How Daylight Savings Affect Fleet Manager Data

Introduction

This document offers a simple explanation of how daylight savings time affects the Fleet Manager system. It describes the situations which may arise when trips recorded by Fleet Manager on-board computers overlap the start and end of the daylight savings period.

Daylight savings and the Fleet Manager system

Daylight Savings Time (DST) adjustments are only applied by the Fleet Manager application software. No adjustments take place in the Fleet Manager on-board computer (OBC).

If a trip recorded by an OBC **started outside** of the DST period, the trip times are not adjusted by the Fleet Manager software, irrespective of whether or not the trip ended inside the DST period.

If however a trip recorded by an OBC **started inside** the DST period, the trip times are adjusted by the Fleet Manager software **as the data is downloaded**, irrespective of whether or not the trip ended inside the DST period**.**

Interval (tacho) data is stored in a highly compressed binary format in the Fleet Manager database and is thus not adjusted until it is extracted at the time of generating an interval data graph. See the section entitled "The effects of DST on interval data" below for an explanation.

The situation that may arise at the end of the DST period

Figure 1 shows a timeline of trips with their corresponding DST adjustments for both the Northern Hemisphere, and the Southern Hemisphere. The following explanation will reference the Northern Hemisphere, but the situations described apply to the Southern Hemisphere as well.

The times of trip A, trip B, trip E and trip F are not adjusted, because they started outside of the DST period. Although trip B crosses into the DST period, it's times will not be adjusted because it started outside of the DST period.

The times of trip C and trip D are adjusted, because they started inside the DST period. Although trip D ends after the end of the DST period, it's times are still adjusted because the it started inside the DST period.

These adjustments result in trip D overlapping trip E.

The following example clarifies this situation further:

If the end of the DST period occurs on 1 October at 02:00, and the DST time shift is 1 hour, if a trip begins at 01:30, and the driver drives for 1 hour, the trip will be recorded with start and end times of 01:30 - 02:30. By the time the driver stops driving, clocks have been set back by an hour, which means that it is once again 01:30. If the driver begins another trip and drives for a further hour, the trip will again be recorded with start and end times of 01:30 - 2:30. This means that the same driver and vehicle will appear to have driven two trips during the same time period.

When this occurs in the Fleet Manager system, the trips will be shown as overlapping trips on the Activity Timeline.
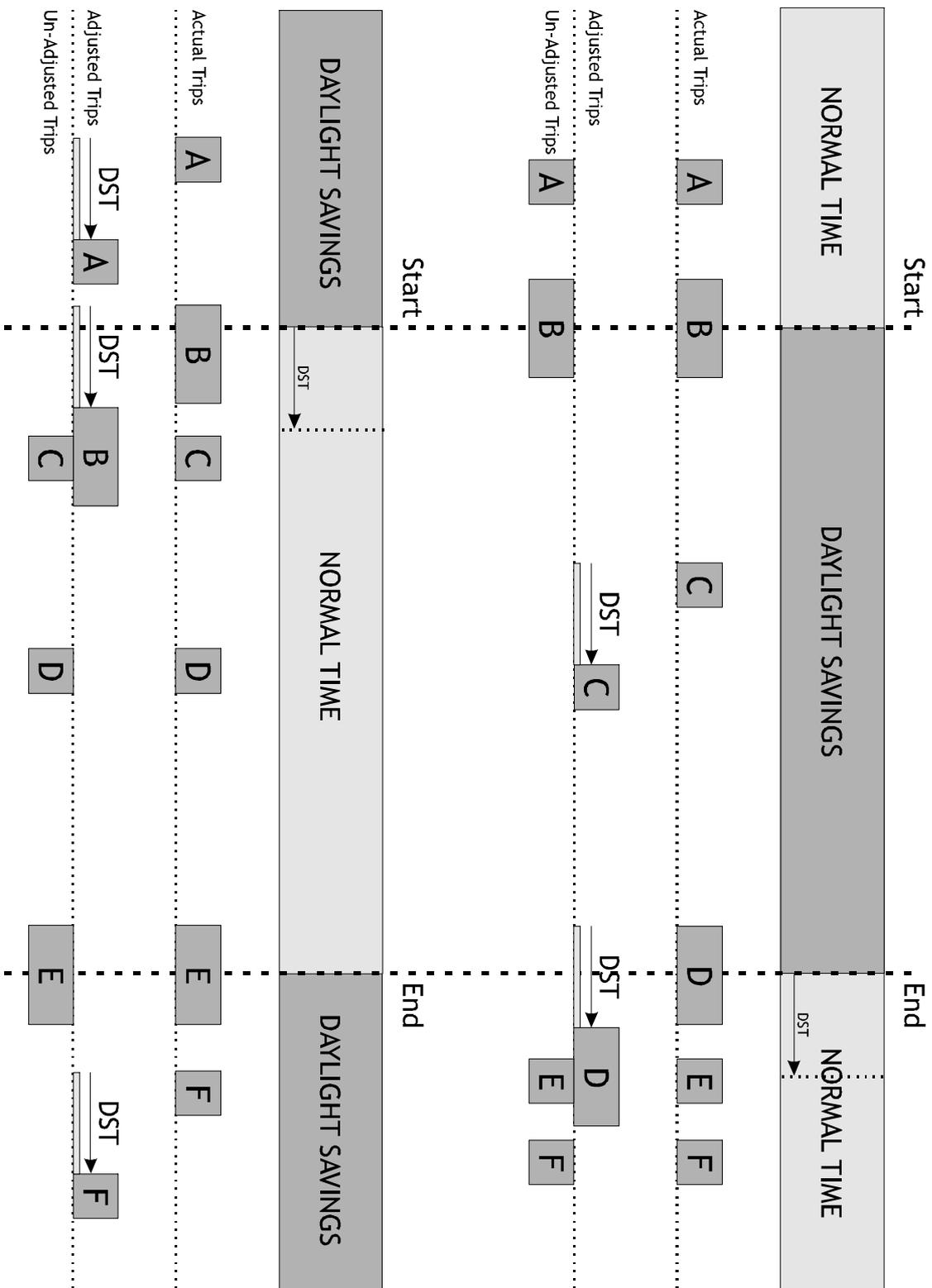
Figure 1 – Daylight Savings in the Northern Hemisphere (top) and Southern Hemisphere (bottom).

Overlapping trips on the Activity Timeline

Figure 2 shows the trips D and E overlapping. The events recorded by trip D are shown as a black bar, and the events recorded by trip E are shown as a white bar:
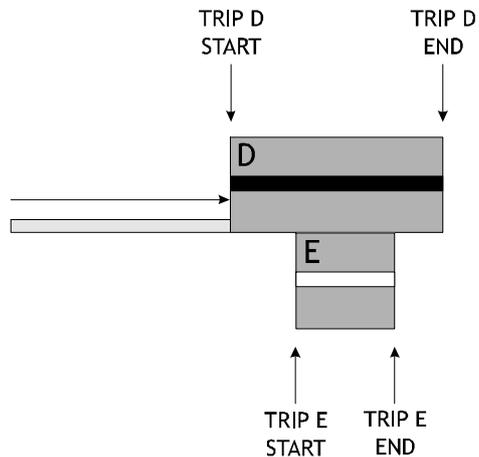

Figure 2 - Overlapping trips D and E

Figure 3 shows trips D and E combined. A display of these trips on the activity timeline will show both trips. They will overlap, and the user will not be able to see the overlap though.
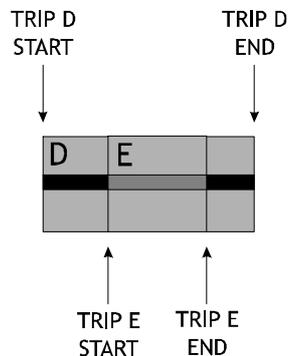

Figure 3 - Overlapping trips D and E combined

When the system processes events for report generation, it takes all the events between the trip start and trip end. Consequently an event display of Trip E will include the events of trip E and trip D. Conversely an event display of Trip D will include the events of trip D and trip E

The effects of DST on interval data

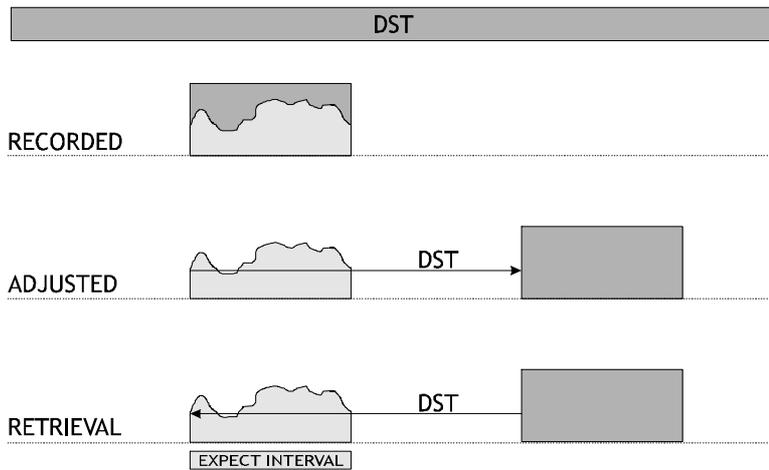An illustration of interval data storage and retrieval is shown below in figure 4:

Figure 4 - Interval storage and retrieval

After the data are recorded, and during the download of data into the client, the trip data are shifted forward by **DST** (which is set in the client). When the user requests a interval graph, the system takes the start of the activity timeline selection into account, and references back to the interval data using **DST**.

Complete illustration of interval data retrieval

The following explanation assumes that the Activity Timeline selection corresponds with that of the trip start and end times.
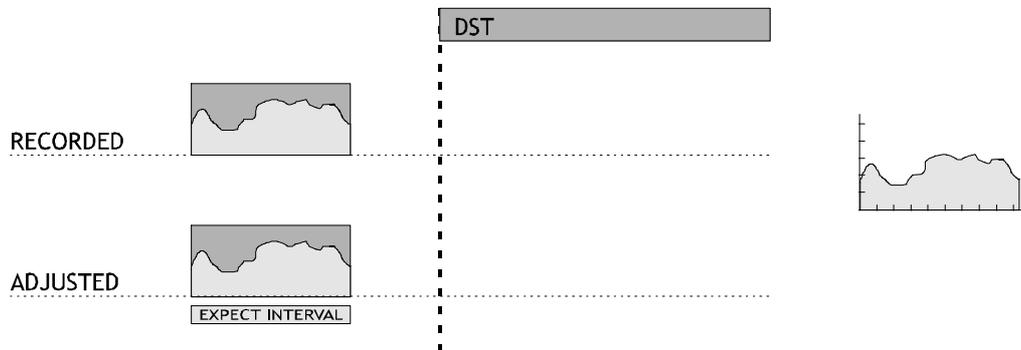

Figure 5 - Trip before DST period

There is no time shift for the trip data, and thus interval data are referenced by the start of the activity timeline selection.

Figure 6 - Trip before DST period crosses into the DST period

Despite the fact that the trip crosses into DST, there is no time shift for the trip data, and thus interval data are referenced by the start of the activity timeline selection.
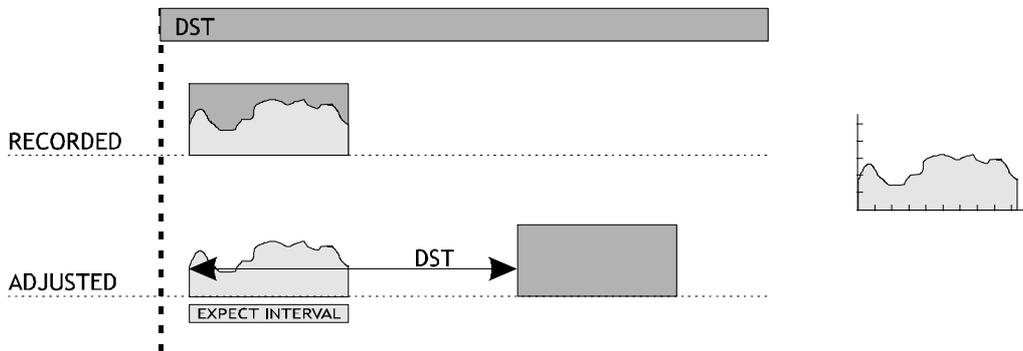
Figure 7 - Trip inside DST period

Because the trip started in DST, there is a time shift for the trip data, and thus interval data are referenced by the start of the activity timeline selection less the **DST** value.
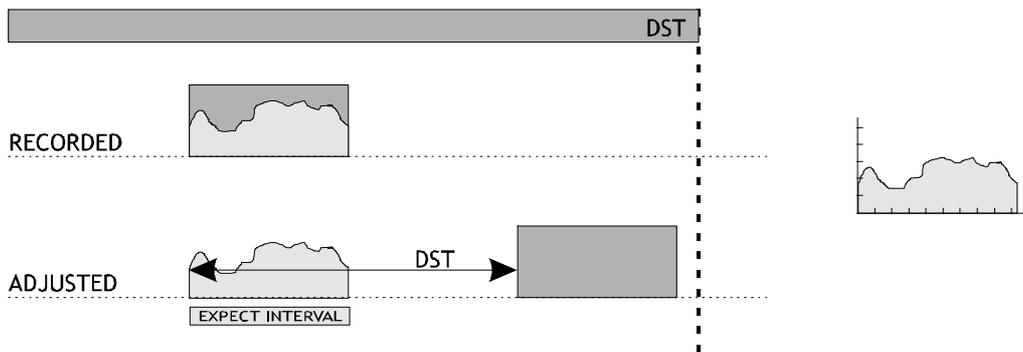

Figure 8 - Trip inside DST period – shifted trip is still inside DST period

Because the trip started in DST, there is a time shift for the trip data, and thus interval data are referenced by the start of the activity timeline selection less the **DST** value.
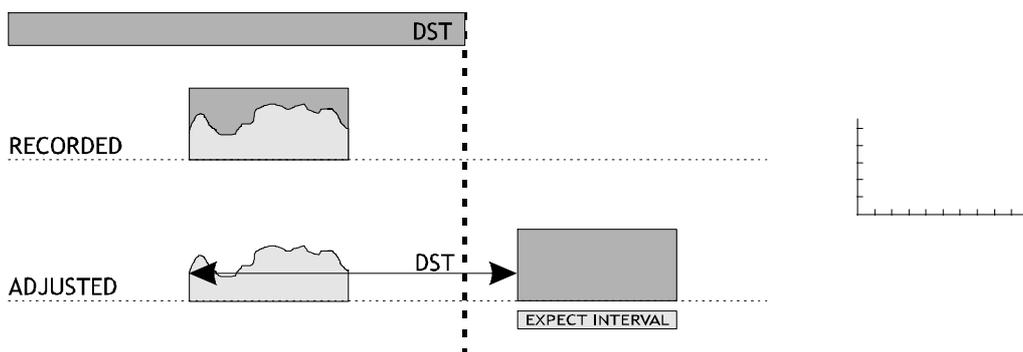

Figure 9 - Trip inside DST period – shifted trip is outside DST period

Because the trip started in DST, there is a time shift for the trip data. The shifted trip data falls **outside** of DST and thus interval data are referenced by the start of the activity timeline selection – unfortunately the interval data are in another location, and as a result no interval data will be displayed.
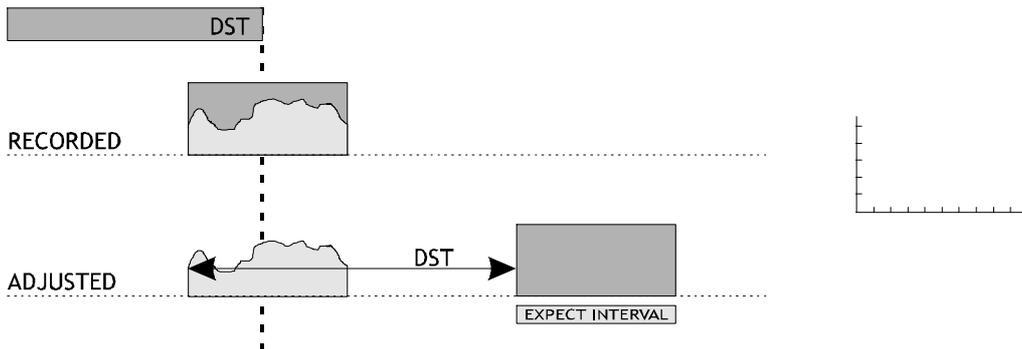
Figure 10 - Trip inside DST period crosses to normal time – shifted trip is outside DST period

Despite the fact that the trip crosses into normal time, the trip started in DST and there is a time shift for the trip data. The shifted trip data falls **outside** of DST and thus interval data are referenced by the start of the activity timeline selection – unfortunately the interval are in another location, and as a result no interval data will be displayed.

Figure 11 - Trip outside DST period

There is no time shift for the trip data, and thus interval data are referenced by the start of the activity timeline selection.
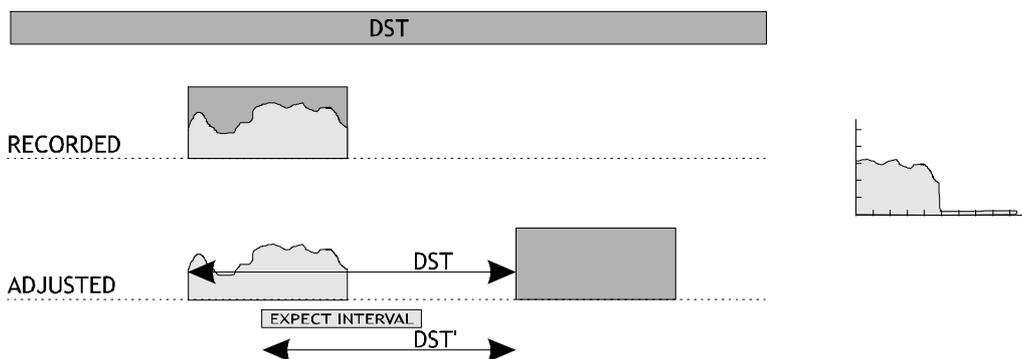

Figure 12- DST time changed after data is downloaded

The trip was downloaded in DST, and thus the trip data are shifted. If the daylight savings amount has been changed, say from a two-hour shift to a one-hour shift, the interval data will not be referenced correctly, and a Interval data plot will include partial interval data.
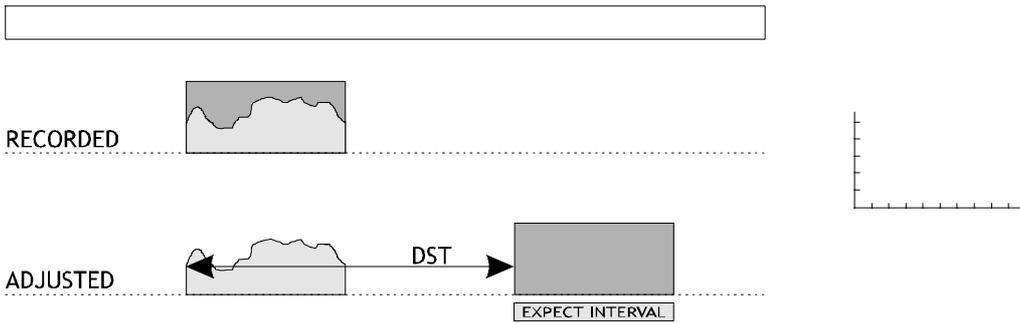
Figure 13 - DST settings disabled after data downloaded in DST period

If the trip data are downloaded in DST, and then daylight savings is turned off, the system will reference the interval data by the start of the activity timeline selection, and not the trip start less the DST value. As a result the interval data will not be displayed.
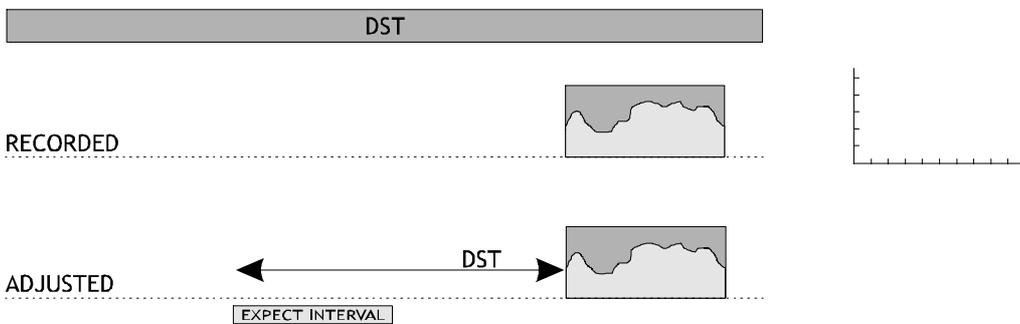

Figure 14 - DST settings enabled after data downloaded in normal time

If the trip data are downloaded in normal time, and then daylight savings is turned on, and the trip date happens to fall within DST, the system will reference the interval data by the start of the activity timeline selection less the DST value, and not the trip start. As a result the interval data will not be displayed.