

# *Linking CORE with MS Project*



**Pieter Bruring  
Systems Engineer  
ADSE**

**PieterB@adse.nl  
www.adse.nl**

ADSE has developed the necessary CORE scripts to link MS Project with CORE. These scripts are available on request. This document clarifies the benefits of combining the functionality of these two programs and way how it is done.

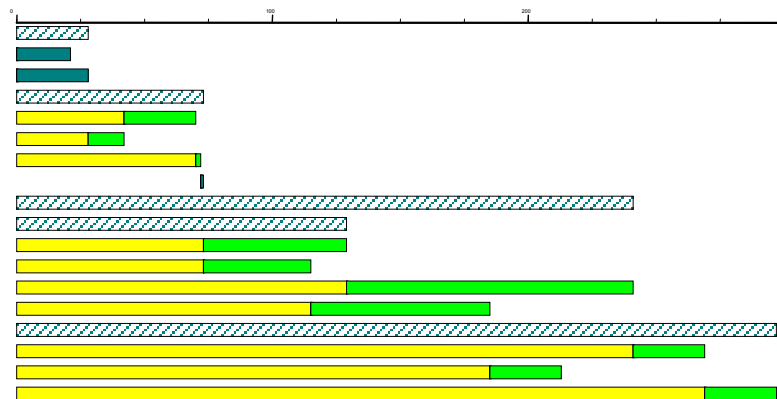
# Linking CORE with MS Project

The project management capabilities of the CORE tool can be integrated with several common used software tools. In this example the integration with MS Project is demonstrated. This enables the communication of task scheduling data centrally to the responsible team members. Normally, this information is locked in an MS Project sheet. Now it is available in CORE and it can be published using a web interface (demonstrated in Figure 4, page 3). Also the time is cut to generate new planning due to design changes. It bridges the gap between planning and control and engineering.

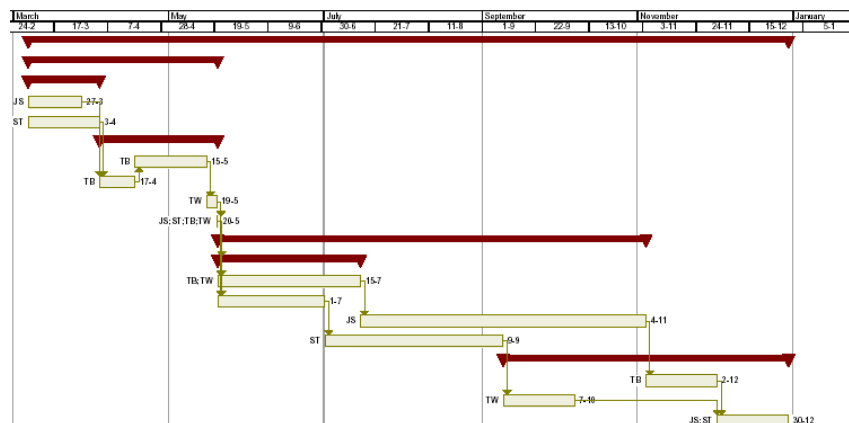
Why use MS Project for schedule generation? A good first indication of the activity scheduling can be created with COREsim (Figure 1, below). However, after comparing this with a MS Project Gantt chart (Figure 2), the following issues arise:

- *The timescale is numerical and not in datevalues*
- *No start- and finish dates of activities.*
- *No Program, Workpackage or Task rollups.*
- *Activity rollups do not start after receiving inputs / triggers.*
- *No influence of working time of resources are shown (such as weekends)*
- *No links shown between Activities*

This is of importance while developing a project planning. And often the same data which resides in the CORE repository would be entered in MS Project.



**Figure 1: A COREsim timeline output**

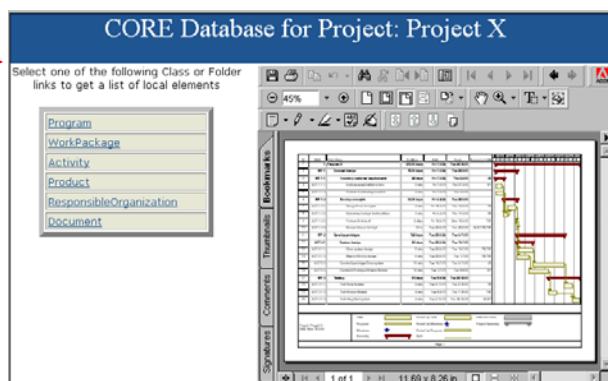
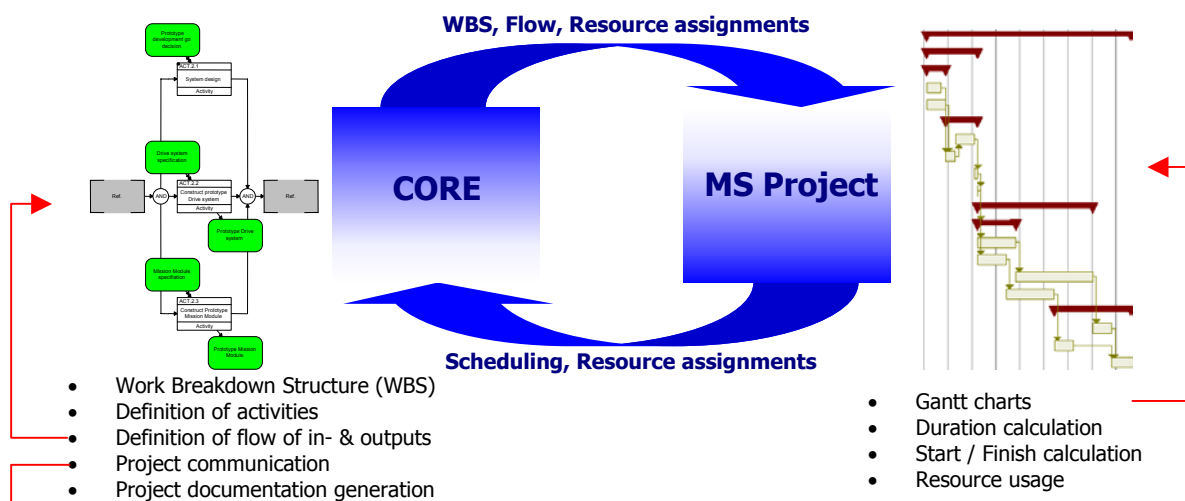


**Figure 2: MS Project Gantt chart**

# Linking CORE with MS Project

The CORE tool is used to construct the work breakdown structure and to graphically construct the order of the tasks using for example Enhanced Functional Flow Block Diagrams (EFFBD's). Relevant information about the activities can be stored centrally in the CORE repository, such as descriptions, assignments and issues. MS Project is excellent to display the scheduling information of these activities, this data can now be incorporated into the CORE repository. The following diagram summarizes the benefits of the link:

**Figure 3: The CORE - MS Project link**



**ResponsibleOrganization: ORB.X.1.2**  
**Thomas Wise**

Hierarchy View:

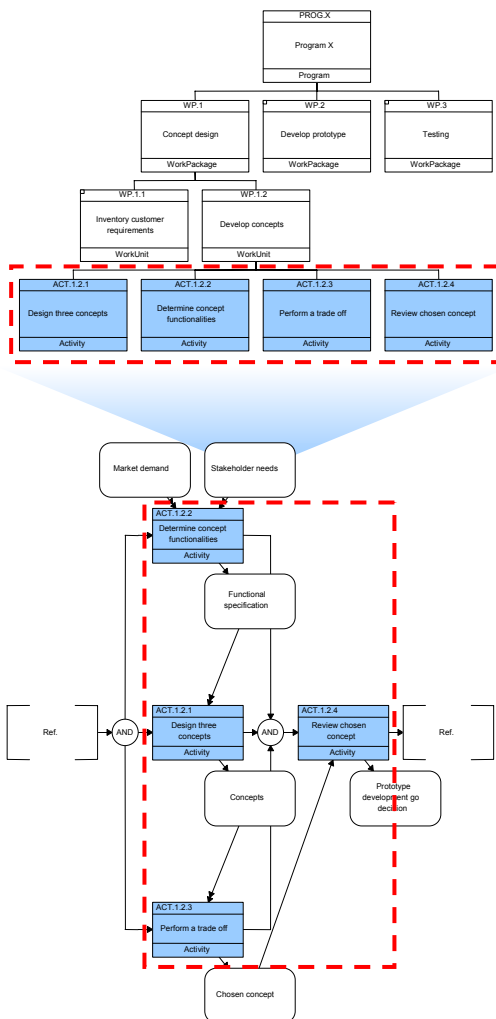
Attributes	
Abbreviation	TW
Created	Monday 10 March 2003 at 09:36:05
Creator	Administrator
Last Modified	Monday 10 March 2003 at 09:51:17
Number	ORB.X.1.2
Type	Client
Relationships	
member of	<a href="#">ResponsibleOrganization ORB.X.1 Design engineers</a>
responsible for	<a href="#">Activity ACT.1.2.3 Perform a trade off</a> <a href="#">Activity ACT.1.2.4 Review chosen concept</a> <a href="#">Activity ACT.2.1.1 Drive system design</a> <a href="#">Activity ACT.3.1.2 Test Mission Module</a>

**Figure 4: Project status communication, using CORE HTML**

# Linking CORE with MS Project

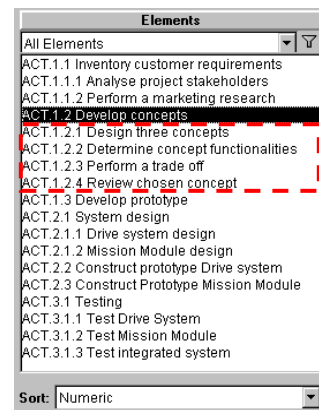
## Project breakdown and flow in CORE

**Figure 5:**  
**Program Hierarchy**



The Work Breakdown Structure (WBS) is designed in CORE, as displayed in Figure 5 to the left. This hierarchy however does not show the order of execution. This is stated using an Enhanced Functional Flow Block Diagram (EFFBD) in CORE. The arrivals of triggers and inputs determine the order of execution (see Figure 7). The outputs of each activity are the deliverables of the project.

The order of the WBS in the MS Project export file is determined by the Program Hierarchy (see Figure 5) and the numerical sorting order of the elements in this hierarchy (Figure 6). The predecessors are determined by examining the sources of the inputs and triggers.



**Figure 6:**

### Activity Element listing

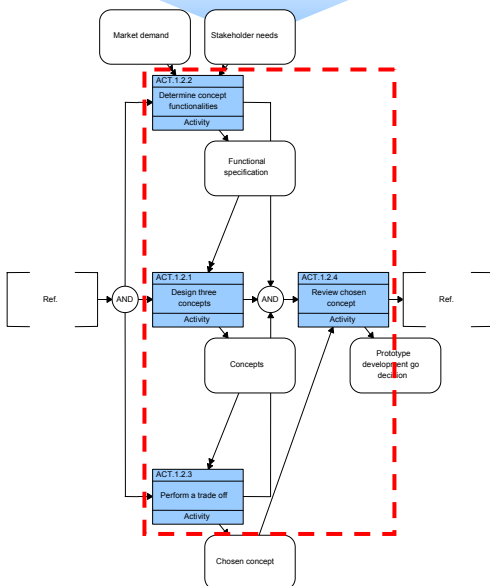
To be able to model the flow of activities It can be possible that a higher level activity needs to be defined. This is then decomposed into the activities listed in the Program Hierarchy included with the desired functional flow.

### Note:

The sections shown in figures 5, 6 and 7 show the elements of the Class Activity which execution order is determined by triggers and inputs. The highlighted element in Figure 6 (ACT.1.2 Develop concepts) is constructed to define the functional flow of the elements it decomposes. But it is not included in the Program Hierarchy.

**Figure 7:**

### Enhanced Function Flow Block Diagram for Activities



# Linking CORE with MS Project

## CORE → MS Project

A CORE script outputs a text file which is then imported using a mapping defined in MS Project. The user selects an Element of the Class Program in CORE as the starting point for the Work Breakdown Structure to export to MS Project. The program hierarchy which is used in this example is display below:

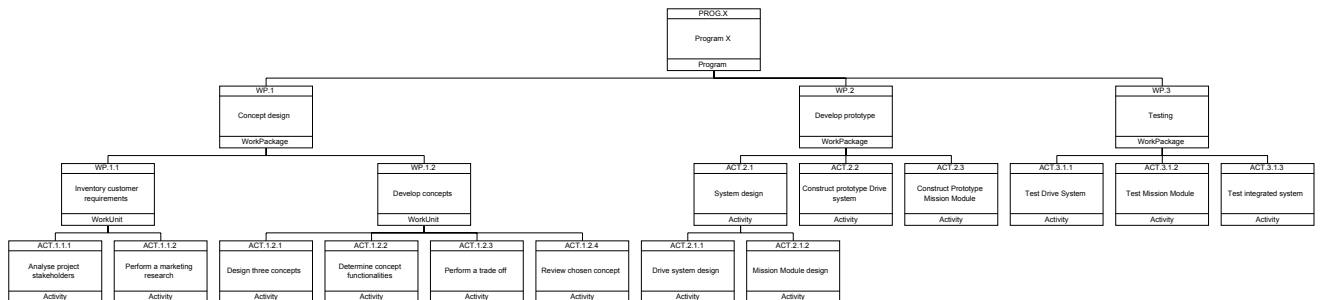


Figure 8: Sample program hierarchy

The script which is developed by ADSE is run after selecting "Run Script" in the Control Panel (1). After selecting the MS Project export script a selection box asks the user to select an element from the class Program (2) which is used as starting element for the work breakdown structure, defined in the program hierarchy. This is followed asking the user for the output file (3).

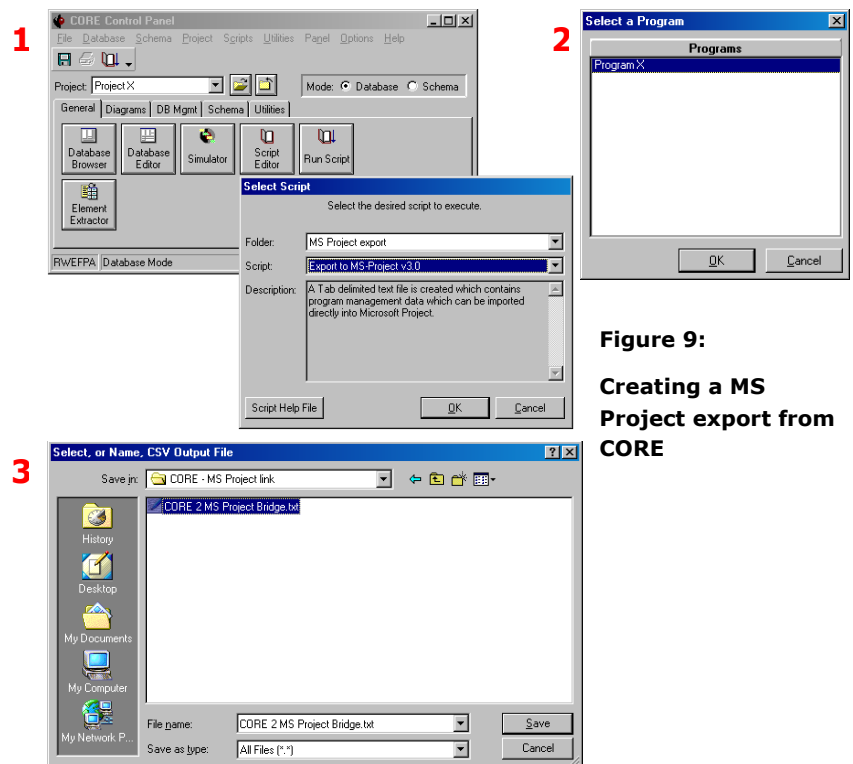


Figure 9:  
Creating a MS  
Project export from  
CORE

# Linking CORE with MS Project

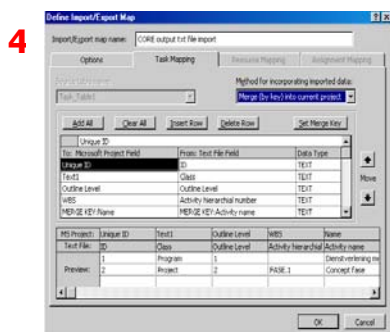
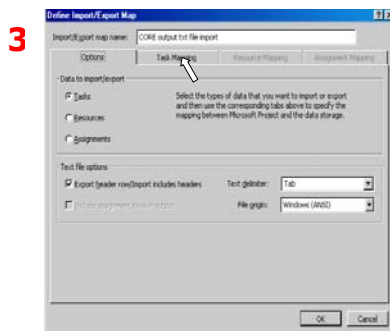
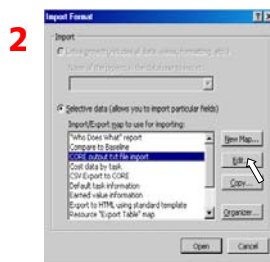
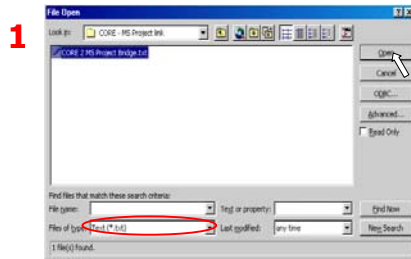


Figure 10:

## Importing a CORE generated MS Project bridge file

### Notes:

1. Due to international settings of Microsoft Windows, the separator sign used in for example CSV files differs. Since this demonstration has been constructed in the Netherlands, it is a semicolon (;)
2. A new mapping can be defined by pressing the "New Map" button in this window. When the settings are OK, only step 1 and 2 are needed

CORE to MS Project bridge file (.TXT)			
Text File Field	Contents origin From CORE	Sample values	MS Project Field
<b>ID</b>	Hierarchical iterate number	1,2,3, ...	<b>Unique ID</b>
<b>Class</b>	Element Class	Program, Project, WorkPackage, Activity	<b>Text 1</b>
<b>Outline level</b>	Hierarchy level	2	<b>Outline Level</b>
<b>Number</b>	Element number	PROG.1, WBS.1.2, ACT.1.4.2	<b>WBS</b>
<b>Name</b>	Element name	Design Concept	<b>Name</b>
<b>Duration text</b>	Element Attribute DurationText (Requires Schema Modification)	2 hrs, 5 days, 4 wks	<b>Duration</b>
<b>Predecessor ID's</b>	Hierarchical iterate number of Activities which are the origin of inputs and triggers	12;15;19	<b>Predecessors</b>
<b>Resource ID's</b>	Collection of the Attributes "Abbreviation" of Class ResponsibleOrganisation Targets of the "assigned to" relation	JS;TW	<b>Resource Initials</b>
<b>Type</b>	Fixed String value	Fixed Duration	<b>Type</b>

The text delimiter character in the export file is the Tab character. This choice is made, because the predecessor- and resource ID's require the (semi)colon character in MS Project (see note below)

1. Name the \*.csv export file
2. Select the Export Mapping
3. Mapping settings for Options: (Set Tab)
4. Task mapping (when done, click OK to import)

# Linking CORE with MS Project



MS Project calculates the scheduling of each activity and it is represented graphically in a Gantt Chart (see below). When a PDF writer application is available, this data can be outputted as a PDF document and included as a document in CORE by using a file reference. After running the HTML generation script, this file is available in the generated HTML output (see Figure 4, page 3).

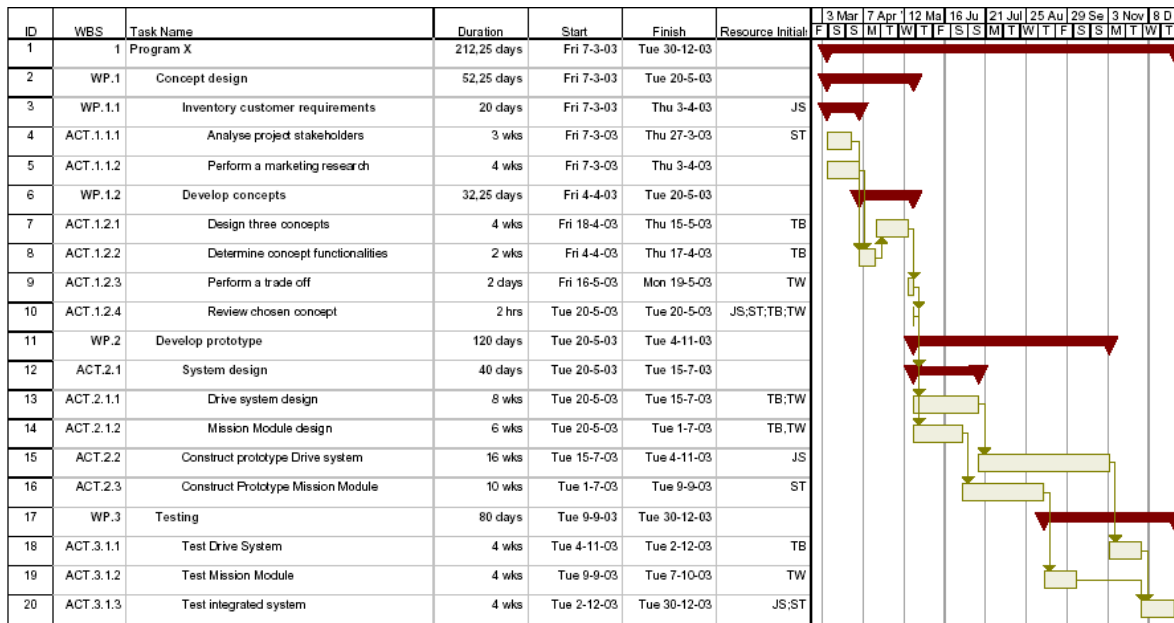


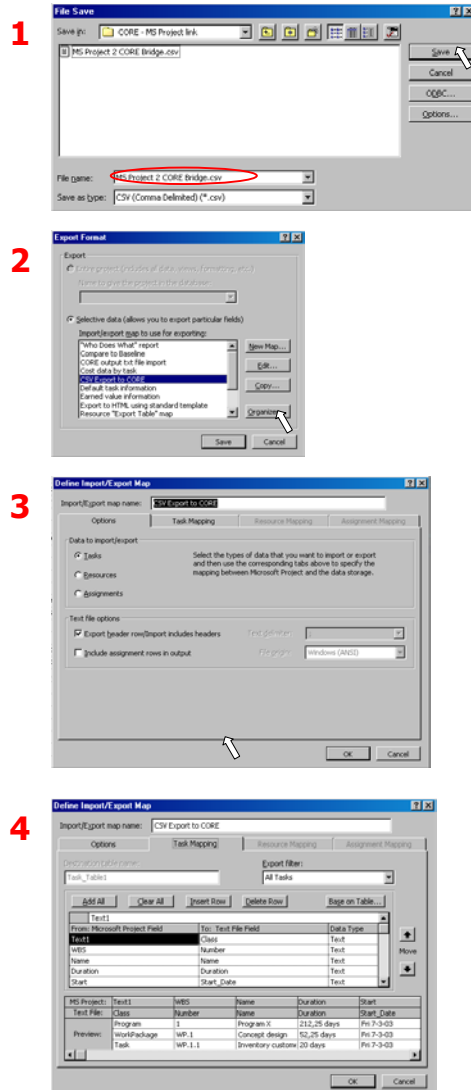
Figure 11: MS Project Gantt Chart, based on CORE data

# Linking CORE with MS Project

## MS Project → CORE

From MS Project a Comma Separated Values (CSV) file is generated using a predefined definition (see table to the right). A MS Project import script updates the CORE database with the calculated start- and finish dates and resource allocations.

MS Project to CORE bridge file (.CSV)			
CSV File Field	Contents origin From MS Project	Sample values	CORE Element, Relation, Attribute
Class	Text 1	<i>Program, Project, WorkPackage, Activity</i>	This is used to filter out the Elements of Class: Activity
WBS	Number	<i>PROG.1, WBS.1.2, ACT.1.4.2</i>	Element Number
Name	Name	<i>Design Concept</i>	Element Name
Duration	Duration	<i>2 hrs, 5 days, 4 wks</i>	Attribute: DurationText*
Start_Date	Start	<i>Thu 27-3-03</i>	Attribute: StartDate*
Finish_Date	Finish	<i>Mon 28-4-03</i>	Attribute: FinishDate*
Resource_Initials	Resource Initials	<i>JS;TW</i>	Set targets of relation "assigned to" to a Responsible Organisations with an abbreviation which matches the initials



1. Name the \*.csv export file
2. Select the Export Mapping
3. Mapping settings for Options: (Set Tab)
4. Task mapping (when done, click OK to import)

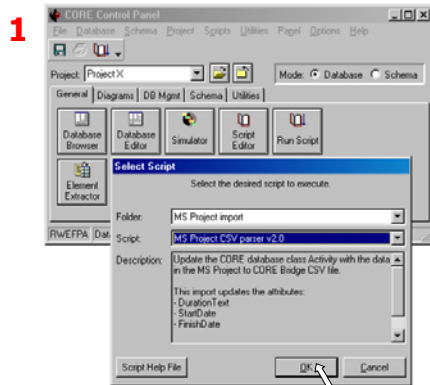
\* This requires an adaptation of the database Schema. The Class Activity needs the following new attributes: DurationText, StartDate and FinishDate

Figure 12:

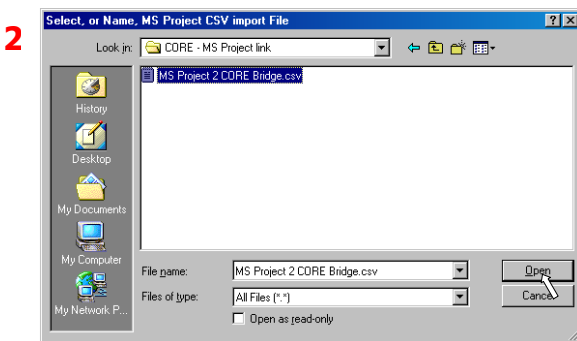
Exporting a MS Project bridge file



# Linking CORE with MS Project



The MS Project to CORE CSV file is imported into CORE after the script is started pressing "Run Script" in the Control Panel (1). Then select the MS Project CSV Parser script and choose the CSV import file to update the CORE database (2).



After completion, the results can be viewed, as demonstrated in Figure 14, which shows the Element view in CORE. Figure 15 displays the HTML output of the same data. This output for example can be available to all team members, ensuring easy access to their task details.

Because the activity scheduling is now incorporated into CORE, the tool can be used to output several useful documents. Such as a project description document containing the description and the flow of the activities, including the traceability and a deliverable timetable (Table 1). Such a script is available upon request at ADSE.

Figure 13:

## Importing the MS Project bridge file into CORE

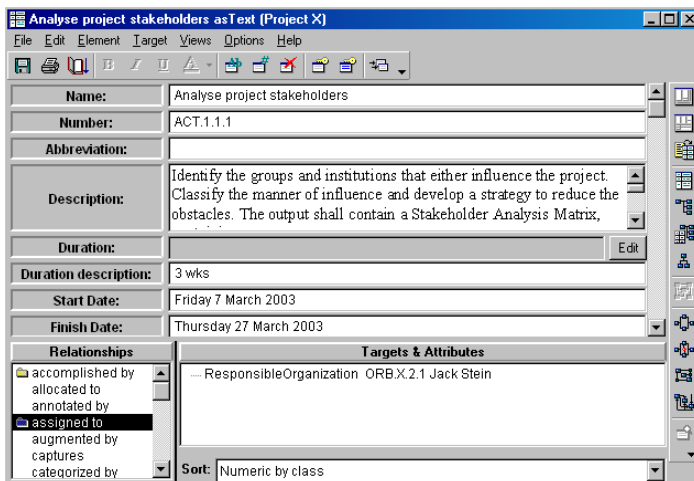


Figure 14:

## Activity Element view with imported values

## Activity: ACT.1.1.1 Analyse project stakeholders

Attributes	
Created	Friday 7 March 2003 at 10:21:22
Creator	Administrator
Description	Identify the groups and institutions that either influence the project. Classify the manner of influence and develop a strategy to reduce the obstacles. The output shall contain a Stakeholder Analysis Matrix, containing: <ul style="list-style-type: none"> <li>- Stakeholder</li> <li>- Stakeholder interests</li> <li>- Impact assessment</li> <li>- Possible obstacle reducing strategy</li> </ul>
Duration description	3 wks
Execution Level	Follow Decomposition
Finish Date	Thursday 27 March 2003
Last Modified	Tuesday 11 March 2003 at 16:08:43
Number	ACT.1.1.1
Start Date	Friday 7 March 2003
Relationships	
assigned to	ResponsibleOrganization_ORB.X.2.1 Jack Stein
decomposes	Activity ACT.1.1 Inventory_customer requirements
outputs	Product PRD.1.1.1 Stakeholder needs

Figure 15:

## HTML output of the Activity Element

# Linking CORE with MS Project



Number	Name	Finish Date
PRD.1.1.1	Stakeholder needs	27-03-03
PRD.1.1.2	Market demand	03-04-03
PRD.1.2.2	Functional specification	17-04-03
PRD.1.2.1	Concepts	15-05-03
PRD.1.2.3	Chosen concept	19-05-03
PRD.1.2.4	Prototype development go decision	20-05-03
PRD.2.1.2	Mission Module specification	01-07-03
PRD.2.1.1	Drive system specification	15-07-03
PRD.2.3.1	Prototype Mission Module	09-09-03
PRD.3.1.2	Qualified Mission Module	07-10-03
PRD.2.2.1	Prototype Drive system	04-11-03
PRD.3.1.1	Qualified Drive system	02-12-03
PRD.3.1.3	Qualified vehicle	30-12-03

**Table 1: CORE generated deliverable timeline**

## Conclusion

By linking CORE with MS Project, the project management functionality is expanded with scheduling capabilities. Time spent on setting up and controlling a project are reduced. Now there is a way for the project scheduling information to be kept continuously up to date. This can shorten the project status check intervals, enabling faster responses to project slips. Also the combined use of CORE and MS Project joins engineering with planning and control, yet respecting their tool of preference.