PPP position types until the timeout expires.

### Using STEADYLINE 2.0 in UAL Mode

UAL mode operation remains the same when using STEADYLINE 2.0.



## Where to go for Support

To help answer questions and/or diagnose any technical issues that may occur, the NovAtel Support website is a first resource: [www.novatel.com/support/](http://www.novatel.com/support/)

Remaining questions or issues, including requests for test subscriptions or activation resends, can be directed to NovAtel Support by visiting [www.novatel.com/support/contact/](http://www.novatel.com/support/contact/). To enable the online form and submit a ticket, first select a "Product Line" and then an associated "Product" from the list.

However, before contacting Support, it is helpful to collect data from the receiver to help investigate and diagnose any performance-related issues. In those cases, if possible, collect the following list of logs (the LOG command with the recommended trigger and data rate is included):

```
LOG VERSIONA ONCE
LOG RXSTATUSA ONCHANGED
LOG RAWEPHEMB ONCHANGED
LOG ALMANACB ONCHANGED
LOG IONUTCB ONCHANGED
LOG GLORAWEPHEMB ONCHANGED
LOG GLORAWALMB ONCHANGED
LOG GLOCLOCKB ONCHANGED
LOG TRACKSTATB ONTIME 10
LOG SATVIS2B ONTIME 60
LOG RANGE B ONTIME 1
LOG BESTPOSB ONTIME 1
LOG MATCHEDPOSB ONCHANGED
LOG PASSTHROUGH B ONCHANGED
LOG RXCONFIGA ONCE
```

The data described above can be collected using a terminal program that supports binary data logging, or NovAtel's CONNECT utility can be downloaded and installed from the NovAtel website: [www.novatel.com/support/info/documents/809](http://www.novatel.com/support/info/documents/809).