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ASCENS

Autonomic Service-Component Ensembles

D10.3: Periodic Project Report for Months 25–36

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SEVENTH FRAMEWORK PROGRAMME

Declaration by the scientific representative of the project coordinator

I, as scientific representative of the coordinator of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period.
- The project has fully achieved its objectives and technical goals for the period.
- The public website is up to date.
- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.4) and if applicable with the certificates on financial statements.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organizations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 3.2.3 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of scientific representative of the Coordinator: Martin Wirsing

Date: 08/11/2013

Executive Summary

This is the Periodic Progress Report for the third reporting period of the ASCENS project. It contains a publishable summary of the project, a list of project objectives for the third reporting period, and a description of the work progress and the activities that have been performed by the partners itemized by work packages. It also contains lists of Deliverables and Milestones for the first three reporting periods, a description of the management activities, and a justification of the resources spent by the project in the third reporting period. Finally it contains the financial statements of the project.

The tables in Sect. B1 (Explanation of the Use of Resources) and B2 (Financial Statements) are generated by the NEF system and still in draft form. Some partners could not provide all financial data before the submission date.

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A1 – Publishable Summary

Project Description

The area of the isolated computer has passed. Instead modern systems are often ensembles: software-intensive systems with massive numbers of nodes or complex interactions between nodes, operating in open and non-deterministic environments in which they have to interact with humans or other software-intensive systems in elaborate ways. Ensembles have to dynamically adapt to new requirements, technologies or environmental conditions without redeployment and without interruption of the system's functionality, thereby blurring the distinction between design-time and run-time. Examples for this trend can be seen in many areas, ranging from interconnected personal devices to banking and trading networks to national infrastructure.

Today's software engineering methods are not adequate for dealing with ensembles: Instead of static software that operates without knowledge about its environment and hence relies on manual configuration and optimization we have to build systems with self-aware, intelligent components that mimic natural features like adaptation, self-organization, and both autonomous and collective behavior.

The goal of the ASCENS project is to build ensembles in a way that combines the maturity and wide applicability of traditional software engineering approaches with the assurance about functional and non-functional properties provided by formal methods and the flexibility, low management overhead, and optimal utilization of resources promised by autonomic, self-aware systems. The overall approach of the ASCENS project is shown in Fig. 1. To this end we are researching and inventing new concepts for design and development of autonomous, self-aware systems with parallel and distributed components. We are developing sound techniques for formal reasoning and verification to support the process of specification, development and runtime analysis of these systems. The project goes beyond the current state of the art in solving difficult problems of self-organization, self-awareness, autonomous and collective behavior and resource optimization in a complex system setting.

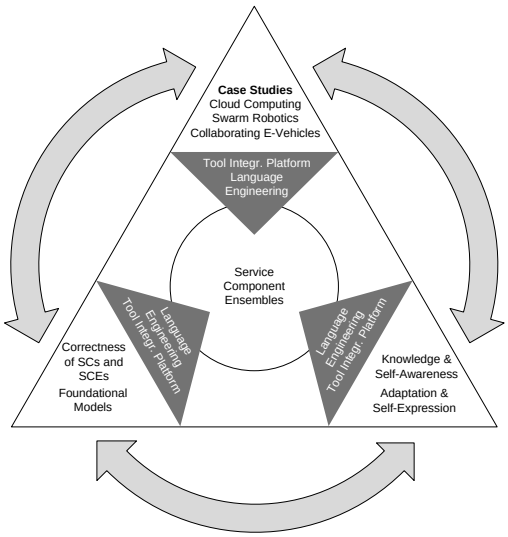

Figure 1: The ASCENS approach.

The ASCENS approach focuses on service-component ensembles (SCEs), hierarchical ensembles built from service components (SCs), simpler SCEs and knowledge units (K) connected via highly dynamic infrastructure, see Fig. 2.

Service components are nodes that can cooperate, with different roles, in an open and non-

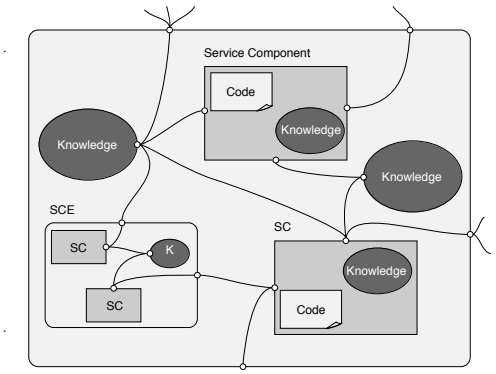

Figure 2: Service Component Ensemble

deterministic environment. These basic properties, already satisfied by, e.g., present service-oriented architectures, are enriched by new properties of awareness: (1) self-awareness; (2) network-awareness; (3) resource-awareness; (4) awareness-rich behavior making SCs adaptable, connectable and composable. The self-awareness of service components in an ensemble is achieved by: (i) equipping SCs with declarative information about their own state and behavior; (ii) enabling SCs to collect and store information about their working environment, possibly gaining limited information about the whole system; (iii) using this information for redirecting and adapting SC behaviors for optimizing system performance or for obtaining better results in a competitive environment.

A service-component ensemble is a set of service components (SCs) interconnected in a dynamic network, featuring goal-oriented, safe and secure execution and efficient resource management. The ensemble may contain dedicated knowledge units, to represent shared local and global knowledge about levels of awareness, resources, connectivity and networking.

Research Objectives

To realize ensembles of service components, whose properties go far beyond the state of the art in current software engineering and technology, we pursue the following research objectives:

1. Linguistic support for programming SCEs, expressing awareness and exchanging knowledge;
2. Formalization and modeling the fundamental properties of SCs and SCEs such as autonomous behavior and awareness-rich networking;
3. Knowledge representation, awareness and self-awareness of SCs and SCEs;
4. Methods and mechanisms for adaptation and dynamic self expression;
5. Techniques and methodology for the design and development of reliable SCs and SCEs and their verification using formal methods;
6. Software infrastructure with a set of tools to support programming, deployment and execution of SCE-based applications;
7. Runtime monitoring and scalable performance analysis methods;
8. Software engineering methods for ensembles.

These objectives are based on a common framework that provides the semantic foundations for the ASCENS approach.

To demonstrate that the results of the project are applicable in practice, we pursue a number of different case studies: swarm robotics, cloud computing and e-mobility which address complementary issues and illustrate both the generic approach and the wide coverage of the ASCENS technology. The case-study work package also serves as a major place for project integration offering a complex multi-dimensional problem space that motivates the multidisciplinary approach of ASCENS, calling formal

method, language and tool developers to build up their contributions to awareness-rich technology. The work in the first project year has been characterized by both individual and collective efforts, the second year placed an emphasis on the integration of the individual contributions while the third year continued the development of the individual techniques as well as the integration efforts by defining the Ensemble Development Life Cycle (EDLC).

Major Achievements of the First Three Reporting Periods

In the first three reporting period the ASCENS project has achieved the following major results:

1. We have defined the Service Component Ensemble Language (SCEL), a new language specifically designed to program autonomic components and their interaction while supporting formal reasoning on their behaviors. SCEL is based on an operational semantics and provides different linguistic layers that permit describing
   - *behaviors* that describe the progress of computations
   - *knowledge* repositories to manage information coming from different sources
   - *aggregations* that describe how different entities are brought together, and
   - *policies* to control and adapt actions, and to guarantee accomplishment of specific tasks or satisfaction of specific properties.

   The syntax and semantics of SCEL rely on a novel communication paradigm based on attributes. The solid semantic grounds of the language lay the basis for developing logics, tools and methodologies for formal reasoning on systems behavior in order to establish qualitative and quantitative properties of both the individual components and the overall systems. We have implemented a runtime environment and an interpreter for developing autonomic and adaptive systems according to the SCEL paradigm. Both the runtime environment and the interpreter have been integrated with reasoners that can be used to support decision making of SCs operating in a changing environment. Finally, we have experimented with high-level design of SCEL-based applications using the DEECo component model.
2. We investigated foundational models of autonomic systems by proposing
   - resource-aware connectors that address also reconfigurable, dynamic and time-constrained systems;
   - co-algebraic models and applications for our resource-aware, nominal calculus NCπ, and a behavioral relation for Markovian process algebras;
   - regular expressions for characterizing the languages of nominal automata;
   - a calculus for synthesizing contracts designed along the Negotiate-Commit-Execute (NCE) scheme of interaction,
   - a general system model for ensembles (GEM) as a basis for formalizing notions such as adaptation, awareness and self-awareness;
   - behavioral equivalences for (soft) constraints languages;
   - a novel operator for the modular presentation of preference domains based on soft constraints;
   - a technique based on soft-constraints and on the orchestration of declarative and procedural knowledge for solving locally optimization problems that are global;
   - a game semantics for agents, focusing on energy trading scenarios, and looking at the self-organizational aspects of an agent-based system managing the interactions among prosumers; and

- the relationship between FuTS-bisimilarity and coalgebraic bisimilarity.

3. Based on a state-of-the-art survey and key requirements for knowledge representation we developed the high-level modeling language KnowLang for specifying knowledge in ensembles.
   - The model is structured into hierarchically organized specification tiers and supports the parameterization necessary to cover the specification of the ASCENS knowledge domains and reasoning primitives.
   - An important break-through was the KnowLang mechanism for self-adaptive behavior where knowledge representation and reasoning help to establish the connection between knowledge, perception and actions realizing self-adaptive behavior.
   - We started working on the KnowLang Reasoner and the KnowLang Toolset.
   - Moreover, we continued our work on the awareness mechanism and developed a conceptual reference model for awareness called "Pyramid of Awareness" and outlined how this model can be realized with the KnowLang Framework.
4. For adaptation and self-expression we
   - defined a sound innovative model (SOTA) to analyze the adaptation requirements of autonomic service component ensembles, also supporting the application of early verification techniques to check the correctness of such requirements;
   - developed the Autonomy Requirements Engineering (ARE) approach, which we used to build efficient and relevant knowledge models for ASCENS;
   - formalized the notion of black-box adaptation based on the GEM system model and proposed a simple structural criterion for white-box adaption, where a component is deemed adaptable if it has a precisely identified collection of control data that can be modified at run-time;
   - identified some key self-adaptation patterns (both at the level of individual SCs and of SCEs) and their framing into a sound taxonomy of self-adaptation schemes centered around the key concept of control loops, and demonstrated how they can successfully be implemented using agent-based systems as well as in object-oriented terms;
   - showed that adaptation patterns can be properly expressed using the SCEL language;
   - identified the main patterns and mechanisms for dynamic self-expression;
   - analyzed and proposed solutions to integrate performance awareness in ensembles, both at the level of quantitative modeling tools and at implementation level;
   - started the analysis of large-scale emergent behavior, and overviewed the possible approaches to the engineering of emergence.
5. We devised a number of qualitative and quantitative approaches to analyzing, validating and verifying ensembles. In particular:
   - We developed quantitative approaches and corresponding tools for analysis and the design of SCs, including statistical model-checking and control synthesis, and applied them to swarm robotics and e-Mobility case studies. We also addressed dynamic allocation of resources by using nominal automata based techniques.
   - Regarding verification of SCEs, we provided a compositional verification technique targeting systems with static architectures. This approach proved to better scale-up to large systems than standard model-checking verification, and was applied successfully to a robotics case study.

- In addition to design-level verification, we also worked on tools for verifying SCs implementation code, based on Java Path Finder.
- Lastly, security issues were addressed specifically with results on privacy, reputation systems, information flow. We also proposed a pattern (ASV+SR) for designing stable clouds against denial-of-service attacks.

6. We continued the evolution of the SENSORIA Development Environment (SDE) into the ASCENS tool integration platform. With the integration in mind, the ASCENS project has developed a range of tools for tasks starting from early modeling (for example MESSI, MISSCEL) through implementation and deployment (for example BIP compiler and tools) to ensemble execution (for example ARGoS, jRESP, jDEECo, SPL).
7. To support the ASCENS approach to engineering ensembles we
   - designed the POEM language that allows the specification of GEM and SOTA models in a practical manner and implemented the *Iliad* compiler, runtime and reasoning engine for POEM;
   - provided a Service-Component Repository that integrates *Iliad* as query engine for service components.
   - developed a catalogue of Patterns describing best practices for the development of ensembles and APEX, a tool to explore and manage this pattern catalogue;
   - defined the Ensemble Development Life Cycle (EDLC), a life-cycle model for ensemble development that takes into account the feedback between design- and run-time activities.
8. We defined application requirements and the system needs for the case studies. Based on these requirements we developed abstract models and implementations for all three case studies and performed experiments in all three domains using the ASCENS tools, techniques and methods.

We have established and continuously updated the ASCENS website, as well as a blog to support the communication of project progress in non-technical terms. Since the start of the project more than 190 scientific articles were published in important journals, conference proceedings and workshops related to the ASCENS topics and as book chapters; moreover, a short overview article was published in the Awareness Magazine and a couple of technical reports were produced during the first three years of the project. ASCENS results were taught in about 40 graduate and postgraduate courses and tutorials. Project members organized almost 30 conferences and more than 40 workshops and participated in the organization of six summer schools covering ASCENS relevant topics. ASCENS members participated in the AWARENESS coordination action (CA) meetings, in bilateral meetings with other projects, in the AWARENESS Virtual Lecture Series (AVLS) and AWARENESS summer schools (AWASS), and in the preparation of an exhibition at ICT 2013.

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A2 – Project objectives for the period

This section details the objectives for the individual work packages during the third reporting period and provides answers to the reviewer's recommendations. Recommendations specific to a single work package are answered in the section of that work package; recommendations pertaining to the whole project are answered in subsection A2.1 on p. 20.

WP1: A Service-Component-Ensemble Language and its Logic

The main objective of WP1 is the development of SCEL (Service Component Ensemble Language), a new language specifically designed to program autonomic components and their interaction, while supporting formal reasoning on their behaviors. The main objectives of this period regarded all WP1 tasks:

- *Task T1.1 (Languages for Describing and Coordinating Ensembles Components)* whose main objective is to develop and experiment with the linguistic primitives for modelling the behavioural part of SCEL components, their aggregations and their communications.
- *Task T1.2 (Primitives for Context Aware Resources Negotiation)* whose main objective is the investigation of resource negotiation while taking into account the environment in which the components operate.
- *Task T1. (Languages and Logics for Task Descriptions and Dynamic Reconfiguration)* whose main objective is the investigation of mechanisms to adapt ensembles to their execution environment while exploiting global or local knowledge.

Recommendations

- *It is not clear what will be the use of performance information once represented in the component knowledge. It would be useful to have examples of use of this piece of information.*

  Answer: The main role of performance information is to support decision taking procedures. In our prototypical methodologies for integrating reasoning capabilities in SCEL it is often the case that reasoners aim at suggesting to SCEL components the best next action according to some specific performance metric. An example that has been studied in detail are SCEL components acting as vehicle controller that use reasoners to minimize collisions. In general, performance measures can be used to update the knowledge to help reasoner in making more accurate predictions.

- *Also, It would be important to clarify the relation of SCEL with KnowLang and POEM, produced in Work Packages 3 and 4, respectively. More precisely, the project should find the way to integrate KnowLang in SCEL.*

  Answer: The collaboration with WP3 has intensified with the aim of investigating the possibility of integrating KnowLang with SCEL. We have actually worked on the integration of simpler reasoners with SCEL. In particular, we have investigated a general methodology to enrich SCEL components with reasoning capabilities by resorting to explicit reasoner integrators and used it to integrate POEM-based reasoners into SCEL. We believe that this work paves the way to the design of interfaces and methodologies to be used for building up systems composed of separated components concerned with computational and decision making. As soon as the prototype implementation of KnowLang is available we shall proceed with its integration that will have

to rely on an intelligent cooperation between procedural and declarative aspects of system behavior. SCEL provides the procedural components and is instead parametric wrt the declarative ones; the integration will have to exploit the correspondence between the KnowLang and SCEL operators for retrieving and adding information from/to shared knowledge repositories.

- *Reflect on whether it would be useful to make a coordinator optional. Having no coordinator has some advantages, but can cause additional rounds of communication to make decisions in some circumstances (adding latency and message overheads) – so it is perhaps application-context dependent as to when a coordinator is a positive or negative aspect.*

  Answer: In SCEL the components involved in an ensemble are dynamically identified by considering the values exposed in the interfaces. This approach does not consider an explicit coordinator that controls the behaviour of components in an ensemble. However this is not a limitation. Indeed, it is relatively easy to program specific components that, by relying on group-oriented communication primitives, coordinate the execution of a set of components. Moreover, both jRESP and in jDEECO, the two implementations of SCEL considered in ASCENS, provide centralised implementations of ensembles that guarantee better performance for specific applications.

- *Check that the SCEL component architecture (specifically the fact that policies appear to be fixed internally and cannot be upgraded / changed externally) is what is actually intended.*

  Answer: We have slightly revised the architecture of SCEL components. Now policies can be dynamically modified to take into account new requirements and to adapt to changing environments. As usual, each action is executed only if it is authorized by the policies enforced by the component willing to perform the action and by the target component(s). These checks are performed through the authorization predicate, which now also determines the (possibly new) policies to be enforced after the policies evaluation. Notably, when a computation step takes place, the authorization predicate is evaluated by the subject component (which performs the action) and by the object components (which are the target of the action). Therefore, dynamic change of polices can be triggered by both internal and external actions. Mechanisms for regulating such changes are intentionally left unspecified in SCEL. We are currently investigating automata-based approaches to dynamic policies.

- *Knowledge and Processes pass through the interface, but Policies do not (e.g. see WP1 slide 9) – this is a request that you reflect carefully on whether it suits the need of the wider project and future autonomic systems ....*

  Answer: The arrows in the figure reported in the mentioned slide represent the capability of some component's elements (i.e., knowledge and processes) to interact with other components. Policies regulate the access (also from outside) to the knowledge and authorize processes' actions (directed also to remote components). Although policies evaluation can be triggered by both internal and external actions, the authorization predicate always acts on local policies.

WP2: Foundational Models for Service Component Ensembles

The overall objective of the WP is to reach a "satisfactory formalization of foundational models for autonomous Service Component Ensembles (SCEs)." Its three tasks focus on complementary issues, which have been advances during year 2.

- *Task T2.1* is concerned with "the study of resource-aware infrastructures and networking middleware modelled in terms of advanced components, glues and connectors". In year 3 the objectives on connectors included the work on the foundations of reconfigurable and dynamic

connectors and the distributed implementation of BIP with time constraints. On the networking middleware, the objectives included the assessment of the co-algebraic semantics of nominal calculi for networking (NCpi) with applications to the pastry protocol and the study of nominal regular expressions for nominal automata.

- *Task T2.2:* The aim of this task is "to develop robust mathematical foundations for interaction scenarios that are characterised by highly dynamic, autonomic components". In year 3 the main objective was concerned with the development of soft constraint techniques for the integration of declarative and procedural aspects in different WPs of the project (including case studies).
- *Task T2.3* is concerned with the application of game semantics techniques from economic theory into (power) grid systems and the instantiation of control theory techniques in a coalgebraic fashion, the latter possibly coalescing with the work on stochastic calculi in Task 1.

Recommendations

- *A clear connection between the language model and the BIP model is missing. It is unclear the impact of part of this work in the project.*

  Answer: BIP plays a main role in ASCENS for the Work Package on Verification (WP5), but of course BIP offers a model that lies at a lower level of abstraction w.r.t. SCEL (as well as its tuple-based instance SCEL_TS). There is some ongoing work on encoding SCEL into BIP, similarly for what has been already done in the past for several programming languages (but still no tool is available yet).

- *Due to the nature of the work in this work package, one would expect that their achievements would have some influence on other packages, especially WP1, WP5 and, indirectly, in WP6.*

  Answer: There are indeed many achievements from WP2 that have been exploited in other WPs during year 3, as well as some started and ongoing collaborations. They are fully accounted for in the concluding section of Deliverable D2.3.

- *It is clear that part of the work done in this work package is directly connected with some work done in other work packages of the project, like the work related to BIP or the work on soft constraints. But, in other cases, the influence of this work on the SCEL language or on the development of verification techniques remains unclear. . . .*

  Answer: As outlined above, Deliverable D2.3 reports in detail the mutual influences between the work in WP2 and other WPs. In particular, Joint Deliverable JD3.2 shows applications of WP2 results to the different case studies and Deliverable D5.3 reports on the application of nominal-automata techniques for verification. Other ongoing activities are addressing the mutuation of techniques coming from the soft-constraint framework to SCEL (see Deliverable D2.2) and the design on MISCEL which originated from the MESSI tool (see JD3.1).

  In more detail, the relationship between activities in WP2 and other WPs (see also Deliverable D2.3):

  - **Foundations of resource-aware connectors** The work on connectors has focused on the expressiveness and implementability of BIP extensions. This work aimed at offering a flexible and comprehensive framework for rigorous SCEs design and is related to the work conducted in WP5, as reported in Joint Deliverable JD3.1, where distributed implementation of enhanced versions of BIP are discussed and in Deliverable D5.3, where BIP is used for verification of information flow security issues and for the compositional verification of timed systems.

- **Foundations of resource-aware languages and models** The work on NCpi has progressed to assess its categorical semantics and applied to the Pastry model used in Science Cloud. This work is detailed in Joint Deliverable JD3.1. Nominal automata techniques are further exploited in Deliverable D5.3 to deal with the analysis of massive numbers of components dynamically adapting to new requirements and environmental conditions.
- **Coalgebraic techniques for dynamical systems** This work is pivotal in the quantitative analysis of case studies, as considered e.g. in Joint Deliverable JD3.1 and WP5.
- **Enhancements of conceptual models for autonomicity** During the third year the soft constraint paradigm has been integrated with other frameworks and used in different WPs. In the Deliverable D7.3 and in the Joint Deliverable JD3.2, the technique for solving locally global optimization problems and its application to the parking lot problem are described, together with an implementation with CIAO for the declarative part and Java for the orchestrator. In the Deliverable D3.3, the soft constraints for KnowLang are considered as a suitable reasoning technique that will help designers impose constraining requirements for special liveness properties. The integration of soft constraints in SCEL is still under development in WP1.
- **Game paradigms for service composition** The smart grid scenario shares interesting analogies with Science Clouds, for what is concerned with competition aspects, like auctions mechanisms for offering/obtaining computational resources from peer cloud nodes and a more direct application for reducing power consumption in cloud farms.
- **Negotiate, commit, execute** The idea is to transfer some of the concepts related to the Negotiate-Commit-Execute scheme to the design of SCEL. This work is still under development.
- **Control Data for ensemble design** The white-box approach based on the neat separation between application logic and adaptation logic proposed in previous years has reached a mature stage and has evolved to the CoDa (for Control Data) methodology that also served as reference model for developing a specification, rapid prototyping and analysis tool written in Maude and called MESSI (for Maude Ensemble Strategies Simulator and Inquirer). The work on MESSI has also been fundamental for the development of the subsequent MISSCEL simulator exploited in the ASCENS tool-chain. This work is reported in Joint Deliverable JD3.2 and Deliverable D1.3.

WP3: Knowledge Representation and Self-Awareness

Our plans for the third year were mainly concerned with further development of KnowLang and knowledge models for the ASCENS Case Studies. The key objectives included:

- T3.1: complete the formal notation and implement appropriate tools for KnowLang, such as Grammar Compiler, Visual and Textual Editor, Consistency Checker, and KnowLang KB Compiler.
- T3.2: continue with further development of the KR models for the ASCENS Case Studies.
- T3.3: continue with further development of the KnowLang Reasoner where we need to complete the KB Operators and start implementing the Inference Primitives together with the KnowLang Awareness Mechanism.

Recommendations

- *Work has to continue on Y3 to complete the tools for the language (editors and compilers).*

  Answer: We have continued to work on the KnowLang language and tools and expect to complete them in the fourth reporting period.

WP4: Adaptation and Dynamic Self-Expression

The key objectives of WP4 for the third year included:

- as part of T4.1 and T4.2, assessing and calibrating the achieved results, namely the study of the self-adaptation and self-expression patterns, via prototyping experiences and providing guidelines for their implementation;
- as part of T4.3, experimenting with complex systems in which emergent behavior could arise, with the aim of identifying solutions to engineer and control such emergent behaviors;
- as part of T4.4, identifying and developing quantitative performance modeling tools and software tools to support performance awareness.

Recommendations

- *The pattern catalogue is deemed important and potentially useful, however there is no characterization of the potential 'quality' of a pattern.*

  Ideally the simulation should help in eliciting such quality, otherwise it is not clear what is the purpose of the simulation tasks in the project.

  Answer: The activity of the third year, devoted to experiencing how such patterns could be effectively implemented in different forms (i.e., we have implemented and simulated the behaviour of such patterns in terms of agent-based systems, SimSOTA, and the SCEL language) have enabled us to clearly show the versatility (as a general quality attribute) of the pattern approach. In addition, the evaluation of the effectiveness of the different patterns in different scenarios define a quantitative comparison of the quality of the different patterns in different situations.

WP5: Correctness of Service Components and Service Component Ensembles

Our overall goal in WP5 is to develop new techniques and underlying theories to allow the design and the implementation of correct and reliable service components and service component ensembles. This year, the objectives were as follows.

- *Task T5.2.* In this task we try to establish global properties for Service Component Ensembles(SCEs) from local properties of its constituents. It involves constructive verification techniques based on compositional reasoning from the properties of individual SCs.
- *Task T5.3* deals with security properties for ensembles. Our objective is to develop a security model (i.e. security policies and their enforcement mechanisms) for designing and composing secure ensembles.
- *Task T5.4* In this task we complete verification and design methods of the previous tasks by checking the compliance of the low-level code with respect to the high-level specifications considered in other tasks.

Recommendations

- *It would be useful to have a presentation of the techniques by putting each of them precisely in the scope of the "design flow" considered in ASCENS and making explicit the assumptions these technique are based upon.*

  Answer: Joint Deliverable JD3.1 presents application of verification/validation techniques developed previously in the project to ASCENS case studies. It also explains their role in the global ASCENS Ensemble Development Lifecycle (see introduction of JD3.1), that is, how to build the corresponding models they are using as input.

- *A question that needs to be addressed is what happens when the component or the ensemble (or the architecture) changes dynamically.*

  Answer: The objective of verification techniques is to prove properties of the system assuming all possible behaviors. We can already address dynamic changes that components/ensembles may be subject to if these changes are part of the model from the very beginning. Since verification techniques are limited to finite structures they can only deal with dynamic changes that boil down to a finite number of configurations. To address more general types of dynamic behavior, we started to work on model-checking techniques using nominal automata allowing to deal with dynamic and unbounded allocation of resources, but we have only preliminary results.

WP6: Tool Integration Platform for Service Component Ensembles

The objective of WP6 aligns with Objective 6 of the ASCENS project, that is, to provide tools (and methodology) for the design and development of correct SC and SCE and their verification. This objective is further augmented with our ambition to release an innovative integrated tool platform for the development of complex software systems based on ensembles, which will be put at work in diverse use case scenarios elaborated within the ASCENS project in general and within WP7 in particular.

Towards this objective, we have mostly completed the work on task T6.1, collecting requirements on the integration platform, settling on an integration course based on the use of the SDE environment, and creating a technical support framework (documentation, issue tracker, communication) for tool developers. We have also initiated work on tasks T6.2 and T6.3, delivering the first prototypes of the ASCENS tools and preparing directions for eventual integration. The details on the tool release are available in D6.2.

Recommendations

- *During the second year the project has released a significant number of tools. Some of them, or previous versions, did already exist before the start of the project, so the actual improvement produced in the scope of ASCENS should be clarified in subsequent releases.*

  Answer: The tool integration deliverable D6.3 explicitly lists third year progress for all tools where such progress was achieved (jSAM, MESSI, MISSCEL, FACPL, KnowLang Toolset, GMC, ARGoS, jDEECo, jRESP, CIAO Environment, SCP, SPL). Few tools (Maude Daemon Wrapper, BIP Compiler) were stable enough so that significant updates in this reporting period were not necessary.

- *Overall, Work Packages 5 and 6 are producing interesting verification methods and tools. However, the role of each of these methods and tools in the development of a complete system is unclear.*

Answer: The joint deliverable JD3.2 pays special attention to the position of individual methods and tools within the ensemble development lifecycle and clarifies their roles in the development of a complete system.

WP7: Case Studies

The two major objectives within this reporting year were: (a) models integration and simulations and (b) implementation and validation, applied to specifics of the three different case studies:

- A self-aware robot swarm that operates in a rescue operation detecting dangerous objects, building blocks around it and removing victims.
- A set of self-aware resources that form a cloud platform, in voluntary and ad hoc manner, where scientific applications run in a robust and transparent way.
- A highly adaptive framework that simulates e-mobility elements: drivers with their itineraries, e-vehicles with their energy restrictions, parking and charging stations with the booking abilities and (semi)simulated traffic conditions.

Recommendations

- *It is unclear what tools have been used from the set of tools in WP6.*

  Answer: The case studies used many tools developed as part of WP6, e.g., jRESP, jDEECo and Helena for high-level modelling, programming and validation, POEM for reasoning and learning, (SCPL) soft constraint logic programming for harmonizing individual and collective goals, and BIP for system verification. A more detailed description of tool use in the case studies is contained in JD3.1 and JD3.2.

- *It seems clear that the robotics scenario is inspiring for the more theoretical work but how and by how much the theoretical work helps in solving the problems posed is not clear.*

  Answer: The ASCENS tools are proving useful especially in the analysis phase. The modeling approaches studied in ASCENS allow us to analyze the properties of the system and validate the correctness of our designs. For instance, in [GLP+12] and [MBL+13] we performed a statistical analysis of two behaviors designed in previous works. Also, in ongoing work, a BIP model allowed us to improve the hand-made design for a scenario of the robotics case study. As an example of ASCENS techniques during the run-time phase, POEM was used to demonstrate adaptation to environmental conditions by using runtime learning.

- *The case study that better seems to use the tools is the eMobility one. However, how a user can actually use the set of tools to solve a complex problem does not seem a simple task. See the recommendation on programmers' acceptance.*

  Answer: This question is answered more fully in Recommendation 4. To summarize, we have started to work on such scenarios and will, in year 4, continue to work towards examples showing the use of tools to solve complex problems.

- *For future deliverables, be clear as to the purpose of the case studies. Clearly they all serve the purpose of demonstrating the actual results of the technical work of the project (and in this regard they are a very appropriate, diverse mix) . . .*

  Answer (robotics): The purpose of the robotics case study is to provide a platform for the study and validation of the novel approaches that constitute the ASCENS vision. The peculiar features

of swarm robotics system, namely decentralization, large-scale, and adaptivity, offers a range of practical problems that inspire the theoretical project work.

Answer (cloud): The science cloud represents not only a technological advancement due to the combination of peer-to-peer and voluntary computing with cloud computing; it also represents a new way of thinking about resilient, large-scale, autonomic computing. By not relying on single controlling entities but rather distributing not only processing power but decisions about where to compute, this technology is ahead of corporate thinking and might trigger a new, more democratic form of cloud computing in the future. It is both aspects that carry significance for computing in general and cloud computing in particular.

Answer (emobility): E-Mobility offers a complex scenario that especially focusses on optimizing individual vs. collective goal. It is a setting dealing with conflicting interests from individual itineraries, traffic condition, resource shortage (parking lots, charging stations, car batteries) upto overall traffic optimization and harmonization.

- *Is the Science Cloud case study as novel and advanced as the other two in this regard?*

  Answer: The novelty of the science cloud case study, on the technological side, lies in the combination of cloud, voluntary and peer-to-peer computing. It is the explicit goal of the case study to drive this idea as a test case of a truly decentralized and voluntary computing system, by which we not only push technological but organizational boundaries, which is another implication of the case study.

WP8: Engineering and Best Practices for Service Component Ensembles

The objectives of WP8 during the third reporting period were

- a first version of a catalogue of patterns and best practices for developing ensembles.
- the definition of the Ensemble Development Life Cycle (EDLC).

Both objectives were achieved in this reporting period.

Recommendations

No specific recommendations were given by the reviewers for WP8, however WP8 was instrumental in defining the Ensemble Development Life Cycle (EDLC) which addresses Recommendation 1 (see p. 20).

WP9: Dissemination, Collaboration and Exploitation

The key objectives of WP9 during the second year were: (1) to improve the dissemination material and infrastructure that enables communication within the project and dissemination of results, (2) to continue with concrete dissemination activities, such as publication, presentations, organization of events and courses, (3) to continuously update the content of the ASCENS web site as well as produce new blog entries, and (4) to participate in dissemination activities organized by the Coordination Action on Self-Awareness in Autonomic Systems (AWARENESS), such as a lectures and summer schools.

Recommendations

- *Exploitation should be expanded to include all partners*

  Answer: In the Deliverable D9.3 we have extended the reporting section on exploitation. It comprises not only the reporting of exploitation activities realized by the industrial partners but also a list reporting activities performed by all partners for the exploitation of scientific results and products.

A2.1 Answers to recommendations concerning the whole project

This section answers how recommendations concerning the whole project were addressed during the third reporting period. Previous recommendations concerning the whole project and their answers are collected in the Appendix (p. 91).

Recommendation 1

It is necessary to better define the software life cycle that the consortium has in mind, defining the phases of interest and assessing for each phase which research contribution is involved and what is going to be achieved. For example after a requirement phase a validation of requirements is mentioned, but it is an objective of the project to deal with changing requirements at run time. It is thus important to explain what happens to the static requirement validation when requirements change and how is this carried on at run time.

We have defined the Ensemble Development Life Cycle (EDLC) that defines two "cycles" of activities, one for design-time and one for run-time, and the mechanisms for transferring results between the cycles (deployment and feedback). The EDLC defines the phases of interest and specifies for each research area of the project to which phase or phases it pertains. The EDLC can be used to refine questions such as how to handle changing requirements at run time according to the circumstances in which a particular ensemble operates (i.e., is the need for changing requirements determined by the awareness mechanism of the ensemble itself or by the designers, which adaptation mechanisms are available to the ensemble, how much feedback can the system provide back to the design-time cycle to enable static re-verification). Designers can then use the catalogue of best practices to determine appropriate mechanisms and system designs that ensure that the static verification results characterize the run-time behavior of the ensemble.

Recommendation 2

The project aims at resilience, fault tolerance and self-adaptivity, but from the results obtained so far there is little stress on what happens at run time in terms of the validation guarantees that are assessed statically. The consortium should clarify what happens statically at development time, what happens dynamically and how the two views, static and dynamic reconcile.

During the year, we clarified the relationships between the run-time behavior of ensembles, and their verification/validation at design time. What we propose fits in the ASCENS Ensemble Development Lifecycle (see Deliverable JD3.2, specifically Figure 1). Our vision is as follows.

A property checked at design time should be also checked at runtime using monitoring, ideally generated from the requirements engineering step. When such a property is not satisfied during the actual execution of the deployed system (i.e. at runtime), we consider that the behavior is faulty. If a fault can be recovered at runtime using ASCENS adaptation schemes (through awareness and then self adaptation), it is only transient and the system quickly goes back to correct execution. Otherwise, it should be reported to the developer to check for divergence between the implementation and the

models used for verification/validation, or invalid assumptions about its execution environment. Once the design is fixed, the system can be either redeployed and patched at runtime.

Recommendation 3

One of the initial project objectives was to deal with the heterogeneity of the nodes. This characteristic seems to not be addressed in the project, which indeed takes an approach that goes in the direction of assuming a common language and middleware layer in the nodes. It is fundamental to clearly state what are the assumptions on the kind of systems you will be able to address. That is, the project should provide some rationale about how the kind of systems considered in ASCENS should be developed, explaining the role of the different verification methods and tools.

Heterogeneity of components can be due to different aspects

- interfaces
- behaviours/capabilities
- performance
- knowledge representation

Our main case studies have limited interface heterogeneity. Differently from Service-oriented Computing (SoC) and Component-oriented Programming (CoP), we heavily rely on information about behaviours and knowledge of the components. Indeed, we are more concerned about adapting behaviours rather than interfaces. However, the science cloud case study deals with large-scale heterogeneous computing infrastructures, while within the automotive case study we have heterogeneous systems composed of intelligent and self-aware nodes and consider Car2x communication, with x being a placeholder for any infrastructure components like traffic management servers, individual streets or service providers.

Within the different case study we approach heterogeneity as follows:

- Science Cloud: the difference in behaviours is homogenized by the Java Cloud Middleware. Different performances of components are taken into account when performing task allocation; then information provided by the interface is heavily used.
- Automotive Scenario: we take a SoC-like approach to the heterogeneity due to the interaction of cars have with parking managers or with meteo or traffic services.
- Robotics: for some applications, we consider robots with different behaviours and capabilities and use knowledge and sensors to involve the right ones at the right moment.

In general for dealing with heterogeneity of knowledge:

- We use tuple spaces to maintain heterogeneous information
- We rely on components with different knowledge handlers
- We build adapters that act as stubs between reasoners and behaviors
- We plan to use reasoners for knowledge homogenization.

Recommendation 4

To help ensure the overall results, especially in terms of the big-picture view, are easy to understand it would be very helpful if a user-guide were constructed with a specific application scenario consistently used throughout. It would start with an application-specific problem statement, proceed through requirements, modelling and use of the SCEL language, use of tools etc. ending with an implemented

solution. At each step the reader would see how the results of the project interrelate and are applied in sequence or iteratively, contributing to the final outcome.

We have made significant progress towards this goal. In the third reporting period we defined the EDLC which clarifies the relationship between the different tools and techniques developed in ASCENS, and specifies possible interactions between them. We have also greatly improved the integration between tools, e.g., by integrating jRESP with the *Iliad* reasoners, so that it is now possible to develop application scenarios that use SCEL and POEM together; this integration has also provided valuable insights for the integration of KnowLang into jRESP that is planned for the fourth reporting period. In a similar vein, we have improved the applicability of our verification and validation tools to the ASCENS languages and used them to analyze more involved case study scenarios. Regarding tutorials, we have developed lessons and exercises for teaching both SCEL and POEM in the AWASS summer school. In the upcoming reporting period we plan to revise these tutorials so that they address a single scenario in the way proposed in the recommendation, and if possible to extend this combined scenario to other tools and techniques. Since a user-guide would benefit from some tools, such as the KnowLang toolchain, that will become available only towards the end of the project, we plan to apply for a cost-neutral extension to the project that would allow us to complete the user-guide and teach a spring school based on the integrated application scenario.

Recommendation 5

A complete picture of the relationship between work packages has to be provided, in line with the good progress of Year 2. In particular, make sure that WP7 (and 8) feed back into the technical WPs (1-6). Also, clarify the relation between the different areas of work in WP2 and the other work packages.

The relationship between work packages is summarized in the following list and shown in Figs.

- WP1 has the following relationships with other WPs:
  - WP2: MISSCEL, the Maude interpreter of SCEL has been inspired by WP2's white-box approach to adaptation (CODA) and the Maude based approaches such as MESSI; integration of soft constraints, NCE and FuTS in SCEL, connectors for SCEL, white-box adaptation.
  - WP3: Integration of simpler reasoners with SCEL-TS in MISSCEL-PIRLO; integration of *Iliad* with jRESP; interoperability between SCEL and KnowLang.
  - WP4: Implementation in SCEL of a number of adaptation patterns.
  - WP5: Statistical model checking with MISSCEL, and an ongoing SCEL to Promela/SPIN translation; preliminary SCEL to BIP results.
  - WP6: New version of jRESP; frameworks based on SCEL abstractions (DEECo, Hexameter).
  - WP7: Policies for Cloud case study; MISCEL and jRESP models of the Robotics case study.
  - WP8: Role of MISSCEL and jRESP in the EDLC; best practices patterns inspired by SCEL paradigm.
- WP2 has the following relationships with other WPs (see also above answers to recommendations in Overall Result):
  - WP1: integration of soft constraints, Negotiate-Commit-Execute and FuTS in SCEL (ongoing), connectors for SCE design (ongoing), white box approach to adaptation based on

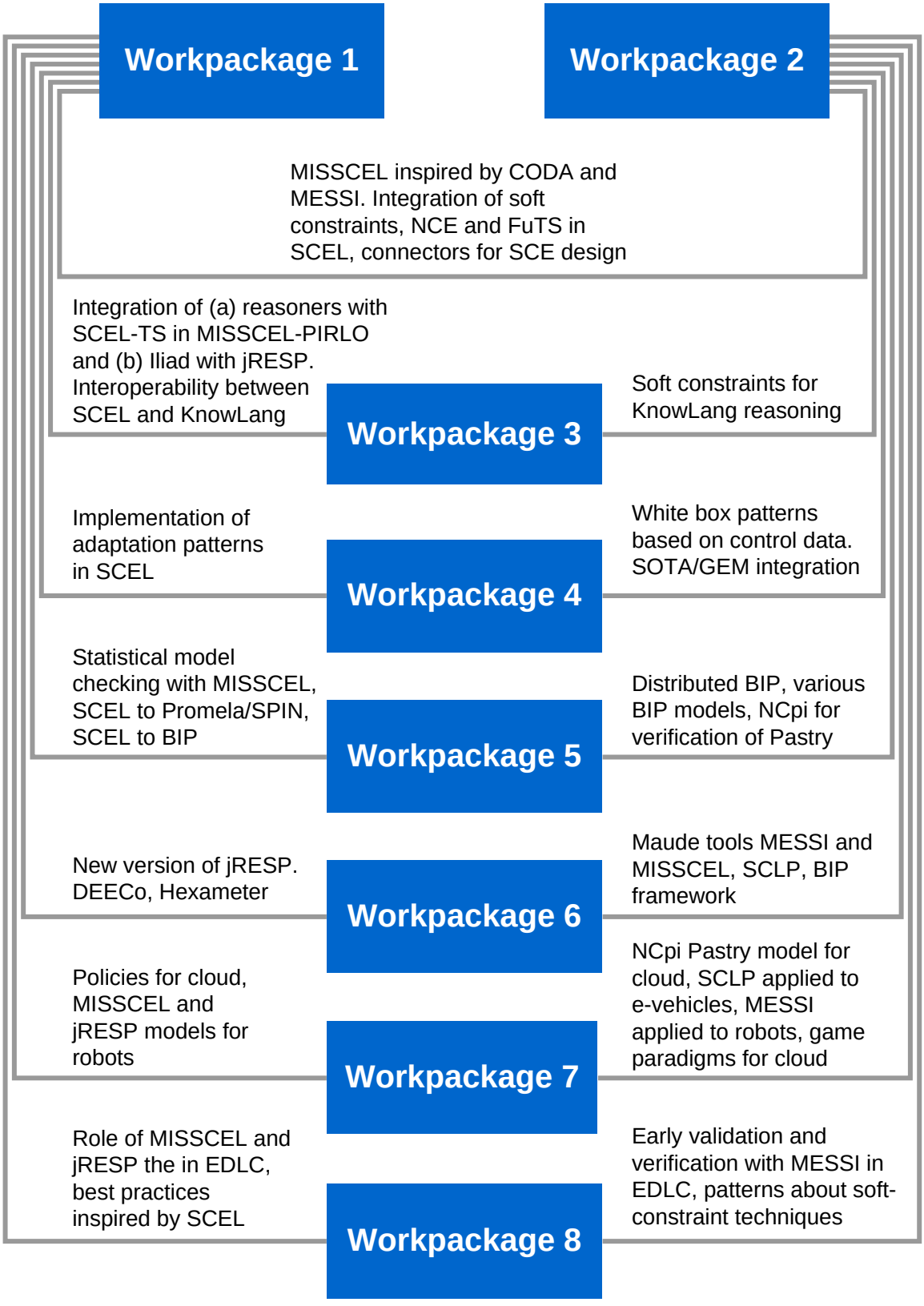

Figure 3: Relationship between work packages (1)

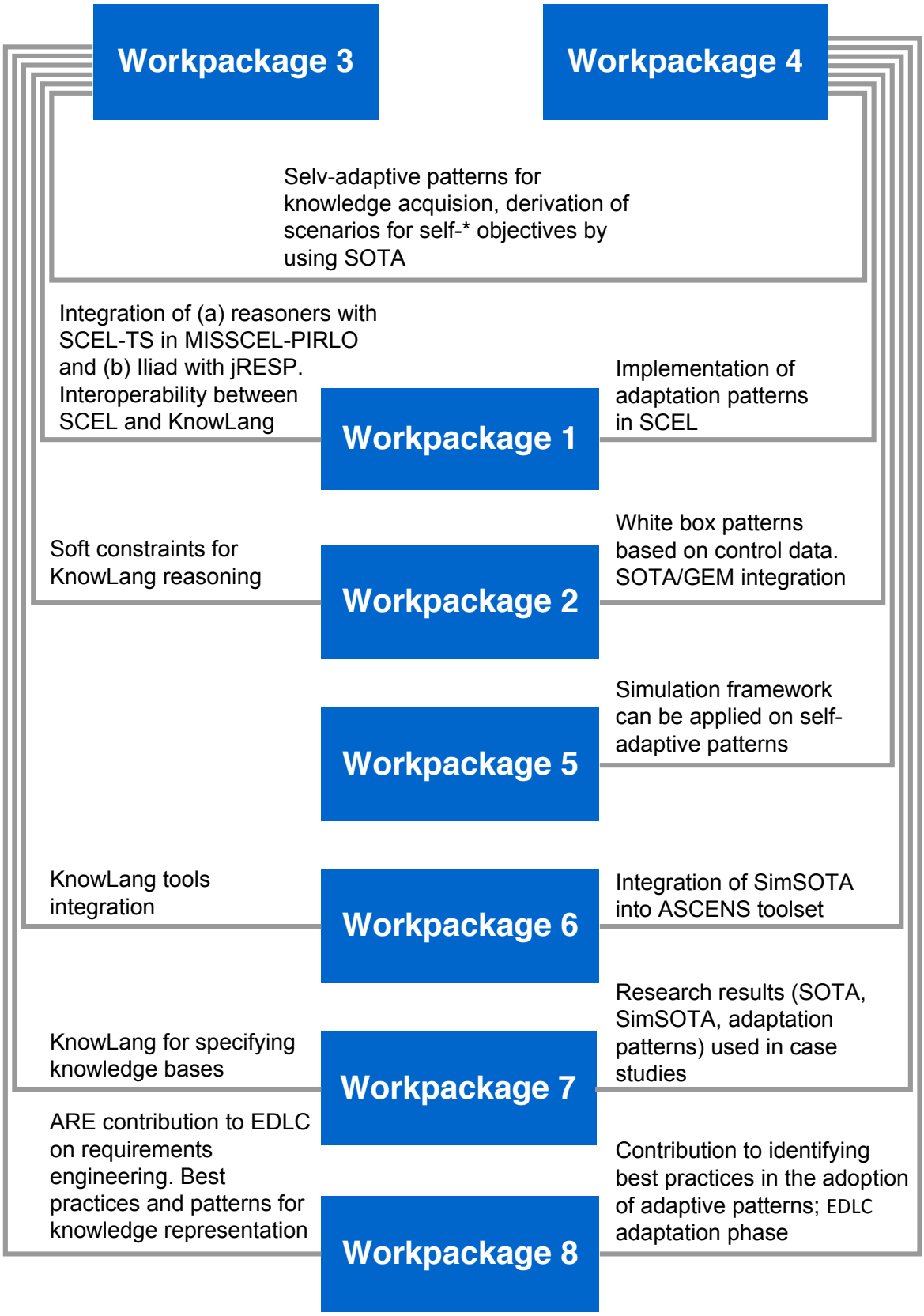

Figure 4: Relationship between work packages (2)

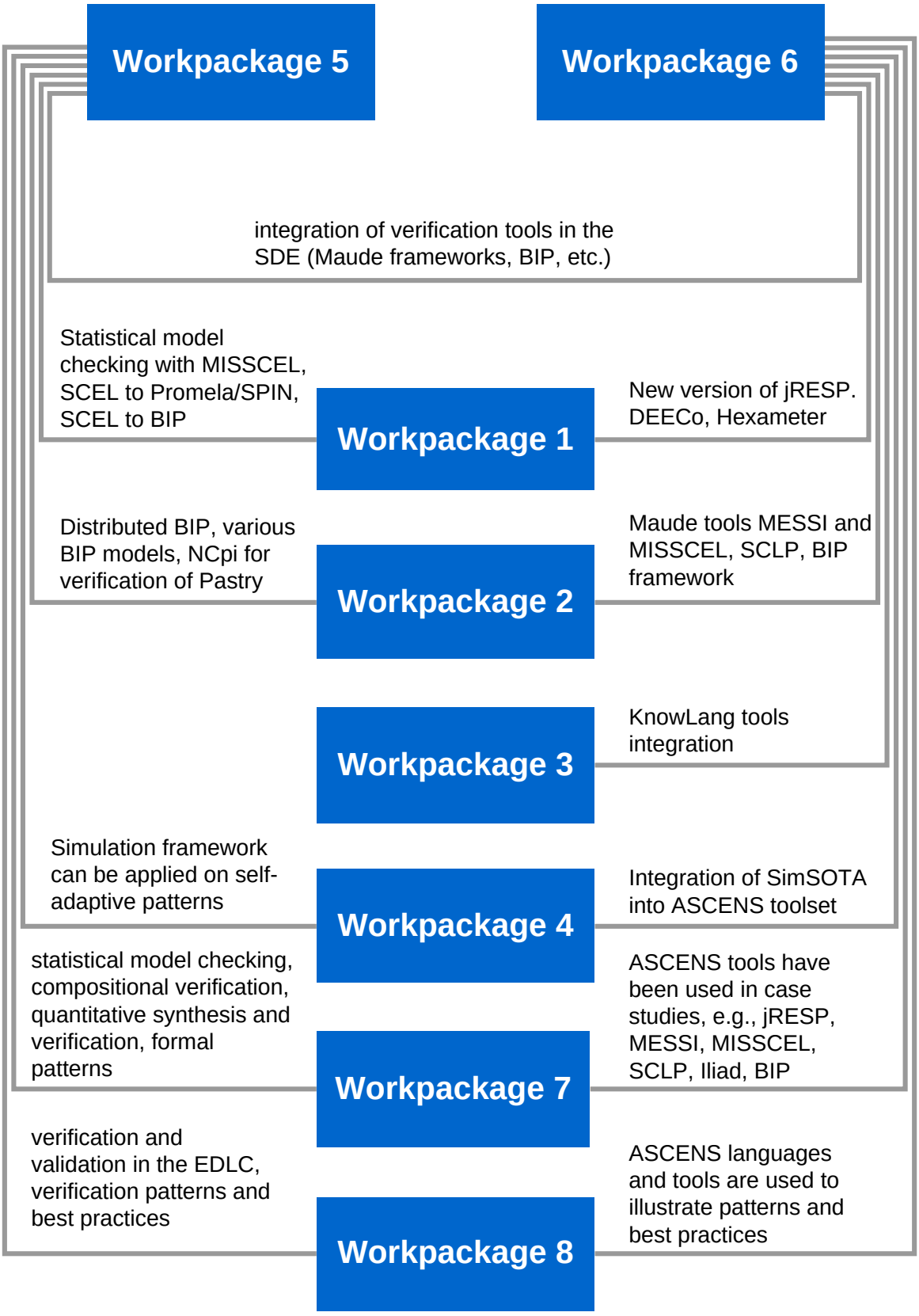

Figure 5: Relationship between work packages (3)

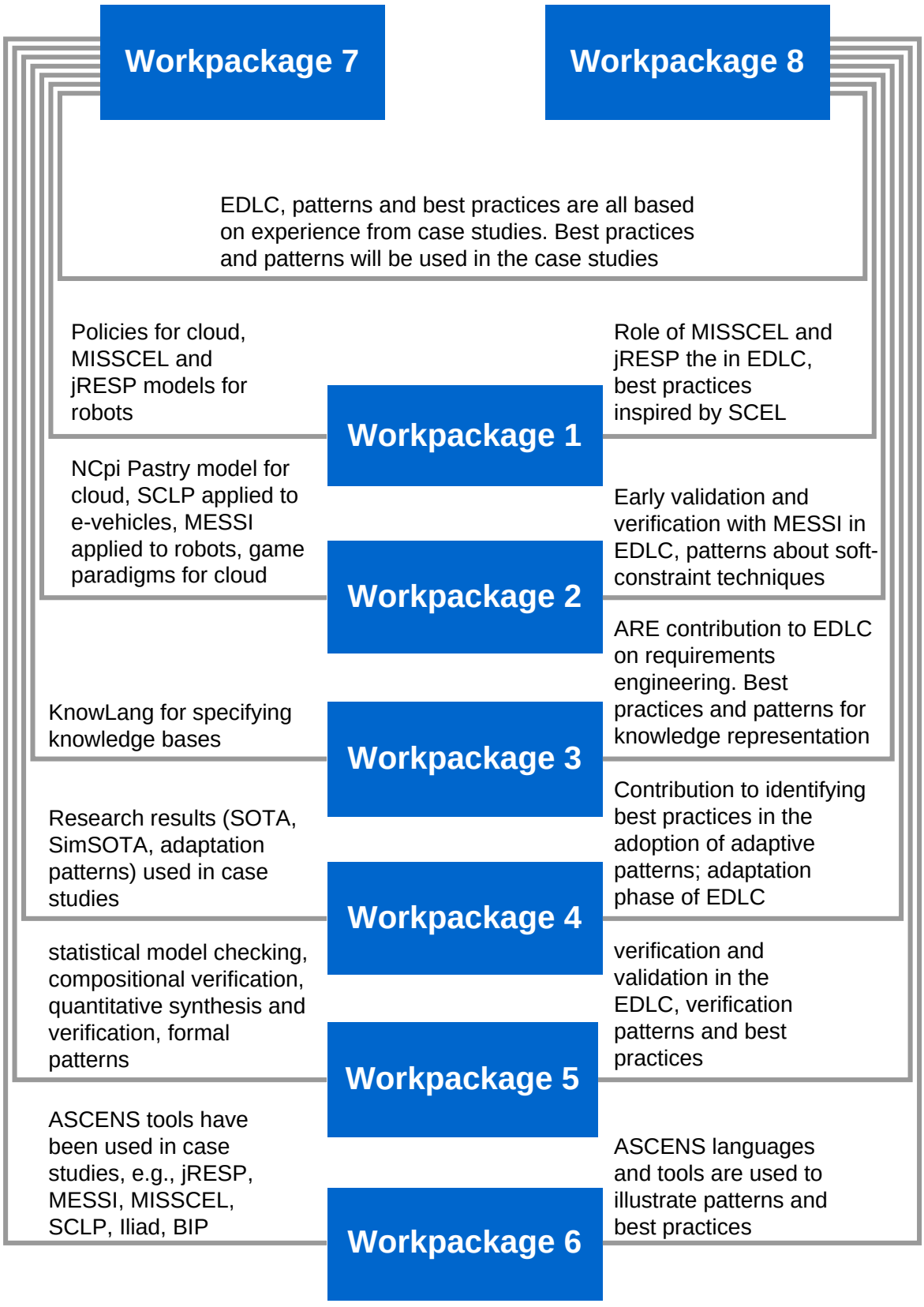

Figure 6: Relationship between work packages (4)

control data (CODA), MESSI (Maude Ensemble Strategies Simulator and Inquirer) exploited for developing MISSCEL

- WP3: soft constraints for Knowlang reasoning
- WP4: white box patterns based on control data; SOTA/GEM integration.
- WP5: Distributed BIP, BIP models for the verification of information-flow security issues and for compositional verification of timed systems, nominal automata techniques, coalgebraic techniques for quantitative analysis, NCpi for verification of Pastry model properties.
- WP6: Maude tools (MESSI, MISSCEL), SCLP (Soft Constraint Solver), BIP framework
- WP7: NCpi Pastry model used in Science Cloud, SCLP solving locally global optimization problems for e-vehicles, MESSI applied to the robotic case study, game paradigms for service composition in Science Cloud
- WP8: early validation and verification with MESSI in EDLC, patterns about soft-constraint techniques.

- WP3 has the following relationships with other WPs:
  - WP1: KnowLang provides a KR model of the SCEL knowledge base; interoperability between SCEL and KnowLang; integration of *Iliad* into jRESP.
  - WP2: Implementation of soft constraints for KnowLang.
  - WP4: Self-adaptive patterns for knowledge acquisition; derivation of scenarios for self-* objectives by using SOTA.
  - WP6: KnowLang tools integration
  - WP7: the ASCENS case studies provide experimental platforms for KnowLang; KnowLang is used to specify knowledge bases for the case studies.
  - WP8: the ARE (Autonomy Requirements Engineering) approach used by WP3 contributes to EDLC (Ensemble Development Life Cycle) by adding on to the requirements engineering of the design phase of EDLC. Best practices and patterns for knowledge representation are being developed.

- WP4 has the following relationships with other WPs:
  - WP1: Adaptation patterns have been expressed in SCEL.
  - WP2: SOTA has been integrated with the general ensemble model, white-box adaptation based on control data.
  - WP3: Self-adaptive patterns and mechanisms for the acquisition of knowledge developed; SOTA specification of self-* objectives.
  - WP5: The simulation framework can be applied on the self-adaptive patterns.
  - WP6; Integration of the SimSOTA tool into the overall ASCENS toolset;
  - WP7: All research results experienced on the case studies.
  - WP8: Contribution to identifying the best practices in the adoption of adaptive patterns, adaptation phase of the EDLC.

- WP5: has the following relationships with other WPs:
  - WP1: Statistical model checking with MISSCEL; SCEL to Promela/SPIN (ongoing); SCEL to BIP (preliminary results).

  - WP2: BIP extended for reconfiguration (Dy-BIP); distributed BIP; verification of BIP models for information-flow security; compositional verification of timed systems, nominal automata; coalgebraic techniques for quantitative analysis, verification of Pastry model properties using NCpi.
  - WP4: simulation framework for self-adaptive mechanisms
  - WP6: integration of verification tools in the SDE (Maude frameworks, BIP, etc.)
  - WP7: JD3.1 provides results of application of WP5 methods and tools to case studies, e.g., robot deployment, routing and access control in the Science Cloud.
  - WP8: verification and validation is a phase in the EDLC design-time cycle, in JD3.1 we show how WP5 fits into EDLC; verification patterns and best practices.

- WP6: connections through tool development and application of tools in examples and case studies; in particular (the list is not exhaustive):
  - WP1: jRESP, frameworks that implement SCEL abstractions.
  - WP2: MESSI and MISSCEL tools, SCLP soft-constraint logic programming; extensions of BIP (Dy-BIP, distributed BIP).
  - WP3: KnowLang toolset
  - WP4: the SimSOTA tool
  - WP5: Maude frameworks and GMC; BIP compiler and tools.
  - WP7: Many of the ASCENS tools have been used in case studies: jRESP, MESSI, MISSCEL, SCLP, *Iliad*, BIP, etc.
  - WP8: The ASCENS languages and tools are used to illustrate the patterns and best practices, e.g., SCEL, jRESP, POEM, *Iliad*.

- WP7: has connection to all other WPs, in particular (the list is not exhaustive):
  - WP1: Policies for Cloud case study; MISCEL and jRESP models of the Robotics case study.
  - WP2: NCpi Pastry model used in Science Cloud, SCLP solving locally global optimization problems for e-vehicles, MESSI applied to the robotic case study, game paradigms for service composition in Science Cloud.
  - WP3: Specification of knowledge bases for the case studies in KnowLang.
  - WP4: SOTA, SimSOTA used in case studies.
  - WP5: Validation and verification have been used extensively in the case studies: statistical model checking, compositional verification, quantitative synthesis and verification, formal patterns.
  - WP6: use of tools in the case studies (see JD3.1, JD3.2 and the work-package specific deliverables).
  - WP8: the EDLC, patterns and best practices are all based on experience from the case studies; best practices and patterns will be used in the case studies.

- WP8: has connections to all other WPs via the EDLC.
  - WP1: Role of SCEL, jRESP, MISSCEL in the EDLC; architectural patterns, best practices and patterns inspired by SCEL, use of SCEL in examples for patterns.

- WP2: Validation and verification using MESSI in the EDLC, patterns about soft-constraint-based techniques.
- WP3: ARE (Autonomy Requirements Engineering) approach for requirements engineering; role of ARE and KnowLang in the EDLC, knowledge-representation patterns and best practices.
- WP4: Adaptation phase of the EDLC; adaptation patterns and best practices.
- WP5: Validation and verification phase in the EDLC; patterns about validation and verification.
- WP6: Examples for tool use in patterns.
- WP7: Influence of case studies on the EDLC, patterns are based on case studies and will feed back into case studies

Recommendation 6

The relation between SCEL, KnowLang and POEM should be clarified. In particular, WP1 should produce a complete definition of SCEL, including the knowledge and policies parts of components, which should integrate the work on WP3.

Answer: Within WP1 we have now defined (see deliverable D1.3) an instance of the parametric language SCEL, that we call SCEL-TS ; it uses tuple spaces and related operations for knowledge management, and is equipped with a specific policy language that we call SACPL.

We have worked on the integration of SCEL with different "reasoners" such as PIRLO and *Iliad* (the reasoner for POEM) that are invoked by processes to take decisions. As soon as the prototype implementation of KnowLang is available we shall proceed with its integration with SCEL; the experience gained from the previous integrations will make the task simpler.

Regarding the relation between the three languages, SCEL is focused on the overall behavior of SCs, the coordination of SCs in a SCE and the mechanisms for disseminating and retrieving knowledge in an SCE, whereas KnowLang and POEM are mostly concerned with (logical and probabilistic) knowledge representation and reasoning mechanisms. Therefore, SCEL is used to developed the main control logic of ensembles; KnowLang and POEM are used to design the knowledge repositories used by these SCEL programs.

Both KnowLang and POEM are based on the same underlying mathematical models (action calculi and graphical models), however with different focus: KnowLang is a comprehensive language for developing knowledge-representation models and ontologies and supports the design-time and run-time phases of the EDLC and their interaction; POEM is a minimal language targeting only the awareness and deployment phases. POEM is focused on investigating and integrating different methods of reasoning and learning, as well as mechanisms for dynamic deployment. Therefore, a knowledge-representation mechanism developed in KnowLang may use the reasoning mechanisms provided by POEM/*Iliad* at run-time (in addition to static verification tools and other run-time reasoning mechanisms) but support developers in modeling and verification tasks that are outside the scope of POEM. POEM, on the other hand, is a more light-weight tool that can also be used in some development processes and environments in which KnowLang is not appropriate. Once the KnowLang toolset becomes available we expect it to replace POEM as the language used in the case studies, while retaining the *Iliad* runtime as part of the KnowLang runtime.

Recommendation 7

Clarify the use of all the tools into a more detailed general methodology and apply it to the use cases. Report on that.

Answer: We have proposed a general methodology called Ensemble-Development Lifecycle (EDLC) and applied it on each of the three case-studies. This is documented in JD3.2, which overviews the EDLC in the general form and shows its application on the case studies along with tools used at different EDLC phases. Further, we have published two papers on this topic in the proceedings of the 3rd Awareness Workshop at IEEE SASO 2013.

Recommendation 8

Evaluate programmers' acceptance of the methodology and tools. Do it beyond the limits of ASCENS, that is, use external programmers in the evaluation. Revisit last year's recommendation.

Answer: In the AWASS summer school, we taught two courses using ASCENS tools: one group of students developed "Ensemble-oriented programming of self-adaptive systems" used SCEL to specify, simulate and execute an example derived from the e-mobility case study; another group of students used the hierarchical reinforcement learning mechanism of POEM to develop an awareness mechanism for foraging robots and evaluate its learning performance in different scenarios. Both groups successfully completed their assignments and provided valuable feedback for the further development of the tools and training materials.

A3 – Work progress and achievements during the period

This section summarizes the work progress and achievements of the technical work packages during the third reporting period.

WP1: A Service-Component-Ensemble Language and its Logic

The main contributions of the third year have been devoted to fulfill the main objectives of tasks T1.1–3:

1. The prototypical implementations of the formalism have been stabilized and a specific dialect of the language that we call SCEL-TS, because it relies on tuple spaces for knowledge handling, has been defined. Moreover, we have integrated implementations of SCEL-TS with different reasoners. MISSCEL is a prototype implementation of SCEL in MAUDE that allows to exploit the rich MAUDE framework to reason on SCEL specifications. jRESP, the Run-time Environment for SCEL programs, has been improved and extended in several directions, including dealing with different interaction patterns. All case studies of the project have been considered to validate the linguistic and architectural choices by specifying and analyzing them in SCEL, MISSCEL and jRESP.

2. To deal with the objectives of task T1.2 we have developed policy description languages. In particular, we have developed and integrated with SCEL-TS languages for specifying policies that can be used to control actions and interactions, thus providing high-level mechanisms to control the interaction between components and of components with the environment they operate in.

3. Regarding the objectives of task T1.3, we have worked on the integration of the behavioral language with external reasoners that are used to support processes in taking their decision to adapt to changing environments. The benefits of the use of reasoners (both with MISSCEL and jRESP) has been validated though a set of experiments on the case studies. Moreover, we have studied the use of dynamic adaptation mechanisms of runtime policies, and shown the flexibility of SCEL by using to model a number of adaptation patterns.

WP2: Foundational Models for Service Component Ensembles

During the third year the WP2 activities have focussed in the following topics.

- We further pursued the investigation on the theoretical foundations of resource-aware connectors (T2.1).
- We kept on investigating the issue of parallel executions for BIP systems, now adding time constraints (T2.1).
- We continued the study of coalgebraic models for the resource-aware calculus NcPI, choosing peer-to-peer overlay as a case study (T2.1).
- We freshly tackled nominal automata, investigating the issue of regular expressions for the language they recognized (T2.1).
- We still focussed on the soft constraints paradigm (T2.2), including
  - a theoretical investigation concerned the laws for behavioral equivalence in SCCP, the best-knwon language based on constraints;
  - the development of a technique based on the orchestration of declarative and procedural knowledge for solving locally global optimization problems.
- We kept on investigating issues related to game semantics for agents, focusing on energy trading scenarios (T2.3).
- We pursued the study of coalgebraic semantics for the FuTS stochastic calculus (T2.3, formerly T2.2).

WP3: Knowledge Representation and Self-Awareness

In this third year of WP3,

- We continued working on the implementation of KnowLang (WP3.T1) where we focused on the KnowLang Toolset.
- We fully implemented the KnowLang's Text Editor, Grammar Compiler and Parser, and almost completed the implementation of the Visual Editor, Semantic Analyzer and Consistency Checker.
- We started working on the implementation of the KnowLang Reasoner (WP3.T3) carrying the integrated mechanism for knowledge processing and self-adaptive behavior along with ASK and TELL operators and implementation of the awareness control loop.
- We also worked on the knowledge models for the ASCENS Case Studies (WP3.T2).

In a joint project with ESA (European Space Agency), we developed an approach to Autonomy Requirements Engineering (ARE), which we used to build efficient and relevant knowledge models for ASCENS. In this endeavor, we used ARE as a software engineering step to select and refine relevant and efficient knowledge data that needs to be represented with KnowLang for the ASCENS Science Clouds case study. The novel requirements engineering technique helped us build a knowledge representation model, which is at the right level of abstraction, i.e., carrying all the necessary details to represent the knowledge necessary to process self-adaptive behavior based on awareness capabilities.

Note that, finding the right level of abstraction for the knowledge models specified with KnowLang was a major flow in our previous knowledge models, which carried unnecessary details, thus eventually overwhelming the reasoning process. With ARE, we focus on the so-called self-$*$ objectives providing for self-adaptive behavior and consecutively centering the knowledge models around this self-adaptive behavior, which makes the knowledge representation very efficient.

WP4: Adaptation and Dynamic Self-Expression

- In the context of T4.1 and T4.2, the activity has concerned the simulation, implementation, and experimentation of self-adaptive and self-expression patterns. In particular, the key activities and results achieved include:
  - We have completed the development of the SimSOTA tool, by integrating additional self-adative patterns in it and by making it more general-purpose, and extensively assessed its effectiveness in support of the e-mobility case study.
  - We have experimented the possibility of implementing self-adaptive and self-expression patterns in terms of a role-based agent system (RoleSystem), and experienced in a simulated way many of such implemented patters on the both robotics and the cloud case studies.
  - We have have identified and implemented a novel adaptation pattern related to the way a SC/SCE can acquire different levels of awareness. The key result is in a general architecture to support self-adaptation in the internalization by an SC/SCE of the necessary sensors and classifiers to reach awareness in an effective way.
  - We have successfully verified, in cooperation with WP1, the possibility of coding self-adaptive patterns in terms of the SCEL language.

- In the context of T4.3, we have initiated the corresponding axis of research and surveyed the concepts of self-organisation and emergence and revisited them with an engineering and a software architecture point of view. This will serve as the basis to well document and interpret the experiments with large-scale complex systems from which we will extract key methodological points to engineer and control complex systems.

- In the context of T4.4, with respect to performance awareness of components and ensembles, we have integrated the work done in WP4 with the general awareness context, where awareness is achieved by an iterative process comprising monitoring, filtering and evaluation, and (optionally) prediction. Within this frame, the key advancements from the third year include,respectively; the development of a domain specific language allowing for convenient and non-intrusive monitoring of Java applications termed DISL; the development of a performance properties formalism termed Stochastic Performance Logic (SPL); the integration of predictive performance models as data sources to the SPL formulas.

There are no relevant deviations from the DoW, apart from a small delay in the activities of T4.3, which we expect to recover over the next reporting period.

WP5: Correctness of Service Components and Service Component Ensembles

This year, the work progressed in the different tasks as follows.

- Task T5.2: We extended previous results by including timing constraints of components in the compositional verification method presented last year. We also continued the work on verification of systems with dynamic allocation of resources using nominal automata, to overcome limitations of standard model-checking approaches which are limited to finite systems.
- Task T5.3: This year, we successfully analyzed reputation systems and privacy using Bayesian decision theory and statistical model-checking. We also provided a framework based on an extension of BIP (secBIP) for compositional verification of information flow.
- Task T5.4: During year 3, we improved previous work by adding a support for jDEECo in the proposed model-checking tool, allowing to verify Java code of SCEL applications.

WP6: Tool Integration Platform for Service Component Ensembles

In the late project stages, main WP6 effort is focused into T6.3 (tools development) and where required also T6.2 (environment development). Major results in the third year (concentrated here but also listed in the work packages where the tools belong thematically) are:

- Completed porting of the jSAM stochastic model-checker from the earlier OCaML version.
- Developed the MESSI ensemble simulator based on Maude.
- Developed the MISSCEL simulation framework based on Maude.
- Developed the FACPL policy specification evaluation tools.
- Developed the editor, compiler and parser components of the KnowLang Toolset, progressing on other components.
- Progressed towards application of the GMC model checker on the ARGoS controllers.
- Developed a new major version of the ARGoS simulator.
- Extended the jDEECo runtime with support for limiting ensemble membership based on quality attributes.
- Extended the jDEECo runtime with support for checking the ensemble components with JPF.
- Extended the jRESP runtime with integration of external reasoners and additional communication mechanisms.
- Improved the *Iliad* compiler, runtime and reasoners for the POEM language.
- Developed the CIAO soft constraint logic programming framework prototype.
- Updated the Science Cloud Platform with new peer-to-peer communication substrate.
- Extended the SPL evaluation engine with support for custom filters and measurement points.

WP7: Case Studies

In the third project year the Case Studies work package has focused on integration and simulation, preparing ground for final implementation of the application scenarios. According to the work plan, this year achievements are (1) integration of ASCENS technology in deploying the ensemble development lifecycle for each of the application scenarios and (2) programming and implementation of the individual case studies, thereby validating the applicability of ASCENS techniques to realistic scenarios.

Integration of ASCENS technology

In a close work with the partners of the theoretical work packages the ensemble development lifecycle has been applied in practice. The swarm robotics, science cloud and e-mobility case studies have been specified and designed as proposed by the EDLC, using tools and methodology defined in other work packages (SOTA and white-box adaptation for specification, SCEL and Helena for modeling and analyses, SCLP for local vs global optimization, and JRESP/jDEECo/ARGoS/*Iliad* for programming and deployment). That also allowed the use of validation and verification techniques (e.g the BIP tool, see JD3.1), so that all phases and transitions of the ensemble development life cycle were covered by the case studies. A tight collaboration among all project partners is presented in JD3.1 and JD3.2 which resulted in the achievement of the milestone M5 "Engineering SCEs".

Programming and implementation

- The major achievement of the swarm robot system is the refinement and finalization of the concrete scenario. Further contributions can be summarized as follows: (1) Using the ARGoS simulation system, the rescue scenario has been programmed in a close-to-real simulation setting. The ensembles of robots are coordinated in an optimal way to allow for efficient search/find/rescue activities; (2) A new prototype of the marXbot robot with magnetic gripper has been finalized to respond to the needs of the rescue scenario; (3) A run-time framework has been developed that will allow for further analyses of the scenario: monitoring, and analyses of awareness and self-adaptation in the live scenario setting.

- The science cloud scenario has been refined and implemented using high-level ASCENS technology. The resulting science cloud platform has the following features: (1) It is based on a voluntary peer-to peer computing paradigm; (2) It is a platform-as-a-service cloud implemented by deploying existing network protocols. The strength of the science cloud scenario is that it succeeds in harmonizing voluntary ad hoc and peer-to-peer principles using high level and sound techniques. By deploying standard low level networking protocols this advanced infrastructure is compatible with state-of-the-art commercial platforms.

- The e-mobility scenario focused on deployment of ASCENS tools in implementing novel and comprehensive simulator that harmonizes local journey goals with global resource optimization. A concept for partially-competitive and partially-cooperative mobility is first modeled in SCEL and then implemented using jDEECo, featuring: (1) Full use of ASCENS technology in all EDLC phases (SOTA, SCEL, SCLP, jRESP, jDEECo); (2) Multiple optimization techniques applied on global (traffic) and local (journey) level as well as on individual (eg. a vehicle and a parking lot assignment) and collective (a group of vehicles competing to a group of parking lots) bases; (3) Close to real simulation that can easily switch from simulated to real traffic data.

The work in the third project year has finished successfully fulfilling both integrative and working goals of the case study work package. The subtasks T1.3, T2.3 and T3.3 on integration and simulation have been accomplished as planned forming a sound bases for further work. The subtasks T1.4, T2.4, T2.5 and T3.4) on implementation and verification started on time and will be the major activities in the coming project period. A strong cross-work package orientation contributed in achieving the milestone M5 Engineering SCEs (due in September 2013, as reported in JD3.1 and JD3.2). With the results achieved so far, the work in the final project year will continue smoothly and according to the plan (as described in the DoW) document.

WP8: Engineering and Best Practices for Service Component Ensembles

In the third reporting period, WP8 has achieved two significant results:

- We have defined the Ensemble Development Life Cycle (EDLC), a life-cycle model for ensemble development that takes into account the feedback between design- and run-time activities as well as the transitions between design time and run time. The EDLC forms a basis for integrating the ASCENS results into various process models and clarifies the relationship of different research areas and tools developed as part of ASCENS.
- A first version of the ASCENS pattern catalogue that defines best practices for the development of ensembles and provides concrete advice how different design goals can be reached.

WP9: Dissemination, Collaboration and Exploitation

The main achievements during the third reporting period were:

- The update of the web site containing general information on the project, its objectives and results.
- The coordination of blog entries illustrating research results in non-technical terms.
- Several publications and presentations of research results at conferences, symposiums and workshops.
- A set of courses where ASCENS related topics were thought.
- The organization of events such as conferences and workshops by members of ASCENS partners.
- The successful proposal for an exhibition at ICT 2013 in Vilnius, 6-8 November.
- The organization of the demonstrations and the printed material, such as posters and flyer for the ICT 2013,

A4 – Deliverables and milestones tables

This sections contains tables of all deliverables for the first 36 months of the projects and the milestones for the first three reporting periods.

A4.1 – Deliverables (excluding the periodic and final reports)

Deliverable No	Deliverable Name	Nature	Dissemination Level	Delivery Date
D1.1	First Report on WP1: Language Primitives for Coordination, Resource Negotiation, and Task Descriptions	R	PU	12
D2.1	First Report on WP2: Enhanced Connectors, Resource-Aware Operational Models, and the Negotiation-Commit-Execute Scheme and its Foundations	R	PU	12

Deliverable No	Deliverable Name	Nature	Dissemination Level	Delivery Date
D3.1	First Report on WP3: Software Requirements, Knowledge Modelling and Knowledge Representation for Self-Awareness—Report and Survey with Experimental Results for Intelligent Multi-agent Systems	R	PU	12
D4.1	First Report on WP4: Catalogue of Patterns of Component- and Ensemble-Level Self-Adaptation and Self-Expression, and Requirements for Knowledge Modelling	R	PU	12
D5.1	First Report on WP5: Verification Techniques for SCs and Correctness Proofs for Negotiate-Commit-Execute Schemes	R	PU	12
D6.1	First Report on WP6: SCE Tooling—Tool Integration Requirements and Technology	R	PU	12
D7.1	First Report on WP7: Requirement Specification and Scenario Description of the ASCENS Case Studies	R	PU	12
D8.1	First Report on WP8: Challenges of Developing SCEs in the Real World	R	PU	12
D9.1.a	Dissemination and Exploitation Plan	R	RE	12
D9.1.b	Progress Report on Dissemination, Collaboration and Exploitation	R	RE	12
D10.1.a	Periodic Project Report for Months 1–12	R	PU	12
D1.5	Language Extensions for Implementation-level Conformance Checking	R	PU	21
D1.2	Second Report on WP1: Languages for Coordinating Ensemble Components	R	PU	24
D2.2	Second Report on WP2: Models for Collaborative and Competitive SCEs, and Distributed Implementation of Connectors	R	PU	24
D3.2	Second Report on WP3: Generic Knowledge Models for SCE Systems, and a Framework for Knowledge Modelling for SCE Systems	R	PU	24
D4.2	Second Report on WP4: Component- and Ensemble-Level Self-Expression Patterns: Report on Experimental and Simulation Activities, and Requirements for Tools Implementation and First Iteration of Methods for Performance Monitoring and Prediction of SCs and SCEs	R	PU	24

Deliverable No	Deliverable Name	Nature	Dissemination Level	Delivery Date
D5.2	Second Report on WP5: Verification Techniques for SCs and SCEs (first version)	R	PU	24
D6.2	Second Report on WP6: The SCE Workbench and Integrated Tools, Pre-Release 1	P, R	PU	24
D7.2	Second Report on WP7: Ensemble Model Syntheses with Robot, Cloud Computing and e-Mobility	R	PU	24
D8.2	Second Report on WP8: The ASCENS Service Component Repository (first version)	R	PU	24
D9.2	Progress Report on Dissemination, Collaboration and Exploitation	R	RE	24
D10.2.a	Periodic Project Report for Months 13–24	R	PU	24
D4.5	Methods for Performance Monitoring and Prediction of SCs and SCEs (second iteration)	R	PU	33
D1.3	Third Report on WP1: Task Descriptions, Dynamic Reconfiguration, Context Aware Resource Negotiation, and Performance Metrics	R	PU	36
D2.3	Third Report on WP2: From Local to Global Knowledge and Back, and Semantics Preserving Transformations	R	PU	36
D3.3	Third Report on WP3: A Reference Model for Self-Awareness in SCE Systems and Experimental Knowledge Models for the ASCENS Case Studies	R	PU	36
D4.3	Third Report on WP4: Prototype Modelling and Implementation of Self-Adaptive SCs and SCEs, and Experience Report on Large-Scale Adaptable Ensembles	R,P	PU	36
D5.3	Third Report on WP5: Verification Techniques and Security Issues	R	PU	36
D6.3	Third Report on WP6: The SCE Workbench and Integrated Tools, Pre-Release 2	P, R	PU	36
D7.3	Third Report on WP7: Integration and Simulation Report for the ASCENS Case Studies	R	PU	36
D8.3	Third Report on WP8: Best Practises for SCEs (first version)	R	PU	36
D9.3	Progress Report on Dissemination, Collaboration and Exploitation	R	RE	36
D10.3.a	Periodic Project Report for Months 25–36	R	PU	36

A4.2 – Milestones

No.	Milestone Title	WPs Involved	Expected Date	Verification
M1	Language Primitives and Patterns for Self-Aware, Autonomic SCEs	WP1, WP3, WP4	12	D1.1, D3.1, D4.1
M2	Correctness Proofs for Negotiate-Commit-Execute Schemes	WP2, WP5	12	D2.1, D5.1
M3	Knowledge Modeling, Correctness, Foundational Models, and Implementation-level Aspects of SCs	WP1, WP2, WP3, WP4, WP5	24	JD2.1, JD2.2, D1.2, D1.5, D2.2, D3.2, D4.2, D5.2
M4	Workbench and Tools, Case Study Experimental Results	WP6, WP7, WP8	24	D6.2, D7.2, D8.2
M5	Engineering SCEs	WP3, WP4, WP6, WP7, WP8	36	JD3.2, D3.3, D4.3, D6.3, D7.3, D8.3
M6	Formally Founded and Verified SCEs, Security Policies, Access Control, and Performance Awareness	WP1, WP2, WP4, WP5	36	JD3.1, D1.3, D2.3, D4.3, D5.3

A5 – Project management

This section describes the consortium management tasks, problems occurring during the reporting period, and changes in the consortium during this reporting period. It contains a list of project meetings and the project planning for the next reporting period.

A5.1 – Consortium Management Tasks and Achievements

The consortium management comprised the following tasks:

- preparation of the contract and consortium agreement (finished in the first reporting period);
- financial administration of the project, including coordination and distribution of the initial advance;
- the preparation of the annual periodic progress report, the monitoring of the deliverables, and the delivery of all reports to the project officer;
- day-to-day coordination activities including the organization/timetabling of meetings and EC reviews, deadline monitoring with work package coordinators, administrative support to partners, workshops coordination, integrated problem solving across the project, and serving as contact point to the project officer;
- risk and self-evaluation management activities including monitoring scientific and technological state-of-art, monitoring the scientific progress of the project, supervision of progress reports, and evaluation of quality metrics of project results.

A5.2 – Problems During the Reporting Period

There were no major problems during the reporting period (month 25–36) and no major deviations from the work planned for this reporting period. Progress on Task T4.3 was slightly slower than planned, and therefore the work on this task is slightly delayed (less than one person-month).

A5.3 – Changes in the Consortium

There were no changes in the consortium during this reporting period.

A5.4 – List of Project Meetings

The following project-wide meetings took place during the project reporting period.

- November 26–28, 2012, Lucca, Second Review Meeting and Rehearsal
- Prague, February 11–14, 2013, General and Working Meeting
- Berlin, March 20–22, 2013, e-Mobility Working Meeting
- Munich, May 6–7, 2013, Ensembles Development Life Cycle Meeting
- Lausanne, July 3–5, 2013, General Meeting together with QUANTICOL Meeting, 2–3 July 2013

The General Meetings also included sessions of the General Assembly. Numerous smaller meetings, involving between 2 and 5 project partners and focused on specific topics were held, often in conjunction with workshops or conferences.

A5.5 – Project Planning and Status

Work in the project has mostly progressed as planned with only minor deviations from the Description of Work: (1) Progress of Task T4.3 was slightly slower than planned; (2) the number of person-months reported by two partners do not match the originally planned numbers. We do not expect any negative effects of these deviations on the progress of the work in the last reporting period or the expected project results.

During the third year, progress of UNIMORE on Task T4.3 “Engineering Emergence” was slightly slower than expected, but this remained inside the normal tolerance expected by a research effort (less than one person month of deviation). UNIMORE expects to recover from this delay over the next reporting period and reach the originally planned goals for T4.3. Other tasks do not depend on the delayed results, therefore there was no negative impact on other work of the project.

During the third year, the work planned by UDF has been carried out (almost entirely) by structured personnel. This means that the work originally expected to be done by post-PhD students, or less experienced personnel, has been performed by more experienced and productive personnel. This has required fewer person-months but at a higher cost per person-month. The progress of the project was not affected by this change.

During the third year, some of the work planned by IMT was carried out by junior researchers. This resulted in more person-months than originally foreseen for more experienced researchers, but because of the lower salary per person-month the overal expenditure remained the same as planned. The progress of the project was not affected by this change.

None of these deviations has a significant impact on the progress of the project’s work. We therefore plan to proceed with the work for the fourth reporting period as described in the Description of Work.

To increase the impact of the project and the external use of our results we plan to propose a spring school in March 2015 that presents an integrated view of the project’s research results. This dissemination effort is not possible during the project’s normal duration since relevant research results and tools will be only available by the end of the project in October 2014. In order to organize the spring school and prepare tutorials that show a specific application scenario consistently developed

using the ASCENS approach and tools, as recommended by the reviewers in Recommendation 4, we intend to apply for a cost-neutral extension of the project.

A5.6 – Impact of Deviations from the Planned Milestones and Deliverables

All Milestones were achieved and all Deliverables were provided within the required 60 days after the end of the first reporting period.

A5.7 – Website, Dissemination, Coordinating Action

The development of the project website, dissemination activities, and co-ordination activities undertaken by ASCENS are reported in Deliverable D9.3 “Progress Report on Dissemination, Collaboration and Exploitation”.

B1 – Explanation of the use of the resources

Tables detailing the use of resources for RP3 and for adjustments to RP1 and RP2 are included on the following pages. These tables are generated by the NEF system and still in draft form. Some partners could not provide all used resources before the submission date.

Use of Resources

Period 3 (25 - 36)
(01-10-2012 - 30-09-2013)

Project Number	257414	Project Acronym	ASCENS

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 1 for the period.

LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN

Work Package	Item description	Amount in €	Explanation	Free Text
WP 1 WP 6 WP 7 WP 8 WP 9	Personnel costs	65,729 €	Salaries of 1 full-time senior researcher (87,9% R&D)	
WP 1 WP 6 WP 7 WP 8 WP 9	Personnel costs	15,900 €	Salaries of 1 part-time senior researcher (72,3% R&D)	
WP 6	Personnel costs	66,412 €	Salaries of 1 full-time senior researcher	
WP 7 WP 8	Personnel costs	4,959 €	Salaries of 1 research assistant	
WP 1 WP 6 WP 7 WP 8 WP 9	Other direct cost	7,645 €	Several travels to ASCENS project meetings. Travel costs for project meetings are higher than for other partners since LMU is the coordinator and therefore more LMU personnel take part in the project meetings	x
WP 1 WP 6 WP 7 WP 8 WP 9	Other direct cost	3,017 €	Several travels to scientific workshops and conferences for the presentations of papers or for invited talks	x
WP 8	Other direct cost	2,303 €	Presentation at ICPC 2013 Conference, San Francisco, USA (P. Mayer)	x
WP 1 WP 5	Other direct cost	1,726 €	Presentation at DSN 2013 Conference, Budapest, Hungary (M. Tribastone)	x
WP 5 WP 8	Other direct cost	1,080 €	Presentation at TGC 2013 Conference, Buenos Aires, Argentia (R. Hennicker)	x
WP 1	Other direct cost	1,450 €	Presentation at ICLP 2013 Conference,	x

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 1 for the period. LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
			Istanbul, Turkey (L. Belzner)	
WP 10	Other direct cost	1,200 €	Audit Costs	
WP 10	Personnel costs	9,048 €	Salaries of 1 full-time senior researcher (12,1% management)	
WP 10	Personnel costs	6,092 €	Salaries of 1 part-time senior researcher (27,7% management)	
WP 10	Other direct cost	2,148 €	Several travels to ASCENS project meetings. Travel costs for project meetings are higher than for other partners since LMU is the coordinator and therefore more LMU personnel take part in the project meetings (travels due to management activities)	
WP 1 WP 3 WP 4 WP 5 WP 6 WP 7 WP 8 WP 9	Other direct cost	1,240 €	Several travels of associated researchers to project meetings	
	Indirect costs	0 €		
	TOTAL COSTS	189,949 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 2 for the period. UNIVERSITA DI PISA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 2 WP 1 WP 4 WP 5 WP 7 WP 9 WP 10	Other direct cost	18,585 €	Travel Dr. Monreale Giacoma (research grant "assegno di ricerca") to Bonn from 22/9/2012 to 30/9/2012 for workshop of logic programming (€773,72); travel Dr. Sammartino Matteo (research grant "assegno di ricerca") to Praga from 9/2/2013 to 14/2/2013 for meeting Ascens (€576,70); travel	

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 2 for the period. UNIVERSITA DI PISA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
			prof. Gadducci Fabio (associate professor) to Praga from 7/2/2013 to 14/2/2013 for meeting Ascens (€605,17); travel prof. Gadducci Fabio (associate professor) to Roma from 22/3/2013 to 23/3/2013 for partecipation Term Graph (€217,78); travel prof. Montanari Ugo (full professor) to Praga from 7/2/2013 to 14/2/2013 for meeting Ascens (€712,98); travel prof. Montanari Ugo (full professor) to Roma from 16/3/2013 to 24/3/2013 for 21st Meeting of IFIP WG1.3 Conference + workshop (€100,00); travel prof. Gadducci Fabio (associate professor) to Roma from 15/3/2013 to 19/3/2013 for workshop group IFIP ACCAT FOSSACS (€545,23); travel prof. Montanari Ugo (full professor) to Roma from 15/3/2013 to 17/3/2013 for working group IFIP 1,3 ACCAT FISSACS (€350,30); travel prof. Andrea Corradini (full professor) to Praga from 7/2/2013 to 14/2/2013 for general meeting ASCENS project (€671,78); travel dr. Sammartino Matteo (research grant "assegno di ricerca") to Cambridge from 30/5/2013 to 1/6/2013 for	

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 2 for the period. UNIVERSITA DI PISA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
			workshop (€421,42); travel dr. Gianluca Mezzetti to Halifax from 12/7/2013 to 24/7/2013 for CIAA2013 conference (€1.755,23); travel Dr. Sammartino Matteo (research grant "assegno di ricerca") to Losanna from 2/7/2013 to 6/7/2013 for meeting Ascens (€821,21); Travel Dr. Monreale Giacoma (research grant "assegno di ricerca") to Praga from 7/2/2013 to 14/2/2013 for meeting progetto Ascens (€637,36); travel prof. Montanari Ugo (full professor) to Cambridge from 30/5/2013 to 1/6/2013 for workshop on semantics in honor Glynn Winskell (€510,87); travel prof. Montanari Ugo (full professor) to Monaco from 6/5/2013 to 7/5/2013 for meeting ASCENS project (€452,01); travel prof. Montanari Ugo (full professor) to Losanna from 2/7/2013 to 5/7/2013 for general meeting (€792,97); travel prof. Bruni Roberto (associate professor) to Losanna from 2/7/2013 to 5/7/2013 for general meeting (€682,50); travel prof. Andrea Corradini (full professor) to Losanna from 2/7/2013 to 5/7/2013 for general meeting (€460,82); travel dr. Gianluca Mezzetti to	

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 2 for the period. UNIVERSITA DI PISA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
			Praga from 9/2/2013 to 14/2/2013 for meeting WP5 (€599,67); prof. Gadducci Fabio (associate professor) ETAPS 2013 conference (€530,00); travel prof. Roberto Bruni (associate professor) to Praga from 9/2/2013 to 14/2/2013 for general meeting (€550,75); travel prof. Fabio Gadducci (associate professor) to Monaco from 5/5/2013 to 7/5/2013 for meeting (€209,02); travel prof. Fabio Gadducci (associate professor) to Losanna from 3/7/2013 to 5/7/2013 for meeting (€512,11); travel prof. Montanari Ugo (full professor) to Buenos Aires from 17/8/2013 to 1/9/2013 for CONUR2013 conference (€2,373,16); travel prof. Fabio Gadducci (associate professor) to Monaco from 5/5/2013 to 7/5/2013 for meeting (€447,25); board accommodation and subsistence Dr. Sobocinski (€2274,43)	
WP 2 WP 1 WP 4 WP 5 WP 7 WP 9 WP 10	Personnel costs	87,698 €	Research grant "assegno di ricerca" dr. Giacoma Monreale (p. month 12) + Research grant "assegno di ricerca" dr. Matteo Sammartino (p. month 9) support research contract Dr. Tomoyuki Suzuki (p. month 4) + support research	

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 2 for the period. UNIVERSITA DI PISA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
			contract Dr.Alain Tcheukam (p. month 6) + personnel cost of Bruni (p. month 0,96), Corradini (p. month 0,96), Ferrari (p. month 0,96), Montanari (p.month 0,96) and Gadducci (p.month 0,96) for a total 35,80.	
	Indirect costs	63,769 €		
	TOTAL COSTS	170,052 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 3 for the period. UNIVERSITA DEGLI STUDI DI FIRENZE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 1 WP 7	Other direct cost	458 €	TRAVELLING: Loreti, participation to meeting in Berlin, 14-16 May 2012	
WP 1 WP 7	Other direct cost	1,607 €	TRAVELLING: Pugliese and Loreti, participation to the meeting in Limerick, 4-6 July 2012	
WP 1 WP 7	Other direct cost	444 €	TRAVELLING: Loreti, participation to the meeting in Munich, 6-7 May 2013	
WP 1 WP 3 WP 4 WP 5 WP 7	Other direct cost	39 €	TRAVELLING: Pugliese and Loreti, particpation to the 2nd review meeting in Lucca, 26-28 November 2012	
WP 1 WP 7	Other direct cost	403 €	TRAVELLING: Loreti participation to the general meeting in Prague, 9-14 February 2013	
WP 7 WP 1 WP 3	Other direct cost	1,451 €	TRAVELLING: Pugliese and Loreti, particpation to the meeting in Lausanne, 2-5 July 2013Lausanne	
WP 1 WP 2 WP 3 WP 4 WP 5 WP 7 WP 9	Personnel costs	49,559 €	Salaries of: two associate professors for 4 PM; one senior researcher for 3 PM	

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 3 for the period. UNIVERSITA DEGLI STUDI DI FIRENZE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
			and two researchers for 4.87 PM	
WP 10	Personnel costs	1,285 €	Salary of one administrative employee for 0.48 PM	
	Indirect costs	33,147 €		
	TOTAL COSTS	88,393 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -999 for the period. CONSIGLIO NAZIONALE DELLE RICERCHE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Personnel costs	6,771 €	Salaries for 1 Senior Researcher (83 person hours) and 1 Researcher (79 person hours)	WP 1
	Personnel costs	6,142 €	Salaries for 1 Senior Researcher (80 person hours) and 1 Researcher (63 person hours)	WP 2
	Other direct cost	741 €	TRAVEL COSTS: Latella, Ascens General and Working Meeting; Prague 09-14/02/2013	All WPs
	Other direct cost	293 €	TRAVEL COSTS: Latella, Ascens General Meeting; Lausanne 03-05/07/2013	All WPs
	Other direct cost	293 €	TRAVEL COSTS: Massink, Ascens General Meeting; Lausanne 03-05/07/2013	All WPs
	Indirect costs	9,026 €		
	TOTAL COSTS	23,266 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 4 for the period. FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 7	Other direct cost	682 €	Travel costs	25.-28.11.2012: ASCENS 2nd Review Meeting, Lucca, 1 person

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 4 for the period. FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 9	Other direct cost	744 €	Travel costs	14.11.2012: ASCENS presentation TU Dresden, 1 person; 30.11.-16.12.2012: Pupin Annual Conference, Belgrade, 1 person
WP 4 WP 6 WP 7 WP 8 WP 9	Personnel costs	138,338 €	Direct personnel costs	19.34 PM for 6 senior scientists
WP 9	Other direct cost	1,922 €	Travel costs	23.-30.03.2013: The Ninth International Conference on Autonomic and Autonomous, Lissabon, 1 person
WP 9	Other direct cost	1,894 €	Travel costs	26.05.-02.06.2013: The Fifth International Conference ADAPTIVE 2013, Valencia, 1 person
WP 7	Other direct cost	745 €	Travel costs	10.-14.02.2013: ASCENS meeting, Prague, 1 person; 21.-23.06.2013: Workshop Adaptive Systems, Dresden, 1 person
WP 9 WP 7	Other direct cost	3,274 €	Travel costs	25.06.-05.07.2013: Invited Talk at ISTAS 2013 und ASCENS meeting, Toronto and Lausanne, 1 person
WP 8 WP 9	Other direct cost	943 €	Travel costs	05.-07.05.2013: ASCENS meeting, Munich, 1 person; 20.-21.06.2013: COFET2020 Conference, London, 1 person
WP 9	Other direct cost	1,700 €	Travel costs	14.-23.09.2013: CANN Conference and PCI 2013 Conference, Halkidiki and Thessaloniki, 1 person
WP 7	Other direct cost	212 €	Other direct costs	Consumables
WP 7	Other direct cost	699 €	Other direct costs	Subsistence costs for

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 4 for the period. FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
				ASCENS meeting (20.-22.03.2013)
WP 10	Personnel costs	4,780 €	Direct personnel costs	0.67 PM for senior scientist
	Indirect costs	108,472 €		
	TOTAL COSTS	264,405 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 5 for the period. UNIVERSITE JOSEPH FOURIER GRENOBLE 1				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 6	Personnel costs	12,614 €	Salaries of BENSALEM Saddek for 1.19 M-M	
WP 7	Personnel costs	5,913 €	Salaries of BENSALEM Saddek for 0.56 M-M	
WP 6	Personnel costs	36,634 €	Salaries of ASTEFANOAEI LACRAMIORA for 11 M-M	
WP 5 WP 6	Other direct cost	576 €	Combaz Jacques: Ascens annual review in Lucca 25-27/11/2012	
WP 5 WP 6	Other direct cost	494 €	Combaz Jacques: Air ticket for Ascens annual review in Lucca 25-27/11/2012	
WP 5 WP 6	Other direct cost	565 €	Bensalem Saddek: Ascens annual review in Lucca 25-27/11/2012	
WP 5 WP 6	Other direct cost	494 €	Bensalem Saddek: Air ticket for Ascens annual review in Lucca 25-27/11/2012	
WP 2 WP 4 WP 5 WP 6 WP 7	Other direct cost	692 €	Combaz Jacques: General meeting in Praha 10-14/02/2013	
WP 5 WP 6 WP 7 WP 4 WP 2	Other direct cost	373 €	Combaz Jacques: Air ticket for General meeting in Praha 10-14/02/2013	
WP 5 WP 6	Other direct cost	280 €	Combaz Jacques: Ascens meeting	

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 5 for the period. UNIVERSITE JOSEPH FOURIER GRENOBLE 1				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
			in Munich 05-07/05/2013	
WP 5 WP 6	Other direct cost	428 €	Combaz Jacques: Air ticket for Ascens meeting in Munich 05-07/05/2013	
WP 5 WP 6	Other direct cost	95 €	Bensalem Saddek: Ascens meeting in Munich 05-07/05/2013	
WP 5 WP 6	Other direct cost	455 €	Bensalem Saddek: Air ticket for Ascens meeting in Munich 05-07/05/2013	
WP 5	Other direct cost	37 €	Combaz Jacques: Ascens meeting in Lausanne 03-05/07/2013	
WP 5	Other direct cost	66 €	Combaz Jacques: Airport shuttle for Ascens meeting in Lausanne 03-05/07/2013	
WP 5	Other direct cost	87 €	Combaz Jacques: Railway ticket for Ascens meeting in Lausanne 03-05/07/2013	
WP 5	Other direct cost	53 €	ASTEFANOAEI LACRAMIORA: Ascens meeting in Lausanne 02-05/07/2013	
WP 5	Other direct cost	53 €	ASTEFANOAEI LACRAMIORA: Railway ticket for Ascens meeting in Lausanne 02-05/07/2013	
WP 5	Other direct cost	43 €	ASTEFANOAEI LACRAMIORA: Airport shuttle for Ascens meeting in Lausanne 02-05/07/2013	
WP 5	Other direct cost	193 €	Bansalem Saddek: Ascens meeting in Lausanne 02-05/07/2013	
	Indirect costs	36,087 €		
	TOTAL COSTS	96,232 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -996 for the period. INSTITUT POLYTECHNIQUE DE GRENOBLE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -995 for the period. CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Personnel costs	2,369 €	Salaries of J.Combaz - permanent researcher for 0,45 PM	WP2
	Personnel costs	194 €	Salaries of J.Combaz - permanent researcher for 0,03 PM	WP4
	Personnel costs	3,170 €	Salaries of J.Combaz - permanent researcher for 0,61 PM	WP5
	Personnel costs	194 €	Salaries of J.Combaz - permanent researcher for 0,03 PM	WP6
	Personnel costs	3,170 €	Salaries of J.Combaz - permanent researcher for 0,61 PM	WP7
	Indirect costs	5,458 €		
	TOTAL COSTS	14,555 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 6 for the period. UNIVERSITA DEGLI STUDI DI MODENA E REGGIO EMILIA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 7 WP 4 WP 3	Personnel costs	10,993 €	Victor Noel	Costs for 49 hours in WP4, 350 hours in WP4, 98 hours in WP7
WP 3	Personnel costs	28,904 €	Nicola Bicocchi	Costs for 913 hours in WP3
WP 4 WP 3	Other direct cost	548 €	Mission to Lausanne, V Noel, July 2013	Participation to ASCENS Meeting by V Noel

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 6 for the period. UNIVERSITA DEGLI STUDI DI MODENA E REGGIO EMILIA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 4 WP 9	Other direct cost	789 €	Mission to Hammamet, NC Puviani, June 2013	Participation to WETICE Conference by MC Puviani
WP 4 WP 7	Other direct cost	636 €	Mission to Lausanne, MC Puviani, July 2013	Participation to ASCENS Meeting by MC Puviani
WP 4	Other direct cost	480 €	Registration to WETICE 2012 Conference	Registration to WETICE Conference by MC Puviani
WP 4 WP 10	Other direct cost	615 €	Mission to Campora San Giovanni, MP Puviani, September 2012	Participation to IDC 2012 Conference
WP 3 WP 4	Other direct cost	962 €	Mission to Limerick, N Bicocchi, July 2012	Participation to ASCENS Meeting e visit to Univ. Limerick Partner
WP 1 WP 3 WP 4 WP 7	Other direct cost	490 €	Mission to Prague, F Zambonelli, February 2013	Participation to ASCENS Meeting
WP 1 WP 4 WP 7	Other direct cost	220 €	Mission to Lucca, F Zambonelli, November 2012	Participation to ASCENS Review
WP 4 WP 3 WP 1	Other direct cost	709 €	Mission to Munich, F Zambonelli, May 2013	Participation to ASCENS Meeting for the Ensemble Development Lifecycle
WP 7 WP 4	Other direct cost	648 €	Mission to Bruxelles, MP Puviani, February 2013	Visit to ULB Partner
WP 3	Other direct cost	875 €	Mission to Prague, N Bicocchi, February 2013	Participation to ASCENS Meeting
WP 1 WP 3 WP 4 WP 7	Other direct cost	438 €	Mission to Lausanne, F Zambonelli, July 2013	Participation to ASCENS Meeting
WP 9	Other direct cost	814 €	Mission to Wroclaw, F Zambonelli, September 2013	Participation to Academia Europaea Meeting
WP 3 WP 9	Other direct cost	799 €	Mission to Budapest, N Bicocchi, June 2013	Participation to ICC Workshop on Collective Awareness Platforms
WP 4 WP 7	Other direct cost	238 €	Mission to Lyon, D Abeywickrama, September 2012	Participation to SASO Conference and Workshops
	Personnel costs	12,509 €	Franco Zambonelli	

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 6 for the period. UNIVERSITA DEGLI STUDI DI MODENA E REGGIO EMILIA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 1 WP 2 WP 3 WP 4 WP 7 WP 9				Costs for 36 hours in WP1, 32 hours in WP2, 49 hours in WP3, 94 hours in WP4, 11 hours in WP5, 24 hours in WP7, 8 hours in WP9
WP 3 WP 4	Personnel costs	513 €	Marco Mamei	Costs for 8 hours in WP3, 8 hours in WP4
WP 2 WP 4	Personnel costs	6,686 €	Giacomo Cabri	Costs for 2 hours in WP2, 149 hours in WP4
WP 4	Personnel costs	54,334 €	Mariachiara Puviani	Costs for 1555 hours in WP4
WP 4 WP 7	Personnel costs	21,986 €	Dhaminda Abeywickrama	Costs for 868 hours in WP4, 276 hours in WP7
WP 7	Other direct cost	460 €	Registration to WETICE 2012 Conference	Registration to WETICE Conference by D Abeywickrama
	Other direct cost	450 €	Registration to IDC 2012 Conference	Registration to IDC Conference by MP Puviani
WP 3	Other direct cost	190 €	Registration to ICC 2013 Workshop	Registration to ICC Workshop by N Bicocchi
WP 4 WP 9	Other direct cost	375 €	Registration to SASO 2012 Conference	Registration to SASO Conference by D Abeywickrama
WP 4 WP 1 WP 3	Other direct cost	90 €	Registration to Limerick Meeting, N Bicocchi, July 2012	Registration to Limerick Meeting by N Bicocchi
WP 7 WP 4	Other direct cost	280 €	Mission to Lucca, D Abeywickrama, November 2012	Participation to ASCENS Review
WP 7	Other direct cost	361 €	Mission to Berlin, D Abeywickrama	Participation to ASCENS Case Study Metting
WP 9 WP 7 WP 4	Other direct cost	380 €	Mission to Beograd, D Abeywickrama	Participation to ECBS Conference
	Indirect costs	88,374 €		
	TOTAL COSTS	236,146 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 8 for the period. UNIVERSITE LIBRE DE BRUXELLES				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 8 for the period. UNIVERSITE LIBRE DE BRUXELLES				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 10	Other direct cost	790 €	Travelling	Travel expenses, Project meeting in Lucca, Nov. 25-29, 2012, participants M. Brambilla & C. Pinciroli
WP 10	Other direct cost	544 €	Travelling	Travel expenses, Project meeting in Prague, Feb. 11-14, 2013, participant C. Pinciroli
WP 10	Other direct cost	756 €	Travelling	Travel expenses, Project meeting in Munich, May 05-07, 2013, participant C. Pinciroli
WP 10	Other direct cost	600 €	Travelling	Travel expenses, Project meeting in Lausanne, July 2-6, 2013, participant C. Pinciroli
WP 7	Other direct cost	214 €	Consumables	Material for arena and robot experiments
WP 7	Other direct cost	15,273 €	Equipment	Robot extension modules
WP 6	Personnel costs	19,882 €	Staff costs	Researcher C. Pinciroli, 4 PM
WP 7	Personnel costs	9,975 €	Staff costs	Researcher C. Pinciroli, 2 PM
WP 8	Personnel costs	24,903 €	Staff costs	Researcher C. Pinciroli, 5 PM
WP 9	Personnel costs	4,953 €	Staff costs	Researcher C. Pinciroli, 1 PM
WP 9 WP 10	Personnel costs	13,445 €	Staff costs	Principal investigator M. Dorigo, 1 PM
	Indirect costs	54,801 €		
	TOTAL COSTS	146,136 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 9 for the period. ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 6 WP 7 WP 9	Other direct cost	1,850 €	Travels and consumable	
	Indirect costs	1,110 €		
	TOTAL COSTS	2,960 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 10 for the period. VOLKSWAGEN AG				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 11 for the period. ZIMORY GMBH				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 12 for the period. UNIVERSITY OF LIMERICK				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 13 for the period. SCUOLA IMT (INSTITUZIONI, MERCANTI,TECNOLOGIE) ALTI STUDI DI LUCCA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 1 WP 2 WP 4 WP 7 WP 9	Personnel costs	51,068 €	Personnel costs RTD (1 senior researcher, 3 assistant professors, 1 PhD student/research collaborator, 1 research collaborator) (15,10 PMs)	
WP 1 WP 2 WP 4 WP 7 WP 9	Other direct cost	5,196 €	Travel costs (1 person - Firenze, 3 persons - Prague, 2 persons - Bibbiena, 2 persons - Munich, 4 persons – Lausanne)	
WP 10	Personnel costs	2,862 €	Personnel costs MGT (1 senior researcher, 1 assistant professor) (0,46 PMs)	
WP 10	Other direct cost	966 €	Other direct costs (lunch and coffee breaks review meeting)	
	Indirect costs	36,054 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 13 for the period. SCUOLA IMT (INSTITUZIONI, MERCANTI,TECNOLOGIE) ALTI STUDI DI LUCCA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	TOTAL COSTS	96,146 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 14 for the period. ASSOCIATION MOBSYA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 7 WP 6 WP 9	Personnel costs	83,342 €	Salary of Dr. Bonani	
WP 7	Other direct cost	2,067 €	Prototypes of robot gripper	
WP 7 WP 6 WP 9	Other direct cost	742 €	Travels to project meetings	
	Indirect costs	51,690 €		
	TOTAL COSTS	137,841 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 15 for the period. UNIVERZITA KARLOVA V PRAZE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 1	Personnel costs	10,063 €	Part time salaries	1 sr. 1 jr. researchers
WP 4	Personnel costs	21,834 €	Part time salaries	1 sr. 4 jr. researchers
WP 5	Personnel costs	9,132 €	Part time salaries	1 sr. researcher
WP 6	Personnel costs	23,319 €	Part time salaries	3 sr. 3 jr. researchers
WP 7	Personnel costs	12,702 €	Part time salaries	1 sr. 2 jr. researchers
WP 8	Personnel costs	9,475 €	Part time salaries	1 sr. 3 jr. researchers
WP 9	Personnel costs	1,340 €	Part time salaries	3 sr. researchers
WP 7 WP 6 WP 8	Other direct cost	371 €	Bilateral Meeting Berlin Sep 18 2012	The costs have been accounted in November 2012 and December 2012, in line with national accounting rules, and therefore are reported as incurred only in this reporting period. (Guide to Financial Issues, Article II.14.1)
WP 1 WP 4 WP 5 WP 6 WP 7 WP 8 WP 9	Other direct cost	2,141 €	Review Meeting Lucca Nov 26-28 2012	
WP 1 WP 6 WP 7 WP 8	Other direct cost	1,211 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 15 for the period. UNIVERZITA KARLOVA V PRAZE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
			Bilateral Meeting Lucca Mar 11-13 2013	
WP 6 WP 7 WP 8	Other direct cost	718 €	Working Meeting Berlin Mar 20-22 2013	
WP 6 WP 7 WP 8	Other direct cost	532 €	Working Meeting Munich May 6-7 2013	
WP 1 WP 4 WP 5 WP 6 WP 7 WP 8 WP 9	Other direct cost	1,494 €	General Meeting Lausanne Jul 3-5 2013	
WP 9	Other direct cost	546 €	Dissemination COMPSAC Jul 16-20 2012	The costs have been accounted in November 2012, in line with national accounting rules, and therefore are reported as incurred only in this reporting period. (Guide to Financial Issues, Article II.14.1)
WP 9	Other direct cost	399 €	Dissemination ETAPS Mar 16-24 2013	
WP 9	Other direct cost	86 €	Dissemination ICPE Apr 21-24 2013	
WP 1 WP 4 WP 5 WP 6 WP 7 WP 8 WP 9	Subcontracting	1,675 €	Project meeting Feb 11-14 2013	Subcontracting for minor tasks (Guide to Financial Issues, Article II.7.3)
WP 6 WP 8 WP 7	Other direct cost	90 €	Bilateral Meeting Berlin Jun 18-20 2012	The costs have been accounted in November 2012, in line with national accounting rules, and therefore are reported as incurred only in this reporting period. (Guide to Financial Issues, Article II.14.1)
WP 10	Personnel costs	1,340 €	Part time salaries	3 sr. researchers
WP 10	Subcontracting	62 €	Project materials courier shipment	
	Indirect costs	58,075 €		
	TOTAL COSTS	156,605 €		

Use of Resources

Period 2 (13 - 24)
(01-10-2011 - 30-09-2012)

Project Number	257414	Project Acronym	ASCENS

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 1 for the period.

LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN

Work Package	Item description	Amount in €	Explanation	Free Text
WP 7 WP 8 WP 9 WP 6 WP 1	Other direct cost	929 €	Several travels to scientific workshops and conferences for the presentations of papers or for invited talks	
WP 1 WP 3 WP 4 WP 5 WP 6 WP 7 WP 8 WP 9	Other direct cost	777 €	Travel of associated researcher (Schmidt) to project meeting in Limerick	
	Indirect costs	0 €		
	TOTAL COSTS	1,706 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 2 for the period.

UNIVERSITA DI PISA

Work Package	Item description	Amount in €	Explanation	Free Text
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 3 for the period.

UNIVERSITA DEGLI STUDI DI FIRENZE

Work Package	Item description	Amount in €	Explanation	Free Text
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -999 for the period.

CONSIGLIO NAZIONALE DELLE RICERCHE

Work Package	Item description	Amount in €	Explanation	Free Text
	Personnel costs	38 €	Revised calculation of personnel costs according to CNR Central Administration	The main reason for the adjustments are summarized below: (1) On Nov. 14, 2012 CNR Central Administration circulated a new value for the overhead percentage to be used in the calculation of

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -999 for the period. CONSIGLIO NAZIONALE DELLE RICERCHE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
				Indirect Costs, the overhead on Personnel costs (Circolare CNR n 32/2012 Prot. 69350 del 14/11/2012). The new value is 69.9%, while the old one was 67.4%. The new value is to be used for cost statements relative to 2011 and subsequent years (until a new value will be decided) (2) Furthermore, a more accurate calculation of Personnel Costs has been performed on the basis of a more accurate computation of the (personnel) cost per hour.
	Indirect costs	333 €		
	TOTAL COSTS	371 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 4 for the period. FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 4 WP 6 WP 7 WP 9	Personnel costs	3,320 €	Direct personnel costs	Differences in personnel costs due to post-calculation.
WP 7	Other direct cost	637 €	Other direct costs	Subsistence costs for ASCENS Project meeting (14.05.2012)
WP 10	Personnel costs	192 €	Direct personnel costs	Differences in personnel costs due to post-calculation.
	Indirect costs	-473 €		
	TOTAL COSTS	3,676 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 5 for the period. UNIVERSITE JOSEPH FOURIER GRENOBLE 1				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -996 for the period. INSTITUT POLYTECHNIQUE DE GRENOBLE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -995 for the period. CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 6 for the period. UNIVERSITA DEGLI STUDI DI MODENA E REGGIO EMILIA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 8 for the period. UNIVERSITE LIBRE DE BRUXELLES				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 10	Other direct cost	1,786 €	Other	Organisation costs (dinner and coffee breaks) at General Assembly Meeting in Brussels, December 5, 2011, 22 participants
	Indirect costs	1,071 €		
TOTAL COSTS		2,857 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 9 for the period. ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 10 for the period. VOLKSWAGEN AG				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 11 for the period. ZIMORY GMBH				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 12 for the period. UNIVERSITY OF LIMERICK				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 13 for the period. SCUOLA IMT (INSTITUZIONI, MERCANTI,TECNOLOGIE) ALTI STUDI DI LUCCA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
WP 1 WP 2 WP 4 WP 7 WP 9	Other direct cost	-161 €	recalculation of several mission costs (deduction of VAT, cancellation of one mission)	
	Indirect costs	-96 €		
	TOTAL COSTS	-257 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 14 for the period. ASSOCIATION MOBSYA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 15 for the period. UNIVERZITA KARLOVA V PRAZE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Use of Resources

Period 1 (1 - 12)
(01-10-2010 - 30-09-2011)

Project Number	257414	Project Acronym	ASCENS

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 1 for the period.
LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN

Work Package	Item description	Amount in €	Explanation	Free Text
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 2 for the period.
UNIVERSITA DI PISA

Work Package	Item description	Amount in €	Explanation	Free Text
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 3 for the period.
UNIVERSITA DEGLI STUDI DI FIRENZE

Work Package	Item description	Amount in €	Explanation	Free Text
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -999 for the period.
CONSIGLIO NAZIONALE DELLE RICERCHE

Work Package	Item description	Amount in €	Explanation	Free Text
	Other direct cost	1 €	Correction of rounding error	
	Other direct cost	0 €	-	
	Other direct cost	0 €	-	
	Personnel costs	4,250 €	Revised calculation of personnel costs according to CNR Central Administration	The main reasons for the adjustments are summarized below: (1) On Nov. 14, 2012 CNR Central Administration circulated a new value for the overhead percentage to be used in the calculation of Indirect Costs, the overhead on Personnel costs (Circolare CNR n

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -999 for the period. CONSIGLIO NAZIONALE DELLE RICERCHE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
				32/2012 Prot. 69350 del 14/11/2012). The new value is 69.9%, while the old one was 67.4%. The new value is to be used for cost statements relative to 2011 and subsequent years (until a new value will be decided) (2) Furthermore, a more accurate calculation of Personnel Costs has been performed on the basis of clarifications, from CNR Central Administration concerning costs for "T.F.R." and "oneri CNR" which had not been included in the cost calculation whereas they have to be included, and on the basis of a more accurate computation of the (personnel) cost per hour.
	Indirect costs	3,196 €		
	TOTAL COSTS	7,447 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 4 for the period. FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 5 for the period. UNIVERSITE JOSEPH FOURIER GRENOBLE 1				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -996 for the period. INSTITUT POLYTECHNIQUE DE GRENOBLE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -996 for the period. INSTITUT POLYTECHNIQUE DE GRENOBLE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary -995 for the period. CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 6 for the period. UNIVERSITA DEGLI STUDI DI MODENA E REGGIO EMILIA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 8 for the period. UNIVERSITE LIBRE DE BRUXELLES				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 9 for the period. ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 10 for the period. VOLKSWAGEN AG				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 11 for the period. ZIMORY GMBH				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
TOTAL COSTS		0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 12 for the period. UNIVERSITY OF LIMERICK				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 13 for the period. SCUOLA IMT (INSTITUZIONI, MERCANTI,TECNOLOGIE) ALTI STUDI DI LUCCA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 14 for the period. ASSOCIATION MOBSYA				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

Table 3.1 Personnel, subcontracting and other Major cost items for beneficiary 15 for the period. UNIVERZITA KARLOVA V PRAZE				
Work Package	**Item description**	**Amount in €**	**Explanation**	**Free Text**
	Indirect costs	0 €		
	TOTAL COSTS	0 €		

B2 – Financial Statements

The financial overview and Form Cs are included on the following pages. These tables are generated by the NEF system and still in draft form. Some partners could not provide all financial data before the submission date.

FP7 - Grant Agreement - Annex VI - Collaborative project

Summary Financial report - Collaborative project

Project acronym	ASCENS	Project nr	257414	Reporting period from	01/10/2012	to	30/09/2013	Page	1/1

Funding scheme	CP

				Type of activity								Total				
				RTD (A)		Demonstration (B)		Management (C)		Other (D)		Total (A+B+C+D)				
Benef. nr	If 3rd Party, linked to benef.	Adjustment (Yes/No)	Organisation Short Name	Total	Max EC Contrib.	Total	Max EC Contrib.	Total	Max EC Contrib.	Total	Max EC Contrib.	Total	Max EC Contrib.	Req. EC Contrib.	Receipts	Interest
1		No	LMU MUENCH	170,221	127,665	0	0	18,488	18,488	1,240	1,240	189,949	147,393	147,393	0	0
1		Yes (2)	LMU MUENCH	-	-	-	-	-	-	-	-	-	-	-	-	-
2		No	UNIPI	170,052	127,539	0	0	0	0	0	0	170,052	127,539	127,539	0	
3		No	UDF	86,337	64,752	0	0	2,056	2,056	0	0	88,393	66,808	66,808	0	
-999	3	No	ISTI	23,266	17,449	0	0	0	0	0	0	23,266	17,449	17,449	0	
-999	3	Yes (1)	ISTI	7,447	5,585	0	0	0	0	0	0	7,447	5,585	5,585	0	
-999	3	Yes (2)	ISTI	371	278	0	0	0	0	0	0	371	278	278	0	
4		No	Fraunhofer	255,991	191,993	0	0	8,414	8,414	0	0	264,405	200,407	200,407	0	
4		Yes (2)	Fraunhofer	3,510	2,632	0	0	166	166	0	0	3,676	2,798	2,798	0	
5		No	UJF-VERIMA	-	-	-	-	-	-	-	-	-	-	-	-	
-996	5	No	INPG	0	0	0	0	0	0	0	0	0	0	0	0	
-995	5	No	CNRS	14,555	10,916	0	0	0	0	0	0	14,555	10,916	10,916	0	
6		No	UNIMORE	-	-	-	-	-	-	-	-	-	-	-	-	
8		No	ULB	146,136	109,602	0	0	0	0	0	0	146,136	109,602	109,602	0	
8		Yes (2)	ULB	2,857	2,142	0	0	0	0	0	0	2,857	2,142	2,142	1,931	
9		No	EPFL	2,960	2,220	0	0	0	0	0	0	2,960	2,220	2,220	0	
10		No	VW	-	-	-	-	-	-	-	-	-	-	-	-	
11		No	ZIMORY	-	-	-	-	-	-	-	-	-	-	-	-	
12		No	UL	-	-	-	-	-	-	-	-	-	-	-	-	
13		No	IMT	-	-	-	-	-	-	-	-	-	-	-	-	
13		Yes (2)	IMT	-	-	-	-	-	-	-	-	-	-	-	-	
14		No	Mobsya	137,841	103,380	0	0	0	0	0	0	137,841	103,380	103,380	0	
15		No	CUNI	154,399	115,799	0	0	2,206	2,206	0	0	156,605	118,005	118,005	44,684	
Total				1,175,943	881,952	0	0	31,330	31,330	1,240	1,240	1,208,513	914,522	914,522	46,615	

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN	Participant Identity Code	999978433
Organisation Short Name	LMU MUENCHEN	Beneficiary nr	1

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	153,000	0	15,140	0	168,140
Subcontracting	0	0	0	0	0
Other direct costs	17,221	0	3,348	1,240	21,809
Indirect costs	0	0	0	0	0
Total costs	170,221	0	18,488	1,240	189,949
Maximum EU contribution	127,665	0	18,488	1,240	147,393
Requested EU contribution					147,393

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art.II.19 ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Willibald Seitz
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	Yes
To	30/09/2013	Adjustment relates to Period :	2

Legal Name	LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN	Participant Identity Code	999978433
Organisation Short Name	LMU MUENCHEN	Beneficiary nr	1

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	-	-	-	-	-
Subcontracting	-	-	-	-	-
Other direct costs	-	-	-	-	-
Indirect costs	-	-	-	-	-
Total costs	-	-	-	-	-
Maximum EU contribution	-	-	-	-	-
Requested EU contribution					

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art.II.19 ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Willibald Seitz
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	UNIVERSITA DI PISA	Participant Identity Code	999862712
Organisation Short Name	UNIPI	Beneficiary nr	2

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	87,698	0	0	0	87,698
Subcontracting	0	0	0	0	0
Other direct costs	18,585	0	0	0	18,585
Indirect costs	63,769	0	0	0	63,769
Total costs	170,052	0	0	0	170,052
Maximum EU contribution	127,539	0	0	0	127,539
Requested EU contribution					127,539

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Prof. Franco Turini
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	UNIVERSITA DEGLI STUDI DI FIRENZE	Participant Identity Code	999895789
Organisation Short Name	UDF	Beneficiary nr	3

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	49,559	0	1,285	0	50,844
Subcontracting	0	0	0	0	0
Other direct costs	4,402	0	0	0	4,402
Indirect costs	32,376	0	771	0	33,147
Total costs	86,337	0	2,056	0	88,393
Maximum EU contribution	64,752	0	2,056	0	66,808
Requested EU contribution					66,808

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Lucia Buzzigoli
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by Third Party) Only applicable if special clause nr 10 is used

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

3rd party legal Name	CONSIGLIO NAZIONALE DELLE RICERCHE		
3rd party Organisation Short Name	ISTI	Working for beneficiary nr	3

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	N/A

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	12,913	0	0	0	12,913
Subcontracting	0	0	0	0	0
Other direct costs	1,327	0	0	0	1,327
Indirect costs	9,026	0	0	0	9,026
Total costs	23,266	0	0	0	23,266
Maximum EU contribution	17,449	0	0	0	17,449
Requested EU contribution					17,449

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Claudio Montani
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by Third Party) Only applicable if special clause nr 10 is used

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	Yes
To	30/09/2013	Adjustment relates to Period :	1

3rd party legal Name	CONSIGLIO NAZIONALE DELLE RICERCHE		
3rd party Organisation Short Name	ISTI	Working for beneficiary nr	3

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	N/A

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	4,250	0	0	0	4,250
Subcontracting	0	0	0	0	0
Other direct costs	1	0	0	0	1
Indirect costs	3,196	0	0	0	3,196
Total costs	7,447	0	0	0	7,447
Maximum EU contribution	5,585	0	0	0	5,585
Requested EU contribution					5,585

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Claudio Montani
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by Third Party) Only applicable if special clause nr 10 is used

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	Yes
To	30/09/2013	Adjustment relates to Period :	2

3rd party legal Name	CONSIGLIO NAZIONALE DELLE RICERCHE		
3rd party Organisation Short Name	ISTI	Working for beneficiary nr	3

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	N/A

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	38	0	0	0	38
Subcontracting	0	0	0	0	0
Other direct costs	0	0	0	0	0
Indirect costs	333	0	0	0	333
Total costs	371	0	0	0	371
Maximum EU contribution	278	0	0	0	278
Requested EU contribution					278

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Claudio Montani
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V	Participant Identity Code	999984059
Organisation Short Name	Fraunhofer	Beneficiary nr	4

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	N/A

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	138,338	0	4,780	0	143,118
Subcontracting	0	0	0	0	0
Other direct costs	12,815	0	0	0	12,815
Indirect costs	104,838	0	3,634	0	108,472
Total costs	255,991	0	8,414	0	264,405
Maximum EU contribution	191,993	0	8,414	0	200,407
Requested EU contribution					200,407

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	Yes
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	Yes

Name of the auditor	Deloitte & Touche GmbH	Cost of the certificate (in €), if charged under this project	0

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Hannah Wolff
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	Yes
To	30/09/2013	Adjustment relates to Period :	2

Legal Name	FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V	Participant Identity Code	999984059
Organisation Short Name	Fraunhofer	Beneficiary nr	4

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	N/A

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	3,320	0	192	0	3,512
Subcontracting	0	0	0	0	0
Other direct costs	637	0	0	0	637
Indirect costs	-447	0	-26	0	-473
Total costs	3,510	0	166	0	3,676
Maximum EU contribution	2,632	0	166	0	2,798
Requested EU contribution					2,798

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	Yes
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	Yes

Name of the auditor	Deloitte & Touche GmbH	Cost of the certificate (in €), if charged under this project	0

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Hannah Wolff
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	UNIVERSITE JOSEPH FOURIER GRENOBLE 1	Participant Identity Code	999907429
Organisation Short Name	UJF-VERIMAG	Beneficiary nr	5

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	-	-	-	-	-
Subcontracting	-	-	-	-	-
Other direct costs	-	-	-	-	-
Indirect costs	-	-	-	-	-
Total costs	-	-	-	-	-
Maximum EU contribution	-	-	-	-	-
Requested EU contribution					-

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	ISABELLE ALLEGRET
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by Third Party) Only applicable if special clause nr 10 is used

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

3rd party legal Name	INSTITUT POLYTECHNIQUE DE GRENOBLE		
3rd party Organisation Short Name	INPG	Working for beneficiary nr	5

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	0	0	0	0	0
Subcontracting	0	0	0	0	0
Other direct costs	0	0	0	0	0
Indirect costs	0	0	0	0	0
Total costs	0	0	0	0	0
Maximum EU contribution	0	0	0	0	0
Requested EU contribution					

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Xavier FAUVEAU
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by Third Party) Only applicable if special clause nr 10 is used

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

3rd party legal Name	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE		
3rd party Organisation Short Name	CNRS	Working for beneficiary nr	5

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	9,097	0	0	0	9,097
Subcontracting	0	0	0	0	0
Other direct costs	0	0	0	0	0
Indirect costs	5,458	0	0	0	5,458
Total costs	14,555	0	0	0	14,555
Maximum EU contribution	10,916	0	0	0	10,916
Requested EU contribution					10,916

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Jérôme VITRE
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	UNIVERSITA DEGLI STUDI DI MODENA E REGGIO EMILIA	Participant Identity Code	999840887
Organisation Short Name	UNIMORE	Beneficiary nr	6

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	-	-	-	-	-
Subcontracting	-	-	-	-	-
Other direct costs	-	-	-	-	-
Indirect costs	-	-	-	-	-
Total costs	-	-	-	-	-
Maximum EU contribution	-	-	-	-	-
Requested EU contribution					-

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			Yes
Name of the auditor	Studio Cippitani	Cost of the certificate (in €)	0

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Eugenio Dragoni
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	UNIVERSITE LIBRE DE BRUXELLES	Participant Identity Code	999986290
Organisation Short Name	ULB	Beneficiary nr	8

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	73,158	0	0	0	73,158
Subcontracting	0	0	0	0	0
Other direct costs	18,177	0	0	0	18,177
Indirect costs	54,801	0	0	0	54,801
Total costs	146,136	0	0	0	146,136
Maximum EU contribution	109,602	0	0	0	109,602
Requested EU contribution					109,602

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Patrick Goblet
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	Yes
To	30/09/2013	Adjustment relates to Period :	2

Legal Name	UNIVERSITE LIBRE DE BRUXELLES	Participant Identity Code	999986290
Organisation Short Name	ULB	Beneficiary nr	8

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	0	0	0	0	0
Subcontracting	0	0	0	0	0
Other direct costs	1,786	0	0	0	1,786
Indirect costs	1,071	0	0	0	1,071
Total costs	2,857	0	0	0	2,857
Maximum EU contribution	2,142	0	0	0	2,142
Requested EU contribution					2,142

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	Yes
If yes, please mention the amount (in €)	1,931

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Patrick Goblet
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE	Participant Identity Code	999973971
Organisation Short Name	EPFL	Beneficiary nr	9

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	0	0	0	0	0
Subcontracting	0	0	0	0	0
Other direct costs	1,850	0	0	0	1,850
Indirect costs	1,110	0	0	0	1,110
Total costs	2,960	0	0	0	2,960
Maximum EU contribution	2,220	0	0	0	2,220
Requested EU contribution					2,220

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Prof. Benoît Deveaud-Plédran and Prof. Hannes Bleuler
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	VOLKSWAGEN AG	Participant Identity Code	999939924
Organisation Short Name	VW	Beneficiary nr	10

Funding % for RTD activities (A)	50.0	If flat rate for indirect costs, specify %	N/A

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	-	-	-	-	-
Subcontracting	-	-	-	-	-
Other direct costs	-	-	-	-	-
Indirect costs	-	-	-	-	-
Total costs	-	-	-	-	-
Maximum EU contribution	-	-	-	-	-
Requested EU contribution					

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	ZIMORY GMBH	Participant Identity Code	990797965
Organisation Short Name	ZIMORY	Beneficiary nr	11

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	-	-	-	-	-
Subcontracting	-	-	-	-	-
Other direct costs	-	-	-	-	-
Indirect costs	-	-	-	-	-
Total costs	-	-	-	-	-
Maximum EU contribution	-	-	-	-	-
Requested EU contribution					

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	UNIVERSITY OF LIMERICK	Participant Identity Code	999809071
Organisation Short Name	UL	Beneficiary nr	12

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	-	-	-	-	-
Subcontracting	-	-	-	-	-
Other direct costs	-	-	-	-	-
Indirect costs	-	-	-	-	-
Total costs	-	-	-	-	-
Maximum EU contribution	-	-	-	-	-
Requested EU contribution					

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	SCUOLA IMT (INSTITUZIONI, MERCANTI,TECNOLOGIE) ALTI STUDI DI LUCCA	Participant Identity Code	965146412
Organisation Short Name	IMT	Beneficiary nr	13

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	-	-	-	-	-
Subcontracting	-	-	-	-	-
Other direct costs	-	-	-	-	-
Indirect costs	-	-	-	-	-
Total costs	-	-	-	-	-
Maximum EU contribution	-	-	-	-	-
Requested EU contribution					-

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Alberto Bemporad
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	Yes
To	30/09/2013	Adjustment relates to Period :	2

Legal Name	SCUOLA IMT (INSTITUZIONI, MERCANTI,TECNOLOGIE) ALTI STUDI DI LUCCA	Participant Identity Code	965146412
Organisation Short Name	IMT	Beneficiary nr	13

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	-	-	-	-	-
Subcontracting	-	-	-	-	-
Other direct costs	-	-	-	-	-
Indirect costs	-	-	-	-	-
Total costs	-	-	-	-	-
Maximum EU contribution	-	-	-	-	-
Requested EU contribution					-

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Alberto Bemporad
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	ASSOCIATION MOBSYA	Participant Identity Code	974500413
Organisation Short Name	Mobsya	Beneficiary nr	14

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	83,342	0	0	0	83,342
Subcontracting	0	0	0	0	0
Other direct costs	2,809	0	0	0	2,809
Indirect costs	51,690	0	0	0	51,690
Total costs	137,841	0	0	0	137,841
Maximum EU contribution	103,380	0	0	0	103,380
Requested EU contribution					103,380

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	No
If yes, please mention the amount (in €)	

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?			No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?			No
Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Mariza Freire and Francesco Mondada
	Date & signature

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)

Project Number	257414	Funding scheme	Collaborative project
Project Acronym	ASCENS		

Period from	01/10/2012	Is this an adjustment to a previous statement ?	No
To	30/09/2013		

Legal Name	UNIVERZITA KARLOVA V PRAZE	Participant Identity Code	999923434
Organisation Short Name	CUNI	Beneficiary nr	15

Funding % for RTD activities (A)	75.0	If flat rate for indirect costs, specify %	60

1. Declaration of eligible costs/lump sum/flate-rate/scale of unit (in €)

	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	87,865	0	1,340	0	89,205
Subcontracting	1,675	0	62	0	1,737
Other direct costs	7,588	0	0	0	7,588
Indirect costs	57,271	0	804	0	58,075
Total costs	154,399	0	2,206	0	156,605
Maximum EU contribution	115,799	0	2,206	0	118,005
Requested EU contribution					118,005

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II. 17 of the grant agreement ?	Yes
If yes, please mention the amount (in €)	44,684

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1 ?	No
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €), if charged under this project	

. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4 ?	No

Name of the auditor		Cost of the certificate (in €)	

6. Beneficiary's declaration on its honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligble costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and Article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls whithin the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Finanancial Statement
	Prof. RNDr. Jan Kratochvil, CSc.
	Date & signature

Appendix – Recommendations from previous periods

The following recommendations concerning the whole project were given at the end of the first reporting period and answered at the end of the second period in D10.2.

- *"Recommendation 2: In future deliverables make clear the cross influence. For instance, by adding a subsection in each deliverable where the influence from and to other deliverables is clearly explained."*

  Answer: Each deliverable for this reporting period contains a section detailing the relationship of the work described in the deliverable to other work packages. Furthermore, cross references explaining the influence from and to other deliverables are included in the text of the deliverables.

- *"Recommendation 6: The consortium should focus on the integration of the work done in different work packages. In particular, it would be important to have a common understanding of the notion of ensemble."*

  Answer: We have made significant progress with the integration of the research performed in the first reporting period. This is reflected in two Joint Deliverables that are due in this reporting period, and in the increasing number of joint publications (38% of publications are joint publications). We have refined the notion of ensemble in SCEL and are using the same notion in POEM; furthermore the SCEL notion of ensemble is compatible with KnowLang and GEM models[1].

- *"Recommendation 7: In future deliverables use one of the case study scenarios to illustrate the introduced concepts. For instance, to illustrate the basic concepts of SCEL in WP1."*

  Answer: We have used the case study scenarios in many of the publications of the project and in all deliverables for the second reporting period. We will continue to use them for publications and deliverables in the next reporting periods.

- *"Recommendation 8: The actual value of new primitives lies in the convenience of the programmer (measured by productivity metrics) and the ease of maintainability of such programmes. This kind of requirements should be considered in ASCENS."*

  Answer: We agree that convenience for the programmer and ease of maintainability of programs are important features of new primitives. These aspects are being considered during the development of the ASCENS languages. To assess the productivity and ease of maintainability of our primitives and languages in practice, we are using them—wherever it is sensible to do so—to develop software for the project. For example, the compiler and standard library of our POEM implementation are implemented in (the executable subset of) POEM itself.

- *"Recommendation 9: The analysis methods play an important role from a scientific perspective, but also for the later transfer into industry. We encourage the consortium to prepare a plan so that the language SCEL makes its way into industrial practice."*

  Answer: Since ASCENS is a FET project, the main focus is on foundational research on ensemble engineering. Transferring these ideas into industrial practice is a process that takes a

[1] Since GEM (and SOTA) are based on a purely relational framework, GEM models need not answer the question which parts of the state space belong to the ensemble and which parts belong to the environment, or which sub-ensembles exist at any point of time. If desired, however, the SCEL concept of ensemble can be included explicitly in the state space of GEM models.

long time and significant resources and can therefore not be accomplished within the scope of ASCENS. However, in the second year we have made significant progress with the implementation of the SCEL, Dy-BIP and POEM languages and with tools for analysis. We will continue to improve these implementations and try to make them usable for developers who are not intimately familiar with the implementation, which is an important first step for possible adaption in industrial practice. Furthermore, many of our tools are integrated into the Eclipse-based SDE and we have developed jDEECo, which provides a programming model based on SCEL for Java programmers. Since jDEECo can be integrated into an existing Java-based development process and environment it is well-suited for integration into industrial practice.

References

[GLP+12] Edmond Gjondrekaj, Michele Loreti, Rosario Pugliese, Francesco Tiezzi, Carlo Pinciroli, Manuele Brambilla, Mauro Birattari, and Marco Dorigo. Towards a formal verification methodology for collective robotic systems. In *Proceedings of the 14th International Conference on Formal Engineering Methods (ICFEM 2012)*, volume 7635, pages 54–70. Springer, Berlin, Germany, 2012.

[MBL+13] M. Massink, M. Brambilla, D. Latella, M. Dorigo, and Birattari. On the use of bio-pepa for modelling and analysing collective behaviours in swarm robotics. *M. Swarm Intelligence*, 7(2–3):201–228, 2013.