

# Requirements of a Navigation System

## Introduction

1. The regulation requires that any vehicle undertaking long journeys transporting cattle, sheep, pigs, goats or horses [excluding registered horses] must be equipped with a navigation system (see Annex 1 chapter VI 4.1). This requirement applies to all *new vehicles* involved in such journeys entering into service on or after 1 January 2007, and to all *existing vehicles* after 1 January 2009. Vehicles undertaking journeys solely within the UK in compliance with the derogation described in part 2 of WATO 2007, where the journey does not exceed 12 hours in order to reach the place of final destination, are *not* required to be fitted with a navigation system.

2. The system must be able to record that information which is required to be completed in the journey log (see Annex II, section 4 of the regulation), and in addition, the status of the tailgate or other loading flaps (open or closed). The system must be capable of (1) storing this information on board the vehicle (2) allowing interrogation of this information at any time during a journey by an enforcement officer. The system is intended to be used primarily by enforcement officers as a tool for assessing compliance with the written journey log. It is likely that the system will require additional functionality *in the near future*. Transporters are advised to bear this in mind when selecting navigation systems.

## Description and Specification

3. The navigation system would more accurately be described as a global positioning and communications system. It is not a requirement that the system be useable by transporters for planning journey routes.

4. The system should comprise 2 separate components:

- An **onboard unit** (OBU) that collects, records and stores the required data automatically
- A **positioning system** that can deduce its own location by use of satellite signals, together with a time stamp

5. The data relating to each separate journey must be stored on the OBU for a period of 4 weeks. This data must be accessible by an enforcement officer at any time, either during a journey or during the 4 week period after the journey is completed, in order that checks can be undertaken to verify compliance with the written journey log.

6. The OBU must be capable of collecting and storing automatically the following information:

- (a) geographical positioning of the vehicle (collected, recorded and stored at least every 5 minutes);
- (b) speed (Kilometres/hour) (collected, recorded and stored at least every 5 minutes);

- (c) opening and closing of entry points to the animal compartment(s) usable for loading and unloading of animals (collected, recorded and stored at least when status changes);
- (d) coupling and decoupling of the trailer (collected, recorded and stored at least when status changes);

7. Additionally, the following information, which can either be generated manually or automatically, must be recorded on the OBU:

- (a) distinguishing number of the journey log;
- (b) the category of animals loaded, at least in compliance with the categories defined in the regulation (EC) No 1/2005;
- (c) the number of animals loaded;
- (d) name and authorisation number of transporter;
- (e) place, date and time departure according to the regulation (EC) No 1/2005;
- (f) place, date and time of arrival according to the regulation (EC) No 1/2005;
- (g) the number of animals dead during and after the journey including their identification

8. Enforcement officers will use data stored either on the OBU to verify compliance of individual journeys with the paper journey log. Enforcement action may be taken where there are obvious discrepancies between the two records. Officers can request data during a journey, for example at a roadside check. Failure to provide such data, or to have installed on the vehicle a functioning navigation system that meets the requirements of the regulation shall be an offence.

9. A more detailed technical specification of the navigation system is provided in the annex to the guidance at [xx]. A complete electronic technical specification is also available on request from Defra [*can supply detailed electronic spec from produced by JRC if requested, but this is far too detailed for inclusion in this guidance*].

10. A number of manufacturers produce navigation systems that meet the requirements outlined in this guidance. Transporters may wish to purchase and fit such systems to their vehicles, or are at liberty to design and construct any system of their own that meets the requirements outlined above.

### **What Might be Required of the Navigation System in the Future?**

11. It is clear that additional functionality will be required from the navigation system in the near future. *Transporters are strongly urged to adopt systems now that will be able to deliver this additional functionality.* The additional functionality is described below.

- A third component of the system is a **communication system** that enables transfer of data recorded by the OBU at regular intervals (assume every 15 minutes) to a base station located at the transporter's

headquarters. The regulation does not specify how long such information should be stored, although it is recommended that information on each journey is kept for a minimum of three years (paper journey logs must be kept for 3 years). Journey information held on the base station shall be made available to an enforcement officer upon request.

- Although it is a *current requirement* to monitor and record temperatures on board the vehicle, there is no requirement to record this data to the OBU. Again, this is likely to become a requirement in the near future. It would be advisable to adopt a system that records and stores to the OBU information on all temperature readings taken from inside the animal compartment at regular intervals (e.g. every 5 minutes) and that can also transmit this information to the base station via the communication system.
- It would also be sensible to incorporate into the system, warning systems that can alert the driver in cab when (i) when the journey time is exceeded, and (ii) when the temperature in the animal compartment moves outside the range 5C to 30C (please see guidance on vehicle temperatures), unless other means of achieving this are already available.

12. The data that the navigation system is required to collect and store is subject to amendment through committee procedure during the life of the regulation. Although no further changes are expected to the specification in the near future (other than the requirement to record and transmit temperature data), transporters should be aware that any system they fit now may need to have additional functionality in the future. A possible example might be the recording of electronic animal identification data. Transporters are advised to bare this in mind and to adopt systems that are flexible and upgradable.

### **Temperatures within Vehicles, and Temperature Monitoring and Recording**

13. It is a requirement of the regulation that the temperatures within the animal compartment of vehicles transporting domestic cattle, sheep, goats, pigs and horses on long journeys be maintained within the range 5C to 30C (with a 5C tolerance either side of this range). The vehicle temperature must be maintained within this range from the beginning to the end of any long journey, including any stops when animals remain on board. Vehicles undertaking such journeys must be fitted with mechanical ventilation systems that can effectively maintain temperatures within this range throughout the animal compartment(s), and that can operate independently from the vehicle engine for at least 4 hours.

14. Vehicles must also be fitted with a means of monitoring *and recording* the temperatures within the vehicle. It is not yet necessary to record such data to the OBU referred to in the section 'Requirements of a Navigation System' (or transmit it to the base station). However, this *is* likely to become a requirement in the near future, and for sake of ease, transporters are advised to use navigation systems that offer this functionality. Any other means of

recording temperature data would currently be acceptable. A recording frequency of every 5 minutes is recommended and records must be time and date stamped.

15. Vehicles must be fitted with a warning system that alerts the driver when the temperature in the animal compartment moves outside the acceptable temperature limit. Although the quoted temperature range specifies a +/- 5C tolerance, the system should notify the driver immediately when the temperature in any part of the vehicle (or trailer) where animals are kept moves outside the 5C to 30C range. This will enable the driver to take prompt preventive action to prevent animals from suffering either heat or cold stress. A driver should take action as soon as practicable on being alerted to restore temperatures to within the acceptable range. In most cases, this action will comprise adjustment of the ventilation system to either increase or decrease airflows through the vehicle, although other effective action may either be taken or necessary.

16. The regulation does not specify the nature of the equipment that should be used to monitor and record temperature. A variety of designs of temperature probe are manufactured and have been used effectively to monitor on board temperatures on animal vehicles. Temperature probes should be of robust construction, capable of tolerating a harsh operating environment, and produce readings that accurately reflect the true air temperature where they are located.

17. Temperature must be recorded in those parts of the vehicle that are expected to experience the worst (or most extreme) environmental conditions. As an absolute minimum, probes must be located onboard where (a) temperatures are expected to be highest and (b) temperatures are expected to be lowest. In most vehicles, the highest temperatures are likely to be experienced at the front of the animal compartment on the top tier; the lowest temperatures are likely to be encountered on the lowest tier at the rear. Thus a minimum of 2 temperature probes will be required. However, it may be advisable, for purposes of assessing animal welfare, to install more temperature probes, especially where onboard temperatures are likely to be less predictable or more variable. Separate probes will also be required for any trailer. Readings from every probe must be monitored and recorded at appropriate frequencies. Where a reading from *either one or more probes* moves outside the accepted temperature range, the driver must be alerted by the warning system so that he can take appropriate action.

18. Transporters are required to make temperature data available to enforcement officers upon request. Enforcement officers can inspect this data, and may additionally, make temperature recordings at any point throughout the vehicle to assess climatic conditions and compliance with the requirements of the regulation. Officers will take enforcement action where animals are found to be suffering adverse welfare as a result of the effects of heat or cold stress, or where historical or current temperature readings are found to be outside acceptable limits.

19. Vehicles undertaking journeys solely within the UK in compliance with the derogation described in part 2 of WATO 2007, where the journey does not exceed 12 hours in order to reach the place of final destination, are *not* required to meet the provisions described above. However, it is still a requirement that the temperature within the animal compartment be maintained within the range 5C to 30C (with a 5C tolerance either side) whilst the vehicle is loaded with animals and moving. This implies that drivers must use some means of regularly monitoring temperatures. Where the temperature moves outside acceptable limits, action must be taken as soon as practicable to reverse the change.

20. For short journeys, no temperature range, or means of monitoring or recording temperature is specified in the regulation. It is however a general requirement of the regulation that animals not be transported in a way likely to cause them suffering or injury. Extremes of temperature can cause heat or cold stress in animals, causing welfare problems, or in more serious cases, death. If animals are transported when the temperature in the animal compartment falls outwith the range 5C to 30C , and animals suffer as a result, it is likely that enforcement action would be taken against a transporter.

WORKING DOCUMENT

**Equipment for navigation systems for livestock vehicles used for long distance transport**

**A. Introduction**

Paragraph 4.1 of Chapter VI of Annex I to Regulation (EC) No 1/2005 provides that as from 1 January 2007 for means of transport by road for the first time in service and as from 1 January 2009 onwards for all means of transport they must be equipped with the appropriate navigation system allowing for recording and providing information equivalent to those mentioned in the journey log as referred to in Annex II, section 4 of the aforementioned Regulation, and also information concerning opening/ closing of the loading flap.

In order to ensure compatibility of satellite navigation systems used on crossborder transports, legislation on the requirements for such systems at Community level is necessary.

In establishing the requirements for satellite navigation systems, a balance should be kept between the various aspects to be taken into consideration, as regards animal welfare, economic and social implications.

In order to avoid unfair competition the legislation should enable all competent manufacturers to develop suitable equipment.

Part B that follows presents the possible requirements for a navigation system referred to in Article 6(9) of Regulation (EC) No. 1/2005 to be adopted in a Commission Regulation after approval by the Standing Committee.

**B. Draft requirements for a navigation system**

**1. Navigation system**

The navigation system shall consist of the following linked parts

- an **onboard unit** (OBU) which is able to collect, record and store automatically data referred to in 2.5 and 2.8 and if deemed necessary, from other additional sensors ;
- a **positioning system** which is able to deduce its own location by satellite signals and provide precise timing;
- a **communication system** which enables automatically the transmission of data collected and recorded by the OBU from a vehicle to a remote device during a journey.

## **2. Onboard Unit (OBU)**

- 2.1 The OBU shall at least be able to work at a temperature range between -40°C and +80°C. If installed outside the cabin, it shall be waterproof.
- 2.2 The OBU shall operate with open software.
- 2.3 In order to allow the connection of sensors and/or modules for the monitoring of the transportation conditions sufficient analog and digital inputs as well as communication ports such as standard USB and CAN port shall be present.
- 2.4 The OBU shall allow thresholds (journey time, temperature inside the animal compartment(s)) to be defined and shall be able to generate warning signals in cases where the collected data indicates that defined thresholds are exceeded.
- 2.5 During the journey, the OBU shall collect, record and store two sets of data for each group of animals covered by one journey log in any circumstances, including disconnection from the electrical power supply of the vehicle.
  - (1) The first set of data, in relation to the time during the journey expressed in Greenwich time, consist of:
    - (a) geographical positioning of the vehicle (collected, recorded and stored at least every 5 minutes);
    - (b) speed (Kilometres/hour) (collected, recorded and stored at least every 5 minutes);
    - (c) opening and closing of entry points to the animal compartment(s) usable for loading and unloading of animals (collected, recorded and stored at least when status changes);
    - (d) coupling and decoupling of the trailer (collected, recorded and stored at least when status changes);
    - (e) temperature inside the animal compartment(s) (collected, recorded and stored at least every 5 minutes);
    - (f) warning signals (collected, recorded and stored when reaching the defined thresholds for the parameters of 2.4).
  - (2) The second set of data, to be entered into the system or generated automatically, consists of the following information
    - (a) distinguishing number of the journey log;
    - (b) the category of animals loaded, at least in compliance with the categories defined in the regulation (EC) No 1/2005;
    - (c) the number of animals loaded;
    - (d) name and authorisation number of transporter;
    - (e) place, date and time departure according to the regulation (EC) No 1/2005;

- (f) place, date and time of arrival according to the regulation (EC) No 1/2005;
  - (g) the number of animals dead during and after the journey including their identification number, when applicable, and the reason of death.
- 2.6 A non-removable memory in the OBU shall store all data collected during the journey at least for 4 weeks after completion of the journey.
  - 2.7 The integrity of the data shall be assured (black box) and protected against any manipulation of its content.
  - 2.8 The OBU has to be able to send and store a warning signal in the case of any type of attempt to be opened and/or manipulated (anti-tampering function).
  - 2.9 The OBU has to be able to allow downloading the data referred to in 2.5 and 2.8 and to alert the driver of the vehicle when reaching the defined thresholds for the temperature in the compartment(s) where animals are located.

### **3. Positioning system**

- 3.1 The device which is used to locate the vehicle shall be based on Global navigation Satellite Systems (GNSS).
- 3.2 The device shall be able to receive signals of 12 satellites simultaneously and to provide the most accurate position of the vehicle.

### **4. Communication system**

- 4.1 The communication system shall be based on General Packet Radio Service (GPRS) technology (minimum dual band class 8) to send data.
- 4.2 Open standard protocols shall be used for communication.
- 4.3 The communication protocol shall provide proof of origin and ensure confidentiality as well as integrity of the data transmitted.
- 4.4 For data interchange Extensible Markup Language (XML) shall be used.
- 4.5 The system shall allow the intervals of data transmission to be defined.