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Road vehicles — Multimedia data exchange format for impact tests

Véhicules routiers — Format d'échange de données multimédia pour les essais de choc

Related electronic document A

Descriptors and Hints

— Version 2.0 proposal 3 —

Meaning of the colour marks:

black	**no change to the old version 1.5**
red	**proposed change or addition to version 1.5**
dark blue	**has to be managed by the ISO**
light blue	**not clarified at the moment**

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Contents

Page

1 Data formats

1.1 Definition of basic data types

Valid basic data types are integer, float and string. Generic data types are date, datetime and coded.

integer: numbers which don't have any fractional digits.

float: IEEE simple precision floating-point type.

string: a set of characters according to ISO/IEC 8859-1 or ISO/IEC 10646 (UNICODE).

date: YYYY-MM-DD — in accordance with ISO 8601.

datetime: YYYY-MM-DD hh:mm:ss — in accordance with ISO 8601.

coded: enumeration of valid values (see 2).

reference: value of a channel code part or id used within an other file.

filereference: filename with extension but without pathinformation (according to the filename convention).

1.2 Information files

1.2.1 General rules

A dot is the first character of an optional descriptor.
Descriptors shall not contain dots, slashes, ...

"+" signs at the first position are restricted to partner specific descriptors, which are not defined in this technical specification.

The information of media objects like channels, photos, movies and also test objects are described in a block structure. Every media object block starts with a begin-descriptor and ends with an end-descriptor. The values of these descriptors shall be the number of the block. Block numbers shall start at the value 1. Within a block the position order of the descriptors is free.

All descriptors belonging to the collectivity of media objects of the same type shall be positioned before the block structure.

1.2.2 Test information

The information about the test has to be stored in the test information file in the main directory. The file extension is MME. In addition to the standard descriptors special lines for the NHTSA and for biomechanical tests are described.

1.2.2.1 MME standard file

Table 1 — Test information (MME) file

File name:	“filename”.MME, where “filename” is identical to the <testnumber>.		
Location:	main directory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Data format edition number	YES	coded	2.0
Timestamp	YES	datetime	Creation date of this medium.
Laboratory name	YES	string	
Laboratory contact name	YES	string	Person to contact
Laboratory contact phone	YES	string	
Laboratory contact fax	YES	string	
Laboratory contact email	YES	string	
Laboratory test ref number	YES	string	
Customer name	NO	string	
Customer test ref number	NO	string	
Customer project ref number	NO	string	
Customer order number	NO	string	
Customer cost unit	NO	string	
Customer test engineer name	NO	string	
Customer test engineer phone	NO	string	
Customer test engineer fax	NO	string	
Customer test engineer email	NO	string	
Medium No./number of media	NO	integer/integer	
Title	NO	string	
Comments	NO	string	
Type of the test	YES	string	For example, frontal impact.
Subtype of the test	YES	string	
Regulation	YES	string	
Date of the test	YES	date	
Reference temperature	NO	float	[℃] Measurement point depends on type of the test.
Relative air humidity	NO	float	[%] Measurement point depends on type of the test.
Novalue float	NO	string	Default is NOVALUE.
Number of test objects	YES	integer	NOVALUE is not allowed
If ‘Number of test objects’ > 0			
#Begin of test object	YES	integer	Value: the number of the test object
Type of test object	YES	string	See”Test Object” Column 1 in related electronic document *Channel Codes*.
Filename of test object	YES	filereference	Name of the Test object information file

			(see 1.2.3)
#End of test object	YES	integer	Value: the number of the test object

1.2.2.2 Additional NHTSA test information

Additional information concerning the test set up and/or conditions required to make the ISO-MME impact test dataset transportable into the NHTSA EV5 data exchange format has to be added to the test information file. Refer to the NHTSA Test Reference Guide (NHTSA TRG), Volume 1, Vehicle Tests, General Test information section, Version 5 (NTRGV1.PDF -- referred to as TRG in the "Remarks" column) for extended field definitions and codes. This document is available on the NHTSA web site at

http://www-nrd.nhtsa.dot.gov/software/test-reference-guides/test-reference-guides.html

File name:	"filename".MME, where "filename" is identical to the <testnumber>.		
Location:	main directory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Test type	NO	coded	see TRG
Test configuration	for NHTSA	coded	see TRG
Track surface	NO	coded	see TRG
Track condition	NO	coded	see TRG
Closing speed	for NHTSA	float	[m/s], see TRG
Impact angle (clockwise)	for NHTSA	integer	0 to 359 degrees, see TRG
Offset	NO	float	[m], see TRG
Side impact point	for NHTSA	float	[m], see TRG
Comments	NO	string	multiple lines, 70 char maximum

1.2.2.3 Additional biomechanical test information

Additional biomechanical information concerning the test set up has to be added to the test information file.

File name:	"filename".MME, where "filename" is identical to the <testnumber>.		
Location:	main directory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Financial support	for biomech.	string	for instance EC or national programm
Project ref number	for biomech.	string	for instance Contract number of the EC project
Project contact name	for biomech.	string	name of the coordinator of the project
Project contact email	for biomech.	string	

1.2.3 Object information

All information concerning test objects, occupants and restraint systems has to be stored in the OBJECT subdirectory. Allowed filenames are built from the testnumber and the first characters of the channel codes: the test object, the position and the main location. Every object is described in an own file with the fileextension INF.

For test objects the filenames consist of the 'testnumber' and the 'type of test object'. For occupants the filenames consist of the 'testnumber', 'type of test object' and 'position'. For restraint systems the filenames consist of the 'testnumber', 'type of test object', 'position' and 'main location' with AIRB and SEBE stored in separate files.

The MME file contains only the information about the number and the type of test objects and the test object information filenames.

1.2.3.1 Standard test object information

File name:	"filename".INF, where "filename" is identical to the <testnumber>_<test object>.		
Location:	OBJECT subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Name	YES	string	
Velocity	YES	float	[m/s] at time zero
Mass	YES	float	[kg]
Impact side	YES	string	See "Fine Location 1" in related electronic document *Channel Codes*.
Driver position	NO	string	See "Position" in related electronic document *Channel Codes*.
Class	NO	string	
Code	NO	string	
Ref number	NO	string	
Offset	NO	float	Overlap in percent
Barrier width	NO	float	[m]
Barrier height	NO	float	[m]
Yaw angle	NO	float	Angle of barrier with normal to direction of vehicle travel. Units: radians. limited to $\pm\pi/2$. 0 rad means that the barrier is perpendicular to the vehicle. Positive sense: Clockwise when viewed from above (SAE J211)
Reference system id number	NO	reference	Coordinate reference system for the loadcell matrix (see 1.2.4)
Origin X	NO	float	[m] Top left corner of the loadcell matrix within the reference system – X coordinate
Origin Y	NO	float	[m] Top left corner of the loadcell matrix within the reference system – Y coordinate
Origin Z	NO	float	[m] Top left corner of the loadcell matrix within the reference system – Z coordinate
Number of loadcells	NO	integer	

1.2.3.2 Additional NHTSA test object information

Additional information concerning the test objects required to make the ISO-MME impact test dataset transportable into the NHTSA EV5 data exchange format has to be added to the test object information files (see 1.2.2.2). The vehicle information is stored e.g. in 100000.INF. The barrier information is stored in B00000.INF or M00000.INF for mobile barriers.

File name:	"filename".INF, where "filename" is identical to the <testnumber>_<test object>.		
Location:	OBJECT subdirectory		
Contents for test object vehicle			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Vehicle make	for NHTSA	string	free text
Vehicle model	for NHTSA	string	free text
Vehicle year	for NHTSA	integer	4 digit year
Body type	for NHTSA	coded	see TRG
VIN	for NHTSA	string	free text
Engine type	NO	coded	see TRG
Engine size	NO	float	[liters]
Transmission type	NO	coded	see TRG
Vehicle test weight	for NHTSA	integer	[kg], see TRG
Wheel base	for NHTSA	float	[m], see TRG
Vehicle length	for NHTSA	float	[m], see TRG
Vehicle width	for NHTSA	float	[m], see TRG
Vehicle center of gravity	for NHTSA	float	[m], see TRG
Steering column separation	NO	coded	see TRG
Column collapse mechanism	NO	coded	see TRG
Vehicle modifications	NO	string	50 characters maximum
Vehicle speed	for NHTSA	float	[m/s], see TRG
Crab angle	for NHTSA	integer	[°], see TRG
Principal dir of force	NO	integer	[°], see TRG
Bumper engagement	NO	coded	see TRG
Sill angagement	NO	coded	see TRG
A-Pillar engagement	NO	coded	see TRG
Damage profile distance 1	NO	float	[m], see TRG
Damage profile distance 2	NO	float	[m], see TRG
Damage profile distance 3	NO	float	[m], see TRG
Damage profile distance 4	NO	float	[m], see TRG
Damage profile distance 5	NO	float	[m], see TRG
Damage profile distance 6	NO	float	[m], see TRG
Vehicle damage index	NO	coded	see TRG
Total length indentation	NO	float	[m], see TRG
Center damaged area to CG	NO	float	[m], see TRG
Maximum crush distance	NO	float	[m], see TRG
Angle of moving cart	for NHTSA	float	[°], see TRG

Veh orientation on cart	for NHTSA	float	[°], see TRG
Contents for test object barrier			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Barrier shape	NO	coded	see TRG
Rigid or deformable barrier	NO	coded	see TRG
Angle of fixed barrier	NO	coded	degrees, see TRG
Diameter of pole barrier	NO	coded	[m], see TRG
Comments	NO	string	Multiple lines, for NHTSA 70 char maximum

1.2.3.3 Additional biomechanical test object information

Additional biomechanical information concerning the test objects has to be added to the test object information files. Biomechanical tests are mostly performed with a test subject on a test device. The test device has to be described as one of the possible test objects (see"Test Object" Column 1 in related electronic document *Channel Codes*). The test subject has to be described within an occupant information file (see 1.2.3.4)

File name:	"filename".INF, where "filename" is identical to the <testnumber>_<test object>.		
Location:	OBJECT subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Acceleration	for biomech.	float	[m/s^2], maximum of acceleration ???

1.2.3.4 Occupant information

The occupant information for all dummies, volunteers or PMHS have to be stored within separate files in the OBJECT subdirectory.

File name:	"filename".INF, where "filename" is identical to the <testnumber>_<test object><position>.		
Location:	OBJECT subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Gender	for biomech.	string	male or female
Age	for biomech.	string	in years
Dummy type	for NHTSA	coded	See "Fine Location 3" in related electronic document *Channel Codes*.
Dummy manufacturer/Ser No	NO	string	50 characters maximum
Dummy modifications	NO	string	50 characters maximum
Head to windshield header	NO	float	[m], see TRG
Head to windshield	NO	float	[m], see TRG
Head to side header	NO	float	[m], see TRG
Head to side window	NO	float	[m], see TRG
Chest to dash	NO	float	[m], see TRG

Chest to steering wheel	NO	float	[m], see TRG
Arm to door	NO	float	[m], see TRG
Hip to door	NO	float	[m], see TRG
Knees to dash	NO	float	[m], see TRG
Head to seatback	NO	float	[m], see TRG
Neck to seatback	NO	float	[m], see TRG
Chest to seatback	NO	float	[m], see TRG
Knee to seatback	NO	float	[m], see TRG
Seat track position	for NHTSA	coded	see TRG
1st contact for head	NO	coded	see TRG
2st contact for head	NO	coded	see TRG
1st contact for chest/abdo	NO	coded	see TRG
2st contact for chest/abdo	NO	coded	see TRG
1st contact for legs	NO	coded	see TRG
2st contact for legs	NO	coded	see TRG
Head injury criterion HIC	NO	integer	nondimensional
Lo HIC time interval	NO	float	[s]
Up HIC time interval	NO	float	[s]
Thorax peak accel (CLIP3M)	NO	float	[m/s^2]
L femur peak load	NO	float	[N]
R femur peak load	NO	float	[N]
Chest severity index	NO	integer	nondimensional
Lap belt peak load	NO	integer	[N]
Shoulder belt peak load	NO	integer	[N]
Thoracic trauma index	NO	float	nondimensional
Pelvis acceleration	NO	float	[m/s^2]
Comments	NO	string	Multiple lines, for NHTSA 70 char maximum

1.2.3.5 Restraint system information

Additional information concerning airbags and seatbelts has to be added to the restraint system information files in the OBJECT subdirectory.

File name:	"filename".INF, where "filename" is identical to the <testnumber>_<test object><position><main location>.		
Location:	OBJECT subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Restraint mount	NO	coded	see TRG
Restraint type	for NHTSA	coded	see TRG
Restraint deployed	NO	coded	see TRG
Comments	NO	string	Multiple lines, for NHTSA 70 char maximum

1.2.4 Reference system information

The descriptive information about all reference systems has to be stored within one reference system information file in the REFERENCE subdirectory.

File name:	"filename".RSI, where "filename" is identical to the <testnumber>.		
Location:	REFERENCE subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Number of reference systems	YES	integer	NOVALUE is not allowed
If 'Number of reference systems' > 0			
#Begin of reference system	YES	integer	Value: the number of the reference system
Reference system id number	YES	reference	Id used in the reference system data file
Extension of data files	YES	string	'J211' for local reference system according to SAE J211 is recommended
Description	NO	string	General description of the reference coordinate system
X origin	NO	string	Description of the origin – X component
Y origin	NO	string	Description of the origin – Y component
Z origin	NO	string	Description of the origin – Z component
X direction	NO	string	Description of the longitudinal axis orientation
Y direction	NO	string	Description of the transversal axis orientation
Z direction	NO	string	Description of the vertical axis orientation
Comments	NO	string	
#End of reference system	YES	integer	Value: the number of the reference system

1.2.5 Channel information

...

1.2.6 Moving image information

1.2.6.1 MII file

The descriptive information about all films, videos and image sequences has to be stored within one moving image information file in the MOVIE subdirectory. If a single image sequence is referenced, the value for 'Name of the movie file' has to point to a subdirectory of the MOVIE directory.

File name:	“filename”.INF, where “filename” is identical to <testnumber>_Movie.		
Location:	MOVIE subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Number of movies	YES	integer	NOVALUE is not allowed
If ‘Number of movies’ > 0			
#Begin of movie	YES	integer	Value: the number of the movie
Id number	YES	string	Id of the movie
Name of movie file	YES	filereference	
Pixel size	YES	float	[µm]
Aspect ratio of pixels	YES	float	Height of the pixel / width of the pixel
Width of image	YES	integer	[pixel]
Height of image	YES	integer	[pixel]
Number of images	YES	integer	
Film speed	YES	float	[Frames per second]
Shutter time	YES	float	[µs]
Start time of the movie	YES	float	[s] Time of the first image
Origin	NO	string	e.g. simulation, test
Description	NO	string	
Camera id number	NO	string	
Camera type	NO	string	
Lens id number	NO	string	
Lens type	NO	string	
Lens focal length	YES	float	
Focus	NO	string	
Aperture	NO	string	
End time of the movie	NO	float	[s] Time of the last image
Time vector filename	NO	filereference	
Format of movie file	NO	string	e.g. AVI
Colour	NO	string	e.g. B/W, RGB, YUV
Compression code	NO	string	e.g. Indeo
Compression quality	NO	string	e.g. 85%
Keyframes	NO	integer	
Image history filename	NO	filereference	
Correction parameter file	NO	filereference	
Distortion index	NO	float	[%] distortion index according ISO 8721
Movie images corrected	NO	coded	See 2.7
Comments	NO	string	
#End of movie	YES	integer	Value: the number of the movie

1.2.6.2 Correction parameter file

The correction parameter file is optional. It is referenced as value of *Correction parameter file* in the MII file.The file content for the correction method *bundle adjustment* shall be:

File name:	"filename".COR, where "filename" is identical to the <testnumber>_<movie id>.		
Location:	MOVIE subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Distortion correction type	YES	coded	**bundle adjustment**
Pixel distance x	YES	float	[mm]
Pixel distance y	YES	float	[mm]
Principal point x	YES	float	[pixel] deviation from the centre of the image (positive from left to right)
Principal point y	YES	float	[pixel] deviation from the centre of the image (positive from left to right)
Calibrated focal length	YES	float	[mm] as positive value
Distortion unit	YES	coded	**pixel** or **mm**
Distortion correction A1	YES	float	1. corr. coeff. for radial symmetrical distortion
Distortion correction A2	YES	float	2. corr. coeff. for radial symmetrical distortion
Distortion correction A3	YES	float	3. corr. coeff. for radial symmetrical distortion
Distortion correction B1	YES	float	1. corr. coeff. for radial asymmetrical distortion
Distortion correction B2	YES	float	2. corr. coeff. for radial asymmetrical distortion
Distortion correction C1	YES	float	affinity
Distortion correction C2	YES	float	non-othogonality
Distortion correction R0	YES	float	2. zero crossing of the distortion curve

1.2.6.3 Image history file

The image history file is optional. It is referenced as value of *Image history filename* in the MII file. The descriptors are not mandatory. They are unique but their position order shall show the time history of the single processing steps. The numbering of the descriptors is used to differentiate between twice or more usage of the same processing item.

File name:	"filename".IMH, where "filename" is identical to the <testnumber>_< movie id >.		
Location:	MOVIE subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Image processing system	NO	string	With version number
Image interpolation	NO	string	With version number
Sharpening i	NO	string	Typically 1 integer value
Colour matrix i	NO	string	
White balance i	NO	string	Typically 3 integer values
Brightness i	NO	string	Single or matrix of integer

Contrast i	NO	string	Single or matrix of integer
Saturation i	NO	string	Integer or float
Hue i	NO	string	Typically integer
Gamma i	NO	string	Typically 1 float value

1.2.7 Photo information

The descriptive information about all fotos has to be stored within one photo information file in the PHOTO subdirectory.

File name:	"filename".INF, where "filename" is identical to <testnumber>_Photo.		
Location:	PHOTO subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Number of photos	YES	integer	NOVALUE is not allowed
If 'Number of photos' > 0			
#Begin of photo	YES	integer	Value: the number of the photo
Id number	YES	string	Id of the photo
Test object code	YES	reference	See test information file
Time classification	YES	coded	See 2.6
Width of image	YES	integer	[pixel]
Height of image	YES	integer	[pixel]
Aspect ratio of pixels	YES	float	Height of the pixel / width of the pixel
Name of photo file	YES	filereference	
Photographer	NO	string	
Description	NO	string	
Camera type	NO	string	
Direction	NO	string	e.g. left hand side
Aperture	NO	string	
Exposure time	NO	float	[s]
Format of photo file	NO	string	e.g. TIFF or JPEG file format
Colour	NO	string	e.g. B/W, RGB, YUV
Compression	NO	string	
Comments	NO	string	
#End of photo	YES	integer	Value: the number of the photo

1.2.8 INF files

The descriptive information about media objects like documents or reports has to be stored within one information file in the corresponding subdirectory. These information files are optional.

File name:	"filename".INF, where "filename" is identical to the <testnumber>_<media object>.
Location:	corresponding subdirectory e.g. REPORT

Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Number of <media objects>	YES	integer	NOVALUE is not allowed
If 'Number of media objects' > 0			
#Begin of <media object>	YES	integer	Value: the number of the <media object>
Filename	YES	filereference	
Description	NO	string	
Format of file	NO	string	e.g. PDF
Originator	NO	string	
#End of <media object>	YES	integer	Value: the number of the <media object>

1.3 Data files

1.3.1 General rules

The header block in the beginning of each data file is surrounded by '#Begin of <media object>' and '#End of <media object>'. The following data section may be consisting of one ore more columns.

Some common used media objects are predefined in the following chapters. The column description of the predefined data types may be omitted. The data type **MultiChannel** has to be used for all media objects which are not predefined. In this case all columns have to be described in the header section. All descriptors which are identical for all columns shall be positioned before the column block structure.

1.3.2 Multi column data files

File name:	"filename"."ext"		
Location:	specific subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
#Begin of header	YES	-	
Data format edition number	YES	coded	**2.0p3**
Type of data	YES	coded	**MultiChannel**
Description	NO	string	
… all descriptors defined in the chapters 1.2 and 1.3, if they are valid for all columns			
#End of header	YES	-	
... Data section ...			
Contents if 'Type of data' is MultiChannel			
Number of columns	YES	integer	NOVALUE is not allowed
#Begin of column	YES	Integer	Value: the number of the column
Name	YES	string	Title of the column
Unit	YES	string	SI unit
Format	YES	coded	See 1.1
… all descriptors defined in the chapters 1.2 and 1.3, if they are valid for the specific column			
Comments	NO	string	

#End of column	YES	integer	Value: the number of the column

1.3.3 Reference system data file

The relations between all reference systems described in the reference system information file have to be stored within one reference system data file in the REFERENCE subdirectory. It is a multicolumn data file.

File name:	"filename".REF, where "filename" is identical to the <testnumber>.		
Location:	REFERENCE subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
#Begin of header	YES	-	
Data format edition number	YES	coded	**2.0p3**
Type of data	YES	coded	**References**
#End of header	YES	-	
... Data section ...			
Column specification if 'Type of data' is References			
Field descriptor	**Value**	**Remark**	
Number of columns	10		
#Begin of column	1		
Name	Source		
Unit	1		
Format	reference	Reference system id number (see 1.2.4)	
#End of column	1		
#Begin of column	2		
Name	Destination		
Unit	1		
Format	reference	Reference system id number (see 1.2.4)	
#End of column	2		
#Begin of column	3		
Name	Time		
Unit	s		
Format	float		
#End of column	3		
#Begin of column	4		
Name	X		
Unit	m		
Format	float		
#End of column	4		
#Begin of column	5		
Name	Y		
Unit	m		

Format	float	
#End of column	5	
#Begin of column	6	
Name	Z	
Unit	m	
Format	float	
#End of column	6	
#Begin of column	7	
Name	QuaternionW	
Unit	1	
Format	float	
#End of column	7	
#Begin of column	8	
Name	QuaternionX	
Unit	1	
Format	float	
#End of column	8	
#Begin of column	9	
Name	QuaternionY	
Unit	1	
Format	float	
#End of column	9	
#Begin of column	10	
Name	QuaternionZ	
Unit	1	
Format	float	
#End of column	10	

1.3.4 Channel data files

A channel data file may consist of one ore more channels each belonging to a component of a physical value. The columns are separated by blanks or tabulation stops. Allowed filenames are built by the codes defined in the related electronic document *Channel Codes*. The recommended extension (see 1.2.4) for channel files with a local reference system according to SAEJ211 is J211.

1.3.4.1 One component data files

One component data files consist of a single data column in the data section and are stored in the CHANNEL subdirectory.

File name:	"filename"."xxx", where "filename" is identical to <testnumber>_ <Channel Code> and the extension "xxx" is connected to the reference system.		
Location:	CHANNEL subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**

#Begin of header	YES	-	
Data format edition number	YES	coded	**2.0p3**
Type of data	YES	coded	**Channel**
Instrumentation standard	YES	integer	
Test object number	YES	integer	
Name of the channel	YES	string	
Laboratory channel code	NO	string	
Customer channel code	NO	string	
Channel frequency class	NO	coded	See “Filter class” in related electronic document *Channel Codes*.
Unit	YES	coded	See “Dimension” in related electronic document *Channel Codes*.
Reference system id number	YES	reference	See <testnumber>.RSI
Transducer type	NO	string	
Transducer id	NO	string	
Prefilter type	NO	string	Anti-aliasing filter
Cut off frequency	YES	float	-3dB frequency of Pre-filter in [Hertz]
Channel amplitude class	YES	float	See ISO 6487
Reference channel	YES	coded	See 2.5
Reference channel name	NO	reference	Channel code of the time reference channel if ‘Reference channel’ is explicit
Data source	YES	coded	See 2.4
Data status	YES	coded	See 2.3
Sampling interval	YES	float	Time step, expressed in [s]
Bit resolution	YES	integer	
Time of first sample	YES	float	In [s], ‘minus’ before impact
Number of samples	YES	integer	
First global maximum value	NO	float	Without unit
Time of maximum value	NO	float	
First global minimum value	NO	float	Without unit
Time of minimum value	NO	float	
Start offset interval	NO	float	In [s], ‘minus’ before impact
End offset interval	NO	float	In [s], ‘minus’ before impact
Loadcell width	NO	float	[mm] width of loadcell
Loadcell height	NO	float	[mm] height of loadcell
Loadcell top left Y	NO	float	[mm] defines top, left of loadcell wrt the loadcell martrix origin
Loadcell top left Z	NO	float	[mm] defines top, left of loadcell wrt the loadcell martrix origin
Comments	NO	string	
#End of header	YES	-	
... Data section ...			

1.3.4.2 Multi component data files

The components of e.g. a triaxial transducer can be combined and stored in a multicolumn data file in the CHANNEL subdirectory. If the three spatial components differ only in the direction fields of their Channel codes, the filename is identical to the Channel code with the direction "M". The three columns contain the values for the X, Y and Z component.

File name:	"filename"."xxx", where "filename" is identical to <testnumber>_ <Channel Code> with the direction "M" and the extension "xxx" is connected to the reference system		
Location:	CHANNEL subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
#Begin of header	YES	-	
Data format edition number	YES	coded	**2.0p3**
Type of data	YES	coded	**TriaxialChannel**
… all descriptors defined in 1.3.4.1 for an one component data file, if they are valid for all components			
#End of header	YES	-	
... Data section ...			
Column specification if 'Type of data' is TriaxialChannel			
Field descriptor	**Value**	**Remark**	
Number of columns	3		
#Begin of column	1		
Name	X		
Format	float		
#End of column	1		
#Begin of column	2		
Name	Y		
Format	float		
#End of column	2		
#Begin of column	3		
Name	Z		
Format	float		
#End of column	3		

1.3.5 Static measurement data file

Static measurement data may consist of points, lines and areas.

File name:	"filename".sta, where "filename" is identical to <testnumber>_ StaticData.		
Location:	STATIC subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**

#Begin of header	YES	-	
Data format edition number	YES	coded	**2.0p3**
Type of data	YES	coded	**StaticData**
#End of header	YES	-	
... Data section ...			
Column specification if 'Type of data' is StaticData			
Field descriptor	**Value**	**Remark**	
Number of columns	7		
#Begin of column	1		
Name	Name		
Unit	1		
Format	string	Shall be the Channel code	
#End of column	1		
#Begin of column	2		
Name	Refsys		
Unit	1		
Format	reference	Reference system id number (see 1.2.4)	
#End of column	2		
#Begin of column	3		
Name	Group		
Unit	1		
Format	string	Name of line or area, **NOVALUE** for points	
#End of column	3		
#Begin of column	4		
Name	Classification	Time Classification, see 2.6	
Unit	1		
Format	coded	See 2.6	
#End of column	4		
#Begin of column	5		
Name	X		
Unit	m		
Format	float		
#End of column	5		
#Begin of column	6		
Name	Y		
Unit	m		
Format	float		
#End of column	6		
#Begin of column	7		
Name	Z		
Unit	m		
Format	float		

#End of column	7	

1.3.6 3D point data file

The coordinates of a three dimensional point can be combined and stored in a multicolumn data file of data type **Point** in the CHANNEL subdirectory. The filename is identical to the Channel code with the direction “M”. The columns contain the values for the Time, X, Y and Z component. The data type **PointStdDev** is an enlargement with 3 additional columns for the standard deviations of the spatial components.

File name:	“filename”.”xxx”, where “filename” is identical to <testnumber>_ <Channel Code> with the direction “M” and the extension “xxx” is connected to the reference system		
Location:	CHANNEL subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
#Begin of header	YES	-	
Data format edition number	YES	coded	**2.0p3**
Type of data	YES	coded	**Point, PointStdDev**
… all descriptors defined in 1.3.4.1 and …, if they are valid for all components			
Column specification if ‘Type of data’ is Point			
Field descriptor	**Value**	**Remark**	
Number of columns	4		
#Begin of column	1		
Name	Time		
Format	float		
Unit	s		
#End of column	1		
#Begin of column	2		
Name	X		
Format	float		
Unit	m		
#End of column	2		
#Begin of column	3		
Name	Y		
Unit	m		
Format	float		
#End of column	3		
#Begin of column	4		
Name	Z		
Unit	m		
Format	float		
#End of column	4		
Column specification if ‘Type of data’ is PointStdDev			
Number of columns	7		

Field descriptor	Value	Remark
… the 4 column descriptions of **Points** and in addition		
#Begin of column	5	
Name	SX	
Format	float	
Unit	m	
#End of column	5	
#Begin of column	6	
Name	SY	
Unit	m	
Format	float	
#End of column	6	
#Begin of column	7	
Name	SZ	
Unit	m	
Format	float	
#End of column	7	

1.3.7 Camera position file and 6dObject file

The position and orientation of all cameras can be stored within one camera position file in the MOVIE subdirectory. It is a multicolumn data file. This data type is also usable for other media objects which are described by a position and an orientation.

File name:	"filename".pao, where "filename" is identical to <testnumber>_ CameraPosition or <testnumber>_ 6dObject		
Location:	MOVIE subdirectory for camera positions OBJECT for objects with 6 degrees of freedom		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
#Begin of header	YES	-	
Data format edition number	YES	coded	**2.0p3**
Type of data	YES	coded	**PositionAndOrientation**
#End of header	YES	-	
... Data section ...			
Column specification if 'Type of data' is PositionAndOrientation			
Field descriptor	**Value**	**Remark**	
Number of columns	10		
#Begin of column	1		
Name	Name		
Unit	1		
Format	reference	Id number of the movie from MII-file or Id number of the 6dObject	

#End of column	1	
#Begin of column	2	
Name	Refsys	
Unit	1	
Format	reference	Reference system id number (see 1.2.4)
#End of column	2	
#Begin of column	3	
Name	Time	
Unit	1	
Format	string	float value for moving, **static** for nonmoving cameras
#End of column	3	
#Begin of column	4	
Name	X	
Unit	s	
Format	float	
#End of column	4	
#Begin of column	5	
Name	Y	
Unit	m	
Format	float	
#End of column	5	
#Begin of column	6	
Name	Z	
Unit	m	
Format	float	
#End of column	6	
#Begin of column	7	
Name	QuaternionW	
Unit	m	
Format	float	
#End of column	7	
#Begin of column	8	
Name	QuaternionX	
Unit	1	
Format	float	
#End of column	8	
#Begin of column	9	
Name	QuaternionY	
Unit	1	
Format	float	
#End of column	9	
#Begin of column	10	
Name	QuaternionZ	

Unit	1	
Format	float	
#End of column	10	

1.4 Comment files

All comment files contain unformatted text. To reference a data channel use the channel code with an appended colon.

2 Coded values

2.1 Valid values for the descriptor ‘Data format edition number‘

Value	Data type	Remark
2.0	float	Current version
2.0p3	string	For testing only; actual proposal 3

2.2 Valid values for the descriptor ‘Data type‘

Value	Data type	Remark
MultiChannel	string	User specific number of columns; see 1.3.2
References	string	10 columns; see 1.3.3
Channel	string	1 column; see 1.3.4.1
TriaxialChannel	string	3 columns; see 1.3.4.2
StaticData	string	7 columns; see 1.3.5
Point	string	4 columns; see 1.3.6
PointStdDev	string	7 columns; see 1.3.6
PositionAndOrientation	string	10 columns; see 1.3.7

2.3 Valid values for the descriptor ‘Data status‘

Value	Data type	Remark
ok	string	
channel failed	string	
meaningless data	string	
no data	string	
questionable data	string	
scaling factor applied	string	
system failed	string	
linearised data	string	
NOVALUE	string	

2.4 Valid values for the descriptor ‘Data source‘

Value	Data type	Remark
transducer	string	Channel data has been generated by transducer.
calculation	string	Channel data has been calculated from other channels.
camera	string	Channel data has been generated by filmanalysis.
simulation	string	Channel data has been generated by simulation.
parameter	string	Channel data can be constant or limit curve.

2.5 Valid values for the descriptor ‘Reference channel‘

Value	Data type	Remark
implicit	string	Time reference is given with the descriptor values ‘Time of first sample’ and ‘Sampling interval’.
explicit	string	Explicit time channel exists in test data. Channel name is given with the descriptor ‘Reference channel name’.
NOVALUE	string	No time reference is available. For example in case of constant channels (filter class ‘X’).

2.6 Valid values for the descriptor ‘Time classification‘

Value	Data type	Remark
PRE	string	Before the test
DURING	string	During the test
POST	string	After the test
NOVALUE	string	No time classification is available.

2.7 Valid values for the descriptor ‘Movie images corrected‘

Value	Data type	Remark
YES	string	The images of the movie are corrected.
NO	string	The images of the movie are not corrected.

2.8 Valid values for the descriptor ‘Distortion correction type‘

Value	Data type	Remark
bundle adjustment	string	See 1.2.6.2

2.9 Valid values for the descriptor ‘Distortion unit‘

Value	Data type	Remark
mm	string	[mm]; see 1.2.6.2
pixel	string	[pixel]; see 1.2.6.2

2.10 Valid values for the descriptor ‘Format‘

Value	Data type	Remark
integer	string	See 1.1
float	string	See 1.1
string	string	See 1.1
date	string	See 1.1
datetime	string	See 1.1

coded	string	See 1.1
reference	string	See 1.1
filereference	string	See 1.1

3 Hints

For future use.

4 Examples

4.1 Examples of information files

4.1.1 Examples of test information files

4.1.1.1 Example of MME file

Filename: 2007ISO2.MME

```
Data format edition number      :2.0p3
Timestamp                       :2007-07-07 09:25:15
Laboratory name                 :ALPHA Car Test Laboratory
Laboratory contact name         :Frank N. Stein
Laboratory contact phone        :+49-222/123-4567
Laboratory contact fax          :+49-222/123-8901
Laboratory contact email        :frank.stein@alpha.cartest.com
Laboratory test ref number      :2001WG3
Customer name                   :ISO/TC22/SC12/WG3 Safety Laboratory
Customer test ref number        :2001ISO1
Customer project ref number     :ISOTC22
Customer order number           :SC12WG3
Customer cost unit              :2001/0
Customer test engineer name     :Mary Land
Customer test engineer phone    :+44-123/555-123
Customer test engineer fax      :+44-123/555-456
Customer test engineer email    :mary.land@iso.tc22.sc12.wg3.uk
Title                           :Simulation Test
Type of the test                :Vehicle into Vehicle
Subtype of the test             :40% Offset both
Regulation                      :AMS
Date of the test                :2007-03-03
Reference temperature           :285.5
Relative air humidity           :75
Number of test objects          :2
Comments                        :
Comments                        :  The following block describes test object 1
Comments                        :
#Begin of test object           :1
Type                            :1
Filename of test object         : 2007ISO2_1.INF
#End of test object             :1
Comments                        :
Comments                        :  The following block describes test object 2
Comments                        :
#Begin of test object           :2
Type of test object             :B
Filename of test object         :2007ISO2_B.INF
#End of test object             :2
```

4.1.1.2 Example of NHTSA test information

Filename: 2007ISO2.MME

```
Data format edition number      :2.0p3
Timestamp                       :2007-07-07 09:25:15
...
```

4.1.2 Example of object information files

4.1.2.1 Example of vehicle information

Filename: 2007ISO2_1.INF

Name	Vehicle A
Velocity	15.72
Mass	1430.00
Impact side	2
Class	A0
Code	LittleCar
Ref number	007-008
Driver position	1

4.1.2.2 Example of barrier information

Filename: 2007ISO2_B.INF

Name	Barrier xyz
Velocity	0.00
Mass	1500.00
Impact side	NOVALUE
Class	NOVALUE
Code	xyz
Ref number	1111-012
Barrier width	3.2
Barrier height	1.64
Reference system id number	006
Comments	according to the SAE J211 coordinate system
Origin X	0.12
Origin Y	-1.4
Origin Z	-1.8
Number of loadcells	64

4.1.2.3 Example of biomechanical test subject information

...

4.1.2.4 Example of NHTSA vehicle information

...

4.1.2.5 Example of NHTSA occupant information

...

4.1.2.6 Example of NHTSA restraint system information

...

4.1.3 Examples of reference system information

Filename: 2007ISO2.RSI

Data format edition number	2.0p3
Type of data	ReferenceDescription

Number of references	5
# Begin of reference system	1
Reference system id number	Local
Description	local systems according to SAE J211
Extension of data files	001
X origin	center of gravity of the transducer
Y origin	center of gravity of the transducer
Z origin	center of gravity of the transducer
X direction	from the rear of the car to the front
Y direction	from the left to the right of the vehicle or dummy
Z direction	in the direction of the force of gravity
# End of reference system	1
# Begin of reference system	2
Reference system id number	VehicleT0
Description	vehicle system at T0
Extension of data files	:002
X origin	center of the front axle
Y origin	center of the front axle
Z origin	center of the front axle
X direction	from the front of the car to the rear
Y direction	from the left to the right of the vehicle
Z direction	opposite to the force of gravity
# End of reference system	2
# Begin of reference system	3
Reference system id number	Vehicle
Description	vehicle system
Extension of data files	003
X origin	center of the front axle
Y origin	center of the front axle
Z origin	center of the front axle
X direction	from the front of the car to the rear
Y direction	from the left to the right of the vehicle
Z direction	opposite to the force of gravity
# End of reference system	3
# Begin of reference system	4
Reference system id number	SAEJ211
Description	vehicle system at T0 / direction of the axes according to SAE J211
Extension of data files	004
X origin	center of the front axle
Y origin	center of the front axle
Z origin	center of the front axle
X direction	from the rear of the car to the front
Y direction	from the left to the right of the vehicle
Z direction	in the direction of the force of gravity
# End of reference system	4
# Begin of reference system	5
Reference system id number	Testrig
Description	testrig system / fixed
Extension of data files	005
X origin	Marker on the floor in front of the barrier
Y origin	Marker on the floor in front of the barrier
Z origin	Marker on the floor in front of the barrier
X direction	from the barrier to the vehicle, opposite to the driving direction
Y direction	from the left to the right of the vehicle
Z direction	opposite to the force of gravity
# End of reference system	5

4.1.4 Example of channel information file ???

4.1.5 Examples of moving image information files

4.1.5.1 Example of moving image information file

Filename: 2007ISO2_Movie.INF

Number of movies	7
Comments	:
Comments	: the following block describes movie 1
Comments	:
#Begin of movie	1
Id number	:1
Origin	:Crashtest
Description	:total view of vehicle A from the left side
Camera id number	:KAPPA12
Camera type	:KAPPA ROC
Pixel size	12
Aspect ratio of pixels	:1.00
Width of image	:512
Height of image	:384
Lens id number	:14579435
Lens type	:Schneider
Lens focal length	:10
Focus	:infinite
Aperture	:5.6 - 8
Number of images	:351
Film speed	:1000
Shutter time	250
Start time of the movie	-0.05
End time of the movie	0.3
Time vector filename	:NO
Name of movie file	:LEFTATOT.AVI
Format of movie file	:AVI
Colour	:RGB
Compression code	:Indeo 5.11
Compression quality	:85%
Keyframes	:7
Image history filename	:KAPPA12.IMH
Correction parameter file	:KAPPA12_14579435.COR
Distortion index	:NOVALUE
Movie images corrected	:NO
#End of movie	1
Comments	
Comments	the following block describes movie 2
Comments	
#Begin of movie	2

. . .

4.1.5.2 Example of COR file

Filename: **see MII file descriptor** Correction parameter file

Distortion correction type	:bundle adjustment
Pixel distance x	:0.016
Pixel distance y	:0.016
Principal point x	:-9.38
Principal point y	:-8.25
Calibrated focal length	:10.128
Distortion unit	:mm
Distortion correction A1	:-1.1685e-003

Distortion correction A2 :5.3873e-006
Distortion correction A3 :2.8685e-007
Distortion correction B1 :-1.4558e-005
Distortion correction B2 :-3.2337e-005
Distortion correction C1 :6.6139e-007
Distortion correction C2 :3.6798e-005
Distortion correction R0 :3.413

4.1.6 Example of photo information file

Filename: 2007ISO2_Photo.INF

Number of photos :6
Comments :
Comments : the following block describes photo 1
Comments :
#Begin of photo 1
Id number :1
Test object number :2
Time classification POST
Photographer Hamilton
Description :partial view of the frontcar of vehicle B
Camera type :ETA 007
Direction :right
Aperture 4 – 5.6
Exposure time :0.008
Comments original area of the camerachip 5850 x 5000 pixel
Width of image :1170
Height of image :1000
Aspect ratio of pixels :1.00
Name of photo file :BRIGPOST.TIF
Format of photo file :TIFF
Colour :RGB
Compression :LZW
#End of photo 1
Comments :
Comments : the following block describes photo 2
Comments :
#Begin of photo 2
. . .

4.1.7 Example of report information file

...

4.2 Examples of data files

4.2.1 Example of reference system data file

Filename: 2007ISO2.REF

Begin of header
Data format edition number 2.0p3
Type of data References
End of header

001	002	0.000	2.9522	-7.3176	1.6790	1.00000	0.00000	0.00000	0.00000
004	002	0.000	0.0000	0.0000	0.0000	0.00000	0.00000	1.00000	0.00000
003	002	-2.000	0.0340	0.0000	0.0000	1.00000	0.00000	0.00000	0.00000
003	002	-1.000	0.0170	0.0000	0.0000	1.00000	0.00000	0.00000	0.00000
003	002	0.000	0.0000	0.0000	0.0000	1.00000	0.00000	0.00000	0.00000

003 002 1.000 -0.0160 0.0000 0.0000 1.00000 0.00000 0.00000 0.00000
. . .

4.2.2 Example of channel data files

4.2.2.1 Example of one component data file

Filename: 2007ISO2_ 11HEAD0000H3ACXA.001

#Begin of header
Data format edition number :2.0p3
Type of data :Channel
Instrumentation standard :ISO 6487 (1987) / SAE J211 (MAR95)
Test object number :1
Name of the channel :Head Acceleration X
Laboratory channel code :HEAD01AX
Customer channel code :1HEAD_X_ACC
Channel code :11HEAD0000H3ACXA
Channel frequency class :1000
Unit :m/(s*s)
Reference system id number :1
Transducer type :TAU 7270 A
Transducer id :071234
Prefilter type :Butterworth, 6 pole
Cut off frequency :2000.0
Channel amplitude class :2000.0
Reference channel :implicit
Reference channel name :NOVALUE
Data source :transducer
Data status :ok
Sampling interval :0.0001
Bit resolution :12
Time of first sample :0.0000
Number of samples :2500
First global maximum value :+1.237802E+02
Time of maximum value :+0.18450
First global minimum value :-5.489905E+02
Time of minimum value :+0.06860
Start offset interval :-0.0500
End offset interval :+0.0000
#End of header
-4.788391E-01
. . .

4.2.2.2 Example of multicomponent data file

Filename: 2007ISO2_11HEADLE00H3ACMA.001

#Begin of header
Data format edition number :2.0p3
Type of data :TriaxialChannel
Instrumentation standard :ISO 6487 (1987) / SAE J211 (MAR95)
Test object number :1
Name of the channel :Head Acceleration XYZ
Laboratory channel code :HEAD01A
Customer channel code :1HEAD_XYZ_ACC
Channel code :11HEAD0000H3ACMA
Channel frequency class :1000

Unit	:m/(s*s)
Reference system id number	1
Transducer type	:TAU 7270 A
Transducer id	071234
Prefilter type	:Butterworth, 6 pole
Cut off frequency	:2000.0
Channel amplitude class	:2000.0
Reference channel	:implicit
Reference channel name	:NOVALUE
Data source	:transducer
Data status	:ok
Sampling interval	:0.0001
Bit resolution	:12
Time of first sample	:0.0000
Number of samples	:2500
Start offset interval	:-0.0500
End offset interval	:+0.0000
#Begin of column	1
First global maximum value	502.136
Time of maximum value	0.075
First global minimum value	-69.0138
Time of minimum value	0.2499
#End of column	1
#Begin of column	2
First global maximum value	165.987
Time of maximum value	0.0838
First global minimum value	-84.1962
Time of minimum value	0.1448
#End of column	2
#Begin of column	3
First global maximum value	291.26
Time of maximum value	0.0763
First global minimum value	-16.7116
Time of minimum value	0.2499
#End of column	3

#End of header

-4.788391E-04	+1.915366E-03	-4.788391E-04
-7.182586E-04	+2.394206E-03	-9.576783E-04

. . .

4.2.3 Example of static measurement data file

Filename: 2007ISO2_ StaticData.sta

```
#Begin of header
Data format edition number          2.0p3
Type of data                        StaticData
Comments                            Name  Refsys  Group  Classification  X  Y  Z
#End of header
11APILMI0000DSM0    vehicle@T0   NOVALUE    PRE    0.361    -0.7885   07172
11APILMI0000DSM0    vehicle@T0   NOVALUE    POST   0.406    -0.7832   07255
...
P0001               vehicle@T0   Dashboard  PRE    0.300    -0.450    0.655
P0002               vehicle@T0   Dashboard  PRE    0.301    -0.450    0.654
P0003               vehicle@T0   Dashboard  PRE    0.302    -0.450    0.653
P0004               vehicle@T0   Dashboard  PRE    0.303    -0.450    0.652
. . .
```

4.2.4 Example of 3D point data file

Filename: 2007ISO2_11HEADLEMI00DSMV.005

```
# Begin of header
Data format edition number          2.0p3
Type of data                        Point
Comments                            Reference system: VehicleT0
# End of header
   -0.0090   4.679542e-001   -4.399675e-001   7.325757e-001
   -0.0080   4.679646e-001   -4.399681e-001   7.326144e-001
   -0.0070   4.679401e-001   -4.399651e-001   7.326324e-001
   -0.0060   4.679460e-001   -4.399436e-001   7.326981e-001
. . .
```

4.2.5 Example of camera position file

Filename: 2007ISO2_CameraPosition.pao

```
# Begin of header
Data format edition number          2.0p3
Type of data                        PositionAndOrientation
Comments                            Name  Refsys  Time[s]  X[m]  Y[m]  Z[m]  Qw  Qx  Qy  Qz
# End of header
L1   0.000   testrig      2.9521    -7.3178   1.6081    0.76506   0.64370   0.01340   0.01277
L1   0.001   testrig      2.9522    -7.3177   1.6080    0.76506   0.64370   0.01341   0.01277
...
L1   0.150   vehicle@T0   2.9525    -7.3177   1.6081    0.76506   0.64370   0.01347   0.01272
IN1  static  vehicle@T0   -0.5000   0.4000    0.8000    0.96593   0.00000   -0.25882  0.00000
IN2  static  vehicle@T0   -0.4980   0.4000    0.7990    0.96126   0.00000   -0.27564  0.00000
. . .
```

4.3 Example of comment files

4.3.1 Example of test comment file

...

4.3.2 Example of channel comment file

...