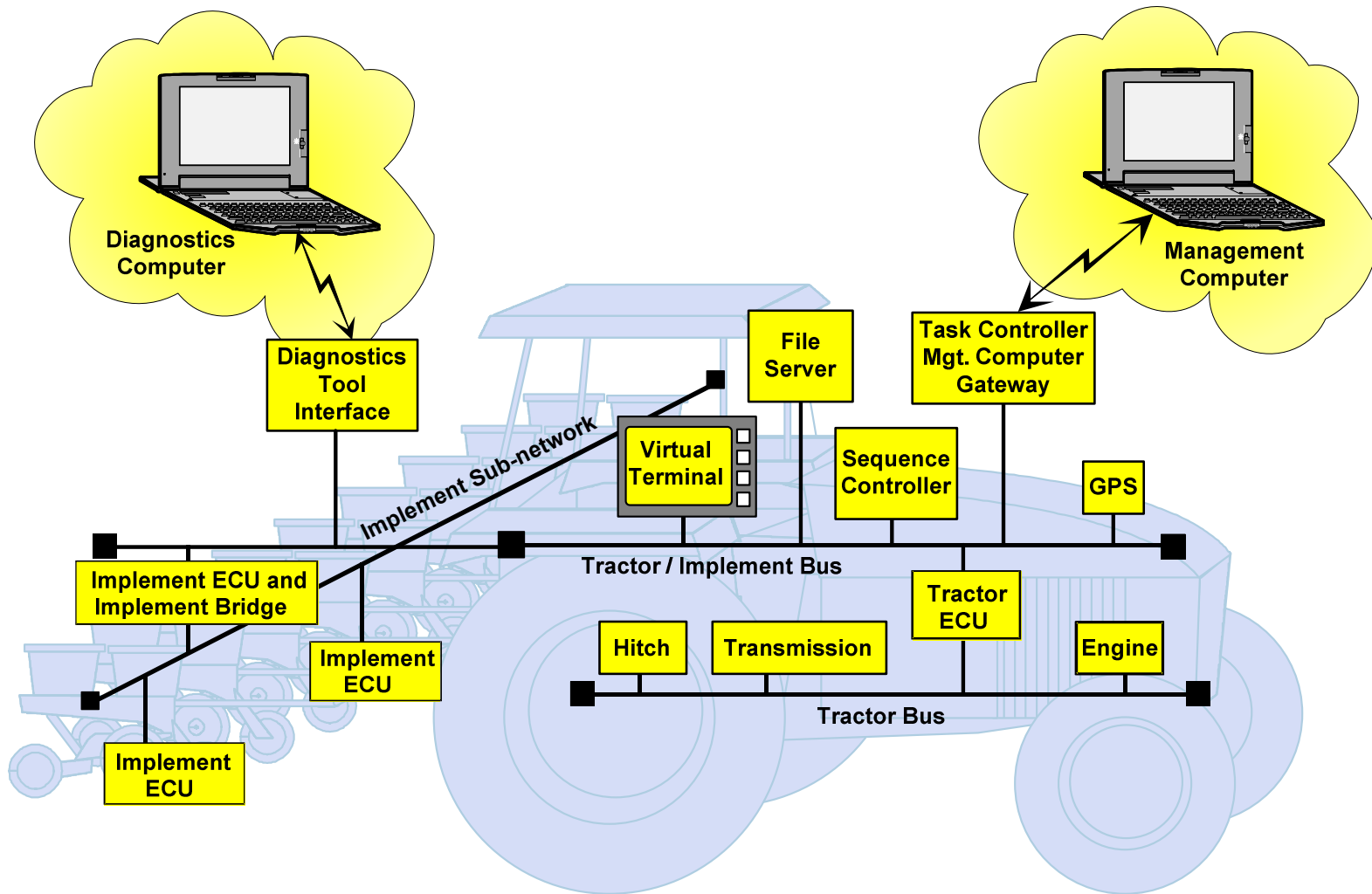


# **ISO 11783 Part 10 Task controller and management information system data interchange**

A brief overview

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# ISO 11783 System



## ISO 11783 / ISOBUS

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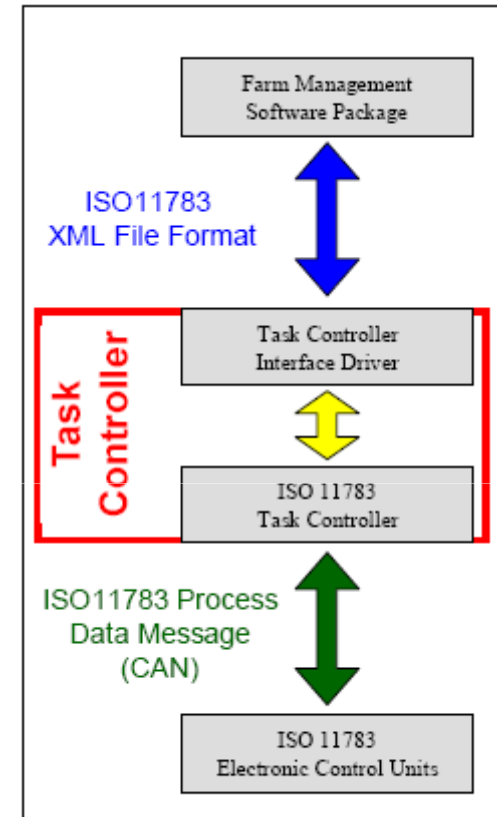
- ISO 11783 provides standardized protocol for communication on-board agricultural equipment and communication from on-board equipment to off-board management computers. Development controlled by ISO TC23/SC19/WG1 – Convenor, Bob Benneweis
  - Part 10 Task Group leader – Jaap Van Bergeijk - AGCO
- ISOBUS is a term trademarked by the AEF to characterize AEF defined useage of ISO 11783 based systems.
  - AEF is a worldwide consortium of equipment manufacturers and interested parties that focuses on promoting agricultural electronics and includes providing guidance to standards bodies.

## ISO 11783 Documents and status

Part	Title	Current Status
1	General Standard for mobile data communication	IS
2	Physical Layer	IS
3	Data Link Layer	IS
4	Network Layer	IS
5	Network Management Layer	IS
6	Virtual Terminal	IS
7	Implement messages	IS
8	Power train messages	IS
9	Tractor ECU	IS
10	Task Controller	IS
11	Mobile Element Data Dictionary	IS
12	Diagnostics	IS
13	File Server	IS
14	Sequence Control	DIS

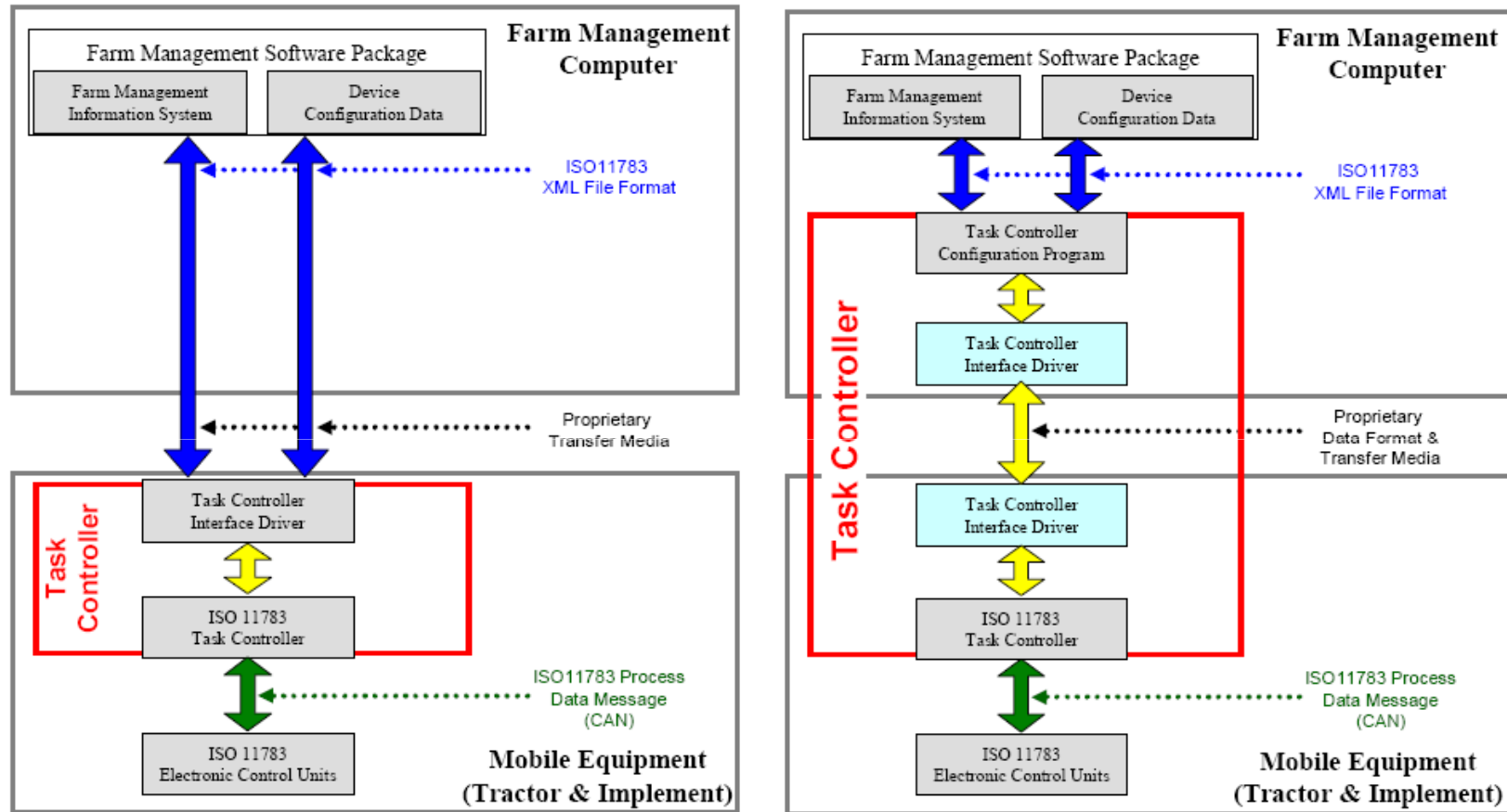
# Functionality covered by Part 10: Task Controller

- Standardized Interface between the Mobile System and the Farm Management Information System (PC in farm office) file. XML based, file oriented.
- Standardized communication between Task Controller (TC) and controllers on the bus (Process Data Message = PDM)
- Documentation of work of the mobile system (totals of tractor, implements, time stamps, etc.; geo-referenced when GPS available)
- Prescriptions for multiple implements in parallel
- Handling of Coding Data (all kinds of setup data like operator names, farm and field names, machine information, etc.)
- Handling of Machine Configuration (mounting positions including their position offsets, working width, etc.)
- Data Dictionary (ISO11783 part 11) defines the data types (defined as online-dB on [www.isobus.net](http://www.isobus.net))



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# Optional Task Controller Interface Methods



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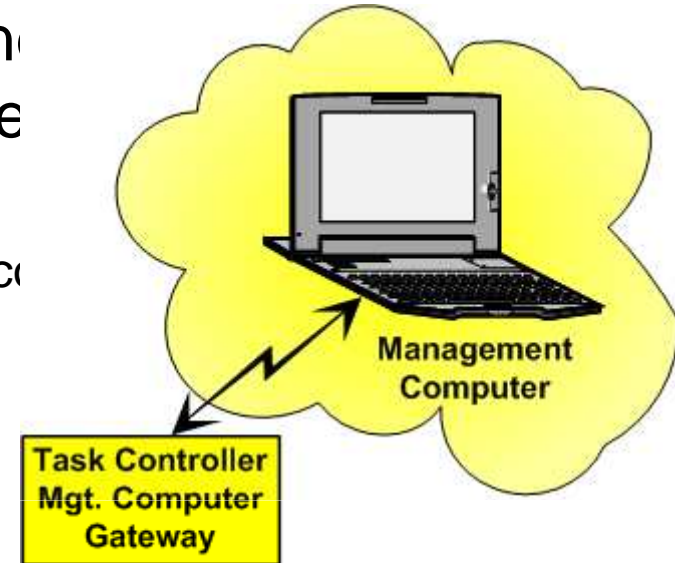
## Task Management Workflow

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- a) Planning of field Task on the desktop computer (Farm Management Information System = FMIS) What, Where, How, by Whom, When, etc.
- b) Conversion of task into standard XML format
- c) Assignment of task data to “implements” (Working Sets clearly identified by their NAME)
- d) Transfer from PC to Mobile TC (Mobile Implement Control System = MICS) (this may include conversion)
- e) TC transmits information as specified to “implement” controllers
- f) TC collects information as specified in the field Totals, site specific data Logging, new Coding Data, etc
- g) Transfer of data back to PC (this may include conversion)
- h) Analyzing of field data in FMIS

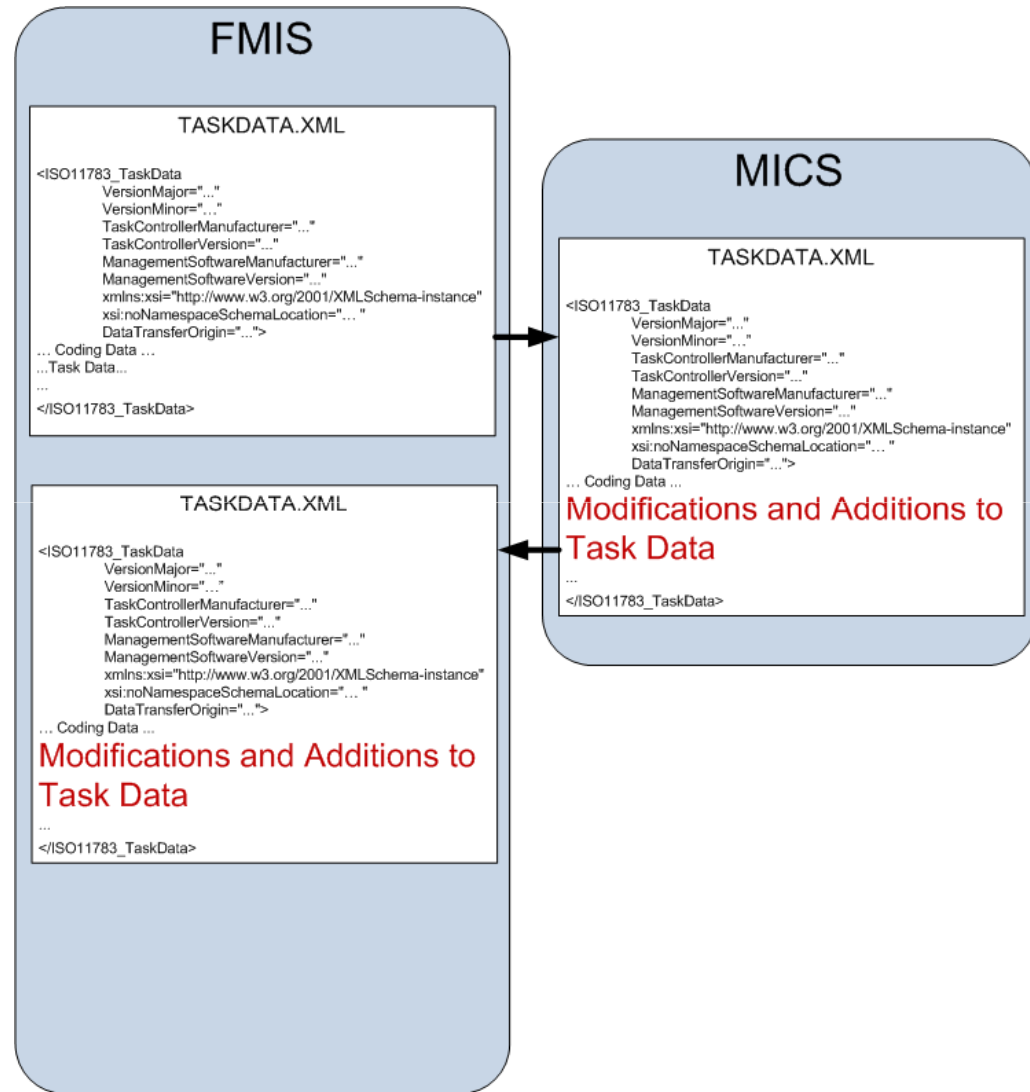
## FMIS to MICS to FMIS communication

- FMIS -> MICS communication and back is based on data transfer file
  - XML data transfer files
    - Formatted as XML version 1.0 and character encoding in UTF-8
  - Optional binary-coded data files for:
    - gridcell definitions
    - logged process data
  - All files are in the same directory.
  - Coding data and task data stored in the same set of XML files upon transmission from FMIS to the MICS. During processing of tasks by the task controller, these files are likely to be modified and, when tasks are finished, can be transferred back to the FMIS.



# Origination and modification of Task Data

- Modified Task Data are added to the Taskdata file by the MICS (Task Controller and transported back to the desktop



## Coding data example

### D.10 CropType — CTP

Type: *Coding data*

Description: The CropType XML element describes a crop that can be cultivated on a partfield. A CropType XML element can include several CropVariety XML elements.

Referenced by XML elements: – *Partfield*

Includes XML elements: – *CropVariety*

Attributes:

Attribute	XML	Use	Type	Length/range	Comment
CropTypeid	A	r	xs:ID	min. 4 .. max. 14	Unique identifier of CropType Format: (CTP CTP-)([0-9])+ Records generated on MICS have negative IDs
CropTypeDesignator	B	r	xs:string	max. 32	Name of the crop
CropVariety		o	xs:element		Includes a list of XML elements CropVariety

## Coding Data Example

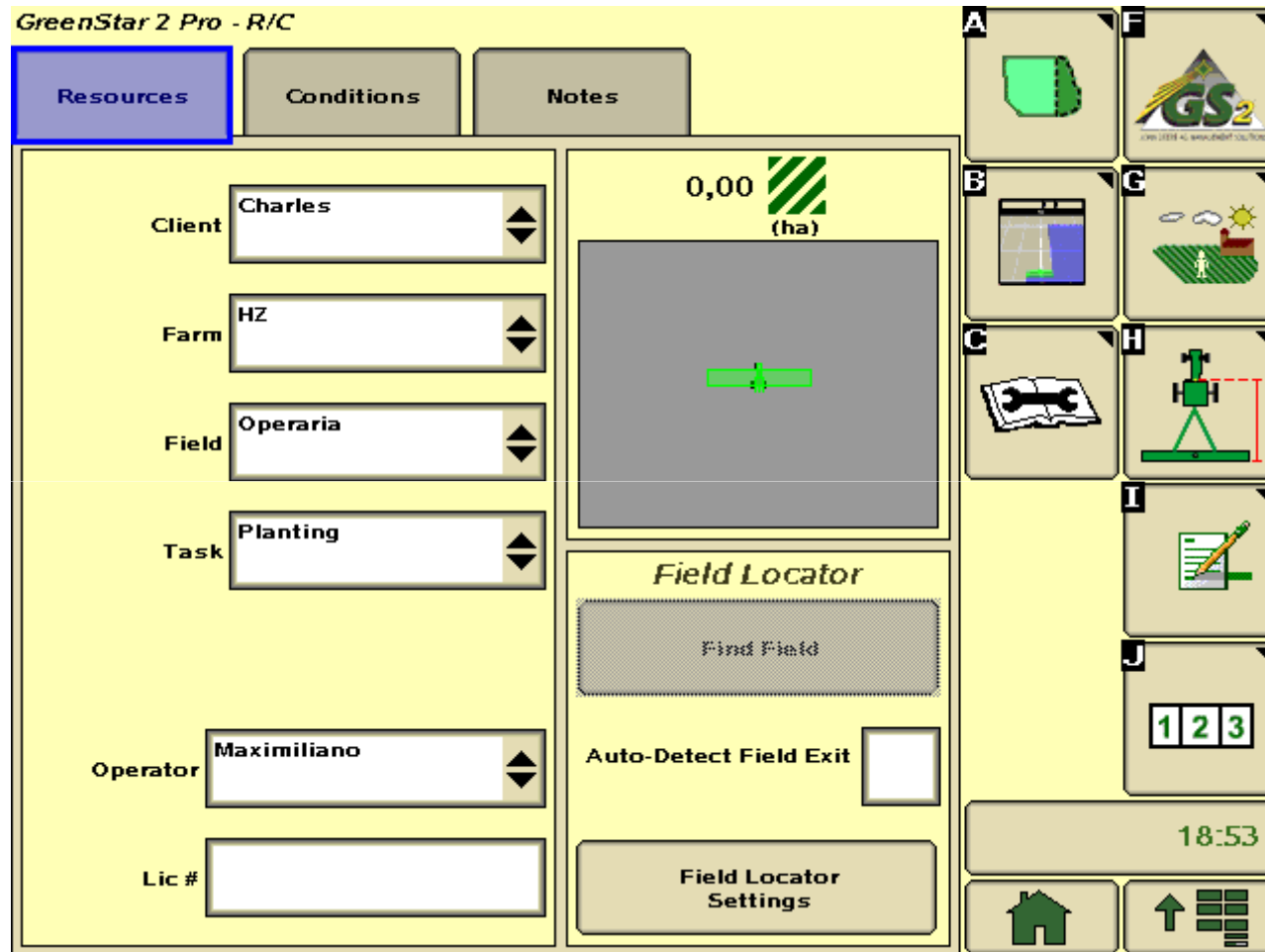
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**<CTP A="CTP1" B="wheat">  
    <CVT A="CVT1" B="Hatcher"/>  
    <CVT A="CVT2" B="Pioneer 25R40"/>  
    <CVT A="CVT3" B="TAM 113"/>  
</CTP>**

**<CTP A="CTP2" B="barley"/>**

**<CTP A="CTP3" B="oats"/>**

# Task Controller user interface



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## Task Controller User Interface Functions

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- A User-Interface is not mandatory, nevertheless common & useful to
  - Select a task from a list
  - Start/Stop a task
  - Modify a task
  - Create a task
  - Add new Coding Data
  - Display Warnings as needed
  - Provide Total Overviews
  - Etc.

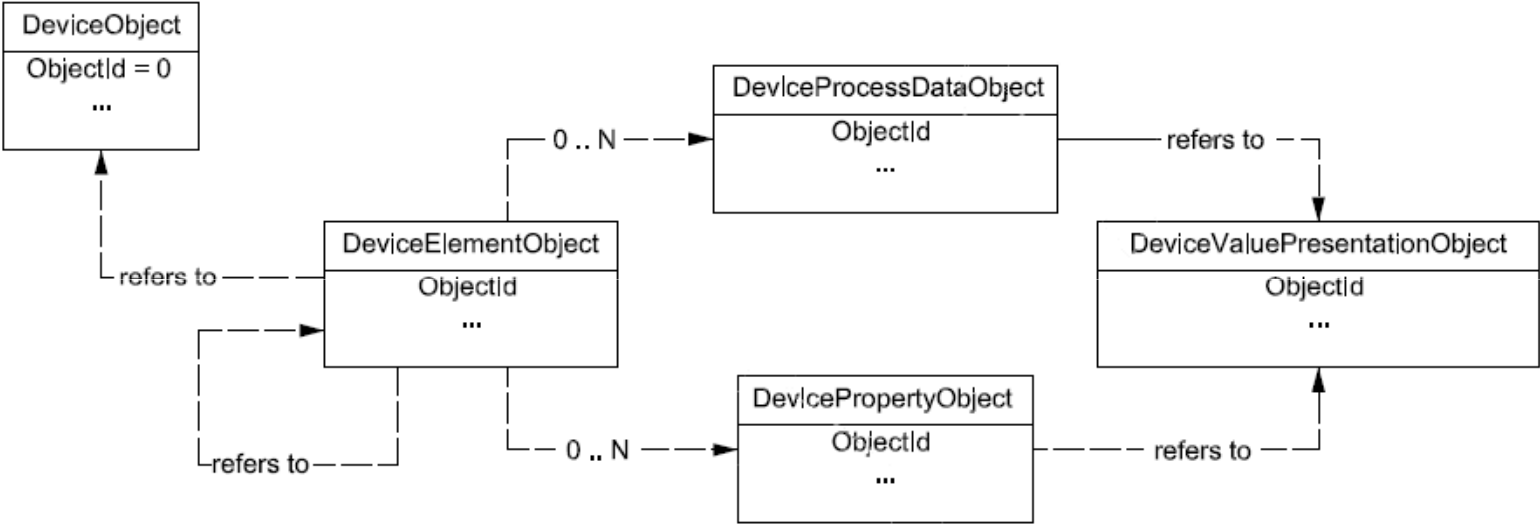
# Device Configuration Data (DCD)

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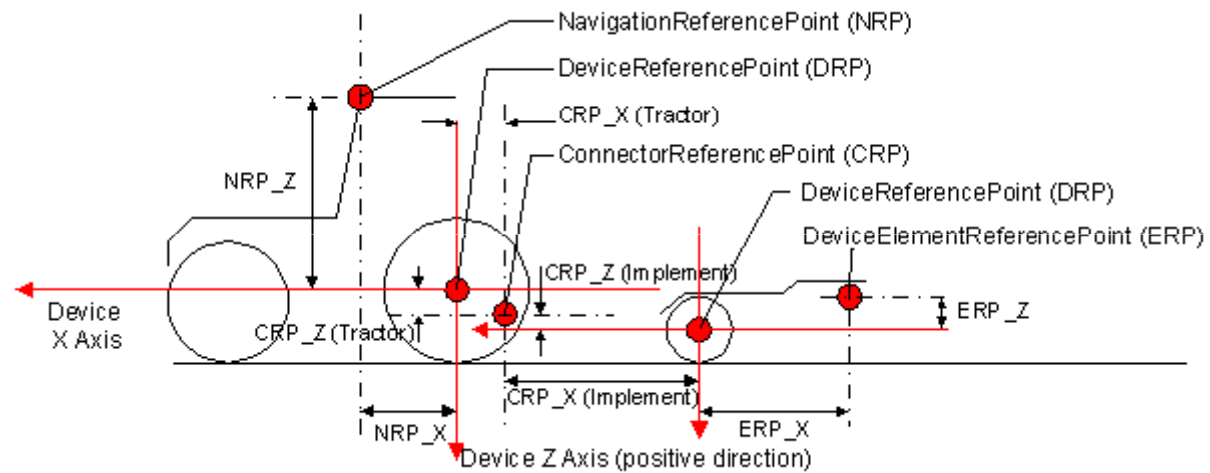
- The DCD describes the connected Working Set for the TC and Desktop SW
  - Number of bins (tanks), booms, sections
  - the structural relationship between the objects (sections are children to a boom, etc)
  - the offsets of the objects to each other (x-, y-, z-offset)
  - which Process Data Variables a particular DCD element supports (e.g. boom supports on/off status and current application rate)
  - version, embedded language and unit settings (localization label)
- A valid DCD has to be available per Working Set for a standard TC communication
  - either as runtime upload via CAN at system start-up
  - or offline via import into Desktop SW

# Device Descriptor Object Pool

Device Descriptor Object Pool



# Device Geometry - Side View



x-axis is specified as positive - in normal driving direction  
y-axis is specified as positive - to the right of the normal driving direction  
z-axis is specified as positive - downward towards the ground

## Data Dictionary Element (DDE)

- Defined in the online database of part 11 (see [www.isobus.net](http://www.isobus.net))

- Includes the following information

- Unique Identifier (DDI)
- Clear definition
- Unit definition
- Value Range
- Resolution
- Diagnostic information (SPN)
- Comments
- Device Class supported by the DDE

ID	6 - Set-point Mass per Area Application Rate
Definition	Set-point Application Rate specified as mass per Area
Units	mg / m <sup>2</sup>
Range	0 - 2 147 483 647 mg / m <sup>2</sup> 0 - 2.147 t / m <sup>2</sup> 0 - 439.84 lb / foot <sup>2</sup>
Resolution	1.0 / bit
SAE SPN	not specified
Comments	none
Device Class	4 - Planter 5 - Fertilizer 6 - Sprayer

- Database allows all DDE's to be downloaded into an Excel Spreadsheet
- Requests for new DDE's are evaluated and assigned by an international Expert Team
- DDI forms a part of the process data message for communicating process data

## Current activity related to Task Controller

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- New version of 11783-10 is in last stages of development.
  - Many improvements including: multi-FMIS support, wireless capability, Real-time sensors, improved tank mix support, multiple-instances of TC's on bus, better support for guidance paths,
- Examination of AgGateway compatibility on agenda at TC23/SC19/WG1
- High-speed networks are being examined for future application in ISO 11783 systems