

The Danish Road Directorate and Counties

**Standard for Communication in Between
VINTERMAN and
Road Clearing Equipment**

Version 1.40 - DRAFT

31-07-2003

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1. Preface

This document describes a standard for communication between winter clearing equipment and the Danish winter administration system, VINTERMAN.

The purpose of the standard is to ensure the possibility of monitoring and optionally also controlling all vehicles during an action even if the equipment is delivered from different suppliers.

The standard described in this document is based on the German DAU standard version 002.

2. Update History

Version 1.0 of this document came in 1998 including the record format 931000.

Version 1.1 from 1999 is updated at the following points:

- The standard VINTERMAN data record is changed a little (code 2104 are replaced by 1080 and 931003 are replaced by 2051).
- The “DAU;002” line are added in the example.
- The debug application is also described in this document.

The changes are made in order to make a more correct DAU specification. However, VINTERMAN will read the old files as well as files with the format described in this second version.

Version 1.2 from March 2000 is updated at the following points:

- There are added an extra VINTERMAN data record (DRCODE 931102) which can be mixed together with the existing data record (DRCODE 931101).

This new data record is mainly expanded for better and more correct data collection from liquid- and combined spreaders. However, most data can also be obtained from liquid- or combined spreaders in VINTERMAN using the old data record.

Version 1.3 from June 2001 is updated at the following points:

- There are added a lot of extra DACODEs in order to make the new VINTERMAN data record with DRCODE 931103, 931104 and 931105.

These new data records are directed against simple GPS-based equipment, a patrol car and a complete spreader information record covering all possible fields.

Version 1.31 from August 2001 contains only a redefinition of DACODE 931054 (sensors on). This field was originally an integer introduced in version 1.3. It is now a string.

Version 1.32 from October 2001 is updated with fresh examples and contains mainly textual changes.

Version 1.40 introduces two way communications which now includes that the office side is able to send messages to the equipment side. The purpose is to be able to implement GPS controlled spreading.

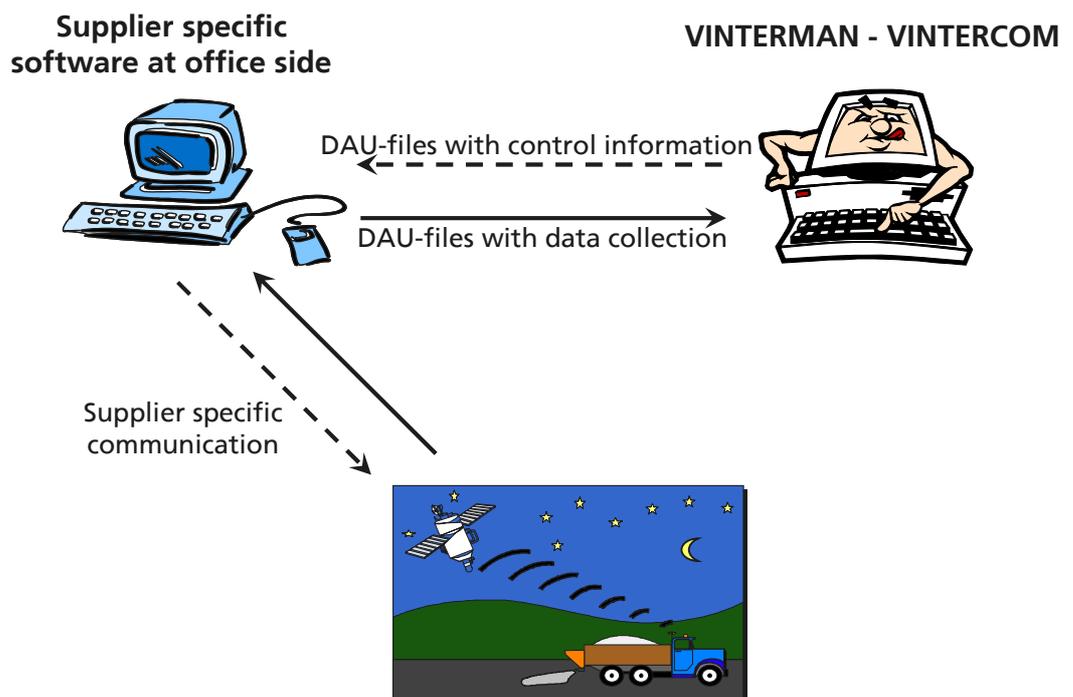
3. Principle

Communication between road clearing equipment and VINTERMAN is expected to involve the following two elements:

- A supplier-specific program to be run at the headquarters responsible for the road clearing equipment. This program must be designed to handle the communication between the supplier's equipment and the central computer, and deliver certain information as text-based message files with a predefined purpose.
- A module at VINTERMAN designed to read the text-based message files submitted by individual suppliers.

The supplier-specific programs may consist of the supplier's present systems, possibly expanded by the addition of a facility designed to deliver the incoming information as text files. It must be possible to run the supplier-specific programs on a normal PC under Windows NT/98 or later versions.

The present standard does not dictate the way in which individual suppliers should communicate with their own equipment. The standard only sets out how the supplier's software should communicate with VINTERMAN. This allows individual suppliers to combine diskettes, smartcards or GSM/GPRS-based communication in a way that meets their customers need and wishes.



4. Protocol

This section describes the actual protocol to be used for the file-based communication between the supplier's software and VINTERMAN.

The supplier-specific software will be responsible for delivering a number of message files in a predefined directory. Message files must conform to the following guidelines:

- The following structure is proposed for file names: "xxxx0123.txt", where "xxxx" may be freely chosen by the supplier as a standard prefix for all files, "0123" is a four-digit serial number which increases in increments of one for each new message file. The file extension "txt" indicates that the file is a text file.
- Nothing must be added to the file when it is closed down by the supplier's program. VINTERMAN can therewith assume that closed files contain only complete messages.
- Message files which have been processed by VINTERMAN will usually be deleted so that no subsequent history is created. For testing and surveillance purposes, however, it will be possible to rename files by changing their file extension so that any problems with the interface can be identified more easily.
- VINTERMAN will check all incoming message files. Errors will be registered in the VINTERMAN log book. Message files containing errors will not be deleted. Ordinary files will normally be deleted by VINTERMAN but can be left with extension "*.ok!" for debugging purposes.
- A message file may contain an unlimited number of messages relating to one or several vehicles/pieces of equipment. If the equipment is connected online (via GSM/GPRS etc.), a message file will typically contain a number of time and position signals output since the last message was sent from the same piece of equipment. If the equipment is connected via a smart-card, a message file will typically contain all information regarding the activity.
- The contents of the files must conform to the structure set out in the DAU 002 specification. Both the structure and the contents will be described in more detail in the following sections.

If the supplier software supports two way communications, it must also be able to read files of the same structure, but stored by VINTERMAN in another predefined directory.

5. DAU Standard

All messages between the supplier's system and VINTERMAN must be relayed in a DAU-compatible format. DAU is the abbreviation for "*Definierte DatenAUSTAUSCHSchnittstelle*". The specification/standard was developed by a German working group which specialises in mobile data acquisition. In this instance, VINTERMAN is only concerned with the DAU definitions of messages, etc., and not with the other areas covered by the specification, such as the connection points on the vehicles, etc.

DAU stipulates that the supplier must submit a definition file (a text file) which defines the contents and format of all messages. This definition file containing the definitions constitutes the user's documentation of any data files produced by that user at a later date. The file defines tree levels of information:

- Data fields, called DACODE
- Data records, called DRCODE
- Messages or groups of records, called DGRCODE

All codes are identified by a number between 0 and 999999. In the case of all three formats, DAU determines all codes in the interval 0-899999. Other users, meanwhile, are free to define new codes in the interval 900000-999999.

Text within data files may contain the Danish letters "æ", "ø" and "å" in a format, which corresponds to the Windows character set.

The following sections contain short definitions of the DACODE, DRCODE and DGRCODE formats. For a complete description, please refer to the documentation relating to DAU, version 002, "Dokumentation DAU Schnittstelle".

5.1. DACODE

DACODE is the description of the data values. Every DACODE is defined using a number and a descriptive text, along with a possible unit and data format.

The following examples illustrate the DACODE format:

```
DACODE
1000;Time;;ZEIT
1140;Date;;DATUM
2022;GPS latitude;rad;LONGREAL
2023;GPS longitude;rad;LONGREAL
1080;Km-counter;km;REAL
```

The unit specification is not relevant for the first codes (1000 and 1140) as there are no syntactical requirements.

The following data formats are available:

- **STRING** – text strings up to 255 characters in length (ASCII)
- **LONGINT** – 4 bytes integers with operational sign
- **CARDINAL** – 2 bytes integers without operational sign
- **SHORTCARD** – 1 byte integer without operational sign
- **LONGCARD** – 4 bytes integer without operational sign
- **REAL** – real number with 7 significant digits corresponding to 4 bytes
- **LONGREAL** – real number with 15 significant digits corresponding to 8 bytes
- **BOOLEAN** – specified using the values 0 and 1 for false and true respectively
- **BLOB** – it is not know how this will be handled within a standard text file
- **DATUM** – a date specified as a numerical value in the format YYYYMMDD
- **ZEIT** – a time specified as a numerical value in the format HHMMSS

Please note that the DAU-standard demands that decimal separator must be specified as a full stop “.” for the data types REAL and LONGREAL. However, VINTERMAN will accept as well full stop and the default separator in the local Windows setup as decimal separator. In Denmark, this often means that comma “,” also will be accepted as decimal separator.

5.2. DRCODE

DRCODE is the description of the data records (data lines). Every DRCODE is defined using a number, a descriptive text and a list of data in the record. Every data element is defined by its number and an indication of the validity period for this value. The following example illustrates the DRCODE format:

```
DRCODE
987654;GPS position record;1140;;1000;;2022;;2023;
```

The example shows the definition for a record/data line containing five fields, the actual DRCODE (987654), the date (1140), the time (1000), the GPS longitude (2022) and the GPS latitude (2023).

The example does not specify a validity period for the data values. If a validity period is specified after 2022 and 2023 as e.g. 001500, this indicates that the information must be repeated every 15 minutes. For a temperature reading, a “validity period” of 0.5 indicates that new information must be relayed every time the temperature increases or drops by 0.5 degrees.

In general, VINTERMAN will not react on a validity period parameter.

5.3. DGRCODE

DGRCODE is the description of a group of records, which correspond to a complete message. Every DGRCODE is defined using a number, a descriptive text and a list of records in the message. In the list of records, every record is described by the following fields:

- The record’s DRCODE identification number
- Begin/end conditions
- A hierarchical level indicator
- A sequence indication
- The minimum number of occurrences of this record
- The maximum number of occurrences of the record

In general, most of those fields are empty in the DGRCODE definition. The following example illustrates the DGRCODE format:

```
DGRCODE
```

```
901234;Test;0001;BOF;1;;1;1;987654;2;;;0002;EOF;1;;1;1
```

The example shows the definition for a DGRCODE message, which starts with a record/line containing a DRCODE of 0001. This may be followed by any number of data lines whose content corresponds to DRCODE 987654. The message must end with a single line, which corresponds to DRCODE 0002. A message must begin with 0001 and end with 0002 as shown in the example.

Information other than the individual record numbers should be specified as follows:

- Start/end conditions should only be specified for the first and last records respectively. In practice, these are specified using the DAU standard definitions for the first and last record (DRCODE 0001 and 0002).
- The hierarchical level indicates whether a record may, or may not, precede another record. A record with a level 3 *must* follow a record with a level 2.
- The sequence indication can be used to enforce a particular sequence for the incoming records.
- The minimum number of occurrences can be used to enforce a particular number of records. The value is set to 1 for 0001 and 0002 respectively to ensure that the start and end records always occur at least once.
- The maximum number of occurrences can be used to maximise the number of times a record may occur in a message.

The five parameters above may be used with every DRCODE to control the possible sequence of data lines in the final data files. The sequence within the actual DGRCODE definition does not determine the sequence of data lines.

6. Messages to/from VINTERMAN

A DAU definition file used to communicate with VINTERMAN must contain the following as an absolute minimum. However, the definition file needs not to be given together with the messages - it just defines the structure of the messages.

```

DAUDEF;002
DACODE
0001;DACODE;;STRING
0002;DRCODE;;STRING
0003;DGRCODE;;STRING
0031;Opcode;boolean;BOOLEAN
0032;Separator sign (alternative to semicolon);;STRING
1000;Time;;ZEIT
1080;Driven length;km;REAL
1140;Date;;DATUM
1250;Vehicle identification;;STRING
1258;Equipment identification;;STRING
1300;Material;supplier specific code (max. 10);;STRING
1360;Person;;STRING
2021;Road temperature;grader celcius;REAL
2022;GPS latitude;rad;LONGREAL
2023;GPS longitude;rad;LONGREAL
2032;Air humidity;%;REAL
2033;Air temperature;grader celcius;REAL
2051;Liquid % in the material (0 or empty: normal, >0: using prewetted salt);%;REAL
2071;Road condition;supplier specific code (max. 10);;STRING
2074;Spreading width (dry material);cm;LONGINT
2075;Spreading dose (dry material);g/m2;REAL
2077;Total amount of used dry material;kg;REAL
2105;Speed;km/h;REAL
931000;Start/finish on the route (Begin/End);;STRING
931001;Length with the spreader turned on (for dry material spreading);km;REAL
931002;Total amount of used liquid (for dry material spreading);l;LONGINT
931004;Spreader turned on now (for dry material spreading) (0=no, 1=yes);;BOOLEAN
931005;Plough works now (0=no, 1=yes);;BOOLEAN
931006;Spreading width with liquid material;cm;LONGINT
931011;Spreading dose (liquid material);ml/m2;REAL
931021;Total amount of used liquid (for liquid spreading);l;LONGINT
931031;Length with the spreader turned on (for liquid spreading);km;REAL
931032;Spreader for liquid material turned on now (0=no; 1=yes);;BOOLEAN
931040;Spreading symmetry;cm;LONGINT
931041;Expected amount of dry material;g/m2;REAL
931042;Expected amount of liquid;ml/m2;REAL
931050;Residual salt;g/m2;LONGINT
931051;Friction coefficient;;REAL
931052;Wheather condition;supplier specific code (max. 10);;STRING
931053;Cloudiness;supplier specific code (max. 10);;STRING
931054;Sensors, text identifying sensors switched on (max. 20);;STRING
931055;Remarks;supplier specific (max. 40);;STRING
931056;Compass direction;degrees;LONGINT
931057;Safe synchronisation point (0=no; 1=yes);;BOOLEAN
931058;Timestamps is in UTC (0/empty=local time; 1=UTC);;BOOLEAN
931059;Route table number/id;;LONGINT
931060;Spreader dosage mode;;LONGINT

```

```

DRCODE
0001;First line of every message;0003;;1140;;1000;;1258;;0031;;0032;
0002;Last line of every message;0003;
931100;VINTERMAN header;
    1140;;1000;;1250;;1360;;931058;;
931101;VINTERMAN data, standard;
    1140;;1000;;931000;;2022;;2023;;1080;;2105;;931001;;
    2074;;2075;;2051;;2077;;931002;;931004;;931005;
931102;VINTERMAN data, std+liquid;
    1140;;1000;;931000;;2022;;2023;;1080;;2105;;931001;;
    2074;;2075;;2051;;2077;;931002;;931004;;931005;;
    931006;;931011;;931021;;931031;;931032;
931103;VINTERMAN data position record;
    1140;;1000;;931000;;2022;;2023;;1080;;2105;;931001;
931104;VINTERMAN data patrol record;
    1140;;1000;;931000;;2022;;2023;;1080;;2105;;
    931050;;
    931051;;2021;;2033;;2032;;2071;;931052;;931053;;931054;;931055;
931105;VINTERMAN data, large;
    1140;;1000;;931000;;2022;;2023;;1080;;2105;;931001;;
    2074;;2075;;2051;;2077;;931002;;931004;;931005;;
    931006;;931011;;931021;;931031;;931032;;
    931040;;931041;;931042;;931050;;1300;;
    931051;;2021;;2033;;2032;;2071;;931052;;931053;;931054;;931055;
931150;VINTERMAN control header;
    1140;;1000;;1250;;931059;;
931151;VINTERMAN control route data;
    1140;;1000;;931000;;2022;;2023;;1080;;2105;;931001;;
    2074;;2075;;2051;;2077;;931002;;931004;;931005;;
    931006;;931011;;931021;;931031;;931032;;
    931040;;931041;;931042;;931050;;1300;;
    931051;;2021;;2033;;2032;;2071;;931052;;931053;;931054;;931055;
931152;VINTERMAN control, Select Dosage Mode;
    1140;;1000;;1250;;931060;;
931153;VINTERMAN control, Change Dosage;
    1140;;1000;;1250;;931059;;2075;;931011;;
931154;VINTERMAN control, Select Route Table;
    1140;;1000;;1250;;931059;;
931155;VINTERMAN control, Reset Counters;
    1140;;1000;;1250;;

```

```

DGRCODE
931200;VINTERMAN report;0001;BOF;1;;1;1;931100;;2;;1;;931101;;3;;;
    931102;;3;;;
    931103;;3;;;
    931104;;3;;;
    931105;;3;;;0002;EOF;1;;1;1
931201;VINTERMAN report;0001;BOF;1;;1;1;931150;;2;;1;;931151;;3;;;
    931152;;3;;;
    931153;;3;;;
    931154;;3;;;
    931155;;3;;;0002;EOF;1;;1;1

```

The file contains a number of DAU-defined field descriptions (DACODE) and some VINTERMAN field descriptions (931000-931060). The field names have, in as far as possible, been translated from German.

The section on DRCODE defines a total of 14 record/data line formats. The first two are the standard DAU start and end records. Afterwards follows a VINTERMAN header record fol-

lowed by five different data records. At last come one VINTERMAN control header and another five command records.

This information in the VINTERMAN records is described detail in the following tree tables. The tables below show how the information must occur in the final data lines of a message file.

6.1. VINTERMAN Header Record

All messages must contain at least one header record for each new piece of equipment within the same file.

| Field | Contents of a VINTERMAN header record, DRCODE 931100 |
|---------|--|
| Rec. ID | 931100 – all data lines must start with the DRCODE |
| 1140 | Present date |
| 1000 | Present time |
| 1250 | Name/identification of the vehicle |
| 1360 | Initials of the driver |
| 931058 | Definition of used timezone for the entire datafile. Empty or 0 means local time while 1 means UTC |

6.2. VINTERMAN Data Records

The five different data record formats are described in the table below to supply the DAU specification. The order of the data fields are as in the table and the last columns shows whenever a field is included in the message type.

| Field | Contents of each data field in the data records. The order of the fields is from top and downwards. The next columns show which fields there are included in which message records | DRCODE 9311xx | | | | |
|---------|--|---------------|----|----|----|----|
| | | 01 | 02 | 03 | 04 | 05 |
| Rec. ID | All data lines must start with 931101, 931102, 931103, 931104 or 931105 to identify the record format | X | X | X | X | X |
| 1140 | Present date | X | X | X | X | X |
| 1000 | Present time | X | X | X | X | X |
| 931000 | A mark showing whatever this is the begin or end of the route. The field must be left empty in between. | X | X | X | X | X |
| 2022 | GPS latitude | X | X | X | X | X |
| 2023 | GPS longitude | X | X | X | X | X |
| 1080 | Km counter or total driven length. It can e.g. start from zero | X | X | X | X | X |
| 2105 | Present speed | X | X | X | X | X |

| Field | Contents of each data field in the data records. The order of the fields is from top and downwards. The next columns show which fields there are included in which message records | DRCODE 9311xx | | | | |
|--------|---|---------------|----|----|----|----|
| | | 01 | 02 | 03 | 04 | 05 |
| 931001 | Length with the spreader turned on (for dry material spreading) | X | X | X | | X |
| 2074 | Spreading width (for dry material spreading) | X | X | | | X |
| 2075 | Present dosage (for dry material spreading) | X | X | | | X |
| 2051 | Original meaning: % of liquid in the spreaded material. In VINTERMAN zero or empty means no prewetted salt and a value higher than 0 means using prewetted salt. The figure is not relevant at a combi-spreader, where dry stuff and liquid is handled in different fields. | X | X | | | X |
| 2077 | Total amount of dry material | X | X | | | X |
| 931002 | Total amount of liquid (for dry material spreading) | X | X | | | X |
| 931004 | Salting now (for dry material spreading) | X | X | | | X |
| 931005 | Is the plough down (working) | X | X | | | X |
| 931006 | Spreading width (for dry liquid spreading) | | X | | | X |
| 931011 | Present dosage (for liquid spreading) | | X | | | X |
| 931021 | Total amount of liquid (for liquid spreading) | | X | | | X |
| 931031 | Length with the spreader turned on (for liquid spreading) | | X | | | X |
| 931032 | Salting now (for liquid spreading) | | X | | | X |
| 931040 | Spreading symmetry, cm. Neutral setting on the control panel is equal to 0 or an empty field. Positive values defines the amount of cm, which the spreading picture is moved towards the centre of the road | | | | | X |
| 931041 | Expected amount of dry material (g/m ²). It shows what the spreader think, it actually spreads. | | | | | X |
| 931042 | Expected amount of liquid (ml/m ²). It show what the spreader think, it actually spreads. | | | | | X |
| 931050 | Residual amount of salt, g/m ² . It can e.g. be measured by the SOBO 20 equipment | | | | X | X |
| 1300 | Material, which are used. Supplier specific code at up to 10 characters | | | | | X |
| 931051 | Friction coefficient | | | | X | X |
| 2021 | Road temperature | | | | X | X |
| 2033 | Air temperature | | | | X | X |
| 2032 | Air humidity, % | | | | X | X |
| 2071 | Road condition | | | | X | X |
| 931052 | Weather condition (up to 10 characters) | | | | X | X |
| 931053 | Cloudiness (up to 10 characters) | | | | X | X |
| 931054 | Sensors set on (bit set). This is a free text field, where each supplier can add text codes showing sensors, which are switched on (up to 20 characters) | | | | | X |
| 931055 | Remarks (up to 40 characters) | | | | X | X |

Only fields having a value will be used by VINTERMAN. The actual frequency wherewith information should be exchanged will not be discussed at present.

VINTERMAN can receive more than one message (with different time-stamps) from the same spreader within the same DAU-file. This gives the opportunity to collect data with a higher frequency and send it from the spreader with a lower frequency. In the same way, VINTERMAN can receive data from more vehicles within the same message file by using a new header record to separate data from the different vehicles.

Each piece of equipment should in general only use one kind of data records. If a piece of equipment want to send different record formats, they will always be presented as the large format including all data fields.

6.3. VINTERMAN Control Route Header

Data records to form a route table are described in the table below to supply the DAU specification. The order of the data fields are as in the table.

| Field | Contents of a VINTERMAN control header record, DRCODE 931150 |
|---------|--|
| Rec. ID | 931150 – all data lines must start with the DRCODE |
| 1140 | Present date |
| 1000 | Present time |
| 1250 | Name/identification of the vehicle |
| 931059 | Route table number (ID) |

6.4. VINTERMAN Control Route Data Records

Data records to form a route table are described in the table below to supply the DAU specification. The order of the data fields are as in the table.

| Field | Contents of each data field in the data records. The order of the fields is from top and downwards. |
|---------|--|
| Rec. ID | All data lines must start with 931151 to identify the record format |
| 1080 | Km counter or total driven length. It can e.g. start from zero |
| 2022 | GPS latitude |
| 2023 | GPS longitude |
| 931056 | Compass direction, angle in degrees |
| 931057 | Safe synchronisation point (0=no; 1=yes) |
| 2105 | Present speed at which the control data is collected |
| 931004 | Salting on/off for dry material spreading |
| 931032 | Salting on/off for liquid spreading |
| 2074 | Spreading width (for both dry and liquid spreading) |
| 931040 | Spreading symmetry, cm. Neutral setting on the control panel is equal to 0 or an empty field. Positive values defines the amount of cm, which the spreading picture is moved towards the centre of the road |
| 2075 | Present dosage of dry material |
| 2051 | Original meaning: % of liquid in the used spreaded material. In VINTERMAN zero or empty means no prewetted salt and a value higher than 0 means using prewetted salt. The figure is not relevant at a combi-spreader, where dry stuff and liquid is handled in different fields. |
| 931011 | Present dosage of liquid |

There will be situations, where position and/or direction are missing. Normally the records above will come in a large set describing a complete route.

Each piece of equipment should in general only use one kind of data records. If a piece of equipment want to send different record formats, they will always be presented as the large format including all data fields.

6.5. VINTERMAN Control Commands

Control command records are described in the table below to supply the DAU specification.

| Field | Command: Select dosage mode |
|---------|--|
| Rec. ID | 931152 – all data lines must start with the DRCODE |
| 1140 | Present date |
| 1000 | Present time |
| 1250 | Name/identification of the vehicle |
| 931060 | Dosage mode (Supplier specific number) |

Select dosage mode is intended to be used to choose among different predefined modes of temperature controlled spreading.

| Field | Command: Change dosage |
|---------|--|
| Rec. ID | 931153 – all data lines must start with the DRCODE |
| 1140 | Present date |
| 1000 | Present time |
| 1250 | Name/identification of the vehicle |
| 931059 | Route table number (ID) |
| 2075 | Change (plus/minus) in dosage of dry material |
| 931011 | Change (plus/minus) in dosage of liquid |

Change dosage is intended to be used for updating the dosage of an existing route table within the spreaders memory. The purpose is to save a complete transmission of a new route table.

| Field | Command: Select route table |
|---------|--|
| Rec. ID | 931154 – all data lines must start with the DRCODE |
| 1140 | Present date |
| 1000 | Present time |
| 1250 | Name/identification of the vehicle |
| 931059 | Route table number (ID) |

If the spreader can store several standard route tables, this function can select the one, which shall be active.

| Field | Command: Counter reset |
|---------|--|
| Rec. ID | 931155 – all data lines must start with the DRCODE |
| 1140 | Present date |
| 1000 | Present time |
| 1250 | Name/identification of the vehicle |

The command shall force a reset of the salt- and km counters on the spreader.

6.6. Data records, example

Below follows an example of a simple message-file with data delivered to VINTERMAN:

```

1. DAU;002
2. 0001;931200;20010201;012058;FalEpoNidoWeis;;
3. 931100;20010201;012058;2;x
4. 931101;20010201;011002;;0,968763327;0,151822701;0,2;21;0,0;300;20,0;30;1;0;1;0
5. 931101;20010201;011024;;0,968744420;0,151820665;0,4;16;0,1;300;25,0;30;6;2;1;0
6. 931100;20010201;011517;3;x
7. 931103;20010201;011252;;0,967705076;0,149926110;0,1;0;0,1
8. 931103;20010201;011318;;0,967738237;0,149771648;0,1;0;0,1
9. 931103;20010201;011324;;0,967746673;0,149732960;0,1;0;0,1
10. 0002;931200

```

This file contains the following data lines:

- The first line is a “file definition” which shows, that the file is a DAU version 002 file. VINTERMAN will not react on this line and it can also be omitted.
- The second line is a standard DAU header line. VINTERMAN will only use this to identify that a message of DGRCODE 931200 comes.
- The third line is a VINTERMAN header record containing date, time, spreader and person. VINTERMAN uses the spreader identification to make a link to an ongoing activity.
- Line four and five is VINTERMAN data record with information about the state of the action.
- In line six a new header line occurs from another vehicle.
- Line seven to nine is data records from the second vehicle.

- The last line is the standard DAU end-record.

As shown above, it is possible to add several VINTERMAN header/data records within the same message file.

6.7. Control records, example

Below follows two examples of simple message-files with control information and commands sent from VINTERMAN:

```
1. DAU;002
2. 0001;931200;20030201;012058;FalEpoNidoWeis;;
3. 931150;20030201;012058;07;1
4. 931151;0;0,968763327;0,151822701;;1;0;0;0;600;;5;;10
5. 931151;0,100;0,968763327;0,151822721;;1;43;1;1;600;;5;;10
6. 931151;0,187;0,968763333;0,151822701;;0;45;1;1;750;;5;;10
7. 931151;0,244;0,968763127;0,151822601;;1;50;1;1;750;;0;;20
8. 931151;0,299;0,968763301;0,151822644;;1;48;0;0;800;;0;;20
9. 0002;931200
```

```
10. DAU;002
11. 0001;931200;20030201;012058;FalEpoNidoWeis;;
12. 931152;20030201;012058;07;3
13. 931155;20030201;012059;04
14. 0002;931200
```

The files contain the following data lines:

- The first and second line in both files is the “file definition” and “standard DAU header line” as in the example before.
- Line four to eight is a route table describing how the spreader shall react.
- Line 12 is a “Select dosage mode” command where dosage mode 3 is selected for equipment “07”.
- Line 13 is a “Counter reset” command to equipment “04”.
- Line 9 and 14 is the standard DAU end-record.

7. Debugging Application

In order to help developing systems, which deliver data to VINTERMAN, a little debug application is developed. The program will be sent free of charge together with data file examples on request.

The screen shot below shows the debug application in operation. The program is placed in one single file, “DauDebug.exe”, which can run under Windows NT/98 or later. There are no installation or registration procedure – just run the program file and delete it when not needed any more.

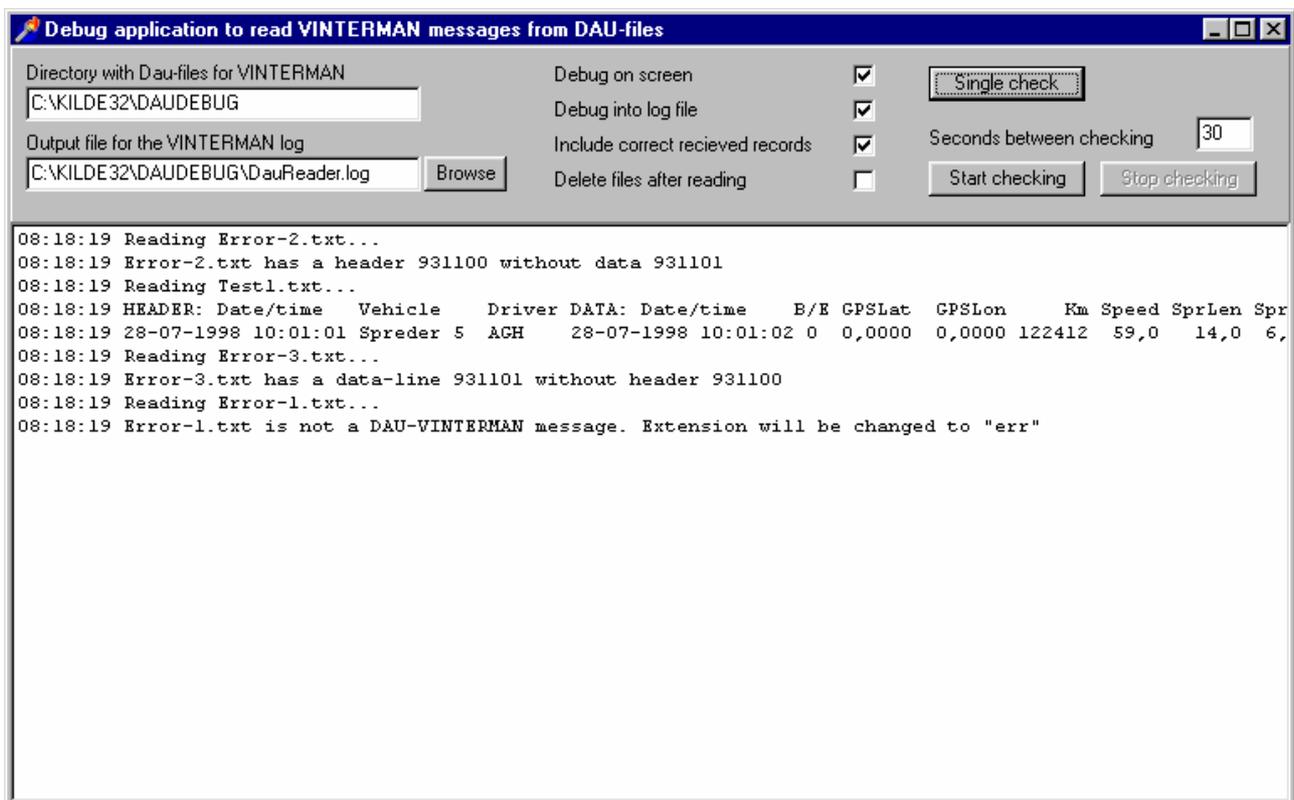


Figure: The main windows of the debug application.

Usage of the application:

- “Directory with Dau-files for VINTERMAN”. The DauDebug program will scan this directory for message-files. The program suggests its own directory.
- “Output file for the VINTERMAN log”. The debug history can be places in a log file with the given name. Default file-name are “DauReader.log” in the present directory.

- “Debug on screen” means that the debug window is updated with debug information.
- “Debug into log file” will send all the information to the given log file.
- “Include correct received records” will also place information about all accepted records in the log.
- “Delete files after reading”. It is the normal operation, but it can be irritating during debugging. If there are no check-mark in this field, the program will try to rename all VINTERMAN messages from extension “txt” to “ok!”. If other files are found in the directory with extension “txt”, they will be renamed to extension “err”.
- The button “Single check” gives one scan/check of the given directory.
- The button “Start checking” will make one scan/check of the given directory with the interval given in the field “Seconds between checking”. This will continue until the button “Stop checking” is pressed.

This little debug application shows only how and what, VINTERMAN will read. It is not meant as a complete syntax checking application.

8. Comments

The actual process of communicating via message files was approved at the VINTERMAN meeting in February 1998 and version 1.0 was a reality later same year.

All present versions of this standard (from 1.0 to 1.32) will be supported by VINTERMAN. However, all those involved are welcome to submit further suggestions for helpful fields, which may prove useful for VINTERMAN. In this case there will be made newer versions of this document with additional DACODE, DRCODE and DGRCODE definitions. Later extensions will normally be made in a way, which always ensures fully backward compatibility with the description in this document.