



C·A·D·P·I·P·E



SIXTH FRAMEWORK PROGRAMME HORIZONTAL RESEARCH ACTIVITIES INVOLVING SMES CO-OPERATIVE RESEARCH

Contract for: CO-OPERATIVE RESEARCH PROJECT

Project acronym: CADPIPE
Project full title: Cad Production Pipeline
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Plan for using and disseminating the knowledge

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Annex 1. of the Final Report

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Version history

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1.0	30.11.06	Deniz Ozdemir		Final version
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List of symbols

Symbol	Name	Explanation
3D	Three Dimensional	Used as a common name for the whole three dimensional, digital technology branch. Three dimensional digital description of an object in XYZ co-ordinates
XML	eXtensible Markup Language	Meta language designed to become able to format other sub languages. XML is a W3C standard including a family of languages for example for: structural data, transformations and linking. Data description for Semantic Web technology
COLLADA	COLLABorative Design Activity	COLLADA is a COLLABorative Design Activity for establishing an open standard Digital Asset schema for interactive 3D applications. COLLADA is designed to be the center piece of Digital Asset toolchains used by the 3D interactive industry.
ID	IDentifier	Alpha numerical or numerical symbol to identify data or other
OSG		Open Scene Graph OpenGL portable, 3D high performance graphics toolkit for applications such as flight simulators, games, virtual reality or scientific visualization. www.openscenegraph.org/

Abstract

PDK (Plan for using and disseminating the knowledge) is the document to draw the guidelines for the dissemination and exploitation progress and to embed the Exploitation Agreement, which shall be the result and a part of it (not public).

This document describes the route of the project dissemination and exploitation process from the beginning of the project and for the later life of the product after the project.

The Plan for using and disseminating the knowledge has been started actually as the first draft in the very early stage during the first WP1. The first draft version deadline was in 01.05.05. by the deliverable ID D18

The Plan was up-to-dated by the same name and ID in 31.12.2005 and 30.11.06 as the deliverable ID D23. After this document the Dissemination and Exploitation Report was written as deliverable D22.

This second edition has been written after the project to make this document more readable.

PLAN FOR USING AND DISSEMINATING THE KNOWLEDGE

Introduction

EU Craft Programme is a way for SMEs to access a special kind of funding which makes them possible to buy RTD work from the Research Institutes and other RTD partners: in the case of CADPIPE they are; VTT, Fraunhofer IFF, Miralab University of Geneva and ICI EGE University. The research and development of these partners is full property of SMEs. Companies with in the project should recognise there are costs and obstacles but also advantages – without forgetting the equality principle.

Exploitation of the results of R&D projects is not very easy. Partners should use the funding allocated for this to support their real sales and marketing. To make sales world wide or even at European level, SMEs need strong partners and ready made business networks. Partners should also see the project as part of their actual business, rather than a marginal activity.

Public dissemination of the knowledge as limited publications is be necessary for the project to get visibility and to fulfil the interest of EU. Dissemination of the knowledge in partners is the most important thing to have all the information that will be later needed in further development of the new products and for sales purposes. This publishable version does not include any detailed information about the product to protect the IPRs of SME partners.

This plan has been designed in co-operation of:

SiennaBioGrafix (PDK coordinator), as main authority and reviewer

Infotron (as Dissemination Manager)

DeskArtes (Exploitation Manager)

Testaluna (leader of the Dissemination WP7)

Sensetrix (SME co-ordinator)

ISOIN, NIKI, DeltaCAD and MELON (SME partners who have most activities in the WP7)

The second edition has been edited by the
project manager

Hannu Kuukkanen

VTT

Timetable for the Dissemination and Exploitation

Tasks of WP7 Dissemination	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	Milestone
7.1 Dissemination and Exploitation plan								■							■													Month 8,15
7.2 Technology transfer in partners												■										■					■	Month 12-26
7.3 Seminars, Fairs																												Month 8-26
7.4 Final Report																												Month 27
7.5 Dissemination and Exploitation Report																												Month 15,26
7.6 Dissemination of the knowledge								■																				Month 8,15,19,26
7.8 Project Management												■																Month 8,12,15,19,23,26

Dissemination activities during the project

2004

8. October 2004:

The project web-site by VTT: <http://cadpipe.vtt.fi>. The website is open for all. From this website all the public material can be downloaded or viewed by any person, enterprise or organisation.

8. October 2004:

Project Extranet by VTT in <http://dohaota.vtt.fi>. (for partners only).

2005

19. January 2005:

DETECT-IT seminar lecture by Hannu Kuukkanen, VTT in Espoo, Finland. About 100 Industry enterprises from the domain of Mobile Technologies in Finland.

15. March 2005:

Article about the CADPIPE project in "Euroopan Tiede ja teknologia" Nr.1 /06 journal published by TEKES, Finland. Delivered to hundreds of Research and industry partners in Finland. Writer VTT.

9. May 2005:

Flyers of the CADPIPE project. Target group is research and industry, software developers and end users. English version only. Partners responsible: VTT and Infotron.

9. May 2005:

VTT and Infotron: The PowerPoint presentation of the CADPIPE project. The target group is research and industry, software developers and end users. English version only.

24-25. November 2005:

INTUITION Workshop and Exhibition: "Virtual reality and virtual environments", France <http://www.intuition2005.org/> About 300 research and industry enterprises were present from EU and other countries. Partner responsible: VTT

15. October 2005:

CADPIPE project poster targeted to potential research and industry experts, software developers and end users. English version only. Partner responsible: VTT

2006**20-22 June 2006:**

The UK Chapter of Eurographics Association: “Theory and Practice of Computer Graphics Research and application” . Published in UK. About 100 prints. Partner responsible: ICI.

22nd of June 2006:

9th IFF Science Days in Germany. About 200 potential Research and industry partner. Partners responsible: ICI, VTT, FhG/IFF

end of October 2006:

IFF Open Days in Fraunhofer Institute Germany. About 100 research and industry partners were present. Partners responsible: ICI, VTT, FhG/IFF

5th - 7th July 2006:

Lecture in CASA2006 conference in Switzerland. About 100 research and industry partner visitors. Partners responsible: Unige, VTT, ICI, FhG/IFF

26-28 June 2006:

ICE 2006 (International Conference on Concurrent Enterprising) in Milan, Italy on 26-28 June 2006. Partner responsible: ISOIN

6. September 2006:

International conference on Rapid Prototyping and Manufacturing “ICRPMF-conference” in Espoo Finland, organized by: Helsinki University of Technology BIT Research Centre in cooperation with FIRPA, GARPA, Suomen Akatemia (Finnish Academy) and Nordic Innovation Centre. Audience consists of enterprises from the research and industry, Industrial Software developers, Rapid prototyping industry enterprises, simulation and automation industry representatives and end users. About ~100 participants. Partners responsible: VTT in cooperation with DeskArtes,

In September 2006:

An article to the publication “Arts & Experiences” publisher: “Elämystuotanto-hanke” Lapin elämysteollisuuden osaamiskeskus (LEO) in Rovaniemi Finland.
www.elamystuotanto.org. This publication is intended to the research and industry, students Internationally. This publication has thousands of readers. Partner responsible: VTT and ICI

7. September 2006:

RadioSuomi, Tiedeuutiset (Finnish Broadcasting Radio channel 1, Research News). Interview about the CADPIPE project.

The audience is mostly end users and wider audience interested in technology development in Finland. This media is Finnish national and the amount of listeners is about ~10.000. Partner responsible: VTT

28-29. September 2006:

4th Common Colloquium on Design Technologies (“4. Gemeinsames Kolloquium Konstruktionstechnik”). in Kuehlungsborn, Germany. FhG/IFF makes a presentation about the topic

"VR-based Technology Development and Machine Configuration". The audience is about ~40.

25-27 October 2006:

“eChallenges 2006”, 25-27 October in Barcelona. The presentation of CADPIPE. Partner responsible: ISOIN.

15. December 2006:

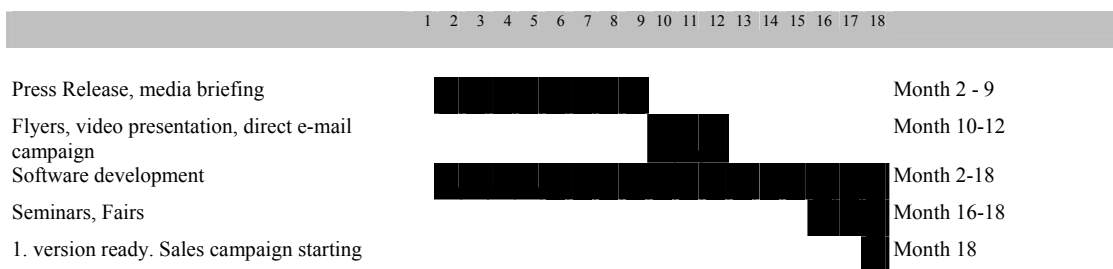
CADPIPE software product Training session for all partners. Partners responsible: VTT, Fraunhofer IFF, Miralab, ICI (all RTDs)

15. December 2006:

User manual for use of partners. English version only. (all RTDs)

15. December 2006: Software documentation for software developer partners. In English. (all RTDs)

Overview about the CADPIPE dissemination activity plan after the project



During the summer 2007:

An article about CADPIPE project result will be written and published in the ERCIM News. This is the publication of the European Research Consortium for Informatics and Mathematics (www.ercim.org) ERCIM News has a delivery of about 10 500 copies around the world among Research Institutes and their customer industry.

after 1. February 2007:

Press release (press/radio/TV), public. Multilingual in partner countries.

after 1. February 2007:

Media briefing for higher education. Multilingual in partner countries.

October 2007:

Flyers of the CADPIPE software for software resellers and end users will be designed and translated in partner countries by cooperation of all partners.

October 2007:

A direct campaign by e-mail has been planned to take place. Target group will be the software resellers and end users. This campaign will be multilingual in partner countries.

October 2007:

Film/video presentation for software resellers and end users. This will be in English version only.

Overview of the Exploitable knowledge and products

Surface Property Database

This data base includes a description of the storable data format. The data description bases on the open source COLLADA and has been written by XML. Document & presentation ready 1.9.2005.

Material editing tool

Beta version ready in 31.11.2006. (Material Editor module)

Material mapper (part of Material editing tool)

Beta version ready in 31.11.2006. (Material Mapper module), abstract material rendering representati

Spatial database

Description of the storable data format ready in 2005 - 2006

CAD Export tool

Beta version ready in 31.11.2006 (Export tool module)

XML standard description

Written document in 1.12.2005. Description of the XML data format, Model DB API Spatial DB API. This description bases on open standard.

VisualEditor import tool

Beta version ready in 31.11.2006. (CAD data import, Parametric Export/Import module, Triangular Import modules)

VisualEditor tools to spatial database connectivity

Beta version ready in 31.11.2006'. '(Data handler tool)

VisualEditor tools, (SceneEditor)

Beta version ready in 31.11.2006. (Scene editor for out-put scene building)

Activity Designer tool

Beta version ready in 31.11.2006. (tool to create / edit Joints etc. Animations)

Level Editor tool

Beta version was ready in 31.11.2006 (tool to prepare the data for viewing out-put stream)

Common user interface for Visual Editor tool-set

Beta version was ready in 31.11.2006. (Common User Interface for the Visual Editor)

The progress beyond

The CADPIPE compatibility tool and CADPIPE production line, builds a network not only for the every-day-production but for the continuing software development process in CAD software and visualisation industry.

Tools made during this project make possible adding new software versions, adding new compatibility rules, adding new data sources and developing and updating the converters.

For data conversions, there are few tools combined to the system usable via one user interface. Every new tool has been added to the list of the compatibility tool to show its dependences to other software and file formats.

This continuous development needs co-operation of the domain. This is only way to maintain the achieved competitiveness of the SMEs in visualisation business and for sake of this, there is strong need of continuous redevelopment of the system. The software business with in the project has interest of keeping the designed tools up-to-date for this same reason.

Basing on the strongest standards keeps the development and renovating easy and in comfortable price category. The development work can be designed in small steps (modules) not to rise the price of the system and to reduce the time-to-market.

The module-based solution makes possible to choose the service pallet for special purposes of an individual enterprise.

Estimated Time To Market

Time to market gap, for the vendors of the system, has been counted from the end of the project up to 18 months. This time will be used for validating and developing the software components of the pipeline, up to a commercial product. This time should be shrunk as short as possible and depends on most cases the requirements set for the commercial product. After the first presentations were ready during the project, the delivery negotiations with international sales organisations had been started.

One of the key partners in this process is DeskArtes Oy. They have the role of Exploitation Manager, Software Dissemination coordinator and Out of EU Export sales coordinator of the project.

CADPIPE's economic and total impacts

The combined totals of the new sales are expected to generate **€ 400 million of growth in the EU** within 5 years. (see next table).

Annual Market Potential of CADPIPE products and services

Market Potential (Annual)	Europe			Global excluding EU		Total	
	Price € x1000	Units pieces	Market million €	Units pieces	Market million €	Units pieces	Market million €
Concept and service system consulting	1	100	0,1	200	0,2	300	0,3
Component sales	0,5	1500	0,8	3000	1,5	4500	2,3
Professional software licenses	2	500	1,0	1000	2	1500	3,0
Everyman category software sales	0,5	2000	1,0	4000	2	6000	3,0
Visualisation service sales	4	32000	128,0	64000	256	96000	384,0
Product support services	0,5	5000	2,5	10000	5	15000	7,5
			133,4		266,7	total	400,1
						M€	

The CADPIPE service including all its components: 3D CAD data professional quality exchange and preparation for real time rendering to several type of terminals. We are aiming to reach about 1% of the markets by 5 years of marketing and sales.

The size of the CAD/CAM SME market:

The potential SME market of CAD/CAM sector is about 8 512 enterprises (40% end users) and 22 000 million US \$ (25.262 million €) in the world (CyberEdge Information Services Inc. (01/10/02)).

"An indication of the size of the CAD/CAM SME market in Europe can be seen from an analysis of Business-advantage.Co, UK database of nearly 20 000 CAD/CAM user sites in the UK. **This shows that nearly four out of five of all CAD/CAM using businesses have less than 250 staff.**

By developing new products during the project, software partners have totally new business and establishment for their competitiveness in custom, EU and export market. By manufacturing and selling CADPIPE production line or its separate components.

The partners expect to be able to capture about 1 % of the rising sales of **EU Virtual Reality market in five years**. 1% means **473,44 milj. € of 41,23 billion US \$ (47 344 milj. €) markets**. To add these numbers extra sales in accompanying software development for example: for server base mobile use, the market may rise still more. **If the game industry continues its success on the mobile market, the rising of 3D modelling and production system sales will develop even much higher.**

Market penetration and additional growth of the CADPIPE

Growth bases on the estimation of The growth of the Virtual Reality market by CyberEdge Information Services Inc. (01/10/02)

Global Market Growth of CADPIPE	Benefit				
	Market M€	18months	3years	4years	5years
Product					
Concept and service system consulting	0,02	0,02	0,04	0,07	0,08
Components and software	0,07	0,07	0,08	0,09	0,11
Visualisation service sales	225,00	225,00	263,25	308,00	360,36
	225,09		263,37	total M€	360,55

In this estimation the start in market % is less than 1%

Indirect benefits

- Improved quality and reliability in delivery because of good presentation of products
- Improved quality of customer services - satisfying customers - better match of desire and product
- rising business imago by possibility to use more professional quality 3D visualisation

Economic Justification of the project

We all expect to become the initial players in the supply team able to offer the products and licensed manufacturing technology on a global basis. The predicted business benefits for each of us, to 2008 are quantified in the table below. This represents a **total potential for Euro 100.191 of increased profits for partners**. Hence we expect to recover our joint investment within 18 months from the end of our development activities, but would additionally expect to generate about **360 500 euros sales over five years**.

Economic Benefits

#	Partner	Nature of Business Benefit	Predicted Benefit € over 3 years
2	Sensetrix	New service concept and software sales	12 069
3	NIKI	Rising sales by advanced production	7 528
4	DeltaCad	Rising sales of software sales	9 310
5	INFOTRON	Rising sales by advanced production	8 510
6	DeskA	Rising sales by new software products	8 376
7	ISOIN	Rising amount of orders in visualisation	15 694
8	SienaBioGraFiX	New service concept and software sales	10 539
9	Melon	Rising sales of software	12 449
10	Nemetschek	Rising sales of software	14 831
11	TL	Rising sales and business consulting	8 339
		Total €	107 646

Economic impact

3D visualisation market grows through lower production expenses. Lot of needed modellind had been left out because of present high prises of the data preparation. Several new areas can be adopted into the production chain from ready-made 3D design data files. The automate reduction system prepares data for example for mobiles, PDAs, for TV and Video solutions and for game industry.

The production chain is now easier because of more compatible data transportation.

New possibilities in production network in making clusters for profitable production and to response to the rising sales.

Straight effects to the employment is in new, innovative software products developed during this project.

By licensing, the amount of economical benefits and effect to employment rises remarkably more.

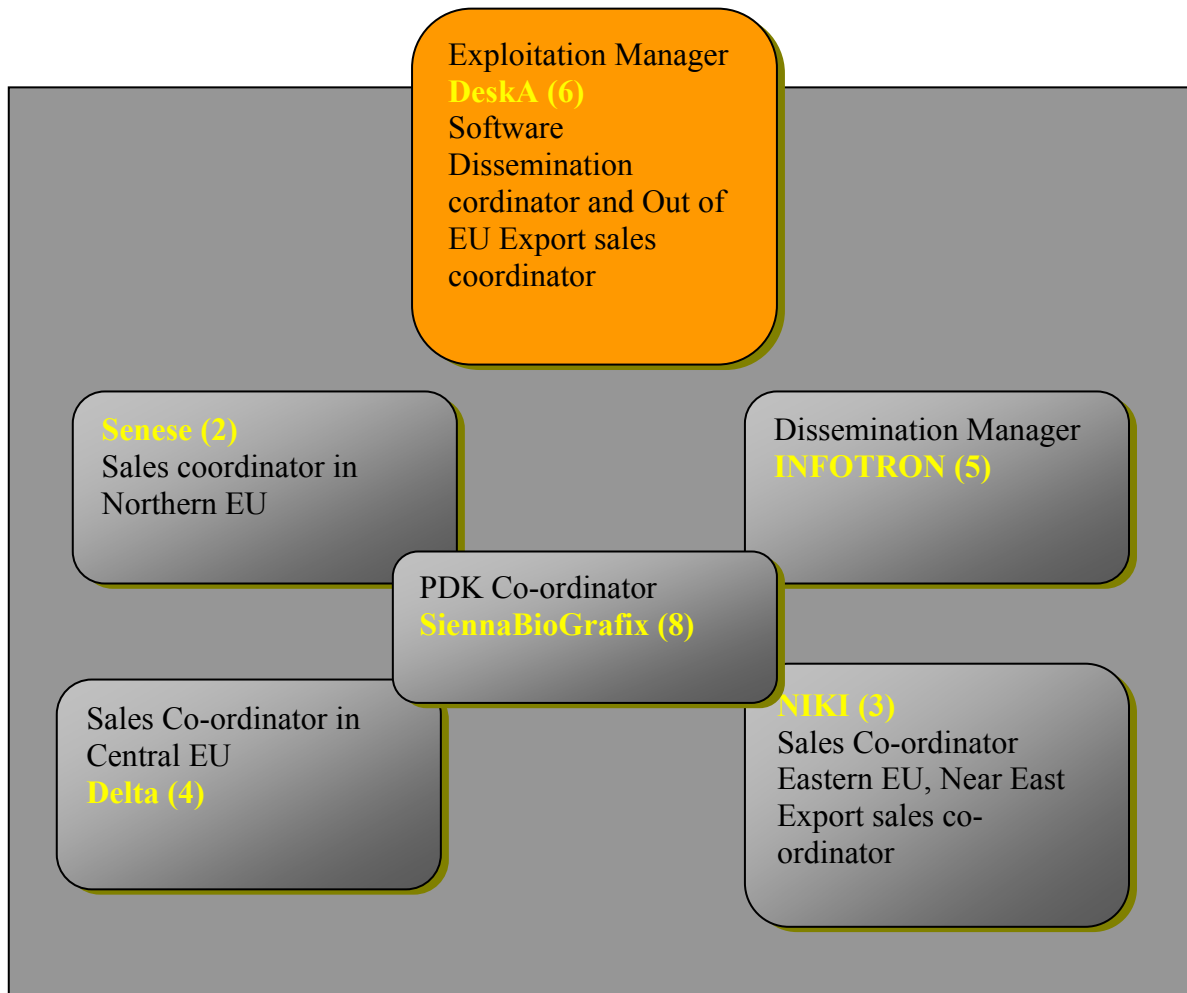
This increases the market opportunities to the systems vendors, with a direct impact on the IT-related employment.

The project objective of the facilitation of Information Technology introduction improves the IT-related skills of workers at the software industry SMEs

Economic Objectives - within 5 years of completion of the RTD is to grow EC 141 by (€M)		
1	Creation of new products that increase exports by	4 €M
2	Creation of new products that will displace imports of	10 €M
3	Creation of totally new market and growth of	126 €M

Dissemination and Exploitation management

Graphical presentation of the organisational structure of the Exploitation and Dissemination management



The process of the Plan for management, using and disseminating knowledge (PDK)

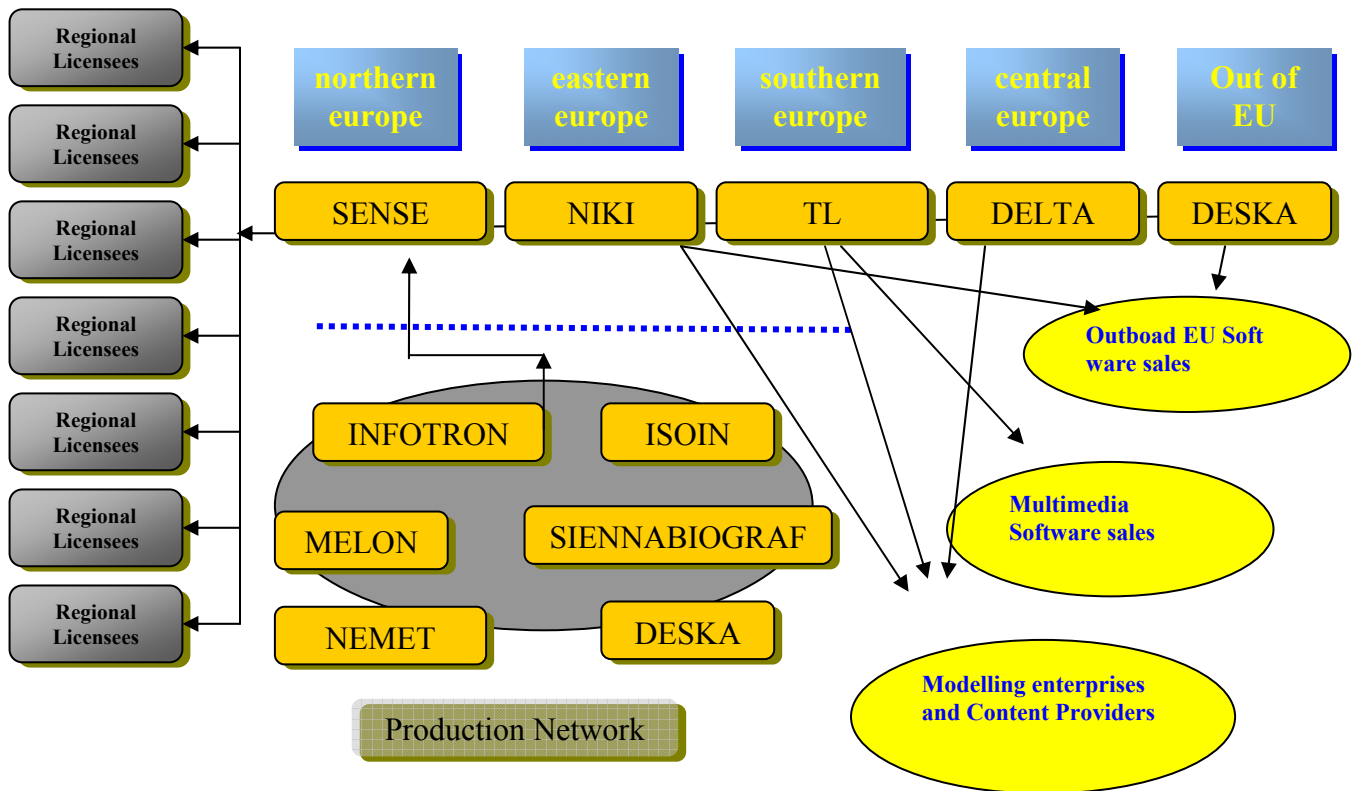
In the beginning of the project (WP1) the Server including the Extranet has been established. This is the databank for all the collected and produced information during the project. The server serves as well the central node where all linked information and presentations is reachable still after the project for one year at least. The "CADPIPE Server" has been divided into two separate parts, one being public and the other part being private for the project partners only, so called "Extranet". All the information has been stored in the most standard formats (RTF, PDF, XML, HTML) to be reachable by the Web Browsers in common use.

One part of this server has been reserved for the use of developers to store all the software under construction – easy to reach for every RTD partner. The version control and daily automate back-up is protecting the software development for hazards.

Commercial exploitation and dissemination of results

It is currently envisaged that the route to exploitation utilises the supply chain model shown in Figure on below, where each partner has a clear and unique role to play in that supply chain. The model clearly shows the interdependency of the partners on each other as well as identifies the role of the software component producers as well as the role of the sales companies

Table: Route to Exploitation



DESKA (6) have agreed to act as the hub for our exploitation activities and named as **Exploitation Manager** and **Out of EU Export sales co-ordinator** (Fig Management Structure) and Software dissemination co-ordinator. They understand the market place well, and have existing customers in market. They can manage the patenting and subsequent licensing of the product distribution and manufacturing process. The partners will develop the patent protection and agree assignment of rights across the consortium. By the point of the R&D contract issue from the EC, the partners will have developed an Exploitation Agreement for the dissemination and exploitation of all the results of the work within the consortium and, in principle, to companies outside the consortium after an initial period of confidentiality.

DeskArtes has a wide range of sales partners in USA and other countries all over the world listed here below:

North America	USA / Canada / Mexico	DeskArtes North America / NEST Technologies
	USA	Computer-Aided Products, Inc,
	USA	Cimquest, Inc.
	Canada	The Drafting Clinic of Canada
Europe	Germany	AlphaCAM GmbH
	Germany	simcon kunststofftechnische Software GmbH
	Germany	MAGMA Giessereitechnologie GmbH
	Germany	Tools & Technologies GmbH
	UK / Ireland	CDG Concurrent Design Group
	UK / Ireland	TIC Ltd.
	Netherlands	Somatech
	France	Multistation
	Italy	Next Factory srl
	Italy	EnginSoft Trading
	Italy	Viadelo s.r.l
	Spain	Timpas
	Sweden / Norway / Denmark	Cascade Computing AB
	Sweden	NovaCast Technologies AB
	Slovakia / Czech Republik / Hungary / Poland / Russia / Belarus / Ukraine	ENTRO Ltd.
	Hungary	Raindrop Geomagic Hungary
	Czech Republic	MCAE Systems
	Poland	KOM-ODLEW
	Greece	EXCEL TECHNOLOGIES & APPLICATIONS
	Portugal	ENGEFLOW, Engenharia Informática, Lda
Asia	Japan	Point Niche Corporation
	Japan	RCCM Research Center of Computational Mechanics, Inc.
	Japan	CDI Corp. / HZS Inc.
	Japan	Zexel Inc.
	Korea	TRINITY Engineering Co.,Ltd.
	India	M/s Leading Edge Marketing Services
	Singapore	MAGMA ENGINEERING ASIA-PACIFIC PTE LTD
South America	Brazil / Argentina	ETP rapid prototype

	/ Uruguay / Paraguay	
Australia	Australia	Scanning & Inspection Pty Ltd
	Australia	InterCAD Ltd.
Africa	South Africa	Laser Optronic Technologies

The person responsible in this project from DeaskArtes is Ismo Mäkelä.

Other sales contacts to East European and Near East countries can be achieved through our Greek partner NIKI and our partner in Turkey: info(+)**TRON** A.S.

NIKI Information Technologies located at Ioannina in Northwestern Greece and established in 1994 by Dimitris Vartziotis, is a highly qualified scientific and engineering software company, specialized on developing complex and customized engineering software and solutions for world-leading European Industry, like DaimlerChrysler AG, TWT GmbH, Hellenic Vehicle Industry, Hellenic Aerospace Industry, etc. The company is providing highly specialized services to the European and Greek Industry in the fields of Information Technologies (Engineering Data Management Solutions, Scientific Problem Solving, Simulation Technologies, Virtual Reality, HCI) and Engineering (CAE). NIKI is specialized in scientific problem solving and simulation, human cognition, ergonomics, personalized training systems and applications for the product development, automotive, aerospace, health and bioscience information management markets. NIKI is setting up the first **Digital Mock-Up Center in function 1.1.2007 – open at least next 3 years** in Greece with the support of the General Secretariat for Research and Technology, focused on supporting Greek and European industry to Digital Engineering and Virtual Reality on Automotive and Bio-informatics applications.

NIKI is especially well equipped for science problem solving, novel simulations, human cognition modelling, ergonomic optimisation and personalized training systems. Services are provided to the product development, automotive, aerospace, health and bioscience markets. Their customers are market sector leaders of the European community.

Our second strong hold of the Eastern Europe markets is our partner in Turkey InfoTron. info**TRON** is a privately owned Turkish company, established in 1994 with its headquarters in Istanbul, Turkey.

INFOTRON A.S. has agreed to act as the hub for our exploitation activities and named as Dissemination Manager (Fig. Management Structure). Their role have been to lead the work and plans of dissemination of the project result. The plan covers the plan for management of knowledge and intellectual property and a description of disseminating knowledge beyond the consortium during the lifetime of the project and afterwards

info**TRON** also has a branch in Ankara, and a manufacturing workshop, in Istanbul and a subsidiary in Munich, Germany.

The mission of info**TRON** is to provide the best service or the product, in the shortest time frame, using or creating the highest available technologies to fully satisfy the customers in the target industries, while increasing the individual knowledge, skills, and cooperation. info**TRON** has two main divisions: Product Design and Development, and Simulation.

info**TRON** Product Design and Development serves a wide spectrum from initial concept designs of products to the final stages of manufacturing, using high-end technology with powerful hardware and software, and most importantly by experienced, talented and hardworking designers and engineers. info**TRON** Product Design and Development process includes Industrial Design, Mechanical Design, Virtual and Rapid Prototyping, Analysis, Manufacturing, Production and Reverse Engineering. info**TRON** Product Design and Development owns its own rapid prototyping systems, 3D optical

scanners and 3 axis Vertical CNC for these purposes. infoTRON Product Design and Development's mission is to be an excellent supplier of design and engineering services and products to the world renowned consumer goods, automotive, aerospace and defense corporations. infoTRON Simulation is also unique in its field with its software development and systems integration capabilities in terrain database modeling, visual and military simulation systems, electronic and tactical warfare systems, again using the most sophisticated hardware, software and toolkits. infoTRON Simulation offers solutions in a wide variety of simulation applications, ranging from engineering, flight simulators and part task trainers to urban simulation. The mission of infoTRON Simulation is to provide and create the leading edge technology simulation products to the urban, automotive and defense corporations, helping them to reach excellent real world performances through virtual world practices.

The Central Europe sales have been left to DeltaCAD in France.

DeltaCAD, a French software designer and reseller. The company (<http://www.deltacad.fr>) is mainly focused on scientific computing and numerical simulation in mechanics. We are an SME company (10 engineers and 1M€ annual turn over). DeltaCAD has a large experience in all software activities for mechanical and physical simulation software (FEM). DeltaCAD develop software products for Computer Aided Engineering. Our products are :

- FEM meshing software (including "repairing" CAD geometry)
- surface re-construction and meshing toolkit
- software to add fillet on meshed model
- software components to transfer stress, displacements, from a mesh to another one

DeltaCAD also distributes and supports Code_Aster, the thermo-mechanical simulation software from Electricité de France and freely available under GPL license (including sources files and examples).

DeltaCAD proposes a wide software services in the following areas :

- Geometrical modelling and CAD interfaces
- Meshing algorithms
- Physical/numerical simulation (Finite Elements Method, Linear and non-linear mechanics, thermal analysis, vibration, ...)
- parallel computing
- interfaces between industrial FEM codes (rezoning)
- 3D Graphical User Interface,
- Software configuration management,
- Validation/ Documentation,
- Distribution and support of softwares

Their customers are mainly in the automotive world (about 80% of car companies in the world), and energy world.

DeltaCAD's responsible representative in project is Dr. Guy Hubert

SENSETRIX Oy is an SME from Finland and capable to handle the sales in Northern European countries. They'll do sales co-operation and software development co-operation with DeskArtes Oy. The contact person of Sensetrix is Mr. Seppo Laukkanen.

Absorption & Exploitation of Results by SME Proposers

Each partner have ad their unique role in the project and they have been involved in a continuous process of technology transfer and absorption throughout the development phase. Already during the first stage of our project, partners have participated in scientific study of base phenomena's and system design, bringing their own knowledge for the design process. Absorbing new information from a field of IT standards of the domain, terminology and methods of the industry and business partners are important part of the project carried out by case studies, product application tasks and testing procedures. Clear and user-friendly reports have been published from the obtained results. The completed results can be absorbed by the partners through user friendly *CADPIPE Users Guide for Design, Manufacturing & Testing* which has been issued to all partners and includes all the important facts concerning CAD data handling and software design.

Validation of the Technology

It is equally important that *market pull* is further stimulated. To assist in this the new technology can be extended through partnerships with other companies interested in products: like 3G mobile game developers, visualisation production for Hologram technology and health care, software industry and companies needing the results like: visualisation and Web content providing business and all CAD/CAM enterprises needing CAD data exchange.

Technical risks known before the project

1) The general problem in CAD data is to get the correct data out of the design program (correct geometry or other visual design depended information) in some other but native data format. The best tool for this is the SDK (Software Development Kit of the CAD software maker) by which you can pass the native data format directly and output the data into some advanced common export format with desired properties and quality). Problem is that these kinds of SDKs are not available for several design programs at all. Most of the case manufacturer will not give the specification of the native data format for any purpose. This previous might have caused problems in the research and development work during the project.

2) The speed of the 3D technology development is high, so there has been a certain possibility that during the time of the project, there has been made other commercial software, or some commercial part of the system or innovation/s, similar as in this project. The risk has been not so high, because of the low investment level of the 3D visualisation industry SMEs, so that the commercial competition isn't expected in this price bracket.

3) Some technical innovation in this proposal might have been too challenging for this short period of time to get complete.

The competition situation and all-the-time CAD program development might affect negative in commercialisation of the software.

All these risks have been taken into account by:

1) In the research part of the project we have found the best possible standard data formats for geometry exchange. We have developed the Visual Editor tool to reduce visual information problem. Properties data bank is the outside repository for complex information not possible to include into the transportation data-format. During the project an XML standard based description format for this additional information has been designed so any CAD program manufacturer may later produce an export tool to support the system.

2) The second risk has not come true today in the end of the project but if it will - it will be compensated by the correct price level for SME visualisation companies and for wider market distribution.

Life cycle and expansion: The most modern technology has been used in the design of the CADPIPE software. The software has been designed and documented so that any further development can be easily made by partners. The open and documented application programming interface (API) ensures that any new CAD/3D file format plug-in can be added later by partners or any other party.

3) To reduce the third risk all tasks have been solved during this project on theoretical level and have been produced into presentations. Any property not been taken to the level of Beta-version software, can be produced after the project in the commercialisation process by software developer partners.

Intellectual Property Rights

The basic IPRs have been agreed in the Consortium Agreement Annex3. The possibility of readjustment of the IPRs has been left to the Technical Board of the project. Sensetrix Oy has been leading of the IPR agreement negotiations as the SME co-ordinator. The Project Co-ordinator ((1) VTT) will also be responsible for the organising any action necessary to protect the generated IPR. The objective of the agreement of intellectual property rights (IPR) is to define rights and goals related to exploitation of results generated under commissions as well as under self- and joint-financed research and development work. Results of development work are protected by applicable technical and juridical protection measures. It is a first rate importance for VTT that technological property of a client is handled as confidential and that the competitive advantage the client gets from the commission can be protected by an applicable intellectual property right (IPR).

DeskArtes as the Exploitation Manager will write the **Exploitation Agreement** by the assistance of all SME partners. In this document all the IPRs of the project will be shared with partners.

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