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AIDE Nomadic Forum activities report

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List of Abbreviations

AIDE	Adaptive Integrated Driver-vehicle Interface
Bluetooth	Short range wireless data transmission specification
BM	Business Model
CAN	Controller Area Network - a multicast shared, differential serial bus standard
Embedded System	A small computer system that is generally hidden inside equipment [machine, electrical appliance, or electronic gadget] to increase the value of the equipment for better or more efficient functionality.
ESoP	European Statement of Principles on Human Machine interaction
EU	European Union
FEP	Front End Processor
FP7	Seventh Framework Programme
GPRS	General Packet Radio Switch – mobile data service available to users of GSM and IS-136 mobile phones
GPS	Global Positioning System
GST	Global Systems for Telematics, Integrated Research & Development Project supported by the European Commission's Information Society Directorate General [1]
HMI	Human Machine Interface
ICT	Information and Communication Technology
IR	Infrared
MIL	Motor Indicator Lamp
MOST	Media Oriented Systems Transport
MP3	MPEG-1 Audio layer 3, digital audio encoding and lossy compression format
ND	Nomadic Device
NDF	Nomadic Device Forum
NDI	Nomadic Device Integration
Nomadic Gateway	Software component installed on the embedded device
OEM	Original Equipment Manufacturer, in this context car maker
PC	Personal Computer
PDA	Personal Digital Assistant
PND	Personal Navigation Device
POI	Point Of Interest
R&D	Research and Development
REQ	Requirement
Service Consumption	Using the information provided by the service
Service Model	Server part of the Nomadic Device Integration link[1]
Service View	Client part of the Nomadic Device Integration link[1]
TCU	Telematics Control Unit
TTS	Text To Speech
UC	Use Case
UMTS	Universal Mobile Telecommunications System
WG	Working Group

Definition of terms in the AIDE project

Term	Definition	Notes	Reference
Action	An event initiated by the driver or an application	Some examples of actions are: route guidance message from the navigation application, a warning from the ACC or an SMS from the phone. An action could also be a continuous output presented to the driver (e.g. the speedometer or output from the radio). The driver actions of interest here are those directed towards systems.	Original definition
AIDE design scenario	A driving situation, specified by at least one **action** and one or more **DVE state** parameters, acted upon by the **AIDE system.**	AIDE design scenarios represent a problem scenario (conflict situation). A description of possible general solution is included. The scenario and solution represent a use case for AIDE meta-functions.	Original definition
AIDE meta-function	The response of the AIDE system to an **AIDE design scenario.**	Examples of potential AIDE meta functions are HMI I/O management, prioritisation, scheduling and warning adaptation.	Original definition
AIDE system	The Adaptive Integrated Driver-vehicle Interface targeted by the AIDE IP, implementing the **AIDE meta-functions.**	The AIDE system consists of a basic set of HMI management components, in particular the ICA and the DVE monitor. Thus, the AIDE system does not include a specific set of applications or HMI I/O devices. Rather, the AIDE system should support different number of applications, I/O devices and configurations in a modular way.	
Application	A program (as a word processor or a spreadsheet) that performs one of the important tasks for which a computer is used	An application is a software component that fulfils a functional specification. Exchanges between application components are persistent or non-persistent information.	EAST-EAA (Webster)
Architecture	The fundamental organization of a system embodied in its components, their relationships to each	In EAST WP3, architectures denote system descriptions on different abstraction levels. For example, the same system has a sketchy architecture on a	EAST-EAA (IEEE Recommende d Practice for Architectural

Term	Definition	Notes	Reference
	other, and to the environment, and the principles guiding its design and evolution.	high level (the Functional Analysis A.) and a detailed architecture on a lower level (The Logical A.). The term "view" could be used, but does not catch the fact that the architectures are subject to design work on the respective level of abstraction.	Description of Software-Intensive Systems; IEEE Standard P1471, IEEE Architecture Working Group (AWG))
Configuration	The arrangement of hardware and/or software elements in a system.		EAST-EAA (Functional safety: safety instrumented systems for the process industry section; Part 1: Framework, definitions, system, hardware and software requirements; IEC2002.)
Device	Functional unit of hardware or software, or both, capable of accomplishing a specified purpose.	Devices can implement a part of a function (more than one device could be necessary to fulfil a function – e.g. rear-view mirror inside and outside to provide for rear-viewing) or one device can implement more than one function (side rear-view mirror is a device that can include temperature captor, direction signalisation ...).	EAST-EAA (Functional safety: safety instrumented systems for the process industry section; Part 1: Framework, definitions, system, hardware and software requirements; IEC2002).
Driving task	All aspects involved in mastering a vehicle to obtain a certain goal (e.g. reach a destination). This corresponds to the primary task in a driving situation.	The driving task can be described on different levels of abstraction. Michon proposed a widely adopted scheme where the driving task is considered on strategic, tactical and operational levels. The strategic level concerns behaviours directed towards more high-level goals, e.g. reaching a destination in time. The tactical level concerns	Original definition.

Term	Definition	Notes	Reference
		behaviour on a shorter time frame, e.g. selecting headway and deciding when to change lane. Finally, the operational level concerns the moment to moment control of the vehicle. (Michon, J.A. (1985). A critical review of driver behaviour models: What do we know? What should we do? In L.A Evans and R.C. Schwing (Eds.) Human Behaviour AND Traffic Safety. (pp. 487-525). New York: Plenum Press).	
DVE (driver-vehicle-environment) state	A set of dynamic parameters representing certain aspects of the driver, the vehicle and the environment.	DVE state and DVE condition is used interchangeably in this deliverable.	Original definition.
Function	A task, action, or activity that must be accomplished to achieve a desired outcome (EAST-EAA).	Examples of Functions are: turn by turn navigation, voice call, incoming warning from an ADAS.	EAST-EAA (IEEE Guide for Developing System Requirements Specifications; IEEE Standard P1233a, 1998).
Human Machine Interface (HMI)	All the input and output devices which permit the interaction between the user and one or more vehicle systems.	The EAST definition considers only interaction with IVIS. The current definition comprises any device that mediates interaction with a vehicle system.	EAST-EAA (slightly modified)
Mental workload	The specification of the amount of information processing capacity that is used for task performance.	The effect that driving demand has on the operator in terms of stages that are used in information processing and their energetic (c.f. **driving demand**).	de Waard, D. (1996). The Measurement of Drivers' Mental Workload. ISBN 90-6807-308-7. Traffic Research Centre. University of Groningen.
System	A collection of components organized to accomplish a specific	Set of elements, which interact according to a design; an element of a system can be	EAST-EAA (IEEE Recommende

Term	Definition	Notes	Reference
	function or set of functions.	another system, called a subsystem, which may be controlling system or a controlled system and may include hardware, software and human interaction.	d Practice for Architectural Description of Software-Intensive Systems; IEEE Standard P1471, IEEE Architecture Working Group (AWG, 2000).
Use case	An intended or desired flow of events or tasks that occur within the vehicle and are directed to or coming from the driver in order to accomplish a certain system-driver interaction.	Standard use case templates are mainly intended for individual IVIS/ADAS functions and include solutions. The "use cases" for AIDE meta-functions are called AIDE design scenarios.	Original definition (based on existing definitions).

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Executive Summary

This report summarises the work and progress of the Nomadic Device Forum (NDF) during its second year of work, following the activities described in AIDE Deliverable 3.2.3 of 28/07/2006. The principal activity comprised a number of working meetings:

- 15/05/2006 Working Groups A & C meeting;
- 16/05/2006 Plenary and round table meeting;
- 25-26/10/2006 Working Group A workshop;
- 27/11/2006 Working Group C workshop.

During this year Working Groups A and C continued their activities to advance the work in specific areas. These WGs have been established during the previous period; WG A works on the definition of "Smart Vehicle-Device Gateway", while WG C works on the Business Cases (a Working Group B, on HMI and safety issues, was formed when the Forum was set up, but after one meeting its members agreed there was not sufficient interest to maintain a separate WG).

The achievements of the NDF in 2006 include the following:

- Enrichment of the Nomadic Devices working forum with key stakeholders in the field of vehicle-portable device integration;
- Alignment and coordination of the separate work on nomadic device integration in the AIDE and GST integrated projects;
- Use cases definition for nomadic device integration;
- Definition of system requirements for a vehicle-device gateway;
- Identification of business scenarios and use cases for nomadic device integration;
- Description of first steps on "roadmap" towards automotive-portable device collaboration.

The Nomadic Device Forum is supported by the AIDE project and managed by ERTICO and ICCS. The Forum is chaired by Mr Wolfgang Reinhardt of ACEA.

1. Introduction

Nomadic devices, or portable devices used or intended to be used by the driver for support, assistance, communication or entertainment, are in increasingly common use. The most common by far are mobile phones used with some kind of hands-free kit. The market for PDA-based navigation systems is growing rapidly as prices fall and systems are sold in discount supermarkets or bundled with a new vehicle. Music players, such as MP3 players are also becoming more common in vehicles.

Increasingly, all of these types of devices are being offered as series- or after-market-fit options by car manufacturers. This growth is in response to customer demand, but it does create important issues for driver safety, for the human-machine interface (HMI) and for the integration of the devices into the vehicle. Specific points of concern include:

- The risk of additional driver distraction from using an unsuitable or poorly located nomadic device;
- The need for clear and agreed guidelines on the safe design, positioning, fixing and use of nomadic devices and their applications;
- The lack of agreed standards for the “docking” and integration of nomadic devices in the vehicle.

AIDE explores a number of issues related to Nomadic devices use by drivers including:

- Safety issues raised by the introduction of the Nomadic Devices in the vehicle.
- Integration of Nomadic Devices and definition of a gateway concept.
- Requirements both from OEMs but also from device manufacturers point of view.

For this scope the AIDE Nomadic devices Forum was created in June 2005. This Forum is coordinated by ERTICO and brings together key stakeholders to discuss these issues, identify problems and needs and finally come to a consensus around this very complex and sensitive area. To address these issues, the Nomadic Device Forum has organised two Working Groups. The first Working Group (WGA) is dealing with the definition of a smart Device-Car Gateway, while the other (WGC) is exploring the Commercial issues and business cases for vehicle-device integration (a Working Group B, on HMI and safety issues, was formed when the Forum was set up, but after one meeting its members agreed there was not sufficient interest to maintain a separate WG).

Currently more than 100 members have participated in the Forum including vehicle manufacturers, automotive suppliers, portable navigation system manufacturers, pocket PC/PDA manufacturers, application developers, navigation map suppliers, mobile telecom operators, service providers, government authorities, the European Commission, driver safety & HMI experts and research organisations & academic bodies. In addition to this a close cooperation has been established with other relevant European Research and development Projects such as GST (Global System for Telematics), an Integrated R&D Project supported by the European Commission's Information Society Directorate General.

This report compiles the main results of the work during 2006 of the European Nomadic Devices Forum.

2. Activities and achievements

The Nomadic Device Forum objectives for 2006 were to continue to provide a platform for all stakeholders with an interest in nomadic devices and their safe use and integration in vehicles. The intention was to hold at least one plenary meeting, a sort of "mini-conference" on nomadic device issues, and to support the various Working Groups to continue their work to define the technical approach (WGA) and business issues (WGC) for a harmonised portable device-vehicle gateway solutions.

The highlights of the year were the following meetings and their results:

- 15/05/2006 Working Groups A & C meeting
- 16/05/2006 Plenary and round table meeting
- 25-26/10/2006 Working Group A workshop
- 27/11/2006 Working Group C workshop

The extended work of WGA was summarised in a separate report, this is appended below at Annex A. This is the principal result of the Forum to date, comprising a presentation of most important use cases, and an analysis of the system and other requirements for a common vehicle-device gateway solution.

This deliverable does not detail the results of each of WGA meeting, as these were compiled together in one report, that is presented in Annex A.

The other activities are summarised below. Presentations made at all these activities are available on the Nomadic Device Forum pages of the AIDE project web-site.

2.1. Working Group A meeting, 15 May 2006

The objective of this Working Group A (WGA) meeting was to continue its work on the definition of use cases and gateway system requirements, as well as possible technology solutions. The results are included in the consolidated requirements presented in Annex A below.

2.2. Working Group C meeting, 15 May 2006

The purpose of this meeting of the business issues Working Group (WGC) was to discuss business issues and specific business-related requirements concerning nomadic device integration in the vehicle. The results are summarised in the table below:

Table 1 - WGC Business Requirements

Stakeholder	Notes	Interest/problem	Requirements
All		Target is safe use of devices while driving	
		Digital Rights Management for content	This issue must be addressed for ND integration…
Telco		Sells services and (smart-) phones that users want to use inside	

Stakeholder	Notes	Interest/problem	Requirements
		the car	
OEM vehicle manufacturer		Keep existing business with infotainment systems (phone, entertainment, navigation are main uses)	
		Keep existing business for fleet management, other professional tools	
		Ensure safe use of devices in vehicles	
		Offer additional services/functionalities to customers	
		Keep OEM brand look and feel	
		React to customer demand	
		Future-proofing the infotainment systems	Must be able to update the interface throughout the lifecycle of the car to support new devices/functions
		Will incur liability if/when offer gateway as part of own product	OEM to certify applications/services that are allowed to use gateway (filter by positive service list)
Driver		Wants seamless use of (all services from) mobile device on in-car environment	
		Drivers want good, safe HMI	Gateway must lead to safer HMI (e.g. handsfree)
		Value function more important than safety (generally speaking)	
		Want cheap navigation, other services	
		Want cheap/free integration in the vehicle	
Passenger			
Employer	e.g. fleet…		
Service provider	Any third party, e.g. motoring club, internet portals, e-call	Want to sell driver services on NDs	Filter by positive (approved) service list
Application provider	e.g. Navigon, PTV…	Want access to data from car	
		Want OEM to take care of DRM	
System integrator	e.g. 3Soft (now Elektrobit)…		
ND hardware providers		Sell devices, don't (yet) care about vehicle integration	
After-market device			

Stakeholder	Notes	Interest/problem	Requirements
manufacturer			
ND parts manufacturer			
Governments		Target is safe use of devices while driving. Economic advantage on a global scale if European integration solution becomes global product	

2.3. Plenary meeting, 16 May 2006

This plenary meeting of the Forum was intended to be a kind of "mini-conference", including a number of presentations in the morning and two panel discussions in the afternoon, on the themes of "Requirements for a harmonised gateway" and "Business use cases".

The content of the panel discussions is briefly summarised in Annex B, while the list of attendees is provided in Annex C below.

2.4. Working Group A meeting, 25-26 October 2006

This meeting of the Working Group A (WGA) aimed to finalise its work on the definition of use cases and gateway system requirements, and form a first view on possible technology solutions. The results, consolidated with those of previous meetings, are presented in Annex A, while the list of attendees is provided in Annex C below.

2.5. Working Group C meeting, 27 November 2006

This objective of this meeting of Working Group C was to address these three themes:

- value and business models;
- towards a common gateway;
- action plan for the Nomadic Device Forum.

The discussion began by asking what the elements of a successful Business Model (BM) are. The main ides are listed below:

- Sales of the common gateway (aftermarket, add-on).
- Sales of adapted services and applications.
- Certification as a revenue opportunity?
- Lower costs for series fit gateway and economies of scale.

- Lower investment costs for the development of the gateway.
- Option or series fit offers customers a desirable product.
- Short term win: advantages of having open solution.
- Extra customer sales to non-favoured devices.

An interesting development in standardisation was presented by Intel, this is the Consumer Electronics Association standard CEA-2017, for a portable device connector to be used in vehicles. A number of vehicle OEMs are participating in this work already, but this does not seem to be generally available to Forum membership.

In the end there was no final consensus on the existence of possible positive business models or on the prospects for finding agreement on a concept and specifications for a common vehicle-portable device gateway. The list of attendees is provided in Annex C below

3. Conclusions

The Forum has been very successful until now in mobilising a broad selection of people from organisations involved in the issues of nomadic device integration in the vehicle. The format has been a mixture of "mini-conference" with excellent presentations of the state of the art, and round table debate sessions with leading actors in the field, and focused Working Group workshops on technical and business topics.

Nevertheless, the Forum has not been able to agree on a cross-sector common strategy for the way that portable devices should be better integrated into the vehicle. The OEM sector has been well represented in general at Forum meetings, but does not appear to have an agreed approach on nomadic device integration. Automotive representatives have expressed the wish that the portable device community be more engaged in the Forum and its work, but until now it has not been possible to secure a better participation from the mobile device sector. It is clear that the obstacles are not purely technical but rather commercial. The automotive sector – at least part of it – sees nomadic devices as a threat to existing business models, while consumer device manufacturers seem to see automotive as a limited opportunity.

It appears that to progress further towards vehicle-device integration beyond the status quo, two major steps are needed:

- substantial resources are needed to support a project team to develop and test options for a harmonised vehicle-device gateway, this could be a self-funded activity or else provided via a European-funded project;

- commitment is needed from senior product managers in both the automotive and portable device sectors, leading to adoption of a shared view on the approach to better integration of devices in vehicles, based on a positive business case for all actors in the value chain.

This implies a need for more companies to participate from the portable device sector, and also that business, marketing and product line people participate from all companies involved, not just research and development engineers.

Concerning the HMI and safety issues of nomadic device integration, more information is needed based on real-life experience of the actual risks posed by nomadic devices in the way they work, their interaction with users and how they are installed in the vehicle. Also information on use of portable devices should be gathered routinely in accident statistics so that the degree of real hazard posed by these devices can be measured.

The outlook for the next year is not very clear. On the one hand there have been some significant changes in personnel at the end of 2006, and WGA no longer has a leader. The WG has also reached a break-point in its work with the issue of its report on requirements for nomadic device integration. This report included a number of recommendations and questions for the Forum generally, and WGA was not prepared to go further in developing an architecture and specifications for a nomadic device gateway without greater clarity on some key commercial issues (for WGC).

The WGC meeting, held one month after the last WGA meeting, was not able to provide answers to most of the WGA questions so these remain as a pending action for the Forum to address.

At the end of 2006 the EU Seventh Framework Programme of Research and Technological Development (FP7) was launched with the first Call for Proposals that closes in May 2007. The ICT programme within FP7 includes openings for work on nomadic device integration,

and it appears that there will be some proposals in this area. Given this context and their position at the end of 2006, it is unlikely that the members of Nomadic Device Forum WGA would wish to proceed further in developing a vehicle-device gateway within the Working Group.

It is therefore recommended that a further Forum plenary meeting be organised around mid-2007 to assess the current state of developments in this field, and to agree what if any further work should be done within the Forum and its Working Groups.

4. References

[1.] GST Integrated Project website: http://www.gstproject.org/

5. Annex A – Consolidated Report of Working Group A: Nomadic Device Gateway Requirements

5.1. Introduction

5.1.1. Intended audience

This document contains the results obtained by the Working Group A (WGA) of the Nomadic Device Forum. These Use Cases and requirements described hereafter are the result of the three workshops organized by the workgroup and two conference calls held between May and October 2006.

The intended audience for this document is on the one hand the members of the Nomadic Device Forum, Working Group A and Working Group C. On the other hand the content of this document could serve as the input for future activities of the Nomadic Device Forum and eventually future projects.

5.1.2. Organization

The document is organized in four parts:

- A first chapter provides some initial information about the work and organisation of the Nomadic Device Forum, more specific WGA.
- A second chapter details the requirements organized by Use Case. Here you will find a description for each requirement identified by the Forum.
- A third chapter summarizes the requirements again and categorizes the requirements according to criticality.
- A fourth chapter contains a list of terms.

5.1.3. Nomadic Device Forum Working Group A Activities

The purpose of the Nomadic Device Forum is to discuss and research Use Cases and Requirements related to the integration of Nomadic Devices in vehicles.

At the moment two Working Groups are active in the Nomadic Device Forum. WGA focuses on the technical aspects of Nomadic Device Integration. WGC looks into the Business models and commercialisation of NDI.

This document presents the results of WGA and summarises the results of the discussion held during the Workshops in February, May and October 2006 and the conference calls in between the workshops of May and October.

Nomadic Device Integration is been researched by two integrated projects: AIDE and GST. The AIDE project, initiator of the Nomadic Device Forum researches the usage aspects of Nomadic Device Integration. The Nomadic Device Integration work topic of the GST Open Systems sub-project developed an architecture and implementation of an example NDI system.

5.1.4. Basic Terminology

To get a good understanding of the following text it is necessary to explain some of the terms used:

Nomadic (computing) device - Portable electronics device, handling digital information and able to communicate with the external world (MP3 player, PDA, PND, Radio, Barcode reader, Smartphone…)

Vehicle - In general apparatus to move goods and people (Car, Truck, Train, Boat, Airplane …)

Integration - Ability to use services from an in-vehicle embedded computing system by a Nomadic Device and vice versa (Playing MP3 over Car audio, Using GPS information provided by the Car, Monitoring temperatures from a deepfreeze bay …)

Service - Information or functionality offering (GPRS/UMTS connection, Location information, video or audio stream, POI, Car status information …)

A full list of terms is provided in Section 4.

5.2. Nomadic Device Integration - Architecture

5.2.1. Use Case Model

1.1.1.1 Device Owner

Type: *public «external»* **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Use Case Model
Details: Created on 24/10/2006 15:57:22. Modified on 24/10/2006 18:07:59

Owns the device or operating system running on the device. Could be the Telecom Operator, device manufacturer or Operating System owner.

Connections

- Association link to usecase *UC-NDI-0002-8 - Restrict access to Nomadic Device infrastructure<UC-NDI-0002 - General>*

1.1.1.2 Embedded (Client System) Application

Type: *public «internal worker»* **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Use Case Model
Details: Created on 10/11/2005 15:32:20. Modified on 24/10/2006 18:07:57

Application running on the in-vehicle, factory mounted computer wishing to communicate data over a wired or wireless connection to the nomadic system. The embedded, in-vehicle

system is also referred to as a TCU or Telematics Computing Unit. Data must be seen as a very wide array of digitized information and includes sound (voice), music and video streams.

Internal Requirements

- REQ-044 - A clear link between presentation and application should exist. (*Type:* Functional; *Status:* Parked; *Difficulty:* Medium; *Priority:* Medium) Applications should be able to consume possible types of data includes streaming data such as voice, video, music and batched data such as traffic information, data synchronization, application upload/download etc. not restricted by the overlaying management system.

Connections

- Association link to usecase *UC-NDI-0001-2-2 - Normal Termination<UC-NDI-0001-1-2 Termination of connection>*
- Association link to usecase *UC-NDI-0002-7 - Voice Control<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-10 - Prioritization of applications output<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-9 - Multiple device connectivity<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0001-2-1 - Abnormal Termination<UC-NDI-0001-1-2 Termination of connection>*
- Association link from usecase *UC-NDI-0001-1-1 Connection initiated by Nomadic Device <UC-NDI-0001-1-1 Establish a Connection>*

1.1.1.3 End User

Type: *public «external»* **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Use Case Model
Details: Created on 10/11/2005 15:58:32. Modified on 24/10/2006 15:59:52.

The End User actor brings in the Nomadic Device and wants to integrate this device with the onboard TCU.

Connections

- Association link to usecase *UC-NDI-0001-2-1 - Abnormal Termination<UC-NDI-0001-1-2 Termination of connection>*
- Association link to usecase *UC-NDI-0002-5 - Safe installation and update of services<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0001-2-2 - Normal Termination<UC-NDI-0001-1-2 Termination of connection>*

1.1.1.4 Nomadic Device

Type: *public «internal worker»* **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Use Case Model
Details: Created on 10/07/2005 22:40:06. Modified on 24/10/2006 16:29:51

A nomadic device represents a mobile computing and/or telecommunication device able to communicate data with the TCU (embedded) device.

Connections

- Association link to usecase *UC-NDI-0003-1 - Authenticate and Authorization<UC-NDI-0003 - Initialization and Service Consumption>*
- Association link to usecase *UC-NDI-0003-3 - Service Consumption<UC-NDI-0003 - Initialization and Service Consumption>*

1.1.1.5 Nomadic Device Application

Type: *public «internal worker»* **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Use Case Model
Details: Created on 09/11/2005 13:58:10. Modified on 24/10/2006 15:01:32
Tag: Application

Application running on the Nomadic Device and needing network access.

Connections

- Association link to usecase *UC-NDI-0001-2-2 - Normal Termination<UC-NDI-0001-1-2 Termination of connection>*
- Association link to usecase *UC-NDI-0002-7 - Voice Control<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-6 - Adaptation of ND User interface to vehicle status.<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-4 - Restrict access to car infrastructure<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-3 - Remote control of HMI of ND<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-2 - Management/Priority and restricting<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0001-2-1 - Abnormal Termination<UC-NDI-0001-1-2 Termination of connection>*
- Association link to usecase *UC-NDI-0001-2-1 - Abnormal Termination<UC-NDI-0001-1-2 Termination of connection>*
- Association link to usecase *UC-NDI-0001-1-1 Connection initiated by Nomadic Device<UC-NDI-0001-1-1 Establish a Connection>*

1.1.1.6 OEM

Type: *public «external»* **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Use Case Model
Details: Created on 14/11/2005 16:04:40. Modified on 24/10/2006 15:31:01.

The OEM authorizes the in-vehicle services available to a specific user. Where mobile service provision is concerned, the service provider authorizes the use of services available to the user based on subscription.

Connections

- Association link to usecase *UC-NDI-0002-5 - Safe installation and update of services<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-4 - Restrict access to car infrastructure<UC-NDI-0002 - General>*

1.1.1.7 TCU (embedded device)

Type: *public «internal worker»* **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Use Case Model
Details: Created on 10/07/2005 22:37:34. Modified on 24/10/2006 16:29:51

Connections

- Association link to usecase *UC-NDI-0003-1 - Authenticate and Authorization<UC-NDI-0003 - Initialization and Service Consumption>*
- Association link to usecase *UC-NDI-0003-3 - Service Consumption<UC-NDI-0003 - Initialization and Service Consumption>*

1.1.1.8 Vehicle

Type: *public «internal worker»* **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Use Case Model
Details: Created on 14/11/2005 13:01:15. Modified on 24/10/2006 16:29:51.

The vehicle provides infrastructure and services to the devices brought into its realm (charging batteries, providing diagnostics and probe information etc.) Services in this context must be seen as information and applications provided by the vehicle itself. This could for instance be an interface to the CAN and MOST busses or in the case of "non" communication Nomadic Devices, access to the communication infrastructure of the car.

Connections

- Association link to usecase *UC-NDI-0001-2-1 - Abnormal Termination<UC-NDI-0001-1-2 Termination of connection>*
- Association link to usecase *UC-NDI-0002-7 - Voice Control<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-6 - Adaptation of ND User interface to vehicle status.<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-3 - Remote control of HMI of ND<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0002-2 - Management/Priority and restricting<UC-NDI-0002 - General>*
- Association link to usecase *UC-NDI-0001-2-2 - Normal Termination<UC-NDI-0001-1-2 Termination of connection>*

5.2.2. UC-NDI-0001 - Data Communication

Data Communication in the context of Nomadic Device Integration, refers to the sending and receiving of binary data between a Nomadic Device and an in-vehicle (embedded) TCU. Data can be communicated over a wired or wireless connection. Both streaming and non-stream data communications are implied.

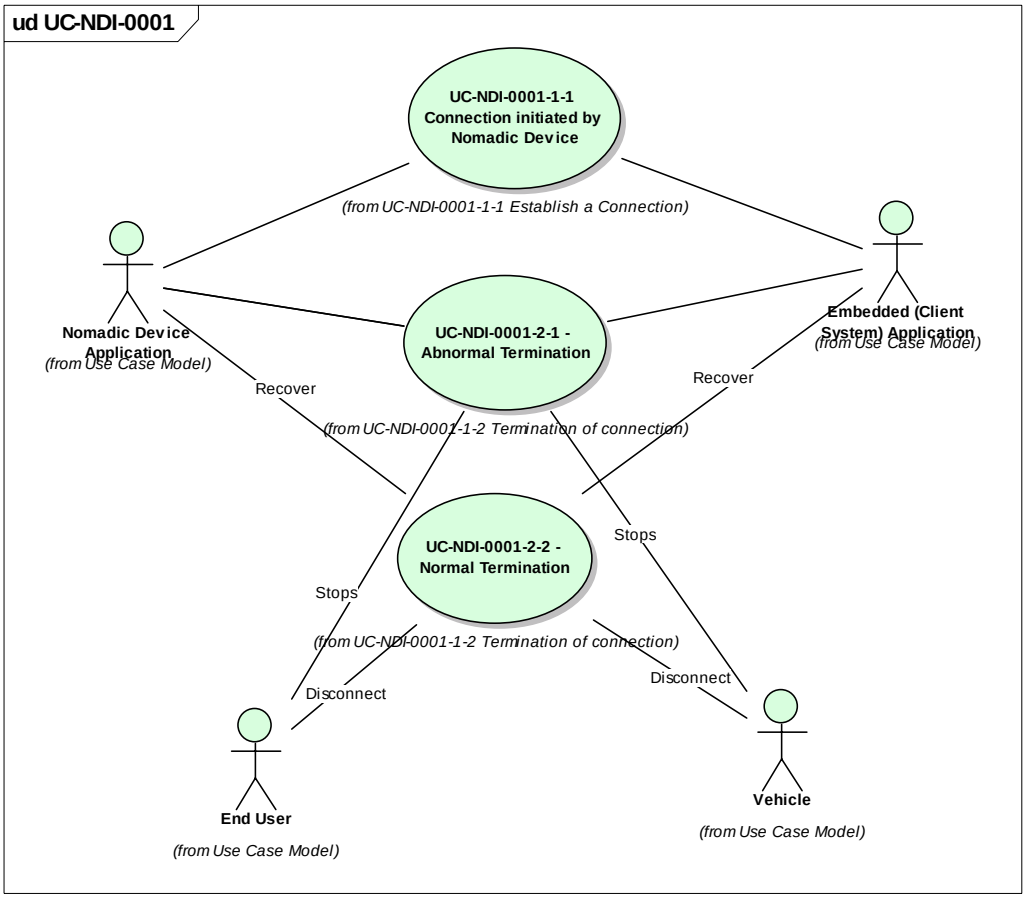

Figure 1 : UC-NDI-0001

5.2.3. UC-NDI-0001-1 Connection

To communicate with each other a TCU and Nomadic Device should be able to set up a Connection between each other.

5.2.4. UC-NDI-0001-1-1 Establish a Connection

1.1.1.9 UC-NDI-0001-1-1 Connection initiated by Nomadic Device

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0001-1-1 Establish a Connection
Details: Created on 07/07/2006 12:04:55. Modified on 30/10/2006 09:30:41.
Tag: Data Communication Connection

This Use Case describes the initiation of a connection by the Nomadic Device. A connection is setup between Nomadic Device and TCU. This should happen in a Seamless, ad-hoc fashion without a minimum of User intervention.

Internal Requirements

- REQ-001 - Add Hoc Network connectivity. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* High; *Priority:* High)
  Setting up an IP connection should be possible ad hoc, without intervention from the end user. Restricted to use inside the car.
- REQ-002 - Communication technology abstraction. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* High; *Priority:* High)
  The specifications and architecture proposed by the Nomadic Device Forum do not rely on or tie into a specific physical communication technology. This could imply a connection abstraction layer on top of available communication facilities (Bluetooth, WiFi, IR, USB etc).
- REQ-003 - Device addressability. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* High; *Priority:* High)
  Each device taking part in the integration setup should have a unique address or receive a unique address from its connecting peer.
- REQ-045 - The addressing should protect the Privacy of the end-user. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)

Connections

- Association link to actor *Embedded (Client System) Application<Use Case Model>*
- Association link from actor *Nomadic Device Application <Use Case Model>*

Scenarios

Initial Connect {Basic Path}.

1. A Nomadic devices comes in a "discoverable" range of a TCU. This can be done for instance by identifying the nomadic device as a Bluetooth peer or by connecting the Nomadic device via a USB connector etc.
2. The TCU receives the Nomadic Device configuration data and includes the device in the in-vehicle add hoc network
3. The TCU checks if the ND runs a "Nomadic Interface", in other words is able to accept management calls from the TCU.
4. The TCU triggers the initialization process.

5.2.5. UC-NDI-0001-2 Termination of connection

1.1.1.10 UC-NDI-0001-2-1 - Abnormal Termination

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0001-1-2 Termination of connection
Details: Created on 25/11/2005 12:04:59. Modified on 30/10/2006 09:30:50.

In this case the Nomadic Device or embedded system disconnects in faulty state. For instance, a Nomadic Device is streaming an MP3 file over the TCU while the end-user is pulling out the USB connector. Both devices should gracefully recover from this situation without bringing the TCU or Nomadic Device in an error state.

Internal Requirements

- REQ-004 - Random disconnect. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)

It should be possible to disconnect devices without disturbing the overall system.

Connections

- Association link from actor *Vehicle <Use Case Model>*
- Association link from actor *End User <Use Case Model>*
- Association link from actor *Nomadic Device Application <Use Case Model>*
- Association link from actor *Embedded (Client System) Application <Use Case Model>*
- Association link from actor *Nomadic Device Application <Use Case Model>*

Scenarios

Connection time out {Basic Path}.
1. The TCU and Nomadic Device detects a time out exception.
2. The TCU gracefully removes the Nomadic Device from the list of connected devices.
3. The Nomadic Device moves to its initial "unconnected" state.

1.1.1.11 UC-NDI-0001-2-2 - Normal Termination

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0001-1-2 Termination of connection
Details: Created on 25/11/2005 12:04:08. Modified on 30/10/2006 09:30:56

In this case the devices are disconnected in a stable situation. This could for instance happen when the end-user leaves the car and as such moves its Nomadic Device out of range of the TCU. This probably might be the exception case. In general End Users will remove devices or shutdown the vehicle at will, not concerned about the state of the devices connected to each other.

Internal Requirements

- REQ-005 - Graceful shutdown. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)
  The interface should offer the possibility to gracefully shutdown the integration of a Nomadic Device rather like a USB device is stopped when you want to remove it from its USB slot (memory key etc.). Eventually this sequence could be integrated into the shutdown procedure of the TCU.

Constraints

- *Proposed Pre-condition* . TCU and Nomadic Device are Connected.
  TCU and Nomadic Device are in the connected (operational) state.
- *Proposed Post-condition* . Nomadic Device removed from list of connected devices.
  The TCU removes the Nomadic Device from the list of "served" devices
- *Proposed Post-condition* . Nomadic Device in the initial not connected stage.
  The nomadic device is ready again to be discovered by a TCU

Connections

- Association link from actor *Embedded (Client System) Application <Use Case Model>*
- Association link from actor *Nomadic Device Application <Use Case Model>*
- Association link from actor *Vehicle <Use Case Model>*
- Association link from actor *End User <Use Case Model>*

Scenarios

Connection shutdown {Basic Path}.

1. The end-user initiates the "remove" connection process from either the TCU or Nomadic Device.
2. The TCU removes the Nomadic Device from the list of connected devices.
3. The Nomadic Device disconnects from the TCU and moves to the initial "non-connected" state.

5.2.6. UC-NDI-0002 - General

A set of General Use Cases which do not strictly belong to any other category (Communication, Navigation, Telephony, ...)

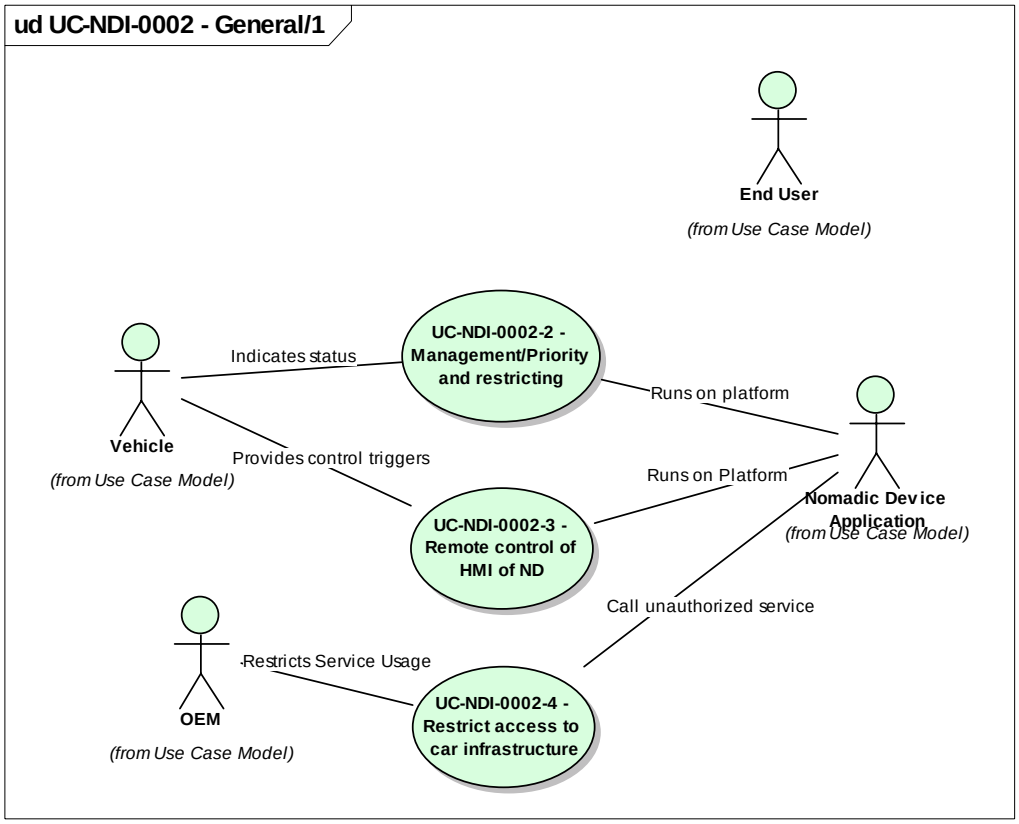

Figure 2 : UC-NDI-0002 - General/1

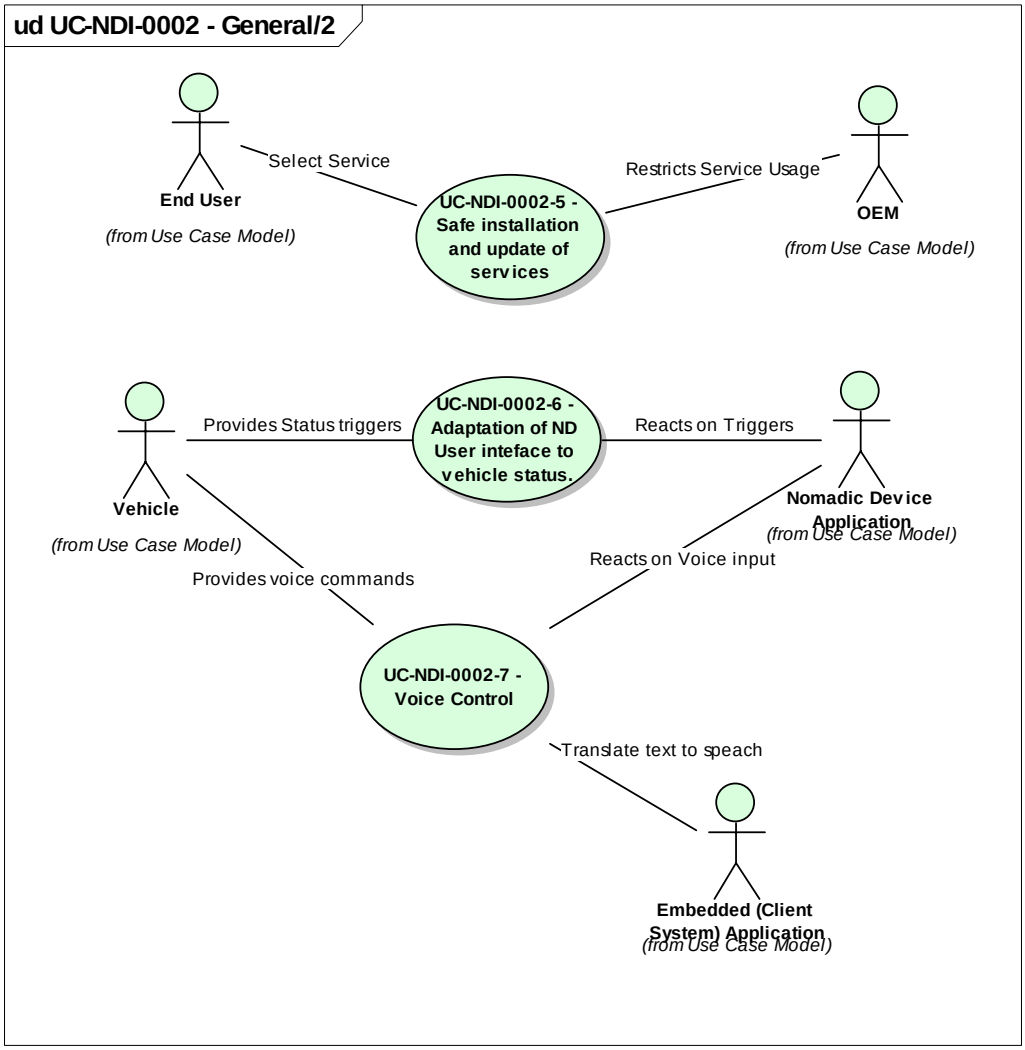

Figure 3 : UC-NDI-0002 - General/2

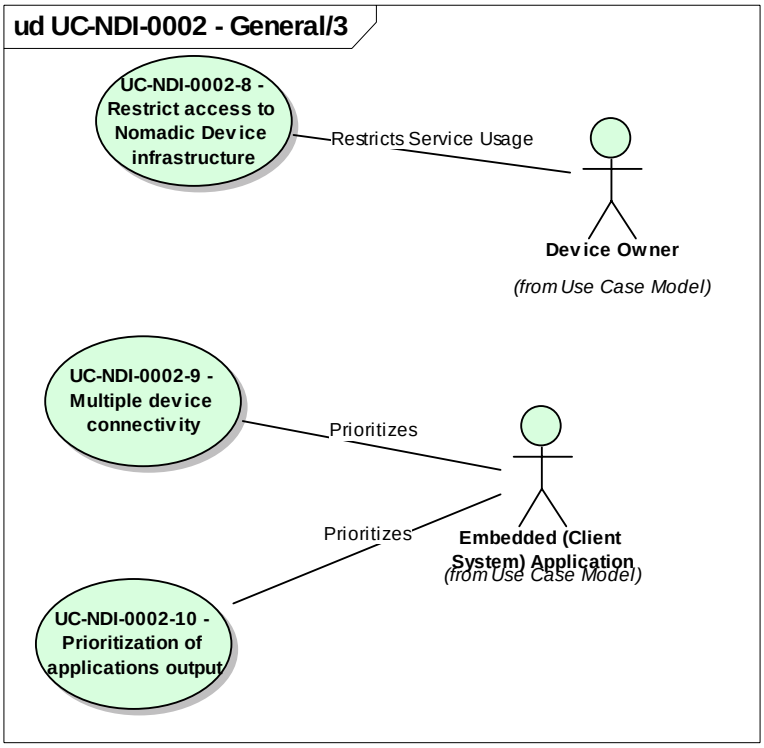

Figure 4 : UC-NDI-0002 - General/3

1.1.1.12 UC-NDI-0002-10 - Prioritization of applications output

Type: *public* **UseCase**
Status: Mandatory. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 25/11/2005 11:31:41. Modified on 30/10/2006 09:31:39.

Multiple applications running on one single device connect to one and the same Nomadic Gateway running on the TCU.

Internal Requirements

- REQ-006 - An application should provide meta data which drives the prioritization. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)
  The meta data should be specified and standardized. See also REQ-007 for details on a possible certification process or strategy.
- REQ-007 - NDI should define a certification process for Nomadic Device Integration applications. (*Type:* Validate; *Status:* Mandatory; *Difficulty:* Low; *Priority:* High)
  Reduce to a logo but the responsibility remains with the manufacturer.
- REQ-008 - Certification should be done on application level. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)

Connections

- Association link from actor *Embedded (Client System) Application <Use Case Model>*

1.1.1.13 UC-NDI-0002-2 - Management/Priority and restricting

Type: *public* **UseCase**
Status: Parked. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 14/11/2005 13:20:29. Modified on 25/10/2006 16:07:59.

Depending on the condition of the car the Nomadic Device enables or disables certain services.

Internal Requirements

- REQ-006 An application should provide meta data which drives the authorization and prioritization. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)
- REQ-019 The Nomadic Device and TCU should filter the available services depending on the driving conditions. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)
  Might be influenced by TTS and Voice recognition
- REQ-020 The TCU should support passing control information to the Nomadic Device. (*Type:* Functional; *Status:* Proposed; *Difficulty:* Medium; *Priority:* Medium)
- REQ-046 The user should be informed about the availability of services or functions services. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)
  Informed does not necessarily mean a message or signal put to the driver.

Connections

- Association link from actor *Nomadic Device Application <Use Case Model>*
- Association link from actor *Vehicle <Use Case Model>*

Scenarios

Vehicle status information {Basic Path}.

1. During the setup of the Nomadic Device/Embedded System communication a mandatory vehicle status listener service is initiated.
2. A service application, for instance an MP3 player, is initiated by the user.
3. The MP3 player registers a listener with the Vehicle Status Service.
4. The car is in a stationary state.
5. The Service Application runs as expected and communicates with the user by means of a Graphical User Interface. The user is able to select songs from its play list.
6. The vehicle starts to move.
7. The Service Application gets informed and acts to the trigger. In the case of an MP3 player the Service Application just closes the graphical User Interface. The User is now not able to select a different song or play list by means of the Graphical User Interface but is limited to the back- and forward buttons to scroll to a play list.

1.1.1.14 UC-NDI-0002-3 - Remote control of HMI of ND

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 14/11/2005 13:34:12. Modified on 25/10/2006 14:56:38.

This Use Case is very similar to UC-NDI-0003/2 except for the fact that the Service Application should listen to other external triggers. What could be useful is the use of

up/down, confirm buttons on the steering wheel. This allows the user to operate the Nomadic Device without influencing his or her driving capabilities.

This technology is very similar to what already exists when using headsets or virtual keyboards with Nomadic Devices. In the case of input devices, such as switches and knops, the signals are probably handled by a embedded device and forwarded to the correct Nomadic Device. This requires a facility to identify the Nomadic Device which will accept these external triggers.

Internal Requirements

- REQ-017 - A Nomadic Device should be able to read input from the user (in-vehicle controls). (*Type:* Functional; *Status:* Optional; *Difficulty:* Medium; *Priority:* Medium)
  The ability of the operation system to accept external triggers and channel them to the appropriate message queue. Ex. steering wheel buttons etc. The NDF may define a standard on external controls.

Constraints

- *Proposed Pre-condition* . The Nomadic Device and Embedded device are authenticated to each other.
- *Proposed Pre-condition* . The Nomadic Device runs a Service allowing it to receive control triggers from the embedded device.
- *Proposed Post-condition* . A new service, item, address ... is selected.
- *Approved Pre-condition* . The Nomadic Device is registered by the embedded device as THE listener for control triggers (up/down/confirm buttons).
- *Proposed Pre-condition* . Proposed Pre-condition. The nomadic device and embedded device support a standardized protocol which enables the embedded device to access content stored on the phone (e.g. addresses, music tracks, etc).
- *Proposed Pre-condition* . The user is not driving.

Connections

- Association link from actor *Nomadic Device Application <Use Case Model>*
- Association link from actor *Vehicle <Use Case Model>*

Scenarios

User selects a phone number on the Nomadic Device {Basic Path}.

1. The User wants to select a phone number from the list of addresses stored by the Nomadic Device.
2. With the up/down and confirm buttons on the steering wheel, the user selects the address book on the ND.
3. The user scrolls through the list of addresses and picks the correct address by hitting the confirm button.
4. The user scrolls through the phone number and initiates the call by hitting the confirm button.
5. After the call the user hits the confirm button to terminate the connection.

User selects an MP3 file from a play list {Basic Path}.

1. The User wants to listen to some music over the car audio system
2. The User scrolls through the list of services by means of the up/down buttons and selects the MP3 player by means of confirm button.
3. The User is now presented with a list of songs from his or her favourite play list and scrolls through the list to select the desired song.
4. The User hits the confirm button to start the song.
5. The Nomadic Device streams the MP3 file over the MP3 Player Proxy to the embedded system.

1.1.1.15 UC-NDI-0002-4 - Restrict access to car infrastructure

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 14/11/2005 14:23:53. Modified on 25/10/2006 15:05:43.

In this approach the embedded device remains in control and only allows a Nomadic Device to use "authorized" services. These authorized services are setup remotely from the OEMs portal. In GST the idea is to "initial provision" a new car with the initial service and parameters. Setting the list of authorized services could be part of this provisioning.

Internal Requirements

- REQ-022 - The TCU should have a vehicle interface controlled by the OEM and should be limited by Safety, Security, Privacy and business constraints. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* High; *Priority:* High)
  This effectively shields a Nomadic Device from the data owned by the vehicle (OEM). Depending on the authorization provided by the vehicle interface a nomadic device is able or unable to read/write data from and to the vehicle.

Constraints

- *Approved Pre-condition* . The embedded device knows in one way or another about the credentials of the end-user.
  This can be achieved by means of a smartcard, smart id card etc.
- *Approved Pre-condition* . An End User provides its credentials to the Nomadic Device on forehand.
  These credentials can be tied to the users pin code. However, in that case the OEM needs to keep track of Users and Pin codes in one or the other way. One could think about a system

Connections

- Association link from actor *Nomadic Device Application <Use Case Model>*
- Association link from actor *OEM <Use Case Model>*

Scenarios

Normal end-user tries to "chip-tune" his car. {Basic Path}.

1. The end-user installs a "hobby" application on a Nomadic Device with the intention to chip tune his car.
2. The end user starts the chip tune application.
3. The chip tune application tries to connect to the Vehicle Interface service on the embedded system.
4. When authenticating the Nomadic Device the embedded system did not add the Vehicle Interface service to the list of allowed services and refuses the connection.
5. The chip tune application on the Nomadic Device receives a failure messages and shuts down.

Road side engineer obtains error code from vehicle {Basic Path}.

1. The car breaks down with the MIL lit.
2. The end-user calls the road side assistant service.
3. The road side assistant uses a PDA type Smartphone.
4. The PDA connects to the embedded system and authenticates with a proper set of OEM registered capabilities.
5. The road side assistant starts a diagnostics application on the PDA.

6. Via the diagnostics proxy the application connects to the diagnostics service running on the embedded device.
7. The embedded device authorizes the use of the diagnostic service and accepts the connection.
8. The road assistant retrieves the error code from the vehicle and sends this information to the road assistant organization backend.
9. The road assistant receives the necessary documentation in order to solve the problem.
10. The road side assistant solves the problem.

1.1.1.16 UC-NDI-0002-5 - Safe installation and update of services

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 14/11/2005 15:05:27. Modified on 25/10/2006 15:42:52.

The discussed Use Case assumes the ability to remotely install Services on either a Nomadic Device or an embedded system. In both cases the interface between ND and embedded systems restricts services only to those authorized.

The installation of software from either the Nomadic Device and embedded system might be an ideal way to "initial provision" new devices.
In general the type of software should be restricted to the "client" part, also called proxy part of a service. This could be the case where a Nomadic Device does not have an MP3 proxy on board and the end-user wishes to stream MP3 over the car audio system. In that case, and if authorized, the proxy is downloaded from the embedded device where after the streaming can start.

Internal Requirements

- REQ-023 - A client role should be able to get provisioned with the necessary proxy in order to consume a new service from the server side. (*Type:* Functional; *Status:* Optional; *Difficulty:* Medium; *Priority:* Medium)
  Add detail information.
  Optional for ND, Mandatory for embedded system/Depends on the complexity of the implementation.
- REQ-025 - The client role can only download and install proxy applications for authorized Services. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* High; *Priority:* High)
  A client part (proxy) can only be downloaded if the peer authorizes the use of a service.
  Conclusion of conference call discussions: Forward to Working Group C

Linked (System) Requirements

- REQ-026 -The communication between Nomadic Device and a TCU should run over a standardized wired/wireless connection technology. (*Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)
  Comment from Maria Farrugia, Vodafone:
  In my opinion this use case covers the need for a standardized wired/wireless connection between the nomadic device and the car. Currently this is most commonly achieved via Bluetooth, however there are a number of interoperability issues that need to be resolved with Bluetooth. Also Bluetooth does not support (not yet at least) the streaming of audio from the nomadic device to the car audio system.

Constraints

- *Proposed Pre-condition* . The Server role, should have a suitable client available for download and install.
- *Proposed Pre-condition* . The Nomadic Device and Embedded device are authenticated to each other.

Connections

- Association link from actor *OEM <Use Case Model>*
- Association link from actor *End User <Use Case Model>*
- Realize link to requirement *REQ-026 -The communication between Nomadic Device and a TCU should run over a standardized wired/wireless connection technology.<Overall Requirements (external)>*

Scenarios

User subscribed to a new service (example MP3 Player) {Basic Path}.

1. The user subscribed to a new Service available on his embedded system, an MP3 player.
2. The user starts his car and the Service Application bundle, containing both Server and Client part is downloaded from the remote Control Centre.
3. The user discovers new services available on the embedded system.
4. The embedded system returns a list of available and authorized services including any newly subscribed service.
5. The user selects according to UC-NDI-0003/3 the MP3 Service.
6. The system detects the missing client part (proxy) and initiates the download form the embedded system.
7. The Nomadic Device installs the client part and runs the MP3 Service Application.
8. The user can now selected the desired MP3 file and run the file over the car audio system.

1.1.1.17 UC-NDI-0002-6 - Adaptation of ND User interface to vehicle status.

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 14/11/2005 15:30:06. Modified on 25/10/2006 15:55:04.

The dashboard illumination status is another value provided for the vehicle status. (Check ESOP for more details).

Internal Requirements

- REQ-027 - The vehicle status should include the status of vehicle systems (dashboard illumination, windscreen wipers). (*Type:* Functional; *Status:* Optional; *Difficulty:* Medium; *Priority:* Medium)

Connections

- Association link from actor *Vehicle <Use Case Model>*
- Association link from actor *Nomadic Device Application <Use Case Model>*

Scenarios

Reaction on vehicle status changement (example switching on lights) {Basic Path}.

1. During the setup of the Nomadic Device/Embedded System communication a mandatory vehicle status listener service is initiated.
2. The screen illumination screen driver registers itself as a listener to the Vehicle

status service
3. The driver switches on the lights
4. The Vehicle Status Service forwards the trigger to the listeners
5. The screen illumination of the Nomadic Device is switched to a night state.

1.1.1.18 UC-NDI-0002-6-1 - Use of vehicle parameters in Nomadic Device Applications

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 25/10/2006 15:56:14. Modified on 26/10/2006 10:27:43.

Internal Requirements

- REQ-047 - Vehicle may pass parameters to ND such as speed, position, fuel etc. (*Type:* Functional; *Status:* Optional; *Difficulty:* Medium; *Priority:* Medium)

1.1.1.19 UC-NDI-0002-7 - Voice Control

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 14/11/2005 15:43:02. Modified on 26/10/2006 10:29:01.

In this case the embedded system captures voice commands and forwards these as control statement to the Nomadic Device. These commands could be about the initiation of a phone call, the selection of a service like and agenda etc.

In the other direction, the Nomadic Device could use the TTS infrastructure of the embedded system to translate otherwise visual and textual information into audio.

Internal Requirements

- REQ-028 - The embedded system may have a speech recognition and TTS interface build in. (*Type:* Functional; *Status:* Optional; *Difficulty:* Medium; *Priority:* Medium)
  As an alternative, the TTS could be embedded in the Nomadic Device and the audio signal output could be rendered through the car audio system. Voice Control could be supported by the Nomadic Device or the embedded system:
  - Preferably the car VC is used
  - If not available from the car, the Nomadic Device VC should be used (but not for controlling the car)
  - Share VC depending on the content - depends on the services supported by the devices (Consumers want a richer HMI)
  - Remains a discussion topic.
- REQ-048 - It should be possible to select either the ND TTS/VC or embedded TTS/VC system. (*Type:* Functional; *Status:* Optional; *Difficulty:* Medium; *Priority:* Medium)
  Forward to WGC

Constraints

- *Proposed Pre-condition* . The embedded device has speech recognition and TTS software.
- *Proposed Pre-condition* . The connection between the Nomadic Device and the embedded system needs to support the transfer of voice commands and audio

information from the TTS output.

Connections

- Association link from actor *Embedded (Client System) Application <Use Case Model>*
- Association link from actor *Vehicle <Use Case Model>*
- Association link from actor *Nomadic Device Application <Use Case Model>*

Scenarios

Audible Traffic information by TTS {Basic Path}.
1. The Nomadic Device runs a traffic information service.
2. In the moving vehicle the Nomadic device receives traffic information
3. According to UC-NDI-0003/3 the ND is informed about the status of the car.
4. The Nomadic Device connects to the TTS interface of the embedded system.
5. The Nomadic Device output the traffic information over the TTS interface to the cars audio system.

Nomadic Device operated by Voice {Basic Path}.
1. The user wants to setup a call.
2. The user selects the contact person by a Vocal command.
3. The embedded system repeats the contact persons name
4. The user acknowledges the contact person proposed by the embedded system.
5. The embedded system sets up the voice call with the Smartphone as discussed by UC-NDI-0003/3

1.1.1.20 UC-NDI-0002-8 - Restrict access to Nomadic Device infrastructure

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 22/11/2005 15:04:44. Modified on 25/10/2006 16:08:45.

Depending on the capabilities of the user authenticated by the TCU some services are available while others are simply restricted. This use case is fairly identical to UC-NDI-0002-4 and is also described by UC-NDI-0003, authentication and authorization.

Internal Requirements

- REQ-029 - The Nomadic Device Interface should remain under control of the ND manufacturer and carrier. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* High; *Priority:* Medium)
  Nomadic Device integration should be limited by Security, Privacy and business issues.

Connections

- Association link from actor *Device Owner <Use Case Model>*

1.1.1.21 UC-NDI-0002-9 - Multiple device connectivity

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0002 - General
Details: Created on 11/05/2006 17:44:56. Modified on 26/10/2006 10:30:04.

Since multiple devices are able to connect to one single client system, the client system needs to prioritize applications. As an example, imagine a nomadic device running a medical monitoring application. This application sends data to the backend system in the hospital by means of the GSM/GPRS service made available by the embedded system. It is rather obvious that this device needs priority above the MP3 player connected to the same client system.

Internal Requirements

- REQ-009 - Multiple connections should not create confusion to the driver. (*Type:* Performance; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* High) If multiple devices offer overlapping functionality the nomadic device interface should be consistent in its choice of what device to use for this function.
- REQ-011 - The NDI should support the connection of multiple devices to the embedded system. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* High; *Priority:* High)
- REQ-012 - The nomadic gateway should allow the driver to indicate of a "preferred" device. (*Type:* Functional; *Status:* Optional; *Difficulty:* High; *Priority:* Medium)
- REQ-013 - The nomadic gateway should be able to identify all available devices and applications. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* High; *Priority:* High)

Connections

- Association link from actor *Embedded (Client System) Application <Use Case Model>*

5.2.7. UC-NDI-0003 - Initialization and Service Consumption

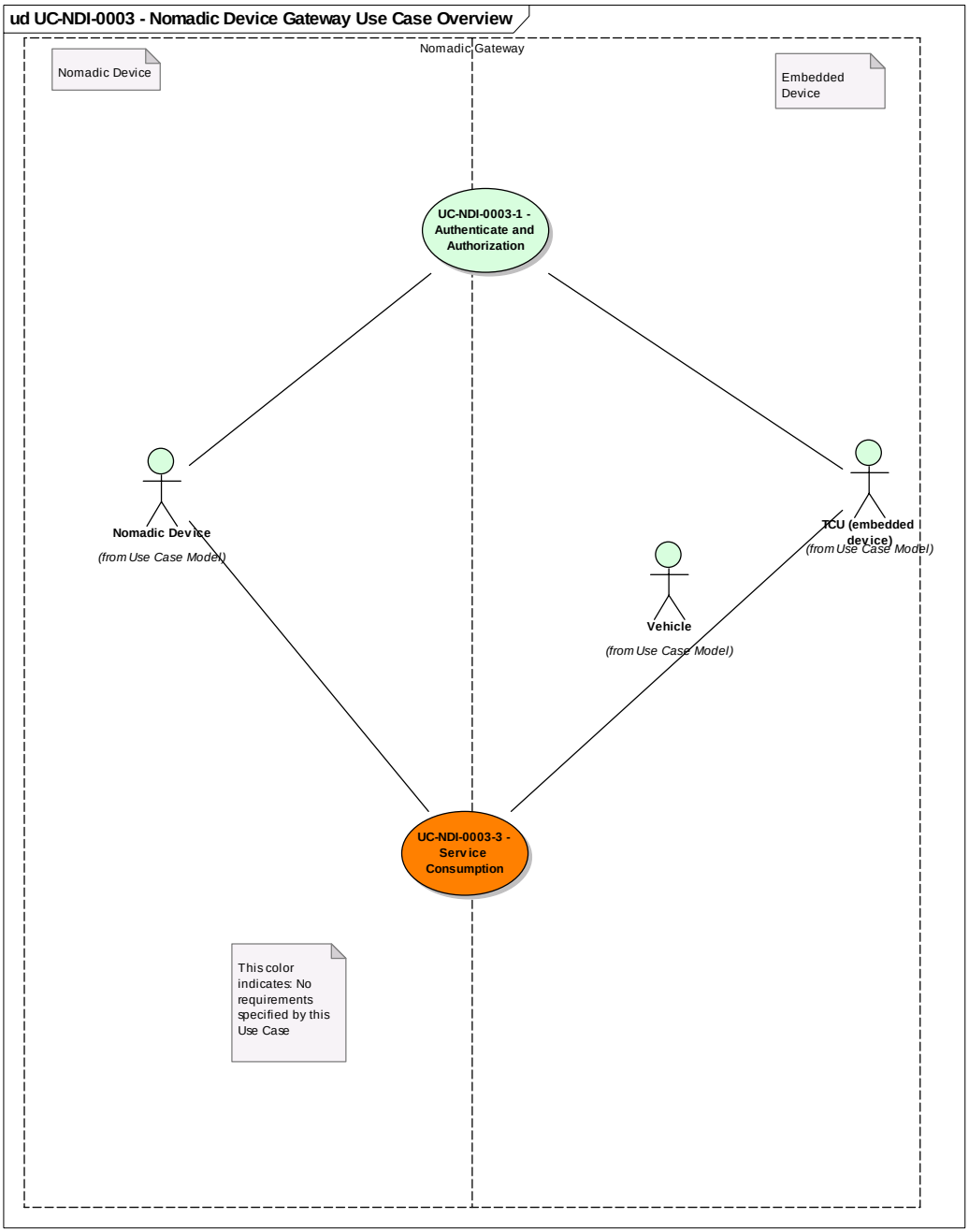

Figure 5 : UC-NDI-0003 - Nomadic Device Gateway Use Case Overview

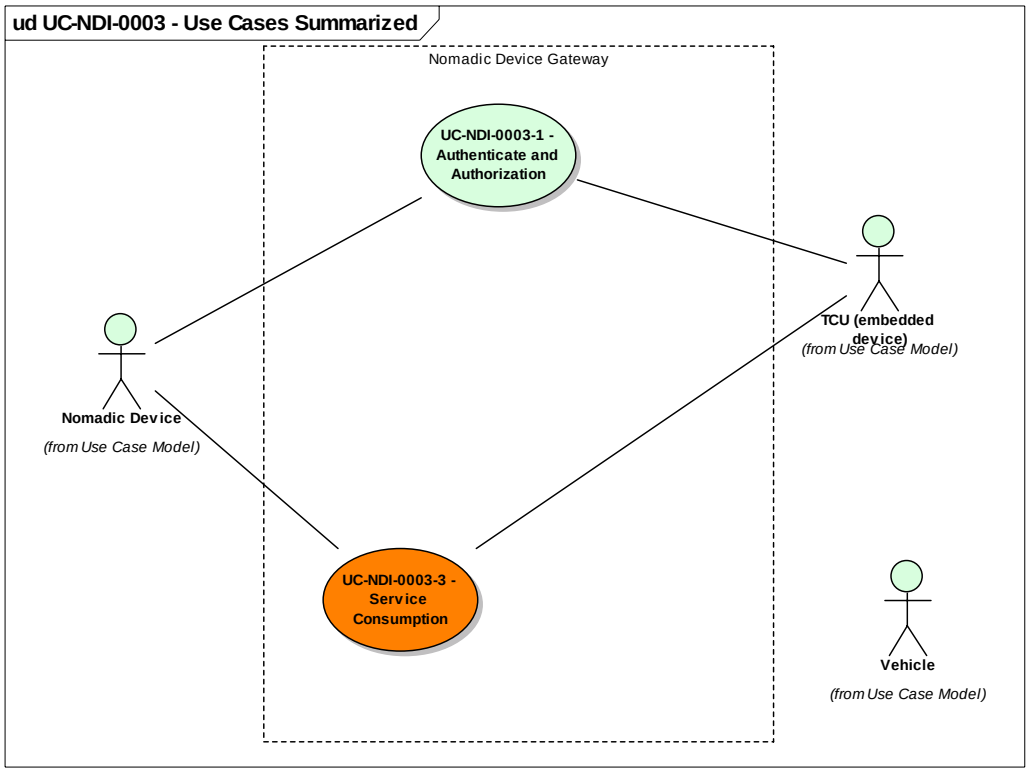

Figure 6 : UC-NDI-0003 - Use Cases Summarized

1.1.1.22 UC-NDI-0003-1 - Authenticate and Authorization

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0003 - Initialization and Service Consumption
Details: Created on 05/07/2005 14:46:54. Modified on 30/10/2006 09:32:52.
Author: Erwin Vermassen

Authentication of the nomadic device and embedded system and activation of the authorized Services.
We might try to run this phase in a parallel processing thread.

The two described scenarios are rather identical. Activation of the authorized services makes these services "connectable" by service clients running on the embedded device. In general a service contains two main parts:

- The Service View or also data producer.
- The Service Model or data handler.

Internal Requirements

- REQ-030 - Authentication should be simple and secure. (*Type:* Functional; *Status:* Parked; *Difficulty:* Medium; *Priority:* Medium)
  The process should remain very simple and transparent for the user.
- REQ-031 - NDI should support the authentication of a Device. (*Type:*

Functional; *Status:* Optional; *Difficulty:* Medium; *Priority:* Medium)
Should be mandatory for more complex applications that need access to vehicle data or other sensible services provided by the embedded system (payment, security, vehicle diagnostics ...)

Connections

- Association link from actor *Nomadic Device <Use Case Model>*
- Association link from actor *TCU (embedded device) <Use Case Model>*

Scenarios

Embedded Device Authentication {Basic Path}.
1. Connect to Physical Interface of Nomadic Device.
2. Send credentials to FEP of Nomadic Device.
3. FEP calls on Authentication and Authorization component to validate credentials.
4. Nomadic Device sends back an acknowledgment or access denial message to embedded device.

Nomadic Device Authentication {Basic Path}.
1. The Nomadic Device sends credentials to the Embedded FEP (Front end Processor).
2. The FEP calls on the Authentication and Authorization component and verifies the credentials.
3. The FEP sends back an acknowledgement or access denial message to nomadic device.

1.1.1.23 UC-NDI-0003-2 - Nomadic Gateway Initialization

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0003 - Initialization and Service Consumption
Details: Created on 03/07/2005 12:56:31. Modified on 25/10/2006 17:26:28.
Author: Erwin Vermassen

This scenario explains what happens when the Nomadic Gateway is initiated.

Internal Requirements

- REQ-032 - Device Pairing. (*Type:* Performance; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* Medium)
  The process of pairing devices should work without user intervention except for the first time where some additional authentication needs to be done. Pairing process should also work if no display is present. Non intended connection must be avoided (other vehicle).
- REQ-033 - Devices should exchange hardware and software capabilities during initiation. (*Type:* Functional; *Status:* Mandatory; *Difficulty:* Medium; *Priority:* High)

1.1.1.24 UC-NDI-0003-3 - Service Consumption

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0003 - Initialization and Service Consumption
Details: Created on 05/07/2005 15:02:35. Modified on 25/10/2006 17:09:08.

What's a Service in the context of the integration of Nomadic Devices. The distinction between the Service View and Service Model is rather arbitrary. In many cases the Service View will not be restricted to the mere rendering of received information but rather produce the information to be handled by the Service Model. Here are a few examples:

1. The Service Client receives Safety and Traffic messages via SMS and forwards this information to the handling Service Model. The Service Model makes this information available to the navigation system or renders this information in a safe way.
2. The Service View streams MP3 files to the Service Model which transfers these files to the in-car audio system.
3. Video communication, the Service View forwards the video stream to the Service Model which forwards this data to the in-car video player.

Internal Requirements

- REQ-034 - Displaying information during driving should be done in a safe way. (*Type:* Performance; *Status:* Mandatory; *Difficulty:* High; *Priority:* High)
  The displaying of information during driving should comply to the ESOP recommendations.
- REQ-035 - The Nomadic Device Interface and Gateway specification should define the minimum requirements for a device. (*Type:* Functional; *Status:* Optional; *Difficulty:* Medium; *Priority:* Medium)
  Details to be specified by the service use cases. Depends on level of integration.

Connections

- Association link from actor *Nomadic Device <Use Case Model>*
- Association link from actor *TCU (embedded device) <Use Case Model>*

Scenarios[1]

Service not available and not downloadable {Alternate}.
1. User initiates Service Browser
2. Get authorized Service list from FEP
3. Returns list of authorized Service (models)
4. Show list of Services
5. Activate a Service Exception
6. Check for downloadable Service View
7. Service View not available - Error message to the end-user

Service View available on Nomadic Device {Basic Path}.
1. User initiates Service Browser
2. Get authorized Service list from FEP
3. Returns list of authorized services (= Activated Service models)
4. Show list of Services
5. Activate a Service
6. Consume a Service over a Stream Connect

Service View not available but downloadable {Alternate}.
1. User initiates Service Browser
2. Get authorized Service list from FEP
3. Returns list of authorized Service (models)
4. Show list of Services
5. Activate a Service - > Exception

[1] These examples are taken from the GST Open Systems 3.1 deliverable and are part of the Nomadic Device Integration workitem specification.

6. Check for downloadable Service View
7. Download Service View

5.2.8. UC-NDI-0004 - ND Provided Services

1.1.1.25 UC-NDI-0004-1 Entertainment

This group of Use Cases collect all Entertainment related services.

1.1.1.26 UC-NDI-0004-2 - Navigation

A special Working Group should look into the minimal requirements needed to integrate navigation applications.

1.1.1.27 UC-NDI-0004-3 - Telephony

Groups telephony services in case the system has a telephony function.

1.1.1.28 UC-NDI-0004-4 - Professional Services

Groups professional services. The requirements are listed by the previous Use Cases.

5.2.9. UC-NDI-0005 - TCU provided devices

1.1.1.29 UC-NDI-0005-1 Vehicle Data Interface

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0005 - TCU provided devices
Details: Created on 12/05/2006 13:23:09. Modified on 30/10/2006 09:32:13.

This is a service allowing external devices to access vehicle data such as speed, windscreen wipers activation, dashboard illumination etc.

1.1.1.30 UC-NDI-0005-2 Professional Services

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0005 - TCU provided devices
Details: Created on 12/05/2006 13:25:08. Modified on 30/10/2006 09:32:18.

This is a variant to UC-NDI-0005-1

1.1.1.31 UC-NDI-0005-3 Interface to the audio system

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0005 - TCU provided devices
Details: Created on 12/05/2006 13:27:34. Modified on 25/10/2006 17:22:02.

Needed for audio streaming

5.2.10. UC-NDI-0006 - HMI

1.1.1.32 UC-NDI-0006-1 Nomadic Device User Interface representation

Type: *public* **UseCase**
Status: Proposed. Version 1.0. Phase 1.0.
Package: UC-NDI-0006 - HMI
Details: Created on 12/05/2006 13:29:14. Modified on 30/10/2006 09:32:00.

This Use Case describes the operation of the Nomadic Device User Interface by means of the in-vehicle terminal screen and buttons on the steering wheel or console. Interface representation does not necessarily mean having a copy of the Nomadic Device interface on the cars terminal screen but could be a functional equivalent representation of the ND screen.

5.3. Requirements overview

The table below summarises the requirements for a nomadic device gateway between vehicle and portable devices, as derived from the use cases described above.

Table 2 – Nomadic Device Integration Requirements

Requirement	Description	Use Case	Mandatory or Optional
REQ-001	Add Hoc Network connectivity	UC-NDI-0001-1-1	**Mandatory**
REQ-002	Communication technology abstraction	UC-NDI-0001-1-1	**Mandatory**
REQ-003	Device addressability	UC-NDI-0001-1-1	
REQ-004	Random disconnect	UC-NDI-0001-2-1	**Mandatory**
REQ-005	Graceful shutdown	UC-NDI-0001-2-2	**Mandatory**
REQ-006	An application should provide meta data which drives the authorization and prioritization. (Need for authorization)	UC-NDI-0002-10-1	
REQ-007	NDI should define a certification process for Nomadic Device Integration	UC-NDI-0002-10-1	**Mandatory**
REQ-008	Authentication and Authorization should be done on application level	UC-NDI-0002-10-1	**Mandatory**
REQ-009	Multiple connections should not create confusion to the driver	UC-NDI-0002-9-1	**Mandatory**
REQ-010	The gateway should be able to discriminate between driver and passenger	UC-NDI-0002-9-1	
REQ-011	The NDI should support the connection of multiple devices to a Client System	UC-NDI-0002-9-1	**Mandatory**
REQ-012	The nomadic gateway should allow the indication of a "preferred" device.	UC-NDI-0002-9-1	**Mandatory**

Requirement	Description	Use Case	Mandatory or Optional
REQ-013	The nomadic gateway should be able to identify all available services.	UC-NDI-0002-9-1	**Mandatory**
REQ-014	The Nomadic Device Compliant with the "Nomadic Device Forum" standards requires a standardized connector.	UC-NDI-0002-1-1	
REQ-015	The vehicle should provide a possibility to charge the Nomadic Device when this device is used in the	UC-NDI-0002-1-1	
REQ-016	And NDF compliant device (Embedded or Nomadic) should provide META data to drive the Management/priority/restriction	UC-NDI-0002-2	
REQ-017	A Nomadic Device must be able to accept remote control triggers	UC-NDI-0002-3	**Optional**
REQ-018	The GUI and audio of the HMI should not be restricted by this Use Case	UC-NDI-0002-3	
REQ-019	The Nomadic device and TCU should filter the available services depending on the driving conditions.	UC-NDI-0002-3	**Mandatory**
REQ-020	The TCU should support passing control information to the Nomadic Device.	UC-NDI-0002-3	**Optional**
REQ-021	Access to the vehicle should be restricted by safety and emergency requirements.	UC-NDI-0002-4	**Mandatory**
REQ-022	The TCU should have a vehicle interface controlled by the OEM and should be limited by Safety, Security, Privacy and business constraints.	UC-NDI-0002-4	**Mandatory**
REQ-023	A client should be able to get provisioned with the necessary proxy in order to consume a new service from the server side.	UC-NDI-0002-5	**Mandatory**

Requirement	Description	Use Case	Mandatory or Optional
REQ-024	Code transmission should be encrypted between peers	UC-NDI-0002-5	
REQ-025	The client role can only download and install proxy applications for authorized Services	UC-NDI-0002-5	
REQ-026	The communication between Nomadic Device and a TCU should run over a standardized wired/wireless connection technology.	UC-NDI-0002-5	**Mandatory**
REQ-027	The vehicle status should include the status of vehicle systems (dashboard illumination, windscreen wipers)	UC-NDI-0002-6	**Optional**
REQ-028	The embedded system may have a speech recognition and TTS interface build in.	UC-NDI-0002-7	**Optional**
REQ-029	The Nomadic Device Interface should remain under control of the ND manufacturer and carrier	UC-NDI-0002-8	**Mandatory**
REQ-030	Authentication should be simple and secure (Better than BT pairing today).	UC-NDI-0003-1	
REQ-031	NDI should support the authentication of a Device	UC-NDI-0003-1	**Optional**
REQ-032	The process of pairing devices should work without user intervention except for the first time where some additional authentication needs to be done.	UC-NDI-0003-2	**Mandatory**
REQ-033	Devices should exchange hardware and software capabilities during initiation.	UC-NDI-0003-2	**Optional**
REQ-034	Displaying information during driving should be done in a safe way.	UC-NDI-0003-3	**Mandatory**
REQ-035	The Nomadic Device Interface and Gateway specification should define the minimum requirements for a device.	UC-NDI-0003-3	**Optional,** depends on level of integration

Requirement	Description	Use Case	Mandatory or Optional
REQ-036	The Nomadic Device Application needs access to a minimal set (defined) set of Vehicle data	UC-NDI-0003-6	**Mandatory**, need to define what data?
REQ-037	The TCU should as a minimum provide information about the state of the car (moving/not moving) by means of the Service "server" running on the Nomadic Device	UC-NDI-0003-7	**Mandatory**, combine with REQ-036
REQ-038	DRM issues should be take care of	UC-NDI-0004-1	Move to WGC
REQ-039	Entertainment protocols should be part of the minimal requirements.	UC-NDI-0004-1	Should be rephrased
REQ-040	Entertainment should be driven by the car status (ESOP)	UC-NDI-0004-1	Combine requirement with REQ-34
REQ-041	Emergency phone calls should never be blocked	UC-NDI-0004-3	**Mandatory**
REQ-042	A Nomadic Device Gateway should control the car resources.	UC-NDI-0004-3	**Optional**, might not be the task of the Nomadic Device Gateway
REQ-043	The Nomadic Device Gateway should support hands free operation	UC-NDI-0004-3	
REQ-044	A clear link between presentation and application should exist	UC-NDI-0006	
REQ-045	Authentication should be separated into the "low" level device authentication and an application level authentication	UC-NDI-0003-1	**Mandatory**, depends on the level of integration

6. Annex B – Proceedings of Panel Discussions, Nomadic Device Forum plenary meeting 16 May 2006 (VTEC Brussels)

This Annex presents a summary of the two panel discussions held during the plenary meeting of the AIDE Nomadic Device Forum on 16 May 2006, held at Volvo AB offices in Brussels. This is an informal note and is presented as it was drafted; it has not been approved by those participating and should not be taken as a complete and accurate record of the proceedings.

6.1. Panel A: Requirements towards a harmonized Gateway

Round table members:

Participants:

Andreas Engelberg	AE	BOSCH
Joerg Hoellermann	JH	Volkswagen
Ralf Becker	RB	Panasonic
Carlo Liberto	CL	CRF

Moderator:

Angelos Amiditis	AA	ICCS

Questions:

1. What is a Nomadic Device? How do we define it?
2. Towards a common or standardized Gateway: Could this be the vision of this Forum? Which are the key technical challenges to achieve this? Are they any technical barriers to overcome?
3. The ND interface and Gateway specification should define the minimum requirements for a device (details to be specified by the services use cases). Do we want minimum requirements? Which minimum?
4. Do we want need a certification process?

Discussion:

Question 1:

RB: A Nomadic Device provides data and applications.

AA: Is USB a nomadic device?

Panel:

Including data like storage devices, might negatively influence the price of the unit.

Harald Berninger: Memory device is also a Nomadic Device. USB is heavily used today so we should (in general) also look at these devices. But which devices will be supported by our standard?

RB: Where is the barrier?

Harald Berninger: We should not make a new definition of a Nomadic Device.

ACEA Wolfgang Reinhardt: defined it relatively narrow. All devices not involved in "distracting" devices is not seen by the automotive world as a nomadic device. A nomadic device should be related to the driver. This is the definition in the narrow sense. See definition and official position of ACEA.

AA: Very interesting to have this definition

Discussion about the barrier

AE: From the AIDE perspective the interaction between the driver and device seems important

Panel: ESoP says that not only the driver is responsible for installing the device.

ACEA: Might also be seen as consumer electronics for private use. No contract between device manufacturer and OEM.

Is it not dangerous to jeopardize the project by putting to much in it. Try to go for a realistic approach here. What ND do we want to integrate?

AA: Given a definition we can always focus on specific Use Cases. Depends on how far want to focus.

Panel: we already said mobile phones, audio players and portable navigation.

AA: Not use cases but we want to define the type of devices.

ACEA: Distraction for the driver is an important topic here. This is very crucial here. Better to take this distraction list from the beginning.

Conclusion: ACEA viewpoint seems to make sense and could be the basis for a definition.

Panel: but would it not be better to identify devices?

AA: Not the time to do this prioritization now. We should do this offline.

Question 2:

RB: Today no low cost solutions are available to implement NDI for all markets. More connection possibilities are popping up. Main technical barrier: the technology available in the future.

Panel, Mike Gardner: are the challenges technologically to great then?

ACEA WB: I believe in our engineers and specialist. They will be able to implement a solution. In five years time most problems will be solved. I do not see technical issues in the feature. Problem is political and not technical. Vision of the Forum? Yes otherwise we would not be here. We will never have the same platform but a standardized gateway could make the development of these platforms a lot easier. We should never forget, however that this is a competitive business.

Panel: Are there any plans to cooperate with the auto SAR community?

JH: Not to my knowledge.

AA: on the level of AIDE there was a close collaboration with Auto SAR but without reaching a final result.

Panel: Why is a singular standardized gateway. Could be a potential problem.

JH: Try to make one solution that does it all might indeed be dangerous. Therefore it might be wise to start with a basic platform and look at META standards (like uPNP etc.). What are the standards that we want to recommend etc.

Panel: the matching mechanism should be solved as well.

Mike Gardner: Two sides to the problem – so modularity might make sense, agree with the META standards idea of JH. Some of the standards will be mandated by the environment (car, home etc.).

ACEA: maybe look at the past. Try to prevent vendor lock-in. In the future, networking between vehicles and networking between vehicles and ND we need to agree on communication standards and move away from this vendor lock-in. Else, a lot of innovations will not take place! The industry still thinks, my standard is the best one, but they should move towards each other and think about common standards

AA: Message is technically we can find the right solution but some political issue to overcome.

Question 3:

CL: Minimum requirements – network device gateway need to know about the priority of the service, requirements should be based on services and applications.

JH: Discussion yesterday revealed: yes we need a basic set of requirements or base it on Use Cases? The sales package should say what the minimum requirements are supported by the package.

Panel: less technical issue but more marketing problem. How can we tell the user what he bought.

AA: So marketing part is also important?

ACEA: What does the customer want? Cars take like 7 years, phones 9 months. Consumers do not have to buy a new car when buying a new phone. When I buy the next generation ND, it should work without any modification to the car. This is customer annoyance. The interface needs to durable.

JH: maybe the 9 month user is not a normal user.

Panel: Not going for a standard might delay the uptake of new models.

AA: This certainly shows the need for a minimum standard.

Panel: agree with the focus on services.

Conclusion: very minimal requirement certainly might be useful.

Theo Kamalski: One of the objectives is safety according to ACEA. If I read minimal req. this means that these are the minimal req. a car can handle. This might be negative towards users.

ACEA: Two markets, device in the vehicle and device outside the vehicle. When using outside of the vehicle you might have a lot more possibilities than inside. We should make sure that the minimal requirements can be forced upon.

Mike Gardner: backward compatibility. ND should be backward compatibility. How are we going to do this? Certification process becomes very important.

ACEA Wolfgang Reinhardt: Certification is important. What we don't want is a complete new organization like in GST which is dealing with certification.

Conclusion: we effectively need a set of minimum requirements.

Question 4:

JH: Not really the Volkswagen position. Having everything certified might be a good idea. However, Standardization yes. Recommendation yes. A label kind of thing yes, might be a great marketing tool. But bureaucracy should be avoided.

AA: this is very near to the position of Wolfgang Reinhardt.

JH: downloaded software to the embedded system should be certified!

Panel: How did Fiat do this?

CL: You need indeed the signature of the Car Manufacturer.

ACEA: Customers will buy inferior devices. How will this be certified? For customer protection. We will increasingly see products that are cheap but are not of the best quality.

Panel: don't think this is an issue.

ACEA: I want to ask the question.

Panel: indeed the problem exists. Certifications might however be a problem for a ND manufacturer because NDs are under an enormous time pressure.

Panel: you cannot press the customer to by a specific

SEAT: Seat makes a list of compatible phones. Problem is not the car but the device and customers come to the car manufacturer to solve the issue. That's why we make a list. If the phone is not on the list we cannot help the customer.

ACEA: Phones need to be certified, not on the costs of the OEM but on the cost of the ND manufacturer.

RB: Why do customers buy a Nomadic Device? Because they want the new features of the device. Stats say that people are 20 minutes in the car and care for compliancy only for 20 minutes.

Panel: shouldn't we make a timeframe? Should we consider to make a demonstrator?

AA: first question, moderators of the group will take of an action plan.

Demonstrator: Something we keep in mind for the future.

Closing AA: This indeed was a useful and helpful discussion.

6.2. Panel B: Business Use Cases

Round table members:

Participants:

Mike Gardner	MG	Motorola
Yann Bouler	YB	Renault
Wolfgang Reinhardt	WR	ACEA
Maria Farrugia	MF	Vodafone

Moderator:

Paul Kompfner	PK	ERTICO

Questions:

1. Do we share the vision of a scalable solution based on series fit gateway in all new vehicles ?
2. How can we find a win-win business case for both vehicle & ND manufacturers?
3. What does the Forum need to offer to attract the decision-makers of the ND community?
4. What are the next steps for the Forum?

Discussions:

The questions were not taken one by one but as a whole.

YB: We all understand that a ND should connect to a vehicle. Users expect this. We did not find a business model approach however. Customer attractiveness could be a driving factor of OEMS to accept NDI. Telecom operators have seen the consumption from a car dropping. How can we make NDI a positive business again for Telecom Operators as well?

WG: Who are the different players? One positive element is coming form the European Commission (i2010 Intelligent Car initiative). The commission would like to see interconnectivity between devices in a car. On the negative side, the EC can't mandate this. Getting the member states on board might be a long lasting effort. Especially the economic situation might be a problem for member states. The younger generation have not the money to buy expensive vehicles but more often use cheaper used vehicles. Parents tend not to buy iPods, but they buy expensive cars. Younger people may use their devices in a unsafe way. In short a group with less purchasing power will use nomadic devices but will not buy expensive vehicles. For a business case: who will profit?

- the device manufacturers;
- the telecom operators (air time).

But what's the benefit for the OEM? By selling the interface (with support from legislators). When there is an interface, with airtime benefits. The question is: are telecom operators ready to pay a fee to the OEMs?

Panel: How many ND are sold compared to car? 4 to 5 times as many mobile phones are sold than cars.

Christine Bartels: Shouldn't we distinguish between safety applications and safe use of applications in cars?

WR: Basically you are right but safety services should integrated safely.

MF: eCall is less obvious than it seems and is heavily discussed in another Forum. We should not try to discuss eCall here.

WR: But eCall could be a driving factor for OEMs, but we should not go into the details.

Harald Berninger: We should keep in mind that we are not discussing about mobile phones.

YB: We should keep the discussion quite simple to get some results, so limit on a few services.

Panel: Different side to the eCall question - car manufacturers will not refuse a standard for a connection with the mobile phone. The problem is that the telecom operators are not coming forward with a standard. Maybe eCall could facilitate this.

WR: Still a large remaining discussion on a lot of aspects regarding business models. We can only move forward when the sectors are willing to take the risk or by jointly trying to outline a business model. We should talk openly to each other.

PK: How far do you think we are from understanding the Business Model?

Discussion goes on about the hardware aspects of integration.

MG: Kits are constructed by both 3rd party and ND manufacturers. Manufacturers are interested if the work they do for home environments can be transposed to the Nomadic Device Integration. That certainly makes it more lucrative for ND manufacturers.

Harald Berninger: There is a clear separation between factory fitted and after market products.

MG: If the proposals for standardization fit with the *Digital Living Network Alliance* (**DLNA**) this might again be a positive point for ND Manufacturers.

MG: on win-win business models: identify the full chain and bring value to that chain. We need to learn how to deal with the full ecosystem.

Three questions are important here:

- What do you have?
- Who cares?
- And how do you own it?

WG: What is the interest of the Telecom Operators.

MG: Several interests: Most people carry their ND with them, extend the way the services and applications are used. If they can be used in a safe way people will more often make phone calls from a car.

WG: Would a user use their phone more if this is legally accepted?

MF: People seem to use their phones anyway, even if illegal. So having a safe way for using the phone would be an advantage to them.

Panel: do you think that *DNA* will listen to the safety req.?

WG: Yes I think so, keep your eyes on the road, keep you hands on the wheel is becoming more and more important.

Panel: Can this be the next step for the Forum?

PK: three steps

1. Work with the DNA.
2. Going at decision maker level.
3. Supporting standardization.

Harald Berninger: NDI will be optional but not a vision for all new vehicles series fit. Even not for tomorrow.

PK: Maybe Q1 should be put differently, can the OEM agree amongst themselves about a specification.

Harald Berninger: also a doubt about the other side about standardization.

WR: Next steps: we should come together in a shorter period. Maybe we can have an earlier meeting of WGA.

PK: Suggest to organize a meeting for WGA earlier than September, proposed is early July. The next meeting will be organized in the last week of September. Next Plenary meeting?

Paul Kompfner of ERTICO: closed the meeting and thanked the audience.

7. Annex C – Lists of attendees

The lists of participants in the AIDE Nomadic Device Forum meetings and workshops, held during this period are provided below.

Table 3 – List of attendees (Plenary meeting, 16 May 2006)

Affiliation	Last name	First name
Delphi Grundig	Brandes	Rolf
Navteq Europe BV	Bussat	Serge
Webraska	Baillet	Laurent
Volvo Car Corporation	Bröstrom	Robert
ICCS	Amditis	Angelos J.
Chalmers Teknikpark	Chen	Fang
Philips Semiconductors BV	Daalderop	Gerardo
Paragon Fidelity	Asner	Alexander
Tele Atlas	Bartels	Christine
Panasonic R&D Center Germany GmbH	Becker	Ralf
Opel	Berninger	Harald
Renault	Bouler	Yann
RACC	Canellas	Rosa
Centro Ricerche Fiat	Liberto	Carlo
Vodafone Group Services Limited	Farrugia	Maria
OrangeFrance	Fond	Michel
Philips	Frimout	Emmanuel
Motorola	Gardner	Mike
SBD	Hart	Andrew
Bosch	Engelsberg	Andreas
Volkswagen Liaison Office to the EU	Hoellermann	Joerg
European Commission	Höfs	Wolfgang
ERTICO	Jeftic	Zeljko
Bosch	Kaiser-Dieckhoff	Uwe
Siemens VDO	Schlösser	Theo
Siemens	Kamalski	Theo
VTT Technical Research Centre of Finland	Kauvo	Kimmo
Ford Research Lab Aachen	Koch	Werner
ERTICO	Kompfner	Paul
Bosch	Sonnenrein	Thomas
Alpine Electronics R&D Europe GmbH	Kueper	Thorsten
Alpine Electronics R&D Europe GmbH	Parlic	Novica
Renault	Pauchet	Mathieu
SEAT S.A.	Marina	Lourdes
Siemens VDO Trading B.V.	Grundlehner	Bernard
ACEA	Reinhardt	Wolfgang
SEAT S.A.	Romera Rué	Maria
BASt / Chemnitz University	Baumann	Martin
BMW	Scholten	Joachim
Volkswagen Liaison Office to the EU	Spell	Sabine
Sepura	Thaxter	Rick
Navigon	Thomas	Bernd
Volvo Technology Corporation	Victor	Trent
ERTICO	Vermassen	Erwin
Delphi Electronics & Safety	Buchholz	Joachim

Table 4 – List of attendees (Working Group A meeting, 25-26 October 2006)

Affiliation	Last name	First name
Panasonic	Becker	Ralf
SRA	Cecci	Ruggero
Siemens VDO	Grundlehrer	Bernard
Volvo Technology	Markkula	Gustav
ICCS	Paglé	Katia
ERTICO (Convener and editor)	Vermassen	Erwin

Table 5 – List of attendees (Working Group C meeting, 27 November 2006)

Affiliation	Last name	First name
ACEA	Reinhardt	Wolfgang
AISIN	Xu	Tang
Alpine Electronics R&D Europe GmbH	Kueper	Thorsten
BMW	Bengler	Klaus
Chalmers Teknikpark	Chen	Fang
DEKRA	Oliver	Deiters
Delphi Grundig	Brandes	Rolf
EC	Wolfgang	Höfs
ERTICO	Jeftic	Zeljko
NAVTEQ	Quoidbach	Lievin
Siemens	Kamalski	Theo
ERTICO	Kompfner	Paul
European Commission	Moutal	Valerie
ICCS	Paglé	Katia
Intel	Plackle	Bart
MAGELLAN	Poncet	François
ORACLE	Sansone	Fulvio
Volkswagen Liaison Office to the EU	Spell	Sabine
Volvo Technology Corporation	Markkula	Gustav