VIsualize all moDel drivEn programming

VIDE

RODAN SYSTEMS S.A.
ZARZADZANIE INFORMACJĄ

TNM Conditional

SOFTEAM
Think Object

SAP

BU
Bournemouth
University

DFKI

Altec

FhG
Fraunhofer Gesellschaft

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The Project

- The VIDE Project funded under EU Sixth Framework Programme
  - Priority: IST-2005-2.5.5 Software and Services
  - Title: Visualize all moDel drivEn programming
  - Acronym: VIDE
  - Duration: 30 months (July 2006 – December 2008)
  - Budget: 3 963 930 EUR
  - EU Funding: 2 296 614 EUR
  - Project Officer: David Callahan
  - Project Coordinator: Polish - Japanese Institute of Information Technology
  - Partners from: Poland, Germany, France, Greece, United Kingdom

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Agenda

- Project aims and expectations:
    - Goals and vision
    - Approach
    - Partners
    - Perspectives
    - Benefits
    - Technology

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Motivation

- FOCUS: Data-intensive business applications

- STRATEGIC GOAL 1: The creation of new software systems
    - easier and faster => productivity
    - less error prone => quality
    - more accessible to business people => usability

  ...by improving and extending methodologies and tools for application design and development

- STRATEGIC GOAL 2: Reinforce a standard based, model driven approach in the area of enterprise software
    - ensure adoption of respective tools and methods by industrial leaders

- MAIN CONCEPTUAL BASE:
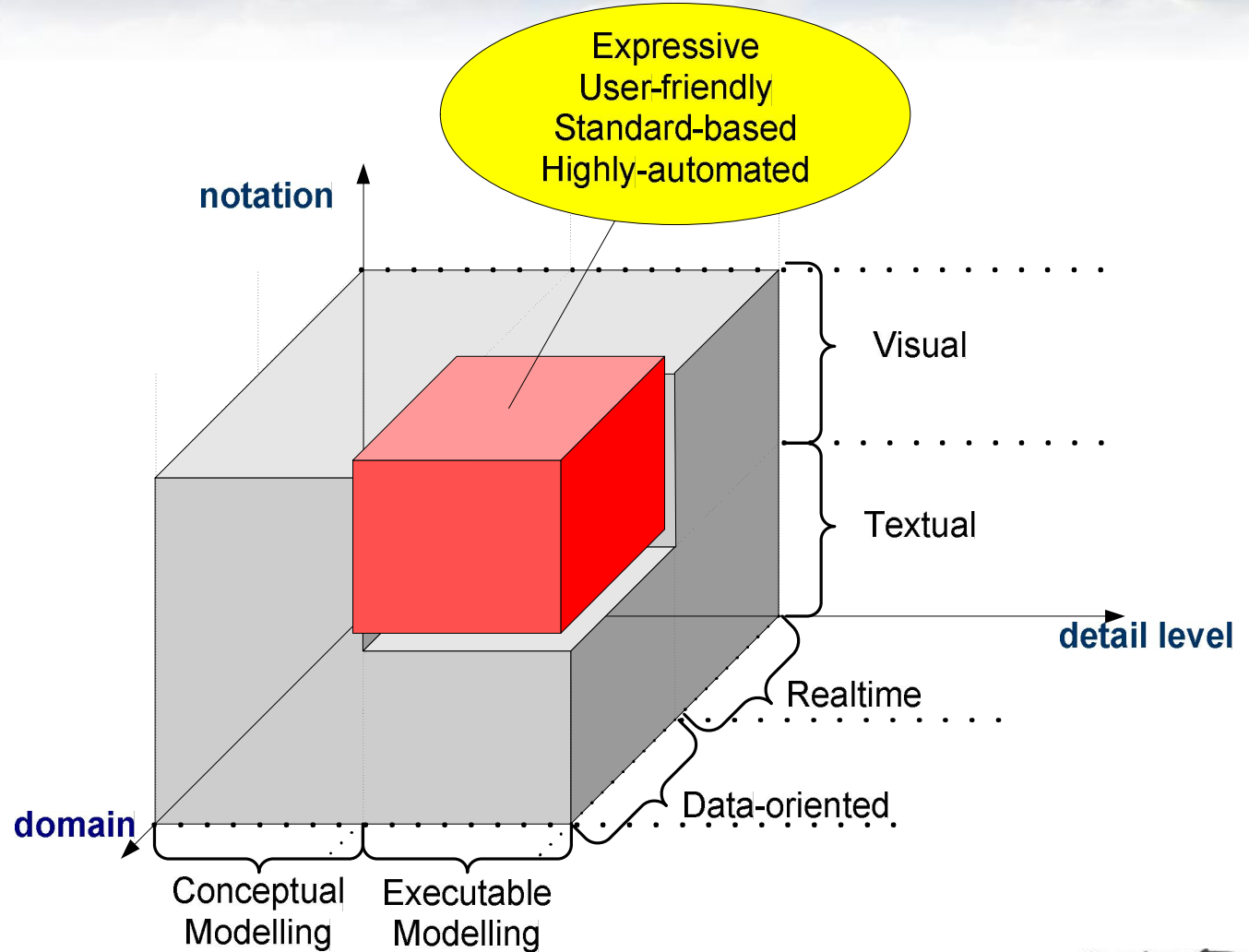   - UML: An accepted standard for application modelling

Vision

Fill a gap within the MDA toolset...

Adopted approach

- Executable modelling
    - Highly automated transformations for the generation of executable code
    - Alignment with the MDA vision and its related standards

- Development on a platform-independent level
    - Aspect-oriented composition
    - Quality assurance utilities

- Business modelling
    - Exploring a further level of abstraction – the MDA's Computation Independent Model (CIM)
    - Encouraging involvement of non-programmers in the use of modelling

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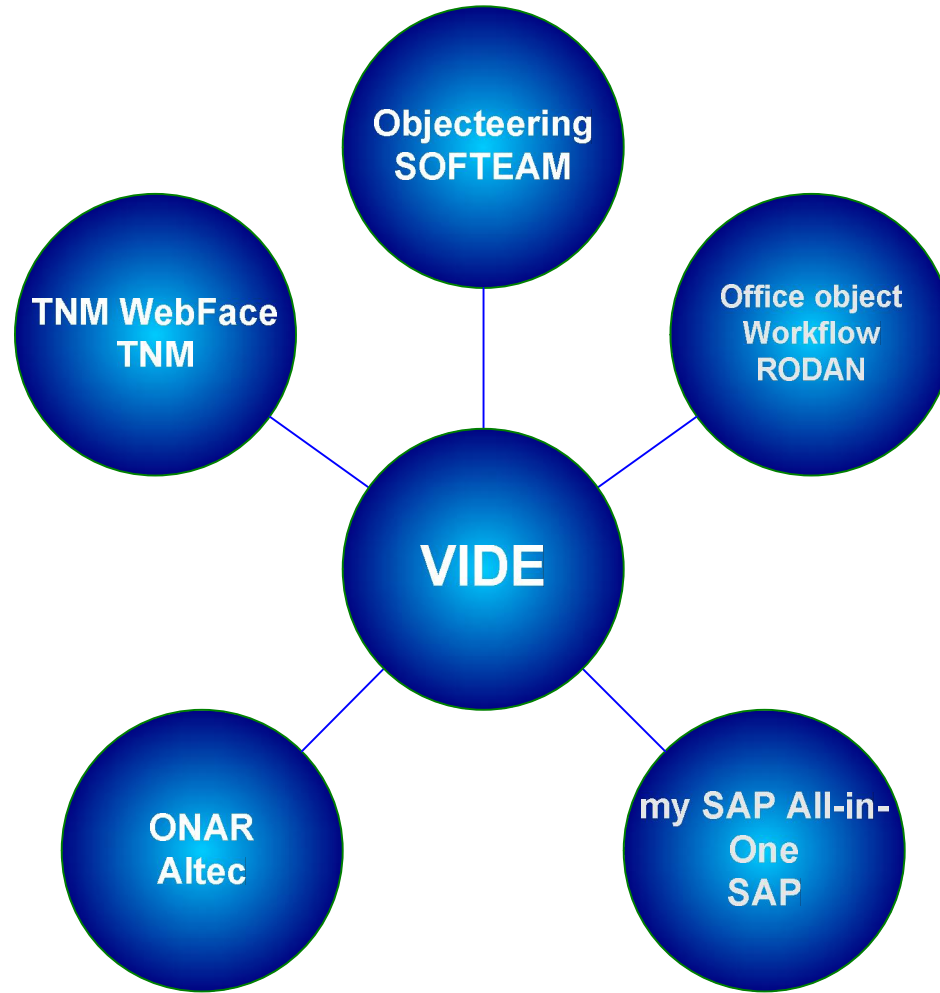# Partners – balance industrial need and research vision

Industry	Research
▪Altec ▪SAP SME: ▪Rodan Systems ▪ SOFTEAM ▪ TNM	▪Bournemouth University ▪Fraunhofer Gesellschaft (Institutes IESE & FIRST) ▪Institute for Information Systems at the German Research Center for Artificial Intelligence ▪Polish-Japanese Institute of Information Technology

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Planed exploitation and industrial use cases

Partners – expertise area (Industry)

- Altec
  - Development of business information systems and services
  - ERP systems and financial systems for SMEs
- Rodan Systems
  - Workflow systems
- SAP
  - Creation and Modelling of (Data Intense) Business Applications
  - Modelling Infrastructures
- SOFTEAM
  - Modelling expertise
- TNM
  - Inter-/Intranet, mobile Devices, E-Learning systems

Partners – expertise area (Research)

- Bournemouth University
  - Business process and use case modelling, user interface design
- DFKI
  - Computer Independent Modelling & Procedure Models
- Fraunhofer Gesellschaft
  - (IESE) Expertise in Software Quality Assurance
  - (FIRST) Modelling specific aspect orientation semantics and decomposition techniques
- PJIIT
  - Language semantics, database languages
  - Visual interfaces to databases, object-oriented models

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Industry Partners' role in the Project

Altec

- Altec shall integrate ONAR, its Service Oriented Application Integration (SOAI) framework, with the VIDE toolset, offering users the ability to cover their integration needs through a visual model-based solution. Altec is also responsible for the dissemination activities along with PJIIT and will overlook the IPR related issues.

Rodan Systems

- Integration with a workflow system.

SAP

- Provide industrial and consolidate partner requirements and evaluation of project results. Major contributions to: Aspects Oriented Composition on the PIM Level, Quality assurance on the PIM Level, System Architecture, System prototype development. Expected exploitation of project results: increase level of modelling in product development, increase adaptability and flexibility of solution.

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Industry Partners' role in the Project

Softeam will contribute to

- The definition of the VIDE/UML connection
- Studying the code generation capacities
- The definition of the architecture to interconnect the VIDE environment and an existing UML CASE tool such as Objecteering
- The implementation of a prototype of a UML/VIDE integrated toolset

TNM will create

- E-Learning-System for the training of VIDE-users (Introduction to VIDE, Development of software with VIDE, Usage of VIDE in application scenarios)
- Web-Portal for VIDE-community: information about VIDE, examples (communication between VIDE users and developers)
- VIDE-Connector to TNM:WebFace (interactive GUI-development for VIDE applications)
- WebService-Connector for VIDE: communication between VIDE-modules and other programs (SOA)

Research Partners' roles in the Project

Bournemouth University

- Research, specify and evaluate the graphical presentation concerns of the VIDE prototype.

DFKI

- Development of a CIM-Level language and a procedure model for the development with the VIDE methodology.

PJIIT

- VIDE language definition, research on the data-intense applications in the context of OMG standards, definition of visual user interfaces, input to computation-independent modelling and to model execution, development of prototypes.

Research Partners' roles in the Project

Fraunhofer Gesellschaft

- (FIRST) Pull up AOP to a conceptual level and define the role of AOP in MDA. Enable VIDE to overcome the limitations of object-oriented modularization at PIM. Design business applications with aspects at PIM level. Show simplification of use cases by using AOP techniques. Specify AOP semantics and constructs for the visual and textual VIDE language representation.

- (IESE) Research quality defects on the PIM level in MDA and design an assistance tool that helps modellers of VIDE-based Systems. Furthermore IESE will plan the testing and elaborate test cases for the VIDE system.

Business perspective – competitiveness of value chains

- Enhancement of research and the development of improved communication with the business community
- Reusability and interaction - reference library
  - A businesses value chain will be enhanced by creating usable models - stored in the reference library - that will lead towards standardization, thus result in more effective inter-business communication.

"VIDE envisions itself as part of the globalization of economies and serves to increase the significance of value chains. Thus, VIDE addresses the need for better interoperability between companies because the competitiveness of value chains depends significantly on the seamless exchange of data and the effectiveness of systems integration."

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Educational perspective – IT and business students – the engine of introducing VIDE

- E-learning system
  - It will enable online users to learn about VIDE concepts and teach them the visual development tools. The prototype will be integrated into the online Web library of VIDE models.
- Involving students - competition between students
  - The following features of VIDE will be verified:
    - Visual coding
    - Application development time
    - Visual aspect composition
    - Quality of platform independent models will be verified in a competition between VIDE programmers and programmers using other development tools. The competition will be organized during a workshop held for business- and IT-oriented universities.

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Benefits

- Improved competitiveness of the European Market
- For IT professionals
    - Improved programming tools
    - Improved communication with business consultants
- For business consultants
    - Improved access to system analysis and design
    - Improved communication with IT professionals
- For the companies
    - Faster and cheaper creation of more reliable software
    - Improved alignment of software to the needs of the organization
- For the end users
    - Improved support for business tasks
    - Software systems easier to learn and use
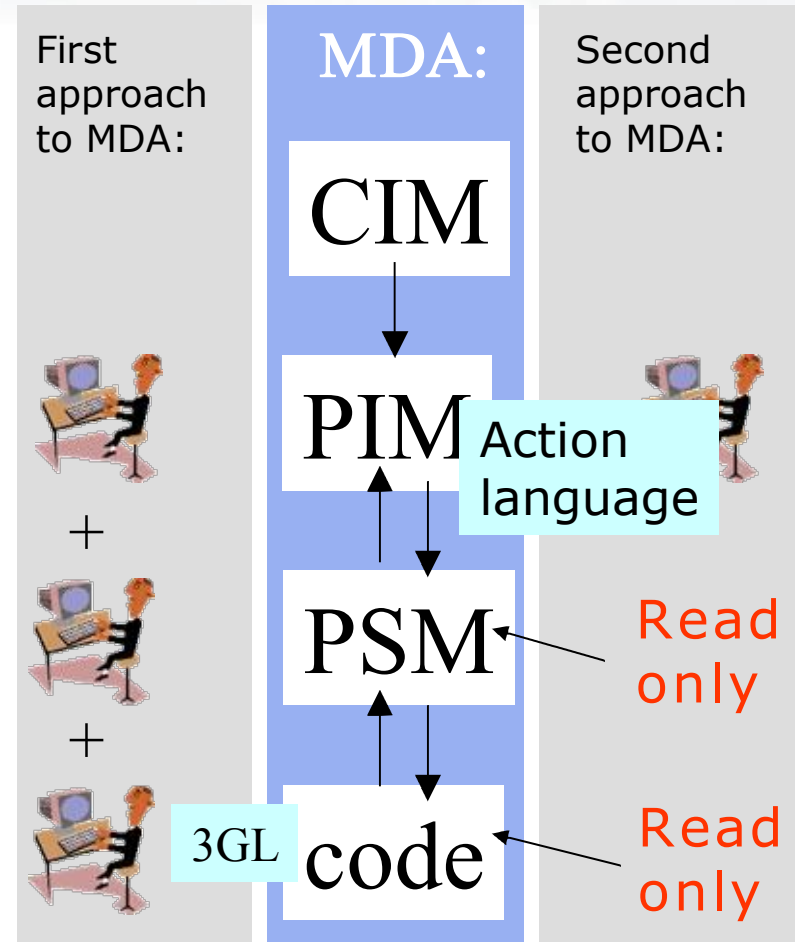   (due to their involvement in system creation)

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Model Driven Architecture

The whole application logic will be specified in Platform Independent Models (PIMs). PIMs are translated to Platform Specific Models (PSMs).

The business and technical aspects should not be tied to each other and are thus developed independently.

In both approaches Computation Independent Models (CIMs) establish a context for application functionality described by the PIMs.

First approach to MDA:

MDA:

Second approach to MDA:

CIM

PIM

Action language

PSM

Read only

3GL   code

Read only

+

+

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Second approach to MDA: Executable UML. Only this approach fully corresponds to the definition of MDA.

- Executable UML builds models, which can be immediately executed and tested. Actions are specified on the model-level using UML-compliant action languages.

- Without focusing on executable UML, some crucial goals of MDA seem to be in danger:

  - Applications will be not fully platform-independent. Every platform change will require recoding the hand-written business logic to a new platform.

  - The PIMs (Platform Independent Models) will be not fully executable and testable, leading to long development cycles.

  - The semantic gap between UML and 3GL/4GL languages will remain an important negative factor in future MDA-based development.

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Challenges for Executable UML

- 3GL/4GL languages are very popular, (there is a considerable „learning curve" for action languages).

- Executable UML needs more industrial support.

- Executable UML is used mostly for real-time systems and not for business systems.

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Challenges for Executable UML - continued

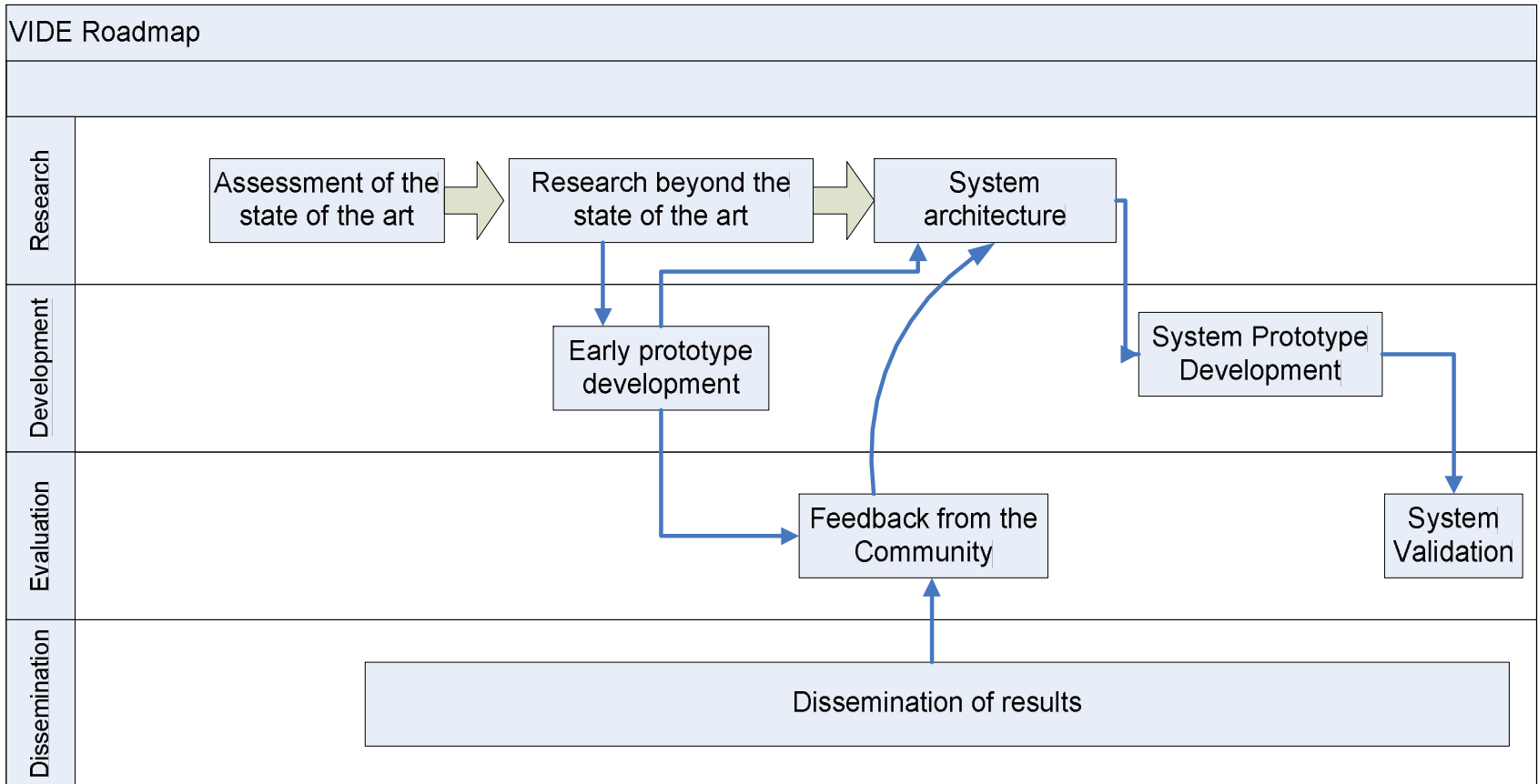|	Real-time systems (telecom, …)	Business systems (banking, insurance, …)
Complexity	Low, easily described by State Machines	Complex, State Machines only partially appropriate and inconvenient
Action specification (logic)	Visual action language exists (SDL)	<u>No visual action language !!</u>
Database Access	Quite easy	Hard – complicated queries

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Our idea

Focus on Executable UML.

Create a visual action language
suitable for business applications,
together with tools
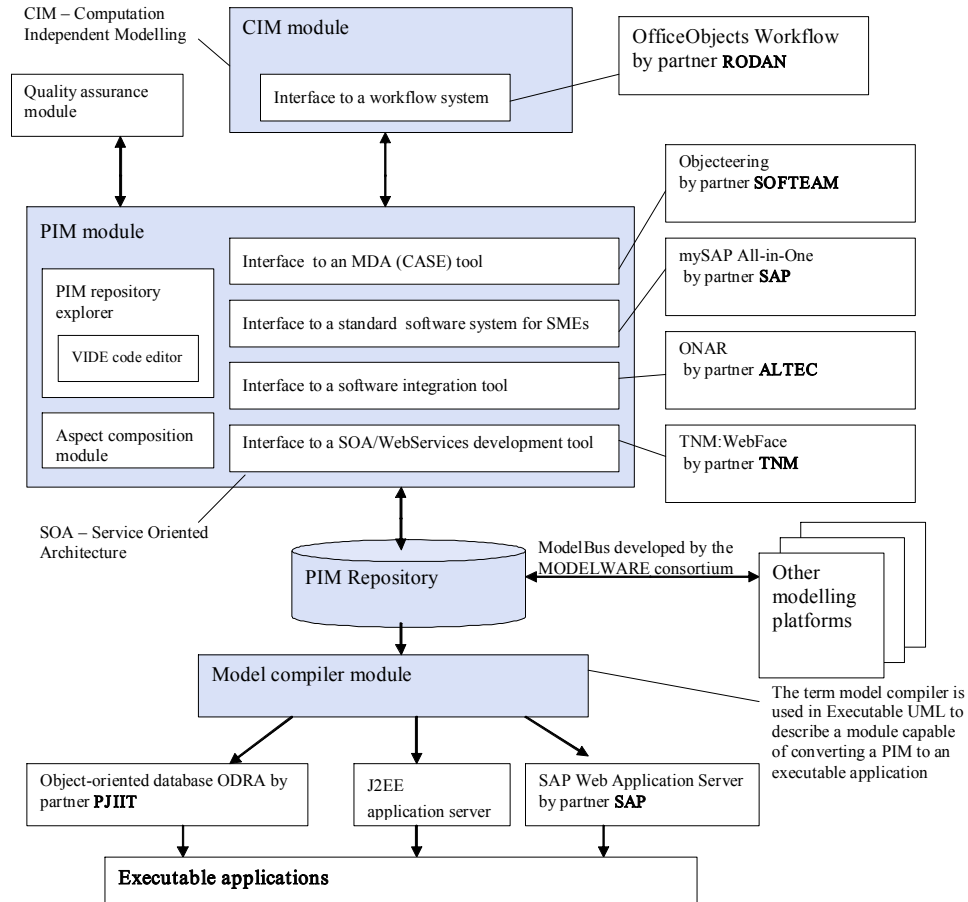for visual system construction and design.

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VIDE Roadmap

VIDE Roadmap

Research	Assessment of the state of the art → Research beyond the state of the art → System architecture	
Development	Early prototype development	System Prototype Development
Evaluation	Feedback from the Community	System Validation
Dissemination	Dissemination of results	

System architecture

Draw your software – use VIDE

Thank you for your attention

Contact: ……..
www.vide-ist.eu

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